

**DEPT. OF ELECTRICAL & ELECTRONICS ENGINEERING**  
**SRM UNIVERSITY, Kattankulathur – 603203.**

Title of Experiment	:10. LCD DISPLAY USING 8051
Name of the candidate	:GAUTAM NAG
Register Number	: RA1811005010278
Date of Experiment	:13-04-2021
Date of submission	: <b>13-04-2021</b>

<b>S.NO :</b>	<b>MARKS SPLIT UP</b>	<b>MAXIMUM MARKS (50)</b>	<b>MARKS OBTAINED</b>
1	PRE LAB	5	
2	PROGRAM	25	
3	EXECUTION	15	
4	POST LAB	5	
TOTAL		50	

**Staff Signature**

## **10. LCD DISPLAY USING 8051**

### **PRE-LAB**

#### **1. What are the modes used in keyboard modes?**

Scanned Keyboard mode with 2 Key Lockout.

Scanned Keyboard with N-key Rollover.

Scanned Keyboard special Error Mode.

Sensor Matrix Mode.

#### **2. How a keyboard matrix is formed in the keyboard interface using 8279?**

The keyboard matrix is- formed using the return lines, RL0 to RL3 of 8279 as columns and decoded scan lines S0 and S1 as rows. A hexa key is placed at the crossing point of each row and column. A key press will short the row and column. Normally the column and row line will be high.

#### **3.What is key debouncing?**

Debouncing mechanisms detect these bounces and register them as only one keystroke so you have more reliable key input. Debounce mechanisms are usually invisible to the user and you (usually) won't be able to trigger them by trying to press the key repeatedly

#### **4.What are the modes used in display modes?**

The two types of display modes are "view modes" and "form modes".

#### **5.Compare memory mapped I/O and peripheral mapped I/O.**

Differences between I/O mapped I/O and Memory-mapped I/O. The I/O devices and memory, both are treated as memory. The I/O devices are treated as I/O devices and the memory is treated as memory. The peripherals or the I/O ports are treated as memory locations.

## 10. LCD display using 8051

### **Aim:**

To write an assembly language program to display characters on a seven segment display LCD using EdSim 51.

### **Apparatus required:**

#### **Hardware Requirement :**

8051 Microcontroller kit, Power supply

#### **Software Requirement :**

8051 EdSim

### **EDSIM51 PROGRAM-**

ORG 0000H

RS EQU P1.3

E EQU P1.2

; THE R/W\* is hardwired to 0v, therefore it is always in write mode

; .....MAIN.....

MAIN:

;SELECT INSTRUCTION REGISTER (IR)

CLR RS ; RS=0 INSTRUCTION REGISTER IS SELECTED

; STORE INSTRUCTION CODE

; FUNCTION SET

CALL FUNCSET

; DISPLAY ON/OFF CONTROL

CALL DISPCON

; ENTRY MODE SET(4 BIT MODE)

CALL ENTRYMODE

; SEND DATA

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    SETB RS    ; RS= 1 – DATA REGISTER IS SELECTED

                ; SENT DATA TO DATA REGISTER TO BE DISPLAYED

    MOV DPTR ,#LUT

BACK:  CLR A

    MOVC A,@A+DPTR    ;----- LOOKUP TABLE (LUT)-----

    JZ FINISH

CALL SENDCHAR

INC DPTR

JMP BACK

FINISH: JMP $    ;PROHRAM ENDS AND STAYS HERE

; .....END OF MAIN.....

FUNCSET:  CLR P1.7

        CLR P1.6

    SETB P1.5    ; I BIT 5=1

    CLR P1.4    ; I(DB4) DL =0 -PUTS LCD MODULE INTO 4-BIT MODE

    CALL PULSE

    CALL DELAY    ; WAIT FOR BF TO CLEAR

    CALL PULSE


    SETB P1.7    ; P1.7 =1 (N) + 2 LINES

    CLR P1.6

    CLR P1.5

    CLR P1.4

    CALL PULSE

    CALL DELAY

    RET

; -----DISPLAY ON/OFF CONTROL-----

; THE DISPLAY IS TURNED ON,THE CURSOR IS TURNED ON

DISPCON:  CLR P1.7

    CLR P1.6    ; I

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```

CLR P1.5 ; I
CLR P1.4 ; I HIGH NIBBLE SET (0H-HEX)
CALL PULSE
SETB P1.7 ; I
SETB P1.6 ; I SET ENTIRE DISPLAY ON
SETB P1.5 ; I CURSOR ON
SETB P1.4 ; CURSOR BLINKING ON
CALL PULSE
CALL DELAY ; WAIT FOR BF TO CLEAR
RET

; .....ENTRY MODE SET ( 4-BIT) MODE.....

; SET TO INCREMENT THE ADDRESS BY ONE AND CURSOR SHIFTED TO THE RIGHT
ENTRYMODE: CLR P1.7
CLR P1.6 ; I P1.6 =0
CLR P1.5 ; I P1.5 =0
CLR P1.4 ; I P1.4 =0
CALL PULSE
CLR P1.7 ; I P1.7 ='O'
SETB P1.6 ; I P1.6 ='L'
SETB P1.5 ; I P1.5 ='L'
CLR P1.4 ; I P1.4 ='O'
CALL PULSE
CALL DELAY ; WAIT FOR BF TO CLEAR
RET

; .....PULSE.....
PULSE : SETB E ; I *P1.2 IS CONNECT TO 'E' PIN OF LCD MODULE *
CLR E ; I NEGATIVE EDGE ON E
RET

; .....SENDCHAR-----
SENDCHAR:
MOV C,ACC.7

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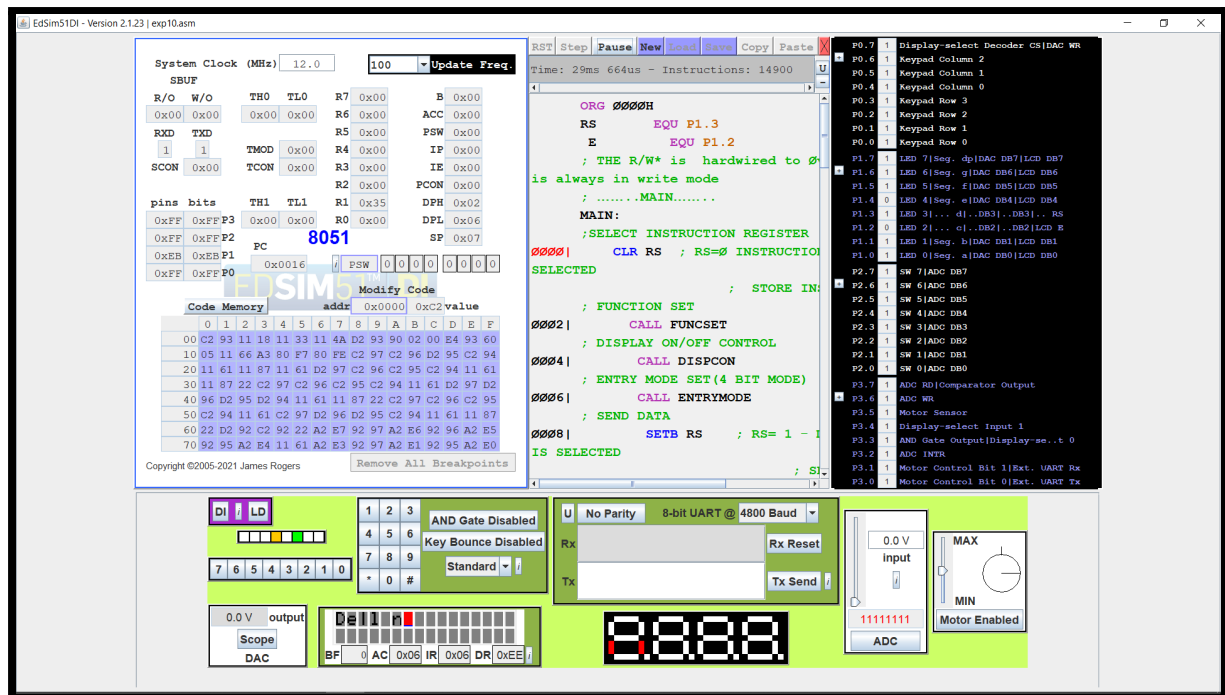
MOV P1.7,C
MOV C,ACC.6
MOV P1.6,C
MOV C,ACC.5
MOV P1.5,C
MOV C,ACC.4
CALL PULSE
MOV C,ACC.3
MOV P1.7 , C
MOV C,ACC.1
MOV P1.5,C
MOV C,ACC.0
MOV P1.4,C
CALL PULSE
CALL DELAY
RET
; .....DELAY.....

DELAY: MOV R0,#50H
DJNZ R0,$
RET
;.....LOOK-UP TABLE (LUT).....

ORG 0200H
LUT: DB 'b','e','l','l','o'
STOP: JMP $
END

```

**SIMULATION :**



## Result:

Thus, an assembly language program LCD displaying the character program was executed by using 8051 Microcontroller.

## POST-LAB

### 1. Write about the CALL statement in 8051??

The CALL instruction interrupts the flow of a program by passing control to an internal or external subroutine. An internal subroutine is part of the calling program. An external subroutine is another program.

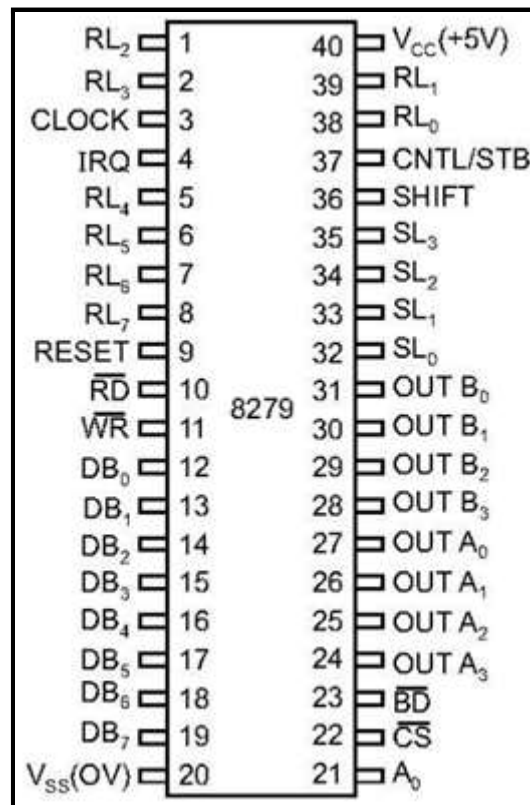
### 2. What is subroutine or procedure??

A subroutine is a sequence of program instructions that performs a specific task, packaged as a unit. This unit can then be used in programs wherever that particular task should be performed.

### 3. What is the function of SWAP?

SWAP swaps bits 0-3 of the Accumulator with bits 4-7 of the Accumulator. This instruction is identical to executing "RR A" or "RL A" four times.

#### 4. Draw the pin diagram for 8279.



#### 5. What is the application of LCD

LCDs are used in a wide range of applications, including LCD televisions, computer monitors, instrument panels, aircraft cockpit displays, and indoor and outdoor signage.