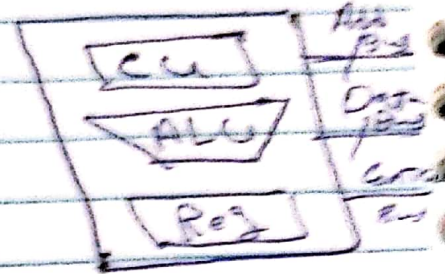
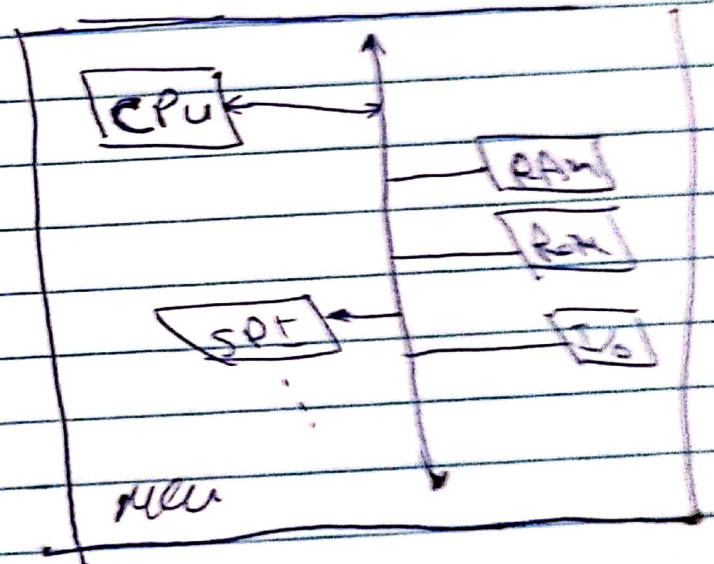


Q1) Micro-Processor :- is the central processing unit that contain (Control unit - ALU - Register) to do arithmetic and logical operation and need external component like (RAM - ROM - Peripherals)



Microcontroller : is a single IC fabricated on it micro processor, RAM, ROM and other peripherals



Embedded System :-

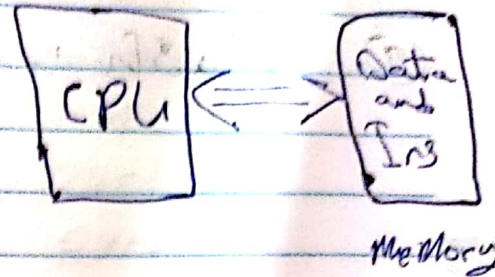
It is a special purpose computer designed for a dedicated function and have constraints (Time - Size of Program - Power Consumption).

Mechatronic system: System in which mechanical hardware is integrated with information driven system.

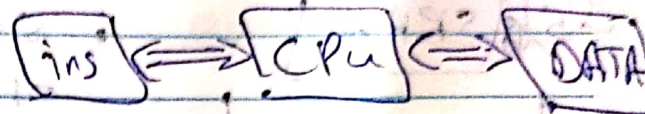
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n-bit Processor - it is a processor that work on n-bit data simultaneously

Q3) Von-Neumann;
use single common memory space where program instruction and data are stored.



Harvard;
separate memory area for instruction and another for data.



Q4) Rom - Read only memory

Types - ① PRom = Programmable read only memory
it can be programmed only once.

- non volatile
- slower than RAM
- can read only from Rom at any time
- Based on floating Gate MOSFET

② Mask Rom - it is one time programmable but it is programmed during manufacturing.

③ EPROM - "Erasable Programmable read only memory"

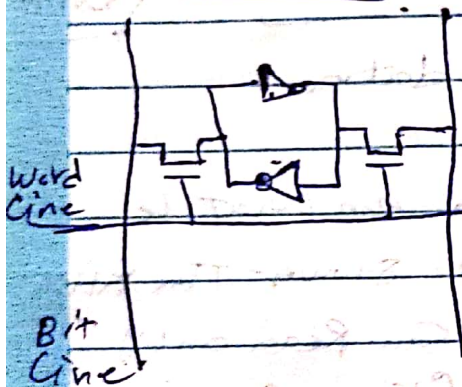
• it can be programmed many times -

• it can be erased using ultra violet radiation

Q4) **EEPROM**: Can be programmed many times and erased byte by byte electrically.
Can be programmed without external devices.

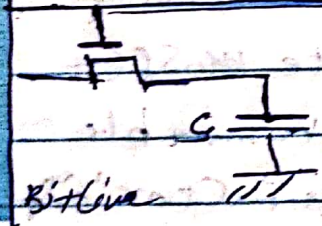
Q5) **Flash**: 1st one Type of EEPROM is block-wise erasable used when large amounts are needed.

Q5) **SRAM**:



- Storage Cells are made of flip-flops.
- refreshing not required to keep data.
- higher speed - higher cost.
- consist of 6 Transistors

Q2) **DRAM**



- Storage Cells are made of capacitors
- Capacitors need refreshing due to leakage of charges
- less speed - lower price

Q6) Rom is called (Read Only Memory) because I can write on it once and then read for ever during running.

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Q7)

Name	Type	volatile	writable	erase size
Prom	Rom	X	X	N/A
masked Rom	Rom	X	X	N/A
EPROM	Rom	X	✓	entire chip
EEPROM	Rom	X	✓	byte
Flash	Rom	X	✓	Block
SRAM	RAM	✓	✓	Byte
DRAM	RAM	✓	✓	Byte
NVRAM	RAM	X	✓	Byte

Max Erase cycles	Cost per Byte	Speed
N/A	inexpensive	fast
N/A	Moderate	fast
Limited	Moderate	fast
Limited	Expensive	fast → read slow → write
Limited	Moderate	fast
unlimited	Moderate	fast
unlimited	Expensive	Moderate
unlimited	Expensive	fast