Assignment :7

Topic : Question paper

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Long questions:

1. Mention the different categories of digital computers and compare it. (1*10=10)

Ans:According to functionality, Type of computers are classified as :

Analog Computer
An analog computer (spelt analogue in British English) is a form of computer that uses continuous physical phenomena such as electrical, mechanical, or hydraulic quantities to model the problem being solved.

Digital Computer
A computer that performs calculations and logical operations with quantities represented as digits, usually in the binary number system.

Hybrid Computer (Analog + Digital):
A combination of computers that are capable of inputting and outputting in both digital and analog signals. A hybrid computer system setup offers a cost effective method of performing complex simulations.

On the basis of Size: Types of Computer

Supercomputer :

The fastest and most powerful type of computer Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations. For example, weather forecasting requires a supercomputer. Other uses of supercomputers include animated graphics, fluid dynamic calculations, nuclear energy research, and petroleum exploration.

The chief difference between a supercomputer and a mainframe is that a supercomputer channels all its power into executing a few programs as fast as possible, whereas a mainframe uses its power to execute many programs concurrently.

Mainframe Computer

A very large and expensive computer capable of supporting hundreds, or even thousands, of users simultaneously. In the hierarchy that starts with a simple microprocessor (in watches, for example) at the bottom and moves to supercomputers at the top, mainframes are just below supercomputers. In some ways, mainframes are more powerful than supercomputers because they support more simultaneous programs. But supercomputers can execute a single program faster than a mainframe.

Mini Computer

A mid sized computer. In size and power, minicomputers lie between workstations and mainframes. In the past decade, the distinction between large minicomputers and small mainframes has blurred, however, as has the distinction between small minicomputers and workstations. But in general, a minicomputer is a multiprocessing system capable of supporting from 4 to about 200 users simultaneously.

Micro Computer or Personal Computer:

• <u>Desktop Computer</u>: a personal or micro-mini computer sufficient to fit on a desk.

• <u>Laptop Computer</u>: a portable computer complete with an integrated screen and keyboard. It is generally smaller in size than a desktop computer and larger than a notebook computer.

• <u>Palmtop Computer/Digital Diary /Notebook /PDAs</u>: A hand-sized computer. Palmtops have no keyboard but the screen serves both as an input and output device.

Workstations
A terminal or desktop computer in a network. In this context, workstation is just a generic term for a user's machine (client machine) in contrast to a "server" or "mainframe."

2. Explain the different types of database management systems with examples.

Ans: Database Management System (DBMS) is a software for storing and retrieving users' data while considering appropriate security measures. It consists of a group of programs which manipulate the database.

The four types of database management systems are are as follows:

Hierarchical DBMS

In a Hierarchical database, model data is organized in a tree-like structure. Data is Stored Hierarchically (top down or bottom up) format. Data is represented using a parent-child relationship. In Hierarchical DBMS parents may have many children, but children have only one parent.

Network Model

The network database model allows each child to have multiple parents. It helps you to address the need to model more complex relationships like the orders/parts many-to-many relationship. In this model, entities are organized in a graph which can be accessed through several paths.

Relational model

Relational DBMS is the most widely used DBMS model because it is one of the easiest. This model is based on normalizing data in the rows and columns of the tables. Relational model stored in fixed structures and manipulated using SQL.

Object-Oriented Model

In Object-oriented Model data stored in the form of objects. The structure which is called classes which display data within it. It defines a database as a collection of objects which stores both data members values and operations.

Examples of DBMS are are as follows :My SQL, oracle database, IBM Db2 family etc.

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

Ans: The two types of modulation are analog and digital modulation. In both the signal, the baseband information is converted to Radio Frequency signals, but in analog modulation these RF communication signals are continuous range of values, whereas in digital modulation these are prearranged discrete states.

Analog Modulation:

In this modulation, a continuously varying sine wave is used as a carrier wave that modulates the message signal or data signal. The Sinusoidal wave's general function is shown in the figure below, in which, three parameters can be altered to get modulation – they are amplitude, frequency and phase, so the types of analog modulation are:
Amplitude modulation (AM)
Frequency modulation (FM)
Phase modulation (PM)

In Amplitude modulation, the amplitude of the carrier wave is varied in proportion to the message signal, and the other factors like frequency and phase remain constant. The modulated signal is shown in the below figure, and its spectrum consists of lower frequency band, upper frequency band and carrier frequency components. This type of modulation requires greater band width, more power. Filtering is very difficult in this modulation.
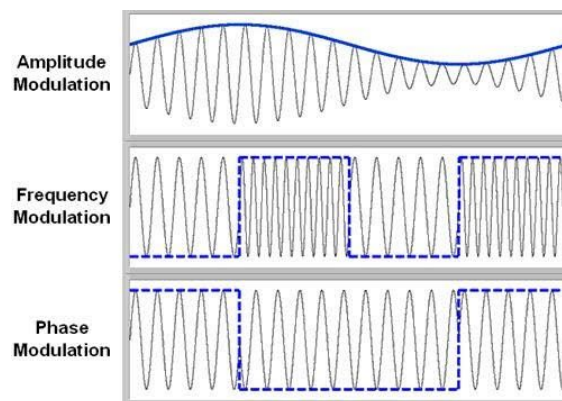

Fig: Types of analog modulation.

Frequency modulation (FM) varies the frequency of the carrier in proportion to the message or data signal while maintaining other parameters constant. The advantage of FM over AM is the greater suppression of noise at the expense of bandwidth in FM. It is used in applications like radio, radar, telemetry seismic prospecting, and so on. The efficiency and bandwidths depend on modulation index and maximum modulating frequency.
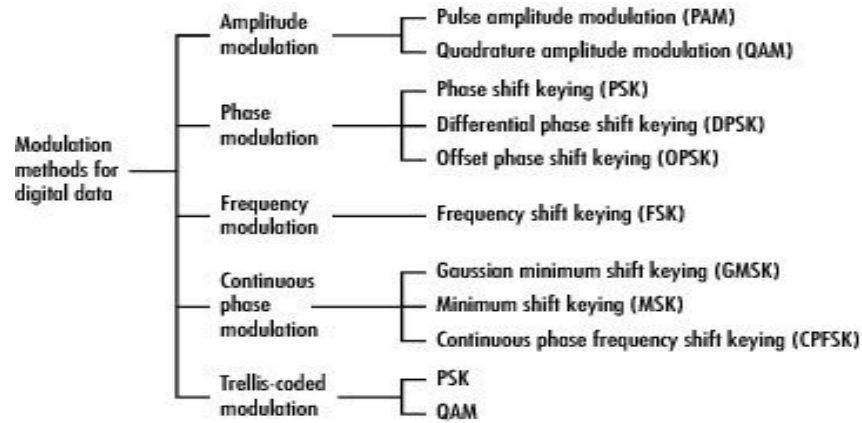
In phase modulation, the carrier phase is varied in accordance with the data signal. In this type of modulation, when the phase is changed it also affects the frequency, so this modulation also comes under frequency modulation.

Analog modulation (AM, FM and PM) is more sensitive to noise. If noise enters into a system, it persists and gets carried till the end receiver. Therefore, this drawback can be overcome by the digital modulation technique.

Digital Modulation

For better quality and efficient communication, digital modulation technique is employed. The main advantages of the digital modulation over analog modulation include permissible power, available bandwidth and high noise immunity. In digital modulation, a message signal is converted from analog to digital message, and then modulated by using a carrier wave.

The carrier wave is keyed or switched on and off to create pulses such that the signal is modulated. Similar to the analog, here the parameters like amplitude, frequency and phase variation of the carrier wave decides the type of digital modulation.

Amplitude modulation
— Pulse amplitude modulation (PAM)
— Quadrature amplitude modulation (QAM)

Phase modulation
— Phase shift keying (PSK)
— Differential phase shift keying (DPSK)
— Offset phase shift keying (OPSK)

Modulation methods for digital data

Frequency modulation
— Frequency shift keying (FSK)

Continuous phase modulation
— Gaussian minimum shift keying (GMSK)
— Minimum shift keying (MSK)
— Continuous phase frequency shift keying (CPFSK)

Trellis-coded modulation
— PSK
— QAM

Short Questions

4. What are the major components of a computer?

Ans: The Major components of computer system are described briefly as:

Input Unit

Input unit is used for transfers' raw Data and control signals into the information processing system by the user before processing and computation. All the input unit devices provide the instructions and data are transformed into binary codes that is the primary memory acceptable format.

Example of Input unit devices: keyboard, mouse, scanner, joystick, MICR, Punched cards, Punched paper tape, Magnetic tape etc.

Memory or Storage Unit

Memory or Storage unit is used for storing Data during before and after processing. The capacity of storage is expressed in terms of Bytes.

Memory

This unit retains temporary results till further processing, For example, Random Access Memory (RAM).This memory is volatile, which means data disappears when the power is lost.

Storage
The storage is used for retaining digital data after processing for permanent. For example, a hard drive. Storage is non-volatile in nature. CPU does not access directly to secondary storage memories, instead they accessed via input-output unit. The contents of secondary storage memories are first transferred to the main memory (RAM) and then CPU access it.

Output Unit
Output Unit receives information from the CPU and then delivers it the external storage or device in the soft or hard processed form. The devices which are used to display output to the user are called output devices. The Monitor or printer is a common output device.

Central Processing Unit
The main chip in a computer is the microprocessor chip, which is also known as the CPU (central processing unit). The CPU is mounted on a printed circuit board called the mainboard or motherboard. This chip is considered to be the controlling chip of a computer system since it controls the activities of other chips as well as outside devices connected to the computer, such as monitor and printer. In addition, it can also perform logical and computational tasks. Microprocessors work on a parallel system. Figure shows a typical structure of one of the first-generation microprocessors. The recent ones possess greater complexity, although the basic design concept has not changed much.

Arithmetic logic unit (ALU)

Arithmetic Logical Unit is used for processing data after inputting data is stored into primary unit. The major operations of Arithmetic Logical Unit are addition, subtraction, multiplication, division, logic and comparison.

Control unit (CU)
It is like a supervisor, that checks ordaining operations or check sequence in which instructions are executed.

5.what are the Types of softwares used in computer systems?

Ans: 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. 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. 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.

 Application software: 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. Email 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.

Programming languages: this is a kind of computer software which is used exclusively by computer programmers. Unless we are also programmers, we are unlikely to come across programming languages. Programming languages are the bricks which can be used to create applications and operating systems. C++, Java and Simlab are some popular programming languages. Generally Java is used for internet applications. C++ is a language of professional developers and used extensively in developing operating systems. PHP is another language used for internet applications. There is a new class of languages which are being utilized for the mobiles. These are lightweight, modular languages which are used to design mobile applications.

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

Ans:The data in the database possess several characteristics data in the database are consistent, integral, non redundant, secured, centrally managed and shared among multiple applications.

7.what do you mean by normalisation ?

Ans:Normalization is a database design technique which organizes tables in a manner that reduces redundancy and dependency of data.
It divides larger tables to smaller tables and links them using relationships.

Normalization is the process of reorganizing data in a database so that it meets two basic requirements:

(1) There is no redundancy of data (all data is stored in only one place)

(2) data dependencies are logical (all related data items are stored together). Normalization is important for many reasons, but chiefly because it allows databases to take up as little disk space as possible, resulting in increased performance.

8.what are The major components of a computer network?

Ans: Computer networks share common devices, functions, and features including servers, clients, transmission media, shared data, shared printers and other hardware and software resources, network interface card(NIC), local operating system(LOS), and the network operating system (NOS).

Servers - Servers are computers that hold shared files, programs, and the network operating system. Servers provide access to network resources to all the users of the network. There are many different kinds of servers, and one server can provide several functions. For example, there are file servers, print servers, mail servers, communication servers, database servers, fax servers and web servers, to name a few. Sometimes it is also called a host computer, servers are powerful computers that store data or application and connect to resources that are shared by the user of a network.

Clients - Clients are computers that access and use the network and shared network resources. Client computers are basically the customers(users) of the network, as they request and receive services from the servers. These days, it is typical for a client to be a personal computer that the users also use for their own non-network applications.

Transmission Media - Transmission media are the facilities used to interconnect computers in a network, such as twisted-pair wire, coaxial cable, and optical fiber cable. Transmission media are sometimes called channels, links or lines.

Shared data - Shared data are data that file servers provide to clients such as data files, printer access programs and e-mail.

Shared printers and other peripherals - Shared printers and peripherals are hardware resources provided to the users of the network by servers. Resources provided include data files, printers, software, or any other items used by clients on the network.

Network Interface Card - Each computer in a network has a special expansion card called a network interface card (NIC). The NIC prepares(formats) and sends data, receives data, and controls data flow between the computer and the network. On the transmit side, the NIC passes frames of data on

to the physical layer, which transmits the data to the physical link. On the receiver's side, the NIC processes bits received from the physical layer and processes the message based on its contents.

Local Operating System – A local operating system allows personal computers to access files, print to a local printer, and have and use one or more disk and CD drives that are located on the computer. Examples are MS-DOS, Unix, Linux, Windows 2000, Windows 98, Windows XP etc. The network operating system is the software of the network. It serves a similar purpose that the OS serves in a stand-alone computer

Network Operating System – The network operating system is a program that runs on computers and servers that allows the computers to communicate over the network.

Hub – Hub is a device that splits a network connection into multiple computers. It is like a distribution center. When a computer requests information from a network or a specific computer, it sends the request to the hub through a cable. The hub will receive the request and transmit it to the entire network. Each computer in the network should then figure out whether the broadcast data is for them or not.

Switch – Switch is a telecommunication device grouped as one of computer network components. Switch is like a Hub but built in with advanced features. It uses physical device addresses in each incoming messages so that it can deliver the message to the right destination or port.

Router – When we talk about computer network components, the other device that used to connect a LAN with an internet connection is called Router. When you have two distinct networks (LANs) or want to share a single internet connection to multiple computers, we use a Router. In most cases, recent routers also include a switch which in other words can be used as a switch. You don't need to buy both switch and router, particularly if you are installing small business and home networks.

There are two types of Router: wired and wireless. The choice depends on your physical office/home setting, speed and cost.

LAN Cable A local area Network cable is also known as data cable or Ethernet cable which is a wired cable used to connect a device to the internet or to other devices like computer, printers, etc.

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

Ans: Processing of data that is done online by different interconnected computers is known as distributed data processing.

-Inexpensive:Some companies buy a mainframe and supercomputers to do large-scale processing online but it cost those a hundred thousand dollars. Buying mainframe and supercomputers tend to centralized processing and if that computer malfunction then all company data gets into risk. On the other hand, doing processing by connecting personal computers from different locations can save money because they cost them a thousand bucks. Data is also distributed so adding and removing nodes (computers) can be easy. To achieve distributed networking we can use Beowulf cluster technology. In Beowulf cluster, remote computers are assigned processing through network switches and routers.

-Easy to replace remote computers:Microsoft Windows server has a feature called failover clustering that helps to remove faulty computers. If any computer on the network fails or corrupted by some means then that computer is automatically replaced by other computers.

-Optimized processing:Managing data on an online server solves slow processing. On the personal computer, we can do extra tasks also. Doing extra tasks consumes processor power. But the online computer is dedicated to one type of processing and it is more likely to increase processing powers.

Database server can only handle database queries and file server stores files. So data processing is optimized.

-Easy to expand:Suppose your company needs more data processing than expected then you can easily attach more computers to the distributed network.

-Parallel processing:Adding and removing computers from the network cannot disturb data flow. All data from different computers are processed in parallel. Parallel processing means data is updated at the same time from all nodes.

-Better performance:The overall performance of the company gets better and data is filtered and processed more rapidly in the distributed environment.

-Backup of data:Data can be backup from any computer connected to the network. So the user can backup data at a different time and work with that data locally and then upload the data to the server.

-Local data synchronization:All the computers on the network can have local storage of important data. Suppose there are different office branches interconnected to each other. All branch computers are interlinked with the main branch office. All office branch computers have a local copy of data. Office users edit and update data and then upload to the main server. So the data is synced and available to all computers. Working locally with data is easy and fast and when the user thinks that his work is complete then at the end of the day he can sync that data with the main server.

-Data recovery:If some data like the database is a loss in any computer then it can be recovered by another interconnected computer i.e. main database server.

10.What are the different protocols of internet?

Ans: Common Internet protocols include TCP/IP (Transmission Control Protocol/Internet Protocol), UDP/IP (User Datagram Protocol/Internet Protocol), HTTP (HyperText Transfer Protocol) and FTP (File Transfer Protocol).

TCP/IP

TCP/IP is a stream protocol. This means that a connection is negotiated between a client and a server. Any data transmitted between these two endpoints is guaranteed to arrive, thus it is a so-called lossless protocol. Since the TCP protocol (as it is also referred to in short form) can only connect two endpoints, it is also called a peer-to-peer protocol.

HTTP: HTTP is the protocol used to transmit all data present on the World Wide Web. This includes text, multimedia and graphics. It is the protocol used to transmit HTML, the language that makes all the fancy decorations in your browser. It works upon TCP/IP.
FTP: FTP is the protocol used to transmit files between computers connected to each other by a TCP/IP network, such as the Internet.

11.How does an email work ?
Ans: The email works on the client-server model. Email clients are the users who wish to use the e-mail facility. The basic functionality of the
client includes—create new email, display and store received emails, address list of contacts etc. Both, the sender of e-mail and the recipient of email are e-mail clients. E-mail server is a combination of processes running on a server with a large storage capacity—a
list of users and rules, and the capability to receive, send, and store emails and attachments. These servers are designed to operate without constant user intervention. The e-mail client interacts with the e-mail server to send or receive e-mail. Most email servers
provide email services by running two separate processes on the same machine-Post Office Protocol 3 (POP3) and Simple Mail Transfer Protocol (SMTP). Some email servers also run

another process on the machine—Internet Message Access Protocol (IMAP). SMTP is used to send email from the client to server and from one server to another server.

POP3 is used by clients for application based e-mail to access mail from the server. IMAP is used by clients for web-based e-mail to access mail on a server. The e-mail client-server work as follows:
o The client connects to an e-mail server when the user wants to send, check or receive e- mail. The client connects to the server on two TCP/IP ports—(1) SMTP on port 25, and
(2) POP3 on port 110 or IMAP on port 143.
o SMTP server accepts outgoing email from client (sender email client). Next, the SMTP server checks the e-mail address at which email has to be delivered (recipient email client). If the recipient email client resides on the same SMTP server, then the email is sent to the local POP or IMAP server, otherwise, the e-mail is sent to another SMTP server so that it reaches the recipient email client's SMTP server.

o POP3 stores email for a client on a remote server. When the client gets connected to server, the e-mail messages are downloaded from POP3 server to client's computer.
o IMAP also stores emails on a remote server. However, the e-mail messages are not downloaded to the client's computer. The user manipulates the e-mail messages directly on the email server.
o The POP3/IMAP and SMTP are linked by an internal mail delivery mechanism that moves mail between the POP3/IMAP and SMTP servers.

12. What do you mean by intranet?

Ans: An intranet is a private network website that only a few selected computers can have access to. Usually, they are being used as internal company websites for employees to know more about what is happening in the company without letting other people see.

An intranet works the same way as a normal website. The system administrator can add webpages to it and it can be accessed normally from a web browser.

13. What do you mean by office automation system?

ANS: Office automation refers to the varied computer machinery and software used to digitally create, collect, store, manipulate, and relay office information needed for accomplishing basic tasks. Raw data storage, electronic transfer, and the management of electronic business information comprise the basic activities of an office automation system. Office automation helps in optimizing or automating existing office procedures.

Advantages of office Automation systems are:

-Office automation can get many tasks accomplished faster.

-It eliminates the need for a large staff.

-Less storage is required to store data.

-Multiple people can update data simultaneously in the event of changes in schedule

BIBLIOGRAPHY

Pictures source:wikipedia

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