Experiment 1:- Design a LED Flasher

Circuit Diagram:-

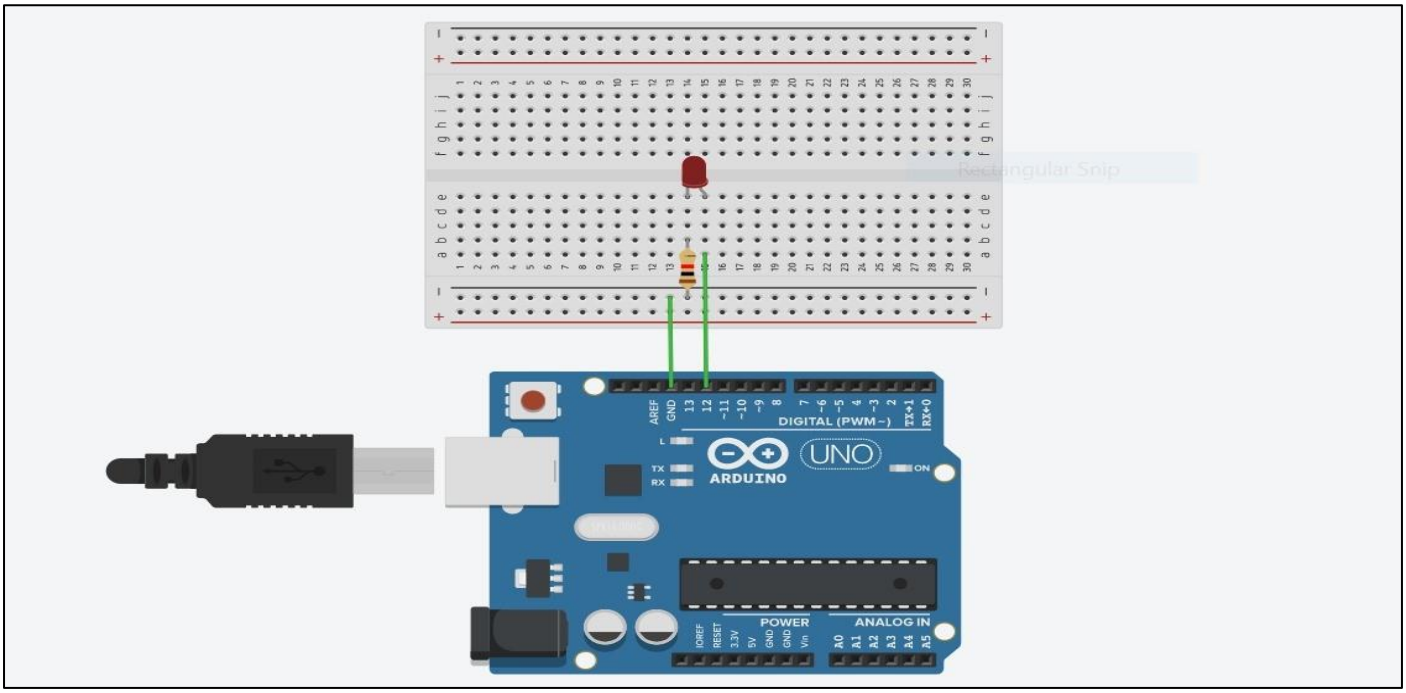

Fig:1

Theory: -

Concept used:-

• The Arduino board can supply a power of 5V as digital output signals through the 14 pins (namely 0-13) present in it as digital input or output pins.

• The GND pin of the Arduino board acts as ground

(It provide 0V).

• LEDs have polarity, which means they will only light up if you orient the legs properly that is the positive terminal of the LED should be

connected to positive the terminal of the battery and negative terminal of the LED should be connected to the negative terminal of the battery.

• But in case of Arduino: The positive is connected to a digital pin on the Arduino board. The short leg goes to GND on the Arduino board.

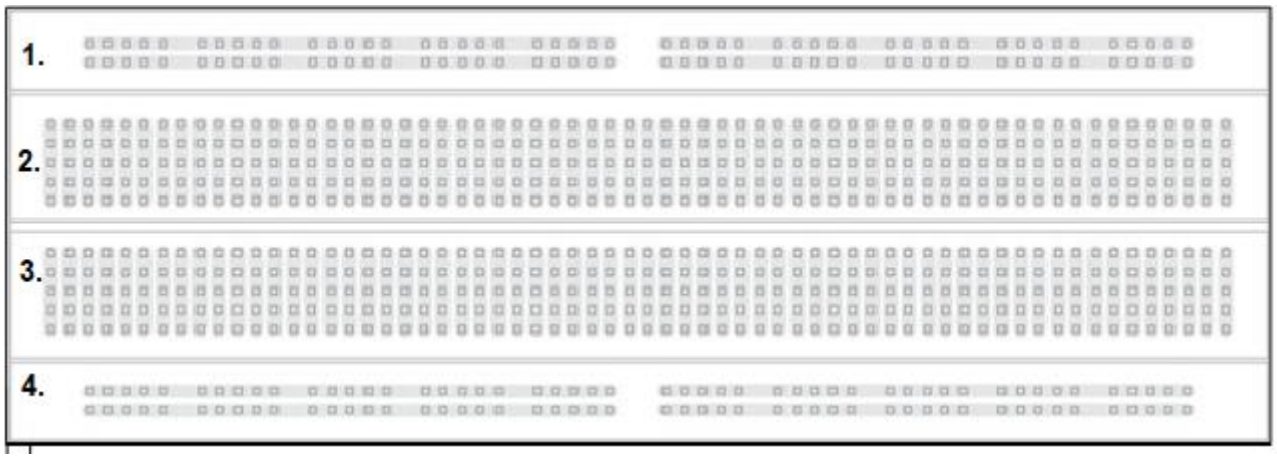

Fig:2

• This is a breadboard, sometimes known as a solderless breadboard. It has lots of holes that you can stick wires or electronic components into, and which are connected inside the breadboard. This lets you create a circuit containing multiple components without having to physically attach them to each other.

Learning and Observation: -

Learnings:

• Making a series and a parallel circuit using an Arduino board and a breadboard.

• LED's are a diode and are biased.

• The long leg of LED is positive and the short leg is negative.

• How an Arduino works and how current flows through it.

• Learned how to connect a Led with an Arduino board.

• In breadboard there are 4 sections which are labeled in the above diagram as 1, 2, 3, and 4. In 1^{st} and 4^{th} section the holes are interconnected horizontally and both sections are independent of each other. And in 2^{nd} and 3^{rd} section the holes are interconnected vertically and both sections are independent of each other.

Observations:-

• When we pass electrical signals to the Arduino via our code the LED blinks accordingly.

• By introducing delays we can make the blinking of led more interactive.

Problem and Troubleshooting:-

• In order to protect the LED, to use a resistor "in series" with the LED. Make sure to use resistor of high resistance.

• If the LED doesn't light up, trying reversing the legs (you won't hurt the LED if you plug it in backward for a short period of time).

• The code was not uploading to the Arduino because of the wrong port selection. Make sure to choose the correct port just after connecting Arduino with the PC.

• Problem in compilation due to syntax error. So make sure to write the correct code

• Problem in sketching i.e. code uploading due to problem n Arduino IDE. If this problem is encountered start the IDE again.

Precautions:-

• The connections at different points should not be loose and the pins should be inserted properly.

• The two pins of the L.E.D should be connected at their appropriate point that is, the positive point should be connected with the Positive pin (digital pin) and the negative point should be connected with the negative pin (ground (GND)).

• Make sure the circuit is closed

• Make sure LED’s are not fused with the help of a multimeter.

Learning Outcomes:-

- I have learned what is a difference between electrical and electronics.
- I have learned how to make circuits using an Arduino board and a breadboard and some other hardware.
- Through this experiment I have gained the skill of making a circuit using different hardware and controlling the functions done by that circuit with the help of codes.
- Like the first program every programmer learns consists in writing enough code to make their code show the sentence "Hello World!" on a screen. The blinking LED is the "Hello World!" of physical computing. So I can say learned a bit about physical computing.
- I have learned how to use a multimeter.
- Learned that computer only understands two states i.e. HIGH (1) and LOW (0).