

Information Technology (5th Batch)

Long Questions

1. Mention the different categories of digital computers and compare it.

Computers can be classified by their size and power as follows:

- Super Computers
- Mainframe Computers
- Mini Computers
- Work Stations
- Micro Computers/ Personal Computer

Super Computers:

- They are the computers with the most processing power.
- The primary application of supercomputers has been in scientific and military work, but their use is growing in business as their prices decreases.
- They are especially valuable for large simulation models of real world phenomena, where complex mathematical representations and calculations are required or for image creation and processing.
- They are also used in weather prediction, design aircraft (Boeing 777), motion picture like star wars and Jurassic Park
- They operate generally at 4 to 10 times faster than the next most powerful computer class., the mainframe.

Mainframe Computers:

- They are less powerful and generally less expensive than supercomputers.
- Large corporate use mainframe computers for centralized data processing maintaining large databases.
- Application than run on a mainframe can be large and complex, allowing for data and information to be shared throughout the organization.
- Examples: Airline Reservation System, Corporate Payroll, Student Information etc.
- A mainframe system may have anywhere from 50megabytes to several gigabytes of primary storage.
- Secondary storage may use high capacity magnetic and optical storage media with capacities in the gigabytes to terabyte range.
- Typically, several hundreds or thousands or online computers can be linked to a mainframe.
- Advance mainframe performs more than 1,000 MIPS and can handle up to one billion transactions per day.

Mini Computers:

- Also called midrange computers, are relatively small, inexpensive and compact computers that perform the same functions as mainframe computers but to limited extent.

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- They are designed especially for accomplishing specific tasks such as process control, scientific research, and engineering applications.
- IBM is the market leader in minicomputers with its AS/400 series of computers.
- Larger companies gain greater corporate flexibility by distributing data processing with minicomputers in organizations units instead of centralization at one place.
- They form the network.

Workstations:

- Computers vendors originally developed desktop engineering workstations or to provide the high levels of performance demanded by engineers.
- They are based on RISC (Reduced Instruction Set Computing) architecture and provide both very high speed calculations and high resolution graphic displays.
- The distinction between workstation and personal computers is rapidly blurring.
- The latest PC's have the computing power of recent workstation.

Micro Computers:

- These are also called PCs and are the smallest and least expensive category of general purpose computers.
- Microcomputer ranges from palmtops to Desktop computers. Laptops/ Notebooks are very popular now days.
- Microprocessor is the core part of the Microcomputers which forms the CPU.

2. Explain the different types of database management system with example.

Database Management System is of four types: Hierarchical Model, Network model, Relational Model, and Object-Oriented Model.

Hierarchical Model: Hierarchical Database model is one of the oldest database models. The hierarchical model assumes that a tree structure is the most frequently occurring relationship. In this model data follow the hierarchical model. Rather than one record type (flat file), a business has to deal with several types which are hierarchically related to each other, e.g. company has several departments, each with attributes: name of director, number of staff, address. Certain types of geographical data may fit the hierarchical model well, e.g. Census data organized by state, within state by city, within city by census tract. The database keeps track of the different record types, their attributes, and the hierarchical relationships between them. The attribute which assigns records to levels in the database structure is called the key.

Network Model: The Network Model structures in a network connecting every node. The network model was evolved to specifically handle non-hierarchical relationships. The network model has greater flexibility than the hierarchical model for handling complex spatial relationships.

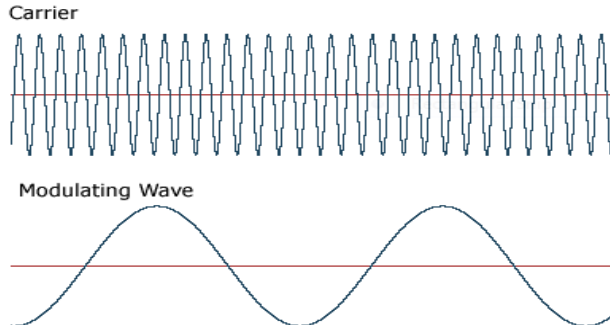
Relational Model: In an RDBMS, a database is considered to be a collection of interrelated data and programs. The data in a database has to be related. For example, in a College Management System, which takes care of maintaining students' records, storing data such as the salary details of the teachers would be inappropriate and considered unrelated. On the other hand the marks details, fee details and other personal details of students would be considered 'interrelated' data. The programs in a database perform the role of manipulating this data. A database that is designed on the concept of 'relational' model is called a 'Relational Database Management System'. A relational database is made up of set of relations or tables. These tables store user data as well as system data. Each of these relations is made up of attributes (fields) and tuples (records). Structured Query Language (SQL) serves as a uniform interface for users providing a collection of standard expressions for storing and retrieving data.

Object-oriented Model: Object-oriented model represents an entity as a class. A class represents both object attributes as well as the behavior of the entity. The objects that falls in the similar class have the similar behavior as mentioned in the class and each object may have special attributes to distinguish itself from other object.

3. Explain the different types of modulation with suitable figure.

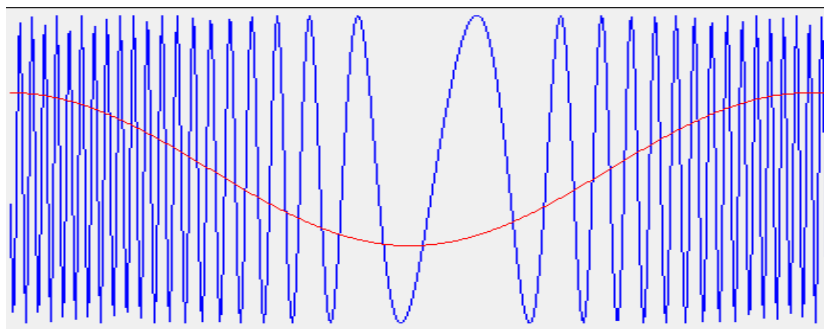
Amplitude of Modulation:

In this type of modulation, w_c and q are kept constant. The amplitude E_c of the carrier wave is varied in accordance with the modulating wave.



Frequency Modulation:

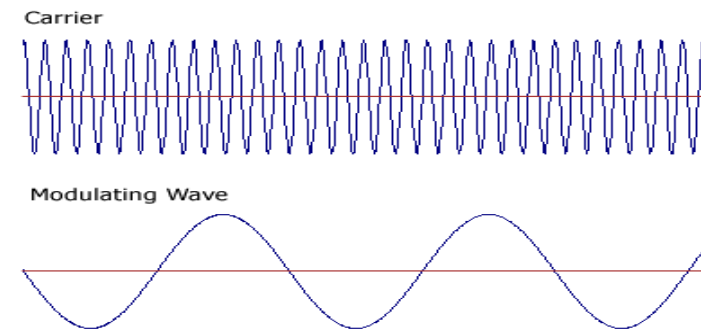
In this type of modulation, E_c and q are kept constant. The frequency w_c of the carrier wave is varied in accordance with the modulating wave.



Phase Modulation:

In this type of modulation, E_c , w_c are kept constant. The phase angle q of the carrier wave is varied according to the modulating wave. The common name for "phase modulation" and "frequency modulation" is "angle modulation".

The digital transmission of analog signals involves pulse modulation. In analog pulse modulation, time is represented in discrete form. In digital pulse modulation, both time and signal amplitude are represented in discrete form.



Short Questions

4. What are the major components of a computer?

CPU(Central Processing unit):-

This is the brain of your computer and directly affects how fast your computer can "think". Faster/better the CPU the faster/better the computer

MOTHERBOARD:- This is the central nervous system of your computer. It is basically the body in which all your hardware connects to. It is the underlining circuitboard of your computer and connects everything together. Again a better motherboard = a faster/better computer

RAM (random access memory): - Random Access Memory (RAM) provides space for your computer to read and write data to be accessed by the CPU (central processing unit). When people refer to a computer's memory, they usually mean its RAM. If you add more RAM to your computer, you reduce the number of times your CPU must read data from your hard disk. RAM is volatile, so data stored in RAM stays there only as long as your computer is running. As soon as you turn the computer off, the data stored in RAM disappears. When you turn your computer on again, your computer's boot firmware (called BIOS on a PC) uses instructions stored semi-permanently in ROM chips to read your operating system and related files from the disk and load

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them back into RAM. More RAM means generally means a faster computer however you can get away with a little less if your computer is pretty clean. Cheap way to boost performance.

HARD DISK DRIVE:- A hard disk drive (often shortened as hard disk, hard drive, or HDD) is a non-volatile storage device that stores digitally encoded data on rapidly rotating platters with magnetic surfaces. Strictly speaking, "drive" refers to a device distinct from its medium, such as a tape drive and its tape, or a floppy disk drive and its floppy disk. Basically stores all the info on your computer. More Harddrive space = more "stuff" you can put on your computer

POWER SUPPLY:- A power supply unit (PSU) is the component that supplies power to the other components in a computer. More specifically, a power supply unit is typically designed to convert general-purpose alternating current (AC) electric power from the mains to usable low-voltage DC power for the internal components of the computer. Some power supplies have a switch to change between 230 V and 115 V. Other models have automatic sensors that switch input voltage automatically, or are able to accept any voltage between those limits. Computer power supplies are rated based on their maximum output power. Typical power ranges are from 300 W to 500 W (lower than 300 W for Small form factor systems) and are intended for ordinary home computers, the use of which is limited to Internet-surfing and burning and playing DVDs[citation needed]. Power supplies used by gamers and enthusiasts mostly range from 450 W to 1400 W. Typical gaming PCs feature power supplies in the range of 500-800 W, with higher-end PCs demanding 800-1400 W supplies. The highest-end units are up to 2 kW strong and are intended mainly for servers and, to a lesser degree, extreme performance computers with multiple processors, several hard disks and multiple graphics cards (ATI CrossFire or NVIDIA SLI). Basically the power needed to run you cpu. more demanding computer needs more power.

5. What are the different types of software used in computer systems?

The different types of computer of software used in computer system are as follows:

a. System Software:

System software or operating system is the software used by the computer to translate inputs from various sources into a language which a machine can understand. Basically, the OS coordinates the different hardware components of a computer. There are many OS in the market. The most popular Os are from the stable of Microsoft. We have all heard, used and wondered at the Windows software, which is an OS. Starting with Windows, Microsoft has migrated to Vista, its latest offering in the market. It may come as a surprise to some that there are other operating systems used by others. Among these UNIX is used for large office setups with extensive networking. XENIX is software which has now become redundant. HP -UX and AIX are some operating systems used by HP computers. Apache OS is quite popular with web servers. IBM still uses proprietary operating systems for its main frames. Proprietary systems are generally built with the help of a variant of UNIX operating system.

b. Application software:

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A normal user rarely gets to see the operating system or to work with it. But all of us are familiar with application software which we must use to interact with a computer. Popular examples of application software are the Microsoft office suite which includes Word, Excel and PowerPoint. We have used these applications extensively. Internet explorer, Mozilla Firefox is two applications used to access the internet. E-mail software like Outlook express is used to manage Emails. It is obvious that all software utilized for working on a computer is classified as application software. In fact all user interfaces are an application. The anti-virus is an application and so is the Media player.

6. What are the major characteristics of data in database?

The major characteristics of data in database are as follows:

Shared: Data in a database is shared among different users and applications.

Persistence: Data in a database exist permanently in the sense; the data can live beyond the scope of the process that created it.

Validity/Integrity/Correctness: Data should be correct with respect to the real world entity that they represent.

Security: Data should be protected from unauthorized access.

Consistency: Whenever more than one data element in a database represents related real-world values, the values should be consistent with respect to the relationship.

Non-redundancy: No two data items in a database should represent the same real-world entity.

Independence: The three levels in the schema (internal, conceptual and external) should be independent of each other so that the changes in the schema at one level should not affect the other levels.

7. What do you mean by normalization?

Normalization is the process of building database structures to store data. Normalization is a formal process of developing data structures in a manner that eliminates redundancy and promotes integrity. Data normalization is a corner stone of the relational theory. In relational database design, the process of organizing data to minimize redundancy is called normalization. Normalization usually involves dividing a database into two or more tables and defining relationships between the tables. The objective is to isolate data so that additions, deletions, and modifications of a field can be made in just one table and then propagated through the rest of the database via the defined relationships. There are three main normal forms, each with increasing levels of normalization: First Normal Form (1NF), Second Normal Form (2NF), and Third Normal Form (3NF). There are additional normalization levels, such as Boyce Codd Normal Form (BCNF), fourth normal form (4NF) and fifth normal form (5NF). While normalization makes databases more efficient to maintain, they can also make them more complex because data is separated into so many different tables.

8. What are the major components of computer networks?

Do yourself.

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9. What are the major advantages of distributed data processing?

Do yourself.

10. What are the different protocols available on the internet?

Types of Network Protocols

The most common network protocols are:

Ethernet:-

- The Ethernet protocol is by far the most widely used.
- Ethernet uses an access method called CSMA/CD (Carrier Sense Multiple Access/Collision Detection).
- This is a system where each computer listens to the cable before sending anything through the network. If the network is clear, the computer will transmit. If some other node is already transmitting on the cable, the computer will wait and try again when the line is clear.
- The Ethernet protocol allows for bus, star, or tree topologies. Data can be transmitted over wireless access points, twisted pair, coaxial, or fiber optic cable at a speed of 10 Mbps up to 1000 Mbps.

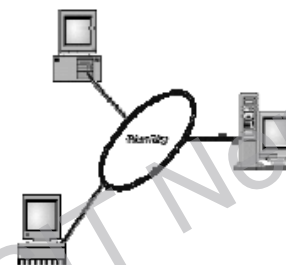


Local Talk:-

- Local Talk is a network protocol that was developed by Apple Computer, Inc. for Macintosh computers.
- The method used by Local Talk is called CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance).
- It is similar to CSMA/CD except that a computer signals its intent to transmit before it actually does so.
- The Local Talk protocol allows for bus, star, or tree topologies using twisted pair cable. A primary disadvantage of Local Talk is speed. Its speed of transmission is only 230 Kbps.

Token Ring:-

- The Token Ring protocol was developed by IBM in the mid- 1980s. The access method used involves token-passing.
- In Token Ring, the computers are connected so that the signal travels around the network from one computer to another in a logical ring.
- A single electronic token moves around the ring from one computer to the next. If a computer does not have information to transmit, it simply passes the token on to the next workstation. If a computer wishes to transmit and receives an empty token, it attaches data to the token. The token then proceeds around the ring until it comes to the computer for which the data is meant.
- The Token Ring protocol requires a star-wired ring using



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twisted pair or fiber optic cable. It can operate at transmission speeds of 4 Mbps or 16 Mbps.

- e) Due to the increasing popularity of Ethernet, the use of Token Ring in has decreased.

11. How does an e-mail work?

Do yourself.

12. What do you mean by intranet?

Commonly used in different types of organizations, an intranet is very similar to an Internet, but the difference is that an intranet is local, while the Internet is global. In other words, an intranet uses data stored on an internal corporate network, while the Internet uses data stored on the servers all around the world. The purpose of an intranet differs according to the type of organization where it is implemented. An intranet implements many technologies known from the Internet, such as file transfer protocols, chat rooms, browser interfaces, and many others. Furthermore, not all users have access to all the data stored on a central server; this depends on the privileges and rank of each employee within the organization. It's also relevant that many organizations have a number of computers and routers already implemented. Therefore, an intranet can be considered as an extension to a network infrastructure that already exists within the organization.

Advantages of an Intranet: Security from outside users; relatively cheap to set up; Quick access to information; Easy and cheap to post information; Increase in productivity

Disadvantages of an Intranet: Security from within; New budget; Cost of training; Cost of maintaining; Separate software might be needed for internet and e-mail

13. What do you mean by office automation system?

Do yourself.