Unit 6 MCU_Fundementals Lesson 1
Assignment

Q1 Define

1. MicroProcessor

MProcessor is an IC that has CPU like normal processors in Computer + Same main Components
- ALU for arithmatic operations [Execution Stage]
- Control Unit for instructions fetching, decoding
- Registers for fast data Access

Some Mprocessors may have MPU, MMU

2. MicroController

also a MicroProcessor with Some extra ICs like RAM, flash, DIO ports, timers, Interrupt Controller, i2c, spi, uart ... etc mainly used in embedded Systems

3. Embedded System

A small world of interacting parts, peripherals mainly having at least a Single core MCU dealing with outer peripherals [I/O ...] for Single purpose

4. Mechatronic System → Mechanics
↳ Electronics

a Combination of both systems, mainly having Control System example: robots, automotive integerations

5. n-bit Processor

A processor that can read/write n-bits at a time and any data > n-bits to be read has to be divided

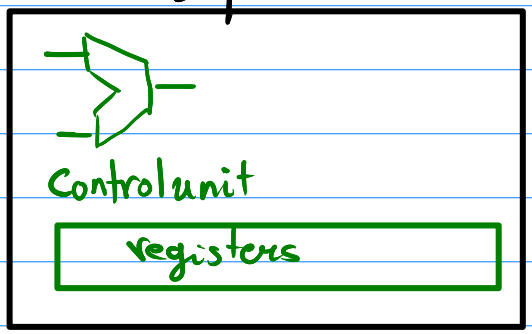
Q2) Compare between *Micro-processor* Vs *Micro-controller*

MP

Small capabilies Processor having normal processor Functions

- ALU
- ControlUnit
- Registers

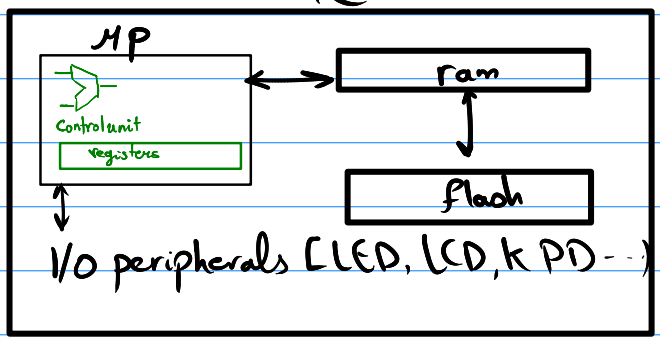
MP



MC

A Mp with extra peripherals (ram, rom, i/o ---) suitable for Embedded Components

MC



Q3) Compare between *Von-Neuman Vs. Harvard Architecture*

POC	Von-Neuman	Harvard
data & Instruction memory	Both data and instruction are inside Same memory	data, instructions are in Separate memories
Busses	Only One Bus to Transfere data / instruction at a time	each memory has it's own bus
Advantages	Minimizing External Signal pins	• Supports Pipelining
Disadvant	No Pipelining Support	

Q4) By Simple way illustrate The Types of (ROM)

Rom types : Read Only Memory

* PROM
Programmable rom

Can Be Programmed only Once by it's user

* mainly used in Small toys in China

* EPROM
erasable Programmable rom

Can be Programmed & Erased many times

Erased by UV rays
+ Can't erase parts of it

[Old + obselete]

* Masked ROM

Comes Programmed from it's manufacturer

+ Can't be erased

Q5) By Simple way illustrate The Types of (RAM)

Random Access Memory

static
* SRAM

made of 6 CMOS transistors for 1 bit Storage

No Refreshing Circuit needed

More Expensive

dynamic
* DRAM

made of 1 transistor + Capacitor

Refreshing Circuit needed to recharge Capacitors

Less Expensive

Q6) WHY ROM is Read only Memory although i can write on it ?

ROM is Read Only Since we can't write on it during runtime , however we write our Code files (hex, elf, bin ---) on it during Burning [flashing] Stage ((the Processor isn't powered on during this Stage))

we use Some HW tools to write Our Code

Type	Volatile?	Writeable?	Erase size	Max Erase cycles	Cost(per Byte)	Speed
eeprom	No	yes	byte	∞		avg
Sram	yes	yes	byte	∞		very high
dram	yes	yes	byte	∞		high
Flash	No	yes	byte	∞		high
NVRAM	NO	Yes	byte	∞		high
eprom	No	yes	All			
Prom	No	Once				
maskedrom	NO	NO				