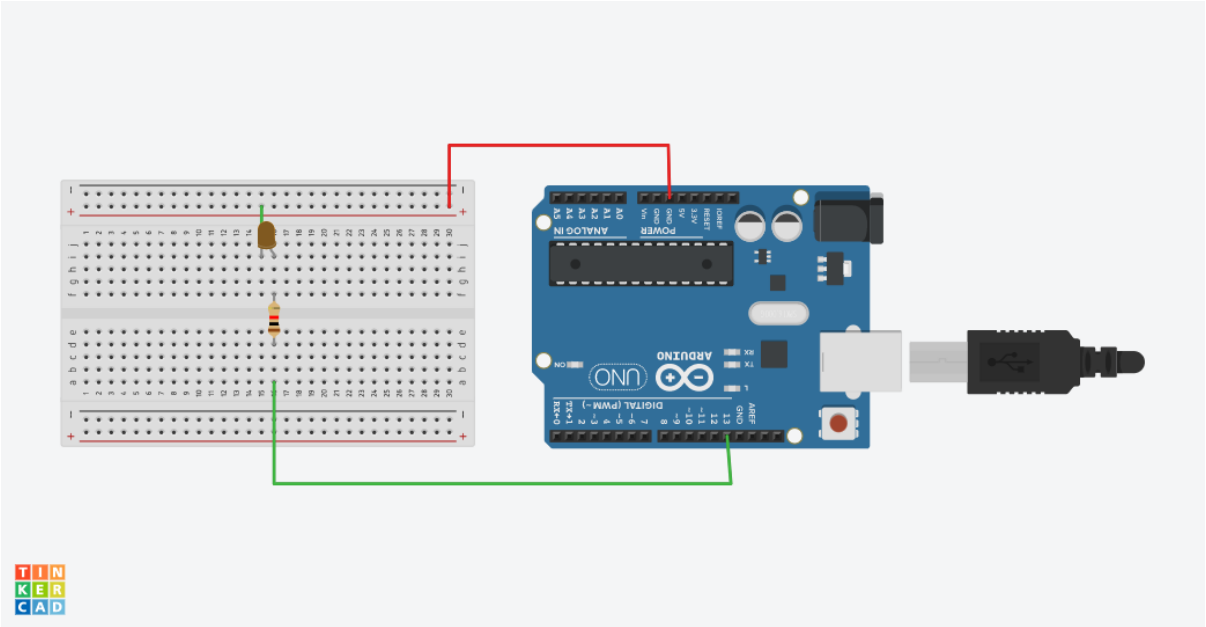
EXPERIMENT 1

LED FLASHER

Circuit Diagram:



Theory:

Concepts used are:

- Working of LEDs (Light emitting diodes)
- Working of Arduino UNO
- Circuitry of Breadboard and it's use
- Code used to program the micro controller.

The LED:

LED stands for "Light Emitting Diode". An LED converts electrical energy into light energy when electric current passes through it. The light in most LEDs it is monochromatic, occurring at a single wavelength. It is consists of two elements:

1. *P-type Semiconductors*
2. *N-type Semiconductors*

The positive side of LED is called "Anode" and the negative side of the LED is called "Cathode." The flow of current is from anode to cathode but current cannot flow from cathode to anode that means it only allows forward current to flow through the circuit and block the backward current.

Arduino Uno circuit board:

1. The arduino board can supply 5V as digital output signals from 14 pins (namely 0 to 13) present in it as digital input or output pins.

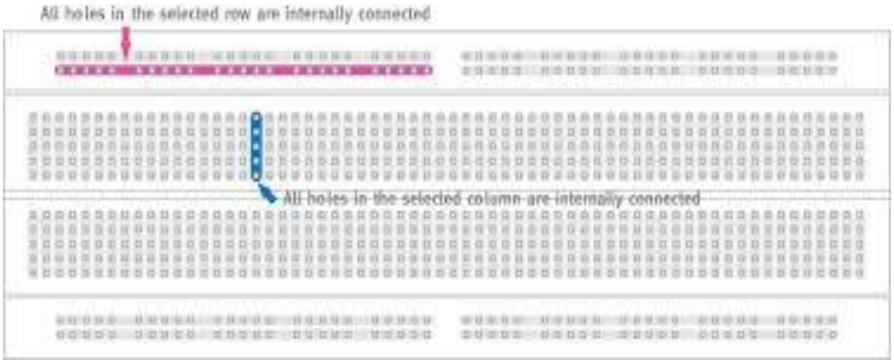
2. The GND pin of the arduino board acts as ground.

3. In our experiment we use digital pin 13 through which we connect positive terminal of LED and the negative terminal of LED is connected to the ground pin named as "gnd" on Arduino board.

4. Arduino is programmed to give output from digital pin 13 and gnd provide return pathway for current.

Breadboard:

In the circuit diagram of bread board present below, the two rows present at the top and bottom are connected with each other in series and the columns present in between are connected in a set of 5 are connected vertically.



The Code used to program the micro-controller:

In order to blink the led's we have to write a certain set of instruction in arduio IDE. In this experiment code results in lighting up the LED for 1 sec and then dimming down the LED for 1 sec. As long as the supply is connected to Arduino, the LED continues to glow.

Precautions:

1. *The circuit's elements should be properly connected and wires should be inserted into the pins properly..*
2. *The LED should be connected in proper orientation i.e. negative terminal of LED should be connected to the ground pin and positive terminal to pin 13 according to this experiment.*

Problems and troubleshooting:

The problems we faced while doing this experiment are:-

1) At first the LED was not working properly so we had to change and put a new LED in its Place.

2) The circuit was not getting closed as the wires were not connected properly so I made sure that the connections were made properly.

Learning Outcomes:

From this experiment we learn and acquire skills about:

1. *How to make circuits using arduino board and bread board.*
2. *Working of Arduino along with the LED.*
3. *Application of digital pins of Arduino Uno Board.*

Program:

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

void loop()
{
  digitalWrite(13, HIGH);
  delay(1000);
  digitalWrite(13, LOW);
  delay(1000);
}
```