Group (B)

Q.NO.1: Define CPU. Differentiate between microprocessor and Microcontroller with example. [1+4]

Answer

CPU (Central Processing Unit) is the primary component of a computer that acts as its "control center".

	Microprocessor		Microcontroller
1)	Microprocessors are widely used in computer system.	1)	Microcontroller is widely used in embedded system.
2)	It has only a CPU embedded into it.	2)	It has a CPU, a fixed amount of RAM, ROM and other peripherals all embedded on it.
3)	In case of here we have to connect all the components externally so the circuit becomes large and complex.	3)	As all the components are internally connected in microcontroller so the circuit size is small.
4)	It consumes more power.	4)	It consumes less power than a microprocessor
5)	It is used for general-purpose.	5)	It is used for single-purpose.
6)	For example: Intel core i7, AMD Athlon, Broadcom BCM2711 (Raspberry Pi) etc.	6)	For example: ATmega 328 (Arduino UNO), STM32 PIC16F877A etc.

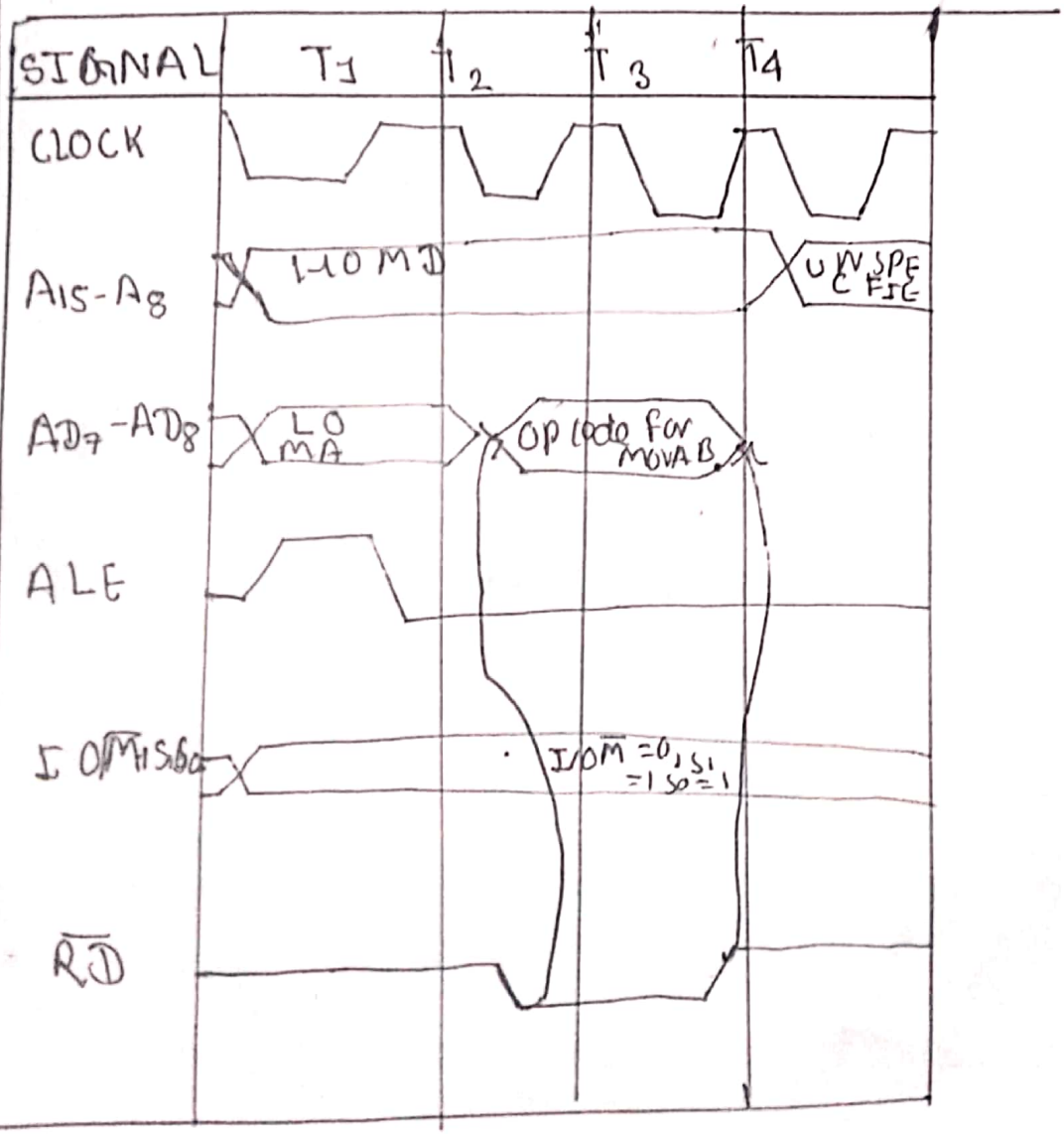
By: Thapa Kazi

Q.NO.3: Define instruction cycle. Explin the opcode fetch machine cycle for MOV A,B with timing diagram (opcode: MOV A,B = 78h) [1+4].

Answer:

Instruction cycle is define as the cycle that the central processing unit (cpu) follows from boot-up untill the computer has shut down in order to process instructions.

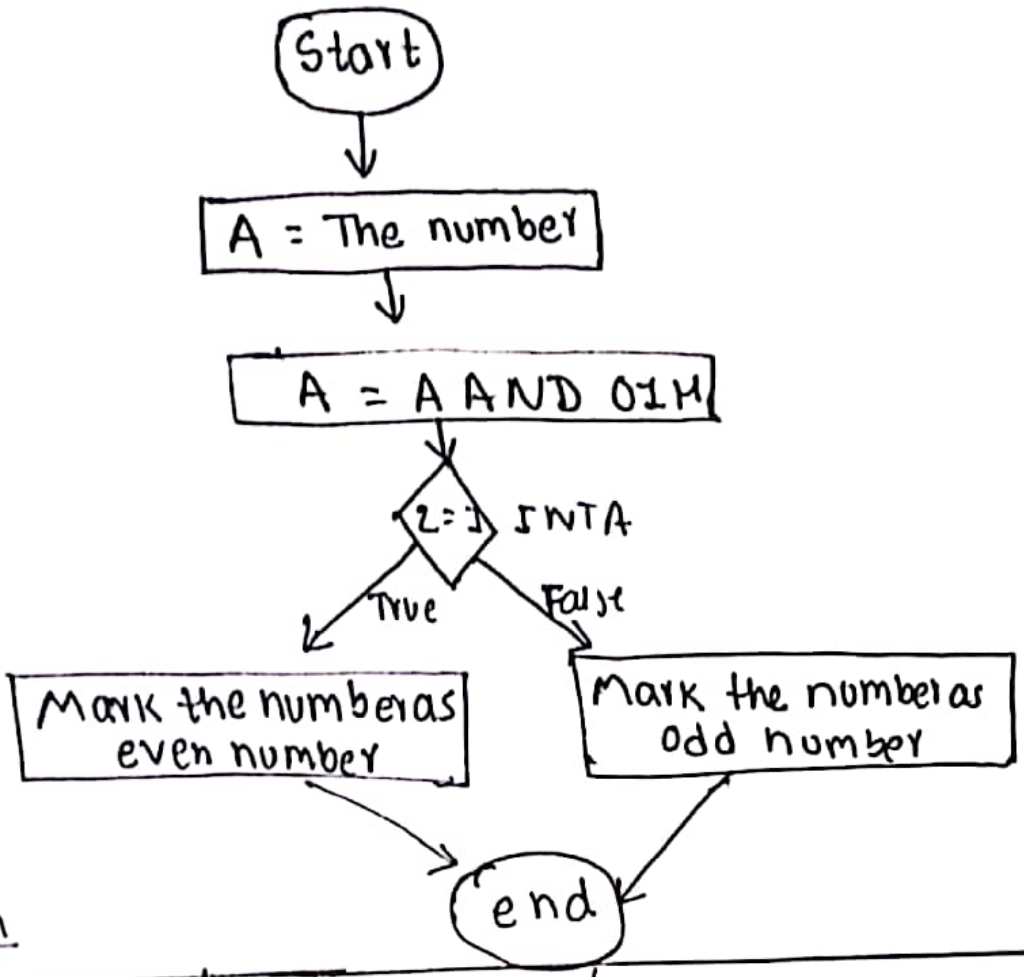
The instruction MOV A,B is a 1-byte instruction. Microprocessor takes only one machine cycle (op-code fetch) to complete instruction. Hence i hex code for MOV A,B is passed to the Microprocessor.



By: Thapakazi

Q.NO4; Write an ALP using 8085 to check number stored in memory location 8080h is either even or odd.

Ans



Program

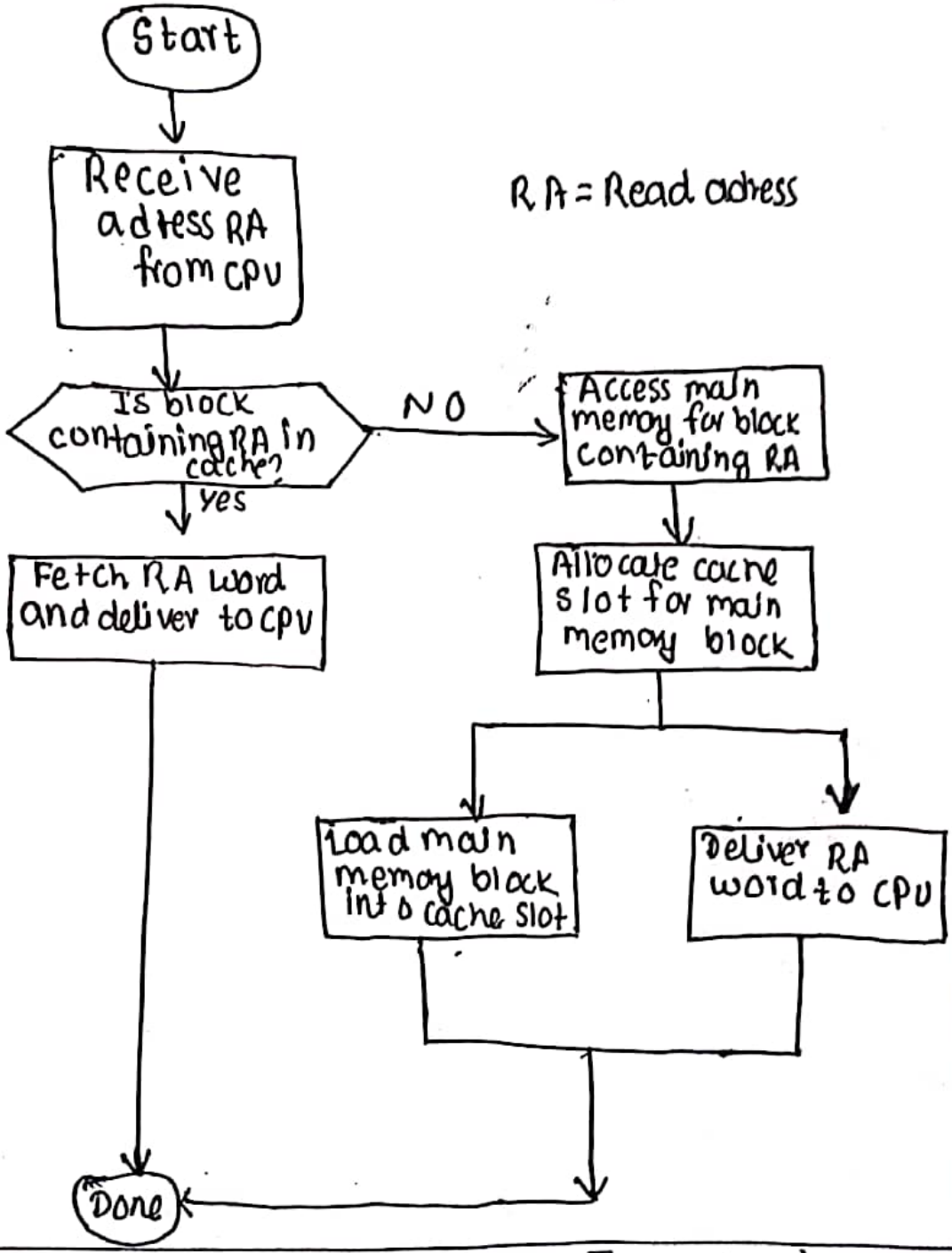
Address	Hexcodes	Label	Mnemonics	Comments.
F000	3A,00,80		LDA 8000H	Load the number from memory
F003	E6,01		ANI 01H	AND 01H with Acc content
F005	CA,0D,F0		JZ EVEN	If Z=0, it is Even.
F008	3E,01		MVIA,01H	Load 01H to indicate it is odd
F00A	C3,0F,F0		JMP STORE	Jump to store
F00D	3E,FF	EVEN	MVIA,FFH	Load FFH to indicate it is Even
F00F	32,50,80	STORE	STA 8050H	store the result into memory.
F012	76		HLT	Terminate the program

By: Thapa Kazi

Q.NO.5: What is cache memory? Explain the elements of cache design.

Ans Cache memory is define as a chip-based computer component that makes retrieving data from the computer's memory more efficient.

The key elements of cache design are: cache size, Block size, Mapping function, Replacement algorithm, and write policy. These are explained as following below.



By: Thapa kazi

a) Cache Size: It seems that moderately tiny caches will have a big on performance.

b) Block Size: Block size is the unit of information change between cache and main memory.

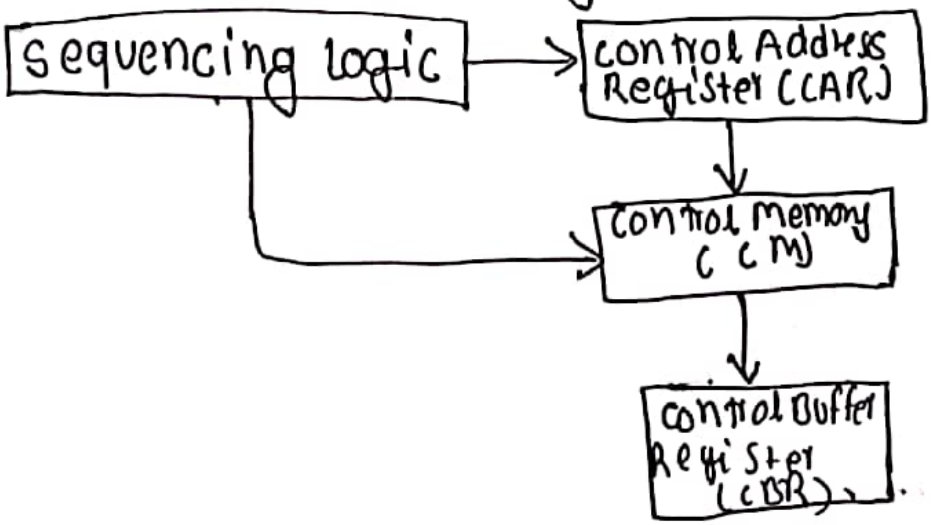
c) Mapping function: When a replacement block of data is scan into the cache, the mapping performs determines that cache location the block will occupy.

d) Replacement Algorithm

e) Write Policy:

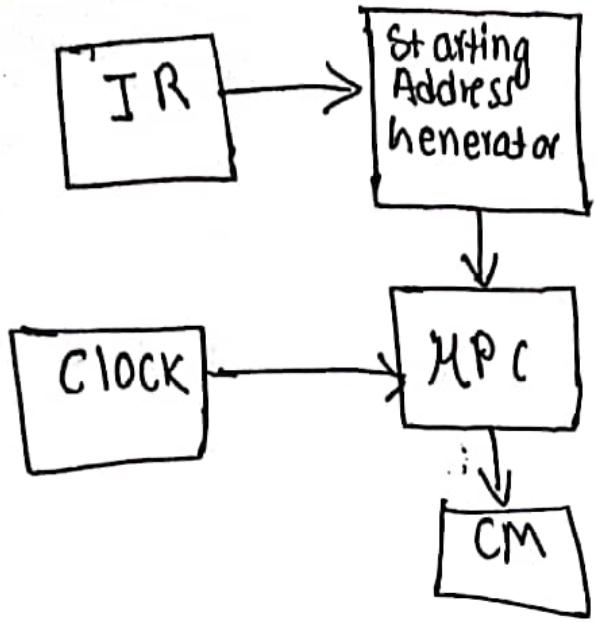
Q.NO.6: Explain the organization of Microprogramme control unit.

Ans A microgrammed control unit is a control unit that saves binary control ~~unit that saves~~ values as words in memory.



- Control Memory
- Control Address Register
- control Buffer Register
- Sequencing

By: Thapa Kazi



The microprogrames for all instruction in the instruction set of a computer are stored in a special memory called the control memory.

Q. NO. 8

a) Accumulator :- An accumulator is a type of register included in a CPU. It acts as a temporary storage location which holds an intermediate value in mathematical and logical calculations. The most elementary use for an accumulator is adding a sequence of numbers. The numerical value in the accumulator increases as each number is added, exactly as it happens in a simple desktop calculator. Once the sum has been determined.

b) 8085 Interrupts:- When microprocessors recive interrupt signals through pin of microprocessor, they are known as hardware Interrupts. There are 5 Hardware Interrupts in 8085 microprocess. They are - INTR, RST 7.5, RST 6.5 RST 5.5, TRAP.

By: Thapa Kazi

Software Interrupts are those which are inserted in between the program with means In 8085 microprocessor. They are - RST 0, RST 1, RST 2, RST 3, RST 4, RST 5, RST 6, RST 7.

Q.NO.10: Define the addressing mode. Explain the various instruction addressing mode with examples.

Ans The addressing mode is the method to specify the operand of an instruction. The job of a microprocessor is to execute a set of instructions stored in memory to perform a specific task.

i) Immediate Addressing Mode: The operand is provided directly within the instruction itself.
eg: MOV R1, #10

ii) Register Addressing mode: The operand is located in a register specified by instruction. Eg: ADD R1, R2

iii) Direct Addressing mode: The address of the operand is explicity specified in the instruction.
Eg: LOAD R1, 5000

iv) Indirect Addressing mode: The address of the operand is held in a register or memory location.
Eg: LOAD R1, (R2)

BH: Thapa Kazi

5) Indexed Addressing Mode: The address of the operand is computed by adding a constant value (index) to base address.

Eg: LOAD R1, 1000 (R2)

6) Base Register Addressing Mode: uses a base register and a displacement to calculate the effective address of the operand.

eg: LOAD R1, 2000 (R1)

7) Register Indirect Addressing Mode: The address of the operand is given by a register which contains the memory address.

Eg: MOV R1, (R2)

8) Displacement Addressing Mode

9) Relative Addressing Mode.

Q.NO.11 ; Define micro-program? Describe symbolic micro-program for instruction FETCH routine.

Explain the orgarization of micro-program sequence for contarl memory with suitable diagram.

Ans process of writing microde for a micro-processor is called microprogramming.

By: Thapa Kazi

Instructions Fetch Routine

The instruction Fetch routine is part of the control unit's operations that retrieves the next instruction to be executed from memory. The typical steps involved in the Fetch routine are:-

1) PC to MAR: Copy the address from the program counter (P to Memory Address Register (MAR)
2) Read Memory: Initiate a read operation to fetch the instruction from memory.
3) Memory to MDR: Transfer the fetched instruction from the Memory Data Register (MDR) to the instruction Register (IR)
4) Increment PC: Update the PC to point to the next instructi

Organization of Microprogram Sequence

The organization of a microprogram sequence for the instruction Fetch routine can be described with the following components: