Model Viva Questions for "microprocessor 8085"

Common to: ET&T & CSE V SEM

Title of the Practical: Study of architecture of microprocessor 8085

Q.1 what is microprocessor?

Ans: - It is a program controlled semi conductor device (IC), which fetches, Decodes and execute instructions.

Q.2 what is the function of program counter?

A1: - program counter is the 16 bit counter.

1. Sequncelly program run.
2. If contain the memory address of the instruction which is next fetched.
3.

Q.3 what is the function of stack pointer?

A2: - stack pointer is the 16 bit register.

1. It indicates the top location of stack memory.
2. While executing the interrupt and subroutine program it uses the microprocessor stack pointer.
3.

Q.4 what is the function of accumulator?

A4: - 1. Accumulator is the 8 bit register. During arithmetical and logical operation microprocessor used this register.

2. After arithmetical and logical operation the output result data bus store through accumulator.

Q.5 what is the function of ALE, and S0, S1 pin?

A5:-ALE- this is the high output signal. Which give the information about the contain on multiplexed address/data line. If the ALE=1 it indicate that the contain on multiplexed line are address line and ALE=0 multiplexed line are data line.

S0, S1-this are status signal which gives the information about the operation of microprocessor.

Q.6 what is the function of HOLD and HLDA signal?

A6: - HOLD- if an external controller want to transmit a large amount of data to microprocessor it first activate HOLD pin.

HLDA-if microprocessor sense HOLD=1 it set address and data bus in tri-state condition then acknowledge the controller.

Q.7 what is the function of TRAP, RST7.5, RST6.5, RST5.5 interrupt?

A7: - TRAP- this is the non mask able, vectored, edge and level triggered interrupt signal. used for emergency purpose like power failure, smoke detector etc. if TRAP signal is activate by any peripheral device control is transfer to the memory location PC=0024H.

RST7.5- it is a mask able, vectored, edge triggered interrupted signal. If RST7.5 is activated then value of PC is set to 003ch.

RST6.5- it is a mask able, vectored, level triggered signal. When RST6.5 is activated the value of PC is 0034H.

RST5.5- it is the mask able, vectored, edge interrupt signal. If RST5.5 activated the value of PC is set to 002CH.

Q.8 what is the function of timing and control unit?

A8: - it receives binary information from the instruction decoder. and generate timing and control signal.

Q.9 what is the function of SID and SOD pin?

A9: - SID pin- SID pin is used by the microprocessor to accept one bit data under software control.

SOD pin- SOD pin is used by microprocessor to transmit one bit data under software control.

Q.10 what do you mean by T-state, instruction cycle, machine cycle?

A10:- T-state-each clock period of clock signal is called T- state. Instruction cycle- the time taken by the microprocessor to read an instruction from memory. It takes 1 to 6 machine cycle to read an instruction from memory.

Machine cycle- the time taken by data/ opcode / oprent from memory/ peripheral devices to acknowledge the external hardware. it takes 1to6 T-state.

Title of the Practical: Assembly Language Programming

Q1. What is assembler?

A1 An assembler translates a file of assembly language statements into a file of binary Machine instructions and binary data.

Q2. What is a Text segment?

A2 The text segment contains the machine language code for routines in the source File. These routines may be unexecutable because of unresolved references.

Q3 what is data segments?

A3 The data segment contains a binary representation of the data in the source file. The data also may be incomplete because of unresolved references to labels in other files.

Q4 what is assembly language?
A4. Assembly language is the symbolic representation of a computer's binary Encoding machine language.Assembly language is more readable than machine language because it uses symbols instead of bits. The symbols in assembly language Name commonly occurring bit patterns, such as opcodes and register specifies, so people can read and remember them

Q5 what is the difference between assembly language and high level language?
A5 Assembly language is a programming language. Its principal difference from high-level languages such as BASIC, Java, and C is that assembly language provides only a few, simple types of data and control flow. Assembly language programs do not specify the type of value held in a variable. Instead, a programmer must apply the appropriate operations (e.g., integer or floating-point addition) to a value. In addition, in assembly language, programs must implement all control flow with go tos. Both factors make
assembly language programming for any machine MIPS or 80x86 more difficult and error-prone than writing in a high-level language.

Q6 what do you mean by assembler directives?
A6 assembler directives are the predefine mnemonics that tell the assembler how to translate a program but do not produce machine instructions.

Q7 what are the drawback of assembly language?

A7 Assembly language has many disadvantages that strongly argue against its widespread use. Perhaps its major disadvantage is that programs written in assembly language are inherently machine-specific and must be totally rewritten to run on another computer architecture.. An assembly language program remains tightly bound to its original architecture, even after the computer is eclipsed by new, faster, and more cost-effective machines.

Q8 what is linker?

A8 A linker's first task is to ensure that a program contains no undefined labels. The linker matches the external symbols and unresolved references from a program's files. An external symbol in one file resolves a reference from another file if both refer to a label with the same name. Unmatched references mean a symbol was used, but not defined anywhere in the program.

Q9 what are the main function of linker?

A9 The linker performs three tasks:

■ Searches the program libraries to find library routines used by the program

■ Determines the memory locations that code from each module will occupy and relocates its instructions by adjusting absolute references

■ Resolves references among files

Q10 what is back patching?

A10 back patching A method for translating from assembly language to machine instructions in which the assembler builds a (possibly incomplete) binary representation of every instruction in one pass over a program and then returns to fill in previously undefined labels.

Title of the Practical: Addition of two 8-bit numbers

Q.1Explian the types of instruction set?

A1there are five types of instruction used in 8085 microprocessor:

1. Data transfer group

2. Arithmetic group

3. Logical group

4. Branching group

5. Stack and machine control group

Q.2- what do you mean by Arithmetic group instruction?

A2 - these groups of instructions perform arithmetic operations such as addition, subtraction, increment and decrement etc.

Q3- What is compiler?

A3 - A compiler is software which converts high level language into its equivalent machine language.A compiler will take a programme as one & compile it.

Q4- What is interpreter?

A4 - software which converts high level language into its equivalent program line by line to all instruction by which error is found & checked & it is improved.

Q.5what is the function of ADD R?

A5 This instruction adds the contents of register R to the contents of Accumulator and stored the obtained result accumulator. Example. - AAD B.

Q.6what is the function of ADD M?

A6: This instruction adds the contents of the memory location addressed by HL pair to the contents of the accumulator and the result is stored in accumulator**.** Example. - ADD M

Q.7what is the function of ADC R?

A7 This instruction add the contents of register R carry flag and accumulator and stored the result in accumulator. **EX. – ADC B**

Q.8what is the function of ADC M?

A8 This instruction adds the contents of memory location addressed by HL pair and carry flag to the contents of accumulator the result in the accumulator. **EX. – ADC M.**

Q.9what is the function of ADI DATA?

A9 This instruction adds 8 bit immediate data to the contents of accumulator and result is stored in accumulator. **EX. – ADI 20 H**

Q.10 what is the function of ACI DATA?

A10: This instruction add the immediate data carry flag and accumulator and stored the result in the accumulator. **EX. – ACI 20 H**

Title of the Practical: Addition of two 16- bit nos.

Q.1what is the function of DAD Rp?

A1– This instruction add the contents of the specified register pair to the HL pair and stores the result in HL pair. **EX. – DAD B**

Q.2:- what do you mean by Immediate Addressing mode addressing mode?

A2: - Immediate Addressing mode – In immediate addressing mode the data is given in the instruction. It is a 2 Byte or 3 Byte instructions

Q.3:- what do you mean by Direct addressing addressing mode?

A3: - Direct addressing mode – In direct addressing mode the address of the data is given in the instruction. It is a 3 Byte instruction

Q.4:- what do you mean by Indirect addressing Mode addressing mode?

A4: - Indirect addressing Mode – In indirect addressing mode the address of the data is not given by the instruction but a memory pointer indicate were the data is present.

Q.5:- what do you mean by Resister addressing mode addressing mode?

A5: - Resister addressing mode – In this addressing mode the data is present in any general purpose resister. It is 1 Byte instruction.

Q.6:- what do you mean by Implicit/Inherent addressing mode addressing mode?

A6: - Implicit/Inherent addressing mode – In this addressing mode the memory location of data/Operant is not given in the instruction, the instruction define it self in a program.

Q.7:- what do you mean by input device?

A7: - the job of input device is to accept input from external world. The input may be given using keyboard\mouse\joystick, from operator. The input may be in the from of Image using video camera and scanner.

Q.8:- what do you mean by output device?

A8: - The job of output device is to make the system user friendly by “displaying” or “announcing”the required data or message. Most widely used output device is CRT screen and LCD screen.

Q.9:- what do you mean by memory unit?

A9- Memory is a storage device. Data and instruction entired in to a computer system through input unit have to be stored inside the computer before actual processing starts.

Q.10:- what do you mean by RAM?

A10: - RAM- the RAM is also called as Read/Write memory. The RAM is a volatile type of memory. It allows programmer to read write data.

Title of the Practical: Subtraction of two 8- bit nos.

Q.1 what is the function of SUB R?

A1: – This instruction subtracts the contents of the register from the contents of the register R and result is placed in the accumulator the contents of register R are not altered. **EX. – SUB B**

Q.2 what is the function of SUB M?

A2: – This instruction subtract the contents of the memory location whose address is given by HL from accumulator and result is placed in the accumulator. **EX. – SUB M**

Q.3 what is the function of SBB R?

A3:– This instruction subtracts register and borrow flag from the accumulator and stores the result in the accumulator. **EX. – SBB C**

Q.4 what is the function of SBB M?

A4: – This instruction subtracts contents of memory location and the borrow flag from accumulator and result is placed in accumulator. **EX. – A (HL) – BORROW - ACCUMULATOR**

Q.5 what is the function of SUI DATA?

A5:– This instruction subtract the immediate data of the instruction from the data in accumulator and the result in placed in the accumulator. **EX. – SUI 50H**

Q.6 what is the function of SBI DATA?

A6: - This instruction subtract the data and the borrow flag from accumulator and stores result in accumulator. **EX. – SBI 40H**

Q.7 what is the function of INR R -?

A7: This instruction increment the contents of the specified register by 1 and result is stored in the same register. **EX. – INR B**

Q.8 what is the function of INR M?

A8: – This instruction increments the contents of the memory location addressed by HL register pair and the result is placed back in the same memory location. **EX. - HL+1 - HL**

Q.9 what is the function of DCR R?

A9: - these instruction decrements the constants of the register R and result is stored in the same register. **EX. DCR B**

Q.10 what is the function of DCR M?

A10: - This instruction decrement the contents of memory location addressed by HL register pair by 1and result is stored back at the same memory location it self. **EX.-HL-1-HL**

Title of the Practical: Subtraction of two 16- bit nos.

Q.1 what is the function of INR R -?

A1: This instruction increment the contents of the specified register by 1 and result is stored in the same register. **EX. – INR B**

Q.2 what is the function of INR M?

A2: – This instruction increments the contents of the memory location addressed by HL register pair and the result is placed back in the same memory location. **EX. - HL+1 - HL**

Q.3 what is the function of DCR R?

A3: - these instruction decrements the constants of the register R and result is stored in the same register. **EX. DCR B**

Q.4 what is the function of DCR M?

A4: - This instruction decrement the contents of memory location addressed by HL register pair by 1and result is stored back at the same memory location it self. **EX.-HL-1-HL**

Q.5 what is the function of INX Rp?

A5: - This instruction increment the contents of the register pair by 1 and result gets stored in the same register pair.

Q.6 what is the function of DCX Rp?

A6: - This instruction decrement the contents of the register pair Rp by 1 and result gets stored in the some Rp it self.

Q.7 what is the function of DAA –?

A7: This instruction changes the contents of accumulator from a binary value to its equivalent two 4bit binary coded decimal i.e. BCD number.

Q.8 what is the function of RLC?

A8: Each binary bit the accumulator is rotated left by one position. Bit D7 is placed in the position of D0 as well as in the carry flag.

Q.9 what is the function of RAL?

A9: Each binary bit of the accumulator is rotated left by one position through the carry flag .Bit D7 is placed in the bit in the carry flag is placed in the least significant position D0 .

Q.10 what is the function of RAR?

A10: Each binary bit of the accumulator is rotated right by one position through the carry flag .bit D0 is placed in the carry flag and the bit in the carry flag is placed in the most significant position D7.

Title of the Practical: Multiplication of two 8- bit nos. using repeated Addition

Q.1 what is the function of RAR?

A1: Each binary bit of the accumulator is rotated right by one position through the carry flag .bit D0 is placed in the carry flag and the bit in the carry flag is placed in the most significant position D7.

Q.2 what is the function of RRC?

A2: Each binary bit of the accumulator is rotated right by one position. Bit D0 is placed in the position of D7 as well as in the carry flag.

Q.3 what is the function of RLC?

A3: Each binary bit of the accumulator is rotated left by one position .Bit D7 is placed in the position of D0 as well as in the carry flag .

Q.4 what is the function of CALL instruction?

A4: -Call is a three byte instruction used to transfer program control to subroutine the starting address is specified instruction.

Q.5 what is the function of RETURN instruction?

A5. Return instruction is a 1 byte instruction used to transfer program control back to main program to implement this transfer is takes back the store contain of PC from stack and next instruction executed will be from main program

Q.6 what do you mean by CONDITIONAL CALL instruction?

A6: - In conditional call instruction, when condition is true then a call at address is mode .If condition is false then it will not have a call and will proceed for next instruction after it.

Q.7 what do you mean by UN-CONDITIONAL CALL instruction?

A7: UNCONDITIONAL CALL:- When this instruction is executed the program sequence is transfer to the address specified in the instruction.

Q.8 what do you mean by UN-CONDITIONAL RETURN instruction?

A8: UNCONDITIONAL RETURN- When this instruction is executed program sequence Is transfer from the subroutine to calling program. The return address is taken from stack and this address is loaded in pc and the programmer execution beings at address Taken from stack

Q.9 what do you mean by CONDITIONAL CALL instruction?

A9: CONDITIONAL RETURN- In conditional RETURN instruction when the Condition is true then only the RET is made at the address given by address if Condition is false it will proceed further to execute the next instruction after it

Q.10 what is the function of RSTN?
A10: This instruction transfer the program Execution to a location depending on the instruction.

Title of the Practical: Division of two 8- bit nos.

Q.1 what do you mean by the upcode fetch operation?

A1: - the operations perform by the microprocessor read up code from program memory is called up code fetch operation.

Q.2 what do you mean by the memory read operation?

A2: - the operations perform by the microprocessor read data from memory that is called memory read operation.

Q.3 what do you mean by memory write operation?

A3: - the operations perform by the microprocessor write a data on memory that is called memory write operation.

Q.4 what do you mean by the I/O read and I/O write operation?

A4: - I/O read- the operations perform by the microprocessor read data from I/O device.

I/O write- the operation perform by the microprocessor write a data on I/O device.

Q.5 what do you mean by the operant fetch operation?

A5:- the operation perform by the microprocessor read operant from program memory.

Q.6 What is the function of I0/ $\overline{m}$, $\overline{RD}$, $\overline{WR}$ signal?

A6: - IO/ $\overline{m}$ -this is a output signal used by microprocessor to differentiate memory devices and IO devices. if IO/ $\overline{m}$ = 1 then the IO related operation and IO/ $\overline{m}$ =0 then the memory related operation. $\overline{RD}$ - This is a active low output signal used by the microprocessor to read data from memory and peripheral device.

$\overline{WR}$ - This is a active low output signal used by the micro processor to write a data on memory device and peripheral device.

$\overline{WR}$

Q.7:- what do you mean by addressing mode?

A7: - It is a way to define a data in a program is called addressing mode.

Q.8:- Explain the type of addressing mode?

A8: - There were five type of addressing mode –

1. Immediate Addressing mode.
2. Register addressing mode
3. Direct addressing mode
4. Indirect addressing mode
5. Implicit addressing mode

Q.9:- what do you mean by ROM,?

A9: - ROM- The data in this memory can only be read, no writing is allowed. It is used to permanent program.

Q.10:- what do you mean by PROM?

A10: - PROM- The basic function is same as that masked ROM. But in PROM, we have fuse link. Depending up on the bit patern, fuse can be burnt or kept intact.

Model Viva Questions for "microprocessor 8085"

Common to: ET&T & CSE V SEM

Title of the Practical: Find 1's & 2's complement of a 8 – bit & a 16 –bit number

Q.1:- what do you mean by EPROM?

A1: - EPROM- It uses MOS circuitry to store data. They store 1's and 0's in form of charge. The information stored can be erased by exposing the memory to UV light which erases the data stored in all memory location.

Q.2:- what do you mean by STATIC RAM?

A2: - STATIC RAM- SRAM consists of flip flop, using either transistor or MOS. For each bit we require one flip flop. It is fast memory.

Q.3:- what do you mean by, **DYNAMIC RAM?**

A3: - DYNAMIC RAM – In this type of memory a data is stored in form of charge in capacitors. When data is 1, the capacitor will be charge and if data is 0, the Capacitor will not be charge.

Q.4:- what do you mean by processing unit?

A4: -- CPU is the brain of computer. CPU stands for central processing unit. Control unit and arithmetic logic unit of a computer system are together known as central processing unit.

Q.5:- what do you mean by a data?

A5: -Data are raw facts. Data can be any number name of a person name of place, weight name of a book, name of store

Q.6:- what do you mean by program?

A6: - program is set of instruction.

Q.7:- Explain the types of memory?

A7: - There are two types of memory:-

Primary memory.- Primary memory of a computer also known as its main memory is used to hold pieces of program ,instruction, data.

Secondary memory.- Secondary memory of a computer is known as auxiliary memory is used to take care of the limitation of primary memory.

Q.8:- what do you mean by a flow chart?

A8: -The flow chart is a pictorial representation of various actions and computations that are taken to perform any task. A flowchart is similar to a block diagram representing the structure of the program.

Q.9:- what do you mean by Data transfer group instruction?

A9: -This group of instructions copies data from source to destination without modifying the contents of the source.

Q.10:- what do you mean by Logical group instruction?

A10: - these groups of instructions perform logical operations such as AND, OR, EXOR, Rotate, Complement etc.

Title of the Practical: Inter facing of IC 8255.

Q1 what is the function of 8255?

A1 8255 is a programmable peripheral interface it is general purpose programmable parallel input output device it contain three input output ports .Which can be program in deferent modes. To program the function to all 3 input output ports it contains a register called control resister. The control register gives the signals which are used to define the function of each input output ports and in which mode they should operate.

Q2 Explain the operating mode of 8255?

A2 It can operate in three modes –

1. Mode0- input output mode.
2. Mode1- strobe mode.
3. Mode2- strobe bidirectional

Q3:- What is trap and what is the vectored address of trap?

A3:- It is a non-maskable , edge & level triggered &vectored interrupt s/g used for emergency purpose like power failure , smoke detector etc. The up doesn't execute any interrupt acknowledge cycle to read interrupt from interrupting device. When trap signal is activated up execute RST 4.5 instruction to generate starting address of TRAP. It is the highest priority interrupt s/g among all interrupt &the memory location for TRAP s/g is 0024H.

Q4:- Differentiate between I/O mapped I/O & memory mapped/O?

A4: - In the peripheral mapped I/O all the input and output devices 2^8 = 256 input &256 output Device can be connected to 8085 up hence the space range for I/O device is from 00H to FFH Control signal used for input &output devices are I/O read & I/O write. The execution speed is 10T state. Decoding 8 bits of address is only required so hardware needed is less.

Memory Mapped: - In memory mapped I/O both I/O o/p device &memory device are treated as memory. The device address is 16 bit hence the address range is 000H to FFFH. Control s/g used in memory mapped I/O O/P is MEMR, MEMW

Q5:- What is call & return instruction?

A5: - Call: - When this instruction is executed the programme sequence is transfer to the address Specifies in the instructions. Before transferring the sequence the programme counter contents are stored on stack. The call instruction is used a sub-routine. Return:- return from subroutine . When this instruction is executed sequence is transferred from The subroutine to the calling program .The return address is taken from the stack & the program execution begins in address taken from stack.

Q6:- what do you mean by Maskable interrupt?

A6: - Maskable interrupt:- The up can be ignore/delay a maskable interrupt request.

It is used to interface peripherals.

Lower priority.

It mainly vectored or non-vectored.

Response time is high.

This interrupt does not disable non maskable interrupt.

Q7:- what do you mean by Maskable interrupt?

A7: Non-maskable interrupt: - The up cannot be masked/delay or nonmaskable interrupt request. It is used for emergency purpose like power failure, smoke detector etc. It has highest priority. It is vectored.The response time is low. Non-maskable interrupt are used for disable all maskable interrupt. The execution speed is 137T state for STA, LDA instruction & 7T state for MOVRd Rs instruction.Since 16 bit address has to be decoded hence more hardware is required.

Q8:- what do you mean by Vectored interrupt?

A8: Vectored interrupt: - are those interrupts which are automatically vectored to specific location on memory page 00H without any external hardware. They do not require INTA s/g or an I?P port. IN 8085 up out of five interrupt four are vectored. These are TRAP RST7.5, 6.5, 5.5.

Q9:- what do you mean by Non- Vectored interrupt?

A9: Non- vectored interrupt:- non-vectored interrupt are not automatically vectored to specific location on page 00H. An external hardware is required to transfer it to a particular location. In 8085 up out of five interrupt only INTR require RSTN instruction for its working RSTN is nothing but it is a s/w interrupt.

Q10:- what do you mean by jump instruction?

A10: - The Jump instruction specifies the memory location explicitly. They are three byte instruction. One byte for the operation code, followed by a 16 bit memory address.

Title of the Practical: Inter facing of IC 8155.

Q1. Which type of architecture 8085 has?
A.1 8085 has Von Neumann architecture. It was derived after the name of mathematician John Von Neumann. It.s having 16 address bus and 8 bit data bus. it can access 2^16 individual memory location.

Q2. How many memory locations can be addressed by a microprocessor with 14 address lines?
A2 2^14=16384

Q3. 8085 is how many bit microprocessor?
A3 8 bit as its data bus is 8 bit.

Q4. Why is data bus bi-directional?
A4 As it has to carry data from mp to external device or the reverse.

Q5. What is the function of accumulator?
A5. This register is used to store 8-bit data and to perform arithmetic and logical operations.The result of an operation is stored in the accumulator.

Q6. What are tri-state devices and why they are essential in a bus oriented system?
A6 Tri state logic devices have three states (0, 1 and high impedance). When the enable maybe active high or active low) line is activated, the device works. The disabled enable line makes the device at high impedance state and it is disconnected from the circuit. For example see the tri stated inverter in the figure shown. In microcomputer system the peripherals are connected in parallel between address bus and data bus. Because of tri stated interfacing devices, peripherals do not load the system buses.

Q8. Why are program counter and stack pointer 16-bit registers?
A8 Because SP points to the beginning of stack memory (LXI SP 8000H) which is 16-bits. Also PC points to the memory locations (16-bits) of the instructions to be excecuted tomaintain the proper sequence of execution of program.

Q9. What does it mean by embedded system?
A9 A specialized computer system that is part of a larger system or machine. Typically, an embedded system is housed on a single microprocessor board with the programs stored in ROM. Virtually all appliances that have a digital interface like watches, microwaves, VCRs, cars etc utilize embedded systems. Some embedded systems include an operating system, but many are so specialized that the entire logic can be implemented as a single program.

10. What are the different addressing modes in 8085?
Register:- Data is provided through the registers. Or operand is only register(s). Example: MOV Rd, Rs.
Register indirect:- Operand M or register pair. Example: MOV A,M; LDAX B; STAX D; MVI M,32H (exception for immediate addressing mode).
Direct:- Operand 8-bit port address or 16-bit memory address. Example: IN 84H, OUT 84H, all CALLs.
Immediate:- Instruction having the letter I. Or immediate data to the destination provided. Also all jump instructions as the meaning is jump immediately. Example MVI M, 2H; ADI 47H; LXIH 2050 (exception for direct addressing mode).
Implicit:- No operand. Example: XCHG.

Title of the Practical: Inter facing of IC 8279.

Q1What is the function of 8237?

A1 The 8237 is a programmable direct memory access controller housed in a 40-pin package It has four independent channels with each channel capable of Transferring 64K bytes.

Q2 Explain the operating mode of 8237?

A2 It can operate in two modes-

1. Slave Mode- In the slave mode, the DMA controller is treated as a peripheral Using the following steps-

1. The MPU selects the DMA controller through Chip Select.
2. The MPU writes the control words as illustrated in example in channel registers and command/status registers by using control signals IOW and IOR.

2. Master Mode- After the initialization, the 8237 in master mode keeps Checking for a DMA request, and the steps in data transfer can be listed As follows-

1. When the peripheral is ready for data transfer, it sends a high signal to DRQ.

2 In the next cycle, the MPU relinquishes the buses and sends the HLDA Signal to the 8237.

Q3. What do you mean by wait state? What is its need?
A3 A wait state is a delay experienced by ìP when accessing external memory or another device that is slow to respond. the vice versa also cone into scenario. Now, to be able to access slow memory the ìP must be able to delay the transfer until the memory access is complete. One way is to increase the ìP clock period by reducing the clock frequency. Some ìPs provide a special control input called READY to allow the memory to set its own memory cycle time. If after sending an address out, the ìP dies not receive a READY input from memory, it enters a wait state for as long as the READY line is in 0 state. When the memory access is completed the READY goes high to indicate that the memory is ready for specified transfer.

Q4. What is PSW?
A4 PSW (Program Status Word) represents the contents of the accumulator and the flag register together considering the accumulator as the high order and flag as the low order register as if it is the AF register pair. For example POP PSW.

Q5. What is ALE? Explain the functions of ALE in 8085.
A5 It is the acronym for Address Latch Enable (pin number 30) used to demultiplex the multiplexed lower order address/data bus. During T1 the ALE goes HIGH. When ALE goes HIGH, the latch is enabled. So the o/p changes according to the i/p data. During T1 the o/p of latch is 05H. When ALE goes LOW, the data byte 05H is latched until the next ALE. And after the latching operation the o/p of the latch represents the lower order

Q.6:- what do you mean by Branching group instruction?

A6: these groups of instructions changes the path of program execution or sequence of program execution.

Q7:- what do you mean by Stack and machine control group instruction?

A7: these groups of instructions performs stack and machine control functions such as PUSH, POP, Halt, and enable/disable interrupt, no operation etc.

Q8:- What is debugging?

A8:-Debugging is a kind of process by which in any program used instructions & content of Register are checked & error is found.

Q9:- Explain the types of debugging?

A9: - There are two types of debugging:-

1. Static debugging: - If the length & size of programme is small than static debugging is used.

2. Dynamic debugging: - If programme length & size is large than dynamic debugging is used.

Q10:-What is interrupt?

A10: - Interrupt: - is a data transfer by an external device peripheral can inform the microprocessor that it is ready for communication & it request as Attention.

Title of the Practical: Inter facing of IC 8253

Q1What is the function of 8253?

A1. The 8253 programmable interval timer is an Ic used to provide accurate time Delay under software control it will work parallel with microprocessor. After the completing the require delay time it will interrupt the Microprocessor to give the information above completion of job.

Q2 what is the function of 8251?

A2 8251 Ic is designed by Intel corporation for parallel communication. The Communication between microprocessor and 8251 is done in parallel.The 8251 will convert the parallel data into serial bit stream and Transmission serial output lines. At the same time if can receive serial data on serial input lines converts it into parallel from and then transfer to microprocessor.

Q3 What is the operation of DMA?

A3 If the data is less than microprocessor will not waste its time. It's simply Transferring data from input output to memory are memory to input output. But if the data is large then the transfer rate from input output to memory or memory to input output will slow down. Because of Microprocessor intervention. In such case to speed up the process of transferring the data under the supervision of a device called DMA controller.

Q4:- Explain the types of interrupt?

A4: - There are two types of interrupt:-

1. Hardware interrupt
2. Software interrupt
3.

Q5:- Differentiate between software &hardware interrupt.

A5: - Difference between hardware &software interrupt.

1. Hardware interrupt: - It is asynchronous event.
   This interrupt is requested by executing instruction.

   PC is incremented.

   It cannot be ignored or masked.

   It has highest priority among all interrupt.

2. Software interrupt: - It is a synchronous event.
   This interrupt is requested by external device.

   PC is not incremented.

   It can be masked.

Q6:-What is function of assembler?

A6:- Assembler is a program which convert a source code into its equivalent object code .During conversion of source code to object code assembler also check the syntax error in the program & if any syntax error is found it repair the programme and remove it.

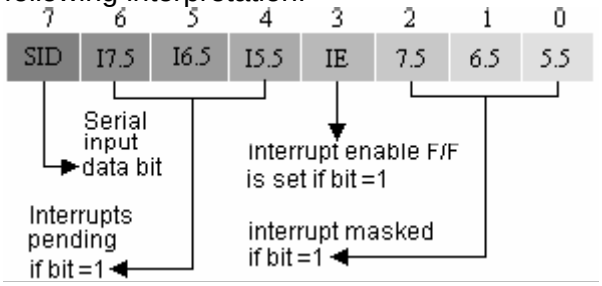
Q6 what happens during DMA transfer?

A6. To make a fast data transfer, the MPU releases the control of its buses to DMA. DMA acts as an external device and the active high input signal HOLD goes HIGH when the DMA is requesting to the MPU to use its buses. After receiving the HOLD request from DMA, the MPU releases the buses in the following machine cycle and generates an
active high output signal HLDA indicating the release of buses. Once the DMA gains that control, it acts in the role of the MPU for data transfer.

Q7. What do you mean by wait state? What is its need?
A7 A wait state is a delay experienced by ìP when accessing external memory or another device that is slow to respond. the vice versa also cone into scenario. Now, to be able to access slow memory the ìP must be able to delay the transfer until the memory access is complete. One way is to increase the ìP clock period by reducing the clock frequency. Some ìPs provide a special control input called READY to allow the memory to set its own memory cycle time. If after sending an address out, the ìP dies not receive a READY input from memory, it enters a wait state for as long as the READY line is in 0 state. When the memory access is completed the READY goes high to indicate that the memory is ready for specified transfer.

Q8. What are the functions of RIM?

A8 Read Interrupt Mask (RIM) RIM is a multipurpose instruction used to read the status of interrupts 7.5, 6.5, 5.5 and to read serial input data bit. RIM loads 8-bit data in the accumulator with the following interpretation:

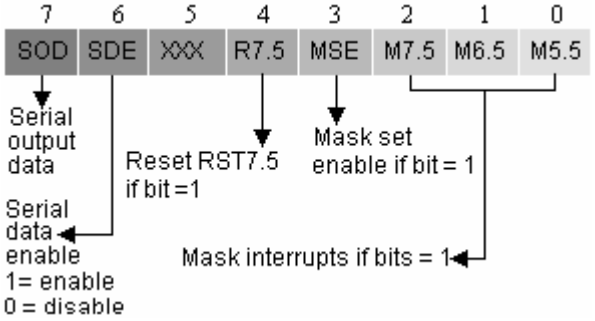


Actually RIM does the following three tasks:

- Read the interrupt mask (bit 2, 1, 0).
- Identify pending interrupts (bit 6, 5, 4).
- Receive serial input data bit (bit 7).
- Read the interrupt mask (bit 2, 1, 0).

Q9. What are the functions of SIM?

A9 Set Interrupt Mask : SIM is a multipurpose interrupt used to implement the 8085 interrupts (RST 7.5, 6.5, 5.5) and serial data output. SIM interprets the accumulator content as follows:



This is mainly Actually, SIM does the following three tasks:

- Mask the interrupts (bit 2, 1, 0).
- Reset RST 7.5 (bit 4). used to overwrite RST 7.5 without serving it.

Q10. What are the functions of IN?

A10 Input Data to Accumulator from a Port with 8-bit Address (IN) The contents of the input port designated in the operand are read and loaded into the accumulator. The operand is an 8-bit address. During execution, this port address is duplicated in the lower order and higher order address buses. Any one of the sets of address lines can be decoded to enable the input port.

Title of the Practical: Find Larger No. of two 8 bit Numbers

Q1. What are the basic units of microprocessor?

A1. The basic units or blocks of microprocessor are ALU, an array of registers and control unit.

Q 2. What is a bus?

A 2. Bus is a group of conducting lines that carries data, address and control signals.

Q 3. Why data bus is bi-directional?

A3. The microprocessor is to fetch (read) the data from memory or input device for processing and after processing it has to store (write) the data to memory or output devices. Hence the data bus is bi-directional.

Q4 Why data bus is bi-directional?

A4. The address is an identification number used by the microprocessor to identify or access a memory location or input/output device. It is an output signal from the processor. Hence the address bus is unidirectional.

Q5. Define machine cycle?

A5. Machine cycle is defined as the time required to complete one operation of accessing memory input/output, or acknowledging an external request. This cycle may consists of three to six T-states.

Q6. Define T-state?

A6. T-state is defined as one subdivision of operation performed in one clock period. These subdivisions are internal states synchronized with the system clock, and each T-state is precisely equal to one clock period.

Q7. What is an instruction cycle?

A7. The sequence of operations that a processor has to carry out while executing the instruction is called instruction cycle. Each instruction cycle of processor contains a number of machine cycles.

Q8. What is fetch and execute cycle?

A8. The instruction cycle is divided in to fetch and execute cycles. The fetch cycle is executed to fetch the opcode from memory. The execute cycle is executed to decode the instruction and to perform the work instructed by the instruction.

Q9. List the flags of 8085?

A9. There are five flags in 8085.They are sign flag, zero flag, auxiliary carry flag, parity flag and carry flag.

Q 10. What does memory-mapping mean?

A10 The memory mapping is the process of interfacing memories to microprocessor and allocating addresses to each memory locations

Title of the Practical: Find largest smallest No. from an array

Q1. What is a port?

A1 the port is a buffered I/O, which is used to hold the data transmitted from the microprocessor to I/O devices and vice versa.

Q2. What is USART?

A2 The device which can be programmed to perform Synchronous or Asynchronous serial communication is called USART (Universal Synchronous Asynchronous Receiver **Transmitter). Eg: INTEL 8251**

Q3. What is scanning in keyboard and what is scan time?

A3 the process of sending a zero to each row of a keyboard matrix and reading the columns for key actuation is called scanning. The scan time is the time taken by the processor to scan all the rows one by one starting from first row and coming back to the first row again.

Q4. What is programmable peripheral device?

A4 If the function performed by the peripheral device can be altered or changed by a program instruction then the peripheral device is called programmable device. It has control register. The device can be programmed by sending control word in the prescribed format to the control register.

Q5. What is baud rate?

A5 The baud rate is the rate at which the serial data are transmitted. Baud rate is defined as (The time for a bit cell). In some systems one bit cell has one data bit, then the baud rate and bits/sec are same.

Q6. What are the tasks involved in keyboard interface?

A6 The tasks involved in keyboard interfacing are sensing a key actuation, Debouncing the key and generating key codes(Decoding the key). These tasks are performed software if the keyboard is interfaced through ports and they are performed by hardware if the keyboard is interfaces through 8279.

Q7. How a keyboard matrix is formed in keyboard interface using 8279?

A7 The return lines, RL0 toRL7 of 8279 are used to form the columns of keyboard matrix. In decoded scan lines SL0 t0SL3 of 8279 are used to form the rows of keyboard matrix. In encoded scan mode, the output lines of external decoder are used as rows of keyboard matrix. output function in different operating modes The port is a buffered I/O, which is used to hold the data transmitted from the microprocessor to I/O devices and vice versa.

Q8. What is the need for interrupt controller?

A8 The interrupt controller is employed to expand the interrupt inputs. It can handle the interrupt request from various devices and allow one by one to the processor.

Q9. What is synchronous data transfer scheme?

A9 For synchronous data transfer scheme, the processor does not check the readiness of the device after a command have been issued for read/write operation. For this scheme the processor will request the device to get ready and then read/write to the device immediately after the request.

Q10. What is asynchronous data transfer scheme?

A10 In asynchronous data transfer scheme, first the processor sends a request to the device for read/write operation. Then the processor keeps on polling the status of the device. Once the device is ready, the processor executes a data transfer instruction to complete the process.

Title of the Practical: Transfer Block of data bytes from one memory location to another in same order & in reverse order.

Q1. What is IMR(Interrupt mask register)?

A1 IMR stores the masking bits of the interrupt lines to be masked. This register can be programmed by an operation command word (OCW).

Q2. What is priority resolver?

A2 It determines the priorities of the bits set in the Interrupt request register (IRR).The bit corresponding to the highest priority interrupt input is set in the ISR during INTA input.

Q3. What is the use of IRR?

A3 The interrupt request register is used to store all the interrupt levels which are requesting the service. The eight interrupt inputs sets corresponding bits of the Interrupt Request Register upon the service request.

Q4. What is Interrupt service register(ISR)?

A4 The interrupt service register stores all the levels that are currently being serviced.

Q5. What is the difference between SHLD and LHLD?

A5 SHLD- Store HL register pair in memory. This instruction is used to store the contents of H and L register directly in to memory. LHLD- Load HL register pair from memory. This instruction copies the contents of memory location given with in the instruction in to the L register and the contents of next memory location in to the H register.

Q6. What is the difference between STAX and LDAX?

A6 STAX rp – Store the contents of Accumulator register (A) in memory location whose

address is specified by BC or DE register pair. LDAX rp – Load Accumulator register (A) with the contents of memory location whose address is specified by BC or DE register pair.

Q7. Write an assembly language program to transfer data from memory block B1 to memory block B2?

A7

```
        MVI C, 0AH;          Initialize counter
        LXI H, 2200H;        Initialize source memory pointer
        LXI D, 2300H;        Initialize destination memory pointer
Loop:   MOV A, M;            Get byte from source memory block
        STAX D;              Store byte in the destination memory block
        INX H;               Increment source memory pointer
        INX D;               Increment destination memory pointer
        DCR C;               Decrement counter
        JNZ Loop;            counter □ 0 repeat
        HLT
```

Q8. What are the types of branching instructions?

A8 1. Jump instructions

2. Call and Return instructions

3. Restart instructions

Q9. Write an assembly language program to add 2 BCD numbers?

A9

```
LXI H,2200H;        Initialize pointer
MOV A,M ;           Get the first number
INX H;              Increment the pointer
ADD M ;             Add two numbers
DAA ;               Convert HEX to valid BCD
STA 2300;           store the result
HLT
```

Q10. Explain the instruction LXI rp,data (16)?

A10 LXI rp, data(16) – Load 16 –bit immediate data to specified register pair or Stack pointer. The rp is 16 – bit register pairs such as BC, DE, HL or stack pointer.

Title of the Practical: order. Arrange data bytes in ascending / descending

Q1. Write a program to swap two numbers using 8051?

A1

```
MOV A,# data
SWAP A
```

Q2. Write a program to subtract two numbers & exchange the digits using 8051?

A2

```
MOV A,#9F
MOV R0,#40
SUBB A,R0
SWAP A
```

Q3. What are the different types of Address decoding Techniques?

A3 Absolute decoding/Full decoding

Linear decoding/Partial decoding

Q4. Comparison between full address decoding and Partial address decoding?

A4 Full address decoding	Partial address decoding
1All higher address lines are decoded to select the memory or I/O device.	1Few higher address lines are decoded to select the memory or I/O device.
2. More hardware is required to design decoding logic.	2. Hardware required to design decoding logic is less and sometimes it can be eliminated.
3. Higher cost for decoding circuit.	3. Less cost for decoding circuit.
4. No multiple addresses.	4. It has a disadvantage of multiple addresses.
5. Used in large systems.	5. Used in small systems.

Q5. What is the significance of wait state generator?

A5 This is used to transfer data between slower I/O device and the microprocessor. In some applns, the speed of I/O systems is not compatible with the microprocessor's timings. So the microprocessor has to confirm whether the peripheral is ready or not. If READY pin is high, the peripheral is ready otherwise 8085 enters in to wait state.

Q6. What is a Non-maskable interrupt?

A6 It is unaffected by any mask or interrupt enable. Eg: TRAP

Q7. What is a Data pointer register?

A7 The data pointer register (DPTR) consists of a high byte(DPH) and a low byte (DPL) functions to hold 16 bit address. It may be manipulated as a 16-bit data register or as independent 8-bit registers. It serves as a base register in indirect jumps, look up table instructions and external data transfer.

Q8. What are the operating modes of 8279?

A8 1. Input modes" : Scanned keyboard,. Scanned sensor matrix , Strobe input

2. Display modes: Left entry (Type writer mode). ,Right entry (Calculator mode)

Q9. What are the different functional units in 8279?

A9 CPU interface section

Keyboard section

Display section

Scan section

Q10. What are the priority modes in 8259?

A10 a. Fully nested mode

b. Special fully nested mode

c. Rotating Priority mode

d. Special Masked mode

e. Polled mode

Title of the Practical: Find the sum of positive nos. from an array & store the result at some memory location (Ignore negative nos.)

Q1. What is opcode fetch cycle?

A1 The opcode fetch cycle is a machine cycle executed to fetch the opcode of an instruction stored in memory. Each instruction starts with opcode fetch machine cycle.

Q2. What are the instructions used to control the interrupts?

A2 EI DI RIM SIM

Q3. What is polling?

A3. In polling, the microprocessor's software simply checks each of the I/O devices every so often. During this check, the microprocessor tests to see if any device. needs servicing.

Q4. What are the different types of interrupts?

A4 Hardware Software

Hardware interrupts- The interrupts where the CPU pins are used to receive interrupt requests , are called hardware interrupts.

Software interrupts – This interrupt is caused by the execution of the instruction. These are special instructions supported by the microprocessor.

Q5. What are the types of hardware interrupts?

A5 TRAP RST 7.5 RST 6.5 RST 5.5 INTR

Q6. Difference between memory mapped I/o and I/O mapped I/o?

A6

Memory mapped I/O	I/O mapped I/O
1. In this device address is 16- bit. Thus Ao to A15 lines are used to Generate the device address	1. In this device address is 8-bit. Thus Ao to A7 or A8 to A15 generate device address.
2. MEMR and MEMW control signals are used to control read and write I/O to control read and write I/O operations	2. IOR and IOW control signals are used operations. to control read and write I/O operations
3. Instructions available are LDA, STA, MOV R,M , ADD M etc.	3. Instructions available are IN and OUT
4. Data transfer is between any register and I/O device.	4. Data transfer is between accumulators And I/O device.
5. Decoding 16-bit address may require more hardware.	5. Decoding 8-bit address will require Less hardware.

Q7. Describe the function of the following pins in 8085?

A7 a) READY b) ALE c) IO/M d) HOLD e)SID and SOD

READY – It is used by the microprocessor to sense whether a peripheral is ready or not for data transfer. If not, the processor waits. It is thus used to synchronize slower Peripherals to the microprocessor.

ALE – In 8085, ADo to AD7 lines is multiplexed and lowers half of address (Ao to

A7) is available only during T1 of the machine cycle. The latching of lower half address from the multiplexed address lines by using ALE signal.

IO/M - indicates whether I/O operation or memory operation is being carried out.

HOLD – This signal indicates that another master is requesting for the use of address

Bus, data bus and control bus.

SID (Serial Input Data) – This input signal is used to accept serial data bit by bit from

The external device.

SOD (Serial Output Data) – This is an output signal which enables the transmission of

Serial data bit by bit to the external device.

Q8 what is ALE?

A8 The ALE (Address latch enable) is a signal used to demultiplex the address and data lines using an external latch. It is used to enable the external latch.

Q9. Where is the READY signal used?

A9 READY is an input signal to the processor, used by the memory or input/output devices to get extra time for data transfer or to introduce wait states in the bus cycles.

Q10. Give some examples of port devices used in 8085 microprocessor based system?

A10 The various port devices used in 8085 are 8212, 8155, 8156,8255,8355,8755.

Title of the Practical: Microprocessor based stepper Motor control.

Q1 . What is the need for timing diagram?

A1 The timing diagram provides information regarding the status of various signals, when a machine cycle is executed. The knowledge of timing diagram is essential for system designer to select matched peripheral devices like memories, latches, ports **etc** from a microprocessor system.

Q2. What operation is performed during first T-state of every machine cycle in 8085?

A2 In 8085, during the first T-state of every machine cycle the low byte address is latched into an external latch using ALE signal.

Q3 . What is interrupt acknowledge cycle?

A3 The interrupt acknowledge cycle is a machine cycle executed by 8085 processor to get the address of the interrupt service routine in order to service the interrupt device.

Q4. What is vectored and non-vectored interrupt?

A4 When an interrupt is accepted, if the processor control branches to a specific address defined by the manufacturer then the interrupt is called vectored interrupt. In Non-vectored interrupt there is no specific address for storing the interrupt service routine. Hence the interrupted device should give the address of the interrupt service routine.

Q5. List the software and hardware interrupts of 8085?

A5 Software interrupts : RST 0,RST 1,RST 2,RST 3,RST 4,RST 5,RST 6,RST 7

Hardware interrupts: TRAP, RST 7.5, RST 6.5, RST 5.5, and INTR.

Q6 . What is TRAP?

A6 The TRAP is a non-maskable interrupt of 8085. It is not disabled by processor reset or after recognition of interrupt.

Q7 . How clock signals are generated in 8085 and what is the frequency of the internal clock?

A7 The 8085 has the clock generation circuit on the chip but an external quartz crystal or LC circuit or RC circuit should be connected at the pins X1 andX2. The maximum internal clock frequency of 8085 is 3.03MHz.

Q8 . Define stack?

A8 Stack is a sequence of RAM memory locations defined by the programmer.

Q9 . What is program counter? How it is useful in program execution?

A9 The program counter keeps track of program execution. To execute a program the starting address of the program is loaded in program counter. The PC sends out an address to fetch a byte of instruction from memory and increments its content automatically.

Q10 . Define opcode and operand?

A10 Opcode(operation code) is the part of an instruction that identifies a specific operation. Operand is a part of instruction that represents a value on which the instruction acts.

Title of the Practical: Microprocessor based Temperature control.

Q1. How the 8085 processor differentiates a memory access and I/O access?

A1 The memory access and I/O access is differentiated using IO/M signal. The 8085 processor asserts IO/M low for memory operation and high for I/O operations.

Q2. When the 8085 processor checks for an interrupt?

A2 In the second T-state of the last machine cycle of every instruction, the 8085 processor checks whether an interrupt request is made or not.

Q3. Why interfacing is needed for I/O devices?

A3 Generally I/O devices are slow devices. Therefore the speed of I/O devices does not match with the speed of microprocessor. And so an interface is provided between system bus and I/O devices.

Q4. What is interrupt I/O?

A4 If the I/O device initiate the data transfer through interrupt then the I/O is called interrupt driven I/O.

Q5 What is GPIB?

A5 GPIB is the General Purpose interface Bus. It is used to interface the test instruments to the system controller.

Q6 . Advantages of differential data transfer?

A6 1. Communication at high data rate in real world environment.

2. Differential data transmission offers superior performance.

3. Differential signals can help induced noise signals.

Q7 . Features of INTEL 8259?

A7 1. It manage 8 interrupt request.

2. The interrupt vector addresses are programmable.

3. The priorities of interrupts are programmable.

4. The interrupt can be masked or unmasked individually.

Q8. What is meant by micro controller?

A8 A device which contains the microprocessor with integrated peripherals like

memory, serial ports, parallel ports, timer/counter, interrupt controller, data acquisition interfaces like ADC, DAC is called micro controller.

Q9. List the features of 8051 micro controllers?

A9 Single supply +5v operation using HMOS technology. 4096 bytes program memory on-chip. 128 data memory on chip. 4 register banks. 2 multiple modes, 16 bit timer/counter . Extensive Boolean processing capabilities.

Q10:- What is debugging?

A10:-Debugging is a kind of process by which in any program used instructions & content of Register are checked & error is found.