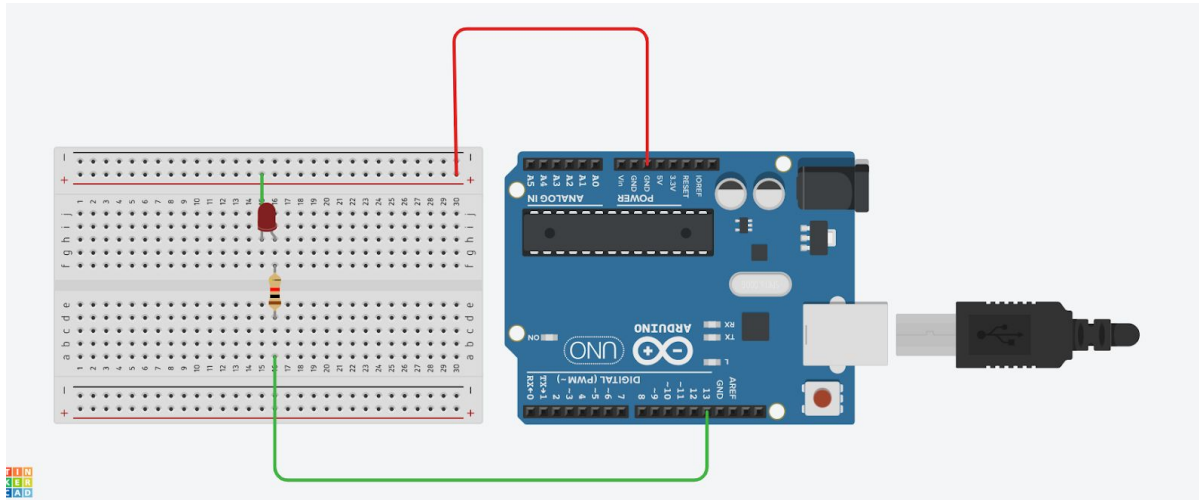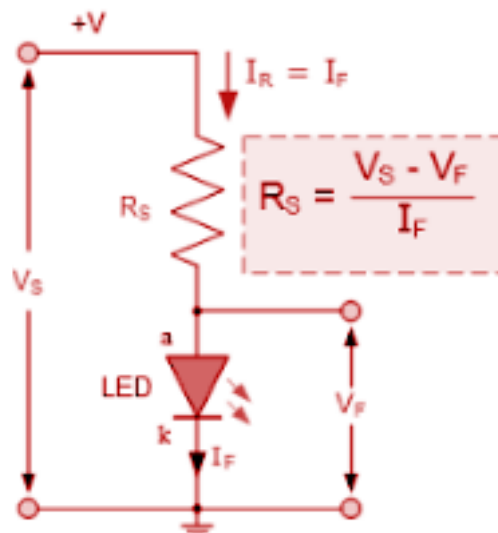# EXP 1 : LED Flasher

## CIRCUIT DIAGRAM



## THEORY

LEDs (that's "ell-ee-dees") are a particular type of diode that converts electrical energy into light. In fact, LED stands for "Light Emitting Diode."
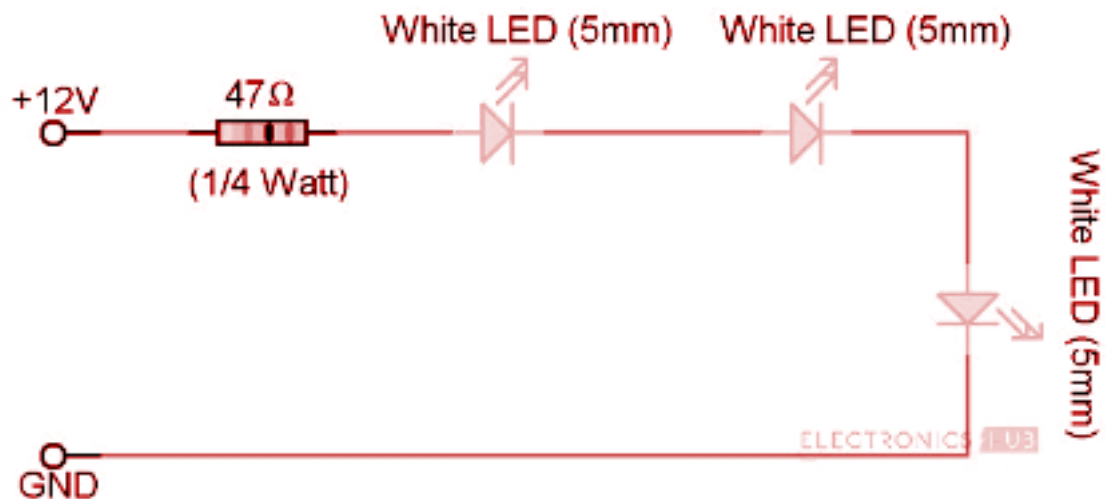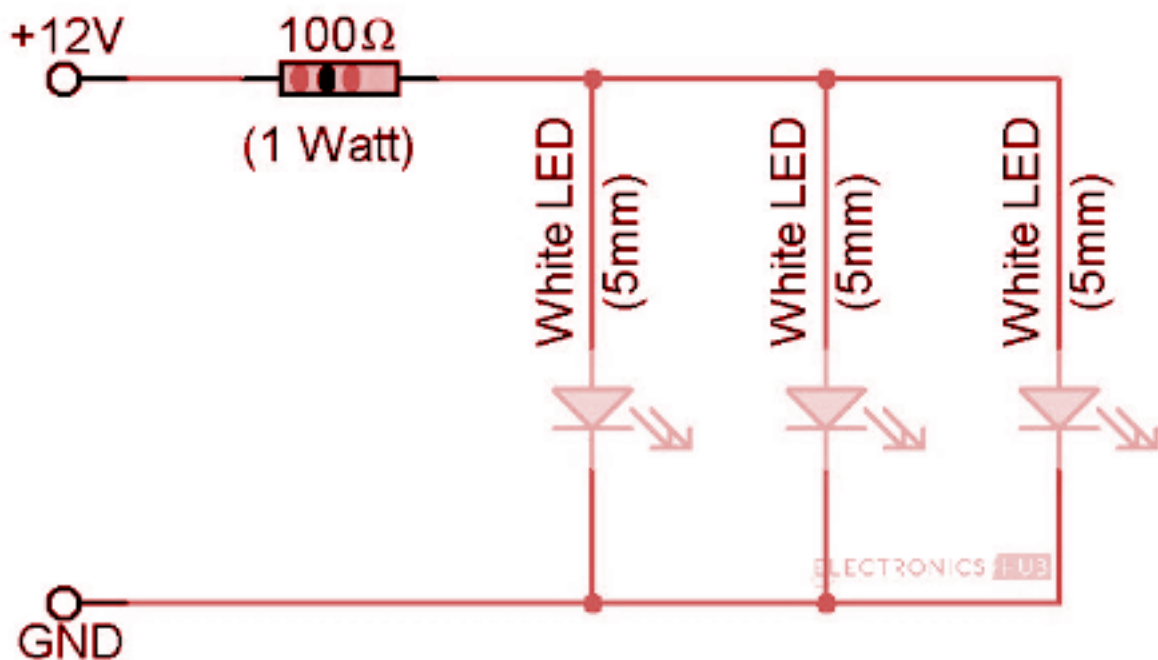
**LED Resistor Circuit :-**



$$R_S = \frac{V_S - V_F}{I_F}$$

**Connecting LEDs Together in Series :-**

We can connect LEDs together in series to increase the number required or to increase the light level when used in displays.

## LEDs in Series

White LED (5mm)   White LED (5mm)

+12V   47Ω

(1/4 Watt)

White LED (5mm)

GND

ELECTRONICS HUB

## LEDs in Parallel

+12V   100Ω

(1 Watt)

White LED (5mm)   White LED (5mm)   White LED (5mm)

GND

ELECTRONICS HUB

## PROBLEMS AND TROUBLESHOOTING

**1)** One very common problem that we face is loose connections. So, before execution of the program, check if all the connections are made tightly and are firmly in place.

**2)** Another error that is encountered is due to mistakes in writing the code or the program correctly.So, before uploading the code, check and verify it so that the code that is uploaded is error-free and is executed correctly.

## PROGRAM

```
void setup()
{
   pinMode(13,OUTPUT);
}

void loop()
{
  digitalWrite(13,HIGH);
  delay(500);
  digitalWrite(13,LOW);
  delay(500);
}
```

## RESULT

Blinking of LED was verified after uploading the program mentioned above.