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

Title of Experiment	:9. Seven segment display
Name of the candidate	: GAUTAM NAG
Register Number	:RA1811005010278
Date of Experiment	:05-04-2021
Date of submission	**:05-04-2021**

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

Staff Signature

9. Seven segment display

PRE-LAB

1. **There are different modes that can be used for each timer what are they?**

   The timer registers can be used in two modes. These modes are Timer mode and the Counter mode. The only difference between these two modes is the source for incrementing the timer registers.

2. **What is the equivalent of the instruction SETB TCON.6?**

   SET B TRl

3. **What is the function of the ANL C, bit?**

   The ANL instruction performs a bitwise logical AND operation between the specified byte or bit operands and stores the result in the destination operand. When this instruction is used to modify an output port, the value used as the port data will be read from the output data latch, not the input pins of the port.

4. **What is LCALL and ACALL?**

   ACALL is a 2-byte instruction in contrast to LCALL, which is 3 bytes. ... The only difference is that the target address for LCALL can be anywhere within the 64K-byte address space of the 8051 while the target address of ACALL must be within a 2K-byte range

5. **What is the function of the instruction MOVC A,@A+DPTR?**
    a) MOVC moves a byte from Code Memory into the Accumulator. The Code Memory address from which the byte will be moved is calculated by summing the value of the Accumulator with either DPTR or the Program Counter (PC)
    b) It is used by the 8051 to access external memory using the address indicated by DPTR

9. Seven segment display

Aim:

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

Apparatus required:

8051 microcontroller kit

(0-5V) DC battery

Algorithm:

1. Enter a program.
2. Initialize number of digits to Scan
3. Select the digit position through the port address C0
4. Display the characters through the output at address C8.
5. Check whether all the digits are display.
6. Repeat the Process.

PROGRAM:

Memory Location	Label	Opcode	Mnemonics	Comments
4100	START	90 45 00	MOV DPTR, #address	Data to be displayed
4103		AA 82	MOV R2, DPL	
4105		AB 83	MOV R3, DPH	
4107		78 07	MOV R0, #07H	total digit positions in seven display
4109		7F 08	MOV R7, #08H	Initialize no.of digits to scan
410B	L1	E8	MOV A, R0	Select digit position
410C		90 FF C0	MOV DPTR, #FFC0H	
410F		F0	MOVX @DPTR, A	
4110		8A 82	MOV DPL, R2	
4112		8B 83	MOV DPH, R3	
4114		E0	MOVX A, @DPTR	
4115		90 FF C8	MOV DPTR, #FFC8H	
4118		F0	MOVX @DPTR, A	
4119		12 41 22	LCALL DELAY	
411C		0A	INC R2	
411D		18	DEC R0	Check if 8 digits are displayed
411E		DF EB	DJNZ R7, L1	If not repeat
4120		21 00	AJMP START	Repeat from the 1st digit
4122	DELAY	7C 02	MOV R4, #02H	
4124	L3	7D FF	MOV R5, #FFH	
4126	L2	DD FE	DJNZ R5, L2	
4128		DC FA	DJNZ R4, L3	
412A		22	RET	

EDSIM51 PROGRAM-

ADDRESS	LABEL	MNEMONICS	OPCODE	COMMENTS
0000	**START**	SETB P3.3	90 45 00	**Setup pin 3.3**
0002	**CLEAR**	SETB P3.4	AA 82	**Setup pin 3.4**
0004		MOV P1,#11000000B	AB 83	**this is set 0 of number '1' of the 7 segment display**
0007		CALL delay	78 07	**Specify delay**
0009		MOV P1,#11111001B	7F 08	**this is set 0 of number '1' of the 7 segment display**
000C		CALL delay	E8	**Specify delay**
000E		MOV P1,#10100100B	90 FF C0	**this is set 0 of number '2' of the 7 segment display**
00011		CALL delay	F0	**Specify delay**
00013		MOV P1,#10110000B	8A 82	**this is set 0 of number '3' of the 7 segment display**
00016		CALL delay	8B 83	**Specify delay**
00018		MOV P1,#10011001B	E0	**this is set 0 of number '4' of the 7 segment display**
0001B		CALL delay	90 FF C8	**Specify delay**
0001D		MOV P1,#10010010B	F0	**this is set 0 of number '5' of the 7 segment display**

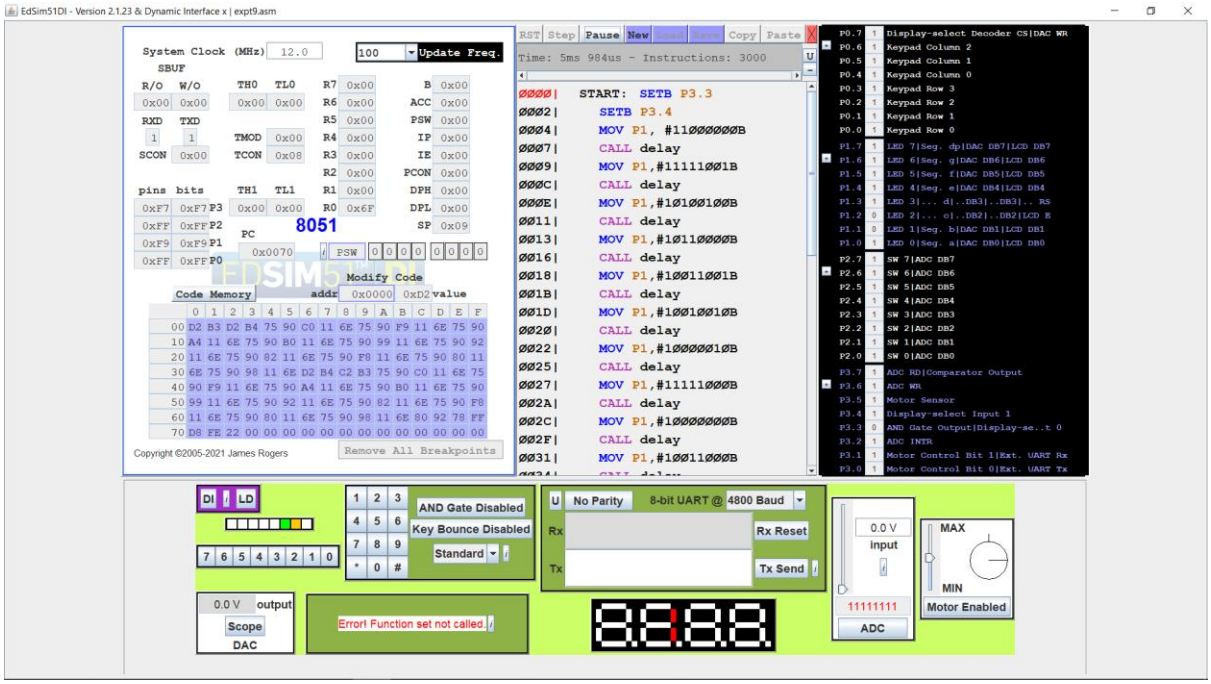
00020		CALL delay	12 41 22	**Specify delay**
00022		MOV P1,#10000010B	0A	**this is set 0 of number '6' of the 7 segment display**
00025		CALL delay	18	**Specify delay**
00027		MOV P1,#11111000B	DF EB	**this is set 0 of number '7' of the 7 segment display**
0002A		CALL delay	21 00	**Specify delay**
0002C		MOV P1,#10000000B	7C 02	**this is set 0 of number '8' of the 7 segment display**
0002F		CALL delay	7D FF	**Specify delay**
00031		MOV P1,#10011000B	DD FE	**this is set 0 of number '9' of the 7 segment display**
00034	**START**	CALL delay	DC FA	**Specify delay between digits pop - ups**
00036	**CLEAR**	SETB P3.4	22	**Set the pin to 1 for the 2nd digit display**
00028		CLR P3.3	90 45 00	**Clear pin number 3**
0003A		MOV P1,#11000000B	AA 82	**this is set 1 of number '1' of the 7 segment display**
0003D		CALL delay	AB 83	**Specify delay**
0003F		MOV P1,#11111001B	78 07	**this is set 1 of number '1' of the 7 segment display**
00042		CALL delay	7F 08	**Specify delay**
00044		MOV P1,#10100100B	E8	**this is set 1 of number '2' of the 7 segment display**
00047		CALL delay	90 FF C0	**Specify delay**
00049		MOV P1,#10110000B	F0	**this is set 1 of number '3' of the 7 segment display**
0004C		CALL delay	8A 82	**Specify delay**
0004E		MOV P1,#10011001B	8B 83	**this is set 1 of number '4' of the 7 segment display**
00051		CALL delay	E0	**Specify delay**
00053		MOV P1,#10010010B	90 FF C8	**this is set 1 of number '5' of the 7 segment display**

00056		CALL delay	F0	**Specify delay**
00058		MOV P1,#10000010B	12 41 22	**this is set 1 of number '6' of the 7 segment display**
0005B		CALL delay	0A	**Specify delay**
0005D		MOV P1,#11111000B	18	**this is set 1 of number '7' of the 7 segment display**
00060		CALL delay	DF EB	**Specify delay**
00062		MOV P1,#10000000B	21 00	**this is set 1 of number '8' of the 7 segment display**
00065		CALL delay	7C 02	**Specify delay**
00067		MOV P1,#10011000B	7D FF	**this is set 1 of number '9' of the 7 segment display**
0006A	**Execute**	CALL delay	DD FE	**Specify delay**
0006C	**DELAY**	JMP start	DC FA	**Execute the program**
0006E	**OPERAND**	MOV R0,#0FFH	22	**Store value of 00FFH to register R0**
00070	**RESUME**	HERE DJNZ R0,HERE	90 45 00	**Decrement byte indicated by first operand**
00072		RET	AA 82	**Resume execution from resulting place**

IN PUT ADDRESS	**DATA**
0000 - 0034	,#11000000B
003A – 006A	#10010010B

OUTPUT	**DATA**
Seg1	**0 1 2 3 4 5 6 7 8 9**
Seg2	**0 1 2 3 4 5 6 7 8 9**

SIMULATION :



Result:

Thus an assembly language program blinking an LED displaying on seven segment display has been executed.

POST-LAB

1. **Name some bit addressable register?**

   A, B, PSW, IP, IE, ACC, SCON, and TCON

2. **How the baud rate can doubled**

   With the fixed crystal frequency, baud rate could be doubled by making SMOD – 1. When the SMOD bit is set to 1, 1/12 of XTAL is divided by 16 (instead of 32) and that is the frequency used by Timer 1 to set the baud rate.

3. **What is TI and RI interrupts?**

   8051 has a serial communication port and have related serial interrupt flags (TI/RI). When the last bit (stop bit) of a byte is transmitted, the TI serial interrupt flag is set, and when the last bit (stop bit) of the receiving data byte is received, the RI flag gets set.

4. **What are the rotate instructions which involve with carry?**

   The ROTATE instructions are primarily used in arithmetic multiply and divide operations and for serial data transfer.

   For example: If A is 0000 1000 = 08H 1. By rotating 08H right : A = 0000 0100 = 04H This is equivalent to dividing by 2.

5. **What is the function of SWAP instruction?**

   The primary purpose for these swap instructions is to provide an atomic operation for reading from and writing to memory, which has been used

to construct mutual-exclusion mechanisms in software for process synchronization.