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

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

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

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