

INFORMATICS

BA ENGLISH

III Semester (2011 Admission)

&

V Semester (2012 Admission)

CORE COURSE



UNIVERSITY OF CALICUT

SCHOOL OF DISTANCE EDUCATION

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STUDY MATERIAL

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INFORMATICS

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MODULE I

GENERAL INTRODUCTION

Objectives:

At the end of this unit the student will:

1. Learn the history of the development of computers.
2. Understand the different generations of computers.
3. Learn about the various types of computers and the importance of I T.

Outline History of the Development of Computers

The beginning:

This text is intended to provide awareness in the field of informatics. For this purpose we need to know what is meant by informatics. Informatics is the study, design, development, implementation, support or management of computer based information systems. It is often used synonymous with Information Technology.

In the very ancient times information was stored in memory and orally transmitted from region to region, culture to culture, and from generation to generation. In 100 A D the use of paper came into existence. Later in 1450 the movable press was invented and still later the binary system for machine storage and processing of information triggered off new developments in the field of communication. These developments made communication more transparent and flexible.

The print format was a great shift in the technique of storing data. Documenting on dry leaves, stones, tablets and cave walls ceased to exist. Printed material became widely used. But there were limitations for the print format as well. The most important of the limitations of print format was the problem of retrieving a required piece of information from a large collection. Another one is the barrier of space and time. The third was storage space.

It was Charles Babbage who, during the 1820s, conceived the idea that information could be processed using a machine. He developed two machines – the difference engine and analytical engine – which are considered as the prototypes of information processing machines. Charles Babbage was thinking far ahead of his time and so he could not materialize what he had proposed. But Babbage is considered as the father of modern computer technology.

The great mathematician Claud Shannon developed a system of symbolic language that could be used for storing information in machines. He found out that the *on* and *off* position of an electric switch could be used to represent two values such as *true* or *false*, *right* or *wrong*, and *present* or *absent*. He defined the *on* position as 1(one) and the *off* position as 0 (zero). By combining a number of switches we can multiply zeros and ones. Definite number of zeros and ones could represent a specified value system and characters in an alphabet. Thus a language was developed for storing information in machines. As this language used only two characters one and zero, it was called binary language. Digital and binary are synonymous. Each digit in the binary system either 0 or 1 is called a bit. A unit of 8 bits (binary digits) is called a byte (bits by eight). A byte is used to represent characters and digits. For example, the letter A in the English alphabet is represented by the byte '01000001' and B is represented by the byte '01000011'. Similarly, the number 1 is represented by the byte '11110001' and the number 2 by '11110010'. In this manner

every bit of information can be represented digitally. There are international standards, which specify binary equivalent of letters, digits and other units of information. The two international standards, which specify 8 bit equivalent of letters and digits, are 'EBCDIC' (Extended Binary Coded Decimal Interchange) and ASCII (American Standards Code for Information Interchange)

The first electronic computer which could store information was developed by Presper Eckert and John Mauchly, engineers of Pennsylvania University, in the year 1946. It was called ENIAC (Electronic Numeric Integrator and Calculator). In ENIAC vacuum tubes or valves were used as electronic circuits. It was a huge computer, which used 18000 valves and 6000 cables. It weighed about 30 tons, occupied a very large hall and consumed about 150000 watts of electricity. With the creation of ENIAC the first electronic computer was born. Early computers were used only for computing or mathematical operations. That was why the machines that handled binary digits were called computers.

Great development has occurred in the field of computers during the past sixty years. The size of computers has decreased but the efficiency has increased. The reason for the reduction in size and increase in power and speed are attributed to the discovery of transistors and their integration into microprocessors.

Self-check questions:

1. Define informatics.
 - a. Informatics is the study, design, development, implementation, support or management of computer based information systems. It is often used synonymous with Information Technology.
2. What are the major events that made communication more transparent and flexible?
 - a. In 100 A D the use of paper came into existence. Later in 1450 the movable press was invented and still later the binary system for machine storage and processing of information triggered off new developments in the field of communication. These developments made communication more transparent and flexible.
3. What are the limitations of print format?
 - a. The most important of the limitations of print format was the problem of retrieving a required piece of information from a large collection. Another one is the barrier of space and time. The third was storage space
4. Why do you call Charles Babbage the Father of modern computing?
 - a. It was Charles Babbage who, during the 1820s, conceived the idea that information could be processed using a machine. He developed two machines – the difference engine and analytical engine – which are considered as the prototypes of information processing machines. So he is called the Father of modern computing.
5. Who developed the binary system of language?
 - a. The great mathematician Claud Shannon developed a system of symbolic language for storing information in machines. This is called the binary system.
6. What is bit?
 - a. Each digit in the binary system either 0 or 1 is called a bit

7. What is byte?

- a. A unit of 8 bits (binary digits) is called a byte (bits by eight).

8. Name the two international standards, which specify 8 bit equivalent of letters and digits?

- a. The two international standards which specify 8 bit equivalent of letters and digits are EBCDIC (Extended Binary Coded Decimal Interchange) and ASCII (American Standards Code for Information Interchange).

9. What is ENIAC?

- a. ENIAC means Electronic Numeric Integrator and Calculator.

10. Who developed ENIAC?

- a. Presper Eckert and John Mauchly of Pennsylvania University developed ENIAC.

Paragraph Questions:

1. What is binary and who developed it?

- a. The great mathematician Claude Shannon developed a system of symbolic language that could be used for storing information in machines. He found out that the *on* and *off* position of an electric switch could be used to represent two values such as *true* or *false*, *right* or *wrong*, and *present* or *absent*. He defined the *on* position as 1(one) and the *off* position as 0 (zero). By combining a number of switches we can multiply zeros and ones. Definite number of zeros and ones could represent a specified value system and characters in an alphabet. Thus a language was developed for storing information in machines. As this language used only two characters one and zero, it was called binary language. Digital and binary are synonymous. Each digit in the binary system either 0 or 1 is called a bit. A unit of 8 bits (binary digits) is called a byte (bits by eight). A byte is used to represent characters and digits. For example, the letter A in the English alphabet is represented by the byte '01000001' and B is represented by the byte '01000011'. Similarly, the number 1 is represented by the byte '11110001' and the number 2 by '11110010'. In this manner every bit of information can be represented digitally. There are international standards, which specify binary equivalent of letters, digits and other units of information. The two international standards, which specify 8 bit equivalent of letters and digits, are 'EBCDIC' (Extended Binary Coded Decimal Interchange) and ASCII (American Standards Code for Information Interchange).

2. What are the main features of ENIAC?

- a. The first electronic computer which could store information was developed by Presper Eckert and John Mauchly, engineers of Pennsylvania University, in the year 1946. It was called ENIAC (Electronic Numeric Integrator and Calculator). In ENIAC vacuum tubes or valves were used as electronic circuits. It was a huge computer, which used 18000 valves and 6000 cables. It weighed about 30 tons, occupied a very large hall and consumed about 150000 watts of electricity. With the creation of ENIAC the first electronic computer was born. Early computers were used only for computing or mathematical operations. That was why the machines that handled binary digits were called computers

Generations of computers:

1945 started with a new concept proposed by Dr. John Von Newman. This was titled as 'stored program concept.' The main idea behind this concept is:

- a. Data and instructions are stored in addressable locations of single Read/Write memory.
- b. Execution of instructions is stored in sequential manner until it is altered by the program.

The first generation computers (1949-55):

Vacuum tubes are the switching hardware component used in first generation computers. These computers are programmed using hand-coded binary language instructions. The computers in this generation are huge in size and slow in performance. No operating systems are used in this generation. ENIAC or Electronic Numerical Integrator and Calculator, was the first electronic computer developed in 1946 by a team led by Prof. Eckert and Mauchly in U.S.A. A large number of vacuum tubes were used in this machine. It had a small memory; it took 2800 micro seconds for completing a multiplication process and 200 micro seconds for completing an addition process. This machine was widely used for calculating the time and direction of missiles. The first generation computers developed after ENIAC were EDVAC, EDSAC and UNIVAC-I. All are based on Newman's stored program concept and only used in scientific applications. Huge size, low memory, lower speed, high power consumption, heat production, etc. are considered as the major limitations of first generation computers.

Second generation computers (1956-65):

The invention of transistors created a drastic change in the hardware structure of computers. Transistors are more reliable and less space-consuming. They produce less heat compared to vacuum tubes. Computer memory also was restructured by the invention of magnetic cores. The core consists of tiny ferrite rings that can store 0 or 1 in two spin directions. Cores are widely used for constructing RAM. Secondary storage also enhanced with the invention of magnetic disk. Operating systems were introduced as batch monitors. High level languages like FORTRAN and COBOL reduced the complexity of programming. Rapid growth in the commercial applications like payroll, inventory control etc. increased the growth of computer technology in society. Some examples of second generation computers are IBM-1401, IBM-7094, CDC-3600, and UNIVAC-1108.

Advantages of second generation computers:

1. Smaller in size than first generation computers.
2. More reliable.
3. Lower power consumption and hence reduced running cost.
4. Higher operating speed. Computational time reduced from milliseconds to microseconds.
5. Less prone to failures.
6. Better portability.
7. Reduced manufacturing cost and hence wider commercial use.

Disadvantages:

1. Air-conditioning was required.

2. Frequent maintenance was required.
3. Manual integration of individual components into functioning units was required.
4. Commercial production was difficult and costly.

Third generation computers (1966-1975):

The invention of integrated circuits is a mile stone in the development of computers. Small Scale Integration (SSI) can hold 10-100 transistors per chip. The size of the computers is further reduced. At the same time, memory capacity and processing speed increased a lot.

In 1960 the Digital Equipment Corporation introduced the Programmed Data Processor-1 (PDP-1), which can be called the first mini computer due to its relatively small size. Even though it was made before 1965, it was called third generation because of the way it was built. The PDP-1 was also the computer that ran the first video game, called Space war (written in 1962).

The software industry came into existence in mid 1970's as companies started to write programs that would satisfy the increasing number of computers. Computers were being used in business, government, military and educational environments. Since these target markets required accounting and statistical programs such items were provided by companies. The first set of computing standards was also created during this period to ensure compatibility between systems.

E-mail originated sometime between 1961 and 1966. This was connected with the work that was being done on Advanced Research Projects Agency Network (ARPANET) for networking technology and innovation which later led to the Internet.

Advantages:

1. Smaller in size than the previous generations.
2. More reliable than second generation computers.
3. Lesser heat generated.
4. Computational time reduced from microseconds to nanoseconds.
5. Maintenance cost low because hardware failures are rare.
6. Easily portable.
7. Less power requirement.
8. Manual integration not required.
9. Commercial production was easier and cheaper.

Disadvantages:

1. Air-conditioning required in many cases.
2. Higher sophisticated technology required for the manufacture of IC Chips (Integrated Circuit Chips).

Some examples for third generation computers are IBM-360, ICL-1900 series and CDC-1700.

Fourth generation computers:

In this generation SSI was replaced by LSI and later by VLSI (Very Large Scale Integration).

This increased the power of microcomputer. Magnetic core memory was replaced with semiconductor memory. The first microcomputer was ALTAIR 8800. Many people consider ALTAIR 8800 as the computer that sparked the modern computer revolution, especially since Bill Gates and Paul Allen founded Microsoft with a programming language called Altair-Basic, made specifically for the 8800. Now the computers could fit on the table and so became very common.

A small company called Apple Computers Inc. was established in 1976. Steve Wozniak and Steve Jobs began to sell their Apple-I computer that same year. It came with a Keyboard and only needed a monitor to be plugged into the back of the system. The Apple-II was released the next year and was the first mass produced microcomputer to be commercially sold. This ushered in the era of personal computing.

In 1981, Microsoft Disk Operating System (MS-DOS) was released to run on the Intel 8086 microprocessor. Over the next few years MS-DOS became the most popular operating system in the world, eventually leading to Microsoft Windows 1.0 being released in 1985. In 1984 Apple introduced their MAC OS, which was the first operating system to be completely graphical. Both MAC OS and Windows used pull down menus, icons and window to make computing more user-friendly. Computers were now being controlled with a mouse as well as a keyboard. The first mouse was developed in 1981 by Xerox.

Software became much more common and diverse during this period with the development of spreadsheets, databases, and drawing programs. Computer networks and e-mail became much more prevalent.

The first truly portable computer called the Osborne-I, was released in 1981. Super computers were sold to Companies, Universities, and the Military. An example of one such computer is CRAY-I, which was released in 1976 by Cray Research.

This generation was also important for the development of the embedded systems. These are special systems, usually very tiny, that have computers inside to control their operation. These embedded systems were put into things like cars, thermostats, microwave ovens, wrist watches, and more.

Advantages:

1. Smallest in size because of high density of components in a single chip.
2. More reliable.
3. Heat generated is negligible.
4. Air conditioning was not required in many cases.
5. Much faster in computation.
6. Hardware failure is negligible and so minimal maintenance cost.
7. Easily portable because of the small size.
8. Totally general purpose.
9. Minimal labour cost involved at assembly stage.
10. Cheapest among all generations.

Disadvantage:

1. Highly sophisticated technology is required for the manufacture of VLSI Chips.

Fifth generation computers:

The developments in the field of artificial intelligence explored a new path in the field of computers. The aim is to develop an autonomous intelligent system that can be controlled by human beings. The expert system in this generation can communicate with people in their natural language. The invention of magnetic bubble memories is a milestone in memory research. Robots with self-computing capacity and decision making power are the ultimate aim of the fifth generation.

Computer processor companies have increased and are offering all kinds of programs for almost anything in this world. Microsoft dominates the scene. Windows 95 raised them to a level of dominance. Now new versions of the same are available. Linux Kernel introduced by Linus Torvalds in 1991 has provided countless open source operating systems and open source software.

Computers have become more and more online oriented with the development of the World Wide Web. Popular companies like Google and Yahoo! were started because of internet.

In 2008 the IBM Roadrunner was introduced as the fastest computer in the world at 1.025 PFLOPS (Peta Flops). Fast super computers aid in the production of movie special effects and the making of computer animated movies.

Self check questions:

1. Who proposed the 'stored program concept'?
 - a. Dr. John Von Newman proposed the 'stored program concept' in 1945.
2. What is the main idea behind the 'stored program concept'?
 - a. The main idea behind the 'stored program concept' is that the data and instructions are stored in addressable locations of single Read/Write memory and the execution of instructions is stored in sequential manner until it is altered by the program.
3. What was the hardware used in first generation computers?
 - a. Vacuum tubes were the switching hardware used in first generation computers.
4. What was the defect of the first generation computers?
 - a. They were huge in size and slow in performance.
5. What were the uses of ENIAC/
 - a. ENIAC was widely used for calculating the time and direction of missiles.
6. What is the other first generation computers developed after ENIAC?
 - a. EDVAC and EDSAC were the other first generation computers developed after ENIAC.
7. What made drastic changes in the hardware structure of computers?
 - a. The invention of transistors created drastic changes in the hardware structure of computers.
8. What is the positive aspect of transistors?
 - a. Transistors are more reliable and less space –consuming. They produce less heat compared to vacuum tubes.
9. What are the four important developments that helped in the growth of second generation computers?

- a. The invention of transistors, magnetic cores, magnetic disk and high level languages like FORTRAN and COBOL helped in the growth of second generation computers.
10. What promoted the development of third generation computers?
 - a. The invention of integrated circuits promoted the development of third generation computers.
 11. What is SSI?
 - a. SSI means small scale integration.
 12. What helped to reduce the size of computers in the third generation?
 - a. The SSI which can hold 10-100 transistors per chip helped to reduce the size of computers in the third generation.
 13. Which is the first minicomputer?
 - a. The Programmed Data Processor-1 (PDP-1) is the first minicomputer.
 14. When did the first videogame run by PDP-I come into existence?
 - a. The first videogame run by PDP-I came into existence in 1962.
 15. When did the software industry come into existence?
 - a. The software industry came into existence in the mid 1970's.
 16. What is ARPANET?
 - a. ARPANET means Advanced Research Projects Agency Network.
 17. What is VLSI?
 - a. VLSI means Very Large Scale Integration.
 18. What is special about fourth generation computers?
 - a. LSI was replaced by VLSI and power of the micro computer increased. Magnetic core memory was replaced by semiconductor memory.
 19. Who established the Apple Computer Inc.?
 - a. Steve Wozniak and Steve Jobs established the Apple Computer Inc.
 20. Which is the first truly portable computer?
 - a. OSBORNE-1 is the first truly portable computer.
 21. What was the focus of fifth generation computes?
 - a. Artificial intelligence was the focus of fifth generation computes.

Paragraph Questions:

1. Describe the first generation computers.

a. Vacuum tubes are the switching hardware component used in first generation computers. These computers are programmed using hand-coded binary language instructions. The computers in this generation are huge in size and slow in performance. No operating systems are used in this generation. ENIAC or Electronic Numerical Integrator and Calculator, was the first electronic computer developed in 1946 by a team led by Prof. Eckert and Mauchly in U.S.A. A large number of vacuum tubes were used in this machine. It had a small memory; it took 2800 micro seconds for completing a multiplication process and 200 micro seconds for completing an addition process. This machine was widely used for calculating the time and direction of missiles. The first generation computers developed after ENIAC were EDVAC, EDSAC and UNIVAC-I. All are based on Newman's stored program concept and only used in scientific applications. Huge size, low memory, lower speed, high power consumption, heat production, etc. are considered as the major limitations of first generation computers.

2. What are the advantages of third generation computers?

a. Advantages of third generation computers are the following:

1. Smaller in size than the previous generations.
2. More reliable than second generation computers.
3. Lesser heat generated.
4. Computational time reduced from microseconds to nanoseconds.
5. Maintenance cost low because hardware failures are rare.
6. Easily portable.
7. Less power requirement.
8. Manual integration not required.
9. Commercial production was easier and cheaper.

3. What are the special features of fourth generation computers?

a. In fourth generation computers SSI was replaced by LSI and later by VLSI (Very Large Scale Integration). This increased the power of microcomputer. Magnetic core memory was replaced with semiconductor memory. The first microcomputer was ALTAIR 8800. Many people consider ALTAIR 8800 as the computer that sparked the modern computer revolution, especially since Bill Gates and Paul Allen founded Microsoft with a programming language called Altair-Basic, made specifically for the 8800. Now the computers could fit on the table and so became very common. They have the following advantages:

1. Smallest in size because of high density of components in a single chip.
2. More reliable.
3. Heat generated is negligible.
4. Air conditioning was not required in many cases.
5. Much faster in computation.
6. Hardware failure is negligible and so minimal maintenance cost.
7. Easily portable because of the small size.

8. Totally general purpose.
9. Minimal labour cost involved at assembly stage.
10. Cheapest among all generations.

It has only one disadvantage, that is, highly sophisticated technology is required for the manufacture of VLSI Chips.

4. Why are fifth generation computers important?

a. Fifth generation computers are important because the developments in the field of artificial intelligence explored a new path in the field of computers. The aim was to develop an autonomous intelligent system that can be controlled by human beings. The expert system in this generation can communicate with people in their natural language. The invention of magnetic bubble memories is a milestone in memory research. Robots with self-computing capacity and decision making power are the ultimate aim of the fifth generation.

Types of Computers:

The technology applied, the power and the size are the parameters used to classify computers. Technology has changed and all computers use microprocessors as their CPU. Thus classification is possible only on the basis of the mode of use. On this basis computers can be classified as Palms, Laptop PCs, Desktop PCs and Workstations. Based on inter-connected computers, they can be classified as distributed computers and parallel computers.

Moore's Law:

Gordon Moore, the co-founder of the Intel Corporation predicted that the phenomenon of exponential growth, i.e., doubling the speed of computers every 18 months, will continue infinitely. So far Moore's prediction has not been disproved. Therefore, it is called Moore's Law.

Palm PCs:

Palm PCs are computers that can be held in a palm. They are small in size with high density pack of transistors on a chip. They have the capabilities of a PC. Palms accept handwritten inputs using an electronic pen, which can be used to write on a Palm's screen (besides a tiny key board). It has small disk storage and can be connected to wireless network. One has to train the system on the user's handwriting before it can be used. A Palm computer also has facilities to be used as a mobile phone, fax and e-mail machine. A version of the MS operating system called Windows – CE is available for Palm.

Simputers:

It is an Indian initiative to meet the need of the rural population of developing countries. This is a mobile handled computer with inputs through icons on a touch-sensitive overlay on the LCD display panel. A unique feature of the Simputers is the use of free open source OS called GNU/Linux. The cost of ownership is thus low as there is no software cost for OS. Another unique feature is a smart card reader/writer, which enhances the functioning of the Simputer including the possibility of personalization of a single Simputer for several users.

Personal Computers (PCs):

A personal computer is a general purpose computer whose size, capabilities and original sales price make it useful for individuals. It is intended to be operated directly by an end user, with no intervening computer operator.

A personal computer may be a desktop computer, a laptop, a tablet PC or a hand held PC (also called palmtop). The most common microprocessors in personal computers are X86 – compatible CPUs. Software application for PCs include word processing, spread sheets, data bases, web browsers and e-mail clients, games and myriad personal productivity and special-purpose software. Modern PCs often have high-speed or dial-up connection to the Internet, allowing access to the World Wide Web and a wide range of other resources.

A PC may be used at home or an office. It can be connected to a Local Area Network (LAN) either by a cable or by wireless.

Earlier the users had to write their own programs but now a wide range of commercial and non-commercial software is available in ready-to-run form. Since the 1980s, Microsoft and Intel have dominated much of the personal computer market. Now PCs are available in different shapes and sizes and provides multifarious functions beneficial for human beings.

Workstations

Workstations are desktop machines. They are more powerful providing processor speeds about ten times that of PCs. Most workstations have a large color display unit, often 19-inch monitors. They have main memory ranging from 512 MB to 2GB and hard disk ranging from 80G to 500G. They use RISC (Reduced Instruction Set Computer) instead of the CISC computers. CISC is Complex Instruction Set Computers. It is pronounced ‘sisk’.

A workstation is designed for technical or scientific applications.

PC vendors like Dell and HP provide Microsoft Windows/Linux running on Intel xenon / AMD opteron. Alternative UNIX based platform is provided by Apple Inc., Sun Microsystem and SGI (Silicon Graphics International).

Server Computers:

Servers are used for specific purposes such as high performance numerical computing (called compute server), web page hosting, database storage, online information service, printing, etc., for which large interactive screens are not necessary. Computers used as servers have high performance processors and large main memory. Database servers have big online disk storage. Print servers support several high-speed printers.

Servers are parts of networks. Each server performs a variety of services to satisfy the needs of clients. The name of the server is based on the task it is carrying out. Thus we have printer server, file server, data base server, e-mail server, news group server, Internet server etc.

Mainframe Computers:

These are large computer systems. During the 1960s and 70s, all computers were called mainframes. There are small, medium and large-scale mainframes, handling from a handful to tens of thousands of online terminals. Large-scale mainframes support multiple gigabytes of main memory and terabytes of disk storage. Large mainframes use smaller computers as front-end processors that connect to the communication network.

The original mainframe vendors were Burroughs, Control Data, GE, Honeywell, IBM, NCR, RCA and UNIVAC. Of these firms, IBM was the largest company. Therefore it was also known as “IBM and the Seven Dwarfs”. Later on Honeywell and UNIVAC absorbed GE and RCA’s computer divisions respectively. Until the emergence of PCs in the early 1980s, computers were large and consisted of multiple cabinets.

Disadvantages

1. Size.
2. High electricity consumption.
3. High cost.

Mainframes have provided the computing power for major corporations for more than 40 years. Sperry Rand (UNIVAC), IBM, GE, RCA, NCR, Burroughs, Honeywell and Control Data were the first companies that made mainframes.

Super Computers:

Super computers are the fastest of the computers available at any given time and are normally used to solve problems, which require intensive numerical computations. They are extremely powerful computers used mainly in research; and space, military and governmental applications. A super computer which can cost tens of crores of rupees contain the equivalent of thousands of personal computers that multiply the processing speed and power to solve very large and complex problems in hours or days hours or days which otherwise would have taken weeks months or years.

Uses

1. Weather predictions.
2. Designing supersonic aircrafts.
3. Design of rockets and space stations.

Mobile Computer Devices:

- | | | | |
|------------------|-------------------------|------------------------------|----------|
| (1) Laptop | (2) Notebook computer | (3) Tablet computer | (4) PDAs |
| (5) Smart phones | (6) E-book readers, and | (7) Portable data terminals. | |

Mobile – The most widely accepted term for a computer device that is both portable and wireless is a ‘mobile computer device’.

But the term mobile is sometimes limited to devices that can be used while moving, as opposed to portable computers, which are only practical for use while in a stationary position.

A cellular telephone is not a mobile computer device unless it includes a web browser and has the capacity to download and manipulate files.

Drawbacks of mobile computing devices:

1. Most such devices can be used only for a few hours before recharging.
2. The reliance on wireless network means that they are less secure than desktop machines that use electric grid and wired networks.
3. Screens are much smaller than those used with desktop computers.
4. The lack of full-size keyboards slows down data entry.

Various types of Mobile Computer Devices:

There are 6 major types of MCDs: laptop computers, notebooks, tablet, PDAs, smart phones and portable data terminals. The first three are often called ‘portable’ computers and the others are often called “handheld” computers.

Laptop Computers

- 1) Sometimes called “desktop replacement PCs” that offers desktop PC performance in mobile environments.
- 2) Widely available in North America since 2002.
- 3) Typical one has 14 to 17 inch screen.
- 4) Internal DVD – RDM or DVD – RW drive
- 5) Large full-featured keyboard
- 6) Integrated modem, network, Bluetooth, & Wi-Fi capabilities
- 7) High quality integrated audio speaker system
- 8) Three or more hours of battery life
- 9) Low battery consumption
- 10) Capability to be upgraded

In addition to in-built keyboard most of them have touchpad or pointing stick for input. A mouse can also be attached.

In spite of the advantages, Desktops are more popular because of its durability and low cost compared to that of laptops.

Notebook Computers

- 1) Light weight computers having thin profile.
- 2) They have 12 to 14-inch screen.
- 3) No DVD or CD system, no internal floppy drive.
- 4) Limited graphic capabilities.
- 5) Integrated modem and network connection.
- 6) Small keyboard.
- 7) Less power consumption.
- 8) Four or more hours of battery life.
- 9) Upgradability is limited.
- 10) Usually, it weighs from 1.5 to 3 pounds,
- 11) Smaller than laptop.

Tablet PCs

- 1) Slate-shaped mobile computers equipped with a touch screen or a graphics tablet/ screen hybrid.
- 2) This helps the user to use the computer with a stylus, digital pen or fingertip instead of a keyboard or a mouse.
- 3) An external keyboard or a mouse can be attached.
- 4) The stylus can also be used to type on a pen-based key layout.
- 5) Some have voice recognition capability.
- 6) Usually small screen – 8 inches.

Disadvantage

- Provides only half the processor speed and memory of notebook computers.

Advantage

- Weight is only half of that of laptop computers.

PDA

1. Personal Digital Assistant.
2. Hand held mobile computers; popular since 2000.
3. Initially used for track of schedules, maintaining directories of names and addresses, and accessing e-mail.
4. Since 2003, processor speeds and memories increased and it became capable of including web browser, cellular telephone and fax capabilities. This eliminates the need to carry a separate cell phone. Cell phone manufacturers have responded with “smart phones”, devices that include a web browser.

Features:

1. Touch screen for entering data.
2. A memory card slot for data storage.
3. Bluetooth and/or Wi-Fi support.
4. Data entry usually done using a virtual keyboard, where a keyboard is shown on the touch screen so that input can be done by tapping the letters with a finger nail or stylus.

RIM’s popular Blackberry PDA has not only a touch screen, but a full keyboard and scroll wheels to facilitate data entry and navigation. The Palm Treo is also a PDA.

*The term “Pocket PC” is given to PDAs that use the Microsoft Windows mobile operating system.

Smart phones

Smart phone is a compromise between a cell phone and a PDA, with a focus on the cellular phone part. It allows a user to install programs, store information, and undertake e-mail; but web access is limited. There are no industry standards for defining what a smart phone is. Apple’s I phone and Google’s 3G have so many features similar to those of PDA’s that some reviews have classified them as PPDA’s. If the exponential growth of computer memory continues, a smart phone (3G phone) will have 50G of storage memory in 2020.

iPod

Brand of portable media players designed and marketed by Apple computers launched in 2001. Devices in the iPod are primarily music players. The full-sized device stores media on an internal hard drive. The iPod nano and iPod shuffle use flash memory.

iPod nano is the fifth generation, video-capable form. The iPod shuffle is display-less.

E-book Readers

An e-book reader is also called an e-book device or e-reader. It is used to display e-books.

Advantage : portability, readability of their screens in bright sunlight, long battery life.

Any PDA capable of displaying text on a screen is also capable of being an e-book reader, but without the advantage of electronic ink display.

Amazon.com, Sony and several companies manufacture e-book readers. The e-book reader provided by Amazon is called Kindle.

Uses of Mobile Computer Devices:

- (1) Database access.
- (2) Web browsing.
- (3) Word processing.
- (4) E-mail.

It makes library work easier:

- 1) No need to wait for a library desktop device to become available.
- 2) Greater familiarity with personally owned devices.
- 3) Ability to access information from anywhere in the library, including the stacks.
- 4) Ability to download information and incorporate it into existing files.
- 5) Speed and ease of taking information away from the library.

One portable data terminal for libraries is as a backup circulation device; another is as an inventory device. They can be used for electronic shelf reading as they can interact with a database in real time using a wireless LAN.

Embedded Computers:

Almost all electronic gadgets have a computer built into them in some way. These very small and single purpose processors are classified as embedded computers. An embedded computer is built into another device to control, monitor or manage some activity of the device. One or more embedded computers do the controls of a microwave oven, automatic washing machine, aircraft, photocopying machine, CT scanner, etc.

Self-check Questions:

1. How do you classify computers?

a. Computers are classified on the basis of the technology used and the power and size of computers. It is also classified according to use.

2. What is Moore's Law?

a. Gordon Moore, the co-founder of the Intel Corporation predicted that the phenomenon of exponential growth, i.e., doubling the speed of computers every 18 months, will continue infinitely. So far Moore's prediction has not been disproved. Therefore, it is called Moore's Law.

3. What are Simputers?

a. It is an Indian initiative to meet the need of the rural population of developing countries. This is a mobile handled computer with inputs through icons on a touch-sensitive overlay on the LCD display panel. A unique feature of the Simputers is the use of free open source OS called GNU/Linux.

4. Define personal computer.

a. A personal computer is a general purpose computer whose size, capabilities and original sales price make it useful for individuals. It is intended to be operated directly by an end user, with no intervening computer operator.

5. What is the purpose of Workstation computers?

a. A workstation is designed for technical or scientific applications.

6. What is the function of server computers?

a. Servers are used for specific purposes such as high performance numerical computing (called compute server), web page hosting, database storage, online information service, printing, etc., for which large interactive screens are not necessary. Computers used as servers have high performance processors and large main memory. Database servers have big online disk storage. Print servers support several high-speed printers.

7. What are the disadvantages of Mainframe computers?

a. Size, High electricity consumption, and High cost are the disadvantages of Mainframe computers.

8. List the uses of Super computers?

a. *Uses of Super computers:*

1. Weather prediction.
2. Designing supersonic aircrafts.
3. Design of rockets and space stations

9. What are the different mobile devices?

a. Mobile Computer Devices are:

- | | | | |
|------------------|-------------------------|------------------------------|----------|
| (1) Laptop | (2) Notebook computer | (3) Tablet computer | (4) PDAs |
| (5) Smart phones | (6) E-book readers, and | (7) Portable data terminals. | |

10. What is PDA?

a. PDA is Personal Digital Assistant. It is a hand held mobile computer device popular since 2000.

11. Define smart phones.

a. Smart phone is a compromise between a cell phone and a PDA, with a focus on the cellular phone part. It allows a user to install programs, store information, and undertake e-mail; but web access is limited.

12. Give the names of two IPod's that use flash memory.

a. The IPod nano and IPod shuffle use flash memory.

13. Name the uses of mobile computer devices.

a. Uses of Mobile Computer Devices are:

- (1) Database access.
- (2) Web browsing.
- (3) Word processing.
- (4) E-mail.

14. What is Kindle?

a. Kindle is an e-book reader manufactured by Amazon.com.

Paragraph Questions:

1. Describe Simputers.

a. It is an Indian initiative to meet the need of the rural population of developing countries. This is a mobile handled computer with inputs through icons on a touch-sensitive overlay on the LCD display panel. A unique feature of the Simputers is the use of free open source OS called GNU/Linux. The cost of ownership is thus low as there is no software cost for OS. Another unique feature is a smart card reader/writer, which enhances the functioning of the Simputer including the possibility of personalization of a single Simputer for several users.

2. What are the features of Mainframe computers?

a. These are large computer systems. During the 1960s and 70s, all computers were called mainframes. There are small, medium and large-scale mainframes, handling from a handful to tens of thousands of online terminals. Large-scale mainframes support multiple gigabytes of main memory and terabytes of disk storage. Large mainframes use smaller computers as front-end processors that connect to the communication network.

The original mainframe vendors were Burroughs, Control Data, GE, Honeywell, IBM, NCR, RCA and UNIVAC. Of these firms, IBM was the largest company. Therefore it was also known as "IBM and the Seven Dwarfs". Later on Honeywell and UNIVAC absorbed GE and RCA's computer divisions respectively. Until the emergence of PCs in the early 1980s, computers were large and consisted of multiple cabinets.

Disadvantages

1. Size.
2. High electricity consumption.
3. High cost.

Mainframes have provided the computing power for major corporations for more than 40 years. Sperry Rand (UNIVAC), IBM, GE, RCA, NCR, Burroughs, Honeywell and Control Data were the first companies that made mainframes.

3. Describe Super Computers.

a. Super computers are the fastest of the computers available at any given time and are normally used to solve problems, which require intensive numerical computations. They are extremely powerful computers used mainly in research; and space, military and governmental applications. A super computer which can cost tens of crores of rupees contain the equivalent of thousands of personal computers that multiply the processing speed and power to solve very large and complex problems in hours or days hours or days which otherwise would have taken weeks months or years.

Uses

1. Weather predictions.
2. Designing supersonic aircrafts.
3. Design of rockets and space stations.

IT and the INTERNET:

The internet is a global system of interconnected computer networks that use the standardized Internet Protocol Suite to serve billions of users worldwide. It is a network of networks that consists of a number of private and public, academic, business and government networks of global scope. They are connected by copper wires, fiber-optic cables, wireless connections, and other technologies.

The internet is a global data communications system. It is a hardware and software infrastructure that provides connectivity between computers. But the Web is one of the interfaces of the internet. It is a collection of interconnected documents and other resources, linked by hyperlinks and URLs.

During the early 1960s the US department of Defense pioneered the establishment of a wide area network. This resulted in the ARPANET which is the forerunner of Internet.

The opening of the network to commercial interest began in 1988. The ability of TCP/IP to work over any pre-existing communication networks allowed the fast growth of the Internet. Further it gained a public face by the 1990s.

Uses:

The Internet is allowing greater flexibility in working hours and location, especially with the spread of unmetered high-speed connections and web applications. The Internet can be accessed from anywhere by numerous means, especially through mobile Internet devices.

Mobile phones, data cards, handheld game consoles and cellular routers allow users to get connected to the Internet from anywhere, where there is a wireless network supporting that device's technology.

The Internet has also become a large market for companies. Many companies have grown by taking advantage of the efficient nature of low-cost advertising and commerce through the Internet. This is also known as e-commerce. The Internet has also facilitated personalized marketing which allows a company to market a product to a specific person or a group more easily than any other advertising medium. The low cost and the speed in sharing ideas, knowledge, and skills has made collaborative work very much easier.

The Internet allows computer users to remotely access other computers and information stores easily, wherever they may be across the world. This is encouraging new ways of working from home, collaboration and information sharing in many industries.

Software products that can access the resources of a web are often called user agents. In normal use, web browsers like Internet Explorer, Firefox, Opera, Apple Safari, and Google Chrome let users navigate from one webpage to the other through hyperlinks. Through keyword-driven Internet search using engines like Yahoo! And Google, users worldwide have easy, instant access to a wide ranging source of information. It has provided a sudden and extreme decentralization of information and data.

E-mail is an important service available on the Internet. Another important service made possible is Internet telephony. The idea began with walkie-talkie-like voice applications for personal computers. Through file-sharing large amounts of data can be transferred across the Internet.

Common methods of Internet access in homes include dial-up, landline broadband, Wi-Fi, satellite, and 3G technology cell phones. Libraries and Internet cafes are access points for Internet. Other public places like airport halls and coffee shops also provide this facility for the public.

Many people use the World Wide Web to access news, weather and sports reports, to plan and book holidays and more. They also use chat, messaging, and e-mail facilities to maintain contact between friends and relatives. Social networking websites like MySpace and Facebook also support this venture.

Self-check Questions:

1. Define Internet.

a. The internet is a global system of interconnected computer networks that use the standardized Internet Protocol Suite to serve billions of users worldwide. It is a network of networks that consists of a number of private and public, academic, business and government networks of global scope.

2. What is web?

a. The Web is one of the interfaces of the internet. It is a collection of interconnected documents and other resources, linked by hyperlinks and URLs.

3. Name the forerunner of the Internet.

a. The ARPANET is the forerunner of Internet.

4. Name some of the web browsers.

a. Internet Explorer, Firefox, Opera, Apple Safari, and Google Chrome are some of the web browsers that let users navigate from one webpage to the other through hyperlinks.

5. What are the common methods of Internet access in homes?

a. Common methods of Internet access in homes include dial-up, landline broadband, Wi-Fi, satellite, and 3G technology cell phones.

6. Name one Social networking website.

a. Facebook is one Social networking website.

Paragraph Question:

1. Define and explain Internet.

a. The internet is a global system of interconnected computer networks that use the standardized Internet Protocol Suite to serve billions of users worldwide. It is a network of networks that consists of a number of private and public, academic, business and government networks of global scope. They are connected by copper wires, fiber-optic cables, wireless connections, and other technologies. The internet is a global data communications system. It is a hardware and software infrastructure that provides connectivity between computers. But the Web is one of the interfaces of the internet. It is a collection of interconnected documents and other resources, linked by hyperlinks and URLs. During the early 1960s the US department of Defense pioneered the establishment of a wide area network. This resulted in the ARPANET which is the forerunner of Internet. The opening of the network to commercial interest began in 1988. The ability of TCP/IP to work over any pre-existing communication networks allowed the fast growth of the Internet. Further it gained a public face by the 1990s.

2. Explain the uses of Internet.

a. The Internet allows greater flexibility in working hours and location, especially with the spread of unmetered high-speed connections and web applications. The Internet can be accessed from anywhere by numerous means, especially through mobile Internet devices.

Mobile phones, data cards, handheld game consoles and cellular routers allow users to get connected to the Internet from anywhere, where there is a wireless network supporting that device's technology. The Internet has also become a large market for companies. Many companies have grown by taking advantage of the efficient nature of low-cost advertising and commerce through the Internet. This is also known as e-commerce. The Internet has also facilitated personalized marketing which allows a company to market a product to a specific person or a group more easily than any other advertising medium. The low cost and the speed in sharing ideas, knowledge, and skills has made collaborative work very much easier.

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Essays

1. Give a brief history of the development of computers?

a. In the very ancient times information was stored in memory and orally transmitted from region to region, culture to culture, and from generation to generation. In 100 A D the use of paper came into existence. Later in 1450 the movable press was invented and still later the binary system for machine storage and processing of information triggered off new developments in the field of communication. These developments made communication more transparent and flexible.

The print format was a great shift in the technique of storing data. Documenting on dry leaves, stones, tablets and cave walls ceased to exist. Printed material became widely used. But there were limitations for the print format as well. The most important of the limitations of print format was the problem of retrieving a required piece of information from a large collection. Another one is the barrier of space and time. The third was storage space.

It was Charles Babbage who, during the 1820s, conceived the idea that information could be processed using a machine. He developed two machines – the difference engine and analytical engine – which are considered as the prototypes of information processing machines. Charles Babbage was thinking far ahead of his time and so he could not materialize what he had proposed. But Babbage is considered as the father of modern computer technology.

The great mathematician Claude Shannon developed a system of symbolic language that could be used for storing information in machines. He found out that the *on* and *off* position of an electric switch could be used to represent two values such as *true* or *false*, *right* or *wrong*, and *present* or *absent*. He defined the *on* position as 1(one) and the *off* position as 0 (zero). By combining a number of switches we can multiply zeros and ones. Definite number of zeros and ones could represent a specified value system and characters in an alphabet. Thus a language was developed for storing information in machines. As this language used only two characters one and zero, it was called binary language. Digital and binary are synonymous. Each digit in the binary system either 0 or 1 is called a bit. A unit of 8 bits (binary digits) is called a byte (bits by eight). A byte is used to represent characters and digits. For example, the letter A in the English alphabet is represented by the byte '01000001' and B is represented by the byte '01000011'. Similarly, the number 1 is represented by the byte '11110001' and the number 2 by '11110010'. In this manner every bit of information can be represented digitally. There are international standards, which specify binary equivalent of letters, digits and other units of information. The two international standards, which specify 8 bit equivalent of letters and digits, are 'EBCDIC' (Extended Binary Coded Decimal Interchange) and ASCII (American Standards Code for Information Interchange)

The first electronic computer which could store information was developed by Presper Eckert and John Mauchly, engineers of Pennsylvania University, in the year 1946. It was called ENIAC (Electronic Numeric Integrator and Calculator). In ENIAC vacuum tubes or valves were used as electronic circuits. It was a huge computer, which used 18000 valves and 6000 cables. It weighed about 30 tons, occupied a very large hall and consumed about 150000 watts of electricity. With the creation of ENIAC the first electronic computer was born. Early computers were used only for computing or mathematical operations. That was why the machines that handled binary digits were called computers.

Great development has occurred in the field of computers during the past sixty years. The size of computers has decreased but the efficiency has increased. The reason for the reduction in size and increase in power and speed are attributed to the discovery of transistors and their integration into microprocessors.

2. What is the difference between third generation and fourth generation computers?

a. The period of Third generation computers is from 1966 to 1975. The invention of integrated circuits is a mile stone in the development of computers. Small Scale Integration (SSI) can hold 10-100 transistors per chip. The size of the computers is further reduced. At the same time, memory capacity and processing speed increased a lot.

In 1960 the Digital Equipment Corporation introduced the Programmed Data Processor-1 (PDP-1), which can be called the first mini computer due to its relatively small size. Even though it was made before 1965, it was called third generation because of the way it was built. The PDP-1 was also the computer that ran the first video game, called Space war (written in 1962).

The software industry came into existence in mid 1970's as companies started to write programs that would satisfy the increasing number of computers. Computers were being used in business, government, military and educational environments. Since these target markets required accounting and statistical programs such items were provided by companies. The first set of computing standards was also created during this period to ensure compatibility between systems.

E-mail originated sometime between 1961 and 1966. This was connected with the work that was being done on Advanced Research Projects Agency Network (ARPANET) for networking technology and innovation which later led to the Internet.

Advantages:

1. Smaller in size than the previous generations.
2. More reliable than second generation computers.
3. Lesser heat generated.
4. Computational time reduced from microseconds to nanoseconds.
5. Maintenance cost low because hardware failures are rare.
6. Easily portable.
7. Less power requirement.
8. Manual integration not required.
9. Commercial production was easier and cheaper.

Disadvantages:

1. Air-conditioning required in many cases.
2. Higher sophisticated technology required for the manufacture of IC Chips (Integrated Circuit Chips).

Some examples for third generation computers are IBM-360, ICL-1900 series and CDC-1700.

In Fourth generation computers SSI was replaced by LSI and later by VLSI (Very Large Scale Integration). This increased the power of microcomputer. Magnetic core memory was replaced with semiconductor memory. The first microcomputer was ALTAIR 8800. Many people consider ALTAIR 8800 as the computer that sparked the modern computer revolution, especially since Bill Gates and Paul Allen founded Microsoft with a programming language called Altair-Basic, made specifically for the 8800. Now the computers could fit on the table and so became very common.

A small company called Apple Computers Inc. was established in 1976. Steve Wozniak and Steve Jobs began to sell their Apple-I computer that same year. It came with a Keyboard and only needed a monitor to be plugged into the back of the system. The Apple-II was released the next year and was the first mass produced microcomputer to be commercially sold. This ushered in the era of personal computing.

In 1981, Microsoft Disk Operating System (MS-DOS) was released to run on the Intel 8086 microprocessor. Over the next few years MS-DOS became the most popular operating system in the world, eventually leading to Microsoft Windows 1.0 being released in 1985. In 1984 Apple introduced their MAC OS, which was the first operating system to be completely graphical. Both MAC OS and Windows used pull down menus, icons and window to make computing more user-friendly. Computers were now being controlled with a mouse as well as a keyboard. The first mouse was developed in 1981 by Xerox.

Software became much more common and diverse during this period with the development of spreadsheets, databases, and drawing programs. Computer networks and e-mail became much more prevalent.

The first truly portable computer called the Osborne-I, was released in 1981. Super computers were sold to Companies, Universities, and the Military. An example of one such computer is CRAY-I, which was released in 1976 by Cray Research.

This generation was also important for the development of the embedded systems. These are special systems, usually very tiny, that have computers inside to control their operation. These embedded systems were put into things like cars, thermostats, microwave ovens, wrist watches, and more.

Advantages:

1. Smallest in size because of high density of components in a single chip.
2. More reliable.
3. Heat generated is negligible.
4. Air conditioning was not required in many cases.
5. Much faster in computation.
6. Hardware failure is negligible and so minimal maintenance cost.
7. Easily portable because of the small size.
8. Totally general purpose.
9. Minimal labour cost involved at assembly stage.
10. Cheapest among all generations.

Disadvantage:

1. Highly sophisticated technology is required for the manufacture of VLSI Chips.
3. Define and discuss the various types of mobile devices and their uses.

a. There are 6 major types of MCDs: laptop computers, notebooks, tablet, PDAs, smart phones and portable data terminals. The first three are often called 'portable' computers and the others are often called "handheld" computers.

Laptop Computers

- 1) Sometimes called "desktop replacement PCs" that offers desktop PC performance in mobile environments.
- 2) Widely available in North America since 2002.
- 3) Typical one has 14 to 17 inch screen.
- 4) Internal DVD – RDM or DVD – RW drive
- 5) Large full-featured keyboard
- 6) Integrated modem, network, Bluetooth, & Wi-Fi capabilities
- 7) High quality integrated audio speaker system
- 8) Three or more hours of battery life
- 9) Low battery consumption
- 10) Capability to be upgraded

In addition to in-built keyboard most of them have touchpad or pointing stick for input. A mouse can also be attached.

In spite of the advantages, Desktops are more popular because of its durability and low cost compared to that of laptops.

Notebook Computers

- 1) Light weight computers having thin profile.
- 2) They have 12 to 14-inch screen.
- 3) No DVD or CD system, no internal floppy drive.
- 4) Limited graphic capabilities.
- 5) Integrated modem and network connection.
- 6) Small keyboard.
- 7) Less power consumption.
- 8) Four or more hours of battery life.
- 9) Upgradability is limited.
- 10) Usually, it weighs from 1.5 to 3 pounds,
- 11) Smaller than laptop.

Tablet PCs

- 1) Slate-shaped mobile computers equipped with a touch screen or a graphics tablet/ screen hybrid.
- 2) This helps the user to use the computer with a stylus, digital pen or fingertip instead of a keyboard or a mouse.
- 3) An external keyboard or a mouse can be attached.
- 4) The stylus can also be used to type on a pen-based key layout.
- 5) Some have voice recognition capability.
- 6) Usually small screen – 8 inches.

Disadvantage

- Provides only half the processor speed and memory of notebook computers.

Advantage

- Weight is only half of that of laptop computers.

PDA

1. Personal Digital Assistant.
2. Hand held mobile computers; popular since 2000.
3. Initially used for track of schedules, maintaining directories of names and addresses, and accessing e-mail.
4. Since 2003, processor speeds and memories increased and it became capable of including web browser, cellular telephone and fax capabilities. This eliminates the need to carry a separate cell phone. Cell phone manufacturers have responded with “smart phones”, devices that include a web browser.

Features:

1. Touch screen for entering data.
2. A memory card slot for data storage.
3. Bluetooth and/or Wi-Fi support.
4. Data entry usually done using a virtual keyboard, where a keyboard is shown on the touch screen so that input can be done by tapping the letters with a finger nail or stylus.

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Advantage : portability, readability of their screens in bright sunlight, long battery life.

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Amazon.com, Sony and several companies manufacture e-book readers. The e-book reader provided by Amazon is called Kindle.

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4. Write an essay on the scope and significance of IT.

a. The internet is a global system of interconnected computer networks that use the standardized Internet Protocol Suite to serve billions of users worldwide. It is a network of networks that consists of a number of private and public, academic, business and government networks of global scope. They are connected by copper wires, fiber-optic cables, wireless connections, and other technologies. The internet is a global data communications system. It is a hardware and software infrastructure that provides connectivity between computers. But the Web is one of the interfaces of the internet. It is a collection of interconnected documents and other resources, linked by hyperlinks and URLs. During the early 1960s the US department of Defense pioneered the establishment of a wide area network. This resulted in the ARPANET which is the forerunner of Internet. The opening of the network to commercial interest began in 1988. The ability of TCP/IP to work over any pre-existing communication networks allowed the fast growth of the Internet. Further it gained a public face by the 1990s.

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MODULE II

INTRODUCTION TO BASIC HARDWARE

The equipment that constitutes the physical parts of the computer- CPU, disks, tapes, modem, cables etc – are called hardware. Both hardware and software are essential for the working of a computer. The main functions of a hardware are storage, processing and transmission.

MONITOR –CRT and LCD

CATHODE - RAY TUBE (CRT)

The CRT is a vacuum tube used as a display screen .Traditionally CRT monitors were bowl-shaped, but flat screen CRT have become the standard on account of their low power consumption, low radiation and space-saving qualities.

ADVANTAGES OF CRT

Excellent viewing angle

Distortion minimal

No input lag

Low radiation

DISADVANTAGES OF CRT

Large size and weight

Geometric distortion in non-flat CRTs

Older CRTs are prone to screen burn-in

LIQUID CRYSTAL DISPLAY (LCD)

A display technology that uses rod-shaped molecules that flow like liquid and bend light. Without being energized, the crystals direct light through two polarizing filters, allowing a natural background colour to show. When energized, they redirect the light to be absorbed in one of the polarizers, causing the dark appearance of crossed polarizers to show. The more the molecules are twisted, the better the contrast and viewing angle.

ADVANTAGES OF LCD MONITORS

Very compact and light

Low power consumption

No geometric distortion

Little or no flicker depending on backlight technology

DISADVANTAGES OF LCD MONITORS

Limited viewing angle

Slow response times, which cause smearing and ghosting.

Input lag

CENTRAL PROCESSING UNIT (CPU)

CPU is the brain of any computer system. It is the computing part of the computer and is also called the “processor”. In a computer system, all calculations and comparisons are made inside the CPU. It is also responsible for activating and controlling the operations of other units of a computer system. CPU is made up the Control Unit and ALU.

The CPU is also called microprocessor or central processor. The CPU usually performs 4 steps in most of its operations. They are fetch, decode, execute and writeback.

The first step fetch involves retrieving an instruction(which is represented by a number or sequence of numbers) from program to memory.

In the decode step, the instruction is broken up into parts that have significance to other portions of CPU.

After fetch and decode steps, the execute step is performed. During this performance, the connected portions of the CPU enact the desired operation.

The final step write back, simply ‘writes back’ the results of the execute step to some form of memory.

COMPONENTS OF THE CPU

CONTROL UNIT

Control Unit is the nerve centre of the computer. It performs the following functions:

1. Fetches the instruction from the primary memory at the location pointed to by the program counter register.
2. Decodes the instruction in the instruction register.
3. Executes the instruction by sequencing a series of control signals to other components of the CPU.
4. Controls all data transfer between various components.

ARITHMETIC AND LOGIC UNIT (ALU)

During a data processing operation, it is in the ALU that the actual execution of the instruction takes place. All the arithmetic and logical operations are made in the ALU. Basic arithmetic functions which an ALU can carry out include addition and subtraction. More powerful CPUs can support additional mathematical operations like multiplication and division. The logical operation the ALU carries out include comparison operations like greater than, equal to and less than.

MOUSE

A mouse is a device that is rolled about on a desktop and directs a pointer on the computer’s display screen. The mouse pointer is the symbol that indicates the position of the mouse on the display screen. The mouse is connected to the computer with the help of a cable attached to a special port of the CPU. The tail like cord and the rounded head of the device earned its name ‘mouse’.

There are 3 types of mice(plural of mouse):

1. Mechanical mouse - the movement of a rubber ball causes a pair of wheels to spin that sensors detect to send data signals to the PC.
2. Opto-mechanical Mouse – Uses light- emitting diodes(LEDs) to sense mouse movements.
3. Optical mouse- eliminates the use of mechanical devices such as balls, rollers and wheels and uses optical scanning to detect the movement of the mouse.

Most commonly used clicks of the mouse button:

1. Single left button click known as left click
2. Two clicks of the left button in quick succession called the double click
3. Clicking the left button three times in quick succession known as triple click.
4. Clicking right hand button once known as Right click

KEYBOARD

Keyboard is an integral component of the computer used not only for data input but also for data output. The computer keyboards are designed on the basis of the typewriter keyboard, but it also has additional keys for performing specific functions. In Pcs, the keyboards are attached to the computer with the help of a cable. There are also wireless keyboards which work with the help of infrared signals.

The first six letters on the left hand side of the upper row reads QWERTY. Keyboards beginning with QWERTY on the upper row are called QWERTY keyboards.

Important keys on the computer keyboard are:

Enter key

Cursor key

Control Up arrow

Numeric lock

Home and End keys

Page up/Page down keys

Function keys

Backspace key

Delete key

Insert keys

Escape key

Control, Alt, command and option keys

PROCESSOR TYPES

Since the processor handles all kinds of information, choosing the right processor is probably the most important thing when buying a computer.

INTEL COMPUTER PROCESSOR

Designed exclusively by Intel. Latest and most popular models include Intel Pentium 4 processor, Intel Pentium 4 processor with HT technology and Intel Celeron processor. The first can handle applications such as DVD authoring and 3D gaming while the second can run multiple applications simultaneously with a fast and efficient response.

AMD COMPUTER PROCESSOR

Made exclusively by Advanced Micro Devices, Inc. Some are programmed with built-in anti-virus protection. Popular models are AMD Athlon XP and AMD Athlon 64.

PORTS

A Port serves as an interface between the computer and other computers or peripheral devices. A Port is a specialized outlet on a piece of equipment to which a plug or cable connects.

USB

Universal Serial Bus is a standard connection method to connect different computer peripherals to the computer with an intention to replace many varieties of serial and parallel ports to connect different devices.

There are many USB versions - USB 1.0, USB 1.1, USB 2.0 and USB 3.0

USB 2.0 was introduced in 2001. Has a hi-speed rate of 480 Mbit/s. Are capable of falling back to full speed operation if necessary; they are backward compatible.

INPUT-OUTPUT DEVICES

An input device is any peripheral used to provide data and control signals to a computer. Some of the commonly used input devices are keyboards, pointing devices such as mouse, trackball, touchpad, graphics tablet, touch screen, joystick, pointing stick etc, Imaging and video input devices, Image scanners, digital camera, microphone and Bluetooth devices etc. Keyboards and mouse were discussed in an earlier section.

A number of pointing devices are used for inputting data. Some of them are mentioned above and they allow the user to control and provide data to the computer using physical gestures like pointing, clicking and dragging.

Pointing devices can be classified as:

Based on motion of object—Mouse, Trackball

Based on touching a surface—Touchpad, Graphics Tablet, Touch screen

Based on relative position of an object—Joystick, Pointing Stick

GRAPHICS TABLET

Also known as digitizing tablet or graphics pad or drawing Tablet. It is a computer input device that allows one to handdraw images and graphics, similar to the way one draws images with a pencil and paper. It consists of a flat surface upon which the user may 'draw' an image using an attached stylus, a pen-like drawing apparatus. The image does not generally appear on the tablet itself, but rather is displayed on the computer screen .

SCANNER

A scanner is a device that optically scans images, printed text, handwriting, or an object, and converts it to a digital image. Scanners use laser beams and reflected light to translate images. The images can be processed by a computer, displayed on a monitor, stored on a storage device, or communicated to another computer. Scanning devices include readers for barcodes. Scanners are very essential for creating digital libraries from older and rare documents. It is practically impossible to type the text of old documents for creating the digital library of older documents.

Some of the commonly available types of scanners are

Drum scanners

Flatbed scanners

Hand scanners

There are three types of scanning devices that sense marks or recognize characters. They are :

1. Magnetic-ink Character Recognition (MICR)
2. Optical Mark Recognition (OMR)
3. Optical Character Recognition (OCR)

OUTPUT DEVICES

An output device is any piece of computer hardware equipment used to communicate the results of data processing carried out by a computer to the outside world. The most common output devices are the monitor and speakers. Headphones, printers, projectors, lighting control systems, audio recording devices and robotic machines.

SPEAKER

Computer speakers or multimedia speakers, are speakers external to a computer that disable the lower fidelity built-in speaker. The computer speakers typically packaged with computer systems are small plastic boxes with mediocre sound quality. Better computer speakers have equalization features such as bass and treble controls. Some computer displays have built-in speakers.

Laptops come with integrated speakers. Unfortunately, the tight restriction on space inevitable in laptops means these speakers produce low-quality sound.

Common Features

An LED power indicator

A 3.5 mm headphone jack

Controls for volume, and sometimes bass and treble

A remote volume control

PRINTERS

There are a number of devices for obtaining hardcopy output from the computer. The most important hardcopy output device is the printer. Many printers are primarily used as local peripherals, and are attached by a printer cable or USB cable to a computer which serves as document source. Some printers, commonly known as network printers, have built-in network interfaces and can serve as a hardcopy device for any user on the network.

Printers are classified on the basis of the print technology they employ.

1. Impact printers: A printer that uses a printing mechanism that bangs the character image into the ribbon and onto the paper. Impact printer varieties include Daisy Wheel Printers, Dot Matrix Printers and Line Printers. All but Dot Matrix printer rely on the use of characters, letterforms that represent each of the characters that the printer is capable of printing.

Dot Matrix printers print each character as a pattern of dots. The quality of dot matrix printer is inferior to that of a letter quality printer but the printing speed is greater.

Daisy Wheel Printer uses a print wheel font known as daisy wheel. The print heads resemble daisy flower and hence the name. Each letter of the daisy wheel has a character embossed on it. A motor spins the wheel at a rapid rate. When the desired character spins to the correct position, a print hammer strikes it to produce the output.

Line Printers print an entire line of text at a time. They are the fastest of all impact printers. However they have now been replaced by high-speed laser printers.

2. Non-impact printers: A printer that prints without banging a ribbon onto paper. Laser, LED, ink jet, solid ink, thermal wax transfer, and dye sublimation printers are examples.

Laser printers use precision lasers to cause toner adherence.

Laser printers have many significant advantages over other types of printers. The fastest colour laser printer can print over 100 pages per minute.

LED printer uses an array of LEDs instead of a laser to cause toner adhesion to the print drum.

Inkjet printers operate by propelling variably-sized droplets of liquid or ink onto almost any-sized page.

A Dye Sublimation printer employs a printing process that uses heat to transfer dye to a medium such as a plastic card, paper or canvas.

Inkless Printers like thermal and UV printers are also in use today. The former works by selectively heating regions of special heat-sensitive paper. UV printers use a special reusable paper coated with a few micrometers of UV light sensitive chemicals.

THUMB DRIVE

Pen drive or Thumb drive or Flash drive is a memory chip that can be rewritten and can hold its content without power. It is also called a “flash RAM” or “flash ROM” chip and is widely used for digital camera and as storage for many consumer and industrial applications.

The Flash drive was first invented in 1998 by Don Moran, President and CEO of M-Systems Flash Pioneers (Israel).

Flash drives are resistant to scratches and dust and are more efficient than the previous forms of portable storage, such as compact discs and floppy discs. This makes them ideal for transporting personal data or work files from one location to another. They are smaller, faster and have thousands of times more capacity and are more durable and reliable because of their lack of moving parts.

Most flash drives draw power from the USB connection and do not require a battery.

USES

Personal data transport

System administration

Booting operating systems

Audio players

Music storage

Brand and product promotion

MODEMS

Modem(modulator-demodulator) is a device that modulates an analog carrier signal to encode digital information, and also demodulates such a carrier signal to decode the transmitted information.

Some of the most common and popularly used modems are discussed below:

Internal modem: is a device installed inside a desktop or laptop computer, allowing the computer to communicate over a network with other connected computers. They are integrated into the computer system and hence do not need any special attention. Internal modems are of two types – Dial-up and WiFi. Dial-up modems operate over a telephone line and require a network access phone number and logon credentials to make a connection. WiFi can connect wirelessly.

External modem: is a small box that uses other kinds of interfaces to be connected to the computer. They are easy to install as you don't have to open the computer. Some important types of external modems are

DSL (Digital Subscriber Line) modem

ADSL(Asymmetric Digital subscriber Line) modem

SDSL(Symmetric Digital Subscriber Line) modem

Cable modem

Satellite modem(SatModem)

DIGITAL CAMERA

A Digital Camera is a camera that takes video or still photographs, or both, digitally by recording images via an electronic image sensor. Digital cameras can do things film cameras cannot: displaying images on a screen immediately after they are recorded, storing thousands of images on a single small memory device, recording video with sound, and deleting images to free storage space. Digital cameras are incorporated into many devices like mobile phones.

Digital cameras are made in a wide range of sizes, prices and capabilities. The photographic images in the digital form can be fed to a computer for viewing and printing. First, the impressions are recorded or stored in the camera. The picture can then be downloaded to a computer by removable disc or by parallel port connection.

MICROPHONE

A microphone is an acoustic-to-electric transducer or sensor that converts sound into an electric signal. Microphones are used in many applications such as telephones, tape recorders, hearing aids, motion picture production, in radio and television broadcasting and in computers for recording voice. Microphones can be used for the input of sound which is then digitized by the computer. Speech recognition programs have given microphones a new arena for development- they can even replace the mouse or the keyboard as the system is programmed to respond to voice inputs.

Desktop computer microphones are not very effective for recording purposes as they pick up sound in all directions. Headset computer microphones come in two version- non USB and USB versions. They can pick up the sound very clearly and hence recording quality will be better. Moreover, they let the speaker to gesture, stand up, or move around for better voice projection and better voice quality.

BLUETOOTH DEVICES

Bluetooth is an open wireless technology standard for exchanging data over short distances using short length radio waves, from fixed and mobile devices. Invented by telecoms vendor Ericsson in 1994, Bluetooth is an anglicized version of Danish Blatand, The epithet of the tenth century king Harald I of Demark.

Bluetooth provides a secure way to connect and exchange information between devices such as faxes, mobile phones, telephones, laptops, personal computers, printers, Global Positioning System(GPS) receivers, Digital cameras etc.

A personal computer must have Bluetooth adapter or “dongle” in order to communicate with Bluetooth devices such as mobile phones, mice and keyboards.

Bluetooth protocols simplify the discovery and set up of services between devices. Bluetooth devices can advertise all of the services they provide. This makes using services easier because more of the security, network address and permission configuration can be automated than with many other network types.

QUESTIONS

1. The acronym CPU stands for
2. The two types of monitors are and
3. Name an input device.
4. Name an output device.
5. The first six letters of a conventional keyboard reads.....
6. mouse uses light emitting diodes to sense mouse movements.
7. records and stores photographic images in digital form.
8. Bluetooth was invented by..... Company.
9. The two major components of the CPU are..... and
10. The acronym LCD stands for

Short answer type

1. What is CPU?

CPU is the central processing unit. CPU is the brain of any computer system. It is the computing part of the computer and is also called the “processor”. In a computer system, all calculations and comparisons are made inside the CPU. It is also responsible for activating and controlling the operations of other units of a computer system. CPU is made up the Control Unit and ALU.

The CPU is also called microprocessor or central processor. The CPU usually performs 4 steps in most of its operations. They are fetch, decode, execute and writeback.

2. What are functions of ALU?

During a data processing operation, it is in the ALU that the actual execution of the instruction takes place. All the arithmetic and logical operations are made in the ALU. Basic arithmetic functions which an ALU can carry out include addition and subtraction. More powerful CPUs can support additional mathematical operations like multiplication and division. The logical operation the ALU carries out include comparison operations like greater than, equal to and less than.

3. List the functions of control unit?

Control Unit is the nerve centre of the computer. It performs the following functions:

Fetches the instruction from the primary memory at the location pointed to by the program counter register.

Decodes the instruction in the instruction register.

Executes the instruction by sequencing a series of control signals to other components of the CPU.

Controls all data transfer between various components.

4. What is a graphic tablet?

Graphic Tablet is also known as digitizing tablet or graphics pad or drawing Tablet. It is a computer input device that allows one to handdraw images and graphics, similar to the way one draws images with a pencil and paper. It consists of a flat surface upon which the user may ‘draw’ an image using an attached stylus, a pen-like drawing apparatus. The image does not generally appear on the tablet itself, but rather is displayed on the computer screen .

5. List the different types of scanners?

Drum scanners, Flatbed scanner, hand scanner

6. What is Bluetooth?

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Bluetooth provides a secure way to connect and exchange information between devices such as faxes, mobile phones, telephones, laptops, personal computers, printers, Global Positioning System(GPS) receivers, Digital cameras etc.

7. What is meant by QWERTY keyboard?

The first six letters on the left hand side of the keyboard upper row reads QWERTY. Keyboards beginning with QWERTY on the upper row are called QWERTY keyboards.

8. What are the various types of impact printers?

A printer that uses a printing mechanism that bangs the character image into the ribbon and onto the paper. Impact printer varieties include Daisy Wheel Printers, Dot Matrix Printers and Line Printers.

9. What is a flash drive?

Pen drive or Thumb drive or Flash drive is a memory chip that can be rewritten and can hold its content without power. It is also called a “flash RAM” or “flash ROM” chip and is widely used for digital camera and as storage for many consumer and industrial applications.

The Flash drive was first invented in 1998 by Don Moran, President and CEO of M-Systems Flash Pioneers(Israel).

Paragraph questions

1. What is a mouse? Describe the various types of mice?

A mouse is a device that is rolled about on a desktop and directs a pointer on the computer's display screen. The mouse pointer is the symbol that indicates the position of the mouse on the display screen. The mouse is connected to the computer with the help of a cable attached to a special port of the CPU. The tail like cord and the rounded head of the device earned its name 'mouse'.

There are 3 types of mice(plural of mouse):

- a. Mechanical mouse - the movement of a rubber ball causes a pair of wheels to spin that sensors detect to send data signals to the PC.
- b. Opto-mechanical Mouse – Uses light- emitting diodes(LEDs) to sense mouse movements.
- c. Optical mouse- eliminates the use of mechanical devices such as balls, rollers and wheels and uses optical scanning to detect the movement of the mouse.

Most commonly used clicks of the mouse button:

- a. Single left button click known as left click
- b. Two clicks of the left button in quick succession called the double click
- c. Clicking the left button three times in quick succession known as triple click.
- d. Clicking right hand button once known as Right click

2. What is a digitizing tablet and how is it used?

Also known as graphics pad or drawing Tablet. It is a computer input device that allows one to handdraw images and graphics, similar to the way one draws images with a pencil and paper. It consists of a flat surface upon which the user may 'draw' an image using an attached stylus, a pen-like drawing apparatus. The image does not generally appear on the tablet itself, but rather is displayed on the computer screen .

3. Describe computer speaker?

Computer speakers or multimedia speakers, are speakers external to a computer that disable the lower fidelity built-in speaker. The computer speakers typically packaged with computer systems are small plastic boxes with mediocre sound quality. Better computer speakers have equalization features such as bass and treble controls. Some computer displays have built-in speakers.

Laptops come with integrated speakers. Unfortunately, the tight restriction on space inevitable in laptops means these speakers produce low-quality sound.

Common Features

An LED power indicator

A 3.5 mm headphone jack

Controls for volume, and sometimes bass and treble

A remote volume control

4. What are the components of CPU? Explain the functions of each.

The components of the CPU are the control unit and the ALU.

Control Unit is the nerve centre of the computer. It performs the following functions:

1. Fetches the instruction from the primary memory at the location pointed to by the program counter register.
2. Decodes the instruction in the instruction register.
3. Executes the instruction by sequencing a series of control signals to other components of the CPU.
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ARITHMETIC AND LOGIC UNIT (ALU)

During a data processing operation, it is in the ALU that the actual execution of the instruction takes place. All the arithmetic and logical operations are made in the ALU. Basic arithmetic functions which an ALU can carry out include addition and subtraction. More powerful CPUs can support additional mathematical operations like multiplication and division. The logical operation the ALU carries out include comparison operations like greater than, equal to and less than.

5. Describe the processor types available in market today.

PROCESSOR TYPES

Since the processor handles all kinds of information, choosing the right processor is probably the most important thing when buying a computer.

INTEL COMPUTER PROCESSOR

Designed exclusively by Intel. Latest and most popular models include Intel Pentium 4 processor, Intel Pentium 4 processor with HT technology and Intel Celeron processor. The first can handle applications such as DVD authoring and 3D gaming while the second can run multiple applications simultaneously with a fast and efficient response.

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6. Describe Modems.

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Some of the most common and popularly used modems are discussed below:

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External modem : is a small box that uses other kinds of interfaces to be connected to the computer. They are easy to install as you don't have to open the computer. Some important types of external modems are

DSL (Digital Subscriber Line) modem

ADSL(Asymmetric Digital subscriber Line) modem

SDSL(Symmetric Digital Subscriber Line) modem

Cable modem

Satellite modem(SatModem)

Essay type questions

1. Describe a few input and output devices.

An input device is any peripheral used to provide data and control signals to a computer. Some of the commonly used input devices are keyboards, pointing devices such as mouse, trackball, touchpad, graphics tablet, touch screen, joystick, pointing stick etc, Imaging and video input devices, Image scanners, digital camera, microphone and Bluetooth devices etc.

A mouse is a device that is rolled about on a desktop and directs a pointer on the computer's display screen. The mouse pointer is the symbol that indicates the position of the mouse on the display screen. The mouse is connected to the computer with the help of a cable attached to a special port of the CPU. The tail like cord and the rounded head of the device earned its name 'mouse'.

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A number of pointing devices are used for inputting data. Some of them are mentioned above and they allow the user to control and provide data to the computer using physical gestures like pointing, clicking and dragging. Pointing devices can be classified as:

Based on motion of object—Mouse, Trackball

Based on touching a surface—Touchpad, Graphics Tablet, Touch screen

Based on relative position of an object—Joystick, Pointing Stick

Graphic Tablets are also known as digitizing tablet or graphics pad or drawing Tablet. It is a computer input device that allows one to handdraw images and graphics, similar to the way one draws images with a pencil and paper. It consists of a flat surface upon which the user may 'draw' an image using an attached stylus, a pen-like drawing apparatus. The image does not generally appear on the tablet itself, but rather is displayed on the computer screen.

A scanner is a device that optically scans images, printed text, handwriting, or an object, and converts it to a digital image. Scanners use laser beams and reflected light to translate images. The images can be processed by a computer, displayed on a monitor, stored on a storage device, or communicated to another computer. Scanning devices include readers for barcodes. Scanners are very essential for creating digital libraries from older and rare documents. It is practically impossible to type the text of old documents for creating the digital library of older documents.

Some of the commonly available types of scanners are

Drum scanners

Flatbed scanners

Hand scanners

There are three types of scanning devices that sense marks or recognize characters. They are :

1. Magnetic-ink Character Recognition (MICR)
2. Optical Mark Recognition (OMR)
3. Optical Character Recognition (OCR)

An output device is any piece of computer hardware equipment used to communicate the results of data processing carried out by a computer to the outside world. The most common output devices are the monitor and speakers. Headphones, printers, projectors, lighting control systems, audio recording devices and robotic machines.

Computer speakers or multimedia speakers, are speakers external to a computer that disable the lower fidelity built-in speaker. The computer speakers typically packaged with computer systems are small plastic boxes with mediocre sound quality. Better computer speakers have equalization features such as bass and treble controls. Some computer displays have built-in speakers.

Laptops come with integrated speakers. Unfortunately, the tight restriction on space inevitable in laptops means these speakers produce low-quality sound. Common feature of Laptops are:

An LED power indicator

A 3.5 mm headphone jack

Controls for volume, and sometimes bass and treble

A remote volume control

There are a number of devices for obtaining hardcopy output from the computer. The most important hardcopy output device is the printer. Many printers are primarily used as local peripherals, and are attached by a printer cable or USB cable to a computer which serves as document source. Some printers, commonly known as network printers, have built-in network interfaces and can serve as a hardcopy device for any user on the network. Printers are classified on the basis of the print technology they employ.

Impact printers: A printer that uses a printing mechanism that bangs the character image into the ribbon and onto the paper. Impact printer varieties include Daisy Wheel Printers, Dot Matrix Printers and Line Printers. All but Dot Matrix printer rely on the use of characters, letterforms that represent each of the characters that the printer is capable of printing.

Dot Matrix printers print each character as a pattern of dots. The quality of dot matrix printer is inferior to that of a letter quality printer but the printing speed is greater.

Daisy Wheel Printer uses a print wheel font known as daisy wheel. The print heads resemble daisy flower and hence the name. Each letter of the daisy wheel has a character embossed on it. A motor spins the wheel at a rapid rate. When the desired character spins to the correct position, a print hammer strikes it to produce the output.

Line Printers print an entire line of text at a time. They are the fastest of all impact printers. However they have now been replaced by high-speed laser printers.

Non-impact printers: A printer that prints without banging a ribbon onto paper. Laser, LED, ink jet, solid ink, thermal wax transfer, and dye sublimation printers are examples.

Laser printers use precision lasers to cause toner adherence.

Laser printers have many significant advantages over other types of printers. The fastest colour laser printer can print over 100 pages per minute.

LED printer uses an array of LEDs instead of a laser to cause toner adhesion to the print drum.

Inkjet printers operate by propelling variably-sized droplets of liquid or ink onto almost any-sized page.

A Dye Sublimation printer employs a printing process that uses heat to transfer dye to a medium such as a plastic card, paper or canvas.

Inkless Printers like thermal and UV printers are also in use today. The former works by selectively heating regions of special heat-sensitive paper. UV printers use a special reusable paper coated with a few micrometers of UV light sensitive chemicals.

Pen drive or Thumb drive or Flash drive is a memory chip that can be rewritten and can hold its content without power. It is also called a “flash RAM” or “flash ROM” chip and is widely used for digital camera and as storage for many consumer and industrial applications.

The Flash drive was first invented in 1998 by Don Moran, President and CEO of M-Systems Flash Pioneers (Israel). Flash drives are resistant to scratches and dust and are more efficient than the previous forms of portable storage, such as compact discs and floppy discs. This makes them ideal for transporting personal data or work files from one location to another. They are smaller, faster and have thousands of times more capacity and are more durable and reliable because of their lack of moving parts. Most flash drives draw power from the USB connection and do not require a battery. Some uses of flash drives are:

Personal data transport

System administration

Bootling operating systems

Audio players

Music storage

Brand and product promotion

2. What are major components of a CPU? Explain the functions of each.

CPU is the brain of any computer system. It is the computing part of the computer and is also called the “processor”. In a computer system, all calculations and comparisons are made inside the CPU. It is also responsible for activating and controlling the operations of other units of a computer system. CPU is made up the Control Unit and ALU.

The CPU is also called microprocessor or central processor. The CPU usually performs 4 steps in most of its operations. They are fetch, decode, execute and writeback.

The first step fetch involves retrieving an instruction(which is represented by a number or sequence of numbers) from program to memory.

In the decode step, the instruction is broken up into parts that have significance to other portions of CPU.

After fetch and decode steps, the execute step is performed. During this performance, the connected portions of the CPU enact the desired operation.

The final step writeback, simply 'writes back' the results of the execute step to some form of memory.

The components of the CPU include the control unit and the ALU. Control Unit is the nerve centre of the computer. It performs the following functions:

1. Fetches the instruction from the primary memory at the location pointed to by the program counter register.
2. Decodes the instruction in the instruction register.
3. Executes the instruction by sequencing a series of control signals to other components of the CPU.
4. Controls all data transfer between various components.

The next component,ALU is the Arithmetic and Logic Unit. During a data processing operation, it is in the ALU that the actual execution of the instruction takes place. All the arithmetic and logical operations are made in the ALU. Basic arithmetic functions which an ALU can carry out include addition and subtraction. More powerful CPUs can support additional mathematical operations like multiplication and division. The logical operation the ALU carries out include comparison operations like greater than, equal to and less than.

3. What are the various types of printers available in the market. Explain.

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MODULE III

INTRODUCTION TO SOFTWARE

OPERATING SYSTEMS

Software

Software is a set of instructions for the computer. It is also called a program. A series of instructions that performs a particular task is called a “program”.

Two major categories of software are:

- System software.
- Application software.

System software is also called operating system – It is made up of control programs like the operating system and database management system (DBMS).

Application Software – Any program that process data for the user (inventory, payroll, spreadsheet, word processor, etc. constitute application software.

Both these are created using a specific set of instructions on the basis of computer language.

Operating System (OS) or System Software:

It is the master control program that runs the computer. It is the first program loaded when the computer is turned on, its main part, the “kernel”, is in memory always. It is the operating system that sets the standard for all applications and programs that are run in the computer. The *Utility Programs* and *Language Translators* are included under the operating software. The application interacts with the operating system for all user interfaces and file management operations.

The Basic Functions of an OS

- (1) User interface – Windows and menus provide methods of interaction between user and computer. (Before Windows and UNIX, it was based on the commands entered by the user).
- (2) Data management – Keeps track of data on disk, tape and optical storage devices. The application program deals with data by file name and a particular location within the file.
- (3) Device management – Controls peripheral devices by sending them commands in their own particular language. The software that knows how to deal with each device is called a “driver”. The OS contains all the drivers for the peripherals attached to a computer.
- (4) Security – Provides password protection to keep unauthorized users out of the system (in case of multi-user systems).

Common OSs:

Commonly used operating systems are the many versions of windows (95, 98, NT, ME, 2000, XP, Windows Vista, Windows 2008 Etc.) and the many versions of UNIX (Solaris, Linux etc.), the Macintosh OS, IBM main frame OS/390 and the AS/400's, OS/400. Dos (*Disk operating system*) is still used for some legacy operations. There are other special operating systems as well.

Functions of Operating Systems:

1. Booting – Causing the computer to start executing instructions. In a PC it is in-built in a ROM chip that is automatically executed on start up. In large computers more button pushing and keyboard input is needed.

The term comes from “bootstrap” since boot straps help you get your boots on; booting the computer helps it get its first instructions. It is often mistakenly used for application software.

2. Managing storage media – Administration of any or all of backup, archival, disaster recovery and hierarchical storage management (HSM) procedures. Managing various storage media is another function. For example, formatting blank disks so as to prepare it to accept data or programs is a function. Now, preformatted disks are available.
3. Providing user interface – It is the combination of menus, screen design, keyboard commands, commands language and online help, which creates the way a user interacts with a computer. If input devices other than keyboard and mouse are required, these are also included. In future natural language recognition and voice recognition will become standard components of the user interface.
4. Managing computer resources – The operating system keeps track of all available hardware and/or software components for a system, a project or application, especially specialized for many different purposes. The transaction manager (TP monitor) communicates with the resource managers to apply the transaction. If a part of the transaction fails, the resource managers are informed to restore the previous status of their database.

Other resource management activities:

1. Partitioning – Keeping aside a part of disk or memory for other purposes. E.g.:- drives C, D, and E could be the same physical disk, but they would act like three separate drives to the operating system and the user.
2. Foreground/ Background – In a multitasking environment, priority given to programs are classified as foreground and background. Foreground programs have highest priority and background is given jobs like batch processing activities (sorts, updates, etc.).
3. File management – Managing files on a disk. It provides functions to delete, copy, move, rename, backup and view files as well as create and manage directories. In Windows 3.1 the file manager was ‘File Manager’. In later editions, it is the Windows Explorer.
4. Task management – Is managing many programs at a time or multitasking.

Windows

- Most widely used operating system.
- It provides geographical user interface and desktop environment, in which applications are displayed in re-sizable, movable windows on screen.
- It contains built-in networking, which allows users to share files and applications with each other if their PCs are connected to a network.

Advantages:

- Huge wealth of application programs that have been written for it.
- It is the standard for desktop and laptop computers worldwide with hundreds of millions of users.
- It is supported by Microsoft, the largest software company in the world.

Disadvantages:

- Windows 95, 98, ME, NT, 2000 and XP are complicated working environments.
- Certain combinations of hardware and software running together can cause problems.
- Each new version of Windows has interface changes, that constantly confuse the users.

Versions:

- (1) Windows 1.0 – 1985 – Provided graphical interface under DOS. It displayed tiled windows (side by side) and was never popular.
- (2) Windows 2.0 – 1987 – An upgrade to Windows 1.0, later named Windows /286.
- (3) Windows 3.0 – 1990 – Widely supported because of its improved interface and ability to manage large amounts of memory.
- (4) Windows 3.1 – 1992 – it added support to multimedia. It ran 16-bit windows and DOS applications.
- (5) Windows 3.11 – 1993 – An upgrade to and the final release of Windows 3.1.
- (6) Windows 95 – 1995 – A32-bit operating system designed to replace the 16-bit Windows 3.1.
- (7) Windows 98 – June 1998 – Major update to 95. Removed bugs and improved performance. Supports more hardware, including the USB.
- (8) Windows 98SE – September 1998 – Upgrade to Windows 98. It incorporates W. 98 Service Pack 1 with Internet Explorer 5, Outlook Express 5, Net Meeting 3 and Media Player 6.1 bundled.
- (9) Windows ME – May 2000 – Upgrade to W.98 (Millennium Edn.). It adds more support for digital cameras, multiplayer games on the internet and home net-working.
- (10) Windows NT {New Technology} – 2000 – A 32-bit OS for PC networking.
- (11) Windows 2000 – Feb 2000 – Also known as Win2K and W2K. A major upgrade to W.NT.4.
- (12) Windows XP – 2001 – Upgrade client version of W 2000.
- (13) Windows 2003 – 2003 – Reversed version of Windows server 2000.
- (14) Windows Vista – 2007 – Revised version of XP.
- (15) Windows 2008 – 2008 – Most of the functions can be selected from the menu. Improved version of 2003.

Window:

A window is a rectangular area on screen surrounded by a window frame with a title bar and a title at the top.

Self-check Questions:

1. What is software?
 - a. Software is a set of instructions for the computer. It is also called a program.
2. What is a program?
 - a. A series of instructions that performs a particular task is called a “program”.
3. What are the two major categories of software?
 - a. The two major categories of software are System software and Application software.

4. What is OS?

a. OS means operating system. It is the master control program that runs the computer. It is the first program loaded when the computer is turned on, its main part, "kernel", is in memory always. It is the operating system that sets the standard for all applications and programs that are run in the computer.

5. Name some of the functions of OS.

a. User interface, data management, device management, and security are some of the functions of OS.

6. Name two common operating systems.

a. Windows XP, and windows 2008 are two of the common operating systems.

7. What is booting?

a. Booting means causing the computer to start executing instructions. In a PC it is in-built in a ROM chip that is automatically executed on start up.

8. What is partitioning?

a. Partitioning is keeping aside a part of disk or memory for other purposes. E.g.:- drives C, D, and E could be the same physical disk, but they would act like three separate drives to the operating system and the user.

9. Explain foreground and Background.

a. In a multitasking environment, priority given to programs, are classified as foreground and background. Foreground programs have highest priority and background is given jobs like batch processing activities (sorts, updates, etc.).

10. What is Windows?

a. Windows is the most widely used operating system. It provides geographical user interface and desktop environment, in which applications are displayed in re-sizable, movable windows on screen. It contains built-in networking, which allows users to share files and applications with each other if their PCs are connected to a network

11. What are the advantages of windows?

a. Advantages of windows are the huge wealth of application programs that have been written for it. It is the standard for desktop and laptop computers worldwide with hundreds of millions of users. It is supported by Microsoft, the largest software company in the world.

12. What is a window in an operating system?

a. A window is a rectangular area on screen surrounded by a window frame with a title bar and a title at the top.

Paragraph Questions:

1. Define and explain software.

a. Software is a set of instructions for the computer. It is also called a program. A series of instructions that performs a particular task is called a "program".

Two major categories of software are:

- System software.
- Application software.

System software is also called operating system – It is made up of control programs like the operating system and database management system (DBMS).

Application Software – Any program that process data for the user (inventory, payroll, spreadsheet, word processor, etc. constitute application software.

Both these are created using a specific set of instructions on the basis of computer language.

2. Define Os and explain its functions.

a. Operating System (OS) or System Software is the master control program that runs the computer. It is the first program loaded when the computer is turned on, its main part, and the “kernel”, is in memory always. It is the operating system that sets the standard for all applications and programs that are run in the computer. The *Utility Programs* and *Language Translators* are included under the operating software. The application interacts with the operating system for all user interfaces and file management operations. The Basic Functions of an OS are:

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3. Device management – Controls peripheral devices by sending them commands in their own particular language. The software that knows how to deal with each device is called a “driver”. The OS contains all the drivers for the peripherals attached to a computer.
4. Security – Provides password protection to keep unauthorized users out of the system (in case of multi-user systems).

3. Define Windows and list out the advantages and disadvantages.

a. Windows is the most widely used operating system. It provides geographical user interface and desktop environment, in which applications are displayed in re-sizable, movable windows on screen. It contains built-in networking, which allows users to share files and applications with each other if their PCs are connected to a network. The advantages are the huge wealth of application programs that have been written for it. It is the standard for desktop and laptop computers worldwide with hundreds of millions of users. It is supported by Microsoft, the largest software company in the world. The disadvantages are that the Windows 95, 98, ME, NT, 2000 and XP are complicated working environments. Certain combinations of hardware and software running together can cause problems. Each new version of Windows has interface changes that constantly confuse the users.

Free Software

The first formal definition of free software was published by FSF (Free Software Foundation) in February 1986. The free software definition, written by Richard Stallman and published by FSF, defines free software, as a matter of liberty, not price. The term free is used in the sense of “free speech”, not of “free beer”. The four freedoms for those who receive a copy of this software are:

1. Freedom 0 – The freedom to run the program for any purposes.
2. Freedom 1 – The freedom to study how the program works, and to change it to make it do what you wish.

3. Freedom 2 – The freedom to redistribute copies so you can help your neighbors.
4. Freedom 3 – The freedom to improve the program, and release your improvements (and modified version in general) to the public, so that the whole

Examples of free software: - Linux kernel, BSD and GNU/Linux operating systems, the GNU compiler collection and C Library.

Free Software Licenses

All free software licenses must grant people all the freedoms as mentioned earlier. The majority of free software uses a small set of licenses. The most popular of these licenses are:

1. The GNU General Public license.
2. The GNU Lesser General Public license.
3. The BSD license.
4. The Mozilla Public license.
5. The MIT license.
6. The Apache license.

The FSF and Open Source Initiative publish lists of licenses they find to comply with their own definition of free software and open software.

The FSF list is not prescriptive. Free software not in the FSF list is also possible. The OSI list only provides the list of licenses that have been submitted, considered and approved. All open source licenses must meet open source definition.

There is also the Debian project. It does not publish a list of approved licenses. So it has to be tracked down for guidelines.

There are three licenses approved by FSF:

- 1) Public domain software.
- 2) Permissive licenses, also called BSD.
- 3) Copyleft licenses, the GNU general public license being prominent.

Linux

It is a version of UNIX that runs on a variety of hardware platforms including X86 PCs, Alpha, Power PC and IBM's product line. It is open source software which is freely available. Technical support is often provided by Red Hat Software. It is stable and has the capacity to host web servers. IBM is supporting Linux for all of its hardware platforms in order to have a common OS for all product lines.

In 1990, a Finnish computer science student, Linus Torvald turned MiNix, a popular classroom teaching tool, into Linux. Torvald created the kernel and most of the supporting applications came from the GNU project and the FSF.

Self-check Questions:

1. What is free software?

- a.. The free software definition, written by Richard Stallman and published by FSF, defines free software, as a matter of liberty, not price. The term free is used in the sense of “free speech”, not of “free beer”.
2. What is FSF?
 - a. FSF means free software foundation.
3. Who installed the FSF?
 - a. Richard Stallman installed the FSF.
4. Name the three licenses approved by FSF.
 - a. The three licenses approved by FSF are:
 1. Public domain software.
 2. Permissive licenses, also called BSD.
 3. Copyleft licenses, the GNU general public license being prominent.
5. What is Linux?
 - a. Linux is a version of UNIX that runs on a variety of hardware platforms including X86 PCs, Alpha, Power PC and IBM’s product line. It is open source software which is freely available. Technical support is often provided by Red Hat Software. It is stable and has the capacity to host web servers.
6. Who developed linux?
 - a. In 1990, a Finnish computer science student, Linus Torvald turned MiNix, a popular classroom teaching tool, into Linux. Torvald created the kernel and most of the supporting applications came from the GNU project and the FSF.
7. What is RED HAT?
 - a. RED HAT is the software that provides technical support to Linux.

Paragraph Questions:

1. What do you mean by free software?
 - a. The first formal definition of free software was published by FSF (Free Software Foundation) in February 1986. The free software definition, written by Richard Stallman and published by FSF, defines free software, as a matter of liberty, not price. The term free is used in the sense of “free speech”, not of “free beer”. The four freedoms for those who receive a copy of this software are: 1. Freedom 0 – The freedom to run the program for any purposes. 2. Freedom 1 – The freedom to study how the program works, and to change it to make it do what you wish. 3. Freedom 2 – The freedom to redistribute copies so you can help your neighbors. 4. Freedom 3 – The freedom to improve the program, and release your improvements (and modified version in general) to the public, so that the whole

Examples of free software: - Linux kernel, BSU and GNU/Linux operating systems, the GNU compiler collection and C Library.
2. Explain free software license?
 - a. All free software licenses grant people all the freedoms. The majority of free software uses a small set of licenses. The most popular of these licenses are:
 1. The GNU General Public license.
 2. The GNU Lesser General Public license.
 3. The BSC license.

4. The Mozilla Public license.
5. The MIT license.
6. The Apache license.

The FSF and Open Source Initiative publish lists of licenses they find to comply with their own definition of free software and open software.

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3. Explain Linux.

a. Linux is a version of UNIX that runs on a variety of hardware platforms including X86 PCs, Alpha, Power PC and IBM's product line. It is open source software which is freely available. Technical support is often provided by Red Hat Software. It is stable and has the capacity to host web servers. IBM is supporting Linux for all of its hardware platforms in order to have a common OS for all product lines.

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SECURITY ISSUES

Computer Virus

A computer virus is a program that can copy itself and infect computer. There are other functions like malware, adware and spyware programs which do not have the reproductive ability. A true virus can only spread from one computer to another. A true virus can only spread from one computer to another. It is often carried on a removable medium such as a floppy disk, CD, DVD or USB drive.

Malware includes computer viruses, worms, trojans, most root kits, spyware, dishonest adware, crimeware and other malicious and unwanted software including real viruses. A worm can exploit security vulnerabilities to spread itself automatically to other computers through networks, while a Trojan is a program that appears harmless but hides malicious functions. Worms and Trojans, like viruses, may harm a computer system's data or performance.

The creeper virus was first detected on ARPANET in early 1970s. The actual term 'virus' came from a novel called *When Harlie Was One*, written by David Gerrold 1972. The first PC virus was called *Brain* created by Farooq Alvi Brothers in Lahore, Pakistan, in 1986.

There are two methods to detect viruses:

1. First is using a list of virus signature definitions.
2. Second is to use a heuristic algorithm to find viruses based on common behaviours.

Antivirus software is used to prevent, detect and remove malware including computer viruses, worms and Trojans horses. Some known antivirus software's are Avast, Avira, Mc Afee etc.

Cryptography is another method of protecting information from being destroyed. It is the practice and study of hiding information. Cryptography is applied in ATM cards, computer passwords, electronic commerce etc. In colloquial use, the term "code" is often used to mean any method of encryption or concealment of meaning.

The study of characteristics of languages which have some applications in cryptography i.e. frequency data, letter combinations, universal patterns etc. is called crypto linguistics.

Cryptography has long been of interest to intelligence gathering and law enforcement agencies. It is also central to Digital Rights Management (DRM), a group of techniques for technologically controlling use of copyrighted material.

Self-check Questions:

1. What is a computer virus?
 - a. A computer virus is a program that can copy itself and infect computer.
2. How does a computer virus spread?
 - a. A true virus can only spread from one computer to another. A true virus can only spread from one computer to another. It is often carried on a removable medium such as a floppy disk, CD, DVD or USB drive.
3. What is Malware?
 - a. Malware includes computer viruses, worms, trojans, most root kits, spyware, dishonest adware, crimeware and other malicious and unwanted software including real viruses. A worm can exploit security vulnerabilities to spread itself automatically to other computers through networks, while a Trojan is a program that appears harmless but hides malicious functions. Worms and Trojans, like viruses, may harm a computer system's data or performance.
4. When was the creeper virus first detected?
 - a. The creeper virus was first detected on ARPANET in early 1970s.
5. Where did the word virus come from?
 - a. The actual term 'virus' came from a novel called *When Harlie Was One*, written by David Gerrold 1972.
6. Who created the virus first?
 - a. The first PC virus was called *Brain* created by Farooq Alvi Brothers in Lahore, Pakistan, in 1986.

7. What are the methods to detect virus?

a. There are two methods to detect viruses. First is using a list of virus signature definitions. Second is to use a heuristic algorithm to find viruses based on common behaviours.

8. What is antivirus?

a. Antivirus software is used to prevent, detect and remove malware including computer viruses, worms and Trojans horses. Some known antivirus software's are Avast, Avira, Mc Afee etc.

9. What is cryptography?

a. Cryptography is another method of protecting information from being destroyed. It is the practice and study of hiding information.

10. In which cases do you use cryptography?

a. Cryptography is applied in ATM cards, computer passwords, electronic commerce etc. In colloquial use, the term "code" is often used to mean any method of encryption or concealment of meaning.

11. What is crypto-linguistics?

a. The study of characteristics of languages which have some applications in cryptography i.e. frequency data, letter combinations, universal patterns etc. is called crypto linguistics.

12. What is DRM?

a. DRM is digital rights management, a group of techniques for technologically controlling use of copyrighted material.

Paragraph Questions:

1. Differentiate between computer Virus and Malware.

a. A computer virus is a program that can copy itself and infect computer. There are other functions like malware, adware and spyware programs which do not have the reproductive ability. A true virus can only spread from one computer to another. A true virus can only spread from one computer to another. It is often carried on a removable medium such as a floppy disk, CD, DVD or USB drive. Malware includes computer viruses, worms, trojans, most root kits, spyware, dishonest adware, crimeware and other malicious and unwanted software including real viruses. A worm can exploit security vulnerabilities to spread itself automatically to other computers through networks, while a Trojan is a program that appears harmless but hides malicious functions. Worms and Trojans, like viruses, may harm a computer system's data or performance.

2. Describe the various security devices used in computers.

a. Two methods are used to detect viruses. First is using a list of virus signature definitions.

Second is to use a heuristic algorithm to find viruses based on common behaviours. Antivirus software is used to prevent, detect and remove malware including computer viruses, worms and Trojans horses. Some known antivirus software's are Avast, Avira, Mc Afee etc. Cryptography is another method of protecting information from being destroyed. It is the practice and study of hiding information. Cryptography is applied in ATM cards, computer passwords, electronic commerce etc. In colloquial use, the term "code" is often used to mean any method of encryption or concealment of meaning. The study of characteristics of languages which have some applications in cryptography i.e. frequency data, letter combinations, universal patterns etc. is called crypto linguistics. Cryptography has long been of interest to intelligence gathering and law enforcement agencies. It is also central to

Digital Rights Management (DRM), a group of techniques for technologically controlling use of copyrighted material.

Essays:

1. Discuss the importance of Windows and enumerate the various versions.

a. Windows is the most widely used operating system. It provides graphical user interface and desktop environment, in which applications are displayed in re-sizable, movable windows on screen. It contains built-in networking, which allows users to share files and applications with each other if their PCs are connected to a network.

Advantages:

- Huge wealth of application programs that have been written for it.
- It is the standard for desktop and laptop computers worldwide with hundreds of millions of users.
- It is supported by Microsoft, the largest software company in the world.

Disadvantages:

- Windows 95, 98, ME, NT, 2000 and XP are complicated working environments.
- Certain combinations of hardware and software running together can cause problems.
- Each new version of Windows has interface changes, that constantly confuse the users.

Versions:

1. Windows 1.0 – 1985 – Provided graphical interface under DOS. It displayed tiled windows (side by side) and was never popular.
2. Windows 2.0 – 1987 – An upgrade to Windows 1.0, later named Windows /286.
3. Windows 3.0 – 1990 – Widely supported because of its improved interface and ability to manage large amounts of memory.
4. Windows 3.1 – 1992 – it added support to multimedia. It ran 16-bit windows and DOS applications.
5. Windows 3.11 – 1993 – An upgrade to and the final release of Windows 3.1.
6. Windows 95 – 1995 – A32-bit operating system designed to replace the 16-bit Windows 3.1.
7. Windows 98 – June 1998 – Major update to 95. Removed bugs and improved performance. It supports more hardware, including the USB.
8. Windows 98SE – September 1998 – Upgrade to Windows 98. It incorporates W. 98 Service Pack 1 with Internet Explorer 5, Outlook Express 5, Net Meeting 3 and Media Player 6.1 bundled.
9. Windows ME – May 2000 – Upgrade to W.98 (Millennium Edn.). It adds more support for digital cameras, multiplayer games on the internet and home net-working.
10. Windows NT {New Technology} – 2000 – A 32-bit OS for PC networking.
11. Windows 2000 – Feb 2000 – Also known as Win2K and W2K. It is a major upgrade to W.NT.4.
12. Windows XP – 2001 – Upgrade client version of W 2000.
13. Windows 2003 – 2003 – Reversed version of Windows server 2000.
14. Windows Vista – 2007 – Revised version of XP.

15. Windows 2008 – 2008 – Most of the functions can be selected from the menu. It is an improved version of 2003.

2. Discuss the dangers to computers and remedies available.

a. There are two kinds of dangers to computers. One is the virus and the other is malware. A computer virus is a program that can copy itself and infect computers. There are other functions like malware, adware and spyware programs which do not have the reproductive ability.. A true virus can only spread from one computer to another. It is often carried on a removable medium such as a floppy disk, CD, DVD or USB drive.

Malware includes computer viruses, worms, trojans, most root kits, spyware, dishonest adware, crimeware and other malicious and unwanted software including real viruses. A worm can exploit security vulnerabilities to spread itself automatically to other computers through networks, while a Trojan is a program that appears harmless but hides malicious functions. Worms and Trojans, like viruses, may harm a computer system's data or performance.

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There are two methods to detect viruses. First is using a list of virus signature definitions.

Second is to use a heuristic algorithm to find viruses based on common behaviours.

Antivirus software is used to prevent, detect and remove malware including computer viruses, worms and Trojans horses. Some known antivirus software's are Avast, Avira, Mc Afee etc.

Cryptography is another method of protecting information from being destroyed. It is the practice and study of hiding information. Cryptography is applied in ATM cards, computer passwords, electronic commerce etc. In colloquial use, the term "code" is often used to mean any method of encryption or concealment of meaning.

The study of characteristics of languages which have some applications in cryptography i.e. frequency data, letter combinations, universal patterns etc. is called crypto linguistics.

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MODULE 4

NETWORKING

A computer network is a collection of computers and devices connected by communication channels. It includes the network operating system in the client and server machines, the cables connecting them and all the supporting hardware in between such as bridges, routers and switches. In wireless systems antennas and towers are also part of the network.

Major benefits of the computer networks are:

Resource sharing is made possible as all data, program and equipment is available to anyone on the network irrespective of the physical location of the resources and the user.

Data replicated on other machines increase reliability and reduce risk.

The computer network has the ability to increase system performance gradually as the workload grows by adding more processors.

Increased storage capacity as more than one computer is available on the network. A standalone computer might fall short of storage memory, but when many computers are on the network, memory of different computers can be used in one case.

It is a very powerful communication medium. Using a network, it is easy for people who live apart to communicate with each other and even to work together.

Disadvantages of networking:

Security issues tend to arise in an environment where data sharing is done.

Rapid spread of computer viruses.

In case the main file server of the network breaks down, the system becomes useless

TYPES OF NETWORKS

PAN – Personal Area Network

LAN – Local Area Network

CAN – Campus Area Network

MAN – Metropolitan Area Network

WAN – Wide Area Network

GAN – Global Area Network

WAN is a communications network that covers a wide geographic area, such as a state or country. A LAN is contained within a building or complex, and a MAN generally covers a city or a suburb. PAN is a computer network used for communication among computer devices close to one person. CAN is a computer network made up of an interconnection of LANs within a limited geographical area. GAN is a model for supporting mobile communication across an arbitrary number of wireless LANs, satellite coverage areas etc.

LAN

LAN is a communication network that serves users within a limited geographic area. It can be within a building or within a campus. It is made up of servers, workstations, a network operating system and a communication link. In LANs the transmission speed is very high as transmission channels use coaxial or fiber optic cables. A printer can be attached locally to a workstation or to a server and be shared by all network users.

The two main purposes of LAN are to link computers within an organization or campus so that they may share expensive peripheral devices such as high-speed printers and magnetic disks holding database, and to allow these computers to communicate with each other. Small LANs allow ordinary PCs and workstations to function as a server, allowing users access to data on another user's machine. Multiple servers are used in large networks.

WAN

A WAN is a geographically dispersed collection of LANs. A network device called a router connects LANs to a WAN. In WAN, the transmission media used are normally public systems such as telephone lines, microwaves and satellite links. The largest and most well-known example of a WAN is the internet.

A WAN may extend over several thousands of kilometers and may operate nationwide or worldwide.

Compared to the transmission cost in LANs, the cost of transmitting data in WANs may be high because transmission medium used are leased lines or public communication systems such as telephone lines.

WIRELESS NETWORKS

Wireless networking refers to two or more computers communicating without the use of cabling. Wireless radio signals or electromagnetic waves are used for communication. Wireless LANs are easy to install and they are particularly in great demand in relation to laptops.

A radio relay station in orbit above the earth receives, amplifies and redirects digital signals contained within a carrier frequency. There are three types of satellites: geostationary satellites, low-earth orbit satellites and medium-earth orbit satellites. In addition there are hundreds of commercial communication satellites in orbit providing services for both industry and consumers.

Earth stations transmit or receive signals in satellite communications. It uses a dish-shaped antenna for microwave transmission. Earlier signals from communication satellites could be received only through earth stations. Now homes use individual small dishes to receive signals.

Advantages of wireless LANs:

Easier to provide connectivity in area where it is difficult to lay cables.

Faster and easier installation.

Access to network possible from anywhere within range of access point

Installation expenses lower

In old buildings where drilling for cabling is difficult, wireless LANs are convenient.

Disadvantages of wireless LANs

Data transfer rate to individual computers will decrease as the number of computers in a network increases.

Applications like video-streaming will be more effective in a wired network

Distance from the access point is a limitation

FILE SHARING

The practice of sharing digitally stored information , such as computer programs, Audio-video programs, digital books etc is termed file sharing. The different modes of file sharing are:

Manual sharing using removable disc or USB

Peer to Peer networks

File hosting networks

Of these, Peer to Peer file sharing is a very popular option for file sharing on the internet. Users can use it to search for shared files already connected to the network. When this software is used, the user's system also becomes part of the network and Information from the user's computer can be downloaded by others in the network.

File hosting services are an alternative to Peer to Peer software. They are used along with Internet collaboration tools like e mails, forums, blogs or any other medium in which links to direct downloads from file hosting services can be embedded.

To ensure offences are not permitted in file sharing, copyright rules have been enacted. A copyright grants the owner of the material exclusive rights to the material and its distribution. By distributing this material without permission , a person distributing the material is violating copyright law and is subject to penalties under the law.

THE INTERNET

The internet is a communication system that comprises of a network of networks. It is made up of more than 450 million computers in more than 200 countries thus acting as a global carrier of information. It consists of millions of private, public, academic, business and government networks linked by a broad array of electronic and optical networking technologies. The internet was originally developed in the cold war period for the exclusive use of the US military force. The Advanced Research Projects Agency (ARPA)funded a project to connect university scientists and engineers together via computers and telephone lines. The project called ARPANET allowed users to access unpublished data and journals on a wide variety of subjects. The internet carries plenty of information resources and services , including the interlinked hypertext documents of the World Wide Web (www).

Today, the internet has become commercialized into a worldwide information highway , providing information on every subject known to mankind. In addition to a number of online services, it also offers e-mail facilities. E-mail and file transfers via internet have become very popular.

The Internet services do not have a central governance on any issue. Only the Internet Protocol address space and the Domain Name System are directed by a maintainer organization, the ICANN(Internet Corporation for Assigned Names and Numbers).

The services offered by the internet are:

Electronic mail(e mail) which helps to send and receive mail.

Telnet or remote login which permits one computer to log onto another computer.

WWW or The Web which is the largest and fastest growing activity on the net

FTP or File Transfer Protocol which allows computer to retrieve complex files from remote sources and to save them

Web browsing

Online Chatting

Newsgroups or internet discussion groups which are set up to receive and send articles and messages on specific topics.

Teleconferencing and videoconferencing

Multimedia resources and services

Multipoint conferencing

HTML services.

Requisites for an internet connection

A computer with good memory and fast processor.

A modem

A Browser software

An internet service provider that connects the system to the internet.

Some Internet Access Services

Internet Service Providers (ISPs) use several types of technologies to enable a user to get connected to the internet. ISP is an agency that provides access to the internet. The communication line can be chosen depending on the bandwidth required for the services. Bandwidth refers to the transmission capacity of an electronic line such as a communication network, computer bus or computer channel. These communication lines are usually made up of twisted copper wire, coaxial cable, fiber optics and wireless systems. Some popular options are dial-up, DSL(Asymmetric Digital Subscriber Line), broadband wireless, cable modem, ISDN(Integrated Services Digital Network) etc. For lthernet, Frame Relay, ISDN, SONET etc may be used.

HTML

HTML stands for Hypertext Markup Language. Markup language may not be visible to us and it is the information that is added to a document to convey information about the document's structure or presentation.HTML is a markup language that tells the web browsers how to structure and display web pages.

HTML was created by Tim Berners Lee in collaboration with Robert Caillou in 1989. HTML documents could be transmitted to any user on the internet and displayed by a browser. An HTML document is composed of 3 parts:

A line containing HTML document type.

A declarative header element

A body which contains the document's actual content.

HTML provides a means to create structured documents by denoting structural semantics for texts such as headings, paragraphs etc for links, quotes and other items.

World Wide Web

It is an internet interface that facilitates all internet services attractive by incorporating hypermedia capabilities. You can retrieve documents, view images, animation and video, speak and hear voice etc. When you log on to the internet using a web browser like Internet Explorer, Mozilla Firefox, Netscape etc, you can view documents on the World Wide Web.

The WWW is a huge collection of web sites. Using the HTML, the author of a document can specially code sections of the document to point to other information resources. These sections are called hypertext links.

A browser is a computer program that enables you to use the computer to view WWW documents and access the internet. It is a software application for retrieving, presenting and traversing information resources on the WWW. Although browsers are primarily used to access the WWW, they can also be used to access information provided by web servers in private networks or files in file systems.

SEARCH ENGINE

A web search engine is designed to search for information on the WWW, the results of which are presented in lists called hits. Web search engines work by storing information about many web pages, which they retrieve from the html itself. A search engine is a searchable database of internet files collected by a computer program. It consists of three components: Spider, Index and Search and retrieval mechanism.

Spider is a program that traverses the web from link to link, identifying and reading the pages. They are also called web wanderers, web crawlers and robots. They send back indexing information to the search engine.

Index is a database containing searchable information about web page gathered by the spider.

Search and retrieval mechanism is the technology that enables users to query the index and that returns in a schematic order.

There are three major types of general search engines: Free Text search engine, DirectoryType search engine and Meta search engine. In addition to these there are also subject specific search engines, directories, subject gateways and information portals. Some websites like yahoo.com function as search engines in addition to other functions.

Most web search engines are commercial ventures supported by advertising revenue and some employ the practice of allowing advertisers to pay to have their listings ranked higher in search results. Some of the top search engines are:

[http:// www.google.com/](http://www.google.com/)

<http://www.yahoo.com/>

<http://www.bing.com/>

<http://www.ask.com/>

<http://www.msn.com/>

<http://www.netscape.com/>

E-mail

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There are two ways of accessing e-mail on the internet- one by using a program like Microsoft Outlook Express e mail service or Netscape Messenger that is installed in the computer and the other is a mail service on the web like gmail and yahoomail, which is accessible from any browser.

To receive and send web based email one has to type in the username and password. E-mail was invented by Ray Tomlinson in 1972. Web based e-mail was first started by MSN with the name hotmail. Others like rediffmail, gmail and yahoo followed.

Advantages of E-mail

It is inexpensive.

E-mail is fast. It is routed through several servers until it reaches its destination. But it usually reaches the recipient fast. Transmission is secure and reliable.

E-mail is flexible in that it does not depend on the type of computer or program you use.

The recipient does not have to be present when the message is sent.

It can be sent to multiple recipients at the cost of a single mail.

E-mail messages can be segregated and stored in folders

E-mail can be accessed from any location with an internet connection.

E-mail programs usually have spell check facilities.

Attachments are possible.

Notification of new e-mail is possible if the system is switched on.

BLOGS

A blog (web log) is a type of website usually maintained by an individual with regular entries of commentary, descriptions of events etc. It is usually a single page entry which archives older entries. A blog is organized in reverse chronological order, from most recent entry to least recent.

A blog is usually owned by a single person, but can be viewed by the public. It could be read as an online journal or diary. Blogs are of different types:

Personal blogs which resemble a diary entry and allow people to share thoughts, feelings and sentiments with others.

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SOCIAL NETWORK

A social network service focuses on building online communities of people who share interests and activities of others. They are web based and allow users to interact using e-mail and instant messaging services. It is a powerful means to communicate and share information.

A social network is typically made up of individuals called nodes tie up by relations such as friendship, kinship, financial exchange, dislike, knowledge etc. Social networking helps you to:

- Search for old friends or make new ones
- Share music and video
- Join communities based on interests
- Even find jobs
- Increased business opportunities

Even though social networking sites are immensely popular, there are also several problems involved. Users receive friend applications even from strangers and an acceptance could give them access to your personal information. Fake profiles allow children to enter these sites which often prove dangerous. Financial irregularities have also been reported from such sites.

Some well-known social networking sites are:

- Twitter
- Orkut
- Facebook
- MySpace
- LinkedIn
- Flickr

SECURITY ISSUES

The main goals of computer system security are confidentiality, integrity and availability. Computer systems are vulnerable to many threats that can inflict various types of damage resulting in significant losses. Losses can stem from the actions of supposedly trusted employees defrauding a system, from outside hackers, or from careless data entry clerks.

Individuals may use a computer to steal small sums of money from a large number of financial accounts. Insiders within an organization may also be responsible for such irregularities.

People who gain access to a computer system without the knowledge of the owner are called hackers. They access and rob the data available on the systems. Before hacking, they gather information about the target system such as its strengths, weaknesses, operating systems, folders, configuration files etc.

Industrial espionage is also common today with companies gathering proprietary data from other companies or even the government.

Malware or malicious software is designed to infiltrate a computer system without the owner's consent.

A virus is a parasitic program written intentionally to alter the way your computer operates.

Trojan horses are programs that appear to serve some useful purpose or provide entertainment, but they also have the covert aim to damage files, place a virus in your system or even allow a hacker to enter your system.

Phishing is the fraudulent process of attempting to acquire sensitive information such as usernames, passwords, and credit card details by masquerading as a trustworthy entity. Communications purporting to be from popular social web sites, auction sites, online payment processors or IT administrators are used to fool people. Phishing is carried out by e-mail or instant messaging. Users are directed to websites which are very similar to legitimate sites. Attempts to control this misdeed have been initiated and these include legislation, user training, public awareness and technical security measures.

Computers can be made safer by following the suggestions below:

Physical security should be maintained and as such doors and locks should always be secure.

Periodic virus checking

When sensitive information is stored, it is better not to have an internet connection.

Passwords should be changed regularly

Security checking password could be installed.

Do not use credit cards over the web if it could be helped.

SHORT ANSWER TYPE QUESTIONS

1. What is LAN?

LAN is a communication network that serves users within a limited geographic area. It can be within a building or within a campus. It is made up of servers, workstations, a network operating system and a communication link. In LANs the transmission speed is very high as transmission channels use coaxial or fiber optic cables. A printer can be attached locally to a workstation or to a server and be shared by all network users.

2. What is meant by wireless network?

Wireless networking refers to two or more computers communicating without the use of cabling. Wireless radio signals or electromagnetic waves are used for communication. Wireless LANs are easy to install and they are particularly in great demand in relation to laptops.

3. Name any four internet services.

E-mail, Chatting, social networking, video conferencing

4. Name a few web browsers.

Mozilla Firefox, Google Chrome, Microsoft Internet Explorer

5. What is HTML?

HTML stands for Hypertext Markup Language. Markup language may not be visible to us and it is the information that is added to a document to convey information about the document's structure or presentation. HTML is a markup language that tells the web browsers how to structure and display web pages.

HTML was created by Tim Berners Lee in collaboration with Robert Caillou in 1989. HTML documents could be transmitted to any user on the internet and displayed by a browser.

6. What is a blog?

A blog (web log) is a type of website usually maintained by an individual with regular entries of commentary, descriptions of events etc. It is usually a single page entry which archives older entries. A blog is organized in reverse chronological order, from most recent entry to least recent.

7. What is social networking?

A social network service focuses on building online communities of people who share interests and activities of others. They are web based and allow users to interact using e-mail and instant messaging services. It is a powerful means to communicate and share information.

Some popular social networking sites are: orkut, Twitter, Facebook etc

8. List two popular online shopping sites.

e-bay, flipkart

9. What is a search engine?

A web search engine is designed to search for information on the WWW, the results of which are presented in lists called hits. Web search engines work by storing information about many web pages, which they retrieve from the html itself. A search engine is a searchable database of internet files collected by a computer program.

PARAGRAPH QUESTIONS

1. What are the different types of computer networks?

The different types of computer networks are the following:

PAN – Personal Area Network

LAN – Local Area Network

CAN – Campus Area Network

MAN – Metropolitan Area Network

WAN – Wide Area Network

GAN – Global Area Network

WAN is a communications network that covers a wide geographic area, such as a state or country. A LAN is contained within a building or complex, and a MAN generally covers a city or a suburb. PAN is a computer network used for communication among computer devices close to one person. CAN is a computer network made up of an interconnection of LANs within a limited geographical area. GAN is a model for supporting mobile communication across an arbitrary number of wireless LANs, satellite coverage areas etc.

LAN is a communication network that serves users within a limited geographic area. It can be within a building or within a campus. It is made up of servers, workstations, a network operating system and a communication link. In LANs the transmission speed is very high as transmission channels use coaxial or fiber optic cables. A printer can be attached locally to a workstation or to a server and be shared by all network users. The two main purposes of LAN are to link computers within an organization or campus so that they may share expensive peripheral devices such as high-speed printers and magnetic disks holding database, and to allow these computers to communicate with each other. Small LANs allow ordinary PCs and workstations to function as a server, allowing users access to data on another user's machine. Multiple servers are used in large networks.

A WAN is a geographically dispersed collection of LANs. A network device called a router connects LANs to a WAN. In WAN, the transmission media used are normally public systems such as telephone lines, microwaves and satellite links. The largest and most well-known example of a WAN is the internet.

2. What is e-mail? What are its advantages?

It is one of the most commonly used services on the net, allowing people to send messages to one or more recipients. E-mail stands for electronic mail. Mail is sent to a simulated mailbox in the network mail server or host computer until the recipient reads it.

There are two ways of accessing e-mail on the internet- one by using a program like Microsoft Outlook Express e-mail service or Netscape Messenger that is installed in the computer and the other is a mail service on the web like gmail and yahoo mail, which is accessible from any browser.

To receive and send web based email one has to type in the username and password. E-mail was invented by Ray Tomlinson in 1972. Web based e-mail was first started by MSN with the name hotmail. Others like rediffmail, gmail and yahoo followed.

Advantages of E-mail

It is inexpensive.

E-mail is fast. It is routed through several servers until it reaches its destination. But it usually reaches the recipient fast. Transmission is secure and reliable.

E-mail is flexible in that it does not depend on the type of computer or program you use.

The recipient does not have to present when the message is send.

It can be sent to multiple recipients at the cost of a single mail.

E- mail messages can be segregated and stored in folders

E-mail can be accessed from any location with an internet connection.

3. What do you mean by file sharing?

The practice of sharing digitally stored information , such as computer programs, Audio-video programs, digital books etc is termed file sharing. The different modes of file sharing are:

Manual sharing using removable disc or USB

Peer to Peer networks

File hosting networks

Of these, Peer to Peer file sharing is a very popular option for file sharing on the internet. Users can use it to search for shared files already connected to the network. When this software is used, the user's system also becomes part of the network and Information from the user's computer can be downloaded by others in the network.

File hosting services are an alternative to Peer to Peer software. They are used along with Internet collaboration tools like e mails, forums, blogs or any other medium in which links to direct downloads from file hosting services can be embedded. To ensure offences are not permitted in file sharing, copyright rules have been enacted. A copyright grants the owner of the material exclusive rights to the material and its distribution. By distributing this material without permission , a person distributing the material is violating copyright law and is subject to penalties under the law.

4. Write a short note on blogs.

A blog (web log) is a type of website usually maintained by an individual with regular entries of commentary, descriptions of events etc. It is usually a single page entry which archives older entries. A blog is organized in reverse chronological order, from most recent entry to least recent.

A blog is usually owned by a single person ,but can be viewed by the public. It could be read as an online journal or diary. Blogs are of different types:

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Corporate and Organizational Blogs which are usually used for business purposes. This is usually used to enhance the communication and culture in a corporation or externally for marketing, branding or public relations.

Other types like political blogs, travel blogs(also called travelogs), fashion blogs, project blogs, education blogs, music blogs, legal blogs, sketchblogs, photoblogs, videoblogs(Vlog) etc exist.

5. What is social networking?

A social network service focuses on building online communities of people who share interests and activities of others. They are web based and allow users to interact using e-mail and instant messaging services. It is a powerful means to communicate and share information.

A social network is typically made up of individuals called nodes tie up by relations such as friendship, kinship, financial exchange, dislike, knowledge etc. Social networking helps you to:

Search for old friends or make new ones

Share music and video

Join communities based on interests

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Even though social networking sites are immensely popular, there are also several problems involved. Users receive friend applications even from strangers and an acceptance could give them access to your personal information. Fake profiles allow children to enter these sites which often prove dangerous. Financial irregularities have also been reported from such sites.

Some well-known social networking sites are:

Twitter

Orkut

Facebook

MySpace

LinkedIn

Flickr

ESSAY QUESTIONS

1. What is a computer network? What are its advantages and disadvantages?

A computer network is a collection of computers and devices connected by communication channels. It includes the network operating system in the client and server machines, the cables connecting them and all the supporting hardware in between such as bridges, routers and switches. In wireless systems antennas and towers are also part of the network.

Major benefits of the computer networks are:

Resource sharing is made possible as all data, program and equipment is available to anyone on the network irrespective of the physical location of the resources and the user.

Data replicated on other machines increase reliability and reduce risk.

The computer network has the ability to increase system performance gradually as the workload grows by adding more processors.

Increased storage capacity as more than one computer is available on the network. A standalone computer might fall short of storage memory, but when many computers are on the network, memory of different computers can be used in one case.

It is a very powerful communication medium. Using a network, it is easy for people who live apart to communicate with each other and even to work together.

Disadvantages of networking:

Security issues tend to arise in an environment where data sharing is done.

Rapid spread of computer viruses.

In case the main file server of the network breaks down, the system becomes useless

Some of the important types of networks are given below:

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WAN is a communications network that covers a wide geographic area, such as a state or country. A LAN is contained within a building or complex, and a MAN generally covers a city or a suburb. PAN is a computer network used for communication among computer devices close to one person. CAN is a computer network made up of an interconnection of LANs within a limited geographical area. GAN is a model for supporting mobile communication across an arbitrary number of wireless LANs, satellite coverage areas etc.

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devices such as high-speed printers and magnetic disks holding database, and to allow these computers to communicate with each other. Small LANs allow ordinary PCs and workstations to function as a server, allowing users access to data on another user's machine. Multiple servers are used in large networks.

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Compared to the transmission cost in LANs, the cost of transmitting data in WANs may be high because transmission medium used are leased lines or public communication systems such as telephone lines.

Wireless networking refers to two or more computers communicating without the use of cabling. Wireless radio signals or electromagnetic waves are used for communication. Wireless LANs are easy to install and they are particularly in great demand in relation to laptops.

A radio relay station in orbit above the earth receives, amplifies and redirects digital signals contained within a carrier frequency. There are three types of satellites: geostationary satellites, low-earth orbit satellites and medium-earth orbit satellites. In addition there are hundreds of commercial communication satellites in orbit providing services for both industry and consumers.

Earth stations transmit or receive signals in satellite communications. It uses a dish-shaped antenna for microwave transmission. Earlier signals from communication satellites could be received only through earth stations. Now homes use individual small dishes to receive signals. Advantages of wireless LANs are given below:

1. Easier to provide connectivity in area where it is difficult to lay cables.
 2. Faster and easier installation.
 3. Access to network possible from anywhere within range of access point
 4. Installation expenses lower
 5. In old buildings where drilling for cabling is difficult, wireless LANs are convenient.
 6. Disadvantages of wireless LANs
 7. Data transfer rate to individual computers will decrease as the number of computers in a network increases.
 8. Applications like video-streaming will be more effective in a wired network
 9. Distance from the access point is a limitation
2. Write an essay on the use and abuse of the internet.

The internet is a communication system that comprises of a network of networks. It is made up of more than 450 million computers in more than 200 countries thus acting as a global carrier of information. It consists of millions of private, public, academic, business and government networks linked by a broad array of electronic and optical networking technologies. The internet was originally developed in the cold war period for the exclusive use of the US military force. The Advanced Research Projects Agency (ARPA) funded a project to connect university scientists and engineers together via computers and telephone lines. The project called ARPANET allowed users to access unpublished data and journals on a wide variety of subjects. The internet carries plenty of information resources and services, including the interlinked hypertext documents of the World Wide Web (www).

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Industrial espionage is also common today with companies gathering proprietary data from other companies or even the government.

Malware or malicious software is designed to infiltrate a computer system without the owner's consent.

A virus is a parasitic program written intentionally to alter the way your computer operates.

Trojan horses are programs that appear to serve some useful purpose or provide entertainment, but they also have the covert aim to damage files, place a virus in your system or even allow a hacker to enter your system.

Phishing is the fraudulent process of attempting to acquire sensitive information such as usernames, passwords, and credit card details by masquerading as a trustworthy entity. Communications purporting to be from popular social web sites, auction sites, online payment processors or IT administrators are used to fool people. Phishing is carried out by e-mail or instant messaging. Users are directed to websites which are very similar to legitimate sites. Attempts to control this misdeed have been initiated and these include legislation, user training, public awareness and technical security measures.

Computers can be made safer by following the suggestions below:

Physical security should be maintained and as such doors and locks should always be secure.

Periodic virus checking

When sensitive information is stored, it is better not to have an internet connection.

Passwords should be changed regularly

Security checking password could be installed.

Do not use credit cards over the web if it could be helped.

MODULE V

KNOWLEDGE RESOURCES ON THE INTERNET

With the introduction of the internet, information gathering has become an easy job. The quantity of information available on the internet is growing at an exponential rate. Even the print media could be retrieved from the net. Books, journals, conference proceedings etc too could be downloaded from the net. Digital publishing started in the 1990s and every year the digital content is increasing by 50%.

This rapid growth of net resources has necessitated the introduction of various control measures. Indexing and cataloguing has become necessary. With the emergence of the internet and the availability of server computers in the net, the availability of online database is increasing at a very fast rate. Not only information specialists, academics and researchers, but the common man is also interested in online information resources.

ENCYCLOPEDIAS

An encyclopedia is a reference work, a storehouse of information either from all branches of knowledge or a particular branch of knowledge, The word has its origins from the Greek language where 'enkyklios' means 'well rounded, encircled' and 'paideia' means 'education'.

While a dictionary provides limited information, analysis or background of the word defined, encyclopedias give information on a much larger scale. An encyclopedia article may include maps and illustrations as well as bibliography and statistics.

TYPES OF ENCYCLOPEDIAS

General encyclopedias . eg The New Encyclopedia Britannica

Subject encyclopedias eg., The Concise Encyclopedia of Archeology

Encyclopedias on CD ROM. Eg., Microsoft Encarta Encyclopedia

Online encyclopedias: online encyclopedias are accessible via www and are often the best choice when you are in a hurry. Some of the popular online encyclopedias are Encyclopedia Britannica, Columbia Encyclopedia, Wikipedia, Educylopedia, Investopedia, Encyberpedia, Encyclopedia Mythica etc.

LIBRARIES

A library is a collection of sources, resources and services and the structure in which it is housed. By traditional professional divisions, libraries can be classified into Academic libraries, Public Libraries, Research libraries , School libraries and Special libraries.

Based on the technology used, libraries are again divided into the following:

Traditional libraries

Automated libraries with machine-readable catalogue, computerized acquisition etc

Electronics libraries where LAN and CD ROM networking is done.

Digital libraries where internet-based services and audio/video conferencing is possible.

Hybrid libraries which are working in both digital as well as print environment

DIGITAL LIBRARIES

Most libraries today are switching into the digital mode due to the information explosion as well as the low cost of technology. The new generation prefers digital libraries as they find searching for books in traditional libraries quite difficult and time consuming.

A digital library is a collection of resources usually accessible via the internet. It has links with other libraries or information services . There are hundreds of digital libraries accessible through the internet. Some of the advantages of digital libraries are:

1. Storage space is not a limitation as digital information requires very little space .
2. Maintenance cost is minimal as there is not much expenditure on staff, rent, book maintenance etc
3. Digital conversion increases accessibility to users
4. People don't have to access the library physically
5. They can be accessed any time of the day
6. Information retrieval is easier as these libraries provide user-friendly interfaces.
7. Preservation is easier .

Some of the disadvantages of digital libraries are:

1. Digital libraries often violate the copyright law.
2. With more computers in the network, speed of access is affected
3. The infrastructure cost of digital library is very high initially.
4. High band width is essential'
5. They cannot reproduce the ideal environment of the traditional library

Popular digital libraries

Internet Library of Early Journals

World Public Library

The Internet Public Library

National Science Digital Library

Digital Library of India

Feedbooks

Fictionwise.com

Dawsonera

OCLC's NetLibrary

Amazon.com

JOURNALS

An academic journal is a peer-reviewed periodical in which scholarship relating to a particular academic discipline is published. They serve as forums for the introduction and scrutiny

of new research. Academic journal is an umbrella term used to include scientific journals, journals of social sciences, humanities etc.

With the arrival of the internet, the world of knowledge too changed and as such academic journals are available online too.

As most scholarly journals are now published in the digital format several institutions can come together and subscribe to journals at a lower cost. UGC and CSIR have all developed consortia for accessing e- journal. In academic publishing, open access(OA) is digital, online, free of charge, and free of most copyright and licensing restrictions access to literature and articles that have traditionally been published in scholarly journals. The Budapest Open Access initiative suggested strategies and models to compensate publishing expenses and make available scholarly journals and journal articles free.

BOOK SITES

Online book sites are very popular these days on the internet. Wholesale booksellers as well as retailers have websites for book sales. The ambience of a real book store cannot be recreated online, but these sites do have a lot of advantages

1. With the advent of search engines, new or rare books could be found.
2. Used books could be purchased at discounted rates.
3. The option of buying books at auction sites is open.
4. An online book store is open 24x 7 and as such it is more convenient for buyers.
5. Since there is no space constraint, innumerable books could be put up for sale.
6. Online book stores can offer books at better prices as maintenance cost is low.
7. Shoppers can post comments, reviews etc in some sites that sell books.
8. E-books can be purchased and its delivery is immediate to the reading device or computer.

Some popular online bookstores are:

Amazon

Barnes and Noble

eBay

AbeBooks

Walmart

Flipkart

Half Price Books

Book Finder

One limitation of online shopping is that you cannot browse through the books via the website. Moreover, there is always the risk of receiving damaged books when orders are placed online.

CONTENT REPOSITORIES

An online content repository functions as a web- based service that allows users to upload and share different types of content.

The content can be in the form of digital images, photographs, video files, documents etc. Several companies provide storage and access services for online content repositories. Some of them are Flickr, Youtube etc.

Portals and gateways

There are hundreds of portal sites providing access to databases, online catalogues and reference sources. Subject gateways provide filtered information on specific subjects. Some of them are

IIEP-UNESCO Wikiof OER repositories

MERLOT

OER Commons

Open Courseware Directory

Resource Discovery Network

Labspace

Wisconsin Online Resource Center

CITIDEL

MathworldConnexions

ONLINE EDUCATION

Online education is a form of distance education that is aided by a personal computer. The internet as well as audio and video technologies are used in online education.

Popular formats include:

- 1 Adult online education: the stress here is on erasing illiteracy and teaching language skills.
- 2 Hybrid Education: Online classes are blended with on-campus sessions
- 3 Online continuing education: Offers classes for students who aim for additional knowledge in addition to the basic degree.
- 4 Online distance education: A student pursuing a traditional degree gets to take online courses and as such are flexible.
- 5 Online Higher education: Students who want a degree but are unable to attend institutions for the attainment of the same are benefitted by this.

Some well-known online universities are:

The University of London

The University of South Africa

The University of Texas

Stanford University

In India online courses are offered by:

Nalanda Open University

AIIMS

IGNOU

BITS

MAHE

University of Mumbai

Advantages of Online education:

1. Students can access web based resources and students can request challenging assignments from the teachers.
2. Students can access educators and course material from anywhere at any time.
3. Online courses offer educational resources in multiple media formats like threaded discussion boards, newsgroups, chat rooms, webcasting etc.
4. You can continue the learning process while working at the same time. Access to more teachers and subject experts outside the student's limited geographical area possible.

Disadvantages of online education:

1. Online education requires a lot of self discipline. Time management is very essential.
2. Only people who have access to a computer or the internet benefit from online education.
3. The cost of online education is usually very high.
4. Lack of interaction with teachers and other students is a serious disability.
5. Courses offered is limited.
6. Course content in online education is not as rigorous as in conventional educational systems.

A Virtual university is one which carries out much of its teaching at a distance from the learner. Virtual universities provide courses online over the internet. Some of these virtual universities are real institutes while others do not have the conventional building or set-up.

Web pages, e-mail and other networked sources are employed by virtual universities. These universities can grant degrees that will be recognized all over the world. Many of them are accredited the way traditional universities are. Mastering software tools is a must in virtual university education.

. Time management skills and access to online academic resources is a must.

OTHER INFORMATION SOURCES

Today the web has grown to encompass a wide variety of information sources such as e-journals, pre-prints, technical reports, databases, library catalogues, educational materials and so on. Some of the primary information sources are:

Conferences, Seminars, Workshops, Meetings, Exhibitions, Tradeshows, Fairs-Published/Forthcoming: Which sometimes even provide a virtual visit to these shows. Advance information is provided here.

Courseware/Tutorials/guides/manuals : Provides distance learning facilities, and offers electronic classrooms.

Directories: Most are available free on the internet and help in establishing contacts either for business or research purposes.

Discussion forums: provide current awareness in a specific field of interest. Members can communicate through messages.

FAQ sources: fundamental concepts on a specific field is represented here.

Electronic Journals: offers quicker access to dsired articles and is economical too

Patents: Patent databases offer information onpatent laws and filing procedures of various patent offices.

Research Projects: includes list of projects underway.

Science news

Technical reports

Library catalogues

Equipment catalogues

Museum and archives

Maps

Employment sources

Matrimonial services

Funding/grants sources

INTERNET DIRECTORIES

Also called web directory or link directory is a directory on the world wide web. It is not a search engine but provides web sites by category and sub-category. Most directories are very general in scope and lists websites on a wide range of categories, regions and languages. Niche directories focus on restricted regions. Example for a niche directory would be the shopping directory. Some of the common features of directories are:

Free submission

Reciprocal link

Paid submission where a one-time fee is charged.

Affiliate links where the directory earns commission for referred customers from listed websites.

WEBSITES OF UNIVERSITIES AND RESEARCH INSTITUTIONS

The two prominent ranking systems for global universities are:

Academic Ranking of World Universities(ARWU) compiled by Shanghai Jiao Tong university.
Rankings are updated annually.

Times Higher Education and Quacquarelli Symonds(QS)

Websites of a few top universities are provided below:

HARVARD UNIVERSITY	http:// www.harvard.edu/
STANFORD UNIVERSITY	http://www.stanford.edu/
UNIVERSITY OF CAMBRIDGE	http://www.cam.ac.uk/
MASSACHUSETTS INSTITUTE OF TECHNOLOGY	http://web.mit.edu/
COLUMBIA UNIVERSITY	http://www.columbia.edu/
UNIVERSITY OF CHICAGO	http://www.uchicago.edu/
UNIVERSITY OF OXFORD	http:// www.ox.ac.uk/
TOKYO UNIVERSITY	http://www.u-tokyo.ac.jp/
UNIVERSITY OF TORONTO	http://www.otoronto.ca/
UNIVERSITY OF DELHI	http://www.du.ac.in/
ANNA UNIVERSITY	http://www.annauniv.edu
JAWAHARLAL UNIVERSITY	http://www.jnu.ac.in
BANARAS HINDU UNIVERSITY	http://www.bhu.ac.in
ANNAMALAI UNIVERSITY	http://annamalaiuniversity.ac.in/
UNIVERSITY OF HYDERABAD	http://www.uohyd.ernet.in
UNIVERSITY OF MADRAS	http://www.unom.ac.in
OSMANIA UNIVERSITY	http://www.osmania.ac.in
BHARATHIAR UNIVERSITY	http://www.b-u.ac.in/
UNIVERSITY OF CALICUT	http://www.caluniv.ac.in/
ALIGARH MUSLIM UNIVERSITY	http://www.amu.ac.in

SHORT ANSWER TYPE QUESTIONS

1. What does the word encyclopedia mean?

An encyclopedia is a reference work, a storehouse of information either from all branches of knowledge or a particular branch of knowledge, The word has its origins from the Greek language where 'enkyklios' means 'well rounded, encircled' and 'paideia' means 'education'.

2. Name four encyclopedias on the net.

The New Encyclopedia Britannica, The Concise Encyclopedia of Archeology
Microsoft Encarta Encyclopedia and Educyclopedia

3. How is an encyclopedia different from a dictionary?

An encyclopedia is a reference work, a storehouse of information either from all branches of knowledge or a particular branch of knowledge, The word has its origins from the Greek language where 'enkyklios' means 'well rounded, encircled' and 'paideia' means 'education'.

While a dictionary provides limited information, analysis or background of the word defined, encyclopedias give information on a much larger scale. An encyclopedia article may include maps and illustrations as well as bibliography and statistics.

4. Name four online libraries.

Universal Digital Library, Project Gutenberg, ibiblio, google books.

5. Name four online bookstores

Amazon, Barnes and Noble, eBay, Walmart

6. How does a journal differ from a professional magazine?

An academic journal is a peer-reviewed periodical in which scholarship relating to a particular academic discipline is published. They serve as forums for the introduction and scrutiny of new research. Academic journal is an umbrella term used to include scientific journals, journals of social sciences, humanities etc.

7. List four popular internet directories.

Yahoo directory, DMOZ directory, Starting Point Directory, Business Directory

8. Mention any two features of a virtual university.

A Virtual university is one which carries out much of its teaching at a distance from the learner. Virtual universities provide courses online over the internet. Some of these virtual universities are real institutes while others do not have the conventional building or set-up.

Web pages, e-mail and other networked sources are employed by virtual universities. These universities can grant degrees that will be recognized all over the world. Many of them are accredited the way traditional universities are. Mastering software tools is a must in virtual university education.

. Time management skills and access to online academic resources is a must.

PARAGRAPH QUESTIONS

1. What is a virtual university? What are the merits and demerits of a virtual university?

A Virtual university is one which carries out much of its teaching at a distance from the learner. Virtual universities provide courses online over the internet. Some of these virtual universities are real institutes while others do not have the conventional building or set-up.

Web pages, e-mail and other networked sources are employed by virtual universities. These universities can grant degrees that will be recognized all over the world. Many of them are accredited the way traditional universities are. Mastering software tools is a must in virtual university education.

. Time management skills and access to online academic resources is a must.

2. How are libraries categorized on the basis of technology used?

Based on the technology used, libraries are again divided into the following:

Traditional libraries

Automated libraries with machine-readable catalogue, computerized acquisition etc

Electronics libraries where LAN and CD ROM networking is done.

Digital libraries where internet-based services and audio/video conferencing is possible.

Hybrid libraries which are working in both digital as well as print environment.

Most libraries today are switching into the digital mode due to the information explosion as well as the low cost of technology. The new generation prefers digital libraries as they find searching for books in traditional libraries quite difficult and time consuming.

A digital library is a collection of resources usually accessible via the internet. It has links with other libraries or information services. There are hundreds of digital libraries accessible through the internet.

3. Mention a few advantages of online bookstores.

Online book sites are very popular these days on the internet. Wholesale booksellers as well as retailers have websites for book sales. The ambience of a real book store cannot be recreated online, but these sites do have a lot of advantages

1. With the advent of search engines, new or rare books could be found.
2. Used books could be purchased at discounted rates.
3. The option of buying books at auction sites is open.
4. An online book store is open 24x 7 and as such it is more convenient for buyers.
5. Since there is no space constraint, innumerable books could be put up for sale.
6. Online book stores can offer books at better prices as maintenance cost is low.
7. Shoppers can post comments, reviews etc in some sites that sell books.
8. E-books can be purchased and its delivery is immediate to the reading device or computer.

Some popular online bookstores are:

Amazon

Barnes and Noble

eBay

AbeBooks

Walmart

Flipkart

Half Price Books

Book Finder

4. Write a short note on academic journals.

An academic journal is a peer-reviewed periodical in which scholarship relating to a particular academic discipline is published. They serve as forums for the introduction and scrutiny of new research. Academic journal is an umbrella term used to include scientific journals, journals of social sciences, humanities etc.

With the arrival of the internet, the world of knowledge too changed and as such academic journals are available online too.

As most scholarly journals are now published in the digital format several institutions can come together and subscribe to journals at a lower cost. UGC and CSIR have all developed consortia for accessing e- journal. In academic publishing, open access(OA) is digital, online, free of charge, and free of most copyright and licensing restrictions access to literature and articles that

have traditionally been published in scholarly journals. The Budapest Open Access initiative suggested strategies and models to compensate publishing expenses and make available scholarly journals and journal articles free.

ESSAY QUESTIONS

1. What do you mean by online education? State the merits and demerits of online education.
 - a. Online education is a form of distance education that is aided by a personal computer. The internet as well as audio and video technologies are used in online education.

Popular formats include:

- 1 Adult online education: the stress here is on erasing illiteracy and teaching language skills.
- 2 Hybrid Education: Online classes are blended with on-campus sessions
- 3 Online continuing education: Offers classes for students who aim for additional knowledge in addition to the basic degree.
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- 5 Online Higher education: Students who want a degree but are unable to attend institutions for the attainment of the same are benefitted by this.

Some well-known online universities are:

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The University of South Africa

The University of Texas

Stanford University

In India online courses are offered by:

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Advantages of Online education:

1. Students can access web based resources and students can request challenging assignments from the teachers.
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3. Online courses offer educational resources in multiple media formats like threaded discussion boards, newsgroups, chat rooms, webcasting etc.
4. You can continue the learning process while working at the same time. Access to more teachers and subject experts outside the student's limited geographical area possible.

Disadvantages of online education:

1. Online education requires a lot of self discipline. Time management is very essential.

2. Only people who have access to a computer or the internet benefit from online education.
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2. Write an essay on the concept of digital libraries .
 - a. Based on the technology used, libraries are again divided into the following:

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A digital library is a collection of resources usually accessible via the internet. It has links with other libraries or information services . There are hundreds of digital libraries accessible through the internet. Some of the advantages of digital libraries are:

1. Storage space is not a limitation as digital information requires very little space .
2. Maintenance cost is minimal as there is not much expenditure on staff, rent, book maintenance etc
3. Digital conversion increases accessibility to users
4. People don't have to access the library physically
5. They can be accessed any time of the day
6. Information retrieval is easier as these libraries provide user-friendly interfaces.
7. Preservation is easier .

Some of the disadvantages of digital libraries are:

1. Digital libraries often violate the copyright law.
2. With more computers in the network, speed of access is affected
3. The infrastructure cost of digital library is very high initially.
4. High band width is essential'
5. They cannot reproduce the ideal environment of the traditional library

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World Public Library
The Internet Public Library
National Science Digital Library
Digital Library of India
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3. Give an account of the various knowledge resources on the internet.

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Conferences, Seminars, Workshops, Meetings, Exhibitions, Tradeshows, Fairs-Published/
Forthcoming: Which sometimes even provide a virtual visit to these shows. Advance information
is provided here.

Courseware/Tutorials/guides/manuals: Provides distance learning facilities, and offers
electronic classrooms.

Directories : Most are available free on the internet and help in establishing contacts either for
business or research purposes.

Discussion forums : Provide current awareness in a specific field of interest. Members can
communicate through messages.

FAQ sources: Fundamental concepts on a specific field is represented here.

Electronic Journals: Offers quicker access to dsired articles and is economical too

Patents: Patent databases offer information onpatent laws and filing procedures of various patent
offices.

Research Projects: includes list of projects underway.

Science news

Technical reports

Library catalogues

Equipment catalogues

Museum and archives

Maps

Employment sources

Matrimonial services

Funding/grants sources.

MODULE VI

COMPUTER LOCALIZATION

The process of adapting software for a particular country or region is called localization.

Localization in India

Problems of localization in India

1. India is a country with more than 30 regional languages.
2. Although we have declared Hindi as our national language, it has not been accepted by all states as a functional language.
3. All the regional languages use independent alphabet with independent character sets.
4. The script in each regional language has undergone many revisions to suit mechanical typesetting and computing and the character set of each language has lost consistency.

Europe has accepted a common alphabet with minor variations. Russia has many different languages in its provinces but Russian is a unifying language. In China they speak Chinese everywhere and computer localization is effective. But in India, it is difficult.

Even within the same language, there are variations. Malayalam has succeeded in producing Malayalam word processing software called RACHANA which facilitates text creation in Old Malayalam font.

Reasons for lack of localization:

- 1) Until recently IT was considered an urban phenomenon and its influence was restricted to the English-knowing section of the society.
- 2) Another reason is the insufficient support for the Indian languages at the operating system level.
- 3) Popularity of non-standard fonts has hampered inter-operatability, collaboration and development of software tools in Indian languages.
- 4) There is also a lack of awareness.

Benefits of localization:

- 1) Achieving equal opportunity for all languages in all areas.
- 2) Services become interactive and transparent.
- 3) E-governance is made possible. E-governance means taking governments to the door-step of people. (National E-governance Plan).
 - a. Efficient delivery of services.

- b. Good governance means citizens being able to avail of services of the government speedily, at convenient location in a cost-effective manner.
- c. Technology can be used to improve quality of life with proper and effective localization.

Localization and Government

India is a member of Unicode Consortium and World Wide Web Consortium (W3C). All modern and ancient Indian scripts have been or are being included in the Unicode standards. Proposals have been put forward to include special notations and characters used in Vedic hymns, which have not been encoded so far. There is also a need for refinement for formation of letters or conjuncts in Indian languages. C-DAC, IITs and many other organizations are contributing to localization efforts, including machine-translation from one language to another.

The front-end of all Government websites should be simultaneously available in all twenty two officially accepted Indian languages and in English as associate official language. Localization should be basic to the NGEF architecture. Government must take a lead in localization efforts.

Font

In typography, a font is traditionally defined as a complete character set of simple size and style of a particular type face.

After the introduction of computer fonts based on fully scalable outlines, a broader definition evolved. *Font* is no longer size-specific, it is style-specific.

The term font is used as a metonym of type face.

Bulmer regular, Bulmer italic, Bulmer bold and Bulmer bold italic are four fonts of one typeface.

This word font is a doublet of the word *fondu*. It derives from Middle French *fonte*, meaning (something that has been) melt(ed) referring to type produced by casting molten metal at a type foundry.

There are certain characteristics to distinguish fonts:-

- Stroke width, called weight
- The style or angle
- Character width

ASCII

- American Standard Code for Information Interchange (pronounced as ae ski - Ass-key).
- It is a character encoding scheme based on the ordering of the English alphabet.
- ASCII codes represent texts in computers, communications equipment, and other devices that use text. Most modern character-encoding systems are based on ASCII.

- It includes definition for 128 characters: 33 are non-printing control characters that affect how text and space is processed; 94 are printable characters and the space is considered as an invisible graphic.
- The most common character encoding on www was US-ASCII until Dec 2007, when it was surpassed by UTF-8.
- It was developed by the American Standards Association (UTF – Unicode Transformation Format).

UNICODE

It is a computer industry standard for the consistent operation and handling of the text expressed in most of the world's writing systems. Developed in conjunction with the Universal Standard Set standard and published in book form as The Unicode Standard, the latest version of Unicode consists of more than 1,07,000 characters conveying 90 scripts.

Unicode began in 1987. It was the result of the studies undertaken by Joe Becker from Xerox and Lee Collins and Mark Davis from Apple, to create a Universal character set. It is intended to address the need for a workable, reliable world text encoding. Unicode can be roughly described as "wide-body ASCII" that has been stretched to 16-bits to encompass the characters of all the world's living languages.

Notable addition to Unicode include Arabic, Armenian, Bengali, Bopomofo, Cyrillie, Devanagari, Georgian, Greek and Coptic, Gujarati, Gurumukhi, Hangul, Hebrew, Hiranga, Kannada, Katakana, Lao, Latin, Malayalam, Oriya, Tamil, Telugu, Thai, and Tibetan.

Software tools for typing Local languages

C-DAC

National agency entrusted with computer localization activities. Two groups of C-DAC are:

1. GIST – Graphics and Intelligence based Script Technology
2. AAI – Applied Artificial Intelligence

C-DAC Multilingual Projects

1. LISM (Linux based application for Indian languages)
2. NASHIR (Perso-Arabic publishing made easy)
3. iLeap (Intelligent, Internet ready, Indian language word processor)
4. CHITRANKAN (Documentation made easy, Digitally)
5. ISM Publisher (Cost effective solution for Indian Language publishing)
6. Shaili (collection of traditional Indian designs)
7. Dnyaneshwari (Multimedia version of Dnyaneshwari)
8. Apex Language Processor (The DOS based word processor)

Works of C-DIT Kerala

1. Computational linguistic team – to function as the Malayalam Computing Solutions Provider to the Government of Kerala and various other agencies of Kerala.
2. Main aim – to integrate Malayalam with Information and Communication technology.

Major Projects

1. Aksharamala CD – A font package incorporating 25 Malayalam fonts including 3 web fonts – a joint venture of C-DIT and C-DAC.
2. Bharana Malayalam – Incorporates commonly used administrative jargon. It also includes telephone directory of Government, the administrative glossary, gazettes published in Malayalam language, Government orders and circulars.
3. 'Nila' Official Malayalam Software
 - 1st phase of 'Mission Malayalam' project
 - It has a UNICODE 5.1 enabled text editor
 - Nila supports inscript, phonetic and typewriter keyboards
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Advantages

The Malayalam spell-checker – a notable feature

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 - Office Content Management Systems – saves document
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 - Administrative Glossary – helps to find the Malayalam equivalents of the English administrative terms
5. Arogyasree
 - A UNICODE enabled text editor
 - It has a Malayalam type write keyboard, along with the Inscript and Phonetic keyboards and has customized official templates for Health Department, Government of Kerala
 6. Periyar Malayalam Community Software(Ongoing)
 - 3rd phase of 'Mission Malayalam'

- Malayalam grammar checker, Universal font converter, Malayalam Thesaurus, Malayalam English Dictionary, South Indian languages dictionary etc. are main components.
- C-DAC developed this software
- It has been extended to multimedia and multi lingual computing
- It has been commercialized successfully

Other Services

1. www.clikkeralam.org
 - 1st major work taken up by the computational linguistic team
 - CLICK (Centre for Linguistic Computing Keralam)
 - Is a website for research, development, production and dissemination of Malayalam Language Technology and Software face of cost among the Malayalam speaking population
 - ‘Nila’, ‘Kaveri’ – software, ‘Nila’ Unicode Malayalam fonts are freely downloadable from this website
2. www.entemalayalam.org
 - Interactive Malayalam tutorial website
 - Enables online learning
 - Provides information about the culture history, literature and art forms of Kerala

Conclusion

Localization is the process of adapting a product to suit local requirement. It can be a software program, to a specific locale i.e. to its language, standards and cultural norms as well as to the needs and expectations of a specific target market. It also meets the legal requirements of a region. Users can interact in their own language. Usually software developed in English is converted to suit the demands of the regional language. So if the original product is not built with a view toward being localized, this can be very expensive and time-consuming.

Self-check Questions:

1. What is localization?
 - a. The process of adapting software for a particular country or region is called localization.
2. Name the organizations that help the government in the process of localization.
 - a. C-DAC, IITs and many other organizations are contributing to localization efforts, including machine-translation from one language to another.
3. What is Font?
 - a. In typography, a font is traditionally defined as a complete character set of simple size and style of a particular type face.
4. What is ASCII?

a. ASCII means American Standard Code for Information Interchange (pronounced as ae ski - Ass-key). It is a character encoding scheme based on the ordering of the English alphabet.

5. What is UNICODE?

a. It is a computer industry standard for the consistent operation and handling of the text expressed in most of the world's writing systems.

6. What is C-DAC?

a. C-DAC is a national agency entrusted with computer localization activities. Two groups of C-DAC are: GIST – Graphics and Intelligence based Script Technology and AAI – Applied Artificial Intelligence.

7. Name some tools for typing local languages.

a. LISM (Linux based application for Indian languages), NASHIR (Perso-Arabic publishing made easy), iLeap (Intelligent, Internet ready, Indian language word processor), CHITRANKAN (Documentation made easy, Digitally), ISM Publisher (Cost effective solution for Indian Language publishing), Shaili (collection of traditional Indian designs), Dnyaneshwari (Multimedia version of Dnyaneshwari), and Apex Language Processor (The DOS based word processor are some of the tools developed by C-DAC for typing in local languages.

8. What is the work of C-DIT Kerala?

a. The Computational linguistic team functions as the Malayalam Computing Solutions Provider to the Government of Kerala and various other agencies of Kerala. Its main aim is to integrate Malayalam with Information and Communication technology.

9. What is AKSHARAMALA CD?

a. Aksharamala CD is a font package incorporating 25 Malayalam fonts including 3 web fonts – a joint venture of C-DIT and C-DAC.

10. What is Bharana Malayalam?

a. Bharana Malayalam incorporates commonly used administrative jargon. It also includes telephone directory of Government, the administrative glossary, gazettes published in Malayalam language, Government orders and circulars.

11. What are the features of Nila?

a. 'Nila' is an official Malayalam Software. It is the first phase of 'Mission Malayalam' project. It has a UNICODE 5.1 enabled text editor. Nila supports inscript, phonetic and typewriter keyboards. Embedded conversion tool helps to convert a document from ASCII to UNICODE. Nila has a set of official templates letter wizards, an official dictionary and a web linker.

12. Which is the free software in Malayalam?

a. Kaveri is the free software in Malayalam.

13. Which is the third phase of Mission Malayalam?

a. Periyar Malayalam Community Software(Ongoing) is the third phase of Mission Malayalam.

Paragraph Questions:

1. What are the problems of localization in India?

a. The problems of localization in India are many. One is that India is a country with more than 30 regional languages. Another is that although we have declared Hindi as our national language, it has not been accepted by all states as a functional language. All the regional languages use independent alphabet with independent character sets. The script in each regional language has undergone many revisions to suit mechanical typesetting and computing and the character set of each language has lost consistency. Europe has accepted a common alphabet with minor variations. Russia has many different languages in its provinces but Russian is a unifying language. In China they speak Chinese everywhere and computer localization is effective. But in India, it is difficult. Even within the same language, there are variations. Malayalam has succeeded in producing Malayalam word processing software called RACHANA which facilitates text creation in Old Malayalam font

2. What are the reasons for lack of localization?

a. Reasons for lack of localization are that until recently IT was considered an urban phenomenon and its influence was restricted to the English-knowing section of the society. Another reason is the insufficient support for the Indian languages at the operating system level. Popularity of non-standard fonts has hampered inter-operatability, collaboration and development of software tools in Indian languages.

There is also a lack of awareness

3. What are the benefits of localization?

a. The benefits of localization are achieving equal opportunity for all languages in all areas;

Services become interactive and transparent; E-governance is made possible; E-governance means taking governments to the door-step of people (National E-governance Plan), and efficient delivery of services. Good governance means citizens being able to avail of services of the government speedily, at convenient location in a cost-effective manner. Technology can be used to improve quality of life with proper and effective localization

4. What is the role of Government in localization?

a. India is a member of Unicode Consortium and World Wide Web Consortium (W3C). All modern and ancient Indian scripts have been or are being included in the Unicode standards. Proposals have been put forward to include special notations and characters used in Vedic hymns, which have not been encoded so far. There is also a need for refinement for formation of letters or conjuncts in Indian languages. C-DAC, IITs and many other organizations are contributing to localization efforts, including machine-translation from one language to another. The front-end of all Government websites should be simultaneously available in all twenty two officially accepted Indian languages and in English as associate official language. Localization should be basic to the NGE architecture. Government must take a lead in localization efforts.

5. Describe Font.

a. In typography, a font is traditionally defined as a complete character set of simple size and style of a particular type face. After the introduction of computer fonts based on fully scalable outlines, a broader definition evolved. *Font* is no longer size-specific, it is style-specific.

The term font is used as a metonym of type face. Bulmer regular, Bulmer italic, Bulmer bold and Bulmer bold italic are four fonts of one typeface. This word font is a doublet of the word *fondue*. It derives from Middle French *fonte*, meaning (something that has been) melt(ed) referring to type produced by casting molten metal at a type foundry. There are certain characteristics to distinguish fonts:-

- Stroke width, called weight
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6. Explain ASCII.

a. ASCII is American Standard Code for Information Interchange (pronounced as ae ski - Ass-key). It is a character encoding scheme based on the ordering of the English alphabet. ASCII codes represent texts in computers, communications equipment, and other devices that use text. Most modern character-encoding systems are based on ASCII. It includes definition for 128 characters: 33 are non-printing control characters that affect how text and space is processed; 94 are printable characters and the space is considered as an invisible graphic. The most common character encoding on www was US-ASCII until Dec 2007, when it was surpassed by UTF-8. It was developed by the American Standards Association (UTF – Unicode Transformation Format).

7. Define and explain UNICODE.

a. It is a computer industry standard for the consistent operation and handling of the text expressed in most of the world's writing systems. Developed in conjunction with the Universal Standard Set standard and published in book form as The Unicode Standard, the latest version of Unicode consists of more than 1,07,000 characters conveying 90 scripts. Unicode began in 1987. It was the result of the studies undertaken by Joe Becker from Xerox and Lee Collins and Mark Davis from Apple, to create a Universal character set. It is intended to address the need for a workable, reliable world text encoding. Unicode can be roughly described as "wide-body ASCII" that has been stretched to 16-bits to encompass the characters of all the world's living languages. Notable addition to Unicode include Arabic, Armenian, Bengali, Bopomofo, Cyrillie, Devanagari, Georgian, Greek and Coptic, Gujarati, Gurumukhi, Hangul, Hebrew, Hiranga, Kannada, Katakana, Lao, Latin, Malayalam, Oriya, Tamil, Telugu, Thai, and Tibetan.

8. What are the major projects of C-DIT Kerala?

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Advantages

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- It will underline misspelt words and give suggestions
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- C-DAC developed this software
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9. Explain the characteristics of Kaveri.

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Essays:

1. Elaborate upon localization and its effects.

- a. The process of adapting software for a particular country or region is called localization.

There are a number of problems regarding localization in India. India is a country with more than 30 regional languages. Although we have declared Hindi as our national language, it has not been accepted by all states as a functional language. All the regional languages use independent alphabet with independent character sets. The script in each regional language has undergone many revisions to suit mechanical typesetting and computing and the character set of each language has lost consistency. Europe has accepted a common alphabet with minor variations. Russia has many different languages in its provinces but Russian is a unifying language. In China they speak Chinese everywhere and computer localization is effective. But in India, it is difficult. Even within the same language, there are variations. Malayalam has succeeded in producing Malayalam word processing software called RACHANA which facilitates text creation in Old Malayalam font.

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Services are becoming interactive and transparent. E-governance is made possible. E-governance means taking governments to the door-step of people (National E-governance Plan). Efficient delivery of services Good governance means citizens being able to avail of services of the government speedily, at convenient location in a cost-effective manner. Technology can be used to improve quality of life with proper and effective localization.

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all Government websites should be simultaneously available in all twenty two officially accepted Indian languages and in English as associate official language. Localization should be basic to the NGEF architecture. Government must take a lead in localization efforts.

2. Discuss the various attempts in the field of localization in Kerala.

a.C-DIT Kerala is the agency in Kerala to promote localization. The Computational linguistic team functions as the Malayalam Computing Solutions Provider to the Government of Kerala and various other agencies of Kerala. The main aim is to integrate Malayalam with Information and Communication technology. The major projects are:

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