

DEPT. OF ELECTRICAL & ELECTRONICS ENGINEERING
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Title of Experiment	: Timer Programming in 8051
Name of the candidate	: GAUTAM NAG
Register Number	: RA1811005010278
Date of Experiment	: 26-02-2021
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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

PRE-LAB

1. Why are the program counter and Data Pointer 16 bit registers?

The Program Counter needs to be able to access all of the system memory, and the (maximum) amount of memory is defined by the number of bits in the address bus. Because the 8085 addresses 16 bits of address, and both the PC and the SP are registers that hold addresses.

2. What are the types of timer modes in 8051?

Timer Mode.

Counter Mode.

TMOD Register.

TMOD(Timer Mode) is an SFR.

Mode 0 of Timer/Counter.

Mode 1 of Timer/Counter.

Mode 2 of Timer/Counter.

Mode 3 of Timer/Counter.

3. Mention the SFR registers used in timer operation?

The TMOD or Timer Mode register or SFR is used to set the Operating Modes of the Timers T0 and T1. The lower four bits are used to configure Timer0 and the higher four bits are used to configure Timer1. The Gate bit is used to operate the Timerx with respect to the INTx pin or regardless of the INTx pin

4. What is the difference between stack pointer and data pointer 8051?

- a. Stack is a buffer which is used to store data from top to down in memory.
- b. Stack pointer is a small register that is used to store the address of the last program accessed by stack.
- c. Data pointer is the user accessible 2 bytes register. It is used to point to data.
- d. Program counter is used to store the address of the current program that is going to execute.

5. What is the major difference between 8031 and 8051?

The 8031 has no interrupts. The 8031 is ROM-less. C.

6.Timer Operations - 8051

Aim:

The purpose of this experiment is to learn about the timer programming in 8051 microcontroller using edsim51.

Apparatus required:

Hardware Requirement:

8051 Microcontroller kit, Power supply

Software Requirement:

8051 EdSim

Procedure

- a. Load the program in the edsim51.
- b. Save, Compile and Emulate the program.
- c. Execute the program using Single run or Run until termination process.
- d. Store the results of the process in the destination register
- e. Terminate the program

Program Logic:

8051 MODE1 TIMER PROGRAMMING: (16bit timer mode)

Steps to generate a time delay:

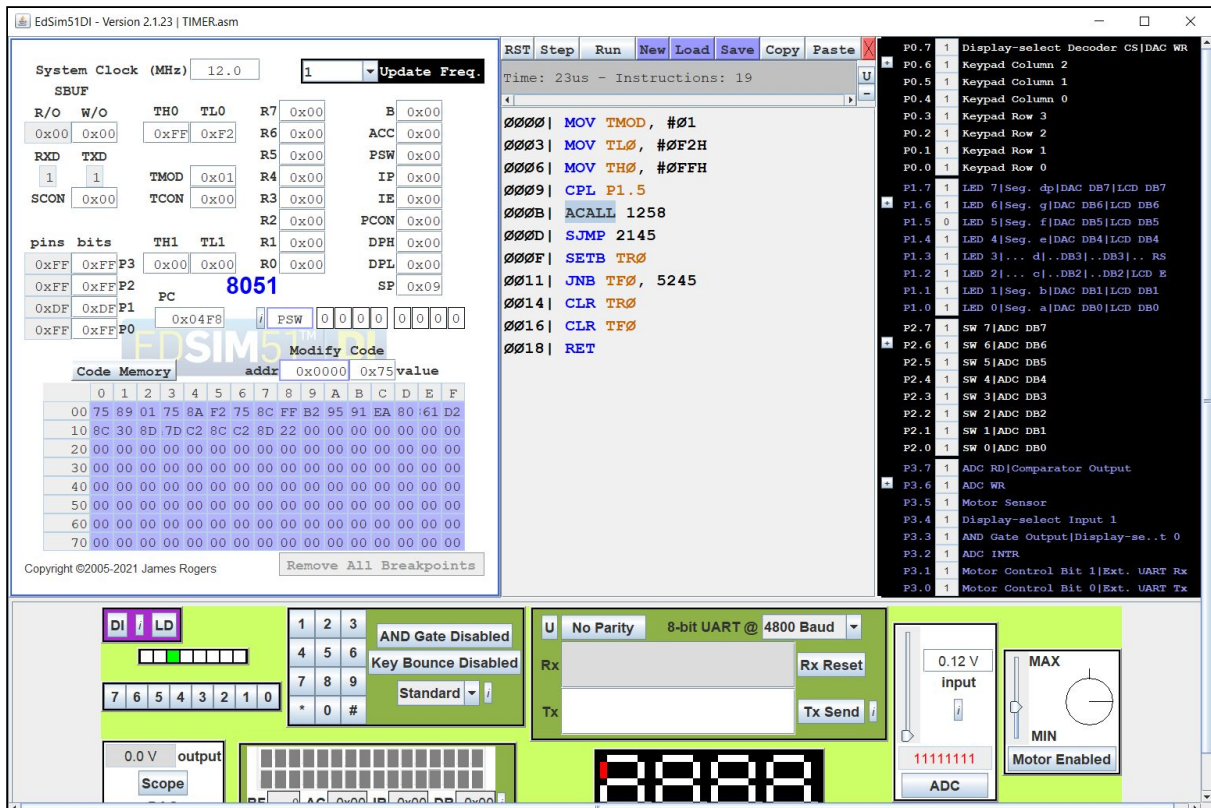
1. Load the TMOD value register indicating which timer (timer 0 or timer 1) is to be used and which timer mode (0 or 1) is selected
2. Load registers TL and TH with initial count value

3. Start the timer
4. Keep monitoring the timer flag (TF) with the JNB TFx, target instruction to see if it is raised Get out of the loop when TF becomes high
5. Stop the timer
6. Clear the TF flag for the next round
7. Go back to Step 2 to load TH and TL AGAIN

EDSIM51 PROGRAM:

LABEL	MNEMONICS	COMMENTS
	MOV TMOD, #01	Timer 0, mode 1(16-bit mode)
HERE	MOV TL0, #0F2H	TL0=F2H, the low byte
	MOV TH0, #0FFH	TH0=FFH, the high byte
	CPL P1.5	Complement/Toggle P1.5
	ACALL DELAY	
	SJMP HERE	
DELAY	SETB TR0	Start the timer 0
AGAIN	JNB TF0, AGAIN	Monitor timer flag 0 until it rolls over
	CLR TR0	Stop timer 0
	CLR TF0	Clear timer 0 flag
	RET	

SIMULATION:

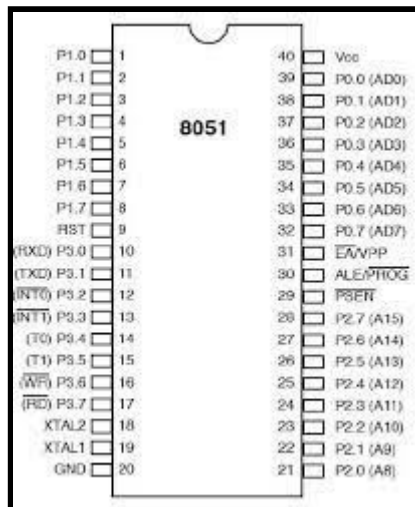


Result Observation:

The timer programming in 8051 microcontroller using edsim51 is experimented for different timer values and observed.

POST LAB

1. Draw the pin diagram of an 8051 microcontroller?



2. What is the evolution of microcontrollers?

Microcontrollers come in three main flavors, 8-, 16- and 32-bit. There are still some 4-bit microcontrollers in use, but many 4-bit customers either have moved to 8-bit or plan to move in the future. The next step up in functionality would be 16-bit MCUs, which are more expensive.

3. Name the ports of 5051.

Port(s)	Protocol	Details
5051	tcp,udp	ITA Agent, Symantec Intruder Alert, Orbit Downloader
5051	tcp	ita-agent Symantec Intruder Alert (official)
5051	tcp	Symantec Intruder Alert
5051	tcp,udp	ITA Agent

4. What is the function of the counter?

The counter counts the number of output pulses from the encoder that detects the number of rotations and direction of the motor. Phase-shifted method and two-pulse input method can be used. Each axis has this function. The counter value can be written or cleared.

5. What are the features of Intel 8051?

64K bytes on-chip program memory (ROM)

128 bytes on-chip data memory (RAM)

Four register banks.

128 user defined software flags.

8-bit bidirectional data bus.

16-bit unidirectional address bus.

32 general purpose registers each of 8-bit.

16 bit Timers (usually 2, but may have more or less)