Lab 2: Experiments in XPO86 kit

Task 1: Study and the following programs and answer the following questions.

Q. Write an ALP in XPO86 kit to read two digits(0-F in hexa) from the keyboard , add them and display the results in the display of the kit.

ANS:-

```
MOV AH,08
INT A1
MOV BL,AL
INT A1
ADD AL,BL
SUB AL,30
MOV DL,AL
MOV AH,02
INT A2
INT A5
```

INPUT:3,4

OUTPUT:7

INTPUT :4,5

OUTPUT:9

Q.2, Write an ALP in XPO86 kit that accepts a hexadecimal number and convert to its equivalent gray code. Display the same on the Display.

Ans:

```
1000:0100 DB 00,01,03,02,06,07,05,04,00,01,02,03,04,05,06,07
MOV BX,1000
MOV DS,BX
MOV BX,0100
MOV AH,08
INT A1
```

```
SUB AL,30
XLAT
ADD AL,30
MOV DL,AL
MOV AH,02
INT A2
INT A5
```

Task 2: Familiarization of Hyper terminal

To display a message on the LCD of a microcomputer using monitor calls.

ALGORITHM:

1. Initialize the data segment and the message to be displayed.
2. Set function value for display.
3. Point to the message and run the interrupt to display the message in the CRT.

PROGRAM:

```
0000                            DISP SEGMENT
ASSUME CS: DISP DS:DISP, ES:DISP

0100                    ORG 0100H
0100  EB 0F 90          STRT: JMP SKIP_DATA
0103  47 4F 4F 44 20 4D MSG1:  DB "GOOD MORNING ",03H
        4F 52 4E 49 4E 47
        20 03
0111  B8 10FF          SKIP_DATA: MOV AX,10FFH ; INIT OF SP FOR KIT
0114  8B E0     MOV SP, AX                      ; MOV AX, AX   ON PC
0116  0E                PUSH CS                 ; INIT FOR DS
0117  1F                POP DS                  ; LOAD KIT INTS
                                                (A0- BF) IN PC USING
0118  B8 0000          MOV AX, 0000H             ; ES is used as SCPD to
011B  8E C0     MOV ES,AX                       ; STORE DATA.
011D  CD AC     INT 0ACH                        ; Clear to new line
011F  BB 0103 R         MOV BX, OFFSET MSG1     ; Pointer to message table
                                                  Ending in ETX
```

```
0122  CD AF     INT 0AFH                    ; Display massage.
0124                DISP ENDS
                    END
```

RESULT:

A message is displayed on the LCD of a microcomputer using MONITOR calls

PROGRAM: ARRANGE THE SET OF ARRAYS IN ASCENDING ORDER

SRC SEGM :ADDR	OP-CODE	LABEL	MNEMONICS	OPERAND	COMMENT
1000:0100	B9 05 00		MOV	CX,0005	Get the count value CX=05h
1000:0103	49		DEC	CX	Decrementing the CX value by 1
1000:0104	89 CA		MOV	DX,CX	Move the content of CX to DX
1000:0106	BF 00 11		MOV	DI,1100	Initialize DI to 1100H
1000:0109	8A 05	LOOP1:	MOV	AL,[DI]	Move the content of DI to AL
1000:010B	47		INC	DI	Increment DI register
1000:010C	8A 1D		MOV	BL,[DI]	Get the second value & move it to BL
1000:010E	38 D8		CMP	AL,BL	Compare AL and BL
1000:0110	73 06		JC	LOOP2(0118)	If AL is greater than BL then go to label location
1000:0112	4F		DEC	DI	Decrement the DI value
1000:0113	88 1D		MOV	[DI],BL	Move the content of BL to DI
1000:0115	47		INC	DI	Increment the DI value
1000:0116	88 05		MOV	[DI],AL	Move the AL value to DI
1000:0118	E2 EF	LOOP2	LOOP	LOOP1(0109)	Decrement the count value by 1 and check whether it is zero or not
1000:011A	89 D1		MOV	CX,DX	Reload the count value

1000:011C	E2 E6		LOOP	0104	Decrement the count value and check whether it is zero or not
1000:011E	CD A5		INT	A5	Return to command mode

OBSERVATION :-

INPUT		OUTPUT	
SRC SEGM :ADDR	**DATA**	**SRC SEGM :ADDR**	**DATA**
0000:1100	22	0000:1100	11
0000:1101	55	0000:1101	22
0000:1102	44	0000:1102	44
0000:1103	11	0000:1103	55
0000:1104	66	0000:1104	66

PROGRAM: CONVERT 8 BIT DECIMAL VALUE TO ASCII VALUE

SRC SEGM :ADDR	**OP-CODE**	**MNEMONICS**	**OPERAND**	**COMMENT**
1000:0100	BF 00 11	MOV	DI,1100	Initialize DI to 1100H
1000:0103	8A 05	MOV	AL,[DI]	Get the value to be converted
1000:0105	04 30	ADD	AL,30	To convert the decimal value into ASCII we have to add 30H with the content of AL
1000:0107	3C 3A	CMP	AL,3A	Finding whether the added value is less than 3A(or)not

1000:0109	72 0A	JC	0115	If it is so then the control will be transferred to the address location
1000:010B	3C 40	CMP	AL,40	If it is not so then the added value will be compared with 40H
1000:010D	73 04	JNC	0113	If carry=0 then the control will be transferred to address location
1000:010F	04 07	ADD	AL,07	If carry=1 then the AL value will be added with value of 07H
1000:0111	EB 02	JMP	0115	After the addition the control will be transferred to address location
1000:0113	B0 FF	MOV	AL,FFH	Move the value FFH to AL
1000:0115	47	INC	DI	Increment DI register
1000:0116	89 05	MOV	[DI],AL	Move the content of AL to DI
1000:0118	CD A5	INT	A5	Return to command mode

OBSERVATION :-

INPUT		**OUTPUT**	
SRC SEGM :ADDR	**DATA**	**SRC SEGM :ADDR**	**DATA**
0000:1100	00	0000:1101	30
0000:1100	07	0000:1101	37
0000:1100	40	0000:1101	FF

Assignment

Q1: Display your name on the LCD of a microcomputer using MONITOR calls

Q2: Find largest number among 10 nos stored in memory specific memory location.
Q3: Convert 8 bit ASCII value to Decimal value.
Q4: Select three small problems of your own and write three assembly language program and test in XPO86 kit

Due on 10th August (5 PM- Hardware Lab, submit handwritten copy)