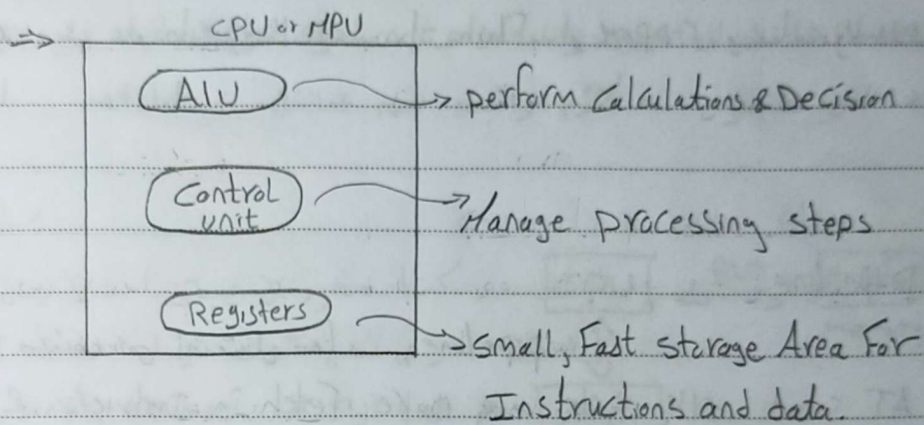


Assignment lesson 1

Question 1 Define the Following:

* **Microprocessor**: \Rightarrow General purpose Integrated Circuit (IC), which can perform Arithmetic and Logical operation.

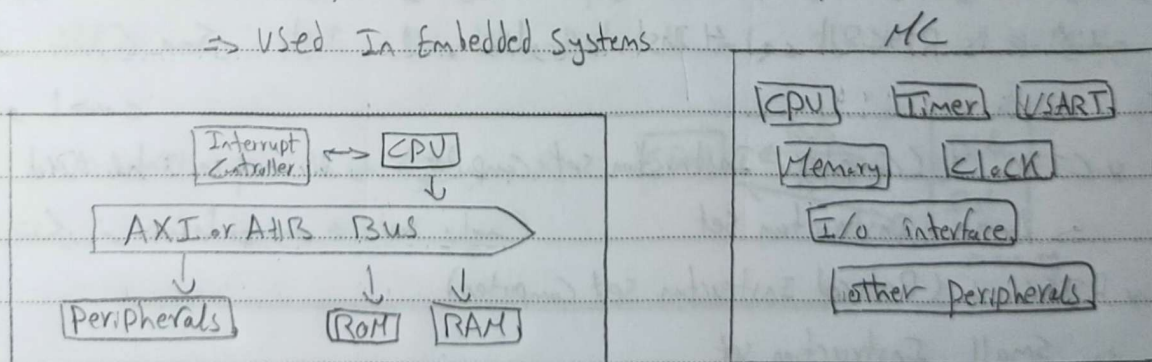
\Rightarrow It consists of CPU only.



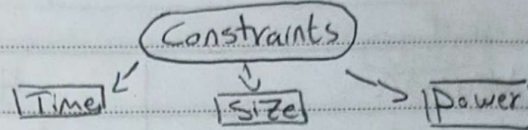
\Rightarrow It can communicate with IC's like Memory (RAM or ROM) and I/O devices.

* **Microcontroller**: \Rightarrow It's specific purpose Integrated Circuit, which consists of CPU, RAM, ROM and other peripherals

\Rightarrow Used in Embedded Systems



* Embedded Systems: \rightarrow Specific Purpose Computer Systems design To perform one or few function under constraints



\rightarrow It's contain Hardware & Software

\rightarrow In Most cases is a part of bigger system.

* Mechatronic System: \rightarrow Systems In which Mechanical hardware are embedded with Microcontroller.

\rightarrow EX: Robotics & Automotive Industry

* n-Bit Processor: \rightarrow It mean CPU can make a process on n-Bit only To be specific ALU can make calculation on n-Bit only

\rightarrow Registers In CPU can store n-Bit only

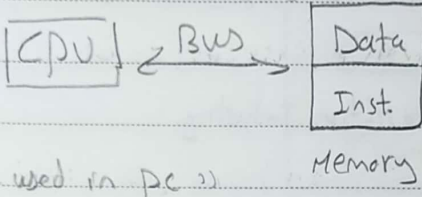
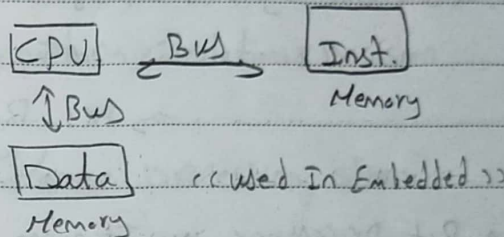
\rightarrow Data Bus contain n-Bit at a Time

\rightarrow Data Larger than n-Bit must to be broke

Question 2 Compare:

Micro Processor	Micro Controller
\rightarrow Single IC which contain only CPU	\rightarrow IC which contain CPU, ROM, RAM, I/O ports
\rightarrow General purpose	\rightarrow Specific Purpose
\rightarrow Can Add Memory with any Size	\rightarrow Can't Add Memory because having constrain on it
\rightarrow It's Very expensive To Build system, because need IC for each Component	\rightarrow It's already having All this Component in single IC

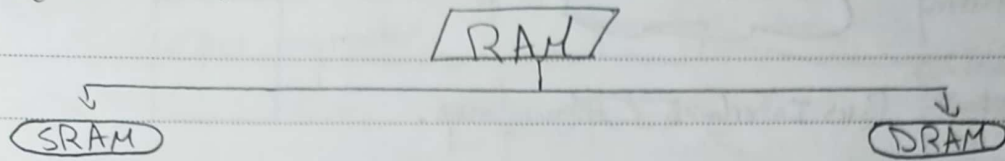
Question 3 Compare:

Von Neuman	Harvard
<ul style="list-style-type: none"> → Single Memory for program Instruction & Data → Single Data Bus for Fetch both Instructions & Data 	<ul style="list-style-type: none"> → Separate Memory for Instruction & Data → one bus To ROM (Instruction) → one bus To RAM (Data)
	

Question 4 :

ROM		
Masked ROM	PRom	EPROM
<ul style="list-style-type: none"> → It programmed from Manufacturer → User can't write program unit → Cheapest ROM → called OTP (One Time programmable) 	<ul style="list-style-type: none"> → Can program once by user → also called OTP 	<ul style="list-style-type: none"> → Can be programmed and erased thousand Time → Erased by UV EPROM

Question 5:



- cells Made of Flip Flop
- Don't need To Refreshing
- each cell need 6 Transistors
- very expensive

- cells Made from capacitors, so it small in size Than SRAM
- Low in price Since it Made from cap
- need To Refresh due To charge leakage
- while Refreshing Data can't access

Question 6: → AT RunTime CPU can't write on ROM just Read From it

→ AT Load Time we can write on ROM using Burner

Question 7:

Type	Volatilk	write able	Erase size	MAX Erase cycle	Cost Per Byte	Speed
SRAM	Yes	Yes	Byte	unlimited	Expensive	Fast
DRAM	Yes	Yes	Byte	unlimited	Moderate	Moderate
Masked ROM	No	No	---	---	Iheap	Fast
PROM	No	Yes, once	---	---	Moderate	Fast
EPROM	No	Yes	All Bytes	Limited	Moderate	Fast
EEPROM	No	Yes	Byte	Limited	Expensive	Fast on Read slow in write
Flash	No	Yes	sector	Limited	Moderate	// //
NVRAM	No	Yes	Byte	unlimited	Expensive	Fast