**Lab Internal Viva Questions COMP**

1. **What is the function of DMA?**

DMA stands for "Direct Memory Access." It is a mechanism that allows certain hardware components, like disk controllers, network adapters, and graphics cards, to access the system's memory directly without involving the central processing unit (CPU).

1. **Differentiate between multicomputer and microprocessor systems?**

**Multicomputer:** A multicomputer is a distributed system consisting of multiple interconnected computing nodes (computers) that work together to perform tasks. **Microprocessor:** A microprocessor is a single integrated circuit that functions as a central processing unit (CPU) of a computer.

1. **Write briefly the significance of virtual memory.**

**Virtual memory** allows the operating system to efficiently manage the available physical memory (RAM) by using disk space as an extension of RAM. Virtual memory expands the effective address space that a process can use. Virtual memory enables the system to swap data between RAM and disk when the physical memory becomes full. Less frequently accessed parts of a process's memory are temporarily moved to disk (paging), while more actively used parts are kept in RAM.

1. **What is interrupt? List the interrupts used in 8085.**

Interrupts a signal generated by either hardware or software that temporarily halts the normal execution of a program to handle a specific event or request.

8085 Interrupts: TRAP having the highest priority, followed by RST 7.5, RST 6.5, RST 5.5, and INTR.

1. **Explain about A/D to D/A conversion.**

A/D and D/A conversion refers to the processes of converting analog signals to digital form (A/D conversion) and converting digital signals back to analog form (D/A conversion). These conversions are essential in various applications, including audio processing data acquisition, telecommunications and control systems.

**A/D conversion:** Process of converting continuous analog signals into discrete digital representation.

**D/A conversion:** Process of converting digital signals back into continuous analog form.

1. **List the addressing modes of 8085.**

Here is a list of the addressing modes supported by the 8085:

\* **Immediate Addressing Mode:**

In this mode, the operand is directly specified in the instruction itself.

Example: MVI A, 25H (Move the immediate value 25H into register A).

\* **Register Addressing Mode:**

The operand is located in one of the registers (A, B, C, D, E, H, L).

Example: MOV A, B

\* **Direct Addressing Mode:**

The operand is directly specified as an address in the instruction.

Example: LDA 3000H

\* **Indirect Addressing Mode:**

The instruction contains a memory address that points to the actual location of the operand.

Example: LDAX B

\* **Register Indirect Addressing Mode:**

The instruction uses a register pair to indirectly access memory.

Example: LHLD 4000H .

\* **Indexed Addressing Mode:**

This mode uses an offset value added to a base address held in a register to access memory.

Example: LXI H, 5000H followed by LDAX D.

\* **Relative Addressing Mode:**

The instruction uses a signed 8-bit offset to modify the program counter (PC), allowing for conditional branching.

Example: JNZ label

\* **Stack Pointer Relative Addressing Mode:**

The instruction uses the stack pointer (SP) to access memory.

Example: PUSH D

1. **Performance RLC, RAR operation with an example?**

**PLC (Rotate Accumulator Left):**

In this instruction, each bit id shifted to the adjacent left position. Bit D7 becomes D0. Carry flag(CY) is modified according to the bit D7.

**RAR:**

Rotates Accumulator to the right through carry flag, with the pervious carry flag. Bit D0 becomes the carry bit and carry bit is shifted into D7. Carry flag(CY) is modified according to the bit D0.

1. **Explain the significance of IO mode operation of 8255**

The I/O mode operation in the 8085 microprocessor is essential as it enables the microprocessor to communicate with external devices and peripherals, facilitating data exchange between the CPU and the external world.

1. **Write the control word of 8255 with mode O I/O operation (port A-I/P, port B-O/P)**

**Control Word for Mode 0 (IO Mode) with Port A I/P and Port B O/P:**

**BYTE 1 (Control Register A)** = 82H

Bit 7: 0 (Mode selection bit 1, must be 0 for Mode 0)

Bit 6: 0 (Mode selection bit 0, must be 0 for Mode 0)

Bit 5: 1 (Port A mode selection bit 1, must be 1 for Mode 0)

Bit 4: 0 (Port A mode selection bit 0, must be 0 for Mode 0)

Bit 3-0: 0 (Bits 3 to 0 are not used in Mode 0)

**BYTE 2 (Control Register B)** = 80H

Bit 7: 0 (Mode selection bit 1, must be 0 for Mode 0)

Bit 6: 0 (Mode selection bit 0, must be 0 for Mode 0)

Bit 5: 0 (Port B mode selection bit 1, must be 0 for Mode 0)

Bit 4: 0 (Port B mode selection bit 0, must be 0 for Mode 0)

Bit 3-0: 0 (Bits 3 to 0 are not used in Mode 0)

**BYTE 3 (Control Register C)** = 82H

Bit 7: 0 (Mode selection bit 1, must be 0 for Mode 0)

Bit 6: 0 (Mode selection bit 0, must be 0 for Mode 0)

Bit 5: 1 (Port C mode selection bit 1, must be 1 for Mode 0)

Bit 4: 0 (Port C mode selection bit 0, must be 0 for Mode 0)

Bit 3-0: 0 (Bits 3 to 0 are not used in Mode 0)

1. **What is ISR (Interrupt Service Routine) in Microprocessor**

ISR stands for "Interrupt Service Routine" in the context of microprocessors. It is a fundamental concept in computer systems and microcontrollers that allows the processor to respond to and handle various events and external requests in a timely manner.

When an interrupt occurs, the microprocessor temporarily suspends the execution of the current program and transfers control to a specific, pre-defined routine called the Interrupt Service Routine (ISR).

1. **Differentiate microprocessor and microcontroller.**

Microprocessors are general-purpose CPUs used in computing devices, Microcontrollers are self-contained computing systems designed for embedded applications. Microprocessors are powerful and versatile, but they require external components for interfacing with peripherals. On the other hand, Microcontrollers offer a complete solution with integrated peripherals and are well-suited for control and automation tasks.

1. **Differentiate Master mode, Slave mode operation of DMA**

**Master Mode:** In Master mode, the DMA controller takes control of the data transfer process and operates independently of the CPU.

It initiates and manages data transfers between peripheral devices and system memory without involving the CPU in each data movement step.

**Slave Mode:** In Slave mode, the DMA controller works under the control of the CPU. When the CPU initiates a DMA transfer, it configures the DMA controller by providing it with necessary information such as the source address, destination address, data length, and other relevant parameters.

1. **Explain the instructions** 
   1. **DAD**
   2. **DAA**
2. **DAD (Double Add) Instruction:**

The DAD (Double Add) instruction is used in many Intel 8085 compatible microprocessors to perform a 16-bit addition of two 16-bit registers. It is primarily used to perform arithmetic operations on 16-bit memory addresses and is commonly used in pointer manipulation and memory access.

1. **DAA (Decimal Adjust Accumulator) Instruction:**

The DAA (Decimal Adjust Accumulator) instruction is used to adjust the contents of the accumulator after performing BCD (Binary Coded Decimal) addition or subtraction operations. It ensures that the result in the accumulator remains in valid BCD format.

1. **Explain in brief RS 232C.**

RS-232C, often simply referred to as RS-232, is a standard for serial communication between devices. It was introduced by the Electronic Industries Association (EIA) in the early 1960s and has been widely used in computer systems, peripherals, and various other electronic devices for decades.RS-232C specifies the electrical and mechanical characteristics for serial communication, including the signal levels, timing, and connector types.

1. **Define Bavd Rate. Does it affect the transmission of data?**

Baud rate, named after Emile Baudot, is a measure of the number of signal changes or symbols transmitted per second in a communication channel. It indicates the speed at which data is transmitted over a serial communication link. The baud rate is typically expressed in bits per second (bps). Baud rate does affect the transmission of data in a serial communication system. The choice of baud rate determines the speed at which data can be transmitted between two devices connected via a serial link.

1. **What is strobe control? Explain.**

A "strobe control" is a signal used to synchronize and coordinate the transfer of data

between different devices. The strobe control signal, also known as a "clock" or "trigger," acts as a timing reference, indicating when data is valid and should be

read or captured.

1. **Define cache memory.**

Cache memory is a type of high-speed, small-capacity memory that is located between the CPU (Central Processing Unit) and the main memory (RAM) in a computer system. Its

primary purpose is to provide faster access to frequently used data and instructions, reducing the time it takes for the CPU to retrieve information from the lower main memory.

1. **Explain working of stacks in 8085.**

The stack is a special region of memory used for temporary storage of data during

subroutine calls and interrupt handling. The stack is implemented as a Last-In-First-Out (LIFO) data structure, meaning that the last data item stored on the stack will be the first one to be removed when accessed.

The stack is primarily managed using two registers:

**Stack Pointer (SP):** The Stack Pointer is a 16-bit register that holds the memory address of the current top of the stack.

It points to the memory location where the next data will be stored or retrieved from the stack.

**Stack Segment (SSP):** The Stack Segment Pointer is also a 16-bit register that contains the starting address of the stack area in memory. In the 8085 microprocessor, the stack is typically located in the lower memory addresses (from 0000H to 1FFFH), and the Stack Segment Pointer holds the value 0000H by default.

1. **Significance of RIM & SIM Instructions**

The **RIM** instruction is significant because it allows the microprocessor to query the current state of the interrupt mask. By reading the interrupt mask, the microprocessor can determine which interrupt requests are currently enabled or disabled.

The **SIM** instruction is significant because it allows the microprocessor to prioritize and control the handling of various interrupt requests.

By setting specific bits in the interrupt mask, certain interrupts can be enabled or disabled based on the system's requirements.

1. **Differentiate between Memory Mapped I/O and Peripheral Mapped I/O.**

Memory-mapped I/O shares the same address space as the main memory and uses load/store instructions for I/O access, while peripheral-mapped I/O has separate address spaces and dedicated I/O instructions for communication with I/O devices.

The choice between the two depends on system design requirements and complexity considerations.

1. **State the difference between Simplex, Half Duplex and Full Duplex Communication links?**

Simplex Mode: In simplex mode, sender can send the data but the sender can’t receive the data. It is a unidirectional communication.

***one direction***

Simplex Mode

Half Duplex Mode:

In half duplex mode, sender can send the data and also can receive the data one at a time it is two-way directional communication but one at a time.

A is sending

B

A

B is receiving

A is receiving

B

A

B is sending

Full Duplex Mode:

In full duplex mode, sender can send the data and also can receive the data simultaneously. It is two-way directional communication simultaneously.

Bidirectional

B

A

simultaneously

1. **Explain the function of ALE signal in 8085?**

**ALE**- It is an address latch enable signal it goes high during first T state of a machine cycle and enables the lower 8-bits of the address, if its values is 1 otherwise data bus is activated.

1. **What are the registers used in 8259A?**

**Registers used in 8259A are:**

* 1. **IRR:** stores all the levels of interrupt requesting for interrupt services.
  2. **ISR:** stores the currently executed levels of interrupt.
  3. **IMR:** stores the masking bits of the interrupt levels.

1. **How many address bit are required to address 128x8 mem? What is the size of each word?**

We can write 128 x 8 RAM chip as 27 x 8, every RAM chip will need a 7-bit address. We will connect the remaining 7-bit address line to every RAM. This 7-bit address will select any word from the 128 words of that RAM, the selected word will be the output as the 8-bit word in the output bus.

1. **Compute the effective memory access time. Where cache access time takes 4ns while main memory access time is 50ns with 80% hit ratio.**

(Effective Access Time) EAT = H\*Access cache + (1-H) \*Access Main Memory

H (Hit ratio) = 80%

Access Time Cache = 4ns

Access Time Main Memory = 50ns

EAT = 0.80\*(4ns) + (1 - 0.80)\* 50ns

=0.80\*(4ns)+(0.2)(4 + 50 ns)

=3.2 + (0.8 + 10)

= 3.2 + 10.8

= 14 ns