



Introduction to Computer Application

SYLLABUS

UNIT-I

An Introduction to Computer : Computer in Business, Elements of Computer System Set-up: Indian computing Environment, components of a computer system, Generations of computer and computer languages; Software PC-Software packages-An introduction, Disk Operating system and windows: Number systems and codes.

UNIT-II

Relevance of Data Base Management Systems and Interpretations of Applications; DBMS System Network, Hierarchical and relational database, application of DBMS systems.

UNIT-III

Data Base Language, dbase package, Basics of data processing; Data Hierarchy and Data file structure, Data files organizations; Master and Transaction file. Programme development cycle, Management of data, processing systems in Business organization.

UNIT-IV

Word processing: Meaning and role of word processing in creating of document, Editing, formatting and printing document using tools such as spelling checks, Data Communication Networking-LAN & WANS.

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UNIT-I

Introduction to Computer

SECTION-A (VERY SHORT ANSWER TYPE) QUESTIONS

Q.1. Who executes the computer instructions and a main unit of computer?

Ans. CPU executes the computer instructions and a main unit of computer.

Q.2. Is computer work 'diligently' ?

Ans. Yes computer works diligently.

Q.3. How many types of digital computers are there?

Ans. There are four types of digital computers.

Q.4. Which type of computer is single user computer system?

Ans. Single user computer is a Microcomputer.

Q.5. Give two examples of microcomputers.

Ans. BBC micro and dolphin are the two examples of microcomputers.

Q.6. Who is known as the father of computer?

Ans. Charles Babbage is known as the father of computer.

Q.7. Name the computers classified on the behalf of their qualities and working efficiency.

Ans. On the behalf of their qualities and working efficiency, computer may be classified into three types :

1. Analog computers
2. Digital computers
3. Hybrid computers.

Q.8. Which is the first known calculating machine used for counting?

Ans. Abacus is the first known calculating machine used for counting.

Q.9. Who invented the Slide Rule?

Ans. William Oughtred invented the Slide Rule.

Q.10. Who developed the Rotating Wheel Calculator?

Ans. Blaise Pascal developed the Rotating Wheel Calculator.

Q.11. Which type of computers has fastest speed to process data?

Ans. Super Computer has fastest speed to process data.

Q.12. Name the main components of CPU.

Ans. ALU, CU and MU are the main components of CPU.

Q.13. Write the full form of MAR.

Ans. Memory Address Register.

Q.14. Write down the full form of ALU.

Ans. Arithmetic Logic Unit.

Q.15. Name any three registers.

Ans. Accumulator, Stack Pointer, Program Counter are the three registers.

Q.16. Which component of CPU performs the arithmetic and logical operations on the operands.

Ans. ALU performs the arithmetic and logical operations on the operands.

Q.17. Name the register that either stores the memory address from which data will be fetched to the CPU or the address to which data will be sent and stored.

Ans. Memory Address Register is the register which either stores the memory address from which data will be fetched to the CPU or the address to which data will be sent and stored.

Q.18. Name any one second generation computer.

Ans. UNIVAC 1108 is an example of second generation computer.

Q.19. Give example of fourth generation of computer.

Ans. STAR 1000 is an example of fourth generation computer.

Q.20. Give example of fifth generation of computer.

Ans. ChromeBook is an example of fifth generation computer.

Q.21. Name two types of printers.

Ans. Impact and Non-Impact printers are the two types of printers.

Q.22. Name two types of impact printers?

Ans. Daisy wheel and Dot Matrix printers are the two types of impact printers.

Q.23. Name any two output devices.

Ans. Printer and Monitor are the two output devices.

Q.24. Is Printer an input Device?

Ans. No, it is an output device.

Q.25. Write down the full form of CRT.

Ans. Cathode Ray Tube.

Q.26. Name any two Input devices.

Ans. Keyboard and Mouse are the two input devices.

Q.27. Name the types of Scanner.

Ans. There are three types of Scanner which are :

1. Drum scanner
2. Flatbed scanner
3. Handled scanner

Q.28. Name the types of Mouse.

Ans. There are three types of mouse which are :

1. Mechanical mouse
2. Opto-mechanical mouse
3. Optical mouse

Q.29. Which device is used to read cheque number in banks?

Ans. MICR device is used to read cheque number in banks.

Q.30. Which technology is used to convert scanned text image into editable text.

Ans. OCR is used to convert scanned text image into editable text.

Q.31. What is the storage capacity of Blu-ray Disk in GB?

Ans. 25 to 50 GB is the storage capacity of Blu-ray Disk in GB.

Q.32. Name any two storage devices.

Ans. Pen drive and hard Disk are the two storage devices.

Q.33. Name the smallest unit of Memory.

Ans. bit (Binary digit) is the smallest unit of memory.

Q.34. Give one example each of CUI and GUI operating system.

Ans. Example of CUI - DOS

Example of GUI - Windows

Q.35. Name the two types of softwares.

Ans. Application software and system software are the two types of softwares.

Q.36. Name any two operating systems.

Ans. LINUX and Windows.

Q.37. Name the types of software that fall under the category of system software.

Ans. Operating System, Language Processor, Device Drivers and Utility software fall under the category of system software.

Q.38. Name any two utility software.

Ans. Data Backup and Recovery software are the two utility software.

Q.39. Write the name of any two customized softwares.

Ans. Commercial websites and business databases are the two customized softwares.

Q.40. Name the types of software that fall under the category of application software.

Ans. The types of software that fall under the category of application software are : general purpose software, specific purpose software and customized Software.

Q.41. What is the full form of GUI?

Ans. Graphical User Interface.

Q.42. What is the full form of CUI?

Ans. Character User Interface.

Q.43. Which number system has the base 2?

Ans. Binary Number System has the base 2.

Q.44. Which number system has the base 8?

Ans. Octal Number System has the base 8.

Q.45. Which number system has the base 10?

Ans. Decimal Number System has the base 10.

Q.46. What is the base of Hexadecimal number system?

Ans. The base of hexadecimal number of system is 16.

Q.47. Name the types of positional number system.

Ans. Binary number system, decimal number system, octal number system and hexadecimal number system are the various types of positional number system.

Q.48. List out the major features of a computer system.

Ans. The major features of a computer system are :

1. Speed
2. Accuracy
3. Versatility
4. Reliability
5. Storage capacity
6. Reduction in manpower
7. Reduction in Paper work
8. Diligence

Q.49. Explain Abacus.

Ans. Abacus is the first known calculating machine used for counting. It is made of beads strung on cords and is used for simple arithmetic calculations. The cords correspond to positions of decimal digits. The beads represent digits. Numbers are represented by beads close to the crossbar. Abacus was mainly used for addition and subtraction and later for division and multiplication.

Q.50. Explain difference engine and Hollerith tabulating machine.

Ans. Difference engine and Hollerith tabulating machine are discussed as follows :

1. **1822 AD - The Difference Engine** : The difference engine was built by Charles Babbage, British mathematician and engineer which mechanically calculated mathematical tables. Babbage is called the father of today's computer.
2. **1890 AD - Hollerith Tabulating Machine** : A tabulating machine using punched cards was designed by Herman Hollerith and was called as the Hollerith Tabulating Machine. This electronic machine is able to read the information on the punched cards and process it electronically.

Q.51. Why office automation is needed?

Ans. The present day's office environment demands several basic requirements that are mentioned below :

1. To control the administration overhead cost.
2. To enhance the office work productivity.
3. To facilitate better customer service.
4. To facilitate precise information to the management.
5. To facilitate the most efficient and fastest method of communication.

Q.52. Explain the disadvantages of computer.

Ans. Following list demonstrates the disadvantages of computers in today's arena:

1. **Incapability to Think** : A computer cannot think and take decision on its own. In case of any error, it cannot take an alternative action.
2. **No Intelligence** : Unlike human beings a computer has no IQ. It needs instructions at every step.
3. **Dependence on Power** : A computer is an electronic machine and thus its dependence on power makes it costly.

Q.53. Name the various components of a computer.

Ans. The components of a computer are as follows :

1. Input unit
2. Output unit
3. Memory unit
4. Central Processing Unit (CPU)

Q.54. Write a short note on input unit.

Ans. Receiving data is the first task of computer. It is the task of the input unit to link the external environment and the computer system so that instructions and data can be fed before the computations are to be performed.

Functions of Input Unit are as follows :

1. Receives set of instructions and data from external environment.
2. Converts instructions and data into digital format so that computer can accept it.
3. Sends the converted instructions and data to computer for data processing.

Some of the commonly used input devices are keyboard, mouse, scanner, etc.

Q.55. Write a short note on output unit.

Ans. Output unit interlinks the computer system with the external environment. The output unit is used to deliver the result of processed data to the user or another device. It converts the processed data into human readable format.

Functions of Output Unit are as follows :

1. Receives the result of processed data.
2. Converts the result into human readable format (since, the result is in coded form which cannot be understood by human beings).
3. Delivers the converted result to user or another device.

Some of the commonly used output devices are monitor, printer, etc.

Q.56. Define ALU.

Ans. ALU is the component of CPU which performs the arithmetic and logical operations on the operands. The arithmetic operations are addition, subtraction, multiplication and division. The logic operations are comparison operations like greater than (>), less than (<), equal to (=), etc.

Logic operations test various conditions encountered during processing and allow different actions to be taken based on results. The data or the operand acts as the input for ALU and it generates the output as a result of computation.

Q.57. Mention two disadvantages of third generation of computer.

Ans. Following are the disadvantages of third generation computers :

1. It mostly requires AC (Air Conditioning).
2. The production of IC chips necessitates highly complex technologies.

Q.58. Name any five computers of first generation computers.

Ans. ENIAC, EDVAC, UNIVAC, IBM-701 AND IBM-650 are some first generation computers.

Q.59. Name the various components of a hardware.

Ans. The various components of a hardware are:

1. Motherboard, 2. Input devices, 3. Output devices, 4. Storage devices, 5. Card, 6. Ports and cords

Q.60. What are ports and cords?

Ans. The computer contains several components which are used as pathway for the flow of data. The backside of a PC has many empty holes or external sockets called ports or

connectors. There are several types of ports within computer; the most important ones are serial port, parallel port, game port and video port.

Serial port is used to connect a mouse, modem or scanner while parallel port is used to connect a printer. Game port connects the joystick while the video port is used to connect a monitor.

Q.61.Name the different types of software.

Ans. 1. System Software : Main types of system software are :

- | | |
|----------------------|-------------------------|
| (i) Operating System | (ii) Language Processor |
| (iii) Device Drivers | (iv) System Utilities |

2. Application Software : Following are the main types of application software:

- | | |
|------------------------------|--------------------------------|
| (i) General Purpose Software | (ii) Specific Purpose Software |
| (iii) Customized Software | |

Q.62.What do you mean by graphical user interface and character user interface?

Ans. Graphical user Interface : It is also known as GUI. This operating system is graphic based and interactive in nature. You can use several devices like Mouse, Keyboard etc. to interact with the system. Windows is the most popular GUI in use now-a-days.

Character user Interface : It is also known as CUI. This type of operating system requires you to type commands in order to interact with the system. UNIX and DOS are popular CUI in use today.

Q.63.Name some general purpose application software.

Ans. Some commonly used packages are :

- | | |
|--------------------------------|--|
| 1. Word Processor Software | 2. Spreadsheets |
| 3. Presentation Software | 4. Data Base Management System (DBMS) |
| 5. Desktop Publishing Packages | 6. Graphics, Multimedia and Presentation Software. |

Q.64.Explain difference between text editor and word processor.

Ans. Text editor and word processor both are edit text, but a word processor has more extensive functionality than a text editor. Text editors just edit plain text files and allow basic editing tasks such as cut, copy and paste, undo/redo. In a word processor, formatting can be changed in a document, using settings like bold, italic, underline, different font setting, table insertion and automatic spell and grammar check etc.

Q.65.Name the different types of positional number system.

Ans. Following are the various types of positional number system:

- | | |
|-------------------------|-------------------------------|
| 1. Binary Number System | 2. Decimal Number System |
| 3. Octal Number System | 4. Hexadecimal Number System. |

Q.66.What is a computer?

Ans. The word computer is derived from computer which means to calculate. A computer is an electronic device that can perform a variety of tasks by executing given set of instructions. It is versatile and can handle multiple tasks like documentation, accounting, budgeting, designing, entertaining, education, railways and other bookings, weather forecasting and many more.

Q.67. Define data and information.

Ans. The word 'data' is the plural form of 'datum', which means fact. Data are facts or the raw material of information. Data are represented by symbols. After processing the data, information is produced. Thus information is data arranged in an order that would be useful to the user. Information is produced due to the output of data processing operations that is acquired by people to achieve specific purpose.

Data processing consists of three basic activities :

1. Capturing the input data ,
2. Manipulating the data and
3. Handling the output result.

SECTION-B (SHORT ANSWER TYPE) QUESTIONS**Q.1. How does the computer helpful in the field of defence and agriculture?**

Ans. The uses of computer in field of defence and agriculture and given as follows:

1. **In the field of Defence :** Computers play a major role in defence capability. Computer simulation technology helps soldiers to prepare for real time battlefield experience. Soldiers are trained to operate air-crafts, tanks and other defence weapons easily and economically. Computers are used in tanks, planes, and ships to target enemy forces and to track incoming missiles and help automatic weapons systems to destroy the incoming target.
2. **In the field of Agriculture :** Since the implementation of computers into agriculture and farming, the productivity rating has increased exponentially. There are no more losses along the way and every process is carefully monitored by computers and optimized for best performances. With the help of computer, scientists research to improve fertility of soil and invent new varieties of fruits, vegetables and crops to improve production and nutrition. On farms, they have computer software that calculates the exact amount of time that it takes to milk a cow or the exact amount of food they need to provide to obtain a certain amount of milk from the cow.

Q.2. Write a short note on Indian computing environment.

Ans. A number of administrative and management activities are part of the daily office work. An organization commonly has several activities such as preparation, distribution, processing and document review. Before the development of computers, either manually or by using mechanical and electrical machines, these types of office work used to be performed. In the past few years, there has been a significant change in the basic nature of the office. In-office automation, the applications of the latest technology is used to enhance office efficiency. Office automation can be seen as the use of the computer and different types of related technologies such as communication and networking to combine the common office work in order to enhance the overall office work's productivity. Office automation is not related to only the installation of computers and communication devices in the office but it entails a lot of other things also. The function of the Office Automation System is collecting, processing, storing and transmitting the data and information in the form of electronic office communication. Another definition of the OAS can be a computer-based information system which collects, processes, stores and transmits electronic messages, document and other form of communication among individual, work group and organisations. For example, word processing, desktop publishing, telecommunication, electronic mail and document image processing.

Q.3. Write a short note on office automation system.

Ans. For performing some basic office operations, a variety of office automation systems are used and these can be divided mainly into the following four categories :

1. **Document Management Systems** : Computerised tools for generation, storage, processing and distribution of documents are included in this system.
2. **Communication Systems** : This is the system that is commonly utilized for sending different messages, data, and documents within and outside to the organisation.
3. **Teleconferencing Systems** : A number of teleconferencing systems can be used in order to provide the electronic mode of communication for performing the various seminars and training programs in the organization.
4. **Support Systems** : Apart from the main office automation systems, some offices also use specific support systems for performing the different workgroup activities.

Q.4. Explain the different types of functions that can be automated in office.

Ans. There are a number of tasks that are to be done in the office. The different types of functions that can be automated in the office are mentioned below :

1. **Document Generation** : There are a number of documents that are to be prepared, typed and printed in a common office. For the automation of routine office work, typewriters, printers and computers are commonly utilized.
2. **Document Processing** : There is also a requirement to process the different documents so that some important information can be accessed from MIS and other different official applications. A number of office automation tools such as word processing, desktop publishing, etc., can be utilized to execute these activities.
3. **Document Distribution** : An electronic distribution system is needed in every office to transfer the data and documents inside and outside of the organization. Photocopiers, Teletax and Fax machines are the main office automation tools that are used for such type of document distribution.
4. **Archival Storage** : The office documents have to be kept for long in order to retrieve them as and when needed. This task is achieved by the use of different storage devices like tapes, disks, etc.

Q.5. Explain the disadvantages of a computer.

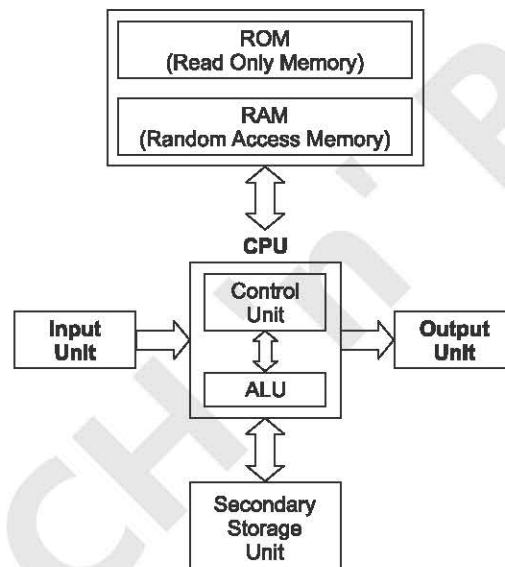
Ans. Following are the main disadvantages of a computer:

1. **Efficient and Wide Range of Computing** : It has an ability to handle the computations ranging from simple arithmetic operations to large and complex scientific calculations. The reliability, accuracy and efficiency are also much greater as compared to human beings.
2. **Networking** : Computer provides the connectivity, ranging from few kilometers to entire world. This interconnectivity is known as networking and it provides several advantages like sharing of devices, files, etc., which saves time and money.
3. **Security** : With the help of passwords and other security means, it is possible to prevent unauthorized people from seeing the contents of a file.
4. **Durability of Data** : By keeping the backup of data on storage devices, files can be stored safely for long time duration in a stand alone computer. A file server can back up all data easily in the networked system.

5. **Ease of Handling the Data** : A huge amount of data can be easily handled by users with the help of computers. With the use of special packages like MS-Office, manipulation of data (like creating text documents, editing and printing them, manipulating and printing images, etc.) becomes more quick and easy.
6. **Magnificent Educational Tool** : With the help of good software, the new learners can develop their thinking power and understanding of various cause-effect relationships. They can solve higher order problems and increase their creative skills. Computers also allow the learners to set the level of experience and challenge according to the comfort level.

Q.6. Draw the block diagram of a computer.

Ans.



Q.7. Explain briefly Memory Unit.

Ans. Memory unit is used to store the data entered by input unit. It also store the intermediary result produced at the time of data processing. As well as, it stores the final result delivered by computer before passing to the output unit for external environment.

Memory is used in computer for keeping the entered data and instructions through the input devices. It is also used to keep the intermediate results produced during the execution process in computer. As well as, the final result after processing is also keep in it, before displaying it on the output unit.

Q.8. Write some characteristics of third generation computers.

Ans. Characteristics of Third Generation Computers

Following are the main characteristics of third generation computers :

1. They make use of IC.
2. As compared to first and second generation computers they are more reliable.
3. They are smaller in size.
4. It generates less heat.
5. They are faster in processing.

6. They require less maintenance.
7. They are costly.
8. They require AC.
9. They consume less electricity.
10. High-level language is supported by them.

Q.9. Mention some advantages of third generation computers.

Ans. Advantages of Third Generation Computers

Following are the advantages of third generation computers :

1. When compared to prior generations of computers they are smaller in size.
2. More reliable as compared to second generation computers.
3. Generate low heat as compared to second generation computer.
4. The computational times were reduced from microseconds to nanoseconds.
5. Low maintenance cost.
6. Easily portable.
7. Throughout the world, it is widely used for a variety of commercial uses, thus are general purpose computer.
8. Individual components do not need to be manually assembled into a functioning unit. As a result, the amount of human labour and associated costs at the assembly stage were dramatically decreased.
9. Easier and cheaper commercial production.

Q.10. Explain second generation computers and their features.

Ans. Second Generation Computers : Transistors (1958-1964)

Second generation used solid state device called transistor in place of vacuum tubes. Like vacuum tubes, transistors were used in same way and were more efficient than vacuum tubes as they were small in size. Less costly and generate less heat. Transistors were made up of silicon. They were developed in 1947 at Bell Laboratories and had brought electronic revolution in late 1950s.

Second generation also introduced the complex arithmetic and logic unit and control units. Facility of system software and high-level programming language also took place in the second generation.

Some computers of this generation were :

- | | | |
|-------------|----------------|-------------|
| 1. IBM 1620 | 2. IBM 7094 | 3. CDC 1604 |
| 4. CDC 3600 | 5. UNIVAC 1108 | |

Features of Second Generation Computers

Following are the features of second generation computers :

1. They make use of transistors.
2. More reliable as compared to previous generation.
3. When compared to first generation computer they are smaller in size.
4. Less heat is generated by them as compared to first generation computers.
5. When compared to first generation computer they produce less electricity.
6. They are faster than first generation computer.
7. Very costly.
8. They necessitate the use of AC.
9. Machine and assembly language is supported by this generation computer.

Q.11. Write down the advantages and disadvantages of second generation computers.

Ans. Advantages of Second Generation Computers

Following are the advantages of second generation computers :

1. When compared to second generation computers they are smaller in size.
2. They are more reliable.
3. They generate less heat.
4. The computational times were reduced from milliseconds to microseconds with the introduction of this generation computer.
5. Hardware failures are less likely to occur.
6. They are more portable.
7. They were used for many commercial purposes.

Disadvantages of Second Generation Computers

Following are the disadvantages of second generation computers :

1. It necessitates the use of AC.
2. Requires frequent maintenance.
3. Individual components had to be manually assembled into a functioning unit.
4. Costly and difficult commercial production.

Q.12. Explain third generation computers.

Ans. Third Generation Computers : Integrated Circuits (IC) (1965-1971)

Third generation introduced the transistors and integrated circuit boards. This time period is technically known as micro-electronic age. The production of digital circuits decreased the size of the computer. ICs were 'discrete component computer chips' being self-contained in nature. These were made up of components like capacitors, transistors and resistors.

ICs can be of different types :

1. SSI (Small Scale Integration)
2. MSI (Medium Scale Integration)
3. LSI (Large Scale Integration)
4. VLSI (Very Large Scale Integration)

The thin wafers of silicon were divided into small areas measuring few milli-meters forming a matrix. Similar circuits were fabricated in each grid and then the wafer was broken to make chips. Each chip comprises of numerous input/output attachment points and gates (Figure).

Some computers of this generation were :

1. IBM-360 series
2. Honeywell-6000 series
3. PDP (Personal Data Processor)
4. IBM-370/168
5. TDC-316

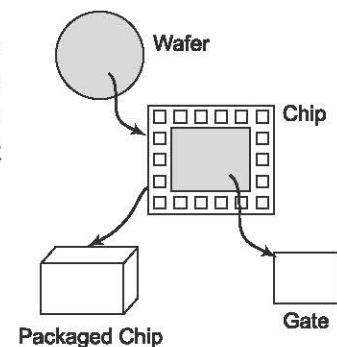


Figure : Relationship between Wafer, Chip and Gate

Q.13.Explain different types of output.

Ans. Output is data that has been processed into useful information. It can be displayed or viewed on a monitor, printed on a printer, or listened through speakers or a headset. Generally, there are two basic categories of output : the output which can be readily understood and used by the humans, and which is stored on secondary storage devices so that the data can be used as input for further processing. The output, which can be easily understood and used by human beings, are of the following two forms :

1. **Hard Copy** : The physical form of output is known as hard copy. In general, it refers to the recorded information copied from a computer onto paper or some other durable surface, such as microfilm. Hard copy output is permanent and a relatively stable form of output. This type of output is also highly portable. Paper is one of the most widely used hard copy output media. The principal examples are printouts, whether text or graphics, from printers.
2. **Soft Copy** : The electronic version of an output, which usually resides in computer memory and/or on disk, is known as soft copy. Unlike hard copy, soft copy is not a permanent form of output. It is transient and is usually displayed on the screen. This kind of output is not tangible, that is, it cannot be touched. Soft copy output includes audio and visual form of output, which is generated using a computer. In addition, textual or graphical information displayed on a computer monitor is also a soft copy form of output.

Q.14.Write a short note on speakers and web camera.

Ans. 1. **Speakers** : Speakers are the output devices which are used to play sound. A speaker converts an alternating electrical current into sound. It may be built into the system unit or connected with cables. We can listen to music and various sound effects through them.

2. **Web Camera** : A web-camera, commonly called as Webcam is a video camera that inputs images in real time into a computer. It is connected to the computer via USB port. As it is commonly used as a video camera for video conferencing and in instant messaging for the World Wide Web, gave the webcam its name.

Q.15.Differentiate between Flatbed Plotter and Drum Plotter.

Ans. Flatbed plotter and Drum plotter can be discussed as follows :

1. **Flatbed Plotter** : A flatbed plotter is known as a table plotter. It plots on a paper that is spread and fixed over a rectangular flatbed table. A pen mounted on a moving carriage, moves in accordance with the signals received from the CPU and produces drawing on the paper. It is very slow in drawing or printing graphs.
2. **Drum Plotter** : The first Plotter as the Drum Plotter unit introduced in 1957 at US National Bureau of standards by Russell Kirsch and his team. A drum plotter is also known as Roller Plotters. It consists of a drum on which a paper is placed. The drum then rotates back and forth to produce the graph on the paper. The pen, mounted on a fixed carriage, moves horizontally across the paper to create a perfect drawing. They are noisier and compact as compared to flatbed Plotters.

Q.16.Write a short note on smart cards and digital cameras.

Ans. Smart Cards and digital cameras is given as follows :

1. **Smart Cards** : Smart cards, going a stage further, have a built-in microprocessor chip where data can be permanently stored. They also possess some processing capability

making them suitable for a variety of applications. For example, to gain access, an employee inserts a card or badge in the reader. This device reads and checks the authorisation code before permitting the individual, to enter a secured area. Since smart cards can hold more information as compared to magnetic strip cards, they are gaining in popularity.

- 2. Digital Cameras :** Digital Cameras look similar to ordinary cameras but take photographs without using the film. The picture is stored as a graphic file that we can transfer directly to our computer through a connection lead. Good quality digital cameras are quite expensive but their advantage is that we do not need a scanner as the photograph is directly converted into a digital graphical format.

Q.17.What are memory cards/sticks?

Ans. A memory card (sometimes called a flash memory card or a storage card) is a small storage medium used to store data such as text, pictures, audio and video for use on small, portable or remote computing devices. They are commonly used in many electronic devices, including digital cameras, mobile phones, laptop computers, MP3 players, and video game consoles. They are small, re-recordable, and they can retain data without power.

Memory sticks are versatile, compatible and user friendly which makes it the most popular portable memory device used for storing/sharing/enjoying digital content anywhere, anytime. It is available in 4 MB, 8 MB, 32 MB, 64 MB and 128 MB storage sizes.

Q.18.What are motherboards?

Ans. Motherboard is mainframe of the computer through which all other components Interface. It is the central circuit board arranged on a complex electronic system. A motherboard offers the electrical connections through which the other components communicate.

Motherboard is the main component of the computer. The motherboard is a large Printed Circuit Board (PCS) contains chips, connectors and other electronics mounted on it. The motherboard is the hub used to connect all necessary components of a computer system. Various devices like RAM, hard drives, disk drives and optical drives are all plugged into the interfaces on the motherboard. It contains the processor, memory, chips, interfaces and sockets.

Memory unit is the main component of a computer system. It is used to store data, instructions and information before the processing by the Arithmetic and Logical Unit (ALU). It is a work area, physically, a collection of integrated circuits within the computer where the Central Processing Unit (CPU) stores data and instructions.

Q.19.Explain plotters.

Ans. A plotter is a vector graphics printing device, which is used to print graphical plots on paper or polyester films. Plotters are different from printers. They are generally vector based and draw lines using a pen. Vector based means from point to point, compared to the normal pixel based system. Vector based printing gives better lines and graphics. Plotters are basically used for graphical applications like Computer Aided Designing (CAD) and for printing maps and drawings.

There are two types of plotters :

- 1. Flatbed Plotter :** A flatbed plotter is known as a table plotter. It plots on a paper that is spread and fixed over a rectangular flatbed table. A pen mounted on a moving carriage,

moves in accordance with the signals received from the CPU and produces drawing on the paper. It is very slow in drawing or printing graphs.

2. **Drum Plotter** : The first plotter as the drum plotter unit introduced in 1957 at US National Bureau of standards by Russell Kirsch and his team. A drum plotter is also known as Roller Plotter. It consists of a drum on which a paper is placed. The drum then rotates back and forth to produce the graph on the paper. The pen, mounted on a fixed carriage, moves horizontally across the paper to create a perfect drawing. They are noisier and compact as compared to flatbed plotters.

Q.20.Explain magnetic tapes and floppy disks in detail.

Ans.

Magnetics Tapes

These are used for sorting files of data that are sequentially accessed or not used very often and are stored offline. They are typically used as backup storage for archiving of data. In case of magnetic tapes, a tape (plastic ribbon usually 1/2 inch or 1/4 inch wide and 50 to 2400 feet long) is wound on a spool and its other end is threaded manually on a take up spool. A metal foil called marker is used to determine the Beginning of the Tape (BOT).

The tap is read sequentially, *i.e.*, data can be read in the order in which the data has been written. This implies that if the desired record is at the end of the tape, all the earlier records have tape read before it is reached.

The storage capacity of the tape depends on its data recording density and the length of the tape. The data recording density refers to the amount of data that can be stored or the number of bytes that can be stored per linear inch of tape. The data recording density is measured in BPI (Bytes per Inch).

Floppy Disks

The disks used with a floppy disk drive are small removable disks made of plastic coated with magnetic recording material. There are two sizes commonly used, with diameters of 5' /4 and 3' /2 inches.

- (i) The 5¼ inch disks recorded data only on one side and were called Single Sided (SS) disks. Today both the surfaces are used for recording and are called Double Sided (DS) disks. These are available in two capacities viz. Double Density (DD), and High Density (HD), where density refers to the number of bits that can be stored per square inch area.
- (ii) The 3½ inch disks record data on both sides and are therefore double sided disks. These disks come in three different capacities viz. double density, high density, and very high density. These are smaller and can store more data than the 5¼ inch disks.

Q.21. Explain hard disk.

Ans. Hard disk is the most common storage device for storing a large amount of data. It is also called HD or HDD (Hard Disk Drive) or Winchester Disk; it was introduced in 1954 by an IBM team led by Rey Johnson.

A Hard Disk Drive (HDD) is a non-volatile storage device for digital data. It features one or more rotating rigid platters on a motor-driven spindle within a metal case. Data is encoded magnetically by read/write heads that float on a cushion of air above the platters.

A magnetic disk is a circular plate made of metal or plastic, coated with magnetised material. Often both sides of the disk are used. Data is recorded on the disk in the form of magnetised and non-magnetised spots (not visible to the naked eye) representing 1s and 0s.

Multiple disks are usually stacked and used together to create disk storage systems having large capacities. In this case, multiple disks are fixed on a central shaft, one below the other to form a disk pack. This is then mounted on a disk drive that has a motor to rotate this disk pack about its axis. The disk drive also has an access arms assembly with a separate read/write head for each surface of the disk pack. The access arms for all the disks surfaces move together. A disk system, is thus, addressed by the disk number, the disk surface, the sector number and the track within the sector.

Q.22.Explain Blu-ray disk and USB Flash/Pen drive.

Ans.

Blu-Ray Disk

Blu-ray disk is a new optical disk format that is rapidly replacing a DVD. Blu-ray Disc (BD) is the name of a next-generation optical disc format jointly developed by the Blu-ray Disc Association (BDA), a group of the world's leading consumer electronics, personal computer and media manufacturers.

The format was developed to enable recording, rewriting and playback of high definition video (HD), as well as storing large amounts of data. The format offers more than five times the storage capacity of traditional DVDs and can hold up to 25GB on a single-layer disc and 50GB on a dual-layer disc. This extra capacity combined with the use of advanced video and audio codecs which offers consumers an unprecedented HD experience.

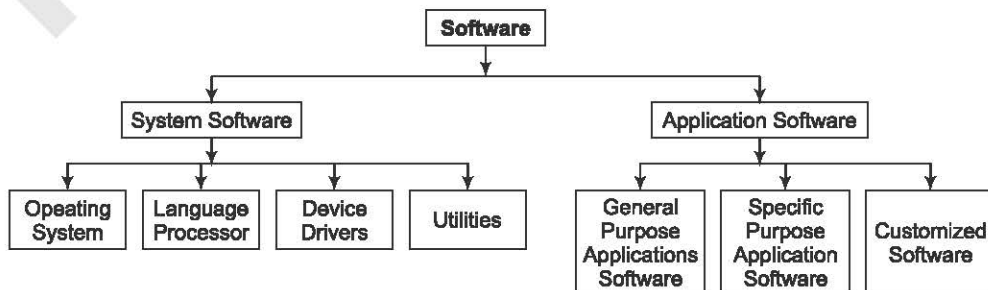
USB Flash/Pen Drive

A flash drive is a small ultra-portable storage device which can be written and rewritten to an almost unlimited number of times, much like a standard hard drive. A USB flash drive consists of a flash memory data storage device integrated with a USB (Universal Serial Bus) USB flash drives are typically removable and rewritable and physically much smaller than a floppy disk.

Q.23.What do you mean by software?

Ans. Software is the collection of computer programs and procedures that instructs a computer how to do different types of tasks. Briefly, computer software is the language in which a user can interact or communicate with computer. Software enhances the capability of the hardware and directs the computer to perform operations like input, Processing and output.

Computer software is classified in different categories according to their uses and utilities.



Q.24. What are the differences between hardware and software?

Ans. Differences between Hardware and Software

Basis	Hardware	Software
Types	Input/output, storage and control devices.	Software is of two types named system software and application software.
Dependency and Functioning	Hardware depends on the software, i.e., hardware works only if the software is loaded successfully.	Software is installed on the hardware for delivering a set of operations.
Reliability	If there is a fault in the hardware then it cannot be updated, i.e., it should be replaced by new one.	In order to remove the fault of software, their testing and upgrading is necessary.
Failure	Hardware fails rarely.	The failure rate of software is systematic.
Nature	Hardware can be touched as it is physical in nature.	Software cannot be touched as it is logical in nature.
Changes	The changing rate of hardware of a computer is much more as compared to software.	Software can be created, modified or erased on a computer.
Examples	Keyboard, mouse, scanner, printer, router, hard disk etc.	MS Word, Adobe Reader, Google Chrome, Corel Draw etc.

Q.25. Explain application software and its various types.

Ans. Application Software

Application software is a set of programs, developed by programmers in order to perform specific tasks. Application software enables the end users to accomplish certain specific tasks. Business software, databases and educational software are some forms of application software.

Different word processors, which are dedicated for specialized tasks to be performed by the user, are other examples of application software.

Types of Application Software

The application software can be categorized as follows :

- 1. General Purpose Application Software :** General purpose software used to resolve general tasks need for end users to enhance their productivity. These kinds of softwares are commonly available on general computer software stores. These types of software are also known as packages.
- 2. Specific Purpose Application Software :** Unlike, General Purpose Application Software that are designed to carry out common tasks, the specific Purpose Application software are developed by programmers to perform only specific tasks.
- 3. Customized Software :** These kinds of softwares are generally known as tailor made softwares as they designed and developed to meet specific end user requirements. This software cost more than a general purpose software as they design and develop on demand. The perfect example to clarify the difference between General purpose software and customized software is to visualise the difference between readymade garments and tailor made cloths. It can easily be modified according to the changing requirements. Some of the customized software are: Commercial websites, business databases, software for private firms etc.

Q.26. Write a short note on number system.

Ans. There are several kinds of data such as, numeric, text, date, graphics, image, audio and video that need to be processed by a computer. The text data usually consist of standard alphabetic, numeric and special characters. The graphics data consist of still pictures such as drawings and photographs. Any type of sound, including music and voice, is considered as audio data. Video data consist of motion pictures. The data has to be converted into a format that the computer understands. Data can be classified into two forms, analog data and digital data. Analog data can have any value within a defined range and it is continuous. Sound waves, telephone signals, temperatures and all other signals that are not broken into bits are examples of analog data. Digital data can be represented by a series of binary numbers and it is discrete. The Arithmetic and Logic Unit (ALU) of the computer performs arithmetic and logical operations on data. Computer arithmetic is commonly performed on two different types of numbers, integer and floating point. As the hardware required for arithmetic is much simpler for integers than floating point numbers, these two types have entirely different representations. An integer is a whole number and the floating-point number has a fractional part. To understand about how computers store data in the memory and how they handle them, one must know about bits and bytes and the number systems. Bits and bytes are common computer jargons. Both the main memory (Random Access Memory or RAM) and the hard disk capacities are measured in terms of bytes. The hard disk and memory capacity of a computer and other specifications are described in terms of bits and bytes. For instance, a computer may be described as having a 32-bit Pentium processor with 128 Megabytes of RAM and hard disk capacity of 40 Gigabytes.

Q.27. Write a short note on bits and bytes.

Ans. A numbering system is a way of representing numbers. The most commonly used numbering system is the decimal system. Computer systems can perform computations and transmit data thousands of times faster in binary form than they can use decimal representations. It is important for every one studying computers to know how the binary system and hexadecimal system work. A bit is small piece of data that is derived from the words "binary digit". Bits have only two possible values, 0 and 1. A binary number contains a sequence of 0s and 1s like 10111. A collection of 8 bits is called as a byte. With 8 bits in a byte, we can represent 256 values ranging from 0 to 255 as shown below:

0 = 0000 0000
1 = 0000 0001
2 = 0000 0010
3 = 0000 0011
.....
.....
.....
254 = 1111 1110
255 = 1111 1111

Q.28. Explain the different types of number system.

Ans. There are two types of number systems :

1. **Non-positional Number Systems** : This number system is currently obsolete where each symbol represents the same value irrespective of its position in the number

Q.32. Explain octal number system in detail.

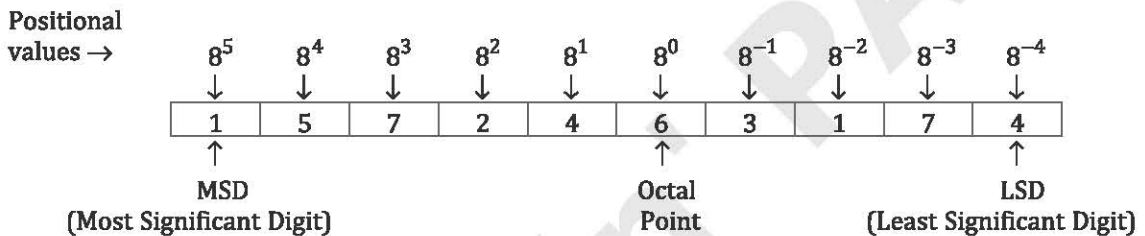
Ans. In this number system, there are 8 digits : 0, 1, 2, 3, 4, 5, 6 and 7 to represent numbers. The base of this number system is 8 because it can represent 8 digits. So, the maximum value of a single digit in this number system is always 7 as given in the definition of base. Any octal number is a string of any combination of these digits. Any octal fraction is also a string of these numbers but with an embedded decimal point.

For example, $(123)_8$, $(34)_8$, $(35.54)_8$, $(0675)_8$ etc.

The octal number system is also a positional value system, wherein each octal digit has its own value or weight expressed as a power of 8.

For example, $(157246.3174)_8$

It can be represented as shown below :



Here, the places to the left of the octal point are positive powers of 8 and places to the right are negative powers of 8.

Q.33. Explain how can we convert decimal numbers to octal numbers. Also, convert the following decimal numbers into their octal equivalents:

(i) 759, (ii) 1598.

Ans. For converting integer decimal numbers into their equivalent octal numbers, divide the given number repeatedly by 8 till the quotient obtained is zero. The following example illustrates this concept :

(i) 759: Start dividing 759 by 8 and continue the procedure till the quotient is 0. The procedure is shown below :

$$\text{Thus, } (759)_{10} = (1367)_8$$

8	759	
8	94 - 7	↑ LSD
8	11 - 6	
8	1 - 3	
0 - 1		

(ii) 1598 :

$$\text{Thus, } (1598)_{10} = (3076)_8$$

8	1598	
8	199 - 6	↑ LSD
8	24 - 7	
8	3 - 0	
0 - 3		

For converting decimal fractions into their equivalent octal fractions, multiply the fractional part repeatedly by 8 and keep track of the overflow. The process of multiplication continues till the fractional part becomes zero or upto required number of digits.

Q.34. Explain how can we convert the octal number into decimal number. Also, Convert the following octal numbers into their decimal equivalents :

(i) $(47)_8$, (ii) $(564)_8$.

Ans. A mixed octal number can be converted to decimal number by the formula given below :

$$M = d_{n+1} 8^n + d_n 8^{n-1} + d_{n-1} 8^{n-2} + \dots + d_3 8^2 + d_2 8^1 + d_1 8^0 + d_{-1} 8^{-1} + d_{-2} 8^{-2} + d_{-3} 8^{-3} + \dots + d_{-n} 8^{-n}$$

Here, M is the mixed number

d_{n+1} is the digit in the $(n+1)$ th position of the integral part

d_{-1} is the digit immediately after the octal point.

$$(i) \quad (47)_8 = 4 \times 8^1 + 7 \times 8^0 = 32 + 7 = 39$$

$$\text{Thus, } (47)_8 = (39)_{10}$$

$$(ii) \quad (564)_8 = 5 \times 8^2 + 6 \times 8^1 + 4 \times 8^0 = 5 \times 64 + 6 \times 8 + 4 \times 1 \\ = 320 + 48 + 4$$

$$\text{Thus, } (564)_8 = (372)_{10}$$

Q.35. How can we convert octal to binary number system. Also, Convert the following octal numbers into their binary equivalents :

(i) $(746)_8$, (ii) $(5043)_8$.

Ans. The octal number system is widely used as a shorthand way of expressing binary values. The octal number system groups three binary bits together into one digit (0 to 7) as given below :

Octal	Binary Equivalent
0	000
1	001
2	010
3	011
4	100
5	101
6	110
7	111

To convert an octal number to its binary equivalent, each digit of the octal number is converted to its 3 bits binary equivalent.

$$(i) \quad (746)_8 = \frac{111}{7} \frac{100}{4} \frac{110}{6}$$

(Replace each octal digit by its 3 bits binary equivalent)

$$= (111100110)_2$$

$$\text{Thus, } (746)_8 = (111100110)_2$$

$$(ii) \quad (5043)_8 = \frac{101}{5} \frac{000}{0} \frac{100}{4} \frac{011}{3} = (101000100011)_2$$

$$\text{Thus, } (5043)_8 = (101000100011)_2$$

Q.36. How can we convert binary to octal? Also, convert the following binary numbers into their octal equivalents :

(i) $(11101)_2$, (ii) $(101010011011.10100011)_2$.

Ans. For converting a binary number into its octal equivalent the following steps are followed :

(i) Divide the given binary number before the binary point into groups of three bits each (from right to left) and after the binary point into groups of three bits each (from left to right) by adding 0 bits for completing the groups (if needed).

(ii) Replace each group by its octal equivalent.

$$(a) \quad (11101)_2 = \frac{011}{3} \frac{101}{5} \quad \text{(Replacing each group by its octal equivalent, 0 added on leftmost position for completing the group)}$$

$$\text{Thus, } (11101)_2 = (35)_8$$

$$(b) \quad (101010011011.10100011)_2 = \frac{101}{5} \frac{010}{2} \frac{011}{3} \frac{011}{3} . \frac{101}{5} \frac{000}{0} \frac{110}{6}$$

(Replacing each group by its octal equivalent, 0 added on rightmost position for completing the group).

$$\text{Thus, } (101010011011.10100011)_2 = (5233.506)_8$$

Q.37. How can we convert decimal numbers to hexadecimal numbers? Also, Convert the following decimal numbers into their hexadecimal equivalents :

(i) $(28)_{10}$, (ii) $(1795)_{10}$

Ans. For converting integer decimal numbers into their equivalent hexadecimal numbers, divide the given number repeatedly by 16 (if the remainder is greater than or equal to 10 then write its symbol i.e., A to F, otherwise the digit 0 to 9) till the quotient obtained is zero.

(i) Start dividing 28 by 16 and continue the procedure till the quotient is 0. The procedure is given below :

$$\begin{array}{r|l} 16 & 28 \\ \hline 16 & 1 - C \\ \hline & 0 - 1 \end{array} \uparrow$$

$$\text{Thus, } (28)_{10} = (1C)_{16}$$

$$(ii) \quad \begin{array}{r|l} 16 & 1795 \\ \hline 16 & 112 - 3 \\ \hline 16 & 7 - 0 \\ \hline & 0 - 7 \end{array} \uparrow$$

$$\text{Thus, } (1795)_{10} = (703)_{16}$$

For converting decimal fractions into their equivalent hexadecimal fractions, multiply the fractional part repeatedly by 16 and keep track of the overflow. If the overflow is greater than equal to 10 then write its symbol i.e., A to F, otherwise the digit 0 to 9. The process of multiplication continues till the fractional part becomes zero or upto required number of digits.

Q.38. How can we convert, hexadecimal numbers to their Decimal Equivalents? Also, Convert the following hexadecimal numbers to their decimal equivalents:

(i) $(9D)_{16}$, (ii) $(517)_{16}$, (iii) $(0.48)_{16}$, (iv) $(0.125)_{16}$

Ans. The conversion of hexadecimal numbers to their decimal equivalents is performed by using the concept of the positional value of each digit in the number, whether it is an integer, a fraction or a mixed number.

$$\begin{aligned} \text{(i)} \quad (9D)_{16} &= 9 \times 16^1 + D \times 16^0 \\ &= 144 + 13 \times 1 \\ &= 144 + 13 = 157 \end{aligned} \quad (\because D=13)$$

$$\text{Hence, } (9D)_{16} = (157)_{10}$$

$$\begin{aligned} \text{(ii)} \quad (517)_{16} &= 5 \times 16^2 + 1 \times 16^1 + 7 \times 16^0 \\ &= 5 \times 256 + 1 \times 16 + 7 \times 1 \\ &= 1280 + 16 + 7 = 1303 \end{aligned}$$

$$\text{Hence, } (517)_{16} = (1303)_{10}$$

$$\begin{aligned} \text{(iii)} \quad (0.48)_{16} &= 4 \times 16^{-1} + 8 \times 16^{-2} = 4 \times 1/16 + 8 \times 1/16^2 \\ &= 4 \times .0625 + 8 \times 0.00390625 \\ &= 0.2500 + .03125000 = 0.28125000 \end{aligned}$$

$$\text{Hence, } (0.48)_{16} = (0.28125)_{10}$$

$$\begin{aligned} \text{(iv)} \quad (0.125)_{16} &= 1 \times 16^{-1} + 2 \times 16^{-2} + 5 \times 16^{-3} \\ &= 1 \times 0.0625 + 2 \times 0.00390625 + 5 \times 0.00024414 \\ &= 0.0625 + 0.00781250 + 0.00122070 = 0.07153320 \end{aligned}$$

$$\text{Hence, } (0.125)_{16} = (0.0715332)_{10}$$

Q.39. How can we convert hexadecimal to binary? Also, convert the following hexadecimal numbers into their binary equivalents :

(i) $(59F)_{16}$, (ii) $(8796)_{16}$, (iii) $(F3A.CB)_{16}$, (iv) $(5D.8F)_{16}$

Ans. For converting a hexadecimal number to its binary equivalent, each digit of the hexadecimal number is converted to its 4. bits binary equivalent. For reading convenience, usually each nibble (4-bit binary equivalent) is written with a little space in between.

$$\begin{aligned} \text{(i)} \quad (59F)_{16} &= \frac{0101}{5} \frac{1001}{9} \frac{1111}{F} && \text{(Replace each hexadecimal digit} \\ &= (0101 \ 1001 \ 1111)_2 && \text{by its 4 bits binary equivalent)} \end{aligned}$$

$$\text{Thus, } (59F)_{10} = (0101 \ 1001 \ 1111)_2$$

$$(ii) \quad (8796)_{10} = \frac{1000}{8} \frac{0111}{7} \frac{1001}{9} \frac{0110}{6} \quad (\text{Replace each hexadecimal digit by its 4 bits binary equivalent})$$

$$= (1000 \ 0111 \ 1001 \ 0110)_2$$

$$\text{Thus, } (8796)_{16} = (1000 \ 0111 \ 1001 \ 0110)_2$$

$$(iii) \quad (F3A.CB)_{16} = \frac{1111}{F} \frac{0011}{3} \frac{1010}{A} \frac{1100}{C} \frac{1001}{B} \quad (\text{Replace each hexadecimal digit by its 4 bits binary equivalent})$$

$$= (1111 \ 0011 \ 1010 \ . \ 1100 \ 1001)_2$$

$$\text{Thus, } (F3A.CB)_{16} = (1111 \ 0011 \ 1010 \ . \ 1100 \ 1001)_2$$

$$(iv) \quad (5D8F)_{16} = \frac{0101}{5} \frac{1101}{D} \frac{1000}{8} \frac{1111}{F} \quad (\text{Replace each hexadecimal digit by its 4 bits binary equivalent})$$

$$= (0101 \ 1101 \ . \ 1000 \ 1111)_2$$

$$\text{Thus, } (5D8F)_{10} = (0101 \ 1101 \ . \ 1000 \ 1111)_2$$

Q.40. Explain the working of a computer.

Ans. To perform any task a computer system does four main following functions:

- 1. Input :** This is the process of entering data and programs into the computer system.
- 2. Processing :** The task of performing operations like arithmetic and logical operations is called processing.
- 3. Output :** This is the process of producing results from the data for getting useful information. It makes processed data available to the user.
- 4. Storage :** The process of saving data and instructions permanently is known as storage. Two types of storage are used, first is primary storage (RAM) and second is secondary storage (hard disk, pen drives, memory cards, etc.).

Q.41. Write a short note on personal computer and laptop.

Ans.

Personal Computer

It can be defined as a small, relatively inexpensive computer designed for an individual user. In price, personal computers range anywhere from a few hundred pounds to over five thousand pounds.

All are based on the microprocessor technology that enables manufacturers to put an entire CPU on one chip. Businesses use personal computers for word processing, accounting, desktop publishing and for running spread sheet and database management applications.

At home, the most popular use for personal computers is for playing games and recently for surfing the internet.

Laptop

Similar in operation to desktops, laptop computers are miniaturized and optimized for mobile use. Laptops run on a single battery or an external adapter that charges the computer batteries.

They are enabled with an inbuilt keyboard, touch pad acting as a mouse and a liquid crystal display. Its portability and capacity to operate on battery power have served as a boon for mobile users.

Q.42. Explain analog, digital and hybrid computers.

Ans.

Analog Computers

Analog computers are the computers that can accept only signals. Thermometer and speedometer are the examples of such computers.

Digital Computers

The computers that can accept digits and alphabets as input are known as digital computers. Such computers are used at home, business and offices.

Depending on their performance, size, cost and capacity, they have been classified into four different types i.e., super computers, mainframe computers, mini computers and microcomputers.

Hybrid Computers

Hybrid computers are the combined forms of both the digital and the analog computers. These computers use signals, digits and alphabets as input and produce better output.

Q.43. Write a short note on Personal Digital Assistants (PDAs)/Palmtop and workstation.

Ans.

PDAs/Palmtop

It is a handheld computer and popularly known as a palmtop. It has a touch screen and a memory card for storage of data.

Palmtops that use a pen rather than a keyboard for input are often called hand-held computers or PDAs. PDAs can also be effectively used as portable audio players, web browsers and smart phones.

Most of them can access the internet by means of Bluetooth or Wi-Fi communication. Because of their small size, most palmtop computers do not include disk drives. However, many contain PCMCIA slots in which you can insert disk drives, modems, memory and other devices. Palmtops are also called pocket computers.

Workstation

It is a type of computer used for engineering applications (CAD/CAM), desktop publishing, software development and other types of applications that require a moderate amount of computing power and relatively high quality graphics capabilities. Workstations generally come with a large, high-resolution graphics screen, at large amount of RAM, built-in network support and a graphical user interface.

Most workstations also have a mass storage device such as a disk drive, but a special type of workstation, called a diskless workstation, comes without a disk drive. The most common operating systems for workstations are UNIX and Windows NT. Like personal computers, most workstations are single-user computers. However, workstations are typically linked together to form a local-area network, although they can also be used as stand-alone systems.

Q.44. Explain briefly Disk Operating System (DOS).

Ans.

Disk Operating System (DOS)

MS-DOS was developed by the Microsoft Ltd. and is an acronym for Microsoft Disk Operating System. DOS is a 16-bit operating system. It has limited memory of 1MB which is in-built, so does not facilitate multiple users or multitasking. DOS monitors each and every part of PC's functioning. It provides an interface between the hardware and the application software. The users can run the application packages, compose letters and reports as soon as the PC's memory has been loaded with the operating system.

Need of DOS

- 1. Manage Devices :** The DOS is required to manage the devices which are needed in proper running of the computer such as printers, disks, screens, keyboards.

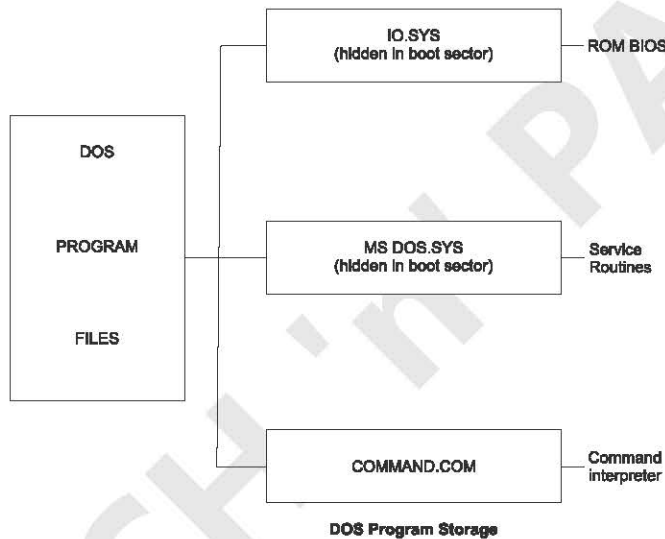
2. **Control Programs** : Various programs are controlled such as loading of program from disk, for executing a program, setting-up the framework, setting limits on the parts of memory and the parts of the disk storage which can be accessed by the program.
3. **Process Command** : The direct instructions of the DOS for the computer users are processed. The C:\> command in the command prompt shows that user is working with the DOS's command processing aspect, as illustrated in figure below.

Q.45. Write a short note on storage of DOS programs.

Ans.

Storage of DOS Program

There are few defined files which store the major DOS programs, which are labelled in given figure:



1. **IO.SYS:** IO.SYS acts as an intermediary between the hardware and software of the system. The input from the keyboard, character output to the monitor, output to printer and the time are monitored by it. The normal user cannot view these files, as these are hidden. All these commands are located in the system's boot area. The further extensions to the ROM-BIOS are included in the IO.SYS file.

These can be the supplements for the current set of basic routines present in the ROM and these may be modified in pre-existing routines available in ROM.

2. **MSDOS.SYS:** The file management and the disk buffering management capabilities are included in MSDOS.SYS. Every access of disk for an application program is traced by it and is stored in the memory. The regular users cannot see these files. Their location is also the boot sector of the system. The MS-DOS service routines include the MSDOS.SYS file. Though the peripheral devices can be monitored better by these routines, then also these routines are less flexible than the ROM-BIOS routines.
3. **COMMAND.COM:** The COMMAND.COM is termed as the command interpreter and is the third part of the OS. It handles the user interface with the execution of the typed command.

DOS command interpreter is included in this. Firstly the command interpreter takes the command which is given to the system. In case, the correct command is given and

the name is same as of the command then defined command is invoked by the COMMAND.COM. If there is an error, then the error message is given by the COMMAND.COM. It means that, every interaction taking place between the user and the system or DOS is via COMMAND.COM only.

Q.46. Describe mainframe computers and super computers.

Ans.

Mainframe Computer

Mainframe computers are larger than mini computers. A powerful multi-user computer capable of supporting many hundreds or thousands of users simultaneously. Large organizations use mainframes for highly critical applications such as bulk data processing and ERP. Most of the mainframe computers have the capacities to host multiple operating systems and operate as a number of virtual machines and can thus substitute for several small servers.

Super Computer

Super computer is a mightiest computer and process billions of instruction per second. In other words, super computer is the computer normally used to solve intensive numerical computations.

Quantum physics, mechanics, weather forecasting, molecular theories are best studied by means of super computers, their ability of parallel processing and their well-designed memory hierarchy give the super computers, large transaction processing powers.

SECTION-C (LONG ANSWER TYPE) QUESTIONS

Q.1. Explain any five characteristics of computer.

Ans.

Characteristics of Computer

The characteristics of computer are as follows :

1. **Accuracy** : In addition to being very fast, computer is also very accurate device. It gives accurate output result provided that the correct input data and set of instructions are given to the computer. It means that output is totally depended on the given instructions and input data. If input data is incorrect, then the resulting output will be incorrect. In computer terminology it is known as garbage-in garbage-out.
2. **Reliability** : The electronic components in modern computer have very low failure rate. The modern computer can perform very complicated calculations without creating any problem and produces consistent (reliable) results. In general, computers are very reliable. Many personal computers have never needed a service call. Communications are also very reliable and generally available whenever needed.
3. **Storage** : A computer has internal storage (memory) as well as external or secondary storage. In secondary storage, a large amount of data and programs (set of instructions) can be stored for future use. The stored data and programs are available any time for processing. Similarly information downloaded from the internet can be saved on the storage media.
4. **Versatility** : Versatile means able to do different things. Modern computer can perform different kind of tasks one by one simultaneously. It is the most important feature of computer. At one moment you are playing game on computer, the next moment you are composing and sending e-mails etc. In colleges and universities computers are used to deliver lectures to the students.

5. **Communication** : Today, computer is mostly used to exchange messages or data through computer networks all over the world. For example the information can be received or sent through the internet with the help of computer. It is most important feature of the modern information technology.

Q.2. Explain the history of computer.

Ans. History of Computers

During the early development period, certain machines had been developed and a brief note of them is given below :

1. **2500 BC - The Abacus** : Abacus is the first known calculating machine used for counting. It is made of beads strung on cords and is used for simple arithmetic calculations. The cords correspond to positions of decimal digits. The beads represent digits. Numbers are represented by beads close to the crossbar. Abacus was mainly used for addition and subtraction and later for division and multiplication.
2. **1614 AD - Napier's Bones** : The Napier's Bones was invented by John Napier, a Scottish mathematician as an aid to multiplication. A set of bones consisted of nine rods, one for each digit 1 through 9 and a constant rod for the digit '0'. A rod is similar to one column of a multiplication table.
3. **1633 AD - The Slide Rule** : The Slide Rule was invented by William Oughtred. It is based on the principle that actual distance from the starting point of the rule is directly proportional to the logarithm of the numbers printed on the rule. The slide rule is embodied by the two sets of scales that are joined together, with a marginal space between them. The suitable alliance of two scales enabled the slide rule to perform multiplication and division by a method of addition and subtraction.
4. **1642 AD - The Rotating Wheel Calculator** : The Rotating Wheel Calculator was developed by a French philosopher, Blaise Pascal, using simple components such as gears and levers. This is a predecessor to today's electronic calculator. He was inspired by the computation work of his father's job and devised the model. He was only 19 years old, when he devised this model.
5. **1822 AD - The Difference Engine** : The Difference Engine was built by Charles Babbage, British mathematician and engineer which mechanically calculated mathematical tables. Babbage is called the father of today's computer.
6. **1890 AD - Hollerith Tabulating Machine** : A tabulating machine using punched cards was designed by Herman Hollerith and was called as the Hollerith Tabulating Machine. This electronic machine is able to read the information on the punched cards and process it electronically.

Q.3. Write some applications of computers.

Ans. Applications of Computers

Some imported applications of computer are given below :

1. **Business** : Manufacturers, wholesalers and retails of any product or service use computer software packages for billing stock maintenance, calculation of duties and taxes and their online payments or even maintenance of complete accounts books. One can predict future trends of business using artificial intelligence softwares. Computer softwares are used in major stock markets to purchase and sell of shares and

commodities. One can do trading online. There are fully automated business houses running on computer software.

2. **Education** : Education system is making use of computer on a large scale. Most good schools in the world have computers available for use in the classroom. It has been proved that learning with computers has been more successful and this is why numerous forms of new teaching methods have been introduced. This enhances the knowledge of the student at a much faster pace than the old traditional methods.
3. **Entertainment** : Our entertainment and pleasure-time have also been affected by computerization. Movies, games, music, even books that are simple and easy as it has been impacted greatly by computers. One can store music and movies at large volume and play them as per interest. Music instruments are also being linked and play with the help of computer. Computer generated graphics gives freedom to designers to add special effects in movies. Even designers can create imaginary characters and make them in action.
4. **Banking** : Computers help bank personnel operate more efficiently and effectively. Computers are used to make and track various transactions and they help process other customer information as well. Without computers, it would be very hard for a bank to offer good customer service day in and day out. Computers help a bank save time and money, and can be used as an aid to generate profits. Computers speed up record keeping and allow banks to offer same day services and even allow you banking to do over the phone and internet.
5. **Monetary Transactions** : Computers have helped fuel the cashless economy, enabling the widespread use of credit cards, debit cards and instantaneous credit checks by banks and retailers. There is also a level of greater security when computers are involved in money transactions as there is a better chance of detecting forged cheques and using credit/debit cards illegally etc.
6. **Scientific Research** : Thousands of scientific applications are processed daily on the computers. This is very important for mankind and with the development of computers scientific research has propelled towards the better a great deal. Because of high-speed characteristics of computer systems, researchers can simulate environments, emulate physical characteristics and allow scientists to prove their theories in a cost-effective manner. Also many test lab animals are spared since computers have taken over their roles in extensive research.
7. **Health Care & Medical Facilities** : Computers are the excellent means for storage of patient related data. Doctors often require the information about a patient's family history, physical ailments, already diagnosed diseases and prescribed medicine. The functioning of the hospital-bed keeping system, emergency alarm systems, X-rays machines and several such medical appliances are based on computer logic. Computer equipments are used to monitor pulse rate, blood pressure and other vital signs. Some of the complex surgeries also can be performed with the aid of computers.
8. **Communication** : The computers are most popular for their uses to connect with others on the World Wide Web. Therefore, communication between two or more parties is possible which is relatively cheap considering the old fashioned methods. E-mailing, teleconferencing and the use of voice messages are very fast, effective and

surprisingly cheaper as well. When connected to the internet, people can gain various amounts of knowledge and know about world events as they occur. Purchasing on the internet is also becoming very popular and has numerous advantages over the traditional shopping methods.

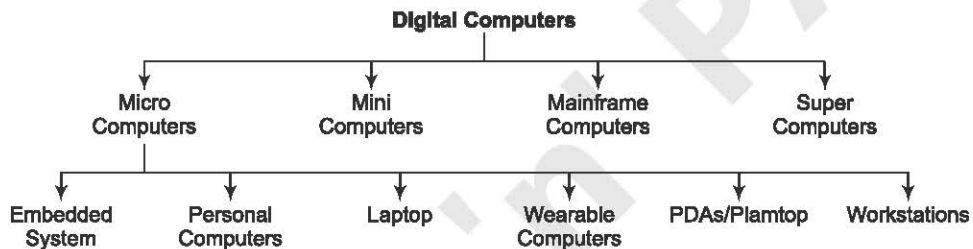
9. **Government** : Various department of government use computer for their planning, control and law enforcement activities. There is an indispensable use of computers in education, law enforcement, taxation, banking, tourism, transportation, health care, defence, construction, traffic, water supply and many more.

Q4. Explain the types of computer depending on their performance, size, cost and capacity.

Ans.

Types of Computers

Depending on their performance, size, cost and capacity, they have been classified into four different types i.e., super computers, mainframe computers, mini computers and microcomputers.



1. Micro Computer

The invention of microprocessor (single chip CPU) gave birth to the microcomputers. They are several times cheaper than mini computers. Although the equipment may vary from the simplest computer to the most powerful, the major functional units of the computer system remains the same i.e., input, processing, storage and output.

Microcomputers are designed to be used by individuals, whether in the form of personal computer, laptop, wearable computer, PDAs/Palmtop and workstation.

- (i) **Embedded System** : It is a specialized computer system that is a part of larger systems or machines. Virtually every electronic device which is designed and manufactured today has an embedded system. Typically, an embedded system is placed on a single microprocessor board with the programs stored in ROM. All the appliances that have a digital interface like watches, microwaves, VCRs, cars etc. utilize embedded systems. The embedded systems are pre-programmed for a specific task and operate on electricity/battery. They are available in wide range of size and power.

- (ii) **Personal Computer** : It can be defined as a small, relatively inexpensive computer designed for an individual user. In price, personal computers range anywhere from a few hundred pounds to over five thousand pounds.

All are based on the microprocessor technology that enables manufacturers to put an entire CPU on one chip. Businesses use personal computers for word processing, accounting, desktop publishing and for running spreadsheet and database management applications.

At home, the most popular use for personal computers is for playing games and recently for surfing the internet.

- (iii) **Laptop** : Similar in operation to desktops, laptop computers are miniaturized and optimized for mobile use. Laptops run on a single battery or an external adapter that charges the computer batteries.
They are enabled with an inbuilt keyboard, touch pad acting as a mouse and a liquid crystal display. Its portability and capacity to operate on battery power have served as a boon for mobile users.
- (iv) **Wearable Computer** : A record setting step in the evolution of computers was the creation of wearable computers.
These computers can be worn on the body and are often used in the study of behaviour modelling and human health. Military and health professionals have incorporated wearable computers into their daily routine, as a part of such studies.
When the users hands and sensory organs are engaged in other activities, wearable computers are of great help in tracking human actions.
- (v) **Personal Digital Assistants (PDAs)/Palmtop** : It is a handheld computer and popularly known as a palmtop. It has a touch screen and a memory card for storage of data.
Palmtops that use a pen rather than a keyboard for input are often called hand-held computers or PDAs. PDAs can also be effectively used as portable audio players, web browsers and smart phones.
Most of them can access the internet by means of Bluetooth or Wi-Fi communication. Because of their small size, most palmtop computers do not include disk drives. However, many contain PCMCIA slots in which you can insert disk drives, modems, memory, and other devices. Palmtops are also called pocket computers.
- (vi) **Workstation** : It is a type of computer used for engineering applications (CAD/CAM), desktop publishing, software development and other types of applications that require a moderate amount of computing power and relatively high quality graphics capabilities. Workstations generally come with a large, high-resolution graphics screen, at large amount of RAM, built-in network support and a graphical user interface.
Most workstations also have a mass storage device such as a disk drive, but a special type of workstation, called a diskless workstation, comes without a disk drive. The most common operating systems for workstations are UNIX and windows NT. Like personal computers, most workstations are single-user computers. However, workstations are typically linked together to form a local-area network, although they can also be used as stand-alone systems.

2. Minicomputer

A multi-user computer capable of supporting up to hundreds of users simultaneously. A powerful multi-user computer capable of supporting many hundreds or thousands of users simultaneously. In terms of size and processing capacity, minicomputers lie in between mainframes and microcomputers. Minicomputers are also called mid-range systems or workstations. The term began to be popularly used in the 1960s to refer to relatively smaller third generation computers. They took up the space that would be needed for a refrigerator or two and used transistor and core memory technologies. The 12-bit PDP-8 minicomputer of the Digital Equipment Corporation was the first successful minicomputer.

3. Mainframe Computer

A powerful multi-user computer capable of supporting many hundreds or thousands of users simultaneously. Large organizations use mainframes for highly critical applications such as bulk data processing and ERP. Most of the mainframe computers have the capacities to host multiple operating systems and operate as a number of virtual machines and can thus substitute for several small servers.

4. Super Computer

Super computer is a mightiest computer and process billions of instructions per second. In other words, supercomputer is the computer normally used to solve intensive numerical computations.

Quantum physics, mechanics, weather forecasting, molecular theory are best studied by means of super computers. Their ability of parallel processing and their well-designed memory hierarchy give the super computers, large transaction processing powers.

Super computer is a broad term for one of the fastest computers currently available. Super computers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations (number crunching). For example, weather forecasting requires a super computer. Other uses of super computers scientific simulations, animated graphics, fluid dynamic calculations, nuclear energy research, electronic design, and analysis of geological data.

Q.5. Explain the elements of computer system set-up in detail.

Ans. Elements of Computer System Set-up

The six elements that make up the computer system interacting with each other and performing the task at hand include :

1. **Hardware** : Hardware of computers are those components that are physical in nature, i.e., they are tangible or can be physically touched. We know that a computer is used for various operations like complex mathematical calculations, sorting, merging, retrieving information in a fast way, but all these operations cannot be possible without hardware. The hardware can be installed inside and can even be attached to outside of a computer. Hardware components have several hardware devices or physical elements.

The different types of hardware of computer are :

- | | |
|-----------------------------------|------------------------|
| (i) Central Processing Unit (CPU) | (ii) Computer Memory |
| (iii) Modem | (iv) Input-Output Unit |

2. **Firmware** : This is hardware on which pre-programmed instructions are hardwired at the time manufacturing. For example, the Basic Input Output System or BIOS is firmware. These are usually in the form of read only memory or ROM that loads in the memory automatically when the computer start-up.
3. **Software** : Software is the planned sequential instructions which required for processing the input data and transform it into information. So, it makes the working of the computer meaningful.

A 'program' is a set of instructions that performs a specific task. Such program as single or in a group is termed as software. These instructions help the computer to process the input data and produce the desired output results.

Hardware and software together make a computer system complete. Either of them singularly, is of no use. It is the software which makes the computer alive or usable.

Both software and hardware helps the computer to perform functions like storage, retrieval and solving different types of problems. Some most commonly used software is Windows Operating System, MS office, Corel Draw etc.

4. **Data** : Data is the group of characters and numbers that can be processed by computer. Data contains text, numbers, sounds and images. For example, every employee record contains data elements to represent employee's details such as name, address, departments etc.
5. **Humanware** : Humanware refers to the living part of the computer system and organisation under which it is installed. Humanware simply means people who deal with computers and their management. The people give input and instructions to the computer and the output is given to the people. People like computer programmers, system analysts, database administrators, data entry operators, hardware engineers etc. refer to humanware. The design of humanware starts with understanding the requirements and limitations of the end-user and working backwards to design the final product. For example, technology designed to help people with disabilities starts with understanding the needs of the end user before designing the product.
6. **Procedure** : Procedure is step-by-step sequence of activities that must be followed in a specific order to correctly perform a task. Repetitive procedures are called routines. Procedures are activities of manipulating data by the computer to produce information. Procedures are operating instructions for the people who use the information system. For example, instructions for filling form or using a software package.

Q.6. Explain Central Processing Unit in detail.

Ans.

Central Processing Unit

CPU can be referred to as 'brain' of a computer system. It is also known as 'processor'. It performs all the calculations and comparisons in the computer system. In addition, controlling and monitoring of other units of computer system is also carried out by CPU. Hence, it is the single component of computer system which determines the system's performance. CPU has five main units :

1. **Arithmetic and Logic Unit (ALU)** : All arithmetic and logical operations are performed by this unit. An ALU performs a huge number of operations. Some of them are as follows :
 - (i) **Logical Operations** : ALU performs logical operations such as AND, OR, NOT, XOR, NOR, NAND, etc.
 - (ii) **Bit-Shifting Operations** : The shifting of locations of bits from specific positions to left or right can be performed by ALU. This operation can be considered as multiplication operations.
 - (iii) **Arithmetic Operations** : ALU performs the arithmetic operations such as addition, multiplication, subtraction and division. These operations are most costly to make.
2. **Control Unit (CU)** : Controlling and monitoring of all the components of computer system is carried out by this unit. It gets instructions from the memory interprets them and directs them to computer. It performs data transfer between memory and peripheral devices.
3. **Registers** : Registers are located at the top of memory hierarchy and offer the fastest way to access data. These are high-speed storage areas within the CPU. After CPU gets data and instructions from the cache or Random Access Memory (RAM), the data and

instructions are transferred to the register, for further processing. Registers are managed directly by the control unit of CPU during instruction execution. Registers are used to accept, store, and transfer data an instruction that are being immediately used by CPU. There are several types of registers that can be used for different objectives. Registers can be divided into :

- (i) Memory Data Register (MDR or DR)
 - (ii) Memory Address Register (MAR or AR)
 - (iii) Temporary Register (TR)
 - (iv) Stack Pointer
 - (v) Flag Register
 - (vi) Accumulator
 - (vii) Instruction Register
 - (viii) Program Counter (PC)
4. **Buses** : Buses connect the two devices. Hence, it acts as a pathway and is able to connect multiple devices. It is considered as a shared transmission medium. Within CPU, bus acts as an information highway. Buses are of three major types :
- (i) **Data Bus** : This is used to move data.
 - (ii) **Control Bus** : This is used to send control signals between two components of computer.
 - (iii) **Address Bus** : This is used to move address or a memory location.
5. **Clock** : The clock measures and allocates a fixed-time slot for processing each and every micro-operation. CPU is allocated on or more clock cycles to complete a micro-operation. The CPU executes instructions in synchronization with the clock pulse. The clock speed is measured in Mega (MHz) or Millions of Cycles per second.

Q.7. Explain Control Unit in detail.

Ans. Control Unit

This unit controls the operations of every other component of a computer system. It also controls the transfer of data and instructions among other unit of computer. In order to execute the instructions, the components of a computer receive signals from the control unit. It extracts instructions from memory, decodes them and sends the necessary signals to ALU to perform the required operation. It is also called the central nervous system of a computer system as it manages all other units.

This unit controls the internal functioning of the computer and input or output units. The unit works according to a program that is instruction given to computer by the operator in computer's language. This unit has an electronic clock that sends millions of pulses in a second on which computer works.

The control unit directs all operations inside the computer. It is known as nerve centre of the computer, because it controls and co-ordinates all hardware operation, i.e., those of the CPU and input-output devices.

It performs following actions :

1. It gives command to transfer data from the input device to the memory (IAS) of arithmetic and logic unit.

2. It also transfers the result from ALU to the memory and on to the output device from printing.
3. It stores the program in the memory, takes instructions one by one, understands them and issues appropriate commands to the other units.
4. It fetches the required instructions from the main storage via Memory Data Register (MDR) and places it in the Control Instruction Register (CIR). Then it interprets the instructions in CIR and gets it executed by sending a command signal to the concerned hardware device. Memory data register is a special register which holds all data and data instructions temporarily, as they pass in and out of the main memory. Control instruction temporarily, as they pass in and out of the main memory. Control instruction register is also a special register which holds machine instructions currently being interpreted by control unit.

Q.9. Explain the different types of Registers in detail.

Ans.

Types of Registers

There are following types of Registers :

1. **Memory Data Register (MDR or DR) :** The Memory Data Register (MDR) is the register of a computer's control unit that contains the data to be stored in the computer storage (e.g. RAM), or the data after a fetch from the computer storage. It acts like a buffer and holds anything that is copied from the memory ready for the processor to use it.
2. **Memory Address Register (MAR or AR) :** The Memory Address Register (MAR) is a CPU register that either stores the memory address from which data will be fetched to the CPU or the address to which data will be sent and stored.
3. **Temporary Register (TR) :** It is 8-bits register. It stores the intermediate data and address of memory location at the time of processing. It is also known as General Purpose Register. There are 6 temporary registers, they are: BX, CX, DX, EX, HX, and LX. They can be used by combing together and known as BC, DE and HL. After combining, they can receive 16-bits data.
4. **Stack Pointer :** To store the address of the present state of a stack, stack pointer is used. Stack works on the principle of LIFO (Last-In-First-Out). In this, the last instruction is executed first and the first instruction is executed in last.
5. **Flag Register :** It is used to store the status of the machine at the time of the execution. Main flag registers are- OF, DF, IF, SF and ZF.
6. **Accumulator :** The basic unit of main memory storage is called accumulator. Accumulators are registers which are used to store data that has been fetched from memory. Program instructions are available which operate on data held in accumulator. One or more accumulators are available depending on the particular microprocessor being used.
7. **Instruction Register :** The instruction register is part of the control unit. To fetch an instruction from the memory the computer does a memory read operation. This places the contents of the addressed memory location on the W bus. At the same time, the instruction register is set up for loading on the next positive clock edge.

The contents of the instruction register are split into nibbles. The upper nibble is a two state output that goes directly to the block labelled "Controller-sequencer". The lower nibble is a three-state output that is read onto the W bus when needed.

- 8. Program Counter (PC) :** It stores the instructions to be executed into the memory address. In other words, it holds the address of the memory location of the next instruction when the current instruction is executed by the microprocessor.

Q.9. Explain the Stepwise Development of Central Processing Unit.

Ans. Stepwise Development of CPU

CPU is also known as Microprocessor. In the production of processors, Intel is the leading company. The processors released by it are : 8080, 8085, 8086, 80286, 80386, 80486, Pentium and dual core series. On the basis of their various properties, they are different from each other.

- 1. 8088 Micro Processor :** The Intel 8088 microprocessor is a variant of the Intel 8086. Introduced on July 1, 1979. It had an 8-bit external data bus. The 8-bit shows that this CPU can send or receive only 8-bit data at a time.
- 2. 8086 Micro Processor :** The 8086 is a 16-bit microprocessor chip designed by Intel between early 1976 and mid-1978, when it was released. In fact, according to the Intel documentation, the 8086 and 8088 have the same Execution Unit (EU)-only the Bus Interface Unit (BIU) is different. It had 16-bit data bus in place of 8-bit data bus. Its speed of sending or receiving data is double than 8088 microprocessor.
- 3. 80286 Micro Processor :** After 8086, the IBM company released 80286 processor. The CPU (Central Processing Unit) supported multitasking, allowing a user to work with more than one application at a time. In multitasking, the OS (operating system) can keep track of where you are in various applications and go from one to the other without losing information. It can run in two modes viz. Real mode and protected mode. In real mode, it works like a 8086 processor. The 80286 could also take advantage of protected mode, which helped to prevent applications from writing outside their allocated RAM zones.
- 4. 80386 Micro Processor :** After 80286, the processor 80386 was released. It is faster than 80286 processor. It also runs in real and protected mode just like 80286 processor.
- 5. 80486 Micro Processor :** It is faster than 80386 processor. It executes approximately 20 million instructions within a second.
- 6. Pentium Series :** A 32-bit microprocessor introduced by Intel in 1993. Its first name was 80586 and then changes to Pentium. The Pentium processor executes approximately 100 million instructions in a second. After that Pentium-I, Pentium-II, Pentium-III or Pentium-4 were released. They are also known as P1, PII, PIII, P-4 processors. Comparatively, the P-4 processor executes more than 1000 million instructions within a second.
- 7. Dual Core Series :** The first Processor of Dual core series developed by Intel Company was released in year 2009. Then after, Core to Duo, i3, i5 and i7 was released. They are very much faster than previous processor.

Q.10. Explain First generation computers in detail. Also discuss their features, advantages and disadvantages.

Ans.

The First Generation Computers

It was developed by John Mauchly and John Presper Eckert at University of Pennsylvania. It was designed as a fast calculating device. ENIAC was the huge system in size as it covered a space of approx. 15,000 feet. Its weight was 30 tonnes. It also comprised 18000 vacuum tubes. The consumption of electricity was also high (140 kilowatt). ENIAC was based on decimal format, i.e., representations and calculations were performed in decimal system. The memory of ENIAC contains about 20 accumulators. This machine was completed in 1946 and the inventors built the first commercial computer UNIVAC in 1947 for facilitating commercial and scientific applications. Mark I was the first electronic computer developed by IBM in 1953. Further in inventions, IBM 701 was used for scientific applications while the IBM 702 was used for business applications.

Some computers of this generation were :

- | | | |
|------------|------------|-----------|
| 1. ENIAC | 2. EDVAC | 3. UNIVAC |
| 4. IBM-701 | 5. IBM-650 | |

Characteristics of First Generation Computers

Following are the characteristics of first generation computers :

1. It uses vacuum tube technology.
2. Uneconomical in cost.
3. Only machine language was supported by first generation computer.
4. Used to generate a lot of heat.
5. Functioning of input and output devices was slow.
6. They were big in size.
7. They necessitate the use of AC.
8. Non-portable.
9. Excessive use of electricity.

Advantages of First Generation Computers

Following are the advantages of first generation computers :

1. At the time, vacuum tubes were the only electronic components available.
2. The invention of vacuum tube technology paved the way for the development of electronic digital computer.
3. They were capable of doing calculations in milliseconds.

Disadvantages of First Generation Computers

Following are the disadvantages of first generation computers :

1. Bigger in size.
2. Unreliable.
3. Thousands of vacuum tubes were utilised, which created a lot of heat and frequently burned out.
4. They necessitate the use of AC.
5. Necessitates continuous maintenance.

6. Non-portable.
7. Costly and difficult commercial production.
8. Commercial use of this generation of computers was limited.

Q.11. Explain fourth generation computers.

Ans. Fourth Generation Computers : (1972-1984)

With the advent of microprocessors, there was introduction of the fourth generation computers. About thousands of ICs were integrated onto a single silicon chip. In 1971, the Intel 4004 chip was developed where the central processing unit, memory and input/output controls were located onto a single chip.

IBM launched the first computer for home users in 1981 while Apple introduced Macintosh in 1984. These days microprocessors are not only used in computers but also in a large number of other devices. Fourth generation computers were more powerful than third generation computers.

Later, they were used for creating networks by interlinking together, which further helped in developing Internet. During the generation hand-held devices, mouse and GUI were also developed.

Some computers of this generation were :

1. DEC 10
2. TAR 1000
3. PDP 11
4. CRAY-1 (Super Computer)
5. CRAY-X-MP (Super Computer)

Characteristics of Fourth Generation Computers

Following are the characteristics of fourth generation computers :

1. It used VLSI (Very Large Scale Integrated) technology.
2. It is cheap in price.
3. It is small in size.
4. It does not require any AC.
5. It provides more accurate and reliable output.
6. High processing speed.
7. It makes use of pipeline processing.
8. It was one of the greatest developments in the fields of network.

Advantages of Fourth Generation Computer

Following are the advantages of fourth generation computer :

1. Because of the high component density, it is smallest in size.
2. It is very reliable.
3. The amount of heat produced is insignificant.
4. Mostly does not require air conditioner.
5. Its computation is faster than previous generation's computers.
6. Minimum maintenance is required.
7. Their small size makes them highly portable.
8. It is totally a general purpose computer.
9. Its assembling requires minimum cost.
10. Less expensive than all other generations.

Q.12.Explain fifth generation computers in detail. Elaborate their features, advantages and disadvantages.

Ans. Fifth Generation Computers : Artificial Intelligence (1984-Onwards)

The VLSI became ULSI (Ultra Large Scale Integrated) circuits in the fifth generation of computer. This generation is based on artificial intelligence, parallel processing and superconductors. Some applications like voice recognition have been developed and are being used in this generation. The inventions in fifth generation are still continuing. In the coming years, the face of computer will be totally different due to the use of various technologies like quantum computation, molecular and nanotechnologies. Responding to natural language input and learning and self-organising capability are the main objectives of fifth generation computing.

Some computer types of this generation are :

1. Desktop
2. Laptop
3. NoteBook
4. UltraBook
5. ChromeBook

Characteristics of Fifth Generation Computers

Following are the basic characteristics of fifth generation computers :

1. It is based on ULSI (Ultra Large-Scale Integration) technology.
2. True artificial intelligence development.
3. Natural language processing.
4. It advances parallel processing.
5. It advances superconductor technology.
6. It provides more user-friendly interface along with multimedia features.
7. Powerful, inexpensive and compact.

Advantages of Fifth Generation Computers

Following are the advantages of fifth generation computer :

1. Human language can be understood by fifth generation computers.
2. It has the capability to understand images and graphs.
3. More CPU cores and parallel processing mean faster performance.
4. These computers are cost effective as compared to recent generation computers.
5. It has self-learning capabilities.

Disadvantages of Fifth Generation Computers

Following are the disadvantages of fifth generation computers :

1. Fifth generation computers are not economic.
2. It requires operators to comprehend the visuals generated by the computer.
3. It necessitates learning curve.

Q.13.Explain any two input devices.

Ans. Keyboard

Keyboard devices allow input into the computer system by pressing a set of keys, mounted on a board connected to the computer system. It is most familiar means of entering data into a computer that allows a person to enter alphanumeric and symbolic data directly.

A keyboard contains keys that allow a user to enter data and instructions into the computer. All computer keyboards have a typing area that includes the letters of the alphabet, numbers,

punctuation marks and other basic keys. Many desktop computer keyboards also have a numeric keypad located on the right side of the keyboard. On notebook and many handheld computers, the keyboard is built into the top of the system unit. A standard computer keyboard is called a QWERTY keyboard because of the layout of its typing area which is similar to that of a typewriter.



There are mainly five types of keys on Keyboard :

- (i) **Typing keys** : These keys include Letters (alphabet keys), Numbers (number keys), Punctuation (. , ; ' ") and Special symbols (+ - & @ etc.). These keys also include the shift, caps lock, backspace, spacebar and the tab keys.
- (ii) **Control keys** : These keys are either used alone or in combination with other keys to perform an action. Ctrl, Alt, Windows logo key and the Esc key are various examples of control keys.
- (iii) **Function keys** : They are used to perform specific tasks. They are placed on the top row of the keyboard and are labelled as F1, F2, ..., F12. These keys have different functions in different programs.
- (iv) **Navigation keys** : They are used for moving through documents or web pages and sometimes for editing the text. These keys are including the Arrow keys, Home, End, PgUp, PgDn, Delete and Insert keys.
- (v) **Numeric keypad** : The numeric keyboard consists of number keys from 0 to 9, the arithmetic operators and the decimal point. It is placed on the right side of a keyboard and is used for entering numbers at a faster pace.

Advantages of using keyboards for data input include :

- (i) It is not necessary to buy additional equipment because most computer systems are normally supplied with keyboards.
- (ii) Entering data and instructions with keyboards is generally faster than with pointing devices.

Disadvantages of using keyboards for data input include :

- (i) It takes a lot of time to practice in order to type quickly and accurately.
- (ii) Typing speeds are still very slow when compared with computer speeds.

Mouse

Mouse is the most commonly used input and pointing device viz. lets you select and move items on the screen. There are basically two types of Mouse buttons-left and right.

The left mouse button is used more frequently than the right button. A single left click selects an item while double-clicking on an item activates the application.

The right click often display a list of commands on the screen. You can also gain access to 'Property' settings, with the right-click.



Dragging and dropping makes it easy to move an item on the screen. With this simple technique, one can delete, copy and move files in a file manager. Mouse is also used in drawing packages to draw freehand lines, circles, boxes and other complicated graphic images.

Types of mouse : There are mainly three types of mouse:

- (i) **Mechanical Mouse :** This type of mouse has metal or rubber ball on its lower side that can roll in all the directions. The screen pointer moves according to the movement of the ball which is detected by the mechanical sensors within the mouse.
- (ii) **Opto-Mechanical Mouse :** This type of mouse uses a mechanism similar to the mechanical mouse. The only difference is that it uses optical sensors to detect the movement of the ball.
- (iii) **Optical Mouse :** Optical mouse does not have any mechanical moving parts. The laser technology is used to detect the movement of the mouse. It is more efficient and expensive than others.

Advantages of using a mouse include :

- (i) A mouse is user-friendly for computer beginners.
- (ii) A mouse is easy and convenient to use with a graphical user interface.
- (iii) Using a mouse to select items or move to a particular position on the screen is faster than using a keyboard.

Disadvantages of using a mouse include :

- (i) It is not easy and convenient to input text with a mouse.
- (ii) Issuing commands by using a mouse is slower than by using a keyboard.
- (iii) A mouse is not accurate enough for drawings that require high precision.
- (iv) A mouse usually requires a flat surface to operate.

Q.14. Explain Trackball, Joystick and Light Pen and their advantages and disadvantages.

Ans.

Trackball

The trackball is a pointing device that is much like an inverted mouse. It consists of a ball inset in a small external box, or adjacent to and in the same unit as the keyboard of some portable computers. It is more convenient and requires much less space than the mouse since here the whole device is not moved (as in the case of a mouse). Trackball comes in various shapes but supports the same functionality.



Advantages of a touch pad include :

- ◆ Easy and Fast one finger control.
- ◆ Ideal for portable devices.

Disadvantages of using a touchpad include :

- ◆ Expensive & found in specific devices e.g. laptops

Joystick

It is an input device which allows the user to move an object on the screen. The joystick is a vertical stick that moves the graphic cursor in the direction the stick is moved. It consists of a spherical ball, which moves within a socket and has a stick mounted on it. The user moves the ball with the help of the stick that can be moved left or right, forward or



backward, to move and position the cursor in the desired location. Joysticks typically have a button on top that is used to select the option pointed by the cursor. Video games, training simulators, and control panels of robots are some common uses of a joystick.

Advantages of using a joystick include :

- ◆ A joystick allows fast interactions required in most games.

Disadvantages of using a joystick include :

- ◆ It is difficult to use a joystick to select objects accurately on the screen.

Light Pen

It is light-sensitive pointing device, commonly used to select or modify data on the screen. It allows the user to point on displayed objects or draw on screen.

It is made up of a light sensitive cell and a lens assembly designed in such a way that it focuses onto itself any light in its field of view. The pen contains a light receptor and is activated by pressing the pen against the display screen. The receptor is the scanning beam that helps in locating the pen's position (X and Y coordinates on screen). Suitable system software is provided to initiate the desired action once the area on the display screen is located with the help of the light pen.



Light pens are typically used in CAD (Computer Aided Design) applications to directly draw on screen.

Advantages of light pens includes :

- ◆ Using a light pen is more direct and precise than using a mouse.
- ◆ Light pen is also convenient for applications with limited desktop space.

Disadvantage of light pens includes :

- ◆ Light pens normally require a specially designed monitor to work with.

Q.15. Explain Scanner and OMR in detail.

Ans.

Scanner

Scanners facilitate the capturing of information and storing it in a graphical format for displaying it back on the graphical screen. They consist of two components, one to illuminate the page so that the optical image can be captured and the other to convert the graphical image into a digital format for storing. The graphical images thus scanned can be seen and processed directly by the computer.

Types of Scanner : Following are the major types of scanner:

- 1. Drum Scanner :** This is the most efficient and expensive scanner. It uses a rotating glass drum to scan. In a drum scanner, the light from the object that is to be scanned is split into separate red, blue and green beams optically, making the image precise. This mechanism is called the Photo Multiplier Tubes (PMT) technology. The drum scanners are used mainly in the publishing industry to print high quality images in books and magazines.
- 2. Flatbed Scanner :** This is a popular desktop scanner. It looks like a miniature printer with a flip-up cover protecting the glass window. In a floated scanner, the object to be scanned is placed face down on the glass window which is then illuminated with a

bright light. It uses the Charged Coupled Device (CCD) technology to read the entire area optically. Depending on its size, a flatbed scanner can fit standard or legal-sized documents and its flexible cover allows you to scan books, newspapers, articles, photographs etc. The flatbed scanners are used at homes, schools and medium-sized offices.

- 3. Handled Scanner :** This is a small manual device which is dragged over the surface of the image to be scanned. These scanners are operated by hand. It is difficult to operate these scanners as they need a steady hand to scan objects in order to avoid distorted images. Bar code scanner is one of the most utilized handheld scanners used in shopping malls.

Optical Mark Recognition (OMR)

OMR is a device for capturing data formed by dark and light marks on specific positions of the paper. It is a special device that can detect marks with ink or pencil.

This kind of device is typically used by academic institutions to grade aptitude tests where candidates need to mark the correct option from a number of alternatives, on a special sheet of paper. These answer sheets can then be directly read by the optical mark recognition device and can be used for further processing by the computer.

The actual technique used by an OMR device once again involves focusing a light on the page being scanned thereby detecting the reflected light pattern for the marks.

Pencil marks made by the user reflect the light, determining which responses are marked.

Advantages of OMR readers include :

- (i) OMR has a better recognition rate than OCR because fewer mistakes are made by machines to read marks than by reading handwritten characters.
- (ii) Large volumes of data can be collected quickly and easily without the need for specially trained staff.
- (iii) The cost of inputting data and the chance of data input errors could be reduced because it is not necessary to type the details for data entry.

Disadvantages of OMR readers include :

- (i) The OMR reader needs to be reprogrammed for each new document design.
- (ii) OMR readers are relatively slow.
- (iii) The person putting marks on the documents must follow the instructions precisely.
- (iv) Any folding or dirt on a form may prevent the form from being read correctly.

Q.16. Write a short note on :

- 1. MICR 2. Microphone 3. BCR**

Ans. 1. Magnetic Ink Character Recognition (MICR)

Magnetic Ink Character Recognition (MICR) is similar to optical mark recognition and is used exclusively by the banking industry. MICR devices are used by the banking industry to read the account numbers on cheques directly and subsequently do the necessary processing.

Banks using the MICR technology print chequebooks on special types of paper. The necessary details of the bank (like the bank's identification code, relevant account number and cheque number) are pre-printed on the cheques using ink that contains iron oxide particles that can be magnetised.

MICR readers are used to read and sort cheques and deposits. An MICR reader-sorter reads the data on the cheques and sorts the cheques for distribution to other banks and customers or for further processing.

2. Microphone

It is an input device used to record and store voice or any other sound into a computer, generally as .wav file. It is also used for recording a narration in a Power point presentation. Generally, it is used to separate component for desktops but can be seen as an integrated component in some laptops. It is commonly used in video conferencing, speech recognition programs, radio broadcasting, recording and sound amplifying systems.

3. Bar Code Reader (BCR)

Data coded in the form of small vertical lines forms the basis of bar coding. Alphanumeric data is represented using adjacent vertical lines called bar codes. These are of varying widths and spacing between them used to uniquely identify books, merchandise in stores, postal packages etc.

Below is an example of a bar code used on one of the books for its unique identification:

A bar code reader uses laser beam technology. The laser beam is moved across the pattern of bars in a bar code. These bars reflect the beam in different ways. The reflected beam is then sensed by a light-sensitive detector, which then converts the light patterns into electrical pulses thereby transmitting them to logic circuits for further conversion to alphanumeric value. Bar code devices are available as handheld devices.

Q.17.Explain types of monitors in detail.

Ans.

Types of Monitors

Monitor is the most common output device, also known as VDU (Visual Display Unit), an electronic visual display for computers. Monitors use a Cathode Ray Tube (CRT) to display information. It resembles a television screen and is similar to it in other respects. The monitor is typically associated with a keyboard for manual input of characters. The screen displays information as it is keyed in, enabling a visual check of input before, it is transferred to the computer. It is also used to display the output from the computer and hence serves as both an input and an output device; this is the most commonly used input/output device today and is also known as a soft copy terminal.

The most common types of monitor are given below :

1. Cathode Ray Tube (CRT)

The main components of a cathode ray terminal are the electron gun, the electron beam controlled by an electromagnetic field, and a display screen, which is phosphor-coated. The screen's phosphor coating is organised into a grid of dots called pixels. The electron gun emits an electron beam, which is directed towards the phosphor coated display by the electromagnetic field and this in turn creates the images.

Nowadays, most computer monitors are based on Cathode Ray Tube (CRT) technology. The basic operation of these tubes is similar to that in television sets. Figure given alongside illustrates the basic components of a CRT.

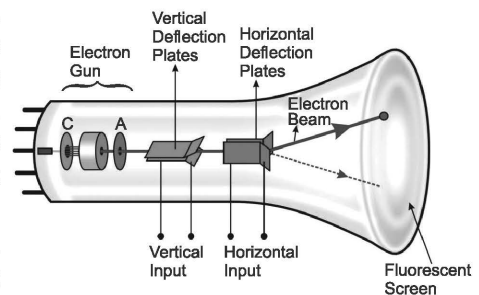


Figure : Cathode Ray Tube

Displaying graphics on a CRT

Nowadays, two classes of computer graphic display are used raster scan and random scan display.

(i) **Raster Scan Display** : In this system, the electron beam is swept across the screen, one row at a time from top to bottom. As the electron beam moves across each row, the beam intensity is turned ON and OFF to create a pattern of illuminated spots. The picture definition is stored in a memory area called the refresh buffer or frame buffer, which holds the set of intensity values for all the screen points. These values are then retrieved from the refresh

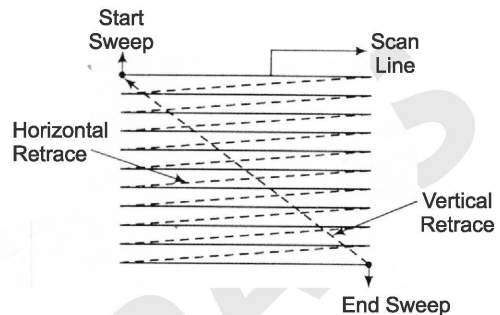


Figure : Raster Scanning

buffer and 'painted' on the screen one row (scan line) at a time. At the end of each scan line, the electron beam returns to the left side of the screen to begin displaying the next scan line. The return to the left of the screen, after refreshing each scan line, is called the horizontal retrace of the electron beam. At the end of each frame, the electron beam returns to the top left corner of the screen to begin the next frame. This is known as vertical retrace. On some raster-scan systems, each frame is displayed in two passes using an interlaced refresh procedure. In the first pass, the beam sweeps across every other scan line from top to bottom. Then after the vertical retrace, the beam sweeps out the remaining scan lines. Interlacing of the scan lines in this way allows us to see the entire screen displayed in half the time it would have taken to sweep across all the lines at once from top to bottom. This is an effective technique for avoiding flicker, providing that adjacent scan lines contain similar display information.

(ii) **Random Scan Display** : In this system, a CRT has the electron beam directed only to the parts of the screen where a picture is to be drawn. Random scan monitors draw a picture one line at a time and for this reason are referred to as vector displays, stroke-writing or calligraphic displays. The component lines of a picture can be drawn and refreshed by a random scan system in any specified order. Refresh rate on a random scan system depends on the number of lines to be displayed. Picture definition is stored as a set of line drawing commands in an area of memory referred to as the refresh display file. To display a specified picture, the system cycles through the set of commands in the display file, drawing each component line in turn. After all line drawing commands have been processed, the system cycles back to the first line command to the list. Random scan systems are designed for line drawing applications. They cannot display realistic shaded scenes.

2. Liquid Crystal Display (LCD)

LCD monitors are relatively thinner and lighter than CRT monitors. Introduced in watches and clocks in the 1970s and is now applied to the display terminals. In this, the cathode ray tube was replaced by liquid crystal to produce the image. It does not have colour capability and the image quality is relatively poor. The main advantage of LCD is its low energy consumption. It finds its most common usage in portable devices where compactness and low energy requirements are of prime importance.

Q.18. Write some characteristics of a monitor in detail.

Ans.

Characteristics of Monitor

Following are the characteristics of a monitor :

- 1. Size :** The most important aspect of a monitor is its size. Screen sizes are measured in diagonal inches, the distance from one corner to another opposite corner diagonally.
- 2. Resolution :** The resolution of a monitor indicates how density the pixels are packed. Pixel is short for picture element. A pixel is a single point in a graphic image. Graphic monitors display pictures by dividing the display screen into millions of pixels arranged in rows and columns. On color monitor each pixel is actually composed of three dots namely a red, a green and a blue. The quality of a display monitor largely depends on its resolution.
- 3. Band Width :** The amount of data that can be transmitted in a fixed amount of time. For digital devices, the band width is usually expressed in bits or bytes per second (bps). For analog devices it is expressed in cycle per second or Hertz (Hz).
- 4. Refresh Rate :** Display monitors must be refreshing many times per second. The refresh rate determines how many times per seconds the screen is to be red drawn. The refresh rate of a monitor is measured in Hertz. The faster the refresher is, the less the monitor flickers.
- 5. Interlacing :** It is a technique in which instead of scanning the image one line at a time, it scans alternately *i.e.* alternate lines is scanned at each pass. It is used to keep band width down. Since inter leaked displaced have been reported to be more flicker, with better technology available, most monitors are non-interlaced now.
- 6. Dot per Inch :** It is measured for the actual sharpness of the on screen image. This depends on both the resolution and the size of the image. Practical experience shows that a smaller screen has a sharper image at the same resolution than does a large screen. This is because it will require more dots per inch to display the same number of pixels.
- 7. Dot Pitch :** A measurement that indicates the vertical distance between each pixel on a display screen. It is measured in millimeter. The dot pitch is one of the principle characteristics that determine the quality of display monitors.
- 8. Video Standards and Display Modes :** PCs have graphics cards (also known as video cards or video adapters) that convert signals from the computer into video signals that can be displayed as images on a monitor. The monitor then separates the video signal into three colour red, green and blue signals. Inside the monitor, these three colours combine to make up each individual pixel. Video cards have their own memory, video RAM or VRAM, which stores the information about each pixel.

The common colour and resolution standards for monitors are VGA, SVGA, XGA, SXGA and UXGA:

- (i) VGA (Video Graphics Array) :** It was developed by IBM for PCs. In graphics mode, the resolution is either 640×480 or 320×200 with 16 colours and 256 colours respectively. In text mode, VGA systems provide a resolution of 720×400 pixels. The total palette of colours is 2,62,144. It uses analog signals rather than digital signals.

- (ii) **SVGA (Super Video Graphics Array)** : It supports a resolution of 800×600 pixels, or variations, producing 16 million possible simultaneous colours, but the number of colours that can be displayed simultaneously depends upon the amount of video memory installed in a computer. SVGA is the most common standard used today with 15-inch monitors.
- (iii) **XGA (Extended Graphics Array)** : It has a resolution of up to 1024×768 pixels, with 65,536 possible colours. It is used mainly with 17 inch and 19 inch monitors.
- (iv) **SXGA (Super extended Graphics Array)** : It has a resolution of 1280×1024 pixels. It is often used with 19 inch and 21 inch monitors.
- (v) **UXGA (Ultra extended Graphics Array)** : It has a resolution of 1600×1200 pixels. It is expected to become more popular with graphic artists, engineering designers and other using 21 inch monitors.

Q.19. Explain different types of printers.

Ans.

Types of Printers

A printer is a peripheral device used for printing the output on a paper, so any other printable media. The printed information on the paper is called the Hard copy.

Printers are of two types : impact printers and non-impact printers

1. Impact Printers

Impact printers allow physical contact between the printer head and paper *i.e.*, they print by the impact of dot wires on paper. They are also called character printers.

- (i) **Daisy Wheel Printers:** These printers have good letter formation capability, but cannot produce graphics. They produce letter-quality documents. The speed of these printers varies from 60 cps to 120 cps (character per second). They are not in use anymore since they are very slow and noisy.
- (ii) **Dot-Matrix Printers:** These are the only Impact printers in use now-a-days. They are noisy and do not have good printing quality. As a result, they are losing popularity. Dot matrix printers were the most popular impact printers used in personal computing. These printers use a print head consisting of a series of small pins to strike a ribbon coated with ink, causing the ink to transfer to the paper at the point of impact. Character thus produced is in a matrix format. The shape of each character, *i.e.*, the dot pattern, is obtained from information held electronically. The speed, versatility and ruggedness, combined with low cost tend to make such printers particularly attractive in the personal computer market. Typical printing speeds in case of dot matrix printers range between 40-1000 cps (characters per second).
- (iii) **Drum Printers :** A drum printer consists of a solid, cylindrical drum which contains complete raised characters set in each band around the cylinder. The number of bands is equal to the number of printing positions. Each band contains all the possible characters. The drum rotates at a rapid speed. There is a magnetically driven hammer for each possible print position. The hammers hit the paper and the ribbon against the desired character on the drum when it comes in printing position. The speed of a drum printer is in the range of 200 to 2000 lines per minute.

2. Non-Impact Printers

Non-impact printers do not allow physical contact between the printing heads and paper i.e., they do not strike against the inked ribbon or the paper which is being printed. Only the ink used for printing, touches the paper. Non-impact printers have gained popularity because they are comparatively quieter than impact printers and have better quality. In addition, they can also produce coloured graphics. The non-impact printers are categorized as Thermal, Ink-jet and Laser printers. Non-impact printers are classified as follows:

- (i) **Thermal Printers:** Thermal printers use a special heat sensitive paper. Characters are formed when heated elements come in contact with the heat sensitive paper, thus forming darkened dots. The standard of print produced is poor thermal printers are widely used in battery powered equipment, such as portable calculators.
- (ii) **Ink-jet Printers:** Ink-jet printers use a series of nozzles to spray drops of ink directly on the paper. These therefore fall under the category of non-impact printers. The print head of an inkjet printer consists of a number of tiny nozzles that can be selectively heated up in a few microseconds by an IC register. When this happens, the ink near it vaporises and is ejected through the nozzle to make a dot on the paper placed in front of the print head. The character is printed by selectively heating the appropriate set of nozzles as the print head moves horizontally.
- (iii) **Laser Printers:** Laser printers use dry ink (toner) static electricity and heat to place and bond the ink onto the paper. They use a combination of laser and photocopier technology. Printing is achieved by deflecting laser beam onto the photosensitive surface of a drum after which the latent image attracts the toner to the image. The toner is then electro-statically transferred to the paper and fixed into a permanent image. Laser printers are capable of converting computer output into print, page by page. Since characters are formed by very tiny ink particles, they can produce very high quality images (text and graphics), generally offer a wide variety of character fonts and are silent and fast in use. Laser printers are faster in printing speed than other printers discussed above. Their speeds can range from 10 pages a minute to about 200 pages per minute, depending upon the make/model. Laser is high quality, high speed, high volume and non- impact technology that work on plain paper or pre -printed stationary. This technology is relatively expensive but is becoming very popular because of the quality, speed and noiseless operations.

Q.20. What do you mean by CD-ROM? Explain different types of CD-ROMs in detail.

Ans.

Meaning of CD-ROM

The CD-ROM (Compact Disk Read-Only Memory) is a direct extension of the audio CD. It is usually made from a resin named polycarbonate that is coated with aluminium to form a highly reflective surface. The information on a CD-ROM is stored as a series of microscopic pits on the reflective surface (using a high-intensity laser beam). The process of recording information on these disks is known as 'mastering'. This is so-called because this master disk is then used to make a die, which is used to make copies.

The information is retrieved from a CD-ROM using a low-powered laser, which is generated in an optical disk drive unit. The disk is rotated and the laser beam is aimed at the disk. The intensity of the laser beam changes as it encounters a pit. A photo-sensor detects the change in intensity, thus recognizing the digital signals recorded on the surface of the CD-ROM and converts them into electronic signals of 1s and 0s.

Types of CD-ROMs

There are two types of CD-ROMs as follows :

1. **CD-R (Compact Disk Readable)** : These disks can record data only once but can read data over and over again.
2. **CD-RW (Compact Disk Rewritable)** : CD-RW is a rewritable disk. It allows us to erase the previously recorded data. We can write new data on a CD-RW disk multiple times.

The advantages of CD-ROMs are :

1. Large storage capacity for information/data.
2. Fast and inexpensive mass replication.
3. Suitable for archival storage since they are removable disks.

The disadvantages of CD-ROMs are:

1. They are read-only and cannot be updated.
2. Access time is greater than that of a magnetic disk.

DVDs

DVD's, invented in 1995, DVD has become a very popular data storage device. Initially it was called Digital Video Disk which was changed to Digital Versatile Disk. Digital Versatile Disks (DVDs) is an optical disk storage format, which is used for digital representation of movies and other multimedia presentations that combine sound with graphics. DVDs are similar to Compact Discs (CDs) but with much greater storage capacity than that of CDs. A DVD uses a 5-inch disc with storage capacity ranging from 4.7 GB to 17 GB. A DVD can store an entire movie, or several hours of audio, or computer data of 5 gigabytes or more. You can use DVDs for recording purpose on both the sides as well as in dual layers, which provides you two individual recordable layers on a single-sided DVD disc.

Physical size	Single Layer Capacity (DVD's)	Dual Layer Capacity (DVD's)
12 cm, Single Sides	7.7 GB	8.5 GB
12 cm, Double Sides	9.4 GB	17 GB
8 cm, Single Sides	1.4 GB	2.6 GB
8 cm, Double Sided	2.8 GB	5.2 GB

DVD is also available in many versions, such as :

1. **DVD-R** : You can record data only once.
2. **DVD-RW** : You can erase and record data many times.
3. **DVD-R and DVD-RW** : Have two additional format which are + and - e.g., DVD - R and DVD + R.1

Q.21. Explain system software in detail.**Ans.****Meaning of System Software**

It is a collection of one or more programs, which are designed to control the overall operation and performance of a computer system. A system software acts as an interface between the user and the computer. System software provides the basic functions for computer usage and helps running applications, manipulating files and folders and communicate with other connected devices with it. System software are communication programs that monitor all activities and instruct user's commands to computer internal and external components like processor, memory, hard disk drive and keyboard, monitor, printer, removable disks etc. Device drivers, status monitoring of component, file management tools, and system utilities are examples of some major types of system software.

The system software can be divided into following four categories :

1. Operating System

An operating system is the most basic and important software that runs on a computer. It enables the computer hardware to communicate with user and manages the computer hardware and provides common services for efficient execution of various application softwares. Without a computer operating system, a computer and software programs would be useless. No utility or application can be run on computer without operating system.

Actually an OS works as an interpreter between a user and a computer system so that the interaction can be made easy between them. It manages the computer's memory, processes, and all of its software and hardware.

The operating system is classified into GUI and CUI, based on the way it interacts with the user.

Some of the popular operating systems are:

(i) WINDOWS, (ii) MAC OS, (iii) LINUX

2. Language Processor

Language processor program converts high level human instructions into the form or language that can be understand by a computer system, because the programmers use the High Level Language (HLL) to write the programs, as computer does not understand any other language than the machine language (binary language).

3. Device Drivers

A device driver is a computer program that controls the function of a particular type of device that is attached to your computer. No device can be operated by operation system without its device driver. Generally device driver are used for every external pluggable device like monitors, keyboard, mouse, printers CD-ROM, removable disks and so on. A device driver essentially converts the more general input/output instructions of the operating system to messages that the device type can understand.

4. Utility Software

Utility software is a small unit of operating system that performs a small range of tasks to manage and operate computer hardware. Disk defragmenters, processor and memory usage monitoring programs, data backup and recovery software and virus scanners are some of the typical examples of utility software.

Q.22.Explain some standard utilities in detail.**Ans.****Major Standard Utilities**

Some of the standard utilities are discussed as follows :

1. **Text Editor** : Text editor is a program to create and modify the text file for information record or print purpose. It is very light and easy to use program and also supports specific text find and replace.
2. **File Manager** : A file manager or file explorer is a computer program that allows a user to work and manipulate with file and folders. The most common operations performed on files or groups of files are: create, open, edit, view, print, play, rename, move, copy, delete, search/find, and modify file attributes, properties and file permissions.
3. **Disk Cleanup** : The Disk Cleanup tool helps you to free up space on your hard disk to improve the performance of your computer. The tool identifies files that you can safely delete and then enables you to choose whether you want to delete some or all of the identified files.
4. **Disk Defragmenter** : When a user create or modify file, the contents of file are often stored at a location on the hard disk that is different from the original file. Additional changes are saved to even more locations. Over time, both the file and the hard disk itself become fragmented, and your computer slows down as it has to look in many different places to open a file. Disk Defragmenter is a tool that rearranges the data on your hard disk and reunites fragmented files so your computer can run more efficiently.
5. **System Restore** : System Restore helps you to restore your computer's system files to an earlier point in time. It's a way to undo system changes to your computer without affecting your personal files, such as documents, e-mail, pictures and other media files. System Restore option uses a feature called system protection to create and save restore points regularly on your computer.
6. **Backup and Restore Utility** : Backup allows making copies of all system and personal data files of a computer. It shows a window to select individual file, folders, libraries, and drives that needs to back up. Restore window copy the backup data into destination computer. So, an intelligent user keeps his files in back up storage devices in order to restore original files at the time of such failures. The current versions of windows have backup utility to make copies of data (files, folders or drives selected by you) on a regular schedule. You can change the schedule manually. Create a backup at any time. Windows automatically keeps track of the files and folders that are new or modified and adds them to your backup.
7. **File Compression Utility** : Compression utility decreases the size of files and folders and reduces the amount of space they acquire on hard disk or removable storage devices. It creates a special format compressed file that can be expanded back to their original form.

- 8. Antivirus :** A computer virus is an executable program that can interfere normal operations of your computer intentionally. It also may cause damage to system and personal files. An anti-virus software program is a computer program that can be used to scan files to identify and eliminate computer viruses and other malicious software on the pre-define virus database.

They perform the following tasks in our computer:

- (i) Scan the computer files to look for virus.
- (ii) Identify suspicious behaviour from other computers.
- (iii) Remove the programs which indicate infection.

Q.23. Explain some general purpose application software in detail.

Ans. General Purpose Application Software

Some popular general purpose application software are as follows:

- 1. Word Processor Software :** Word Processor does not edit plain text files or allow basic editing tasks such as cut, copy and paste, undo/redo but also is used to change formatting and apply special operation in a document; using settings like bold, italic, underline, different font setting, table insertion, automatic spell, grammar check and mail merge etc.

Example : Microsoft Word, OpenOffice.org Writer, Adobe InCopy, Lotus Word Pro Wordpad, WordPerfect and Google Docs etc.

- 2. Spreadsheet :** A spreadsheet is a table which displays numbers in rows and columns. Spreadsheets can be used for a variety of purposes (accounting, budgeting, charting/graphing, financial analysis, scientific applications). Spreadsheets can exist in paper format but the electronic spreadsheets are able to perform automatic calculations on changing data.

Example : Microsoft Excel, OpenOffice.org Calc, Lotus 1-2-3, Corel Quattro Pro, and Google Docs etc.

- 3. Presentation Software :** Presentation software helps you to structure the ideas and information that you want to convey with it. You can add visual images, animation graphics, documents and audio which enhance presentation delivery. Not only the text can be inserted but also images, sound and animation can also be added into the same document with a variety of effects. This software helps to create and display slides on a computer for business and educational purposes.

Examples : Microsoft Powerpoint, Adobe Flash, Director, OpenOffice.org Impress and Google Docs etc.

- 4. Database Management System (DBMS) :** In a computer, database software helps you to store and manage a large amount of information in an organized way. You can easily create, add, find, update, sort and search the information stored in a database. Everyone uses database in their daily lives, for example, we maintain phone directories, payroll figures, accounts, etc.

Examples : Microsoft Access, DBASE, Foxpro, Microsoft Sql Server, Sybase, Oracle etc.

5. **DTP Package** : DTP (Desktop Publishing) software helps to create documents such as local newsletters, books, magazines and newspapers using various page layout setting to implies more professional looking end result in compression with the output of word processing softwares. With the advancement of DTP packages, the same work that a printing press could complete in a few days can easily be finished within a few hours.

Examples : Microsoft Publisher, Adobe Indesign, Corel Draw, Adobe Illustrator, Quark Express etc.

6. **Multimedia Software** : It is used to create and play video, animation, sound, graphics and text with a high degree of interaction.

For example : Windows Media Player.

Q.24. Explain some specific purpose application software in detail.

Ans. Specific Purpose Application Software

There are some specific purpose application software which are described below:

1. **Accounting Management** : Accounts are the backbone of every organization. Thus, a proper accounting software is needed by all to store and manage these account transactions. Some most popular accounting software in India are: TALLY, WINGS and BUSY etc.
2. **Reservation System** : With reservation software, you can have more control of the reservation system for your hotel- tickets, restaurant, etc., and avoid double bookings. This is because of the real-time update capabilities you'll have with this program. Some of the reservation softwares are web-based. They can store essential data and operate on customer related transaction online. For example, makemytrip.com etc.
3. **Attendance System** : Now-a-day, most of the organizations prefer computerized attendance system of their employees. With facilities like finger-print scanning or personalized sim-based card system, it is easier to record information and generate attendance reports later.
4. **Payroll System** : Many organizations use payroll software to manage the payroll system of their enterprise. This software manages the monthly salary slips, annual salary reports, calculation of employee tax details and many more.
5. **Billing System** : Commercial organizations such as hotels, shopping malls, hospitals and other stores which sell their services or products use the billing software in order to interact effectively with the customer. The software provides the option of credit and pre-paid payment system. It increases the speed of data processing and also includes the application of discounts, penalties and traffic on the products.
6. **Inventory Management System** : This type of software helps an organization in tracking its goods and materials on the basics of quality as well as quantity.
7. **School Inventory Control** : Different companies are providing school management software with facilities like :

Student's registration and admission, automated time-table generation, managing hostel (boarding and lodging), Library management, Transport maintenance management etc.

For Example: Tally, Microsoft Money, Microsoft Visio, Microsoft Project.

Q.25. Explain Binary number system in detail.

Ans. Binary Number System

Explain this number system, there are 2 digits: 0 and 1 to represent numbers. The base of this number system is 2 because it can represent only 2 digits. So, the maximum value of a single digit in this number system is always 1 as given in the definition of base. Digital computers use binary number system because the electronic devices can understand only 'on' (1) or 'off' (0). Any binary number is a string of any combination of 0 and 1. Any binary fraction is also a string of these digits but with an embedded decimal point.

For Example, $(101)_2$, $(11110000)_2$, $(11.001)_2$, $(1111)_2$, $(000000)_2$ etc.

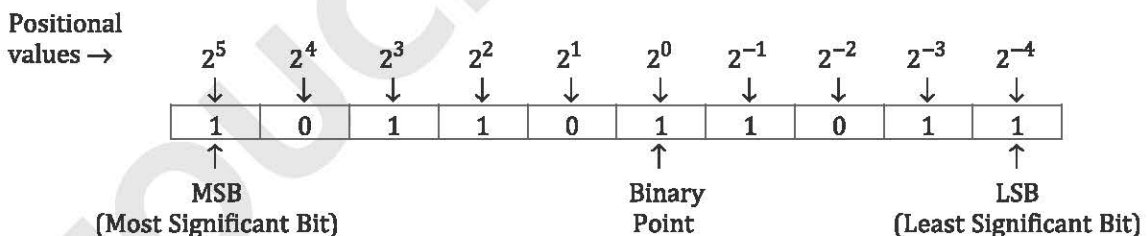
But 210, 300, 511 are not binary numbers because they have digits such as 2, 3 and 5 which are not binary digits.

To interpret a binary number, we multiply each digit by the power of 2 associated with that digit's position.

Thus, all the numbers in binary system are written with the help of these two digits namely, 0 and 1. The positional value or place value of each digit in system is identical to decimal number system with the base replaced by 2. The binary numbers are usually written with the base indicated as a subscript on the least significant digit (LSD).

For example, $(1011011011)_2$

It can be represented as shown below :



Computer Word : A computer word, like a byte, is a group of fixed number of bits which varies from computer to computer but is fixed for each computer. The number of bits in a computer word is known as the **word size** or **word length**.

Why is Binary number System used by Computers?

- (i) The circuits and switches in a computer have only two states, either on or off, which are represented by 1 and 0.
- (ii) Handling of two digits i.e., 1 and 0 is simpler, cheaper and more reliable.
- (iii) Every operation or activity that can be performed by decimal number system can also be done using binary number system, so it does not create any problem.

Q.26. Explain Decimal number system in detail.

Ans.

Decimal Number System

In this number system, there are 10 digits : 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9, to represent numbers. The base of this number system is 10 because it can represent 10 digits. So, the maximum value of a single digit in this number system is always 9 as given in the definition of base. This system is used in our day-to-day life. Any decimal number is a string of any combination of these digits. Any decimal fraction is also a string of these numbers but with an embedded decimal point.

For example, $(123)_{10}$, $(34)_{10}$, $(35.54)_{10}$, $(0679)_{10}$ etc.

Analogous to mathematics, each decimal number also has units, tens hundreds, thousands place etc. so, each place represents a specific power of the base which is 10.

The value of each digit in a number depends upon the following :

- (i) The face value of the digit i.e., the digit itself.
- (ii) The base of the system.
- (iii) The position of the digit in the number.

Thus, the magnitude of a number depends upon the digits of which it is made, position of the digits and base of the system.

For example,

351479.8265

Since no base is mentioned, the base is taken as 10.

It can be represented as shown below :

Positional values →	10^5	10^4	10^3	10^2	10^1	10^0	10^{-1}	10^{-2}	10^{-3}	10^{-4}
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	3	5	1	4	7	9	8	2	6	5
	↑					↑				↑
	MSD					Decimal				LSD
	(Most Significant Digit)					Point				(Least Significant Digit)

Here, the places to the left of the decimal point are positive powers of 10 and places to the right are negative powers of 10.

In a decimal number as we move from right to left (starting with the digit before decimal point) the positional or place value of each digit is 10 times the positional value of the digit to its right and as we move from left to right (starting with the digit after decimal point) the positional value of each digit becomes one-tenth of the positional value of the previous digit. The part of the number before the decimal point is called **integral part** and the one after the decimal point is called the **fractional part**.

Q.27. Explain hexadecimal number system in detail.

Ans.

Hexadecimal Number System

In this number system, there are 16 digits. The first 10 digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. The remaining next 6 digits are A, B, C, D, E, F which represents the decimal values 10, 11, 12, 13, 14, 15. The base of this number system is 16 because it represents 16 digits. Any hexadecimal number is a string of any combination of these digits. Any hexadecimal fraction is also a string of these numbers but with an embedded decimal point.

For example, $(A26)_{16}$, $(2B4)_{16}$, $(95.4)_{16}$, $(BCA)_{16}$ etc.

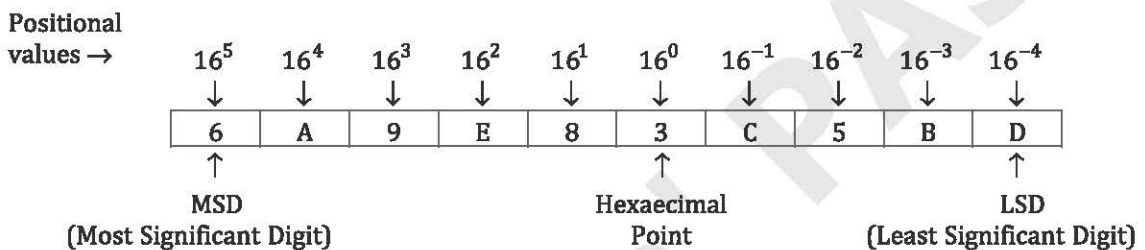
The equivalence between hex-numbers (hexadecimal numbers) and decimal numbers is given below :

Decimal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hexadecimal	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

Hexadecimal number system is also a positional value system, wherein each hexadecimal digit/letter has its own value or weight expressed as a power of 16. I

For example, $(6A9E83.C5BD)_{16}$

It can be represented as shown below :



Hexadecimal number shown with Positional values

Here, the places to the left of hexadecimal point are positive powers of 16 and places to the right are negative powers of 16.

The table number systems : Illustrates the relation between binary, octal, decimal and hexadecimal:

Relation between number systems

Binary	Octal	Decimal	Hexadecimal
0000	0	0	0
0001	1	1	1
0010	2	2	2
0011	3	3	3
0100	4	4	4
0101	5	5	5
0110	6	6	6
0111	7	7	7
1000	10	8	8
1001	11	9	9
1010	12	10	A
1011	13	11	B
1100	14	12	C
1101	15	13	D
1110	16	14	E
1111	17	15	F

Q.28. How can we convert binary to decimal number system? Also, find the decimal equivalent of the following binary numbers?

- (a) 10110 (b) 101011 (c) 11011100
 (d) 0.111 (e) 0.1010111 (f) 0.1011
 (g) 110010.1011 (h) 1110.1001

Ans. A binary number can be converted to its decimal equivalent by adding the weights of the various positions in it which have a 1.

$$(a) \quad (10110)_2 = 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 \\ = 16 + 0 + 4 + 2 + 0 = (22)_{10}.$$

It must be noted that the binary number 10110 has five digits in all. The Most Significant Digit (MSD) has the fifth position (starting from rightmost digit) so it is multiplied by 2^4 and each digit on its right will be half of it in its positional value, so these are multiplied by $2^3, 2^2, 2^1, 2^0$ respectively and the product so obtained are added to get the required decimal equivalent.

$$(b) \quad (101011)_2 = 1 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 \\ = 32 + 0 + 8 + 0 + 2 + 1 = (43)_{10} = 43.$$

$$(c) \quad (11011100)_2 = 1 \times 2^7 + 1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0 \\ = 128 + 64 + 0 + 16 + 8 + 4 + 0 + 0 \\ = (220)_{10} = 220.$$

$$(d) \quad (0111)_2 = 1 \times 2^{-1} + 1 \times 2^{-2} + 1 \times 2^{-3} \\ = 1/2 + 1/4 + 1/8 \\ = 0.5 + 0.25 + 0.125 = (0.875)_{10} = 0.875$$

$$\therefore (0111)_2 = (0.875)_{10}$$

$$(e) \quad (01010111)_2 = 1 \times 2^{-1} + 0 \times 2^{-2} + 1 \times 2^{-3} + 0 \times 2^{-4} + 1 \times 2^{-5} + 1 \times 2^{-6} + 1 \times 2^{-7} \\ = 1/2 + 0 + 1/8 + 0 + 1/32 + 1/64 + 1/128 \\ = 0.5 + .125 + 0.03125 + 0.015625 + 0.0078125 \\ = (0.6796875)_{10} = 0.6796875$$

$$\therefore (0.1010111)_2 = (0.6796875)_{10}$$

$$(f) \quad (0.1011)_2 = 1 \times 2^{-1} + 0 \times 2^{-2} + 1 \times 2^{-3} + 1 \times 2^{-4} \\ = 1/2 + 0 + 1/8 + 1/16 \\ = 0.5 + 0.125 + 0.0625 \\ = (0.6875)_{10} = 0.6875$$

$$\therefore (0.1011)_2 = (0.6875)_{10}$$

$$\begin{aligned}
 \text{(g) } (110010.1011)_2 &= (1 \times 2^5) + (1 \times 2^4) + (0 \times 2^3) + (0 \times 2^2) + (1 \times 2^1) + (0 + 2^0) + (1 \times 2^{-1}) \\
 &\quad + (0 \times 2^{-2}) + (1 \times 2^{-3}) + (1 \times 2^{-4}) \\
 &= 32 + 16 + 0 + 0 + 2 + 0 + 0.5 + 0 + 0.125 + 0.0625 \\
 &= (50.6875)_{10} = 50.6875
 \end{aligned}$$

$$\therefore (110010.1011)_2 = (50.6875)_{10}$$

$$\begin{aligned}
 \text{(h) } (11101001)_2 &= 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 + 1 \times 2^{-1} + 0 \times 2^{-2} + 0 \times 2^{-3} + 1 \times 2^{-4} \\
 &= 8 + 4 + 2 + 0 + \frac{1}{2} + 0 + 0 + \frac{1}{16} \\
 &= 14 + 0.5 + 0.0625 \\
 &= 14.5625.
 \end{aligned}$$

Q.29. How can we convert decimal number to binary number system? Also, find the binary equivalents of the following :

(a) 25, (b) 283, (c) 5280

Ans. A positive decimal integer can be converted to binary form by successive division by 2. The procedure is given below :

Divide the given number N by 2 and let the quotient be q_1 and the remainder be R_1 . Again divide the quotient q_1 by 2 and let the remainder be R_2 . Continue the procedure of division till the quotient becomes 0 and in this case let the remainder be R_n .

Then, the binary representation by N is given as

$$N = R_n R_{n-1} \dots R_3 R_2 R_1,$$

where each of the R 's is either 0 or 1.

(a) Start dividing 25 by 2 and continue the procedure till the quotient is 0. The procedure is shown below.

2	25	
2	12 - 1	(= R_1)
2	6 - 0	(= R_2)
2	3 - 0	(= R_3)
2	1 - 1	(= R_4)
0	- 1	(= R_5)

The required number in the binary number system = $R_5 R_4 R_3 R_2 R_1 = 11001$

Thus, $(25)_{10} = (11001)_2$

(b) Start dividing 283 by 2 and continue the procedure till the quotient becomes 0.

2	283	
2	141 - 1	(= R ₁)
2	70 - 1	(= R ₂)
2	35 - 0	(= R ₃)
2	17 - 1	(= R ₄)
2	8 - 1	(= R ₅)
2	4 - 0	(= R ₆)
2	2 - 0	(= R ₇)
2	1 - 0	(= R ₈)
0	- 1	(= R ₉)

The required binary equivalent of 283 = R₉ R₈ R₇ R₆ R₅ R₄ R₃ R₂ R₁
 = (10001101)₂

Thus, (283)₁₀ = (10001101)₂

(c) Start dividing 5280 by 2 and continue the procedure till the quotient becomes 0.

2	5280	
2	2640 - 0	(= R ₁)
2	1320 - 0	(= R ₂)
2	660 - 0	(= R ₃)
2	330 - 0	(= R ₄)
2	165 - 0	(= R ₅)
2	82 - 1	(= R ₆)
2	41 - 0	(= R ₇)
2	20 - 1	(= R ₈)
2	10 - 0	(= R ₉)
2	5 - 0	(= R ₁₀)
2	2 - 1	(= R ₁₁)
2	1 - 0	(= R ₁₂)
0	- 1	(= R ₁₃)

The required binary equivalent of 5280 = R₁₃ R₁₂ R₁₁ R₁₀ R₉ R₈ R₇ R₆ R₅ R₄ R₃ R₂ R₁
 = (1010010100000)₂

Thus, (5280)₁₀ = (1010010100000)₂

Q.30. What are computer codes? Explain the different types of computer codes in detail.

Ans.

Computer Codes

A computer handles non-numeric data in addition to numerical data i.e., alphabets, punctuation marks and other special characters. Some predefined codes are used to represent the numeric and non-numeric characters. These codes are known as alphanumeric codes. Any data or information is represented internally using the bits 0 and 1.

Types of Computer Codes

The various codes for data representation are :

- (i) BCD (Binary Coded Decimal)
 - (ii) EBCDIC (Extended Binary Coded Decimal Interchange Code)
 - (iii) ASCII (American Standard Code for Information Interchange)
- (i) BCD Code :** It is one of the early memory codes. Each digit of the decimal number is converted into its binary equivalent instead of the entire number into its pure binary form. The conversion process is quite simple. The following table shows the BCD equivalent of the decimal digits.

Decimal Digits	BCD Representation
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001

For example, 57 = **0101 0111** in BCD

The other arrangements 1010, 1011, 1100, 1101, 1110, 1111 are not used in BCD coding.

As the 4 bits are insufficient to represent the different characters used by a computer, so computer designers generally use 6 bits for representation of characters in BCD code. Two additional bits known as zone bits are added before the 4 bits to make it a 6 bit code which can represent 64 different characters (10 decimal digits, 26 alphabets and 28 special characters).

The following table shows the BCD representation of alphabetic and numeric characters:

Illustration of BCD code of alphabetic and numeric characters

Character	BCD Code		Character	BCD Code	
	Zone	Digit		Zone	Digit
A	11	0001	S	01	0010
B	11	0010	T	01	0011
C	11	0011	U	01	0100
D	11	0100	V	01	0101
E	11	0101	W	01	0110

F	11	0110	X	01	0111
G	11	0111	Y	01	1000
H	11	1000	Z	01	1001
I	11	1001	1	00	0001
J	10	0001	2	00	0010
K	10	0010	3	00	0011
L	10	0011	4	00	0100
M	10	0100	5	00	0101
N	10	0101	6	00	0110
O	10	0110	7	00	0111
P	10	0111	8	00	1000
Q	10	1000	9	00	1001
R	10	1001	0	00	1010

Now let us represent the word COMPUTING in BCD Code :

110011 100110 100100 100111 010100 010011 111001 100101 110111
 C O M P U T I N G

- (ii) **EBCDIC** : It is pronounced as “ebb-see-dick”. It is a 8 bit code and can represent 256 different characters. All of the 256 bit combinations are not meaningful, so the code can still add new characters if required. In this code the first 4 bits are known as zone bite and remainder 4 bits represent digit values. It is a standard character code for large computers. The following table shows the EBCDIC representations of alphabetic and numeric characters :

Illustration of EBCDIC code of alphabetic and numeric characters

Character	EBCDIC Code		Character	EBCDIC Code	
	Zone	Digit		Zone	Digit
A	1100	0001	S	1110	0010
B	1100	0010	T	1110	0011
C	1100	0011	U	1110	0100
D	1100	0100	V	1110	0101
E	1100	0101	W	1110	0110
F	1100	0110	X	1110	0111
G	1100	0111	Y	1110	1000
H	1100	1000	Z	1110	1001
I	1100	1001	0	1111	0000
J	1101	0001	1	1111	0001
K	1101	0010	2	1111	0010
L	1101	0011	3	1111	0011
M	1101	0100	4	1111	0100

N	1101	0101	5	1111	0101
O	1101	0110	6	1111	0110
P	1101	0111	7	1111	0111
Q	1101	1000	8	1111	1000
R	1101	1001	9	1111	1001

Now let us represent the word COMPUTING in EBCDIC Code :

11000011	11010110	11010110	11010111	11100100	11100011	11001001
C	O	M	P	U	T	I
					11010101	11000111
					N	G

(iii) **ASCII** : It is pronounced as 'ask-ee'. It is used extensively in small computers, peripherals, instruments and communication devices. It has replaced many of the earlier codes used by manufacturers.

ASCII-7 can represent 128 characters. The 8th bit is used for parity (an extra bit for checking errors) or it may be permanently 1 or 0. Out of 7 bits, 3 are zone bits and remaining 4 are numeric bits.

ASCII-8 can represent 256 characters. It is an extended form of ASCII-7. The additional bit is used as a zero bit i.e., the number of zone bits in this code is 4.

The following table shows the ASCII-7 and ASCII-8 representation of alphabetic and numeric characters :

Illustration of ASCII-7 and ASCII-8 Codes of Alphabetic and Numeric Characters

Character	ASCII-7 Code		ASCII-8 Code	
	Zone	Digit	Zone	Digit
0	011	0000	0101	0000
1	011	0001	0101	0001
2	011	0010	0101	0010
3	011	0011	0101	0011
4	011	0100	0101	0100
5	011	0101	0101	0101
6	011	0110	0101	0110
7	011	0111	0101	0111
8	011	1000	0101	1000
9	011	1001	0101	1001
A	100	0001	1010	0001
B	100	0010	1010	0010
C	100	0011	1010	0011
D	100	0100	1010	0100
E	100	0101	1010	0101

F	100	0110	1010	0110
G	100	0111	1010	0111
H	100	1000	1010	1000
I	100	1001	1010	1001
J	100	1010	1010	1010
K	100	1011	1010	1011
L	100	1100	1010	1100
M	100	1101	1010	1101
N	100	1110	1010	1110
O	100	1111	1010	1111
P	101	0000	1011	0000
Q	101	0001	1011	0001
R	101	0010	1011	0010
S	101	0011	1011	0011
T	101	0100	1011	0100
U	101	0101	1011	0101
V	101	0110	1011	0110
W	101	0111	1011	0111
X	101	1000	1011	1000
Y	101	1001	1011	1001
Z	101	1010	1011	1010

Q.31. Explain the memory of a Computer. Also discuss its types.

Ans.

Computer Memory

A memory is just like a human brain. It is used to store data and instructions. Computer memory is the storage space in the computer, where data is to be processed and instructions required for processing are stored. The memory is divided into large number of small parts called cells. Each location or cell has a unique address, which varies from zero to memory size minus one. For example, if the computer has 64k words, then this memory unit has $64 * 1024 = 65536$ memory locations. The address of these locations varies from 0 to 65535.

Memory is primarily of three types :

1. Cache Memory
2. Primary Memory/Main Memory
3. Secondary Memory

1. Cache Memory

Cache memory is a very high-speed semiconductor memory which can speed up the CPU. It acts as a buffer between the CPU and the main memory. It is used to hold those parts of data and program which are most frequently used by the CPU. The parts of data and programs are transferred from the disk to cache memory by the operating system, from where the CPU can access them.

Advantages : The advantages of cache memory are as follows :

- (i) Cache memory is faster than main memory.
- (ii) It consumes less access time as compared to main memory.
- (iii) It stores the program that can be executed within a short period of time.
- (iv) It stores data for temporary use.

Disadvantages : The disadvantages of cache memory are as follows :

- (i) Cache memory has limited capacity.
- (ii) It is very expensive.

2. Primary Memory (Main Memory)

Primary memory holds only those data and instructions on which the computer is currently working. It has a limited capacity and data is lost when power is switched off. It is generally made up of semiconductor device. These memories are not as fast as registers. The data and instruction required to be processed resides in the main memory. It is divided into two subcategories RAM and ROM.

Characteristics of Main Memory:

- (i) These are semiconductor memories.
- (ii) It is known as the main memory.
- (iii) Usually volatile memory.
- (iv) Data is lost in case power is switched off.
- (v) It is the working memory of the computer.
- (vi) Faster than secondary memories.
- (vii) A computer cannot run without the primary memory.

3. Secondary Memory

This type of memory is also known as external memory or non-volatile. It is slower than the main memory. These are used for storing data/information permanently. CPU directly does not access these memories, instead they are accessed via input-output routines. The contents of secondary memories are first transferred to the main memory, and then the CPU can access it. For example, disk, CD-ROM, DVD, etc.

Characteristics of Secondary Memory

- (i) These are magnetic and optical memories.
- (ii) It is known as the backup memory.
- (iii) It is a non-volatile memory.
- (iv) Data is permanently stored even if power is switched off.
- (v) It is used for storage of data in a computer.
- (vi) Computer may run without the secondary memory.
- (vii) Slower than primary memories.

Q.32. Discuss in detail computer programming languages.

Ans. Computer Programming Languages

Computer programming languages allow us to give instructions to a computer in a language the computer understands. Just as many human-based languages exist, there are an array of

computer programming languages that programmers can use to communicate with a computer. The portion of the language that a computer can understand is called a "binary." Translating programming language into binary is known as "compiling." Each language, from C Language to Python, has its own distinct features, though many times there are commonalities between programming languages.

These languages allow computers to quickly and efficiently process large and complex swaths of information. For example, if a person is given a list of randomized numbers ranging from one to ten thousand and is asked to place them in ascending order, chances are that it will take a sizable amount of time and include some errors.

1. Python

Python is an advanced programming language that is interpreted, object-oriented and built on flexible and robust semantics.

Uses : Professions and Industries : Python developers, software engineers, back end developers, Python programmers. Used by employers in information technology, engineering, professional services and design.

Major Organizations : Google, Pinterest, Instagram, YouTube, Dropbox, NASA, ESRI.

Specializations and Industries : Web and Internet development (frameworks, micro-frameworks and advanced content management systems); scientific and numeric computing; desktop graphical user interfaces (GUIs).

Importance : Python lets you work quickly to integrate systems as a scripting or glue language. It's also suited for Rapid Application Develop (RAD).

- (i) The game Civilization 4 has all its inner logic, including AI, implemented in Python.
- (ii) NASA uses Python in its Integrated Planning System as a standard scripting language.

Features :

- (i) Simple to learn and easily read.
- (ii) Associated web frameworks for developing web-based applications.
- (iii) Free interpreter and standard library available in source or binary on major platforms.

2. Java

Java is a general-purpose, object-oriented, high-level programming language with several features that make it ideal for web-based development.

Uses : Professions and Industries :

- (i) Software engineers, Java developers.
- (ii) Used by employers in communications, education, finance, health sciences, hospitality, retail and utilities.

Major Organizations : V2COM, Eclipse Information Technologies, eBay, Eurotech.

Specializations and Industries : Internet of Things (IoT), Enterprise Architecture, Cloud Computing.

Importance : Java is used to develop enterprise-level applications for video games and mobile apps, as well as to create web-based applications with JSP (Java Server Pages). When used online, Java allows applets to be downloaded and used through a browser, which can then perform a function not normally available.

- (i) Programs that use or are written in Java include Adobe Creative Suite, Eclipse, Lotus Notes, Minecraft and OpenOffice.
- (ii) Java is the core foundation for developing Android apps.

Features :

- (i) Application portability
- (ii) Robust and interpreted language
- (iii) Extensive network library

Originally known as Oak, Java was developed in 1990 at Sun Microsystems to add capabilities to the C++ language. Java was developed according to the principle of WORA (Write Once Run Anywhere). The language was introduced to the public in 1995 and is now owned by Oracle.

3. HTML (Hypertext Markup Language)

HTML is the standard markup language used to create web pages; it ensures proper formatting of text and images (using tags) so that Internet browsers can display them in the ways they were intended to look.

Uses : Professions and Industries :

- (i) Web developers, technical editors, email designers, software engineers.
- (ii) Used by employers in Information Technology, Engineering, Design, Professional Services, Management, Marketing, Customer Services and Sales.

Major Organizations : Apple, CyberCoders, Apex Systems, CareerBuilder.

Specializations and Industries Where HTML is Used Most : Web Development, Email Programming.

Importance : HTML is used to create electronic documents (pages) displayed online. Visit any page and you will see an example of HTML in action.

- (i) The diversity and complexity in the structure and appearance of today's sites is made possible with HTML.

Features :

- (i) Easy to use and learn the basics of HTML.
- (ii) Free and accessible.
- (iii) Multiple versions available.

HTML was created by physicist Tim Berners-Lee in 1990 to allow scientists to share documents online. Before then, all communication was sent using plain text. HTML made "rich" text possible (i.e. text formatting and visual images).

4. JavaScript

JavaScript is a client-side programming language that runs inside a client browser and processes commands on a computer rather than a server. It is commonly placed into an HTML or ASP file. Despite its name, JavaScript is not related to Java.

Uses : Professions and Industries :

- (i) JavaScript developers, Web developers, software engineers
- (ii) Used by employers in Information Technology, Engineering, Design, Marketing, Finance and Healthcare

Major Organizations : WordPress, Soundcloud, Khan Academy, Linkedin, Groupon, Yahoo and many others.

Specializations and Industries Where JavaScript is Used Most : Front End Website Development, Gaming Development.

Importance : JavaScript is used primarily in Web development to manipulate various page elements and make them more dynamic, including scrolling abilities, printing the time and date, creating a calendar and other tasks not possible through plain HTML. It can also be used to create games and APIs.

- (i) The agency Cyber-Duck in Britain uses public APIs, created with JavaScript, to pull in data about crime and enables users to review a local area.
- (ii) Tweetmap, created by Pete Smart and Rob Hawkes using JavaScript, represents a world map that is proportionally sized according to the number of tweets.

Features :

- (i) Basic features are easy to learn.
- (ii) Multiple frameworks.
- (iii) Users can reference JQuery, a comprehensive Javascript library.

JavaScript was designed by Netscape and originally known as LiveScript, before becoming JavaScript in 1995.

5. C Language

C Language is a structure-oriented, middle-level programming language mostly used to develop low-level applications.

Uses : Professions and Industries :

- (i) Software developers, computer engineers, business and systems analysts, IT and Web content administrators, embedded software engineers.
- (ii) Used by employers in Information Technology, Engineering, Management, Healthcare and Professional Services.

Major Organizations : Microsoft, Apple, Oracle, Cisco, Raytheon.

Specializations and Industries Where C Language is Used Most : Embedded Systems, Systems Programming, Artificial Intelligence, Industrial Automation, Computer Graphics, Space Research, Image Processing and Game Programming.

Importance : C Language is used to develop systems applications that are integrated into operating systems such as Windows, UNIX and Linux, as well as embedded softwares. Applications include graphics packages, word processors, spreadsheets, operating system development, database systems, compilers and assemblers, network drivers and interpreters.

- (i) Facebook's TAO systems is programmed mostly using C language.
- (ii) Most device drivers are still developed using C Language.

Features :

- (i) Simple to learn; there are only 32 keywords to master.
- (ii) Easy to write systems programs such as compilers and interpreters.
- (iii) Foundational language for beginners.

The C Language was developed in 1972 at Bell Labs specifically for implementing the UNIX system. It eventually gave rise to many advanced programming languages, including C++, Java C#, JavaScript and Pearl.

6. C++

C++ is a general purpose, object-oriented, middle-level programming language and is an extension of C language, which makes it possible to code C++ in a "C style". In some situations, coding can be done in either format, making C++ an example of a hybrid language.

Uses : Professions and Industries :

- (i) C++ software engineers, C++ software developers, embedded engineers, programmer analysts.
- (ii) Used by employers in Information Technology, Engineering, Professional Services, Design, Quality Control and Management.

Major Company and Organization Users : Google, Mozilla, Firefox, Winamp, Adobe Software, Amazon, Lockheed Martin.

Specializations : System/Application Software, Drivers, Client-Server Applications, Embedded Firmware.

Importance : The C++ language is used to create computer programs and packaged software, such as games, office applications, graphics and video editors and operating systems.

- (i) The Blackberry OS is developed using C++.
- (ii) The newest Microsoft Office suite was developed using C++.

Features :

- (i) Often the first programming language taught at college level.
- (ii) Quick processing and compilation mechanism.
- (iii) Robust standard library (STL).

Released in 1983 and often considered an object-oriented version of C language, C++ was created to compile lean, efficient code, while providing high-level abstractions to better manage large development projects.

Q.32. Explain various uses of the Internet in our Daily Life.**Ans. Uses of the Internet in our Daily Life**

The following points will help you learn why the internet is important. How the internet changed the world. What are the advantages for you if you're connected to the internet? How the internet is influencing your life. So, Let's begin :

1. **Uses of the Internet in Students Daily Life :** Students have a free platform to learn throughout their lifetime. People in the age group 18 to 35 are among the most frequent users of the Internet today and these people are mostly students from all over

the world. They are using the Internet to learn new skills and even acquire degrees in professional online courses.

Similarly, educators like us are using the Internet for teaching and sharing our knowledge and experience with the world. There are many websites that help to explore what your hidden potential is and which profession would suit you the best.

- 2. Uses of the Internet to increase the Speed of Daily Tasks :** Our routine is initiated by the Internet. It is the first thing in the morning we do- see our notifications and emails. The Internet has made human life so much easier, now the biggest and toughest tasks are done in minutes. No matter it is a simple email, pizza order, shopping or money transfer it is so much easier by the use of the Internet in life.
- 3. Uses of the Internet for Business Promotion and Innovation :** We also use the Internet to promote our business. We can sell our products by using various e-Commerce solutions on the Internet. E-commerce is booming on the Internet and we can see new services and creative businesses starting up every single day, which in turn is creating jobs and thereby reducing unemployment.

I think if our youth of India or from other countries learn and use the Internet seriously they can get hundreds of options for their careers on the Internet. I believe that the uses of the Internet in business have brought about an exciting stir in the business world and it will not hold back anymore.

Use of Google Ad words, Facebook ads, and content marketing are common in product and services marketing on the Internet. People are always looking for ways on the Internet to grow their businesses.

- 4. Uses of the Internet for Shopping in our Daily Life :** Shopping has become a hassle-free task now and almost anybody can order products online after comparison with other websites. The boom and the resultant competition in the online shopping business are evident. Shopping sites are more interesting because of the huge discounts different companies are offering customers.

People are attracted to them and this is good news especially for the Indian shopper because of our frugal spending habits. The customer can pay cash for the delivery of a product delivered to his house in a few hours and can return the product if he is not satisfied with it.

Shopping on the Internet is affordable, convenient, and saves time. The Use of flipkart.com, alibaba.com, amazon.com, paytm.com, snapdeal.com, etc. for online shopping is common. That's how the Internet is affecting our shopping habits in daily life. And all this process is called eCommerce. eCommerce has changed business and now it's an important part of our life.

- 5. Use of the Internet for Research and Development :** The pace of work towards innovation and quality of research is developed by Internet tools. It is not tough to research on the Internet. From small business owners to big universities everyone is getting the benefits of the Internet for research and development. Data analysis, data entry, data research, data management, etc. services are in demand.

A person who is a data scientist and data analyst are really important for innovative decision-making. Even the importance of Microsoft Excel in business is being realized

by people now. Similarly, CRM and Google Analytics are helping businesses to analyze the consumer's behavior on websites and advertising campaigns.

Decision-making is an important part of all kinds of businesses and organizations. Success and failure depend on our decision. After the rise of online business and higher competition on the Internet to conduct business, it's really important that decisions do not be a burden on the organization. That's why today you can visualize, analyze and monitor customers' data in real-time by using data analysis tools. That helps the business to remain competitive in the market by better data analysis.

Any information we need regarding health, money, law, RTI, etc. everything is in front of us within a few seconds. So, it is really important that we use the power of the Internet for practical benefits.

- 6. Use of the Internet Provide us Quick and Free Communication :** The Internet is undoubtedly the most effective and far-reaching communication tool we have at present. Communication on the Internet is free and fast. We all are connected with each other on various computers and IPs. Skype, chat messengers, social media is common for personal and professional purposes.

Indeed we are also using standardized communication protocols but the Internet evolves constantly by using artificial intelligence and search engines to find out how we communicate, how this can be made simpler for us to use and have a better experience in the shortest possible time.

This ability to communicate at breakneck speeds enables us to finish our tasks faster and become more efficient.

- 7. International Uses of the Internet by Working Remotely and Providing Business Services :** It is obvious that the presence of the Internet has made doing business much easier. But it has also created its own set of challenges such as high competition, needs for quality content, etc. But knowledge is power and anyone can do business and job after learning more about it.

As the newer generations start to log into the Internet there are possibilities of completely new businesses and jobs. Nowadays the Internet is widely used in making money. If you have talent, then you can earn money by sitting at home on the Internet.

□

UNIT-II

Database Management System (DBMS)



SECTION-A (VERY SHORT ANSWER TYPE) QUESTIONS

Q.1. What is the full form of DBMS?

Ans. Database Management System is the full form of DBMS.

Q.2. Name the different categories of database models.

Ans. Various categories of database models are : Relational model, Network model and Hierarchical model.

Q.3. Which component is used to convert the DML statements into regular function?

Ans. DML Pre-compiler is used to convert the DML statements into regular function.

Q.4. Which component of DBMS interprets and converts the DDL statements into a set of tables to record metadata?

Ans. DDL Interpreter interprets and converts the DDL statements into a set of tables to record metadata.

Q.5. Name some commercial databases.

Ans. ORACLE, INGRESS, MySQL and SYBASE are some commercial databases.

SECTION-B (SHORT ANSWER TYPE) QUESTIONS

Q.1. Write a short note on DBMS.

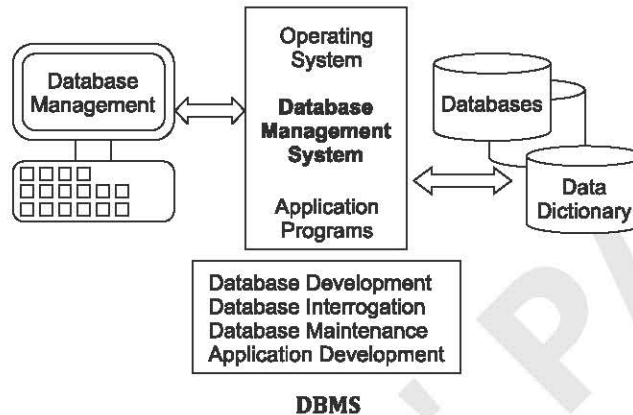
Ans. A database management system (DBMS) is a collection of interrelated data and a set of programs to access those data. The collection of data, usually referred to as the database, contains information relevant to an enterprise. The primary goal of a DBMS is to provide a way to store and retrieve database information that is both convenient and efficient.

Database systems are designed to manage large bodies of information. Management of data involves both defining structures for storage of information and providing mechanisms for the manipulation of information. In addition, the database system must ensure the safety of the information stored, despite system crashes or attempts at unauthorized access. If data are to be shared among several users, the system must avoid possible anomalous results.

Because information is so important in most organizations, computer scientists have developed a large body of concepts and techniques for managing data. These concepts and

techniques form the focus of this book. This chapter briefly introduces the principles of database systems.

Some commercial databases are ORACLE, INGRESS, MySQL and SYBASE etc. The following figure illustrates the overview of DBMS:



Q.2. What are the different issues of integration of application?

Ans. Various Issues of Integration of Application

Integration of application involves following issues :

- 1. Cost :** In most cases, the most essential consideration in application integration is cost. The cost of integration and overall benefit gained must be justifiable.
- 2. Compatibility :** The apps are typically developed and implemented independently. As a result, there are compatibility issues among applications components.
- 3. Legacy Applications :** Applications that are being used by organisation for decades and are implemented on very old technology are known as legacy systems. These applications cannot be thrown off. Integration of these systems can be difficult at times.
- 4. Migration :** From existing old technology, the database and/or procedure may need to be implemented with new technology. Many times, even though the source code exists, just an executable version of the procedure is available. In this case, reverse engineering may be required.
- 5. Operational Control :** Control is typically transferred from one entity to another when one application is integrated with another. It is also possible that the application's control will be shared. Thus it often requires redesigning of the control and authority.
- 6. Security :** When applications are integrated, the system is exposed to more security dangers than when they are used separately. The system's vulnerability to security threats must be taken extremely seriously.

Q.3. What are the objectives of DBMS?

Ans. Objectives of DBMS

The points highlight objectives of the database approach. It serves as a guide to database requirements process and data modeling :

- 1. Availability :** Data must be available for applications and queries.

2. **Share-ability** : Data items prepared by one application must be available to all other applications or queries. No data items are exclusive to an application.
3. **Evolv-ability** : The database must evolve as application usage and query needs evolve.
4. **Data Independenc** : The users of the database ascertain their view of the data and its structure not considering the actual physical storage of the data.
5. **Data Integrity** : The database sets a consistent high level of accuracy. Validation rules are imposed by the database management system to insure the integrity.

Q.4. What are the advantages of DBMS system?**Ans. Advantages of DBMS System**

Following are the main advantages of DBMS System:

1. **Redundancy can be Reduced** : DBMS reduces the duplicacy (redundancy) and is aware of the redundancy and takes up the updates responsibility (i.e., it automatic change at other places in case of duplicate data).
2. **Inconsistency can be Avoided** : It also controls the inconsistency (mismatch of two entries with same data). Database controls the redundancy which automatically controls inconsistency.
3. **Data can be Shared** : Data stored in the database can be used with the other applications and because stored data satisfies all its need so there is no need of creating new file.
4. **Standards can be Enforced** : To represent the data, standards are used such as company, installation, departmental, industry, national and international standards. It is useful when user wants to migrate and interchange between systems.
5. **Security Restriction can be Applied** : Various authorisation checks (while using sensitive data) and proper channels are required to access the database.
6. **Integrity can be Maintained** : Data integrity is important because databases are used in the shareable mode. Databases provide the data integrity and ensure that they are accurate.

Q.5. What are the disadvantages of DBMS system?**Ans. Disadvantages of DBMS system**

There are some limitations attached with the database system. These are :

1. **High Cost** : Cost is the one of the significant disadvantage of database system because to use a database, organisation requires upgrade or a new hardware. So organisation will have to pay different costs such as developing and hardware.
2. **Problems Associated with Centralisation** : There is less security when data is accessed in centralised (data is accessed by every user) manner. So data can be lost and damaged.
3. **Complexity of Back-Up and Recovery** : In a multi-user database system when backup is loading, it may lead to duplicacy of data. If one takes the database back-up then it may affect the multi-user database system (which is in operation).

4. **Confidentiality, Privacy and Security** : When data is accessible from the remote location (i.e., database system is centralised) then the possibilities of misuse of data increases compared to conventional database. To secure the unauthorised access of data, it is mandatory to take technical, administrative and legal measures.
5. **Data Quality** : Suitable and sufficient controls are required to control the users who are updating the data and control the data quality. Direct access of data by various users leads to massive opportunities for users to damage the data. So if no suitable controls are available then it may be possible that data is comprised.

Q.6. What are the difference between file system and DBMS?

Ans. Differences between File System and DBMS

S.No.	File System	DBMS
1.	A collection of data is termed as the file system. The user has to write the procedures for its management.	DBMS is also a collection of data but the user needs not to write the procedures for its management.
2.	The file system is saved in temporary locations.	It is well arranged and saved to permanent locations.
3.	It provides details of data representation and storage of data.	It hides details and provides an abstract view of data.
4.	Storing and retrieval of data cannot be done efficiently.	Storing and retrieval of data is done efficiently by use of various sophisticated techniques.
5.	No transaction is possible.	Several transactions such as insert, delete, view, updating etc. are possible.
6.	Simultaneous access to data gives rise to problems. For example, a user reading the file while another one is deleting or updating data in it at the same time.	Simultaneous access is smooth as DBMS uses locking.
7.	Data is accessed through single or various files.	Data is accessed through tables (schema).
8.	It does not have a crash recovery mechanism.	It has a crash recovery mechanism which protects users from the effects of system failures.
9.	Protection of file under file system is difficult.	DBMS has a good protection mechanism.

Q.7. Write a short note on data models.

Ans. Data Models

To describe the structure of the database, several concepts are used. These collections of concepts are known as data models. They also provide the essential means to get the abstraction.

The structure of a database includes :

1. Data Types,
2. Relationship, and
3. Constrains.

These elements should hold for the data. For the specific retrievals and updates of the database, data models also have some operations.

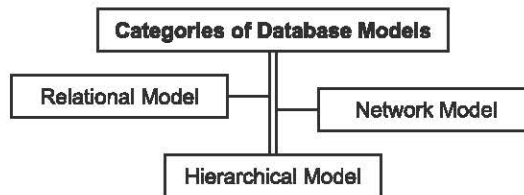
When real world entities, their constraints and relationships are logically organised, then it is known as 'data model'. For a data model a database language is a concrete syntax.

A data model is implemented by a database. A group of conceptual tools is known as data model. It describes the :

1. Data,
2. Data relationships,
3. Data semantics, and
4. Data constraints.

Categories of Database Models

The main categories of data models are :



Q.8. Explain database.

Ans.

Meaning of Database

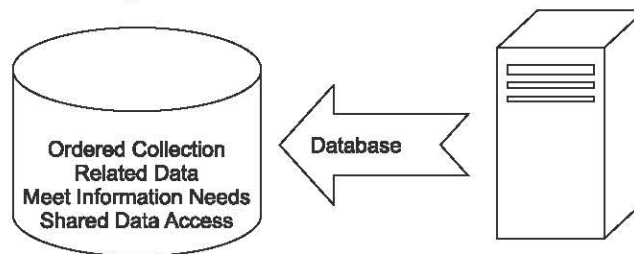
Database is as an organized collection of data, so that a computer program can easily and quickly access the needed data, so, multiple users can share it for various purposes.

A collection of information that is grouped and stored in structured way is called database. The gathered information which is helpful in retrieving the necessary information is termed as a database. Various categories of information such as electronic, printed, graphic, audio, statistical, combinations can be part of the gathered information. Two types of databases are physical and electronic databases.

The database can either be very complex or simple. Simple database example includes, in an address book alphabetical arrangement of names whereas complex example is a database providing information in a combination of format.

Non-computerised database examples are: a dictionary, a phone book, a collection of recipes and a TV guide, whereas the computerised database examples are, customer files, books catalogue, employee rosters, sales transactions and equipment inventories. Other than storing and retrieving data, the database supports various other operations such as, addition, updation and deletion of the data. A database management system (DBMS) is used to perform such operations.

A database is described as a suitably managed collection of related data elements. It must fulfil information needs of the organisation. A database is normally designed to be shared among multiple users, as shown in figure:



Database Overview

Q.9. Explain the different database system applications.

Ans. Various Database System Applications

Database are widely used. Here are some representative applications :

1. Enterprise Information

- (i) **Sales** : For customer, product, and purchase information.
- (ii) **Accounting** : For payments, receipts, account balances, assets and other accounting information.
- (iii) **Human Resources** : For information about employees, salaries, payroll taxes, and benefits and for generation of paychecks.
- (iv) **Manufacturing** : For management of the supply chain and for tracking production of items in factories, inventories of items in warehouses and stores and orders for items.
- (v) **Online Retailers** : For sales data noted above plus online order tracking, generation of recommendation lists, and maintenance of online product evaluations.

2. Banking and Finance

- (i) **Banking** : For customer information, accounts, loans and banking transactions.
- (ii) **Credit Card Transactions** : For purchases on credit cards and generation of monthly statements.
- (iii) **Finance** : For storing information about holdings, sales and purchases of financial instruments such as stocks and bonds; also for storing real-time market data to enable online trading by customers and automated trading by the firm.

3. Universities

For student information, course registrations and grades (in addition to standard enterprise information such as human resources and accounting).

4. Airlines

For reservations and schedule information. Airlines were among the first to use databases in a geographically distributed manner.

5. Telecommunication

For keeping records of calls made, generating monthly bills, maintaining balances on prepaid calling cards and storing information about the communication networks.

Q.10. Explain the different disadvantages of the file-based approaches that came into being with the first commercial application of computers suffered?

Ans. The file-based approaches that came into being with the first commercial application of computers suffered from the following significant disadvantages :

- 1. **Data Redundancy** : Data redundancy refers to the duplication of information in several files.
- 2. **Data Inconsistency** : Data inconsistency means different copies of the similar data do not match. This shows different versions of same basic data. This occurs when update operations are performed that are not updating the similar data stored at different places.

For example, address information of a customer is recorded differently in different files.

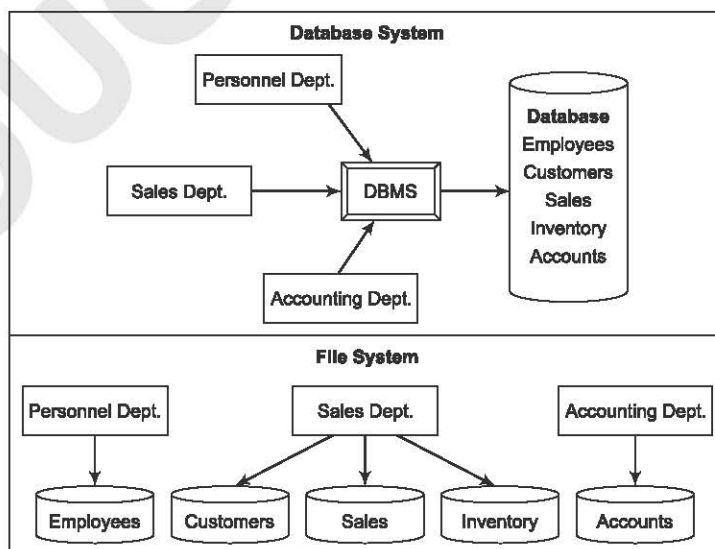
3. **Difficulty in Accessing Data :** It is not easy task to fetch information using a conventional file processing system. Convenient and efficient information retrieval is not possible using conventional file processing system.
4. **Data Isolation :** Data are spread in various files and these files may have different formats. Thus writing new application program to retrieve such data is every complex task.
5. **Integrity Problems :** The data values should follow some integrity constraints. For example, the balance value must be greater than 4000. One can control such through program code in file processing systems. But in case of database, user can declare the integrity constraints along with definition itself.
6. **Atomicity Problem :** It is very difficult task to fulfil atomicity in file processing system. For example, let us consider the transferring of an amount of ₹ 100 from Account A to account B. If a failure occurs during execution, there could be situation like an amount of ₹ 100 is deducted from Account A and not gone in Account B.
7. **Concurrent Access Anomalies :** If several users are updating the similar data simultaneously, then it will result in inconsistent state. In file processing system, it is very hard to handle such situation using program code. This gives rise to concurrent access anomalies.
8. **Security Problems :** In file processing system, enforcing security constraints is very complex as the application programs are added to the system in an *ad-hoc* manner.

Q.11. Explain file system in detail.

Ans.

Meaning of File System

File is a collection of related arrangement of records. All records in a file are of the similar record type. Every record contains an identical format. If each record in the file has exactly the similar size, the file is said to be known as fixed-length records. If different records have different sizes, the file is said a variable-length records.



Comparison of File System and Database

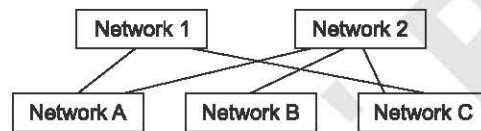
For example, a telephone book is equivalent to a file. It contains a list of records consisting of three fields: name, address and telephone number. In today's world, files and databases have become an indispensable part of daily life. Everyone interacts with a database during the course of a day, such as depositing and withdrawing funds in banks; making a hotel or airline reservation; accessing a computerised library catalogue; or ordering a magazine subscription from a publisher, etc.

Q.12. Explain Network Data Model in detail. Also discuss its advantages and disadvantages.

Ans.

Network Data Model

This model represents data by collection of records and relationships among data. This is represented by links, which can be viewed as pointers. The records in the database are organised as collection of arbitrary graphs.



Network Model

Database Task Group (DBTG) of the Conference on Data System Language (DBTG/CODASYL) formalised the network data model in the late 1960s. Their first report that has been revised a number of times, contained detailed specifications for the network data model (a model conforming to these specifications is also known as the DBTG data model). Many of the current database applications have been built on commercial DBMS systems using the DBTG model.

Advantages of Network Data Model

1. Network model is useful for representing such records which have many-to-many relationships.
2. Problem of inconsistency does not exist in a network model because a data element is physically located at just one place.
3. Searching a record is easy since there are multiple access paths to a data element.

Disadvantages of Network Data Model

1. All the records are maintained using pointers and hence the whole database structure becomes very complex.
2. Insertion, deletion and updation of any record would require pointer adjustments.

Q.13. Explain Hierarchical Data Model in detail. Also writes its advantages and disadvantages.

Ans.

Hierarchical Data Model

This model is similar to network model in the sense that data and relationships among data are represented by records and links respectively.

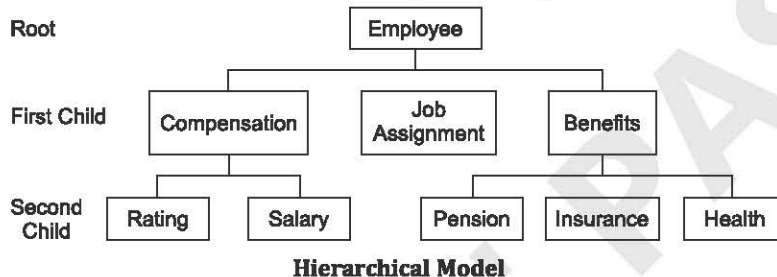
It differs from network model in that the records are organised as collection of trees rather than arbitrary graphs.

A DBMS belonging to the hierarchical data model uses tree structures to represent relationship among records. Tree structures occur naturally in many data organisations because some entities have an intrinsic hierarchical order.

A hierarchical database therefore consists of a collection of records, which are connected with each other through links.

Each record is a collection of fields (attributes), each of which contains one data value. A link is an association precisely between two records.

For example, consider the EMPLOYEE hierarchy in the figure.



Advantages of Hierarchical Data Model

1. It is a simple, straightforward and natural method of implementing record relationships.
2. Hierarchical model is useful when there is some hierarchical character in the database.

Disadvantages of Hierarchical Data Model

1. The hierarchical model cannot represent all the relationships that occur in the real world.
2. It cannot demonstrate the overall data model for the enterprise because of the non-availability of actual data at the time of designing the data model.
3. The hierarchical model is used only when there is a hierarchical character in the concerned database. It cannot represent many-to-many relationship (a child can have only one parent).

SECTION-C LONG ANSWER TYPE QUESTIONS

Q.1. Explain database concepts in detail.

Ans. Database Concepts

The most important resource for an organisation is data and to run an organisation in an efficient manner, the organisation and management of data is essential. The basic terminologies in a database system are :

1. **Data** : Data can be defined as a series of facts or statements that may have been collected, stored and processed.
2. **Database** : Database is a collection of related files or tables that is stored in a standardised format and can be shared by several users. For example, an employee file with the names, addresses, departments and related information about employees is a database.

3. **Entity** : Entity is any real-world object, observation, or person about which data is stored in a database.
4. **Field** : A field is a column of the database file or table that defines a single attribute of the table.
5. **Record** : For any particular entity, the related fields are referred to as a record. For example, the values for all fields of a student table like the name, class, section, roll number etc. for one student would form a record.
6. **File** : A collection of records is called a file.
7. **Attribute** : It is the characteristic of the values of every field.
8. **Relation** : The basic collection of data in a relational database is called a relation. It is represented using a two-dimensional array of rows and columns containing single value entries and no duplicate rows.
9. **Table** : A table is also called a relation. It is a collection of data organised in the form of records and fields.
10. **Key** : In a table, a key is a field or a group of fields that uniquely identifies a record.
11. **Data Dictionary** : The data dictionary is the area where the metadata about data is stored. The data dictionary describes tables, fields, indexes, constraints etc. in a table.
12. **Data Model** : The data model is the logical data structures including the operations and constraints to effectively process data and provided by DBMS. For example, relational data model.

Q.2. Write down the characteristics of Database Management System.

Ans. Characteristics of a DBMS

Following are the main characteristics of a DBMS:

1. **Self-Describing Nature of a Database System** : A database system not only contains the data but also description of the data structure and Metadata (data about data). This information is needed to DBMS software or users of database. This feature makes it different from the traditional file based system where data definition is a part of application programs.
2. **Isolation between Program and Data** : The structure of data files is defined in the application programs in the file based system. In case, a user wants to change the file structure then all programs which access that file also needs to be changed. Conversely, in the database approach, data structure is stored in the system catalogue and not in the programs and as such, one change suffices.
3. **Support Multiple View's of Data** : A view can be said to be a subset of a database which gets defined, by specific users of the system with each view containing data which is of interest to a specific user or group of users. This means that there can be multiple views of the system.
4. **Sharing of Data and Multi-User System** : A multi-user database system allows multi-user access. In order to achieve this, multi-user DBMS should have concurrency control strategies implemented.

5. **Control Data Redundancy** : Ideally each data item should be stored in only one location in the database under the database approach. Nevertheless, redundancy occurs which is controlled for keeping it at a minimum for improved system performance.
6. **Data Sharing** : As data is integrated in an organisation, it leads to better capability for producing more information from a specific amount of data.
7. **Enforcing Integrity Constraints** : For defining and enforcing the limitations like data type, data uniqueness, etc., DBMS must provide the capability.
8. **Restricting Unauthorised Access** : All users of the system do not have the same access rights. This is achieved by DBMS providing a security subsystem for creating and controlling user accounts.
9. **Transaction Processing** : The DBMS should have concurrency control subsystems to ensure that simultaneous updation by several users are done in a controlled manner. Consistency and validity must be maintained in the updates.

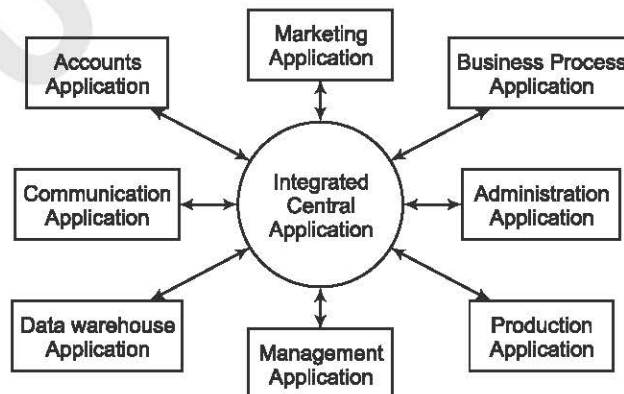
Q.3. Explain the integration of application in detail.

Ans.

Integration of Application

Many applications work together to achieve the company's goals in any typical business organisation. However, the apps do not provide a cost-effective solution and are difficult to administer when installed and maintained individually. Integration of current apps into a single entity can substantially improve application availability and sharing. Application integration is required due to management control and security issues. As a result, these standalone apps must be incorporated into a larger, enterprise-wide solution. Many solutions, such as ERP, have emerged.

A typical international firm has 30 to 50 enterprise apps and spends 25 to 40% of its IT budget on application integration according to a recent survey. With the current wave of acquisitions and mergers, integration criteria are becoming more stringent.



Integrated Central Application

The parts of the problem can be resolved for short-term by the custom point-to-point solutions and other e-band-aids. However, these methods of problem solving are typically expensive and difficult to maintain.

The goal of application integration is to provide a low-cost integration architecture and infrastructure that promotes application interoperability. And in today's global marketplace, where change is fast, interoperability is the key to agility.

Integrating cross-functional business processes allows information to move freely across systems, between organisations, between businesses, and among trade partners. Web-based applications, front-and back-office systems, ERP systems, and package software applications may all be integrated using a variety of technologies. PeopleSoft, Oracle, SAP, and other top ERP systems, as well as the leading Database Management Systems, are some of the most common application integration solutions.

Q.4. What are relevance of database management system?

Ans.

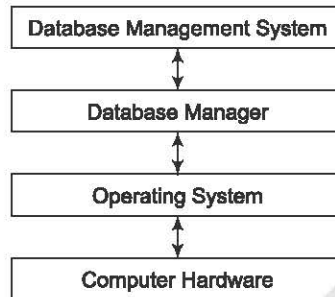
Relevance of DBMS

Following are the relevance of database management system :

- 1. Reduction of Redundancies :** Unwanted data repetition of data can be avoided and total amount of data storage can be effectively reduced with the help of database management system. Extra processing required to trace the needed data in a large mass of data can also be eliminated with the help of this system. DBMS controls any redundancies that exist and ensure the consistency of these multiple copies.
- 2. Shared Data :** By any number of application programs or users, database allows the share of data under its control.
- 3. Integrity :** Not only the accuracy, but data integrity also ensures the consistency of data consists in database. Therefore, data values are full within a specified range and their format is corrected by checking these data values entered in for storage. To provide data integrity, incorporation of adequate checks in DBMS can also be ensured by the centralised control.
- 4. Security :** It is important to maintain the confidentiality of the data as it is necessary for organisation. Unauthorised persons are not allowed to access such confidential data. Proper access procedures are followed including proper authentication schemes for access to the DBMS and. extra checks before allowing access to sensitive data must be ensured by the DBA who has the ultimate responsibility for the data in DBMS. Implementation of different levels of security varies with the types of data and operations.
- 5. Conflict Resolution :** DBS resolves the conflicting requirements of various users and applications as it controls the database. Although with a relatively slower response, while allowing less critical applications to use the database continuously, DBA selects the best file structure and method to access to get the significant performance for the response critical application.
- 6. Data Independence :** Physical data independence and logical data independence are the two bases to consider the data independence. Organisation of the files or physical storage devices can be changed without any change in the external views or conceptual view and thus in application programs using the database with the help of physical independence.

Q.5. Explain database manager in detail.

Ans. A program module that provides interaction between the low level data stored in the database and application programs and problems submitted to the system is referred to as database manager. Interfacing with file system is possible with the help of database manager.



Converting the queries of the users coming directly from the query processor or indirectly from an application program from the logical view of the user to the physical file system is one of the main functions of database manager. Moreover, the activity to enforce constraints in order to maintain the consistency and integrity of the both data and security is also performed by the database manager.

Database manager controls the synchronisation of simultaneous operations performed by the users. Both backup and recovery operations are performed by the data managers.

Following are the tasks managed by the database manager :

1. **Interface with the File Manager** : Storing of raw materials on disk using the file system provided by a conventional operating system facilitates the interaction between the database manager and file manager of the operating system.
The Data Manipulation Language statement is translated into the sequence of low-level file system commands for storing, retrieving and updating data in the database by the database manager.
2. **Integrity Enforcement** : Database manager checks that the consistency constraints do not violets by the update in the database. For example, in banks, database manager ensures that no account balance is below ₹ 1000 otherwise the consistency constraints are violated.
3. **Security Enforcement** : The security of database is ensured by the database manager by defining the security checks and constraints. The database manager has the right whether to allow the user to use database or to deny it. Only database manager is responsible to allow the user to access the database.
4. **Backup and Recovery** : Database manager must ensure that the database is not lost or damaged by taking its back-up regularly. It provides required recovery procedure to resurrect the database in case of damaged or lost database, if any.

Q.6. Explain Data Abstraction in detail.

Ans. A database can be viewed in the three level of abstraction and it is known as three-level architecture. So there are three independent levels by which database is organised.

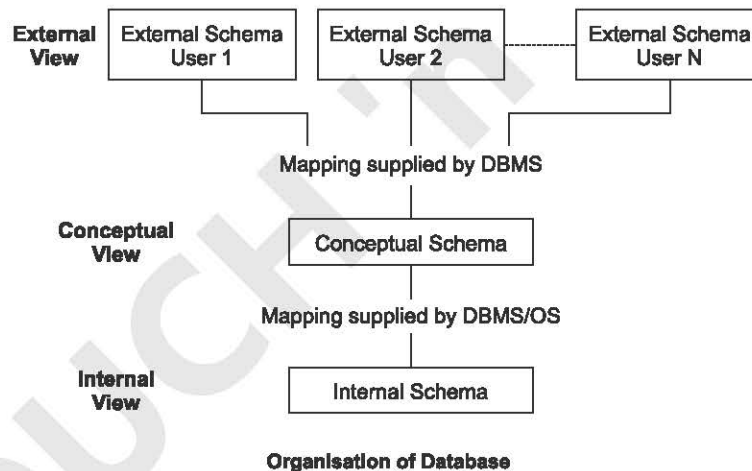
- 1. External View :** The highest level of the abstraction is external view. This view contains the user or application program concerns. For a conceptual or global view, various users' views can exists.

'External or sub schema' is used to describe the external views. These schemas have :

- Logical Records Definition,
- Relationships in the External View, and
- Method of deriving the objects in the external view from the objects in the conceptual view.

The object comprises of :

- Entities,
- Attributes, and
- Relationships.



- 2. Conceptual View :** The database entities and relationship among them are considered at this abstraction level. Conceptual views are described using conceptual schemas. It explains all the relationships and records comprised in the conceptual view. So on the basis of this, every database has only one conceptual schema.

The method of deriving the objects in the conceptual view from the objects in the internal view is also considered by the conceptual view.

Data explanation at conceptual view is format independent of its physical representation. Properties that state the check to preserve integrity and consistency are also comprised by this schema.

- 3. Internal View :** It is nearest to the physical storage method and also the abstraction's lowest level. It shows :
 - How data is saved and also explains the used data structure, and
 - Which access methods are used by the database?

It is described using internal schema. The definition of the stored records is also include by internal schema and following methods are also used.

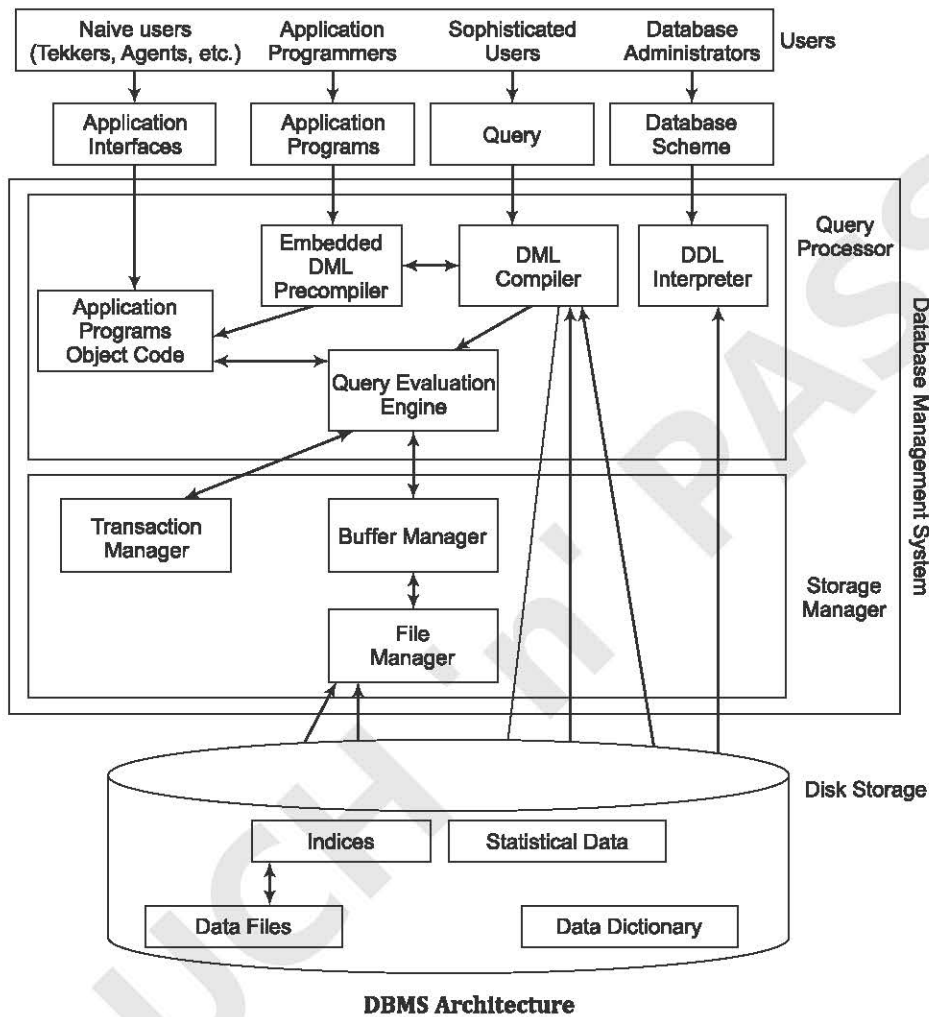
- (i) Method of representing the Data Fields,
- (ii) Expresses the Internal View, and
- (iii) The Access Aids

Q.7. Explain the Components of DBMS in detail.

Ans. Components of DBMS

The common components of DBMS are mentioned below :

1. **DML Pre-Compiler** : DML pre-compiler is used to convert the DML statements (embedded in an application program) into regular function (languages are called in the host language). To produce the suitable code, it needs to interact with the DML compiler.
2. **DDL Interpreter** : It interprets and converts the DDL statements into a set of tables to record metadata (such as the name of the files, data items, storage details of each file, mapping information and constraints, etc.). The schema definitions stated in DDL statements are processed.
3. **File Manager** : The task of the file manager is space allocation on disk storage and data structure which represents the information stored on the disk. It is implemented using an interface to the current file subsystem of the host computer or it is included in a file subsystem written exclusively for DBMS.
4. **Database Manager** : The database manager is a program module which acts like an interface between low level data and application programs and queries. It has the onus of interfacing with the file system.
5. **Query Processor** : Query processor is used to interpret the user's queries and convert it into understandable form by the data manager for further execution. A Data dictionary is used by the query processor to find the format of the relevant portion of the query. Query processor uses this information to modify the query.
6. **Database Administrator (DBA)** : This is a high level function which manages all data resources in an organisation and also includes maintaining corporate wide data definitions and standards.
7. **Data Dictionary** : The data dictionary or data repository is a significant part of DBMS which contains data about data or metadata. It contains the real database descriptions used by DBMSs where the data dictionary is active (checks database each time database is accessed) and integrated.
8. **Storage Manager** : It creates the interface between the low-level data (stored in the database), application programs and queries. Data storage, their retrieval and Updation is the main job of storage manager.
9. **Buffer Manager** : A buffer is the area in which a block from a file is read. Buffer management comes with the objective of optimum performance with minimum demand on CPU resources. When two or more buffers are used for a file, it permits the transfer of data to be related with the processing of data.
10. **Database Users** : Database users are the end users who retrieve the information from database. They access the database for querying, updating and generating reports.



Types of Users

- (i) **Casual End Users** : A casual user has occasional access with different requirements each time and uses a high level query language like SQL which is the standard query language for relational database systems.
- (ii) **Naive and Parametric End Users** : These are the people who use permanent application programs. Examples of such users are airline reservation clerk, bank teller, data entry clerks, etc.
- (iii) **Sophisticated End Users** : These are the users who are familiar with the DBMS facilities like engineers and business analysts.
- (iv) **Application Programmers** : They execute applications like canned (standard types of queries and updates used by Naive or parametric end users to regularly querying and updating) transactions on top of DBMS for providing convenient access to naive and parametric end users.

Q.8. Explain Relational Data Model in detail. Also discuss its advantages and disadvantages.

Ans.

Relational Data Model

To represent the data and relationships among them, this model uses the 'relations' (group of tables). Every table has the number of attributes (columns) with unique names.

This model relates the records using the value of the relation. This model is based on the mathematical theory of relation and it is conceptually simple. This is one of the main advantages of relational data model. In this, users need to worry more about the storage structure and access method.

For example, let's consider a table (named wage) is a relational database.

	Hours	Rate	Total
Abhay	40.5	10.35	419.175
Shobhit	38	8.75	332.50
Ajay	42.70	9.25	394.975

CODD Rules

1. **Foundation Rule** : The stored data must be managed using the relational capabilities of a relational database management system.
2. **Information Rule** : Only a single way must be used to represent all the information in a database.
3. **Guaranteed Access Rule** : One can access each and every data logically by combining the column name, primary key value and table name.
4. **Systematic Treatment of Null Values** : Independent of the data types missing information can be represented in a fully relational DBMS in systematic way using null values.
5. **Dynamic On-line Catalog Based on the Relational Model** : The representation of the database description is the same as the ordinary data at the logical level. So the authorised users can query to it using the same relational language in the same way it is applied to regular languages.
6. **Comprehensive Data Sublanguage Rule** : They support several 'modes of terminal use' and 'languages'.
7. **View Updating Rule** : Theoretically and systematically update of all the views are possible.
8. **High-level Insert, Update and Delete** : It is possible to handle derived relation or base relation as single operand. The same facility also applies to operations (such as deletion, insertion and update) related to the data.
9. **Physical Data Independence** : There is no logical effect of the change made to access methods or storage representations on the terminal activities and applications programs.
10. **Logical Data Independence** : When changes are made to the base table such that they theoretically do not impair them, the terminal activities and the application programs also remain unimpaired.
11. **Integrity Independence** : It must be possible to define the integrity constraints for a specific relational database in the relational data sublanguage and store them in the catalog instead of application programs.

12. **Distribution Independence** : During the times the data are physically distributed or centralised, the terminal activities, application programs and data manipulation sublanguage of the relational DBMS should remain logically unimpaired.
13. **Non-Subversion Rule** : If there is support for any low level language in a relational system, it should not happen such that the low-level language bypasses or subverts the constraints or, integrity rules that have been imposed by the relational language at the higher level.

Advantages of Relational Data Model

1. **Ease of Use** : This is simple to use because information is stored in tables so if one is handling (try to make any update) it for the first time, then he/she finds it very attractive.
2. **Flexibility** : This is flexible, so one can get the data in the form which he/she wants. He/she can extract the information very easily and information can also be manipulated by using various operators such as project, join, etc.
3. **Precision** : This is precise. Precise means there is no ambiguity in the data. To achieve the precision, this model uses the relational and calculus algebra for the manipulation of the relations between the tables.
4. **Security** : Security control and authorisation can also be implemented more easily by moving sensitive attributes in a given table into a separate relation with its own authorisation controls. If authorisation requirement permits, a particular attribute could be joined back with others to enable full information retrieval.
5. **Data Independence** : Data independence is achieved more easily with normalisation structure used in a relational database, than in the more complicated tree or network structure.
6. **Data Manipulation Language** : The possibility of responding to ad-hoc query by means of a language based on relational algebra and relational calculus is easy in the relational database approach. For data organised in other structure the query language either becomes complex or extremely limited in its capabilities.

Disadvantages of Relational Data Model

1. A major constraint and therefore disadvantage in the use of relational database system is machine performance. If the number of tables between which relationships to be established are large and the tables themselves are voluminous, the performance of responding to queries is definitely degraded.
2. With an interactive system, for example, an operation like join would depend upon the physical storage also. It is, therefore, common in relational databases to tune the databases and in such a case the physical data layout would be chosen so as to give good performance in the most frequently run operations.
3. While the relational database approach is a logically attractive, commercially feasible approach, if the data is, for example, naturally organised in a hierarchical manner and stored as such, the hierarchical approach may give better results.

□

UNIT-III

Program Development and Data Processing

SECTION-A (VERY SHORT ANSWER TYPE) QUESTIONS

Q.1. Name the flowchart symbol used to show start or stop point in a process.

Ans. Terminator is used to show start or stop point in a process.

Q.2. Which flowchart symbol is used to jump from one point to another?

Ans. Connector symbol is used to jump from one point to another

Q.3. What is the full form of DFD?

Ans. Data Flow Diagram.

Q.4. Name the elements of DFDs.

Ans. Process, Data Flow, External entity and Data Stores are the various elements of DFDs..

Q.5. What does a rectangle in a DFD represent?

Ans. A rectangle in a DFD represents an external entity.

Q.6. What is the full form of DDL?

Ans. The full form of DDL is Data Definition Language.

Q.7. What is the full form of DML?

Ans. The full form of DML is Data Manipulation Language.

Q.8. Which SQL command is used to remove an object from the database?

Ans. DROP. TABLE command is used to remove an object from the database.

Q.9. Which command of SQL is used to change definitions of existing tables?

Ans. ALTER TABLE command

Q.10. Which command is used to change some or all of the values in an existing row?

Ans. UPDATE statement command is used to change some or all of the values in an existing row.

Q.11. Name the two methods of data processing.

Ans. Manual method and computerised method are the two methods of data processing.

Q.12. Name the steps of data processing.

Ans. The various steps of data processing are Collection, preparation, Input, Processing, Output and Interpretation and Storage.

Q.13. Name the different modes of data processing.

Ans. File Processing, Batch Processing system, Real Time Processing, Database processing, Electronic Data Processing, Online Processing and Offline Processing are the various modes of data processing..

Q.14. What is the full form of EDP?

Ans. Electronic Data Processing.

Q.15. Name the different types of files used in database systems.

Ans. Master File, Transaction File and Report File are the different types of files used in database system.

Q.16. Name the techniques of file organisation.

Ans. Heap (or Pile) Access File, sequential Access File, Index Sequential Access File and Direct Access File are the various techniques of file organisation.

Q.17. Name the file technique used to organise the collection of records in a file.

Ans. Sequential Organisation of file is used to organise the collection of records in a file..

Q.18. Name the different types of master files.

Ans. Static master files or reference Files and Dynamic Master files or Tables Files are the various types of master files..

Q.19. Which files are permanent in nature?

Ans. Master Files are permanent in nature.

Q.20. Name the different types of reports.

Ans. Various types of reports are Single page Report and Multiple Page Report.

Q.21. Write down the features of a flowchart.

Ans. Salient features of flowchart are as follows:

1. Standard flow of control in flowchart is either from top to bottom or from left to right.
2. Flowchart instructions are simple and concise.
3. None of the arrows in a flowchart intersect each other.
4. A flowchart always begins with a Start symbol and ends with a Stop symbol.

Q.22. What are the advantages of flowchart?

Ans. Following are the main advantages of flowchart:

1. **Communication** : In every concern it is a good tool if communicating the logic of a system.
2. **Effective Analysis** : Analysis is more effective if analysed using the flowchart.
3. **Proper Documentation** : It is used as good program documentation and used for different purposes.
4. **Proper Debugging** : In the debugging process it helps a lot.
5. **Efficient Program Maintenance** : It makes program maintenance more efficient and programmer can place efforts more efficiently on its selected part.

Q.23. What are the disadvantages of flowchart

Ans. Main disadvantages of flowchart are :

1. **Complex Logic** : For a complex logic or program flowchart becomes more complicated. A flowchart does not show that why a particular step is executed so to solve this problem a lot of comment boxes are used, this will make a flowchart more cumbersome.
2. **Alterations and Modifications** : Alteration in flowchart required completely re-drawing of that flowchart.
3. **Reproduction** : Flowchart reproduction is a big problem because symbol used in the flowchart cannot be typed.
4. **Time-Consuming** : It is a time consuming process because it uses only various box which is not easy as typing.
5. **Subjective** : It is more subjective. So flowcharts created by two different programmers may not be the same.

Q.24. Write a short note on DFD.

Ans. The graphical representation of data "flow" through an information system referred to as a Data Flow Diagram (DFD). These are also referred to as data flow graphs. DFDs are used during problem analysis and its use is not limited to problem analysis for software requirements specification but it can be used in effective analysis and understanding any system.

DFD depicts the flow of data through a system. The complex system transforms the inputs into desired outputs by way of a series of transformations. DFD thus captures the output data. It is the process (also referred to as the bubble) which transforms the data from one state to another.

Q.25. Write down the database classes of DBase.

Ans. The database classes of DBase are:

1. Row Set, 2. Field, 3. StoredProc, 4. Datamodule, 5. Session, 6. Database, 7. Query

Q.26. Write down the visual classes of DBase.

Ans. Visual classes contains:

- | | | | | |
|----------------|-------------------|-----------------|----------------|---------------|
| 1. PushButton, | 2. Image, | 3. Grid, | 4. Scroll Bar, | 5. ActiveX, |
| 6. Report, | 7. Report Viewer, | 8. SpinBox, | 9. ComboBox, | 10. ListBox, |
| 11. Text, | 12. TextLabel, | 13. orm, | 14. SubForm, | 15. Notebook, |
| 16. Container, | 17. Entry field, | 18. RadioButton | | |

Q.27. What is data processing?

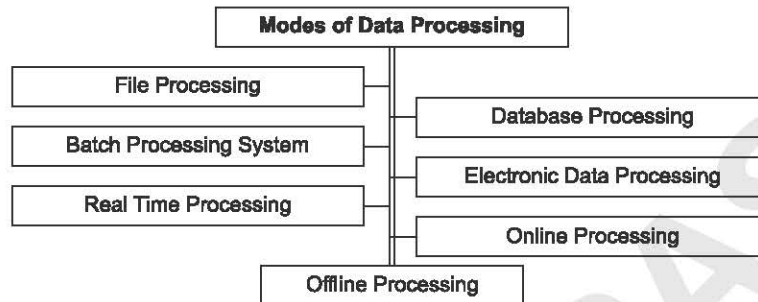
Ans. The system that is used for the processing of the data captured and encoded in the format that is being managed by the data processing system or is developed and stored by any other information process system unit is termed as a data processing system.

Data processing can be seen as the technique that is performed to convert the raw data into useful information. In order to perform the data processing through computers, there is a need for data collection, checking it for accuracy, and feeding it in the computer.

Information processing is the other name that can be used by data processing. It can be seen as the data processing method to convert the data more useful and informative manner and therefore converting it into information.

Q.28. What are the modes of data processing?

Ans. The below-mentioned data processing systems are commonly used by the organization in order to have the greater efficiency:



SECTION-B (SHORT ANSWER TYPE) QUESTIONS

Q.1. Write a short note on program.

Ans. A 'program' is a set of instructions that performs a specific task. Such program as single or in a group is termed as software. These instructions help the computer to process the input data and produce the desired output result. A program can be seen as the combination of the various instructions that can execute a certain task and it is recorded in a certain format on the computer disk. In simple words, the program can be defined as the intangible combination of different computer instructions to execute certain activities. This is also termed a program or software program.

For solving the computation problem, the solution must be indicated in the form of a series of computational steps and every step may be performed efficiently by an individual or any digital computer. Programming languages can be defined as the systematic notation for the details of serial computation processes. Program is the series of statements (instructions) to perform a certain defined activity. Programming is the activity of program development for facilitating the solution of computation problems. A programmer is an individual who managed the task of programming.

Q.2. Write some characteristics of a good program.**Ans. Characteristics of a Good Program**

The characteristics of the good programs are mentioned below:

1. **Accuracy** : It is important for a program to perform all those things for which it is being developed and fulfill all the parameters that are laid down in its descriptions.
2. **Reliability** : It is important for a program to perform all those things for which it is being developed without any possibility of failure.
3. **Efficiency** : The available storage space and resources must be used by the program in such a manner the speed of the system is utilized fully.
4. **Robustness** : Invalid data must be managed by the program without stopping any indication to occur and without any type of mistake.
5. **Usability** : The use of the program should be easy and it should have all the documentation required.

6. **Maintainability** : Easy modification of the program should be possible with efficient structuring and documentation.
7. **Readability** : Program codes must be well developed and details with proper comments must be provided.

Q.3. What do you mean by flowchart?

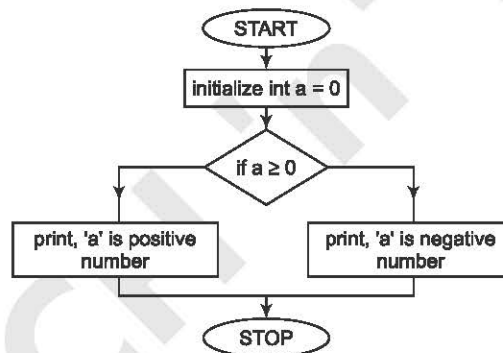
Ans. The visual representation of algorithm and pseudo is known as flowchart or in other words, the graphical representation of a program flow and algorithm is known as flowchart.

It helps to solve a problem efficiently. It also helps to check the program flow after the coding part. For the mainlining and testing of software it acts as a good tool. In addition, a flowchart is one that is created by the programmers that represent the sequence of steps involved in solving a problem graphically.

Flowchart is blueprint of the software project which displays the design, general plan and necessary facts of a planned system. In a programming sense a flowchart is a logical diagram. To compare the various approaches and alternatives on the paper it helps to the programmer.

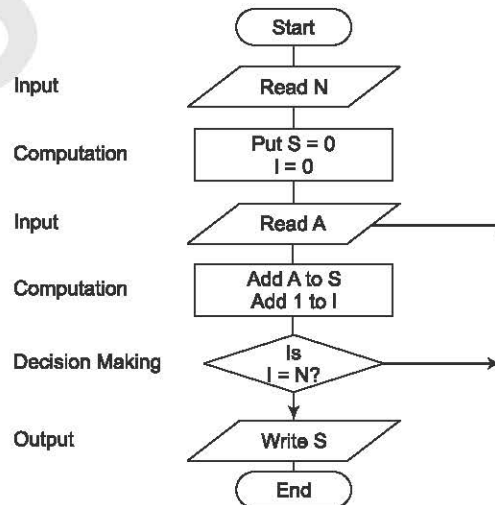
Q.4. Design a flowchart to determine whether a number is positive or negative.

Ans.



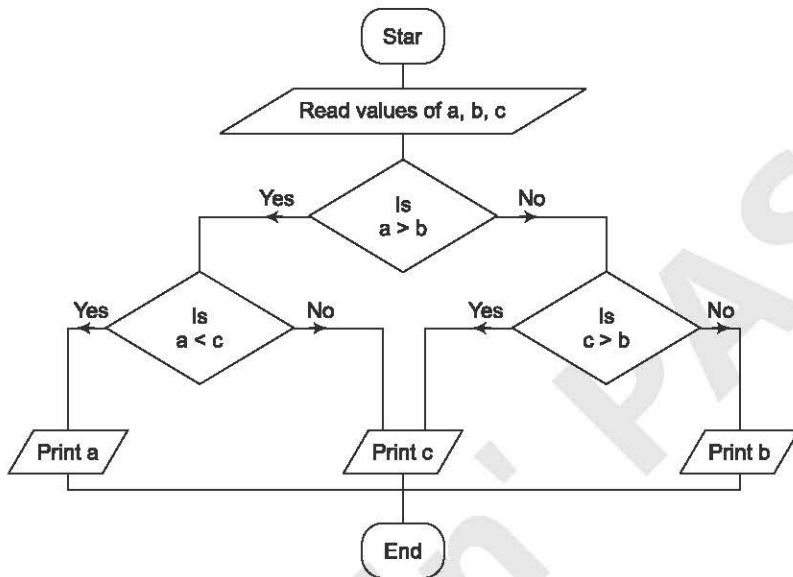
Q.5. Design a flowchart to find the sum of N numbers.

Ans.



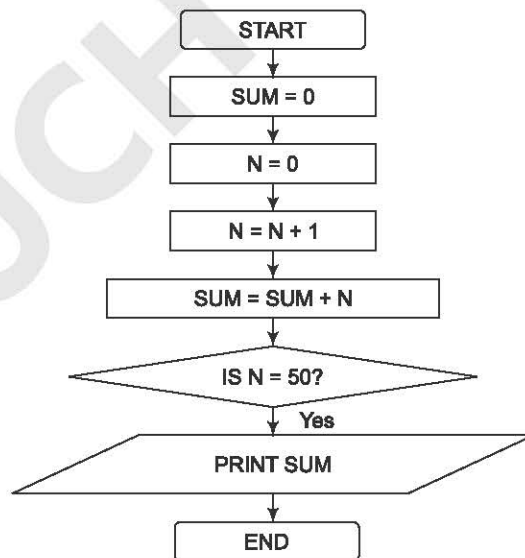
Q.6. Design a flowchart to choose the largest of three distinct numbers.

Ans.



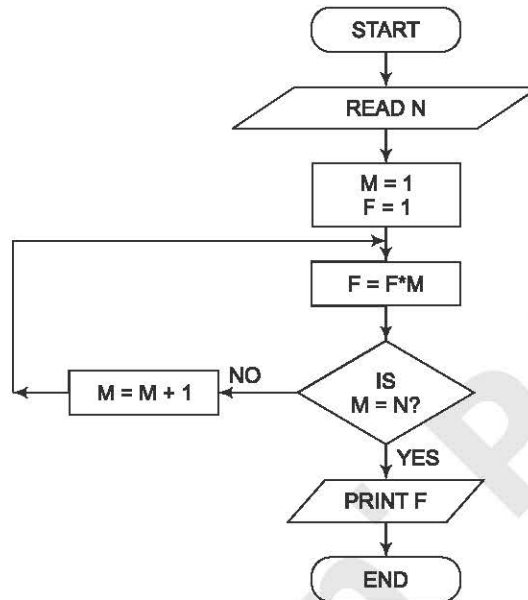
Q.7. Design a flowchart to find the sum of first 50 natural numbers.

Ans.



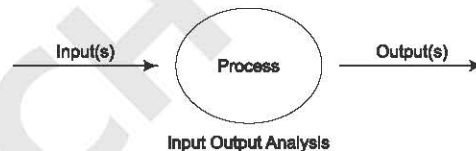
Q.8. Design a flowchart for the computation of factorial N (NI).

Ans.



Q.9. Write a short note on Input Output Analysis.

Ans. Each process can be considered as an agent that has some inputs and converts them into some type of output as indicated below:



The importance of input-process-output analysis of any system is quite significant to have a better understanding, characterizing, and designing of a system. Thus, in system analysis and design, it is widely used. In this method, the complete system is subdivided into small processes and inputs and outputs are identified for these processes.

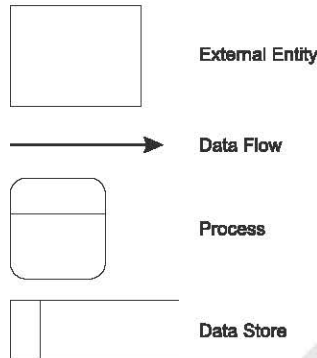
An almost similar thing is represented with the help of DFD (Data Flow Diagrams). In the case of a process that is quite tough to understand, it may be subdivided further into easier processes continue until the simplest form of the process is not obtained for managing them individually.

Q.10. Write down the elements of DFD.

Ans. Four basic symbols are used in DFD to show the movement (flow) of data.

1. **Process :** Process is an activity which is performed according to the incoming data flow or conditions. This is represented by a 'circle' or a 'rectangle'.
2. **Data Flow :** It shows an input of data to a process, or the output of data from a process. Data flow is represented by 'solid line with an arrow'.

3. **External Entity** : It shows an external entity like another department. A business, a person or a machine, can be used to send or receive data to and from the system. It is represented by 'square'.



4. **Data Stores** : Data are stored in 'data store'. A data store is represented by open-ended box, which is an inventory of data.

Q.11. Write down the steps used for development of DFD.

Ans. Steps Involved in Development of DFD

The steps used for development of DFD utilising the top-down approach are explained as following:

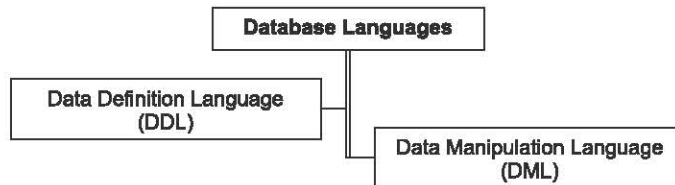
- Step 1.** A business activities' list should be made and utilised to establish different:
 - (i) External Entities/Actor,
 - (ii) Data Flows,
 - (iii) Processes, and
 - (iv) Data Stores.
- Step 2.** Context diagram should be created depicting external entities and data flows to and from system. Detailed processes and data stores are not to be shown.
- Step 3.** Diagram 0 should be drawn. Processes and data stores should be displayed at this level.
- Step 4.** Child diagrams should be formed for every process in diagram 0.
- Step 5.** Errors should be checked and each process labelled. Data flows should be meaningful.
- Step 6.** Physical data flow diagram should be developed from logical data flow diagram. Manual and automated process should be differentiated. Actual files and reports should be defined by name and controls should be supplemented to specify process completion or error occurrence.
- Step 7.** The physical data flow diagram should be segregated by splitting parts of the diagram to help programming and implementation.

Q.12. Writ a short note on Database Languages.

Ans. A Database Management System (DBMS) is a software programme that performs a variety of activities, including allowing users to access and edit data in a database. The database serves as a conduit between the physical database, the computer, and the operating system, as well as the users.

Database Management System offers one or more programming languages that are known as database languages, in order to provide different services to different users.

Following are the key languages that are supported through database :



Q.13.Explain the term DBase.

Ans. A specific software product that allows one to create and manipulate relational databases is known as DBase. DBase is also referred to as database programming language, which debuted with the DBase is also referred to as database programming language, which debuted with the DBase product but is now accessible in a variety of database formats.

DBase is a Database Management System (DBMS) for microcomputers running on Windows operating system. DBase enables the easy development of a wide range of applications, including middleware, Web apps hosted on Windows servers and Windows rich client applications. This is the reason behind the uniqueness of DBase. DBase is a relational database management system. It is a very good debugger and a versatile third-generation language with nonprocedural functionality.

DBase dates back to 1978, when **Wayne Ratliff** created it under the name "Vulcan." Vulcan was purchased by Ashton-Tate in the 1980s, and it was marketed as DBase II, the first DBase version. DBase II was compatible with a 16-bit microcomputer control programme. On 16-bit DOS platforms, later versions such as DBase III, III+, and IV were used. 16-bit Windows platforms supported Visual DBase 5.5 and Visual DBase 5.7. More current versions that run on 32-bit Windows systems include Visual DBase 7.0, Visual DBase 7.5, dB2K, and DBase Plus. DBase Plus is the most extensively used version as of 2011.

Q.14.What are the features of DBase?

Ans. **Features of DBase**

DBase offers following number of distinguishing features that help it to stand out among database management systems and tools:

1. A Just-In-Time (JIT) compiler that translates source language to machine language.
2. A DBase linker that allows one to develop DBase apps (.exe files).
3. Web servers runtime engine installer and machines to run DBase runtime applications.
4. Pre-processors, which read the programme source file and produce pre- processed files that are passed into the compiler.
5. A development environment that includes a command window and navigator.
6. Two-way Graphical User Interface (GUI) design tools, which allow one to
7. A source code editor, which enables manual code entering and editing.

Q.15.Explain the methods used for the data processing.

Ans. Methods of Data Processing

Two methods can be used for the data processing:

- 1. Manual Method :** In the case of manual data processing, no electronic or electromechanical devices are used for performing the different steps that are required to convert the data into useful information. Alternatively, manual data processing is done with the help of hands and mechanical devices. The typical example of manual data processing can be seen in the form of a clerk in the library who maintain the descriptions of the books, for example, the details of the book issued, returned, determining the fine because of the late return of the books and so on and these data are registered in the various registers by hand.

These methods are quite old now and they are becoming less popular in current time. There are a number of limitations related to the manual methods than the benefit received from them. In the case of manual processing, there are greater chances of committing mistakes. This has a slow speed and if some work is to be repeated then it will become quite slow.

- 2. Computerised Method :** Electronic Data Processing (EDP) are the data processing methods that utilize a number of computers and various electronic device and these can be semi-manual and semi-electronic.

In comparison to the manual methods, a number of benefits are associated with the computerized methods and they have lesser chances of mistakes and increased data processing speed.

Q.16.Explain Database Processing.

Ans. A database can be seen as a self-explaining combination of connected records. This is termed self-explaining as there is a directory' or dictionary that includes the details of the contents.

When it comes to data processing, the role of an intermediary between the user or the application program and the database is played by the Database Management System (DBM'S). The data is stored and processed with the help of DBMS to have the accessing of data with the help of their relationship with the different records.

When any report is required by any user with the help of data that is stored in two different tables, a request can be submitted, by the user and depending on the data item relationship, DBMS will unite and organize the information from the different tables and provide it to the user. DBMS is responsible for relationships, data in tegrity and other related activities.

Q.17.Differentiates between online processing system and offline processing system.

Ans. Differences between Online Processing System and Offline Processing System

S.No.	Realtime or Online Processing	Non-Realtime or Offline Processing
1.	Real-time processing refers to the processing Of data as it becomes available.	Data is saved and then processed later in non-real-time processing.
2.	Data cannot be saved in any of these applications.	Data is saved or stored for future use.

3.	Listening to music from a computer's CD-ROM drive is an example of realtime processing. The data from the CD is read, processed and sent to the processor.	Example of offline processing includes: the satellite photos are initially stored, and then they are later analysed
4.	Speech signals processing, cellular phones, televisions, radar signal processing, etc., are some of the applications that use online or real-time processing.	X-ray enhancement, Animation, graphics visualisation, pattern recognition, etc., are examples of offline or non-real-time processing.

Q.18.Explain the types of File Processing.

Ans. Types of File Processing

In the case of file processing, different files are used to store and process the data. File processing can be of following two types:

- 1. Sequential Access :** This is the file access in which the records are read in a sequence (first one record then the other record), initiating from the beginning to the file to end. It is possible to rewind the sequential files in order to be read as needed. But it is not possible to read the records that are not in order in these files. For example, the 31st record and then the 5th records, and then the 8th records cannot be reads in sequential files. These files are more useful when the serial access storage media is used. For example, in place of direct-access, magnetic disk, it is better to use magnetic tapes. This is the most widely used and easiest way of accessing the data. In this access method, information can be accessed in the logical der as we can move from one information block to the next one.
- 2. Direct Access :** Random access files are the ones whose records can be read from any location. These can be seen as the combination of various records that are stored on a disk and these records can be given the numbering such as 1, 2, 3 etc. and thus their numbers can be used to refer to them rather than using their position. For these files, it is important to store on direct access media for example, disk.

There are a number of uses of random-access files. For example, database system. In the case of a banking application, any customer may be willing to check his current balance.

This is quite possible by identifying the record's location of that customer with the help of the account number used as a key in place of reading the thousands of records of the other customers sequentially and then fetching the records of the customers to read.

Q.19.Explain Offline Processing in detail. Elaborate its advantages and disadvantages.

Ans. Offline Processing

Offline processing was invented in order to speed up data input and output into computer systems. This eliminates the need for slow input devices. Data is instead stored in files on a high-speed data storage device. This could be accomplished in a variety of ways.

Offline processes can be used for editing purpose and for creating effects. For example, If the computer is too slow for real-time processing or the editing requires more than one pass.

Different computer systems can be used by operator to simply store paper form data into a file, potentially by using a key-to-disk method. Data could be read automatically and stored in

a file if the data was in a machine-readable format (such as OMR sheets). Instead of relying on slow input devices, the computer can get all of the data it needs from these files on the high speed storage device.

The main computer performing the processing is not instantly controlling and reading data from its input devices, therefore it is referred to as offline processing.

The information is prepared and saved on a high-speed storage device separate from the computer, then made available as needed.

Advantages of Offline Processing

Following are the advantages of offline processing:

1. Even when the internet is down the offline processing system has the ability to work on the information.
2. A quick, responsive, and productive CMS (Content Management System), owing to the fact that it is being used on a personal computer.
3. It provides a variety of options in respect of publishing content before making it public.
4. Disseminating content does not require an online database, resulting in completely optimised (search engine friendly) pages that get loaded rapidly and with no effort.

Q.20. Explain the management of data processing systems in business organisations.

Ans. The data processing system in any organization can be quite trivial. The most important factor is the system management will decide the entire organization's success.

The size and complexity of the system will decide the management structure. The system may be quite simple that can be managed by a single manager, on the other hand, in some cases, a number of departments can participate. In the common situation, the data processing system will include the following:

1. EDP (Electronic Data Processing) Manager
2. System Programmers
3. Application Programmers
4. Auditors
5. Maintenance Engineers
6. Database Administrators etc.

The data processing manager has the below mentioned responsibilities:

1. Looking for the requirement of acquiring new technology that includes both software and hardware.
2. Evaluating the same.
3. Procurement of the technology approved.
4. Facilitating the different users with EDP services in the organization as per their requirements.
5. Introducing new processing features and deleting the older ones.
6. Implementing the new business rules and facilitating the needed interfaces to the different users.

7. Determining the resource usages.
8. Making sure that the system is up and running by evaluating and initiating corrective initiatives if some breakdowns occur.

Q.21. What are Files?

Ans. File is a collection of related arrangement of records. All records in a file are of the similar record type. Every record contains an identical format. If each record in the file has exactly the similar size, the file is said to be known as fixed-length records. If different records have different sizes, the file is said a variable-length records. For example, a telephone book is equivalent to a file. It contains a list of records consisting of three fields: name, address, and telephone number.

In today's world, files and databases have become an indispensable part of daily life. Everyone interacts with a database during the course of a day, such as depositing and withdrawing funds in banks; making a hotel or airline reservation; accessing a computerised library catalogue; or ordering a magazine subscription from a publisher, etc. To grasp the fundamentals of database management, we must first comprehend files, their numerous types, and organisational structures, all forming a database.

Q.22. Write a short note on Data File Organization. Enlist its techniques.

Ans. **Data File Organization**

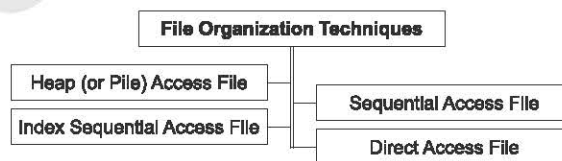
The process of storing data and assessing data in a file is defined as file organisation. In other words, the logical structure of documents as defined by how they are accessed is referred to as file organisation.

When a file is saved on a disc, file organisation is a method of organising the entries in the file. Data files are organised to make records more accessible and to guarantee that they are stored efficiently.

The files and access methods layer of the code implements the file of records, which is an essential abstraction in a DBMS. A file can be created, destroyed, and records can be added to or removed from it. It also enables scans, which allow users to go through all of the file's records one-by-one. A file of records is generally used to store a relation.

File Organisation Techniques

Following are the techniques of file organisation:



Q.23. Explain Master File. Enlist its types.

Ans. Master files are permanent files in nature. For example, inventory, payroll file etc. the information are permanent in master file and the time to time updation is done by recent transactions.

For example, the master file could contain records having the following fields:

Emp No.	Emp Name	Emp Address	Date of Joining
---------	----------	-------------	-----------------

The employee details are changes less frequently.

Updation of Master File

The updation of master file means updating the following details:

1. Addition of data/records
2. Deletion of data/records
3. Amending of data/values.

Types of Master Files: Following are the major types of master files:

1. Static Master Files or Reference Files

- (i) These are permanent or semi-permanent in nature.
- (ii) Some examples of business entities are products, suppliers, customers, employee, etc.
- (iii) These are subject to occasional revision.

2. Dynamic Master Files or Table Files

- (i) These are transitory in nature.
- (ii) Some examples of business entities are customer orders, works orders, price lists, etc.

Q.24. Explain Transaction File.

Ans. The data related to business are recorded in the transaction file before going to another stage of processing. It is created from a document which is used for recording transactions or events. For example,

1. Customer's orders for product
2. Purchase orders, job cards, invoice, dispatch notes, etc.

A transaction file is a temporary file that contains the details of all relevant data of transactions. For example,

1. Sale transaction file record of every day
2. Daily stores issue file.

These files are generally used for two purposes:

1. To collect data about relevant transaction
2. To update master files to reflect the results of new transactions,

Q.25. Write the uses of files in programming.

Ans. Data can be stored in digital format such as image data, plain text or any other content by using the computer file. Inside the different directories, computer files can be organised. Digital data can be kept by using the files.

Digital counterparts of paper document are known as computer files.

Programming language requires management of file. A person does some calculations and stores result in some variables when she/he runs program. Since the result will lose after finishing of execution because of variable reside in main memory (RAM). Therefore, a permanent memory which is secondary (ROM) is required to store the results.

To store data permanently, file management is the management of secondary storage. Program helps in both storing the calculation result and taking input from file. File management is defined as the process of storing and retrieving data from or to file, and one goes to file whenever permanent storage of data is required.

One of the most prominent examples of file management application is Data Management System.

SECTION-C LONG ANSWER TYPE QUESTIONS

Q.1. What is program development cycle? Write down the steps involved in the program development process.

Ans. Program Development Cycle

Program Development Life Cycle (PDLC) can be defined as the organized method of developing sophisticated software. A well-organized plan is developed by it for dividing the different types of activities of program development into the different parts that are easy to manage and every part must be performed successfully before going to the next step. The different steps involved in the program development process are mentioned below:

Steps Involved in Program Development Process

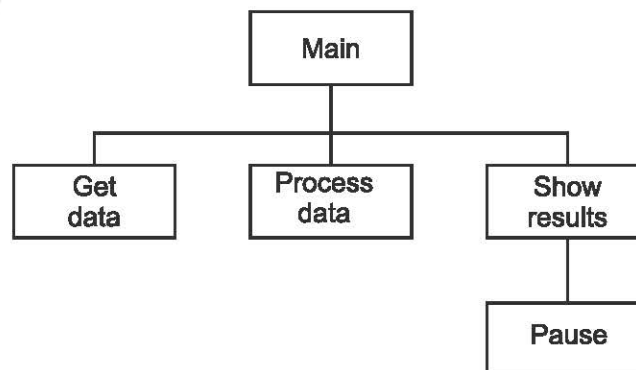
1. **Defining the Problem** : Defining the problem is the initial step. In the case of major software projects, this task is managed by the system analysts who will facilitate the output of their work to the programmers using program specifications. The program specification will provide the details of the data utilized in the program, the required processing for getting the solution, the output format, and the user interface.
2. **Designing the Program** : The program design step starts by concentrating on the main objective that is to be accomplished using the program and then dividing the program into easily manageable portions and these will contribute to the overall goal. This method of program design is termed top- bottom program design or modular programming.

The first stage is to find out the main routine that is among the main tasks of the program. From here, different elements of the main routine are divided by the programmers into smaller segments that are termed modules. Each module will have a conceptual plan drawn by the programmer with the help of a suitable program design tool to monitor how the assigned jobs will be performed by the module.

Different program design tools are stated below :

- (i) **Structure Charts** : A structure chart is also termed a Hierarchy chart and is mainly used to represent the top-down design of the program. A task to be performed is represented by every box in the structure. The top module is termed as a Main module or Control module.

For example, the following figure shows structure chart:



- (ii) **Algorithms** : The step-by-step detail of achieving the solution in the easiest manner is termed as algorithm. Algorithms are not used only in the computer field; in fact, these are also used in daily life.
- (iii) **Flowcharts** : A diagram that indicates the logic of the program is termed a flowchart.
- (iv) **Decision Tables** : A decision table can be seen as a special type of table that has four different parts in the form of horizontal and vertical lines.
- (v) **Pseudo Code** : This is another type of method that can be used to explain the manner in which a certain solution is obtained.

This is not identical to algorithms as these are expressed in a programming language such as constructs.

3. **Coding the Program** : Coding the program can be seen as converting an algorithm into a certain programming language. Structured programming is the method in which we use a well-defined control structure.

Different types of languages rules are to be followed by the programmers and errors may result due to breach of any rule. Before moving to the next step, it is important to rectify these errors.

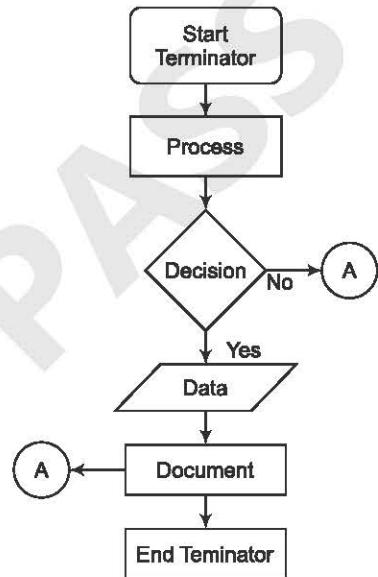
4. **Testing and Debugging the Program** : The process of identifying errors and eliminating them is known as Debugging.

Once the syntax errors are avoided, the execution of the program will take place. But, there may be some errors in the program output because of logical errors in the program. A logical error can be defined as any mistake that is made by the programmer during the development of the problem solution.

Thus, it is important for the programmer to search for the mistakes and rectify the logical errors through cautious inspection of the program output with the help of Test Data. Syntax error and Logical error are also termed Bugs. Debugging is the activity involved in looking for errors and rectifying them.

5. **Documenting the Program** : Once testing is done, the software project is on the verge of completion. The structure charts, pseudo-codes, flowcharts, and decision tables that were developed in the design phase can be used as documentation for the other users that are also related to the software project.

When the manual is written to facilitate the overview of operation of the program, a tutorial for the beginner, detailed explanation of the important program characteristics, reference documentation for all the commands of the program, and the comprehensive detail of the error messages provided by the program will terminate this step.



6. Deploying and Maintaining the Program : In the last step, the installation of the program is done at user's site. In this step, proper monitoring of the program is done until the approval is received from the user.














Even when the software is completed, regular maintenance and evaluation will be needed. In software maintenance, different types of programs errors are rectified by the programming team, and software is updated too.



















Q.2. Explain the symbols used in flowchart.

Ans. During construction of a flowchart some standard symbols are used. It makes language independent to the flowchart. Generally The American National Standard Institute (ANSI) symbols are used to create flowchart. The operation which is performed by a computer shown by a symbol/different shapes (such as rectangle, etc.). These symbols are known as flowchart symbols.

Symbols used in flowcharts are given in the table:

Flowchart Symbols

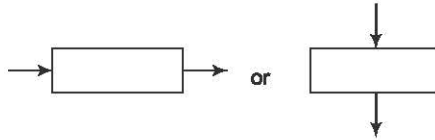
Flowchart Symbol	Name (Alternates)	Description
	Process	Operation or action step.
	Terminator	Start or stop point in a process.
	Decision	Question or branch in the process.
	Delay	Waiting period
	Predefined Process	It defines sub-process.
	Alternate Process	It shows an alternate to the normal process step.
	Data (I/O)	Indicates data inputs and outputs to and from a process.
	Document	Shows a document or report.
	Multi-Document	Similar as Document, except, well, multiple documents.
	Preparation	Preparation or set-up process step.
	Display	Machine display.
	Manual Input	Manually input into a system.
	Manual Operation	A process step that is not automated.

	Card	Old computer punch card.
	Punched Tape	Old computer punched tape input.
	Connector	Jump from one point to another.
	Off-Page Connector	Continuation onto another page.
	Transfer	Transfer of materials.
	Or	Logical OR
	Summing Junction	Logical AND
	Collate	Organizing data into a standard format or arrangement.
	Sort	Sorting of data into some pre-defined order.
	Merge (Storage)	Merge multiple processes into one. Also used to show raw material storage.
	Extract (Measurement) (Finished goods)	Extract (split processes) or more commonly— a measurement or finished goods.
	Stored Data	A general data storage flowchart symbol.
	Magnetic Disk (Database)	A database.
	Direct Access Storage	Storage on a hard disk.
	Internal Storage	Data stored in memory.
	Sequential Access Storage (Magnetic Tape)	An old reel of tape.
	Callout	One of many callout symbols used to add comments to a flowchart.
	Flow Line	Indicates the direction of flow for materials and/or information.

Q.3. Write down the properties need to draw the flowchart.

Ans. To draw the flowchart one needs to follow the following properties:

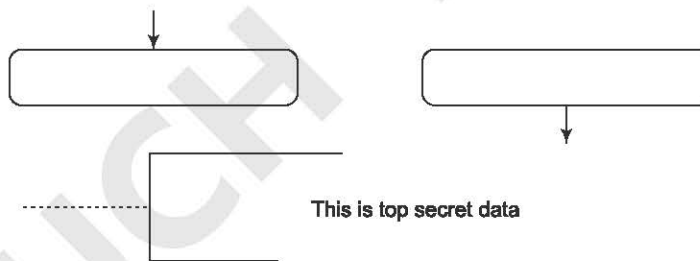
1. List out the all requirement in logical order to draw an appropriate flowchart.
2. Avoid ambiguity and the flowchart must be neat and clear. It should be easy to follow.
3. Left to right or top to bottom direction of the flow is recommended.
4. From a process symbol only one line should come.



5. One decision symbol has only one flow line however for every possible answer there are two or more flow lines that must leave the decision symbol.



6. In conjunction with terminal symbol only one flow line is used.

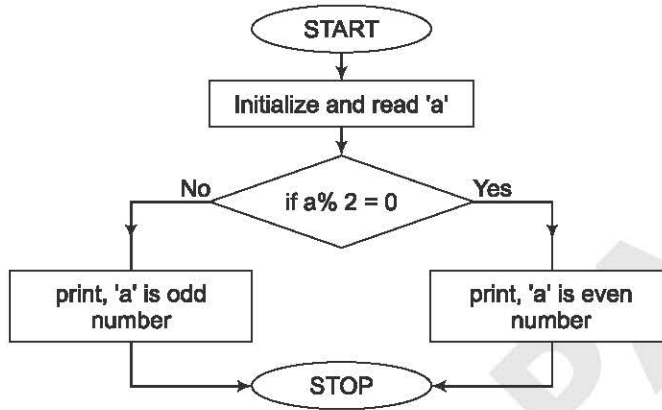


7. Use standard symbols to write. To describe the data or computational steps more clearly one needs to use the annotation symbol.
8. Use connector symbol to reduce the complexity of a flowchart. To make more effective and better way of communication avoid the intersection of flow lines.
9. A flowchart always has a logical start and finish.
10. Using the simple test data test the validity of the flowchart.

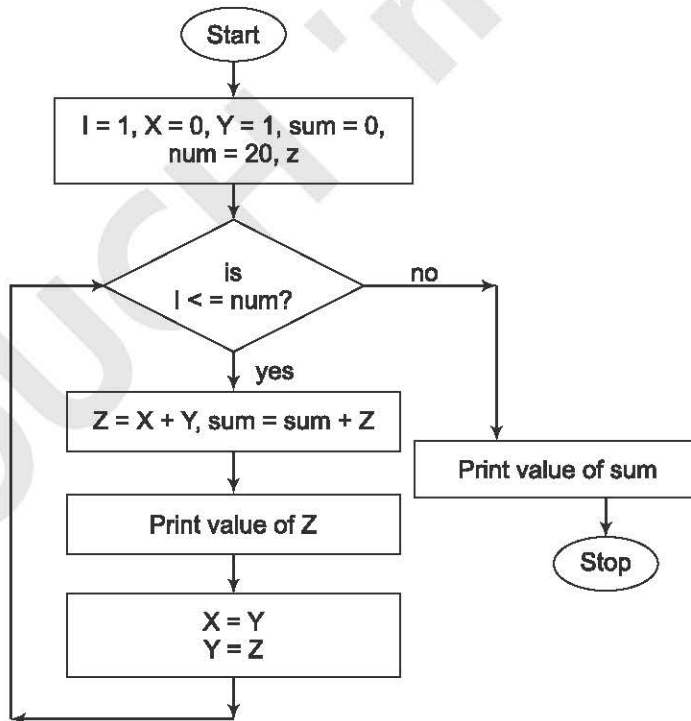
Q.4. Design the flowcharts for the following :

- (a) To determine whether a number is even or odd.
- (b) To display first 20 fibonacci numbers and their sum.
- (c) To find HCF or GCD of two numbers.
- (d) To find the parameter of a square when its side is given.

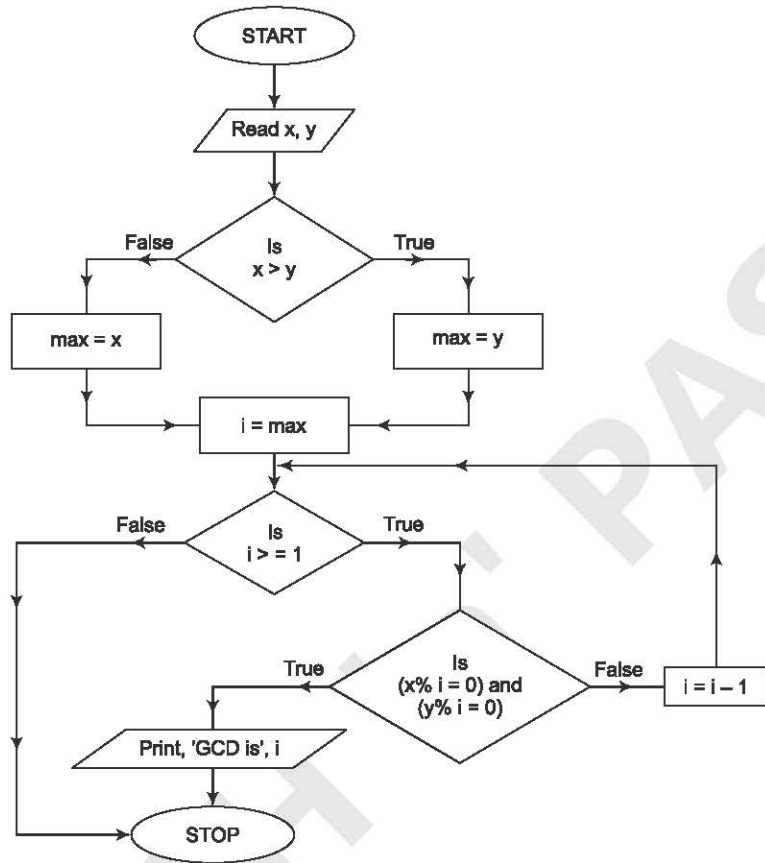
Ans. (a)



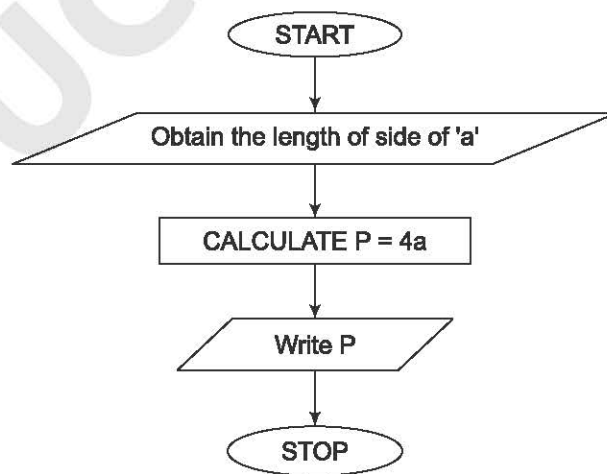
(b)



(c)



(d)



Q.5. Explain the DFD rules.

Ans. Following are the major DFD rules:

1. Process

- (i) Processes cannot have only outputs. If it does, then it has to be a source.
- (ii) Processes cannot have only inputs. If it does, then it has to be a sink.
- (iii) A verb phrase label is present in a process.

2. Data Source

- (i) Data must be moved by a process from one data store to another.
- (ii) Data must be moved by a process from an outside source which places the data in a data store.
- (iii) Data must be moved by a process from the data store to an external sink.
- (iv) A noun phrase label is present in a data store.

3. Source/Sink

- (i) Data must be moved by a process from the source to a sink if the data is of any importance to the system. Else, the data will not be visible on the DFD.
- (ii) A noun phrase label is present in a source/sink.

4. Data Flow

- (i) A data flow usually has one direction of flow among symbols. To illustrate a read before an update, it can flow both ways between a process and data store. But both the flows are indicated by separate arrows as they occur at different times.
- (ii) A fork in a data flow indicates that different copies of same data from a common location are reaching different locations which may be processes, data stores or source/sinks.
- (iii) A join in a data flow indicates that the same data is coming from any two or more different processes, data stores or source/sinks to a common location.
- (iv) Once a data flow leaves a process, it cannot return to it. There must be another process that handles, produces some other data flow and then returns the original data flow to the initial process.
- (v) A data flow to the data store means an update is required.
- (vi) A data flow from the data store means retrieval.
- (vii) A noun phrase label is contained in a data flow. More than one noun phrase may appear on a single arrow. This is possible if all of the flows on the same arrow move as a single package.

Q.6. What are the advantages and disadvantages of DFDs?

Ans.

Advantages of DFDs

Main advantages of DFDs are as follows :

- 1. Early Implementation :** Provides freedom from commitment to technical implementation of the system.
- 2. Study Independence :** Provides an understanding of the inter-relation between systems and sub-systems.

3. **Analysis** : An analysis of the proposed system helps to understand if the necessary data and processes have been clearly described.
4. **Tool for Communication** : It is used as a tool to communicate to user, the analyst understands of the system on which the users are asked to observe the accuracy achieved. Based on the user feedback, the analyst can make changes which more accurately replicate the user's needs.
5. **Reduces Costs** : DFDs permit analysts to describe every component of the diagram. This helps in ensuring that all the necessary output is achieved from the input data and processing logic is also reflected in the diagram. The resolving of errors and design flaws in the later phases of systems development lifecycle is cheaper as compared to that performed at the initial phases.

Disadvantages of DFDs

DFDs have some disadvantages too, which are as follows:

1. **Imprecise** : In DFD, the function of a process is judged by its label but the label will not capture the entire functionality as there is sufficient scope for DFD to be vague. For example, a process of find-book-position only has a spontaneous meaning without throwing light on what happens if some input is incorrect.
2. **Absence of Control Aspects** : A DFD model does not mention the order in which processes are executed because DFD does not specify the control aspects. Like, the sequence in which inputs are consumed and outputs are produced by a process is not mentioned.
3. **Highly Subjective** : DFDs are highly subjective as it depends on the choice and judgement of the analyst. For the same problem, many DFD representations are possible as per the whims of the analyst.

Q.7. Explain Data Definition Language (DDL) in detail.

Ans. DDL is a standard for commands that define the several different types of structures in a database. DDL statements create, modify and remove database objects such as tables, indexes, and users.

SQL provides three data manipulation commands:

1. **CREATE TABLE** : The CREATE TABLE Statement is used to create tables to store data. Integrity Constraints like primary key, unique key and foreign key can be defined for the columns while creating the table.

Syntax :

```
CREATE TABLE Table_Name
(
  Column_Name1 Data_Type,
  Column_Name2 Data_Type,
  .....
);
```

Where

- (i) **Table_Name** is the name of the table.
- (ii) **Column_Name1, Column_Name2...** is the name of the columns.
- (iii) **Data_Type** is the data type for the column like char, date, number etc.

For example, to create an Employee table, whose schema is as below: Employee (Ecode, Ename, Sex, Grade, Gross)

The SQL command will be:

```
CREATE TABLE Employee (
    Ecode integer,
    Ename char (20),
    Sex char (1),
    Grade char (2),
    Gross decimal);
```

The result of above query is shown in the given table:

Employee

Ecode	Ename	Sex	Grade	Gross
-------	-------	-----	-------	-------

- ALTER TABLE :** The ALTER TABLE command is used to change definitions of existing tables. Usually, it can add columns to a table. Sometimes it can delete columns (depending on privileges) or change their sizes.

In general, ALTER TABLE command is used:

- To add a column
- To add an integrity constraint
- To redefine a column (datatype, size, default value).

Syntax :

```
ALTER TABLE Table_Name
ADD Column_Name Data_Type Size [Constraint_Name];
```

For example, to add a new column tel_number of type integer in table Employee (Ecode, Ename, Sex, Grade, Gross) the query is:

```
ALTER TABLE Employee
ADD (tel_number integer);
```

- DROP TABLE :** The SQL DROP command is used to remove an object from the database. If anyone drop a table, all the rows in the table are deleted and the table structure is removed from the database.

Once a table is dropped one cannot get it back, so be careful while using DROP command. When a table is dropped all the references to the table will not be valid.

Syntax :

```
DROP TABLE Table_Name;
```

For example, if one wanted to drop the table called Employee, he/she created, the query would be like:

```
DROP TABLE Employee;
```

Q.8. Explain Data Manipulation Language (DML) in detail.**Ans.****Data Manipulation Language**

Data manipulation language commands let users insert data into the database, modify and delete the data in the database.

SQL provides three data manipulation commands:

- 1. INSERT Statement :** There are essentially basically two ways to INSERT data into a table:

(i) Inserting the Data Directly to a Table : Insert into table by giving the values directly.

Syntax :

```
INSERT INTO Table_Name [(col_1, col_2, col_3,...col_N)]
VALUES (value_1, value_2, value_3,...value_N);
```

Where col_1, col_2,...col_N - the names of the columns in the table into which one wants to insert data.

While inserting a row, if one is adding value for all the columns of the table he/she needs not specify the column(s) name in the SQL query. But he/she needs to make sure the order of the values is in the same order as the columns in the table. The SQL insert query syntax now will be as follows:

```
INSERT INTO Table_Name
VALUES (value_1, value_2, value_3,...value_N);
```

For example, if anyone wants to insert a row to the Employee table, the query would be like,

```
INSERT INTO Employee (id, name, dept, age, salary, location) VALUES (105,
'Srinath', 'Aeronautics', 27, 33000);
```

If one is inserting data to all the columns, the column names can be , omitted. The above insert statement can also be written as,

```
INSERT INTO Employee
VALUES (105, 'Srinath', 'Aeronautics', 27, 33000);
```

- (ii) Inserting Data to a Table through a SELECT Statement :** One can select data from some table and insert that data to a different table.

Syntax :

```
INSERT INTO table_name [(column1, column2,... columnN)]
SELECT column1, column2, ...columnN
FROM table_name [WHERE condition];
```

For example, consider the Temp_employee table has columns emp_id, emp_name dept, age, salary, location. To insert a into the Employee table from a temporary table, the sql insert query would be like,

```
INSERT INTO Employee (id, name, dept, age, salary location)
SELECT emp_id, emp_name, dept, age, salary, location FROM
Temp_employee;
```

If one is inserting data to all the columns, the above insert statement can also be written as,

```
INSERT INTO Employee
SELECT * FROM Temp_employee;
```

- 2. UPDATE Statement :** Sometimes there is a need to change some or all of the values in an existing row. This can be done using the UPDATE command of SQL. UPDATE command specifies the rows to be changed using the WHERE clause and the new data using the SET keyword.

Syntax :

```
UPDATE table-name
SET column_name = new_value
WHERE column_name = some_value;
```

For example, consider the following table :

Weather		
City	Average Temperature	Date
Nagpur	22°C	10/10/2005
Surat	21°C	10/10/2005
Pune	20°C	10/10/2005
Nagpur	18°C	10/09/2005
Surat	20°C	10/09/2005
Pune	17°C	10/09/2005

If one has to set AverageTemperature as 20 for 'Nagpur' city. Then the query is as below:

```
UPDATE Weather
SET AverageTemperature = 20°C
WHERE City = 'Nagpur'
```

The result of this update is given in the following table:

Weather		
City	Average Temperature	Date
Nagpur	20°C	10/10/2005
Surat	21°C	10/10/2005
Pune	20°C	10/10/2005
Nagpur	10°C	10/09/2005
Surat	20°C	10/09/2005
Pune	17°C	10/09/2005

All values in the AverageTemperature column for Nagpur city are set to 20.

3. **DELETE Statement :** The SQL DELETE statement allows one to delete a single record or multiple records from a table.

Syntax :

DELETE FROM table_name

WHERE column_name = some_value;

For example, let consider the following Weather table:

Weather		
City	Average Temperature	Date
Nagpur	22°C	10/10/2005
Surat	21°C	10/10/2005
Pune	20°C	10/10/2005
Nagpur	18°C	10/09/2005
Surat	20°C	10/09/2005
Pune	17°C	10/09/2005

Hence to delete all rows containing Weather data for "Nagpur". One has the following lines:

DELETE FROM Weather

WHERE City = 'Nagpur'

The result is shown in the table:

Weather		
City	Average Temperature	Date
Surat	21°C	10/10/2005
Pune	20°C	10/10/2005
Surat	20°C	10/09/2005
Pune	17°C	10/09/2005

Q.9. Explain the functions performed by the data processing.

Ans. Functions of Data Processing

Data processing can be seen as the process of restructuring, converting or storing the data by machine or individuals so that their utility and value can be improved for specific applications.

The data processing can perform the following mentioned functions:

1. **Origination :** Data to be processed is the first function that is to be done in the data processing.
It is important to find out the nature, source, and type of the source documents. For example, sales orders, production orders, and so on.
2. **Data Capture :** It is important to record or store the data in any form before processing it. The different important data and what types of data is to be gathered for input and processing will be decided by the organization and its system. Data can be collected in

paper form with the help of source documents and it can be done in a paperless manner using:

- (i) Keyboards
 - (ii) Automated teller machines
 - (iii) Different input devices that can manage input data in machine-readable form
- 3. Sorting :** If the data is organized logically, it will be easy to work with data. For example,
- (i) First to last
 - (ii) Time sequence
 - (iii) Biggest to smallest
 - (iv) Oldest to newest, etc.
- This type of data arrangement is termed sorting.

- 4. Merging :** This function allows multiple files to be put together in a sequence, provided the files are already in sorted order. This can be used to combine the different files in a sequence if the files are in a sorted way.

For example, the file related to the new customer can be merged into the current customer master file that has been sorted on the magnetic disk in the form of a customer number

- 5. Calculating :** Calculating is the arithmetic data manipulation in order to develop the important outcomes and it is quite a widely used data processing activity. This activity can be seen as the most important element of manipulation operation as the results are part of the output.
- 6. Summarizing :** Summarizing is the activity of converting the big data to a compact and useful form. Commonly, data summarizing is done in the form in which output is expected. For example,
- (i) Pie charts
 - (ii) Barcharts
 - (iii) Other graphs

A number of computer-generated graphics can be used to view data.

- 7. Managing Output Results :** After capturing and manipulating the data there will be a requirement for one or more types of operations as mentioned below:

(i) Output : Once a number of operations is performed on the data, it is possible to perform the delivery or communicating the information or outcomes in the following manners:

- (a) Reporting, what type of format for presentation and distribution of the processed data is to be used.
- (b) Document issuing for example, cheques, invoices and reports.
- (c) Retrieval is the accessing of certain item or a number of items of stored information as requested by the user.
- (d) Analysis, it includes the various methods that are used by the receivers to use the output i.e., applying the information obtained from the system,
- (e) Communicating and reproducing (Transmission).

Data transmission is the process of transferring data from one location to different locations and this process is performed until the information is received by the end-user in a useful format. There may be the requirement to copy or duplicate final documents.

(ii) **Storage** : At last, the outcome of the data processing has to be stored for future references. Such functions are termed as storage.

Q.10. Write down the steps involved in data processing.

Ans.

Steps of Data Processing

The data processing includes the below mentioned important steps:

Step 1. Collection : This can be seen as the initial step of data processing that is quite important as the quality of collected data will largely influence the output. It must be ensured by the collection process that collected data is not only valid but also precise in order to further decisions that are based on the findings.

Both the baseline to measure and the target to enhance are provided by this step. Census (collection of data related to the different aspects in the group or statistical population), sample survey (the method of data collection that consists of some portion of the entire population), and administrative by-product (data collection can be seen as the byproduct of daily operations of the firm) are the common types of data collection methods.

Step 2. Preparation : This can be seen as converting the data in such a form that is useful for additional analysis and processing. It is not possible to process the raw data and thus its accuracy has to be evaluated.

Preparation mainly includes the development of a dataset from different data sources that can be utilized for additional exploration and processing. Highly misleading outcomes can be obtained from the data analysis that is not screened carefully for the different types of problems and it is dependent on the data quality.

Step 3. Input : This is the activity of coding the verified data or converting this data into a form that can be read by the machine in order to process it with the help of the computer. Keyboard, digitizer, scanner, or data entry from the current source can be used for the data entry. This process takes a lot of time and needs higher speed and precision.

The formal and strict syntax is needed in the majority of the data as there will be a requirement for the higher processing power to break the trivial data in this step. Because of higher costs, the majority of the businesses are looking to outsource this step.

Step 4. Processing : When data undergo the different types and modes of manipulation and the point where the data can be executed by the computer program containing the program code and current processes, it will be termed as processing. This process can include a number of execution threads that can perform the number of instructions together based on the operating system.

As the computer program is the passive combination of various commands, the process can be seen as the real implementation of these commands. In order to process a huge volume of data in a shorter period of time, a number of software programs can be used.

Step 5. Output and Interpretation : In this step, the processed information is transferred to the user. Users will receive the output in a different report format that can include a printed report, audio, video, or on monitor. The interpretation of output is important to facilitate meaningful information that can help future organizational decision-making.

Step 6. Storage : This is the final step of the data processing cycle in which data, instruction, and information can be stored for future applications. This is important as it will facilitate faster retrieval and access of the processed information that can also permit it to enter in the next step as required. To store system and application software, there will be a need for some storage in every computer system.

Q.11. Explain batch processing system in detail. Also give its advantages and disadvantages.

Ans.

Batch Processing System

In the case of the batch processing system, the collection and processing of data are performed in the form of batches or groups. Despite using online processing for interactive business systems that may need immediate data input and output, some of the other types of events can be managed by batch processing with greater efficiency. For example, batch processing is commonly useful for the huge data volume that has to be processed in a usual schedule like pay checks or transactions related to credit cards.

In the case of batch processing, the grouping of input transactions is done into a single file and these are processed combinedly. For example, when the customer statement has to be prepared by the firm for its customers at the end of the month, many thousands of records can be processed in one program run using the batch application.

Batch processing is the most suitable method for applications where there is no need to update records on an urgent basis such as payroll. This system relies on an automatic job-to-job translation facility that is being facilitated by many operating systems. Collect, group and process transactions periodically are the main task of a batch processing system.'

Batch programs can be operated by an IT operations group at a pre-planned schedule without requiring any kind of involvement of the user, during business hours, even during night or weekends, and there will be a need for a relatively lower number of network resources in comparison to the online systems.

Steps of Batch Processing

Following steps are involved in the Batch processing system:

Step 1. First, source transaction programs that are captured on forms are collected by the computer operator. Then these forms are combined in the form of a batch with a batch slip attached to it that will consist of the information related to the batch such as document details, total, amount, and so on. Then this batch is transferred to the data processing centres for further processing of the job. Checking of these batches is done according to the batch slip. Once the checking is done, storing of data is performed on the storage device such as tape or the disk.

Step 2. Now, the validated program batches are loaded into the computer by the operator where these data batches are executed in a sequence. The master file will be updated by these executions and a final report will be prepared.

Step 3. At last, the operator will collect these printed reports and share them with the different users.

Advantages of Batch Processing

1. Different users can share the computer resources with each other.
2. The task of job processing is done when the computing resources are normally not too busy.
3. Due to minute-by-minute human interaction and supervision, the idle time of computer resources is minimised.

Disadvantages of Batch Processing

1. There is a risk of data value being destroyed when the data are cumulated into batches.
2. In each step, the data has to wait in line, and thus there is an increased turnaround time.
3. The desired priority scheduling is not possible.

Q.12. Explain Electronic Data Processing in detail. Also discuss its advantages.

Ans.

Electronic Data Processing

Electronic Data Processing (EDP) is an uncommon term for "IS" (Information Services) or "MIS" (Management Information Systems), and it can be seen as the data processing with the help of the computer and different programs in a setup that includes the electronic communication. The inception of EDP is from "DP" (Data processing) which is a term that was developed at the time when the majority of the computing inputs were physically fed into the computer in the form of punched card and the output is also obtained in the form of paper reports or punched cards.

The different automated methods that are used for the processing of commercial data can be termed as Electronic Data Processing (EDP). Commonly, in order to process a huge quantity of identical information, this system utilizes simple and repetitive processes. For example, making stock updates in the inventory, banking transactions related to account and customer master files, transactions related to booking and ticketing in the reservation system of any airline, billing for various utility services.

Advantages of Electronic Data Processing

Following are the advantages of electronic data processing:

1. **Comprehension and Usage** : It is important to learn accounting manually first if someone is willing to have a better understanding and using it efficiently. It is important to understand the steps that are used in the accounting cycle such as accounts, types, normal balances, and debits and credits before estimating the nature of the business transaction.

Once this is done, then only the recording activity can be carried forward. First of all, journal and ledger are to understand and then the trial balance and at last adjustment. After gaining comprehensive insights about the ins and outs related to the manual system, if any error is committed anywhere, one can easily identify it and rectify it. If one has the knowledge of entering the input data and has no information about why and how the compilation of numbers is done, the ₹10 mistake can easily be compounded into a ₹200 mistake on the books.

2. **Speed and Efficiency** : There is undoubtedly several advantage of a computerized system over a manual system. Reports that may take many hours can easily be

generated just by the touch of some buttons and a relatively lesser time. When some debit or credit data is fed in the accounting software, the balances are shown directly into the suitable accounts of the general ledger. Then, the addition and subtraction of data take place and the new balance is found. This balance will be shifted to the right line item in a trial balance. The entire process is done in just a few seconds.

3. **Accuracy** : Mistakes are mostly committed by humans. If there is correct programming of the computers, no errors are made in the output. It can save a lot of time required to find and rectify the mistakes when the system is operating perfectly. But if some errors are made during the data entry by any person, the outputs will be inaccurate.
4. **Timeliness of Information** : Having the latest information at the fingertips is one of the main benefits of the computerized system. Once the data is fed, it is possible to get new and updated information. After collecting the raw data, analysis of the data is done through programming in spreadsheet formulas. It can save a lot of time and can provide the information on time. The manager will not be required to wait for two weeks after the month-end closing to know the profit and loss resulted in the last month.

Q.13. Explain Real Time Processing in detail. Write its advantages and disadvantages.

Ans.

Real Time Processing

The processing of data in a short amount of time to provide almost instantaneous results is known as real-time data processing. It requires a continuous flow of input data to produce a continuous output because processing takes place only when the data is entered.

Bank ATMs, traffic control systems, and modem computer systems such as the PC and mobile devices are all examples of real-time data processing systems. A batch data processing system, on the other hand, gathers data and then processes it all at once at a later time, which also implies delayed output.

The input of rapidly changing data is processed by real-time processing system to produce output almost instantly, allowing change over time to be easily observed.

In order to reveal the location of various aircrafts flying within the radar's range, a radar system first processes a continuous stream of input data and then displays it on the screen. Because of the constant stream of input data necessary to produce output for that moment, real-time data processing is also known as stream processing. E-commerce order processing, online booking and reservations, and credit card real-time fraud detection are all good examples of real-time data processing.

The most significant advantage of real-time data processing is ensuring that everything remains up to date. Batch processing, on the other hand, means that data is no longer available in real time.

Advantages of Real-Time Processing

Following are the advantages of real-time processing:

1. In real-time processing, the response is pretty quick.
2. Information is always up to date in real-time processing. As a result, the organisation will be able to act quickly to an issue, situation, or scenario.

- Not only has it allowed the company, to obtain new insights from the updated data but it also aids in the detection of patterns that could indicate opportunities or hazards.

Disadvantages of Real-Time Processing

Following are the disadvantages of real-time processing:

- Real-time processing is both complicated and expensive processing.
- It is a time-taking processing.
- Difficult for auditing.

Q.14.Explain Online Processing in detail. What are its advantages and disadvantages?

Ans.

Online Processing

Processing data file by logging into a computer or a network is known as 'online' processing. In online processing the user processes the data file and simultaneously use the input, output and storage devices. Earlier batch processing application, was used by many computer systems but today mostly all systems depend upon online processing.

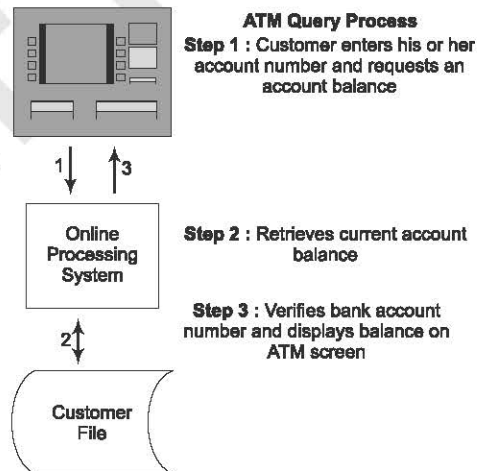
Transactions are managed by online system as soon as they are made, and users receive immediate output. Online processing reduces delays and allows a continuous interaction between the user and the system because of its interactive nature.

Airline reservation system is a perfect example of online processing. An online customer can enter the origin, destination, trip dates, and travel times in the Screen. The system looks for available flights, schedules, and prices in a database and displays them to the user.

Advantages of Online Processing

Following are the advantages of online processing:

- It makes online shopping easier.
- Quick response time.
- It is simple to use; user needs to simply fill out the form and the work will be done instantly by web and database servers.
- For money transactions, online banks now use online processing systems.
- These systems also deal with credit card usage.
- With the help of bank wire transfers, credit cards and online banks online, anyone may access anything from anywhere in the world and buy it right away. Online processing is used to manage all of these systems.



When a Customer Requests a Balance, the ATM System Verifies the Account Number, Submits the Query, Retrieves the Current Balance, and Displays the

Disadvantages of Online Processing

Following are the disadvantages of online processing:

- At any given time, millions of requests are sent to banks, making it difficult for them to handle.
- When servers get hang for a few seconds during a purchase, transactions are disrupted, which is bad for large websites, organisations, and high- traffic sites.

3. Problem is created when Website is hacked or data is lost because credit card numbers and e-mail addresses of the user are stored on database servers. For example, the LinkedIn website was hacked, and hackers gained access to users' e-mail and passwords. which were then publicly disclosed by hackers.
4. Hardware malfunction in the online processing systems makes it inconvenient for the visitors of the website to make transaction and as a result online transactions get halted and effected.

Q.15.Explain data hierarchy in detail.

Ans.

Data Hierarchy

Depending on the fields, records and files traditional databases are organised as:

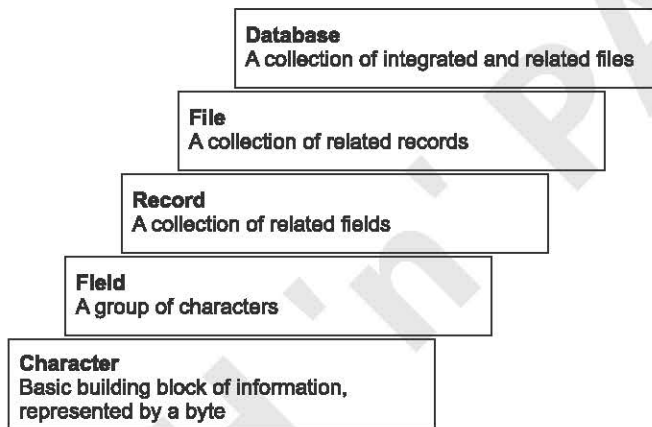


Figure : Data Hierarchy

1. **Character** : The most basic data element which can be observed and manipulated is the character. It may comprise a single alphabetic, numeric or other symbol.
2. **Field** : This is the smallest unit in a database as it contains single piece of information. For example, student information is stored in the database below and the table below contains a sample of 5 students.

There are six types of information of each student which are:

(i) Roll No., (ii) Name, (iii) Date of birth, (iv) Sex, (v) Address and (vi) Subjects.

Each type of information is called a field where each field represents one feature of an item or event. In this database, there are six fields.

Roll No.	Name	Date of Birth	Sex	Address	Subjects
9721001	Subrat Das	21.05.1980	M	C36, Sector 2, Bhubaneswar Orissa	Pol Sc, Eco, History, Eng, Hindi
9721002	Aditya Bhoi	12.06.1981	M	At/Po. Burla, Sambal Pur	Phy, Chem, Biology, Eng, Hindi
9732012	Madhu Jain	03.01.1979	F	A31, Pilani, Rajasthan	Pol Sc, Eco, History, Eng, Hindi

9724004	Ahmad Ali	23.11.1979	M	12A, Sheikh Sarai-I, New Delhi	Phy, Chem, Biology, Eng, Hindi
9715023	C. Suresh	07.09.1980	M	96, Hind Nagar, Bhopal	Pol Sc, Eco, History, Eng, Hindi

Each field is different from other, for example, Date of birth is, date type M-inip is character type.

3. **Record** : Related fields for a specific even are referred to as a record which means it is a collection of logically related fields. for example, while considering the details of a student, all six fields taken together comprise a record for that particular student.

Field name	Field content	Field name	Field content	Field name	Field content	Field name	Field content	Field name	Field content
First Name	Last Name	Age	Address	Tel 1	Tel 2				
				9543567342					
				9503452176					
Eric	Rabkin	54	abcd	9336567843	25345689				
Mary	Smith	25	wxyz	9336789453	28976789				
John	Doe	27	pqrs	9795674837	23145675				

Value list
Value list
Records, one per row
Value
Nominal data
Continuous data
Descriptive (uncoded) data
Nominal
Continuous or nominal coded data

Fields in columns (first row)
Value list
Value list
Records, one per row

Student Table

4. **File** : The collection of related records is a file. Usually, all records are of the same size and type but there can be exceptions too. This depends on the size of records in a file. Telephone directory containing records of various telephone holders can be considered to be an example of a file.

In the database systems, the following three types of files are used:

- (i) **Master File** : This is the file which contains permanent information about the entities. This acts as a reference point for transaction processing where information is collected on the basis of transaction data.
- (ii) **Transaction File** : These contain records of description of activities by an organisation. This gets created at the time of transaction processing and preparation of transaction documents. It is also used for permanent updation of master file.
- (iii) **Report File** : This gets created by data extraction from various records for report creation. Example, report file about weekly sales of a particular item.
5. **Databases** : This is a collection which comprises description of activities of one or more related organisations. Thus, all such data is made available to users where redundant data is removed or minimised.

A database handles business inventory and accounting information in its files to prepare summaries, estimates and other reports. There might also be a database which will store newspaper articles and magazines.

Q.16.Explain different types of files in detail.**Ans.****Types of Files**

Files can be of following types depending upon their content:

1. **Data Files** : The data records are saved in data files. Related data organised in convenient groupings of data items are contained in these data files that are well defined data structures.

Following are two additional types of records that each data file has:

- (i) **Header Records** : It comprises file identifying information and serve to differentiate between distinct groupings of records in a file.
- (ii) **Trailer Record** : It comprises codes that indicate when a set of data records has come to an end. These are also used to keep track of file usage information.

Data files can be classified into the following categories, depending on the nature of the data:

- (i) Master file, (ii) Transaction file, (iii) Work file, (iv) Audit file, (v) Backup file

File Organisation : Different ways can be used to organise data in files. Any of the following methods can be used to organise these data records:

- (i) Serial, (ii) Sequential, (iii) Indexed Sequential, (iv) Directly Accessible/Random

2. **Program Files** : Programmes written in various languages by various software companies can be stored in program files. Depending on the programming language, these files have different extensions. For example:

- (i) Extensions C is used for program file written in 'C' language.

- (ii) Extension CPP is used for program files written in C++.

3. **Object Code Files** : Compiled programs written in a language are stored in these files. The machine code is contained in these files. For example, file having extension. OBJ is created by C compiler after compilation.

4. **Executable Files** : These files include programs that are ready to run. EXE.COM or.BAT is extension of these files. Command prompt can be used to directly execute these programs.

5. **Unformatted Text Files:**

- (i) These files are simple text files.

- (ii) Any text editor or line editor can be used to produce text files.

MS-DOS Edit editor or the MS-Windows Notepad editor provided by MS- windows can be used to create text files.

6. **Formatted Text Files** : These files include text that has been formatted, i.e., formatted text. These also include several formatting commands and symbols. Any word processor can be used to produce these files.

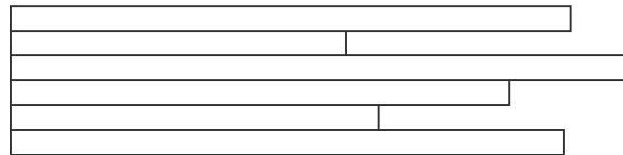
For example, a formatted text file having DOC extension can be created using MS-WORD.

Q.17.Explain Heap (Pile) Access File in detail. Also write its advantages and disadvantages.

Ans.

Heap Access File

This is the simplest method of organising file.



Variable Length Records

Heap (Pile) File Organisation

In a heap or pile file organisation, records are collected in the order they arrive. A heap's blocks are connected by pointers. If there is space, a new record is put in the last block; otherwise, a new block is allocated, and the record to be inserted is placed. Accumulating and saving mass of data is the purpose of the pile. The pile file has no structure, and finding records requires an intensive search. For small files or when data is collected before processing, the heap file organisation is employed. Following figure depicts a basic heap file organisation:

EMP.ID	Name	Other fields	EMP.ID	Name	Other fields	EMP.ID	Name	Other fields
000-121	A. Roy	001-125	B. Saha	001-130	T. Khan	
R ₁			R ₂			R ₃		

Serial File

It is the most basic and fundamental kind. These files are made up of records that are arranged in a random order. The records will not be arranged in any specific sequence. Insert, retrieve, and delete are the operations that may be performed on the records.

It is common to end up with an exhaustive search of the whole file when looking for a certain record in a heap file. To search for a record, an average of $n/2$ blocks must be accessed, where n is the total number of blocks in the file. As a result, searching in a heap file takes a long time. Because changing a record necessitates first locating the required record, the cost of updating is also extremely significant. Reading a heap file from beginning to end, on the other hand, takes significantly less time. Following are the features of pile file or heap file:

1. New records can be placed in any vacant area that is available.
2. The previously occupied space becomes available for placing new records when old records are removed.
3. Records may need to be relocated (moved) to a new location if the number of updated records increases. This must maintain a list of unfilled spaces.

Advantages of Heap File Organisation

Following are the advantages of heap file organisation:

1. Heap file organisation is an easy and simple method of organising file.
2. It is easy to insert new records with this file organisation.
3. It facilitates the bulk-loading data into the tabular form.
4. Heap file organisation is efficient during the time of scanning files and when records are required to be updated regularly.

Disadvantages of Heap File Organisation

Following are the disadvantages of heap file organisation:

1. It requires a linear search for recovery of files and is ineffective.
2. Unused space or the need for reorganisation may be the result of deletion.

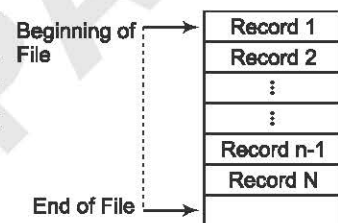
Q.18.Explain Sequential Access File in detail. What are its advantages and disadvantages?

Ans.

Sequential Access File

Sequential organisation of files is the most basic way to organise the collection of records in a file. The primary key field values are used to store the file's records in an order. They can only be accessed in the order in which they were stored, i.e., in the primary key order. The task in which nearly every record in a file needs to be accessed requires this kind of file organisation.

The records in a sequential file are kept in the logical order of their primary key values. As demonstrated in given Figure sequential files are inefficient for random access but are suitable for sequential access. A sequential file can be stored on devices that allow sequential access, such as magnetic tape.



Sequential File Organisation

Aggregately searching for a record in a sequential file necessitates looking through half of the file's records. If, on the other hand, a sequential file is saved on a disc with the keyword stored separately from the remainder of the record, then just the disk blocks containing the requested record or records must be read. This form of storage enables for binary searches on sequential file blocks, which improves access time. Generally, updating a sequential file results in the creation of a new file in order to preserve the record sequence on the primary key. The update procedure first copies the records until they reach the record for which an update is required, following which the modified record is placed in the new file, followed by the rest of the records. This method of updating a sequential file produces a backup copy automatically.

Advantages of Sequential File Organisation

Following are the advantages of the sequential file organisation:

1. When dealing with huge amounts of data that must be handled on a regular basis, sequential file organisation is quick and efficient.
2. Implementation of sequential file organisation is easy.
3. The blocking efficiency of this organisation is effective.
4. Blocking reduces the amount of time it takes to handle a file from input to output.
5. On the disk, a significant quantity of storage space may be saved.

Disadvantages of Sequential File Organisation

Following are the disadvantages of sequential file organisation:

1. All new transactions must be sorted into the correct order for sequential access processing.
2. Rearranging the file is required for finding, storing, updating, removing, or adding records.
3. This technique is too sluggish to handle applications that need to be updated or responded to right away.

Applications of Sequential File Organisation

Following are the applications of sequential file organisation:

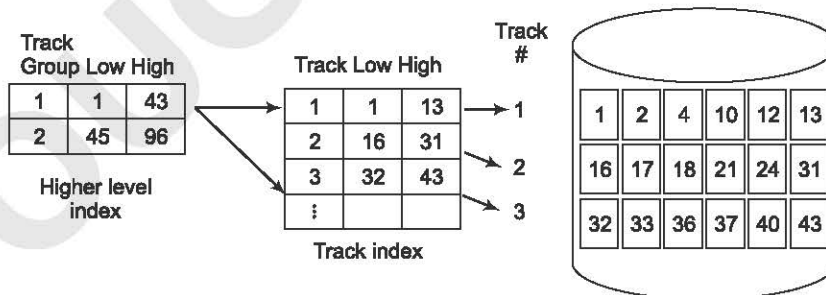
1. Bank cheque processing,
2. Payroll System,
3. Financial accounting, and
4. Billing and customer statement preparation.

Q.19. Explain Index Sequential Access File in detail. Discuss its advantages and disadvantages.

Ans. Index Sequential Access File

A hybrid organisation that combines the benefits of both indexed and sequential file organisations while avoiding some of their disadvantages is known as index sequential file organisation. It employs an index to identify the section of the disc surface that may contain the record with key k in order to locate it. To find the requested record, records in this part of the disc are searched consecutively. An index is a collection of address and index value pairs. Indexing is the process of associating a set of items with a set of orderable values that are frequently less numerous or has different properties.

As a result, an index is a tool for facilitating speedier search. Though the indices and data blocks are physically stored together, they are logically separated. Let us refer indexes as index file, and data files as data records. The index size can be small enough to fit into main memory. An index sequential file is a sequential (or sorted on primary keys) file that is indexed on its primary key. Random record access is allowed by the index, while quick access to sequential records is allowed by the sequential storing of the file's records. The overflow area is another feature index sequential access file. The overflow area provides more room to add records without having to create them. A master file of employee information organised as an index-sequential file is shown in figure.



The key field is used to sort records in ascending order. To make searching easier, two indices have been created. The smallest and greatest key values located on each track are indicated by the track index. Entries for groups of tracks containing three tracks each are contained by higher level index. In order to find the record with key k , the higher level index for a group of tracks that might contain the requested record is firstly searched.

Secondly, in order to locate the track containing the requested track, searching of track index for the tracks of the group is done. After this, key k is used to sequentially search the selected track for the record. If the record is not found on the track, the search is failed.

Advantages of Index Sequential File Organisation

1. Indexed sequential file organisation offers the low cost and efficient use of sequential processing whenever the activity rate is high.
2. With the help of this file organisation, one can access the records quickly and with efficient manner.
3. User can insert or update record within middle of the file.

Disadvantages of Index Sequential File Organisation

1. This file organisation is not much efficient in the use of storage space as other file organisations.
2. There is a need of expensive hardware and software resources in indexed sequential file organisation.
3. It requires unique keys.
4. Processing is sometimes very slow.
5. Re-organisation of file is needed after a period of time.

This file organization combines some of the advantages of direct and sequential approaches and is therefore used in several applications such as Material A/C, banking industry etc.

Q.20.Explain Direct Access File in detail. Also write its advantages and disadvantages.

Ans.

Direct Access File

Direct access or random access files have records that can be read in any sequence or order.

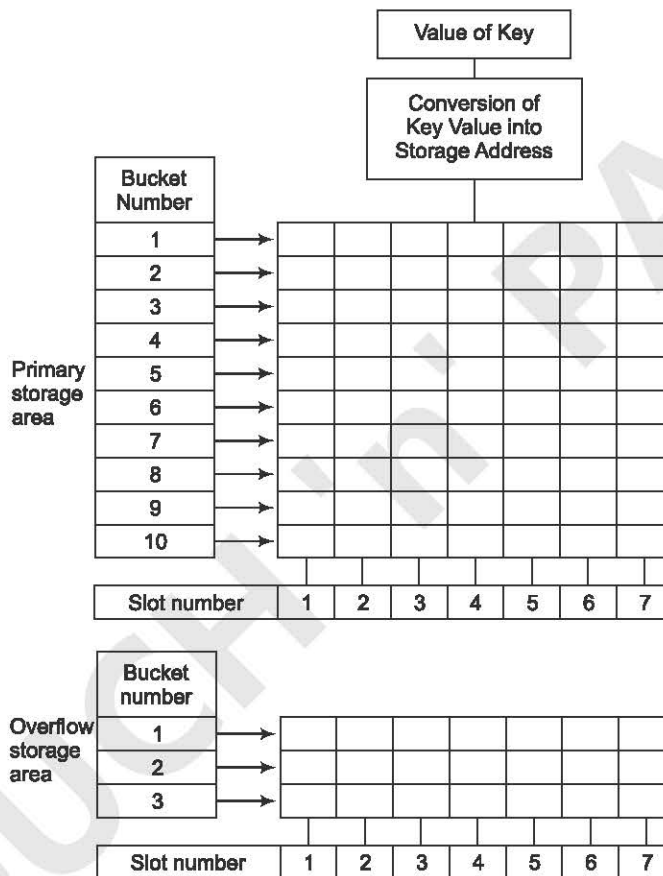
Collection of records saved on a disc that are numbered 1, 2, 3 and so on are basically random access files. As a result, instead of being referred to by their position, they can be referred to by their numbers. Direct-access media, such as a disc, should be used to store such files. These are quite useful for quick access to large amounts of information.

For example, database systems. In a banking app, a customer may want to check their current account balance. This can be easily accomplished by locating that customer's record using his or her account number as a key, rather than reading the records of thousands of other customers sequentially before locating and reading that customer's record.

In this file organization, the key value is directly linked with the address of the storage location. The organisation of direct files can be done in two ways:

1. **Relative Addressed Direct File Organisation :** With this type of file organization, the user must specify the relative address of a desired data record from the base address. For example, 15th or 7th record of the data files etc. If a specific record is to be accessed, the user must view the base documents and check the relative address of the record to be accessed before sending it to the computer. If the values of the key fields are in ordered manner starting with 1, then this task can be accomplished with less difficulty. There exist some situations where the key can be in alphanumeric form. In such a situation, the user must necessarily focus the base document to identify the relative address of the data set of interest.

2. **Hashed Addressed Direct File Organisation** : The keys of records in this file organization are randomly distributed in an area called the hash table. Hashing table allows user to access quickly and directly any record without using an index. Hence, it is the most efficient way to access files on most online systems. Figure given shows a schematic representation of the hash file organization.



The hashed file consists of a primary memory area and an additional memory area. Each of these memory areas consists of numerous buckets and slots. Each bucket contains a number of slots. In the hashed file organization, a slot is the smallest storage area. Each key value in a data set is stored in slot of a bucket using a specific hashing algorithm. There are many algorithms to find the hashed address for each of the keys in the file. The best key conversion algorithm is the remainder algorithm.

Advantages of Direct File Organisation

1. It is not necessary to sort the records as they are added.
2. Provides record quickly.
3. Provides efficient use of memory.

4. Direct file operations are fast, so there is no need to collect the similar kind of operations as done in the sequential file system.
5. The search time depends on the mapping method, not on the logarithm of the number of search keys as with B-trees.
6. Support fast storage devices.

Disadvantages of Direct File Organisation

1. The calculation of address is necessary in the direct organization. Therefore, tills calculation consumes more processing time to register the address.
2. Expensive hardware and software are required for direct organization.
3. Adding and deleting record is very complex in the direct file.
4. Organizing files directly depends on the device.
5. Less efficient in using storage space.

Applications of Direct File Organisation

Direct file organisation is best suitable for interactive online applications like:

1. Flight/Train reservation systems
2. Teller facility in banking applications

Q.21. Explain the Report Design in detail. What are the guidelines, for designing printed report?

Ans.

Report Design

Report is an effective method of presenting the data in the printed format. The user can present the information in desired format that he/she wants, as there is possibility of altering the size, appearance and the format in the report.

When systems analysts need a data record or a report of information, or they need to send a big amount of information to numerous people at the same time, they specify reports. Highly needed reports must be printed. A single well-designed report can replace several poorly designed reports. No one benefits from providing unneeded information, thus analysts should be cautious about producing unnecessary data.

Different printed reports can have different size. Following standard size is used by analysts to print a report:

1. 9½ by 11 inches
2. 11 by 14.7 inches
3. 8 by 14.7 inches

These sizes are for continuous forms (sometimes called pin-fed or fan-fold forms)—connected sheets of papers that feed into the printer one after the other.

Formatted output is required for commercial output. The term report is used for this formatted output. Following are the contents of formatted report:

1. Report heading, 2. Page heading, 3. Page numbering, 4. Footers, 5. Some remarks, 6. Date, month and year of printing.

The commercial output can be extended to multiple pages. In that situation a provision in one's software must be made to ensure that particular details are printed on each page. For example, page titles may need to be printed on each page.

Following are the types of reports:

1. Single page report.
2. Multiple page report.

Layout of a Printed Report

The arrangement of items on the output medium is known as an output layout. When analysts create an output layout, they are creating a mock-up of the final report or document that will appear once the system starts functioning. Location and position of the following should be displayed by the layout:

1. All variable information, 2. Item details, 3. Summaries and totals, 4. Control breaks, 5. Separators, 6. All pre-printed details, 7. Headings, 8. Document names and titles, 9. Corporate name and address, 10. Instructions, 11. Notes and comments

In the construction of programs, thus layout will act as a blueprint for the guidance purpose. In program instructions, each variable in the layout must be accounted for. The sample of report is shown in figure below :

Employee_Details Report1					
Emp_ID	First Name	Last Name	Contract	Address	Company
1	Mohan	Sharma	2786754	Gomti Nagar	123

Guidelines for Designing Printed Report

Following guidelines should be followed for designing printed report:

1. Designing of documents and reports should be such that they can be read from left to right and top to bottom.
2. The most crucial item should be placed in a position where it can be easily visible.
3. Not only should the title and page number be present on each page but also the date the output was created.
4. Labelling of all the columns is must.
5. Abbreviations should be avoided at all costs.

Multiple Page Reports

Following parts forms the content of multiple page reports:

1. **Report Heading** : It only appears on the first page of the report and represents report's title.
2. **Report Sub-Heading** : It is printed on each page as and when needed.
3. **Page Heading** : It appears at the top of every page.

- 4. **Page Footer** : It appears at the bottom of every page. It is usually the total amount of records on a page, the sum of numeric data, etc.
- 5. **Report Detail** : Report detail is the main body of report. This group contains the output details or information of the main consequence.

Q.22.Explain Data File Structure in detail.

Ans. File Structure

There are several ways to organise the data. Data structure may be defined as the logical or mathematical structure of a certain situation.

Data structure, also known as the abstract data types refers to the data class that is characterised on the basis of organisation and operations defined on it.

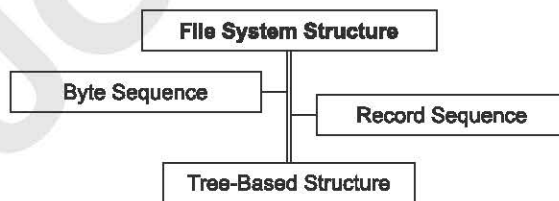
The possible ways in which data has been processed and analysed are greatly affected by the data file structure. Any changes to data file are difficult and time taking once the structure has been filled with data.

The internal structure of data file varies with the type of data file and a research project may have multiple separate data files that are related to one another in different ways.

Formatting the content of data file such as organisation and types of variables may also determine the structure of data files. The information related to the relationship among various elements and their content parts is also provided by the structure of data file.

Data file also includes an essential part of the metadata. For example, it may be in the form of value labels, variables and names, different kinds of supplementary content variables and notes. Thus the clarity of data documentation is also determined by the structure of data.

Following are the three ways for structuring the file:



- 1. **Byte Sequence** : The operating system at first only sees bytes and does not determine what is there in file because file is an unstructured sequence of bytes initially. User level program can be used to impose any meaning. This approach can be used by both Windows and UNIX.

Operating system provides maximum flexibility to the files as it only regards file as a byte sequence. User programs name their file in any way which is significant for them and put anything they want in their file.

Figure (a) shows the file in unstructured sequence of bytes.

2. **Record Sequence** : Record sequence is the second way to structure the file. It is a sequence of fixed-length record each having internal structure. Read operation reads only one record and turns it back that is why file is known as a sequence of records. One's record has been overwrites by the write operation and connects them.

Figure (b) shows the record sequence structure.

3. **Tree-Based Structure** : Tree-based structure is the third way to structure data file. Different records have different length containing a key field in fixed position in record. To enable the fast searching for a particular key, the tree is sorted a key field.

Figure (c) shows the tree-based file structure.

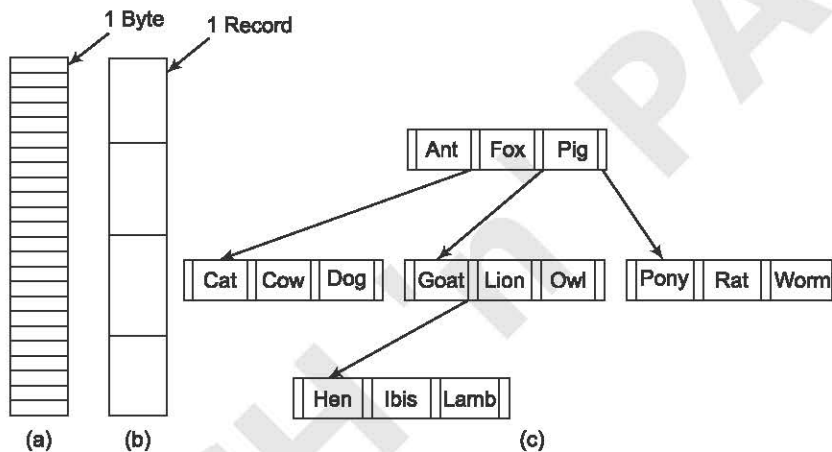


Figure : Three kinds of Files (a) Byte sequence (b) Record sequence (c) Tree-Based Structure

□

UNIT-IV

Word Processing and Networking

SECTION-A VERY SHORT ANSWER TYPE QUESTIONS

Q.1. Write down the shortcut key for Undo.

Ans. Ctrl + Z is the shortcut key for Undo.

Q.2. Write down the shortcut key for Copy and Paste.

Ans. Ctrl + C and Ctrl + V is the shortcut key for Copy and Paste.

Q.3. Write down the shortcut key for Find and Replace.

Ans. Ctrl + F and Ctrl + H is the shortcut key for Find and Replace.

Q.4. Write down the shortcut key for Select All.

Ans. Ctrl + A is the shortcut key for Select All.

Q.5. Write down the shortcut key for creating a new document.

Ans. Ctrl + N is the shortcut key for creating a new document.

Q.6. Write down the steps to create a new document in Word 2016.

Ans. To create a new document, follow these steps :

1. Click on the File tab. The Backstage view will appear.
2. Select New option.
3. Click on the Blankdocument.

A new blank document window will appear on the screen.

Q.7. Name the different bands for communication channels.

Ans. Narrow-band, Voice-band and Broad-band are the various bands for communication channels.

Q.8. Give two examples of simplex devices.

Ans. Two examples of simplex devices are keyboards and traditional monitors.

Q.9. Give an example of full-duplex communication.

Ans. The telephone network is an example of full-duplex communication.

Q.10. Give two examples of half-duplex system.

Ans. Walkie-talkies and CB (citizens band) radios are both half-duplex systems.

Q.11. What is the full form of WAN?

Ans. The full form of WAN is Wide Area Network.

Q.12. What is the full form of NIC?

Ans. Network Interface Card is the full form of NIC.

Q.13.What is the full form of LAN?

Ans. Local Area Network is the full form of LAN.

Q.14.What is the full form of PAN?

Ans. The full form of PAN is Personal Area Network.

Q.15.What is the full form of MODEM?

Ans. MODulator DEModulator is the full form of MODEM.

Q.16.Name the different types of Network

Ans. There are four basic types of computer network:

1. LAN
2. MAN
3. WAN
4. PAN

Q.17.What is the maximum range of LAN?

Ans. The maximum range of LAN card can be 10 kilometre.

Q.18.What is the maximum range of MAN?

Ans. The maximum range of MAN can be 50 km.

Q.19.Which network component is used in a wired network to connect Internnet cables from a number of devices together?

Ans. Switch is used in a wired network to connect Internnet cables from a number of devices together.

Q.20.Which network component identifies every single node in a network by providing a unique physical address to it?

Ans. Network Interface Card component identifies every single node in a network by providing a unique physical address to it.

Q.21.Write down the steps to delete the text in Word 2016.

Ans. To delete the text in Word 2016, follow these steps:

1. Select the text you want to delete.
2. Press the Delete or Backspace key.

The selected text will be deleted.

Q.22.How can you save a document in Word 2016?

Ans. To save a document, follow these steps:

1. Click on the File tab. The Backstage view will appear.
2. Select the Save option.
3. Select the PC option.
4. Click on Browse button.
5. Select the location where you want to save your file.
6. Type the file name.
7. Click on the Save button

Q.23.Write down the steps to close a Word document.

Ans. To close a document, follow these steps:

1. Click on the File tab. The Backstage view will appear.
2. Select the Close option. Word will ask to save the changes, if there are changes in the document that have not been saved.
3. Click on the Save, if you want to save the changes.

Q.24. How can you open an existing document in Word 2016?

Ans. To open an existing document, follow these steps:

1. Click on the File tab. The Backstage view will appear.
2. Select the Open option.
3. Select the Computer option.
4. Click on Browse button.
5. Select the file.
6. Click on the Open button.

Q.25. What do you mean by editing a document?

Ans. Making changes after typing the text in a document is called editing. You edit a document to insert text, copy text, delete text, move text or rectify errors. To perform the actions like copying, moving or deleting the text, we need to select the text first.

Q.26. How can you insert the text in Word 2016?

Ans. You can insert new text to an already existing document. Place the cursor where you want to insert the text. Now start typing the text.

The existing text which is placed after the cursor will be shifted to the right side and the new text will be inserted.



Q.27. How can you move the text in Word 2016?

Ans. The Cut and Paste commands are used to move the text from its original location to a new location. Where, the Cut command removes the text from its original location and the Paste command insert the cut text at the new location.

To move the text, follow these steps :

1. Select the text that you want to move.
2. Click on Cut option in the Clipboard group on the HOME tab.
3. The text disappears from the document. Place the cursor at the location where you want to place the cut text.
4. Click on the Paste option in the Clipboard group on the HOME tab.

Q.28. What are undo and redo options?

Ans. MS Word keeps track of all the changes that we make in a document. We can easily undo the change and restore the original text. The Undo  and Redo  buttons are available on the Quick Access Toolbar.

The Undo command is used to reverse the last action performed, while the Redo command is used to reverse the effect of the Undo command.

Q.29. What do you mean by formatting a document?

Ans. Formatted text can draw the reader's attention to specific parts of a document and emphasize important information. The process of changing the appearance and arrangement of text to make it look attractive is known as formatting.

Formatting helps to make changes to the default settings. In Word, you have several options to enhance the document like changing the font style, size and colour, highlighting important text, changing text case, applying border, creating butted lists, etc.

Q.30. How can you preview a document in Word 2016?

Ans. You can check the way the document pages will appear after getting printed. To preview a document, follow these steps :

1. Click on the FILE tab.
2. Select the Print option. A preview of the document automatically appears on the right side of the Print screen.
3. Click on the arrows below the preview section to view every page in the document.
4. You can magnify the view by making use of the Zoom slider bar at the bottom of the preview section.

Q.31. How can you print a document in Word 2016?

Ans. After checking the preview of the document, you can choose to print it by following the given steps:

1. Click on the FILE tab.
2. Select the Print option.
3. Select the printer from the Printer drop-down list.
4. Specify the number of copies in the Copies: spin box.
5. Click on the arrows next to the Print All Pages option under the Settings section to choose which pages to print.
6. Click on the Print option.

Q.32. Write down the steps to insert a row or a column in a table.

Ans. Inserting a new row : To insert a new row in a table, follow these steps:

1. Place the cursor in the column to the left or right of which a new column is to be inserted.
2. Click on the LAYOUT tab under TABLE TOOLS.
3. Click on the Insert Above or Insert Below option in the Rows & Columns group.

Inserting a new column : To insert a new column in a table, follow these steps:

1. Place the cursor in the column to the left or right of which a new column is to be inserted.
2. Click on the LAYOUT tab under TABLE TOOLS.
3. Click on the Insert Left or Insert Right option in the Rows & Columns group.

A new row gets inserted in the table.

Q.33. Write down the steps of deleting rows or column in a table.

Ans. To delete rows or columns, follow these steps:

1. Place the cursor in the row or column to be deleted.
2. Click on the LAYOUT tab under TABLE TOOLS.
3. Click on the Delete option in the Rows & Columns group. A list of options appears.
4. Click on the Delete Columns or Delete Rows option to delete a row or column.

Q.34. Write down the steps of merging cells in detail.

Ans. Merging cells refers to combining two or more cells in a row or a column into a single cell. To merge cells, follow these steps:

1. Select the cells to be merged.

2. Click on the LAYOUT tab under TABLE TOOLS.
3. Click on the Merge Cells option in the Merge group.

The selected range of cells get merged into a single cell.

Q.35. Write down the steps of splitting cells in detail.

Ans. Splitting cells refers to dividing a single cell into multiple cells. To split a cell, follow these steps:

1. Click on the cell that you want to split.
2. Click on the LAYOUT tab under TABLE TOOLS.
3. Click on the Split Cells option in the Merge group.
4. Specify the number of columns and rows.
5. Click on the OK button.

Q.36. What is computer network?

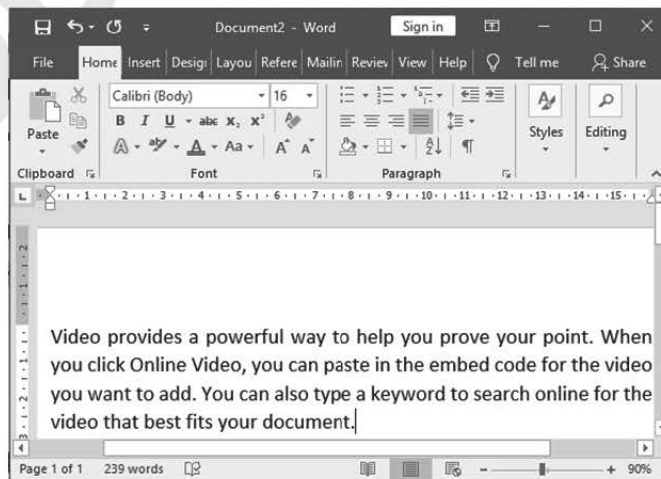
Ans. A network is a group of devices that are connected to each other through any communication medium like copper wire, fibre optic cable, microwave, infrared or through satellite. A computer network facilitates the sharing of hardware and software resources among different users working on computer. These shared resources can be data files, any application software or hardware devices like Printers, Modems etc.

A system consisting of connected computer nodes and devices made to share data, hardware and software is called a Computer Network. For example, network of telephones or radio network or cable network, etc.

SECTION-B (SHORT ANSWER TYPE) QUESTIONS

Q.1. How can you enter text in Word 2016?

Ans. The insertion point or cursor is the blinking vertical line in your document. It indicates where you can enter text on the page. When a new blank document opens, the insertion point is located in the top-left corner of the page. Do not press the Enter key when you reach at the end of the line. As you type the text, the insertion point automatically shifts to the next line as needed. This feature is called Word Wrap. Press the Enter key only to start a new line.

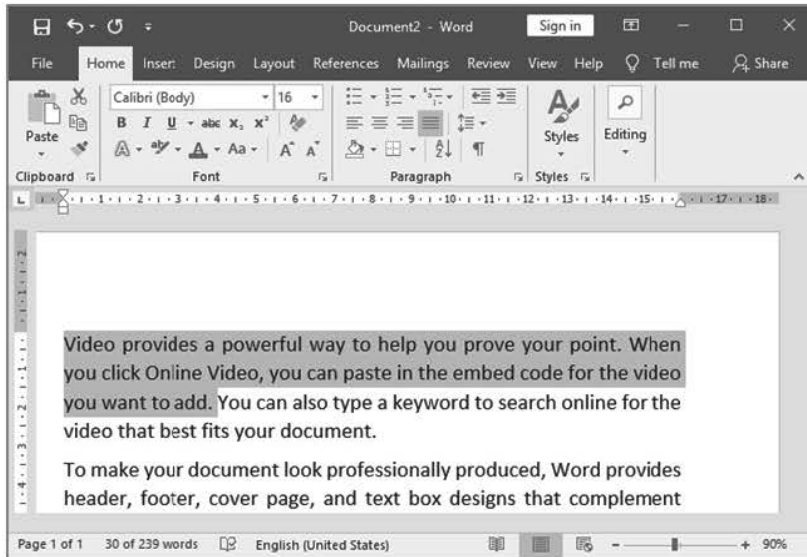


Q.2. How can you select text in Word 2016?

Ans. To select text in Word, follow these steps:

1. Place the cursor before the text you want to select.
2. Now, keeping the mouse button pressed, drag the mouse over the text to be selected. Then, release the mouse.

You have selected the text. A highlighted box will appear over the selected text.

**Q.3. How can you select the text in Word 2016?**

Ans. You can select the text using the mouse or the keyboard.

Selecting the text using the mouse : Various methods of selecting the text using the mouse are :

Selection	Method
A word	Double-click on the word.
A sentence	Move the pointer to the left of the line. When the cursor shape changes to a right-pointing arrow, click it.
A paragraph	Triple-click anywhere in the paragraph or double-click to the left of the paragraph, when the shape of the cursor changes to a right-pointing arrow.
Entire document	Triple-click to the top-left of the document text, when the shape of the cursor changes to a right-pointing arrow.

Selecting the text using the keyboard : Various methods of selecting the text using the keyboard are:

Selection	Method
One character to the right	Ctrl + →
One character to the left	Ctrl + ←
One word to the right	Ctrl + Shift + →

One word to the left	Ctrl + Shift + ←
Text from the current position to the beginning of a line	Ctrl + Home
Text from the current position to the end of a line	Ctrl + End
Text from the current position to the end of a paragraph	Ctrl + Shift + ↵
Text from the current position to the beginning of a paragraph	Ctrl + Shift + ↶
The entire document	Ctrl + A

Q.4. How can you copy the text in Word 2016?

Ans. The Copy and Paste commands are used to duplicate the text. We can copy the text from one location to another within a document or even from one document to another. This feature helps in reducing our time and effort in typing.

The Copy command creates a duplicate copy of the original text and the Paste command is used to insert the copied text at the new location.

To copy the text, follow these steps:

1. Select the text that you want to copy.
2. Click on Copy option in the Clipboard group on the HOME tab.
3. Place the cursor at the location where you want to place the cut text.
4. Click on the Paste option in the Clipboard group on the HOME tab.

The text moves from its original location to the new location.

The text gets copied to the new location.

Q.5. How can you apply borders in Word 2016?

Ans. You can add borders around the text, a paragraph or a page.

To add a border around the text or a paragraph and a page, follow these steps:

1. Select the text.
2. Click on the Borders option in Paragraph group on the HOME tab.
3. Select Borders and Shading option.
4. Select the appropriate option under Setting: section
5. Select the border style under Style: list box.
6. Select the border colour under Color: list box.
7. Select the border thickness under Color: list box.
8. To add a border around the page, click on the Page Border tab.
9. Select the appropriate option under Setting: section
10. Select the border style under Style: list box.
11. Select the border colour under Color: list box.
12. Select the border thickness under Color: list box.
13. Click on OK button.

Q.6. Explain briefly column formatting.

Ans. By default, MS Word 2016 document has one column. However, the document can be formatted to have more than one column, as we see articles written in a newspaper. The text under the heading is arranged in the form of columns.

To format a text in column format, follow these steps:

1. Select the text that has to be displayed in columns.

2. Click on the Columns option in the Page Setup group in the PAGE LAYOUT tab.
3. Click on the More Columns... option. The Columns dialog box appears.
4. Click any of the present column formats in the Presets box or entering a number in the Number of columns: box
5. If you want columns of equal width, select the Equal column width check box. For columns of different widths, type the column width for each column.
6. Click on the Line between check box for inserting a line between the columns.
7. Click on the OK button.

Q.7. What are tables? Why are tables useful?

Ans.

Meaning of Tables

Tables are useful for various tasks such as presenting text information and numerical data. In Word, you can create a blank table, convert text to a table, and apply a variety of styles and formats to existing tables.

A table is a set of data (text and/or numbers) arranged in rows and columns. The intersection of rows and columns forms rectangular boxes called cells.

The vertical series of cells in a table is called a column. The horizontal series of cells in a table is called a row.

Uses of Tables

Table is useful to the following activities:

1. Organize a collection of related data in rows and columns.
2. Find information easily.
3. Compare information on different categories.
4. Catch attention of the reader.

Q.8. Explain briefly spelling and grammar tool.

Ans. Word provides you with several proofing features including the Spelling and Grammar tool that can help you produce error-free documents. For each error in your document, Word will try to offer one or more suggestions. You might have noticed that when you are typing some text in Word 2016, you get red or blue wavy lines under some words.

1. A red wavy underline indicates a misspelled word. Any word that is not there in the Word dictionary is marked as misspelled.
2. A blue wavy line indicates grammatical mistakes, including misused words (also known as a contextual spelling error, occurs when a word is spelled correctly but used incorrectly).

To check spelling and grammar, follow these steps :

1. Click on the Spelling & Grammar option in the Proofing group on the REVIEW tab.
2. The Spelling and Grammar pane will appear. You can select a suggestion and click Change to correct each error.
3. Click on the OK button.

Word will move through each error until you have reviewed all of them. After the last error has been reviewed, a dialog box will appear.

Q.9. Explain Thesaurus tool.

Ans. Word has an in-built dictionary called Thesaurus. This feature provides a list of synonyms (*i.e.*, words with similar meaning) for a given word and antonym (*i.e.*, opposite of a word). It proves to be useful by helping you improve your vocabulary and can be used to replace a word with one of its synonyms.

To use the Thesaurus, follow these steps :

1. Place the cursor anywhere within the word for which you want to look for a synonym.
2. Click on the Thesaurus option in the Proofing group on the REVIEW tab.
3. A list of synonyms (and antonyms, if any) appears in Thesauruspane on the right side of the window. To use one of the words from the list, point to it. Then, click on the down arrow next to it and select the Insert option.
4. Click on the Insert option.

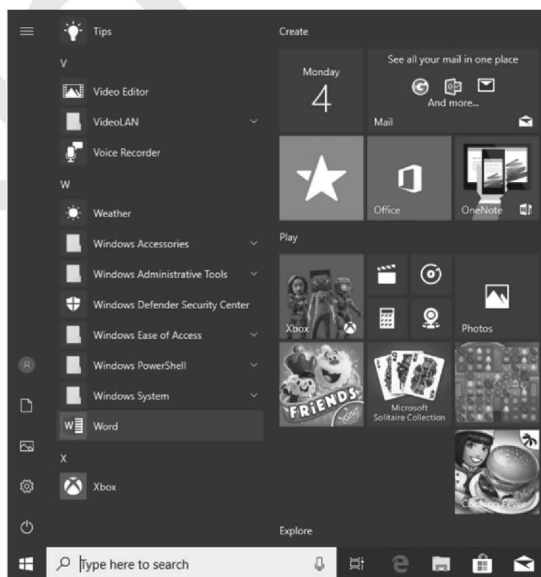
Q.10. Write down the steps to start MS WORD 2016.**Ans. Steps of Starting MS Word 2016**

To start MS Word 2016, follow these steps :

1. Click on the **Start** button.
2. Click on the **Word**.

When you open Word 2016, the **Word Start Screen** will appear. From here, you'll be able to create a **new document**, choose a **template**, or access your **recently edited documents**.

3. Click on the **Blank document** to create a new document.



Microsoft word window will appear named **Document 1**.

Q.11. How can you change the style, size and colour of the text?

Ans. You can change the style, size and colour of the text.

1. Changing the Font of the text : To change the font of the text, follow these steps:

- (i) Select the text.
- (ii) Click on the down arrow next to the Font box in the Font group on the Home tab.
- (iii) Select the desired font.

Notice that the font of the selected text changes.

2. Changing the size of the text : To change the font size of the text, follow these steps:

- (i) Select the text.
- (ii) Click on the down arrow next to the Font Size box in the Font group on the Home tab.
- (iii) Select the desired font size.

The size of the selected text will be changed.

3. Changing the colour of the text : To change the colour of the text, follow these steps:

- (i) Select the text.
- (ii) Click on the down arrow next to the Font Color option in the Font group on the Home tab.
- (iii) Select the desired font colour.

The colour of the selected text will be changed.

Q.12. Explain Bullets and Numbering as features of Word 2016.

Ans. **Bullets and Numbering**

It is an important feature of Word 2016. It is useful when you want to present your text as a list of items. Lists make it easy to find information that we are looking for. There are two types of lists. They are :

- (i) Bulleted list
- (ii) Numbered list

A bulleted list is usually used when the order of items in the list does not matter (unordered). By default, Word uses a simple black dot as a bullet.

A numbered list is used for listing when the order of items is important, e.g. a sequence of events or steps.

1. Creating a Bulleted List

To create a bulleted list, follows these steps :

- (i) Select the text.
- (ii) Click on the Bullets option in Paragraph group on the HOME tab.
- (iii) Select the desired bullet.

2. Creating a Numbered List

To create a Numbered list, follows these steps:

- (i) Select the text.
- (ii) Click on the Numbering option in Paragraph group on the HOME tab.
- (iii) Select the desired numbering style.

Q.13.Explain the different ways of creating tables in Word 2016.**Ans. Ways of Creating Tables**

In MS Word 2016 document, a table can be created in different ways. They are discussed here one by one:

1. Using a Grid

To insert a table using a grid, follow these steps :

- (i) Place the insertion point in the document where you want the table to appear.
- (ii) Click on the INSERT tab.
- (iii) Click on the Table option in the Tables group. A table grid appears.
- (iv) Drag the mouse button to highlight the desired number of rows and columns. Click the mouse button.

An empty table is inserted in the document.

2. Using the Insert Table option

The steps to insert a table in a document using the Insert Table option are as follows :

- (i) Click on the INSERT tab.
- (ii) Click on the Table option in the Tables group.
- (iii) Select the Insert Table... option. The Insert Table dialog box appears.
- (iv) Specify the number of rows and columns.
- (v) Click on the OK button.

3. Drawing a Custom Table

To draw a custom table, follow these steps :

- (i) Click on the Table option in the Tables group on the INSERT tab.
- (ii) Click on the Draw Table option.
- (iii) Click and drag to draw a rectangle in the document. Draw horizontal lines to create rows, and draw vertical lines to create columns.

Q.14.What is data communication?

Ans. When we communicate, we are sharing information. This sharing can be local or remote. Between individuals, local communication usually occurs face to face, while remote communication takes place over distance. The term telecommunication, which includes telephony, telegraphy, and television, means communication at a distance (teleis Greek for "far").

The word data refers to information presented in whatever form is agreed upon by the parties creating and using the data. Data communications are the exchange of data between two devices via some form of transmission medium such as a wire cable. For data communications to occur, the communicating devices must be part of a communication system made up of a combination of hardware (physical equipment) and software (programs).

Q.15.Write down the characteristics of data communication.**Ans. Characteristics of Data Communication**

The effectiveness of a data communications system depends on four fundamental characteristics:

1. **Delivery** : The system must deliver data to the correct destination. Data must be received by the intended device or user and only by that device or user.

2. **Accuracy** : The system must deliver the data accurately. Data that have been altered in transmission and left uncorrected are unusable.
3. **Timeliness** : The system must deliver data in a timely manner. Data delivered late are useless. In the case of video and audio, timely delivery means delivering data as they are produced, in the same order that they are produced, and without significant delay. This kind of delivery is called real-time transmission.
4. **Jitter** : Jitter refers to the variation in the packet arrival time. It is the uneven delay in the delivery of audio or video packets. For example, let us assume that video packets are sent every 3D-ms. If some of the packets arrive with 3D-ms delay and others with 4D-ms delay, an uneven quality in the video is the result.

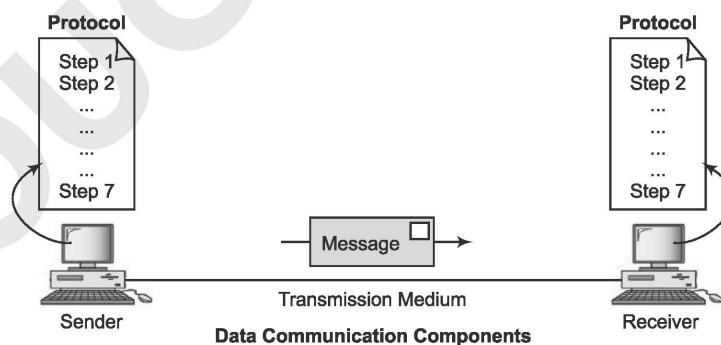
Q.16. Write down the components of data communication.

Ans.

Components of Data Communication

A data communications system has five components :

1. **Message** : The message is the information (data) to be communicated. Popular forms of information include text, numbers, pictures, audio, and video.
2. **Sender** : The sender is the device that sends the data message. It can be a computer, workstation, telephone handset, video camera, and so on.
3. **Receiver** : The receiver is the device that receives the message. It can be a computer, workstation, telephone handset, television, and so on.
4. **Transmission medium** : The transmission medium is the physical path by which a message travels from sender to receiver. Some examples of transmission media include twisted-pair wire, coaxial cable, fibre-optic cable and radio waves.
5. **Protocol** : A protocol is a set of rules that govern data communications. It represents an agreement between the communicating devices. Without a protocol, two devices may be connected but not communicating, just as a person speaking French cannot be understood by a person who speaks only Japanese.



Q.17. Explain Bandwidth channels.

Ans. The bandwidth, or grade, of a communication channel determines the rate or speed that data can be transmitted over a channel. The term bandwidth is often shortened to band. There are 3 bands for communication channels:

1. **Narrow-band** : The narrow-band channel is used where data volume is relatively low and which transmits data at a rate between 40 to 100 bits per second (bps). Telegraph lines are an example of narrow-band channels and their transmission rate is slow.

2. **Voice-band** : The voice-band channels are able to speed up the transmission rate between 110 to 9600 bits per second. Telephone lines are an example of voice-band channels. In many cases, a terminal operator at a remote location uses the regular dial-up telephone switching network, calls a number at the control processor location and enters the data. For large volumes of data, it is cheaper for an organization to acquire its own dedicated or leased line which can be used for both voice and data transmissions.
3. **Broad-band** : The broad-band channels are used where data volumes are large and which transmit data at rate upto several megabits per second. Microwaves, coaxial cables, fiber optics and communications satellites are examples of broad-band channels.

Q.18. What is need for data communication?

Ans. Need for Data Communication

Following points highlight the need for data communication:

1. Sharing of Resources :

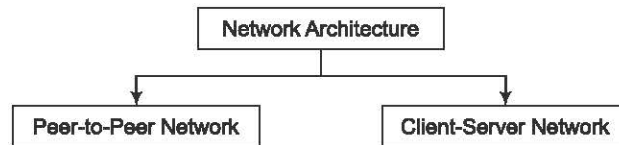
- (i) Primary goal of a computer network is to share resources.
- (ii) Computer networking allows sharing of resources.

Connections of computers in a network will enable you to share files and devices such as printers, CD-ROM drives, etc. It makes available programs, data and equipment available to anyone on the network irrespective of the physical location of the resource and the user. In case of over capacity utilization of the Central Processing Unit (CPU) of any one computer in network, the computer networks helps in transferring loads to another computer in the network.

2. **Sharing Information** : Information on a single computer can be accessed by other computers in the network. Computer networks allow you to share files with friends, family, co-workers and customers. Before the Internet and home networks became popular, files were often shared using floppy disks. Nowadays, some people still use CD-ROM / DVD-ROM disks and USB keys for transferring their photos and videos, but networks give you more flexible options.
3. **Fast & Accurate Communication** : Networks make communication among groups of people easy at remote locations through e-mail, chat, etc. It also facilitates rapid exchange of information and business data over the company's internal network. Use of the computer network and the internet allows users to access to data from anywhere in the world.
4. **Cost Effective** : Network provides information sharing and transfer from one computer to another computer located across continents almost instantaneously. It saves a large amount of time and resources. Now you can even talk face to face with your friends and relatives anywhere in the world.
5. **Security of Data** : Networks ensure greater security of stored data by enforcing authenticity and authorization rules of the users.

Q.19.Explain briefly Network Architecture.**Ans.****Network Architecture**

Network Architecture is an overall design of a computer network that describes how a computer network is configured and what strategies are being used. Computer networks are of two main types :



1. **Client-Server Network** : It is a network where several computers called clients or workstations are connected to the main computer called the server.
Server is a computer that provides services to clients and controls access to hardware, software and other resources.
Clients are the computers which request services like data retrieval, storage, etc. from the server.
2. **Peer-to-Peer Network** : Peer-to-Peer is a network where a few computers having equal capacity and capabilities are connected together to use the resources available on the network. The Peer-to-Peer network, there is no central server. Each computer can act as a server as well as client.

SECTION-C (LONG ANSWER TYPE) QUESTIONS**Q.1. Explain the different parts of MS Word 2016 window.****Ans.****Parts of MS Word 2017**

1. **Quick Access Toolbar**: It is present at the left-most corner of the Word window. It contains frequently-used commands. By default, it shows the **Save, Undo and Repeat** commands. You can add other commands depending on your preference.
 - (i) **Save** button is used to save your document.
 - (ii) **Undo** button is used to undo the previous action.
 - (iii) **Repeat** option is used to repeat the previous action.
2. **Ribbon**: A Ribbon is designed to respond to your current task. It contains multiple tabs- File, Home, Insert, Design, Page Layout, References, Mailings, Review and View, each with several groups of commands. You will use these tabs to perform the most common tasks in Word.
3. **Title Bar**: It is present at the top of the Word window. It shows the name of the document followed by the program name. There are five buttons in the right side of title bar. They are- Microsoft Word Help, Ribbon Display Options, Minimize, Restore Down/Maximize and Close.
 - (i) You can search for online help or from the local computer using the **Microsoft Word Help** button.
 - (ii) You can choose to minimize the Ribbon if you find that it takes up too much screen space using the **Ribbon Display Options** button.

- (iii) The **Minimize** button reduces a window to a small icon on the taskbar.
 - (iv) The **Maximize** button displays the full-screen view of the window.
 - (v) The **Restore Down** button appears when the window is maximized. It changes the window to its original size.
 - (vi) The **Close** button is used to close the window.
4. **Collapse the Ribbon Button:** You can collapse the ribbon if you need to see more of the document you are creating. To collapse the ribbon, click the arrow at the bottom right. When you click on this button, it will minimize the ribbon, only the tab names get displayed.
 5. **Box Launcher:** It is the small icon that appears in some groups. If you click on this icon, a dialog box related to that group opens. It may contain many options that you can select as per your choice.
 6. **Work Area:** It is the area where you can type text, insert pictures, tables, etc. A cursor is present in the work area which shows the position at which text appears when you type.
 7. **Rulers:** The Ruler makes it easier to adjust your document with precision. If you want, you can hide the Ruler to create more screen space. There are two rulers- Horizontal ruler and Vertical ruler.
 - (i) The **Horizontal ruler** is present at the top of the document window. It is used to set the left and right margins.
 - (ii) The **Vertical ruler** is present at the left of the document window. It is used to set the top and bottom margins.
 8. **Scroll Bars:** By default, the Vertical scroll bar and Horizontal scroll bar are shown. You can hide scroll bars if you want to display more of the document.
 - (i) The **Vertical scroll bar** is present to the right of the document window. You can drag the vertical scroll bar up and down to see parts of a document that are currently not visible.
 - (ii) The **Horizontal scroll bar** is present at the bottom of the document window. You can also drag the horizontal scroll bar left and right.
 9. **Status Bar:** It appears at the bottom of the Word window. It provides information such as the current page number, number of pages and words in the document on its left side. The View button and the Zoom slider are present on its right side.
 - (i) The View buttons are a feature that lets you change how the document appears. You can choose to view your document in Read Mode, Print Layout, or Web Layout. These views can be useful for various tasks, especially if you're planning to print the document.
 - (ii) The Zoom slider is available for zooming in and out of documents quickly and easily.

Q.2. How can you find and replace the text in Word 2016?

Ans. When you're working with longer documents, it can be difficult and time consuming to search for a particular word or text in a document. Word can automatically locate a specific word or text in a document using the Find feature, and it allows you to quickly change a specific word or text in a document using the Replace option.

Finding Text

To find a word or text in a document, follow these steps:

- (i) Click on the Find option in the Editing group on the Home tab. The Navigation Pane appears.
- (ii) Type the word that you want to find in the Search Document box.
- (iii) Now, click on a result in the Navigation pane to see it in the document.
MS Word searches the text you entered and displays the result in the Navigation Pane and also highlights the word in the document.
You can look at all the results by clicking on the Next Search Result and Previous Search Result arrows in the Navigation Pane.

Replacing the text

The Find and Replace commands can be combined to find a particular word or text in a document and replace it with another word or text.

To find and replace text, follow these steps:

- (i) Click on the Replace option in the Editing group on the Home tab. The Find and Replace dialog box appears with the Replace tab selected.
- (ii) Enter the text you want to search and replace in the Find what: box.
- (iii) Enter the new text to replace the existing text in the Replace with: box.
- (iv) Click Find Next.
- (v) Click on the Replace to change individual instances of text or Replace All to replace every instance of the text throughout the document.

Q.3. Explain character formatting in detail.

Ans.

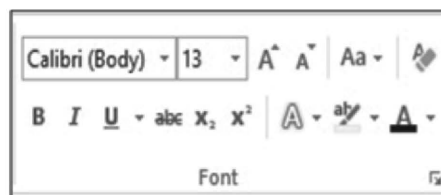
Meaning of Character Formatting

The process of displaying the selected text in a certain manner is called character formatting. It consists of text properties like bold, italic, underline, font style, font colour, font size, etc.

1. Increase or Decrease Font Size

The Increase Font Size and Decrease Font Size options are used to make your text a bit bigger and smaller respectively. To increase or decrease font size, follow the given steps:

- (i) Select the text.
- (ii) Click on the Increase Font Size to make the text bigger and Decrease Font Size to make the text smaller in the Font group on the HOME tab.



2. Changing the Case

When you need to quickly change text case, you can use the ChangeCase command instead of deleting and retyping text. Word 2016 allows you to change the case of typed text to any of the following five options:

Sentence case	Only the first letter of a sentence is displayed in uppercase. The rest of the letters are displayed in lowercase.
lowercase	All the letters are displayed in small letters (lowercase).

UPPERCASE	All the letters are displayed in capital letters (uppercase).
Capitalize Each Word	The first letter of each word is displayed in uppercase. The rest of the letters are displayed in lowercase.
tOGGLE cASE	It changes the case of every letter. The uppercase letters are changed to lowercase and the lowercase letters are changed to uppercase.

To change the case of the text, follow the given steps:

1. Select the text.
2. Click on the Change Case option in the Font group on the HOME tab.
3. Select the desired option.

3. Bold, Italic and Underline

The **Bold**, *Italic* or Underline options can be used to emphasize the text to make it stand out. These options can be used to help draw attention to important words or phrases.

To apply the Bold, Italic or Underline effect to the text, follow these steps:

- (i) Select the text.
- (ii) Click on the Bold option to bold the text, Italic option to italicize the text and Underline option to underline the text in the Font group on the HOME tab.

4. Strikethrough, Subscript and Superscript

Strikethrough is a font effect that cross something out by drawing a line through it.

To apply Strikethrough, follow these steps:

- (i) Select the text.
- (ii) Click on the Strikethrough in the Font group on the Hometab. It cross the text out by drawing a line through it.

Superscript refers to the text that is positioned slightly higher than the line of text. To apply Superscript, follow these steps:

- (i) Select the text.
- (ii) Click on the Superscript in the Font group on the HOME tab.

It positioned the selected text slightly higher than the line of text.

Subscript refers to the text that is positioned slightly lower than the line of text. To apply Subscript, follow these steps:

- (i) Select the text.
- (ii) Click on the Subscript in the Font group on the HOME tab.

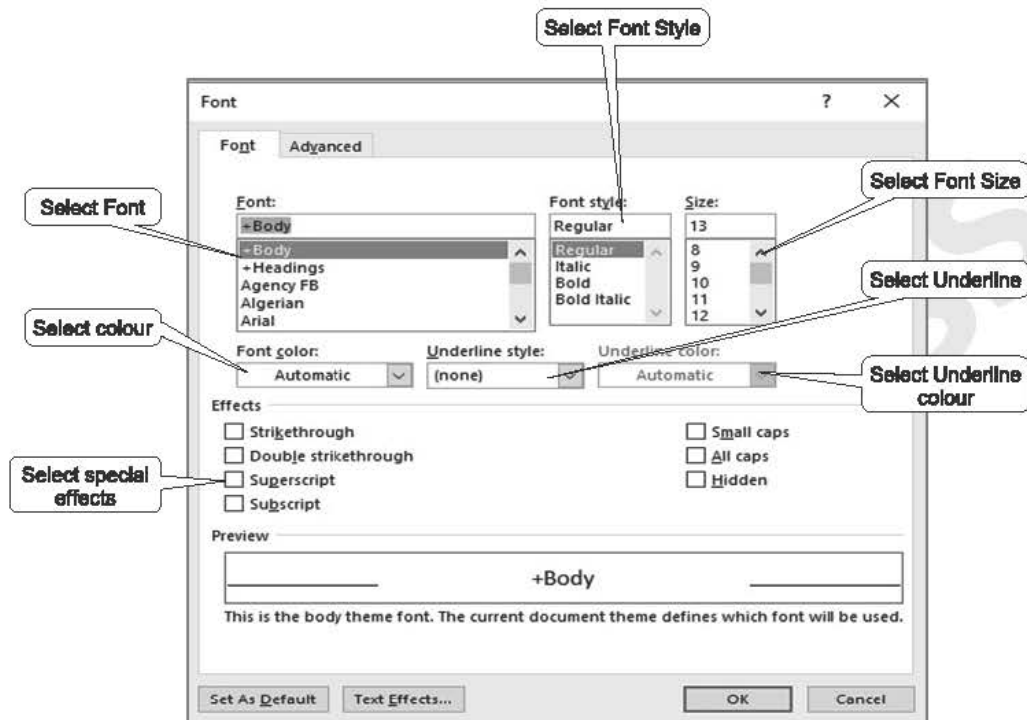
5. Text Effects

You can modify the appearance of the text by changing the fill or outline colour and adding effects like shadow, glow, reflection effects, etc. using the Text effects option.

To apply text effects, follow these steps:

- (i) Select the text.
- (ii) Click on the Text Effects and Typography option in the Font group on the HOME tab.
- (iii) Select the desired option.

It changes the appearance of the text.



6. Clear All Formatting

You can easily clear all formatting (such as bold, underline, italics, colour, superscript, subscript, and more) from your text and return your text to its default formatting styles. The Clear All Formatting option is used to remove all formatting from the selection, leaving only the normal, unformatted text.

To use the Clear All Formatting option, follow these steps:

- (i) Select the text.
- (ii) Click on the Clear All Formatting option in the Font group on the HOME tab.

It clears all the formatting.

7. Highlighting Text

Highlighting means making the text look different to draw the reader's attention towards it. We can highlight important parts using the Text Highlight Color option.

To highlight the text, follow these steps:

- (i) Select the text.
- (ii) Click on the Text Highlight Color option in the Font group on the HOME tab.

8. Character Formatting using the Font dialog box

You can use the more formatting options using the Font dialog box. To open the Font dialog box, click on the Font dialog box launcher in the Font group on the HOME tab.





Q.4. Explain Paragraph formatting in detail.

Ans. Paragraph Formatting

The paragraph formatting feature of Word 2016 can be used to format the appearance of text in a paragraph.

1. Aligning Text

The manner in which text is placed between the margins of a page is called alignment. Word 2016 allows you to change the alignment of the text to any of the following four options.

Align Left		It places the text towards the left margin leaving a ragged right edge. By default, the text is always aligned to the left margin.
Center		It places the text in the centre of the left and right margins.
Align Right		It places the text towards the right margin leaving a ragged left edge.
Justify		It places the text evenly between the left and right margin.

To align the text, follow these steps :

- (i) Select the text.
- (ii) Select the required Alignment options in the Paragraph group on the HOME tab.

2. Line Spacing

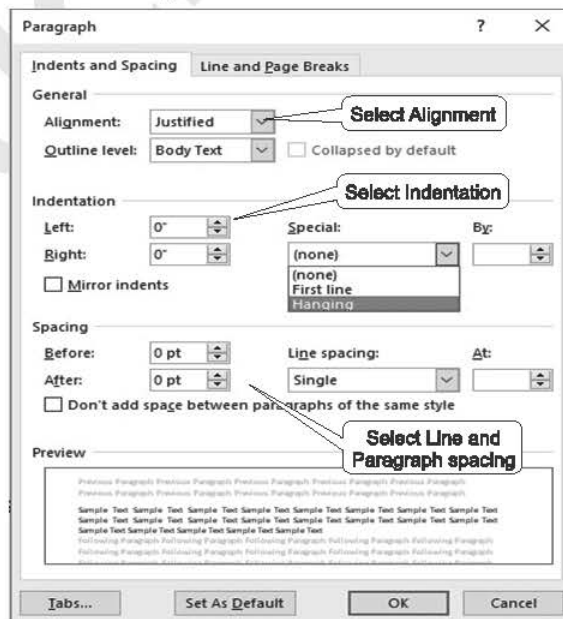
The amount of blank space left between the lines of text in a paragraph is called line spacing. It is measured in lines or units called points.

To increase or decrease the space between the lines, follow these steps :

- (i) Select the text.
- (ii) Click on the Line and Paragraph Spacing option in the Paragraph group on the HOME tab.
- (iii) Select the desired spacing value.

3. Paragraph Spacing

The amount of blank space above or below a paragraph is called paragraph spacing. To set the paragraph spacing, follow these steps :



- (i) Select the text.
- (ii) Click on the PAGE LAYOUT tab.
- (iii) Specify the required values in the Before: and After: spin boxes in the Paragraph group.

4. Indenting Text

The amount of spacing between the text and the page margins is called indentation. Various types of indentations are as follows :

Left indentation	It is used to specify the amount of spacing to be given from the left margin.	
Right indentation	It is used to specify the amount of spacing to be given from the right margin.	
Special indents	They are divided into two parts:	
	First line	It makes the first line of the paragraph indented more towards the right, compared to the subsequent lines.
	Hanging	It makes the first line of the paragraph indented more towards the left, compared to the subsequent lines.

To set the indentation for the text, follow these steps :

- (i) Select the text.
- (ii) Click on the PAGE LAYOUT tab.
- (iii) Specify the required values in the Left and Right spin boxes in the Paragraph group.

5. Paragraph Formatting using the Paragraph dialog box

You can apply the paragraph formatting using the Paragraph dialog box. To open the Paragraph dialog box, do one of the following :

- (i) Click on the Paragraph dialog box launcher in the Paragraph group on the HOME tab.
- (ii) Click on the Paragraph dialog box launcher in the Paragraph group on the PAGE LAYOUT tab.

Q.5. Explain Page formatting in detail.

Ans. **Meaning of Page Formatting**

Making changes to the settings of a page is called page formatting. The PAGE LAYOUT tab of Word 2016 is used for page formatting.

1. Page Margins

The Page Margin is the amount of white space between the text and the edge of the page on all four sides.

The default setting for the top, bottom, left and right margins in Word 2016 is 1 inch.

To set the page margins, follow these steps :

- (i) Click on the Margins option in the Page Setup group in the PAGE LAYOUT tab.
- (ii) A list of predefined margin settings appears. Click on a predefined margin setting you want, say, Normal.

2. Page Orientation

The Page Orientation is the property that determines the printing direction of the text. The page orientation can be either Portrait (document printed along the width of the paper) or Landscape (document printed along the length of the paper).

Video provides a powerful way to help you prove your point. When you click Online Video, you can paste in the embed code for the video you want to add. You can also type a keyword to search online for the video that best fits your document.

To make your document look professionally produced, Word provides header, footer, cover page, and text box designs that complement each other. For example, you can add a matching cover page, header, and sidebar. Click Insert and then choose the elements you want from the different galleries.

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To make your document look professionally produced, Word provides header, footer, cover page, and text box designs that complement each other. For example, you can add a matching cover page, header, and sidebar. Click Insert and then choose the elements you want from the different galleries.

To change the orientation of the page, follow these steps :

- (i) Click on the Orientation option in the Page Setup group in the PAGE LAYOUT tab.
- (ii) Select the desired orientation type as Portrait or Landscape.

3. Page Size

You must choose a page size before printing a document. To set the page size, follow these steps :

- (i) Click on the Size option in the Page Setup group in the PAGE LAYOUT tab.
- (ii) Select the desired page size.

4. Page Break

A Page Break indicates the end of a page. To insert a page break, follow these steps :

- (i) Click the position where you want to insert a page break.
- (ii) Click on the Page Break option in the Pages group in the INSERT tab.

Q.6. Explain different types of data transmission.

Ans.

Types of Data Transmission

Communication between two devices can be simplex, half-duplex, or full-duplex.

1. Simplex

In simplex mode, the communication is unidirectional, as on a one-way street. Only one of the two devices on a link can transmit; the other can only receive. Keyboards and traditional monitors are examples of simplex devices. The keyboard can only introduce input; the monitor can only accept output. The simplex mode can use the entire capacity of the channel to send data in one direction.

2. Half-Duplex

In half-duplex mode, each station can both transmit and receive, but not at the same time. When one device is sending, the other can only receive, and vice versa. The half-duplex mode is like a one-lane road with traffic allowed in both directions. When cars are traveling in one direction, cars going the other way must wait. In a half-duplex transmission, the entire capacity of a channel is taken over by whichever of the two devices is transmitting at the time. Walkie-talkies and CB (citizens band) radios are both half-duplex systems.

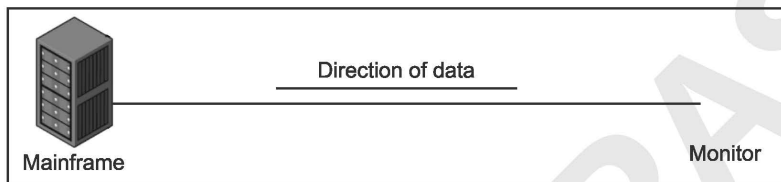
The half-duplex mode is used in cases where there is no need for communication in both directions at the same time; the entire capacity of the channel can be utilized for each direction.

3. Full-Duplex

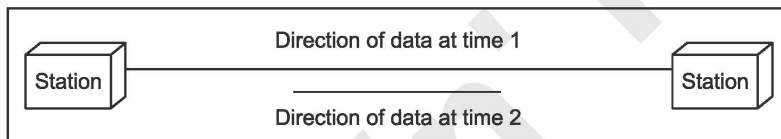
In full-duplex mode (also called duplex), both stations can transmit and receive simultaneously. The full-duplex mode is like a two-way street with traffic flowing in both directions at the same time. In full-duplex mode, signals going in one direction share the

capacity of the link: with signals going in the other direction. This sharing can occur in two ways: Either the link must contain two physically separate transmission paths, one for sending and the other for receiving; or the capacity of the channel is divided between signals traveling in both directions. One common example of full-duplex communication is the telephone network. When two people are communicating by a telephone line, both can talk and listen at the same time.

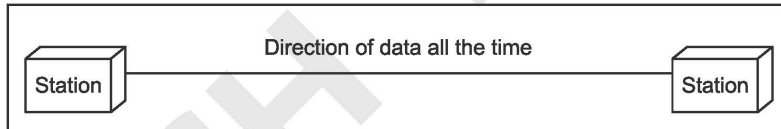
The full-duplex mode is used when communication in both directions is required all the time. The capacity of the channel, however, must be divided between the two directions.



(a) Simplex



(b) Half-duplex



(c) Full-duplex

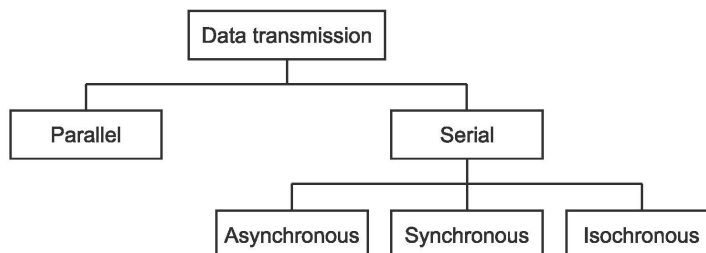
Q.7. Explain transmission modes in detail.

Ans.

Data Transmission Modes

Of primary concern when we are considering the transmission of data from one device to another is the wiring, and of primary concern when we are considering the wiring is the data stream. Do we send 1 bit at a time; or do we group bits into larger groups and, if so, how? The transmission of binary data across a link can be accomplished in either parallel or serial mode. In parallel mode, multiple bits are sent with each clock tick.

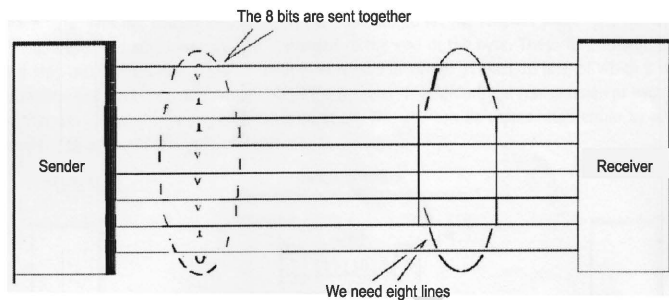
In serial mode, 1 bit is sent with each clock tick. While there is only one way to send parallel data, there are three subclasses of serial transmission: asynchronous, synchronous, and isochronous.



1. Parallel Transmission

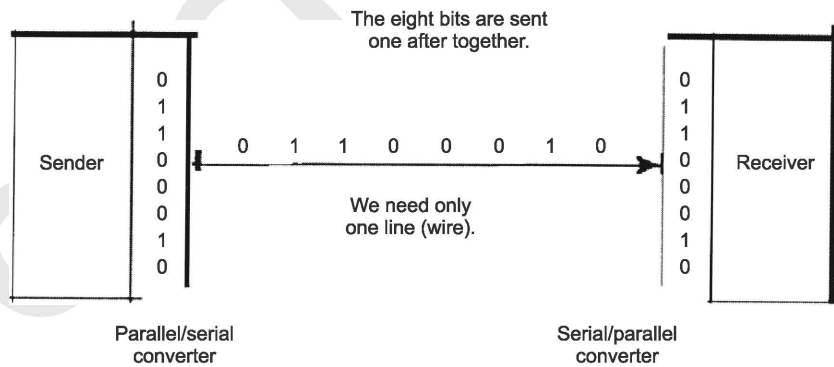
Binary data, consisting of 1s and 0s, may be organized into groups of n bits each. Computers produce and consume data in groups of bits much as we conceive of and use spoken language in the form of words rather than letters. By grouping, we can send data n bits at a time instead of 1. This is called parallel transmission.

The mechanism for parallel transmission is a conceptually simple one: Use n wires to send n bits at one time. That way each bit has its own wire, and all n bits of one group can be transmitted with each clock tick from one device to another. The figure given below shows how parallel transmission works for $n=8$. Typically, the eight wires are bundled in a cable with a connector at each end. The advantage of parallel transmission is speed. All else being equal, parallel transmission can increase the transfer speed by a factor of n over serial transmission.



2. Serial Transmission

In serial transmission one bit follows another, so we need only one communication channel rather than n to transmit data between two communicating devices.

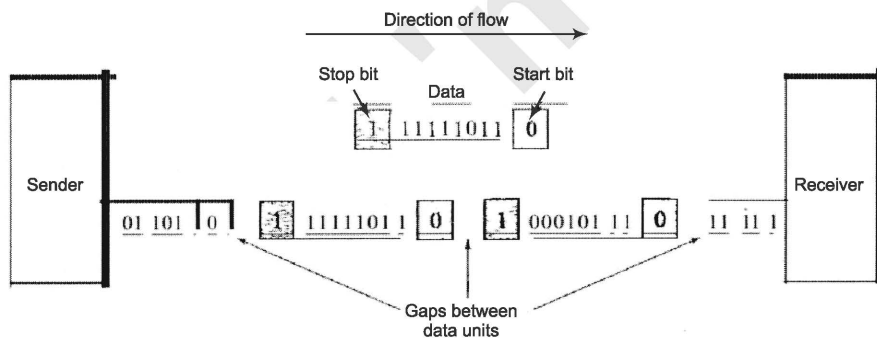


The advantage of serial over parallel transmission is that with only one communication channel, serial transmission reduces the cost of transmission over parallel by roughly a factor of n .

Since communication within devices is parallel, conversion devices are required at the interface between the sender and the line (parallel-to-serial) and between the line and the receiver (serial-to-parallel). Serial transmission occurs in one of three ways: asynchronous, synchronous, and isochronous.

- (i) **Asynchronous Transmission** : Asynchronous transmission is so named because the timing of a signal is unimportant. Instead, information is received and translated by agreed upon patterns. As long as those patterns are followed, the receiving device can retrieve the information without regard to the rhythm in which it is sent. Patterns are based on grouping the bit stream into bytes. Each group, usually 8 bits, is sent along the link as a unit. The sending system handles each group independently, relaying it to the link whenever ready, without regard to a timer.

Without synchronization, the receiver cannot use timing to predict when the next group will arrive. To alert the receiver to the arrival of a new group, therefore, an extra bit is added to the beginning of each byte. This bit, usually a 0, is called the start bit. To let the receiver know that the byte is finished, 1 or more additional bits are appended to the end of the byte. These bits, usually 1s, are called stop bits. By this method, each byte is increased in size to at least 10 bits, of which 8 bits is information and 2 bits or more are signals to the receiver. In addition, the transmission of each byte may then be followed by a gap of varying duration. This gap can be represented either by an idle channel or by a stream of additional stop bits.

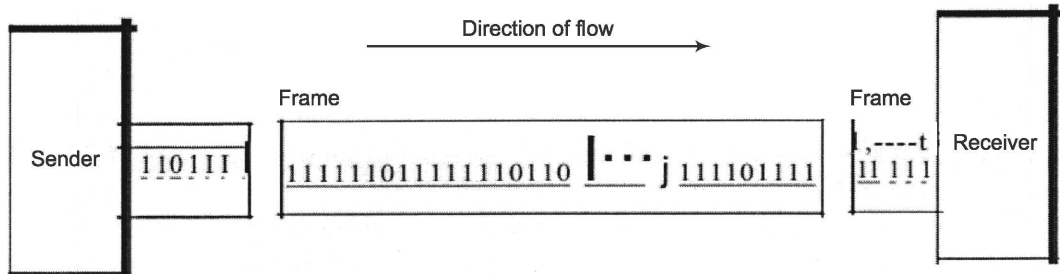


- (ii) **Synchronous Transmission** : In synchronous transmission, the bit stream is combined into longer “frames,” which may contain multiple bytes. Each byte, however, is introduced onto the transmission link without a gap between it and the next one. It is left to the receiver to separate the bit stream into bytes for decoding purposes. In other words, data are transmitted as an unbroken string of 1s and 0s, and the receiver separates that string into the bytes, or characters, it needs to reconstruct the information.

In synchronous transmission, we send bits one after another without start or stop bits or gaps. It is the responsibility of the receiver to group the bits.

The Figure gives a schematic illustration of synchronous transmission. We have drawn in the divisions between bytes. In reality, those divisions do not exist; the sender puts its data onto the line as one long string. If the sender wishes to send data in separate

bursts, the gaps between bursts must be filled with a special sequence of 0s and 1s that means idle. The receiver counts the bits as they arrive and groups them in 8-bit units.



Without gaps and start and stop bits, there is no built-in mechanism to help the receiving device adjust its bit synchronization midstream. Timing becomes very important, therefore, because the accuracy of the received information is completely dependent on the ability of the receiving device to keep an accurate count of the bits as they come in. The advantage of synchronous transmission is speed. With no extra bits or gaps to introduce at the sending end and remove at the receiving end, and, by extension, with fewer bits to move across the link, synchronous transmission is faster than asynchronous transmission. For this reason, it is more useful for high-speed applications such as the transmission of data from one computer to another. Byte synchronization is accomplished in the data link layer. We need to emphasize one point here. Although there is no gap between characters in synchronous serial transmission, there may be uneven gaps between frames.

- (iii) **Isochronous** : In real-time audio and video, in which uneven delays between frames are not acceptable, synchronous transmission fails. For example, TV images are broadcast at the rate of 30 images per second; they must be viewed at the same rate. If each image is sent by using one or more frames, there should be no delays between frames. For this type of application, synchronization between characters is not enough; the entire stream of bits must be synchronized. The isochronous transmission guarantees that the data arrive at a fixed rate.

Q.8. Explain the different applications, components and various types of computer network.

Ans. Applications of Computer Network

There are various applications of network system; some of them are as follows:

1. Mobile Phones

Today mobile phones have become an essential part of almost everyone's life. Even some of them can't imagine their daily life without it. With the help of mobile people are accessible almost anytime and anywhere. The mobile phone has totally changed the world. All it could be possible through network systems.

2. ATM (Automated Teller Machine)

ATM is a data terminal used for money transactions. If you have ever faced an unexpected need for cash, then you have probably accessed an ATM machine. ATM allows you access to the cash in your bank account whenever you need it.

3. Online Banking

Network has made possible 24 hour online banking service for all their customers. One doesn't have to go to the bank's branch to request a financial statement. We can download it from our online bank account, which shows us up-to-the minute updated figures. Thousands of customers can be dealt with at once. There is no need to have too many clerks and cashiers. The administrative work gets reduced drastically with Internet banking.

4. Instant Reservations

Reservations for trains, airplanes, hotels, restaurants and theatres are possible 24 × 7 for anywhere in the world instant confirmation even without leaving home. Now you can plan your trips instantly according to your convenience.

5. Cable and Satellite Television

Today cable and satellite television is a top media for news updates and entertainment. We can have a clear idea that what is happening in the world, we can have live information about the several good or bad events happening on the globe. One can have a weather forecast and accordingly plan several things before time. It is also a good source of entertainment which is very cheap and within the access of everyone.

6. Internet

Today internet is a essential need for knowledge and information sharing. It is not just provide access to e-mail, chat rooms and search engines but Internet has great potential and lot of stuff to offer. It also became the best business tool of modern scenario. Today internet has brought a globe in a single room. Right from news across the corner of the world, wealth of knowledge to shopping, purchasing the tickets of your favourite movie-everything is at your fingertips.

7. Video Conferencing

Video conferencing has to offer is the ability to meet with people in remote locations without incurring travel expenses or other expenses associated with face to face communication. Business meetings, educational meetings, healthcare conferences and more can all be easily conducted thanks to video conferencing technology.

8. GPS (Global Positioning System)

GPS is a satellite based global positioning system that provides reliable location and time information in all weather and at all times and anywhere on or near the Earth. Global positioning systems are widely in use today for navigation, map making, land survey for fishing, vehicle tracking, and many scientific applications. GPS receivers can be incorporated into cars, boats, computers, mobile phones, watches and more.

Components of Network

The different components of network are:

1. Server

A server is a powerful computer or a series of computer with high speed and great processing capability. It can link other computers or electronic devices together over servers to provide important services to both private and public users.

2. Client

A client is a computer system which uses a network to access a remote service from the server. It can access all the applications or information from the main server. A client is also known as a node.

3. Switch

A switch is used in a wired network to connect Internet cables from a number of devices together. The switch allows each device to talk to the others.

4. Hub

A hub is just like a switch. It is also used in a wired network to connect Ethernet cables from a number of devices together.

5. Network Interface Card (NIC)

It is a small piece of computer hardware — a LAN Card, which facilitates the communication between different computers over a network. The NIC identifies every single node in a network by providing a unique physical address to it. This address is stored on the chip, which is mounted on the card.

6. Mode of Connection

Computer networks can be classified on the basis of both hardware and software technology which is used to interconnect the individual devices in a network, such as optical fibre, ethernet or wireless LAN. All the nodes in a network are connected through basic hardware components such as NICs, Bridges, Hubs, switches and Routers.

7. Modem

A 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. There are two types of modems: Wireless Modem and Cable Modem.

Types of Computer Network

There are four basic type of computer network:

1. Local Area Network (LAN)

A local area network (LAN) is a computer network that connects computers and devices in a limited geographical area such as home, school, computer laboratory or office building. Each computer in a LAN has its own CPU to access hardware devices and software anywhere on the network. This means that many users can share expensive devices, such as Printers, Disks, Scanners, Modem, as well as data files. Users can also use the LAN to communicate with each other, by sending e-mail or engaging in chat sessions. The maximum range of LAN card can be 10 kilometre. The number of computers in a LAN varies from 2 to 1000.

2. Metropolitan Area Network (MAN)

A MAN usually interconnects a number of local area networks (LANs) using a high-capacity data transfer technology, such as fibre-optical links or radio frequency links, within a large geographic area. It can cover an entire city. The most common example of a MAN type of network in our daily life is cable Television Network. The maximum range of MAN can be 50 km.

3. Wide Area Network (WAN)

A WAN is used to connect sites that span in larger geographic areas or locations beyond the boundaries of regions, countries or continents, linked by communication facilities like Telecommunication or satellite signals. Dedicated high-capacity data transfer fibre-optical cabling or satellite up links is used to connect this type of networks.

The most common example of a WAN type network in our daily life is Telecom system. The usage of WAN is limited to very large organizations and government agencies. The main characteristics of WAN are that it requires a public telecommunication media to transfer data.

4. Personal Area Network (PAN)

A computer network which is used for communication among computers and different information technological devices close to each other is called a PAN. Some examples of the devices that are used in a PAN are personal computers, printers, fax machines, scanners and even video game consoles. A PAN may include wired and wireless devices.

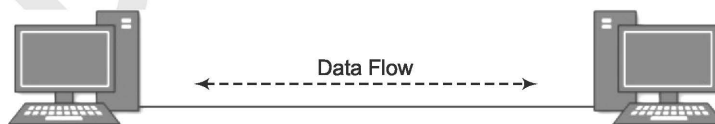
Q.9. What is network topology? Explain the different type of network topologies.

Ans.

Meaning of Network Topology

A Network Topology is the way computer systems or network equipment connected to each other. Topologies may define both physical and logical aspect of the network. Both logical and physical topologies could be same or different in a same network.

Point-to-point networks contains exactly two hosts (computer or switches or routers or servers) connected back to back using a single piece of cable. Often, the receiving end of one host is connected to sending end of the other end and vice-versa.



If the hosts are connected point-to-point logically, then may have multiple intermediate devices. But the end hosts are unaware of underlying network and see each other as if they are connected directly.

Types of Network Topology

Following are the main types of network topology:

1. Bus Topology

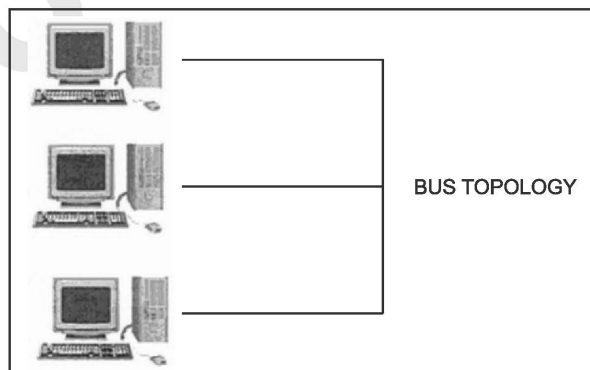
In this case all the server/nodes share a common bus of connecting cables. Every computer can communicate directly with every other computer or device in the network. Each node is given an address. To access a particular, a user just needs to know its address. This topology is frequently used with local area networks. Going through a hierarchy of nodes is not necessary.

Advantages of the Bus Network : Main advantages of bus network are:

- (i) **Short Cable Length and Simple Wiring Layout :** Because there is a single common data path connecting all nodes, the bus topology allows a very short cable length to be used. This decreases the installation cost and also leads to a simple, easy to maintain, wiring layout.
- (ii) **Resilient Architecture :** The bus architecture has an inherent simplicity that makes it very reliable from a hardware point of view. There is a single cable through which all data passes and to which all nodes are connected.
- (iii) **Easy to Extend :** Additional nodes can be connected to an existing bus network at any point along its length. More extensive additions can be achieved by adding extra segments connected by a type of signal amplifier known as a repeater.

Disadvantages of the Bus Network: Following are the main disadvantages:

- (i) **Fault Diagnosis is Difficult :** Although the simplicity of the bus topology means that there is very little that can go wrong, fault detection is not a simple matter. In most LANs based on a bus, control of the network is not centralized in any particular node. This means that detection of a fault may be performed from many points in the network.
- (ii) **Fault Isolation is Difficult :** In the star topology, a defective node can easily be isolated from the network by removing its connection at the center. If a node is faulty on a bus, it must be rectified at the point where the node is connected to the network. Once the fault has been located the node can simply be removed. In the case where the fault is the network medium itself, an entire segment of the bus must be disconnected.
- (iii) **Repeater Configuration :** When a bus-type network has its backbone extended using repeaters, reconfiguration may be necessary. This may involve tailoring cable lengths, adjusting terminators, etc.
- (iv) **Nodes must be Intelligent :** Each node on the network is directly connected to the central bus. This means that some way of deciding who can use the network at any given time must be performed in each node. It tends to increase the cost of the nodes irrespective of whether this is performed in hardware or software



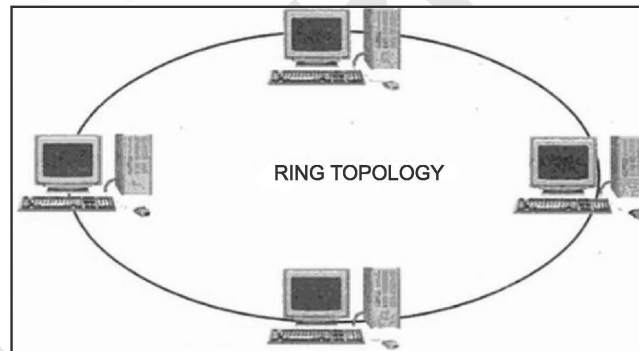
2. Ring Topology

As the name suggests all the server/nodes are joined together to form a ring. There is no central server in this case. A ring may be unidirectional or bi-directional. A unidirectional ring moves data in one direction only; a bi-directional ring moves data in both directions, but only

one direction at a time. In a unidirectional ring, if one computer breaks down, special software is required to keep the network functional. When one node malfunctions in a bi-directional ring, a message can usually be sent in the opposite direction still allowing the node to communicate with all the other active nodes in the network.

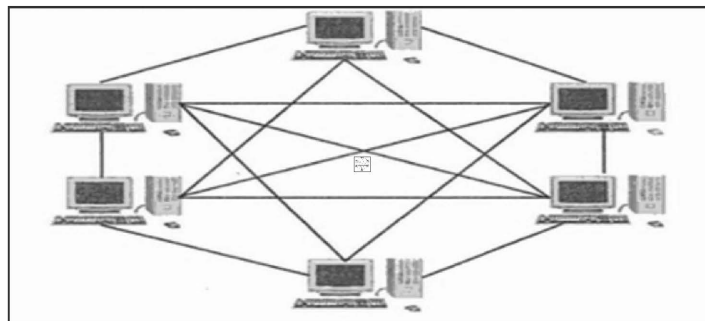
Advantages of the Ring Network: Following are the main advantages of ring network:

- (i) **Short Cable Length :** The amount of cabling involved in a ring topology is comparable to that of a bus and is small relative to that of a star. This means that less connections will be needed, which will in turn increase network reliability.
- (ii) **No Wiring Closet Space Required :** Since there is only one cable connecting each node to its immediate neighbours, it is not necessary to allocate space in the building for wiring closets.
- (iii) **Suitable for Optical Fibers :** Optical fibers offer the possibility of very high speed transmission. Because traffic on a ring travels in one direction, it is easy to use optical fibers as a medium of transmission. Also, since a ring is made up of nodes connected by short segments of transmission medium, there is a possibility of mixing the types used for different parts of the network. Thus, a manufacturing company's network could use copper cables in the office area and optical fibers in the factory areas, where electrical interference may be a problem.



3. Mesh Topology

A network topology featuring a direct path between two nodes. The backbone of this topology looks like this, where most major cities have a direct connection to most major cities.



MESH TOPOLOGY

Advantages of the Mesh Network: Following are its main advantages:

- (i) **Units Affected by Media Failure :** Mesh topologies resist media failure better than other topologies. Implementations that include more than two devices will always have multiple paths to send signals from one device to another. If one path fails, the transmission signals can be routed around the failed link. Theoretically, no units are affected by media failure. However, if all paths normally use the maximum capacity of each link, some performance degradation will occur as signals are routed around a failed link.
- (ii) **Ease of Installation :** Mesh networks are relatively difficult to install because each device must be linked directly to all other devices. As the number of devices increases, the difficulty of installation increases geometrically.
- (iii) **Ease of Troubleshooting :** Mesh topologies are easy to troubleshoot because each medium link is independent of all others. You can easily identify faults and can isolate the affected link.
- (iv) **Ease of Reconfiguration :** Mesh topologies are difficult to reconfigure for the same reasons that they are difficult to install.

4. Tree Topology

From a purely topological viewpoint, this network resembles an interconnection of star networks. Individual peripheral nodes must transmit to and receive from one other node only, toward a central node. An advantage of a tree structure is that functional groupings can be created.

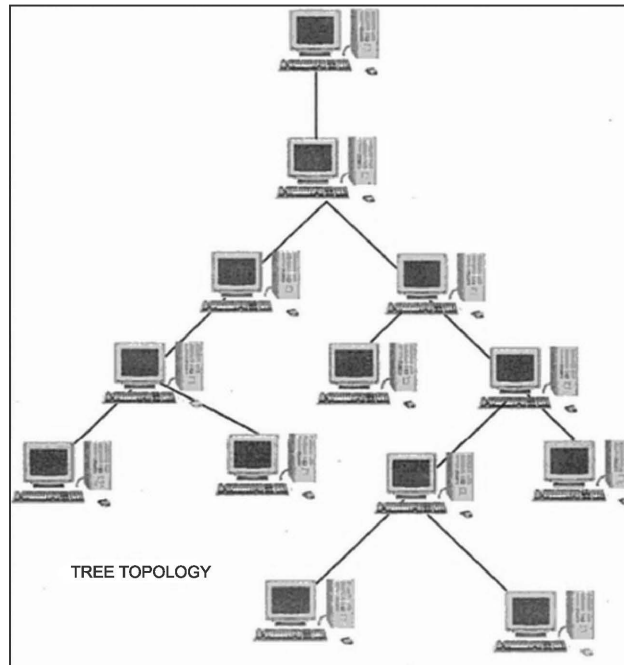
For example, one branch could contain all the general ledger terminals, another branch all the accounts receivable terminals, and so on. If one branch stops functioning, the other branches in a tree network are not affected. However, data movement through this network can be slow.

Advantages of the Tree Network: Main advantages of tree topology are:

- (i) **Easy to Extend :** Because the tree is of its very nature, divided into subunits, it is easier to add new nodes or branches to it.
- (ii) **Fault Isolation :** It is possible to disconnect whole branches of the network from the main structure. This makes it easier to isolate a defective node.

Disadvantages of the Tree Network: Main disadvantages of tree network are:

- (i) **Dependant on the Root :** If the "headend" device fails to operate, the entire network is rendered inoperable. In this respect, the tree suffers from the same reliability problems as the star.



5. Star Topology

In this case all the computers and the main server form a star like shape. All the computers are connected to a single main host. All communication first goes through the centralized computer allowing it to control the operation, work load, and resource allocation of the other computers in the network. For example, a bank with branch offices would typically use a star network to control and coordinate those branches. The advantage is relative simplicity, but a problem exists with the single-point vulnerability of the network. If the central computer breaks down, none of the other computers can communicate with each other.

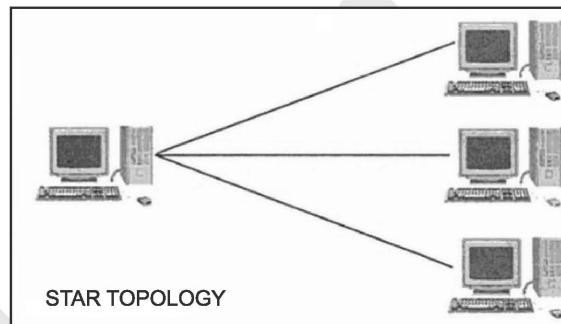
Advantages of the Star Network: Main advantages are as follows:

- (i) **Ease of Service :** The star topology has a number of concentration points, i.e. at the central node or at intermediate wiring closets. These provide easy access for service of reconfiguration of the network.
- (ii) **One Device per Connection :** Connection points in any network are inherently prone to failure. In the star topology, failure of a single connection typically involves disconnecting one node from an otherwise fully functional network.
- (iii) **Centralized Control/ Problem Diagnosis :** The fact that the central node is connected directly to every other node in the network means that faults are easily detected and isolated. It is a simple matter to disconnect failing nodes from the system.
- (iv) **Simple Access Protocols :** Any given connection in a star network involves only the central node and one peripheral node. In this situation, contention for who has control

of the medium for transmission purposes is easily solved. Thus in a star network, access protocols are very simple.

Disadvantages of the Star Network: Following are the main disadvantages of star network:

- (i) **Long Cable Length :** Because each node is directly connected to the centre, the star topology necessitates a large quantity of cable. While the cost of the cable is often small, congestion in cable ducts and maintenance and installation problems can increase costs considerably.
- (ii) **Difficult to Expand :** The addition of a new node to a star network involves a connection all the way to the central node. Expansion is usually catered for by providing large numbers of redundant cables during the initial wiring. However, problems can arise if a longer cable length is needed or an unanticipated concentration of nodes is required.
- (iii) **Central Node Dependency :** If the central node in a star network fails, the entire network is rendered inoperable. This introduces heavy reliability and redundancy constraints on this node.



□

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MODEL PAPER

Introduction to Computer Application

B.Com.-I (SEM-I)

[M.M. : 75

Note : Attempt all the sections as per instructions.

Section-A : Very Short Answer Type Questions

Instruction : Attempt all **FIVE** questions. Each question carries **3 Marks**. Very Short Answer is required, not exceeding 75 words.

1. Which type of computer is single user computer system?
2. Which component is used to convert the DML statements into regular function?
3. What does a rectangle in a DFD represent?
4. Write down the shortcut key for Copy and Paste.
5. Give two examples of half-duplex system.

Section-B : Short Answer Type Questions

Instruction : Attempt all **TWO** questions out of the following 3 questions. Each question carries **7.5 Marks**. Short Answer is required not exceeding 200 words.

6. How does the computer helpful in the field of defence and agriculture?
Or Explain the different types of functions that can be automated in office.
7. What are the different issues of integration of application?
Or What are the disadvantages of DBMS system?
8. Design a flowchart for the computation of factorial N (NI).
Or How can you select text in Word 2016?

Section-C : Long Answer Type Questions

Instruction : Attempt all **THREE** questions out of the following 5 questions. Each question carries **15 Marks**. Answer is required in detail, between 500-800 words.

9. Explain some specific purpose application software in detail.
Or Explain hexadecimal number system in detail.
10. Explain the Components of DBMS in detail.
Or Explain Relational Data Model in detail. Also discuss its advantages and disadvantages.
11. Explain the symbols used in flowchart.
Or Explain the DFD rules.
12. What is network topology? Explain the different type of network topologies.
Or Explain transmission modes in detail.
13. Explain Data Definition Language (DDL) in detail.
Or Explain Paragraph formatting in detail.

□