
**DEPARTMENT OF ROBOTICS & MECHATRONICS ENGINEERING**
**UNIVERSITY OF DHAKA**

**Course name:** Microcontroller and Programmable Logic Controller Lab Course

**Experiment no:** 01
**Name of the experiment:** Write an 8051 C program to flash (on and off ) a LED using Port P1.0 and simulate it by using a compiler

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**Objectives:**

- To learn basic coding of 8051 micro-controller
- To be familiar with hardware and software interfacing of 8051 micro-controller
- To see how the program works in micro-controller

**Equipments:**
**Hardware:** desktop/laptop
**Software:** Keil 5.0
Proteus 8.0

**Theory:**

Simulation is used in many contexts, such as simulation of technology for performance optimization, safety engineering, testing, training, education, and video games. Often, computer experiments are used to study simulation models. Simulation is also used with scientific modelling of natural systems or human systems to gain insight into their functioning, as in economics. Simulation can be used to show the eventual real effects of alternative conditions and courses of action. Simulation is also used when the real system cannot be engaged, because it may not be accessible, or it may be dangerous or unacceptable to engage, or it is being designed but not yet built, or it may simply not exist.

ARES is used for PCB designing. It has the feature of viewing output in 3D view of the designed PCB along with components. The designer can also develop 2D drawings for the product.

ISIS has wide range of components in its library. It has sources, signal generators, measurement and analysis tools like oscilloscope, voltmeter, ammeter etc., probes for real time monitoring of the parameters of the circuit, switches, displays, loads like motors and lamps, discrete components like resistors, capacitors, inductors, transformers, digital and analog Integrated circuits, semi-conductor switches, relays, microcontrollers, processors, sensors etc.

The micro-controller simulation in Proteus works by applying either a hex file or a debug file to the microcontroller part on the schematic. It is then co-simulated along with any analog and digital electronics connected to it. This enables its use in a broad spectrum of project prototyping in areas such as motor control, temperature control and user interface design. It also finds use in the general hobbyist community and, since no hardware is required, is convenient to use as a trainer or teaching tool.

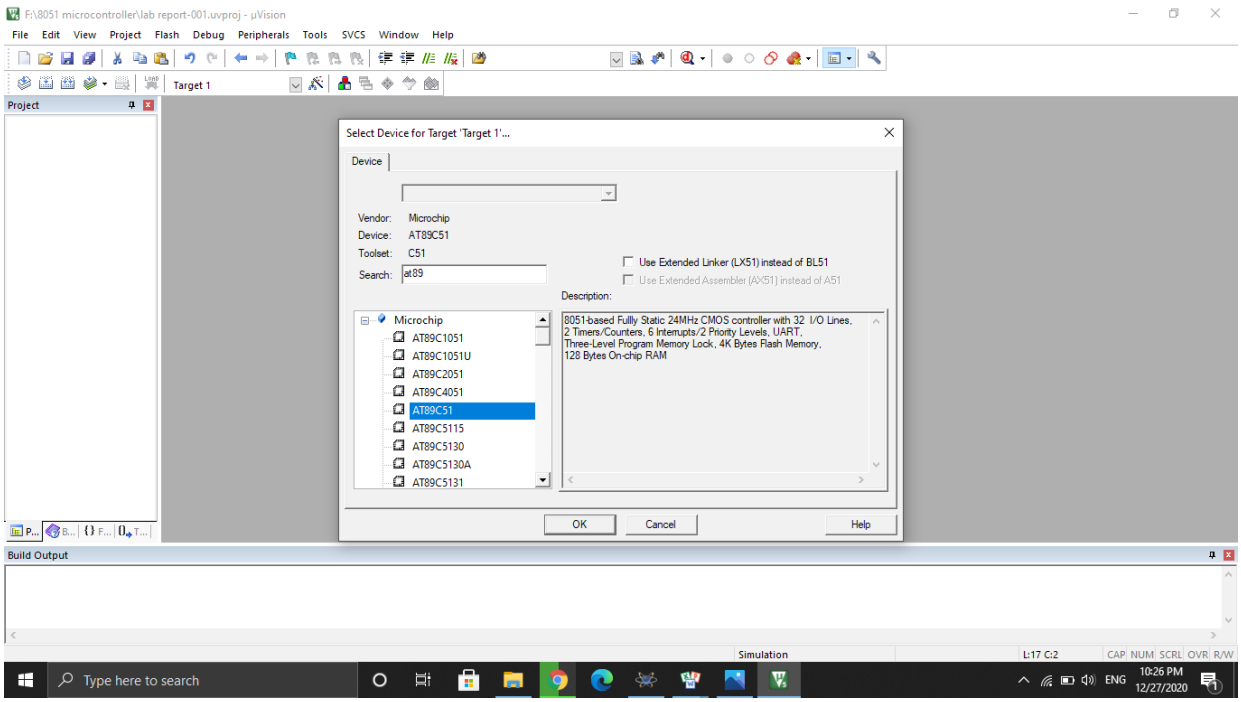
A by-product of microprocessor which is smart, intelligent and programmable is the microcontroller. The same fabrication techniques and programming concepts that make possible the general purpose microprocessor also yielded the microcontroller. Nowadays many communication, digital entertainment, portable devices, are controlled by it.

Programming instructions or physical pin connections determine the use of any multifunction pins. The system designer decides the functions is to be used and designs the hardware and

software affecting that pin accordingly. It has 40 pins. Among them, Program Store Enable named PSEN reads signal for external program memory & is normally active low.
EA ,External Access Enable is active low to access external program memory locations 0 to 4K .To indicate that program code is stored in external Rom this pin must be connected to the ground. When an EA pin is connected to the Ground the 8051 fetches opcode from external ROM by using PSEN.

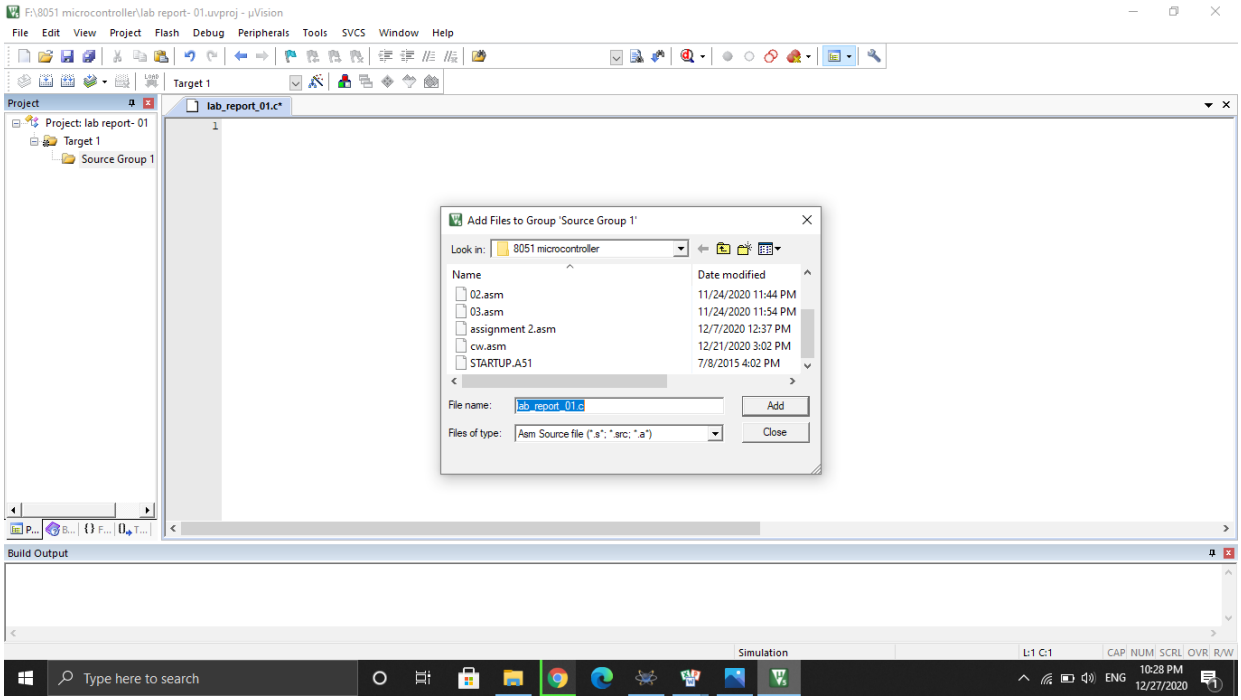
**Procedure:**

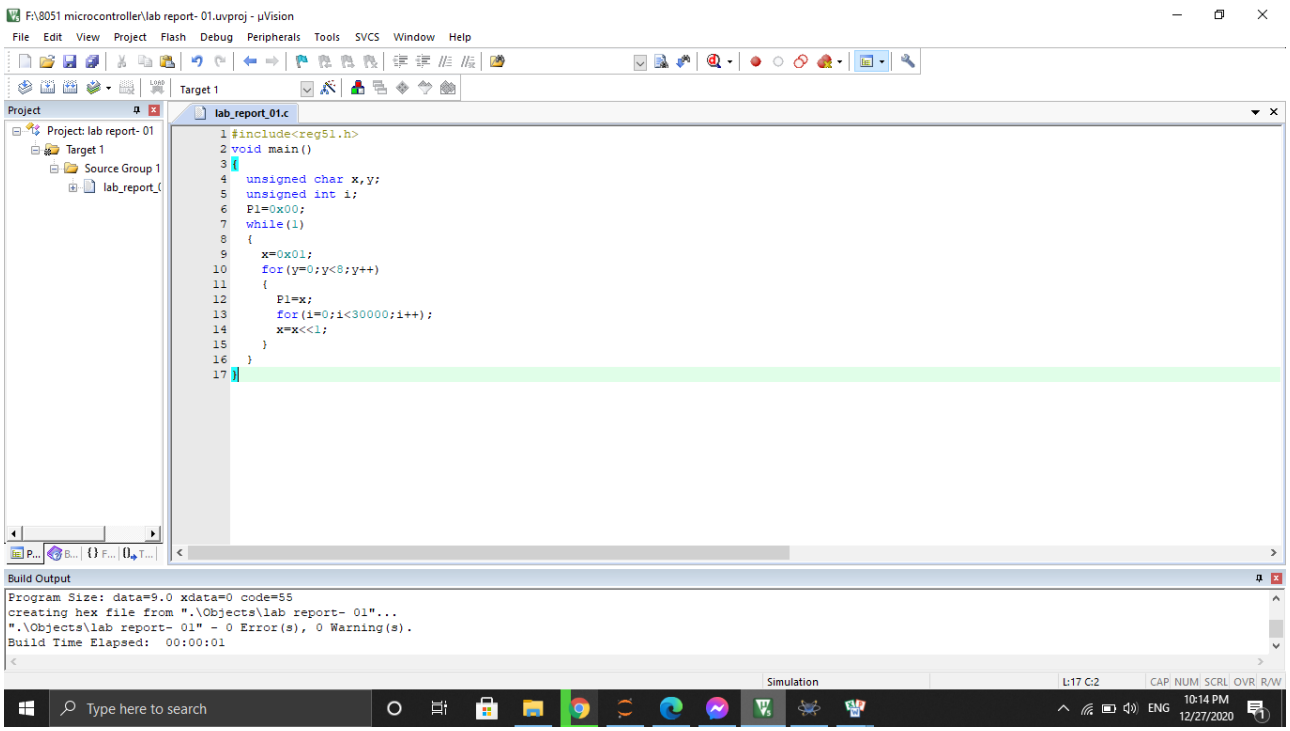
- At first we open a new project in Keil 5.0. Then we select the At89C51 from the selection panel of microcontroller.




- Then we save the project

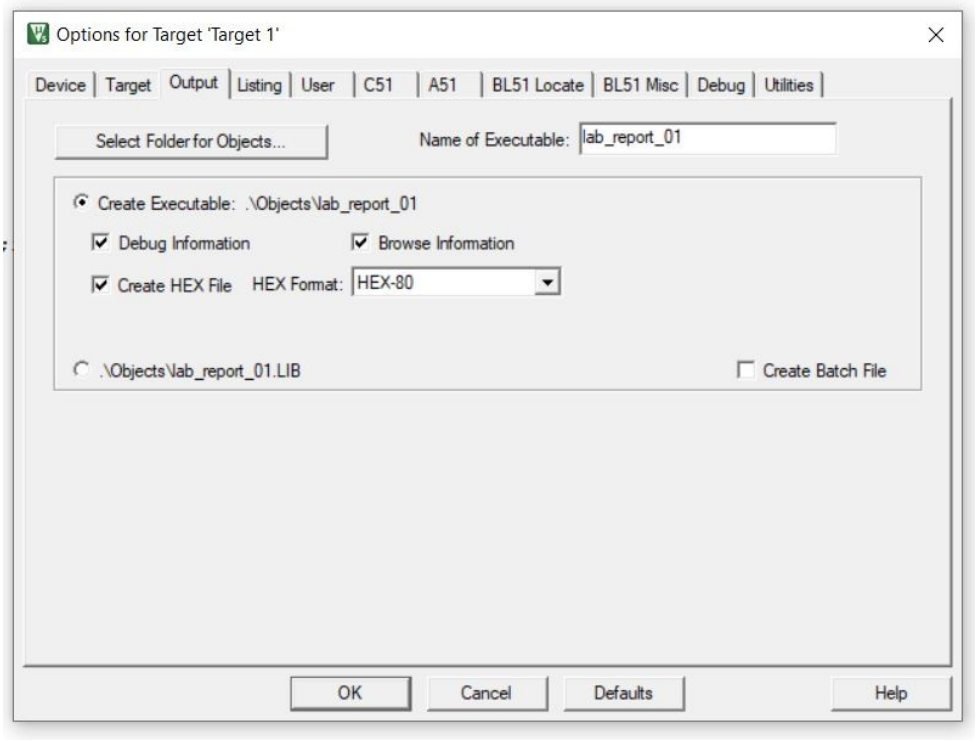
- Now we extend the target and from there we right click on source group and select “add new item to the source group” and select the following thing.



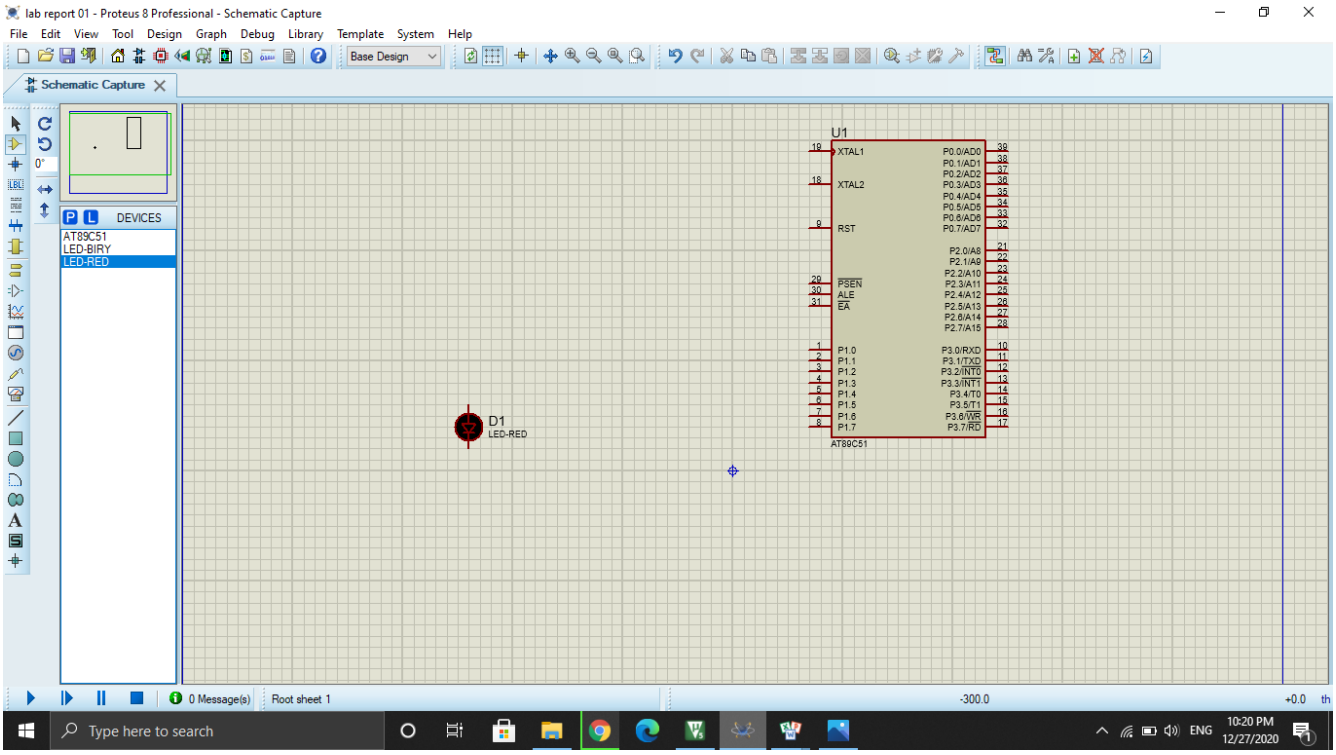




- Now we write the c code in the program.

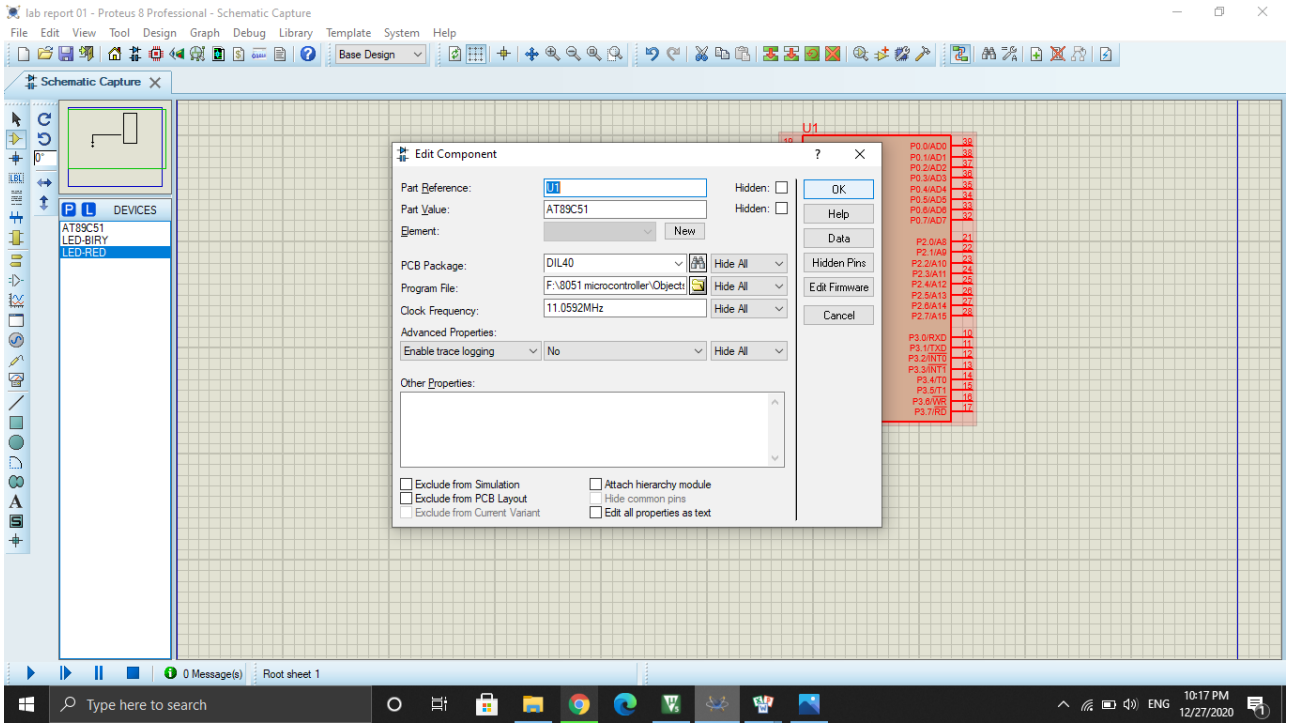
- Now we right click on the target and from there go to the output to select the following ”create hex file”

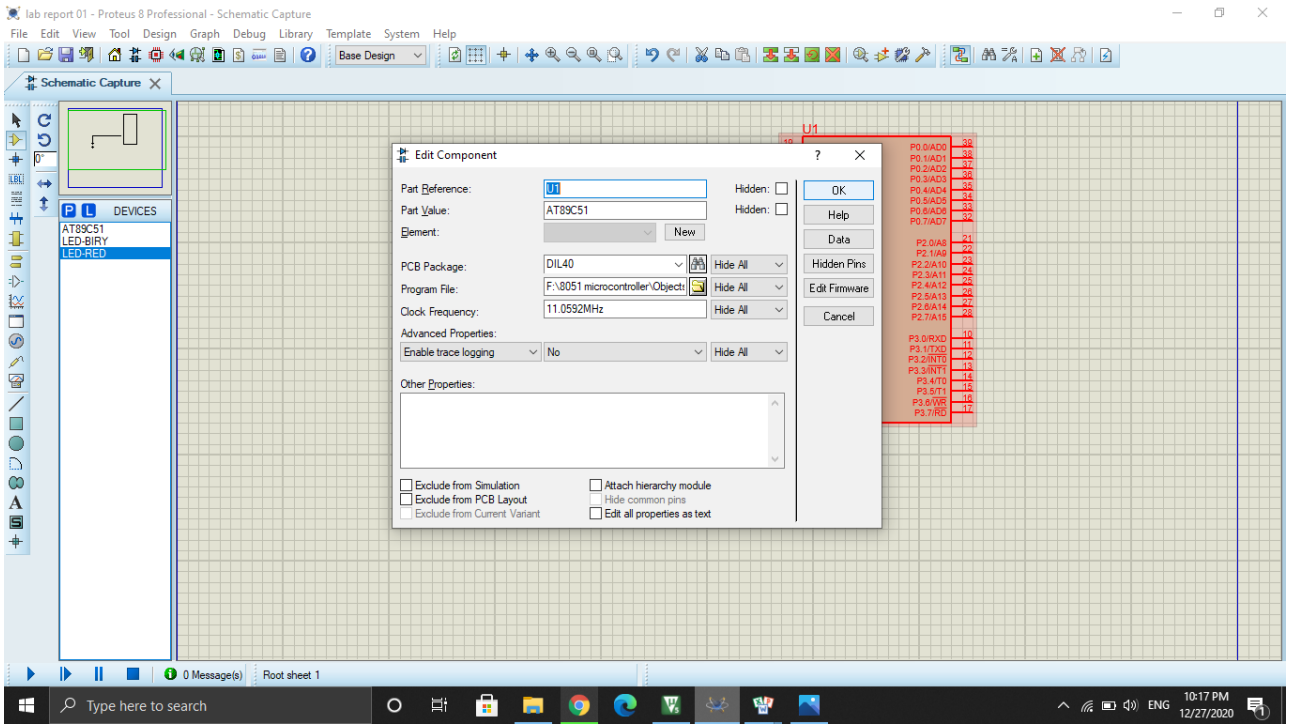



- After that we build our target. With that our hex file is created and the part of keil is completed.
- Now we open a project in Proteus 8.0 and save it.
- In the schematic part we pick AT89C51 and LED like following.



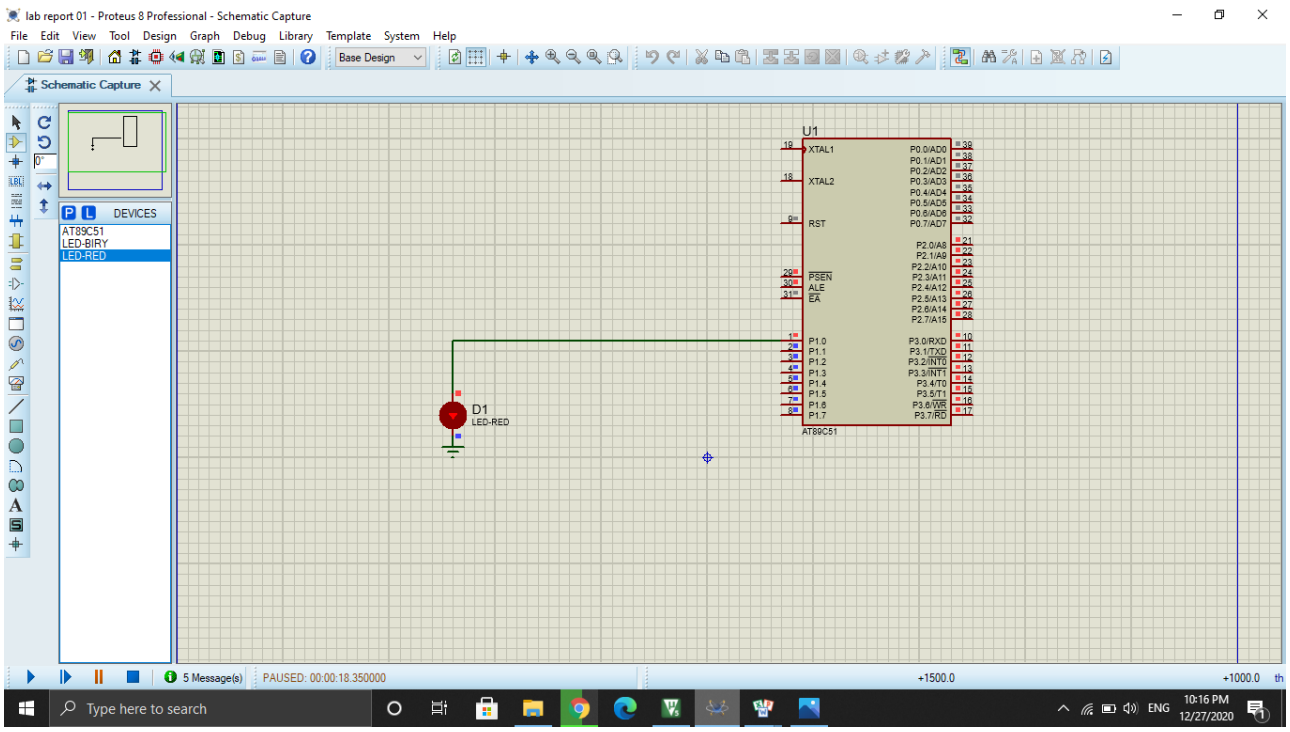

- Now we double click on 8051 and select our hex file like following.




- Now we connect the LED with port P1.0 and ground it.

- At last we run the simulation and get the blinking of the LED.




**Program in C:**

```
#include<reg51.h>

void main()

{

        unsigned char x,y;
```

```
        unsigned int i;

        P1=0x00;

        while(1)

        {

                x=0x01;

                for(y=0;y<8;y++)

                {

                        P1=x;

                        for(i=0;i<30000;i++);

                        x=x<<1;

                }

        }

}
```

**Discussion:**

A simple switching function for blinking an LED was implemented in the experiment. The experiment ran as expected and the LED switched on and off at a delay. So, this experiment can be considered as successful.