

www.csepedia.com

Punjab Technical University

B.Tech. – Computer Science & Engineering (Sem. – 4<sup>th</sup>)

Microprocessor and Assembly Language  
Programming

Subject Code: CS-208

2 Marks Questions:-

Q:-1) What is Program Counter and why it is required. (May 2012)

Ans:-1) **Program Counter**:- It is a 16 bit special function register in the 8085 microprocessor. It holds the address of the memory location of the next instruction when the current instruction is executed by the microprocessor. The program counter (PC) is also called as instruction pointer (IP).

Q:-2) What is the need of Address Bus in Microprocessor? (May 2012)

Ans:-2) **Address Bus**:- A collection of wires connecting the CPU with main memory that is used to identify particular locations (addresses) in main memory. The width of the address bus (that is, the number of wires) determines how many unique memory locations can be addressed.

**Q:-3) Explain Status Flag Registers of 8085? (May 2012)**

**Ans:-3) Status Register (or Flag register):-** A flag register contains a number of flags either to indicate certain conditions arising after arithmetic and logical operations or to control certain operations.

A flag is a flip-flop which is set or reset by the processor to indicate certain conditions or set/reset by the programmer to control certain operations.

**Intel 8085 contains the following Status flags:**

**Carry flag** - it indicates whether there is carry or not after an arithmetic and logical operation.

**Zero flag** - it indicates whether the result of an arithmetic or logical operation is zero or nonzero.

**Sign flag** - it indicates whether the result is positive or negative,

**Parity flag** - it indicates whether the result contains odd number of 1's or even number of 1's.

**Auxiliary carry (or half carry)**, that is carry from the 3<sup>rd</sup> bit to 4<sup>th</sup> is also indicated.

**Q:-4) What do you understand by Synchronous Data Transfer?**

(May 2012)

**Ans:-4) Synchronous Data Transfer:** - The transfer of data between two devices on a network where they both carry out a predetermined set of interactions based on a clock. The sending of collections of data by a

computer, where every collection is sent periodically and where the acknowledgement from the destination computer has to be received by a certain time, is an example of this form of data transfer.

**Q:-5) Difference between PUSH and POP Instruction? (May 2012)**

**Ans:-5) PUSH Instruction:-** It is used to Copy the contents of Register Pair onto Stack.

**Example: PUSH B**

Stack Pointer is decremented and the contents of high-order register (B) are copied into stack.

Stack Pointer is again decremented and the contents of low-order register (C) are copied into stack.

**POP Instruction:-** It is used to Copy the contents of Top of Stack into Register Pair.

**Example: POP H**

The contents of location pointed out by Stack Pointer are copied to the low-order register (L).

Stack Pointer is incremented and the contents of location are copied to the high-order register (H).

**Q:-6) List the Functions of 8251? (May 2012)**

**Ans:-6)** The **8251** is a **USART (Universal Synchronous Asynchronous Receiver Transmitter)** for serial data communication. As a peripheral device of a microcomputer system, the 8251 receives parallel data from the CPU and transmits serial data after conversion. This device also receives serial data from the outside and transmits parallel data to the CPU after conversion.

**Q:-7) What do you understand by Emulator? (May 2012)**

**Ans:-7) Emulator:** - In computing, an emulator is hardware or software or both that duplicates (or *emulates*) the functions of one computer system in another computer system.

**Q:-8) List two differences between 8085 and 8086 Microprocessors? (May 2012)**

**Ans:-8) Difference between 8085 and 8086**

- **8085** is a 8-bit microprocessor, **8086** is a 16-bit processor
- **8085** have 8-bit Data Bus, **8086** have 16-bit Data Bus
- **8085** have 16-bit Address Bus, **8086** have 20-bit Address Bus

**Q:-9) What do you mean by Synchronous and Asynchronous Bus?**

(May 2010)

**Ans:-9) Synchronous bus:**

- Transmitter and Receivers are synchronized of clock
- Data bits are transmitted with synchronization of clock
- Character is received at constant Rate
- Used in high – speed transmission

**Asynchronous bus:**

- Transmitters and Receivers are not synchronized by clock
- Bits of data are transmitted at constant rate
- Start and stop bits are required to establish communication of each Character
- Used in low – speed transmission

**Q:-10) Difference between Direct and Indirect Address Instructions?**

(May 2010)

**Ans:-10) Direct Address Instruction**

In this Instruction, the address of the operand is given in the instruction itself.

**LDA 2500H** Load the contents of memory location 2500H in Accumulator.

**Indirect Address Instruction**

In this Instruction, the address of operand is specified by H-L register pair.

**MOV A, M** Move data from memory location specified by H-L pair to Accumulator.

**Q:-11) Explain Bus System? (May 2010)**

**Ans:-11)** A Bus, in computing, is a set of physical connections (cables, printed circuits, etc.) which can be shared by multiple hardware components in order to communicate with one another.

### **Data Bus**

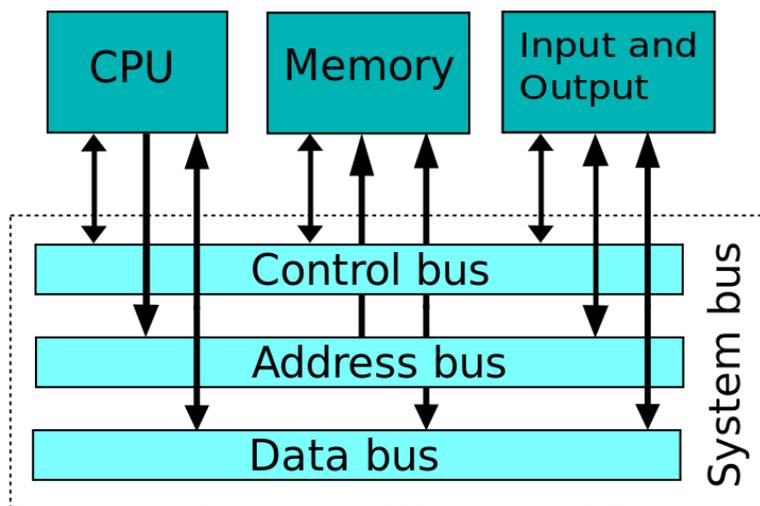
The bidirectional data bus can only transmit in one direction at a time. The data bus is used to transfer instructions from memory to the CPU for execution. It carries data (operands) to and from the CPU and memory as required by instruction translation.

### **Address Bus**

The address bus consists of all the signals necessary to define any of the possible memory address locations within the computer, or for modular memories any of the possible memory addresses locations within a module. Before data or instructions can be written into or read from memory by the CPU or I/O sections, an address must be transmitted to memory over the address bus.

## Control Bus

The Control Bus is used by the CPU to direct and monitor the actions of the other functional areas of the computer. It is used to transmit a variety of individual signals (read, write, interrupt, acknowledge, and so forth) necessary to control and coordinate the operations of the computer.



Q:-12) Diff b/w Min and Max modes of 8086 microprocessor? (May 2010)

Ans:-12) In **Min mode** one processor is present without any co-processor,  
But in **Max mode** Many Processors are connected to each other.

**Q:-13) Discuss Various Types of RAM? (May 2010)**

**Ans:-13)** RAM is an acronym for *random access memory*, a type of computer memory that can be accessed randomly; that is, any byte of memory can be accessed without touching the preceding bytes. RAM is the most common type of memory found in computers and other devices, such as printers.

**There are two different types of RAM:**

- **DRAM** (Dynamic Random Access Memory)
- **SRAM** (Static Random Access Memory)

The two types of RAM differ in the technology they use to hold data, with DRAM being the more common type. In terms of speed, SRAM is faster. DRAM needs to be refreshed thousands of times per second while SRAM does not need to be refreshed, which is what makes it faster than DRAM.

DRAM supports access times of about 60 nanoseconds, SRAM can give access times as low as 10 nanoseconds. Despite SRAM being faster, it's not as commonly used as DRAM because it's so much more expensive. Both types of RAM are *volatile*, meaning that they lose their contents when the power is turned off.

**Q:-14) Differentiate a Microprocessor and a Microcontroller? (May 2010)**

**Ans:-14) Difference between microprocessor and microcontroller**

**Microprocessor** is an IC which has only the CPU inside them i.e. only the processing powers such as Intel's Pentium 1,2,3,4, core 2 duo, i3, i5 etc. These microprocessors don't have RAM, ROM, and other peripheral on the chip. A

system designer has to add them externally to make them functional. Application of microprocessor includes Desktop PC's, Laptops, notepads etc.

**Microcontroller** has a CPU, in addition with a fixed amount of RAM, ROM and other peripherals all embedded on a single chip. At times it is also termed as a computer on a single chip. Today different manufacturers produce microcontrollers with a wide range of features available in different versions. Some manufacturers are ATMEL, Microchip, TI, Free scale, Philips, Motorola etc.

**Q:-15) List the various types of Interrupt signals available in 8085?**  
(May 2010)

**Ans:-15)** Interrupt is a mechanism by which an I/O or an instruction can suspend the normal execution of processor and get itself serviced.

**Maskable/Non-Maskable Interrupt:-**An interrupt that can be disabled by writing some instruction is known as Maskable Interrupt otherwise it is called Non-Maskable Interrupt.

There are two types of interrupts used in 8085 Microprocessor:

- 1. Hardware Interrupts**
- 2. Software Interrupts**

There are 6 pins available in 8085 for interrupt:

**TRAP**

RST 7.5

RST6.5

RST5.5

INTR

INTA

Q:-16) How Many Address Lines are necessary to address 4 Megabytes of Memory? (Dec 2012)

Ans:-16)  $2^{22} = 4$  MB Memory Locations

22 Address lines are necessary to address Four Megabytes of Memory.

Q:-17) Why Address Bus is Unidirectional? (Dec 2012)

Ans:-17) The address bus is unidirectional because the address information is always given by the Micro Processor to address a memory location of an input / output devices.

Q:-18) What is the importance of RISC Processors? (Dec 2012)

Ans:-18) **RISC** or **Reduced Instruction Set Computer** is a type of microprocessor architecture that utilizes a small, highly-optimized set of instructions, rather than a more specialized set of instructions often found in other types of architectures.

**Q:-19) What are different modes of Data Transfer in DMA? (Dec 2012)**

**Ans:-19) DMA Stands for "Direct Memory Access."** DMA is a method of transferring data from the computer's RAM to another part of the computer without processing it using the CPU.

### **Modes of Data Transfer in DMA**

- **Block transfer**

DMA controller takes the bus control by CPU. CPU has no access to bus until the transfer is complete. During this time CPU can perform internal operations that do not need bus.

- **Cycle stealing**

This is a word-by-word transfer based on CPU cycle stealing. When DMA steals a cycle, CPU is stopped completely for one cycle. Cycle stealing is not an interrupt. CPU pauses for just one machine cycle. This type of transfer takes a period of time.

- **Interleaved DMA**

It is similar to block transfer technique, here DMA controller takes the control of system bus only when CPU is not using it. For example, performing an ALU operation or incrementing a counter. The data transfer by this kind of method takes a period of time.

**Q: - 20) Compare CALL and JUMP instructions of 8085. (Dec. 2011)**

**Ans:-20) Jump Instruction:** - The program sequence is transferred to the memory location specified by the 16-bit address given in the operand.

**Call Instruction:** - It changes the sequence by calling subroutines.

**Q: - 21) Write Branching instructions of 8085. (Dec. 2011)**

**Ans:-21)** The Branching instruction alter the normal sequential flow.

- i) Jump (16 bit Address)
- ii) JZ (16 bit Address)
- iii) JNZ (16 bit Address)
- iv) JC (16 bit Address)
- v) JNC (16 bit Address)
- vi) CALL (16 bit Address)
- vii) RET

**Q: - 22) How many memory locations can be addressed by a microprocessor with 14 Address lines? (May 2011)**

**Ans:-22)** Address Bus =14

It can access  $2^{14} = 16384 = 16 \text{ KB}$  Memory Locations

**Q: - 23) List four interrupt initiated instructions? (Dec. 2011)**

**Ans:-23)** DI (Disable Interrupt)

EI (Enable Interrupt)

RIM (Read Interrupt Mask)

SIM (Set Interrupt Mask)

Q: - 24) Discuss the function of the following signals to 8085. (Dec. 2005)

i) RD            ii) ALE

Ans:-24) **RD** : This is the Control Signal used both for Reading Memory and for Reading an Input device, IO/M Pin is used to generate two different Signal : One for Memory and another for Input.

**ALE** : Address Latch Enable, It goes high driving first clock cycle of a machine cycle and enables the lower 8 bits of address to be latched either into the memory or external latch.

**ALE = 0** → Data Bus

**ALE = 1** → Address Bus

Q: - 25) Distinguish between Synchronous and Asynchronous Bus?

(May 2006)

Ans:-25) Synchronous means “at the same time”. The device which sends data and the device which receives data are synchronized with the same clock. And this data transfer with I/O devices or using Memory Read/Write when using same clock that is done by Synchronous Bus.

When Data transfer is not of regular intervals that are not based on pre-determined timing pattern. Asynchronous Data transfer is used for Slow I/O devices, is done by Asynchronous Bus.

[www.csepedia.com](http://www.csepedia.com)