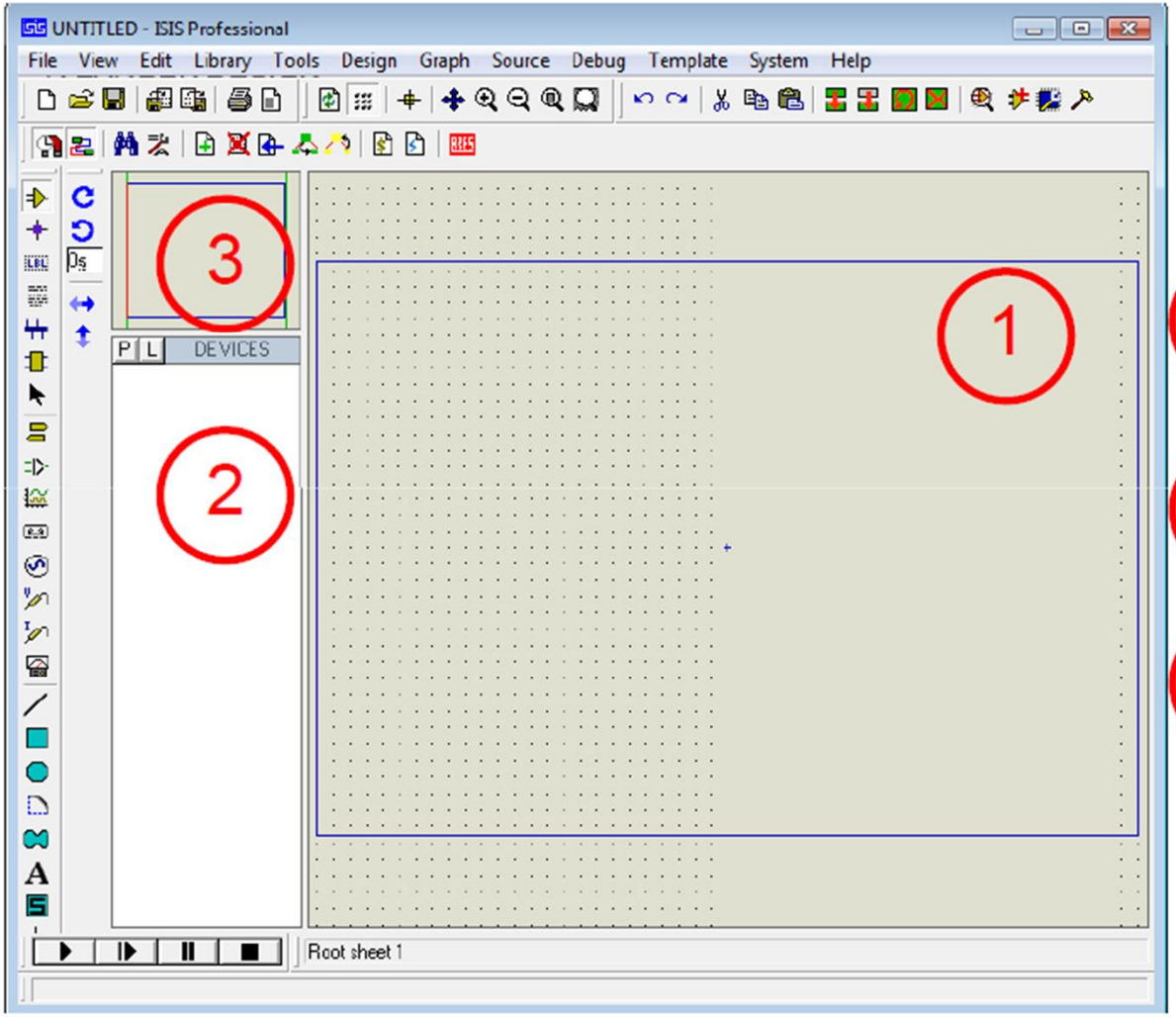
# Microprocessors and Microcontrollers (EE-231)

## Lab-2

# Main Objectives

- Introduction to Proteus ISIS and its use in 8051 simulation.
- Writing an Assembly program in KEIL and Its debugging.
- Generating Delay using a subroutine in Assembly.
- Generating Delay using For Loop in “C”.

# Proteus Environment

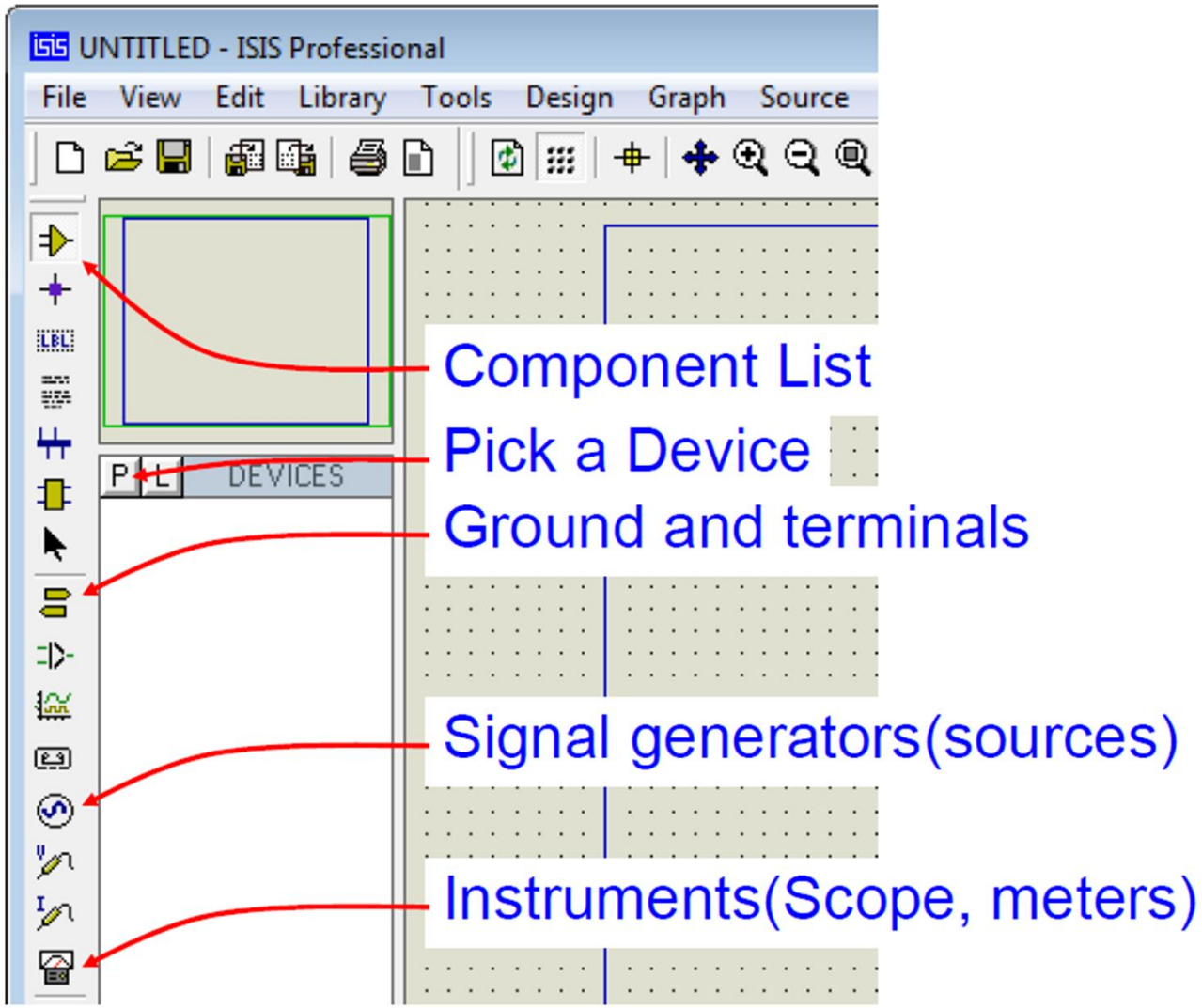



1 Editing Window

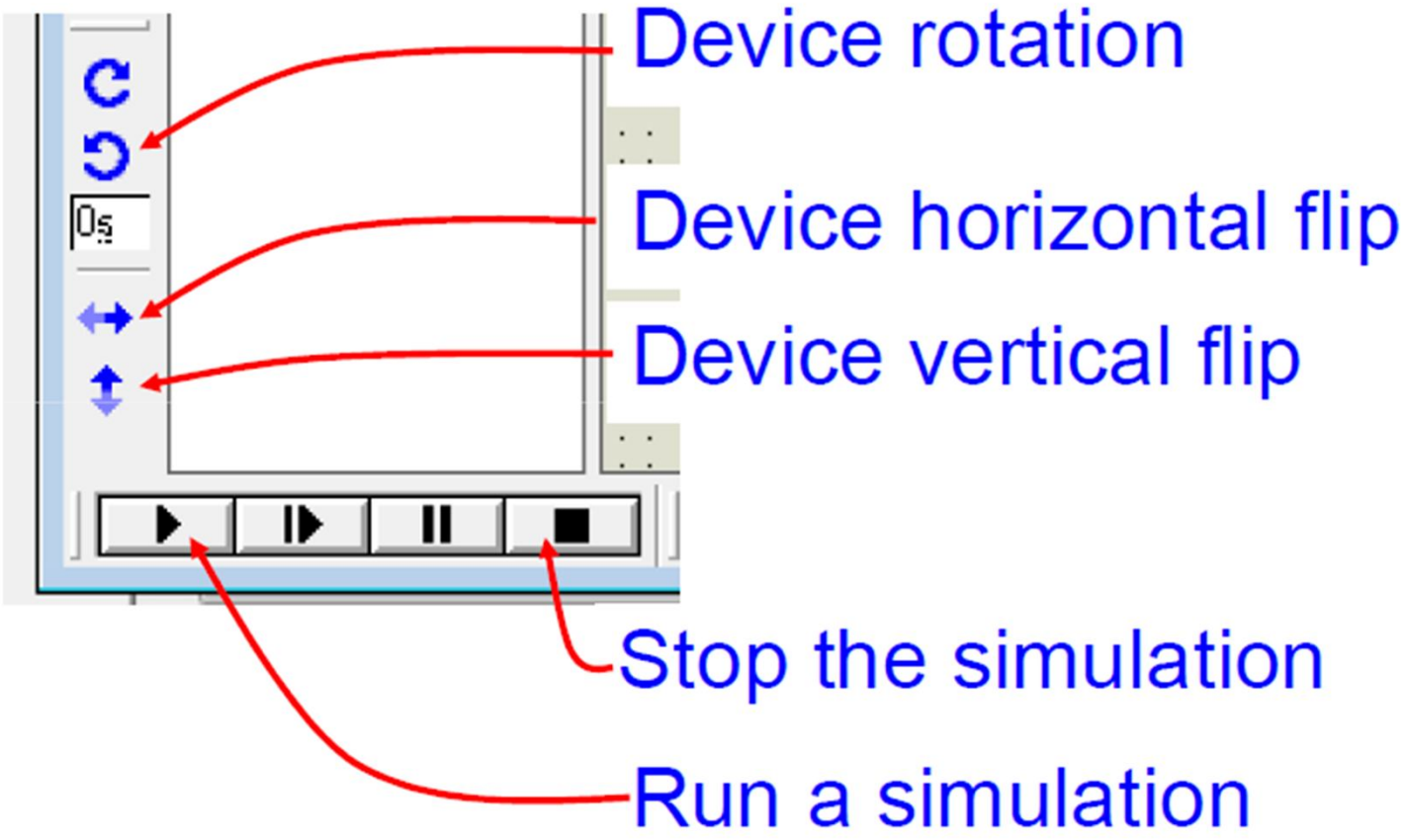
2 Object Selector

3 Overview Window

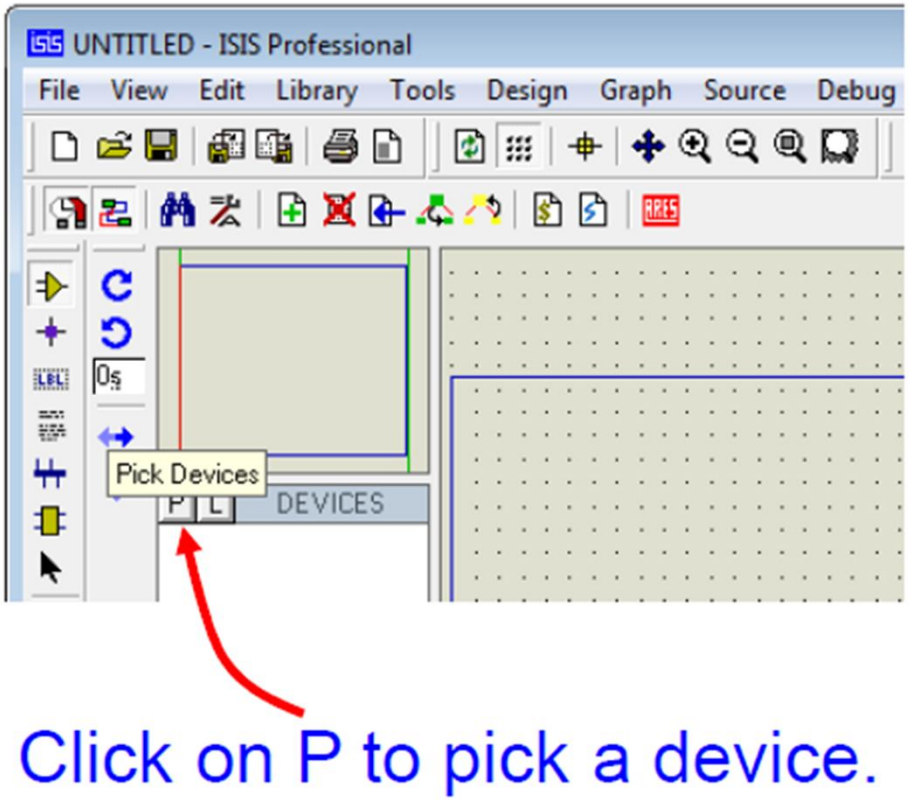
# Tools and Buttons



# Tools and Buttons

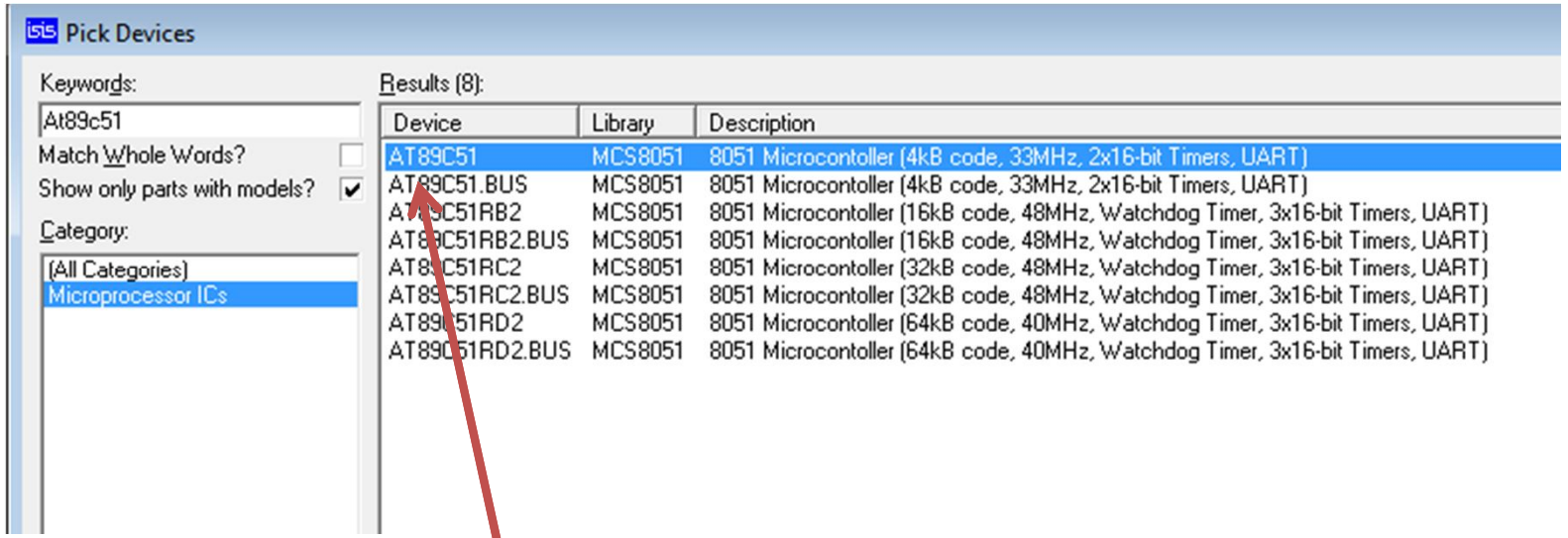


# Picking a Device



# Picking a Device

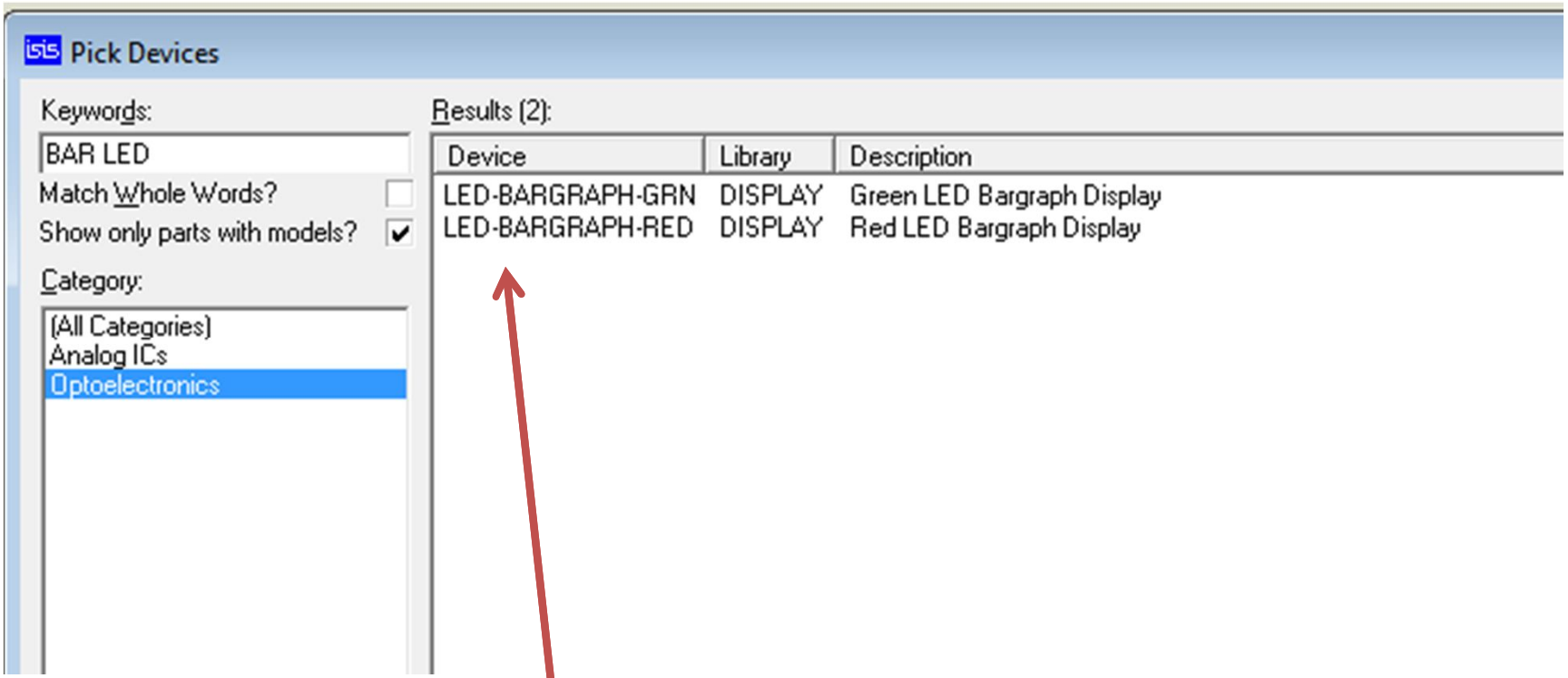
- In order to pick a microcontroller
- Now either go in “ Microprocessors category” or in keyword space write “AT89C51”




**Double click on this highlighted line.**

# Picking a Device

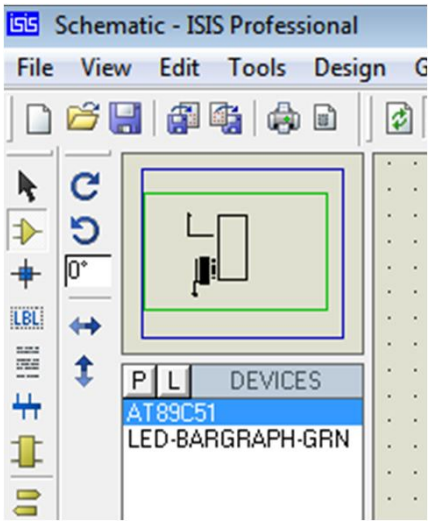
- Now in order to pick a “ BAR LED”
- write BAR LED in keyword space or choose ‘Optoelectronics’




**Double click on  whichever color you want**

# Drawing Schematic

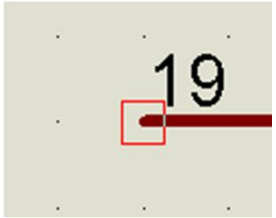
- Now choose device from the list and just left click in the editing window/schematic window.



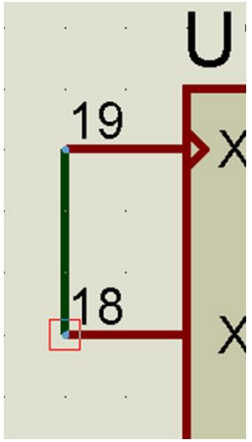

- An outline of the device will appear. Place it where you want to.

# Connecting Wires

- Just move your cursor over to the pin of the device,  a small square box will appear. Click on that pin.

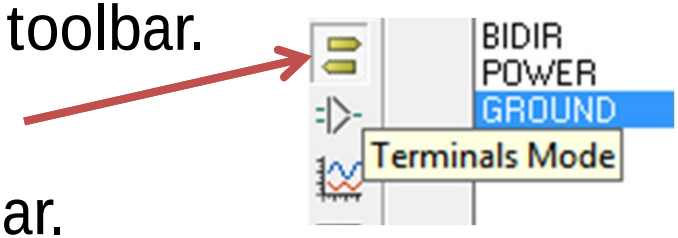



- Now a wire will follow the mouse cursor.
- Take the cursor to the pin you want the wire to connect to.
- Click on that pin and connection will be made.



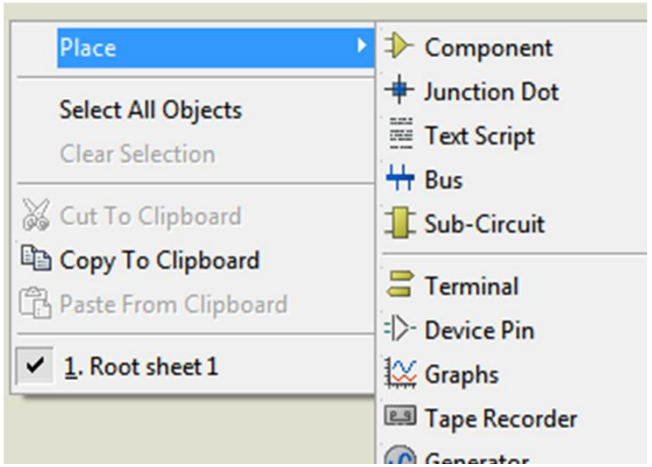
# Placing Vcc and GND

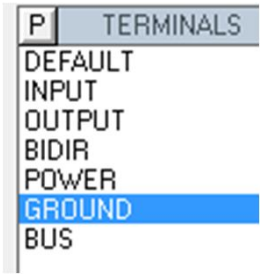
- In order to place a Vcc or GND terminal in your schematic, just select terminal mode from toolbar.




- A list of terminals will appear.
- Choose whichever terminal you want to place and then click on the schematic to place the selected terminal.

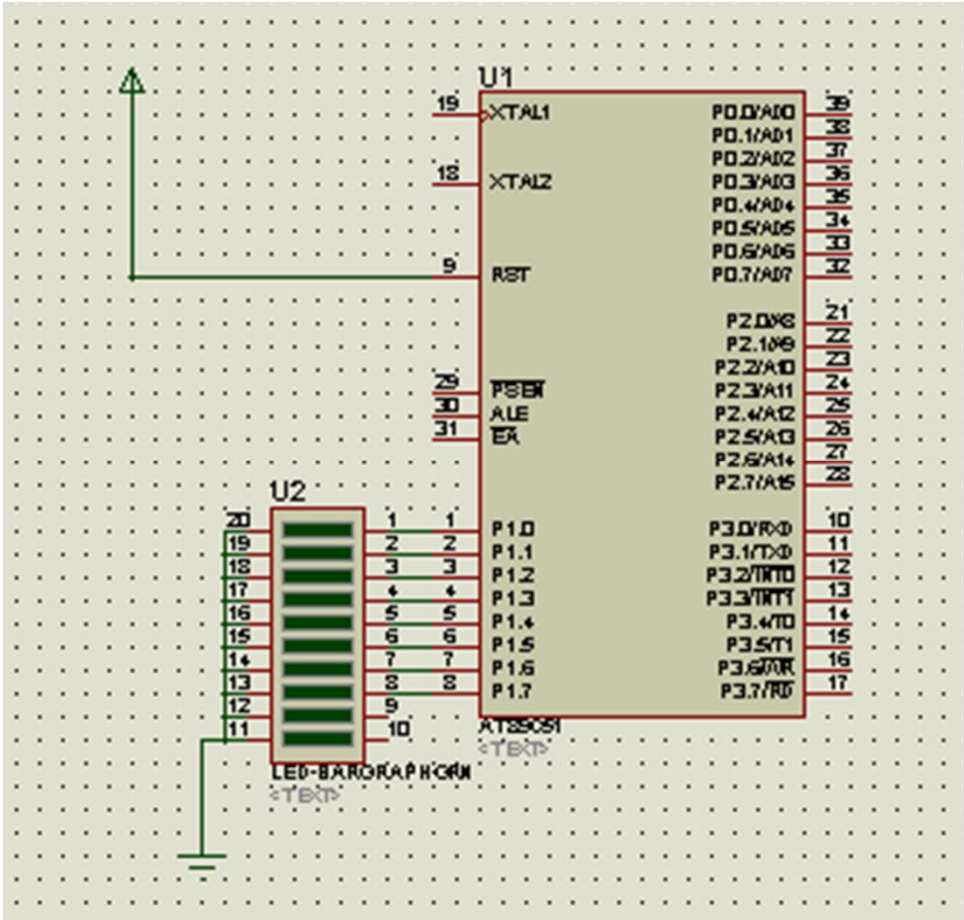
We can place any item by right clicking And Selecting “Place”



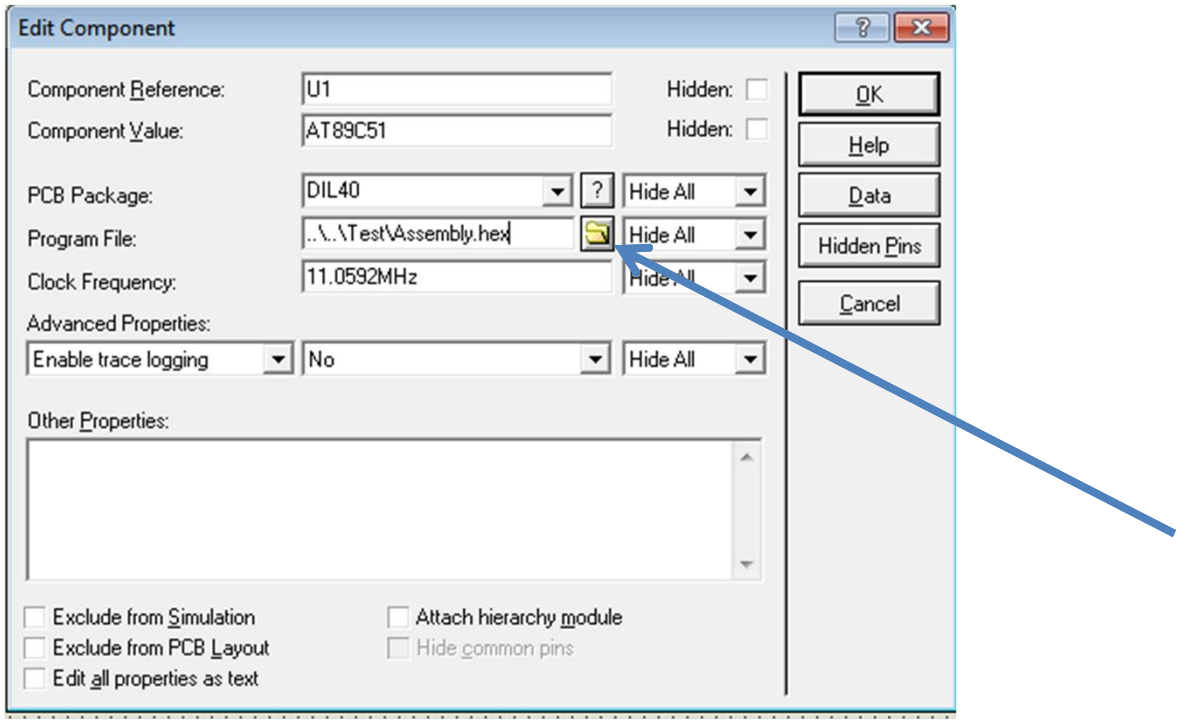
# Simulating 8051

- Draw the following schematic



# Downloading Hex File in 8051

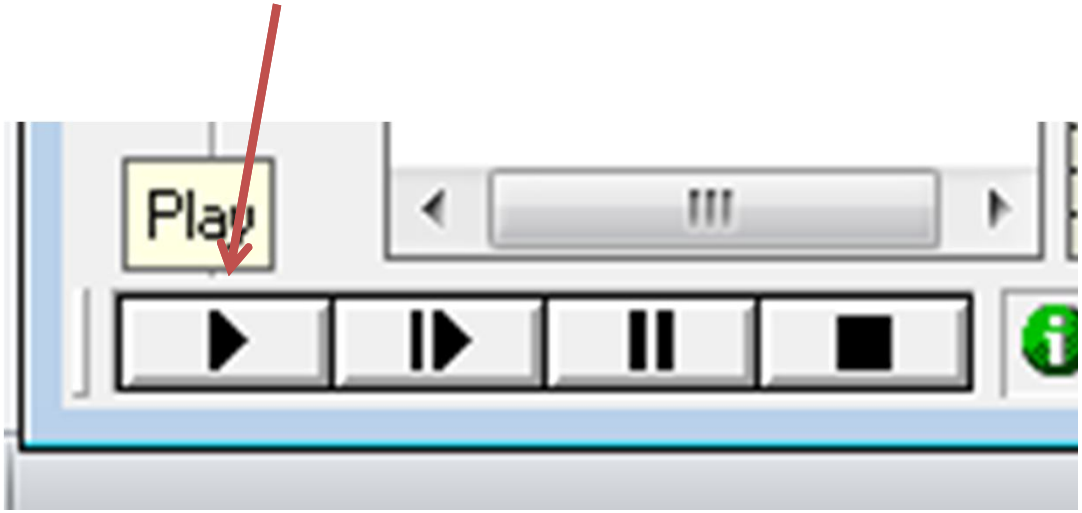
- Just double click on the 8051 IC schematic.
- Now browse for “Program file by clicking on the browse button.




- Pick your desired hex file and click ‘open’

# Running Simulation.

- Click on the “Play” button to run the simulation



# Creating Assembly file in KEIL

- Create the new file.
- Save it as **.asm** file.
- Now when you add this file to the Project it will be an assembly file.
- You can write your assembly code in this file.

# Creating Assembly file in KEIL

- Write the following code and run it in Proteus.

- ORG 0
- MOV A, #055
- MOV P1, A
- END

# LAB Task

1. Write a code that toggles the bits of P1 port Continuously.
2. Write a code that toggles the bits of P1 port after some **delay**. Use delay routine.

```
ORG 0
Start:
MOV A,#55H
MOV P1,A
MOV A,#0AAH
MOV P1,A
SJMP Start
```

```
01  ORG 0
02  Start:
03  MOV A,#55H
04  MOV P1,A
05  ACALL Delay
06  MOV A,#0AAH
07  MOV P1,A
08  ACALL Delay
09  SJMP Start
10
11  ORG 100
12  Delay:
13  MOV R1,#255
14  Label1:
15  MOV R2,#255
16  Label2:
17  DJNZ R2,Label2
18  DJNZ R1,Label1
19  RET
```

# Delay in C

- To Generate delay in C simply use the for loop.

```
for(i=0;i<5000;i++);
```

- Or to multiply delay, use nested for loop.

```
for(i=0;i<500;i++)
for(i=0;i<10;i++);
```

# Task

- Write your name on easy 8051 Kit LEDs using delay in C.

# Task

```
void chr_led(char);
void delay(int);
void main(void)
{
while(1)
{
chr_led('B');
delay(10);
chr_led('A');
delay(10);
chr_led('B');
delay(10);
chr_led('A');
delay(10);
chr_led('R');
delay(36);
}
}
//Function Definitions
void chr_led(char mychar)
{
switch(mychar)
{
case 'A':// To write A
P0=~0xFE;
P1=~0x11;
P2=~0x11;
P3=~0xFE;
break;
case  'B':// To write B
P0=~0xFF;
P1=~0x99;
P2=~0x99;
P3=~0x66;
break;
case 'R':// To Write R
P0=~0xFF;
P1=~0x19;
P2=~0x19;
P3=~0xE6;
break;
}

}

void delay(int delay)
{
int i,j;
for(i=0;i<10000;i++)
for(j=0;j<delay;j++);
}
```