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Year 2017 - Question 5 (d);

Describe various types of computers classified on the basis of size, memory, capacity and speed.

There are eight various types of computers available currently. Each one of them has specific use. They are discussed below:

(1) Supercomputers;

They are large-scale systems that require cooling circuits to run. They have extremely fast processors which are capable of performing quadrillions of calculations per second. Their memory is largest, ranging from Terabytes to Petabytes.

(2) Mainframe Computers;

Slightly smaller than super-computers, they are as huge as an entire room. They support millions and billions of calculations per second, catering to multiple users all at the same time. Their memory is also large, ranging from Gigabytes to Terabytes.

(3) Minicomputers;

They are rack-mounted computers with moderate processing speeds. The memory ranges between Megabytes and Gigabytes. They have entry-level processors and high-performance CPUs. Their size is medium.

(4) Hybrid computers;

They have high-performance processors, ideal for use in industries. Their speed is very fast as they can process

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both numerical and logical data. Their size varies according to the industry where they are used.

5) Server Computers:

Their size varies as they can be tower, rack or blade servers. They have large memory to process and store large amount of data. They serve multiple users at the same time. They are faster than normal PCs.

6) Micro Computers:

These are our desktops, laptops, tablets etc, with memory between Gigabytes to Terabytes. Their size is small as they are for everyday general use. Entry-level processors are used along with high performance CPUs.

7) Workstation:

They are similar to desktops with high RAM and storage. They offer fast speed as well as they are optimized for ~~storage~~ graphics and computation.

8) Embedded Computers:

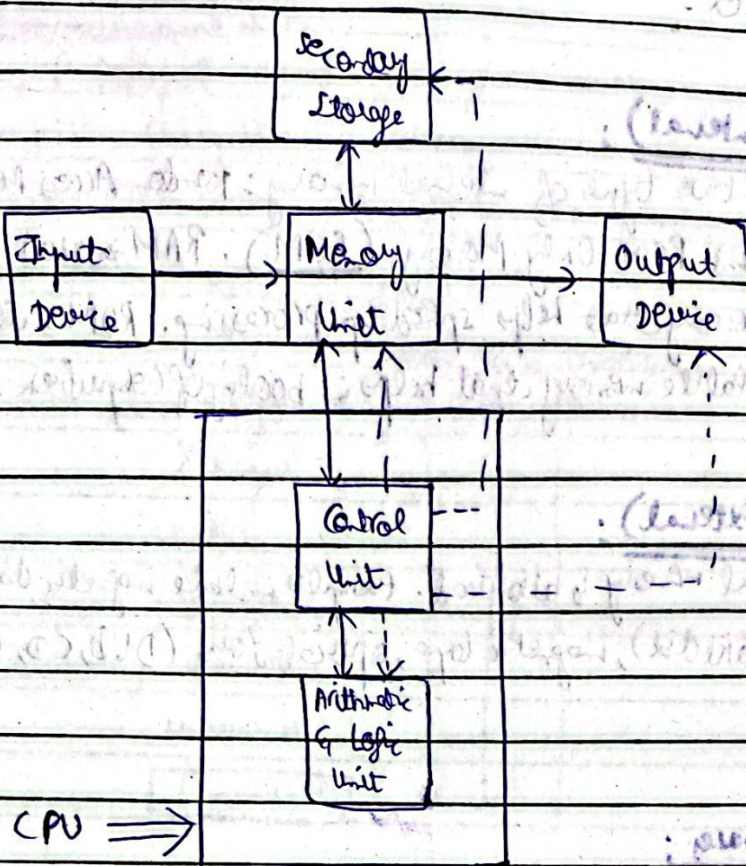
They are chip-size devices integrated into other devices. Their ~~speed~~ ^{memory} ranges from kilobytes to gigabytes. Their speeds are according to the intended applications.

2017- Question 5 (c):

Draw a basic computer block diagram and briefly explain the function of each part.

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(1) Input Devices: Allows the user to give instructions, data, visuals (image, video) etc. to the computer for processing. Examples are keyboard, mouse, microphone, scanner etc.

(2) Output Devices: Carry the ~~output~~ output to the user in form of audio, video, document etc. Examples are monitor, printer, speaker etc.

(3) CPU: It is the brain of the computer. It stands for Central Processing Unit. It is a single piece of silicon containing millions of tiny microscopic electrical components wired together. There are three units of a CPU;

- (1) Arithmetic Unit - performs arithmetic operations (+, -, ÷, ×)
- (2) Logic Unit - performs logical operations (>, <, =)
- (3) Control Unit - carries the communication between different parts of

PC Computer.

(4) Memory (Internal);

There are two types of internal memory: Random Access Memory (RAM) and Read-Only Memory (ROM). RAM is short-term volatile memory that helps speed up processing. ROM is long-term non-volatile memory that helps in booting of computer.

Memory (External);

External memory is also used. Examples include magnetic disk (floppy, hard disk), magnetic tape, optical forms (DVD, CD, CD-R etc.)

(5) Computer Buses;

They are electrical wires through which CPU communicates with other parts of the computer. There are three types of computer buses:

- (i) Data bus (carries data to and from CPU to memory)
- (ii) Address bus (carries address of data from the memory)
- (iii) Control bus (carries instructions and signals to ensure everything is working smoothly)

(6) Motherboard;

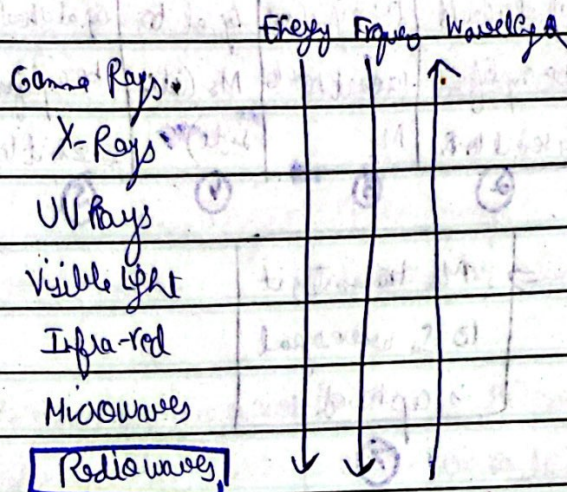
It allocates power to different parts of the computer.

Year 2022- Question 5 (c);

Briefly explain the working and structure of a cellphone.

Mode of Communication

A cell phone uses electromagnetic waves as parallel communication. Cell phone is a telecommunication device that connects subscribers through radio waves. The spectrum of electromagnetic radiation is given below:

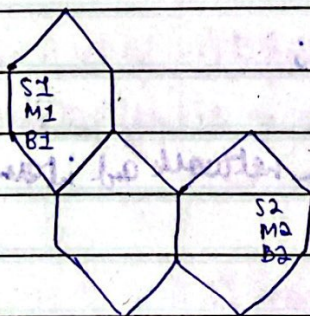


Radio waves are used as they have low frequency so they are least penetrating. They have low frequency, this can be increased using modulation. They are used as they are the least harmful out of the electromagnetic spectrum.

Cellular Networking

Each cell phone has two contacts: (1) Mobile and (2) Base Station. Mobile is responsible for transmitting or receiving signals whereas base station does the necessary modulation required to amplify the signal.

S1 = Galla



S2 = Littera

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The path used is as follows:

$S_1 \rightarrow M_1 \rightarrow B_1 \rightarrow M_1 \rightarrow M_2 \rightarrow B_2 \rightarrow M_2 \rightarrow S_2$

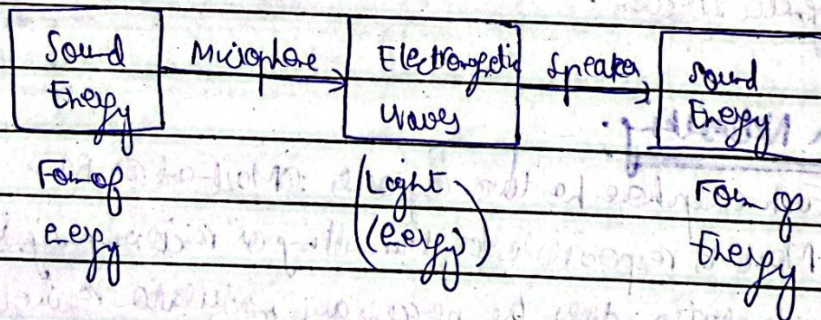
Signal generated & sent to M_1	M_1 detects Signal should be amplified & send it to B_1	B_1 amplifies the signal & sends it back to M_1	M_1 transmits Signal to M_2 (other side)	M_2 detects Signal should be amplified & send it to B_2	B_2 amplifies the signal & sends it back to M_2
(1)	(2)	(3)	(4)	(5)	(6)

Final step $\Rightarrow$ M_2 transmits it
to S_2 where signal
is captured

(7)

Law of Conservation of Energy:

The total energy during communication remains the same, it just
changes from one form to another as shown below:



Year 2023 : Question 5 (a)(i):

Difference between ~~free~~ between network and internet.

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Network

Internet

(1) Definition: A group of interconnected computers.

(1) Definition: Worldwide collection of interconnected networks.

(2) Size: Small to medium.

(2) Size: Very large-scale global connection.

(3) Ownership: Owned by a single person or organization.

(3) Ownership: No single person shared by all.

(4) Access: Accessed by few authorized individuals.

(4) Access: Accessed by public with few restrictions.

(5) Examples: Office LAN, Home network etc.

(5) Examples: Email, World Wide Web, Social Media etc. ; ITO

2023 - Question 5 (4x11);

What is the difference among application, program and software?

Program

Software

Application

1) Definition: A set of instructions used to perform a task.

1) Definition: A collection of programs used by a computer.

1) Definition: Software designed for user tasks.

2) Scope: Smallest

2) Scope: Broadest

2) Scope: Subset of

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3) Purpose: performs a specific operation

4) Examples: C program, Python script etc.

3) Purpose: helps, manages, controls the computer.

4) Examples: Windows, Linux, etc.

Software

3) Purpose: assist user to perform tasks or solve problems.

4) Examples: MS Word, MS Excel, Facebook etc.

Year 2020 - Question 5 (c);

What is Open System Interconnection (OSI) and describe its layers?

OSI;

OSI model is a conceptual framework developed by ISO (International Organization for Standardization) that describes how data is transmitted over a network from one device to another. It has seven layers which are as follows;

(1) Physical Layer:

It deals with physical transmission of raw bits. It converts digital data to signals (electrical, optical or radio). Examples include cables, switches, connectors, voltage levels and data rates.

(2) Data Link Layer;

It ensures error-free data transfer between two directly connected devices. It breaks data into frames, converts errors using MAC.

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address. Examples are switches, bridges, MAC address, Ethernet protocol etc.

3) Network Layer;

It is responsible for routing data between different networks. Assigns logical address and selects the best path for data routing. Examples are routers, IP protocols etc.

4) Transport Layer;

It ensures end-to-end communication between devices. It provides error recovery, flow control and retransmission if packets are lost. It can be connection-oriented or connectionless. Examples are UDP, TCP etc.

5) Session Layer;

It manages and controls sessions between computers. It handles session creation, maintenance and termination. Example is remote login.

6) Presentation Layer;

It ensures that data is in a readable format for the receiving system. It performs encryption, compression, and data translation. Examples are MP3, encryption (SSL/TLS) etc.

7) Application Layer;

It is closest to user. It provides network services to applications and handles things like file transfer, email, web browsing etc. Examples are HTTP, DNS, SMTP, FTP etc.

Ques 5 (a) - Year 2018;

Hard disk drive (HDD) stores data magnetically on one or more circular disks called platters. Each platter is ~~coated~~ coated with a magnetic material that allows data to be written and read by a device called the read/write head.

① Magnetic Storage Principle;

Data is stored as tiny magnetized regions on the platter's surface. A region magnetized in one direction = binary 1 and in other direction is binary 0.

② Platter, Tracks and Sectors;

Each platter is divided into tracks (concentric circles). Tracks are further divided into sectors which are the smallest storage units. A group of tracks at the same position on all platters forms a cylinder.

③ Read / Write Head;

The head floats extremely close to the platter surface. Writing is done when the head magnetizes tiny spots in a pattern representing 0s & 1s. For reading, it detects the magnetic patterns already present.

④ Rotation;

Platters spin at high speed (e.g. 5400 or 7200 RPM). The moving platter allows the head to access different sectors quickly.

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5) Data Organization:

Data is stored in files, each broken into multiple sectors. The hard disk uses a filesystem (e.g. NTFS, FAT32) to keep track of where files are located.

6) Advantages of Magnetic storage:

They are non-volatile, large capacity with relatively low cost.

