
Block 1
Computer Technology and Tourism

UNIT 1 HISTORY AND EVOLUTION OF COMPUTERS GENERATION; COMPUTER HARDWARE AND SOFTWARE,CPU

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1.0 OBJECTIVES

On completion of this unit, you will be able to:

- Know the major personalities, devices and events that led to development of computers.
- How computer has grown with the passage of time
- Understand Von-Neumann architecture
- Learn how computer has passed through various generations
- Understand how development took place in electronic components
- Classification of Digital Computers
- Know about types of computers

1.1 INTRODUCTION

The development of computer technology is the story of a revolution that began in the 1940s. It is still accelerating rapidly towards more advanced systems and technologies. In this unit brief exposure on computer systems and its fundamental knowledge is essential for an entry into computer world. The evolution and growth of computer technology is covered in the form of a brief history in reference to the important milestones in the evolution of computing machines from the primitive form to the modern high-speed supercomputers. The first commercial computer was large enough to fill up a big room. It was so expensive that only US government department could afford it. Now if you see the price of ordinary personal computers (PC) is easily affordable. These machines not only have high speed, processing power and versatility is superior to early machines. There is no other form of technology or branch of science that matches the phenomenal progress of computer technology.

Today, computer technology has enhanced the efficiency of typical office functions, however, has been an off shoot of its recent development. It was only made possible when the price of computers came down. The growth and development of this technology, however, has largely by-passed India. In spite of some promising attempts at fundamental research during fifties, by and large, this technology has not had the desired impact on our country.

Before on starts this unit the question that comes naturally to you is why should you learn about history of computers? Awareness of the history of computers may be useful to you for several reasons. Firstly, as a computer professional, you will see how the development of this technology has been closely associated with practical requirements of real-life situations. Secondly, it will give you an insight into the trends and directions of this technology and its relevance to the business environment. Finally, it will be a tribute to those fascinating and dedicated thinkers and innovators whose genius made this era to be called the computer age. In the end of this section, you will have complete picture in development of computers right from its first generation to the last generation.

1.2 HISTORY ON COMPUTERS JOURNEY

Abacus

The modern computers may have been born in the 1940s, but the concept of devising a calculating or computing machine existed many centuries ago. It is said that the circular arrangement of massive stones at the famous Stonehenge in England was just one part of a massive computer used by the Druid priests to predict eclipses. Primitive man used his fingers, toes for counting and they also learned to count by making marks on wood and later by using tally sticks. On finding the limitation of this method, he switched over pebbles. These pebbles strung on a piece of wood formed the basic component of a kind of counting machine called the Abacus shown in fig 1.2 (a).

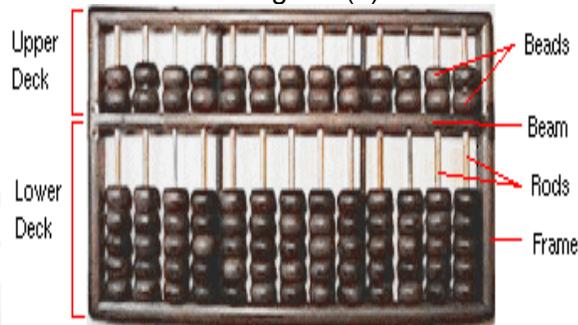


Fig. 1.2 (a) Abacus

Abacus was originated in china around 3500B.C .The standard abacus can be used performed addition subtraction division and multiplication; the abacus can also be used to extract square roots-cubic roots .the abacus is typical constructed of various types of hard woods and comes in varying sizes. The frame of the abacus has a series of vertical rods on which a number of wood beads are allowed to slide freely. Horizontal beam separate the frame into two sections, known as upper deck and lower deck. The beats are manipulated with either the index finger or thumb of one hand each bead in the upper deck has a

value of 5; each bead in lower deck has a value 1. Beads are counted, when move towards the beam that separates the two decks. After 5 beads are counted the results is carried upper deck; after both beads in the upper deck are counted, the resulted 10 is than carried two the left most adjacent column. The right most column is ones column; the next adjacent to the left is tense columns as so on. Abacus is still in use today by shopkeeper in Asia and China town in North America blind children are use the abacus for performing a simple calculations. In addition, some shop assistants in Japan who use electronic cash registers prefer to check the results through the abacus.

Devices by Pascal and Leibnitz

The next important invention in computing was the adding machine made by the French mathematician Blaise Pascal around 1641. Pascal, the son of a tax collector, invented the machine to help his father with his calculations. In 1642, Blaise Pascal developed a calculating machine called the Pascaline for carrying out repeated additions and subtractions. It worked similar to the odometer of a car or scooter. The number to be processed was set on the dials and through a set of rotating gear wheels, the calculation was carried out and the result displayed on the dial. Due to poor quality of the Pascaline could not be introduced on a big scale because of stiff resistance of any mechanization of computing work. Meanwhile Pascal turned to other fields and invented diverse items like the hydraulic press, barometer, wheel barrow, etc.

In 1676, Pascial was followed by another great mathematician-Goltrfied Leibnitz who improved on Pascaline by incorporating multiplication and division. This machine known as Leibnitz Wheel also met the fate of Pascaline primarily due to the fact that Leibnitz was loath to use his inventions as a commercial product.

In 1820, however, a similar mechanical calculator, called Thomas Arithmometer met with commercial success. The gearing wheel technology had obviously improved and contributed to its success.

Jacquard's Punched Card

The other significant development on automatic computing was, however, not related to the invention of a calculating machine. It came from the weaving industry. In 1801, a French inventor called Joseph Jacquied conceived the idea of using a card with a set of holes (punched card) for weaving patterns on cloth. The automation of pattern weaving in looms was a major commercial success. Fifty years later, this concept of coding through punched card was perfected by Herman Hollerith and subsequently; the punched cards emerged as the most important medium for storing and entering data.

Herman Hollerith and the Punched Card

In 1890, Herman Hollerith, an employee of the United States bureau of census, invented a tabulating machine, which completed the 1890 census in a record time. The tabulating machine used punched cards to store data. Although the credit for inventing these punched cards goes to Jacquard, Hollerith's real contribution comes from inventing a machine, which could read data from the punched cards by an electromechanical device and perform mathematical operations on the data. Of course, it is said that Hollerith had no knowledge of Jacquard's invention for using punched cards in the weaving industry. He is said to have developed this idea from watching railway conductors punching holes in the tickets. Dr.Hollerith introduced the idea of recording data by punching holes on cards. With the help of punched cards and tabulating machines, the 1890

census reports were ready in about two years. The population figure itself was announced with six weeks of the completion of the census. The program and data were stored on a stack of cards arranged in pre-determined sequence. Thus, a file of punched cards used to be only a bundle of cards. It is interesting to note that, it was Hollerith, who after leaving the US government service, started a company which finally came to be known as the IBM, which has remained a top computer manufacturer even till today. As time progressed, the tabulating machine of Hollerith was further perfected. In the meantime, followed by Edison's invention of electric bulbs, vacuum tubes were invented. These tubes formed the main components of the first electronic computer.

Charles Babbage and the Analytical Engine

Undoubtedly the greatest hero in the history of computing was the Englishman Charles Babbage (1792-1871). The son of a wealthy banker, Babbage was passionately interested in mathematics and founded the Analytical Society at Cambridge in 1812. He was a versatile genius who made important contributions to mathematics, manufacture, life insurance postal services, railways, cryptology, etc. In 1822, he built a machine called the Difference Engine. It could do complex algebraic equations and was built on the principle of gearing wheels of earlier era. He refined it further and finally in 1833, conceived the plans for a truly remarkable device. He called it the analytical engine. It was a steam driven calculator, capable of performing 60 additions in a minute. It could store 1000 numbers of 50 decimals each. It was capable of handling most of the mathematical problems. It was a prophetic concept in the realm of automatic computation. Babbage, however, had no marketing or commercial aptitude. Before a machine could go into production, he was busy modifying and perfecting it. Thus, the invention of this gifted scientist earned the name of 'Babbage's folly from the common man. Undaunted, Babbage spent the rest of his life and all his money in pursuit of the Analytical Engine. Unfortunately he was a hundred years ahead of his time in terms of his ideas and his grand vision of a computer.

During this period, however, exciting and revolutionary inventions were taking place in the field of electric and electronic technology. The inventions of telegraph by Samuel Morse in 1844 and telephone by Alexander Graham Bell in 1876 changed the world of communication. The invention of typewriter by Christophr Sholes in 1867 similarly had a revolutionary impact towards office automation. Let us throw further light on difference engine and analytical engine developed by Charles barbbage in addition to what we said above.

Difference Engine was based on the mathematical principle of finite differences and was used to solve calculations on large numbers using formula. It was also used for solving the polynomial and trigonometric functions.

Analytical Engine was a general purpose-computing device, which could be used for performing any mathematical operation automatically. It consisted of the following components.

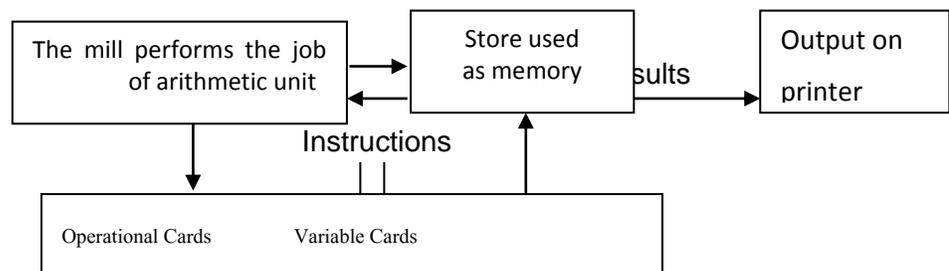
- **The store:** A mechanical memory unit consisting of set of counters wheels.
- **The Mill:** An arithmetic unit, which is capable of performing the four basic arithmetic operations.
- **Cards:** There are basically two types of cards: Operational and Variable cards

- **Operational Cards:** Selects one of four arithmetic operations by activating the mill to perform the selected function.
- **Variable cards:** Selects the memory locations to be used by the mill for a particular operation (i.e, the source of the operands and the destination of the results).
- **Output:** Could be directed to a printer or card punch device.

The basic features of this **analytical engine** were:

- It was a general-purpose programmable machine.
- The provision for sign checking of result existed.
- Provision for automatic sequence control that is to enable programs to alter its sequence of operations.

There is mechanism for enabling execution of any desired instruction. This modern computer is now on display at science museum London.



Cards make the program and each card contains an instruction.

Fig. 1.2 (b) Logical structure of Babbage's Analytical Engine

Harvard Mark I and the Bug:

The next significant effort towards devising an electromechanical computer was made at the Harvard University. Jointly sponsored by IBM and the department of US Navy, Howard Aiken of Harvard University, developed a system called Harvard Mark I in 1944. Some of you must have heard a term called "bug". It is mainly used to indicate errors in computer programs. This term was coined, when one day, a program in Mark I did not run properly due to a moth short-circuiting the computer. Since then, the moth or the 'bug' has been linked with errors or problems in computer programming. The process of eliminating errors in a program is thus, known as 'debugging'. The basic drawbacks of these mechanical and electromechanical computers are:

- Friction/inertia of moving components had limited the speed.
- The data movement using gears and liner was quite difficult and unreliable.
- The change was to have switching and storing mechanism with no moving parts and then the electronic switching technique "triode" vacuum tubes were devised which led to new electronic computer.

ENIAC

It is indeed ironic that scientific inventions of great significance have often been linked with supporting a very sad and undesirable aspect of civilization i.e. fighting wars. Nuclear energy would not have been developed as fast, if colossal efforts were not spent towards devising nuclear bombs. Similarly, the origin of the

first truly general-purpose computer was also designed to meet the requirement of World War II. The ENIAC (the Electronic Numerical Integrator and Calculator) was designed in 1945 at the University of Pennsylvania to calculate figures for thousands of gunnery ushured in the era of what is known as first generation computers. It could perform 5000 additions or 500 multiplications per minute.

It used thousands of vacuum tubes (18000), weighed 30 tons, occupied a number of rooms, needed a great amount of electricity and emitted excessive heat. The ENIAC also had one had major deficiency. To pass on a program or set of instructions to the computer one had to re-align the circuit board wiring manually. This was cumbersome and the consuming. To offset this deficiency, john von Neumann introduced the concept of storing both program and data in the main memory of the computer. This 'stored program concept' led to the design of ENIAC's successor called EDVAC (Electronic Discrete Variable Automatic Computer). This concept finally crystallized in a classical structure of computer systems known as Von Neumann's Architecture.

Check Your Progress 1

Q1) Fill in the blanks

- a) ENIAC stands for
- b) Abacus is believed to have originated in around 3500 B.C
- c) Recording data by punching holes on card is introduced by
- d) Analytical engine was developed by

Q2) Match the following

- a) EDVAC 1) ENIAC
- b) Gunny tables 2) Sholes
- c) Typewriter 3) Stored programs

Q3) State True (T) or False (F)

- a) Abacus had more than 10 breads
- b) In 1676 difference engine was developed.
- c) 66 additions per minute was performed by analytical engine
- d) Program in mark-I system did not run properly because of short-circuiting

1.3 VON NEUMANN ARCHITECTURE

Computer is defined in the Oxford dictionary as "An automatic electronic apparatus for making calculations or controlling operations that are expressible in numerical or logical terms". The computer can perform only those operations/calculations, which can be expressed in Logical or Numerical terms.

The basic function performed by a computer is the execution of a program. A program is a sequence of instructions which operates on data to perform certain tasks. In modern digital computers data is represented in binary form by using two symbols 0 and 1 which are called binary digits or bits. But the data which we deal with consists of numeric data and characters such as decimal digits digits 0 to 9, alphabets A to Z, arithmetic operators (e.g.+, -, etc.), relations operators (e.g.=, >, etc), and many other special characters (e.g.; @, {,}, etc.) Thus, in general, computers use eight bits to represent these above characters/numbers internally. This allows up to $2^8=256$ different items to be represented uniquely.

This collection of eight bits is called a byte. Thus, one byte is used to represent one character internally. Most computers use two bytes or four bytes to represent numbers (positive and negative) internally. Another term which is commonly used in computer is a Word. A word may be defined as a unit of information which a computer can process or transfer at a time. A word must be equal to the number of bits transferred between the central processing unit and the main memory in a single step or it may be defined as the basic unit of storage of integer data in a computer. Normally, a word may be equal to 8, 16, 32, or 64 bits. The terms like 32 bit computer, 64 bit computers etc. basically points to the word size of the computer.

One of the key aspects in program execution is the execution of an instruction. The key questions, which can be asked in this respect, are: (a) how are the instructions supplied to the computer? And (b) how are they interpreted and executed? We answer these questions one by one now.

Most Computer designs are based on the concepts developed by Jon von Neumann referred to as the von Neumann architecture. This structure has arithmetic logic unit (ALU) that does all your calculations i.e both arithmetic and logical. In order to perform any given calculation by this unit on the data, there is a need for control signals that direct the ALU to perform a particular operation. Thus changing control signals, variety of operations can be performed. But how can these control signals are supplied. Let us try to answer this form the definition of a program. Program consists of a sequence of steps. Each of these steps, require certain arithmetic or logical or input/output operations to be performed on data. Therefore, each step may require a new set of control signals. There is unique code for each set of control signals. There is a hardware unit which interprets a code to generate respective control signal is termed as control unit (CU). The function of CU is to generate all necessary control signals to perform any activity. The type signal generated will vary from the instruction to instruction. The ALU and CU together are termed as the central processing unit, which is the most important component of computers. All the arithmetic and logical operations are performed in the CPU in special storage areas called registers. The size of the register refers to amount of information that can be held at a given time. The larger the register size more powerful will be the computing power of the machine. The processing speed varies from MIPS (million instructions per second) to Pico-seconds with the passage of generations. The data / instruction are supplied through input module such keyboard, disk etc. while reports are generated on output modules such as printer, monitor etc.

All the units in the computer are connected through bus structure. A bus is a set of wires (lines) that transfers information from one end to other end. A system bus may consist of 50 to 100 separate lines.

Are the above-mentioned components are sufficient for a working computer? No, a temporary storage area is needed for storing data/instructions or programs to be executed. This component is referred to as memory. The memory unit stores all the information in a group of memory cells, also called memory locations, as binary digits (bits). Each memory locations have unique address where the data is stored or retrieved as when required. CPU provides the address of the memory location where the write or read operation is to be performed. The amount of the information that can be stored is known as memory capacity. The unit of capacity is bytes. Capacity of memory is measured in Kilo or Mega or Giga bytes. One-

kilo byte is 1024 bytes or characters. As one character is one byte. In addition, to transfer the information, the computer system internally needs the interconnections. Let us sum up the key features of a von Neumann machine.

- The hardware of the Neumann machine consists of ALU and CU
- Main Memory is used for storing the data temporarily.
- There is an Input/Output system.
- This structure stores program and data in the same memory unit. The computers prior to this used separate memories for storing the same.
- Each location of main memory is addressed independently.
- Variety of Control signals are generated by CU to control overall operations
- Execution of instructions in Von Neumann machine as shown in above Fig. 1.3 (a) is carried out in a sequential manner (unless altered explicitly by the program itself) from one instruction to the next.

This structure has only single path between the main memory and control unit, which is a bottleneck feature of this architecture. There are several other architectures have been suggested for the modern computers.

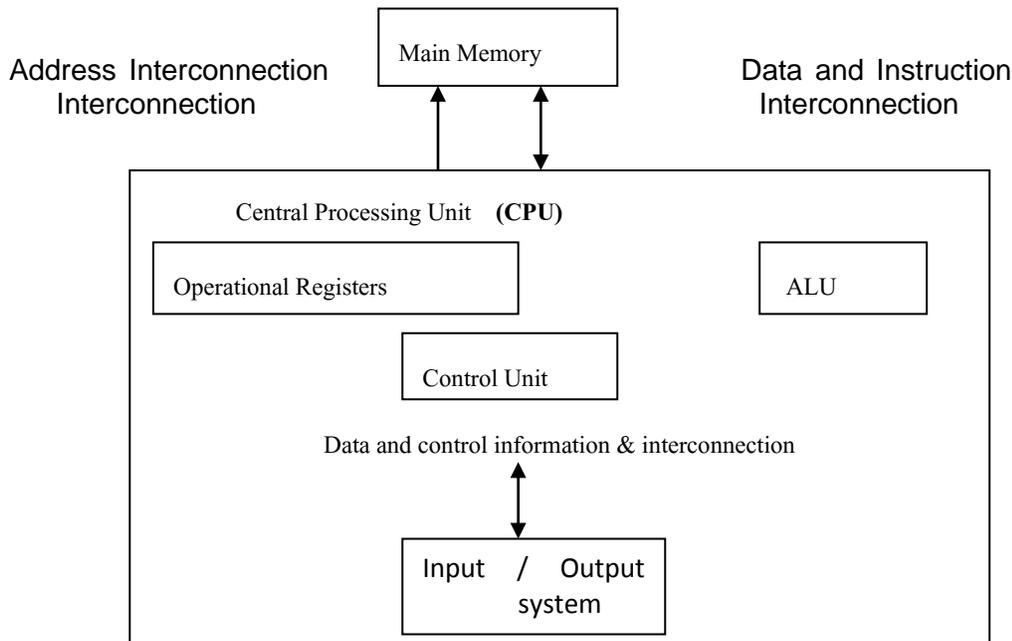


Fig. 1.3 (a) Computer based on Neumann Architecture

Check Your Progress 2

Q1) Fill in the blanks

- A system bus consist of lines
- Control unit generates
- ALU stands for
- is sequence of instructions that operate on data to perform tasks.

Q2) State True (T) or False (F)

- a) A byte is equal to 8 bits.
- b) One kilo byte equal to 1024.
- c) Neumann architecture specifies different memory for data and instructions.
- d) Neumann each bit of memory can be accessed independently.

1.4 COMPUTER GENERATIONS

The phases of evolution of computers are commonly termed as generations. Usually, an important technological breakthrough or conceptual re-orientation in the field of hardware or software, trigger the birth of a new generation, pushing the earlier generation into obsolescence. One must remember that the main thrust of technological progress in computers, is towards producing smaller, faster, cheaper and user-friendly machines. In recent times, however, generation changes have become both defused and controversial. There are so many parallel developments in every facet of computer technology, that it has become almost impossible to pin point a particular year or event as the beginning of a new generation. Thus it is still not very clear whether one is in fourth generation or fifth generation. Any way for all practical purposes, we will assume that we are somewhere in the gray zone between the fourth and the fifth generation.

1.4.1 First Generation Computers (1940-55)

The origin of the first truly general-purpose computer was designed to meet the requirements of world war-II.

The ENIAC (the electronic numerical integrator and calculator) was designed in 1945 at the University of Pennsylvania to calculate figures for thousands of gunnery tables required by US army for accuracy in artillery fire. The ENIAC could perform 5000 additions or 500 multiplications per minute. It was, however, a monstrous installation. It used thousands of vacuum tubes, weighed 30 tons, occupied a number of rooms, needed a great amount of electricity and emitted excessive heat. Some popular computers of this era are IBM-650/701.

Summarizing the main features of first generation:

- Vacuum tubes were used in electronic circuits.
- Magnetic drum used as primary internal-storage medium.
- Limited main storage capacity and slow operating speed (10^{-3} sec.).
- Slow input /output devices such as punched card and tape-oriented.
- Machine language and assembly language were used for programming.
- More prone to heat, maintenance problems and fusing of tubes.
- Mainly batch processing applications such as payroll, record keeping were developed.
- Memory was designed using ferrite-core.
- Switching time was from .1 to 1 milli-second
- Data and programs were entered through punched cards and output on printer or on cards.
- Computer was accessible to only one programmer at time i.e single user environment) and bulky in size and were expensive.

1.4.2 Second Generation (1956 – 64)

The second-generation computers started with the advent of transistors. Transistors made of germanium semiconductor material were highly reliable as compared to tubes. Unlike vacuum tubes, transistors do not require wires, metal glass capsule and vacuum, therefore, is called a solid-state device. This device has two states. The generation of computers is basically differentiated by a fundamental hardware technology. Each new generation of computer is characterized by greater speed, large memory capacity and smaller size than the previous generation. Thus, second generation computers were more advanced in terms of arithmetic and logical unit and control unit than their counterparts of first generation. During this period high-level language are in use and this led to development of system software. One of the main computer series during this time was the IBM 700 series. Each successful number of this series showed increased performance and capacity and reduced cost. In these series two main concepts, I/O channels – an independent processor for input/output. And Multiplexor- a useful routing device, were used. Some popular computers of this era are IBM-1401, 1602.

Summarizing the main features of second generation:

- Use of transistors and diodes for internal operations.
- Magnetic core as primary internal-storage medium.
- Increased main-storage capacity.
- Faster input/output devices such as VDU, OCR and MICR readers were introduced.
- High-level programming languages (Cobol, Fortran) were used.
- Great reduction in size, price, power consumption and heat generation.
- Increased speed and reliability (typical operating speed 10^{-6} s)
- Batch-oriented applications such as billing, payroll processing, inventory control, ledgers, linear programming etc were developed
- Switching time was from 1 to 10 microseconds and storage capacity was increased.
- Data was transferred from magnetic tape instead of punched cards which used sequentially techniques to access the information.
- Multi-user, time sharing concept was initiated

1.4.3 Third Generation (1965 – 74)

A single self-contained transistor is called discrete component. In 1960s, the electronic equipments were made from the discrete components such as transistors, capacitors, resistors and so on. These components were manufactured separately and were soldered on circuit boards, which then can be used for making computers. Since computer can contain around 10,000 of these transistors, therefore, the entire mechanism was cumbersome. Microelectronics era started, with the invention of integrated chips (ICs). Some examples of third generation computers are IBM system/360 family and DEC, PDP8 systems. The third generation computers mainly used small-scale integrated chips (SSI). These chips eliminated wired interconnection between various components. In addition SSI had 10 transistors per chip then extended to 100 transistors per chip

i.e medium scale integrated chips (MSI). Switching speed of transistor was reduced by a factor of 10 and size was also reduced quite a bit. Power dissipation reduced by a factor of 10 and thus extremely powerful CPUs were developed having processing speed of 1 million instructions per second (MIPS). The memory capacity has reached about 4 MB and timed shared operating system was developed. Some popular computers of this era are IBM-960, CDC-6000.

Summarizing the main features of third generation:

- Invention of ICs and semi-conductor memories were started
- Keyboard, disk made their appearance in this generations
- Smaller size and better performance and reliability.
- Operating speed 10^{-9} to 10^{-12} s.
- Operating system of computers was incorporated with efficient methods such as sharing of resources.
- Switching time was from .1 to 1 micro-seconds
- Online systems became feasible such as Data Base Management Systems, airline reservation system; interactive query systems etc were developed.

1.4.4 Fourth Generation (1975- 84)

The advent of large-scale integrated circuit (LSI) with many thousands of transistors on a single silicon chip signaled the beginning of fourth generation. It is LSI technology that has led to development of Microcomputers. This gave a way to very large-scale integrated chips (VLSI). This has further led to the development of Microprocessors (MPU). Different companies later designed these MPU. The growth of VLSI technology imparted tremendous power, speed and main memory capacity.

Close intimacy developed between computer and communication technology and has resulted in sharing of data, software and computing resources among widely different categories of users and computer systems. During this generation computer network concept started and capacity of disks were improved further.

The other development is the decentralization of computer organization. Individual microprocessor controls for terminals and peripherals devices have allowed the CPU to concentrate on processing the main program. Interactive graphics devices and language interfaces were developed and had led to computer aided engineering design. Fourth generation systems have become user friendly and highly reliable. The effective cost came down considerably. Some popular computers of this era are MICRO, HCL, and DCM.

Summarizing the main features of fourth generation:

- Development of LSI and VLSI
- Increased storage capacity and speed (nano to pico seconds).
- Availability of sophisticated programs for special applications.
- Greater versatility of input/output devices: audio responses terminals, graphic display terminals, etc.
- Increased use of microcomputers.

- Applications such as mathematical modeling and simulation, electronic funds transfer, computer aided instruction, CAD/CAM, distributed and real-time systems applications were developed
- Effective cost of the system came down and capacities of disk and memories were improved.
- Microprocessor came into existence.
- Switching time from 10 to 100 nanoseconds and graphic devices were developed
- Concurrent programming languages were developed such as ADA
- 4GL languages are dBASE, ORACLE, FOXPRO ETC
- Software level new concepts such as microprogramming, database management system, and virtual memory were developed.

1.4.5 Fifth Generation (1985 – Onwards)

A major development in all above generations was in hardware technology. Fifth generation was widely believed that breakthroughs would not only be in hardware but also in software. Thus first breakthrough was in making of intelligent systems. The fifth generation machines were based on parallel processing and Artificial Intelligence (AI) software. A great amount of work is going on in AI along with the closely related fields such as robotics. A number of projects have been proposed by Japan and European countries to build fifth generation computers. If one goes back to Neumann architecture where CPU processed one instruction, where as with change in hardware technology with time has resulted a new architecture called parallel processing. Thus in this generation it was possible to build a single computer with more than one CPU to carry out parallel processing. This resulted in reduction of execution time by the CPU i.e CPU can now process more instructions at a time than earlier machines of earlier generations. Today's one of the largest computer is the CRAY super computer. It is a huge computer comprising 200,000 circuits with 30 components per circuit i.e 6 million components. This was further improved to more than 10 million components upon a single chip. This has resulted in shrink in the size of the computers. Laptop, CRAY, XMP and PARAM computers are the examples.

Summarizing the main features of fifth generation:

- Various types of architectures were developed.
- Intelligent systems were developed.
- Development in high-level languages such as LISP, HTML, ASP, JAVA etc.
- Size and the cost of the machine were reduced.
- Improvement in the features and types of operating systems i.e these operating systems had efficient facilities to use resources optimally.
- More powerful processing machines were developed using different architectures.
- Revolution in the disks capacities from MB to GB.
- Different types of Memories were developed such SDRAM, RDRAM etc and in addition capacity was improved to the order of giga byte (GB).
- Graphics oriented systems were developed.

1.5 COMPUTER HARDWARE AND SOFTWARE, CPU

INTRODUCTION

We have already discussed about the Neumann Architecture that forms the basic computer structure. In this unit we will learn further on the hardware components of computer system and their functioning. In addition, we will discuss about the computer memory system and its needs. In memory section we will learn about what are various characteristics of memories and more details about the main memory, high-speed memories such as cache memory etc. We will introduce the new concepts such as RISC/CISC features, parallel processing and Vector processing and multiprocessing systems. In addition some related issues on above the mentioned processing techniques would be introduced. This unit covers with software concepts such system software, application software, types of operating systems etc. In addition, development stages of software, categories of languages and their needs will be introduced. The key elements in programming languages will be introduced so that one gets idea how are programs developed. In the last segment of this unit will deal with CPU and its components, its organization. We will have an idea on the register organization of CPU, addressing techniques used, how the execution of instruction takes and how the interrupts are handled. After completing this unit one will have complete knowledge on hardware, software, CPU of computer system and their related issues.

1.5.1 HARDWARE: Hardware Components of Computer System

A microprocessor is a complete CPU on a single chip and a Microcomputer is a computer whose CPU is a microprocessor. The main components of a computer are Central Processing Unit (CPU), memory, I/O ports/modules and buses. Computer components are shown in fig. 1.5.1 (a).

Input /Output Unit

The keyboard and the monitor are some of the I/O devices that you commonly come across. The keyboard is used for giving commands/data to the computer. CPU interprets these commands and executes them and later displays the results on the monitor. Of course, in addition to these two, you have a hard disk and /or a floppy diskette in which you store your programs, a printer through which you take a printout of your program or results. There are many types of input/output devices available. All these I/O devices communicate to CPU through I/O ports. There are two kinds of ports: Parallel Ports and Serial ports.

Parallel Port is parallel communication channel, connects most printers. Example of parallel interface port is centronics. This interface has become an industry standard, consisting of, both standard sized connector and specific meanings for each pin. The term parallel implies that all 8 bits of data are sent to the printer simultaneously, rather than 1 bit at a time and are used for short distances.

Serial Port, is a serial communication channel, connects a mouse, a modem or any other serial device to the computer system. It sends data bits one at a time, rather than in parallel, RS-232-C is a standard serial interface used with PCs and used for long distances.

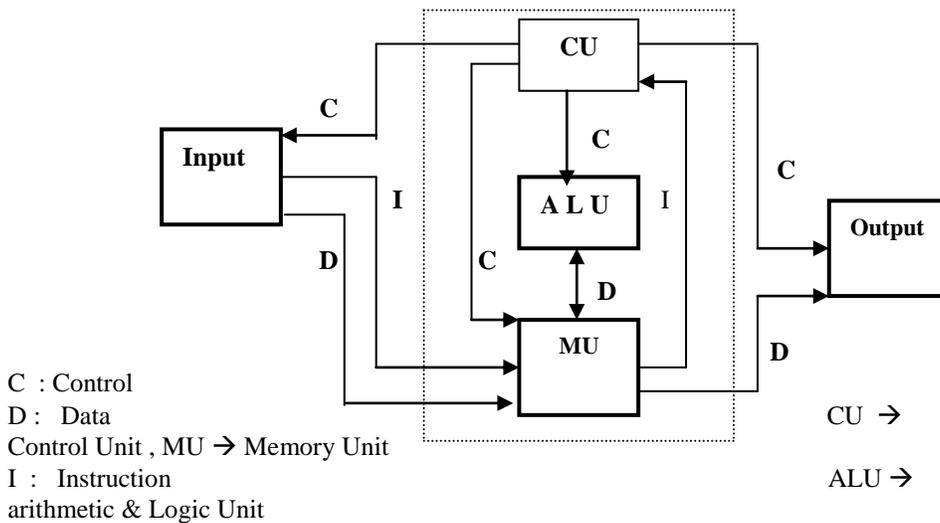


Fig. 1.5.1 (a) Components of Computers

Memory Unit

Once the data has been inputted from an input device, it needs to be stored in Memory. Memory can be broadly divided into two categories: 1) Main or primary memory 2) Secondary memory

Primary or main memory contains information, which is currently been in use. This memory is used for storing and for executing users programs. The Read/Write memory and ROM are two categories of primary memory.

R/W Memory: It is also popularly known as Random Access Memory, or Read/Write memory. This memory is volatile, i.e. the contents of the memory is lost as soon as the power is turned off and is accessible for storing users programs / software.

ROM

As this memory cannot be easily programmed, it for all practical reasons is called Read Only Memory. It is non-volatile memory i.e its contents are not lost even after the power is switched off. Therefore, this memory is used for storing some of the crucial information about the system such as the initial of the boot program needed for the system start called POST program (Power on self test).

Central Processing Unit

Central processing unit, or CPU, as it is called in short, is the brain of any computer system. The CPU of the computer consists of various registers of store data, the arithmetic/logic unit, ALU, to perform arithmetic and logical computations, instruction decoders, counters, and control lines. The CPU reads instructions from the memory, decodes them, and executes them, with the help of its various components. The CPU also controls the functioning of the various other units of the system, like memory unit, and other interfacing units, by synchronizing their operations with the help of its clock and other control circuitry, called the **control unit**.

Control unit basic functions are to control data exchange of CPU with the memory or I/O modules, internal operations in the CPU. The functional requirements of CU are type operations performed by CPU such as arithmetic, logical etc. and micro-operations performed by the CPU such register transfer etc. The basic responsibility of the control unit lies in the fact that the CU must be able to guide the various components of CPU to perform a specific sequence of micro-operations to achieve the execution of an instruction. A CU have a set of input values based on which it produces an output control signals which in turn perform micro-operations. These output signals controls the execution of a program. There are two types of control units Hard-wired and micro-programmed control unit. In case former signals are generated through hardware and while in case later signals are generated through software program stored in control memory. Micro-programmed is more widely preferred because of its flexibility. Hardwired is less flexible than Micro-programmed as it can be easily updated.

Buses

Buses are a set of wires, connecting various parts of the computer, internally and externally. They are used to send the data in the form of voltages. Here, data could be an address of the memory location whose contents needs to be accessed, or the control signals, indicating the type of operation to be performed on the memory. Based on the type of information they are carrying, the buses are classified into three types: Address bus, Data bus, and Control bus. The bus could be used to sending information from the CPU to one of the memory chips or some I/O device, or vice-versa, or even in both the directions, i.e., from the CPU to the memory or I/O device and vice-versa. The former are called unidirectional buses, while the latter are called as Bi-directional.

Address bus: The CPU to send the address of the memory location or the I/O port that needs to be accessed uses this bus. The size of the address bus determines the number of memory locations that can be directly accessed/ or addressed. A bus of n lines can address upto 2^n location directly. Example: 8086 Microprocessor with address bus equal to 16 bits can access upto 2^{16} , i.e.64K bytes directly.

Data bus: This bus is used by the CPU to send data, to and from memory or I/O devices. Data bus could be 8,16,32, or even 64 bits wide. Normally, a microprocessor is said to be of n bits if the size of its data bus is 'n' bits. Thus, one can say that word-length of computer is of n-bits. The data is said to being read if it is traveling from the memory or I/O device to the CPU i.e read operation, and is said to being written, if it traveling from the CPU to the memory or I/O device i.e write operation. Any device connected to the data bus must have three-state outputs, so that its outputs can be disabled when it is not being used to put data on the data bus.

Control bus: Control bus contains various control signals that are used to control various devices connected to the CPU. The control signals vary from the microprocessor to the microprocessor. They are designed keeping in mind the design philosophy of the microprocessor and the requirements of the various devices connected to the CPU. Some of the common used control signals are MEMORY READ (MEMR), MEMORY WRITE (MEMW), I/O READ (IOR), I/O WRITE (IOW) etc.

1.5.2 Memory, its types and their characteristics

Memory is an important part of a computer system that holds programs as well as data. A computer system uses variety of devices for storing these instructions and data that are required for its operations. The basic objective of memory is to increase the speed of it so that it works at the same speed as that of CPU. The memories with smaller cost have very high access time. Memory units may have different physical and operational characteristics. Memory unit is a collection of storage cells together with associated circuits needed to transfer information in and out of storage. The memory stores binary information in groups of bits called words. Word in memory is an entity of bits that move in and out of storage as unit. A memory word is a group of 1's and 0's and may represent a number, an instruction code, one or more alphanumeric characters, or any other binary-coded information. A group bits called byte. The capacity of memories is stated as the total number of bytes that can be stored. The internal structure of a memory unit is specified by the number of words (locations) and the number of bits in each word. Address lines are used for selecting a particular word. Each word in memory is assigned a unique number called an address, which starts from 0 to 2^k-1 , where k is the number of address lines.

A decoder inside the memory accepts address and opens the path needed to select the bits of the specified word.

Computer memories may range from 1024 words, requiring an address of 10 bits, to 2^{32} words. One kilo is equal to 1024 bytes or characters. One mega byte is equal to 1024 KB. Similarly, one Giga byte equals to 1024 MB. Earlier computers used magnetic core memory. However, all modern computers use semi-conductor memories. Semi-conductor memory is faster and cheaper than magnetic memory.

Memories are divided into two types; main memory and secondary memory. Main memories are faster in speed, and have less capacity to store information. While secondary memories are slow in speed but have more capacity to store information than main memories. Main memory is of two type; RAM and ROM.

RAM: There are two types of RAMs available, static RAM and dynamic RAM. Static RAM stores a bit as voltage, which dynamic RAMs store them as charge. The advantage of dynamic RAMs is their high density and fast speed. The disadvantage however is that they need to be refreshed after certain time. This gives an edge to static memories, as they are more stable and therefore, don't need to be refreshed. Either case information is retained as long as power is available. The two operations that a RAM can perform are the read (transfer-out operation) and write (transfer-in operation).

Steps performed for Read and write operations are given below.

Write operation: During this operation data is transferred to memory location.

- Apply the binary address of the desired word onto address bus.
- Apply the data bits that must be stored in memory on the data bus.
- Active the Write signal.

Read operation: During this operation data is transferred from memory location

- Apply the binary address of the desired word onto address bus.
- Active the Read signal

ROM: This is another part of main memory and used for storing programs that cannot be altered and only meant for read only. Thus information is permanently

stored. As for read operation ROM is concerned it is similar to Read operation of RAM. The necessary instructions are stored at the time of manufacture. ROM is used in a computer to hold certain essential instructions such frequently needed routines, interrupt service routines, diagnostic routines etc that are needed for computer in order to conduct itself whenever needed. There three types of ROM; PROM, EPROM, EEPROM.

PROM: It stands for programmable ROM. This type ROM can be programmed even after its manufacture only once and is done by special circuitry.

EPROM: It stands for electrically programmable ROM. This type ROM is better than PROM in the sense that it can be reprogrammed. Data can be erased by exposing to ultraviolet light and is a time-consuming process.

EEPROM: It stands for electrically erasable programmable ROM. In this type ROM write time is higher than reading time. The biggest advantage is that they can be easily updated and the disadvantage is that of high cost.

Main common features of ROM types are Long data life, Non-volatile, Non-destructive Read out.

Characteristic terms used for various memory devices (Main memory or secondary memory)

Storage capacity: It is defined as the amount of information that can be stored and measured in bytes.

Unit of transfer: It is defined as the number of bits that can be read in or out of the memory in a single Read or Write operation and depends upon word length of the machine.

Data transfer rate: It is defined as the amount of information that can be transferred in or out of the memory in a second. It is measured in bits per second.

Permanence of storage: It is defined as whether the information can be stored permanently or temporarily.

Access time: The access time is the time required between the requests made for a read or write operation till the time the data is made available or written at the requested location. Generally used for Read operation.

Access modes: It is defined as how the stored information can be accessed from memory. There are three modes of accessing techniques:

Random Access: This technique is used in memories. Information is located randomly.

Sequential Access: This technique is used in magnetic tapes. Information is searched in series.

Direct Access: This technique is used in disks and is a combination of the above techniques.

Secondary memories are discussed in the unit 3 of this block.

1.5.3 SOFTWARE

Computer consists of two components hardware and software. Hardware is defined as the physical components of computer systems such as mechanical, magnetic, electrical, electronics devices, which are used for processing data. Software is defined as a set of programs, procedures etc written to perform a particular task by the computers. It acts as an interface between user and computer hardware. The software is stored in the permanent storage devices such as disks, tapes etc. Software stored permanently in ROM is called as

firmware while managers, operators etc are called liveware. Programming is a process of written a program, using computer language. There are two types of software's: Application software and System software.

1.5.3.1 System Software

System Software, are those software programs that are exclusively designed for the internal use of the system and are also used for the execution of the application software. Example: Operating System, Interpreter, Compiler etc. These software programs are written by highly skill and trained people who have complete knowledge of system. They are developed using High-level languages.

Language translator: A language translator is system software, which translates a computer program written by a user using high-level language into machine language. The machine language is built around binary number system. This number system contains two bits called 0 or 1. All of the required information is converted into strings of 0's and 1's. Examples of language translators are compilers and interpreters. Every language has its own compilers & interpreters.

Operating System

An operating system (OS) is the most important system software and is needed to control and manage the activities of computer system. An operating system manages a computer's resources very effectively, takes care of scheduling of multiple jobs for execution and manages the flow of data and instructions between the input / output units and the main memory. Operating system concept came in the second generation. Since then operating systems have undergone several revisions and modifications in order to achieve a better utilization of computer resources. The first operating system, called **batch processing** (serial) operating system, was developed for the second-generation computers. This operating system executes jobs serially one after another, from a batch of jobs submitted for execution. The CPU remains idle during an Input or output operations but remains busy only during processing of jobs. This idle time of CPU was over come by the introduction new concept called overlapped processing that is execution more than one job simultaneously. This led to a new concept called **multi-programming**. In multi programming operating system handles multiple jobs simultaneously by overlapping the input, output & processing of various jobs. This concept came in third generation to utilize CPU more efficiently. Hence more jobs got executed on an average. The other types of operating system that are popular are multi-processing operating system, real time operating system, network operating system and distributed operating system.

A multi-processing operating system uses multiple CPUs to process multiple jobs. A real time operating system is a type of interactive operating system with strict time limitation. Examples are railway reservation system military applications. A network operating system is a collection of software and associated protocols that allow a set of computers, which are interconnected, by a computer network to exchange the information from one end to another. Operating system in addition performs functions such as overall master control of operations, memory management, management of input/output devices, manages the use of system software as compilers, utilities and provides 'protection' to user programs through access code and 'security' through authentication procedures of 'passwords'.

Utilities

Utility software programs are those, which are very requested by many application programs and are needed to maintain the system. They are written to provide man-machine communications and improve programming efficiency. Utility programs perform tasks, such as sorting records, merging several sorted files, or transferring data from one I/O device to another. A few examples are Editor, Loader, monitor etc. Editors are interactive programs that are stored in the memory and allow the user to write programs, generate text, or to make a wide variety of changes etc. Loader is a utility program that transfers user programs from storage devices to memory.

A monitor is a program, which is stored in ROM and performs all basic functions required in a microcomputer such as execute programs, time allocations to programs, managing the activities of devices etc.

Application Software

Application software is software program that is exclusively designed to perform a specific task or applications such as payroll, word-processing etc. User using programming language for a particular type of application develops application software. There are two main categories of applications such as business and scientific. Business application are characterized by processing of large inputs, outputs, high volume of data storage and retrieval while on the other hand, scientific applications deal with high computation. There are two categories of application software:

- Pre-written software Packages
- User application program.
- Application software packages are easy to learn and use as compared to programming languages. The most important software packages are:
- Data Base Management Software
- Spreadsheet Software and Word Processing Software
- Data Communication Software
- Statistical and Operation Research Software

Data Base Management Software

DBMS Software packages called data Base Management Systems are developed to maintaining and integrating large volumes of data on large machines. The distinguishing feature of a DBMS package on personal computers is that it provides an interface, which is more user friendly as compared to the one provided by a high level language, and can be easily learned by a user who do not have skills on languages.

Features:

- It is easy to use and learn within know time
- It provides a high-level language interface, which is command, oriented.
- Fourth generation language and user friendly
- Small business firms can be easily implemented in a few days using this package.
- Can be used as a tool to prototype large applications. Prototyping is useful for saving costs in implementing large applications.
- Creation, deletion and updation of files are easy.

- Report generation based on the data files is easy and query can easily be solved.

Word Processing Software

Word Processing software is, application software designed to enable the user to prepare typed documents. This software can be used as a typewriter. Examples of word processing software are WordStar, MS-word etc. With the help of this software one can type the document in a better way and can do the following:

- Better presentation and multiple copies of typed document can be generated
- Different styles of text type can be generated
- Can be sent over a distance places and graphical picture can in co-operated
- Manipulations are easy and mail merging can be done easily.

Electronic Spreadsheet Software

Electronic spreadsheet software is a spreadsheet package having a sheet of paper in the form of rows and columns in which one can enter data, numbers and text. It is much faster and easier to make modifications. All types of calculations can be computed. They are used in financial modeling, marketing production, logistics and human resources. A balance sheet is a spreadsheet, a price list is a spreadsheet and in fact most managerial reports are spreadsheets. The most important capability that a spreadsheet offers is that of a straightforward, rapid and unobtrusive sensitivity analysis.

Business Graphics Software

It is an application software package developed to generate different types of graphs for given set of data. These graphs can be plotted in colors and given different features such as shapes, orientations etc. computer accessible data can readily be converted to graphic form on the screen as well as on paper using dot-matrix printers or plotters. With plotters it is possible to have different colours (generally four colours).

Typical business graphics software enables data to be plotted as: Line Charts, Bar Charts, Pie Charts etc. Sophisticated business graphics software also provides for three dimensional display and maps.

Data Communication Software

Data communications software has been developed which runs on the personal computers to make inter communication among network computers possible. Data can be accessed from a host computer. Selected data can be 'downloaded' into the personal computer's memory and stored in the form of files on disks. Downloading on a personal computer would enable the manager to analyse up-to data on product movement in different markets.

Statistical Packages

A number of easy-to-use packages were developed on microcomputers to perform standard statistical analysis for a given data. Typical capabilities are frequency distributions, cross-tabulations, tests for population means and proportions, analysis of variance, contingency table tests, regression and correlation analysis. More advanced packages would include forecasting modules, time-series analysis and non-parametric analysis example SPSS, MATLAB etc.

Operation Research Packages

Inexpensive packages are available for standard operations research models such as linear programming, critical path analysis, resources scheduling, simulation, and decision free analysis and network flows. While these packages are not as powerful as software on large machines, they are far more user-friendly and cost one-tenth to one hundredth as much. They are powerful enough to solve problems of moderate size. For example practical linear programming models with less than 100 variables and around 50 constraints can be readily solved.

Integrated Software

Software that combines several of the capabilities of packages listed above is now available. For example, **LOTUS 1-2-3** version 2 combines spreadsheet, database, graphics and statistical capabilities. **FRAMEWORK**, which combines word-processing, spreadsheet, database and graphics functions. **EXCEL**, which is most popular latest version of M.S OFFICE 2007. Integrated software is that the user does not have to learn to handle a variety of disparate packages so that his learning time and effort is reduced and the same data can readily be passed from one function to another.

1.6 CENTRAL PROCESSING UNIT (CPU)

1.6.1 Instruction Set

Instruction set is a collection of all the instructions that a CPU can execute. Each instruction consists of several elements. An instruction element is unit of information that is required by the CPU for execution. Instruction set provides the functional requirements of the CPU. The elements of an instruction are op-code and reference to operands. Instruction set design is the most complex and plays very important role in the design of the CPU as it defines many functions of it. Since instruction sets are the means by which a programmer can control the CPU, therefore, users view must be considered while designing the instruction set. Some of the important design issues of an instruction set are:

- How many and what operations and operands to be provided?
- What should be the length of instruction format?
- Modes of specifying an operands address?
- What number of registers which can be referenced by an instruction and how are they used?

1.6.2 Instruction Format

The CPU is designed to perform a variety of operations. For each operation, an instruction called machine instruction is available. The number of instructions varies from computer to computer. The general format of instruction consists of op-code and operand. Op-code specifies the type of operation to be performed and operands specifies the way the data is to be accessed. There can be one or more references to operands in an instruction format i.e there can be one or more operand fields. Operand data types refer to an address, numbers characters and logical data. The general instruction format is shown in figure 1.6.2 (a). Thus, there are many types of instruction formats for a given instruction sets. The reference to the operand on which operation to be performed can be

obtained either from memory location or register or I/O device. Based on the number of address fields in the instruction format, the instruction can be categorized as zero-address, one-address, two-address, three-address instruction. Below examples are written in assembly language:

Three address instruction: Add R1, R2, R3 ; $R1 \leftarrow R2 + R3$

Two address instruction: Add R1, A ; $R1 \leftarrow R1 + M[A]$

One address instruction: Add A ; $AC \leftarrow AC + M[A]$

Zero address instruction: Push A ; $TOS \leftarrow M[A]$

In the above examples M[A] stands for memory location, TOS stands for top of stack, AC stands for Accumulator register and R1, R2, R3 stands for general purpose registers.

If the operands are located in the registers then in memory, an instruction can be executed faster. The main reason for this is that memory access time is higher in comparison to register access time. The next instruction, which is to be executed, is normally the next instruction following the current instruction in the memory. Therefore, no explicit reference to the instruction is provided. The types of instructions generally used are:

- *Data processing instructions* are used for performing arithmetic and logical operations such as arithmetic, Boolean, shift, string-processing instructions etc
- *Data storage/retrieval instructions* are used for performing operations on the data stored in CPU registers such as Load and store instructions.
- *Data movement instructions* are used for bringing the required data to or from memory or I/O devices such as MOV A,B start I/O, halt I/O etc.
- *Control instructions* are used for testing the status of computation through processor status word (PSW). *Miscellaneous instruction* do not fall in above category are used for special purpose. Control instructions examples swapping, halt, interrupt etc.

These instructions can be of one-byte, two-byte or three-byte depending upon the number of memory locations required for storing them i.e length of the instruction.

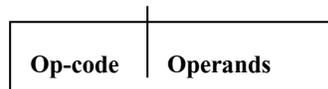


Fig. 1.6.2 (a) General Instruction Format

1.6.3 Register Organization

These are memory elements that are capable of receiving information, holding it and transferring it very quickly. They are used as temporary memory locations in the sense that the information or data is held in them only for as long as it necessary. Registers can be of different sizes and capacities; 8 bit, 16 bit, 32 bit etc. Each register has a specific function in the CPU. The set of registers can be broadly classified as

a) **Control and status registers:** These registers are used to control the CPU or the execution of a program.

- *Program counter (PC):* It contains the address of the next instruction to be executed.
- *Instruction Register (IR):* It contains the instruction currently being executed.

- *Memory address register (MAR)*: It contains the address of a memory location from which data or instruction is to be accessed or stored for the Read or write operation.
- *Accumulator (AC)*: It interacts with ALU and stores the input or output operand (data) and is main register used in most of the operations.
- *Data Register*: It acts like a buffer to store data between the main memory and CPU.

b) Programmer Visible Registers: These register; can be used by machine or assembly language program writers.

1) General Purpose Registers: These registers are used for performing any logical or arithmetic operations and logical operations etc.

2) Segment Registers: These are used for calculating the physical address of the data associated with them.

3) Special Registers: These registers are used for performing different types of functions such as stack operation etc.

4) Flags Registers: These register are used to indicate some condition produced by the execution of an instruction, or controls certain operations. Conditional flags are set to 0 or 1 based on the result of arithmetical or logical operation. Flags available are carry-flag, zero flag, sign flag etc.

CPU contains many digital circuits such counters, adders, decoders etc. Let us discuss in brief about them

- **Adders:** It is a circuit that performs arithmetic addition in ALU.
- **Comparators:** It determines whether the contents of two registers are equal or not.
- **Encoder:** It translates data from decimal to binary
- **Decoder:** It translates from binary to decimal
- **Instruction Decoder:** It decodes (analyzes the instruction of the program and initiates the appropriate control signals.
- **Counters:** It keeps track of number of clocks arrived.

1.6.4 Micro-operations

The operations are performed on the data stored in the register. The operations executed on data stored in registers are the micro-operations. It is elementary operation performed on the information stored in one or more registers. The result of the operation performed may be transferred to another register or to one of the source register itself. A micro-operation, in general, is a primitive action performed by a machine on the data stored in the registers. The following are types of micro-operation performed by ALU:

Register transfer micro-operations e.g $R1 \leftarrow R2$; R1 is destination and R2 is Source register respectively.

Arithmetic micro-operations e.g $R3 \leftarrow R1 + R2$, $R3 \leftarrow R1 - R2$, $R3 \leftarrow R1 * R2$, $R1 \leftarrow R1 + 1$ etc.

Logic operations such as AND, OR, NOT etc e.g $R1 \vee R2$

Shift micro-operations e.g $R1 \leftarrow \text{Shl}(R1)$, $R2 \leftarrow \text{Shr}(R2)$ etc.

ALU as discussed earlier performs the simple arithmetic-logic and shift operations. The complexity of an ALU depends on the type of instruction set which has been realized for it. ALU can be implemented for Fixed-point or

floating-point operations. Hardware designing is simple for fixed-point arithmetic as compared to floating point operation.

1.6.5 Addressing Modes

Addressing mode is a technique by means, which the address of the operand (data) to be operated upon is calculated. The way the operands are chosen during program execution is dependent on the addressing mode of the instruction. The addressing mode specifies a rule for interrupting or modifying the address field of the instruction before the operand is actually referenced. Some of the commonly used addressing modes are:

1) **Direct address mode:** In this mode the effective address is equal to the address part of the instruction.

Example LOAD 2005 implies transfer the contents of memory location 2005 to accumulator register i.e $AC \leftarrow M[2005]$

2) **Immediate addressing:** In this mode the operand is specified in the instruction itself. Example MVI B, 24h implies load B register with value 24 i.e $B \leftarrow 24$

3) **Implied address mode:** In this mode the operands are specified implicitly in the definition of the instruction. Example CMA implies complement the contents of A register i.e $A \leftarrow \bar{A}$

4) **Register address mode:** In this mode the instruction specifies a register in the CPU whose contents give the address of operand in the memory. Example MOV A, B implies transfer contents of B to A register i.e $A \leftarrow B$

In principle there are many types of addressing techniques, which varies from machine to machine. They are used to give programming versatility to the user and to reduce the number of bits in the addressing field of the instruction.

1.7 SUMMARY

During the last 50 years, computers, originally designed to compute or calculate numbers have come a long way. If you compare the ENIAC, essentially a super-calculator, with the supercomputers of today, a sense of awe is inescapable. A part from the great enhancement in computing power, one is struck by versatility and potentials of this twentieth century technology. Computers were originally designed to simplify and speed up the process of calculation. Then, it was used to perform repetitive clerical processes. This was followed by information processing to generate management information systems. Finally, today the computers assist in almost every activity of our civilization. In the near future, ignorance about computers will automatically earn the label of semi-literacy. It will be as relevant as basic knowledge on languages or mathematics. The frontiers of this technology are extending towards simulating human thinking, the most complex and unknown of all activities. The argument on whether computers are good or bad for the society is over. Computers have come to stay. One should only think about graceful and careful absorption of this technology for the betterment of the society.

In the end, if we re-collect about this unit, we have learnt about complete history, evolution of computers. We have also gained knowledge on von Neumann architecture (Please note that there are many more architectures, in addition to Neumann), classification of computers. We have discussed on how computers

have passed through various generations and how the technology has changed since 1940 to till today. Thus we conclude on the note that technology has under gone a tremendous change and lot of effort has been made in this direction since computers came into existence.

In this unit, we have taken a complete view of the memory system of computer of system along with the various technologies. The unit has outlined the importance of memory system, the main memory, the high-speed memories etc. We have also discussed the key characteristics of these memories and the technologies, which are used for constructing these memories. There are several other memory concepts such as virtual memory etc details of which one can be obtained from different books titled "Introduction to Computer".

Last section deals with the complete view on CPU and its organization. We have discussed how execution of instruction takes i.e its life cycle. The interrupt mechanism was also covered to given an idea what type of signals that are generated and how CPU handles them. We covered wide variety of topics in general to have an idea on topics such as instruction format, various addressing modes etc, so that it gives complete picture of inside CPU. For more details if any, students are advised to consult books.

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1.9 EXERCISES (Model Answers)**Check Your Progress 1**

- Q1) a) Electronic Numerical Integrator and Calculator
b) China
c) Dr. Hollerith
d) Charles Babbage
- Q2) a) 3 b) 1 c) 2
- Q3) a) F b) F c) T d) T

Check Your Progress 2

- Q1) a) 50 to 100 b) Signal c) Arithmetic and logic unit d) Program
- Q2) a) T b) T c) F d) T

Check Your Progress 3

- Q1) a) Vacuum tube b) IBM-700 c) Integrated chip d) Very Large scale integrated chip
- Q2) 1) Low cost and increased operating speed
 2) Reduction in size and more reliable
- Q3) a) T b) T c) F d) F

Check Your Progress 4

- Q1) a) Continuous b) bit c) Hospital d) Special-Purpose
- Q2) a) F b) T c) T d)

UNIT 2

CONCEPTS OF COMPUTERS APPLICATIONS, INPUT / OUTPUT DEVICES

CONTENTS

- 2.0 OBJECTIVES
- 2.1 INTRODUCTION
- 2.2 COMPUTER APPLICATIONS
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- 2.5 INPUT-OUTPUT TECHNIQUES
- 2.6 DOS COMMANDS
- 2.7 SUMMARY
- 2.8 REFERENCES
- 2.9 EXERCISES (Model Answers)

2.0 OBJECTIVES

At the end of this unit you should be able to:

- Learn about computer applications
- Identify some of the Input/Output devices.
- Identify the term of input/output module.
- Define the three types of Input/Output techniques, viz. Programmed Input/Output, Interrupt driven input/output and Direct Memory Access.
- Understand I/O storage device (Secondary Memories)
- Identify the serial and parallel interfaces

2.1 INTRODUCTION

Till now we have discussed about various components and memory system for a computer. We have also introduced one interconnection structure called the Bus. In this unit we will discuss more about the input/output organization of a computer system and the secondary storage devices such as magnetic tape, floppy / hard disks etc. Firstly, we will discuss briefly about computer applications and then various types of input/Output devices and then we move on to the function and structure of an Input/Output techniques & Input/Output processors.

Which were quite common in mainframe computers? With the advancement of technologies the optical memories are becoming increasingly popular and, therefore, will be discussed in sufficient details in this unit. Finally we will discuss about two popular devices interfaces.

2.2 COMPUTER APPLICATIONS

Major technological innovations have revolutionized lives of individuals. A society is composed of different types of individuals. "Society" really means those who work within organizations for example, the individuals within the educational commercial, industrial, administrative, transport, medical, society, legal and financial organizations. A few important areas in which computers are used extensively are listed below:

Examples: Scientific and engineering applications:

- Surveying, Navigation, satellites and space flight control,
- Patient weapons systems, Earthquake calculations, Analysis of electrical networks
- Analysis and designs of engineering components and structures, e.g. bridges, building, pressure vessels
- Weather, rainfall forecasting and Solution of mathematical equation
- Aircraft and vehicle design, Optimum design, Architectural design and drafting

Examples: Business, administrative and other applications:

- Payroll, Invoicing, Financial accounting, Accounts receivable and payable
- Linear programming, Billing (e.g. electricity, telephone bills), Inventory control
- Sales analysis and forecasting, Hospital bed allocation, Booking of tickets
- Bio-medical and medical computations, Insurance premiums
- Ecological systems, Bank Accounting, handling cheques and credit systems
- Finger-print identification crime detection, and police records
- Railways time-table, Air traffic control, Instrumentation and monitoring systems
- Telephone directory updating and collating, Word processing, Computer games, music, House

Examples: applications in the humanities:

- Archaeological research, Music analysis and composition, Linguistics.

The applications can be classified into the following six types of activities: data acquisition, data management, analysis-decisions, action and monitoring. The few important areas where they are used are discussed below:

Computer Education

Computer is used to carry out lengthy or complex calculations. Students of higher education and those studying science and technology use computer as a computational tool. They learn a programming language (Basic of Fortran) and write programs to solve some of their course work problems, treating the computer as a tool.

Computer can also be used to assist in the actual teaching and learning processes. There are essentially three learning methods: Computer assisted instruction (CAI) Computer assisted learning (CAL), and Computer managed learning (CML). In CAI, method information is provided to student on a given topic and queries are raised at the end to test the skills of the students so that whether students have understood or not. In CML, method the computer program is designed not only to supervise a test but also to direct each student to the next appropriate set of tasks. Computer also retains each student's record so that the teacher can find out at any time the progress an individual student makes. In CAL method programs are designed to encourage the students to acquire knowledge by finding out and learning rather than by drill and practice. Students can carry out experiments, which may not be feasible in real life through simulation models.

Scientific Research

Computers are used in applications, such as mathematical, statistical, and model processing. In mathematical applications the computer is used to perform computations required by mathematical solution procedures. In Statistical applications computer performs the computations to arrive at statistical quantities such as median, mode, standard deviation, etc. computer models are nothing but a set of computer program statements which are written in order to solve a particular problem or a process that is being investigated. For example, a planning model is a set of program statements, which compute the values in the various planning equations.

Commercial Data Processing

It is important to know that commercial data processing accounts for about 70% of the total computer usage. The introduction of microcomputers is enabling even smaller offices to function faster and more effectively with the use of the machines. Increasing use is being made of computers to assist the production of text materials known as word processing. A word processing package allows a material to be edited and corrections to be made. In a business situation, the word processing is used to generate reports, prepare and update such things as the firm's telephone directory or standard feature of office practice and is a significant part of office automation. In addition to word processing packages, a number of software packages are used in business. They include packages, which will handle payroll of personnel, office accounts, invoicing, records keeping, sales analysis, stock control and financial forecasting.

Payroll

The most established application of the computer in business is processing of payroll. This involves the preparation of pay slips for weekly wage earners and monthly salaried staff. The data for each fresh run of a payroll program includes items such as number of hours worked per employee, overtime and number of day absent. Permanent files are used to store records for each employee. These files are access and updated during each program run. Normally, they contain information of permanent nature such as position or grade of the employee, insurance particulars, personal tax particulars, total pay till date for the current

financial year, total tax deducted, pension contribution, etc. In normal payroll applications, lot of time is spent in retrieving information, updating and sorting files and printing out individual pay slips using preprinted forms. Files generated by payroll may be enlarged to include additional information of the employee such as length of service, qualifications, training, attendance, and vacation records, etc.

Computer can be used to analyze the results based on the payroll program in order to improve the efficiency of a firm. For example, the relationship of total wage costs, jobs in hand, total costs to date, individual job costing, etc., can be derived using suitable software.

Stock Control and Sales

Some of the additional-areas where the computer assistance was used are; in business and commercial organizations such as stock control, processing of sales order and sales accounting, sales analysis, market research and forecasting and production planning. For example, the control of levels of stock carried by large supermarkets is not as simple a procedure as one might imagine. In order to survive, the shop needs to sell its wares to customers. As stock levels of one item or another go down because they are being sold, so new stocks of those items have to be ordered from the warehouse. Obviously, if new stocks do not arrive, the customers will buy the goods elsewhere. Thus, the particular shop in question loses a sales and its profit. Hence, it is very important for the shopkeeper to know the exact amount of stock of all the items.

Banking

Financial institutions are making ever-increasing use of computers. Most of the banks in developed countries can not function without them because of the volume of transactions and customers' enquiry that have to be dealt with daily. The various uses of processing of cheques at the clearing banks is done by linking the branches by one or more terminal devices to a large national or regional centre. The development of magnetic ink character readers (MICR) has made it possible to sort out cheques rapidly and automatically using a special reader. Automated teller machines have been installed to enable customers to draw money from accounts (but not overdraw), pay bills, obtain bank statements, and transfer money within accounts. In general various uses in banks are on-line enquiry about balance, Cheque handling, interest calculations, printing reports etc. Other areas of commercial data processing are insurance and stock broking and MIS for taking important management decisions.

Industrial Applications:

Process control

Computerized process control systems are being used to monitor continuously operating facilities such as oil refineries, chemical plants, steel and paper mills and electric power generating stations. These processes convert input materials and energy into output materials, products etc. During the process, instruments measure variables such as pressure, temperature flow and so on. If the process is deviating from an acceptable standard, regulating devices are adjusted to bring the process back into control. Uses of computers in process control leads to greater efficiency and in such applications as chemical processing improve safety standards.

Electricity and power stations

In power station the control rooms, control boilers, turbines and switchgear more effectively, large quantities of accurate information is required-information that can be scattered over a very large station. Hence, computers are used to control and process these readings. The types of computer needed for this purpose is smaller and less comprehensive than those normally used in large scientific and business organizations. These computers are more rugged and are designed to withstand much greater extremes of temperature generated by the industrial environment. Other areas of industrial applications are production control, printing steel

Space technology

Computers are used extensively at the design stage of the project itself and also in all the phases of development right through to the flight control. They are used to monitor and control proper functioning of all the equipment, to determine the routes, to keep surveillance during the flight, to plot the courses of action when unforeseen events occur, and finally to process information relayed from the space vehicle.

Space satellites linked with a computer provide enormous information that is very difficult to collect otherwise. This information is not only of interest to scientific research but it also increases our knowledge about our own planet (e.g. geology and metereology). Satellites are used extensively for metereological predictions. Another important use of satellites is in the reflection of microwaves for the benefit to TV and radio.

Communication:

Electronic mail

Computer networks enable machines to communicate with each other. In the office environment, a network enables information to be piped from one office to another or to any other point on the network. The sort of material you might write in a letter or say over the telephone can be transmitted over the network. Messages are keyed in at one point and displayed at another. Thus, information can be sent from person to person without any paper. Normally, such a message will be retained on a storage unit attached to the network until the recipient is ready to deal with it. Relaying message in this way is known as electronic mail. The development of networks is due to the recent advances in communications technology, which made it possible to transmit data in digital form at very high speeds. Networks, which serve smaller areas, not more than 1 km in diameter, are called Local Area Networks (LAN). There are also networks, which extend over long distances and are called as Wide Area Networks (WAN). They may be used to send information worldwide using telecommunications links, microwaves and satellites.

Air travel

While an aircraft is in flight, the conditions around it may change rapidly. A human pilot has only limited reactions to deal with these continuously changing situations, which may include sudden pressure changes, variations in wind speed and direction, and so on. As the flying speed increases, control decision must be taken more quickly. Small computers are installed as part of the plane's

equipment. These computers continuously analyze the data (relayed directly from the various instruments) and provide information to the pilot in time such that he may take proper decision and action.

Computer controlled seat reservation brings benefit to customers and to the airlines. From the passengers' point of view, the existence of a computer reservation system means that he can step in an airline office or travel agency almost anywhere in the world, ask for reservation and get immediately either a confirmation of the reservation or information that the flight he required is fully booked.

Transportation

Other transport facilities such as railways also make use of computers extensively. They use computers for preparations of timetables, scheduling, and for the control of busy stretches of track. Computer controlled ticket machines are used by shipping companies to find the best method of loading and storing cargo. These programs take into account the variable factors such as size, weight, destination, urgency, etc.

Traffic control

Computer control of all the traffic lights at a group of junctions can combine much of the flexibility of the policeman at an individual cross-road with the ability to react to the overall traffic situations can be set to give the best traffic flow in all directions. Some systems even show optimum speeds (through displays situated near the traffic signals) to drivers by following, which they can maintain, continuous movement.

Public Utilities

Telephones

Any large organization with geographically dispersed units has a problem in the control of messages, which are transmitted from one location to another via telephones. This problem can be solved by a telephone system in which each location is equipped with a transmitting and receiving terminals linked to a central switching centre. The switching centre makes the connection between the receiving and sending terminals. The switching function, which was done manually till now, is being performed by the computers. They also make a record of all messages for reference (if necessary) and maintain a log of calls for subsequent billing.

Medicine

The medical benefits from the ability that profession computer systems can file and maintain vast amounts of information, and retrieve information from the files at high speed. Doctors can search through data banks of medical information to examine various case histories and to seek out up-to-date knowledge. The computer can be used to assist in the diagnosis of a patient's condition and to watch over the progress of a patient under intensive care. Computers can also be used in medical research and medical policymaking. These application areas are represented schematically. Computers are employed in many hospitals for record keeping activities in order to run the hospitals efficiently. In general, application of computers in health care centre is in hospital administration, patient data, medical records, diagnosis, research, patient monitoring and physiological modeling and simulation.

Libraries and information retrieval

Information is generated in all fields of science, technology, administration, etc. many thousands of scientific papers and textbooks are published every year in many languages on every possible subject. Business, law and government departments also generate large quantity of printed matter. All this information has to be stored in files and libraries. Computer indexing can assist extracting information on a subject from a whole library. In such systems, the title of each scientific paper is reduced to a number of meaningful key words. In addition to the key-word identifiers, a short abstract is prepared and stored on secondary storage medium.

The above information retrieval applications, computers are also used to maintain a list of borrowed books. It also automatically generates and prints out reminders for those books which are overdue. It may also be used to keep a tally of the number of times a particular book is taken out by the members of the library. Many libraries in a particular location may be linked to a network in order to offer efficient service.

Computer aided design

Aerospace, motor manufacture and electronic industries are using Computer Aided Design (CAD) systems to develop new products. Development of new product will involve the following steps: 1) preliminary design 2) final design 3) model development 4) model testing 5) prototype testing and 6) production and construction. All these, steps are performed by using a computer. The computer can also be asked to give a breakdown of all the materials needed for production and can even design the machine tools that will make the parts.

Computer in the home

The size and cost of computers are progressively becoming lesser. Computers are used in homes for wide variety of entertainment and for playing game such as chess and draughts etc. Computer can also be used as an educational aid and can be used in home management by keeping tracks of family spending or storing addresses or recipes etc. In future, it may be possible for us to work from home, bank from home and shop by computer catalogue.

Check Your Progress 1

Q1) Fill in the blanks

- a) stands for individuals within the an organization
- b) CML stands for
- c) To draw the money banking organization installed machine
- d) LAN stands for
- e) business application is used for generation of salaries
- f) Message transferring through computers is called

2.3 INPUT/OUTPUT DEVICES

The computer receives information from outside world through input devices and communicates to external world through output devices. I/O devices also called as peripherals.

2.3.1 Input Devices

Input technologies are rapidly developing and are used for transferring user command or data to the computer.

Keyboard

The keyboard is one of the most common input devices for computers. The layout of the keyboard is like that of the traditional QWERTY typewriter, although there are some extra command and function keys provided for.

The computer keyboard usually has 104 keys. Each key is like a button, which has to be pressed to input data into the computer. The keys are divided into four main groups:

Function key: The function keys are the programmable keys whose operations are preprogrammed by the software being use. Each key is used to perform a special function or job. The function keys are placed at the top most row of the keyboard.

Number keys: The number keys are used to type the numbers. Note, that all the number keys on the keyboard also have special characters or symbols printed on the top. They are placed above the top row of the alphabet keys. The number keys are also placed at the right side of the keyboard. They are called numeric keyboard.

Alphabet keys: Alphabet keys have 26 alphabets from A to Z. They are placed in a jumbled manner to help the typists to do the work fast. The first six characters of the first row of the alphabet keys are Q, W, E, R, T, Y. Therefore, the keyboard is also known as QWERTY keyboard.

Special keys: are as following:

- a) Cursor movement keys.
- b) Symbol keys.
- c) Spacebar key.
- d) Backspace key.
- e) Caps Lock key
- f) Shift key.
- g) Enter key.
- h) Delete key.
- i) Control key.
- j) Tab key.
- k) Escape key.

These keys are used for special purpose as mentioned above. There are four types of keyboard switches that are used are contact switch, magnetic read key switch, hall-effect key switch and capacitive key switch. Of these the contact switch is simple to produce and less cost effective and has life cycle of 10^7 operations, while others are costly and have longer life. There are two types of keyboards serial and parallel. In serial keyboard data is transferred in bit-by-bit form while in case of parallel byte-by-byte form. Each key pressed is converted into 8-bit form (Machine understandable form) in the computer memory.

Pointing Devices

There are many input devices that are called as pointing devices and are used for computer graphics applications. With the help of these pointing devices one

can select an option and move across, on the screen to select subsequently options. There are several pointing devices, some of them are:

Mouse

A mouse is a pointing input device. It usually contains two or three push buttons on the upper surface. These buttons are used to select or point the object on the screen. Inside the mouse, there is an electronic circuit and a rubber ball. The rubber ball can be seen by reversing the mouse. As the user rolls the mouse on the mouse pad, the moving ball moves the mouse pointer in the same direction. A mouse controls the pointer's movement on the screen. The mouse can be used to open and close applications, playing games and drawing different shapes. The motion is converted to digital values and is used to determine the direction and magnitude of the mouse movement. It requires only a small amount of surface area for its use and is inexpensive. It can also be used as an alternative to keyboard or it can be used in combination with the keyboard to enhance input operation.

Light Pen

This is a pen shaped device allowing natural movement on the screen. The pen contains the light receptor and is activated by pressing the pen against the display screen. Receptor is the scanning beam, which helps in locating the pen's position. When the pen brought in front of a picture element of the CRT, it senses light and generates a pulse that is sent to the computer, which identifies the pixel that the pen is pointing to. In order to draw images on the CRT surface, the computer generates a small cross-shaped pattern of dots on the screen slightly larger than field of view of the pen. This cross is continuously aligned with the pen as it moves over the display and lines are drawn. The pen's field of view can be controlled by putting different sizes of apertures in front of the lens or by adjusting the lens focus. Suitable system software is provided to initiate necessary action when we locate an area on the display surface with the help of the light pen. There are few other pointing devices known as tracks balls and joy sticks which are used more on entertainment usage like games.

Digitizer

The digitizer is an input device that is used for the conversion of basic two-or three-dimensional graphical data into digital form. A digitizing system consists of a programmable controller and a flat plotting table, adjustable for rake and elevation. The digitizing table or graphic tablet consists of a flat surface below which there is grid of closely spaced horizontal and vertical wires.

Several pieces of equipment are used in conjunction with the graphic tablet. These may include a stylus or pen, a push button cursor puck, and a menu. The tablet itself is available in a wide range of size (9" × 12" to 48" × 72"). The grid of wires is used to detect electrical pulses at desired locations using a stylus or puck. Their locations in terms of the table X and Y coordinates are then entered into the computer (Several styles of pucks and styluses are available). The digitizing table may thus input graphical information directly and as such, is used in such applications as map drawing (input information from aerial photographs), transferring and modifying engineering and architectural plans, printed circuit design, etc. The important parameters of tablets and other locator devices are resolution, linearity, repeatability, and size. These parameters are useful for digitizing maps and drawing, but are of less value when the device is used only to position a cursor on the screen. Example are HISTKETCH 1812/1812D, 18

×12 inch. Digitizers may be used in conjunction with Cathode Ray Tubes (CRT). When used with the CRT, the computer displays the figure inputted through the digitizer, on the CRT, which will have neat printing and the sketches will have rounded corners and bold lines. After the final sketching, the computer may be instructed to analyze the design using suitable software.

Joystick

A joystick is an input device and is similar to large toggle switch. It is used for playing video games. With the help of this device, one can move things around the screen. This device incorporates an upright “stick”, which is mounted on a spherical ball, which moves in a socket. The stick can be swing in any direction. Potentiometers are used to sense the movements of the stick. Using the stick, the cursor (A cursor is a small cross or underline or a small bright rectangle on the screen) can be moved rapidly to any desired position. The joystick is generally used to control the velocity of the screen cursors movement rather than its absolute position. The current position is changed according to rates determined by the joysticks. A joystick is normally seen in video parlous.

Voice/speech Input

One of the most exciting areas of research is in recognizing human voices/speech so that this could from input to computer directly. This approach will eliminate the need for keying in data and will facilitating casual users to use the computer very easily. There are several problem areas for research since speech recognition system should be able to identify who is speaking and what the message is. Voice recognition techniques along with several other techniques to convert the voice the signals to appropriate words and derive the correct meaning of words are required for a commercially viable comprehensive speech recognition system. We have found limited success in this area and today devices are available commercially to recognize and interpret human voices within limited scope of operation.

Scanners

It is an input device. Scanners facilitate capturing of the information and storing them in graphic format for displaying back on the graphical screen. Scanner consists of two components, the first one to illuminate the page so that the optical image can be captured and the other to convert the optical image into digital format for storage by computer. The graphic image scanned can now be seen and processed directly by the computer. Substantial research work has been done to establish methods by which the scanned image can be automatically converted into equivalent text for further processing.

Magnetic ink character recognition (MICR)

MICR is process of magnetically reading Cheque and deposit slips of banking industry. This system contains 14 characters. A magnetic ink character reader can recognize such characters. Using these characters and fonts the identification marks of a bank and account number of the customer are reprinted on a Cheque in magnetic ink on its lower right hand corner. The magnetic ink contains iron-oxide particles. In a Cheque, for instance, the branch code, account number, and Cheque number are preprinted at the bottom using magnetic ink.

The Cheque itself can now be read using a special input unit called MICR reader-sorter. It reads the Cheque by first magnetizing the magnetic characters printed on the Cheque and then sensing the signal induced by each passing character under a reading head and captured data is fed to computer system. This method eliminates the need to manually enter data from cheques into a floppy or punched card. Besides saving time, this method ensures accuracy of data entry and also error detection and correction becomes easier. Magnetic Ink Character Recognition (MICR) devices are generally used by the banking industry to read the account numbers on cheques directly and do the necessary processing. The strength of the ink decreases with course of time.

Optical Mark Reading and Recognition (OMR)

In this method special preprinted forms are designed with boxes, which can be marked with a dark pencil or ink. Each box is annotated distinctly so that the user clearly understands what response he is marking. Such a document is read by a document reader, which transcribes the marks into electrical pulses, which are transmitted to the computer. The typical operating speed of mark readers is 200 documents per minute (approximately 4000 characters per minute). The speed of scanning also depends upon the size of the document. Academic and testing institutions to grade aptitude tests where candidates mark the correct alternatives on a special sheet of paper use this kind of device. The optical mark recognition devices then directly read these answers sheets and the information sent to a computer for processing. The entrance tests and some of the assignments are being marked by OMR.

The advantage of this method is that:

- The information is entered is entered at its source and no further transcription is required.
- This minimizes unreliability of data.

The main disadvantage of this method is that:

- The need for accurate of alignment of printing on forms and the need for good quality expensive paper.
The form cannot be redesigned frequently because any change will require reprinting of the form, which is expensive.

Optical Character Reader (OCR)

OCR is a process of recognizing preprinted characters and distinguishes one character from another provided the characters meet OCR standards. Optical Character Reader (OCR) not only detects the presence of characters but also differentiates them by their shape. Thus, they can be used as an input device to read numeric and alphanumeric characters from pre-printed documents produced by typewriters, printers, etc. However, the early OCRs were designed to recognize characters that were printed in a special format. Using OCRs, each character is scanned photo electrically and converted into a pattern for all the possible characters until an exact match is found, thus identifying the character. When the generated signal does not match with any of the characters that have been stored, the inputted character is rejected. An optical reader uses photoelectric devices to scan the characters being read and convert the reflected light patterns of the data into binary form. Most applications of OCR have a large part of the document preprinted, with the variable input typed or hand-written

afterwards. Readers with speeds varying from 100 to 1500 documents per minute (roughly 2000-30,000 characters per minute) are available. OCR techniques are used in credit card billing and reading of pin code numbers in large post offices to sort mail geographically.

2.3.2 OUTPUT DEVICES

The output obtained can be produced either on a display unit/device or on a paper. Some of the output display devices are:

One of the most important peripherals in computer is the graphic display device. A conventional computer display terminal known as alphanumeric terminals, display characters (images) from a multi-dot array (normally 5*7 or 7*9). These are used to read text information displayed on the screen. However, there is increasing demand for display of graphics, diagrams and pictures to make the visual presentation of information more effective for user interaction and decision-making.

Graphic display is made up of a series of dots called 'pixels' (picture elements) whose pattern produces the image. Each dot on the screen is defined as a separate unit, which can be directly addressed. Since each dot can be controlled individually there is much greater flexibility in drawing pictures. There are three categories of display screen technology:

- 1) Cathode Ray Tube (CRT)
- 2) Liquid Crystal Display (LCD)
- 3) Projection Displays

Printers

Printers are used for producing output on paper and are classified as impact and non-impact printers. Impact printers fall into two main categories, namely, line printers and serial character printers. A line printer prints a complete line at a time. Printing speeds vary from 150 lines to 2500 lines per minute with 96 to 160 characters on a 15-inch line. Six to eight lines per vertical inch are printed. Usually 64 and 96 character set is used with English letters. Printers are available in almost all scripts, e.g., Japanese, Arabic, Cyrillic (Russian) etc.

There are two types of line printers. These are the drum printers and the chain printers. A drum printer consists of a cylindrical drum. The characters to be printed are embossed on its surface. One complete set of characters is embossed for each and every print position on a line. Thus a printer with 132 characters per line and a 96 character set will have on its surface $132 * 96 = 12672$ characters embossed.

The codes of all characters to be printed on one line are transmitted from the memory of the computer to a storage unit in the printer. The storage unit called a printer buffer register can normally store 132 character codes. The printer drum is rotated at a high speed. A set of print hammers, one for each character in a line, are mounted in front of the drum. The position of each character on a band of the drum surface is coded using its angular displacement from the origin. Striking a hammer against the embossed character on the surface prints a character. A carbon ribbon and paper are interposed between the hammer and the drum. As the drum rotates, the hammer waits, and is activated when the character to be printed is at that position (as given in the print buffer register)

appears in front of the hammer. Thus the drum would have to complete one full revolution for a line to be printed. This is called “on the fly” printing as the drum continues to rotate at a high speed when the hammer strikes it. Thus the hammer must strike very quickly and must be accurately synchronized with drum movement. If the hammer striking is mistimed, then the printed line looks wavy and slightly blurred. Printer drums are expensive and cannot be changed often. Thus drum printers have a fixed font. There are a large variety of printing devices, which can be classified according to the print quality and the printing speeds. Currents estimates indicate that about 1500 types of printers are commercially available conforming to about 15 different printing technologies. The following categories of printers are identified.

1) Printing Technology-impact printers vs. non-impact printers: Impact printers use variations of standards typewriter printing mechanism where a hammer strikes paper through inked ribbon. Non-impact printer uses chemical, heat or electrical signals to etch or induce symbols on paper. Many of these require special coated or treated paper.

2) Character forms-fully formed characters vs. dot matrix: Fully formed characters are constructed from solid lines and curves like the characters of typewriter whereas a dot matrix character is made up from a carefully arranged sequence of dots packed very close to each other. Obviously print quality of a dot matrix printer will be poorer compared to that from fully formed characters.

3) Printing sequence – serial vs. line vs. page: This indicates the amount of information of printer can output within a single cycle of operation. Serial printing is done character by character whereas line printing forms an entire line and prints a line at a time whereas a page printer outputs a whole page of character and images simultaneously during one cycle. Clearly the speed of output will depend upon the printing sequences incorporated in the printing device.

Dot Matrix Printers

This is one of the most popular printers used for personal computing systems. These printers are relatively cheaper compared to other technologies. The impact technology uses a print head containing banks of wires moving at high speeds against inked ribbon and paper. Characters are produced in matrix format. The speeds range from 40 characters per second (CPS) to about 1,000 cps. A disadvantage of this technology is that the print quality is low. The two types of non-impact printers are given below:

Ink Jet Printers

These print by spraying a controlled stream of tiny ink droplets accurately on the paper forming either dot matrix or solid characters. One technique is to accelerate the droplet with electrostatic fields after the ink drop has been formed the other method is to squeeze the droplet through a small orifices of piezoelectric crystals. These crystals can change shape when electric field is applied. These printers are non-impact printers and are relatively silent and are high quality printers. The typical speeds range from 50 cps to above 300 cps and this technology has been used well for production of colour printing and elaborate graphics. The only problem with inkjet is ink clogging in the print head.

Laser Printers

Printing is achieved by deflecting laser beam on to the photosensitive surface of a drum and the latent image attracts the toner to the image areas. The toner is

then electrostatically transferred to the paper and fixed into a permanent image. Laser printer actually uses a laser diode to write information on to a drum coated with photo-sensitive material. The coating on the drum reacts to the laser in the sense that it converts the light to an electrostatic charge. Special ink dust is sprinkled on the drum, which sticks electrostatically to the charged area of the drum, forming image. As drum rotates, the paper is wrapped around it and image is transferred on to paper. Rollers and heaters are used to fuse the ink on the paper. Resolution of laser printers, range from 300 dpi to 1600 dpi. Speeds can range from 10 pages a minute to about 200 pages per minute. This technology is relatively expensive but is becoming very popular because of the quality, speed and noiseless operations.

Plotters

The plotters are used to produce graphical output on paper. They are used wide variety of applications drawings graphic making maps, civil engineering etc. a high degree of accuracy of 1000th of an inch. Plotters may be driven on-line. If we are using the computer for a design work, then we can use it on-line. But if we want to use it for graphic applications, then we can drive them off-line. There are two types of plotters: drum and flatbed

The flat-bed plotter is less expensive and is used in many smaller computing systems. In this plotter, the paper is held horizontally on a flat bed, by an electrostatic field. Then pen is moved across the surface in two orthogonal (the X and Y) directions. In addition, the pen can be raised or lowered onto the paper, during the drawing operations. Then pen holder can be equipped with upto four different pens to allow for multi-colour plots. Calcomp 738 flat-bed plotter can generate multiple columns and multiple line width plots. Drum or incremental plotters are normally used with mainframe computer systems. In these plotters, the pen is mounted on a carriage, which moves across the width of the paper only. The paper is mounted around a horizontal drum and held in position by sprocket holes and spins at the paper edge. During plotting operations, the drum drives the paper, backwards and forwards as the pen moves across the width of the paper. Multiple-pen heads may also be used. The step resolution of drum plotters is as high as 0.002-cm. The plot size may be very large with paper widths of upto 1 meter and a almost indefinite paper lengths.

Recently, electrostatic plotters have been introduced. They compose an image on a electrostatic grid and then transfer to paper. These types produce images which consist of dots. The density of dots, which is directly related to image quality, is called resolution. (Resolution is measured in dots/inch.) Some of these plotters produce densities of 500 dots per inch.

Visual Display Terminals

Visual display terminals use cathode ray tubes. They can also be used as output devices. Two types of CRTs may be used: Alphanumeric displays, for real-time applications involving enquiry and response, where no permanent record is record. VDUs are much faster than printers-they can display up-to 10,000 characters per second.

The graphic display can be used to output graphs, charts, and etc. There is more expensive and comes in two varieties: 1. *Storage* and 2. *Refresh*. The image

produced by storage tube display is maintained on the screen without the need for rewriting, as long as the unit is switched on. A picture once generated need not be refreshed and thus this system does not need a display file or buffer memory. However, storage screen terminals cannot erase a portion of the screen (i.e. the entire display must be erased) or display moving objects and hence have limited interactive capability. Picture resolution is fairly high (up to 4096 * 4096 points on a 19" screen).

A graphic display terminal displays information in both character and graphic forms and is used in CAD/CAM applications.

Check Your Progress 2

Q1) Fill in the blanks

- a) Keyboard is called
- b) Chain printer is a Printer
- c) A is a pick device.
- d) MICR coding systems contains total characters

Q2) State True (T) or False (F)

- a) Mouse is a pointing input device
- b) Track ball is not an input device
- c) DMP is a non-impact printer
- d) A storage tube allows selective erasing

2.4 SECONDARY STORAGE DEVICES

2.4.1 Floppy Disks

Floppy disk is made of Mylar tape material coated with magnetic-oxide. This is a flexible tape material and is cut into circular piece 5.25 inches in diameter and is about .64 mm thick. This disk is packed in a square plastic envelope with a long slit for R/W access. The disk along with its envelope, is slipped into drive mechanism, the mechanism holds the envelope and the flexible disk is rotated inside the envelope. The disk is divided into tracks. Each track is divided into sectors and there are two surfaces. The disk has a central hole for which signals the beginning of track. Each sector stores 1/2KB. A capacity of floppy drive range from 80 KB to 1.5MB. A servomechanism controls track-to-track movement and portioning of the head. Since the inner side of the envelope has woolen fiber, it therefore permits smooth free rotation. The head is moved radially along the slit on the envelope. Surface no, tracks no, forms the address for storing or retrieving record. There is write protect notch on the floppy to avoid any deletion of information accidentally. Average access times are of the order of 150 milliseconds with transfer rates averaging around 20-30 KB per second. There are two types of floppies hard and soft sectored floppies. Hard-sectored floppies have sectored marked permanently at the time of manufacture and each sector beginning is indicated by a hole. While in soft sectored there is index hole that marks the beginning of a track and division of tracks and sectors is done through software program called formatting. The floppies are available in 3 sizes 8", 5 ¼", 3 ½" inches are available under two capacities low density & and high density. Low density floppy drive have storing capacity of 720 KB & high density have

1.44 MB out of the number of tracks available all are not available for recording purpose. They are used to provide alternate tracks for bad tracks and for maintenance purposes. The space usable for data is thus reduced. Total capacity of Floppy Drive is given by

$$\text{Capacity} = \text{No. of tracks} * \text{No. of sectors} * \text{No. of surface} * \frac{1}{2} \text{ KB}$$

3 ½ inch floppy is called micro floppies & 5 ¼ inch floppy is called mini floppies. Storage densities can be improved further by replacing ferric-oxide coating by pure coating magnetic metal such cobalt or nickel etc and also by changing the recording technique from horizontal to vertical. The figure is given below.

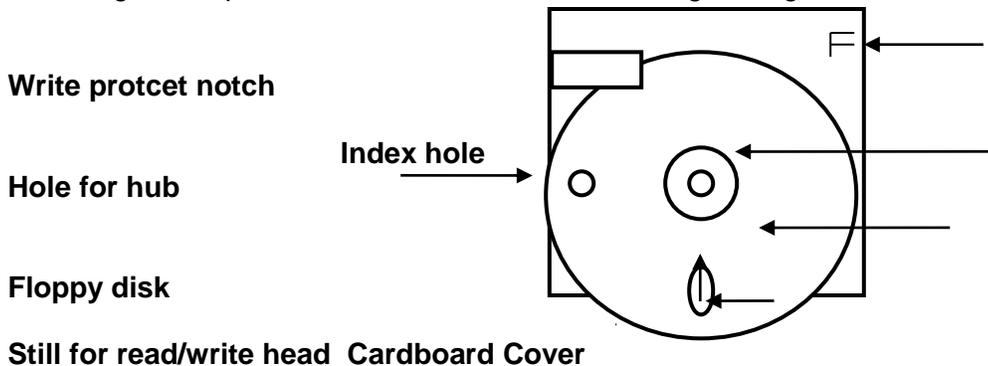


Fig 2.4.1 (a) Floppy_Disk

2.4.2 Hard disk

Hard disk is a sealed rigid disk, which is not removable from the drive, is called Winchester disk. There are two types of head disks; movable and fixed. In case of movable head disk there is a single one-read/write head while in case of fixed-head disk have one-read/write head per track. Magnetic disks are smooth metal plates coated on both sides with a thin film of magnetic material. A set of such magnetic plates is fixed to a spindle one below the other to make up a disk pack. The disk pack is mounted on a disk drive about 3600 revolutions per minute. The drive also has a set of magnetic heads mounted on arms. The arm assembly is capable of moving in and out in a radial direction. Information is recorded on the surface of a disk as it rotates about its axis. Thus it is on circular tracks on each disk surface. A set of concentric tracks is recorded on each surface. A set of corresponding tracks in all surfaces of a disk pack is called a cylinder. In a disk with 6 plates there are 12 surfaces. Out of the 12 surfaces, the top-most surface is not used for recording. Thus there are 10 tracks in such a disk pack. A track is divided into sectors. Read and write operations on a disk start at sector boundaries. If the number of bytes to be stored in a sector is less than the capacity of a sector, then the rest of the sector is padded up with the last byte recorded. Typically 512 bytes are stored per sector. There are 50 sectors pr track, 400 tracks per surface and 10 surfaces. The total capacity of the disk pack is thus $512 \times 50 \times 400 \times 10 / (\pi \times 12) = 102.4$ million bytes. The density of a recording on a track is of the order of $50 \times 512 \times 8 = 5500$ bits per inch for a disk pack of diameter 12 inches. A set pf disk drives are connected to a disk controller. The disk controller accepts commands from the computer and positions the read-write heads of the specified disk for reading or writing. In order

to read or write on a disk pack, the computer must specify the drive number, cylinder number, surface number and the sector number. The figure of hard disk is given below.

When the disk controller receives a read-write command, the controller first positions the arm assembly so that the read-write head reaches the specified cylinder. The time taken to reach a specified cylinder/track is known as **seek time** and may vary depending upon the position of the head. It will take more time from moving inner to outer most cylinders. Average seek time is of the order of 30 milliseconds. After the head is positioned on a track, there will be further delay to locate the sector. Thus time taken by R/W head to reach to a particular sector is called latency time. On average it is half of the time taken for a rotation by the disk. Latency time for a disk rotating at a speed of 3600 rpm is 8.3 milliseconds. The sum of average latency and seek time is access time and defined as time taken to read a block of data from the disk. The time is a combination of seek and latency time. Capacity of Hard disk ranges from 20 Mega-byte to 80 Giga-byte. Hard disks are sold under the names such as Seagate, IDE, SCSI.

Removable and Non-removable disks: Disk that is permanently fixed inside sealed cabinet container is called Non-movable disks such as hard disk. Disks that can be removed is called removable disk such as floppy disk.

2.4.3 Magnetic Tape

Magnetic tapes are mounted on reels or a cartridge or a cassette of tape to store large volumes or backup data. These are cheaper and since these are removable from the drive, they provide unlimited storage capacity. Since the recording is like that in a tape recorder used in audio systems, information retrieval will be only sequential and not random. These are convenient for archival storage for backup. The tape drive is termed as sequential access device that is to read a record N, if tape is at present record 1 then it has to pass through all the records till N-1 sequentially. In case the tape head is positioned beyond Nth record then the tape need to be re-wound to a particular distance and then forward reading is done to read Nth record. Tape moves only if read or write operation is requested. The tapes are used in earlier generations. They are low cost, low speed, portable and still widely used because of their low cost. Now days DAT (Digital audio tape) drives have more popularly used.

2.4.4 Optical Memories

Optical memories are alternate mass storage devices with huge capacity. The advent of compact disk digital audio system, a non-erasable optical disk, paved the way for the development of a new low cost storage technology. In optical storage devices the information is written using laser beam. These memories can store large amount of data.

2.4.4.1 CD-ROM

The CD-ROM (Compact disk read-only memory) is a direct extension of audio CD. CD-ROM players are more rugged and have error-correction facility. This ensures proper data transfer from CD-ROM to the main memory of the computer. CD-ROM is written into during the process of manufacture by a high power laser

beam. Information is retrieved from a CD-ROM using a low power laser, which ingenerate in an optical disk drive unit. In CD-ROMs the information is stored evenly across the disk in segments of the same size. Therefore, in CD-ROMs data stored on a track increases as we go towards outer surface of disk. Thus, the CD-ROMs are rotated at variable speeds for the reading process.

The data is stored sequentially along a spiral track. In this disk random access becomes more difficult because locating a desired address involves first moving the head to the specific area then adjusting the rotation speed and then reading the address, and then to find and access the specific sector. CD-ROMs are very good for distributing large amount of information or data to large number of users. The data is written at time of manufacture. The Capacity of CD-ROM disk is 680 MB and above. They are used in multi-media to store data, pictures etc. The three main advantages of CD-ROMs are:

- Large data/information storage capacity.
- Mass replication is inexpensive and fast.
- These are removable disks, thus, are suitable for archival storage.

The disadvantages of CD-ROMs are:

- It is read-only, therefore, cannot be updated.
- Access time is longer than that of a magnetic disk.

2.4.4.2 WORM

In certain applications only few copies of compact disks are to be made which makes the CD-ROMs production economically unviable. For such cases write-once, read-many CD has been developed WORM disks are prepared in such a way that they can be written only once subsequently by a laser beam of modest intensity. The disk controller of WORM is more expensive than that of CD-ROM. WORM uses sector structure same as that of magnetic disks. High power laser first prepares the WORM disk. For example, a typical technique for preparing the disk is to produce a series of blisters on the disk using high-power laser. A low-power laser then can be used to generate just enough heat to burst these blisters, wherever desired, in a WORM drive. A laser in the WORM drive, which illuminates the disk's surface, carries out the read operation. These burst blisters provide higher contrast than that of surrounding area, thus, are recognized easily.

2.4.4.3 Erasable Optical Disk

The most recent development in optical disks is the erasable optical disk. The data in these disks can be changed repeatedly as the case with any magnetic disk. In such systems, a laser beam is used along with a magnetic field to read or write the information on a disk, which is coated with a magnetic material. The laser beam is used to heat a specific spot on which the magnetic field is then applied, thus, the polarization of the sport can be changed in turn recording the desired data. The process does not cause any physical change in the disk, therefore can be repeated many times. The read operation is performed by detecting the degree of rotation of the polarized user beam reflected from the surface. This erasable optical disk is a true secondary storage device (unlike CD-ROMs and WORM). The main advantages of erasable optical disk over magnetic disk are:

- The capacity of an erasable disk is very high in comparison to magnetic disk. For example, a 5.1/4 inch optical disk can store around 650 Mbytes of data while the Winchester disks normally can store a maximum capacity of 512 MB.
- The erasable optical disks are portable while a Winchester disk is not.
- The erasable optical disks are highly reliable and have a longer life.
- Erasable optical disk also uses format that makes semi-random access feasible.

The only disadvantage of this disk is the high cost. The disadvantage will disappear in near future.

Check Your Progress 3

Q1) State True (T) or False (F)

- a) Hard disk is hard to format on different systems
- b) Data on a CD-ROM is written at the time manufacture
- c) Secondary memories are volatile in nature.
- d) Information is accessed direct accessing method in case of disk
- e) Erasable optical disks are not potable.
- f) Storage densities does not improve by changing recording technique in disks.

2.5 INPUT/OUTPUT TECHNIQUES

Input/Output Interface: The input/output module (I/O interface) is connected in between computer system and input/output devices. The main features of I/O module are:

- a) To handle wide varieties of I/O devices having different control commands, data formats as command to CPU.
- b) To provide data transfer between I/O device to the computer memory or vice-versa.
- c) To provide synchronization of data transmission between units due to speed mismatch memory and I/O devices.
- d) They act as interface between I/O device and Computer system thereby providing facilities like buffer (storage area) and error detection mechanism.
- e) It contains various types of registers such as decoder, status, data register etc. Each having its own function to perform.

Input Output Techniques

The Input/Output operations can be performed by three basic techniques. These are:

- Programmed controlled Input/Output technique.
- Interrupt driven Input/Output technique
- Direct memory Access technique.

In both programmed I/O and interrupt driven I/O, CPU is responsible for extracting data from the memory for output and storing data in memory for input. Such a requirement does not exist in DMA where the memory can be accessed directly by I/O module. Thus, the I/O module can store or extract data in/from the memory. In case I/O module exhibits the characteristics of CPU then it is referred

as I/O channel or I/O processor. The basic advantages of these devices are the free CPU of the burden of Input/output transfers. Thus, during this time CPU can do some other work, therefore, effectively increasing the CPU utilization and also increasing performance of the system.

Programmed Input/Output technique

Programmed Input/Output are useful I/O method for computer where hardware costs need to be minimized. The input or output operation in such case may involve:

- Transfer of data from I/O device to the CPU registers.
- Transfer of data from CPU registers to memory.

In addition, in a programmed I/O method the responsibility of CPU is to constantly check the status of the I/O device to check whether it has become free (in case output is desired) or it has finished inputting the current series of data (in case input is going on). Thus, Programmed I/O is a very time consuming method where CPU wastes lot of time of checking and verifying the status of an I/O device.

In programmed I/O, the I/O operations are completely controlled by the CPU. The CPU executes programs that initiate, directs and terminate an I/O operation. It requires a little special I/O hardware, but is quite time consuming for the CPU, since CPU has to wait for slower I/O operations to complete and remains idle during this period.

Interrupt Driven Input/Output: What are the basic drawbacks of programmed I/O? The speed of I/O devices is much slower in comparison to that of CPU, and because the CPU has to repeatedly check whether a device is free; or wait till the completion of I/O, therefore, the performance of CPU in programmed I/O goes down tremendously. What is the solution? How to remove waiting time of CPU to make it free? The solution is that instead of CPU checking status of I/O operation, once it has been initiated, it is the job of I/O device to inform CPU about the status of I/O operation whether it has completed or not through an interrupt signal i.e on the completion of I/O, the I/O device interrupts the CPU to tell it has finished the work. Interrupts can be generated by various sources internal or external to the CPU.

Interrupts are primarily issued on:

- Initiation of Input/Output operation.
- Completion of an Input/Output operation.
- Occurrence of hardware or software errors.

Direct Memory Access (DMA)

When large amount of data is to be transferred from CPU, a DMA module can be used. In both interrupt driven and programs I/O, the CPU is tied up in executing input/output instructions while DMA acts as if it has taken over control over control from the CPU. The DMA operates in the following way:

- When an I/O is requested, the CPU instructs the DMA module about the operation by providing the following information:
 - Which operation (Read or Write) to be performed.
 - The address of I/O device to be used.
 - The starting location on the memory where the information will be read or written to
 - The number of words to be written or to be read.

- After supplying above information CPU it starts executing another program or may be another part of the same program
- The DMA module once the data is assembled from I/O device, a signal is sent by DMA to CPU to inform that it is ready for transfers the data block byte by byte directly to the memory without the help of CPU.
- With each data byte transferred word counter register is decremented by one.
- In case of dual port memory the DMA interface can transfer information to the memory as long as CPU is not accessing the same port of memory independently.
- In case if DMA does not have a separate port of memory then it shares with CPU port of memory for the transfer. In such case the DMA sends a signal to CPU to yield the next memory cycle to DMA. During this cycle DMA transfers all the required data to the memory. This is called cycle stealing.

Table 3.5.1 below gives an overview of these three techniques.

	Interrupt Required	I/O module to/from Memory transfer
Programmed I/O	No	Through CPU
Interrupt driven I/O	Yes	Through CPU
Direct Memory Access	Yes	Direct transfer

Input-Output Processors

The concept of I/O processor is an extension of the concept of DMA. The I/O processor can execute specialized I/O program residing in the memory without intervention of the CPU. Thus, CPU only needs to specify a sequence of I/O activity to I/O processor. The I/O processor then executes the necessary I/O instructions, which are required for the task; and interrupts the CPU only after the entire sequence of I/O activity as specified by CPU have been completed. An advanced I/O processor can have its own memory, enabling a large set of I/O devices to be controlled without much involvement from the CPU. Thus, an I/O processor has the additional ability to execute I/O instructions, which provide it a complete control on I/O operations. Thus I/O processors are much more powerful than DMA which provides only a limited control of I/O device. For example, if an I/O device is busy then DMA will only interrupt the CPU and will inform the CPU again when the device is free while and once it has found to be free go a head with I/O finishes, communicate it to the CPU. The I/O processor is termed as channel in IMB machines.

In computer systems, which have IOPs the CPU normally, do not execute I/O data transfer instructions. I/O instructions are stored in memory and are executed by IOPs. The IOP can be provided with the direct access to the memory and can control the system bus. An IOP can execute a sequence of data transfer instructions involving different memory regions and different devices without intervention of the CPU.

External Interfaces

Our discussion on I/O system will not complete if we do not discuss about external interfaces. The external interfaces can be characterized into two main categories (a) parallel interface (b) serial interface.

In parallel interface multiple bits can be transferred simultaneously. The parallel interfaces are normally used for high-speed peripherals such as tapes and disks. The dialogue that takes place across the interface includes the exchange of control information and data. A common parallel interfaces is centronics.

In serial interface only one line is used to transmit data, therefore, only one bit is transferred at a time. Serial interface is used for serial printers and terminals. The most common serial interface is RS-232-C.

2.6 DOS COMMANDS

Dos stand for Disk Operating System. It is an operating system and falls under the category of system software. Microsoft Corporation developed it in 1980s. It is an interface between user and machine. It contains series of programs that manage the activities of the computer system.

2.6.1 Terms You Should Know

File: A collection of related information. Similar to ms-office files. A file can have instructions, textual information or data records. Every file on the system is identified by its name given by user. It consists of the following:

Syntax of File name: **Filename. extension**

- a) First name --- 1 to 8 characters (without blank space)
- b) Extension --- 0 to 3 characters (optional)

A dot is placed between file name and file extension. The following symbols can also be used while giving the file name. Symbols are A-Z, a-z, 0 to 9, special characters. The first letter of the name should start with an alphabet. Blank spaces all not allowed. Following names should not be used, as they are used operating system.

They are AUX, LST, COM, CON, PRN, KEYBD\$, LPT.

Valid filenames are SOME.PAS, STUD.DAT, TURBO.EXE, YMCADATA.

Invalid filenames are

- TRAIN DAT (blank space not allowed)
- Stud,data (comma not allowed)
- Stud".bak (special character included)

File extension	Meaning for DOS
BAS	Short for basic programming language

BAT A file having set of dos commands in it and runs when you type the file with the first name.

EXE Executable file that runs directly on DOS prompt.

SYS System file that can only be used by DOS.

COM Command file that contains a program.

Table 1: Some typical special file extensions of DOS.

In file names, upper and lower case letters are treated as same, e.g., RAMA, Rama , rama all are same.

Examples of valid filenames abc, , Ram, abc.txt, kapil, M.P etc.

Directory: Directory is an indexed table for files. Directory is a special file that holds files and further subdirectories.

It contains following information:

- File name

- File size
- The date and time of last when modified/created the file.

Command: Commands are instructions for computer for manipulation of files or data.

Disk Names: Floppy drives are identified by "A" or "B" and Hard Disk drive as "C" or "D", followed by ':'

e.g A: , B: , C: etc.

Disk Capacity: Floppy disk capacity usually 360 KB or 720 KB in lower densities and for higher densities 1.2 MB or 1.44 MB. While in case of hard disk capacities available are 20 MB, 40 MB, 80 MB, 1GB, 8 GB etc

Disks:

Floppy disks: Size of these movable disks available are 5 ¼ inch (obsolete now days) or 3.5 inch, which is most widely used now days and have higher capacity than 5 ¼ inch floppies.

Hard Disks: They are fixed disk of 14 inch in size and available under different capacities as mentioned above. Hard disk is protected by contamination-free sealed external casing, these are less prone to dust and environment.

Precautions for handling floppies

Do

- Hold floppy at corner, i.e from Labels
- Store it in jacket
- Write with sketch pen on labels

Do Not

- Place floppy near magnet
- Clean with duster
- Write on labels with sharp pencil or ball-point pen
- Expose to extreme heat
- Touch the exposed area of floppy

2.6.2 INTERNAL AND EXTERNAL DOS COMMANDS

The DOS commands are divided into three categories: Internal, External and batch commands.

Current directory: It is the directory you are currently working in. When DOS starts, the root directory is the current directory i.e c:\>.

Internal Commands are further divided into general commands and file and directory commands.

General Commands are : *Cls* , *Date* , *Time* , *Prompt* , *ver* , *drive change command*.

Internal Commands are *Copy con* , *Rename* , *Delete* , *Copy* , *Type*

Important External Commands are *Diskcopy* , *Format* , *Attrib* , *chdisk* , *restore* , *sys* , *xcopy* , *tree*,

Internal Commands: At C> prompt type the following Commands and after typing press ENTER key from the keyboard. Note you can use either small letters or capital letters or both. These commands can be typed in any current sub-directory where you want while external commands can be used from the directory where they are kept in the hard disk or from floppy diskette.

GENERAL COMMANDS

Date command: This command allows user to change the system date. Example The command "DATE 01-01-91" will change the system date 01-01-91.

Time command: This command allows user to change the system time. Example The command "Time" will display the current system time and will ask you if you want to change it.

Prompt command: This command allows user to change default prompt like c> or a>. Example The command "Prompt \$p\$g" will change the prompt to show "drive:current directory name>" i.e c:\dbase> will be the prompt you will see, if currently is dbase.

Ver command: This command is used for knowing the DOS version. The latest DOS version is 6.22.

Drive command: This command allows user to change from one drive to another. Example C>a: and press enter key will change your prompt from C> to a> i.e you have shifted from Hard disk to floppy disk. If you want to revert this operation then just type a>c: to get back to C>

File Commands : Copy con command: This command allows user to create a file in DOS . Example The command "copy con abc" will create a file with name abc in the current directory where you are. After typing press ctrl+z to save or ctrl+c to quit the operation.

Copy command: This command allows user to copy files from one directory to another or from one drive to another, either with same file name or different file name i.e duplicate copy of the original file Example The command "copy abc xyz" will create a duplicate file xyz in the current directory where you are. The contents of this file xyz and abc are same.

Ren command: This command allows user to rename a file in the current directory where you are i.e alternate name to original file. Example The command "Ren abc xyz" will change the name of abc to xyz in the current directory.

Type command: This command allows user to see the contents of a file in the current directory. Example The command "Type abc" will display the contents of abc in the current directory.

Print command: This command allows user to print a file on the printer in background. Example The command "print abc" will print the contents of file abc to printer.

Del command: This command allows user to deleting a file or files. One should use this command carefully, and while using with wild cards characters can delete group of files. Example The command "del abc" will delete file abc from current directory. "del a*.*" will delete all files starting a letter.

Directory Commands

MD command: This command allows user to create a sub-directory. Example The command "MD dbase" will create a sub-directory with name "dbase" in the current directory.

DIR command: This command allows user to see the names of all files and sub-directories existing in the current directory. Example The command "Dir " will display all file names and directories that exist.

CD command: This command allows user to change from one sub-directory to another working sub-directory. Example The command "C>CD dbase" will

change from root directory to sub-directory called dbase. At the end to your prompt will appear like this C:\dbase>.

RD command: This command allows user to remove all the sub-directories if three conditions are satisfied.

1. Directory should be empty. 2. Directory should exist. 3. Move to parent directory to remove child directory. Example The command “C>RD dbase” will remove sub-directory with name “dbase” from root directory provided if above mentioned conditions are satisfied.

External Commands (Few of them are discussed below)

Attrib Command: This command is used for changing the write protection status of a file. Example: The command “attrib +r C:\dbase*. *” will make all the files in the sub-directory read only. Similarly other options can be tried using manuals or by using help command e.g C>help attrib and press enter key, will give details of attrib commands. Similarly one can use help command for finding details of any other internal or external command.

Chkdsk Command: This command is used for finding errors in the disk of specified drive. Example: The command “chkdsk c:” will find errors in drive C: and try to correct them.

diskcopy Command: This command is used for copying the complete content of one floppy into another. Example: The command “diskcopy A:A:” will copy the content of source disk drive A: to target disk. The disk will be inserted one by one.

fdisk Command: This command is used for making partitions on the disk. This command is a self –explanatory.

Example: The command “fdisk” will partition the disk as desired by you.

format Command: This command is used for initializing the directory and files in file allocation table (FAT) on the disk. Example: The command “format A:/4” will format the floppy disk(5 ¼ inch) in drive A.

More Command: This command is a filter that reads from standard input and displays one screen of information at a time. Example: Command “C>dir *.* | More” will display one screen of files with a pause.

sys Command: This command transfers the MS-DOS system files from the disk in default drive to the specified space in the disk, in the specified drive. Example: The command “sys c:” at A:> prompt will copy the system files from DOS system disk 1 to the root directory of C drive.

Tree Command: This command displays the directory tree structure for the disk on the specified drive. Example: The command “tree c:” will show you the directory tree structure of the hard disk c.

Xcopy command: This command is used for copying files and directories.

Check Your Progress 4

Q1) State True (T) or False (F)

- The devices are normally connected directly to system bus.
- I/O interface is needed for slower I/O devices
- Parallel interface are commonly used for connecting printers to a computer.
- DMA does not need the help of CPU for transferring data.

Q2) Write two functions of I/O module.

2.7 SUMMARY

In this unit, we have discussed about the computer applications, Input/Output devices, Input/Output module and interfaces and I/O techniques. The discussion is only at the introductory level, however, you can refer to further readings for more details. The input/output technologies are developing all the time with the advancement of technology. Some newer technologies will be available in near future, however all the new things can be categorised less than one of the techniques, we have discussed in the unit.

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2.9 EXERCISES (MODEL ANSWERS)

Check Your Progress 1

Q1) a) Society b) Computer Managed Learning c) ATM d) Local area network e) Payroll f) Electronic Mail

Check Your Progress 2

Q1) a) QWERTY b) Line c) Light Pen d) 14
Q2) a) T b) F c) F d) F

Check Your Progress 3

Q1) a) F b) F c) T d) F
Q2) 1) To handle wide variety of data formats
2) Transfers the data

Check Your Progress 4

Q1) a) T b) T c) F d) T e) F f) F

UNIT 3

WINDOWS AND MS OFFICE, MS WORD / MS EXCEL / MS POWER PRESENTATION

Contents

- 3.1 Introduction
- 3.2 Objectives
- 3.3 Windows
- 3.4 MS Office
- 3.5 MS Word
- 3.6 MS Excel
- 3.7 MS Power Presentation
- 3.8 Summary
- 3.9 Expected Questions
- 3.10 References

3.1 INTRODUCTION

In this unit, we are going to learn the basics about various software packages of computer. Computers basically are working through an interaction of hardware and software. Hardware is physical component of a computer system. It is a tiny rectangular chip inside the computer called the central processing unit (CPU), or microprocessor. It is the "brain" of computer—the part that translate instructions and performs calculations. Hardware items such as monitor, keyboard, mouse, printer and other items are often called hardware devices. Software refers to the instructions or programs that tell the hardware what to do. The operating system (OS) is system software that manages computer and the devices connected to it. OS is responsible for management and coordination of activities and the sharing of the limited resources of computer. The OS acts as a host for other application software.

Office Automation Products are used all over the industry for performing all kinds of tasks like word Processing, mathematical calculations, documents management, Emails, making presentations, creating catalogues and brochures and websites management. Microsoft office products are the most popular for Office Automation. Computers have been use in businesses, schools, hospitals, homes for many years now. Apart from being used to automate large systems and processes, they have made a big difference in office automation. Day-to-day office tasks such as creating documents, letters, memos, faxes, filing, storing, retrieving, mailing has become simpler and sophisticated with the use of computers. There are many software applications that help to create, edit, save and print documents, letters, mailing labels and reports. Some software can be used by students to create their project reports or assignments, at home to make a list of things to do or to buy and by anyone for any kind of document work.

Software package that enables us to create, edit, print and save documents for future retrieval and reference is known as a Word Processor. We will study about Word Processor and its features later on in this unit. Every business has numerical tasks to be performed, be it related to accounts, taxes,

sales or budgeting. Businesses also need graphs and charts for analysis and projections. At homes, we track our own budgets and investments. Mathematics and Engineering students deal with big numbers, formulas and calculations. Almost all of us deal with tables, data and calculations in some or the other form. There are many software packages available to assist us in all these number based functions. Electronic spreadsheet or MS Excel is the most common of them. In this unit, we will also study about MS Excel.

In the present world whether in academics or in industrial workplace, the role of demonstrations is vital for understanding the vision. Therefore, MS PowerPoint is playing a useful role for giving the presentations which help us to demonstrate the concepts, company strategic policies etc. In this unit, we will also learn the various features of MS PowerPoint.

3.2 OBJECTIVES

- To understand the concept of computer operating system MS Windows and its various features
- To know and understand about MS Office and its various components
- To know and understand about MS Word and its various features
- To know and understand about MS Excel and its various features
- To know and understand about MS PowerPoint and its various features

3.3 WINDOWS

3.3.1 Introduction

Windows is the main operating system (OS) using in the present time. The other alternative of Windows OS is Linux, which is comparatively less in use because of its complex interface. Both are having their own advantages and disadvantages. Linux works better on older, less powerful computer hardware because it requires less resource (memory or processing) as compared to Windows. Compared to Windows, Linux is virus-free and bugs free. Windows provides the user a mature, familiar and interactive interface that is easy to learn and understandable. A network administrator should have an expertise on both of these leading network operating systems. Even most of the network administrators are running both Linux and Windows on the server for the best networking.



Figure 1: Windows (Source: About.com, 2013)

Microsoft Windows is a series of graphical interface operating systems developed, marketed and sold by Microsoft. Microsoft introduced an operating environment named Windows on November 20, 1985 as an add-on to MS-DOS in response to the growing interest in graphical user interfaces (GUIs). Microsoft Windows came to dominate the world's personal computer market with over 90% market share, overtaking Mac OS which had been introduced in 1984. The most recent client version of Windows is Windows 8; the most recent mobile client version is Windows Phone 8; the most recent server version is Windows Server 2012.

3.3.2 Early versions of Windows (till 1995)

The term Windows collectively describes any or all of several generations of Microsoft operating system products. These products are generally categorized as follows:



Figure 2: Windows 8

The history of Windows dates back to September 1981, when Chase Bishop, a computer scientist, designed the first model of an electronic device and project "Interface Manager" was started. It was announced in November 1983 (after the Apple Lisa, but before the Macintosh) under the name "Windows" but Windows 1.0 was not released until November 1985.

Windows 1.0 lacked a degree of functionality, achieved little popularity and was to compete with Apple's own operating system. Windows 1.0 is not a complete operating system; rather, it extends MS-DOS. The shell of Windows 1.0 was a program known as the MS-DOS Executive. Windows 1.0 did not allow overlapping windows. Instead all windows were tiled. Only dialog boxes could appear over other windows.

Microsoft Windows version 2.0 was released in December 1987, featured several improvements to the user interface and memory management and was slightly more popular than its predecessor.

Windows 2.1 was released in two different versions: Windows / 386 employed the 386 virtual 8086 mode to multitask several DOS programs and the paged memory model to emulate expanded memory using available extended

memory. Windows / 286 (which, despite its name, would run on the 8086) still ran in real mode but could make use of the high memory area.

In addition to full Windows-packages, there were runtime only versions that shipped with early Windows software from third parties and made it possible to run their Windows software under MS-DOS and without the full Windows feature set.

The early versions of Windows were often thought of as simply graphical user interfaces, mostly because they ran on top of MS-DOS and used it for file system services. However, even the earliest 16-bit Windows versions already assumed many typical operating system functions; notably, having their own executable file format and providing their own device drivers (timer, graphics, printer, mouse, keyboard and sound) for applications. Unlike MS-DOS, Windows allowed users to execute multiple graphical applications at the same time, through cooperative multitasking. Windows implemented an elaborate, segment-based, software virtual memory scheme, which allowed it to run applications larger than available memory: code segments and resources were swapped in and thrown away when memory became scarce, and data segments moved in memory when a given application had relinquished processor control.

Windows 3.0, released in 1990, improved the design, mostly because of virtual memory and loadable virtual device drivers (VxDs) that allowed them to share arbitrary devices between multitasked DOS windows. Also, Windows applications could now run in protected mode (when Windows was running in Standard or 386 Enhanced Mode), which gave them access to several megabytes of memory and removed the obligation to participate in the software virtual memory scheme. They still ran inside the same address space, where the segmented memory provided a degree of protection, and multi-tasked cooperatively. Windows 3.0 also featured improvements to the user interface. Microsoft also rewrote critical operations from C into assembly. Windows 3.0 was the first Microsoft Windows version to achieve broad commercial success, selling 2 million copies in the first six months.

Windows received a facelift in Windows 3.1, made generally available on March 1, 1992. In August 1993, a special version with integrated peer-to-peer networking was released with version number 3.11. It was sold in parallel with the basic version as Windows for Workgroups. Windows 3.1 support ended on December 31, 2001.

(Source: Coursey, 2001)

3.3.3 Later versions of Windows (from 1995 to 2000)

Windows 95 was released on August 24, 1995, featuring a new object oriented user interface, support for long file names of up to 255 characters, the ability to automatically detect and configure installed hardware (plug and play) and preemptive multitasking.

Windows 95 was designed to replace not only Windows 3.1, but also Windows for Workgroups, and MS-DOS. It could natively run 32-bit applications, and featured several technological improvements that increased its stability over Windows 3.1. The changes Windows 95 brought to the desktop were revolutionary, as opposed to evolutionary, such as those in Windows 98 and Windows ME.

There were several OEM Service Releases (OSR) of Windows 95, each of which was roughly equivalent to a service pack. Mainstream support for Windows 95 ended on December 31, 2000 and extended support for Windows 95 ended on December 31, 2001.

Next in the consumer line was Microsoft Windows 98 released on June 25, 1998. It was followed with the release of Windows 98 Second Edition (often shortened to Windows 98 SE) in May 1999. Mainstream support for Windows 98 ended on June 30, 2002 and extended support for Windows 98 ended on July 11, 2006.

In February 2000, Windows 2000 (in the NT family) was released, followed by Windows ME (Millennium Edition) in September 2000.

The consumer version following Windows 98 was Windows ME (Windows Millennium Edition). Released in September 2000, Windows ME updated the core from Windows 98 but adopted some aspects of Windows 2000 and removed the "boot in DOS mode" option. Windows ME implemented a number of new technologies for Microsoft: most notably publicized was "Universal Plug and Play". It also added a new feature called System Restore, allowing the user to set the computer's settings back to an earlier date.

Windows ME is often confused with Windows 2000 (because of its name.) Windows ME was heavily criticized due to slowness, freezes and hardware problems and has been said to be one of the worst operating systems Microsoft ever released.

In July 1993, Microsoft released Windows NT based on a new kernel. The NT family of Windows systems was fashioned and marketed for higher reliability business use, considered to be the professional OS. The first release was Windows NT 3.1 (1993), numbered "3.1" to match the consumer Windows version, which was followed by Windows NT 3.5 (1994), Windows NT 3.51 (1995), Windows NT 4.0 (1996) and Windows 2000 (2000). Windows NT was the first Windows version to utilize preemptive multitasking. Windows NT 4.0 was the first in this line to implement the "Windows 95" user interface (and the first to include Windows 95's built-in 32-bit runtimes). Microsoft released Windows 2000 as part of the NT line in February 2000. During 2004 part of the source code for Windows 2000 was leaked onto the Internet. Windows 2000 is the last NT-based Windows release that does not include Microsoft Product Activation. After Windows 2000, the Windows NT family was split into two lines: A client line, including Windows XP and its successors, consists of operating systems produced for installation on client computers, such as workstations, home computers, laptops, tablet computers and media centers.

A Windows Server line, including Windows Server 2003 and its successors, consists of operating systems produced for server computers. Later, a third line for embedded systems was added with the introduction of Windows Embedded. **(Source: Todea, 2006)**

3.3.4 Modern versions of Windows like XP, Vista and 7 (from 2000 to 2011)

Microsoft moved to combine their consumer and business operating systems with Windows XP that was released on October 25, 2001. Windows XP

is built on the Windows NT kernel, retooled to also function as a home operating system. This new version was widely praised in computer magazines.

XP shipped in two distinct editions, "Home" and "Professional", the former lacking many of the superior security and networking features of the Professional edition. Additionally, the first "Media Center" edition was released in 2002, with an emphasis on support for DVD and TV functionality including program recording and a remote control. A niche market versions for tablet PCs was also released. Mainstream support for Windows XP ended on April 14, 2009. Extended support will continue until April 8, 2014.

After Windows 2000, they mould the release of schedules for various server operating systems. In April 2003, Windows Server 2003 was introduced, replacing the Windows 2000 line of server products with a number of new features and a strong focus on security; this was followed in December 2005 by Windows Server 2003 R2. After a lengthy development process, Windows Vista was released on November 30, 2006 for volume licensing and January 30, 2007 for consumers. It contains a number of new features, from a redesigned shell and user interface to significant technical changes, with a particular focus on security features. It is available in a number of different editions, and has been subject to some criticism. Vista's server counterpart, Windows Server 2008 was released in early 2008.

On July 22, 2009, Windows 7 (please see Figure 1) and Windows Server 2008 R2 were released as RTM (release to manufacturing) while the former was released to the public 3 months later on October 22, 2009. Unlike its predecessor, Windows Vista, which introduced a large number of new features, Windows 7 was intended to be a more focused, incremental upgrade to the Windows line, with the goal of being compatible with applications and hardware with which Windows Vista was already compatible. Windows 7 has multi-touch support, a redesigned Windows shell with a new taskbar, referred to as the Superbar, a home networking system called HomeGroup, and performance improvements.

(Source: Nash, 2008)

3.3.5 Windows 8 – the latest operating system of Windows (2012-2013)

Windows 8, the successor to Windows 7, was released to the market on 26 October 2012. Windows 8 (please see Figure 2) has been designed to be used on both tablets and the conventional PC. The Microsoft Surface tablet was released alongside Windows 8, as a competitor to the Apple iPad and Android tablets. Microsoft Surface is available in two editions, Surface with Windows RT and Surface with Windows 8 Pro, aimed at designers and other work-based users. The Surface RT will run a limited version of Windows 8, and will not run many classic Windows desktop applications, as users can download new applications from the Windows App Store. However, the Surface Pro, to be released on February 9, 2013, will have a full desktop operating system capable of running all classic desktop applications. See Microsoft Surface for more information. Windows 8 was released to manufacturing on 1 August 2012, with a build of 6.2.9200. It is available for purchase in two versions, Windows 8 and Windows 8 Pro.

For the first time since Windows 95, the Start button is no longer available on the taskbar. It has been replaced with the Start screen and can be triggered by clicking the bottom-left corner of the screen and by clicking Start in the Charms or by pressing the Windows key on the keyboard. However, there are many third-party solutions such as Stardock Start8 and Classic Shell that do bring back the Windows 7 style start menu.

In February 2013, it was reported that an update to Windows 8, codenamed *Windows Blue*, had completed the first milestone, indicating development is approximately halfway complete.

(Source: Hornby, 2013)

3.4 MS Office

3.4.1 Introduction

The term MS Office stands for Microsoft Office. It is basically a suite of products developed by Microsoft Corporation that includes Microsoft Word, Excel, Access, Publisher, PowerPoint and Outlook (please see Figure 3). Each program serves a different purpose and is compatible with other programs included in the package. The suite of programs is compatible with both the Windows and Macintosh operating system. Microsoft Office is the most common form of software used in the western world.

The Microsoft Office is an office suite of desktop applications, servers and services for the Microsoft Windows and OS X operating systems, introduced by Microsoft on August 1, 1989. Initially a marketing term for a bundled set of applications, the first version of Office contained Microsoft Word, Microsoft Excel and Microsoft PowerPoint.

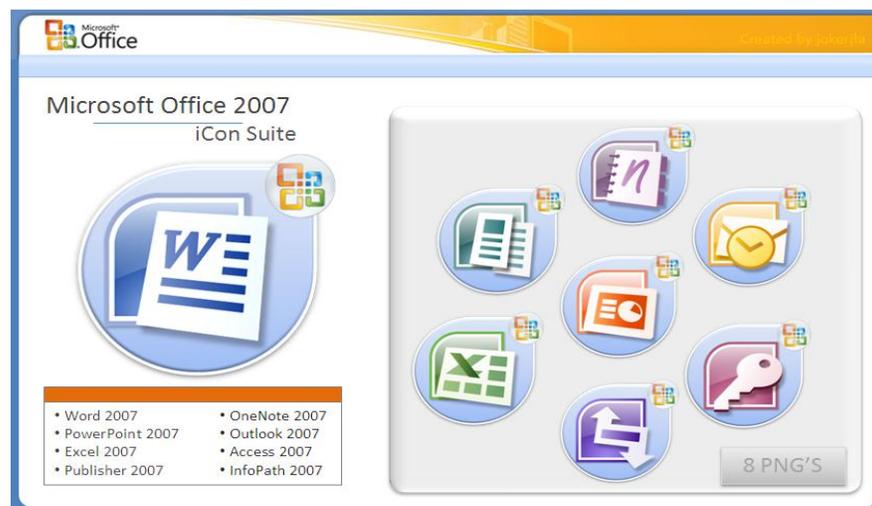


Figure 3: MS Office Suite

Over the years, Office applications have grown substantially closer with shared features such as a common spell checker, OLE data integration and Microsoft Visual Basic for Applications scripting language. Microsoft also positions Office as a development platform for line-of-business software under the Office Business Applications brand. Office is reported to now be used by over

a billion people worldwide. The current versions are Office 2013 for Windows, released on October 11, 2012 and Office 2011 for OS X, released October 26, 2010. On 24 October 2012, the RTM final code of Office 2013 Professional Plus has been released to TechNet and MSDN subscribers for download. On 15 November 2012, the 60-day trial version of Office 2013 Professional Plus was released for download.

(Source: Hughes, 2009)

3.4.2 Various components of MS Office

3.4.2.1: Word

Microsoft Word is a word processor and was previously considered the main program in Office. Its proprietary DOC format is considered a *de facto* standard, although Word 2007 can also use a new XML-based, Microsoft Office-optimized format called .DOCX, which has been standardized by Ecma International as Office Open XML and its SP2 update supports PDF and a limited ODF. Word is also available in some editions of Microsoft Works. It is available for the Windows and OS X platforms. The first version of Word, released in the autumn of 1983, was for the MS-DOS operating system and had the distinction of introducing the mouse to a broad population. Word 1.0 could be purchased with a bundled mouse, though none was required. Following the precedents of LisaWrite and MacWrite, Word for Macintosh attempted to add closer WYSIWYG features into its package. Word for Mac was released in 1985. Word for Mac was the first graphical version of Microsoft Word. Word is used for Scripts and other writing pieces.

3.4.2.2: Excel

Microsoft Excel is a spreadsheet program that originally competed with the dominant Lotus 1-2-3, but eventually outsold it. It is available for the Windows and OS X platforms. Microsoft released the first version of Excel for the Mac OS in 1985, and the first Windows version (numbered 2.05 to line up with the Mac and bundled with a standalone Windows run-time environment) in November 1987.

3.4.2.3: Outlook

Microsoft Outlook (not to be confused with Outlook Express) is a personal information manager and e-mail communication software. The replacement for Windows Messaging, Microsoft Mail, and Schedule+ starting in Office 97, it includes an e-mail client, calendar, task manager and address book. On the Mac OS, Microsoft offered several versions of Outlook in the late 1990s, but only for use with Microsoft Exchange Server. In Office 2001, it introduced an alternative application with a slightly different feature set called Microsoft Entourage. It reintroduced Outlook in Office 2011, replacing Entourage.

3.4.2.4: PowerPoint

Microsoft PowerPoint is a presentation program for Windows and OS X. It is used to create slideshows, composed of text, graphics, and other objects, which can be displayed on-screen and shown by the presenter or printed out on transparencies or slides.

3.4.2.5: Other desktop applications (Windows version only)

- **Microsoft Access** — database manager
- **Microsoft InfoPath** — an application to design rich XML-based forms
- **Microsoft OneNote** — note-taking software for use with both tablet and conventional PCs
- **Microsoft Project** — project management software to keep track of events and to create network charts and Gantt charts (*not bundled in any Office suite*)
- **Microsoft Publisher** — desktop publishing software mostly used for designing brochures, labels, calendars, greeting cards, business cards, newsletters, and postcards.
- **Microsoft SharePoint Workspace** (formerly known as Groove) — a proprietary peer-to-peer collaboration software leveled at businesses
- **Microsoft Visio** — diagram and flowcharting software (*not bundled in any Office suite*)
- **Microsoft Office InterConnect** — business-relationship database available only in Japan
- **Microsoft Office Picture Manager** — basic photo management software (similar to Google's Picasa or Adobe's Photoshop Elements), replaced Microsoft Photo Editor

The following applications are no longer branded as part of Microsoft Office:

- **Microsoft SharePoint Designer** — a WYSIWYG HTML editor and web design program for customizing SharePoint applications, it replaces Microsoft FrontPage (*not bundled in any Office suite*)
- **Microsoft Lync** — Integrated communications client for conferences and meetings in real time (known as Microsoft Office Communicator in Office 2007, bundled with Professional Plus and Enterprise editions)

Server applications

- **Microsoft SharePoint** — collaboration server
 - Excel Services
 - InfoPath Forms Services
- **Microsoft Lync Server** (formerly Office Communications Server and Live Communications Server) — real time communications server
- **Microsoft Office Forms Server** — lets users use any browser to access and fill InfoPath forms. Office Forms Server is a standalone server installation of InfoPath Forms Services.
- **Microsoft Office Groove Server** — centrally managing all deployments of Microsoft Office Groove in the enterprise
- **Microsoft Office Project Server** — project management server
- **Microsoft Office Project Portfolio Server** — allows creation of a project portfolio, including workflows, hosted centrally
- **Microsoft Office Performance Point Server** — allows customers to monitor, analyze, and plan their business

Web services

- **Office Web Apps** — Web-based companions to Microsoft Office applications to view, create, and edit documents.
- **Office Live**
 - *Office Live Small Business* — Web hosting services and online collaboration tools for small businesses.

- *Office Live Workspace* — Online storage and collaboration service for documents, superseded by Office Web Apps and SkyDrive
- **Live Meeting** — Web conferencing service.
- **Microsoft Office product web site** — Provides support for all Microsoft Office products.
- **Microsoft Update** — Web site. Patch detection and installation service for Microsoft Office.
- **Microsoft Office 365** — Subscription based software services that can include a subscription to desktop applications in addition to cloud-based services.

(Source: Marco, 2010 and Wildstrom, 2008)

3.4.3 Microsoft Windows and MS Office Versions

Table 1 presented the various Microsoft Windows and MS Office versions from MS Office 1997 to MS Office 2013.

Table 1: Microsoft Windows and MS Office Versions

Microsoft Windows version	Last version	Mainstream support end-date	Extended support end-date
Windows NT 3.51 with Service Pack 5	Office 97	31-Aug-01	28-Feb-02
Windows 95	Office 2000	30-Jun-04	14-Jul-09
Windows NT 4.0	Office XP	11-Jul-06	12-Jul-11
Windows 98	Office XP	11-Jul-06	12-Jul-11
Windows Me	Office XP	11-Jul-06	12-Jul-11
Windows 2000 with Service Pack 2	Office XP	11-Jul-06	12-Jul-11
Windows 2000 with Service Pack 3 or later	Office 2003	14-Apr-09	8-Apr-14
Windows XP with Service Pack 2	Office 2007	10-Apr-12	11-Apr-17
Windows XP with Service Pack 3	Office 2010	13-Oct-15	13-Oct-20
Windows Server 2003	Office 2003	14-Apr-09	8-Apr-14
Windows Server 2003 with Service Pack 2	Office 2010	13-Oct-15	13-Oct-20
Windows Vista	Office 2007	10-Apr-12	11-Apr-17
Windows Vista with Service Pack 1	Office 2010	13-Oct-15	13-Oct-20
Windows Server 2008	Office 2010	13-Oct-15	13-Oct-20

Windows 7	Office 2010	13-Oct-15	13-Oct-20
Windows 7 with Service Pack 1	Office 2013	TBA	TBA
Windows 8	Office 2013	TBA	TBA

*TBA = To Be Announced

3.5 MS WORD

3.5.1 Introduction

Microsoft Word is a word processor designed by Microsoft (please see Figure 4). It was first released in 1983 under the name *Multi-Tool Word* for Xenix systems. Subsequent versions were later written for several other platforms including IBM PCs running DOS (1983), the Apple Macintosh (1984), the AT&T Unix PC (1985), Atari ST (1986), SCO UNIX, OS/2 and Microsoft Windows (1989). It is a component of the Microsoft Office software system; it is also sold as a standalone product and included in Microsoft Works Suite.

3.5.2 Development and versions

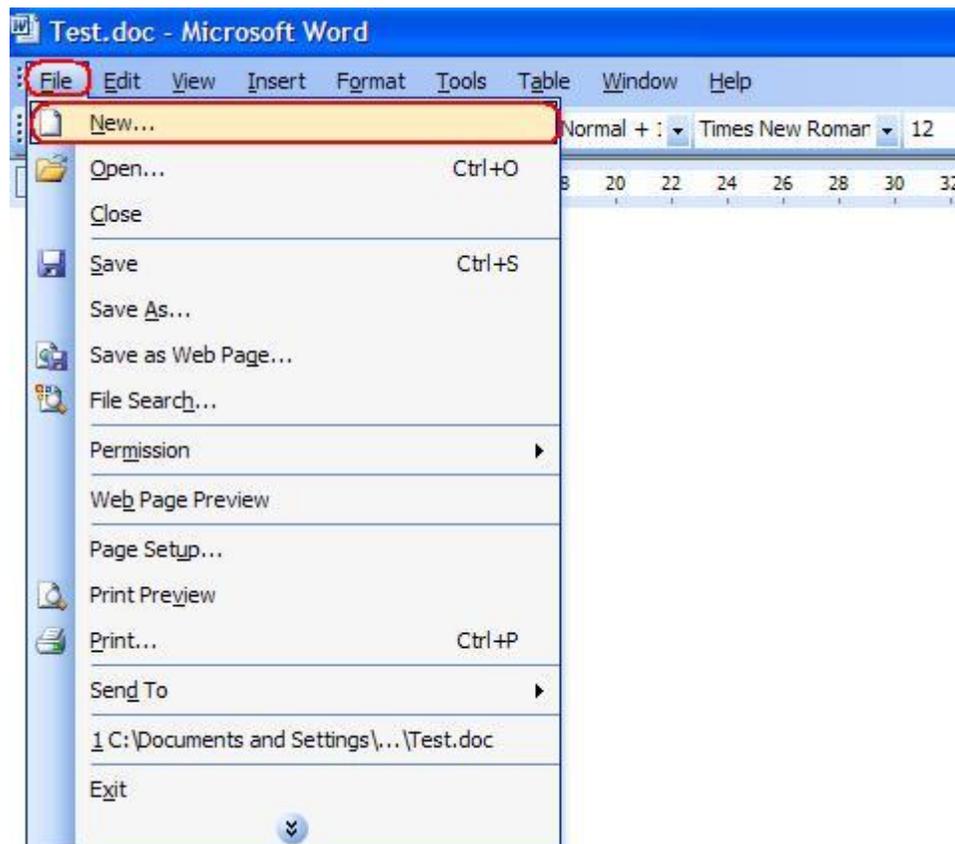


Figure 4: MS Word

A full-featured word processing program for Windows and Mac from Microsoft are available stand-alone or as part of the Microsoft Office suite. Word contains rudimentary desktop publishing capabilities and is the most widely used word processing program on the market. Word files are commonly used as the format for sending text documents via e-mail because almost every user with a computer can read a Word document by using the Word application, a Word viewer or a word processor that imports the Word format.

Word 95 for Windows was the first 32-bit version of the product, released with Office 95 around the same time as Windows 95. It was a straightforward port of Word 6.0 and it introduced few new features, one of them being red-squiggle underlined spell-checking. Starting with Word 95, releases of Word were named after the year of its release, instead of its version number.

In 1997, Microsoft formed the Macintosh Business Unit as an independent group within Microsoft focused on writing software for the Mac. Its first version of Word, Word 98, was released with Office 98 Macintosh Edition. Document compatibility reached parity with Word 97, and it included features from Word 97 for Windows, including spell and grammar checking with squiggles. Users could choose the menus and keyboard shortcuts to be similar to either Word 97 for Windows or Word 5 for Mac.

Word 2001, released in 2000, added a few new features, including the Office Clipboard, which allowed users to copy and paste multiple items. It was the last version to run on classic Mac OS and, on Mac OS X, it could only run within the Classic Environment. Word X, released in 2001, was the first version to run natively on, and required, Mac OS X, and introduced non-contiguous text selection.

Word 2004 was released in May 2004. It included a new Notebook Layout view for taking notes either by typing or by voice. Other features, such as tracking changes, were made more similar with Office for Windows.

3.5.3 Features and loopholes

Among its features, Word includes a built-in spell checker, a thesaurus, a dictionary, and utilities for manipulating and editing text. The following are some aspects of its feature set.

3.5.3.1: WordArt

WordArt enables drawing text in a Microsoft Word document such as a title, watermark, or other text, with graphical effects such as skewing, shadowing, rotating, stretching in a variety of shapes and colors and even including three-dimensional effects, starting at version 2007, and prevalent in Office 2010. Users can apply formatting effects such as shadow, bevel, glow, and reflection to their document text as easily as applying bold or underline. Users can also spell-check text that uses visual effects, and add text effects to paragraph styles.

3.5.3.2: Macros

A Macro is a rule of pattern that specifies how a certain input sequence (often a sequence of characters) should be mapped to an output sequence according to defined process. Frequently used or repetitive sequences of keystrokes and mouse movements can be automated. Like other Microsoft Office documents, Word files can include advanced macros and even embedded programs. The language was originally WordBasic, but changed to Visual Basic for Applications as of Word 97.

This extensive functionality can also be used to run and propagate viruses in documents. The tendency for people to exchange Word documents via email, USB flash drives, and floppy disks made this an especially attractive vector in 1999. A prominent example was the Melissa virus, but countless others have existed in the wild.

These macro viruses were the only known cross-platform threats between Windows and Macintosh computers and they were the only infection vectors to affect any Mac OS X system up until the advent of video codec trojans in 2007. Microsoft released patches for Word X and Word 2004 that effectively eliminated the macro problem on the Mac by 2006.

Word's macro security setting, which regulates when macros may execute, can be adjusted by the user, but in the most recent versions of Word, is set to HIGH by default, generally reducing the risk from macro-based viruses, which have become uncommon.

3.5.3.3: Layout issues

Before Word 2010 (Word 14) for Windows, the program was unable to correctly handle ligatures defined in TrueType fonts. Those ligature glyphs with Unicode codepoints may be inserted manually, but are not recognized by Word for what they are, breaking spell checking, while custom ligatures present in the font are not accessible at all. Since Word 2010, the program now has advanced typesetting features which can be enabled: OpenType ligatures, kerning, and hyphenation. Other layout deficiencies of Word include the inability to set crop marks or thin spaces. Various third-party workaround utilities have been developed. Similarly, combining diacritics are handled poorly: Word 2003 has "improved support", but many diacritics are still misplaced, even if a pre-composed glyph is present in the font. Additionally, as of Word 2002, Word does automatic font substitution when it finds a character in a document that does not exist in the font specified. It is impossible to deactivate this, making it very difficult to spot when a glyph used is missing from the font in use. If "Mirror margins" or "Different odd and even" are enabled, Word will not allow the user to freshly begin page numbering an even page after a section break (and vice versa). Instead it inserts a mandatory blank page which cannot be removed. In Word 2004 for Macintosh, support of complex scripts was inferior even to Word 97, and Word 2004 does not support Apple Advanced Typography features like ligatures or glyph variants.

3.5.3.4: Bullets and numbering

Word has extensive lists of bullets and numbering features used for tables, lists, pages, chapters, headers, footnotes, and tables of content. Bullets and numbering can be applied directly or using a button or by applying a style or through use of a template. Some problems with numbering have been found in Word 97-2003. An example is Word's system for restarting numbering. The Bullets and Numbering system has been significantly overhauled for Office 2007, which drastically reduces these problems. Users can also create tables in Word. Depending on the version, Word can perform simple calculations. Formulae are also supported in it while creating document is an act of making a document. After that the document can be printed out as a hardcopy.

3.4.3.5: Auto Summarize

AutoSummarize highlights passages or phrases that it considers valuable. The amount of text to be retained can be specified by the user as a

percentage of the current amount of text. According to Ron Fein of the Word 97 team, AutoSummarize cuts wordy copy to the bone by counting words and ranking sentences. First, AutoSummarize identifies the most common words in the document (barring "a" and "the" and the like) and assigns a "score" to each word—the more frequently a word is used, the higher the score. Then, it "averages" each sentence by adding the scores of its words and dividing the sum by the number of words in the sentence—the higher the average, the higher the rank of the sentence. "It's like the ratio of wheat to chaff," explains Fein.

AutoSummarize was removed from Microsoft Word for Mac 2011, although it was present in Word for Mac 2008. AutoSummarize was removed from the Office 2010 release version (14) as well.

(Source: Mendelson, 2010 and Edwards, 2008)

3.6 MS EXCEL

3.6.1 Introduction

Microsoft Excel is a spreadsheet application developed by Microsoft for Microsoft Windows and Mac OS X (please see Figure 5). It features calculation, graphing tools, pivot tables, and a macro programming language called Visual Basic for Applications. It has been a very widely applied spreadsheet for these platforms, especially since version 5 in 1993, and it has replaced Lotus 1-2-3 as the industry standard for spreadsheets. Excel forms part of Microsoft Office.

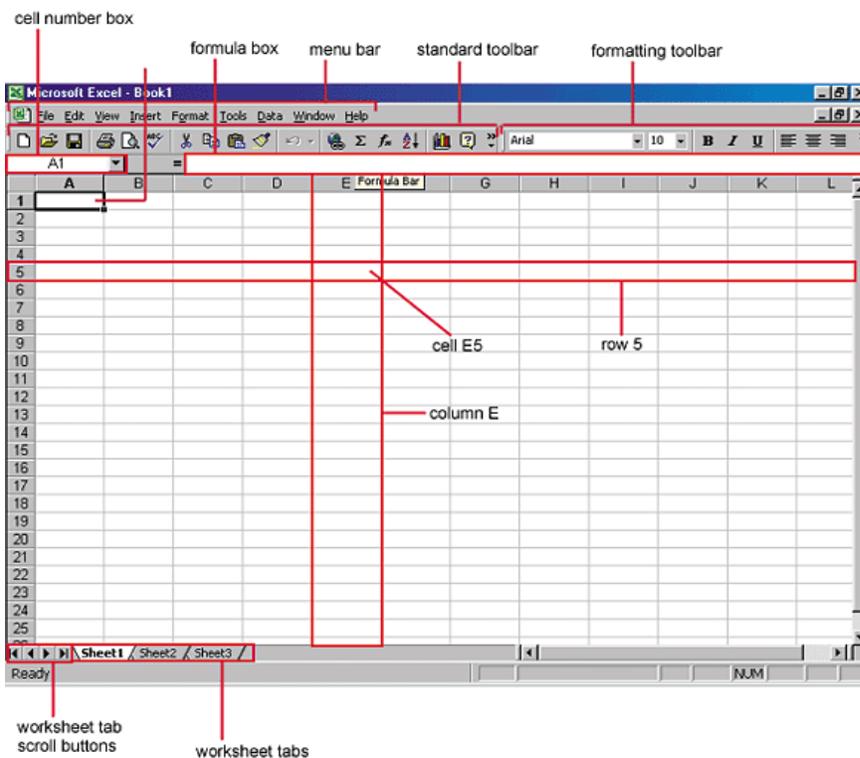


Figure 5: MS Excel

Microsoft Excel has the basic features of all spreadsheets, using a grid of *cells* arranged in numbered *rows* and letter-named *columns* to organize data manipulations like arithmetic operations. It has a battery of supplied functions to answer statistical, engineering and financial needs. In addition, it can display data as line graphs, histograms and charts, and with a very limited three-dimensional graphical display. It allows sectioning of data to view its dependencies on various factors for different perspectives (using *pivot tables* and the *scenario manager*)

It has a programming aspect, *Visual Basic for Applications*, allowing the user to employ a wide variety of numerical methods, for example, for solving differential equations of mathematical physics, and then reporting the results back to the spreadsheet. It also has a variety of interactive features allowing user interfaces that can completely hide the spreadsheet from the user, so the spreadsheet presents itself as a so-called *application*, or *decision support system* (DSS), via a custom-designed user interface, for example, a stock analyzer, or in general, as a design tool that asks the user questions and provides answers and reports. In a more elaborate realization, an Excel application can automatically poll external databases and measuring instruments using an update schedule, analyze the results, make a Word report or Power Point slide show, and e-mail these presentations on a regular basis to a list of participants.

3.6.2 Features of MS Excel

3.6.2.1: VBA Programming

The Windows version of Excel supports programming through Microsoft's Visual Basic for Applications (VBA), which is a dialect of Visual Basic. Programming with VBA allows spreadsheet manipulation that is awkward or impossible with standard spreadsheet techniques. Programmers may write code directly using the Visual Basic Editor (VBE), which includes a window for writing code, debugging code, and code module organization environment. The user can implement numerical methods as well as automating tasks such as formatting or data organization in VBA and guide the calculation using any desired intermediate results reported back to the spreadsheet.

VBA was removed from Mac Excel 2008, as the developers did not believe that a timely release would allow porting the VBA engine natively to Mac OS X. VBA was restored in the next version, Mac Excel 2011.

A common and easy way to generate VBA code is by using the Macro Recorder. The Macro Recorder records actions of the user and generates VBA code in the form of a macro. These actions can then be repeated automatically by running the macro. The macros can also be linked to different trigger types like keyboard shortcuts, a command button or a graphic. The actions in the macro can be executed from these trigger types or from the generic toolbar options.

The VBA code of the macro can also be edited in the VBE. Certain features such as loop functions and screen prompts by their own properties, and some graphical display items, cannot be recorded, but must be entered into the VBA module directly by the programmer. Advanced users can employ user prompts to create an interactive program, or react to events such as sheets being loaded or changed.

Users should be aware that using Macro Recorded code may not be compatible from one version of Excel to another. Some code that is used in Excel 2010 cannot be used in Excel 2003. Making a Macro that changes the cell colors and making changes to other aspects of cells may not be backward compatible.

VBA code interacts with the spreadsheet through the Excel *Object Model*, a vocabulary identifying spreadsheet objects, and a set of supplied functions or *methods* that enable reading and writing to the spreadsheet and interaction with its users (for example, through custom toolbars or *command bars* and *message boxes*). User-created VBA subroutines execute these actions and operate like macros generated using the macro recorder, but are more flexible and efficient.

3.6.2.2: Charts

Excel supports charts, graphs, or histograms generated from specified groups of cells. The generated graphic component can either be embedded within the current sheet, or added as a separate object.

These displays are dynamically updated if the content of cells changes. For example, suppose that the important design requirements are displayed visually; then, in response to a user's change in trial values for parameters, the curves describing the design change shape and their points of intersection shift, assisting the selection of the best design.

3.6.2.3: Statistical functions

The accuracy and convenience of statistical tools in Excel has been criticized, as mishandling missing data, as returning incorrect values due to inept handling of round-off and large numbers, as only selectively updating calculations on a spreadsheet when some cell values are changed, and as having a limited set of statistical tools. Microsoft has announced some of these issues are addressed in Excel 2010.

3.6.2.4: Excel MOD function error

Excel has issues with modulo operations. In the case of excessively large results, Excel will return the error warning #NUM! instead of an answer.

3.6.2.5: Date problems

Excel includes January 0, 1900 and February 29, 1900, incorrectly treating 1900 as a leap year. The bug originated from Lotus 1-2-3, and was purposely implemented in Excel for the purpose of backward compatibility. This legacy has later been carried over into Office Open XML file format. Excel also does not support dates before 1900.

3.6.2.6: Filenames

Microsoft Excel will not open two documents with the same name and instead will display the following error:

A document with the name '%s' is already open. You cannot open two documents with the same name, even if the documents are in different folders. To open the second document, either close the document that is currently open, or rename one of the documents.

The reason is for calculation ambiguity with linked cells. If there is a cell ='[Book1.xlsx]Sheet1'!\$G\$33, and there are two books named "Book1" open, there is no way to tell which one the user means.

3.6.2.7: Export and migration of spreadsheets

Programmers have produced APIs to open Excel spreadsheets in a variety of applications and environments other than Microsoft Excel. These include opening Excel documents on the web using either ActiveX controls, or

plugins like the Adobe Flash Player. The Apache POI opensource project provides Java libraries for reading and writing Excel spreadsheet files. Excel Package is another open-source project that provides server-side generation of Microsoft Excel 2007 spreadsheets. PHPEXcel is a PHP library that converts Excel5, Excel 2003, and Excel 2007 formats into objects for reading and writing within a web application. Excel Services is a current .NET developer tool that can enhance Excel's capabilities.

(Source: Harvey, 2007)

3.7 MS POWER PRESENTATION

3.7.1 Introduction

Microsoft PowerPoint is the name of a proprietary commercial presentation program developed by Microsoft (please see Figure 6). It was officially launched on May 22, 1990 as a part of the Microsoft Office suite, and runs on Microsoft Windows and Apple's Mac OS X operating system. PowerPoint is the most widely used software for making presentations and slide shows. It helps to create a professional presentations, brochures, graphs and charts.

Originally designed for the Macintosh computer, the initial release was called "Presenter", developed by Dennis Austin and Thomas Rudkin of Forethought, Inc. In 1987, it was renamed to "PowerPoint" due to problems with trademarks, the idea for the name coming from Robert Gaskins. In August of the same year, Forethought was bought by Microsoft for \$14 million USD (\$28.6 million in present-day terms), and became Microsoft's Graphics Business Unit, which continued to develop the software further. PowerPoint was officially launched on May 22, 1990, the same day that Microsoft released Windows 3.0.

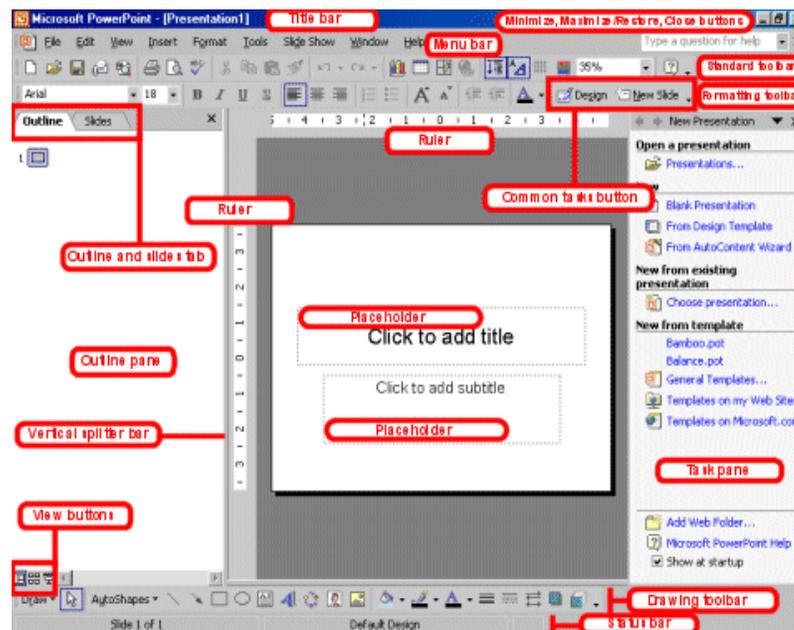


Figure 6: MS PowerPoint

PowerPoint introduced many new changes with the release of PowerPoint 97. Prior to PowerPoint 97, presentations were linear, always proceeding from one slide to the next. PowerPoint 97 incorporated the Visual Basic for Applications (VBA) language, underlying all macro generation in Office 97, which allowed users to invoke pre-defined transitions and effects in a non-linear movie-like style without having to learn programming.

PowerPoint 2000 (and the rest of the Office 2000 suite) introduced a clipboard that could hold multiple objects at once. Another change was that the Office Assistant was changed to be less intrusive.

As of 2012, various versions of PowerPoint claim approximately 95% of the presentation software market share, with installations on at least 1 billion computers. Among presenters world-wide, this program is used at an estimated frequency of 350 times per second.

3.7.2 Basic Functions

PowerPoint presentations consist of a number of individual pages or "slides". The "slide" analogy is a reference to the slide projector. A better analogy would be the "foils" (or transparencies / plastic sheets) that are shown with an overhead projector, although they are in decline now. Slides may contain text, graphics, sound, movies, and other objects, which may be arranged freely. The presentation can be printed, displayed live on a computer, or navigated through at the command of the presenter. For larger audiences the computer display is often projected using a video projector. Slides can also form the basis of webcasts. Power Point provides three types of movements:

1. Entrance, emphasis, and exit of elements on a slide itself are controlled by what PowerPoint calls Custom Animations.
2. Transitions, on the other hand, are movements between slides. These can be animated in a variety of ways.
3. Custom animation can be used to create small story boards by animating pictures to enter, exit or move.

3.7.3 Benefits

Microsoft Office PowerPoint Viewer is a program used to run presentations on computers that do not have PowerPoint installed. Office PowerPoint Viewer is added by default to the same disk or network location that contains one or more presentations packaged by using the Package for CD feature. PowerPoint Viewer is installed by default with a Microsoft Office 2003 installation for use with the Package for CD feature. The PowerPoint Viewer file is also available for download from the Microsoft Office Online Web site.

The presentations which are password protected can even open or modify by PowerPoint Viewer. The Package for CD feature allows packaging any password-protected file or setting a new password for all packaged presentations. PowerPoint Viewer prompts for a password if the file is open password-protected. PowerPoint Viewer supports opening presentations created using PowerPoint 97 and later. In addition, it supports all file content except OLE objects and scripting. PowerPoint Viewer is currently only available for computers running on Microsoft Windows.

Source: Wright, 2009)

3.7.4 Features of MS PowerPoint 2010

- i. Customize the Ribbon
- ii. Group Slides into Sections
- iii. Improved Picture Crop
- iv. Broadcast Slideshow via the SkyDrive
- v. Insert Video from Online Sites
- vi. Save Presentation as a Video
- vii. Combine Shapes Tools
- viii. Bookmark and Trigger Audio and Video
- ix. Remove Background from a Picture

The detailed explanations are as follows:

- i. **Customize the Ribbon:** The ribbon option provides the help to much easier for locate certain commands. It also provides the ability to create customized tabs filled with whatever tools and commands use on a regular basis.
- ii. **Group Slides into Sections:** Another feature is the ability to arrange group slides into sections. Overall, this feature is very useful for longer presentations, normally more than 50 slides. With sections one can navigate the slide deck easily by collapsing or expanding sections from both the slide sorter view and the normal view through the navigation pane.
- iii. **Improved Picture Crop:** One can now easily crop pictures by aspect ratio, a feature which is great for working back and forth between widescreen (16:9 or 16:10) presentations and the standard 4:3 PowerPoint slide ratio.
- iv. **Broadcast Slideshow via the SkyDrive:** Let's face it, not everyone has SharePoint, so sharing documents and slideshows with people in other locations is still a bit tricky. Luckily, PowerPoint 2010 gives the ability to broadcast our slideshow, allowing us to upload the presentation using the free PowerPoint Broadcast Service.
- v. **Insert Video from Online Sites:** PowerPoint 2010 presenters can insert and play video from online sites such as YouTube, Vimeo and Revver during a slide show. All one need to do is copy and paste the embed code into the insert video dialog box and PowerPoint does the rest.
- vi. **Save Presentation as a Video:** It provides the innate ability to create a video and see that in doing so both audio and very complex animations keep their timings and synchronization.
- vii. **Combine Shapes Tools:** With PowerPoint 2010, one can join two or more shapes with either the Shape Union or Shape Combine tools and even cut shapes using the Shape Intersect or Shape Subtract tools.
- viii. **Bookmark and Trigger Audio and Video:** Another great new feature in PowerPoint 2010 is the ability to create bookmarks inside media, allowing the presenter to skip or jump to a particular point within the media. But this feature really finds its power in the ability to trigger an animation to media bookmarks, which if one can ever tried to sync animations to music, then one can understand why bookmark triggers are so helpful.
- ix. **Remove Background from a Picture:** By far the most used feature in PowerPoint 2010 is the background removal tool for pictures. As someone who has been using Photoshop to do exactly this for years, one even welcome PowerPoint's quick and easy-to-use tool for removing the background picture.

(Source: Ackmann, 2011)

3.8 SUMMARY

Microsoft introduced an operating environment named Windows on November 20, 1985 as an add-on to MS-DOS in response to the growing interest in graphical user interfaces (GUIs). Microsoft Windows came to dominate the world's personal computer market with over 90% market share, overtaking Mac OS, which had been introduced in 1984. The most recent client version of Windows is Windows 8; the most recent mobile client version is Windows Phone 8; the most recent server version is Windows Server 2012.

The Microsoft Office is an office suite of desktop applications, servers and services for the Microsoft Windows and OS X operating systems, introduced by Microsoft on August 1, 1989. Initially a marketing term for a bundled set of applications, the first version of Office contained Microsoft Word, Microsoft Excel and Microsoft PowerPoint.

Microsoft Word is a word processor designed by Microsoft. It was first released in 1983 and the subsequent versions were later written for several other platforms including IBM PCs running DOS (1983), the Apple Macintosh (1984), the AT&T Unix PC (1985), Atari ST (1986), SCO UNIX, OS/2 and Microsoft Windows (1989). It is a component of the Microsoft Office software system.

Microsoft Excel is a spreadsheet application developed by Microsoft for Microsoft Windows and Mac OS X. It features calculation, graphing tools, pivot tables, and a macro programming language called Visual Basic for Applications.

Microsoft PowerPoint is the name of a proprietary commercial presentation program developed by Microsoft. It was officially launched on May 22, 1990 as a part of the Microsoft Office suite, and runs on Microsoft Windows and Apple's Mac OS X operating system. PowerPoint is the most widely used software for making presentations and slide shows. It helps to create a professional presentations, brochures, graphs and charts.

3.9 EXPECTED QUESTIONS

- Q1: What do you mean by the term Windows and explain the historical development of Windows over the time?
- Q2: Write an essay on MS Office?
- Q3: What are the various features of MS Word?
- Q4: Explain the utility of MS Excel in day today working arena?
- Q5: Define and explain the significance of MS PowerPoint in various fields of expertise?

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UNIT 4

USE OF COMPUTER TECHNOLOGY IN TOURISM INDUSTRY

Overview: There is lot of changes in the modus operandi of Indian tourism industry. It is possible to book your ticket, lodge complaint electronically and see the action taken within stipulated time. Many destinations have been planning to bring time bound services in tourism. Tourist keeps SIM, ATM card and Mobile phone, which is a sign of technological progress of the country. Once, upon the time you were special if you have BSNL SIM, SBI ATM card and mobile phone. Technology has enabled government to manage better, by giving fast access to data, instant communication, and decision making tools.

Contents

- 4.0 Introduction
- 4.1 Information Systems applications
- 4.2 Tourism & Hospitality
- 4.3 Integrated Hotel Information Systems
- 4.4 MIS vis a vis Tourism
- 4.5 MIS applications
- 4.6 Key words
- 4.7 Summary
- 4.8 References

4.0 INTRODUCTION

MIS is immensely useful in tourism. Tourism industry consists of many segments of smaller sectors like: tourists transport, hospitality, accommodation, leisure, entertainments etc. IS play vital role by integrating all these sub units.

4.1 INFORMATION SYSTEMS APPLICATIONS

Generally, information system is applied everywhere. It is more useful in services sector. It is used due to four basic reasons (Tragett David, Grimshaw David J. and Powell Philip, 1999)

- (i) Competition and business impact
- (ii) Management planning
- (iii) Managing Information resources
- (iv) Information and communications

Most of the organizations in general in services sector and in particular in tourism, travel and allied sector use information systems due to competition in the segments. Organizations are forced to have technology for better management of information due to stiff competitions. It helps them to provide niches services.

Information systems help to plan your work in organization. There are many functions like: expansions, launch of new tour package, change in business strategy is part of meticulous planning in the organizations.

It also helps to manage information resources. Tourism, travel and peripheral services are based in information and information managed properly means you have advantage in the industry. That is why it is necessity to have IS.

I feel that most basic reason behind the use of information system in tourism and related sector is communications. All applications like: CRS, Global Distribution Systems (GDS), Hotel Reservation Systems (HRS), Property Management Systems (PMS), all purpose Ticket Issuing Systems (APTIS) are based on communication systems. There are two types of sue of communication in this area:-

- (i) General communication
- (ii) Communication for industry specific applications

Computerized Reservation Systems has tremendous scope in this sector and all major CRS systems are based on intranet. Likewise, GDS has its presence in over many countries. Amadeus is present on 100 or more countries. So, these systems are most powerful communication systems.

In allied sector Banks have ATM machines connected through wireless communication.

Check your progress

Name any three communication systems used in Tourism, Travel

4.2 TOURISM AND HOSPITALITY

Information Technology introduce traceability in financial transactions to strike a blow against black money (Ashok Jhunjhunwala, 22nd Feb.2011, Times of India, New Delhi). Rulers in small countries Tunisia and Egypt have fallen. Interestingly, information technologies played their small part in this. But, our country is not like Tunisia and Egypt. Our country's economy has belied expectations. It grows at 8 to 9% year after year. As large sections do not benefit appropriately from this grow th. There has been focus on government programmes to make it inclusive. Our press has demonstrated its independence. The Act like: RTI enables us to demand and get information in transparent manner. The back-end core banking system of almost all banks allows that. ATM withdrawals, anywhere, any-branch banking and internet banking thrive on it. The internet is used by a small section. Credit card based payments and transaction could be another way, but have not caught on much except for use of debit cards for cash withdrawals. India has over 750 million mobile phone connections. It is growing at 15 million per month. About 500 million individuals are believed to have mobiles. Mobile telephony could touch most of India's adult population. It is now also possible to connect one's (tourist's) mobile phone to a bank account. So, it is possible to carry out most transactions including money transfer, bill payments, balance enquiry and checks on past transactions. A bank's computer uses the caller line identification (CLI) and customer's PIN to authenticate her, following which any transaction can be carried out using an application loaded on her phone. End-to-end encryption (codified form for security) makes transactions secure. Transactions are instantaneous: like, any payment is notified by sending an SMS to the payer as well as payee.

The Mobile Payment Forum of India, RBI and National Payment Corporation of India worked with banks, telecom operators and technology providers to make money transfer possible between customers of any two banks, any two operators and any two technology providers. One does not even need the bank account number to make payments, as the payee’s mobile number and mobile money ID (MMID) uniquely map to her bank account.

Mobile payments would make cash redundant. One could pay a vegetable vendor who displays a mobile number and MMID at the shop. Similarly, auto fare or kirana shop payments can be made instantaneously. Money can be transferred whether the recipient is near or far. Doing so from Mumbai to an Orissa village would now be a simple matter. A single day amount could be small, say Rs 50, or as much as Rs 50,000. Safe, secure, simple, instantaneous and with a complete list of payments and receipts in one’s passbook, there is no reason why anyone would not use this method. Using mobile payments instead of cash could be our way to bring in traceability and say no to the black money economy.

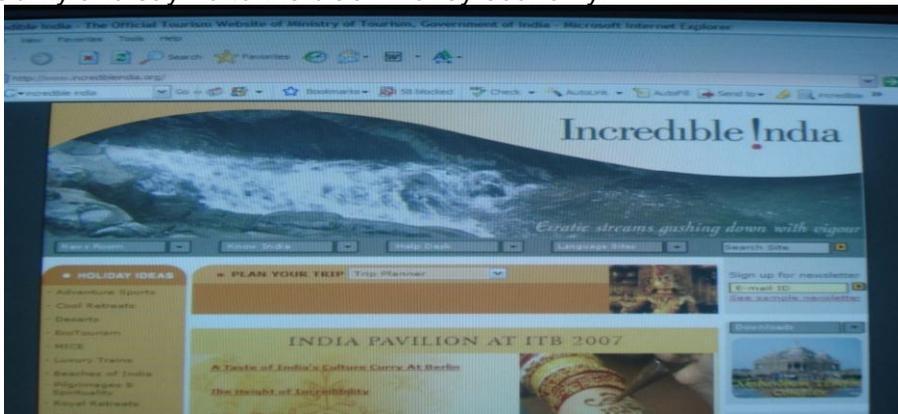


Figure 1 Incredible India Website

There is a question-do all banks extend mobile-to-mobile payment services? About 10 banks do and another 15 will by the end of next month. Will there be troubles? But, nothing that can’t be handled. Will transaction charges be high? Banks and telecom operators can make transactions below Rs 1,000 free and charge one or two rupees for transactions up to Rs 10,000. Will SMS come in real time? Telecom companies can ensure that.

You may argue that many in rural India and some in urban India do not have bank accounts. With financial inclusion initiatives, no-frill bank accounts can be opened quickly using IT. Mobile transactions (payments etc.) would incentivize people in general and tourists in particular to open such accounts. Telecom operators are tying up with banks to come up with phone-based pre-paid cards (virtual money or mobile wallets) for making payments and transferring money as in mobile banking. There is one more important questions-Will illiteracy be a bottleneck several banks and technology providers use mobile voice banking? Tourist has to speak to carry out a

Check your progress

What are main problems in tourism and Travel sector? How these problems are rectified by Information Svstems?

transaction. There may be some problems, but there are technical answers. Many of us will remember that computerization of tourists transport like: railway reservations in the 1980s dealt problems like: corruption in ticketing. Mobile payments give us a much bigger opportunity. We would demand that government recalls high denomination notes and makes it mandatory for all shops and vendors to accept only electronic payments. Tourist or people will get MMID and they will start using mobile payments instead of using cash. Shops will start displaying their mobile numbers and MMID. That would be a big statement against cash payments.

4.4 INTEGRATED TOURISM AND HOTEL INFORMATION SYSTEMS

A comprehensive information system in tourism entities like: hotels would be enhancing variety of functions. It will also help to make it more marketable and develop competitive advantage. It would deal with internal and external hotel operations (Poon Auliana, 1998). Many functions back office, front office, reservation, food and beverages, marketing distribution, linking with data sources etc. are integrated in comprehensive information systems. 'Smart Building and resort Office' in Japan is a good example of amalgamation of technology in hotel management.

4.5 MIS Applications

MIS has many applications in tourism, Travel and peripheral services. Main applications are listed below:-

- (i) Decisions Support Systems
- (ii) Executive Support Systems
- (iii) Networked Travel Agencies
- (iv) Networked Tourism Education Institutes
- (v) Improved legal delivery systems
- (vi) Banking and financial services
- (vii) Natural resource planning at tourism destination
- (viii) Land record management

4.6 KEY WORDS

SMSR	Smart Building Smart Resort
TIS	Tourism Information System
ITHIS	Integrated Tourism and Hotel Information Systems
APTIS	All purpose Ticket Issuing Systems
PMS	Property management Systems
CRS	Computerized Reservations Systems
GDS	Global Distribution Systems

4.7 SUMMARY

In this unit, we discussed about the use of IS in tourism, travel and hospitality sector. It is widely used for information communication, information management, tourism destination planning, development etc.

4.8 QUESTIONS

1. What is the use of MIS in tourism?
2. There is a small travel agency located in a room in New Delhi. Do you feel that travel agent must have computerized system? Justify your answer.

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Block 2
Application of Computer Software in
Tourism Industry

UNIT 5

INTRODUCTION OF CRS, COMPUTER RESERVATION SYSTEM (CRS) FOR RAIL TRANSPORT, HOTEL BOOKING & AIRLINES

Structure

- 5.0 Objective
- 5.1 Introduction
- 5.2 Networking
- 5.3 Computerized Reservation Systems
- 5.4 Terms Used In Computerised Reservation Systems
- 5.5 Structure of Computerised Reservation Systems
- 5.6 Hotel Services through Computer Reservation Systems
- 5.7 Summary
- 5.8 References
- 5.9 Progress Review

5.0 OBJECTIVE

After going through this unit, you should be able to:

- Understand the nature and purpose of Computerized Reservation System (CRS)
- Have an idea about Information Technology in Travel
- To understand practical use of reservation tools.

5.1 INTRODUCTION:

Computerized Reservation System is an important component of ticketing in present context. It has significant role like nervous system in human body. Its' structure seems like criss-cross network spread all over the world. This virtual highway of information has been lifeline of airlines support system. Computerized Reservation System (CRS) is based on computer network as a major hardware and software tool.

5.2 NETWORKING

In 70s main processor was the core concept. Gradually attention of information society shifted towards networking due to connectivity requirements to transfer ample amount of data from one location to others and general communication purpose. Network can be defined as 'sharing of resources'. A computer network is inter-connection of computers and other peripheral devices. Network has following advantages over stand alone PCs.

Sharing of hardware: Networking is the only way to share precious hardware.

1. Sharing of information: A big project requires contribution of large team. Information can be shared between a no. of users.
2. Communication: Network can be utilized as a medium of communication between different locations. It can be intra-organisational communication or inter organizational communication.
3. Decentralization of departments: A network can be used as a tool to facilitate multi-counter, multi-location service provider. Computerized Reservation System (CRS) is a tool to provide tickets to passengers at different locations simultaneously.

Types of Network: A network can be classified as follows:

1. On the basis of ownership
 - (a) Private network
 - (b) Public network
2. On the basis of geography
 - (a) Local Area Network (LAN)
 - (b) Metropolitan Area Network (MAN)
 - (c) Wide Area Network (WAN)
3. (a) Intra network
(b) Inter networking
4. On the basis of connecting medium
 - a. Land line network
 - b. Wireless network

5.3 COMPUTER RESERVATION SYSTEMS

Computer reservation system is a good tool to automate reservation activities. It has penetrated a large area all over the world. In fact in a country like India computer reservation systems is facilitating its' services to millions of passengers traveling by Indian Railways. Indian railways are running about 14,000 trains per day and about millions of people traveling daily by train. Majority is traveling by sleeper class, which is reserved one. So, in all millions of passengers are getting services through computer reservation systems. It is also proving its' worth in the field of Air lines reservations by providing variety of services to the client in form of meal code, car rental, hotel, flight availability, Passenger Name Record (PNR), fare details, seating map, currency conversion and a lot more. The same thing is also applicable in the area of Ship/ ferry reservation.

Travel is an age-old activity. Men have fascination for travel since long time. During primitive days travel was a simple activity. People used to travel for trade or education. Later period travel became frequent activity for a number of reasons like pilgrimage, education, Spa etc. But, there was no concept of leisure travel during those days. In history, we have got lot of information about travel of Heinsung, Fahyan, and Columbus.

Historical developments in travel are mentioned below in form of a list: -

Period	Event
1552	There was an act passed by England for keeping holidays and fasting days.
16 th Century	English visited Italy

18 th century	Golden age of grand tour
18 th century	Annual holidays started in Europe. The term derived from 'holyday'.
1950	Computerised Reservation Systems (CRS)
1973-74	Oil crisis
1980-81	Mild recession
1991 & 2003	Gulf war
1958	Mass tourism took off
1978	Europe civil aviation conference (ECAC) introduced in USA.
1960s	Bank Settlement Plan (BSP) in USA
1984	BSP in UK

Need of CRS felt due to following factors: -

1. Information intensive industry.
2. Developments in the field of Information Technology (I.T.)
3. Peaceful era after world war

Computer Reservation system came into existence in 60s. The year 1978 is known as a turning point in the history of tourism due to deregulations in U.S. and new avenues to technology.

Air lines companies or group of companies owns CRS systems. A CRS system may be a regional system catering its' services in a particular region only.

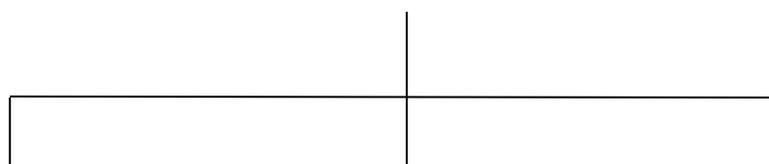
National or international level system.

Different travel agents have different, types of access to CRS. A ticket denied by one travel agent at the last moment may be arranged by another travel agent.

This is possible due to different types of accessibility to different travel agents.

We can classify accessibility or level of participation as follows:-

LEVEL OF PARTICIPATION



Booking by Phone Only

Direct Access

Full Access

Different travel agents can also share through CRS. By Shared access travel agents can collaborate for ticket issue and booking of seats. Last seat availability an important factor for a travel agent, as it can provide seat at the last moment. A travel agent having full access to the suppliers system can provide book tickets from last seat availability.

Bank settlement plan is a buffer between travel agents and suppliers. It can be classified as follows: -

BSP



Manual

Automated

Semi-automated

Travel agents are used to sell tickets of different airlines companies. At the end of a day/ certain period they have to send money to respective airline. BSP is acting as a collection body on behalf of suppliers.

BSP was established in 1960s in 53 countries all over the world. The settlement plan was first time adopted by United States of America. It started function in UK in 1984. It is the biggest network of its' own kind in the world involving more then 30,000 travel agents in 200 countries all over the world. BSP is supposed to take care of following jobs: -

1. To distribute standard format of ticket to travel agents. The travel agent has to plate the ticket according to the airlines company. The plate is known as Carrier Identification Plate (CIP).
2. Billing analysis of travel agents and airlines companies
3. To prepare credit card billing report

BSP facilitates a role of a guide to help travel agents for the smooth operation of travel agency.

Validation: - Only recognized travel agents can issue air tickets. They are provided a plate to emboss some marking on the ticket. A ticket issued by authorized travel agent is considered as a valid ticket.

PTA (Prepaid Ticket Advice): - PTA charges accrue to the carrier issuing PTA. It is non-refundable. The open PTA does not constitute ticket for any special fare requirement.

Legal and Regulatory Bodies in Tourism & Travel: -

Regulatory bodies are playing vital role by putting standards and defining rules and regulations. These bodies are also acting like a watchdog. Few are enlisted below: -

- a. IATA (International Association of Travel Agents): - IATA is an international association of airlines companies. Its' head office is located in Montreal, Canada. IATA is involved in areas like: BSP, tariff rules, inter-airlines billing, data processing.
- b. Travel Technology Initiative (TTI): - It was created in 1987 with the philosophy to form a neutral forum for users and suppliers. It is active in the field to develop standards, motivate users to invest in technology etc.
- c. HEDNA: - Hoteliers established it in 1991. The website address of HEDNA is <http://www.hedna.org>. Main activities of HEDNA are:-
 - To organize meetings and conferences
 - To impart education
 - To develop electronic distribution channels
- d. The Guild of Business Travel Agents (GBTA): - 6 travel agents of UK started the group known as GBTA in 1967. Guild concentrates in the field of customer care, qualitative aspects of travel business and technology.
- e. National Association of Independent Travel Agents (NAITA): - The association was established in 1978 with the philosophy to develop the business of small and independently working travel agencies.
- f. Indian Association of Tour Operators (IATO)
- g. Travel Agents Association of India (TAAI)

5.4 TERMS USED IN COMPUTER RESERVATION SYSTEMS: -

Codes (Airport code, city code, country code)

Stopovers

Non-stop Flight

Queues

Fare quotes:

Car Rental

Limousine

IATA

Neutral Availability

Preassigned seat

Special Travellers Account Records

Auxiliary services

Direct Flight

Aisle

Window Seat

Crew Members

Crib

Infant

Child

Group PNR

PNR

Switch

Workstation

Server

Miscellaneous Charges Order (MCO): - MCO is meant for the payment of excess luggage. It is produced against the advance payment by traveler.

Pre-Paid Ticket Advice (PTA)

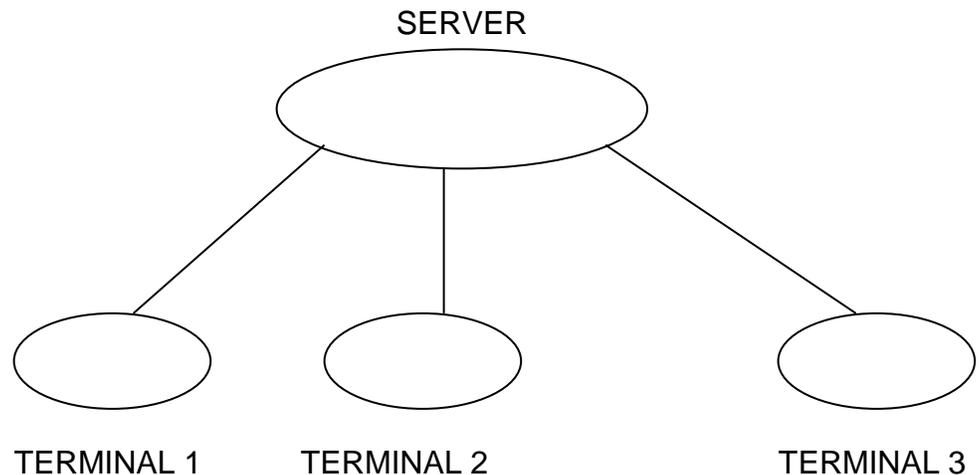
Computer Reservation Systems Programmes Available In Market: -

1. Amadeus
2. Galileo
3. Sabre
4. Worldspan
5. SITAR
6. Other regional/ national level CRS systems

5.5 STRUCTURE OF COMPUTER RESERVATION SYSTEMS: -

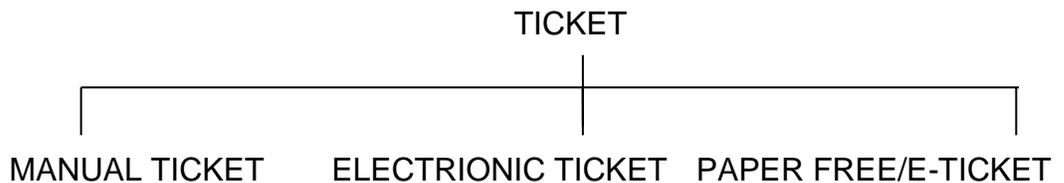
Computer reservation system is based on networking concept. Networking is a form of sharing of resources among different electronic device like: computer, printer etc. In Computer reservation system, main computer, which is used to store all data, is known as Server. Server is sometimes also known as Master computer. Other computers provided to travel agents, corporate house (connected at end users' premises) are known as terminals. Terminals are supposed to work in coordination with server. So, the company providing

reservation access to a travel agent can control the terminal. A network can be explained by given diagram:



Its' a form of wide area network connected through cable, satellite linked both. A computer can be connected to the network with the help of telephone line. Telephone line is very useful in this regard as it is providing connectivity for a large mass of computers. The device used to connect computer with telephone line is called as MODEM.

Ticket: - Ticket is a traveling document carried by passenger. It is very important for a travel agent to issue a ticket with appropriate information. It can be classified into three classes: -



Passenger Name Record (PNR): - Passenger Name Record (PNR) is the unique set of information related to the passenger. It is useful for searching information about passenger. A number allotted to this information is known as PNR no. In technical terminology it is known as the key field. Passenger Name Record (PNR) consist different components mention details about name of all passengers traveling jointly, their telephone no., flight no, class of travel, date of travel, reservation status, seat no., meal code, source, destination, name of person booked ticket on behalf of passenger, mode of issue of ticket.

Flight Availability: - When passenger approaches a travel agent, first step is to find out flights available from departure point to arrival point. The list of flights available can be displayed on computer screen & passenger can be asked to give a preference. Flight availability may be 'without any preference' or 'based on some preference' like: non-stop flights only, flight vai certain stopover only, flights after some specific time only.

Waiting Line: Waiting line is very important as it is meant for preferential listing of subject related records. It is also known as queue. Waiting line can remind us about the ticket issue date, about payments etc.

Meal Services: - Passengers traveling by air are provided different food types. Like: Non-vegetarian food, vegetarian Food, continental, lacto ovo, Asian vegetarian food, child food etc. each food category has certain food code.

Car Services Through Computer Reservation Systems (CSCRS): -

Different Car rental companies are associated with computer aided reservation system. Cars can be booked through CARS and payments can be done along with air ticket payment. There is variety of cars available through CARS. These Cars can be classified as follows: -

1. Ordinary car
2. AC Car
3. Limousine or Luxury Car
4. 2 Door Car
5. 4 Door Car

5.6 HOTEL SERVICES THROUGH COMPUTER RESERVATION SYSTEMS: -

Different hotel chains are providing their services through CARS. There is variety of rooms available through CARS.

1. Double bedded room
2. Single bedded room
3. Room with king-size bed
4. Twin bedded room
5. President Suite
6. AC Room
7. Non Ac Room

Other Services in Computer Reservation Systems: -

There are a number of other services available in CARS. These are given below: -

- (a) Wheel Chair: - Wheel chair is available on request.
- (b) VIP/ VVIPs: Special services are available to VIPs, VVIPs, and club class travelers.

Global Travel Distribution: -

Global distribution system is a concept to distribute an item globally. In present scenario, we cannot think of global distribution system without technology. Computer or I.T. acts like backbone in global distribution system.

GDS is a leading distribution channel in the field of airlines tickets. Travel agencies, big corporate houses, use it worldwide. It can also be defined as super switch i.e. computer providing access to various CRSs. It is a co-operative arrangement of different CRSs. There are different other distribution channels also like: Internet, CRS etc.

Functions of GDS: There are different functions of GDS enlisted bellows: -

- a. Common language interface
- b. Remote Ticket Issue
- c. PNR consolidation

World's Major GDS Systems: -

Features ↓	Amadeus	Galileo	Sabre	Worldspan
Introduction	1987	1991	1960	1990
Controlling Airlines	AF, LUFTANSA, IB	BA, SWISS AIR, KLM, COVIA	AMERICAN AIRLINES	DELTA, NORTH WEST, TRANS WORLD
Terminals	1,68,000	128000	130000	39101
Locations worldwide	39,000	33000	30000	15000
Participating Airlines	440	500	400	414
Features	Neutral Schedule & availability, Dual city pair, Carrier preferred, direct access, time table, hotels & car rentals	Flight availability, Flight specific time table, Booking files, Seating, Client file, hotel & car etc.	Availability, front end functions	Direct sale/access/ response, Source, Ferry Source, Rail System, Hotel, Car, Fares etc.
Countries	117	66	64	45
Properties	35,000	37,000	35,000	26,000
Hotel Chains	268	208	215	182
Associated Car Rentals	55	47	50	40

Source: IT for Travel & Tourism by Gary Inkpen, 2nd Edition, Longman, ISBN:0-582- 31002-4

Computerised Reservation System Vs GDS: - Computerised Reservation System (CRS) is a computer-aided system to perform reservation activities. The concerned company usually owns it. CRS is subject to perform its' job on regional basis, national basis or international basis. Like CRS used by local airlines companies like: Jet Airways, Sahara, Indian Airlines is regional CRSs. On the other hand GDS is a combined effort of various companies. It is used to cater its' services to various countries. Its'a kind of co-operative effort. Major GDS systems are Amadeus, Sabre, and Worldspan & Galileo.

Internet and Reservation: - Internet is a powerful tool to facilitate reservation and enquiry services. Its' impact is seen by Travel Agents all over the world during last decade. There were long discussions in PATA conference and luncheon meetings of IATO about the role of travel agents after Internet based reservation services.

Electronic Ticketing: E-ticketing is an activity, in which user can apply for reservation through Internet. In e-ticketing user is supposed to travel with paperless ticket.

E-Services for reservation and enquiry: - There are many web based companies providing electronic ticket issue, fare enquiry, electronic check in and electronic check out services to travelers all over the world.

Future Trends in Computer Reservation Activity: -

Future will be dominated by electronic ticketing services. Probably, Internet linked ticketing and mobile enabled ticketing services will become popular due to large penetration of Internet access and mobile service in the society.

5.7 SUMMARY:

Reservations Systems came in to existence due to complexity in travel. In 70s main processor was the core concept. Gradually attention of information society shifted towards networking due to connectivity requirements to transfer ample amount of data from one location to others. Network can be defined as sharing of resources. A computer network is interconnection of computers and other peripheral devices. Network has following advantages over stand alone PCs.

Computer Reservation System (CRS) is a good tool to automate reservation activities. It has penetrated a large area all over the world. In fact in a country like India computer aided reservation systems is facilitating its' services to millions of passengers traveling by Indian Railways. Indian railways are running about 14,000 trains per day and about millions of people traveling daily by train. Majority is traveling by sleeper class, which is reserved one. SO, in all millions of passengers are getting services through computer reservation systems. It is also proving its' worth in the field of Air line reservations by providing variety of services to the client in form of meal code, car rental, hotel, flight availability, PNR, fare details, seating map, currency conversion and a lot more. The same thing is also applicable in the area of Ship/ ferry reservation.

Computer reservation system is based on networking concept. Networking is a form of sharing of resources among different electronic device like: computer, printer etc. In Computer aided reservation system, main computer, which is used to store all data, is known as Server. Server is sometimes also known as Master computer. Other computers provided to travel agents, corporate house (connected at end users' premises) are known as terminals. Terminals are supposed to work in coordination with server. So, the company providing reservation access to a travel agent can control the terminal.

Computerised Reservation System (CRS) is a computer-aided system to perform reservation activities. The concerned company usually owns it. CRS is subject to perform its' job on regional basis, national basis or international basis.

5.8 REFERENCES:

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5.9 PROGRESS REVIEW

1. CRS is a tool for (i) Information only (ii) ticketing (iii) car Rental (iv) Hotel (v) All
2. Following is not a type of CRS: (i) Amadeus (ii) SITAR (iii) Worldspan (iv) IBMII
3. Following is not a step of ticketing: (i) creating PNR (ii) see flight availability (iii) issue ticket (iv) modify PNR (v) check ticket
4. Following does not offer ticketing service for airlines: (i) Fidelio (ii) Sabre (iii) Galileo (iv) Amadeus

Exercises

1. What is CRS?
 2. What are various steps in booking a ticket?
 3. What are different types of CRS systems?
 4. Why it is beneficial to use CRS in tourism and travel organizations? Explain with example.
 5. What is the future of Computer Reservation System?
-

UNIT 6**GDS- CONCEPT AND USES: AN INTRODUCTION
TO AMADEUS, GALILEO IN TOURISM SECTOR**

Structure

- 6.0 Objective
- 6.1 Introduction
- 6.2 Amadeus
- 6.3 Amadeus Central System
- 6.4 Core functions of Amadeus
- 6.5 Galileo
- 6.6 Technology in Galileo
- 6.7 Travel Automation Services (TAS)
- 6.8 Summary
- 6.9 References
- 6.10 Progress Review
- 6.11 Exercises
- 6.12 Further Readings

6.0 OBJECTIVE:

After going through this unit, you should be able to:

- Understand the nature and purpose of Amadeus and Galileo
- Have an idea about Computerized Reservation System
- To understand practical use of CRS

6.1 INTRODUCTION:

GDS or Global Distribution Systems refer to the reservation tool travel agents use when making an air, hotel, car or other travel service booking. And not only do GDSs power the content of 'traditional' travel agency platforms, they also provide pricing, availability and reservation functionality to many online travel agencies.

A worldwide computerized reservation network used as a single point of access for reserving airline seats, hotel rooms, rental cars, and other travel related items by travel agents, online reservation sites, and large corporations.

The premier global distribution systems are Amadeus, Galileo, Sabre, and Worldspan. They are owned and operated as joint ventures by major airlines, car rental companies, and hotel groups. Also called automated reservation system (ARS) or computerized reservation system (CRS).

6.2 AMADEUS:

Amadeus is the largest GDS in the world. It has 1,68,000 terminals distributed all over the world. It has access to 39,000 Travel Agencies and 8,500 airlines sales offices worldwide. It has availability in 117 countries. It employs about 43,000 employees. It is connecting 440 airlines companies, 268 hotel chains and 55 car rental companies. It is representing over 35,000 properties.

Initially, Air France, Luftansa, Iberia, established Amadeus Global system in 1987. It acquired a computerized system from Continental Airlines in USA in 1995. All three major stakeholders AF, IB and Luftansa has 29.2% share and continental has remaining 12.4% share in Amadeus. In addition to these Amadeus has 32 partner airlines. It has got decentralized structure. Its' offices are located in Madrid, Spain. Amadeus is divided in to following branches: -

1. Amadeus Data Processing: It runs Amadeus global Network (AMANET) and Central computer. It is located in Erding, Germany. It is a home to a special purpose computer building that houses some world's largest mainframe computers and a whole host of smaller interlinked machines e.g. six IBM mainframes, two Amdahl mainframes, four Unisys main frames with 68 processors and massive amount of magnetic data storage. The operating system environment is in several parts: an IBM transaction processing facility (TPF) for reservations applications, an IBM multiple virtual storage (MVS) for software development and support. The standard Unisys operating system OS 1100 is used to run a maximum capacity of 900 end users transaction per second, and the current workload of approximately 30 million transactions per day is therefore well within this ceiling.

2. Amadeus marketing: This unit is responsible for product marketing. It also coordinates with the activities of all Amadeus National marketing Company (NMC) in each country. It controls flow and distribution of income between service providers. It also looks after training, help desk and documentation functions.

3. Amadeus Development: It is based in Sophia Antipolice. Its' basically designs, develops and tests all Amadeus Central System (ACS) Software. It also provides maintenance functions.

4. NMCs: One NMC is located in every major country. It is responsible for marketing of Amadeus within its' geographical area. It is also responsible for other functions like help desk, local customer service, and running national distribution system. Majority of NMCs own local National Distribution Systems (NDSs) and provides access to rail services, ferries, tour operators, events, and back office.

5. Partner Airline: - Many Amadeus partner airlines own a share holding in their local NMC. These airlines also use Amadeus for their own internal purposes.

The acquisition of system one from Continental Airlines in April 1995 was significant move for Amadeus and it is therefore worthwhile examining this in a little more detail. To be precise the acquisition made by Amadeus was of all the assets of Continental Airlines System one subsidiary. As a by-product of this acquisition Continental obtained a 12.4% stake in Amadeus. Overnight, Amadeus became the largest single GDS in the world. Its' information technology centered architecture is different from remaining GDSs systems popular in the World.

6.3 THE AMADEUS CENTRAL SYSTEM

The Amadeus Central System is a technical system, which supports workstation link and host booking functions for global airlines, car rental companies and major hotel chains. These central systems applications run on the Amadeus mainframes housed within the Erding (Germany) data center. It falls into two main types: (i) host connectivity applications, and (ii) core end-user support functions.

Amadeus Air

The Amadeus Central System (ACS) supports the flight schedules of more than 740 airlines approximately, out of which 440 may be booked by subscribers. Of the 440 airlines, 220 participate with Amadeus in Standard Access, 140 in direct Access, 150 in Amadeus Access and over 230 airlines show last seat availability displays. These individual statistics do not add up to 440 because many airlines are connected to Amadeus so as to provide multiple levels of participation (they are counted more than once). Hence, it is important to understand various levels of airline participation that Amadeus provides. The following are the main ones:

Amadeus Direct Access: This enables users to be connected to the participation airline's CRS and therefore their seat inventories, on what is known as a secondary carrier specific display.

- **Amadeus Access**

- Direct access: Data Access is similar to carrier preferred with the added modification that displays may be ranked by the time of departure.

- **Amadeus Cars**

- Amadeus GDS has got on-line links to major car rental companies. This provides subscribers to book car rental services and either include them as part of an existing air PNR or to provide separate stand-alone service.

- **Amadeus Standard Access:**

- This allows booking messages to be sent to the car rental company, which responds by returning confirmations formatted as teletype messages.

- **Amadeus Complete Access:** This service is based on high speed telecommunications links between the car rental company's computer and the Amadeus Central System computer.

- **Amadeus Hotels**

- More than 35000 properties around the world may be booked directly via the Amadeus Hotels facility. In addition to the standard set of hotel rates available via participating chains, a facility to allow travel agents to store their own specially negotiated hotel rates was introduced in 1995.

- **Timetable:** Timetable shows a time schedule of all airlines may be ranked by date range or a specific day of the week.

6.4 CORE FUNCTIONS

They fall into two main groups: (a) functions that improve the productivity of end user by automating respective tasks, and (b) information that is commonly needed to service customers of travel agencies and the sales offices of partner airlines. Here are just a few of the main ones:

- **Central profiles:** This enables travel agents to store personal information about their business travel companies and frequent travelers.

- **Card check and ticket check:** This is a function that supports sales made by customers using that supports sales made by customers using credit and charge cards.
- **Ticketing:** Amadeus supports all three ticketing methods used around the world. These are: (I) the conventional transitional automated ticket (TAT),(II) the ATB, and (III) the new ATB2. The support provided by Amadeus for these different ticket types varies with the deployment of each type, on a market-by-market basis.
- **Amadeus' information system (AIS)** This provides user with access to on-line information on Amadeus products and participation suppliers. An up-front news page gives highlights of new additions.
- **Amadeus' instant marketing (AIM)** This is an important feature that suppliers can use to market their products and services to travel agents around the world
- **TIMATIC:** On-line access to passport, visa and health information for all countries.
- **On-line help :** An information source that helps subscribers solve problems related to their use of the Amadeus system.
- **Calculator:** It is a self-explanatory feature of Amadeus. It has been enhanced also to provide currency conversion functions and encoding decoding of city, airport and provider codes
- **Practice training:** This simulates live use of the system but does not create any live booking and does into allow any entries to affect the live Amadeus system.
- **Scholar or Teach:** This is a user friendly, self-learning facility that subscribers can use at their own pace to gain a solid grounding in how to use Amadeus. It is nevertheless secondary to attending a purpose designed classroom training course specifically designed to teach people how to use Amadeus.
- **AmadeusPro:** AmadeusPro is a PC-based travel agency management system (AMS). It focuses on providing a simple to use Windows base GUI to the Amadeus Central System.
- **AmadeusPro Res:** It is a software product designed for operation on a standard PC running the IBM OS/2 operation system. This provides a mouse and icon based interface to the Amadeus Central System as well as an interface to locally connected suppliers.
- **AmadeusPro Base:** This is an extended version of AmadeusPro Res that supports locally stored client profiles and other booking reference data.
- **Amadeus Pro Sale:** This is a mid-Office product that provides support for reservations functions, local client profiles, local storage of other data and integration with office productivity tools.

HOTEL DISTRIBUTION SYSTEM (HDS):

The basic purpose of most Hotel Distribution System (HDS) companies is to provide reservations and information services to travel agents via 5,00,000 airline GDS terminals used in travel agencies throughout the world. However, this

situation is changing rapidly at the present time, particularly as a result of the large scale penetration of Internet. It may be categorized as follows:

1. Computer switches connecting a hotel's own in-house reservation system with the major GDSs for distribution purposes.
2. Service companies providing smaller hotels with an outsourced marketing, reservations and distribution service and also with connections to airline GDSs.

6.5 GALILEO:

It is one of the largest GDSs in the world. It is developing very fast in India also. It was introduced first time in 1991 with an initial investment of 200 pounds. It is a global distribution system having 02 cores systems in USA and rest of the world. It has national distribution company (NDC) system in each country in which it is operating. NDC is responsible for sells and support of service in the respective country. It has got presence in USA, Asia Pacific, Europe, and Middle East. It is jointly owned by British Airways, Alitalia, KLM Royal Dutch, TAP Air Portugal, Aer Lingus, Austrian Airlines, Olympic Airways, Swissair, United Airlines, Air Canada, Covia.

6.6 TECHNOLOGY IN GALILEO: -

It is a global computer and telecommunication networked system based on central database and high-speed links with terminals spread all over the world. It uses special 'computer like' instructions. It has central system to carry highly efficient message format. It runs on 15 IBM Amdahl mainframe computers and other processors having speed of almost 3,283 MIPS (million instructions per second) and capable to handle 66 million messages per day. Its' operating systems environment is based on virtual machine (VM), multiple virtual storage (MVS) and transaction processing facility (TPF). Galileo Central System is distributed all over the world using virtual super highway. At local level it has NDC.

6.7 TRAVEL AUTOMATION SERVICES (TAS): -

Travel Automation Services is a part of British Airways (BA) in the England. It was restructured in 1997 into 03 separate business units i.e. Galileo UK, Chameleon, and Icanos. Each unit has specific area of work.

- **Galileo UK:** It is a NDC looking after distribution part of Galileo international in U.K. It was first time introduced in 1991.
- **Chameleon:** It focuses on training and consultancy. Its' primary role is to run training courses for travel agents.
- **Icanos:** It provides technical support to travel industry. It also provides network services for individual customers, supply rail and ferry booking systems, market agency management systems etc.

6.8 SUMMARY:

Amadeus is the largest Global Distribution system in the world. It has 168000 terminals distributed all over the world. It has access to 39,000 Travel Agencies and 8,500 airlines sales offices worldwide. It has availability in 117 countries.

It employs about 43,000 employees. It is connecting 440 airlines companies, 268 hotel chains and 55 car rental companies. It is representing over 35,000 properties.

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Galileo It is also one of the largest GDSs in the world. It is developing very fast in India also. It was introduced first time in 1991 with an initial investment of 200 pounds. It is a global distribution system having 02 cores systems in USA and rest of the world. It has national distribution company (NDC) system in each country in which it is operating. NDC is responsible for sells and support of service in the respective country. It has got presence in USA, Asia Pacific, Europe, Middle East.

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6.9 REFERENCES:

1. Inkpen Gary, 1998, Longman, UK, pp-110
2. Poon Auliana, Tourism Technology and Competitive Strategy, CAB International, U.K.

6.10 PROGRESS REVIEW

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3. Following is not a step of ticketing by Amadeus (i) creating PNR (ii) see flight availability (iii) issue ticket (iv) modify PNR (v) check ticket
4. Following does not offer ferry booking (i) Fidelio (ii) Sabre (iii) Galileo (iv) Amadeus

6.11 EXERCISES

1. Write a brief note of Amadeus and its' services?
2. What is Amadeus Central System?
3. What are various steps in ticketing?
4. What are various features of Galileo?

UNIT 7

USES OF MICROS- FIDELIO AND OTHER LATEST SOFTWARE IN TOURISM OPERATION

Structure

- 7.0 Objective
- 7.1 Introduction
- 7.2 Front Office Operations
- 7.3 The Back Office
- 7.4 Housekeeping, Engineering, and Security
- 7.5 Software's Used in Tourism Business
- 7.6 Summary
- 7.7 References
- 7.8 Progress Review
- 7.9 Exercises
- 7.10 Further Readings

7.0 OBJECTIVE:

After going through this unit, you should be able to:

- Know the meaning of interpretation of accounts.
- Identify the key ratios/ percentages from the trading account, profit and loss accounts and balance sheet.
- Understand terms: sales mix, gross profit margin and others.
- Carry out detailed ratio analysis.
 - Understand the different concepts of profit.
 - Understand the nature and purpose of MICROS- FIDELIO
 - Have an idea about PMS
 - To understand practical use of POS/PMS.

7.1 INTRODUCTION:

MICROS-FIDELIO and other computer software are used to manage front office, back office, kitchen, laundry, house keeping and accounts related jobs in a hotel. It is widely used in various countries. Its' general functions are given below: -

Accounting System: It provides management with a number of key advantages: -

1. Reduces error considerably.
2. Speeds up accounting operations.
3. Produces key documents at the flick of a key like trading accounts, trial balance, profit and loss account.
4. Overcomes problem of repetition.

It has three additional distinct facilities:-

1. A wide ranging selection of management reports on the business
2. It gives the ability to control internal operations
3. An improved cash flow

The use of computerized accounts in hospitality is useful. It will remove drudgery of book keeping. Computerized system is an integrated computer package. It provides: -

1. Sales ledger
2. Purchase Ledger
3. Nominal Ledger
4. Management Information

7.2 FRONT OFFICE OPERATIONS: -

It is called nerve center of hotel. Here staff members provide contact between hotel and guests. From check-in to checkout, guests may have little or no contact with hotel personnel except front office staff. Opinion of guests about hotel and its' services are formed largely by their impression on the front office staff. Front office operations are generally divided it to four categories: -

1. Check-in/check-out:
 2. Reservations:
 3. Cashier service:
- **Check-in/check-out:** It involves greeting and registration of guest, managing room availability, assigning rooms, dispensing keys, and checking out departing guests.
 - **Reservations:** It involves handling of advance room requests received by telephone, computer links, telex or fax transmission.
 - **Communications:** It includes handling of both incoming and outgoing guest mail, messages, and information. The front desk staff is generally responsible for communicating hotel services, activities, and events to guests.
 - **Cashier service:** Cashier services include maintaining guest accounts, determining credit status, presenting the bill at checkout and handling guest payments.
 - **GUEST SERVICES:** When a guest is registered, the reservation data is transferred to guest folio. If a reservation is not made previously, the guest name, address, organization/company, arrival and departure dates, and so forth are entered in the folio. This folio will become the permanent guest record. Charges incurred during the stay will be posted to the guest folio, and the final bill will be prepared from this record.
 - **Housekeeping, Engineering, and Security:** House keeping is the next important function after front office management and guest services. Its' responsibilities are cleanliness, attractive rooms, pleasant sanitary conditions. It consists of managers and staff responsible for cleaning guest rooms, public areas, corridors.
 - **Food and Beverages Operations:** The food and beverages functions for generating additional profit for hotel, services to guests/ community, cost controlling. It is divided in to following areas:-
 - Food production and preparation
 - Food purchasing
 - Food service
 - Banquet/ catering
 - Beverage service

Food production staff is responsible for preparation of food and designing of menu. Food purchasing staff is responsible for purchasing of foodstuffs from the market. Food service staff is responsible for greeting, serving, attending guests in the dining area. The beverage service is responsible for dispensing alcoholic beverages and other drinks (except dairy production). Banquet and catering is responsible for catering banquets, meeting and conferences/ conventions.

7.3 THE BACK OFFICE:

It is known as the nerve center of hotel. It has 04 basic functions: -

1. Cost control
2. Accounting
3. Forecasting
4. Financial reporting

It is responsible for budgeting, handling credit requests, performing accounts, bookkeeping, managing payrolls, planning etc. The controller or accounting director is the highest authority of business office. Main accounting tools used in the back office are as follows:-

1. Cash receipts journals
2. Account receivable journal
3. Cash disbursement journal
4. Guest checks, invoices and receipts
5. Purchase orders
6. Accounts payable journals
7. Sales Report

7.4 SOFTWARE'S USED IN TOURISM BUSINESS: -

The computer is an important development of modern time. Almost every aspect of business and work has benefited in some way or another from by computer technology. Basically, lodging establishments use three types of computer systems: -

1. Reservations Systems
2. Point of Sale (POS)
3. Property Management System (PMS)

A reservation system is used to record room requests and, in some cases, to manage rooms. The major hotel chains, franchisee networks, and referral organizations have centralized computer reservation systems to which individual properties can be linked. Some hotel computer systems can also be linked to the reservation systems used by airlines companies and travel agencies. The reservation system can be used to display current room availability and applicable rates, book reservation, print rack slips, post charges, and generate arrival reports, list people scheduled to check in on a particular date. A point of sale (POS) is a computerised system that is used by the front office to record client payments and manage accounts receivable. A computer used by cashier to enter invoice total, charges on accounts and cash receipts. In POS entries are done by front office, lounge and dining room. It can also be used to print account receivable, sales summaries, cash receipt report. Property Management System (PMS) is basically used to do accounting functions of various hotel departments.

It is also used to keep food and beverages and room sales, telephone charges, and other income details. It can be used to print operating statements, management reports, cost analysis and sales forecast.

7.5 SUMMARY:

MICROS-Fidelio and other computer software are used to manage front office, back office, kitchen, laundry, house keeping and accounts related jobs in a hotel. Front Office Operations: - It is called nerve center of hotel. Here staff members provide contact between hotel and guests. From check-in to checkout, guests may have little or no contact with hotel personnel except front office staff. Opinion of guests about hotel and its' services are formed largely by their impression on the front office staff. Property Management System (PMS) is basically used to do accounting functions of various hotel departments. It is also used to keep food and beverages and room sales, telephone charges, and other income details. It can be used to print operating statements, management reports, cost analysis and sales forecast.

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7.7 PROGRESS REVIEW

Give the correct word or phrase for each system used by the following definitions:

- a. _____ A computer system used by the front office. (Ans: Point of Sale)
- b. _____ is used to handle the accounting, rooms sales, food and beverages sales, telephone charges. (Ans: PMS)
- c. _____ A computer systems used to handle the accounting functions of all the departments of the hotel. (Ans: PMS)

7.8 EXERCISES

1. What are various features of Fidelio?
2. What are departments in a hotel?
3. Write a brief note on Point of Sale?
4. Write Property Management System (PMS)?

UNIT 8

ADVANTAGE AND DISADVANTAGES OF USING COMPUTER TECHNOLOGY, ADVANTAGES AND DISADVANTAGES OF USING COMPUTER SOFTWARE

Structure

- 8.0 Objective
- 8.1 Introduction
- 8.2 Applications in Tourism & Travel Industry
- 8.3 Computer Basics
- 8.4 Operating Systems
- 8.5 Applications in Service Sector
- 8.6 Summary
- 8.7 References
- 8.8 Progress Review
- 8.9 Exercises
- 8.10 Further Readings

8.0 OBJECTIVE:

After going through this unit, you should be able to:

- Understand the nature and purpose of using computer in tourism
- Have an idea about computer
- To understand practical use of information technology

8.0 INTRODUCTION:

Present age is known as the age of information. Information age has its genesis in postindustrial era. Information is the key to successful development. Information is immensely useful to develop service sector. In USA about 64% economy is contributed by service sector.

● **Information Society:** Society has ever been information society. Even during Sindhu Valley civilization, information was kept in temples. During 3000 BC there was a computing system popular in China known as Abacus. That time information and people was dependant on word of mouth. Vedas and Upanishads were remembered and passed by word of mouth.

Present information requirement is vast and urgent. After industrialization in UK there was requirement of trained workers. In nineteenth century, growth of universities invention of satellite based communication system gave impetus to knowledge workers requirements. During II world war information networks played important role. After 2nd world war, information acted as a tool to strengthen govt. network. Technological development in form of Jet, CRS, and Internet ships credit card game rise to mass tourism.

Transaction processing system can further classified into Batches Processing System (BPS), On-Line System and Real Time System.

- **Batch Processing:** Group of instructions or data called as batch. In this technique, group of instructions or data collected in the given time period is processed separately. For example: We can design a batch file to display date, time and directory. C:\> Copy / con / < file name > date time

A file used to process batch is known as batch file.

- **On Line Processing:** On line processing system is meant for instant processing of given task. It's suitable for tasks like computerized enquiry system reservation system banking system air traffic system etc.

- **Real Time System:** Time is the basic constraint. A real time system is required to process data in given time frame only. In applications like space shuttle launching real time system is required. A real time system is always an on line system. But vice-versa is not correct in all cases. As mentioned above computer based Information System (CBIS) for strategic level is divided into two categories i.e. (i) Decision support system and (ii) knowledge based system. Decision support system is based on logical programming system like: MYCIN are good for medical practitioners to arrive at a decision.

Knowledge based system are more elaborated and based on the principle of knowledge representation.

Top Management	DSS
Middle Management	MIS
Lower Management	TPS
Clerical Level	OAS

8.1 APPLICATIONS IN TOURISM & TRAVEL INDUSTRY: -

1. Information presentation system: - Multimedia based information presentation systems are used to retrieve & present data from heterogeneous data sources. A user can call upon remote database from various sources & ask various data sources & ask questions in form of query.

2. Multimedia Based Tourist Guide: - a multimedia based tourist guide system can be a part of computer assisted travel agencies & tourist information centres. Although, it cannot replace a travel agent because of his judgment capabilities & cognitive ness. But, it can help in providing specific details about the chosen tour and facilities from available heterogeneous data base. It can also assist in selecting desirable itinerary and place combinations. A tourist can derive a new tour itinerary. This type of system has some inherited advantages like: user friendliness, specific information delivery, interactive ness, audio-visual support, extendibility. There is a hypermedia model presented by A. Tsaldatrodon University of Athence, Department of Informatics, Greece named as hypermedia tourist guide. It is a form of presentation tool for tourists. As explained by a. Tsalgatidou – “this system models all relevant multimedia information according to the object oriented paradigm & organizes into a hypermedia network” it has been developed on Macintosh platform using hyper cards and satisfies following requirements: -

- a) It has an appropriate user-friendly interface for two types of users.
 1. Travel agent
 2. Tourist
- b) IT models and maintains all the relevant multimedia information.

- c) To add new information & keep database updated
- d) To customize it to personal interest of tourist

The Tourist Is Able To: -

- (A) Explore the multimedia information by navigating the hyper network
- (B) To interactively create their personalized tour.
- (C) To observe their personalized tour, as a simulation of desirable journey through the interest site they have selected.

In HT Guide Information Is Classified In To 2 Classes: -

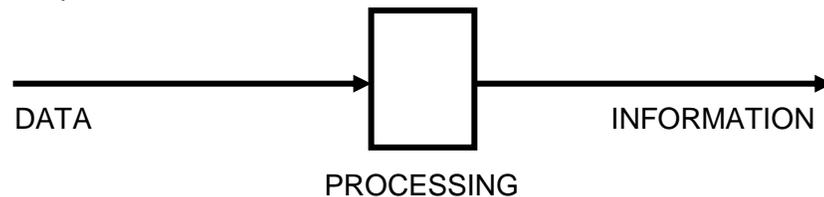
1. Information about attractions
2. Information about facilities, such as: transportation, accommodation. Information is available into 2 classes aggregate & specialized.
3. Tourist Information System (TIS): - Tourist information system is a database of information about tourist places, accommodation, resorts etc. Its' like add-on facility to tourist guide. It can also be used in computer assisted tourist offices/ travel agencies/ information booths. A TIS designed by Gerald Guirchmyr (Johannes Kepler university, Austria) and Reinbold Schmak (Johannes Kepler university, Austria) was presented in Vienna tourist fare (Ferien Messe Veien 1993) first time.

8.2 COMPUTER BASICS

Algorithms: it is a logical sequence of operations. Algorithm is useful for programme designing.

Simple Model Of Computer: -

1. Input
2. Processing
3. Output

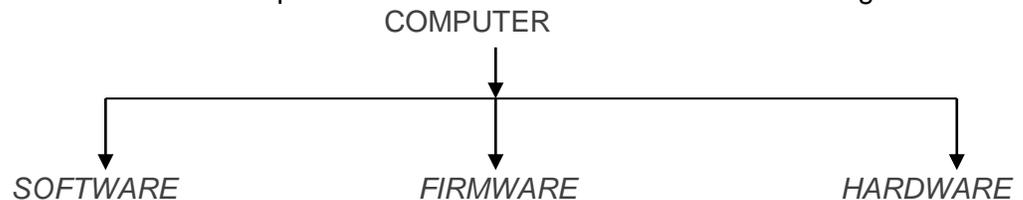


Input: To store raw facts. Input devices are keyboard, mouse, tablet, and joystick etc.

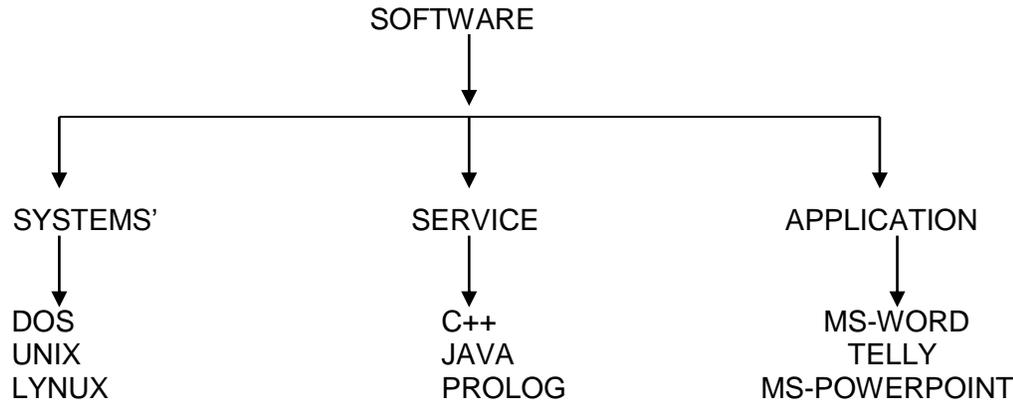
Processing: Processing unit is the most complex part of computer system. It is also known as central processing unit (CPU). CPU consist control unit, arithmetic logic unit, main memory, registers & buses.

Microprocessor: The main chip inside the CPU is called microprocessor. Example: PENTIUM IV, 68020, AMD

Classification: A computer can be classified in to three classes as given below:-



Software: Set of instructions or programme is called as software. It can be classified as follows: -



Software Concepts: Software is a set of instructions in logical order. Software is an important component of computer system due to its potential to define computer's capacity to take decisions. Infact that's why cost of software is generally more then hardware.

Types of Software: -Software can be classified in to 3 classes: -

- (a) Operating System Software
- (b) Service Software
- (c) Application Software

Programming Languages: Programming languages are used to design different other Programmes. Like: DOS, UNIX, MS-OFFICE, or other tailor made Programmes. Different programming languages have specific applicability. For example C is suitable for operating systems designing. COBOL is a business programming language. Prolog is used to design logic-orientated Programmes.

Name of Few Programming Languages: -

FORTRAN, COBOL, BASIC, PASCAL, JAVA, C++, C

Systems' Software: - System software is used to operate computer. Its' other functions are –

- Memory management
- Peripheral checks
- Co-ordination with other devices
- Booting

Application Software: - Application software is used to perform specific task. Like: Documentation work.

Service Software: It has designing capabilities. It is used to design other software Programmes.

Booting of Computer:Booting of computer can be defined as starting of computer. It can also be defined as the change of status from idle to working. Booting is done by operating systems programme. Technically booting is the loading of three files namely: msdos.sys, IO.sys and command.com in a DOS based computer. Without booting, we cannot use any system.

8.3 OPERATING SYSTEMS:

A programme used to operate computer is known as operating systems Programmes. Operating system programme is supposed to do following jobs:

1. To start a system
2. To perform memory checks
3. To check all peripheral devices connected to the system
4. To keep a computer operational
5. To shut down safely during interrupt

Operating systems may be Single User or Multi User operating systems.

Single User Operating systems: - Single user operating system is meant for a single user at a time. Its' simple and easy to learn. DOS is a single user O/S. DOS is introduced by Microsoft. Previously there were two programmes 1. PC-DOS & 2. MS-DOS. They merged into MS-DOS.

Few DOS Commands: - DOS commands are classified into two classes.

1. Internal commands & 2. External commands.

Date, Time, Prompt, Edit, Copy, Format, Diskcopy, Mem, Tree, CLS, COPY CON,

Multi User Operating System: Multi-user O/S can accommodate many users at a time. It is fast & able to multiple programmes. UNIX or LYNIX are multi-user O/S.

Data Base Management Systems (DBMS): Data Base Management System is used to keep information in form of records & fields. DBMS is very useful in business in form of accounting systems, inventory systems, pay roll systems etc. Applications can be developed by using programmes like: FOXPRO, dBASE, Clipper, ORACLE, SYBASE. These programmes are known as DBMS programmes.

Features of DBMS programmes: - DBMS programmes must have following features: -

1. Query
2. Label
3. Browsing
4. Editing
5. Listing of database
6. Sorting & Indexing of data
7. Deletion
8. Screen Handling

8.4 APPLICATIONS IN SERVICE SECTOR: -

Service sector is dominated by technology due to intangible product & presentation required to give an idea about product or services. Service sector is identified in following forms: -

1. Tourism & Travel
2. Cargo Management
3. Banking & Financial Services
4. Education & training services
5. Insurance services
6. Telecommunication services
7. Other

In Tourism & Travel: - Computer applications in Tourism & Travel can be identified as follows: -

1. Information Presentation System:- Multimedia based information presentation systems are used to retrieve & present data from heterogeneous data sources. A user can call upon remote database from various sources & ask various data sources & ask questions in form of query.

2. Multimedia Based Tourist Guide: - A multimedia based tourist guide system can be a part of computer assisted travel agencies & tourist information centres. Although, it cannot replace a travel agent because of his judgment capabilities & cognitive ness. But, it can help in providing specific details about the chosen tour and facilities from available heterogeneous data base. It can also assist in selecting desirable itinerary and place combinations. A tourist can derive a new tour itinerary. This type of system has some inherited advantages like: user friendliness, specific information delivery, interactive ness, audio-visual support, and extendibility.

Bus: Bus is the connecting unit inside CPU. Buses are also known as electrical highway. Example: Data bus of 8088 can carry 8 bits at a time & data bus of 68020 or 80386 can carry 32 bits at a time.

3. Tourist Information System:- Tourist information system is a database of information about tourist places, accomodation, and resorts etc. Its' like add-on facility to toursit guide. It can also be used in computer assisted tourist offices/ travel agencies/ information booths.

A TIS designed by Gerald quirchmyr (Johannes Kepler University, Austria) and reinbold schmak (Johannes kepler university, Austria) was presented in Vienna tourist fare (ferien messe veien 1993) first time.

4. Information Kiosks: Information kiosk is a modern tool to provide information to travelers, tourists and others. Normally, Information Kiosks are installed over public places like: Railway stations, Airports, Tourist places. etc. It is a touch screen based information display computer. It can provide facilities like: fax, photocopy, telephone, printouts, voice services etc.

Advantage: Automatic information management tool. It can provide updated information on daily, weekly, or monthly updating basis.

5. Smart card: Smart Card is a handy device to keep information. Its' like credit card size wise and embedded with a tiny microprocessor, memory and input/output to store information. Smart cards can provide facilities like: Salary disbursement, Inventory Management, Medical History of Tourist/ Field Staff, Credit card, Pre paid card etc.

Smart card is very useful in the field of travel & tourism due to its' size, and storage capacity. It can also be used to keep data about the place. It can be given to tourist guides.

6. Global Distribution System: - Global distribution system is a concept to distribute an item globally. In present scenario, we cannot think of global distribution system without technology. Computer or I.T. acts like backbone in global distribution system.

7. Arm Chair Tourism: - Technology has changed the world drastically. Today's world is like a global village. We are in touch with each other irrespective of distance & time. Travel time is also reduced now. So, a new trend is developing very fast. Now a day, tourists would like to see a place from his home with it real

like feeling. Armchair tourism means to facilitate real like situation to the person at his doorsteps.

8. Virtual Reality: - Virtual reality is not much different from armchair tourism. Virtual reality is a means to create artificial environment. As explained by Mr. Sabine Musil & Mr. Georg Paul of Vienna User Interface Group – “Imagine its’ Friday 2010/ After a hard business day you want to do something for your fitness before finishing of your balance. You decide to tour with your bicycle through the Alps. But, instead of driving to a holiday resort somewhere in the Tyrol you just go into the next room, turn on your computer, choose a programme, put on strange helmet, sitdown on your hometrainer and start pedaling. Up the slopes and down the hills in the beautiful countryside of Austrian Mountains. The Sun is shining and you can regulate the wind by turning a knob on your handle bar. After two exhausting hours you climb down from your bike and go back to work”.

Hardware Devices Required In VR: -

- a. Glove: - Input device for position (hand position)& gesture information.
- b. Tracking system: - To record motion of head.
- c. Computer or workstation: A high performance computing system with good resolution & speed is an essential component of VR.
- d. Stereoscopic display: Head mounted device to give feeling of presence. This device is fitted in Helmet.

Limitations of ‘Virtual Reality’ based systems: -

- (a) Free movement: Free movement is restricted in VR systems. A person cannot walk down or move away for a while due to limited space and junk of wires.
- (b) Recording of body movement: Its’ difficult to record movement of head, eyes etc.
- (c) Frame rate: 20-32 frames per second are considered as satisfying frame rate. But, still its’ a great problem to design faster devices to achieve right frame rate.
- (d) Tactile feedback: - Its’ difficult to develop feel of the surface etc.

Virtual Reality And Tourism: - Virtual reality has opened new avenues of tourism. It can generate a new area to virtual journeys to Space, Antarctica and journey through time. It can also facilitate harmless adventure tours to a large segment. There are few negative aspects also. It may create a feeling that virtual tours are more comfortable and people would like to use VR only. It may destroy tourists’ or traveler’s ability to deal with real problems. We cannot actually tell tourist about the real journey problems during Mansarovar Yatra through VR devices.

8.5 SUMMARY:

Present age is known as the age of information. Information age has its genesis in post industrial era. Information is the key to successful development. Information is immensely useful to develop service sector. In UCA about 64% economy is contributed by service sector.

Present information requirement is vast and urgent. After industrialization in UK there was requirement of trained workers. In nineteenth century, growth of universities invention of satellite based communication system gave impetus to knowledge workers requirements. During II world war information networks

played important role. After 2nd world war, information acted as a tool to strengthen govt. network. Technological development in form of jet, CRS, Internet ships credit card game rise to mass tourism.

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Top Management	DSS
Middle Management	MIS
Lower Management	TPS
Clerical Level	OAS

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8.7 PROGRESS REVIEW

1. Computer tool for (i) typing (ii) Information processing (iii) programming (iv) All
2. Following is not a type of information processing activity: (i) batch (ii) real Time (iii) Real Process

8.8 EXERCISES

1. What is computer?
2. What are various applications of Computer in Service Industry?
3. What are different types of Information processing?
4. Why it is necessary to use Computer in a tourism and travel organizations? Explain with example.
5. Being as a manager how would you apply automation?
6. What is virtual Reality?

Block 3

Fundamentals of Internet

UNIT 9

INTRODUCTION TO INTERNET, ACCESSING WEBSITES

- 9.1 Introduction
- 9.2 Objectives
- 9.3 Internet
- 9.4 Accessing Websites
- 9.5 Summary
- 9.6 Expected Questions
- 9.7 Keywords
- 9.8 References

9.1 INTRODUCTION

In this unit, we are going to learn the basics about the fundamentals of internet. In brief, the Internet is a worldwide collection of networks that links millions of businesses, government agencies, educational institutions and individuals. Also we will also learn about the World Wide Web which contains a vast collection of linked multimedia pages that is ever-changing. The term Internet access means by which individual terminals, computers, mobile devices, and local area networks are connected to the global Internet, which we will also cover in this unit. We will also learn that we access the internet through web browser. Web browser is a software application used to locate, retrieve and also display content on the World Wide Web, including Web pages, images, video and other files. And finally, we will know about website. A website, also written as Web site, web site, or simply site, is a set of related web pages served from a single web domain.

9.2 OBJECTIVES

- To understand the fundamentals of internet
- To know and understand about World Wide Web and TCP / IP Protocol
- To aware from the domain name system and URLs
- To know how to access the internet through web browser

9.3: INTERNET

9.3.1 Introduction

The Internet is a worldwide telecommunications system that provides connectivity for millions of other, smaller networks. Therefore, the Internet is often referred to as a network of networks. It allows computer users to communicate with each other across distance and computer platforms. In other words, the Internet is a worldwide collection of networks that links millions of businesses, government agencies, educational institutions and individuals (please see Figure 1).

The Internet began in 1969 as the U.S. Department of Defense's Advanced Research Project Agency (ARPA) to provide immediate communication within the Department in case of war. Computers were then installed at U.S. universities with defense related projects. As scholars began to go online, this network changed from military use to scientific use. As ARPAnet grew, administration of the system became distributed to a number of organizations, including the National Science Foundation (NSF). This shift of responsibility began the transformation of the science oriented ARPAnet into the commercially minded and funded Internet used by millions today.

The Internet acts as a pipeline to transport electronic messages from one network to another network. At the heart of most networks is a server, a fast computer with large amounts of memory and storage space. The server controls the communication of information between the devices attached to a network, such as computers, printers or other servers.

An Internet Service Provider (ISP) allows the user access to the Internet through their server. Many teachers use a connection through a local university as their ISP because it is free. Other ISPs, such as America Online, telephone companies, or cable companies provide Internet access for their members. You can connect to the Internet through telephone lines, cable modems, cell phones and other mobile devices.

(Source: Badger, 2013)



Figure 1: Concept of Internet

9.3.2 World Wide Web (www)

The Internet is often confused with the World Wide Web. The misperception is that these two terms are synonymous. The Internet is the collection of the many different systems and protocols. The World Wide Web, developed in 1989, is actually one of those different protocols. As the name implies, it allows resources to be linked with great ease in an almost seamless fashion (please see Figure 2).

The World Wide Web contains a vast collection of linked multimedia pages that is ever-changing. However, there are several basic components of the Web that allow users to communicate with each other. Below you will find selected components and their descriptions.

9.3.2.1 TCP / IP protocols

In order for a computer to communicate on the Internet, a set of rules or protocols computers must follow to exchange messages was developed. The two most important protocols allowing computers to transmit data on the Internet are Transmission Control Protocol (TCP) and Internet Protocol (IP). With these protocols, virtually all computers can communicate with each other. For instance, if a user is running Windows on a PC, he or she can communicate with iPhones.

9.3.2.2 Domain name system (DNS)

An Internet address has four fields with numbers that are separated by periods or dots. This type of address is known as an IP address. Rather than have the user remember long strings of numbers, the Domain Name System (DNS) was developed to translate the numerical addresses into words. For example, the address fcit.usf.edu is really 131.247.120.10.

9.3.2.3 URLs

Addresses for web sites are called URLs (Uniform Resource Locators). Most of them begin with http (HyperText Transfer Protocol), followed by a colon and two slashes. Some of the URL addresses include a directory path and a file name. Consequently, the addresses can become quite long.

9.3.2.3 Top-level domain

Each part of a domain name contains certain information. The first field is the host name, identifying a single computer or organization. The last field is the top-level domain, describing the type of organization and occasionally country of origin associated with the address.

Top-level domain names include:

- | | | |
|------|------|-------------------------|
| i. | .com | Commercial |
| ii. | .edu | Educational |
| iii. | .gov | US Government |
| iv. | .int | Organization |
| v. | .mil | US Military |
| vi. | .net | Networking Providers |
| vii. | .org | Non-profit Organization |

Domain name country codes include, but are not limited to:

- | | | |
|------|-----|----------------|
| i. | .au | Australia |
| ii. | .de | Germany |
| iii. | .fr | France |
| iv. | .nl | Netherlands |
| v. | .uk | United Kingdom |
| vi. | .us | United States |

Paying attention to the top level domain may give you a clue as to the accuracy of the information you find. For example, information on a "com" site can prove useful, but one should always be aware that the intent of the site may be to sell a particular product or service.

Likewise, the quality of information you find on the "edu" domain may vary. Although many pages in that domain were created by the educational institutions themselves, some "edu" pages may be the private opinions of faculty and students. A common Web convention at many institutions is to indicate a faculty or student page with a ~ (tilde) in the address.

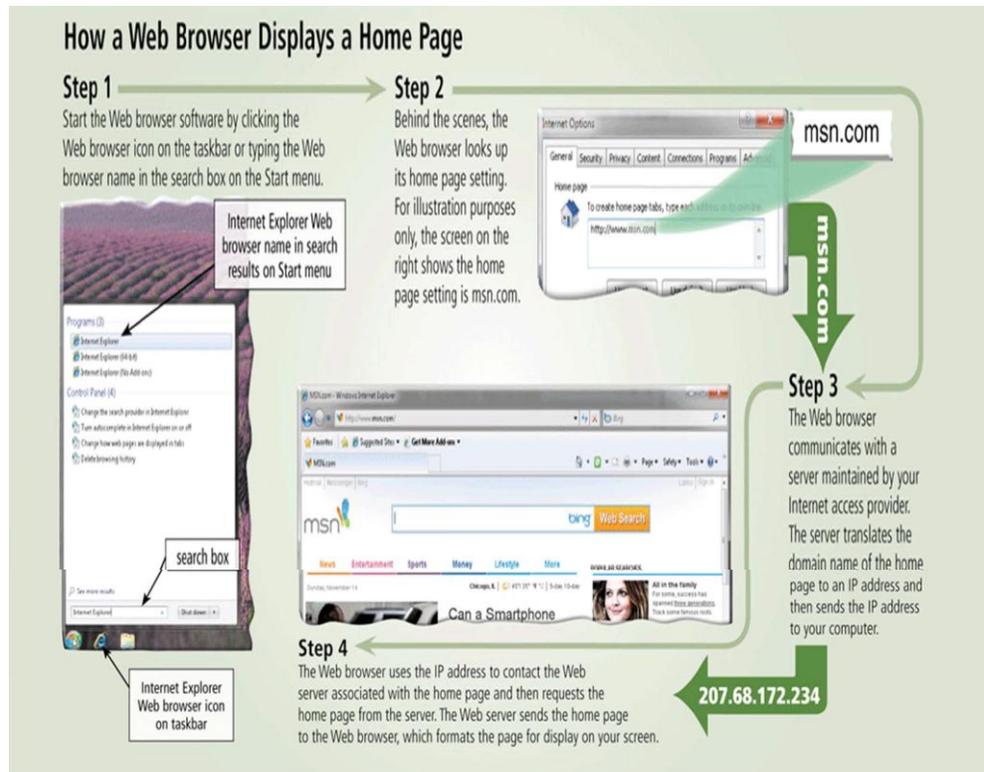


Figure 2: How a Web Browser Displays a Home Page

9.3.3 Various applications of Internet

Internet technologically is the network of computers. Not just a few special computers, but over millions of all kinds of computers. Similarly, it is not just a network but a network of networks. Hence the name Internet is the name for a vast, worldwide system consisting of people, information and computers.

Internet is a global communication system of diverse, INTER connected computer NET works for the exchange of information of virtually every conceivable topic known to man.

The Internet is such a large conglomerate of systems and resources that any attempt to create a comprehensive catalog is doomed to failure. The rate of growth of information currently exceeds any technology's ability to keep pace. Fortunately the WWW as a subset of the total Internet is a bit more manageable in this respect.

The HTTP protocol that drives Web space offers tools that allow the design of automated search and indexing engines, programs that gather data and present in to the Web users in searchable format. These programs run on server systems as separate tasks from other server types, perhaps sharing processor resources with other services (HTTP, FTP etc.) in use at that site.

Web search engines provide many valuable services:

(a) Indexing of available, sites by URL.

(b) Indexing of site by page titles, text content, quality of content and freshness of content.

The Internet provides a number of services. The important among them are as follows:

- i. Simple-mail Transfer Protocol (SMTP)
- ii. File Transfer Protocol (FTP)
- iii. NETWORK NEWS
- iv. List Servers
- v. Internet Relay Chat (IRC)
- vi. Electronic Mail

The description is as follows:

- i. **Simple-mail Transfer Protocol (SMTP):** The Internet uses a TCP / IP family protocol called the Simple-mail Transfer Protocol (SMTP) as the standard method for transferring electronic mail over the internet system. SMTP is also used in many local area and wide area networks, although there are many other competing e-mail protocols available on LAN's. SMTP is accessed by a system's electronic mail routing program.
- ii. **File Transfer Protocol (FTP):** File transfer protocol is one of the first developed inter services which allow users to move files from one place to another. The FTP service allows the user to copy files from one computer to another. FTP, like many other services provided on the Internet is a client / server application; the client in the FTP system a Local Host and server is called a Remote Host. In order to connect to a computer using an FTP program, the remote system must have an FTP server running on it. The administrator of the machine must set up this server and the administrators decide which files and information are made available 'through the FTP server.
- iii. **NETWORK NEWS:** Network News is the Internet equivalent of a discussion group or a "Bulletin Board System" (BBS). To the user, network news organizes discussions under a set of broad headings called news-groups. News-groups were originally conceived for exchange of technical information. However, today they have developed for nontechnical subjects such as hobbies, news items, and social subjects. Newsgroups are organized hierarchically with the broadest grouping first in the name followed by an arbitrary number of subgroups. The name of each group is separated from its parent and the subgroups by a period (.). For example, 'rec.music.folk could refer to a recreational discussion on a general category of music with a specific focus on the sub group folk music.
- iv. **List Servers:** While both public and closed news servers make a wealth of information readily available, there is another related source of information you can use. This information source is a list server. A list

server distributes messages to people who have subscribed to the list. So, instead of using a news server to look through messages, just subscribe to a list and have the messages sent to your e-mail address.

- v. **Internet Relay Chat (IRC):** Internet Relay Chat, usually called IRC, is a public talk facility, which can be used by anyone on the net at any time. Within IRC, there are many conversations going on at any time, many of which are organized around a particular topic or idea.
- vi. **Electronic Mail:** Unlike manual mail delivery system, the electronic mail delivery system is very fast and efficient. The postal delivery in this system may neither be stopped by snow nor by rain, heat, night, wind etc. The attraction of e-mail is, no doubt, its speed. It has a speed of the telephone without a requirement of both parties be available at the same instant. It also leaves a written copy of delivered message with the sender. It also provides a way of sending same message to multi destinations at the same instant.

9.4 ACCESSING WEBSITES

9.4.1 Internet access

Internet access is the means by which individual terminals, computers, mobile devices, and local area networks are connected to the global *Internet*. It is a source through which users can access Internet services. Internet access is usually sold by Internet Service Providers (ISPs) that use many different technologies offering a wide range of data rates to the end user. Consumer use first became popular through dial-up connections in the 1980s and 1990s. By the first decade of the 21st century, many consumers had switched away from dial-up to dedicated connections, most Internet access products were being marketed using the term "broadband" and broadband penetration was being treated as a key economic indicator. The following are the seven steps to keep general internet browsing safe:

1. Always check the spelling in the address bar at the top of the screen to ensure you are at the official website and not a carbon copy of the website you think you are at.
2. Always look for the padlock and the letters "https" rather than "http" when signing into an online account or making online purchases. This means that information you provide, such as your name, address and credit card information, is being encrypted on its way to the web server that hosts the website you are buying from. This is important because this information crosses many public devices before reaching its destination and someone in the middle can access this data if it's not encrypted.
3. Avoid shady sites which promise offers too good to be true such as: free electronics, free software, pirated software and illegal file sharing websites.
4. Your browsing history is an insight into your browsing habits, particularly if you share a computer. To protect your privacy, clear your browser's temporary Internet files and history after each session.
5. Cookies are used to track your browsing history, usually for marketing purposes. Web browsers can be configured to notify you when a site sends you a cookie. You can then decide which sites you are willing to accept

cookies from. Changing your cookie settings is found in the “privacy” or “security” section of your browser's Internet options or preferences.

6. Look for privacy policies. It's always a good idea to review a web sites privacy policy to see how it will use your information before you tell them your details. Look for a clearly stated privacy policy and if there is not one then do not register your details with them as your private information may be passed to others without your permission.
7. You may not always be protected from all the latest threats as they occur. These are referred to as zero day vulnerabilities but if you are practicing safe browsing habits, you may avoid a threat that even your AV software could not protect you from.

9.4.2 Web Browser

Short for *Web browser*, a software application used to locate, retrieve and also display content on the World Wide Web, including Web pages, images, video and other files. As a client/server model, the browser is the client run on a computer that contacts the Web server and requests information. The Web server sends the information back to the Web browser which displays the results on the computer or other Internet-enabled device that supports a browser.

Today's browsers are fully-functional software suites that can interpret and display HTML Web pages, applications, JavaScript, AJAX and other content hosted on Web servers. Many browsers offer plug-ins which extend the capabilities of a browser so it can display multimedia information (including sound and video), or the browser can be used to perform tasks such as videoconferencing, to design web pages or add anti-phishing filters and other security features to the browser.

The two most popular browsers are Microsoft Internet Explorer and Firefox. Other major browsers include Google Chrome, Apple Safari and Opera. While most commonly use to access information on the web, a browser can also be used to access information hosted on Web servers in private networks.

Also, there are a number of browsers that are designed to access the Web using a mobile device. These mobile browsers ("*Microbrowser*") are optimized to display Web content on smaller mobile device screens and to also perform efficiently on these devices which have far less computing power and memory capacity as Desktop or laptop computers. Mobile browsers are typically "stripped down" versions of Web browsers and offer fewer features in order to run well on mobile devices.

9.4.3 Websites

A website, also written as *Web site*, *web site*, or simply *site*, is a set of related web pages served from a single web domain. A website is hosted on at least one web server, accessible via a network such as the Internet or a private local area network through an Internet address known as a Uniform Resource Locator (URL). All publicly accessible websites collectively constitute the World Wide Web. A webpage is a document, typically written in plain text interspersed with formatting instructions of Hypertext Markup Language (HTML, XHTML). A webpage may incorporate elements from other websites with suitable markup anchors.

Webpages are accessed and transported with the Hypertext Transfer Protocol (HTTP), which may optionally employ encryption (HTTP Secure, HTTPS) to provide security and privacy for the user of the webpage content. The user's application, often a web browser, renders the page content according to its HTML markup instructions onto a display terminal.

The pages of a website can usually be accessed from a simple Uniform Resource Locator (URL) called the web address. The URLs of the pages organize them into a hierarchy, although hyper-linking between them conveys the reader's perceived site structure and guides the reader's navigation of the site which generally includes a home page with most of the links to the site's web content and a supplementary about, contact and link page. Some websites require a subscription to access some or all of their content. Examples of subscription websites include many business sites, parts of news websites, academic journal websites, gaming websites, file-sharing websites, message boards, web-based email, social networking websites, websites providing real-time stock market data, and websites providing various other services (e.g., websites offering storing and/or sharing of images, files and so forth).

9.4.4 Types of Websites

On the basis of “function” websites can be classified in four major categories:

- Personal website
- Commercial website
- Government website
- Non-profit organization website

While on the basis of “style” website can be categorized as:

- **Static website:** The static website design is a simple website design which is cost effective and beneficial for the small enterprises or individuals to expand their business through web. Through static website individuals or small business houses can place simple information regarding their company and products in simple manner and at low cost. This type of website is very useful for expanding market of company with its information and appearance on Internet.
- **Dynamic website:** Dynamic pages are the pages that change dynamically. Dynamic pages can change every time when they are loaded without making any changes. Dynamic web pages can also change their content based on what user does, like clicking on some text or an image. If the information stored in the database changes, the web page connected to the database change accordingly and automatically without human intervention.

There are range of websites each having particular type of “content” in specific field. These websites may be randomly classified in any number of ways. A few such classifications are:

- **Affiliate:** enabled portal that rend not only its custom contents but also syndicated content from other content providers for an agreed fee. There are usually three relationship tiers.
 - i. *Affiliate Agencies* (e.g. Commission Junction)
 - ii. *Advertisers* (e.g. eBay)
 - iii. *Consumer* (e.g. Yahoo)
- **Archive site:** used to preserve valuable electronic contents that are on verge of extinction. For examples: Internet Archive, which since 1996 has preserved

billions of old and new web pages; and Google Groups, which in early 2005 had preserved over 845,000,000 messages posted to Usenet news/discussion groups.

- **Blog Site:** sites generally used to post online diaries, comments or views that may include discussion forums (e.g., blogger, Xanga).
- **Content Site:** these sites create and sell of original content to end-user. (e.g., Slate, About.com).
- **Corporate website:** used to provide information regarding business, organization, or service.
- **Commerce site (or e-Commerce site):** these sites are designed for purchasing or selling goods, such as Amazon.com, CSN Stores, and Overstock.com
- **Community site:** sites where persons with similar interests communicate to each other through chatting and messaging or through soci message boards, such as MySpace or Facebook.
- **City Site:** A site that shows information about a certain city or town and events that takes place in that town. Usually created by the city council. For example, Richmond.com is the geodomain for Richmond, Virginia.
- **Gripe site:** a site devoted to the critique of a person, place, corporation, government, or institution.
- **Humor site:** satirizes, parodies or otherwise exists solely to amuse.
- **Information site:** contains content that is intended to inform visitors, but not necessarily for commercial purposes, such as: RateMyProfessors.com, Free Internet Lexicon and Encyclopedia. Most government, educational and non-profit institutions have an informational site.
- **Mirror site:** A complete reproduction of a website.
- **News site:** similar to an information site, but dedicated to dispensing news and commentary.
- **Personal homepage:** run by an individual or a small group such as a family that contains information or any content that the individual wishes to include. These are usually uploaded using a web hosting service such as Geocities.
- **Phish Site:** a website created to fraudulently acquire sensitive information, such as passwords and credit card details, by disguising as a trustworthy person or business (such as Social Security Administration, PayPal) in an electronic communication.
- **Political site:** A site on which people may voice political views.
- **Porn site:** a site that shows sexually explicit content for enjoyment and relaxation, most likely in the form of an internet gallery, dating site, blog, or video sharing.
- **Rating site:** A site on which people can praise or disparage what is featured.
- **Review site:** A site on which people can post reviews for products or services.
- **School site:** a site on which teachers, students, or administrators can post information about current events at or involving their school.
- **Video sharing:** A site that enables user to upload videos, such as YouTube and Google Video.
- **Shock site:** includes images or other material that is intended to be offensive to most viewers (e.g. rotten.com).

- **Search engine site:** a site that provides general information and is intended as a gateway for retrieving other sites. Google, Yahoo and MSN are the most widely known search engines.
- **Warez:** a site designed to host and let users download copyrighted materials illegally.
- **Web portal:** a site is vehicle that provides a gateway to other resources on the Internet or an intranet.

9.5 SUMMARY

In this chapter, we learnt majorly about the internet and accessing the websites. The term “Internet” means a worldwide telecommunications system that provides connectivity for millions of other, smaller networks. In other words, the Internet is often referred to as a network of networks. It allows computer users to communicate with each other across distance and computer platforms. Internet is based on World Wide Web commonly known as www. The World Wide Web contains a vast collection of linked multimedia pages that is ever-changing. However, there are several basic components of the Web that allow users to communicate with each other. After that we understand about internet access. Internet access is the means by which individual terminals, computers, mobile devices, and local area networks are connected to the global *Internet*. It is a source through which users can access Internet services. Internet access is usually sold by Internet Service Providers (ISPs) that use many different technologies offering a wide range of data rates to the end user.

9.6 EXPECTED QUESTIONS

- Q1: What do you understand by the terms internet and World Wide Web?
Q2: What is domain name system and explain top level domain?
Q3: What are the various applications of internet?
Q4: Explain the role of web browser in internet access?
Q5: What do you understand by the term websites and explain the types of websites?

9.7 KEYWORDS

- **Home Page:** A home page is the first page that a Web site displays
- **Surfing the Web:** Web pages provide links to other related Web pages
- **Downloading** is the process of receiving information
- Some Web pages are designed specifically for **micro-browsers**
- A Web page has a unique address called a **URL** (Uniform Resource Locator) or **Web address**
- **Tabbed browsing** allows you to open and view multiple Web pages in a single Web browser window
- Two types of **search tools** are:
 - i. **Search engines** – Finds information related to a specific topic
 - ii. **Subject directories** – Classifies Web pages in an organized set of categories
- A **search engine** is helpful in locating items such as:

Images, videos, audio, publications, maps, people or businesses, blogs

- Some Web browsers contain an **Instant Search box** to eliminate the steps of displaying the search engine's Web page prior to entering the search text

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UNIT 10

COMPUTER NETWORK AND MICROSOFT OUTLOOK, CONCEPT OF LAN AND WAN

Contents:

- 10.1 Introduction
- 10.2 Objectives
- 10.3 Computer Network
- 10.4 Microsoft Outlook
- 10.5 Concept of LAN and WAN
- 10.6 What is E-Mails?
- 10.7 Sending and Receiving of E-Mails
- 10.8 Subscription of E-Mail to various sites
- 10.9 Summary
- 10.10 Expected Questions
- 10.11 References

10.1 INTRODUCTION

In this unit, we learn about computer networks which is a communications network in which the end points are computers and it is used for the purpose of commute the data. After that we learn about the communication media which includes the study of wired, wireless and exotic technologies. There are various types of networks which are also covered in this unit from personal area network to wide area network. The next topic that covered is Microsoft Outlook which consisted of the two types or versions that helps in communicating in day today professional as well as in the personal life. Furthermore, two types of networks are covered thoroughly i.e. Local Area Network (LAN) and Wide Area Network (WAN) along with their advantages and disadvantages. After that, the concept of Electronic Mail popularly known as e-mail is discussed with how to subscribe, write, send and receive the e-mail.

10.2 OBJECTIVES

- To understand the concept of computer networks
- To know and understand the significance of Microsoft Outlook
- To familiar with Local Area Network and Wide Area Network
- To understand the utility of E-Mail
- To know how to subscribe, write, send and receive the e-mails

10.3 COMPUTER NETWORK

10.3.1 Introduction

A computer network is a type of telecommunications network between data processing nodes for the purpose of data communications. It is a communications network in which the end points are computers. The interconnection of computers is accomplished with a variety of networking

hardware. Computer networks are built primarily from general-purpose programmable hardware and they are not optimized for a particular application like making phone calls or delivering television signals. Instead, they are able to carry many different types of data, and they support a wide, and ever growing, range of applications. Today's computer networks are increasingly taking over the functions previously performed by single-use networks.

Two devices are said to be networked, when a process in one device is able to exchange information with a process in another device. Networks may be classified by various characteristics, such as the media used to transmit signals, the communications protocols used to organize network traffic, network scale, network topology, benefits, and organizational scope. The best known computer network is the Internet.

Communication protocols define the rules and data formats for exchanging information in a computer network. Well-known communications protocols include Ethernet, hardware and link layer standard that is widely used for local area networks, and the Internet protocol suite (TCP/IP), which defines a set of protocols for communication between multiple networks, for host-to-host data transfer, and for application-specific data transmission formats. Protocols provide the basis for network programming.

Computer networking may be considered a branch of electrical engineering, telecommunications, computer science, information technology or computer engineering, since it relies upon the theoretical and practical application of the related disciplines.

10.3.2 Properties of a network

A computer network has the following properties:

- i. **It provides the facilitates for interpersonal communications:** People can communicate efficiently and easily via email, instant messaging, chat rooms, telephone, video telephone calls, and video conferencing.
- ii. **It allows sharing of files, data and other types of information:** Authorized users may access information stored on other computers on the network. Providing access to information on shared storage devices is an important feature of many networks.
- iii. **It allows sharing of network and computing resources:** Users may access and use resources provided by devices on the network, such as printing a document on a shared network printer. Distributed computing uses computing resources across a network to accomplish tasks.
- iv. **It may be insecure:** A computer network may be used by computer crackers to deploy computer viruses or computer worms on devices connected to the network, or to prevent these devices from accessing the network (denial of service).
- v. **It may interfere with other technologies:** Power line communication strongly disturbs certain forms of radio communication, e.g., amateur radio.
- vi. **It may be difficult to set up:** A complex computer network may be difficult to set up. It may be costly to set up an effective computer network in a large organization.

10.3.3 Communication Media

Computer networks can be classified according to the hardware and associated software technologies used to interconnect the individual network devices. These technologies include electrical cable (HomePNA, power line communication, G.hn), optical fiber and radio waves (wireless LAN). In the OSI model, these are located at levels 1 and 2.

A widely-adopted *family* of communication media is collectively known as Ethernet. Defined by IEEE 802, it uses various standards and media to enable communication between devices. Wireless LAN technology is designed to connect devices without wiring. These devices use radio waves or infrared signals as a transmission medium. The communication media is divided into three types:

- i. Wired technologies
- ii. Wireless technologies
- iii. Exotic technologies

i) Wired technologies

The order of the following wired technologies is roughly, from slowest to fastest transmission speed.

a) Twisted pair wire is the most widely used medium for telecommunication. Twisted-pair cabling consist of copper wires that are twisted into pairs. Ordinary telephone wires consist of two insulated copper wires twisted into pairs. Computer network cabling (wired Ethernet as defined by IEEE 802.3) consists of 4 pairs of copper cabling that can be utilized for both voice and data transmission. The use of two wires twisted together helps to reduce crosstalk and electromagnetic induction. The transmission speed ranges from 2 million bits per second to 10 billion bits per second. Twisted pair cabling comes in two forms: unshielded twisted pair (UTP) and shielded twisted-pair (STP). Each form comes in several category ratings, designed for use in various scenarios.

b) **Coaxial cable** is widely used for cable television systems, office buildings, and other work-sites for local area networks. The cables consist of copper or aluminum wire surrounded by an insulating layer (typically a flexible material with a high dielectric constant), which itself is surrounded by a conductive layer. The insulation helps minimize interference and distortion. Transmission speed ranges from 200 million bits per second to more than 500 million bits per second.

c) ITU-T G.hn technology uses existing home wiring (coaxial cable, phone lines and power lines) to create a high-speed (up to 1 Gigabit/s) local area network.

d) An **optical fiber** is a glass fiber. It uses pulses of light to transmit data. Some advantages of optical fibers over metal wires are less transmission loss, immunity from electromagnetic radiation, and very fast transmission speeds of up to trillions of bits per second. One can use different colors of lights to increase the number of messages being sent over a fiber optic cable.

ii) Wireless technologies

a. **Terrestrial microwave** – Terrestrial microwave communication uses Earth-based transmitters and receivers resembling satellite dishes. Terrestrial microwaves are in the low-gigahertz range, which limits all communications to line-of-sight. Relay stations are spaced approximately 48 km (30 mi) apart.

- b. **Communications satellites** – Satellites communicate via microwave radio waves, which are not deflected by the Earth's atmosphere. The satellites are stationed in space, typically in geosynchronous orbit 35,400 km (22,000 mi) above the equator. These Earth-orbiting systems are capable of receiving and relaying voice, data, and TV signals.
- c. **Cellular and PCS systems** use several radio communications technologies. The systems divide the region covered into multiple geographic areas. Each area has a low-power transmitter or radio relay antenna device to relay calls from one area to the next area.
- d. **Radio and spread spectrum technologies** – Wireless local area networks use a high-frequency radio technology similar to digital cellular and a low-frequency radio technology. Wireless LANs use spread spectrum technology to enable communication between multiple devices in a limited area. IEEE 802.11 defines a common flavor of open-standards wireless radio-wave technology.
- e. **Infrared communication** can transmit signals for small distances, typically no more than 10 meters. In most cases, line-of-sight propagation is used, which limits the physical positioning of communicating devices.
- f. A **global area network** (GAN) is a network used for supporting mobile across an arbitrary number of wireless LANs, satellite coverage areas, etc. The key challenge in mobile communications is handing off user communications from one local coverage area to the next. In IEEE Project 802, this involves a succession of terrestrial wireless LANs.

iii) Exotic technologies

There have been various attempts at transporting data over exotic media:

- a. IP over Avian Carriers was a humorous April fool's Request for Comments, issued as **RFC 1149**. It was implemented in real life in 2001.
- b. Extending the Internet to interplanetary dimensions via radio waves.
Both cases have a large round-trip delay time, which gives slow two-way communication, but doesn't prevent sending large amounts of information.

10.3.4 Types of Networks

A network can be characterized by its physical capacity or its organizational purpose. Use of the network, including user authorization and access rights, differ accordingly.

- i. Personal area network
- ii. Local area network
- iii. Home area network
- iv. Storage area network
- v. Campus area network
- vi. Backbone network
- vii. Metropolitan area network
- viii. Wide area network
- ix. Enterprise private network
- x. Virtual private network
- i. **Personal area network:** A personal area network (PAN) is a computer network used for communication among computer and different information

technological devices close to one person. Some examples of devices that are used in a PAN are personal computers, printers, fax machines, telephones, PDAs, scanners, and even video game consoles. A PAN may include wired and wireless devices. The reach of a PAN typically extends to 10 meters. A wired PAN is usually constructed with USB and Firewire connections while technologies such as Bluetooth and infrared communication typically form a wireless PAN.

- ii. **Local area network:** A local area network (LAN) is a network that connects computers and devices in a limited geographical area such as a home, school, office building, or closely positioned group of buildings. Each computer or device on the network is a node. Wired LANs are most likely based on Ethernet technology. Newer standards such as ITU-T G.hn also provide a way to create a wired LAN using existing wiring, such as coaxial cables, telephone lines and power lines.
- iii. **Home area network:** A home area network (HAN) is a residential LAN which is used for communication between digital devices typically deployed in the home, usually a small number of personal computers and accessories, such as printers and mobile computing devices. An important function is the sharing of Internet access, often a broadband service through a cable TV or digital subscriber line (DSL) provider.
- iv. **Storage area network:** A storage area network (SAN) is a dedicated network that provides access to consolidated, block level data storage. SANs are primarily used to make storage devices, such as disk arrays, tape libraries, and optical jukeboxes, accessible to servers so that the devices appear like locally attached devices to the operating system. A SAN typically has its own network of storage devices that are generally not accessible through the local area network by other devices. The cost and complexity of SANs dropped in the early 2000s to levels allowing wider adoption across both enterprise and small to medium sized business environments.
- v. **Campus area network:** A campus area network (CAN) is made up of an interconnection of LANs within a limited geographical area. The networking equipment (switches, routers) and transmission media (optical fiber, copper plant, Cat5 cabling, etc.) are almost entirely owned by the campus tenant / owner (an enterprise, university, government, etc.). For example, a university campus network is likely to link a variety of campus buildings to connect academic colleges or departments, the library, and student residence halls.
- vi. **Backbone network:** A backbone network is part of a computer network infrastructure that provides a path for the exchange of information between different LANs or sub-networks. A backbone can tie together diverse networks within the same building, across different buildings, or over a wide area. For example, a large company might implement a backbone network to connect departments that are located around the world. The equipment that ties together the departmental networks constitutes the network backbone. When designing a network backbone, network performance and network congestion are critical factors to take into account. Normally, the backbone network's capacity is greater than that of the individual networks connected to it. Another example of a backbone network is the Internet

backbone which is the set of wide area networks (WANs) and core routers that tie together all networks connected to the Internet.

- vii. **Metropolitan area network:** A Metropolitan area network (MAN) is a large computer network that usually spans a city or a large campus.
- viii. **Wide area network:** A wide area network (WAN) is a computer network that covers a large geographic area such as a city, country, or spans even intercontinental distances. A WAN uses a communications channel that combines many types of media such as telephone lines, cables, and air waves. A WAN often makes use of transmission facilities provided by common carriers, such as telephone companies. WAN technologies generally function at the lower three layers of the OSI reference model: the physical layer the data link layer and the network layer.
- ix. **Enterprise private network:** An enterprise private network is a network built by a single organization to interconnect its office locations (e.g., production sites, head offices, remote offices, shops) in order to share computer resources.
- x. **Virtual private network:** A virtual private network (VPN) is a computer network in which some of the links between nodes are carried by open connections or virtual circuits in some larger network (e.g., the Internet) instead of by physical wires. The data link layer protocols of the virtual network are said to be tunneled through the larger network when this is the case. One common application is secure communications through the public Internet, but a VPN need not have explicit security features, such as authentication or content encryption. VPNs, for example, can be used to separate the traffic of different user communities over an underlying network with strong security features. VPN may have best-effort performance, or may have a defined service level agreement (SLA) between the VPN customer and the VPN service provider. Generally, a VPN has a topology more complex than point-to-point.

10.4 MICROSOFT OUTLOOK

Microsoft Outlook is a personal information manager from Microsoft, available as a part of the Microsoft Office suite. The current version is Microsoft Office Outlook 2013 for Windows and Microsoft Office Outlook 2011 for Mac.

Although often used mainly as an email application, it also includes a calendar, task manager, contact manager, note taking, a journal and web browsing. It can be used as a stand-alone application, or can work with Microsoft Exchange Server and Microsoft SharePoint Server for multiple users in an organization, such as shared mailboxes and calendars, Exchange public folders, SharePoint lists and meeting schedules. There are third-party add-on applications that integrate Outlook with devices such as BlackBerry mobile phones and with other software such as Office and Skype internet communication. Developers can also create their own custom software that works with Outlook and Office components using Microsoft Visual Studio. In addition, Windows Mobile devices can synchronize almost all Outlook data to Outlook Mobile. Microsoft Outlook is of the following types:

- i. Microsoft Outlook 2007
- ii. Microsoft Outlook 2010

Microsoft Outlook 2007:

Outlook 2007 was available in retail stores at the end of January 2007. Features that debuted in Outlook 2007 include:

- Office Fluent "ribbon" user interface (though not for the main window)
- To-Do bar added to the shell UI that shows a snapshot of the user's upcoming appointments and active tasks for better time and project management, and provides navigation entry points into calendar (e.g. selecting calendar dates in Date Navigator, clicking on day/date names in appointments area)
- Changed calendar views that display the tasks due below each day on the week view and supports overlaying multiple calendars
- Send your calendar information with calendar snapshots, which creates an HTML representation of your calendar so you can share this information with anyone
- Ability to publish calendars in Internet Calendar format to Microsoft Office Online or to a WebDAV server
- Send text and picture messages from Outlook with Outlook Mobile Service to a mobile phone. Forward Outlook email messages, contacts, appointments, and tasks as text messages. Automatically send email messages, reminders, and your daily calendar as text messages to a mobile phone Outlook SMS Service Provider
- Integrated RSS aggregator
- 'Instant Search' through a context indexer based search engine with Windows Desktop Search
- Enhanced integration with Microsoft Office SharePoint Portal Server
- New programmability features
- Preview Handler extension for previewing email attachment (including reading pane) without leaving Outlook
- Ability to add a picture or company logo to a contact or electronic business card
- Color Categories give you an easy, visual way to distinguish any type of information from one another, so it's easy to organize your data and search your information
- Save as PDF or XPS
- Discontinuation of Common User Access cut and paste support
- Improved anti-phishing filters
- Office Outlook 2007 Email Postmark is designed to make it very time-consuming to send email. This makes it technologically detrimental for users to send mass email with Outlook, prompting spammers to use other e-mail clients.
- Information Rights Management (IRM) restricts and/or expires distribution of email using Windows Server 2003 or later running Windows Rights Management Services (RMS)
- Managed policy compliance features integration with Exchange Server 2007
- Now renders HTML-formatted e-mails using Microsoft Word instead of Internet Explorer (making the rendering less standards-compliant, but more in line with what a user sees when composing e-mail using Word)

Microsoft Outlook 2010:

Features that debuted in Outlook 2010 include:

- Ribbon interface in all views
- Contact cards to show pop-up details of all message participants from GAL or user contact records
- Grouping of conversations improved - includes messages from all folders, and optionally from separate accounts
- Improved To-Do bar, for example showing how many appointments are not shown when space is limited
- "People Pane" and Social Networking features

10.4 CONCEPT OF LAN AND WAN

10.4.1 Local Area Network (LAN)

10.4.1.1: Introduction of LAN

A local area network (LAN) is a computer network that interconnects computers in a limited area such as a home, school, computer laboratory, or office building using network media. The defining characteristics of LANs, in contrast to wide area networks (WANs), include their usually higher data-transfer rates, smaller geographic area, and lack of a need for leased telecommunication lines.

In other words, a LAN is a high-speed data network that covers a relatively small geographic area. It typically connects workstations, personal computers, printers, servers, and other devices. LANs offer computer users many advantages, including shared access to devices and applications, file exchange between connected users, and communication between users via electronic mail and other applications. Some of the characteristics of LAN are:

- Limited distance within a few miles
- High data rate - 2 to 1000Mbps
- Low error rate
- Good response time
- Private owned
- No regulation
- Share hardware, software and data files

A local area network (LAN) supplies networking capability to a group of computers in close proximity to each other such as in an office building, a school, or a home. A LAN is useful for sharing resources like files, printers, games or other applications. A LAN in turn often connects to other LANs and to the Internet or other WAN. Most local area networks are built with relatively inexpensive hardware such as Ethernet cables, network adapters, and hubs. Wireless LAN and other more advanced LAN hardware options also exist.

Specialized operating system software may be used to configure a local area network. For example, most flavors of Microsoft Windows provide a software package called Internet Connection Sharing (ICS) that supports controlled access to LAN resources. The term LAN party refers to a multiplayer gaming event where participants bring their own computers and build a temporary LAN. For example the most common type of local area network is an

Ethernet LAN. The smallest home LAN can have exactly two computers; a large LAN can accommodate many thousands of computers. Many LANs are divided into logical groups called subnets. An Internet Protocol (IP) "Class A" LAN can in theory accommodate more than 16 million devices organized into subnets.

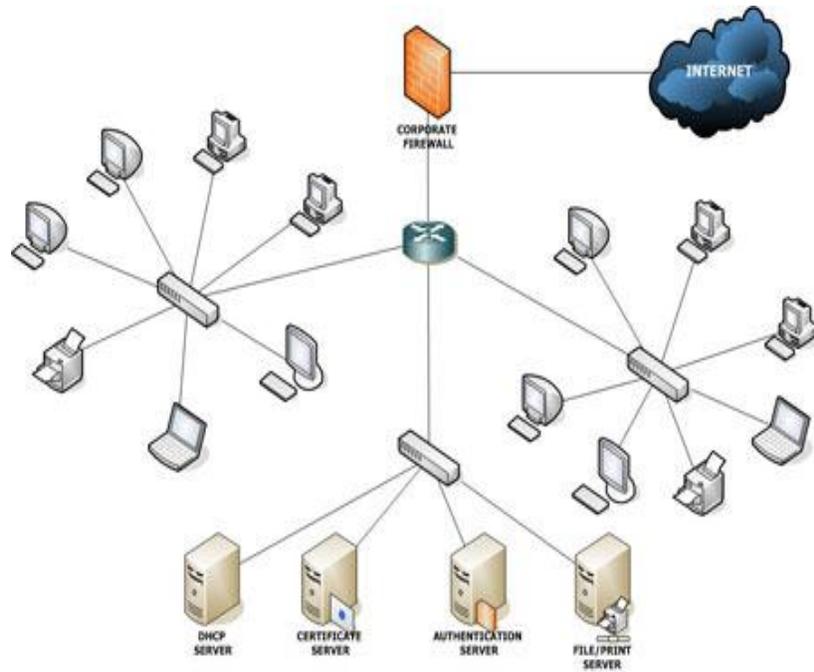


Figure 1: Local Area Network (LAN)

10.4.1.2 Introduction to LAN Protocols

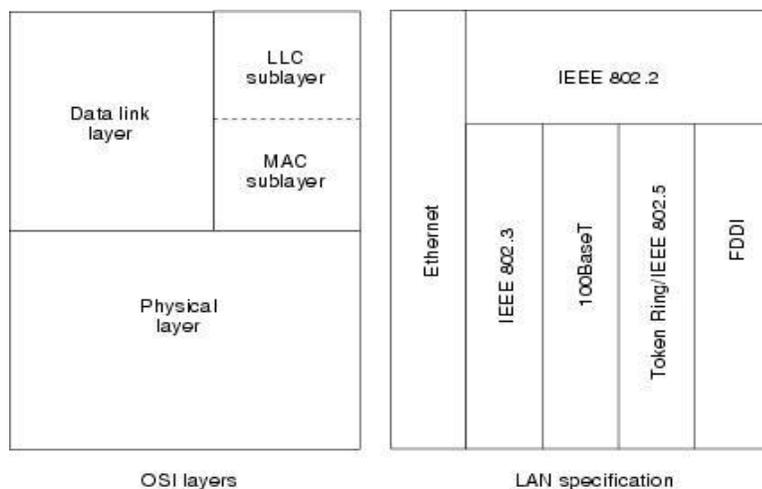


Figure 2: Popular LAN Protocols Mapped to the OSI Reference Model

ARCNET, Token Ring and other technology standards have been used in the past, but Ethernet over twisted pair cabling, and Wi-Fi are the two most common technologies currently used to build LANs.

Network topology describes the layout of interconnections between devices and network segments. At the Data Link Layer and Physical Layer, a wide variety of LAN topologies have been used, including ring, bus, mesh and star, but the most common LAN topology in use today is switched Ethernet. At the higher layers, the Internet Protocol (TCP/IP) has become the standard, replacing NetBEUI, IPX/SPX, AppleTalk and others.

Simple LANs generally consist of one or more switches. A switch can be connected to a router, cable modem, or ADSL modem for Internet access. Complex LANs are characterized by their use of redundant links with switches using the spanning tree protocol to prevent loops, their ability to manage differing traffic types via quality of service (QoS) and to segregate traffic with VLANs. A LAN can include a wide variety of network devices such as switches, firewalls, routers, load balancers, and sensors. LANs can maintain connections with other LANs via leased lines, leased services, or the Internet using virtual private network technologies. Depending on how the connections are established and secured in a LAN, and the distance involved, a LAN may also be classified as a metropolitan area network (MAN) or a wide area network (WAN).

10.4.1.3 LAN Transmission Methods

LAN data transmissions fall into three classifications: unicast, multicast, and broadcast. In each type of transmission, a single packet is sent to one or more nodes.

In a *unicast transmission*, a single packet is sent from the source to a destination on a network. First, the source node addresses the packet by using the address of the destination node. The package is then sent onto the network, and finally, the network passes the packet to its destination.

A *multicast transmission* consists of a single data packet that is copied and sent to a specific subset of nodes on the network. First, the source node addresses the packet by using a multicast address. The packet is then sent into the network, which makes copies of the packet and sends a copy to each node that is part of the multicast address.

A *broadcast transmission* consists of a single data packet that is copied and sent to all nodes on the network. In these types of transmissions, the source node addresses the packet by using the broadcast address. The packet is then sent on to the network, which makes copies of the packet and sends a copy to every node on the network.

10.4.1.4 LAN Topologies

LAN topologies define the manner in which network devices are organized. These topologies are logical architectures but the actual devices need not be physically organized in these configurations. Logical bus and ring topologies, for example, are commonly organized physically as a star.

Four common LAN topologies exist:

- i. Bus Typology
- ii. Ring Typology

- iii. Star Typology
- iv. Tree Typology
- i. **Bus Typology:** A *bus topology* is a linear LAN architecture in which transmissions from network stations propagate the length of the medium and are received by all other stations. Of the three most widely used LAN implementations, Ethernet/IEEE 802.3 networks—including 100BaseT—implement a bus topology, which is illustrated in Figure 3.

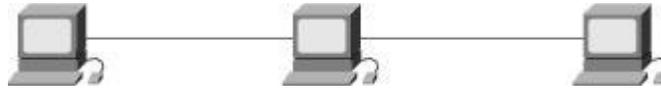


Figure 3: Some Networks Implement a Local Bus Topology

- ii. **Ring Typology:** A *ring topology* is a LAN architecture that consists of a series of devices connected to one another by unidirectional transmission links to form a single closed loop. Both Token Ring/IEEE 802.5 and FDDI networks implement a ring topology.

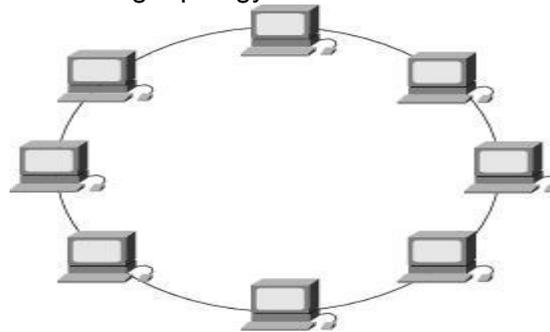


Figure 4: Logical ring topology

- iii. **Star Typology:** A *star topology* is a LAN architecture in which the endpoints on a network are connected to a common central hub, or switch, by dedicated links. Logical bus and ring topologies are often implemented physically in a star topology.
- iv. **Tree Typology:** A *tree topology* is a LAN architecture that is identical to the bus topology, except that branches with multiple nodes are possible in this case. Figure 5 illustrates a logical tree topology.

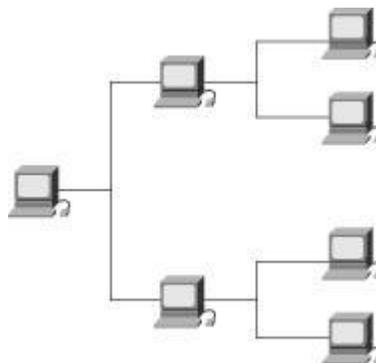


Figure 5: A Logical Tree Topology Can Contain Multiple Nodes

10.4.1.5: LAN Devices

Although there are number of LAN devices are used like bridges, LAN switches, routers, hubs etc. according to the requirements. The most commonly devices used in LANs are as follows:

- i. Repeater
 - ii. Hubs
 - iii. LAN extenders
- i. **Repeater:** A *repeater* is a physical layer device used to interconnect the media segments of an extended network. A repeater essentially enables a series of cable segments to be treated as a single cable. Repeaters receive signals from one network segment and amplify, retimes, and retransmit those signals to another network segment. These actions prevent signal deterioration caused by long cable lengths and large numbers of connected devices. Repeaters are incapable of performing complex filtering and other traffic processing.

In addition, all electrical signals, including electrical disturbances and other errors, are repeated and amplified. The total number of repeaters and network segments that can be connected is limited due to timing and other issues. Figure 6 illustrates a repeater connecting two network segments.

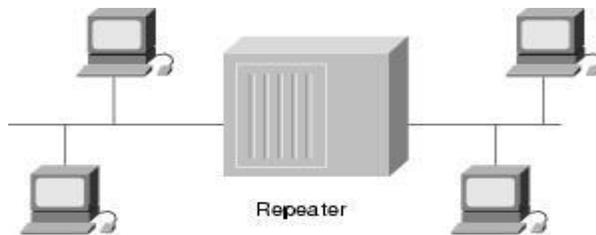


Figure 6: A Repeater Connects Two Network Segments

- ii. **Hub:** A *hub* is a physical layer device that connects multiple user stations, each via a dedicated cable. Electrical interconnections are established inside the hub. Hubs are used to create a physical star network while maintaining the logical bus or ring configuration of the LAN. In some respects, a hub functions as a multiport repeater.
- iii. **LAN extender:** A *LAN extender* is a remote-access multilayer switch that connects to a host router. LAN extenders forward traffic from all the standard network layer protocols (such as IP, IPX, and AppleTalk) and filter traffic based on the MAC address or network layer protocol type. LAN extenders scale well because the host router filters out unwanted broadcasts and multicasts. However, LAN extenders are not capable of segmenting traffic or creating security firewalls. Figure 7 illustrates multiple LAN extenders connected to the host router through a WAN.

10.4.1.6 Advantages and Disadvantages of LAN

10.4.1.6.1 Advantages of LAN

- Hardware such as printers can be shared so individual workstations do not need their own printer. When they print, the data is stored in a queue on a server. The data is then passed to the printer.

- All the users work can be stored in a central place (the dedicated file server) so a user can access their work through any computer on the network.
- Software can be shared, software packages are stored on the server and downloaded to workstations as requested. Note that a license still has to be bought for each copy of the software needed.
- Data can be shared because database files stored in the server are available to users around the network; data from CD-ROMs can also be shared across the network.
- Central back-up can take place automatically at regular intervals. A user will usually be able to retrieve work that has been deleted by mistake.
- Messages can be sent to people working at other computers on the network which can save time and paper.
- It is possible to set up a local intranet such as that on the KLB school network. The web pages of information can be accessed only over the LAN. An intranet is free because it does not involve phone links.
- There is control over users' access rights to programs and data.

10.4.1.6.2 Disadvantages of LAN

- Printing can be slow. Where a lot of workstations are served by only one or two printers, long print queues may develop.
- A virus can spread more easily. If a virus gets into one computer, it is likely to spread quickly across the network because it will get into the central backing store.
- As data is shared there is a greater need for security. Users of the network have to have authentication techniques such as user ids and passwords. Unique user ID's control access to the files and settings on the network while passwords prevent unauthorized users from logging onto the network. Data may also have to be encrypted so that it is meaningless if intercepted.
- If the server fails, all the workstations are affected. Work stored on shared hard disk drives will not be accessible and it will not be possible to use network printers either.
- The cost of installing the equipment is greater. Cabling can be expensive to buy and to install.
- Damage to cables can isolate computers. Some sections of the network can become isolated and will not be able to communicate with the rest of the network.
- Because networks can be complicated to maintain, a network manager may be need to be employed to run the system.

10.4.2 Wide Area Network (WAN)

A Wide Area Network (WAN) is a network that covers a broad area (i.e., any telecommunications network that links across metropolitan, regional or national boundaries) using private or public network transports. Business and government entities utilize WANs to relay data among employees, clients, buyers and suppliers from various geographical locations.

In essence, this mode of telecommunication allows a business to effectively carry out its daily function regardless of location. The Internet can be

considered a WAN as well, and is used by businesses, governments, organizations and individuals for almost any purpose imaginable.

A WAN spans a large geographic area, such as a state, province or country. WANs often connect multiple smaller networks, such as local area networks (LANs) or metro area networks (MANs).

The world's most popular WAN is the Internet. Some segments of the Internet, like VPN-based extranets, are also WANs in themselves. Finally, many WANs are corporate or research networks that utilize leased lines.

WANs generally utilize different and much more expensive networking equipment than do LANs. Key technologies often found in WANs include SONET, Frame Relay and ATM. Related terms for other types of networks are personal area networks (PANs), local area networks (LANs), campus area networks (CANs) or metropolitan area networks (MANs) which are usually limited to a room, building, campus or specific metropolitan area (e.g., a city) respectively. A WAN spans a large geographic area, such as a state, province or country. WANs often connect multiple smaller networks, such as local area networks (LANs) or metro area networks (MANs).

The world's most popular WAN is the Internet. Some segments of the Internet, like extranets, are also WANs in themselves. Finally, many WANs are corporate or research networks that utilize leased lines. WANs generally utilize different and much more expensive networking equipment than do LANs. Key technologies often found in WANs include SONET, Frame Relay and ATM. The term Wide Area Network (WAN) usually refers to a network which covers a large geographical area and use communications circuits to connect the intermediate nodes. A major factor impacting WAN design and performance is a requirement that they lease communications circuits from telephone companies or other communications carriers. Transmission rates are typically 2 Mbps, 34 Mbps, 45 Mbps, 155 Mbps, 625 Mbps (or sometimes considerably more).

Numerous WANs have been constructed, including public packet networks, large corporate networks, military networks, banking networks, stock brokerage networks and airline reservation networks. Some WANs are very extensive, spanning the globe but most do not provide true global coverage. Organizations supporting WANs using the Internet Protocol are known as Network Service Providers (NSPs). These form the core of the Internet.

By connecting the NSP WANs together using links at Internet Packet Interchanges (sometimes called "peering points") a global communication infrastructure is formed. NSPs do not generally handle individual customer accounts (except for the major corporate customers) but instead deal with intermediate organizations that they can charge for high capacity communications. They generally have an agreement to exchange certain volumes of data at a certain "quality of service" with other NSPs. So practically any NSP can reach any other NSP but may require the use of one or more other NSP networks to reach the required destination. NSPs vary in terms of the transit delay, transmission rate and connectivity offered.

Advantages of WANs:

- These are similar to those of LAN's except the scale of sharing etc. becomes far greater and can be world-wide.

Disadvantages of WANs:

- Again these are similar to those of LAN's except that issues such as security become even more important as potential hackers could break into a computer system from anywhere in the world rather than having to physically be in a building.
- Encryption of secure data such as financial transactions is necessary because it is even easier to intercept data

10.5 WHAT IS E-MAILS?

10.5.1 Introduction

The term E-Mail stands for **electronic mail**; another common spelling for e-mail is *email*. Electronic mail, most commonly referred to as email or e-mail since approximately 1993 is a method of exchanging digital messages from an author to one or more recipients. Modern email operates across the Internet or other computer networks. Some early email systems required that the author and the recipient both be online at the same time, in common with instant messaging. Today's email systems are based on a store-and-forward model. Email servers accept, forward, deliver and store messages. Neither the users nor their computers are required to be online simultaneously; they need connect only briefly, typically to an email server, for as long as it takes to send or receive messages.

Moreover, it is the transmission of messages over communications networks. The messages can be notes entered from the keyboard or electronic files stored on disk. Most mainframes, minicomputers and computer networks have an e-mail system. Some electronic-mail systems are confined to a single computer system or network but others have gateways to other computer systems, enabling users to send electronic mail anywhere in the world. Companies that are fully computerized make extensive use of e-mail because it is fast, flexible, and reliable.

Historically, the term *electronic mail* was used generically for any electronic document transmission. For example, several writers in the early 1970s used the term to describe fax document transmission. As a result, it is difficult to find the first citation for the use of the term with the more specific meaning it has today.

10.5.2 Components of E-Mail

An Internet email message consists of three components, the message *envelope*, the message *header*, and the message *body*. The message header contains control information, including, minimally, an originator's email address and one or more recipient addresses. Usually descriptive information is also added, such as a subject header field and a message submission date/time stamp.

Most e-mail systems include a rudimentary text editor for composing messages, but many allow you to edit your messages using any editor you want. You then send the message to the recipient by specifying the recipient's address.

You can also send the same message to several users at once. This is called *broadcasting*.

Sent messages are stored in electronic mailboxes until the recipient fetches them. To see if you have any mail, you may have to check your electronic mailbox periodically, although many systems alert you when mail is received. After reading your mail, you can store it in a text file, forward it to other users or delete it. Copies of memos can be printed out on a printer if you want a paper copy.

All online services and Internet Service Providers (ISPs) offer e-mail and most also support gateways so that you can exchange mail with users of other systems. Usually, it takes only a few seconds or minutes for mail to arrive at its destination. This is a particularly effective way to communicate with a group because you can broadcast a message or document to everyone in the group at once.

Although different e-mail systems use different formats, there are some emerging standards that are making it possible for users on all systems to exchange messages. In the PC world, an important e-mail standard is MAPI. The CCITT standards organization has developed the X.400 standard, which attempts to provide a universal way of addressing messages. To date, though, the de facto addressing standard is the one used by the Internet system because almost all e-mail systems have an Internet gateway.

Originally a text-only (7-bit ASCII and others) communications medium, email was extended to carry multi-media content attachments, a process standardized in RFC 2045 through 2049. Collectively, these RFCs have come to be called Multipurpose Internet Mail Extensions (MIME).

Electronic mail predates the inception of the Internet and was in fact a crucial tool in creating it, but the history of modern, global Internet email services reaches back to the early ARPANET. Standards for encoding email messages were proposed as early as 1973 (RFC 561). Conversion from ARPANET to the Internet in the early 1980s produced the core of the current services. An email sent in the early 1970s looks quite similar to a basic text message sent on the Internet today.

Network-based email was initially exchanged on the ARPANET in extensions to the File Transfer Protocol (FTP) but is now carried by the Simple Mail Transfer Protocol (SMTP), first published as Internet standard 10 (RFC 821) in 1982. In the process of transporting email messages between systems, SMTP communicates delivery parameters using a message *envelope* separate from the message (header and body) itself.

10.5.3 Types of E-Mail

There are following types of e-mails:

- i. Web-based email (webmail)
 - ii. POP3 email services
 - iii. IMAP email servers
 - iv. MAPI email servers
- i. **Web-based email (webmail):** This is the type of email that most users are familiar with. Many free email providers host their servers as web-based email (e.g. Hotmail, Yahoo, Gmail, AOL). This allows users to log into the email account by using a web browser to send and receive their email. Its main

disadvantage is the need to be connected to the internet while using it. Other software tools exist which integrate parts of the webmail functionality into the OS (e.g. creating messages directly from third party applications via MAPI).

- ii. **POP3 email services:** POP3 is the acronym for Post Office Protocol 3. It is a leading email account type on the Internet. In a POP3 email account, email messages are downloaded to the client device (i.e. a computer) and then they are deleted from the mail server. It is difficult to save and view messages on multiple devices. Also, the messages sent from the computer are not copied to the Sent Items folder on the devices. The messages are deleted from the server to make room for more incoming messages. POP supports simple download-and-delete requirements for access to remote mailboxes (termed maildrop in the POP RFC's). Although most POP clients have an option to leave messages on the server after downloading a copy of them, most e-mail clients using POP3 simply connect, retrieve all messages, store them on the client device as new messages, delete them from the server, and then disconnect. Other protocols, notably IMAP, (Internet Message Access Protocol) provide more complete and complex remote access to typical mailbox operations. Many e-mail clients support POP as well as IMAP to retrieve messages; however, fewer Internet Service Providers (ISPs) support IMAP.
- iii. **IMAP email servers:** IMAP refers to Internet Message Access Protocol. It is an alternative to the POP3 email. With an IMAP account, a user's account has access to mail folders on the mail server and can use any compatible device to read messages, as long as such a device can access the server. It shows the headers of messages, the sender and the subject and the device needs to request to download specific messages. Usually mail is saved on a mail server, therefore it is safer and it is backed up on an email server.
- iv. **MAPI email servers:** Messaging Application Programming Interface (MAPI) is a messaging architecture and a Component Object Model based API for Microsoft Windows.

10.6 SENDING AND RECEIVING OF E-MAILS

Electronic mail (or e-mail or email) is an Internet service that allows those people who have an e-mail address (accounts) to send and receive electronic letters. Those are much like postal letters, except that they are delivered much faster than snail mail when sending over long distances and are usually free.

Like with regular mail, users may get a lot of unwanted mail. With e-mail, this is called spam. Some programs used for sending and receiving mail can detect spam and filter it out nearly completely.

To send or receive an email in the traditional way, you need a device (computer, phone etc.) connected to the Internet and an e-mail program (simply called mailer). Several formats exist for email addresses. The most common, called RFC 2822, looks like user@domain.com. E-mail messages are sent mostly by text and sometimes by HTML style.

Some companies let you send and receive emails for free from a remote website. Gmail, Hotmail and Yahoo! do this kind of service, which is known as "web mail". Also, Microsoft invented its own "protocol" (or set of rules) for sending and receiving mail. The name of the protocol is "Exchange".

The Figure 8 gives an example of what happens when email is sent from one person to another using the traditional method. In this example, Alice is sending email to Bob.

1. First, Alice writes a message to Bob in her e-mail program. Her e-mail program puts the message together along with some other information, such as her email address, the address of the person she is writing to, the time at which she is sending her message, and so on. When it is ready, Alice's mail program sends the message to a special computer called a mail server (or a Mail Transfer Agent) using some rules called the Simple Mail Transfer Protocol (SMTP).
2. The mail server that Alice is using to send her message (smtp.a.org) takes Alice's message and looks at the address to see where the message is being sent. The mail server then goes out on the internet and tries to find the mail server that Bob is using. It does this by talking to a Domain Name System (DNS) server, which keeps records about how to find different computers on the internet, including mail servers.
3. The DNS server gives Alice's mail server the proper address for the server that Bob is using to receive his email (mx.b.org).
4. Alice's mail server sends the message to Bob's email server, which puts it into Bob's mailbox.
5. Bob opens his e-mail program and downloads his messages using one of two sets of rules—either the Post Office Protocol (POP) or the Internet Message Access Protocol (IMAP). His messages include the new message from Alice.

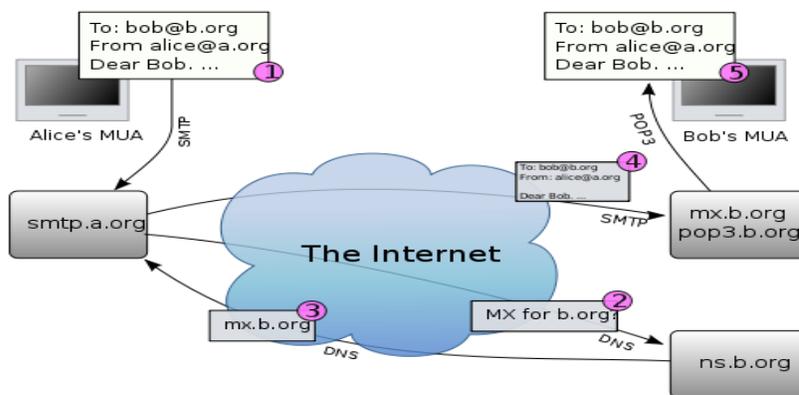


Figure 8: Sending and receiving an E-Mail

Some more features are included in the e-mail are as follows:

- Moreover, one can send files along with the emails by using the *Attachment* feature. This is a common way of sending longer documents, spreadsheets, photographs etc. to other people.
- The *CC (Carbon Copy)* function lets you send a copy of the email to other people.
- The *BCC (Blind Carbon Copy)* function also lets you send a copy of the email to other people. This function hides the names of the recipients from each other.

10.7 SUBSCRIPTION OF E-MAIL TO VARIOUS SITES

Now-a-days, the subscription to e-mail account is free for most of the service providers like Google mail, Outlook, Yahoo mail, Rediff mail etc. The following are the process involved in it:

10.7.1 Creating or Subscribing an E-mail Account

The following are the steps for the process of subscribing an e-mail account:

1. Type the URL into the website search option
e.g.: 'http://www.rediff.com' in the Internet explorer to visit the Rediff website.
2. Since you are a new user at this time, you need to Sign Up as a new user.
 - Click on Sign Up to create yourself as a new user.
 - A new page will be displayed that will allow you to select the kind of account you want – Free or paid (these differ in the storage space and additional facilities).
3. Once you click on the 'Sign Up Now' button, Rediff displays a registration form and requires you to fill some necessary details like a user ID, password, Name etc.
4. After you register yourself on a website, you become a member and can then simply log into your mail account using the username and password.
5. It is, therefore, very important to remember your username and password because without that you cannot access your e-mail account.

On the similar note, one can subscribe other e-mail services according to their choice and needs by following the same pattern as mentioned above.

10.7.2 Some Tips for E-mailing

Each day millions of e-mail messages travel over the Internet. Since each of us contributes towards the large volume of such messages and deal with a large number of them on a daily basis, it may be worthwhile keeping the following tips in mind:

- Arrange your e-mails into different folders (depending on their content). This will organize your mails into different categories, e.g. Travel, Education, Newsletters etc. while leaving only those in your Inbox that require immediate action.
- Periodically scan your messages to delete the old messages and preserve your e-mail account space.
- Always write meaningful subject in your mails.
- You can also set up e-mail filters to avoid cluttering your Inbox. Filters are used to automatically send certain messages (by sender for example) to separate folders.
- Zip your attachments if they are very big.
- Scan the attachments received before opening them.
- Periodically change your password to protect your e-mail account from unauthorized users.
- Do not forward junk mails or chain letters.
- Do not forget to log out of your e-mail account.

10.8 SUMMARY

First of all, we studied about computer network. A computer network is a type of telecommunications network between data processing nodes for the purpose of data communications. Computer networks are built primarily from general-purpose programmable hardware and they are not optimized for a particular application like making phone calls or delivering television signals. Some properties of computer network are that it provides the facilitates for interpersonal communications, it allows sharing of files, data and other types of information, it allows sharing of network and computing resources, it may be insecure, it may interfere with other technologies and it may be difficult to set up. Computer networks can be classified according to the hardware and associated software technologies used to interconnect the individual network devices. It is divided into three types i.e. Wired technologies, Wireless technologies and Exotic technologies.

Any network can be characterized by its physical capacity or its organizational purpose. Use of the network, including user authorization and access rights, differ accordingly. The network is of the types like Personal area network, Local area network, Home area network, Storage area network, Campus area network, Backbone network, Metropolitan area network, Wide area network, Enterprise private network and Virtual private network.

The Microsoft Outlook is a personal information manager from Microsoft, available as a part of the Microsoft Office suite. The current version is Microsoft Office Outlook 2013 for Windows and Microsoft Office Outlook 2011 for Mac. Although often used mainly as an email application, it also includes a calendar, task manager, contact manager, note taking, a journal and web browsing. Microsoft Outlook is of the two types i.e. Microsoft Outlook 2007 and Microsoft Outlook 2010.

A local area network (LAN) is a computer network that interconnects computers in a limited area such as a home, school, computer laboratory, or office building using network media. The defining characteristics of LANs, in contrast to wide area networks (WANs), include their usually higher data-transfer rates, smaller geographic area, and lack of a need for leased telecommunication lines. Four common LAN topologies exists are Bus, Ring, Star and Tree. Although there are number of LAN devices are used like bridges, LAN switches, routers, hubs etc. according to the requirements. A Wide Area Network (WAN) is a network that covers a broad area (i.e., any telecommunications network that links across metropolitan, regional or national boundaries) using private or public network transports. Business and government entities utilize WANs to relay data among employees, clients, buyers and suppliers from various geographical locations.

The term E-Mail stands for *electronic mail*, another common spelling for e-mail is *email*. Electronic mail, most commonly referred to as email or e-mail since approximately 1993 is a method of exchanging digital messages from an author to one or more recipients. Modern email operates across the Internet or other computer networks. Some early email systems required that the author and the recipient both be online at the same time, in common with instant messaging. Today's email systems are based on a store-and-forward model. Email servers accept, forward, deliver and store messages. Neither the users nor their

computers are required to be online simultaneously; they need connect only briefly, typically to an email server, for as long as it takes to send or receive messages.

10.9 Expected Questions

Q1: What do you mean by the term computer network and explain the properties of computer network?

Q2: Explain the types of communication media and the various types of networks?

Q3: Write an essay on Microsoft Outlook?

Q4: Explain the concept along with their pros and cons of Local area and Wide area networks?

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UNIT 11

SEARCH ENGINES, SEARCHING THROUGH VARIOUS SEARCH ENGINES, CHATTING AND VARIOUS ONLINE MESSAGES

Structure

- 11.1 Introduction
- 11.2 Objectives
- 11.3 Search Engines
- 11.4 Searching through various Search Engines
- 11.5 Chatting and various online messages
- 11.6 Summary
- 11.7 Expected Questions
- 11.8 References

11.1 INTRODUCTION

The growth of the Internet has led to a paradoxical situation. While on the one hand there is a colossal amount of information available on the Internet, on the other hand sheer volume of unorganized information makes it difficult for the users to find relevant and accurate information in a speedy and efficient manner.

Internet can be said to be the most exhaustive, important and useful source of information on almost all aspects of knowledge hosted on millions of servers connected to Internet around the world. It is a known fact that there are neither defined policies for hosting information nor is there a centralized database for organizing and searching the information available on the Internet. This makes the Internet as the most diverse and unorganized source of information. Searching for specific information is the main purpose of using Internet for several users. However, with availability of excessive information, it has become very difficult for a common user to search for precise and relevant information on the Internet. To tackle this situation, computer scientists came up with search tools that search through the information on the Internet to churn out required information by a user. There are varieties of search, resource discovery and browsing tools that have been developed to support more efficient information retrieval. Search engines are one of such discovery tools.

Search engines use automated programs, variably called bots, robots, spiders, crawlers, wanderers and worms developed to search the web. The robots traverse the web in order to index websites. Some of them index websites by title, some by Uniform Resource Locators (URLs), some by words in each document in a website, and some by combinations of these. These search engines function in different ways and search different parts of the Internet.

11.2 OBJECTIVES

- To know about the search engines and their evolution
- To understand how search engines work;
- To know about the various components of a search engine;
- To know the various categories of search engines;
- To aware about the various search techniques;
- To understand about On Line Chat
- To know about the chat is a powerful medium of communication in business
- To understand the significance of Chat Etiquette

11.3 SEARCH ENGINES

11.3.1 Definitions

Search Engine is a generic term used for the software that 'searches' the web for pages relating to a specific query. 'Google' and 'Yahoo' are two examples of common search engines that index and search a significant part of the web. Several websites have their own search engines to index their own websites. The World Wide Web has several sites dedicated to indexing of information on all other sites. These sites allow a user to search the web for any word or combination of words for information resources on the web.

A search engine is a computer program that searches documents on the Internet containing terms being searched by a user. A search engine can be defined as a tool for finding, classifying and storing information on various websites on the Internet. It can help in locating information of relevance on a particular subject by using various search methods.

It is a service that indexes, organizes and often rates and reviews websites. It helps users to find the proverbial needle in the Internet haystack. Different search engines work in different ways. Some rely on people to maintain a catalogue of websites or web pages; others use software to identify key information on sites across the Internet. Some combine both types of service. Searching Internet with different search engines for the same topic, therefore, provides different results.

Search engines are also defined as online utilities that quickly search thousands of web documents for a word or phrase being searched. Although there are some subscription-based search engines, most of them operate on profits from advertisements. It should be noted that no single search engine has the contents of every web page on the Internet. Instead, each search engine defines its scope in terms of contents for web pages that it would host. Moreover, some search engines index every word on every page. Others index only a part of the document. Full-text search engines generally pick up every word in the text except commonly occurring stop words such as 'a', 'an', 'the', 'is', 'and', 'or' and 'www'. Some of the search engines discriminate upper case from lower case; others store all words without reference to capitalization. A user, therefore, gets different results from different search engines because of these reasons.

Search engines are usually accessed using web clients called web browsers. Each search engine provides different search options and has its own peculiarities. Search engines also differ greatly in the types of resources they

allow a user to search. Many search engines offer both search and browse interfaces.

11.3.2 Evolution of Search Engines

The Archie, developed in 1990 by Alan Emtage, a student at McGill University in Montreal, can be considered as the first search engine that was used for indexing and searching files on FTP server. It was actually an indexing spider that visited each anonymous FTP site, read all directories and file names, and then indexed them in one large database. Inspired with the success of Archie, the University of Nevada developed Veronica in 1993.

VERONICA (Very Easy Rodent-Oriented Netwide Index to Computerized Archives) was developed at the University of Nevada to search all menu items on Gopher servers. Soon, another user interface named Jughead appeared with the same purpose as Veronica. The JugHead (Jonzy's Universal Gopher Hierarchy Excavation And Display) was a powerful Gopher search tool written by Rhett 'Jonzy' Jones. It was a computer program that searched a specified Gopher site (not all). It searched directory titles only, not the text of resources that appeared on the Gopher submenus. Archie, VERONICA and Jughead have now disappeared, but before the web's spectacular growth, these tools were real workhorses for searchers on the Internet.

Soon after launch of World Wide Web in 1993, the first robot, called World Wide Web Wanderer, was introduced by Matthew Gray to search the web. In October 1993, Artijn Koster developed an Archie-like Indexing tool for the web, called ALIWEB. It did not use a robot to collect the metadata, instead, it allowed users to submit the websites they wanted to be indexed by ALIWEB with their own descriptions and keywords. By December of 1993, three full-fledged robot-fed search engines had surfaced on the web, i.e., JumpStation, the World Wide Web Worm, and the Repository-Based Software Engineering (RBSE) spider. JumpStation gathered information about the title and header from web pages and retrieved them using a simple linear search. As the web grew, JumpStation slowed to a stop. The WWW Worm indexed titles and URLs. The JumpStation and the World Wide Web Worm did not use any ranking method to list their search results, results were listed in the order they were found. The RSBE spider did implement a ranking system.

The 'Excite' was a by-product of the project called Architext that was started in 1993 by six Stanford undergraduates. They used statistical analysis of word relationships to make searching more efficient. The Excite search software was released by mid-1993. However, the technique used by the Excite seems irrelevant because the spiders were not intelligent enough to understand what all the links meant. The EINet Galaxy Web Directory was launched in January, 1994.

The EINet Galaxy became a success since it also contained Gopher and Telnet search features in addition to its web search feature. In April 1994, David Filo and Jerry Yang created Yahoo as a collection of their favourite web pages. As their number of links grew, they had to reorganize and develop a searchable directory. The Yahoo directory provided description with each URL as an improvement to the Wanderer. Brian Pinkerton of the University of Washington launched the WebCrawler on April 20, 1994. It was the first crawler that indexed entire pages. In 1997, Excite bought out WebCrawler and AOL began using

Excite to power its NetFind. WebCrawler opened the door for many other services to follow the suit.

Three important search engines, namely Lycos, Infoseek and OpenText appeared soon after Web Crawler was launched. Lycos was the next major search engine developed at Carnegie Mellon University in July 1994. On July 20, 1994, Lycos was launched with a catalogue of 54,000 documents. By August 1994, Lycos had identified 394,000 documents and by November 1996, Lycos had indexed over 60 million documents, more than any other web search engine. In October 1994, Lycos ranked first on Netscape's list of search engines by finding the most hits on the word 'surf'. Info seek was also launched in 1994. In December 1995, Netscape started using Infoseek as its default search engine. AltaVista was also launched in December 1995. It brought many important features to the web searching. They were the first to allow natural language queries and advanced searching techniques.

The LookSmart directory commenced functioning in 1996. The Inktomi Corporation came about in May 1996 with its search engine called Hotbot. It was bought by Yahoo. Ask Jeeves was launched in April 1997 followed by the Northern Light. 1998 witnessed the launch of Google, the most powerful search engine till date. The Google ranks its pages based on number of inbound links to a page. Google has become so popular that major portals such as AOL and Yahoo have used Google to search their directories. In 1998, three major search engines and directories were launched, they were MSN search, Open Directory and Direct Hit.

Disney released the Go Network in 1999. Fast released its search technology in the same year, and was considered the closest competitor to Google. In 2000, the Teoma search engine was released, which uses clustering to organise sites by subject-specific popularity. In 2001, Ask Jeeves bought Teoma to replace the Direct Hit search engine. LookSmart bought the WiseNut search engine in 2002 to power their new search product. In 2003, Google began to introduce semantic elements into its search product thereby bringing improvements in its search result, Overture purchased AllTheWeb and AltaVista.

Yahoo bought Inktomi and Overture. In 2004, MSN dropped LookSmart in favour of Inktomi and Yahoo dumped Google in favour of its own search engine. Yahoo! has built a new database separate from the Inktomi database, that replaced both AltaVista and AllTheWeb in March 2004.

11.3.3 Categories of Search Engines

Most search engines facilitate several functionalities besides being a tool for finding websites. They provide information such as recent news stories, newsgroup postings, reference material (such as dictionary entries and maps), and e-mail addresses, street addresses and telephone numbers of business and individuals. Search engines can be divided into the following categories:

- i. Primary Search Engines
- ii. Meta Search Engines
- iii. Subject or Web Directories
- iv. Hybrid Search Engines
- v. Subject Gateways or Subject Portals

i) Primary Search Engines: Primary search engines deploy computer programs called web crawlers or spiders, web wanderers and web worms, to traverse the web and scan websites for words, phrases, or the whole site so as to generate a database of web pages. Search engines do not actually search the web in real time, but uses database of web page collected by its robots hypertext links that are updated on a regular basis. Primary search engines are the most commonly used search engines. These vary to a great extent in terms of:

- a. *Database size:* width and depth of websites indexed by their 'spiders'.
- b. *Database content:* Full-text or metadata, i.e., URL, keywords, title, description, etc.
- c. *Syntax used:* word search, Boolean search, phrase search and other advanced features.
- d. *Ranking of results:* paid sites, recent update, popularity, etc.

ii) Meta Search Engines: Meta search engines, also known as mega indexes, do not have their own databases. Instead, they have access to other primary search engines. Meta search engines may conduct a search on a single primary search engine or it may search a number of primary search engines simultaneously and present the unified results as a single package. Such search engines are also called multi-threaded search engines. Ask Jeeves, MetaCrawler, Savvy Search, @Once!, All-in-One Search Page, Galaxy, Internet Sleuth, Magellan, Net Search, Dogpile, Metacrawler, Metafind, Metasearch, ixquick.com are some of the betterknown meta search engines.

A meta search engine is defined as a search engine that searches the databases of several other search engines at the same time to locate web pages that match search terms given by a user. Unlike the primary search engines and directories, meta-search engines do not have their own databases, i.e., these search engines do not collect web pages, do not accept URL additions, and do not classify or review websites. Instead, they send queries simultaneously to multiple search engines and / or web directories. Many of the meta-search engines integrate search results: duplicate findings are merged into one entry, some of them rank the results according to various criteria, some allow selection on search engines to be searched.

Before conducting a search on a meta-search engine, it is important to find out which search engines are included by the meta search engine. Most meta search engines act as default search engines to majority of popular search engines, such as Google, AltaVista, Excite, Lycos and GO.com. Successful use of a meta search engine depends on the current status of each of the primary search engines being used. Some primary search engines may be too busy at that time and some may be unreachable. It may be noted that a query submitted to a meta-search engine, with its uniform search interface and syntax, is to be applied against the diversity of individual search engines. It is, therefore, impossible for one meta search engines to take advantage of all the features of the individual search engines. Boolean searches, for example, may produce varied results. Phrase searches may not be supported. Other features, such as query refinement, are sacrificed in a meta search engine. Moreover, meta-search engines generally do not conduct exhaustive searches and do not bring back all the pages from each of the individual search engines. They only make use of the top 10 to 100 hits from each of them. While this is sufficient for most searches,

individual search engines must be consulted if one needs to go beyond the top hits as determined by the meta-search engines. Some meta-search engines facilitate this by providing query links back to the individual search engines. Specialized search engines are primary search engines that focus on a small or specialized segment of the Internet. Examples of specialised search engines are Direct Search (<http://www.freepint.com/gary/direct.htm>), Beaucoup (<http://www.beaucoup.com/>), Hoovers Online, (<http://www.hoovers.com/>) and Sirius (<http://www.sirus.com/>).

iii) Subject or Web Directories: Directories are the Yellow Pages of the Internet. They contain information that has been submitted to them by their indexers or by users who submit entries. The subject directories are often manually maintained, browsable and searchable web-based interfaces. Yahoo is the most famous subject directory. Yahoo! has several subject headings. A subject directory contains information that is organised into categories and subcategories or topics and subtopics. Like a search engine, one can search a subject directory for all entries that contain a particular set of keywords. Although directories can be searched using keywords, it is often as easy to click on a category, and then click through specific subdirectories until one finds the desired subject. Most web directories are designed to be searched by browsing the subject categories. Directories differ from indexes; however, in the way they organise information. Web indexes simply compile a growing number of records while directories, in contrast, organise information into groups of related records. Besides, Yahoo!, the best-known directories include Open Directory Project (Dmoz.org) and LookSmart.

Directories contain fewer resources than search engine databases. It is because resources in a directory are manually selected, maintained and updated. This, in turn, can be to the advantage of users especially if he or she is searching for a general topic. The directories, therefore, increase the likelihood of retrieving relevant results and increase the possibility of finding high quality, reliable websites. The directories also have some drawbacks. It is possible that items with similar topics may be placed under two different subject categories in a directory. Directories may not be as current as search engine databases because while the search engines update their databases automatically using robots or spiders, directories are updated manually after new entries are selected, rated and categorized. The directories may also miss out on some of important resources, since resources are selected manually.

iv) Hybrid Search Engines: In the early days of the web, a search engine presented either crawler-based results or human-powered listings. Today, it is very common for search engines to present both types of results. Usually, a hybrid search engine favours one type of listings over the other. For example, MSN Search is more likely to present human-powered listings from LookSmart. However, it does also present crawler-based results (as provided by Inktomi), especially for more obscure queries. There are also many directories that attempt to organise the Internet by subject, and, there are many search engines that combine directory and keyword search capabilities.

v) Subject Gateways or Subject Portals: Subject gateways, variably called as meta resources, subject-based information gateways (SBIGs), subject-based gateways, subject index gateways, virtual libraries, clearing houses, subject trees, pathfinders and guide to Internet resources are facilities that allow easier

access to network-based resources in a defined subject area. For consistency of terminology, this Unit would use 'subject portals' in preference to other prevailing terminology. Subject portals redirect a user to the holders of the original digital material. It may provide its own indexing and search services or it may combine original resources from a number of different providers. The subject portals restrict their operation to providing linkages to electronic resources hosted on other servers.

A subject portal can be defined as an organized and structured guide to Internet-based electronic information resources that are carefully selected after a predefined process of evaluation and filtration in a subject area or specialty. Subject portals are often independent web-sites or part of an institution or library's website that serve as a guide to Internet resources considered appropriate for their target audiences. A subject portal site that is a part of an institutional website or the library's website may include resources that are on subscription by the parent organization and are accessible for free to all. A subject portal may also be built by a commercial enterprise that is accessible free of charge up to the bibliographic level. However, a user may be required to pay if he / she wishes to access the full-text. Home pages of all the major education and research institutions, especially in the developed world, provide an organized and structured guide to electronic resources available on the Internet. Some of the examples of subject portals are LibrarySpot, Librarian's Index to Internet, Argus Clearing House, BIOME and BUBL.

11.4 SEARCHING THROUGH VARIOUS SEARCH ENGINES

11.4.1 Searching via search engines

Search engines do not really search the World Wide Web directly. Instead, they search their own databases consisting of the keywords or full text of web pages that were earlier selected and picked-up from billions of web pages residing on servers all over the world. When a user searches the web using a search engine, it always searches an old copy of the real web page that is residing on the server of a search engine. When a user clicks on the links provided in a search engine's search results, he / she is directed to the current version of the page. A typical search engine has the following three components:

- i. The Robot or Spider
- ii. The Database
- iii. The User Interface or the Agent

I.The Robot or Spider: Variably known as bot, robot, spider, crawler, web wanderer or indexer, they are automatic computer programs that traverse the World Wide Web information space. These programs move from one web page to another by visiting links embedded on each web page it finds and in the process builds an index to visited web pages. This process can be compared to citation searching, where a user follows a reference within a journal article to another article on the same topic. The spider is resident on a host computer and uses the HTTP protocol (like any web surfer) to connect to remote web pages. Spiders may be configured to retrieve files in all formats. They crawl on the web to discover new resources, to index the web for keywords and, to look for dead links for automated maintenance. Unlike a virus, a robot does not physically

moves from computer to computer; it simply visits sites, like a user, and requests for documents to be indexed. Main functions of a robot or a spider are indexing of web pages, HTML validation, link validation, identifying new information and mirroring websites.

Different robots use different strategies to index the web. In general, most search engines start from a meta-resource site or a subject portal that contain links to several other resources. They scan the web constantly, keeping track of new documents that appear afresh and deleting documents that are duplicate. Most search engines permit users to submit URLs manually that are queued and visited by the robot later. While some search engines are highly comprehensive in their coverage and index all kinds of resources available on the web pages, news groups, discussion forum, Gopher, listservs and FTP sites, etc., others restrict themselves to indexing web pages only. Similarly, some search engines are programmed to traverse the net daily, others are programmed to visit predefined sites at predefined intervals.

Search engines use their own spider software that are designed to harvest indexing information from websites on specified criteria. Similarly, search interfaces are customized to highlight special features of various search engines. Each uses its own algorithm or set of rules that determines how the search engine selects, indexes, and retrieves sites. Some types of pages and links (such as pornographic sites) are excluded from most search engines by policy. Besides, there are sites that do not allow search engines to index them. Moreover, search engines cannot index database-driven sites. Such sites are referred to as the 'Invisible Web' or 'Hidden Web', information that is priced and hidden behind databases. After spiders find pages from web, they pass them on to another computer program for 'indexing'. This program identifies the text, links and other content in the page and stores it in the search engine database's files.

ii. The Database: A robot or a spider harvests indexing information from web pages that it visited in its database or catalogue that lists URLs, titles, headers, words from title and text, first lines, abstracts, and sometimes even full-text. The robot performs search in a way that the most popular sites are found and indexed first. The resulting database, that stores millions of web pages, forms the index that is searched by the users. The size of this database determines the comprehensiveness of a search engine. Most search tools also create a separate database containing records consisting of a web page, URL, title and a summary. When a user retrieves results from a search tool, a summary record is displayed for the users. Search engines either update their databases cumulatively or rebuild it completely after a definite interval. Lycos, for example, updates information on new and existing URLs cumulatively rather than rebuilding it. Excite, on the other hand, rebuilds its database periodically by sending its spider to bring back the contents of pages identified from the 'new sites' every week.

iii. The User Interface or the Agent: The user interface or agent is a software program that accepts queries from users and searches them through the database consisting of index of millions of pages. The agent matches the query with the database, finds hits and ranks them in order of relevance. The results consisting of web links and brief descriptions are arranged in order of relevance and are presented to the users. Amongst items with same relevance, the most popular sites are listed first.

11.4.2 Choosing a Search Engine

The criteria given below may be used to assess the usefulness of a search engine:

- i. Ease of Use
- ii. Comprehensiveness
- iii. Quality of Content
- iv. Control Over the Search
- v. Flexibility in Searching
- vi. Assessment of Relevance
- vii. Informative Presentation of Results

i. Ease of Use: Most search engines provide a single search window for input of search terms. Search engines query its database for search terms keyed-in by the user. Some search engines have the capabilities of understanding natural language. In a search engine capable of understanding natural language, a user may pose the question exacting as he / she would ask it at the reference desk in a library, i.e., to find out the name of the President of India, he / she may type "Who is the President of India" in the query box. 'Advanced search' in most search engines provides multiple drop-down menu for selection of operators for combining search terms and specifying other parameters that provide a degree of control over the search. Quite often the same controls are available from the standard search window using rather less user-friendly symbols such as AND, OR, NOT, NEAR, (), +, -, "", filename:, etc.

ii. Comprehensiveness: Several well-established search services index hundreds of millions of web documents. Generally, they index full texts of documents. None of the existing search engine indexes complete spectrum of information available on 233 million servers hosted on the Internet. As the contents available on the web increases, the proportion indexed would decrease. Currently, the maximum coverage by any one search engine is estimated to be 34%.

iii. Quality of Content: Search engines are increasingly paying attention to techniques that address the issue quality of content. Relevant and qualitative search results may be given higher weightage than speed and size of search engines. Additional processing, be it human or machine, is used to sift, sort and add value to search results. Examples of such processing are:

- a. Subjective evaluation and rating by a human classifier
- b. Automatic checking of how often a resource is linked to others
- c. Automatic processing of data on previous accesses to the resource

The results of such processing, combined with matching of search terms, generate a relevance score to be used in the ranking of search results. Currency of the information in the database, particularly working links, is another aspect of quality. A number of search engines revisit URLs at a variable rate depending on how often changes are made to the page.

i. Control Over the Search: In case of complex queries, the capability for specifying search parameters in detail becomes important. A user should be able to combine multiple search terms with ease. Most search engines usually allow users to specify how search terms are combined, either by typing the search string using the Boolean terms AND, OR and NOT into the search window, or giving equivalent functionality via drop-down menus. The use of parentheses in nesting Boolean search combinations provides further level of control. Search

techniques described in the next section of this Unit elaborates on various techniques and how they control the search results.

ii. Flexibility in Searching: Advanced search features in some of the search engines provide following flexibilities:

- a. Provision to restrict the search to specific fields (i.e., title, description, keywords, links, body, etc.)
- b. Provision to restrict a search to a specified time period
- c. Provision to search for similar documents (if a user finds something useful)
- d. Provision to search within the results of a previous search

iii. Assessment of Relevance: A good search engine should take quality of resources into account while ranking search results. Search engines display the search results either using the frequency of keywords used in the web page, positioning of keywords on the web page (title, description, body, etc.) and frequency of inbound-links from other websites. Irrespective of ranking mechanism, a user would prefer to see document relevant to his / her search in the first few search results.

iv. Informative Presentation of Results: Search engines should record the number of hits found for a search. A user would prefer to get enough information to judge the usefulness of a link before following it. Most search engines take some portion of the text to provide an abstract. Dates are often useful. A user would also like an option to specify alternative criteria for ranking, for example by location, date, etc. A user would prefer live links, i.e., the search engine should validate links and update its database frequently.

11.4.3 Search Results

After entering the search terms, once a user clicks at 'submit' or 'search' button, search engines usually provide a list of best matches for the search term keyed-in by the user. The search softwares are designed to rank the sites in order of relevance. Different search engines use different algorithms to measure relevance. Most search engines use frequency of keywords and their positioning in a document to determine its relevancy, considering that if the keywords appear more frequently and appear early in the document, or in the headers, it is likely to be more relevant. Frequency with which a document is linked to other documents on the web is considered as a measure of its popularity and relevance by the Google search engine, and search results are ranked and arranged accordingly.

- i. Result Lists
- ii. Result Descriptions
- iii. Relevance Ranking

I.Result Lists: Generally, search engines display 10 to15 search results in a page. At the bottom of the list there are options to click for next page and / or options to customize number of hits that should appear on a page. The software may have a limit to the number of sites it can retrieve. Most search engines allow users to fine-tune the search, either through advanced search or by searching within the search results. Observations reveal that if relevant results are not found in the first 50 hits, chances are that there may be none and a user may have to start the search process all over again.

ii. Result Descriptions: Most search engines offer search results with descriptions of sites to help the users to determine whether the link is worth following. Some search engines include the first few paragraphs of a document

along with the URL of the site. Many search engines simply give listing of URLs with very little description.

iii. Relevance Ranking: Once a user finishes his search, the search engine retrieves results and displays the hits. How a search engine organizes its findings varies greatly from search engine to search engine. Most of the search engines return results with confidence or relevancy rankings. In other words, they list the hits according to how closely they think the results match the query. In spite of ranking methods used and advanced search facilities offered, users find thousands of websites as a result of their searches, many of them seem completely irrelevant.

Most search engines use frequency of keywords on a web page as a primary way of determining whether a document is relevant or not. A search engine will analyze how often keywords appear in relation to other words in a web page. Those with a higher frequency are often deemed more relevant than the others. Some search engines consider both the frequency and the positioning of keywords to determine its relevancy, considering that if keywords appear early in the document, or in the headers, it is likely that the document is more relevant. For example, one method is to rank hits according to how many times keywords appear and in which fields they appear (i.e., in headers, titles or in plain text). Links given by other websites is a popular method used for ranking of websites considering the fact that there are several other users that find the site useful and important.

As far as the user is concerned, relevance ranking is critical, and becomes more so as the sheer volume of information on the web grows. The user neither has patience nor time to go through scores of hits to determine which hyperlinks he / she should actually explore. A user would naturally prefer a search engine that provides more relevant sites in its first few results.

11.5 CHATTING AND VARIOUS ONLINE MESSAGES

11.5.1 Chatting and Online messages

Have you ever spent your free time chatting with your friend or friends? It is indeed a pleasurable experience if you have done so. What exactly do we do when we chat? We speak about everything – WE COMMUNICATE. Are you aware that besides chatting face-to-face with people, we also do so over the phone?

Now, with technology changing and advancing with each day, the internet has become a media through which we can get information, pass on information, or give information to people anywhere in the world within minutes.

Online chat may refer to any kind of communication over the Internet, that offers a real-time direct transmission of text-based messages from sender to receiver, hence the delay for visual access to the sent message shall not hamper the flow of communications in any of the directions. Online chat may address point-to-point communications as well as multicast communications from one sender to many receivers and voice and video chat, or may be a feature of a web conferencing service.

Online chat in a less stringent definition may be primarily any direct text-based or video-based (webcams), one-on-one chat or one-to-many group chat

(formally also known as synchronous conferencing), using tools such as instant messengers, Internet Relay Chat (IRC), talkers and possibly MUDs. The expression *online chat* comes from the word *chat* which means "informal conversation". Online chat includes web-based applications that allow communication – often directly addressed, but anonymous between users in a multi-user environment. Web conferencing is a more specific online service that is often sold as a service, hosted on a web server controlled by the vendor.

On the other side, the term "Instant messaging" (IM) is a form of communication over the Internet that offers quick transmission of text-based messages from sender to receiver. In push mode between two or more people using personal computers or other devices, along with shared clients, instant messaging basically offers real-time direct written language-based online chat. The user's text is conveyed over a network, such as the Internet. It may address point-to-point communications as well as multicast communications from one sender to many receivers. More advanced instant messaging allows enhanced modes of communication, such as live voice or video calling, video chat and inclusion of hyperlinks to media.

Since Live Chat support is the most interactive of all online support practices in both customer and technical areas, it is widely used. This fast growing BPO trend is extremely useful for two reasons.

- Firstly, you have a round the clock chat assistance, whereby you can share your problems and get them resolved in the least possible time.
- Secondly, Live Chat support is highly interactive - it's more like a chat session with a friend of yours sitting in some remote corner of the world and assisting you on how to handle a particular situation.

Again, since Live Chat offers you the opportunity to share things then and there, it becomes more attentive, since the executive is serving only you at a particular point of time. His attention won't be diverted to anything else; therefore, delivering you promising results. This is one reason why the idea of outsourcing Live Chat support has received positive encouragement in business.

How does this help in business? Business, nowadays, is being conducted among all the countries of the world. Communicating by regular post or on the phone is expensive. The internet has made it possible to communicate at a low cost and quickly by way of emails, on-line chat, audio-conferencing, video-conferencing, etc.

"On-Line Chat" is a simple way of speaking with people by typing out what you want to say instead of actually speaking verbally. When you have a conversation with someone (either face to face or on the phone) and you are asking for information, it could go like this.

11.5.2 Chat Etiquette

First of all, let us understand the meaning of etiquette. It is rules about what is polite, correct and professional behavior is "Etiquette". Just like any professional conversation demands etiquette, a Live Chat session has its own etiquette that needs to be followed - perhaps more closely and efficiently than in other communication channels. Whenever one chats with a Live Customer Support Agent, people tend to closely observe even the shortest of sentences which are more likely to be ignored in a face-to-face or phone conversation.

Errors made on a Live Chat session is, therefore, more likely to be noticed. There are many steps in a Live Chat, from greeting a web visitor to closing the chat, where etiquette needs to be observed.

Whenever greeting a web visitor, the Live Chat Customer Support Agent must introduce her/himself by name and then continue with a greeting that is appropriate for the business model of the website. The name introduction can be avoided only in cases where the Live Chat window is displaying the Agent's name. Start a conversation in the same way as you would in a business telephone call e.g. "Hello, I'm Mani Gopalan from kpc.com", not "Hi there!"

A Live Agent, when providing customer support on a website, must always remember the business model of the website and thus the expected visitors on the website. This will help the agent in choosing the proper words for the kinds of visitors expected. For example, a law firm's website may be extremely particular in using (and not using) certain professional words or phrases. On the other hand, a music company that caters largely to teenagers will have much less formal approach towards the language used by Live Customer Support Agents on its website.

During a business chat, spelling, grammar and tone are very important. Begin all new sentences with capital letters, capitalize all proper nouns, and do not forget to capitalize the pronoun 'I', irrespective of where you use it in a sentence. Be careful with spelling. Keep a list of most commonly mispronounced word pairs within your reach or paste it on your workstation. For instance, principle/ principle, their/there, advice/advise, etc.

It's rude to say "Sit Down" – it is polite to say "Please take your seat" - This should be the tone of your language when you chat with customers. It is interesting to note here that many aspects like language to be used; grammar, spelling and tone follow similar rules in both email writing and live chat channels. Many people may not be as comfortable as you are in using the keyboard. Give them time to respond. Not only will such people be slow to respond, but their responses may seem too brief, curt or may even sound rude. Try not to judge the person based on the initial conversation. Try to understand and empathize with the other person. You remain polite and professional. It is alright if the other person does not use "please" and "thank you"; however, you need to make these words an important part of your everyday language.

Remember, when you speak to a person either face-to-face or on the phone, the tone of your voice conveys a lot – like your tone could be polite, helpful, patient, rude, aggressive, bored etc., but while chatting you are only writing your conversation and neither the other person nor you will be able to hear the tone. The only thing that conveys the tone in written communication is your choice of words. Take care to use simple sentences in a polite tone.

11.6 SUMMARY

In this unit, we discussed about the search engines. Basically, search engines are tools to search diverse and disorganized sources of information available on the Internet. There are several search, resource discovery and browsing tools that have been developed to support more efficient information retrieval. Search engines use automated programs variably called as spiders, robots, crawlers, wanderers and worms. Search engines are defined as tools for

finding, classifying and storing information about various websites on the Internet. This Unit also traces evolution of search engines from Archie, developed in 1990, which can be considered as the first search engine that was used for indexing and searching files on FTP server. Archie, VERONICA and Jughead can be considered as workhorse used for searching the Internet before the launch of World Wide Web in 1993. The evolution of search engines is checked with companies in the business of web search technology acquiring other companies to strengthen their own position. After that describing functioning of a search engine, the Unit elaborates the three components of a search engine viz. Robots, Databases and User Interface or Agent. The Unit divides search engines into the five categories i.e. Primary search engines, Meta search engines, Specialized search engines, Web directory and Hybrid search engine. The Unit also elaborates upon the criteria based on which the search engines can be judged like ease of use, comprehensiveness, quality of content, control over the search, flexibility in searching, assessment of relevance and informative presentation of results for choosing a search engine. In last, the unit explains about chatting and online messages and its relevance in the present competitive world. It explains that on line chat is a popular channel used in business today. It is easy and quick and helps people solve issues and with this help we can communicate anywhere in the world.

11.7 KEYWORDS

- **Access:** to find or see information, especially using a computer
- **Accurately:** correctly or exactly
- **Inventory:** a list of all the things that are in a place; for example, an inventory of stationery in an office
- **Judgmental:** quick to criticize people
- **Posture:** the position of your back, shoulders, etc. when you are standing or sitting
- **Profane:** showing no respect to rules of morality

11.7 EXPECTED QUESTIONS

- Q1: Define search engines. Are all search engines alike?
- Q2: Which search engine can be considered as the first search engine for the World Wide Web?
- Q3: What are the general criteria's for choosing a search engines?
- Q4: Name various categories and components of a search engine?
- Q5: What do you understand by the term "online messages" and explain the significance of chatting in the present corporate world?

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UNIT 12

TRAVEL AGENCY AUTOMATION, TOURISM PRODUCTION SYSTEM, ARM CHAIR TOURISM, E-TOURISM BUSINESS, E-TOURISM MARKETING

Structure

- 12.1 Introduction
- 12.2 Objectives
- 12.3 Travel Agency Automation
- 12.4 Tourism Production System and Arm Chair Tourism
- 12.5 E-Tourism Business and E-Tourism Marketing
- 12.6 Summary
- 12.7 Expected Questions
- 12.8 References

12.1 INTRODUCTION

In this unit, we will understand the travel agency automation system where the concept of information technology is linked with tourism operations will be study. All the associated segments of tourism industry are influenced by automation system which helps in smooth running of the industry. Similarly, in the next part, we will study the role and contribution of information technology in managing the overall tourism system. The concept of armchair tourism or in other words virtual or online tourism is also discussed where one can understand the role of these e-tools in promoting the tourism destinations across the globe. After that, E-Tourism business and e-tourism marketing are discussed which suggested the role of electronic mediums with the help of internet, revolutionized the tourism industry.

12.2 OBJECTIVES

- To understand the concept of travel agency automation.
- To know and understand the various roles of travel agency automation.
- To aware about the Tourism production system.
- To understand the concept of armchair tourism.
- To understand the significance of e-tourism business and e-tourism marketing.

12.3 TRAVEL AGENCY AUTOMATION

As we know that the travel agency is a link between the customers, i.e., traveler or tourist and the principle suppliers, i.e., primary service providers such as tour wholesalers, hotels, airlines, etc. It is the first stop for anyone considering travel, especially to a distant place, i.e., tourist destination, in order to make travel arrangements. The primary job of a travel agency is to provide easy and trouble free travel to the traveler. It is also important for a travel agency to provide enough information to the tourist so that the tourist is not cheated during

his or her travel and has a hassle free trip. Since the information technology is changing very rapidly the face of travel industry, one must keep track of the changing times and only this will and can help to make the business better.

Product knowledge can be acquired through information which the travel agency collects from various sources. This information should be stored properly and must be constantly updated to meet the ever-growing customer needs. This could be filling, storing data on computers or both. Besides, everyone in the organization must strictly ensure that any change, addition, withdrawal, etc. has to be immediately taken note of without any time lag, failing which can lead to irreparable losses to the company in terms of revenue as well as image. While providing information to the customers' one must ensure that it is the current and complete information. The sources of information may include:

- Computer information systems produced for the trade
- Brochures and news bulletins of principal suppliers
- Newspapers
- Television programmes
- Documentary films
- Travel trade magazines
- Current affairs magazines
- Familiarization trips
- Travel advisories

As a manager one must always be updated on information and there should be constant exchange of information within the company. The existing trend in travel agency business operation is to conduct regular meetings and training sessions of employees being addressed either by own Senior Management members or by external consultants.

The travel industry of today wears a different look. It is automated and high tech and as a manager it is your prime responsibility to assure the availability of required infrastructure and support systems for the adaptation of technological advancements to manage your business profitably. The list of equipments comes under the travel agency automation are as follows:

- Telephones
- Fax
- Electronic mail
- Photocopiers
- Computers

The above mentioned automation tools are essential communication equipments in a travel agency which are required for the following purposes:

- Requesting information
- Receiving information
- Making reservations
- Confirmations
- Transmitting information to clients

Proper use of communication technology saves time, reduces costs and thus, contributes to the profitability of the agency. Having trained staff for operating them and regular maintenance of the equipment are other managerial tasks meant within the travel agency. Even, the staff members should be trained for maintaining records on computers.

The newly emerging computer systems concept of information management can prove to be very useful in delivering accuracy, timeliness, objectivity and relevance to your decisions. More importantly, however, it will lead to the amplification and acceleration of a phenomenon that we have already begun to experience – “creation of a comparative business advantage through information”. In fact, the MIS in the organization should be developed through the latest technological advances.

To achieve desired goals both in terms of customer satisfaction and generating profits for your company you should think of connecting various decision centers at various levels, formal and informal, as an information network with the wide use of computers. One must also acknowledge that the managers / supervisors working at different levels in tourism operations require different types of information to take decisions at right time. Hence, one will need an MIS catering to the management / leadership styles, i.e., if there could be greater user involvement at all stages of MIS lifecycle then the end results would tend to be superior. As a result the MIS developed by the company would help each executive in his / her decision making process while identifying the problems, generating and evaluating the alternative course of actions as well as to acquire necessary feedback on implementing his or her decision and if the requirement arises to take corrective actions.

Other important area where technology can be applied is in purchasing or procuring procedures so that malpractices can be overcome as is given below:

- Reorder
- Issue
- Store
- Check Stock Level
- Price Stock Level
- Quotations
- Selected supplier
- Purchase order
- Receive
- Check quality and quantity

The most important automation system used in travel agency is computer reservation system. A computer reservations system or central reservation system (CRS) is a computerized system used to store and retrieve information and conduct transactions related to air travel. Originally designed and operated by airlines, CRSes were later extended for the use of travel agencies. Major CRS operations that book and sell tickets for multiple airlines are known as global distribution systems (GDS).

Airlines have divested most of their direct holdings to dedicated GDS companies, who make their systems accessible to consumers through Internet gateways. Modern GDSes typically allow users to book hotel rooms and rental cars as well as airline tickets. They also provide access to railway reservations and bus reservations in some markets, although these are not always integrated with the main system. Some major Computer Reservation System (CRS) are as follows:

- i. ameliaRES
- ii. Takeflite

- iii. Abacus
- iv. AccelAero
- v. Amadeus
- vi. Axess
- vii. Internet Booking Engine
- viii. KIU
- ix. Mercator
- x. Navitaire
- xi. PARS / SHARES by EDS
- xii. Patheo
- xiii. Radixx
- xiv. Sabre
- xv. Travel Sky
- xvi. Travelport GDS includes Apollo, Galileo and Worldspan
- xvii. WorldTicket Sell-More-Seats

Some important points of the above mentioned softwares are:

- Sabre Holdings was purchased by private investors Silver Lake Partners and Texas Pacific Group on March 30, 2007 for about US\$5 billion. Full year 2008 Sabre Holdings revenues were about US\$3 billion.
- In December 2006, Travelport, which owns Galileo, agreed to buy and merge with the Worldspan GDS. The combined company would then control a 46.3% market share using 2002 airline booking data.
- Worldspan's market share is 16.9% globally and 31% in the U.S. according to 2006 MIDT airline transaction data.
- In March 2007, KLM Royal Dutch Airlines switched from its own reservations system (CORDA) to Amadeus as a result of the merger with Air France.
- In February 2010, JetBlue converted its reservation system over to the SabreSonic Customer Sales and Service platform.

The role of travel technology is also crucial in travel agency automation. The term travel technology means (also called tourism technology and hospitality automation) the application of Information Technology (IT) or Information and Communications Technology (ICT) in the travel, tourism and hospitality industry. One form of travel technology is flight tracking.

Since travel implies locomotion, travel technology was originally associated with the computer reservations system (CRS) of the airlines industry but now is used more inclusively, incorporating the broader tourism sector as well as its subset the hospitality industry. While travel technology includes the computer reservations system, it also represents a much broader range of applications, in fact increasingly so. Travel technology includes virtual tourism in the form of virtual tour technologies. Travel technology may also be referred to as *e-travel* / *e-travel* or *e-tourism* (E-Tourism), in reference to "electronic travel" or "electronic tourism".

E-Tourism can be defined as the analysis, design, implementation and application of IT and e-commerce solutions in the travel & tourism industry; as well as the analysis of the respective economic processes and market structures and customer relationship management.

Travel technology is increasingly being used to describe systems for managing and monitoring travel including travel tracking and flight tracking

systems. In other contexts, the term "travel technology" can refer to technology intended for use by travelers, such as light-weight laptop computers with universal power supplies or satellite Internet connections. That is not the sense in which it is used here.

Travel technology includes many processes such as dynamic packaging which provide useful new options for consumers. Today the tour guide can be a GPS tour guide, and the guidebook could be an audioguide, podguide or I-Tours, such as City audio guides. The biometric passport may also be included as travel technology in the broad sense.

XML-based technologies have become increasingly important for the travel industry. XML can be used to support air reservation booking or to implement optional services and merchandising functions in the booking process. Another important application of XML is the establishing of direct connections between Airlines and Travel Agencies. In order to create a generally accepted XML-standard, the Open Axis Group was founded.

However, it must also be noted that the basic management concepts of planning, organizing, directing and controlling are essential in travel agency business and should be suitably carried out with the usage of technology as per the requirements. Besides, the role of technology can also be witnessed in the tasks of planning itineraries, ticketing, reservations, dealing with principal suppliers, marketing and sales or deciding on further expansion, the management concepts are of much use in providing guidelines to make best use of available resources.

12.4 TOURISM PRODUCTION SYSTEM AND ARM CHAIR TOURISM

12.4.1 Information Technology and Tourism System

Information Technologies (ITs) have revolutionized the tourism industry and altered the competitiveness of organizations and destinations. The rapid development of both tourism supply and demand makes ITs an imperative partner of the industry, especially for the marketing, distribution, promotion and coordination of the industry. In the late 1990s, the proliferation of the Internet and the World Wide Web in particular revolutionized communications as it enabled organizations to demonstrate their offerings globally using multimedia interfaces. As a result, most of tourism enterprises and destinations had to readdress their strategic management and marketing and to redesign their practices in order to take advantage of the new tools. In addition, several new organizations emerged to satisfy the emerging demand.

The importance of information technology in tourism, especially of the World Wide Web, has increased tremendously over the past years and this trend will certainly continue. However, since the technology itself is now available to almost everyone, its use alone does not necessarily bring a competitive advantage anymore. The integration of IT into the organizational fabric of the destination marketing organization (DMO) is an important key to success. Integration means that technology, advertising strategy and overall organizational mission/goals are coordinated to achieve the desired effectiveness. Traditional advertising strategies should be reconfigured to reflect the new realities (i.e.,

availability, interactivity and research capabilities) of Internet technologies and of the rapidly changing business environment.

It is difficult for most destination marketing organizations to keep pace with the evolution of new technologies, the emergence of innovative advertising strategies, the changes in the consumer market and the growing competition due to increasing globalization. They often have to struggle with limited financial and human resources, a lack of technological expertise and time constraints. Accordingly, various high tech information and communication technologies are in use in the tourism sector around the world. They are used for tourism product development, marketing, distribution and training of tourism sector personnel. These technologies are so indispensable in order to find out and satisfy the ever-changing demands for tourism products.

One of the unique characteristics of tourism products is the need of the role played by the so-called travel intermediaries. These travel intermediaries are travel agents, tour operators, conference organizers booking agents etc. They are so important because of the nature of the tourism product, perishability and intangibility.

These travel agencies are performing this indispensable task of being intermediary by the use of computers and computer reservation systems (CRS). GDSs are systems, which distribute reservation and information services to sales outlets around the world. Unlike the CRSs used solely by an airline or hotel chain, GDS distribute more than one CRS to users who are usually travel agents. GDSs were formed Facilitation is one important aspect of enhancing tourism business. Facilitation includes, issuing of visa, customs clearing and immigration check in ports. Lack of appropriate management in giving fast and efficient service to tourists in this area will deter the tourist flow substantially.

12.4.2 Tourism Production System

The following are the components which composed the concept of tourism production system:

- i. Collaborative Filtering
- ii. Personalization Software / Profiling
- iii. Knowledge-Based Software
- iv. Electronic payment
- v. Video Conferencing
- vi. Virtual Reality and Web Casting
- vii. Online Word of Mouth (WOM) Monitoring
- viii. Knowledge-based systems
- ix. CRS (Computer Reservation System)
- x. GDS (Global Distribution Systems)
- xi. GIS Applications in Tourism Planning

- i. **Collaborative Filtering:** Collaborative filtering is a data mining type of software. This type of application uses the power of customer databases to identify customers who have similar profiles like preferences, interests, and travel patterns, etc. based on previously accumulated customer knowledge. The findings are used for direct marketing. Great examples today are Amazon.com, Barnes&Noble and SkyMall.

- ii. **Personalization Software / Profiling:** Personalization software is also a form of data mining. This software rests on the belief that people live busy lives and want other people to look after their needs. This type of software tracks and monitors the preferences and purchasing behaviors of consumers. Thus, it can customize products/services based on needs and preferences and perform direct marketing accordingly.
- iii. **Knowledge-Based Software:** This software is based on the belief that people want more choices but they just do not want to be burdened with those choices. This type of software takes criteria set by customers and goes into digital databases. It then gets available choices for the customers. This type of software not only automatically finds information for customers but also narrows down the choices and lets customers find the best deal. The emergence of this type of software may challenge the services and products of intermediaries and DMOs. In this scenario, products/services have to be extremely competitive to be picked. In addition, customers will not rely on advertising to obtain the desired information, which is a threat to the very nature of advertising.
- iv. **Electronic payment:** This type of software enables electronic transactions. It has five significant impacts on business operations. These impacts are:
 - a. It simplifies a very complex buying-payment process that leads to a bypassing of intermediaries
 - b. It assists in monitoring/tracking causal relationships to understand the relationship between the effect of ads and purchase patterns
 - c. It facilitates the efforts required for niche marketing and narrow casting
 - d. It lowers the entry barriers into the tourism industry and increases competition
 - e. It augments the competitive capability of small organizations to expand their business
- v. **Video Conferencing:** Video conferencing is the type of software that allows people to communicate with each other visually, regardless of their physical location. It helps geographically dispersed businesses to cooperate. That may reduce the need for business travel. However, this technology is still in an infant stage and communications are difficult because certain clues are missing.
- vi. **Virtual Reality and Web Casting:** Virtual reality displays three-dimensional worlds. Web casting provides online live videos and events. Two things could happen: One is the loss of intrigue. Intrigue is one of the reasons that motivate people to travel. If people can go on the Internet and experience cyberspace vacations, they may lose their motivation to visit that place in the real world. The other thing is the balance between advertisement and reality. If people obtain an accurate view of the destination before they visit it, they are going to have really well formulated expectations of what they will see at their travel destination.
- vii. **Online Word of Mouth (WOM) Monitoring:** Consumer-to-consumer interaction contributes the most to the success of web-based advertising. Like through conventional communication channels such as phone and mail, people share their travel experience on the Web. Statistical evidence shows that there are more and more people using different features of the Internet (i.e. email, chat) to keep in contact with their friends

and relatives. Tourism organizations have the ability to influence conversations related to the travel product and the end destination through WOM. Providing a virtual community for people to share their experience and stories is the most common example.

- viii. **Knowledge-based systems:** Knowledge is the key resource for DMOs because they are not really in the tourism business; they are in the business of shifting information and knowledge. Knowledge-based systems facilitate the acquisition of knowledge and encourage learning. Besides learning, they foster information creation/storage/management, interaction, and knowledge sharing. The question is how to build a system that effectively incorporates available technologies. AskDan, a knowledge-based system developed by the National Laboratory for Tourism and eCommerce, is a framework that intends to change organizational knowledge management. It consists of five components:

- a. Market intelligence
- b. Data warehouse
- c. Knowledge tool box
- d. Knowledge builder (online research reports / documents)
- e. Community builder

The nature and speed of change represents new challenges for DMOs. Knowledge-based systems help them in increasing their competitive capabilities in this dynamic environment.

- ix. **CRS (Computer Reservation System):** The airline CRS systems were the pioneers of computer applications in the 1950s and are now virtually indispensable to airlines because they enable their revenue streams to be maximized by efficient inventory control (an inventory in this context refers to an airline's stock of passenger seats that is available for sale). However, these days, hotel and car hiring companies by renting the service from the airline companies are also employed these systems. The technology works by using computers of special kind and leased telephone lines. The travel agent is connected on line to the central host computer system or CRS. The host computer is almost always a mainframe with massive database attached. The mainframe host polls each travel agent terminal every second or so, to see if it has any messages to send. In this system it is possible that airliners, Hotels and car rental companies can talk to the travel agent and vice-versa. This system contributes to a great extent in increasing sales volume and giving precise information on the availability and selling the products efficiently ensuring substantial profit gain.

- x. **GDS (Global Distribution Systems):** GDSs are systems, which distribute reservation, and information services to sales outlets around the world. Unlike the CRSs used solely by an airline or hotel chain, GDS distribute more than one CRS to users who are usually travel agents. Some leading GDS are Amadeus, Galileo, Sabre and World Span. This world leading GDSs are switches or simply computers that are connected on the one side to many different supplier systems and on the other side to many end users. The end users of switch comprise travel agents with a single reservation system to support the sale of airline seats and related travel products such as hotel and car hire, via a single computer terminal, usually a Personal Computer. GDSs require massive investment because they are

extremely large computer systems that link several airlines and travel principals into a complex network of PCs, telecommunications and large mainframe computers.

- xi. **GIS Applications in Tourism Planning:** Geographic Information Systems (GIS) is now recognized widely as a valuable tool for managing, analyzing, and displaying large volumes of diverse data pertinent to many local and regional planning activities. Due to the complex nature of tourism planning issues, the potential of GIS in resolving these issues is increasingly acknowledged. Generally, GIS applications in tourism have been confined to recreational facility inventory, tourism-based land management, visitor impact assessment and recreation-wildlife conflict; and have been limited by lack of funding, and uncoordinated and inadequate data collection procedures. Three different landscape features usually characterize tourism destinations are Points, Lines and Polygons. Point features are individual tourist attractions, for example, a campground in a park, or a historic site along the highway. Coastal beaches and resorts often follow a linear pattern, while big theme parks or natural parks are characteristics of a polygon feature. These location attributes are essential to a geographic information system. It is apparent that GIS has tremendous potential for application in tourism. However, due to the general lack of tourism databases and inconsistencies in data, its applications are limited. For example, there is very little site-specific information about sources of visitors origin and estimation, travel motivation, spatial patterns of recreation and tourism use, visitor expenditure patterns, levels of use and impacts, and suitability of sites for recreation/tourism development - all of which are suitable application areas of GIS.

12.5 ARM CHAIR TOURISM

12.5.1 Armchair Tourism

An *armchair tourist* is someone with no direct experience of travelling; for example, someone who watches travel shows on TV instead of venturing out on vacation. Armchair tourist lets you vicariously enjoy the sights and sounds of well known and obscure travel locations from around the world. Watch online, on select broadcast channels, in-flight and in hotel rooms around the world. Enjoy the beach scenes, Asian markets, European cafes, fountains, skylines and train stations— from around the planet.

The Armchair Tourism is similar to Virtual Tour or Virtual Tourism. A virtual tour or armchair tourism is a simulation of an existing location, usually composed of a sequence of video or still images. They also may use other multimedia elements such as sound effects, music, narration and text.

The phrase "virtual tour" is often used to describe a variety of video and photographic-based media. Panorama indicates an unbroken view, since a panorama can be either a series of photographs or panning video footage. However, the phrases "panoramic tour" and "virtual tour" have mostly been associated with virtual tours created using still cameras. Such virtual tours are made up of a number of shots taken from a single vantage point. The camera and lens are rotated around what is referred to as a no parallax point (the exact

point at the back of the lens where the light converges). A video tour is a full motion video of a location. Unlike the virtual tour's static wrap-around feel, a video tour is as if you were walking through a location. Using a video camera, the location is filmed while moving from place to place. Video tours are continuous movement taken at a walking pace.

The first use of a virtual tour and the derivation of the name was in 1994 as a museum visitor interpretation, providing a 'walk-through' of a 3D reconstruction of Dudley Castle in England as it was in 1550. This consisted of a computer controlled laserdisc based system designed by British based engineer Colin Johnson.

One of the first users of a virtual tour was Her Majesty Queen Elizabeth II, when she officially opened the visitor centre in June 1994. Because the Queen's officials had requested titles, descriptions and instructions of all activities, the system was named and describes as: "Virtual Tour, being a cross between Virtual Reality and Royal Tour." Details of the original project can be viewed online. The system featured in a conference held by the British Museum in November 1994 and in the subsequent technical paper.

12.5.2 Methods of creation armchair tourism by stitching photographs

There are three popular ways of "stitching" virtual tours together as explained below:

- i. Rectilinear Stitching
- ii. Spherical Stitching
- iii. Cubical Stitching

I. Rectilinear Stitching: This involves the rotation of a digital camera, typically in the portrait (up and down) position and centered directly over the tripod. As the operator manually rotates the camera clockwise, the camera stops or clicks into a detent such as every 30°. The rotator can be adjusted by changing the position of "detent ring or bolt," into another slot like; 40°, 60°, 90° etc. If your camera lens supports a wider view, you could select a detent of say 60° which meant you only need to take 6 shots as opposed to 10 shots to capture the same panoramic view. The combination of a precision rotator and a digital camera allows the photographer to take rectangular "slices" of any scene (indoors or outdoors). With a typical point and shoot digital camera, the photographer will snap 8, 10, 12 or 14 slices of a scene. Using specialized "photo stitching" software such as PT Gui, Autopano or some other program the operator then assembles the "slices" into a rectangular one—typically 4,500 pixels to 6,000 pixels wide. This technique, while extremely time consuming, has remained popular even through today as the required equipment, rotator heads and software are relatively inexpensive to buy and are easy to learn. This type of stitched panoramic view is also called "cylindrical" -- as the resulting stitched panorama allows panning in a complete 360° but offers a limited look up or down of about 50° degrees above or below the horizon line.

ii. Spherical Stitching: This method requires the use of a "fish eye" lens equipped digital SLR camera. The 2-shot fish eye camera system was made popular by IPiX in the mid 1990's and a two-shot rotator head that rotated and locked into 0° and 180° positions only. The camera was an Olympus or Nikon

CoolPix camera and the lenses used were the Nikon FC-E8 or FC-E9 fish eye lens. The IPiX 360 camera system enabled photographers to capture a full 360 X 360 floor to ceiling view of any scene with just 4 shots as opposed to the more time consuming 8, 10, or 12-shot rectilinear produced panoramas as in technique #1 above. This type of virtual tour required more expensive virtual tour camera equipment including (for example) a Sigma 8mm f/3.5 lens which allowed photographers to set their rotator heads to 90° and capture a complete virtual tour of any scene in just 4 shots (0°, 90°, 180°, 270°).

iii. Cubical Stitching: This technique was one of the first forms of immersive, floor to ceiling virtual tours and Apple Computer pioneered this with the release of Apple's QuickTime VR in the early 1990s. Free utility software such as Cubic Converter and others allowed photographers to stitch and convert their panoramas into a "cube" like box to achieve a complete 360 X 360 view. Today, this technique is considered rather "old school," and technique #2 (Spherical Stitching) has become more mainstream for producing these types of tours. While programs such as Adobe Photoshop have new features that allow users to stitch images together, they only support "rectilinear," types of stitching and Photoshop cannot produce them as fast or as accurate as stitching software programs can such as Autodesk Stitcher. This is because there is sophisticated math and camera-lens profiles that are needed to create the desired panorama image which is based on your camera's depth of field (FOV) and the type of lens you used. Camera's such as the Nikon D3 or D700 have a full full frame digital SLR cameras, whereas the Nikon D90 or Canon T2i (Rebel line of Digital EOS cameras) have a smaller sensor. When full frame digital SLR cameras are used with a fish eye lens such as a Sigma 8mm F/3.5, you will see a full circular image. This allows you to shoot 2 or 3 shots per view to create a 360 X 360 stitched panoramic image. When used with a non full frame digital SLR camera like the Nikon D90 or Canon digital Rebel and similar cameras, typically 4-shots are required and the camera is in the portrait position. You will see the left and right sides cropped off each of the 4 images and in each of the four corners, the image is rounded.

12.5.3 Other tools of armchair tourism

Beyond the above mentioned tools, the following are the two important tools used in virtual tour:

- i. Video-based virtual tours
- ii. Specialized software

i. Video-based virtual tours: With the expansion of video on the internet, video-based virtual tours are growing in popularity. Video cameras are used to pan and walk-through subject properties. The benefit of this method is that the point of view is constantly changing throughout a pan. However, capturing high-quality video requires significantly more technical skill and equipment than taking digital still pictures. Video also eliminates viewer control of the tour. Therefore the tour is the same for all viewers and subject matter is chosen by the videographer. Editing digital video requires proficiency with video editing software and has higher computer hardware requirements. Also, displaying video over the internet requires more bandwidth. Due to these difficulties, the task of creating video-based tours is often left to professionals.

ii. Specialized software: Various software products can be used to create media rich virtual tours, and some examples include methods developed by MOVES Institute at the Naval Postgraduate School. Additionally web-based software allows users to upload any JPEG spherical image or cylindrical image and create HD (High Definition) virtual tours.

12.5.4 Applications of armchair tourism

Virtual tours are used extensively for universities and in the real estate industry. Virtual Tours can allow a user to view an environment whilst on-line. Currently a variety of industries use such technology to help market their services and product. Over the last few years the quality, usability and accessibility of virtual tours has improved considerably, with some websites allowing the user to navigate the tours by clicking on maps or integrated floor plans. Virtual tour is majorly used in the following two areas:

- i. Web-based
- ii. Real estate

i. Web-based: For most business purposes, a virtual tour must be accessible from everywhere. The major solution is a web-based virtual tour. In addition, a rich and useful virtual tour is not just a series of panoramic pictures. A better experience can be obtained by viewing a variety of materials such as that obtained from videos, texts, and still pictures in an interactive web content. There are many ways to gather data in mixed web content, such as using rich content builders (Java applet or Adobe Flash being two examples) or a Web content management system. Immersive rich, full screen Flash-based tours are becoming very popular today. A study done by the PEW Research Group showed that more than 5 million Americans watched virtual tours every day in 2004. PEW's research data which showed that Americans watching virtual tours rose from 54 million people in 2004 to 72 million people by August 2006. Meaning that in two years—an increase of 18 million. Assuming the same growth rate of 18 million people every two years, this is 36 million people more than August 2006. Meaning that 108 million Americans are watching virtual tours as of August 2010. Thanks in part to the recent explosion of many Internet devices, such as Apple's iPad, iPhone and other tablet computing platforms powered entirely by Google's Android 3 operating systems such as Motorola's Xoom, it can be predicted that consumption of virtual tour content, through the use of Adobe Flash and HTML5/CSS3 driven virtual tours will only increase over time.

ii. Real estate: Virtual tours are very popular in the real estate industry. Several types of such tours exist, including simple options such as interactive floor plans, and more sophisticated options such as full-service virtual tours. An interactive floor plan shows photographs of a property with the aid of a floor plan and arrows to indicate where each photograph was taken. Clicking on arrows shows the user where the camera was and which way the camera was pointing. Full service virtual tours are usually created by a professional photographer who will visit the property being sold, take several photos, and run them through stitching software. Full service virtual tours are usually more expensive than interactive floor plans because of the expense of the photographer, higher-end equipment used, such as a digital SLR camera, and specialized software. Real estate virtual tours are typically linked to the listing in the Multiple Listing Service.

12.6 E–TOURISM BUSINESS & E–TOURISM MARKETING

12.6.1 E – Tourism Business

The term “E-Tourism” can be defined as the analysis, design, implementation and application of Information Technology and E-Commerce solutions in the travel and tourism industry, as well as the analysis of the respective economic processes and market structures and customer relationship management. On the other hand, *E-tourism* is the digitisation of all the processes and value chains in the tourism, travel, hospitality and catering industries that enable organisations to maximise their efficiency and effectiveness. E - Business requires a customer-centric view and a shift away from mass production to mass customisation and from selling to relationship-building.

12.6.1.2 E - Tourism includes all business functions as given below:

- E-commerce and E-marketing
- E-finance and E-accounting
- E-HRM
- E-Procurement
- E-Strategy
- E-Planning
- E-Management

12.6.1.3 Outcomes of E – Tourism:

- It revolutionises all business processes, the entire value chain as well as the strategic relationships of tourism organisations with all their stakeholders.
- It takes advantage of intranets for reorganising internal processes, extranets for developing transactions with trusted partners and the internet for the interacting with all its stakeholders.
- It increasingly determines the competitiveness of the organisation and therefore it is critical for the competitiveness of the industry in the longer term.

12.6.1.4 Drivers for E - Business in Tourism:

- Economic necessity
- Rapid advancements in technology
 - ✓ Reduced cost
 - ✓ Ease of access
- Rising consumer expectations
 - ✓ Time poor
- Overcame fears regarding security

12.6.1.5 Benefits of E – Business for Tourism:

- Allow small businesses to compete internationally
- Dispose of unwanted inventory
 - ✓ e.g.: wotif.com and lastminute.com
 - ✓ These systems pose problems as well

- Consumer can now package their own product but does require effort hence agents still used. Also someone to blame if there are problems.
- Changed the structure of the industry
 - ✓ Many intermediaries have gone or have been swallowed up as part of vertical integration
- Internet great for brand enforcement, enlargement and expansion
 - ✓ Clutter now becoming a problem.
- Can set price in real time to help manage demand

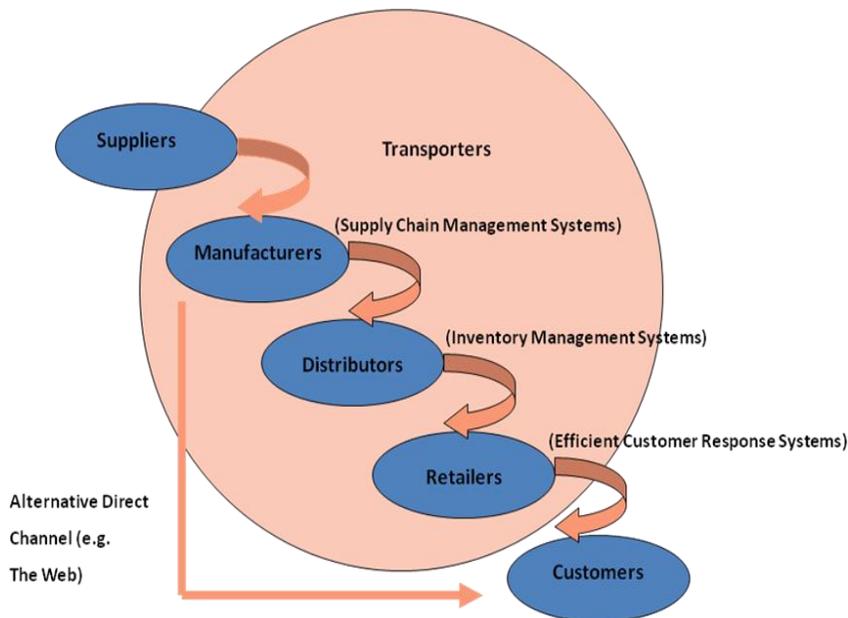


Figure 1: E – Business and Industry Value Chains

- Sophisticated yield management to maximise profits
 - ✓ Initially only airlines
 - ✓ Then hotels
 - ✓ Now open to smaller operator
- Underpin strategic alliances for airlines
- Sophisticated ICTs allow organisations to predict and target consumer needs
 - ✓ Differentiate product for different consumer groups
 - ✓ Foster relationship management & marketing
- Loyalty programs

12.6.2 E – Tourism Marketing

Any transfer of goods or services from seller to buyer (the broadest definition of *marketing*) that involves one or more electronic methods or media can be considered *electronic marketing* (EM).

E-Tourism Marketing is also associated with the online advertising. It is also known as *online advertisement*, *internet marketing*, *online marketing* or *e-marketing*, is the marketing and promotion of products or services over the Internet. Examples of online advertising include contextual ads on search engine results pages, banner ads, blogs, rich media ads, social network advertising,

interstitial ads, online classified advertising, advertising networks, dynamic banner ads, cross-platform ads and e-mail marketing, including e-mail spam. Many of these types of ads are delivered by an ad server.

The electronic buying and selling was started by telegraph in the nineteenth century. With the advent and mass acceptance of the telephone, radio, TV and then cable, electronic media have become the dominant marketing force. New permutations of these four electronic methods—as well as the microcomputer explosion—continue to create many new forms of electronic media. Marketing through an electronic medium ranges from the familiar to the cutting edge of technology.

EM know-how is now vital for any new college graduate, even an MBA who is marketing-oriented, computer-trained and innovative. But any trainee concerned with marketing, sales, advertising, display, promotion, PR, research, or service, will advance more quickly by demonstrating an understanding of EM. In addition, EM can be a life saver for career changers seeking a growth field in marketing.

Marketing specialists without EM know-how are becoming outmoded in many areas, including: advertising agency CEOs, account executives, creative heads, media buyers, research directors, or ambitious trainees in advertising agencies; catalog managers, creative heads, phone marketers, list brokers; marketing consultants in direct marketing; or principals, account executives; senior writers, and beginners in public relations.

Advancement or even getting hired in any field is becoming difficult without EM know-how, particularly in the areas of broadcast and cable TV, radio; new electronic media; mass and targeted print media; electronic information providers; trade magazines and newsletters; and trade associations.

Small businesses without EM facilities and expertise face a bleak future. EM know-how can save jobs and mean survival for a small firm. EM can make the difference between firing or advancement for an executive. And for home office business and other start-ups—whether you're a rep, consultant, or other type of one-person operation—electronic marketing know-how can make the difference between success and failure.

The Internet is revolutionizing the distribution of tourism information and sales. Even the small and medium-sized tourism enterprises (SMTEs) with well-developed and innovative Web sites can now have “equal Internet access” to international tourism markets. For tourism businesses, the Internet offers the potential to make information and booking facilities available to large numbers of tourists at relatively low costs. It also provides a tool for communication between tourism suppliers, intermediaries, as well as end-consumers. The Internet is revolutionizing the distribution of tourism information and sales. An increasing proportion of Internet users are buying on-line and tourism will gain a larger and larger share of the online commerce market. Obviously, the Internet is having a major impact as a source of information for tourism.

12.6.2.1 Advantages of E – Tourism Marketing

Internet marketing is inexpensive when examining the ratio of cost to the reach of the target audience. Companies can reach a wide audience for a small fraction of traditional advertising budgets. The nature of the medium allows consumers to research and to purchase products and services conveniently.

Therefore, businesses have the advantage of appealing to consumers in a medium that can bring results quickly.

Internet marketers also have the advantage of measuring statistics easily and inexpensively; almost all aspects of an Internet marketing campaign can be traced, measured, and tested, in many cases through the use of an ad server. The advertisers can use a variety of methods, such as pay per impression, pay per click, pay per play and pay per action. Therefore, marketers can determine which messages or offerings are more appealing to the audience. The results of campaigns can be measured and tracked immediately because online marketing initiatives usually require users to click on an advertisement, to visit a website, and to perform a targeted action.

12.6.2.2 Problems of E – Tourism Marketing

i.Privacy: The use of online advertising has implications on the privacy and anonymity of users. Hosting the banner images on its servers and using third-party cookies, the advertising company is able to track the browsing of users across these two sites. Third-party cookies can be blocked by most browsers to increase privacy and reduce tracking by advertising and tracking companies without negatively affecting the user's Web experience. Many advertising operators have an opt-out option to behavioral advertising, with a generic cookie in the browser stopping behavioral advertising.

ii.Malware: There is also a class of advertising methods which are considered unethical and may even be illegal. These include external applications which alter system settings (such as a browser's home page), spawn pop-ups, and insert advertisements into non-affiliated WebPages. Such applications are usually labeled as spyware or adware. They may mask their questionable activities by performing a simple service, such as displaying the weather or providing a search bar. These programs are designed to dupe the user, acting effectively as Trojan horses. These applications are commonly designed so as to be difficult to remove or uninstall. The ever-increasing audiences of online users, many of whom are not computer-savvy, frequently lack the knowledge and technical ability to protect themselves from these programs.

12.6.2.3 Limitations of E – Tourism Marketing

- One of the challenges that Internet marketers face (as does the general public) is that many internet products are outright scams or promoted with deception making it difficult to know which one is worth buying. This is especially the case with products that are supposed to train or aid Internet marketers in making money. While the quality of products has improved in the past few years, ethics are often still missing in online marketing. Many so-called money making products are "empty boxes" in which there is essentially nothing there, yet a buyer is to make money by reselling this empty box to others. Pyramid schemes are also still prevalent.
- The consumer is unable to physically feel or try on the product which can be a limitation for certain goods. However a survey of consumers of cosmetics products shows that email marketing can be used to interest a consumer in visiting a store to try a product or to speak with sales representatives; from here a purchase decision can be made.

- The marketer will not be able to use personal interaction to influence the audience as the marketing is completely based on the advertisement and the information that the advertisement might lead to (websites, blogs and other channels)

12.7 SUMMARY

In this unit, we understand about the travel agency automation. Since the information technology is changing very rapidly the face of travel industry, one must keep track of the changing times and only this will and can help to make the business better. The primary job of a travel agency is to provide easy and trouble free travel to the traveler. It is also important for a travel agency to provide enough information to the tourist so that the tourist is not cheated during his or her travel and has a hassle free trip. The travel industry of today wears a different look. It is automated and high tech and as a manager it is your prime responsibility to assure the availability of required infrastructure and support systems for the adaptation of technological advancements to manage your business profitably. The list of equipments comes under the travel agency automation are Telephones, Fax, Electronic mail, Photocopiers and Computers. These mentioned automation tools are essential communication equipments in a travel agency which are required for Requesting information, Receiving information, Making reservations, Confirmations and Transmitting information to clients.

After that we understand the concept of armchair tourist. An *armchair tourist* is someone with no direct experience of travelling; for example, someone who watches travel shows on TV instead of venturing out on vacation. Armchair tourist lets you vicariously enjoy the sights and sounds of well known and obscure travel locations from around the world. Watch online, on select broadcast channels, in-flight and in hotel rooms around the world. Enjoy the beach scenes, Asian markets, European cafes, fountains, skylines and train stations— from around the planet. There are three popular ways of "stitching" virtual tours together viz. Rectilinear Stitching, Spherical Stitching and Cubical Stitching.

Then the concept of E-Business and E-Tourism Marketing are discussed. The term "E-Tourism" can be defined as the analysis, design, implementation and application of Information Technology and E-Commerce solutions in the travel and tourism industry, as well as the analysis of the respective economic processes and market structures and customer relationship management. On the other hand, *E-tourism* is the digitisation of all the processes and value chains in the tourism, travel, hospitality and catering industries that enable organisations to maximise their efficiency and effectiveness. E - Business requires a customer-centric view and a shift away from mass production to mass customisation and from selling to relationship-building. Any transfer of goods or services from seller to buyer (the broadest definition of *marketing*) that involves one or more electronic methods or media can be considered *electronic marketing* (EM). E-Tourism Marketing is also associated with the Online advertising. It is also known as *online advertisement*, *internet marketing*, *online marketing* or *e-marketing*, is the marketing and promotion of products or services over the Internet. Examples of online advertising include contextual ads on search engine results pages,

banner ads, blogs, rich media ads, social network advertising, interstitial ads, online classified advertising, advertising networks, dynamic banner ads, cross-platform ads and e-mail marketing, including e-mail spam. Many of these types of ads are delivered by an ad server.

12.8 EXPECTED QUESTIONS

- Q1: Write an essay on travel agency automation?
Q2: What do you understand by the tourism production system and explain the role of information technology in it?
Q3: Explain the term armchair tourism?
Q4: Define the role of E - Tourism business in promoting the overall tourism business?
Q5: Explain the concept of E – Tourism Marketing?

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Block 4

E - Business in Tourism

UNIT 13**MEANING AND APPLICATIONS OF E-COMMERCE,
E-BUSINESS AND E-MARKETING; SIGNIFICANCE
OF E-COMMERCE IN TOURISM AND TRAVEL**

Structure

- 13.1 Introduction
- 13.2 Objectives
- 13.3 Meaning and applications of E-Commerce
- 13.4 Meaning and applications of E-Business
- 13.5 Meaning and applications of E-Marketing
- 13.6 Significance of E-Commerce in Tourism and Travel
- 13.7 Summary
- 13.8 Expected Questions
- 13.9 References

13.1 INTRODUCTION

In this unit, we are going to learn about the concepts of electronic commerce, electronic business and electronic marketing. We will learn the role of electronic systems popularly denoted by “e” in the ever growing tourism and travel industry. With the advent of internet and e-system, the working environment in tourism industry has revolutionized. Now the working system in tourism and travel industry is based on online query system. The geographical locations are no more constrain in tourism sector. From exploring the potential tourism destinations, comparing the services offered in tourism packages and then booking the online travel packages etc. are all possible due to the e-system. E-business and e-marketing guide us to set-up a database on virtual level and then expand our online presence through e-marketing. These all tools help the business for expansion beyond continents. In last, we learn about the role of e-commerce in tourism industry via various modes right from generating query to revert back, from offering services to transactions etc.

13.2 OBJECTIVES

- To understand the role and concept of e-commerce
- To know about e-business
- To understand the concept and contributions of e-marketing in present world
- To know and understand the significance of e-commerce in tourism industry

13.3 MEANING AND APPLICATIONS OF E-Commerce

13.3.1 Meaning of E-Commerce

Electronic commerce, commonly known as e-commerce, is a type of industry where buying and selling of product or service is conducted over electronic systems such as the Internet and other computer networks. Electronic

commerce draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems. Modern electronic commerce typically uses the World Wide Web at least at one point in the transaction's life-cycle, although it may encompass a wider range of technologies such as e-mail, mobile devices social media, and telephones as well.

Electronic commerce is generally considered to be the sales aspect of e-business. It also consists of the exchange of data to facilitate the financing and payment aspects of business transactions. E-commerce can be divided into:

- E-tailing or "virtual storefronts" on websites with online catalogs, sometimes gathered into a "virtual mall"
- The gathering and use of demographic data through Web contacts and social media
- Electronic Data Interchange (EDI), the business-to-business exchange of data
- E-mail and fax and their use as media for reaching prospective and established customers (for example, with newsletters)
- Business-to-business buying and selling
- The security of business transactions

13.3.2 Applications of E-Commerce

Various applications of e-commerce are continually affecting trends and prospects for business over the Internet, including e-banking, e-tailing and online publishing/online retailing. A more developed and mature e-banking environment plays an important role in e-commerce by encouraging a shift from traditional modes of payment (i.e., cash, checks or any form of paper-based legal tender) to electronic alternatives (such as e-payment systems), thereby closing the e-commerce loop. Some benefits of e-Commerce are:

- It helps in expanded the geographical reach
- It expanded the customer base
- It increase visibility through Search Engine Marketing
- It provides customers valuable information about your business
- It is available 24/7/365 - Never Close
- It builds customer loyalty
- It helps in reduction of Marketing and Advertising Costs
- It helps in collection of Customer Data
- It helps in increase the sales
- It helps in decreasing the costs
- It helps in increasing the profits
- It helps in understanding that profits is not the same as sales
- It helps in expands the size of the market from regional to national or national to international
- It helps in towards contract the market
- It helps to reach a narrow market

E-Commerce is a massive growth area, were colossal sums of money are being made and spent every day. This is largely to do with the hype of the Internet and on-line shopping. The Internet is growing exponentially, and will

continue to grow for some time to come. This, coupled with good advertising, can provide a solid foundation from which to launch a stake in the Internet and e-commerce boom.

E-commerce is big business. The fact that people want it is probably the biggest lure for companies to jump onto the bandwagon, but there are other factors, making e-commerce a good sense solution. It helps towards lowering the transaction costs. If the site is implemented well, the web can significantly lower order taking costs and customer service costs after the sale by automated processes. It also provides the variety for shoppers. It gives people the opportunity to shop in different ways. It also provides the followings:

- The ability to build an order over several days
- The ability to configure products and see actual prices
- The ability to compare prices between multiple vendors
- The ability to search large catalogues easily

Some more opportunities provided by e-commerce are as follows:

- Larger catalogues:** On the web, a company can display their entire range. If they were to print a glossy catalogue to do the same job, it would be too big. E.G. Amazon sells 3 million books. Imagine trying to fit all their available books into a paper catalogue. The Web cuts out printing cost and distribution.
- Global availability:** Anyone with an Internet connection, in any part of the world can access online services, without costing the company a penny, over and above the marketing costs. This ubiquitous presence is far greater reaching than a catalogue drop.
- New business model:** E-commerce allows people to create completely new business models. A mail order company has high costs for staff and catalogue printing & distribution. However in e-commerce these costs fall practically to zero.

13.4 MEANING AND APPLICATIONS OF E-BUSINESS

13.4.1 Meaning of E-Business

Electronic business commonly referred to as "eBusiness" or "e-business" or an internet business, may be defined as the application of information and communication technologies (ICT) in support of all the activities of business. Commerce constitutes the exchange of products and services between businesses, groups and individuals and can be seen as one of the essential activities of any business. Electronic commerce focuses on the use of ICT to enable the external activities and relationships of the business with individuals, groups and other businesses.

E-business may be defined as the conduct of industry, trade and commerce using the computer networks. The term "e-business" was coined by IBM's marketing and Internet teams in 1996.

Electronic business methods enable companies to link their internal and external data processing systems more efficiently and flexibly, to work more closely with suppliers and partners, and to better satisfy the needs and expectations of their customers. The internet is a public through way. Firms use more private and hence more secure networks for more effective and efficient management of their internal functions.

In practice, e-business is more than just e-commerce. While e-business refers to more strategic focus with an emphasis on the functions that occurs using electronic capabilities, e-commerce is a subset of an overall e-business strategy. E-commerce seeks to add revenue streams using the World Wide Web or the Internet to build and enhance relationships with clients and partners and to improve efficiency using the Empty Vessel strategy. Often, e-commerce involves the application of knowledge management systems.

E-business involves business processes spanning the entire value chain: electronic purchasing and supply chain management, processing orders electronically, handling customer service, and cooperating with business partners. Special technical standards for e-business facilitate the exchange of data between companies. E-business software solutions allow the integration of intra and inter firm business processes. E-business can be conducted using the Web, the Internet, intranets, extranets or some combination of these.

Basically, electronic commerce (EC) is the process of buying, transferring, or exchanging products, services, and/or information via computer networks, including the internet. EC can also be beneficial from many perspectives including business process, service, learning, collaborative, community. EC is often confused with e-business

The scope of E-Business is as wide as an ocean & there by the implementation hurdles. When one thinks of the Electronic Business even through final goal remains the same as that of the traditional business, but the way in which they function in order to improve the performance is different. As information sharing is the major part of the corporate industries, networking has given boost to E-Business. This change in view-point has opened door for new opportunities.

Nationalized and Private banks agrees that adopting e-business as a strategy is one of the important steps the banks has taken in its development due to the tremendous benefits e-business adoption provides. According to them their perceived benefits include convenience to customers, speed and quality of service, reduction of queues in banking halls and reduction in the total overhead cost such as reduction in employee recruitment and reduction in space for clients and customers. These factors are pushed their drive to adopt e-business.

13.4.2 Types of E-Business

Broadly there are three types of E-Business as explained below:

- i. Business to Customer (B2C)
- ii. Business to Business (B2B)
- iii. Customer to Business (C2B)
- iv. Customer to Customer (C2C)

i. Business to Customer (B2C):

The business-to-consumer, or B2C, model of e-business sells products directly to retail consumers online. Amazon.com is an example of a B2C model. The e-business has only an online identity through which it offers a range of products to customers. Other B2C enterprises include bestbookbuys.com and gartner.com. Most B2C models generate revenue from direct sales and processing fees. B2C also is known as electronic retail or e-tail.

ii. Business to Business (B2B):

The business-to-business, or B2B, model involves companies using the Internet to conduct transactions with one other. B2B e-business accounts for more than 90 percent of all electronic commerce, according to the U.S. Census Bureau. The main reason for this is the complexity of B2B transactions. Unlike B2C transactions that involve sellers offering products and services and buyers purchasing them, B2B transactions are multifaceted and often involve multiple transactions at each step of the supply chain. B2B businesses generate revenue from direct sales.

iii. Customer to Business (C2B):

Consumer-to-business, or C2B, is a unique e-business model in which consumers create value and demand for products. Reverse auctions are a common characteristic of C2B models, in which consumers drive transactions and offer their own prices for products. The airline ticket website Priceline.com is an example of a C2B e-business model. The website allows customers to bid for tickets and offer their own prices. Shopping sites such as cheap.com, gilt.com and ruelala.com also are C2B.

iv. Customer to Customer (C2C):

Consumer-to-consumer, or C2C, e-business models enable consumers to behave as buyers and sellers in third-party-facilitated online marketplaces. Craigslist is an example of a third-party marketplace. The company brings together disparate buyers and sellers to conduct business. Other examples of C2C websites include eBay and PayPal. A C2C model generates revenues in several ways, including personal ad fees, membership or subscription fees, sales commissions and transaction fees.

13.4.3 Applications of E-Business

E-business involves business processes spanning the entire value chain: electronic purchasing and supply chain management, processing orders electronically, handling customer service and cooperating with business partners. Special technical standards for e-business facilitate the exchange of data between companies. E-business software solutions allow the integration of intra and inter firm business processes. E-business can be conducted using the web, the internet, intranets, extranets, or some combination of these. Activities using e-Business tools include:

- Trading of goods or services online, such as e-Procurement, primarily through the web-sites
- Electronic retailing (e-Tailing)
- Use of the internet, intranets or extranets to conduct research and manage business activities
- Web-site marketing
- Online communications, such as e-mail
- Online training for staff (e-Learning)

E-business tools include:

- Mobile phones
- Personal digital assistants (PDA)
- Electronic Data Interchange

- File transfer
- Facsimile
- Video conferencing, internet, intranets and extranets

The benefits of implementing e-Business tools is not so much in the use of technology, but in the streamlining of business processes and the ease in finding new markets. Some of the major benefits are given below:

- Quicker and easier communications.
- Strengthened marketing capabilities and reach.
- Increased hours of operation (a web-site provides 24-hour seven day information to existing and potential customers).
- Access to broader information through research.
- Reducing the cost of doing business by lowering transaction costs and increasing efficient methods for payment, such as using online banking and reducing stationery and postage costs.
- The opportunities to adopt new business models and develop tailored customer support.

13.5 MEANING AND APPLICATIONS OF E-MARKETING

13.5.1 Meaning of E-Marketing

Any transfer of goods or services from seller to buyer (the broadest definition of *marketing*) that involves one or more electronic methods or media can be considered *electronic marketing* (EM). The electronic buying and selling was started by telegraph in the nineteenth century. With the advent and mass acceptance of the telephone, radio, TV and then cable, electronic media have become the dominant marketing force. New permutations of these four electronic methods—as well as the microcomputer explosion—continue to create many new forms of electronic media. Marketing through an electronic medium ranges from the familiar to the cutting edge of technology. The various electronic marketing forms are as follows:

- Broadcast or cable TV
- In-bound or out-bound telemarketing
- Voice mail
- Talking ads
- Sponsored tele-media
- In-bound or out-bound fax-mail
- Fax-aided ads
- Video brochures
- Video catalogs
- Video media ads in videocassettes
- Movie ads on planes and in theatres
- Interactive ads on computer disks
- Interactive computer disk catalogues
- E-mail
- Computer bulletin boards
- Computer networks

- Online marketplaces
- Online catalogue
- Electronic multimedia kiosks in marketplace

Electronic media and their marketing applications will soon touch virtually every aspect of business. EM knowledge is critical for those who hold the following jobs in big firms:

- Chief Executive Officer (CEO)
- Chief Financial Officer (CFO)
- VP of marketing
- Director of sales
- Advertising manager
- Direct marketing manager
- Head of Public Relations
- Promotion manager
- Market research manager
- Telemarketing manager
- Product brand
- Category managers

EM know-how is now vital for any new college graduate, even an MBA who is marketing-oriented, computer-trained and innovative. But any trainee concerned with marketing, sales, advertising, display, promotion, PR, research, or service, will advance more quickly by demonstrating an understanding of EM. In addition, EM can be a life saver for career changers seeking a growth field in marketing. Marketing specialists without EM know-how are becoming outmoded in many areas, including: advertising agency CEOs, account executives, creative heads, media buyers, research directors, or ambitious trainees in advertising agencies; catalog managers, creative heads, phone marketers, list brokers; marketing consultants in direct marketing; or principals, account executives; senior writers, and beginners in public relations.

Advancement or even getting hired in any field is becoming difficult without EM know-how, particularly in the areas of broadcast and cable TV, radio; new electronic media; mass and targeted print media; electronic information providers; trade magazines and newsletters; and trade associations.

Small businesses without EM facilities and expertise face a bleak future. EM know-how can save jobs and mean survival for a small firm. EM can make the difference between firing or advancement for an executive. And for home office business and other start-ups—whether you're a rep, consultant, or other type of one-person operation—electronic marketing know-how can make the difference between success and failure.

13.5.2 Attributes of E-Marketing

Some of the major attributes of e-marketing are listed as below:

- One-to-one approach:** The targeted user is typically browsing the Internet alone, so the marketing messages can reach them personally. This approach is used in search marketing, where the advertisements are based on search engine keywords entered by the user. And now with the advent of Web 2.0 tools, many users can interconnect as "peers".

- ii. **Appeal to specific interests:** E- Marketing places an emphasis on marketing those appeals to a specific behavior or interest, rather than reaching out to a broadly defined demographic. "On- and Off-line" marketers typically segment their markets according to age group, gender, geography, and other general factors. Marketers have the luxury of targeting by activity and geo location. Internet marketing differs from magazine advertisements, where the goal is to appeal to the projected demographic of the periodical. Because the advertiser has knowledge of the target audience—people who engage in certain activities (e.g., uploading pictures, contributing to blogs) — the company does not rely on the expectation that a certain group of people will be interested in its new product or service.
- iii. **Geo targeting:** Geo targeting (in internet marketing) and geo marketing are the methods of determining the geo location (the physical location) of a website visitor with geo location software, and delivering different content to that visitor based on his or her location, such as country, region / state, city, metro code/zip code, organization, Internet Protocol (IP) address, ISP or other criteria.
- iv. **Different content by choice:** A typical example for different content by choice in geo targeting is the FedEx website at FedEx.com where users have the choice to select their country location first and are then presented with different site or article content depending on their selection.
- v. **Automated different content:** With automated different content in internet marketing and geo marketing the delivery of different content based on the geographical geo location and other personal information is automated.

13.5.3 Applications of E-Marketing

Following are some of the advantages of e-Marketing:

- i. **Reduction in costs through automation and use of electronic media:** Internet marketing is relatively inexpensive when compared to the ratio of cost against the reach of the target audience. Good planning and excellence in the execution of an effectively targeted e-marketing campaign can reach your desired audience much better than large scale traditional marketing channels.
- ii. **Faster response to both marketers and the end user:** Internet marketing is able to, in ways never before imagined, provide an immediate impact. Imagine the consumer is reading his/her favourite magazine. He / She see a double-page advert for some new product or service, maybe BMW's latest luxury sedan or Apple's latest iPod offering. With this kind of traditional media, it's not that easy, for the consumer, to take the step from hearing about a product to actual acquisition. With e-Marketing, it's easy to make that step as simple as possible, meaning that within a few short clicks the consumer could have booked a test drive or ordered the iPod. And all of this can happen regardless of normal office hours. Effectively, Internet marketing makes business hours 24 hours per day, 7 days per week for every week of the year. By closing the gap between providing information and eliciting a consumer reaction, the consumer's buying cycle is speeded up and advertising spend can go much further in creating immediate leads.

iii. Increased ability to measure and collect data: The nature of the medium allows consumers to research and purchase products and services at their own convenience.

iv. Opens the possibility to a market of one through personalization

Increased interactivity: Whereas traditional marketing is largely about getting a brand's message out there, e-Marketing facilitates conversations between companies and consumers. With a two-way communication channel, companies can feed off of the responses of their consumers, making them more dynamic and adaptive. It is easy to target a product to a language or location. You can even change the workflow of your website in order to match the products your users want and visit.

13.6 SIGNIFICANCE OF E-COMMERCE IN TOURISM AND TRAVEL

E-commerce, which takes the world by storm in recent years, is bringing new business opportunities to global travel and tourism industry. With the rising of the Internet boom, the tourist sector would by no means be left behind. Tourism-related institutions and Internet companies are joining hands in tap this potential market. Airlines and hotels and many other industry sectors have made enormous investment in improving service and establishing customer loyalty and retention programs. Going electronic is not cheap, but it is a necessary investment, according to the trends in the travel and tourism industry. Tour operators can use the Internet to reach a global audience. With continuous increasing in the world population, this is a very rosy prospect. Travel agencies can also expand from a regional base to an international business.

13.6.1 E-Commerce and four principles

Due to e-commerce in tourism, the main four principles which create the communication to bring the information from the suppliers to the final customer or tourist can be defined as follows:

- i. The traveller books his trip at the tour-operator who buys the services from the suppliers.
- ii. The traveller books by consulting a travel-agency that offers products of different tour-operators.
- iii. The traveller books at a travel-agency that operates like a tour-operator buying services from the suppliers without another tour-operator.
- iv. The traveller books directly at the supplier.

The second alternative is the most important of today's business. This kind of communication is marked by the participation of almost all partners in the value chain.

13.6.2 Prominent reasons of E-Commerce

Economy of the tourist services is depending on the ability of the companies to react on short-term demands and modifications. This means that the capability of bringing short-term information to the demanding markets is an essential factor for tourist marketers. So the added value of tourist services is mainly based on the efficient combination of information.

The tourist market is an area of world-wide importance and growing turnover. Companies being active in the tourist market require a network of communication in tourism for reasons of competition, satisfaction of the source markets and optimisation of co-operative structures. Some of the prominent reasons where e-commerce contributes in tourism industry are given as follows:

- i. Competition
- ii. Satisfaction of source markets and customers
- iii. Optimisation of co-operative structures

i. Competition:

The tourist companies are enforced to adapt their competition to the changes of the market. More and new competitors are pushing to the source markets offering their products directly to the customers. The attractiveness of a destination can change quickly, for example by political events. On the other side new destinations have to be developed for European customers. As a consequence, tourist companies need to strengthen their international competition.

ii. Satisfaction of source markets and customers:

Customers get more experienced in travelling and are looking for more specific information fitting to their needs of travelling. Subsequently, tourist companies have to serve these needs by offering more specific and short term products. Looking at the competitors, the companies have to keep the customer satisfied for not only selling one travel to him. One major requirement in this area is the reduction of lead times, which allows booking of travels just a few days before the actual travel date without the inconveniences of last-minute trips.

iii. Optimisation of co-operative structures:

Today the co-operation between different business partners is processed by different kinds of handling business transactions although they are of a similar structure. These different kinds of handling lead to costs for administrative work and to the prolongation of the transactions that could be shorted by a standardised and open model. The conditions for the change of business processes are the flexibility, the openness and the security of the information-flow in a forward-looking solution.

13.6.3 Effects of E-Commerce on Tourism Industry

Beyond the above mentioned three reasons, e-commerce also showing the effects on tourism industry. Some of the most important effects of electronic commerce in tourism are explained as follows:

- i. The digitalisation of economic transactions
- ii. Virtual / electronic markets
- iii. Economy is changed from mass-structure to individual structure by E-Commerce
- iv. Globalisation of markets

i. The digitalisation of economic transactions: Today's economic transactions are marked by different media like paper, fax and phone. Although some transactions are done electronically there is still missing the continuity of information-flow along the entire business process.

- ii. **Virtual / electronic markets:** Because of the immaterial and virtual character of the value-chain the tourist market is very adequate for building a market in electronic commerce. The process of forming the prices will be expedited leading to prices of a day or ad-hoc-prices similar to a stock exchange. For marketer this means less security of planning but also a more distinguished instrument of steering and immediate efficiency review.
- iii. **Economy is changed from mass-structure to individual structure by E-Commerce:** The availability of more genuine and current information allows customers to act in a more individual way corresponding to his specific needs independent for opening times
- iv. **Globalisation of markets:** The technical possibilities of networking allow the gaining and distribution of information on a global area. This brings chances to open up of new markets. Destinations can bring their offers to new markets of sales. On the other hand customers reach new markets of resourcing. This brings chances of winning new business partners especially to small and medium enterprises (SME).

13.6.4 Effects of E-Commerce on communication with in Tourism Industry

In the first step the change of communication from one-to-one to mass relationship or corporate networking will permit the communication between all interested partners in tourism business. In the second step, it can be expected that some relationships between business partners will become of a wider importance.

Because of the cost-effect by choosing the direct way and saving the provision for broker the direct communication between suppliers and tour operators as far as the direct communication between suppliers and travellers will expand.

With the rising spread of the internet travellers will ask for more "first-hand" information from the suppliers to get more details from the offered services. Asking for specific opportunities concerning hobbies, sports or similar themes the traveller will look for a partner in the destination. This role might be taken over by the destination agency getting more direct contact to the traveller.

Experience shows that one of the main criteria for choosing a service is the impressions other traveller have collected in the destination. This effect will support for example by newsgroups. Especially people looking for individual services will force this way of communication.

The On Tour network will allow all kinds of companies in tourist business to offer and request services, enabling especially smaller and medium sized organisations to participate in the business as equal partners. Additionally, the traveller will get the opportunity to communicate directly to destination agencies and suppliers, such as car rentals and hotels. Thus, On Tour will offer a completely integrated solution supporting all kinds of communication during the tourist business chain. Entire business processes, e.g. information of the tourist, booking the journey, service at the destination and even all payments will be carried out via the On Tour network.

Even today the tourist market has a virtual character. The digitalisation of economic transactions has far-reaching effects on these markets. E-Commerce

will not allow some classic business to act like before but will bring a lot of chances and new opportunities to companies and travellers. The concentration on special competences the widening of the distribution of tourist services will bring a globalisation of resourcing markets and distribution markets. In this sense, the On Tour-project will not only help to design one part of the e-commerce in tourism but also can be a basis of experience for other branches.

13.7 SUMMARY

In this unit, majorly we learnt about the three broad concepts of e-commerce, e-business and e-marketing. E-commerce is a type of industry where buying and selling of product or service is conducted over electronic systems such as the Internet and other computer networks. E-business or an internet business may be defined as the application of information and communication technologies (ICT) in support of all the activities of business. Any transfer of goods or services from seller to buyer that involves one or more electronic methods or media can be considered as electronic or e-marketing.

E-business is a very broad entity dealing with the entire complex system that comprises a business that uses electronic medium to perform or assist its overall or specialized business activities. E-commerce is best described in a transactional context. So for example an electronic transaction of funds, information or entertainment falls under the category handled by principles of e-commerce. Technically, e-commerce is a part of e-business. E-marketing is also a part of E-business that involves electronic medium to achieve marketing objectives. E-marketing is set on a strategic level in addition to traditional marketing and business strategy.

Moreover, E-commerce, which is gaining popularity day-by-day, is bringing new business opportunities to global travel and tourism industry. With the rising of the Internet boom, the tourist sector would by no means be left behind. Tourism-related institutions and Internet companies are joining hands in tap this potential market. Airlines and hotels and many other industry sectors have made enormous investment in improving service and establishing customer loyalty and retention programs. Going electronic is not cheap, but it is a necessary investment, according to the trends in the travel and tourism industry. Tour operators can use the Internet to reach a global audience. With continuous increasing in the world population, this is a very rosy prospect. Travel agencies can also expand from a regional base to an international business.

13.8 EXPECTED QUESTIONS

- Q1: What do you mean by the term e-commerce and explain its applications?
Q2: Write an essay on e-business?
Q3: Explain the utility of e-marketing in modern era of industrial atmosphere?
Q4: Define and explain the significance of e-commerce in tourism industry?
Q5: Write the applications of e-business?

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UNIT 14

E- BUSINESS SETUP: B2B, B2C, C2C

Contents:

- 14.1 Introduction
- 14.2 Objectives
- 14.3 E-Business Setup
- 14.4 B2B and B2C
- 14.5 C2B and C2C
- 14.6 Difference between E-commerce and E-business
- 14.7 Status of E-commerce in India
- 14.8 Summary
- 14.9 Expected Questions
- 14.10 References

14.1 INTRODUCTION

This unit provides an idea about the concept of E business and the role of ICT in it. Now-a-days, majority of the firms are using the concept of E business which saves both time and money. It is convenient for both consumer and suppliers. The unit also explains step by step the process involved in starting an E-Business especially in Indian context. Moreover, in this unit, the students will learn about the various terms are using in E Business like B2B, B2C, C2B and C2C. These all concepts are directly correlated with business and consumers and hence provide lesser space for middlemen. After that, the students will learn about the major differences between the two similar terms E Business and E Commerce. As India is a growing economy, so the present status of E Commerce in India is also discussed in this unit.

14.2 OBJECTIVES

- To understand the concept of E - Business
- To know and understand the B2B and B2C
- To know and understand the C2B and C2C
- To aware about the difference between E – Business and E – Commerce
- To understand the present status of E – Commerce in India

14.3 E – BUSINESS SETUP

E-business (electronic business), derived from such terms as "e-mail" and "e-commerce," is the conduct of business on the Internet, not only buying and selling but also servicing customers and collaborating with business partners. In other words, it defined as the application of information and communication technologies (ICT) in support of all the activities of business. Commerce constitutes the exchange of products and services between businesses, groups and individuals and can be seen as one of the essential activities of any business. Electronic commerce focuses on the use of ICT to enable the external

activities and relationships of the business with individuals, groups and other businesses. One of the first to use the term was IBM, when, in October, 1997, it launched a thematic campaign built around the term. Today, major corporations are rethinking their businesses in terms of the Internet and its new culture and capabilities. Companies are using the Web to buy parts and supplies from other companies, to collaborate on sales promotions, and to do joint research. Exploiting the convenience, availability, and world-wide reach of the Internet, many companies, such as Amazon.com, the book sellers, had already discovered how to use the Internet successfully.

The following are the general requirements that needed in order to set up an e-business in the present competitive world:

- i. Website Hosting Services
- ii. Website Building Services
- iii. Privacy Policy
- iv. Shipping
- v. Return Policy
- vi. Local Advertising
- vii. Customer Service

i. **Website Hosting Services:** Unless you want to own and manage your own server, you will need to contract with a web hosting service that will maintain your website on their servers. There are plenty of web hosting services on the internet. While selecting one look for:

- a. Sufficient storage capacity
- b. Multiple email accounts
- c. Free domain name registration
- d. Website statistics

Other factors to be considered include:

- a. How long have they been in business?
- b. How do they handle security of their site?
- c. What kind of support do they offer?
- d. How much can you control the site?

ii. **Website Building Services:** Some people choose to have someone they know develop their website for them. Then they upload the created website to their contracted web hosting service. Alternatively, many web hosting services also have website development tools that aid you in developing your website. The cost of webhosting services and website building services is often very reasonable, but are recurring in nature. Some basic principles to be followed while creating your website are:

i. Keep it simple

- a. Stick to basic colors.
- b. Make the font and text easy to read.

ii. Download time should be 3 to 8 seconds:

Make sure your company name, logo, tag line, and privacy statement are well displayed.

iii. Contact information should be easy to find:

The site should be easy to navigate.

A user should be able to locate what they are looking for in fewer than 4 clicks.

- iv. Features to look for include:*
- An online catalog
 - An online shopping cart (such as Paypal)
 - Secure payment transaction processing (SSL)
 - Website development tools
- v. There are many web hosting and website building companies like:*
- www.qcommerce.com
 - www.bizhosting.com
 - www.ipowerweb.com
 - www.ipage.com
 - www.ebay.com
 - smallbusiness.yahoo.com
- iii. **Privacy Policy:** If you are collecting any customer data (names, addresses, email addresses, credit card numbers, etc.) you will need to develop a Privacy Policy for your e business as per the legal policy. You should display a link to your Privacy Policy on your website.
- iv. **Shipping:** You have to find the suppliers. Most online sellers, don't create their own products from scratch, they locate and resell those products for a profit. A significant advantage to selling on line. You can locate a wholesale supplier who rather than shipping inventory to you, will ship straight to your end customer once an order is placed. This is called a drop ship supplier. Every Customer wants timely delivery in a Good Condition and if the drop ship supplier is not available then you have to arrange the logistics part by yourself. There are a number of third party logistics company with which you can have a tie up like DTDC, Bluedart, Indiaonline, Java Fedex etc. As an e business, you will need to develop a plan for delivering products to your customers. Remember to add the cost of shipping to your financial plans.
- v. **Return Policy:** Decide on your return policy. Sales will be going to customers across the Country, and possibly internationally. Select a return policy that adds value to your customer, without being prohibitively expensive. A Full Return Policy can be very useful for items that require approval, such as clothing. However, you will have to make a decision whether to "eat" the return shipping.
- If you put a time period on your return policy, define carefully when the "clock" starts.
- Does the time period begin when you ship the goods, or when the customer receives them?
 - Does the time period extend to the date the customer sends the goods back to you, or when you receive them?
- If you offer "Store Credit", can your payment module handle payment options other than credit card payments?
- Store Credit
 - Gift Certificates
 - Debit Cards
- Will you charge a restocking fee?
- vi. **Local Advertising:** Proper marketing in the form of advertisement and other publicity measures are required in various media including Television, radio, newspaper, magazine and websites for the success of the business.

- **Customer Service:** Initial setup of frequently asked questions (FAQs) for new clientele to view.
- Discussion boards can be used to ask questions and members of the customer service department can respond. All customers will have access to this page, so if they ever need to look up a question, it will be available to them.
- If any type of technical assistance is needed, phone numbers and email addresses need to be readily available to view.
- A search tool should also add to the website to help the customer find what they are looking for.

14.3 B2B and B2C

14.3.1 B2B

Business-to-business (B2B) describes commerce transactions between businesses, such as between a manufacturer and a wholesaler, or between a wholesaler and a retailer. B2B (Business to Business) Branding is a term used in marketing. On the Internet, B2B (business-to-business), also known as e-biz, is the exchange of products, services, or information between businesses rather than between businesses and consumers.

It is a new name given to EDI. As the name suggests, it is a business platform involving two independent or even dependent business entities. In B2B version of online transaction(s) the manufacturing organization takes a lead in setting up a business platform. This platform acts a business communication channel between the manufacturing/software developer entity and its vendors/suppliers, i.e., whatever was being done earlier in offline manner are now being done online. This may include registration of vendors, invitation of quotations, negotiations, price settlement, contract finalization, procurement, cargo tracking, and payments – online. Thus a B2B platform acts as a business facilitator, negotiator and dealmaker, which facilitates, negotiates and clinches deal between independent or dependent business units.

14.3.2 B2C

The term B2C stands for Business-to-Customer. It refers to a business platform, involving a business entity and consumers. It is a retail version of e-commerce known as e-tailing. Selling goods or services through web based shops. It is the most popular model of e-commerce as it has helped moving commercial transactions from public domain to private domain. B2C is about creating a better offline shopping experience – online. It has benefit for both the business entity and consumer. E-tailing is a cheaper option as it is cheaper to set up a single website and warehouse combination than operate a chain of shops. From the point of consumer benefits are in the form of convenience, wider choice and time saver. From the consumer's point of view, online shopping is a great leveler. One can shop at any time (24x7), from anywhere, i.e. all consumers are to be treated equally online. It has made shopping a great fun.

The customer can shop and order through internet and the merchandise are dropped at the customer's doorstep. Here the retailers use drop shipping technique. They accept the payment for the product but the customer receives

the product directly from the manufacturer or a wholesaler. This format is ideal for customers who do not want to travel to retail stores and are interested in home shopping Example: Amazon, Flipkart, Jabong, eBay etc.

The volume of B2B (Business-to-Business) transactions is much higher than the volume of B2C (Business to Customer) transactions. The primary reason for this is that in a typical supply chain there will be many B2B transactions involving sub components or raw materials, and only one B2C transaction, specifically sale of the finished product to the end customer. For example, an automobile manufacturer makes several B2B transactions such as buying tires, glass for windscreens, and rubber hoses for its vehicles. The final transaction, a finished vehicle sold to the consumer, is a single (B2C) transaction. B2B is also used in the context of communication and collaboration. Many businesses are now using social media to connect with their consumers (B2C); however, they are now using similar tools within the business so employees can connect with one another. When communication is taking place amongst employees, this can be referred to as "B2B" communication.

The terms B2B and B2C are short forms for Business-to-Business (B2B) and Business-to-Customer (B2C). Both describe the nature and selling process of goods and services. While B2B products and services are sold from one company to another, B2C products are sold from a company to the end user.

While almost any B2C product or service could also be a B2B product, very few B2B products or services will be used by consumers. For example, toilet paper, a typical B2C product, can be seen as a B2B product if it is bought in larger quantities by a hotel for their restrooms and guestrooms. However, few people will buy an excavator for their private use.

Most B2B products are purchased by companies to be used in their own manufacturing, producing goods and services to be sold on. The value added product can then be either sold to yet another company; or to the consumer.

Any consumer product would have gone through numerous value-adding processes before it is being purchased by the final user. Numerous suppliers from various industries would have contributed to the finished product. For instance, a can of soft drink will require different companies to provide the can, water, sugar, other ingredients, label-printing, packaging, transportation and paint for the printing. The can itself is made from aluminum that needs to be processed and extracted. Only the very last transaction in the sales/ purchase chain is a true B2C relationship.

In terms of perceived risks, a b2b product is commonly viewed to possess higher perceived risks compared to b2c products due to the value of each transaction: e.g. buying machinery can cost Rs. 25 lakhs compared to a tube of toothpaste which would cost just Rs.25. However in reality, risks levels in terms of duty-of-care can be fairly similar depending on the nature of the product. A faulty machine similar to a contaminated tube of toothpaste can bring grave harm to its respective users. However, because of the quantum of purchase, buyers of B2B products tend to place more focus on the evaluation and selection process.

14.3.3 Difference between B2B and B2C

The main difference between B2B and B2C is who the buyer of a product or service is. The purchasing process is different in both cases and the following is a list of key differences between them.

- i. Risks
- ii. Buying behaviour in a B2B environment
- iii. B2B brands need to be differentiated

i. Risks: Buying one can of soft drink involves little money, and thus little risk. If the decision for a particular brand was not right, there are very little implications. The worst that could happen is that the consumer does not like the taste and discards the drink immediately.

Buying B2B products is much riskier. Usually, the investment sums are much higher. Purchasing the wrong product or service, the wrong quality or agreeing to unfavourable payment terms may put an entire business at risk. Additionally, the purchasing office / manager may have to justify a purchasing decision. If the decision proves to be harmful to the organization, disciplinary measures may be taken or the person may even face termination of employment.

In international trade, delivery risks, exchange rate risks and political risks exist and may affect the business relationship between buyer and seller. Strong brands imply lower risk of using them. Some of them in detail:

- Buying unfamiliar brands implies financial risks. Products may not meet the requirements and may need to be replaced at high cost.
- There exists a performance risk as there might be something wrong with an unfamiliar brand.
- When buying machinery or supplies for a company, peers may not approve the purchase of an unknown brand, thus posing a social risk.

ii. Buying behaviour in a B2B environment: Some characteristics of organizational buying / selling behaviour in detail:

- For consumer brands the buyer is an individual. In B2B there are usually committees of people in an organization and each of the members may have different attitudes towards any brand. In addition, each party involved may have different reasons for buying or not buying a particular brand.
- Since there are more people involved in the decision making process and technical details may have to be discussed in length, the decision-making process for B2B products is usually much longer than in B2C.
- Companies seek long term relationships as any experiment with a different brand will have impacts on the entire business. Brand loyalty is therefore much higher than in consumer goods markets.
- While consumer goods usually cost little in comparison to B2B goods, the selling process involves high costs. Not only is it required to meet the buyer numerous times, but the buyer may ask for prototypes, samples and mock ups. Such detailed assessment serves the purpose of eliminating the risk of buying the wrong product or service.

iii. B2B brands need to be differentiated: One of the characteristics of a B2B product is that in many cases it is bought by a committee of buyers. It is important to understand what a brand means to these buyers. (Note: Temporal) Buyers are usually well-versed with costing levels and specifications. Also, due to constant monitoring of the market, these buyers would have excellent knowledge of the products too. In many cases the purchases are specification driven. As a result of this, it is vital that brands are clearly defined and target the appropriate segment.

As explained above, every one product can only be associated with one brand. Because of this, it is vital that companies find a white space for their brand, an uncontested category to occupy space in the minds of the buyer.

Differentiating one's brand, companies can use various strategies, leveraging on the origin of the goods or the processes to manufacturing them. Some have identified up to 13 such strategies. Depending on the company's history, the competitive landscape, occupied spaces and white spaces, there could be one or many strategies any one company could use. Ultimately, a strong B2B brand will reduce the perceived risk for the buyer and help sell the brand.

14.4 C2B and C2C

14.4.1 C2B

C2B stands for Customer-to-Business. It is exact opposite of the B2C process. It is an innovative retail-marketing platform, where a business entity offers a variety of packages or options to entice the online customer. Here the business entity / service provider bids for consumer. It is often referred to as 'reverse auction'. Such models are widely prevalent in tourism and travel industry. The tour operators, hotels and airlines not only give deep discounts to the consumers but also give them option to negotiate the prices. It is a pro-active version of e-commerce as it offers deals, packages or bundle of products at competitive prices. Interestingly, its major success has come by the adoption of this model by the business entities – mainly the manufacturers. This process of reverse auction has resulted into major savings for the manufacturers, as suppliers bid for the purchase orders, offering discounts in the process.

14.4.2 C2C

Consumer-to-consumer (C2C) or citizen-to-citizen electronic commerce involves the electronically facilitated transactions between consumers through some third party. A common example is the online auction, in which a consumer posts an item for sale and other consumers bid to purchase it; the third party generally charges a flat fee or commission. The sites are only intermediaries, just there to match consumers. They do not have to check quality of the products being offered. The product can be anything from real estate to consumer goods. There are a number of websites which act as intermediaries for transactions between consumers like www.olx.in, www.quickr.com, www.ebay.in etc. in India.

It represents a consumer business platform, which is for the consumer, by the consumer. It is referred to as online 'consumer-to-consumer' auctions. Almost anything can be offered on such online platforms. A buyer who wants a particular item enters the maximum amount he is prepared to pay. This remains a secret to other bidders while auction site's computers monitor the bidding. Highest offer is accepted until the end of auction. Highly popular online auction sites, like eBay also provides services where bidders may even check the reliability of a seller, how he has been rated by other buyers by reading comments left by people who have done business with him before. Once a bid has been won, the two sides contact each other, the buyer pays and the seller sends the goods. Payments

can be made online as well. PayPal, an online payments company supports eBay buyers. This is an improvement over traditional selling or auction processes in terms of convenience and volume of goods being auctioned.

14.5 DIFFERENCE BETWEEN E-COMMERCE AND E-BUSINESS

E-business refers to all aspects of a business where technology is important. This may include knowledge management, design, manufacturing, R&D, procurement, finance, project planning, human resource planning and the related activities. Ecommerce is that part of e-business that relates directly to sales & marketing. That is, e-commerce is part of the all-encompassing world of e-business. E-business is a wider concept that embraces all aspects of the use of information technology in business. It includes not only buying & selling but also servicing customers and collaborating with business partners and often involves integration across business processes & communication within the organization.

E - business and e - commerce are terms that are sometimes used interchangeably, and sometimes they're used to differentiate one vendor's product from another. But the terms are different, and that difference matters to today's companies. In both cases, the e stands for "electronic networks" and describes the application of electronic network technology - including Internet and electronic data interchange (EDI) - to improve and change business processes.

E-commerce covers outward-facing processes that touch customers, suppliers and external partners, including sales, marketing, order taking, delivery, customer service, purchasing of raw materials and supplies for production and procurement of indirect operating-expense items, such as office supplies. It involves new business models and the potential to gain new revenue or lose some existing revenue to new competitors. It's ambitious but relatively easy to implement because it involves only three types of integration: vertical integration of front-end Web site applications to existing transaction systems; cross-business integration of a company with Web sites of customers, suppliers or intermediaries such as Web-based marketplaces; and integration of technology with modestly redesigned processes for order handling, purchasing or customer service.

E-business includes e-commerce but also covers internal processes such as production, inventory management, product development, risk management, finance, knowledge management and human resources. E-business strategy is more complex, more focused on internal processes, and aimed at cost savings and improvements in efficiency, productivity and cost savings.

An e-business strategy is also more difficult to execute, with four directions of integration: vertically, between Web front- and back-end systems; laterally, between a company and its customers, business partners, suppliers or intermediaries; horizontally, among e-commerce, enterprise resource planning (ERP), customer relationship management (CRM), knowledge management and supply-chain management systems; and downward through the enterprise, for integration of new technologies with radically redesigned business processes. But e-business has a higher payoff in the form of more efficient processes, lower costs and potentially greater profits.

E-commerce and e-business both address these processes, as well as a technology infrastructure of databases, application servers, security tools, systems management and legacy systems. And both involve the creation of new value chains between a company and its customers and suppliers, as well as within the company itself. All companies should have an e-commerce strategy. (Governments should have an e-public service strategy.) Electronic networks in general and the Internet in particular are too important for firms to ignore if they want to interact with customers, suppliers or distribution partners. But some companies need to move beyond e-commerce and form e-business strategies - especially large companies that already have links to EDI networks or have completed major ERP.

While the words Commerce and Business don't have much difference in English and in fact are largely interchangeable as nouns describing organized profit-seeking activity, there is a difference between e Commerce and e Business. The difference is quite artificial, but different terms do carry different meanings. The first wave of thinking about electronic business was a reaction to the success of Amazon and Dell in selling products over the Internet. Electronic business transactions involving money are "e Commerce" activities. However, there is much more to e Business than selling products: what about marketing, procurement and customer education? Even to sell on-line successfully, much more is required than merely having a website that accepts credit cards. We need to have a web site that people want to visit, accurate catalog information and good logistics. For selling online successfully one needs to know basics of website development. The term "e Business" was introduced as a deliberate attempt to say to people: "Your first understanding of e Commerce was too narrow. To be successful, we need to think more broadly."

E-business goes far beyond ecommerce or buying and selling over the Internet, and deep into the processes and cultures of an enterprise. It is the powerful business environment that is created when you connect critical business systems directly to customers, employees, vendors, and business partners, using Intranets, Extranets, ecommerce technologies, collaborative applications, and the Web. Dell Computer gets a lot of attention as a pioneering ebusiness today and is the best example of this form of business. It sells \$ 15m worth of computers from its websites each day.

The company has created a 'fully integrated value chain ' – a three-way information partnership with its suppliers and customers by treating them as collaborators who together find ways of improving efficiency across the entire chain of supply and demand. Dell's suppliers have real-time access to information about its orders. Through its corporate extranet, they can organize their production and delivery to ensure that their customer always has just enough of the right parts to keep the production line moving smoothly. By plugging its suppliers directly into the customer database, Dell has ensured that they will instantly know about changes in their demand.

Similarly, by allowing entry to customers into its supply chain via its website, Dell enables them to track the progress of their orders from the factory to their doorstep. Successful new-businesses can emerge from nowhere. Trends suggest it takes little more than two years for a start-up to emerge out of nowhere, formulate an innovative business idea, establish a web-presence and reach a dominant position in its chosen sector. The high valuation of the stocks

of such start-ups and the massive amount of venture capital flowing into their businesses is proof enough that complacency is foolhardy here. America has already reached a threshold in e-business, from where it is set to accelerate into hyper-growth, as per Forrester Research. Britain and Germany will go into the same level of hyper-growth two years after America, with Japan, France and Italy, a further two years behind.

In the past the rules of business were simple – Beat the competition, squeeze your suppliers and keep your customers in the dark. But with increased collaboration in the completely networked world, uncertainties arise. Nobody can predict how the customer with all the perfect market information available at his disposal will respond to the rapidly shifting business alliances and federations or how companies will manage such customers. The need of the hour is a good strategy.

Early ecommerce companies have used their understanding of the technology's potential and the absence of any competition to steal a march and enter markets that would previously have been closed to them, but in future simply having a good business idea and being technologically smart might not be enough. The global giants, after taking a while to see the opportunity seem to have worked out how to adapt their multi-layered supply chains and diverse distribution channels and are finally getting into the race. Besides this, for successful implementation of e - business security is the key issue. E - business security is very important as the transactions processed contains critical information.

14.6 STATUS OF E-COMMERCE IN INDIA

Today E-commerce is a byword in Indian society and it has become an integral part of our daily life. There are websites providing any number of goods and services. Then there are those, which provide a specific product along with its allied services Multi-product e-commerce- These Indian E-commerce portals provide goods and services in a variety of categories. To name a few: Apparel and accessories for men and women, Health and beauty products , Books and magazines, Computers and peripherals, Vehicles, Software, Consumer electronics, Household appliances, Jewelry, Audio/video, entertainment, goods, Gift articles, Real estate and services Single-product e-commerce. Some Indian portals / websites deal in a specialized field, for example:

- i. Automobiles
- ii. Stocks and shares and e-commerce
- iii. Real estate and e-commerce
- iv. Travel & tourism and e-commerce
- v. Gifts and e-commerce

i. Automobiles: On these sites we can buy and sell four-wheelers and two-wheelers, new as well as used vehicles, online. Some of the services they provide are: Career search and reviews, Online evaluation, Technical specifications, Vehicle Insurance, Vehicle Finance.

ii. Stocks and shares and e-commerce: In India today, we can even deal in stocks and shares through e-commerce. Some of the services offered to registered members are: Online buying/selling of stocks and shares, Market

analysis and research, Company information, Comparison of companies, Research on Equity and Mutual Funds.

iii. Real estate and e-commerce: They provide information on new properties as well as properties for resale. One can deal directly with developer through consultant. Allied services: Housing Finance, Insurance companies, Architects and Interior Designers, NRI services, Packers and Movers.

iv. Travel & tourism and e-commerce: India has a rich history and heritage and e-commerce is instrumental, to a large extent, in selling India as a product, encouraging Indians as well as foreigners to see its multifaceted culture and beauty. The tourist destination sites are categorized according to themes like: Adventure -trekking, mountain climbing etc, Eco-Themes pertains to jungles, flora and fauna.

v. Gifts and e-commerce: In the bygone days, one had to plan what to gift a loved one, trudge across to your favorite shop, and browse for hours before purchasing a gift. The gifts are categorized as: Collectibles like paintings and sculptures, Luxury items like leather goods, perfumes, jewelry boxes, etc, household curios and carpets, etc, Toys & games, Chocolates, Flowers, Wood-craft & metal-craft.

14.7 SUMMARY

In this unit, we learnt about the concept of E – Business. It defined as the application of information and communication technologies (ICT) in support of all the activities of business. Commerce constitutes the exchange of products and services between businesses, groups and individuals and can be seen as one of the essential activities of any business. On the other hand, Electronic commerce focuses on the use of ICT to enable the external activities and relationships of the business with individuals, groups and other businesses.

Business-to-business (B2B) describes commerce transactions between businesses, such as between a manufacturer and a wholesaler, or between a wholesaler and a retailer. The term B2C stands for Business-to-Customer. It refers to a business platform, involving a business entity and consumers. It is a retail version of e-commerce known as e-tailing. C2B stands for Customer-to-Business. It is exact opposite of the B2C process. It is an innovative retail-marketing platform, where a business entity offers a variety of packages or options to entice the online customer. Consumer-to-consumer (C2C) or citizen-to-citizen electronic commerce involves the electronically facilitated transactions between consumers through some third party.

E-commerce represents online transactions. E Commerce and E business are two different terms and E business is a wider term with Ecommerce as one of its component. In general terms, e-commerce is a business methodology that addresses the needs of organizations, traders and consumers to reduce costs while improving the quality of goods and services and increasing the speed of service delivery. E - business and e - commerce are terms that are sometimes used interchangeably, and sometimes they're used to differentiate one vendor's product from another. But the terms are different, and that difference matters to today's companies. Today E-commerce is a byword in Indian society and it has become an integral part of our daily life. There are websites providing any number of goods and services. Then there are those,

which provide a specific product along with its allied services Multi-product e-commerce- These Indian E-commerce portals provide goods and services in a variety of categories.

14.8 EXPECTED QUESTIONS

- Q1: What do you understand by the term E – Business and explain the general requirements to set up and E – Business?
- Q2: Explain the term B2B and B2C and also explain the difference among them?
- Q3: Write an essay on C2B and C2C?
- Q4: Elaborate the difference between E – Business and E – Commerce?
- Q5: Write a brief note on the status of E – Commerce in India?

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UNIT 15 SAFETY AND SECURITY IN E-BUSINESS; ENCRYPTION, FIREWALL, DIGITAL SIGNATURE

CONTENTS:

- 15.1 Introduction
- 15.2 Objectives
- 15.3 Safety and Security in E-Business
- 15.4 Encryption
- 15.5 Firewall
- 15.6 Digital Signature
- 15.7 Summary
- 15.8 Expected Questions
- 15.9 Keywords
- 15.10 References

15.1 INTRODUCTION

In this unit, we will learn about safety and security in e – business. In the present digitized world, although online or e – business is make our job daily transactional or operational job easy but also put some serious threats. To find a solution of these threats, in this unit, we learn about the various security objectives. These objectives will help us to make our online business safer and securer. After that, we will learn about encryption and decryption of data that help to easier communicate the data without any security loop-hole. The types of encryption will help us to understand the whole concept of encryption. In the next segment, we learn about all important concept of firewall. Here we will study about working and types of firewall along with their significance in modern world.

15.2 OBJECTIVES

- To understand the importance of safety and security in E – business
- To know about the concept of encryption and decryption
- To aware from the significance of firewall
- To understand the role and importance of digital signature.

15.3 SAFETY AND SECURITY IN E – BUSINESS

15.3.1 Introduction

E-Business systems naturally have greater security risks than traditional business systems, therefore it is important for e-business systems to be fully protected against these risks. A far greater number of people have access to e-businesses through the internet than would have access to a traditional business. Customers, suppliers, employees, and numerous other people use any particular e-business system daily and expect their confidential information to stay secure. Hackers are one of the great threats to the security of e-businesses. Some common security concerns for e-Businesses include keeping business and customer information private and confidential, authenticity of data, and data

integrity. Some of the methods of protecting e-business security and keeping information secure include physical security measures as well as data storage, data transmission, anti-virus software, firewalls and encryption to list a few.

15.3.2 Common Security Threats and E-Business Security Objectives

There is almost an uncountable number of ways that an e-business setup could be attacked by hackers, crackers and disgruntled insiders. Common threats include hacking, cracking, masquerading, eavesdropping, spoofing, sniffing, Trojan horses, viruses, bombs, wiretaps, etc. While the list of actual manifestation is long, conceptually, they break down to a few categories. These are spoofing, unauthorized disclosure, unauthorized action, and data alteration. From a business perspective Denial of Service (DoS) attacks appear to be the most serious threat. DoS attacks consist of malicious acts that prevent access to resources that would otherwise be available. Even though data may not be lost, the financial losses that could be incurred from not being able to supply a service to customers could be of much higher value.

In conducting e-business, every organization ought to be able to:

- positively identify or confirm the identity of the party they are dealing with on the other end of the transaction;
- determine that the activities being engaged in by an individual or machine is commensurate with the level of authorization assigned to the individual or machine;
- confirm the action taken by the individual or machine and be able to prove to a third party that the entity (person or machine) did in fact perform the action;
- protect information from being altered either in storage or in transit;
- be certain that only authorized entities have access to information;
- ensure that every component of the e-business infrastructure is available when needed;
- be capable of generating an audit trail for verification of transactions.

15.3.3 Security Objectives

Effective information security policy must have the following six objectives confidentiality; integrity; availability; legitimate use (identification, authentication, and authorization); auditing or traceability; and non-repudiation. If these objectives could be achieved, it would alleviate most of the information security concerns. Each information security objective is discussed below with emphasis on the specific challenges it poses to Internet mediated businesses.

i. Confidentiality

ii. Integrity

iii. Availability

iv. Legitimate use

v. Auditing or Traceability

vi. Non – Repudiation

- i. **Confidentiality:** Confidentiality involves making information accessible to only authorized parties, or restricting information access to unauthorized parties. Confidentiality concerns did not originate with the Internet. However,

conducting business over the Internet has exacerbated the situation. As an example, one context in which this issue has been addressed extensively is the area of confidentiality of electronic health data. There have always been concerns about confidentiality in health care. Online intermediation has complicated the problem and heightened the misgivings that already exist. For example, recent surveys reported by the Georgetown University Institute for Health Care Research and Policy contain some rather revealing statistics about people's concern for confidentiality:

Sixty-three percent of Internet 'health-seekers' and sixty percent of all Internet users oppose the idea of keeping medical records online, even at a secure, password-protected site, because they fear other people will see those records. An overwhelming majority of Internet users are worried about others finding out about their online activities: eighty-nine percent of Internet users are worried that Internet companies might sell or give away information and eighty-five percent fear that insurance companies might change their coverage after finding out what online information they accessed.

To maintain the confidentiality of Web users' information, organizations have to find ways to keep the information from unauthorized view. From an operational point of view, that means information that is stored has to be secured in a way that it can only be accessed by authorized parties. Similarly, information in transit has to be kept from the view of unauthorized parties and that it is retrieved only by a legitimate entity.

- ii. **Integrity:** Transmitting information over the Internet (or any other network) is similar to sending a package by mail. The package may travel across numerous trusted and untrusted networks before reaching its final destination. It is possible for the data to be intercepted and modified while in transit. This modification could be the work of a hacker, network administrator, disgruntled employee, government agents or corporate business intelligence gatherer; it could also be unintentional.

The need for accuracy of information in an information-driven society cannot be over stated. Typically, information is either stored at a given location or being passed from one point to another. Either way, the primary concern for information integrity is that it remains intact so that nothing is added nor taken from it that is not intended or authorized. The extreme cases of lack of information integrity are when a whole database is lost or replaced with something else. Between these extreme cases are situations where data is corrupted either minimally or significantly such that major repairs have to be done to make it useable again.

- iii. **Availability:** Availability means that systems, data, and other resources are usable when needed despite subsystem outages and environmental disruptions. Lack of availability is essentially loss of use. The most commonly known cause of availability problems is Denial of Service (DoS) attacks even though there are other common causes such as outages, network issues, or host problems. The goal is to ensure that system components provide continuous service by preventing failures that could result from accidents or attacks. From a security point of view, availability is enhanced through measures to prevent malicious denials of service.

Closely related to availability and very important to e-businesses are reliability and responsiveness. Reliability implies that a system performs

functionally as expected. Responsiveness is a measure of how quickly service could be restored after a system failure. In other words, it is a measure of system survivability. This does not necessarily mean that the failed system is revived just that service is restored or not lost at all despite the failure. One advantage for e-businesses is that the Internet, being a distributed system, affords a greater opportunity for building redundancy into systems so as to mitigate denial of service problems. In fact, system survivability is at the heart of the design of the Internet and appropriate use of it should result in minimal availability problems. Nevertheless, there are still real threats to availability.

- iv. **Legitimate use:** Legitimate use has three components: identification, authentication and authorization. Identification involves a process of a user positively identifying itself (human or machine) to the host (server) that it wishes to conduct a transaction with. The most common method for establishing identity is by means of username and password. The response to identification is authentication. Without authentication, it is possible for the system to be accessed by an impersonator. Authentication needs to work both ways: for users to authenticate the server they are contacting, and for servers to identify their clients. Authentication usually requires the entity that presents its identity to confirm it either with something the client knows (e.g. password or PIN), something the client has (e.g. a smart card, identity card) or something the client is (biometrics: finger print or retinal scan). Biometric authentication has been proven to be the most precise way of authenticating a user's identity. However, biometric processes such as scanning retina or matching fingerprints to one stored in a database are often considered intrusive, and there always exists some measure of fear that this information will be misused.

The approach to authentication that is gaining acceptance in the e-business world is by the use of digital certificates. A digital certificate contains unique information about the user including encryption key values. These public/private encryption key pairs can be used to create hash codes and digitally sign data. The authenticity of the digital certificate is attested to by a trusted third party known as a "Certificate Authority." The entire process constitutes Public Key Infrastructure.

Once an entity is certified as uniquely identified, the next step in establishing legitimate use is to ensure that the entity's activities within the system are limited to what it has the right to do. This may include access to files, manipulation of data, changing system settings, etc. A secured system will establish very well defined authorization policy together with a means of detecting unauthorized activity.

- v. **Auditing or Traceability:** From an accounting perspective, auditing is the process of officially examining accounts. Similarly, in an e-business security context, auditing is the process of examining transactions. Trust is enhanced if users can be assured that transactions can be traced from origin to completion. If there is a discrepancy or dispute, it will be possible to work back through each step in the process to determine where the problem occurred and, probably, who is responsible. Order confirmation, receipts, sales slips, etc. are examples of documents that enable traceability. In a well-secured system, it should be possible to trace and recreate transactions,

including every subcomponent, after they are done. An effective auditing system should be able to produce records of users, activities, applications used, system settings that have been varied, etc., together with time stamps so that complete transactions can be reconstructed.

- vi. **Non-repudiation:** Non-repudiation is the ability of an originator or recipient of a transaction to prove to a third party that their counterpart did in fact take the action in question. Thus the sender of a message should be able to prove to a third party that the intended recipient got the message and the recipient should be able to prove to a third party that the originator did actually send the message. This requirement proves useful to verify claims by the parties concerned and to apportion responsibility in cases of liability. Obviously, this is a crucial requirement in any business transaction when orders are placed and both buyers and sellers need to be confident that not only are they dealing with the appropriate parties but also that they have proof to support the claims of any action taken in the process. Non-repudiation protocol is also useful in forensic computing where the goal is to collect, analyze and present data to a court of law.

15.4 ENCRYPTION

15.4.1 Introduction

When we use the Internet, we're not always just clicking around and passively taking in information, such as reading news articles or blog posts -- a great deal of our time online involves sending others our own information. Ordering something over the Internet, whether it's a book, a CD or anything else from an online vendor, or signing up for an online account, requires entering in a good deal of sensitive personal information. A typical transaction might include not only our names, e-mail addresses and physical address and phone number but also passwords and personal identification numbers (PINs).

The incredible growth of the Internet has excited businesses and consumers alike with its promise of changing the way we live and work. It's extremely easy to buy and sell goods all over the world while sitting in front of a laptop. But security is a major concern on the Internet, especially when you're using it to send sensitive information between parties.

Let's face it, there's a whole lot of information that we don't want other people to see, such as:

- Credit-card information
- Social Security numbers
- Private correspondence
- Personal details
- Sensitive company information
- Bank-account information

Information security is provided on computers and over the Internet by a variety of methods. A simple but straightforward security method is to only keep sensitive information on removable storage media like portable flash memory drives or external hard drives. But the most popular forms of security all rely on encryption, the process of encoding information in such a way that only the person (or computer) with the key can decode it.

Encryption is a way to enhance the security of a message or file by scrambling the contents so that it can be read only by someone who has the right encryption key to unscramble it. For example, if you purchase something from a website, the information for the transaction (such as your address, phone number, and credit card number) is usually encrypted to help keep it safe. Use encryption when you want a strong level of protection for your information.

In other terms, Encryption is the conversion of data into a form, called a ciphertext that cannot be easily understood by unauthorized people. Decryption is the process of converting encrypted data back into its original form, so it can be understood.

The use of encryption / decryption is as old as the art of communication. In wartime, a cipher, often incorrectly called a code, can be employed to keep the enemy from obtaining the contents of transmissions. (Technically, a code is a means of representing a signal without the intent of keeping it secret; examples are Morse code and ASCII.) Simple ciphers include the substitution of letters for numbers, the rotation of letters in the alphabet, and the "scrambling" of voice signals by inverting the sideband frequencies. More complex ciphers work according to sophisticated computer algorithms that rearrange the data bits in digital signals. In order to easily recover the contents of an encrypted signal, the correct decryption key is required. The key is an algorithm that undoes the work of the encryption algorithm. Alternatively, a computer can be used in an attempt to break the cipher. The more complex the encryption algorithm, the more difficult it becomes to eavesdrop on the communications without access to the key.

Encryption or decryption is especially important in wireless communications. This is because wireless circuits are easier to tap than their hard-wired counterparts. Nevertheless, encryption / decryption is a good idea when carrying out any kind of sensitive transaction, such as a credit-card purchase online, or the discussion of a company secret between different departments in the organization. The stronger the cipher -- that is, the harder it is for unauthorized people to break it -- the better, in general. However, as the strength of encryption / decryption increases, so does the cost.

In recent years, a controversy has arisen over so-called strong encryption. This refers to ciphers that are essentially unbreakable without the decryption keys. While most companies and their customers view it as a means of keeping secrets and minimizing fraud, some governments view strong encryption as a potential vehicle by which terrorists might evade authorities. These governments, including that of the United States, want to set up a key-escrow arrangement. This means everyone who uses a cipher would be required to provide the government with a copy of the key. Decryption keys would be stored in a supposedly secure place, used only by authorities, and used only if backed up by a court order. Opponents of this scheme argue that criminals could hack into the key-escrow database and illegally obtain, steal, or alter the keys. Supporters claim that while this is a possibility, implementing the key escrow scheme would be better than doing nothing to prevent criminals from freely using encryption/decryption.

15.4.2 Historical Development and usage of Encryption

Encryption has long been used by militaries and governments to facilitate secret communication. It is now commonly used in protecting information within

many kinds of civilian systems. For example, the Computer Security Institute reported that in 2007, 71% of companies surveyed utilized encryption for some of their data in transit, and 53% utilized encryption for some of their data in storage. Encryption can be used to protect data "at rest", such as files on computers and storage devices (e.g. USB flash drives). In recent years there have been numerous reports of confidential data such as customers' personal records being exposed through loss or theft of laptops or backup drives. Encrypting such files at rest helps protect them should physical security measures fail. Digital rights management systems which prevent unauthorized use or reproduction of copyrighted material and protect software against reverse engineering (see also copy protection) is another somewhat different example of using encryption on data at rest.

Encryption is also used to protect data in transit, for example data being transferred via networks (e.g. the Internet, e-commerce), mobile telephones, wireless microphones, wireless intercom systems, Bluetooth devices and bank automatic teller machines. There have been numerous reports of data in transit being intercepted in recent years. Encrypting data in transit also helps to secure it as it is often difficult to physically secure all access to networks.

Encryption, by itself, can protect the confidentiality of messages, but other techniques are still needed to protect the integrity and authenticity of a message; for example, verification of a message authentication code (MAC) or a digital signature. Standards and cryptographic software and hardware to perform encryption are widely available, but successfully using encryption to ensure security may be a challenging problem. A single slip-up in system design or execution can allow successful attacks. Sometimes an adversary can obtain unencrypted information without directly undoing the encryption.

One of the earliest public key encryption applications was called Pretty Good Privacy (PGP). It was written in 1991 by Phil Zimmermann and was purchased by Symantec in 2010. Digital signature and encryption must be applied at message creation time (i.e. on the same device it has been composed) to avoid tampering. Otherwise any node between the sender and the encryption agent could potentially tamper it. It should be noted that encrypting at the time of creation only adds security if the encryption device itself has not been tampered with.

15.4.3 Types of Encryption

There are two basic types of encryption schemes:

- i. Symmetric - key
- ii. Public - key encryption

i. **Symmetric–Key:** In symmetric-key schemes, the encryption and decryption keys are the same. Thus communicating parties must agree on a secret key before they wish to communicate. In symmetric-key encryption, each computer has a secret key (code) that it can use to encrypt a packet of information before it is sent over the network to another computer. Symmetric-key requires that you know which computers will be talking to each other so you can install the key on each one. Symmetric-key encryption is essentially the same as a secret code that each of the two computers must know in order to decode the information. The code provides the key to decoding the message.

Think of it like this: You create a coded message to send to a friend in which each letter is substituted with the letter that is two down from it in the alphabet. So "A" becomes "C," and "B" becomes "D". You have already told a trusted friend that the code is "Shift by 2". Your friend gets the message and decodes it. Anyone else who sees the message will see only nonsense.

The same goes for computers, but, of course, the keys are usually much longer. The first major symmetric algorithm developed for computers in the United States was the Data Encryption Standard (DES), approved for use in the 1970s. The DES uses a 56-bit key. Because computers have become increasingly faster since the '70s, security experts no longer consider DES secure -- although a 56-bit key offers more than 70 quadrillion possible combinations (70,000,000,000,000,000), an attack of brute force (simply trying every possible combination in order to find the right key) could easily decipher encrypted data in a short while. DES has since been replaced by the Advanced Encryption Standard (AES), which uses 128-, 192- or 256-bit keys. Most people believe that AES will be a sufficient encryption standard for a long time coming: A 128-bit key, for instance, can have more than 300,000,000,000,000,000,000,000,000,000 key combinations.

ii. **Public - key encryption:** In public-key schemes, the encryption key is published for anyone to use and encrypt messages. However, only the receiving party has access to the decryption key and is capable of reading the encrypted messages. Public-key encryption is a relatively recent invention: historically, all encryption schemes have been symmetric-key (also called private-key) schemes.

One of the weaknesses some point out about symmetric key encryption is that two users attempting to communicate with each other need a secure way to do so; otherwise, an attacker can easily pluck the necessary data from the stream. In November 1976, a paper published in the journal IEEE Transactions on Information Theory, titled "New Directions in Cryptography," addressed this problem and offered up a solution: public-key encryption.

Also known as asymmetric-key encryption, public-key encryption uses two different keys at once -- a combination of a private key and a public key. The private key is known only to your computer, while the public key is given by your computer to any computer that wants to communicate securely with it. To decode an encrypted message, a computer must use the public key, provided by the originating computer, and its own private key. Although a message sent from one computer to another won't be secure since the public key used for encryption is published and available to anyone, anyone who picks it up can't read it without the private key. The key pair is based on prime numbers (numbers that only have divisors of itself and one, such as 2, 3, 5, 7, 11 and so on) of long length. This makes the system extremely secure, because there is essentially an infinite number of prime numbers available, meaning there are nearly infinite possibilities for keys. One very popular public-key encryption program is Pretty Good Privacy (PGP), which allows you to encrypt almost anything.

The sending computer encrypts the document with a symmetric key, and then encrypts the symmetric key with the public key of the receiving computer. The receiving computer uses its private key to decode the symmetric key. It then uses the symmetric key to decode the document.

To implement public-key encryption on a large scale, such as a secure Web server might need, requires a different approach. This is where digital

certificates come in. A digital certificate is basically a unique piece of code or a large number that says that the Web server is trusted by an independent source known as a certificate authority. The certificate authority acts as a middleman that both computers trust. It confirms that each computer is in fact who it says it is, and then provides the public keys of each computer to the other.

15.5 FIREWALL

15.5.1 Introduction

A system designed to prevent unauthorized access to or from a private network. Firewalls can be implemented in both hardware and software, or a combination of both. Firewalls are frequently used to prevent unauthorized Internet users from accessing private networks connected to the Internet, especially *intranets*. All messages entering or leaving the intranet pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria.

While in computing, a firewall is software or hardware-based network security system that controls the incoming and outgoing network traffic by analyzing the data packets and determining whether they should be allowed through or not, based on a rule set. A network's firewall builds a bridge between the internal network or computer it protects, upon securing that the other network is secure and trusted, usually an external (inter)network, such as the Internet, that is not assumed to be secure and trusted.

Many personal computer operating systems include software-based firewalls to protect against threats from the public Internet. Many routers that pass data between networks contain firewall components and, conversely, many firewalls can perform basic routing functions.

15.5.2 Working of Firewall

If you have been using the Internet for any length of time, and especially if you work at a larger company and browse the Web while you are at work, you have probably heard the term firewall used. For example, you often hear people in companies say things like, "I can't use that site because they won't let it through the firewall."

If you have a fast Internet connection into your home (either a DSL connection or a cable modem), you may have found yourself hearing about firewalls for your home network as well. It turns out that a small home network has many of the same security issues that a large corporate network does. You can use a firewall to protect your home network and family from offensive Web sites and potential hackers. Basically, a firewall is a barrier to keep destructive forces away from your property. In fact, that's why it's called a firewall. Its job is similar to a physical firewall that keeps a fire from spreading from one area to the next. As you read through this article, you will learn more about firewalls, how they work and what kinds of threats they can protect you from.

Firewalls are customizable. This means that you can add or remove filters based on several conditions. Some of these are:

- i. **IP addresses** - Each machine on the Internet is assigned a unique address called an IP address. IP addresses are 32-bit numbers, normally expressed

as four "octets" in a "dotted decimal number." A typical IP address looks like this: 216.27.61.137. For example, if a certain IP address outside the company is reading too many files from a server, the firewall can block all traffic to or from that IP address.

- ii. **Domain names** - Because it is hard to remember the string of numbers that make up an IP address, and because IP addresses sometimes need to change, all servers on the Internet also have human-readable names, called domain names. For example, it is easier for most of us to remember www.howstuffworks.com than it is to remember 216.27.61.137. A company might block all access to certain domain names, or allow access only to specific domain names.
- iii. **Protocols** - The protocol is the pre-defined way that someone who wants to use a service talks with that service. The "someone" could be a person, but more often it is a computer program like a Web browser. Protocols are often text, and simply describe how the client and server will have their conversation. The http in the Web's protocol. Some common protocols that you can set firewall filters for include:
 - **IP** (Internet Protocol) - the main delivery system for information over the Internet
 - **TCP** (Transmission Control Protocol) - used to break apart and rebuild information that travels over the Internet
 - **HTTP** (Hyper Text Transfer Protocol) - used for Web pages
 - **FTP** (File Transfer Protocol) - used to download and upload files
 - **UDP** (User Datagram Protocol) - used for information that requires no response, such as streaming audio and video
 - **ICMP** (Internet Control Message Protocol) - used by a router to exchange the information with other routers
 - **SMTP** (Simple Mail Transport Protocol) - used to send text-based information (e-mail)
 - **SNMP** (Simple Network Management Protocol) - used to collect system information from a remote computer
 - **Telnet** - used to perform commands on a remote computer

A company might set up only one or two machines to handle a specific protocol and ban that protocol on all other machines.

- **Ports** - Any server machine makes its services available to the Internet using numbered ports, one for each service that is available on the server. For example, if a server machine is running a Web (HTTP) server and an FTP server, the Web server would typically be available on port 80, and the FTP server would be available on port 21. A company might block port 21 access on all machines but one inside the company.
- **Specific words and phrases** - This can be anything. The firewall will sniff (search through) each packet of information for an exact match of the text listed in the filter. For example, you could instruct the firewall to block any packet with the word "X-rated" in it. The key here is that it has to be an exact match. The "X-rated" filter would not catch "X rated" (no hyphen). But you can include as many words, phrases and variations of them as you need.

Some operating systems come with a firewall built in. Otherwise, a software firewall can be installed on the computer in your home that has an

Internet connection. This computer is considered a gateway because it provides the only point of access between your home network and the Internet.

With a hardware firewall, the firewall unit itself is normally the gateway. A good example is the Linksys Cable/DSL router. It has a built-in Ethernet card and hub. Computers in your home network connect to the router, which in turn is connected to either a cable or DSL modem. You configure the router via a Web-based interface that you reach through the browser on your computer. You can then set any filters or additional information.

Hardware firewalls are incredibly secure and not very expensive. Home versions that include a router, firewall and Ethernet hub for broadband connections can be found for well under \$100.

15.5.3 Types of Firewall

There are several types of firewall techniques as explained below:

- i. Packet filter
 - ii. Application gateway
 - iii. Circuit-level gateway
 - iv. Proxy server
- i. **Packet filter:** Looks at each packet entering or leaving the network and accepts or rejects it based on user-defined rules. Packet filtering is fairly effective and transparent to users, but it is difficult to configure. In addition, it is susceptible to IP spoofing.
 - ii. **Application gateway:** Applies security mechanisms to specific applications, such as FTP and Telnet servers. This is very effective, but can impose a performance degradation
 - iii. **Circuit-level gateway:** Applies security mechanisms when a TCP or UDP connection is established. Once the connection has been made, packets can flow between the hosts without further checking.
 - iv. **Proxy server:** Intercepts all messages entering and leaving the network. The proxy server effectively hides the true network addresses.

In practice, many firewalls use two or more of these techniques in concert. A firewall is considered a first line of defense in protecting private information. For greater security, data can be encrypted.

15.5.4 Advantages of Firewall

There are many creative ways that unscrupulous people use to access or abuse unprotected computers:

- **Remote login** - When someone is able to connect to your computer and control it in some form. This can range from being able to view or access your files to actually running programs on your computer.
- **Application backdoors** - Some programs have special features that allow for remote access. Others contain bugs that provide a backdoor, or hidden access, that provides some level of control of the program.
- **SMTP session hijacking** - SMTP is the most common method of sending e-mail over the Internet. By gaining access to a list of e-mail addresses, a person can send unsolicited junk e-mail (spam) to thousands of users. This is done quite often by redirecting the e-mail

through the SMTP server of an unsuspecting host, making the actual sender of the spam difficult to trace.

- **Operating system bugs** - Like applications, some operating systems have backdoors. Others provide remote access with insufficient security controls or have bugs that an experienced hacker can take advantage of.
- **Denial of service** - You have probably heard this phrase used in news reports on the attacks on major Web sites. This type of attack is nearly impossible to counter. What happens is that the hacker sends a request to the server to connect to it. When the server responds with an acknowledgement and tries to establish a session, it cannot find the system that made the request. By inundating a server with these unanswerable session requests, a hacker causes the server to slow to a crawl or eventually crash.
- **E-mail bombs** - An e-mail bomb is usually a personal attack. Someone sends you the same e-mail hundreds or thousands of times until your e-mail system cannot accept any more messages.
- **Macros** - To simplify complicated procedures, many applications allow you to create a script of commands that the application can run. This script is known as a macro. Hackers have taken advantage of this to create their own macros that, depending on the application, can destroy your data or crash your computer.
- **Viruses** - Probably the most well-known threat is computer viruses. A virus is a small program that can copy itself to other computers. This way it can spread quickly from one system to the next. Viruses range from harmless messages to erasing all of your data.
- **Spam** - Typically harmless but always annoying, spam is the electronic equivalent of junk mail. Spam can be dangerous though. Quite often it contains links to Web sites. Be careful of clicking on these because you may accidentally accept a cookie that provides a backdoor to your computer.
- **Redirect bombs** - Hackers can use ICMP to change (redirect) the path information takes by sending it to a different router. This is one of the ways that a denial of service attack is set up.
- **Source routing** - In most cases, the path a packet travels over the Internet (or any other network) is determined by the routers along that path. But the source providing the packet can arbitrarily specify the route that the packet should travel. Hackers sometimes take advantage of this to make information appear to come from a trusted source or even from inside the network! Most firewall products disable source routing by default.

Some of the items in the list above are hard, if not impossible, to filter using a firewall. While some firewalls offer virus protection, it is worth the investment to install anti-virus software on each computer. And, even though it is annoying, some spam is going to get through your firewall as long as you accept e-mail.

The level of security you establish will determine how many of these threats can be stopped by your firewall. The highest level of security would be to simply block everything. Obviously that defeats the purpose of having an Internet connection. But a common rule of thumb is to block everything, then begin to

select what types of traffic you will allow. You can also restrict traffic that travels through the firewall so that only certain types of information, such as e-mail, can get through. This is a good rule for businesses that have an experienced network administrator that understands what the needs are and knows exactly what traffic to allow through. For most of us, it is probably better to work with the defaults provided by the firewall developer unless there is a specific reason to change it.

One of the best things about a firewall from a security standpoint is that it stops anyone on the outside from logging onto a computer in your private network. While this is a big deal for businesses, most home networks will probably not be threatened in this manner. Still, putting a firewall in place provides some peace of mind.

15.6 DIGITAL SIGNATURE

15.6.1 Introduction

A Digital Signature Certificate, like hand written signature, establishes the identity of the sender filing the documents through internet which sender can not revoke or deny. Accordingly, Digital Signature Certificate is a digital equivalent of a hand written signature which has an extra data attached electronically to any message or a document.

Digital Signature also ensures that no alterations are made to the data once the document has been digitally signed. A DSC is normally valid for 1 or 2 years, after which it can be renewed. A Digital Signature is a method of verifying the authenticity of an electronic document.

Digital signatures are going to play an important role in our lives with the gradual electronization of records and documents. The IT Act has given legal recognition to digital signature meaning, thereby, that legally it has the same value as handwritten or signed signatures affixed to a document for its verification. The Information Technology Act, 2000 provides the required legal sanctity to the digital signatures based on asymmetric cryptosystems. The digital signatures are now accepted at par with handwritten signatures and the electronic documents that have been digitally signed are treated at par with paper documents.

In other words, a digital signature is a mathematical scheme for demonstrating the authenticity of a digital message or document. A valid digital signature gives a recipient reason to believe that the message was created by a known sender, such that the sender cannot deny having sent the message (authentication and non-repudiation) and that the message was not altered in transit (integrity). Digital signatures are commonly used for software distribution, financial transactions, and in other cases where it is important to detect forgery or tampering.

Digital signatures are often used to implement electronic signatures, a broader term that refers to any electronic data that carries the intent of a signature but not all electronic signatures use digital signatures. In some countries, including the United States, India and members of the European Union, electronic signatures have legal significance.

Digital signatures employ a type of asymmetric cryptography. For messages sent through a non-secure channel, a properly implemented digital

signature gives the receiver reason to believe the message was sent by the claimed sender. Digital signatures are equivalent to traditional handwritten signatures in many respects, but properly implemented digital signatures are more difficult to forge than the handwritten type. Digital signature schemes in the sense used here are cryptographically based, and must be implemented properly to be effective. Digital signatures can also provide non-repudiation, meaning that the signer cannot successfully claim they did not sign a message, while also claiming their private key remains secret; further, some non-repudiation schemes offer a time stamp for the digital signature, so that even if the private key is exposed, the signature is valid. Digitally signed messages may be anything representable as a bitstring: examples include electronic mail, contracts, or a message sent via some other cryptographic protocol.

15.6.2 Scheme of Digital Signature

A digital signature scheme typically consists of three algorithms:

- A *key generation* algorithm that selects a *private key* uniformly at random from a set of possible private keys. The algorithm outputs the private key and a corresponding *public key*.
- A *signing* algorithm that, given a message and a private key, produces a signature.
- A *signature verifying* algorithm that, given a message, public key and a signature, either accepts or rejects the message's claim to authenticity.

Two main properties are required. First, a signature generated from a fixed message and fixed private key should verify the authenticity of that message by using the corresponding public key. Secondly, it should be computationally infeasible to generate a valid signature for a party without knowing that party's private key.

15.6.3 Uses of Digital Signature

As organizations move away from paper documents with ink signatures or authenticity stamps, digital signatures can provide added assurances of the evidence to provenance, identity, and status of an electronic document as well as acknowledging informed consent and approval by a signatory. The United States Government Printing Office (GPO) publishes electronic versions of the budget, public and private laws, and congressional bills with digital signatures. Universities including Penn State, University of Chicago and Stanford are publishing electronic student transcripts with digital signatures. Below are some common reasons for applying a digital signature to communications:

- i. **Authentication:** Although messages may often include information about the entity sending a message, that information may not be accurate. Digital signatures can be used to authenticate the source of messages. When ownership of a digital signature secret key is bound to a specific user, a valid signature shows that the message was sent by that user. The importance of high confidence in sender authenticity is especially obvious in a financial context. For example, suppose a bank's branch office sends instructions to the central office requesting a change in the balance of an account. If the central office is not convinced that such a message is truly sent from an authorized source, acting on such a request could be a grave mistake.

- ii. **Integrity:** In many scenarios, the sender and receiver of a message may have a need for confidence that the message has not been altered during transmission. Although encryption hides the contents of a message, it may be possible to *change* an encrypted message without understanding it. (Some encryption algorithms, known as nonmalleable ones, prevent this, but others do not.) However, if a message is digitally signed, any change in the message after signature will invalidate the signature. Furthermore, there is no efficient way to modify a message and its signature to produce a new message with a valid signature, because this is still considered to be computationally infeasible by most cryptographic hash functions.
- iii. **Non-repudiation:** Non-repudiation, or more specifically *non-repudiation of origin*, is an important aspect of digital signatures. By this property, an entity that has signed some information cannot at a later time deny having signed it. Similarly, access to the public key only does not enable a fraudulent party to fake a valid signature.

15.7 SUMMARY

E-Business systems naturally have greater security risks than traditional business systems, therefore it is important for e-business systems to be fully protected against these risks. A far greater number of people have access to e-businesses through the internet than would have access to a traditional business. Some of the methods of protecting e-business security and keeping information secure include physical security measures as well as data storage, data transmission, anti-virus software, firewalls and encryption to list a few. In conducting e-business, every organization ought to be able to positively identify or confirm the identity of the party they are dealing with on the other end of the transaction; determine that the activities being engaged in by an individual or machine is commensurate with the level of authorization assigned to the individual or machine; confirm the action taken by the individual or machine and be able to prove to a third party that the entity (person or machine) did in fact perform the action; protect information from being altered either in storage or in transit; be certain that only authorized entities have access to information; ensure that every component of the e-business infrastructure is available when needed; be capable of generating an audit trail for verification of transactions. Each information security objective should include Confidentiality, Integrity, Availability, Legitimate use, Auditing or Traceability and Non – Repudiation.

Encryption is a way to enhance the security of a message or file by scrambling the contents so that it can be read only by someone who has the right encryption key to unscramble it. In other terms, Encryption is the conversion of data into a form, called a ciphertext that cannot be easily understood by unauthorized people. Decryption is the process of converting encrypted data back into its original form, so it can be understood. There are two basic types of encryption schemes viz. Symmetric – key and Public - key encryption. In symmetric-key schemes, the encryption and decryption keys are the same. Thus communicating parties must agree on a secret key before they wish to communicate. In symmetric-key encryption, each computer has a secret key (code) that it can use to encrypt a packet of information before it is sent over the network to another computer. In public-key schemes, the encryption key is

published for anyone to use and encrypt messages. However, only the receiving party has access to the decryption key and is capable of reading the encrypted messages. Public-key encryption is a relatively recent invention: historically, all encryption schemes have been symmetric-key (also called private-key) schemes.

A system designed to prevent unauthorized access to or from a private network. Firewalls can be implemented in both hardware and software, or a combination of both. Firewalls are frequently used to prevent unauthorized Internet users from accessing private networks connected to the Internet, especially *intranets*. All messages entering or leaving the intranet pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria. While in computing, a firewall is software or hardware-based network security system that controls the incoming and outgoing network traffic by analyzing the data packets and determining whether they should be allowed through or not, based on a rule set. A network's firewall builds a bridge between the internal network or computer it protects, upon securing that the other network is secure and trusted, usually an external (inter)network, such as the Internet, that is not assumed to be secure and trusted.

Many personal computer operating systems include software-based firewalls to protect against threats from the public Internet. Many routers that pass data between networks contain firewall components and, conversely, many firewalls can perform basic routing functions. There are several types of firewall techniques like Packet filter, Application gateway, Circuit-level gateway and Proxy server. One of the best things about a firewall from a security standpoint is that it stops anyone on the outside from logging onto a computer in your private network. While this is a big deal for businesses, most home networks will probably not be threatened in this manner. Still, putting a firewall in place provides some peace of mind.

15.8 EXPECTED QUESTIONS

- Q1: What do you mean by safety and security in e – business?
Q2: Explain the safety objectives in e – business?
Q3: Write a brief note on encryption?
Q4: What is the relevance of digital signature?

15.9 KEYWORDS

- **Block cipher:** A block cipher is a method of encrypting text (to produce ciphertext) in which a cryptographic key and algorithm are applied to a block of data (for example, 64 contiguous bits) at once as a group rather than to one bit at a time. The main alternative method, used much less frequently, is called the stream cipher.
- **Data Encryption Standard (DES):** Data Encryption Standard (DES) is a widely-used method of data encryption using a private (secret) key that was judged so difficult to break by the U.S. government that it was restricted for exportation to other countries.
- **Data key:** In cryptography, a data key is a key (a variable value that is applied to a string or block of text to encrypt or decrypt it) that is used to

encrypt or decrypt data only and is not used to encrypt or decrypt other keys, as some encryption formulas call for.

- **Output Feedback (OFB):** In cryptography, output feedback (OFB) is a mode of operation for a block cipher. It has some similarities to the ciphertext feedback mode in that it permits encryption of differing block sizes, but has the key difference that the output of the encryption block function is the feedback (instead of the ciphertext).
- **Stream cipher:** A stream cipher is a method of encrypting text (to produce ciphertext) in which a cryptographic key and algorithm are applied to each binary digit in a data stream, one bit at a time. This method is not much used in modern cryptography. The main alternative method is the block cipher in which a key and algorithm are applied to blocks of data rather than individual bits in a stream.

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UNIT 16

ON LINE BUSINESS AND ITS SETUP, STUDY OF ANY THREE E-BUSINESSES ORGANISATION IN TOURISM AND TRAVEL

Contents:

- 16.1 Introduction
- 16.2 Objectives
- 16.3 On line business and its setup
- 16.4 Study of any Three E-Business Organisation in Tourism and Travel
- 16.5 Summary
- 16.6 Expected Questions
- 16.7 References

16.1 INTRODUCTION

In this unit, we learn about the online or e – business. Major focus is to learn about the concept of online business, its various types and activities using online business tools and the most important the various things required for set-up online business. Moreover, we also learn about the advantages of online business along with the step wise process of setting online business.

After the theoretical portion, we discuss the three online or e – tourism organizations one by one to understand the practical aspect of e – tourism companies working in the market. In the case studies of the three online tourism organizations, we learn their profile, expertise, services, market approach, marketing plan and their major clientele. After knowing about these companies, we will have a better idea about the online or e – companies and their role in tourism and travel industry.

16.2 OBJECTIVES

- To know and understand the online or e – business
- To understand the processes and concept of e – business
- To know about how to set – up an online business
- To discuss the case studies of three online tourism organizations
- To understand the role of e – tourism organizations in tourism sector

16.3 ONLINE BUSINESS AND ITS SET-UP

16.3.1 Online Business

Online or E - Business (electronic business) is using technology to improve the business processes. This includes managing internal processes such as human resources, financial and administration systems as well as external processes such as sales and marketing, supply of goods and services and customer relationships.

The way in which one can manage his / her business relationships has not changed but the way they are referred to when using E - Business tools has. They are becoming more often known as:

- Business to Business (B2B)
- Business to Consumer (B2C) (also known as E - Commerce)
- Government to Consumer (G2C)
- Government to Business (G2B)

16.3.1.1 Activities using E - Business tools include

- trading of goods or services online, such as e - Procurement, primarily through websites
- electronic retailing (e - Tailing)
- use of the Internet, intranets or extranets to conduct research and manage business activities
- website marketing
- online communications, such as email
- online training for staff (e - Learning)

16.3.1.2 E - Business tools include

- mobile phones
- personal digital assistants (PDAs)
- electronic data interchange
- file transfer
- facsimile
- Video conferencing, Internet, intranets and extranets.

16.3.1.3 E - Business and your business

E - Business is more than having a website for your business. Using E - Business tools can make your administrative and operational activities more efficient through:

- accessing the Internet to source information about your industry, suppliers and products and for general research
- the use of electronic transaction, for example online banking, financial management, stock control and compliance reporting to regulatory bodies such as the Australian Taxation Office
- purchasing and selling without a web presence by using email or efax
- human resources management, through the development of an intranet for news, policies, staff movements and enabling staff to apply for leave and access their personnel information online
- customer relationship management, which integrates front and back office functions of an organization through electronic capabilities
- using appropriate project management software.

16.3.1.4 Advantages of E - Business

The benefits of implementing E - Business tools is not so much in the use of technology, as in the streamlining of business processes and the ease in finding new markets. Some of the advantages include:

- quicker and easier communications
- strengthened marketing capabilities and reach
- increased hours of operation (a website provides 24 hour 7 day information to existing and potential customers)
- access to broader information through research
- reducing the cost of doing business by lowering transaction costs and increasing efficient methods for payment, such as using online banking and reducing stationery and postage costs
- the opportunities to adopt new business models and develop tailored customer support.

16.3.2 Set – up Online Business

Before starting up any online business, one should know about how to set-up a website, as explained below.

16.3.2.1 How to set-up a Website

These days, online business is booming. Without a web presence, chances are your firm could drop off the radar. To avoid your business becoming a casualty of the digital age, it's best to get online and open yourself up to a global audience.

A decent website doesn't need to cost the Earth; in fact, there are many packages out there that will help you put together a sophisticated site that doesn't look cheap and amateurish. The following points outline the essential steps needed in order to get up and running online.

- i. Register your domain
- ii. Choose hosting
- iii. Plan your site
- iv. Design your site
- v. E - Commerce options
- vi. Online presence
- vii. Getting Business Online

i. Register your domain: You can't have a website without a web address. Don't be swayed by offers of free web addresses though, as they may be difficult for customers to find easily, or may make your firm look less than professional. Register your address with one of the domain registries offering your chosen domain in Ireland. The dot-com (.com) addresses are cheaper, but firms doing business in Ireland might want to consider registering a dot – i.e. domain name, as some customers may perceive them as more trustworthy. Dot - eu is also an option for Irish firms, especially if they plan on doing business throughout Europe.

ii. Choose hosting: You can host the website yourself if you have your own server. However, most small businesses do not have access to a dedicated server. Thankfully there are plenty of firms willing to host your website, for a fee. Choose your hosting provider carefully. Don't be tempted to opt for the cheapest one; do your homework first. There is also the question of whether to stick with an Irish firm or look abroad. Although you may be tempted by the seemingly lower prices that foreign hosting firms offer, there may be hidden issues that you

should consider. For example, what happens if the server goes down in the middle of the day here, but it's outside office hours for your hosting firm? Is 24-hour support provided, or would you have to wait for tech support to come into the office for a response?

iii. Plan your site: Regardless of whether you are going to design a website yourself or turn it over to the professionals, make sure you know exactly what you want to include on the site.

If you don't nail down these details at an early stage, the chances are you will end up with an ever-expanding project. You should also have a rough idea of what the pages are going to look like, deciding on colour schemes, logos and whether you are going to have E - Commerce functionality.

iv. Design your site: If you have enough skills and design experience to create your own site, it can save you some expense. There are plenty of web design packages available, from Microsoft's FrontPage to more advanced programs such as Macromedia Dreamweaver, which provides a "what you see is what you get" (WYSIWYG) view - meaning you don't have to deal with HTML programming language unless you really want to. The program you choose ultimately depends on your budget. Dreamweaver, for example, costs a few hundred Euro.

There are three essential elements to a website:

- a. Clear navigation
- b. Easy-to-read information
- c. A definite focus for the site - will it be selling your products or providing a point of information for customers?

You should also keep the following points in mind when setting up your site:

- a. Keep it simple
- b. Make sure the site works with all web browsers, not just Internet Explorer
- c. Ensure your contact information is clearly visible on the site

If you are collecting personal information from customers, you must have a privacy policy in place. If you are not familiar with design, however, it is best left to the experts. A quick search on Google will reveal a number of web design firms located in Ireland. Check out their previous work before making any commitments; it also helps if they are familiar with your specific type of business.

v. E - Commerce options: If you are selling online, you will need to accept credit card payments. There are two basic elements necessary for this: a payments gateway and an internet merchant account. While this may seem like a lot of trouble to go to, there are a couple of companies that offer merchant banking services and payments gateways to firms selling online, without the hassle and expense of setting up a dedicated merchant account. For example, PayPal's Website Payments Standard combines the payments gateway with the internet merchant account. This will provide you with a secure server to accept payments, whether customers are paying by credit card or PayPal. WorldPay offers a similar service. You could also opt for a bricks-and-mortar financial institution to provide your internet merchant account.

vi. Online presence: Regardless of your business type, you will likely benefit from having an online presence - a port of call where customers and potential clients can find out more information about your products or services. If your competitors are getting online, you must ask yourself if you can afford not to do so.

vii. Getting Business Online: The Getting Irish Business Online campaign will support businesses and sole traders to build a fully functional website by the end of the session which is the first step to building an online business.

16.3.2.2 Steps to set-up Online Business

Everyday someone starts to think about setting up their own online business but not everyone will take that thought and put it into action. There are various steps which should be carried out when one is thinking about starting up his / her own online business. When one is thinking about to set-up the online business, the following are the points one should keep in the mind:

- i. What will the company do?
- ii. Why our company is better than any other company who may offer the same or similar product / service?
- iii. Why should someone choose our company when compared against others?
- iv. What can we provide which will attract people?
- v. What budget do we have? (Budget & Financial Planning)
- vi. What will we call the company?
- vii. How are we going to get the point across? (Advertise)

There are always a lot of things that we may need to think about and the list above only contains some of the important things. There are still smaller things which one will notice as we think about it more.

- i. What will the company do?** When looking at setting up own online business we need to decide or think about what our company will do or offer. There are many things that our online company can do or provide. We can run a reseller store, run our own E-Commerce website, Provide Advertising Services, etc.
- ii. Why our company is better than any other company who may offer the same or similar product / service?** The main thing that we need to ask our-self is "What can I offer that is equal or better than theirs." This is a common misconception that many people overlook. We have to think about this because if we don't, then we can start up our business and then find out that someone is offering something better than us and that all our "Possible Clients" are going to them. We need to think about what we can do to make our service, just that "Little bit" better than those who also offer the same product / service that we are offering / selling. Once again, some people will think that they can just setup an online business and then people will just come rushing to them. Running an effective and worthwhile online business takes time and a fair amount of effort. "Do not give up your day job", because you may not profit much for a while until your company / store is well known and is trusted by many. Once we have any idea, take a look at who offers the same or similar product / service. Once we have done our research, see if we can make better changes or offer something cheaper but make sure that we can still cover our costs.
- iii. Why should someone choose our company when compared against others?** This is another major thing that we need to think about. "Why should someone choose our company when compared against others?" Many people will rush in and just hope that once their online business

presence has been made; that people will just "Rush" in and start buying. Once again, a misconception on behalf of the person who is wishing to set-up their own online business. The business needs to be carefully planned and well advertised before any good sales start coming in on their way.

- iv. What can we provide which will attract people?** When we have the site up and running and we have already thought about a lot of other things, we need to find a way to bring visitors to our website. There are various traffic building websites that we can use to get traffic to our website for free. It is like an exchange. Traffic Syndicate is a very good traffic exchange. One surf a few sites and then we can place our website there to be surfed. (I surf yours, you surf mine) kind of idea. One need to spread the word; tell people, post on forums (Relevant posts), post a blog, email our mates (Do not SPAM!) and advertise on social networking websites. The most important thing is to make sure that our website looks good or trustworthy. This way, if people visit but do not buy something the first, second or third time; they might come back and buy something the fourth time because they believe that our website is trustworthy and they feel secure making transactions through it.
- v. What budget do we have? (Budget & Financial Planning)** When setting up a business, finance is usually the biggest restriction and chooses when we can start a business. One way to plan for this is to setup a bank account while we are still working and to put some money away which we can use to invest. We could also take out a loan from a bank if required but it is advised to avoid this if possible. The most advised way to deal with equipment would be to make sure that we have enough money to purchase the equipment beforehand so that we have it before we require it. This way, we do not need to worry so much about getting into debt. In some circumstances, there can be hidden costs when we are setting up our own business. The best way to avoid this would be to make a list of everything that we may require. Do not forget that we also need to have a budget set away for marketing and general payments. Please remember to make a list of what may be required and to price things up accordingly.
- vi. What will we call the company?** Choosing a name for our business is a creative but important process. It is also something that we need to get right. Possible clients / customers may make an impression on the company based on its name. Although it may be interesting to see what we can come up with from our personality, there are many reasons why we should not. Being objective and thinking carefully about our company name can reflect well on our company. Choose a sensible name can make us or break us.
- vii. How are we going to get the point across? (Advertise)** The first thing that we need to consider before starting to advertise is who are our target customers / audience i.e. their age, country, gender, etc. Now that we have taken a look at what our audience may be, we need to choose which media that we may use to advertise. i.e. radio, TV, newspaper, website, etc. Try to make an idea of how we can get our advertising into the chosen media and how much it may cost us. (This should not be so much of a sting, if we took note of the advertising budget.) It is advised that we sell the main benefit of our product / service and try to show the "buyer" what we can do to help them or solve their problem. Try not to make the advertising of our new

business too complicated. We have got too many other things to worry about.

16.4 STUDY OF ANY THREE E-BUSINESS ORGANISATION IN TOURISM AND TRAVEL

Valued at over ₹50,000 crores, tourism is the largest service industry in India, with a contribution of 6.23% to the national GDP and 8.78% to the total employment in India. In 2011, more than 8 million Indians enjoyed their holidays abroad, while more than 560 million holidayed in India itself. Moreover, the country witnessed a whopping 5 million foreign tourist arrivals in the same year. According to the World Travel and Tourism Council, India will be a global tourism hotspot from 2012 to 2018. Interestingly, most of the foreign tourists spend more in India than in any other country across the globe and tourist arrivals in India are expected to escalate by 22 percent each year. With the booming domestic tourism, the writing is clear on the wall. Tourism industry will continue to expand and achieve meteoric growth rates over the next decade.

The following are there Indian e-business organizations in tourism and travel sector:

- | | |
|---------------------------------|--|
| 16.4.1 MakeMyTrip.com | (Web link: http://www.makemytrip.com) |
| 16.4.2 Yatra.com | (Web link: http://www.yatra.com) |
| 16.4.3 Aadya e-travel Pvt. Ltd. | (Web link: http://www.aadyaetravel.com) |

16.4.1 MakeMyTrip.com

16.4.1.1 Introduction: Nurtured from the seed of a single great idea - to empower the traveller - MakeMyTrip went on to pioneer the entire online travel industry in India. MakeMyTrip has revolutionized the travel industry over the years. This is the story of MakeMyTrip, India's Online Travel Leader.

MakeMyTrip.com, India's leading online travel company was founded in the year 2000 by Mr. Deep Kalra. Created to empower the Indian traveler with instant booking and comprehensive choices, the company began its journey in the US-India travel market. It aimed to offer a range of best-value products and services along with cutting-edge technology and dedicated round-the-clock customer support. After consolidating its position in the market as a brand recognized for its reliability and transparency, MakeMyTrip followed its success in the US by launching its India operations in 2005. With the foresight to seize the opportunities in the domestic travel market, brought on by a slew of new airlines, MakeMyTrip offered travelers the convenience of online travel bookings at rock-bottom prices. Rapidly, MakeMyTrip became the preferred choice of millions of travelers who were delighted to be empowered by a few mouse clicks.

MakeMyTrip's rise has been lead by the vision and the spirit of each one of its employees, for whom no idea was too big and no problem too difficult. With untiring innovation and determination, MakeMyTrip proactively began to diversify its product offering, adding a variety of online and offline products and services. MakeMyTrip also stayed ahead of the curve by continually evolving its technology to meet the ever changing demands of the rapidly developing global travel market. Steadily establishing itself across India and the world, MakeMyTrip simultaneously nurtured the growth of its offline businesses like its franchises

and affiliates simultaneously, augmenting the brand's already strong retail presence further.

Today, MakeMyTrip is much more than just a travel portal or a famous pioneering brand - it is a one-stop-travel-shop that offers the broadest selection of travel products and services in India. MakeMyTrip is the undisputed online leader, with its share of the travel market extending to more than 50% of all online sales, a fact evinced by the trust placed in it by millions of happy customers.

Remaining reliable, efficient and at the forefront of technology, MakeMyTrip's commitment and customer-centricity allows it to better understand and provide for its customers' diverse needs and wants and deliver consistently. With dedicated 24x7 customer support and offices in 20 cities across India and 2 international offices in New York and San Francisco (in addition to several franchise locations), MakeMyTrip is there, whenever and wherever.

16.4.1.2 Corporate Values: The following are the corporate values practiced by MakeMyTrip.com:

- **Excellence:** The Company must strive for excellence in whatever they do. Focus on continuous improvement in interactions with people, efficiency of processes and the well-being of the organization.
- **Integrity:** The Company must ensure consistency between their words and actions, always delivering what they commit. It can thereby maintain transparency, trust and accountability.
- **Innovation:** The Company must continually apply intelligence, reason and technology to their work and environment. This allows them to take informed risks and champion new ideas to improve the business as well as the community.
- **Fun at work:** The Company must create and maintain an atmosphere of fun while at work and making work a happy place.
- **Passion for winning:** The Company must have a "can do" attitude, not take "no" for an answer and believe that nothing is impossible. This will allow them to work relentlessly toward achieving their goals and honouring the commitments.
- **Customer Centricity:** The Company must maintain focus on the customers both internal and external, by giving them priority. Strive to exceed their expectations in terms of the value and quality delivered.
- **Accountability:** The Company must feel responsible and accountable for the commitments they make and the quality of the results they deliver to all their stakeholders.
- **Teamwork:** The Company must foster an environment wherein we can efficiently utilize the abilities of all team members to achieve goals. They should work on the premise that the whole is greater than the sum of the parts.
- **Empowerment:** The Company must give fellow colleagues the opportunity and freedom to think and act in ways that will allow them to get the job done and yet be consistent with the processes laid down.
- **Respect for people:** The Company must give everyone, with whom we interact, respect and consideration.

16.4.1.3 Products: The following are the products offered by MakeMyTrip.com to the market:

- International and Domestic Air Tickets,
- Holiday Packages and Hotels
- Domestic Bus and Rail Tickets
- Private Car and Taxi Rentals
- MICE (Meetings, Incentives, Conferences and Exhibitions)
- B2B and Affiliate Services
- Flights
- Flight and Hotel Deals
- International Flights
- Hotels
- Holidays in India
- International Holidays
- Online Bus Ticket Booking
- Rail
- Mobile Site
- Mobile Apps
- Deals
- MICE
- B2B
- Cars
- Corporate

16.4.1.4 Partnership Benefits: The following are the partnership benefits:

i. Operations support:

- MakeMyTrip Operations Support Manager to ensure franchisee operational excellence.
- State-of-the-art operational tools for a stronger interface with your consumers.
- Dedicated team of holiday service delivery experts to provide on-time solutions to all enquiries.
- MakeMyTrip's committed regional team to support you with day to day operations.
- Frequent and timely updates on the travel industry trends and updated information on MakeMyTrip products.

ii. Training and Recruitment:

- Guidelines for recruitment of suitable staff
- Buddy training program for franchisee staff to help them understand various aspects of the business
- Regular product training workshops to familiarize the team with all MakeMyTrip products
- Frequent training programs at franchise location by MakeMyTrip experts.

iii. Franchise Meets, Rewards and Recognition Programs:

Every year, MakeMyTrip organizes a pan India franchise meet. This meet serves as a unique platform to discuss developments, share best practices, celebrate achievements and reward top performers.

iv. Marketing Support:

- Support in designing the store as per MakeMyTrip's retail identity
- High decibel launch of the franchise store in the catchment area.
- Media support in the form of mentions (address & phone numbers) in regional /national print campaigns
- Support for local promotional activities

v. Performance Linked Bonus:

In order to consistently achieve their own ambitions & goals set with MakeMyTrip, we offer our franchise partners an opportunity to earn performance linked bonuses in the form of monetary and non-monetary incentives.

16.4.2 Yatra.com**16.4.2.1 An Introduction to Yatra.com**

Yatra.com is India's leading online travel company. Positioned as a brand "Creating Happy Travelers", it provides information, pricing, availability and booking facility for domestic and international air travel, railway reservation, hotel bookings, holiday packages, buses and car rentals. It offers a host of travel services designed to make business and leisure travel easier.

Based in Gurgaon, India, Yatra is a one-stop-shop for all travel-related services. A leading consolidator of travel products, Yatra.com provides reservation facility for more than 5,000 hotels across 336 cities in India and over 90,000 hotels around the world. Through continued excellence in providing travel solutions, responses to booking travel online through Yatra.com have also reached new heights with the company doing 20,000 domestic tickets and 1000 hotels and holiday packages booking a day.

Customers can access Yatra.com through multiple ways:

- through the user-friendly website
- 24x7 multi-lingual call centre
- a countrywide network of Holiday Lounges and Yatra Travel Express stores
- through their mobile phones

Yatra.com provides booking facility for all the popular as well as exotic national and international destinations. Launched in August 2006, Yatra is today ranked as the leading provider of consumer-direct travel services in India. Yatra.com has emerged as the most trusted travel brand in India and we were recently voted 'Most Trusted Brand of India' in the online travel category by Brand Equity and also received the coveted most preferred online travel company award twice at the CNBC / Awaaz Consumer Travel Awards.

In April 2012, it was the second largest online travel website with 30 per cent share of the ₹370 billion (US\$ 6.8 billion) market for all online travel-related transactions, it also launched a "holiday-cum-shopping card" with State Bank of India (SBI), India's largest bank.

16.4.2.2 Services and specialties of Yatra.com

The following are the major services and unique specialties of Yatra.com:

- i. Yatra.com services
- ii. Accessibility – Distribution channels
- iii. Site Information

- iv. Customer Profile
- v. Other initiatives in Travel domain
- vi. Technical expertise
- vii. Customer service
- viii. Understanding of Travel market and consumer insights
- ix. Payment options
- x. Yatra.com Promoters
- xi. Rewards and Recognitions
- xii. Strength of Yatra.com as a brand

i. Yatra.com services

a. Airline bookings:

- Linked to ALL domestic carriers
- Provides bookings to most international destinations
- Inbound flights from UK & US

b. Railway bookings & info services:

- Bookings for all sectors
- Info services include route, availability, train info, etc.

c. Hotel bookings:

- Direct contract with over 4000 hotels in India
- Linked to over 90,000 hotels overseas with real time access

d. Holiday packages:

- Customized holidays – Both domestic & International
- Both individual travellers & groups

e. Bus ticketing and Car rentals

ii. Accessibility – Distribution channels

a. Website (www.yatra.com):

- Over 2.1 million unique visitors per month
- 17+ million page views in a month

b. 24x7 Call centre:

- Over 300 experienced travel consultants

c. Retail outlets called 'Yatra Holiday Lounges':

- Premium outlets to research & plan holidays at leisure
- Currently have outlets at 13 locations across India (Expanding to 20+ in 3 months)

d. Mobile phone:

- Travel fulfilment via WAP site, downloadable application, IVR & SMS

e. Offline travel agent:

- A robust B2B model + affiliate partners + white label solutions for greater reach

f. Yatra Travel Express (Quick ticket counters):

- Small size retail outlets
- Looking at over 100 such outlets in the next 6 months in Tier-II towns

iii. Site Information

- Registered user base : 1.7 million
- Number of users / month : 6 million
- Website page views / month : 24 million
- Av Time spent / visit : 7 minutes
- Air tickets / month : 3,50,000
- Hotel Room Nights / month : 20,000
- Av transaction size : Rs. 8000 /-
- Filters available on the database : City wise – 80 %
traffic from top 6 cities
- Frequent flyers : transactions done
twice in the last 3 months
- Credit Card : gold card, platinum
card, titanium or any other
- User Base details captured : Name, e-mail ID,
Mobile number, Residence /
Office address

iv. Customer Profile*a. Demographic Targeting:*

- Professionally qualified between the age group : 18 – 45 years
- Male : 80
- Female : 20

b. Psychographic Targeting:

- Is married or planning
- Watches news channels – both English & Hindi
- Reads Times of India, Economic Times, India Today etc.

c. Profile Targeting:

- Access to Computers / Internet / Mobile
- English speaking, working in a MNC
- Active credit card user
- 60% have traveled abroad

v. Other initiatives in Travel domain

The following initiatives put Yatra on a higher pedestal vis-à-vis competition:

- a. We own a destination management company, *Yatra Exotic Routes* providing services like Guides, Language experts, Ground support, Local transportation, etc. to inbound travelers.
- b. Have a UGC website (www.raahi.com), providing travel information with features like Travel Guides, Hotel reviews, Travel Q&A, Travelogues, etc.
- c. Also invested in Intech Hotel Solutions, a company engaged in providing technology solutions to small & mid-sized accommodation providers, thereby enabling real time inventory management and sales.

vi. Technical expertise

- a. A strong 75+ member in-house technology team has experience & expertise in developing Travel products for various distribution channels.

- b. Have successfully built & multiple partners are using our APIs/web services to integrate & sell Yatra products to their customers.
 - c. Have a very strong & robust back-end infrastructure & technology to cater to most exceptions leading to near zero down-time.
 - d. Believing in Mobile & other new media, we have invested in an in-house development team dedicated for future technologies.
- vii. Customer service**
- a. Yatra.com boasts over 300 experienced travel consultants with extensive knowledge & resources.
 - b. 24x7 availability to cater to customers' need round the clock through a call center & facilitate help while travelling
 - c. Toll free helpline number for users to call without worrying about the call charges
 - d. The retail lounges provide on ground customer support in 13 cities with professionally trained travel experts
 - e. We have DMCs (Ground Staff) in all major cities who can be contacted directly by the customer anytime for any query / service
- viii. Understanding of Travel market and consumer insights**
- a. With the management team having 100+ years of combined experience in various functions of this business, we have the right insights to what customers are looking for & how to do it.
 - b. With the diversity of the customers we deal with for various products sold through different channels, we know the right ingredients to make a product successful at every level
 - c. Besides experience, Yatra.com has been constantly investing in technologies & market research exercises and surveys to get a deeper understanding, some of the findings are:
 - Indians rely most on AC train, followed by air & private car hire
 - 4 in 10 would take an impulse holiday driven by cheaper fares & off-season hotel rates
 - Children and their peer group are important influencers for destination selection
 - Paid accommodations used 2x the rate of staying with family/friends
- ix. Payment options**
- a. Offering all payment options – Credit Cards, Debit Cards, Net Banking (24 banks), Cash Cards, Bank Deposits (HDFC & AXIS), IVR for offline bookings, Cash
 - b. Support all kind of cards – Tie-ups with VISA, MasterCard, AMEX, etc.
 - c. For Credit Cards, we have tie-ups with all suppliers – ICICI, HDFC, Citibank & AXIS
 - d. Have very strong relationships with all banks – Both issuing banks & acquiring banks
- x. Yatra.com Promoters**
- a. *Reliance Capital Ltd.*: A member of reliance group headed by Anil Ambani
 - b. *Network 18 (formerly known as TV18)*: India's premier news broadcaster (CNBC, CNN IBN and Awaaz)

- c. *Norwest Venture Partners (NVP)*: Promod Haque's leading venture capital firm
- d. *Intel Capital*: Promod Haque's leading venture capital firm

xi. Rewards and Recognitions

- a. Brand Equity and Nielsen Company's survey ranked Yatra.com as the No.1 online travel service provider in 2010
- b. Won the 'Most Preferred Travel Portal' at CNBC Awaaz Travel Awards 2010
- c. Recognized as Top Rated Online Travel site by Economic Times Travel Awards in September 2009
- d. AC Nielsen findings show that Yatra.com has the Strongest franchise in the competitive set in their report - Measuring brand health in the OTA segment, August 2009.
- e. Yatra has the highest unaided brand recall among travel Web sites – India Travel Markeplace study by PhoCusWright, 2008 .
- f. Declared the 'Best Online Travel Agency' of the year 2008 at the Galileo Express Travel World's awards
- g. The only Indian travel company among the 2008 'Top 100 start ups in Asia' awarded by Red Herring
- h. Recognized as the 'most used travel website' by Juxt Consult in their India Online Survey 2008

xii. Strength of Yatra.com as a brand

The following are the travel related services launched first in the market by Yatra.com:

- a. Cash on delivery
- b. Co-branded Travel Credit Card with Barclays
- c. BYOP – Build your own package
- d. Inbound travel company – Yatra Exotic Routes
- e. Miles based Loyalty Programme
- f. Travel & Life Insurance as a part of our offering

16.4.3 Aadya e-travel Pvt. Ltd.

16.4.3.1 Introduction

Aadya e-Travel is a one-stop travel solutions company that offers customized and end-to-end travel solutions to corporate and retail clients for both domestic and international needs. The company focuses on providing solutions that are well suited to the unique requirements of each traveler, at highly competitive rates while providing excellent customer service. The aim of the company is to make their clients' travel completely hassle free. They work with them right from helping them plan their travel, to providing them with ideally suited options to managing the reservations and making any changes to the itineraries to providing travel advisory services.

From railway ticketing to domestic and international air reservations to hotel reservations and car rentals, aadya e-travel provides several value-added services and benefits. The company is committed to providing affordable and convenient travel services. Their ultimate aim is to become a trusted travel advisor for their clients, build upon our quality of services and continue our

growth trajectory. Aadya e-Travel is IATA (International Air Transport Association) accredited, Govt. approved (recognized by Ministry of Tourism) and a master collaborator with IRCTC (Indian Railways Catering & Tourism Corporation Limited) authorized to create e-ticketing agents all over the country. Being a part of PCTI Group, an ISO 9001:2008 certified organization (web link: <http://www.pctigroup.com>), the company follows the highest level of quality standards.

16.4.3.2 Portfolio of activities in Aadya e-travel

The following are the portfolios activities of the company to their clients:

- i. IATA accredited, Govt. Approved and IRCTC authorized Travel Agency
 - ii. Special Travel Solutions for Corporate Clients
 - iii. Creating Business Associates across India
 - iv. Tour Operations
 - v. Event Management
 - vi. Why work with the company
- i. ***IATA accredited, Govt. Approved and IRCTC authorized Travel Agency:***
We provide complete travel solutions to our clients. Our travel services include:
- Train Bookings
 - Air Bookings (Both domestic and International)
 - Hotel / Bed and Breakfast Bookings
 - Cab / Bus Bookings
 - Travel Insurance
 - Visa
 - Foreign Exchange
 - Tour packages
 - Domestic and International Tour packages
 - Tour packages for school and colleges students
 - Special tour packages for corporate and groups
- ii. ***Special Travel Solutions for Corporate Clients:*** The company has a dedicated team of corporate travel consultants to analyze the specific travel requirements of our corporate clients, provide them with customized travel solutions and help them optimize their travel budget. The company is differentiated themselves by offering:
- Complete travel solution under one roof
 - Dedicated Business Managers to take care of our clients' customized requirements
 - Fast and hassle free procedures
 - Attractive deals
 - Postpaid Bill Settlement Plan, without any security deposits
 - Excellent customer service
- iii. ***Creating Business Associates across India:*** The company has created a fast growing chain of business associates all over India, who provide travel services to other customers. The company currently has over 400 business associates across India. It also provides direct authorization from IRCTC to book railway e-tickets. It also has a dedicated B2B portal for booking air tickets online.

Apart from this, the company also provides the excellent deals on international air tickets and tour packages.

iv. **Tour Operations:** The company provides a wide range of options for holidays, religious tours, group tours, incentive travel and customized packages for all popular destinations in India including Goa, Kerala, Himachal Pradesh, Golden Triangle, Royal Rajasthan and many more. It also covers all international destinations such as Singapore, Malaysia, Thailand, Europe, USA, Australia and New Zealand etc. Aadya e-Travel is a one-stop solution for inbound / domestic and international/outbound tourism.

v. **Event Management:** Aadya e-Travel is in the business of organizing conferences / seminars / events on turnkey project basis which includes air / rail travel, pick & drop, cab bookings, reception arrangements, booking of conventional halls, arrangement of accommodation, sightseeing, special arrangements for spouses / children / parents, etc. Aadya e-Travel has successfully organized and managed conferences, seminars and corporate functions.

vi. **Why work with the company:**

- It provides complete travel solution under one roof
- It have a highly qualified and dedicated team of travel experts to take care of their client's customized requirements
- It provides competitive pricing and attractive deals
- It give excellent customer service and ensure that you have a positive travel experience
- The company is a fast growing one and are constantly looking for innovative ways to serve their customers better

16.4.3.3 Services offered by Aadya e-travel

Beyond the portfolios activities, following are the main services of aadya e-travel:

- i. Airlines Service
- ii. Railways Service
- iii. Hotels Service
- iv. Cab Service
- v. Bus Service
- vi. Tour packages
- vii. Visa Service
- viii. Travel Insurance / Forex Service
- ix. MICE (Meetings Incentives Conferences Events)
- x. Cruise Service
- xi. Other Services

i. **Airlines Service:** Being an IATA accredited agent, Aadya e-Travel has direct tie-ups with several of the major airlines across the world and can offer excellent deals on airfares. It provides the complete schedule of airlines, best fares and options available and help to minimize the travel cost. It also offers special discounted fares across airlines from time to time. It can also provide group fares, coupons and other airline related services.

ii. **Railway Service:** We provide complete assistance in your train bookings. As a master collaborator with IRCTC, we have extensive expertise in train e-

ticketing. We can quickly advise you of most suitable train options, process your bookings instantly, cancel bookings, apply for refunds and provide a whole range of options.

iii. Hotel Service: We provide assistance in choosing and booking hotels (both domestic and international) which are best suited to your requirements at guaranteed lowest rates. Through our extensive network of hotels, hotel chains and suppliers, we can find and book a hotel for you anywhere in the world within any budget. We provide accommodation in all categories of hotels from budget to 5 Star and special categories such as heritage properties, resorts, B&B's etc. Our service includes working with you to understand your preferences, recommending options most suited to your needs, negotiating competitive rates, processing bookings and making amendments (if required) We provide excellent service to ensure that you have a hassle-free stay. We can provide options specifically catering to business travel, honeymoon, family vacation or a corporate or student group or any other unique category.

iv. Cab Service: We have our own fleet of cabs regularly plying in Delhi/NCR region. We also provide luxury cabs and SUV/MUV at competitive rates and with excellent service. We ensure end-to-end quality service. Our cabs will be neat and clean and our drivers will be polite, reliable and well-trained. We also have an extensive transporter network all over India to meet your cab requirements in any city.

v. Bus Service: We can make arrangements for larger vehicles such as buses, tempo travelers, mini-buses etc. We make arrangements based on exact requirements and budget. We arrange buses for transfers, sightseeing and events.

vi. Tour packages: Aadya e-Travel also provides assistance in holiday planning across various destinations around the globe. Through our extensive vendor network and team of travel specialists, we are able to provide ideally suited holiday packages at most competitive rates. We provide complete tour package as per unique customer requirements, be it domestic or international. We can handle individual as well as group tours.

a. Domestic / Inbound Tourism: Aadya e-Travel is committed to showing the world the best of India. India is a land famous for its rich culture and tradition, its diversity, its arts and crafts and historical places. India has been among the most fascinating destinations for travelers across the world. India offers an amazing variety of choices to its tourists. There are adventure sports, religious retreats, beaches, mountains, heritage sites, jungle resorts, ecotourism, spiritual holidays, royal retreats and many more options to choose from. Aadya e-Travel can plan and organize a hassle free travel experience for you. Right from the arrival at the airport to personalized assistance at the time of departure, we take care of all the needs of the travelers. Our guests just sit back and enjoy their holidays with all the value for the money they have spent. We provide:

- Complete itinerary planning for individuals and groups
- Personalized assistance on arrival and departure
- All sorts of transfer from car to coach in any place in India
- Accommodation in all categories of hotels from budget to 5 Star hotels all over India
- Multilingual guide services

- Air tickets, train tickets, bus tickets, entry tickets to all major attractions and all related travel services
- Sightseeing in comfortable cars and coaches
- Special cultural theme events if any

b. International / Outbound: We also cover all international destinations such as Singapore, Malaysia, Thailand, Europe, USA, Australia and New Zealand etc. We can organize incentive travel for employees, special packages for honeymooners and family vacations for all international locations. We provide excellent value for money for all kinds of travelers. We can cater to requirements of individuals/small families as well as have expertise arranging all-inclusive packages for professionals, students and large groups including hotel stay, sightseeing, multilingual guide services, meals etc.

- vii. **Visa Service:** We provide full Visa assistance to our guests traveling abroad. We provide visa assistance at nominal charges for all international destinations. We also provide free visa assistance from time to time. Our visa assistance services include:
- Informing the visa requirements
 - Preparing documents and filing of relevant forms
 - Coordinating/Follow ups with embassy
- viii. **Travel Insurance / Forex Service:** We can provide travel insurance as per your requirements for all international destinations. We can also help you purchase foreign currency at competitive rates for your international travel needs.
- ix. **MICE (Meetings Incentives Conferences Events):** We also make complete arrangements for small to large scale meetings/conferences/corporate and social events. We also plan and handle complete incentive travel for companies for employees, clients, partners, dealers etc.
- x. **Cruise Service:** We plan and arrange cruise vacations for all popular routes and all popular cruise liners. We will advise you of best options in terms of destinations, which cruise line to choose, which tours to take and how to make the most out of your cruise vacation. Contact us today to book a cruise vacation.
- xi. **Other Services:** We can provide several other value added services such as Matrix phone cards for use in international locations, pre-paid currency cards, meet-and-greet service and any other travel related services upon request.

16.5 SUMMARY

The term Online or E - Business (electronic business) means to using technology to improve the business processes. This includes managing internal processes such as human resources, financial and administration systems as well as external processes such as sales and marketing, supply of goods and services and customer relationships. The benefits of implementing E - Business tools are that it helps in quicker and easier communications, it strengthened marketing capabilities and reach, it increased hours of operation, it access to broader information through research, it helps in reducing the cost of doing business by lowering transaction costs and increasing efficient methods for

payment, such as using online banking and reducing stationery and postage costs and it provides the opportunities to adopt new business models and develop tailored customer support. The step wise process to start the online business are to identify what will the company do then why our company is better than any other company who may offer the same or similar product / service. After that why should someone choose our company when compared against others then what can we provide which will attract people. IN the next step, what budget do we have then what we will call the company and the last step is how is our company is going to get the point across for advertisement purposes. There are always a lot of things that we may need to think about and the steps mentioned are highlighted only some of the important things. There are still smaller things which one will notice as we think about it more and it depend upon market to market.

The major three Indian e-business organizations in tourism and travel sector are MakeMyTrip.com, Yatra.com and Aadya e-travel Pvt. Ltd. Nurtured from the seed of a single great idea - to empower the traveller - MakeMyTrip went on to pioneer the entire online travel industry in India. MakeMyTrip has revolutionized the travel industry over the years. MakeMyTrip.com, India's leading online travel company was founded in the year 2000 by Mr. Deep Kalra. It aimed to offer a range of best-value products and services along with cutting-edge technology and dedicated round-the-clock customer support. After consolidating its position in the market as a brand recognized for its reliability and transparency, MakeMyTrip followed its success in the US by launching its India operations in 2005. Rapidly, MakeMyTrip became the preferred choice of millions of travelers who were delighted to be empowered by a few mouse clicks. Steadily establishing itself across India and the world, MakeMyTrip simultaneously nurtured the growth of its offline businesses like its franchises and affiliates simultaneously, augmenting the brand's already strong retail presence further. Today, MakeMyTrip is much more than just a travel portal or a famous pioneering brand - it is a one-stop-travel-shop that offers the broadest selection of travel products and services in India. MakeMyTrip is the undisputed online leader, with its share of the travel market extending to more than 50% of all online sales, a fact evinced by the trust placed in it by millions of happy customers.

Yatra.com is India's leading online travel company. Positioned as a brand "Creating Happy Travelers", it provides information, pricing, availability and booking facility for domestic and international air travel, railway reservation, hotel bookings, holiday packages, buses and car rentals. It offers a host of travel services designed to make business and leisure travel easier. Based in Gurgaon, India, Yatra is a one-stop-shop for all travel-related services. A leading consolidator of travel products, Yatra.com provides reservation facility for more than 5,000 hotels across 336 cities in India and over 90,000 hotels around the world. Through continued excellence in providing travel solutions, responses to booking travel online through Yatra.com have also reached new heights with the company doing 20,000 domestic tickets and 1000 hotels and holiday packages booking a day. Yatra.com provides booking facility for all the popular as well as exotic national and international destinations. Launched in August 2006, Yatra is today ranked as the leading provider of consumer-direct travel services in India. Yatra.com has emerged as the most trusted travel brand in India and we were

recently voted 'Most Trusted Brand of India' in the online travel category by Brand Equity and also received the coveted most preferred online travel company award twice at the CNBC / Awaaz Consumer Travel Awards.

Aadya e-Travel is a one-stop travel solutions company that offers customized and end-to-end travel solutions to corporate and retail clients for both domestic and international needs. The company focuses on providing solutions that are well suited to the unique requirements of each traveler, at highly competitive rates while providing excellent customer service. The aim of the company is to make their clients' travel completely hassle free. They work with them right from helping them plan their travel, to providing them with ideally suited options to managing the reservations and making any changes to the itineraries to providing travel advisory services. From railway ticketing to domestic and international air reservations to hotel reservations and car rentals, aadya e-travel provides several value-added services and benefits. The company is committed to providing affordable and convenient travel services. Their ultimate aim is to become a trusted travel advisor for their clients, build upon our quality of services and continue our growth trajectory.

16.6 EXPECTED QUESTIONS

- Q1: What do you understand by online or e – business?
Q2: What are the various advantages of online business?
Q3: Explain the various steps of setting up of online business?
Q4: Write an essay on any one e - tourism organization?
Q5: Summarize the role of e – tourism organizations in providing the quick services to the customers?

16.7 REFERENCES

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