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University of Mumbai  
F.Y.BSc (HS)  
Information Technology (USHO107)  
Semester 1

Total 75 Marks  
2 1/2 Hours

- NB: 1) Figures to the right indicate full marks.  
2) Illustrate your answer with neat sketches wherever necessary

1. (a) Write the definition of the following. (1 Mark each)

[15]

i) Intranet

An intranet (intra means within) is an internal network that uses Internet technologies. Intranets generally make company information accessible to employees and facilitate working in groups.

ii) ALU

The arithmetic logic unit (ALU), another component of the processor, performs arithmetic, comparison, and other operations.

iii) ISP

An Internet Service Provider (also known as an ISP or even as an IAP, internet access provider) is a firm that offers subscribers access to the internet.

iv) Bandwidth

In computer networks, bandwidth is the amount of data that can be carried from one point to another in a given time period (usually a second). This kind of bandwidth is usually expressed in bits (of data) per second (bps).

v) Utility Software

A utility program allows a user to perform maintenance-type tasks usually related to managing a computer its devices, or its programs such as the disk defragmenter and System Restore.

(b) Fill in the blanks: - (1 Mark each)

- i) DPI stands for Dots per Inch  
ii) Dvd is a short form of Digital Versatile/Video Disc  
iii) MAN is a network that connects computer in a Metropolitan area network.  
iv) Printer is used to take hard copy.  
v) A Software/Program is a collection of instructions that performs a specific task when executed by a computer

(c) Match the following: - (1 Mark each)

Group A

- (i) Secondary Storage  
(ii) zip  
(iii) BD  
(iv) Router  
(v) MTRJ

Group B

- (a) Pen Drive  
(b) Compress files  
(c) Blue Ray Disk  
(d) Connects Multiple Computers on Network  
(e) Fiber Optics

2) Answer the following (Any three, 5 marks each)  
 (a) Differentiate hardware and software

[15]

	Hardware	Software
<b>Definition of</b>	Physical Devices used to store and execute various software	Set of instructions that enables a user to interact with the computer. It enables the computer to perform a specific task.
<b>Examples of</b>	Monitor, CPU, Keyboard, Mouse, CD-ROM, Pen Drives, Printer, Scanners, Modem etc	Microsoft Word, Microsoft Excel; Acrobat Readers, Window XP
<b>Types of</b>	Input Devices, Output Devices, Storage Devices, Processing Devices, Control Devices	System software, Programming software, and Application software
<b>Function of</b>	Hardware acts as the delivery system for software solutions. Once installed, hardware is not required to be changed on day to day basis.	Software is used to perform the specific task. New versions are released for software from time to time.
<b>Reliability of</b>	Hardware are reliable and no bugs are usually noticed in its life time.	Software needs constant testing and any deficiencies / bugs noticed are to be fixed from time to time
<b>Lifetime of</b>	Hardware wears out over time.	Software does not wear out over time.
<b>Nature of</b>	It is physical in nature	It is logical in nature

b) Explain characteristics of computers.

Basic characteristics about computer are:

- Speed:** - As you know computer can work very fast. It takes only few seconds for calculations that we take hours to complete. You will be surprised to know that computer can perform millions (1,000,000) of instructions and even more per second.
- Accuracy:** - The degree of accuracy of computer is very high and every calculation is performed with the same accuracy. The errors in computer are due to human and inaccurate data.
- Diligence:** - A computer is free from tiredness, lack of concentration, fatigue, etc. It can work for hours without creating any error. If millions of calculations are to be performed, a computer will perform every calculation with the same accuracy. Due to this capability it overpowers human being in routine type of work.
- Versatility:** - It means the capacity to perform completely different type of work. You may use your computer to prepare payroll slips. Next moment you may use it for inventory management or to prepare electric bills.
- Power of Remembering:** - Computer has the power of storing any amount of information or data. Any information can be stored and recalled as long as you require it, for any numbers of years.



7. **No Feeling:** - It does not have feelings or emotion, taste, knowledge and experience. Thus, it does not get tired even after long hours of work. It does not distinguish between users.

**c) Explain difference between data and information.**

Computers process data into information. Data is a collection of unprocessed items, which can include text, numbers, images, audio, and video. Information conveys meaning and is useful to people. For example, computers process several data items to print information in the form of a cash register receipt.

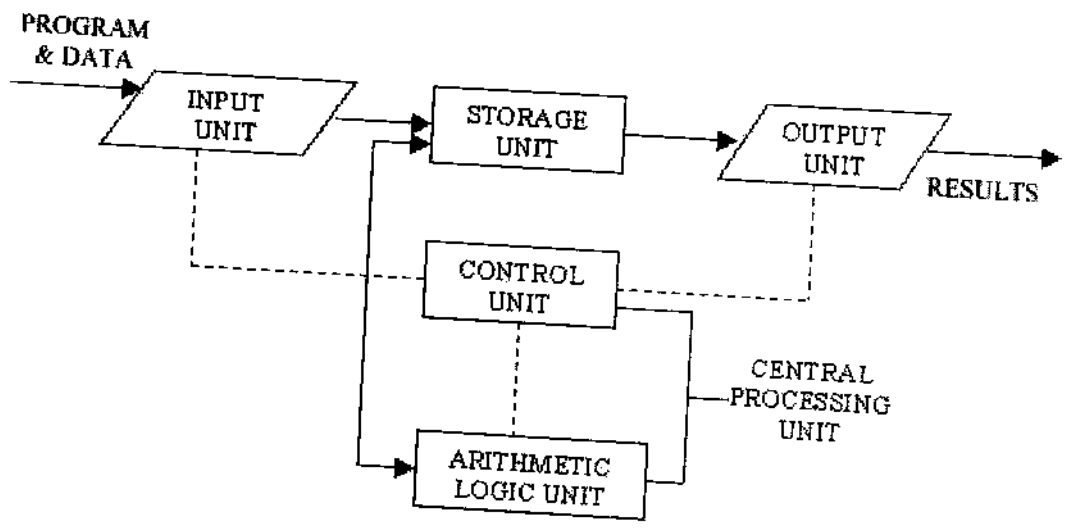
Comparison chart

	Data	Information
Meaning:	Data is raw, unorganized facts that need to be processed. Data can be something simple and seemingly random and useless until it is organized.	When data is processed, organized, structured or presented in a given context so as to make it useful, it is called Information.
Example:	Each student's test score is one piece of data	The class' average score or the school's average score is the information that can be concluded from the given data.
Definition:	Latin 'datum' meaning "that which is given". Data was the plural form of datum	Information is processed data.

**d) Draw a Block Diagram of Computer system.**

A block diagram of a typical microcomputer system as shown below consist of the following parts (a) Central processing Unit ( CPU ) comprising of Arithmetic Logic Unit (ALU ), Control Unit and Memory Unit, (b) Input Device like a keyboard or mouse and (c) Out unit like VDU or printer.

**OUTLINE OF A COMPUTER**



A computer possesses five important parts - the processor; the memory, the Input/output (I/O), the disk storage and programs.

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### e) What is software copyright?

When someone creates an original piece of software, that person then holds something called the **copyright** for that software. (This is also true when people create books, films and songs.)

Holding the copyright for software means that you have the **protection of the law** if anyone tries to steal your software.

Under copyright law, people must not:

1. **Copy** the software for other people
2. **Lend** the software to other people
3. **Rent** the software to other people
4. **Install** the software on a **network** when other users can access it (unless it is a special 'network' version)

If someone **breaks** the copyright, they can be **punished** by **fines** or even by **imprisonment**. The reason for this is that creating software can involve the work of many people and may take thousands of hours. It is only fair that all of this effort is protected.

### f) Explain PowerPoint and its various features.

Presentation software is used to create presentations, quizzes, e-learning packages, information points and many other multimedia products.

Most presentation software packages allow you to create your multimedia product using a series of slides. Text, images, video, animations, links and sound can be combined on each slide to create a sophisticated final product.

#### Common features of presentation software

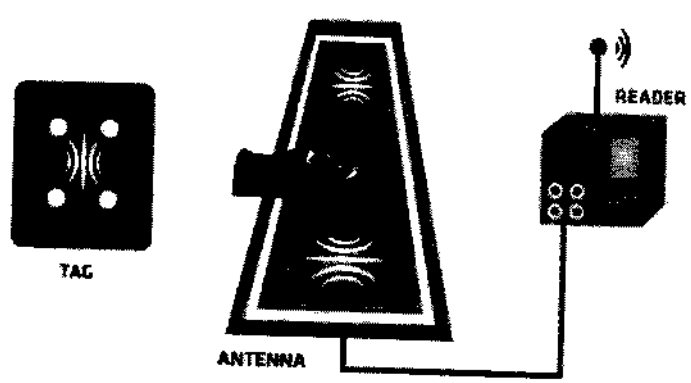
- 1) Slides that can contain any mixture of text, images, video, animations, links and sound.
- 2) Animation effects that allow the various elements on each slide to appear after a certain amount of time or when a presenter presses a button.
- 3) Slide master – this allows the style (font, font size, background etc) to be set once and then used throughout the presentation.
- 4) Transitions – this is how the presentation software "moves" the display of one slide to another. Transitions usually include dissolving from one slide to the next or the current slide being moved in some way to show the next slide as though it was underneath.

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3) Answer the following (Any three, 5 marks each)

[15]

a) Explain RFID



RFID (radio frequency identification) is a technology that uses radio signals to communicate with a tag placed in or attached to an object, an animal, or a person. RFID tags, which contain a memory chip and an antenna are available in many shapes and sizes. An RFID reader reads information on the tag via radio waves. RFID readers can be handheld devices or mounted in a stationary object such as a doorway. Many retailers see RFID as an

alternative to bar code identification because it does not require direct contact or line-of-site transmission. Each product in a store would contain a tag that identifies the product. As consumers remove products from the store shelves and walk through a checkout area, an RFID reader reads the tag(s) and communicates with a computer that calculates the amount due.

Other uses of RFID include tracking times of runners in a marathon; tracking location of soldiers, employee wardrobes, airline baggage, and misplaced or stolen goods etc.

b) Briefly explain input devices.

An input device is any hardware component that allows you to enter data and instructions into a computer. Five widely used input devices are the keyboard, mouse, microphone, scanner, and Web cam.

A computer keyboard contains keys you press to enter data into the computer. A mouse is a small handheld device. With the mouse, you control movement of a small symbol on the screen, called the pointer, and you make selections from the screen. A microphone allows a user to speak into the computer. A scanner converts printed material (such as text and pictures) into a form the computer can use. A Web cam is a digital video camera that allows users to create movies or take pictures and store them on the computer instead of on tape or film.

c) Write a short note on barcode reader.

Bar-code readers, price scanner, point-of-sale (POS) scanner or barcode scanners are generally found in supermarkets and large departmental stores. It is a type of scanner which is used for reading printed barcodes.



A barcode reader is a hand-held or stationary input device used to capture and read information contained in a barcode. Barcode contains detailed information about the particular product.

A barcode reader consists of a scanner, a decoder (either built-in or external), and a cable used to connect the reader with a computer. Because a barcode reader merely captures and translates the barcode into numbers and/or letters, the data must be sent to a computer so that a software application can make sense of the data. A barcode reader works by directing a beam of light across the bar code and measuring the amount of light that is reflected back.



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There are five basic kinds of barcode readers -- pen wands, slot scanners, Charge-Couple Device (CCD) scanners, image scanners, and laser scanners.

**d) Distinguish between RAM & ROM.**

**RAM vs ROM**

**Read-only memory or ROM** is a form of data storage in computers and other electronic devices that cannot be easily altered or reprogrammed. RAM is referred to as volatile memory and is lost when the power is turned off whereas ROM is non-volatile and the contents are retained even after the power is switched off.

**Random Access Memory or RAM** is a form of data storage that can be accessed randomly at any time, in any order and from any physical location in contrast to other storage devices, such as hard drives, where the physical location of the data determines the time taken to retrieve it.

**Comparison chart**

	RAM	ROM
<b>Definition:</b>	Random Access Memory or RAM is a form of data storage that can be accessed randomly at any time, in any order and from any physical location allowing quick access and manipulation.	Read-only memory or ROM is also a form of data storage that cannot be easily altered or reprogrammed. Stores instructions that are not necessary for re-booting up to make the computer operate when it is switched off.
<b>Stands for:</b>	Random Access Memory	Read-only memory
<b>Use:</b>	RAM allows the computer to read data quickly to run applications. It allows reading and writing.	ROM stores the program required to initially boot the computer. It only allows reading.
<b>Volatility:</b>	RAM is volatile i.e. its contents are lost when the device is powered off.	It is non-volatile i.e. its contents are retained even when the device is powered off.
<b>Types:</b>	The two main types of RAM are static RAM and dynamic RAM.	The types of ROM include PROM, EPROM and EEPROM.

**e) Explain secondary storage devices.**

Storage Devices are the data storage devices that are used in the computers to store the data. The computer has many types of data storage devices. Some of them can be classified as the removable data Storage Devices and the others as the non-removable data Storage Devices.

Storage holds data, instructions, and information for future use. For example, computers can store hundreds of millions of customer names and addresses. Storage holds these items permanently.

A computer keeps data, instructions, and information on storage media. Examples of storage media are USB flash drives, hard disks, optical discs, and memory cards. A storage device records (writes) and/or retrieves (reads) items to and from storage media. Storage devices often function as a source of input because they transfer items from storage to memory.

f) Explain different types of monitor.

The monitor displays the video and graphics information generated by the computer through the video card. Monitors are very similar to televisions but usually display information at a much higher resolution

Depending on your budget, there are a lot of options out there when it comes to computer monitors. With so many choices to consider, it is important to determine your needs before making your purchase. Important considerations are space available, size needed, and budget.

CRT (Cathode Ray Tube) computer monitors were the most common computer monitors until flat panel screens became affordable. Similar to older TVs, CRT monitors still typically have much better contrast ratios and viewing angles than other computer monitor alternatives.



until have

LCD (Liquid Crystal Display) computer monitors save a lot of space and can even be mounted on walls. They provide a wide viewing angle and come in sizes typically ranging from 17-inches to 60-inches.



Plasma computer monitors are less commonly used with computers due to their high operating temperatures, high power consumption, and fixed resolution.

Touch screen computer monitors provide a new way of interacting with your computer with a touch-sensitive screen. This allows users to interact directly with the application on screen without need for a mouse or keyboard.

OLED (Organic Light Emitting Display) computer monitors are much thinner and brighter than LCD or Plasma screens. OLED monitors can also be placed on transparent surfaces, such as glass, allowing the user to see through them when not active.

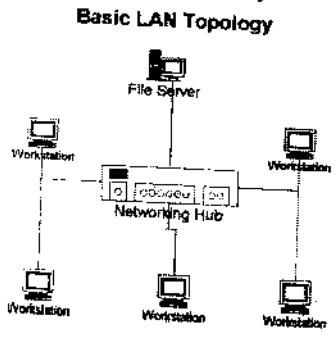
4) Answer the following (Any three, 5 marks each)

[15]

a) Explain any different types of network.

LANs, MANs, and WANs

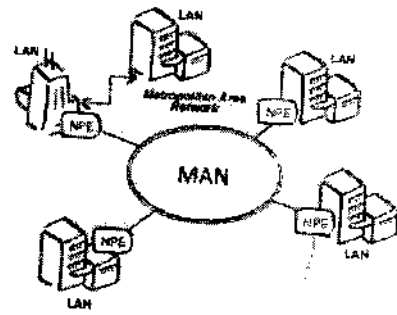
Networks usually are classified as a local area network, metropolitan area network, or wide area network.



LAN A local area network (LAN) is a network that connects computers and devices in a limited geographical area such as a home, school computer laboratory, office building, or closely positioned group of buildings. Each computer or device on the network, called a node, often shares resources such as printers, large hard disks, and programs. Often, the nodes are connected via cables. A wireless LAN (WLAN) is a LAN that uses no physical wires. Very often, a WLAN communicates with a wired LAN for access to its resources.

## 9) MAN

A metropolitan area network (MAN) is a high-speed network that connects local area networks in a metropolitan area such as a city or and handles the bulk of communications activity across that region. MAN typically includes one or more LANs, but covers a smaller geographic area than a WAN.



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A MAN usually is managed by a consortium of users or by a single network provider that sells the service to the users. Local and state governments, for example, regulate some MANs. Telephone companies, cable television operators, and other organizations provide users with connections to the MAN.

## WAN

A wide area network (WAN) is a network that covers a large geographic area (such as a city, country, or the world) using a communications channel that combines many types of media such as telephone lines, cables, and radio waves. A WAN can be one large network or can consist two or more LANs connected together. The Internet is the world's largest WAN.



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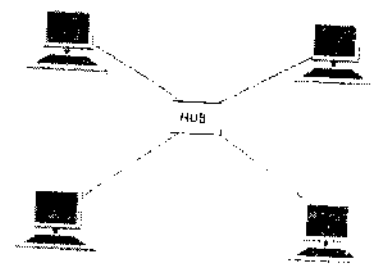
### b) Illustrate 1) Star 2) Ring topologies.

#### STAR Topology

In this type of topology all the computers are connected to a single hub through a cable. This hub is the central node and all others nodes are connected to the central node.

#### Features of Star Topology

- Every node has its own dedicated connection to the hub.
- Can be used with twisted pair, Optical Fibre or coaxial cable.



#### Advantages of Star Topology

- Fast performance with few nodes and low network traffic.
- Hub can be upgraded easily.
- Easy to troubleshoot.
- Easy to setup and modify.
- Only that node is affected which has failed, rest of the nodes can work smoothly.

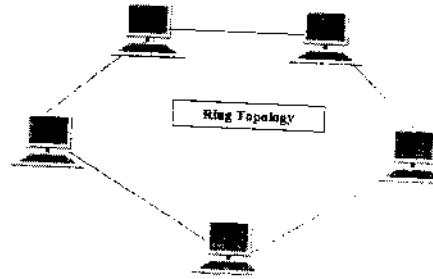
#### Disadvantages of Star Topology

- Cost of installation is high.
- Expensive to use.
- If the hub fails, then the whole network is stopped because all the nodes depend on the hub.



## 9) RING Topology

It is called ring topology because it forms a ring as each computer is connected to another computer, with the last one connected to the first.



### Features of Ring Topology

On a ring network, a cable forms a closed loop (ring) with all computers and devices arranged along the ring. Data transmitted on a ring network travels from device to device around the entire ring, in one direction. When a computer or device sends data, the data travels to each computer on the ring until it reaches its destination.

### Advantages of Ring Topology

Transmitting network is not affected by high traffic or by adding more nodes  
Cheap to install and expand

### Disadvantages of Ring Topology

Troubleshooting is difficult in ring topology.  
Adding or deleting the computers disturbs the network activity.  
Failure of one computer disturbs the whole network.

## c) Explain RJ45 & RJ11

Registered Jack is the meaning of the acronym RJ which is the acronym that cable connectors usually start with.

Two of the most common jacks are the RJ45 and RJ11, each with their own specific purpose. The main difference between these two is in where they are actually used.

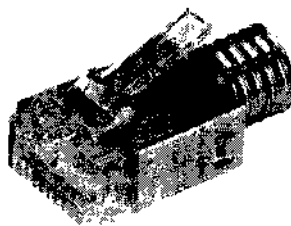
RJ45 jacks are used in networking, where you connect computers or other network elements to each other.

RJ11 is the cable connector that is being used in telephone sets.

1. RJ45 is used with Ethernet cables in computer networking while RJ11 is used in connecting telephone units
2. RJ45 contains more wires than RJ11
3. RJ45 is physically bigger than RJ11 to accommodate the extra wires.



RJ11



RJ45

## d) Explain a) Internet b) Extranet a) Internet

Alternatively referred to as the net or web, the Internet was initially developed to aid in the progress of computing technology by linking all the best academic computer centers. The Internet as we know it today first started being developed in the late 1960's and transmitted its first message on Friday, October 29, 1959. In 1993, the Internet experienced one of its largest growths to date and today is accessible by people all over the world.

10) The Internet contains billions of web pages created by people and companies from around the world, making it a limitless place to locate information and entertainment. The Internet also has thousands of services that help make life more convenient. For example, many financial institutions offer online banking that enables a user to manage and view their account online.

### **The Internet basic features**

- The Internet and the WWW are not the same thing.
- The Internet utilizes the TCP/IP protocol and is accessed using a computer modem, broadband, 3G, 4G, or network that is connected through an ISP.
- In the case of broadband, many computers and devices use Wi-Fi to connect to router that is connected to the ISP.
- The Internet is explored, which is more commonly referred to as surfing, using a browser.
- Finding information on the Internet is achieved by using a search engine.
- Users browse web pages by following hyperlinks.
- Files, pictures, songs, and video can be shared downloading (receiving) and uploading (sending).
- The Internet is also used for communicating with others through social networks, online games, forums, chat, e-mails, IM and VoIP

### **(b) Extranet**

An extranet is a communications network based on common internet protocols including the Transport Control Protocol and the Internet Protocol (TCP/IP), and typically used for information sharing. An extranet differs from an internet website in that access to the extranet is restricted to individual users possessing the appropriate login credentials. Additionally, an extranet can be subdivided into multiple specialty areas with each having different access requirements. Therefore, information and data can be isolated so that a business partner, customer, or vendor may only access the information pertinent to their operations, and prohibits access to other sensitive company data.

### **Extranet Example**

FPS is a large shipping company specializing in transporting packages and other goods. FPS has several customers, one of which is the XYZ Corporation, who ships many products to their customers. XYZ Corporation requires detailed shipping reports and associated documentation. FPS does have a website on the internet that everyone can use to track packages, but the website does not offer the level of detail or meet XYZ's privacy requirements. XYZ needs the ability to access reports detailing all packages shipped, by whom, and package receipt data. To meet their customer's needs, FPS creates an extranet that requires a special login. The extranet offers XYZ Corporation access to their own detailed proprietary reports and related shipping documentation

### **e) Explain a) Domain Name b) VoIP**

#### **a) Domain name**

When referring to an Internet address or domain name is the location of a website. For example, the domain name "computerhope.com" points to the IP address "45.79.151.23", but it is generally easier to remember a name rather than a long string of numbers. A domain name can be a maximum of sixty-three characters with one character minimum, and is entered after the protocol in the URL, as you can see in the following example.

URL or Internet address

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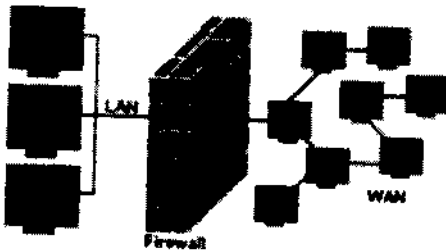
<http://www.computerhope.com/jargon/u/url.htm>

Protocol	Subdomain	Domain and domain suffix	Directories	Web page
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**b) VoIP**

**VoIP (Voice over IP, or Internet Protocol)**, also called Internet telephony, enables users to speak to other users over the Internet (instead of the public switched telephone network). To place an Internet telephone call, you need a high-speed Internet connection (e.g., via cable or DSL modem); Internet telephone service; a microphone or telephone, depending on the Internet telephone service; and Internet telephone software or VoIP router, or a telephone adapter, depending on the Internet telephone service. VoIP services also are available on some mobile devices that have wireless Internet service. Calls to other parties with the same Internet telephone service often are free, while calls that connect to the telephone network typically cost about \$15 to \$35 per month.

**f) Explain firewall and its types.**



A firewall is hardware and/or software that protects a network's resources from intrusion by users on another network such as the Internet. All networked and online computer users should implement a firewall solution.

Organizations use firewalls to protect network resources from outsiders and to restrict employees' access to sensitive data such as payroll or personnel records. They can implement a firewall solution themselves or outsource their needs to a company specializing in providing firewall protection. Large organizations often route all their communications through a proxy server, which is a component of the firewall. A proxy server is a server outside the organization's network that controls which communications pass into the organization's network.

Home and small office/home office users often protect their computers with a personal firewall utility. A personal firewall is a utility program that detects and protects a personal computer and its data from unauthorized intrusions. Some operating systems, such as Windows, include personal firewalls.

Some small office/home office users purchase a hardware firewall, such as a router or other device that has a built-in firewall, in addition to or instead of personal firewall software. Hardware firewalls stop intrusions before they attempt to affect your computer maliciously.

**5) Write short note (Any three, 5 marks each)**

**a) Different types of computer**

There are mainly four types of computer

- 1. Microcomputer:** Microcomputer is at the lowest end of the computer range in terms of speed and storage capacity. Its CPU is a microprocessor. The first microcomputers were built of 8-bit microprocessor chips. The most common application of personal computers (PC) is in this category. The PC supports a number of input and output devices. An improvement of 8-bit chip is 16-bit and 32-bit chips. Examples of microcomputer are IBM PC, PC-AT.
- 2. Mini Computer:** This is designed to support more than one user at a time. It possesses large storage capacity and operates at a higher speed. The mini computer is used in multi-user system in which

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various users can work at the same time. This type of computer is generally used for processing large volume of data in an organization. They are also used as servers in Local Area Networks (LAN).

3. **Mainframes:** These types of computers are generally 32-bit microprocessors. They operate at very high speed, have very large storage capacity and can handle the work load of many users. They are generally used in centralized databases. They are also used as controlling nodes in Wide Area Networks (WAN). Example of mainframes are DEC, ICL and IBM 3000 series.
4. **Supercomputer:** They are the fastest and most expensive machines. They have high processing speed compared to other computers. They have also multiprocessing technique. One of the ways in which supercomputers are built is by interconnecting hundreds of microprocessors. Supercomputers are mainly being used for weather forecasting, biomedical research, remote sensing, aircraft design and other areas of science and technology. Examples of supercomputers are CRAY YMP, CRAY2, NEC SX-3, CRAY XMP and PARAM from India.

### b) System software

System software consists of the programs that control or maintain the operations of the computer and its devices. System software serves as the interface between the user, the application software, and the computer's hardware. Two types of system software are the operating system and utility programs.

The operating system (OS) is the best-known example of system software. The OS manages all the other programs in a computer.

Other examples of system software and what each does:

The **BIOS** (basic input/output system)

The **boot** program

An **assembler**

A **device driver**

### c) Types of printer

In computers, a printer is a device that accepts text and graphic output from a computer and transfers the information to paper. Printers vary in size, speed, sophistication, and cost. In general, more expensive printers are used for higher-resolution color printing.

**Most common types of printer are:**

#### **Ink-Jet Printers**



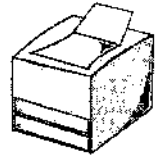
The four printer qualities of most interest to most users are **Color, Resolution, Speed and Memory.**

An ink-jet printer is a type of nonimpact printer that forms characters and graphics by spraying tiny drops of liquid ink onto a piece of paper. Ink-jet printers have become a popular type of color printer for use in the home. Ink-jet printers produce text and graphics in both black-and-white and color on a variety of paper types.

(13)

### **Laser Printer**

Laser stands for Light Amplification by Stimulated Emission of Radiation. A laser printer is the fastest and high quality non-impact printer. It works like a photocopier. The laser printer transfers the image of output on paper using LASER technology and toner. Toner is an ink powder.



### **Thermal Printers**

A thermal printer generates images by pushing electrically heated pins against heat-sensitive paper. Basic thermal printers are inexpensive, but the print quality is low and the images tend to fade overtime.



Besides the above, there are other printer such as

**Dot-Matrix Printers , Daisy-wheel printers, Line printers, Drum printer, Chain printers**

### **d) Device Drivers**

A device driver is a program that controls a particular type of device that is attached to your computer. There are device drivers for printers, displays, CD-ROM readers, diskette drives, and so on. When you buy an operating system, many device drivers are built into the product. However, if you later buy a new type of device that the operating system didn't anticipate, you'll have to install the new device driver.