Victoria University
of Bangladesh

Assessment Topic:

Mid Assessment

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Submitted To:

Umme Khadiza Tithi

Lecturer, Department of Computer Science & Engineering

Victoria University of Bangladesh

Submitted By:

Ruhul Amin

ID: 2120180051

Department: CSE

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<u>**Answer to the question no 1(a)**</u>

 # Write down block diagram of a basic Microcomputer and features of Microprocessor.

Answer: A digital computer with one microprocessor which acts as a CPU is called microcomputer. It is a programmable, multipurpose, clock -driven, register-based electronic device that reads binary instructions from a storage device called memory, accepts binary data as input and processes data according to those instructions and provides results as output.

The microprocessor contains millions of tiny components like transistors, registers, and diodes that work together.

## Block Diagram of a Microcomputer
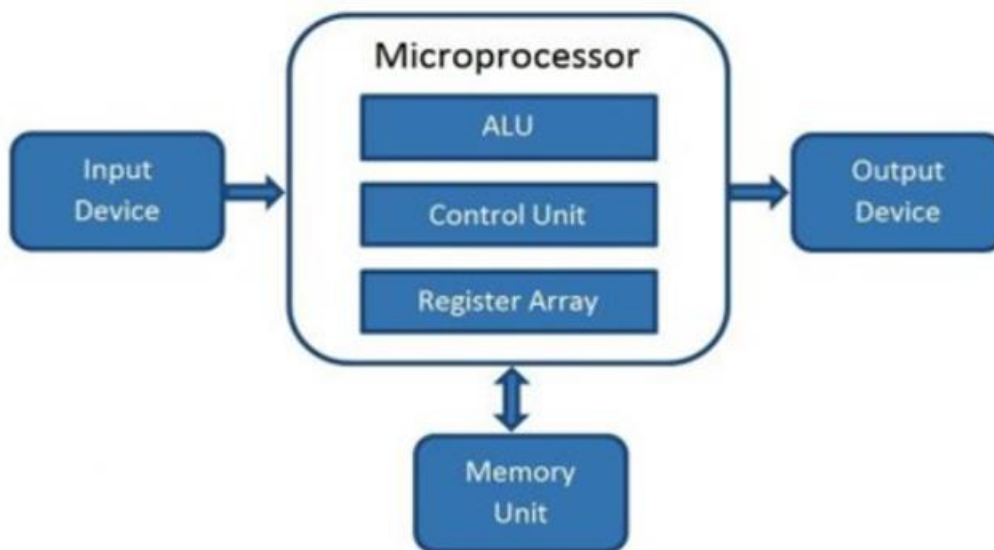
Features of Microprocessor
- ➤ **Low Cost** - Due to integrated circuit technology microprocessors are available at very low cost. It will reduce the cost of a computer system.
- ➤ **High Speed** - Due to the technology involved in it, the microprocessor can work at very high speed. It can execute millions of instructions per second.
- ➤ **Small Size** - A microprocessor is fabricated in a very less footprint due to very large scale and ultra-large-scale integration technology. Because of this, the size of the computer system is reduced.

- ➢ **Versatile** - The same chip can be used for several applications, therefore, microprocessors are versatile.
- ➢ **Low Power Consumption** - Microprocessors are using metal oxide semiconductor technology, which consumes less power.
- ➢ **Less Heat Generation** - Microprocessors uses semiconductor technology which will not emit much heat as compared to vacuum tube devices.
- ➢ **Reliable** - Since microprocessors use semiconductor technology, therefore, the failure rate is very less. Hence it is very reliable.
- ➢ **Portable** - Due to the small size and low power consumption microprocessors are portable.

Answer to the question no 1(b)

Draw 8085 Architecture.

Answer: Block Diagram of 8085
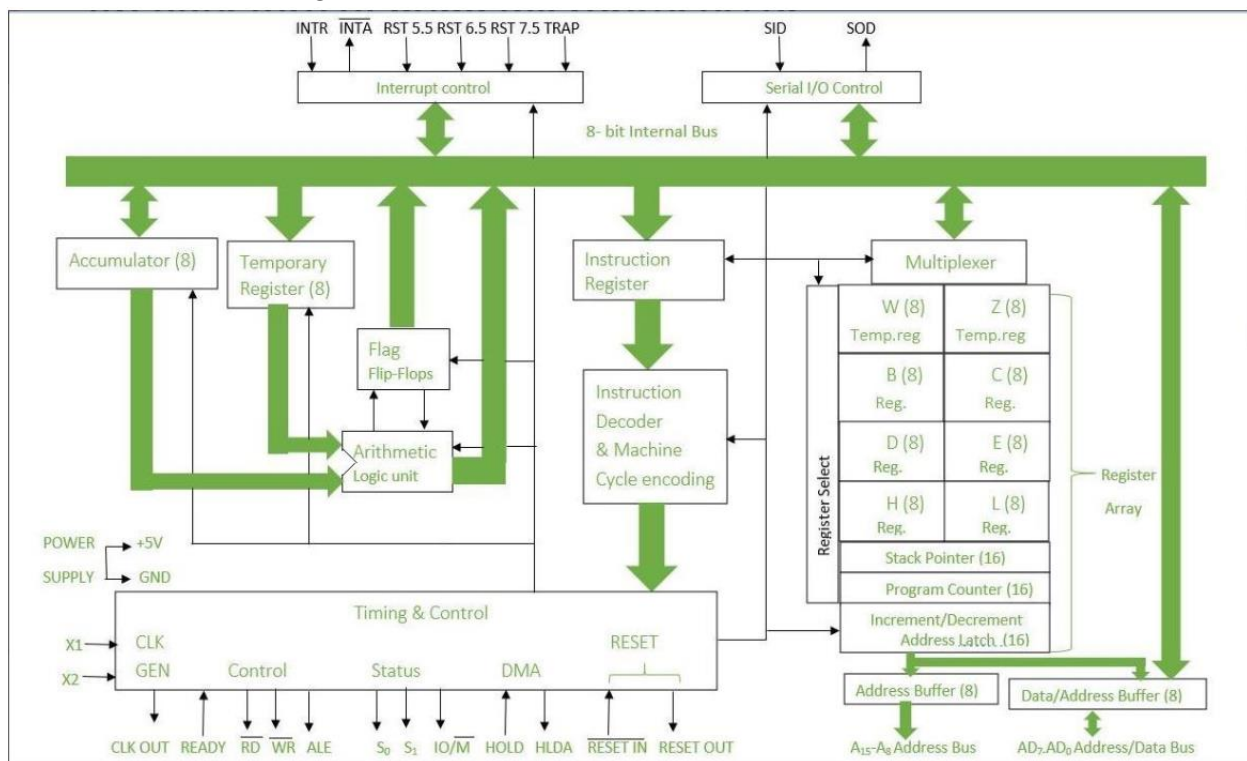
Pin Configuration

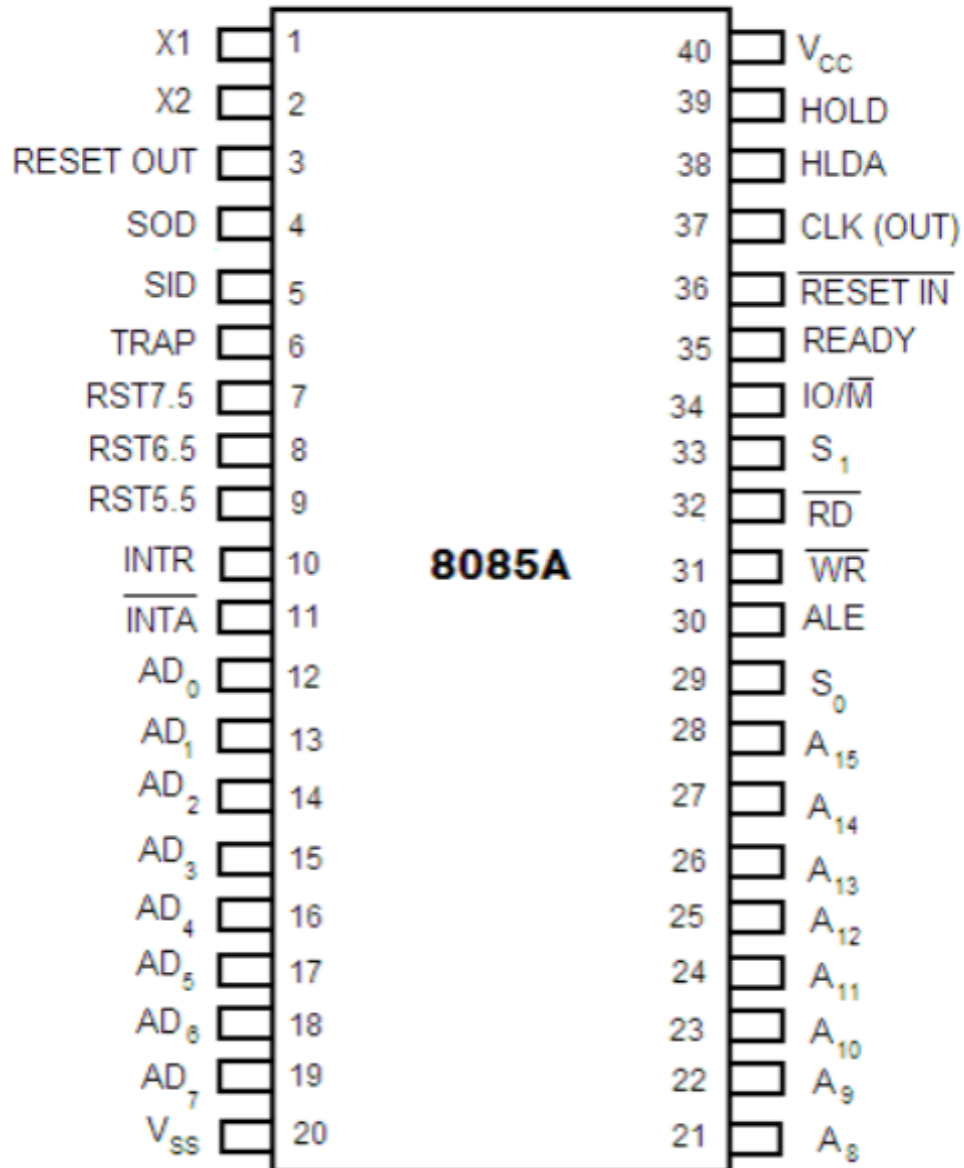|		
X1	1	40	Vcc
X2	2	39	HOLD

Fig: Pin diagram of Intel 8085 microprocessor

Answer to the question no 1(c)

Define Bit Manipulation Instructions.

Answer:

Bit Manipulation Instructions

Logical instructions carry out binary operations on the bits stored in the registers. In logical operations, each bit of the operand is treated as a Boolean variable. Logical instructions can change bit value, clear a group of bits, or can even insert new bit value into operands that are stored in registers or memory words. Each logical instruction is represented by mnemonic symbols.

Name	Mnemonics
Clear	CLR
Complement	COM
AND	AND
OR	OR
Exclusive-OR	XOR
Clear carry	CLRC
Set carry	SETC
Complement carry	COMC
Enable interrupt	EI
Disable interrupt	DI

The clear instruction replaces the specific operand with 0's. The complement instruction inverts all the bits of the operand and produces 1's complement. The AND, OR, and XOR instructions perform logical operations on each bit or group of bits of the operand.

The AND instruction can clear a bit or group of bits of an operand. For the Boolean variable, a, the relationship 'ab0 = 0' and 'ab1 = a' indicates that the binary variable when ANDed with 0 changes the value to 0.

The OR instruction can set a bit or group of bits of an operand. For the Boolean variable, a, the relationship 'a + 1 =1' and 'a + 0 = a' indicates that the binary variable when ORed with 1, changes the value to 1.

The XOR instruction can complement bits of an operand. For the Boolean variable, a, the relationship 'a + 1 = a' and 'a + 0 = a' indicates that the binary variable is complemented when XORed with 1. However, the variable does not change the value when XORed with 0.

The carry bits can be cleared, set, or complemented with appropriate instructions. The bit manipulation instructions can also enable or disable the interrupt facility, which is controlled by flip-flops.

<u>**Answer to the question no 2(a)**</u>

How DMA operations are performed?

Answer: DMA stands for Direct Memory Access. It is designed by Intel to transfer data at the fastest rate. It allows the device to transfer the data directly to/from memory without any interference of the CPU.

Using a DMA controller, the device requests the CPU to hold its data, address and control bus, so the device is free to transfer data directly to/from the memory. The DMA data transfer is initiated only after receiving HLDA signal from the CPU.

Following is the sequence of operations performed by a DMA –
- ➤ Initially, when any device has to send data between the device and the memory, the device has to send DMA request (DRQ) to DMA controller.
- ➤ The DMA controller sends Hold request (HRQ) to the CPU and waits for the CPU to assert the HLDA.
- ➤ Then the microprocessor tri-states all the data bus, address bus, and control bus. The CPU leaves the control over bus and acknowledges the HOLD request through HLDA signal.
- ➤ Now the CPU is in HOLD state and the DMA controller has to manage the operations over buses between the CPU, memory, and I/O devices.

Answer to the question no 2(b)

Define 8257 pin description.

Answer:

The following image shows the pin diagram of a 8257 DMA controller –