Ahsanullah University of Science & Technology

Department of Computer Science & Engineering

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Course Title : **Assembly Language Programming Sessional**
Assignment No : **01**

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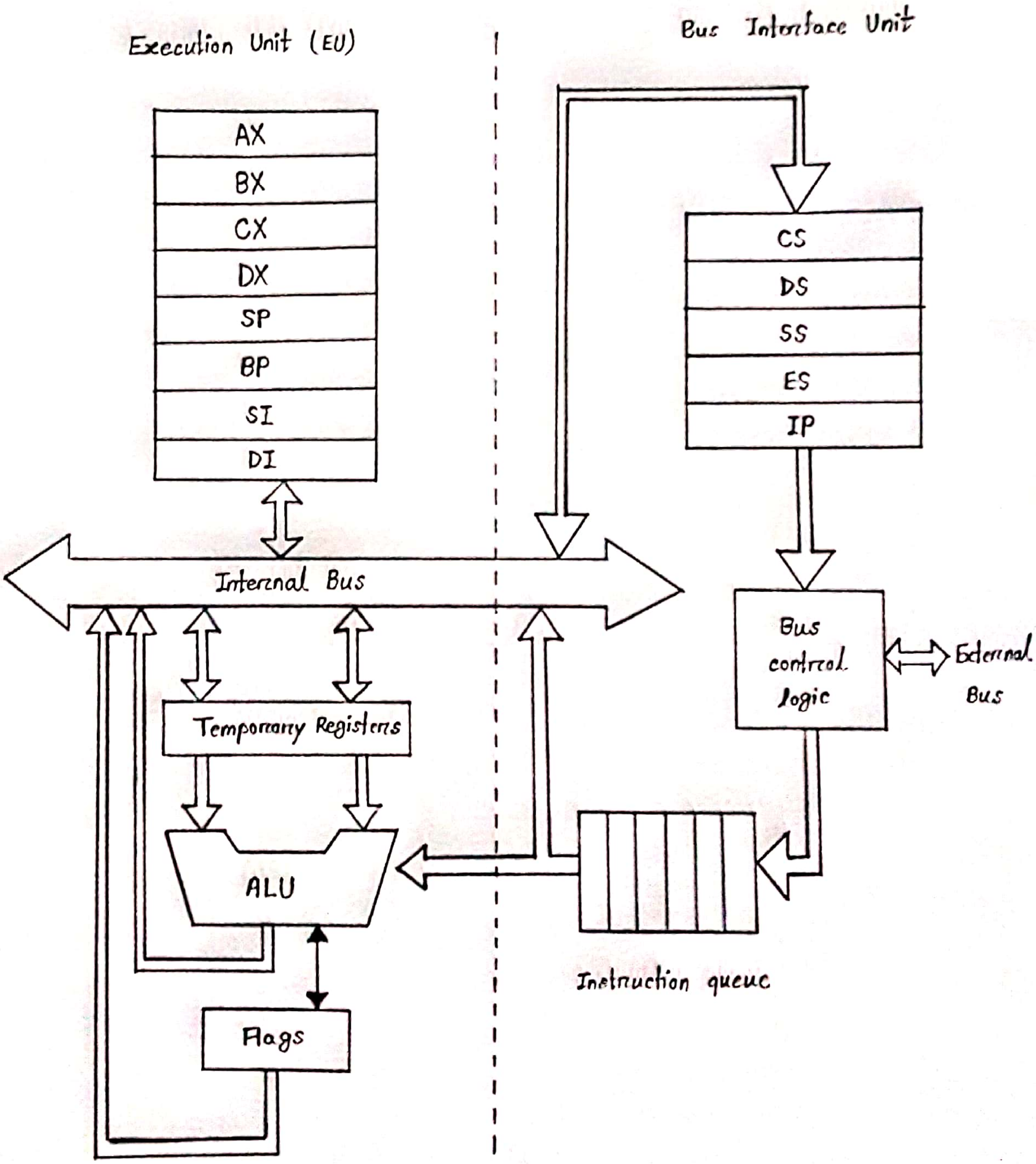
Question - 1 : Draw the diagram of the Intel 8086 Microprocessor organization.

Answer :



Question - 2 : Consider a machine language instruction that moves a copy of the contents of register AX in the CPU to a memory word. What happens during the fetch cycle and execution cycle.

Answer :

Machine instructions have two parts. They are Opcode and Operands. Opcode field specifies the particular operation that is to be performed. Each operation has its unique opcode. Operands fields which specify where to get the source and destination operands for the operation specified by the opcode.

The steps of executing an instruction (the fetch - execution cycle) are :

During Fetch Cycle :

① Fetch an instruction from memory.

② Decode the instruction to determine the operation.

③ Fetch data from memory if necessary.

During Execution Cycle :

① Perform the operation on the data.

② Store the result in memory if needed.

The CPU goes through the following steps to execute a machine instruction :

① Fetch the instruction :

To start the cycle, the BIU places a memory read request on the control bus and the address of the instruction on the address bus. Memory responds by sending the contents of the location specified. The CPU accepts the data and adds four to the IP so that the IP will contain the address of the next instruction.

② Decode the instruction :

On receiving the instruction, a decoder circuit in the EU decodes the instruction and determines that it is an ADD operation involving the word at address 0.

③ Fetch data from memory :

The EU informs the BIU to get the contents of memory word 0. The BIU sends address 0 over the address bus and a memory read request is again sent over the control bus. The contents of memory word 0 are sent back over the data bus to the EU and are placed in a holding register.

④ Perform the operation :

The contents of the holding register and the AX register are sent to the ALU circuit, which performs the required addition and holds the sum.

⑤ Store the result :

The EU directs the BIU to store the sum at address 0. To do so, the BIU sends out a memory write request over the control bus, the address 0

over the address bus, and the sum to be stored over the data bus. The previous contents of memory word 0 are overwritten by the sum.

The cycle is now repeated for the instruction whose address is contained in the IP.