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COURSE:MICROPROCESSORS AND MICRO-CONTROLLERS[CE271]

INDEX NUMBER:BS424104620

CLASS:CE 2

MICROPROCESSORS ASSIGNMENT

1. A Register is a memory storage where data is stored during program execution. The maximum size of any register in the 8086 microprocessor is 16-bits.
2. General Purpose Registers are used for holding data,variables and immediate results whiles Special Purpose Registers are used in the segment, index and offset storage registers for a specific addressing modes.
3. a. Addressing Modes specifies the way data(operand) is to be operated by an instruction.
 - Immediate Address Addressing Mode
 - Register-Based Addressing Mode
 - Direct Addressing Mode
 - Based Addressing Mode
 - Indexed Addressing Mode
 - Based-Indexed Addressing Mode
4. a. Opcode(operational code):It is a machine language instruction that specifies the operation to be executed.
b. Operand: it is the data or location used to execute that instruction.
- 5.The Physical Address of an instruction is address that maps directly to the memory. Corresponds to the actual binary code by the Bus Interface Unit.
6. a. MOV:It is used to copy a byte or word from a provided source to a provided destination.
b. ADD: It is used to add a provide byte to a byte or a word to a word.
c. ADC:It is used to add a provide byte to a byte or a word to a word with carry.
d. SBB:It is used to subtract a provide byte to a byte or a word to a word with borrow
e. SUB:It is used to subtract a provide byte to a byte or a word to a word.
f. INT 3: It is a special one-byte interrupt that is used to set a breakpoint to occur.
7. a. MOV AX, 0102h
b. ADD:1000h, 2220h
c. ADC 2101h, 0000h
d. SBB 2111h, 0100h
e. SUB 1220h, 0200h
f. INT 3
- 8.Special Purpose Registers are used during the computation of DIV and MUL.

8. a. MUL and DIV operations output are stored in the General Purpose Registers(AX)

9. a. MOV:It is used to copy a byte or word from a provided source to a provided destination.

b. DIV: It is used to divide an unsigned byte by byte or unsigned word by word.

c. MUL:It is used to multiply an unsigned byte by byte or unsigned word by word.

d. IMUL: It is used to multiply a signed byte by byte or signed word by word.

e. IDIV:It is used to divide a signed byte by byte or signed word by word.

f. INT 3: It is a special one-byte interrupt that is used to set a breakpoint to occur

10.a. MOV AX, 0102h

b. DIV:1000h, 2220h

c. MUL 2101h, 0000h

d. IMUL -2111h, -0100h

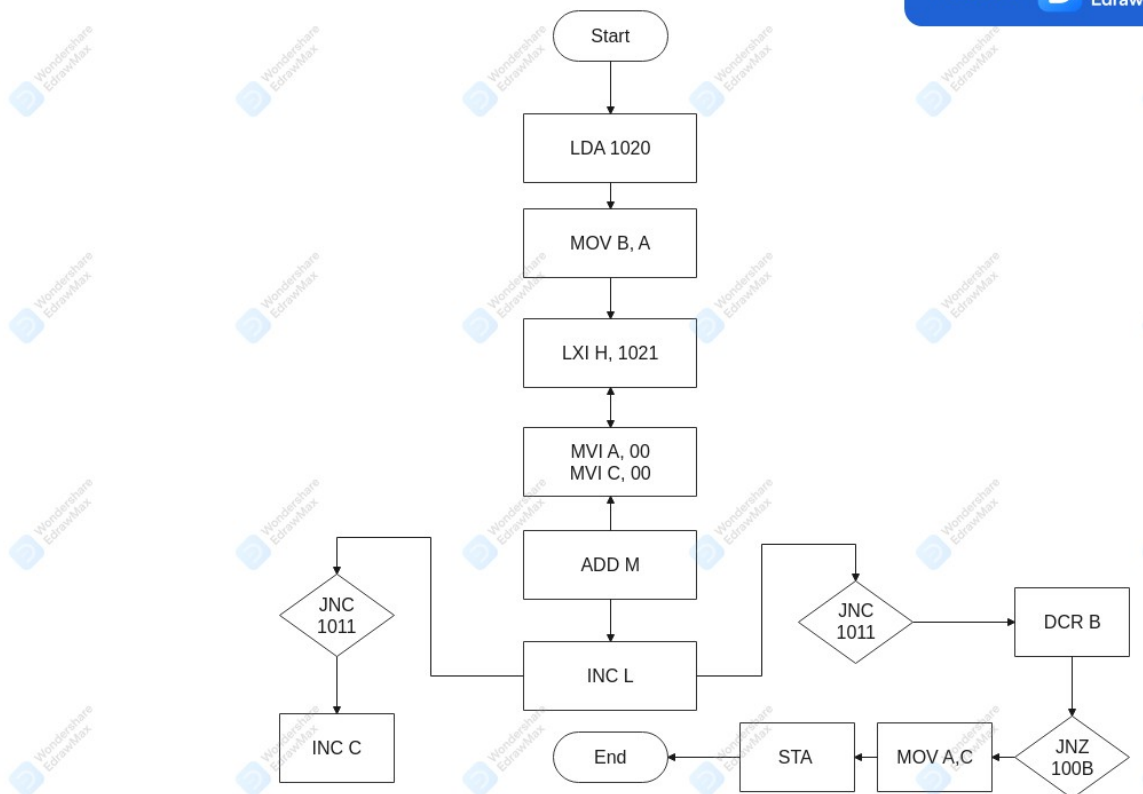
e. IDIV -1220h, -0200h

f. INT 3

11.Flag Register changes status according to the result stored in the accumulator. Its the flip-flop register thus its status is either 0 or 1.

12.The Physical Address of 8086 is FFFF0H (FFFFH:0000H) after reset.

13.Flowchart for the sum of 8bit numbers in series



14.The Counter register(CX) is used to store loop execution of counter values

15.Assembler Directives are instructions that tells the assembler the execution of a program should be done. It is also called a Pseudo-instructions.

16. A LABEL is a symbol that represent the memory address of an instruction or data, it also define values of the symbols .

17.

MNEMONICS	ADD,ADC,CALL,CLD,CMD,CMP,CMPSB,CMPSW,DEC,DIV,HLT,IDIV,IMUL,IN,INC,IRET,JA,JA,JB,JBE,JE,JG,JGE,JL,JLE,JMP,JNE,LDS,LES,LODSB,LODSW,LOOP,MOV,MOVS,MOVS,MOVSW,MUL,NEG,NOT,OR,OUT,POP,PUSH,REP,REPNE,RET,SBB,SCASW,SCASB,STD,STOSB,STOSW,SUB,XOR
ASSEMBLER DIRECTIVES	DB,DW,SEG,END,ORG,END,EVEN,EQU,PROC,ENDP,FAR,NEAR,SHORT,MACRO
LABEL	TOP,GOTO

18.LABEL allocates address or memory locations for all data mnemonics,assembler directives.

19.a. MOV:It is used to copy a byte or word from a provided source to a provided destination.

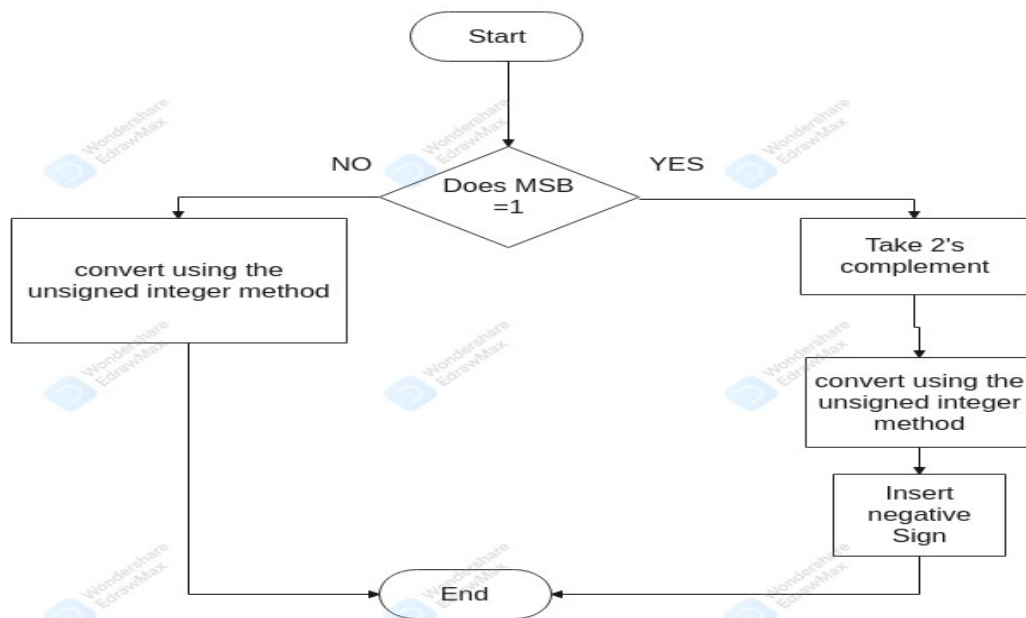
b. ADD: It is used to add a provide byte to a byte or a word to a word.

c. LOOP:It is used to repeat an instructions for a certain times until a condition is met.

- d. JMP: It is used to jump to a provided address to proceed to the next instruction.
- e. REP: It is used to repeat a given instruction till CX != 0.
- f. JZ: it is used to jump if equal or zero flag = 1
- g. XCHG: it is used to exchange a data from two location.

- 20.a. MOV AX, 0102h
 b. ADD 1000h, 2220h
 c. LOOP NEXT
 d. JMP CX = 0
 e. REP: ADD 100h, 100h
 f. JZ: X_LOOP
 g. XCHG AX, DX

21. one's and two's complement flowchart



- 22.a. MOV: It is used to copy a byte or word from a provided source to a provided destination.
 b. INC: It is used to increment a byte or word.
 c. NOT: It is used to invert each bit of a byte or word
 d. CMC: It is used to complement the state of the carry flag.
 e. AND: It is used to multiply each bit of a byte or word to its corresponding bits in another byte or word.
 f. OR: It is used to add each bit of a byte or word to its corresponding bits in another byte or word.
 g. XOR: it is used to perform an exclusive OR.

- 23.a. MOV AX, 1000h
 b. INC 0002h

- c. NOT 1010h
- d. CMC AL, BL
- e. AND 1010h, 1101h
- f. OR 1000h, 0221h
- g. XOR 1020h, 2222h

24. Yes the content of the flag register changes after the complement operation because its only data transfer operation that does not change the status of the flag register