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Assignment no. 2

(1)

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Course Code - 23OBC101

Course Title - Computational Thinking and Fundamentals
of IT

PART - A

Q1. The layout of _____ is just like the traditional typewriter of the type QWERTY.

Ans1 (A) Keyboard

Q2. An input device that can electronically capture an entire page of text or images such as photographs or artwork is called _____.

Ans2 (D) Scanner

Q3. Which storage method is suitable for caching and real-time applications, using a key-value pair model?

Ans3 (C) Redis

Q4. Which type of ROM can be programmed after manufacturing and used for embedded system.

Ans4 (A) PROM

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Q5. Which type of software is responsible for converting high-level programming languages into machine code?

Ans - (A) Compilers

Q6. What is the primary focus of utility programs?

Ans - (B) Enhancing system performance

Q7. The _____ is always the sign bit and the remaining bits represent the magnitude.

Ans - (B) MSB

Q8. A _____ is any arrangement where a sender transmits a message to a receiver over a channel with a medium.

Ans - (B) Communication Network

Q9. _____ connects two or more computers that are apart but reside in the same or different cities.

Ans - (C) Metropolitan Area Network (MAN)

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Q10.

_____ is a collection of protocols that governs the data transfer from one machine to another across networks.

Ans

(A) TCP/IP

PART-B

Q2.

Explain the generations of computer.

Ans 2

There are five generations of computer -

- ① The First Generation (1940-1956) Vacuum Tubes -
 - The period 1940-1956, roughly considered as the First Generation of Computer.
 - The first generation computers were developed by using vacuum tube or thermionic valve machine.
 - The input of this system was based on punched cards and paper tape, how the output was displayed on printouts.
 - The first generation computers worked on binary-coded concept that is language of 0-1.
- Examples ENIAC, EDVAC, etc.

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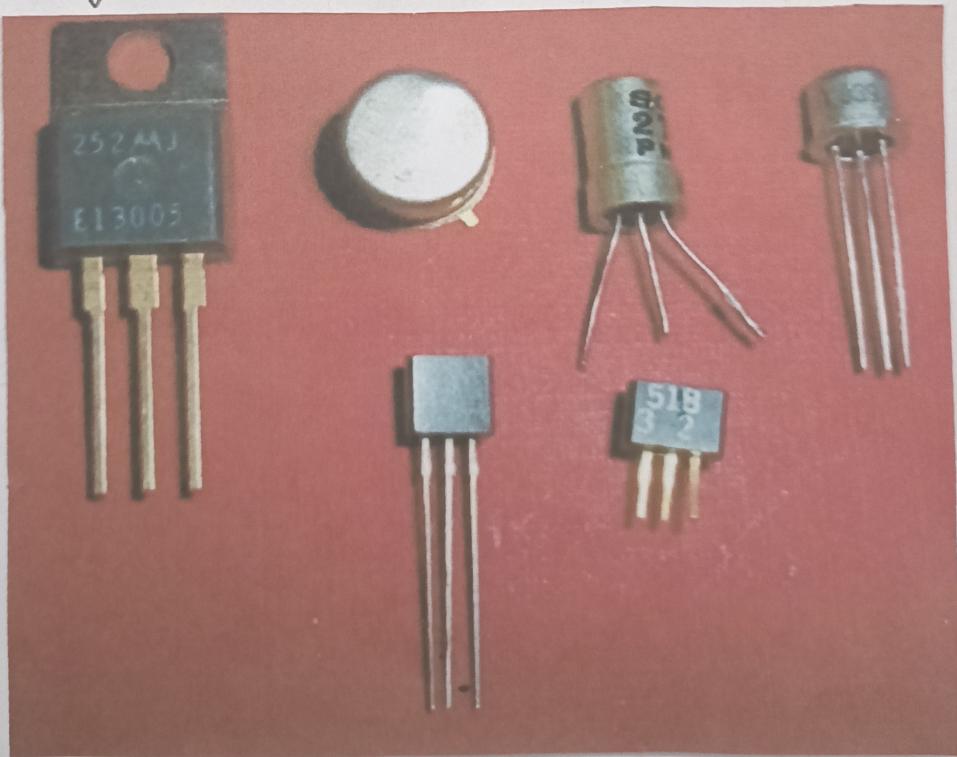
FIRST GENERATION - VACUUM TUBES

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② Second Generation Computers (1956-1963) Transistors

- The period 1956-1963 is roughly considered as the period of Second Generations of computers.
- The second generation computers were developed by using transistor technology.
- In comparison to the first generation, the size of second generation was smaller.
- In comparison to computers of the first generation, the computing time taken by the computers of the second generation was lesser.



SECOND GENERATION - TRANSISTORS

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③ The Third Generation Computers (1964-1971) Integrated Circuits

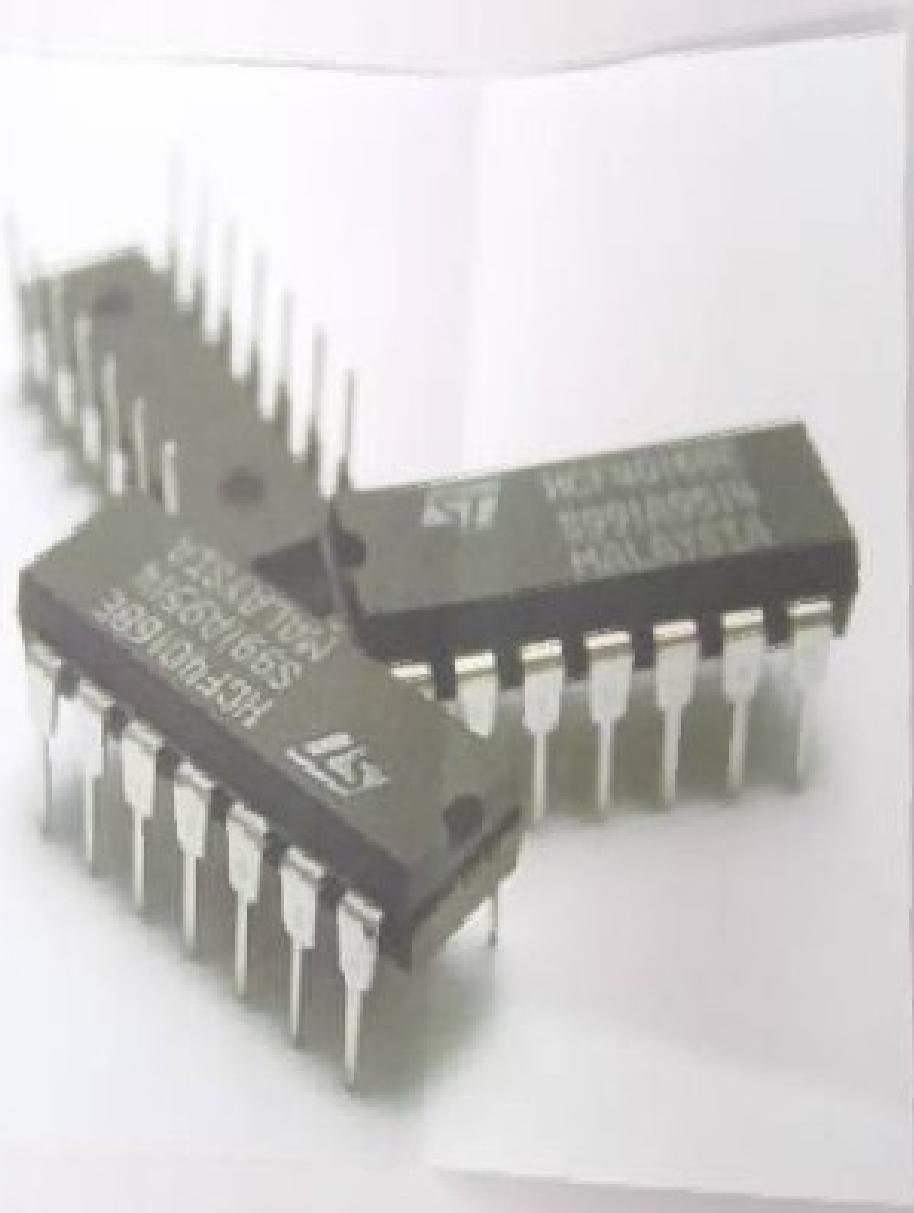
- The period 1963 to 1971 is roughly considered as the period of Third Generation of computers.
- The third generation computers were developed by using the Integrated Circuit (IC) technology.
- In comparison to the computers of the second generation, the size of the computers of the third generation was smaller.
- In comparison to the computers of the second generation, the computing time taken by the computers of the third generation was lesser.
- The third generation computer consumed less power and also generated less heat.
- The maintenance cost of the computers in the third generation was also low.
- The computer system of the computers of the third generation was easier for commercial use.

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THIRD GENERATION - INTEGRATED CIRCUITS

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④ The Fourth Generation Computers (1971 till date)

Microprocessors -

- The period 1971 till date is roughly considered as the fourth generation of computers.
- The fourth generation computers were developed by using microprocessor technology.
- By coming to fourth generation, computer became very small in size, it became portable.
- The machine of fourth generation started generating very low amount of heat.
- It is much faster and accuracy became more reliable.
- The production cost reduced to very low in comparison to the previous generation.
- It became available for the common people as well.

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FOURTH GENERATION - MICROPROCESSORS

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⑤ The Fifth Generation

- The period 2010 to till date and beyond, roughly considered was the period of fifth generations of computers.
- By the time, the computer generation was being categorized on the basis of hardware only, but the fifth generation technology also included software.
- The computers of the fifth generation had high capability and large memory capacity.
- Working with computers of this generation was fast and multiple tasks could be performed simultaneously.
- Some of the popular advanced technologies of the fifth generation include Artificial intelligence, Quantum computation, Nanotechnology, Parallel processing, etc.

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Q3.

Ans 3

Categorize various secondary storages.

Secondary storage stores much larger amount of data and information for extended periods of time. Data in secondary memory cannot be processed directly by the CPU, it must first be copied into primary memory, that is RAM. It is slower and cheaper form of memory than primary storage.

Secondary storage is used to store data and programs when they are not being processed. It is also non-rotatable in nature. Due to this the data remain in the secondary storage as long as it is not overwritten or deleted by the user. It is a permanent storage.

Secondary memory devices include following types of memory -

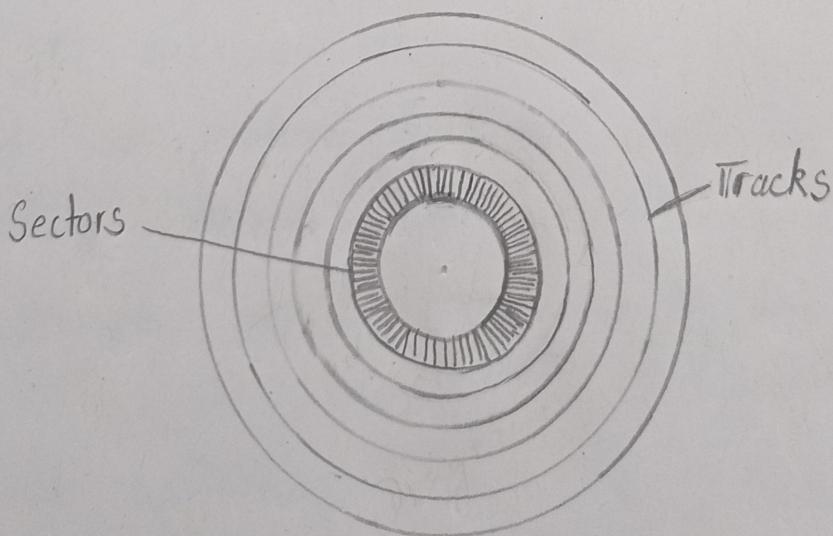
- ① Hard Disk Drive (HDD) - It is a non-rotatable and random access digital data storage device. HDD is a data storage device used for storing and retrieving

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digital information using rotating disks coated with magnetic material.

All programs of a computer are installed in hard disk. It is a fixed disk that is cannot be removed from the drive. It consists of a spindle that holds non-magnetic flat circular disks called platters, which hold the recorded data. Each platter requires two read / write heads, that are used to write and read information from a platter. All the read / write heads are attached to a single access arm so that they cannot move independently.



Tracks and Sectors

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The information is recorded in bands; each band of information is called a track. Each platter has the same number of tracks and a track location that cuts across all platters is called a cylinder. The tracks are divided into pie-shaped sections known as sectors.

- ② Magnetic Tape - These tapes are made of a plastic film-type material coated with magnetic materials to store data permanently. Data can be read as well as write. It is usually 12.5mm to 25mm wide and 500m to 1200m long.

Magnetic tapes hold the maximum data, which can be accessed sequentially. They are generally used to store backup data or that type of data, which is not frequently used or to transfer data from one system to another.

(3) Magnetic Disks- A magnetic disk is a storage device that uses a magnetization process to write, rewrite and access data. It is covered with a magnetic coating and stores data in the form of tracks, spots and sectors. Hard disks, zip disks and floppy disks are common examples of magnetic disks.

(4) Cartridge Tapes- A cartridge tape is a storage device that contains a spool of magnetic tape used to store different kinds of data, from corporate data to audio and video files. Each cartridge is designed to fit into a compatible audio/video recorder system or computer system. In the context of computing, however a tape cartridge tape is the magnetic tape storage cartridge used in tape library units to store digital data on magnetic tape, which is packaged in cassettes and cartridges.

Cartridge tape are also known as cartridge data.

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- ⑤ Floppy Disk - Floppy disk is round in shape and a thin plastic disk coated with iron oxide. It is used to store data but it can store small amount of data and it is slower to access than hard disks.

Data is retrieved or recorded on the surface of the disk through a slot on the envelope.

Floppy disk is removable from the drive.

Floppy disk is availbl available in three sizes - 8 inch, $5\frac{1}{4}$ inch and $3\frac{1}{2}$ inch.

- ⑥ Solid State Storage - It is a type of storage technique that employs storage devices built using silicon microchip based storage architecture. It includes pen / flash drive, memory card , which are described below -

• Pen / Thumb Drive - It is also known as flash drive . A flash idrive is a data storage device that consists of flash memory with a

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portable USB (Universal Serial Bus) interface. USB flash drives are typically removable, rewritable and much smaller than a floppy disk.

Today, flash drives are available in various storage capacities as 256 MB, 512 MB, 1 GB, 4 GB, 16 GB upto 64 GB. They are widely used as an easy and small medium to transfer and store the information from the computers.

- Memory Cards - These are the data storage devices in card shaped. They are commonly used in many electronic devices, including digital cameras, mobile phones, laptop, computers. They are small, re-recordable, easily portable and very light weighted.

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Q4. Explain different primary storages.

Ans4

The memory unit that communicates directly with the CPU is called primary memory or internal memory or main memory.

The primary memory allows the computer to store data for immediate manipulation and to keep track of what is currently being processed. It has limited storage capacity.

① Random Access Memory (RAM) - It is also known as read/write memory, that allows CPU to read and write data and instructions into it.

RAM is used for the temporary storage of input data, output data and intermediate results.

The two categories of RAM are as follows

- Dynamic RAM (DRAM) It is made up of memory cells where each cell is composed of one capacitor and one transistor.

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DRAM must be refreshed continually to store information. DRAM is slower, less expensive and occupies less space on the computer's motherboard.

- Static RAM (SRAM) It retains the data as long as power is provided to the memory chip.

SRAM needs not be refreshed periodically. It uses multiple transistors for each memory cell. It does not use capacitor. SRAM is often used cache memory due to its high speed. SRAM is more expensive and faster than DRAM.

- ② Read Only Memory (ROM) It is also known as non-volatile memory or permanent storage. It does not lose its contents when the power is switched OFF.

ROM can written data and instructions to it only one time. Once a ROM chip is programmed at the time of manufacturing,

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it cannot be reprogrammed or rewritten. So, it has only read capability, not write.

- (3) Programmable ROM (PROM) - It is also non-volatile in nature. Once a PROM has been programmed, its content can never be changed. It is one-time programmable device. This type of memory is found in video game consoles, mobile phones, implantable medical devices and high definition multimedia interfaces.
- (4) Erasable Programmable ROM (EPROM) - It is similar to PROM, but it can be erased by exposure to strong ultraviolet light, then rewritten. So, it is also known as Ultraviolet Erasable Programmable ROM (UVE PROM).

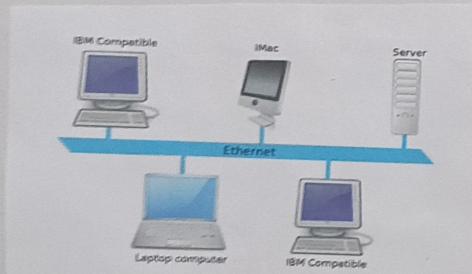
- ⑤ Electrically Erasable Programmable ROM (EEPROM)
 It is similar to EPROM, but it can be erased electrically, then rewritten electrically and the burning process is reversible by exposure to electric pulses. It is the most flexible type of ROM and is now commonly used for holding BIOS.

- Q6. Differentiate LAN, MAN and WAN.

Ans 6 Local Area Network (LAN)

LAN is a small and single-site network. It connects network devices over a relatively short distance.

It is a system in which computers are interconnected in the geographical area such as home, office, building, school, etc. which are within a range of 1km. Its speed is upto 1000 Mbps. On most LANs, cables



LAN

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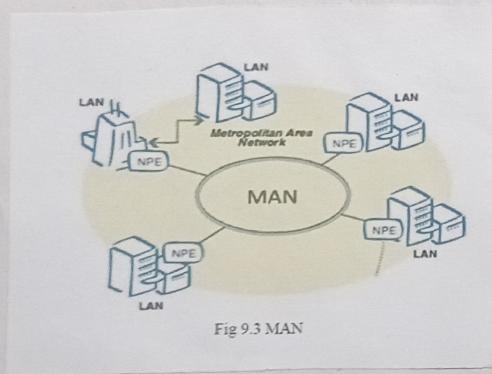
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are used to connect the computers.

LANs are typically owned, controlled and managed by a single person or organisation. They also use certain specific connectivity technologies, primarily Ethernet and Token Ring. LAN provides a sharing of peripherals in an efficient or effective way.

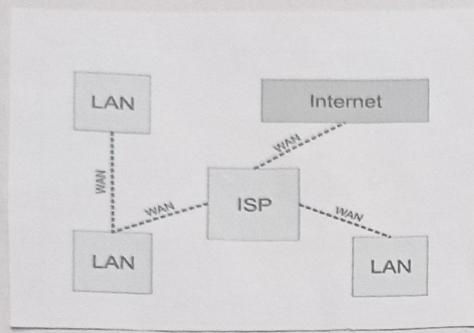
Metropolitan Area Network (MAN) - It is a data network designed for a town or city. It connects an area larger than a LAN, but smaller than a WAN. Its speed is upto 100 Mbps.

Its main purpose is to share hardware and software resources by various users. Cable TV network is an example of metropolitan area network. The computers in a MAN are connected using co-axial cables or fibre optic cables.



MAN

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WAN

Wide Area Network (WAN) - WAN is a geographically dispersed collection of LANs. A WAN like the Internet spans most of the world. A network device called a router connects LANs to a WAN. Its speed is upto 150 Mbps.

Like the Internet, most WANs are not owned by any one organisation, but rather exist under collective or distributed ownership and management. WANs use technology like ATM, Frame Relay and X.25 for connectivity.

Q 8. Illustrate components of data communication.

Ans 8 Components of Data Communication -

Whenever we talk about communication between two computing devices using a network, five most important aspects come to our mind. These are sender, receiver, communication medium, the message

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to be communicated and certain rules called protocols to be followed during communication. The communication media is also called transmission media.

Five components of data communication are -

- ① Sender - It is a computer or any such device which is capable of sending data over a network. It can be a computer, mobile phone, smartwatch, walkie-talkie, video-recording device etc.
- ② Receiver - It is a computer or any such device which is capable of receiving data from the network. It can be any computer, printer, laptop, mobile phone, television, etc. The sender and receiver are known as nodes in a network.

- (3) Message - It is the data or information that needs to be exchanged between the sender and the receiver. Messages can be in the form of text, number, image, audio, video, multimedia, etc.
- (4) Communication Media - It is the path through which the message travels between source and destination. It is also called medium or link which is either wired or wireless.
- (5) Protocol - It is a set of rules that need to be followed by the communicating parties in order to have successful and reliable data communication.