AIR UNIVERSITY	**Department of Electrical and Computer Engineering**
	LAB # 2 Introduction to SmartPRO 5000u

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Objective: Familiarize students with ATMEL 8051 IC and RIMS trainer kit

Familiarization with Keil µVision ,SmartPRO 5000U and proteus

LAB ASSESSMENT:

Attributes	Excellent (5)	Good (4)	Average (3)	Satisfactory (2)	Unsatisfactory (1)
Ability to Conduct Experiment					
Ability to assimilate the results					
Effective use of lab equipment and follows the lab safety rules					

Total Marks: 15 Obtained Marks : _____

LAB REPORT ASSESSMENT:

Attributes	Excellent (5)	Good (4)	Average (3)	Satisfactory (2)	Unsatisfactory (1)
Data presentation					
Experimental results					
Conclusion					

Total Marks: 15 Obtained Marks: _____

Date: _____ Signature: _____

Introduction

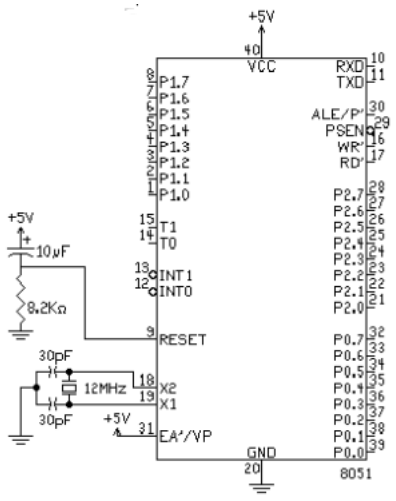
A microcontroller is similar to a basic computer with even similar parts such as processor , memory and hardware peripherals (I/O).Unlike a computer all these attributes are integrated on a single chip.A microcontroller can execute one task whose parameters are set on software by coding.The 8051 microcontroller has 40 pins which are programmable and will be used in this experiment.

Objectives

- Familiarize students with ATMEL 8051 IC and RIMS trainer kit
- Familiarization with Keil µVision, SmartPRO 5000u and proteus

Procedure

Keil µVision is used to write the code which consists of the instructions which are later integrated on the microcontroller.Make sure that ATMEL 89c51 microcontroller is selected and the frequency is set to 11.0592Mhz .To create a hex file turn on the option and select build target.Make sure the hex file is saved and now open proteus.Select AT89c51 chip and make the circuit as follows



Double click on the chip and again set clock frequency to 11.0592Mhz and upload the hex file we previously created.Now we can simulate and validate our code before burning it on the microcontroller.

Lastly, burn the code on the microcontroller using SmartPRO 5000U and obtain similar results on the hardware.

Results

TASK 2 (HomeTask)

Question:

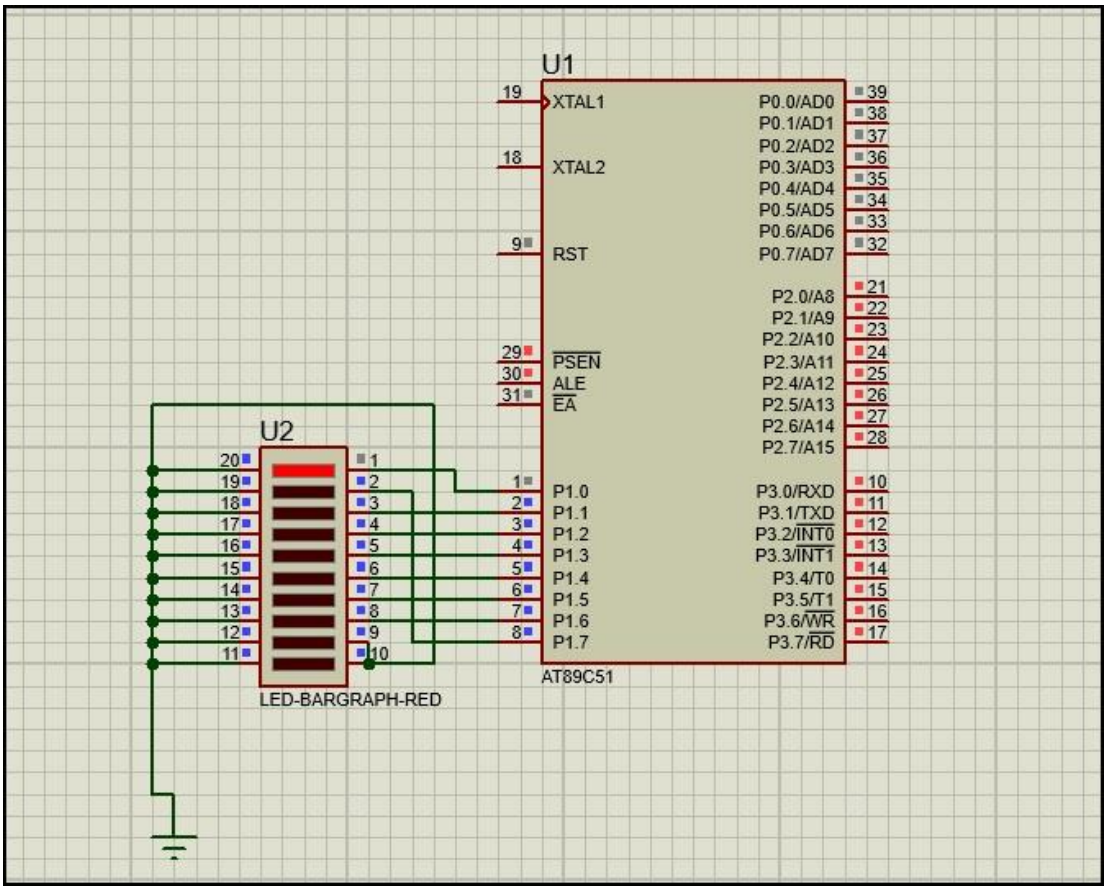
Generate the following sequences on LEDs:

1. Blinking LEDs towards right
2. Blinking LEDs towards left

Code with EXPLANATION

```
org 000h
mov A,#10000000b ; first bit is 1 so first led to be on
rightshift:
mov b,#07h ; counter for right shift
loop_1: mov p1,A  ; displays first led
call delay ; calls delay function
RR A ; rotates  the eight bits to right by 1 position
DJNZ b , loop_1 ; keeps on rotating until b becomes 0 and 8th led is on
jmp leftshift ; control goes to this label
leftshift: ; lab
mov b,#07h ; counter for left shifting
loop_2:mov p1,A ;displays 7th led
call delay ; calls delay function
RL A ; rotates the bits one postion to left
DJNZ b , loop_2 ; repeats until 1st led is lit
jmp rightshift ; now control goes back to label for even
delay: mov r0,#04 ; delay function sets the time of delay
here: mov r1,#255  ; register r1 containing 255
again: mov r2,#255 ;register r2 containing 255
againn: djnz r2,againn ; runs until r2 reaches 0 to 255
djnz r1,again ; goes to outer loop until r1 reaches 0 from
djnz r0,here ; when register r0 reaches 0 control goes to here label
ret
end
```

Proteus Simulation:



Video Demo : https://vimeo.com/753920338

CONCLUSION

Learned to program a microcontroller by burning a hex code using SmartPRO 5000 and connecting it to the trainer and leds with correct Pin configuration to match simulation and hardware results.