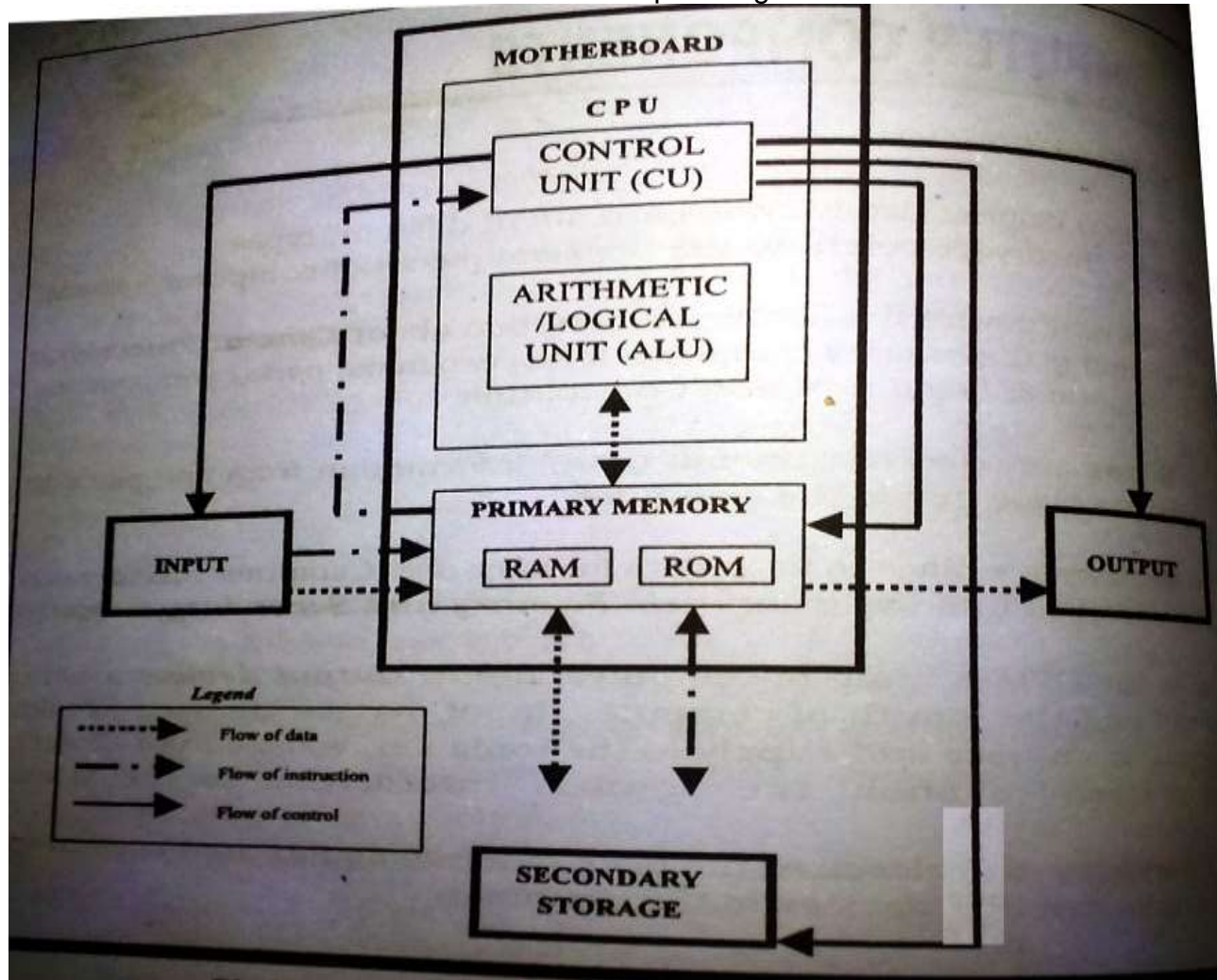


Q1. Describe C.P.U and its subunits with the help of diagram?



Ans. C.P.U (CENTRAL PROCESSING UNIT) Book page # 27

The C.P.U is the **brain of computer** .It controls and supervises all the units. Processing and Calculating functions takes place in CPU . It **convert RAW data into meaningful information** considering as **HUB of all activities**. It takes information from input/ memory and according to the predefined instructions given to the computer, consider as the most important element of Computer.

The functions of C.P.U are:

Interprets the data and instructions by CU

Generates the control signals to all connected devices and memory by CU

Performs Arithmetic and Logical functions by ALU

Produce the address bits needed by memory or I/O devices by CU

To sort data and instructions.

To control the sequence of operations.

To give commands to all parts of the computer system.

To carry out processing.

In personal computer the C.P.U resides on a single chip called **Microprocessor**. From functional point of view C.P.U consist of two parts which are:

1. Arithmetic and Logic Unit (A.L.U)
2. Control Unit (C.U)

Arithmetic and Logic Unit (ALU).

A.L.U is capable of performing arithmetic and logic operations such as addition, subtraction, multiplication and division

ALU perform logic operation like comparing two numbers to see which number is greater than, less than, equal to or not equal to another number.

Group of registers (high speed volatile or temporary memory locations ) built directly into the CPU that are used to hold data currently being processed.

Two registers work directly under the supervision of ALU which are **AC (Accumulator) and SR (Status Register/ Flag Register)**.

Control Unit (CU).

The control unit acts like **Traffic Cop** the supervisor directing instructions and making sure that are done in an order.

Thus the control unit can be considered as the "**Boss**" of operation for the whole CPU.

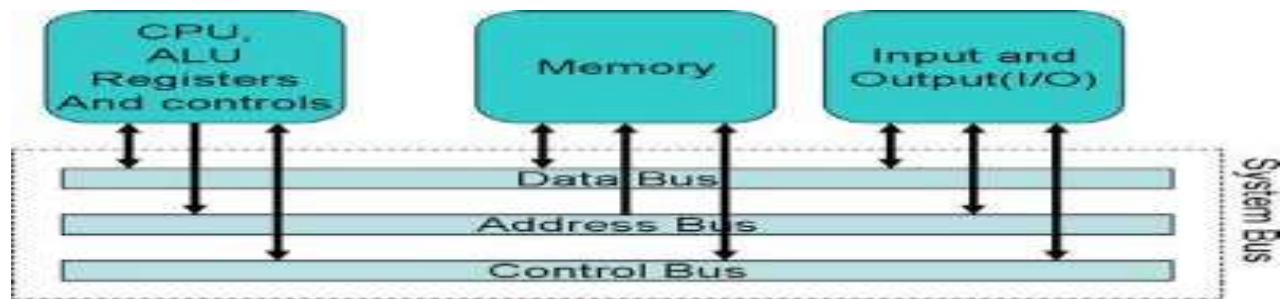
It does not execute or process the instructions itself; **it directs other parts of computer to do so.**

1. It extracts the information from memory (RAM)
2. Decodes the data and instructions sets (**microcode**)
3. Executes them including calling ALU when needed.
4. It has the list of all operations that CPU can perform.

The major functions of CU are:

1. Manage overall resources of computer system
2. CU have two register working directly under are IR and PC
3. Interprets and carries out instructions of computer programs.
4. Selects program statements from memory.
5. Move instructions to the registers.
6. Controls the Input/output devices.
7. Storage and retrieval of data from memory and storage devices.
8. Routing information between ALU and memory unit.

Q2. What is a Bus? How many types of Buses are there? Book page # 30-31



Ans. **BUS.**

A collection of wires/ set of wires through which signals are data is transmitted from one part of computer to another is known as bus. Processor communicates with I/O Devices and memory unit using **three types of signals**. (**Address Signals, Control Signals and Data signals**).

**DATA BUS.**

A bus connected to the processor, memory and peripheral devices with which it communicates for the purpose of transferring data between them is known as Data Bus.

**Data bus is a bi-directional bus** means it can send as well as receive data signals from devices and other components of computer system. The speed of computer, at which data can travel between hardware components, **depends on the number of wires in data bus**. Each wire transmits a single bit at a time. Communicate the route at which data travel in between CPU, Memory and I/O devices

**ADDRESS BUS.**

A bus connecting C.P.U with main memory that is used to **identify particular locations (addresses) in main memory** is known as Address Bus. The width of the address bus (number of wires) determines how many unique memory locations can be addressed by the C.P.U. This is **unidirectional bus** because information flows over it in only one direction from the CPU to the main memory elements. **Modern PC's have 36 address lines transmitting 64 GB of data.**

**Address bus will generates the address signals** of particular memory location 2384 or particular I/O device and will send the address in binary format by address bus to all the connected devices and memory units and then **only address matched device/memory location will response as acknowledgement** through Control Bus .

**CONTROL BUS.**

A control bus is used to carry all the control signals between a processor and peripherals of a computer. Transmit all signals at a proper time and coordinate with CU about the completion of any task and also asked for retransmission if acknowledgment is not received. It carries signals that reports status of various input, output, and storage devices. For example: **One line of the control bus is used to indicate** whether the CPU is currently reading from or writing to the main memory.

Q3. Define Mother Board? Book page # 31

Ans. MOTHER BOARD

A Mother board is a rectangular printed circuit board (PCB). Containing a computers CPU, RAM chips and expansion slots, equipped with sockets to which processor, plug-in card and peripheral devices connection slots. The base of a motherboard consists of a very firm sheet of non-conductive material, some sort of rigid plastic. Thin layers of copper or aluminum foil, referred to as *traces*, are printed onto this sheet. Motherboard contains a number of sockets and slots to connect the other components.



Q4. Define Memory with its types? Page # 31

Ans. MEMORY STORAGE. Memory is the storage device inside the computer where data, information or program reside. It is mainly of two types:

Internal Memory / Primary Memory / Main Memory

External Memory / Secondary Memory/ Auxiliary Memory

**PRIMARY MEMORY.** All the data, instructions and operating system are loaded into the main memory at the time of execution of a program. This memory is an integral part of the CPU and is housed in the CPU itself. This basic type of memory consists of a set of chips. These chips are plugged into slots present on the mother board. This is also called internal memory. It is close to the microprocessor so data can travel quickly between two devices. It is of two types: RAM (Random Access Memory) ROM (Read Only Memory)

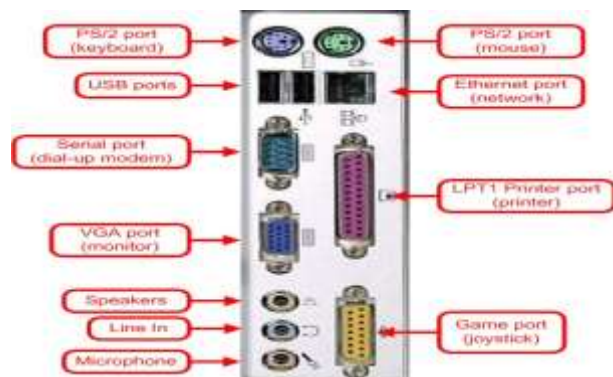
**RANDOM ACCESS MEMORY (RAM).** Almost all the primary memory is randomly accessible so, it can be justifiably called **User's memory, Primary Memory** . RAM is temporarily highly accessible, high speed work area. It holds one major program and data in a section at a time. RAM is also refer as READ-WRITE memory , it is temporary and Volatile memory , contents will be erased/lost when electric current is turned off.

The information stored in RAM is volatile that is when the computer is shut down the stored information is lost. It holds the contents and data currently running including operating system after booting . Its common types are SRAM (Static RAM) and DRAM(Dynamic RAM) and SDRAM (Synchronous Dynamic RAM), DDRAM (Double Dynamic RAM)

**READ ONLY MEMORY (ROM).** It is a type of preprogrammed memory that contains one or more program vital to computer's need. This part of memory contains permanently stored information. When the power is switched off, ROM does not wash away. This information is available to a computer to read and process but not to change it. The information which is frequently required for a computer and need not to be changed is kept on ROM. Its common types re PROM, EPROM and EEPROM.

**SECONDARY MEMORY:** The secondary memory is the external memory also called **Auxiliary Memory**, since the amount of primary memory is pretty less and RAM suffers form the draw back of being volatile and ROM suffers form the draw back of being non-writeable, the alternative is the use of external memory with which read / write operations both are possible. Secondary storage devices are physically separated but connected directly to the mother board through a communication cable. Secondary memory can not be directly accessed by the C.P.U. Its contents must first be copied into primary storage (RAM) before execution. Secondary storage devices include Hard disk, Floppy disk, CD-ROM etc.

Q5. Define Ports with its types?



Ans: **PORT.**

A socket at the back side of the computer used to attached peripherals devices are known as port. Personal computers have several types of ports. Internally, there are several slots for connecting modems, LAN card, VGA card etc on the motherboard while externally, a personal computer have ports for connecting display screen LCD/Monitors/projectors, keyboards, printers mouse, scanner and other peripheral devices. There are two types of ports, which are :

Serial Port & Parallel Port

Serial Port.

A port or interface that can be used to **transmit only 1 bit at a time** is known as serial port. A serial port is used for **serial communication**. There are two lines to carry out this task one for Serial Input Data (SID) line which is an input line to the CPU and the other Serial Output Data (SOD) line which is an output line. Microprocessor receives the data through SID and sends the data through SOD. Usually a serial port is known as **Male connector**. It is a **general purpose interface** that is used for almost any type of device including modems, mice, printers etc. A serial port has **9 or 25 pins**. Slow devices are connected but serial port is reliable in term of data transmission can transmit to a longer **distance up to 15 feet**.

Parallel Port.

A port or interface that can be used for **parallel communication**, in which multiple bits can be transmitted at a time, is called parallel port. There may be 8, 16, 32 channels (wires); each channel carries 1 bit of information, so 8 channels would be used to transmit 8-bits at a time. All the channels are not used for data only; some are used for control signals as well. Usually a parallel port is known as **female connector. It has 25 holes**, and the cable that plugs into it has 25 pins. It is a general purpose interface that is used for almost any type of external devices like printers, scanner, CD-ROMs, Harddisks, etc. Transmit data faster and quickly but upto short distance 3-5 feet.

Some other new ports developed are:

PS2 Port (Playstation 2 ), VGA Port for LCD/Monitors, DVI Port, Ethernet /LAN port for Internet connections, SCSI Port (Small Computer System Interface), USB Port (Universal Serial Bus), Game Port

Q#6. What are major functions of Input/output devices ?

#### INPUT & OUTPUT DEVICES.

Pronounced as “eye-oh” devices are used to transmit receive data into or taken out /extract from computer system. These includes printers, hard disk , keyboard and mouse. Keyboard and mouse are considered as primary input devices . Printer and Monitors are called Primary output devices.

**Input-Devices.** Physical equipment that can read and transmits the data entered from keyboard or mouse consisting alphabets, numbers or symbols into binary format its electronic pulses which can be understood easily by machine or computer. The main function of input devices is to pass the information in binary format to memory RAM then forwarded to CU and the data along with instruction retain in main memory. Commonly used input devices are: Keyboard , Mouse , Scanner, Joystick, trackball, light pen, digital camera, touch screen Microphones, web camera etc

**Output-Devices** . Physical equipment which represent the outcome of any computations and related activites of ALU & CU out from the CPU into human understandable format. They are used to convert the data and information expressed in electronic format to human understandable format mostly to monitors or on printer . Commonly used output devise are: Monitors , Printers , speakers , plotters ,projectors, Fax machine etc

Q#7 What is Computer Register and what are its types ?

**Registers.** CPU registers are high speed volatile temporary storage areas with temporary memory location s and no physical address. There are fourteen |(14) basic registers directly worked under CPU shared by CU and ALU. Data along with instruction being processed currently held or next will be stored in registers. They have fast access then memory . Out of fourteen (14) register 09 are general purpose and 05 are special purpose registers.

Two registers work directly under CU are IR and PC.

Two registers work directly under ALU are AC and SR

Nine general purpose registers are:

1. AC – Accumulator – stored data for ALU
2. SR – Status register indicate overflow, zero, on-zero, +ve, -ve even or odd
3. MBR- hold the data value access by MAR
4. MAR- hold the address of memory location from where data was retrieved/saved
5. IR – hold the current instruction being executed by CU
6. PC – deals with the order of executions of instructions
7. SP- indicated the stack memory locations for storing
8. INPR – Input register hold the data from input device
9. OUTFR- output register hold the data for output devices.

Q# 8. Define the following terms Word, Bit, Byte, Nibble, Access Time, Seek Time

**Computer Word.** Computer memory word is define as the number of bits or bytes that a microprocessor can manipulate as a single unit. It depends on the processor and data bus capacity what size of maximum bits word it can support can be 8bit word , 16bit word (Modern PC have 32 bits or 64 bits word support). Length of world varies from computer to computer.

**Bit** Bit is the abbreviation of Binary digit with is a non-addressable unit of memory. It is represented with 0 for OFF or 1for ON signal- flow of current.

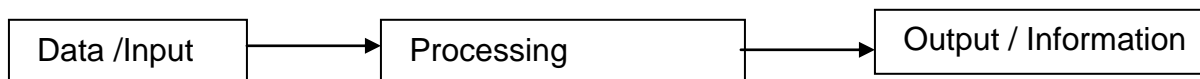
**Byte** Combination or group of 8 bits called Byte. Byte is the smallest addressable location of memory that can hold one character the character may be alphabetic ( A to Z) or number (0 to 9) or special symbols such as (?,\$,&, !, #)

**Nibble** Combination of four (04) bits called Nibble. 1 Nibble = 4 bits or 1 Nibble = ½ byte

**Access Time** time taken by processor to fetch and access the data from a memory location.

**Seek Time** time taken by processor to move and reach a memory location for reading/writing Instructions for fetching of data and decoding of instructions in CPU from a memory.

Q# 9. Define data processing cycle with diagram



**Data Processing Cycle** The sequence of input, processing and output in the form of information is called a data processing cycle. Converting any input data into information is the process of data processing. In data processing cycle the input data is changed and usually combine with other information to produce data in more use full form for understanding.

Data processing includes not only numerical calculations but also operations such as the classification of data and transmission of data from one place to another.

## Q# 10 Differentiate between RAM & ROM

RAM	ROM
RAM stands for Random Access Memory	ROM stands for Read only Memory
It is volatile – temporary memory	It is non-volatile permanent memory
It is not pre-programmable	It is pre-programmable mostly by the manufacturer company
It is erasable, alterable and programmable memory	It is mostly not erase able, non-alterable and non-programmable , can only be erase by exposing it to ultraviolet light /rays or to electrical charge
It allow user to read/write data in memory	It allow user only to read data from memory
It is also called user's memory, primary memory or main memory.	It is also called Firmware and it is not a user's memory
It can be taken in/taken off from the motherboard easily by the user	It can't be taken in/ taken off from the motherboard easily by the user as mostly it's circuit is insulated /soldered in the motherboard
It has two types : Dynamic RAM – DRAM Static RAM – SRAM	It has three types : PROM, EPROM, EEPROM USB is an advance form of EEPROM
It is mostly support operating system and contents of important files copied into it from external memory	It is mostly support booting sequence of computer system and support for BIOS test.
It is mostly available in the size of 1/2/4/8/16/32/64 GB	It's size is not fixed it depends on the motherboard 1/2/4/8 MB mostly.

## Differentiate between Internal & External Memory

Internal Memory	External Memory
It is located in the form of chip on the motherboard, connected by inserting chips in sockets (RAM) while (ROM) chips are built in with motherboard.	It is any external /physical device which can be separated from CPU by data cable and power cables.
It has two main types : RAM – Volatile and ROM – Non-Volatile memory Cache Memory and Registers	It is non-volatile memory / permanent memory. Different types include Magnetic Tape, Magnetic Disk, Floppy disk , USB , Optical Disk (CD/DVD)
It speed is fast in term of data access	It speed is slow in data access
Its storage capacity is small can be in MB/GB	Its storage capacity is huge can be in GB/TB
Also known as Primary memory or Main memory	Also known as Secondary or Auxiliary Memory
It holds the program currently executing like operating system directly work under control unit.	It holds the data and contents for longer period of time. Its contents need to be copy into the RAM when needed.



Differentiate between Serial and parallel ports

Serial port	Parallel ports
It can be used for serial transmission sending/receiving 1 bit at a time	It can be used for parallel transmission sending/receiving more than 1 bit at a time
Also known as Male connector / port	Also known as Female connector / port
It has 9-25 pins	It has 25 holes
Can transmit 1 bit at a time	Can send 8bits simultaneously
Slow data transfer rate	Faster data transfer rate
Reliable for longer distance up to 15 meter	Not reliable for long distance up to 4-5 meter
Slow devices are connected	Faster devices are connected
Devices like Modem through telephone line, Mouse, printer , VGA	Tape drives, CD-ROM , External Hard disk, printer
General purpose interface where USB is the advance form of serial ports	Special purpose interface
Serial ports can be named as COM1, COM2, COM3 , RS-232 and so on	Parallel ports are named as LPT1, LPT2, LPT3 and so on