ASSIGNMENT: 1

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Q-1 Differentiate minimum and maximum mode of 8086 and choose appropiate microprocessor system for each.

	Minimum mode		Maximum mode
1)	In minimum mode only one processor is used i.e 8086	1)	In maximum mode there can be there can be multiple processor with 8086 i.e 8087, 8089
2)	MN/$\overline{MX}$ is 1 to indicate minimum mode	2)	MN/$\overline{MX}$ 0 to indicate maximum mode
3)	ALE for latch is given by 8086 as it is the only processor in the circuit	3)	ALE for latch is given by 8288 bus controller as there can be multiple processor.
4)	$\overline{DEN}$ and DT/$\overline{R}$ for the trans-receivers are given by 8086	4)	$\overline{DEN}$ and DT/$\overline{R}$ for the trans-receiver are given by 8288
5)	circuit is simpler	5)	circuit is complex
6)	Direct control M/$\overline{IO}$, $\overline{RD}$ and $\overline{WR}$ are given by 8086	6)	Instaded of control signal each processor generate status signal $\overline{S_2}$, $\overline{S_1}$, $\overline{S_0}$

7)	control signal $M/\overline{IO}$, $\overline{RD}$ and $\overline{WR}$ are decoded by 3:8 decoder like 74138	7)	Status signal S_2, S_1, S_0 are decoded by a bus controller like 8288
8)	$\overline{INTA}$ is given by 8086 in response to an interrupt on INTR line	8)	$\overline{INTA}$ is given by 8288 bus controller in response to an interrupt on INTR line.
9)	HOLD and HLDA signals are used for bus request with DMA controller like 8237	9)	$\overline{RQ}/\overline{GT}$ lines are used for bus request by other 8237 or 8089
10)	Multiprocessing cannot be performed hence perform is lower	10)	As multiprocessing can be performed it can given very high performance.

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Q-2 Illustrate the program for addition of two 8 bit number by chosing required interrupt function.

ANS

```
DATA SEGMENT
MSG1  DB  0DH, 0AH, "Enter First NO = $"
MSG2  DB  0DH, 0AH, "Enter second NO = $"
MSG3  DB  0DH, 0AH, "Enter Addition is = $"
DATA ENDS

CODE SEGMENT
ASSUME CS: CODE , DS: DATA
START : MOV AX, DATA
        MOV DS , AX
        MOV DX, OFFSET MSG1
        MOV AH, 09H
        INT 21H
        MOV BL, AL
        MOV DX, OFFSET MSG2
        MOV AH, 09H
        INT 21H
        ADD BL
        MOV DX, OFFSET MSG3
        MOV AH, 09H
        INT 21H
        MOV DX, AX
        MOV AX, 02H
        INT 21H.
        MOV AH, 4CH
        INT 21H
CODE ENDS
END START.
```

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OUTPUT:- Enter first NO: 5
Enter second NO: 6
Addition is: 11

⇒ Here, we have used MOV AH, 09H INT 21H interupt function to display the starting of characters specified by DX register.

⇒ we have used MOV AH, 02H INT 21H interupt function to display only single character whose ASCII value is in DL register.

⇒ we have used MOV AH, 4CH INT 21H interupt function to cause program exit immediatly.

Q-3 Discuss whether to use macro procedure to calculate square of number by writing program.

ANS
```
DATA SEGMENT
M1  DB  0DH, 0AH, "Enter the NO: $"
M2  DB  0DH, 0AH, "Result is : $"
DATA ENDS

PRINT MACRO MSG
        MOV  AH, 09H
        MOV  DX, OFFSET MSG
        INT  21H
ENDM
```

```
CODE SEGMENT
ASSUME CS: CODE , DS: DATA
START:  MOV AH, DATA
        MOV DS, AX
        PRINT M1
        MOV AH, 01H
        INT 21H
        SUB AL, 30H
        MOV BL, AL
        MUL BL
        PRINT M2
        AAM
        ADD AL, 30H
        ADD AH, 30H.
        MOV CX, AX
        MOV DL, CH
        MOV AH, 02H.
        INT 21H
        MOV DL, CL
        MOV AH, 02H
        INT 21H
        MOV AH, 4CH
        INT 21H
        CODE ENDS
END START
```

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⇒ Following are the used of macro insted of procedure due to following reason.

(i) The no of instructions set used in macro are not more then 8 instruction so it may not consume large part of memory.

(ii) execution time of macro is faster than procedure.

(iii) we wont need to load the flags in the stacks, as at each call we do in procedure.

(iv) Even the overhead time is avoided as calling and returning does not take place.

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Q-4 Design microprocessor system for a problem of your choice write algorithm and hardware requirements of the same.

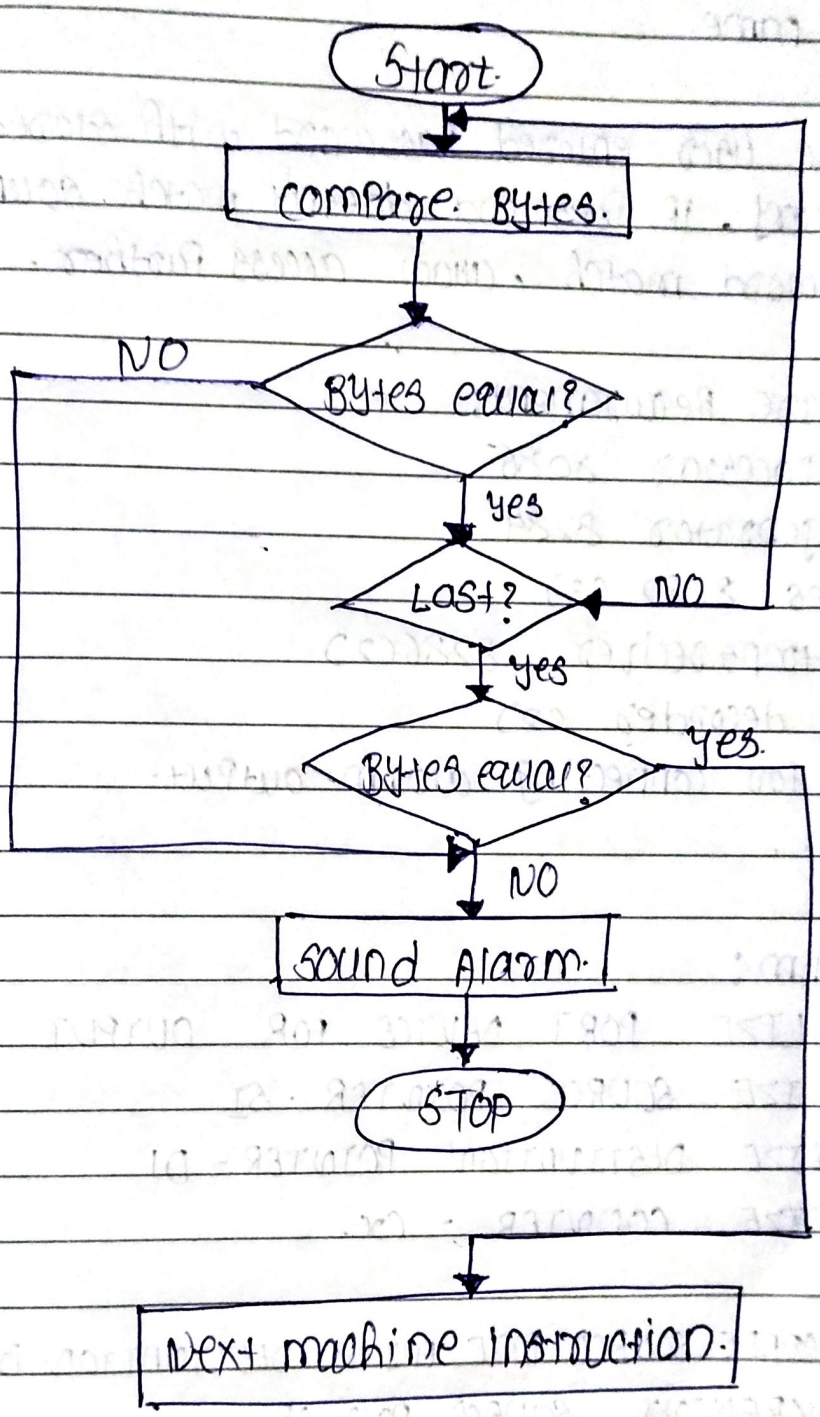
Ans compare user entered password with stored password in memory. If password doesn't match sound alarm. if password match, allow access further.

Hardware Requirement:

1] microprocessor 8086
2] clock generator 8284
3] latches 8282 (3)
4] Data transreciver 8286(2)
5] 3: 8 decoder (2)
6] 8255 for connecting alarm output.
7] alarm.

Algorithm:

INITIALIZE PORT DEVICE FOR OUTPUT
INITIALIZE SOURCE POINTER - SI
INITIALIZE DESTINATION POINTER - DI
INITIALIZE COUNTER - CX.
REPEAT
    COMPARE SOURCE BYTE WITH DESTINATION BYTE
    INCREMENT SOURCE POINTER.
    INCREMENT DESTINATION POINTER
    DECREMENT COUNTER.
UNTIL (STRING BYTES NOT EQUAL) OR (CX=0).
IF STRING BYTES NOT EQUAL THEN.
    SOUND ALARM.
    STOP

ELSE

DO NEXT MACHINE INSTRCTION.