CSE-4142
Computer Peripherals and Interfacing Lab

Port Address(8255A):

Dot Matrix LED	Address	4 LEDs and Seven Segment LED	Address
Port A	18H	Port A	19H
Port B	1AH	Port B	1BH
Port C	1CH	Port C	1DH
Control Register	1EH	Control Register	1FH

Experiments:

5. Dot matrix LED print(Top to Bottom):

Machine Code	Mnemonics	Description
B0,80	MOV AL,80H	AL = 80H , IO mode selection
E6,1E	OUT CONT. REG.	
B0,FF	MOV AL , FFH	For red color dot display
E6,18	OUT PORT-A	
B2,80	**START :** MOV DL , 80H	DL=80H , need to be shift for output
B0,FF	**NEXTROW :** MOV AL , FFH	Turn on all column
E6,1C	OUT PORT-C	1C for Column
32,C2	XOR AL , DL	DL XOR with AL(FFH) to produce (7FH,BFH,DFH,EFH,F7H,FBH,FDH,FEH)
D0,EA	SHR DL,01H	DL Shifted right for value (40H,20H,10H,08H,04H,02H,01H)
E6,1A	OUT PORT-B	1A for Row
B9,FF,FF	MOV CX, FFFFH	Assuming FFFFH = 1 sec
E2,FE	**L1:** LOOP L1	Label(L1) repeat 65535 times
72,ED	JC START	DL will produce carry after 01H i.e repeat
EB,ED	JMP NEXTROW	Otherwise jump to display next row

3. Display 1 , 2 , 3 on Seven-Segment LED with 5s delay:

Machine Code	Mnemonics	Description
BO, 80	MOV AL,80H	AL = 80H , IO mode selection
E6, 1F	OUT CONT. REG.	
B0, F0	MOV AL,F0	
E6, 1B	OUT PORT-B	
B0, F9	**START :** MOV AL,F9H	Common Anode F9H/79H = 1 for seven segment LED display
E6, 19	OUT PORT-A	
B2, 05	MOV DL,05H	DL = 5 , for 5 sec delay
B9, FF, FF	**L1 :** MOV CX,FFFFH	
E2, FE	**LABEL1 :** LOOP LABEL1	
FE, CA	DEC DL	Decrement DL by one
75, F7	JNZ L1	Label(L1) repeat 5 times
B0, A4	MOV AL,A4H	Common Anode A4H/24H = 2 for seven segment LED display
E6, 19	OUT PORT-A	
B2, 05	MOV DL,05H	DL=5 , for 5 sec delay
B9, FF, FF	**L2:** MOV CX,FFFFH	
E2, FE	**LABEL2 :** LOOP LABEL2	
FE, CA	DEC DL	
75, F7	JNZ L2	Label(L2) repeat 5 times
B0, B0	MOV AL,B0	Common Anode B0H/30H = 3 for seven segment LED display
E6, 19	OUT PORT-A	
B2, 05	MOV DL,05H	
B9, FF,FF	**L3 :** MOV CX,FFFFH	
E2,FE	**LABEL3 :** LOOP LABEL3	
FE, CA	DEC DL	
75, F7	JNZ L3	Label(L3) repeat 5 times
EB, D1	JMP START	Repeat showing 1,2,3 again

4. Dot matrix LED print(LEFT to RIGHT):

Machine Code	Mnemonics	Description
B0,80	MOV AL,80H	AL = 80H , IO mode selection
E6,1E	OUT CONT. REG.	
B0,FF	MOV AL,FFH	For red color dot display
E6,18	OUT PORT-A	
B2,01	**START :** MOV DL,01H	DL= 01H , need to be shift for output
B0,00	**NEXTCOLUMN :** MOV AL,00H	Turn on all row
E6,1A	OUT PORT-B	1A for row selection
8A,C2	MOV AL,DL	To call port C with DL content
E6,1C	OUT PORT-C	1C for column selection
O2,D2	ADD DL,DL	DL + DL to produce-2,4,8,16,...,256
B9,FF,FF	MOV CX,FFFFH	
E2,FE	LOOP LABEL	
72,ED	JC START	DL = 256 means carry flag = 1 i.e repeat
EB,ED	JMP NEXTCOLUMN	Otherwise jump to display next column

2. Dot matrix LED print(H,F,E with 5s delay):

Machine Code	Mnemonics	Description
B0,80	MOV AL,80H	AL = 80H , IO mode selection
E6,1E	OUT CONT. REG	
B0,FF	MOV AL,FFH	For Red light dot display
E6,18	OUT PORT-A	
B2,FF	**START :** MOV DL, FFH	DL = FFH , for 255 sec delay [as 5 sec is not appropriate delay for showing up]
B0,00	**L1 :** MOV AL, 00H	Turn on all row(0 to turn on)
E6,1A	OUT PORT-B	1A for row
B0,C3	MOV AL, C3H	C3 for first two and last two column to turn on for displaying 'H'
E6,1C	OUT PORT-C	1C for column(1 to turn on)
B9,FF,01	MOV CX, 01FFH	Count value changed for synchronization when displaying letters.
E2,FE	**LABEL1 :** LOOP LABEL1	
B0,E7	MOV AL, E7H	E7 for turn on middle two row of 'H'
E6,1A	OUT PORT-B	1A for row
B0,FF	MOV AL, FFH	Turn on all column
E6,1C	OUT PORT-C	1C for column

B9,FF,01	MOV CX, 01FFH	
E2,FE	**LABEL2 :** LOOP LABEL2	
FE,CA	DEC DL	
75,E2	JNZ L1	Label(L1) repeat 255 times
B2,FF	MOV DL, FFH	
B0,00	**L2 :** MOV AL, 00H	Turn on all row(0 to turn on)
E6,1A	OUT PORT-B	1A for row
B0,03	MOV AL, 03H	03 for first two column to turn on for displaying 'F'
E6,1C	OUT PORT-C	1C for column
B9,FF,01	MOV CX, 01FFH	Count value changed for synchronization when displaying letters.
E2,FE	**LABEL3 :** LOOP LABEL3	
B0,27	MOV AL, 27H	27 for top two and middle two row to turn on for displaying 'F'
E6,1A	OUT PORT-B	1A for row
B0,FF	MOV AL, FFH	Turn on all column
E6,1C	OUT PORT-C	1C for column
B9,FF,01	MOV CX, 01FFH	
E2,FE	**LABEL4 :** LOOP LABEL4	
FE,CA	DEC DL	
75,E2	JNZ L2	Label(L2) repeat 255 times
B2,FF	MOV DL, FFH	
B0,00	**L3 :** MOV AL, 00H	Turn on all row(0 to turn on)
E6,1A	OUT PORT-B	
B0,03	MOV AL, 03H	03 for first two column to turn on for displaying 'E'
E6,1C	OUT PORT-C	1C for column
B9,FF,01	MOV CX, 01FFH	
E2,FE	**LABEL4 :** LOOP LABEL4	

B0,24	MOV AL, 24H	24 for top two, middle two and bottom two row to turn on for displaying 'E'
E6,1A	OUT PORT-B	1A for row
B0,FF	MOV AL, FFH	
E6,1C	OUT PORT-C	1C for column
B9,FF,01	MOV CX, 01FFH	
E2,FE	**LABEL5 :** LOOP LABEL5	
FE,CA	DEC DL	
75,E2	JNZ L3	Label(L3) repeat 255 times
EB,9E	JMP START	

1. A traffic controlling system with three LEDs Red, Green, Yellow color light.

RED ⟶ YELLOW ⟶ GREEN ⟶ YELLOW ⟶ RED

Machine Code	Mnemonics	Description
BO, 80	MOV AL,80H	AL = 80H , IO mode selection
E6, 1F	OUT Control Register	
BO, FF	MOV AL,FFH	Turn off Port-A
E6, 1B	OUT PORT-B	
E6, 19	OUT PORT-A	
B0, 00	MOV AL,00H	
E6, 1D	OUT PORT-C	
B0, F1	**START :** MOV AL,F1H	F1 = Red light(Top Left)
E6, 1B	OUT PORT-B	
B2, 0A	MOV DL,0AH	DL=10 , for 10 sec delay
B9, FF, FF	**L1 :** MOV CX,FFFFH	

E2, FE	LOOP LABEL	
FE, CA	DEC DL	
75, F7	JNZ L1	Label(L1) repeat 10 times
B0, F4	MOV AL,F4H	F4 = Yellow light
E6, 1B	OUT PORT-B	
B2, 05	MOV DL,05H	DL = 5 , for 5 sec delay
B9, FF, FF	**L2 :** MOV CX,FFFFH	
E2, FE	LOOP LABEL	
FE, CA	DEC DL	
75, F7	JNZ L2	Label(L2) repeat 5 times
B0, F2	MOV AL,F2H	F2 = Green light
E6, 1B	OUT PORT-B	
B2, 0F	MOV DL,0FH	DL = 15 , for 15 sec delay
B9, FF, FF	**L3 :** MOV CX,FFFFH	
E2, FE	LOOP LABEL	
FE, CA	DEC DL	
75, F7	JNZ L3	Label(L3) repeat 15 times
B0, F1	MOV AL,F4H	F4 = Yellow light
E6, 1B	OUT PORT-B	
B2, 05	MOV DL,05H	DL = 5 , for 5 sec delay
B9, FF, FF	**L4 :** MOV CX,FFFFH	
E2, FE	LOOP LABEL	
FE,CA	DEC DL	
75,F7	JNZ L4	Label(L4) repeat 5 times
EB, C2	JMP START	Jump to start for repetition

B0, F4 = Yellow.. light