Lab 1: Traffic Light

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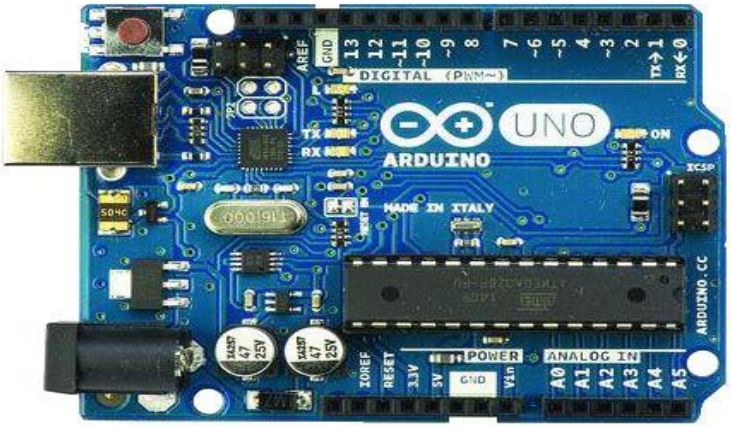
INTRODUCTION

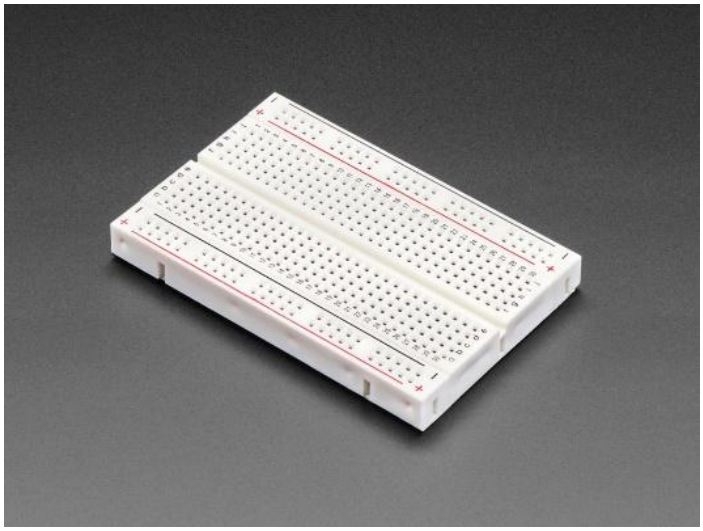
This experiment proposes the creation of a light show using LEDs.

COMPONENTS

1. **An Arduino UNO board**: An open-source microcontroller board based on the Microchip ATmega328P MCU, developed by Arduino.cc and initially released in 2010.



2. **A Breadboard**: A construction base used to build semi-permanent prototypes of electronic circuits.

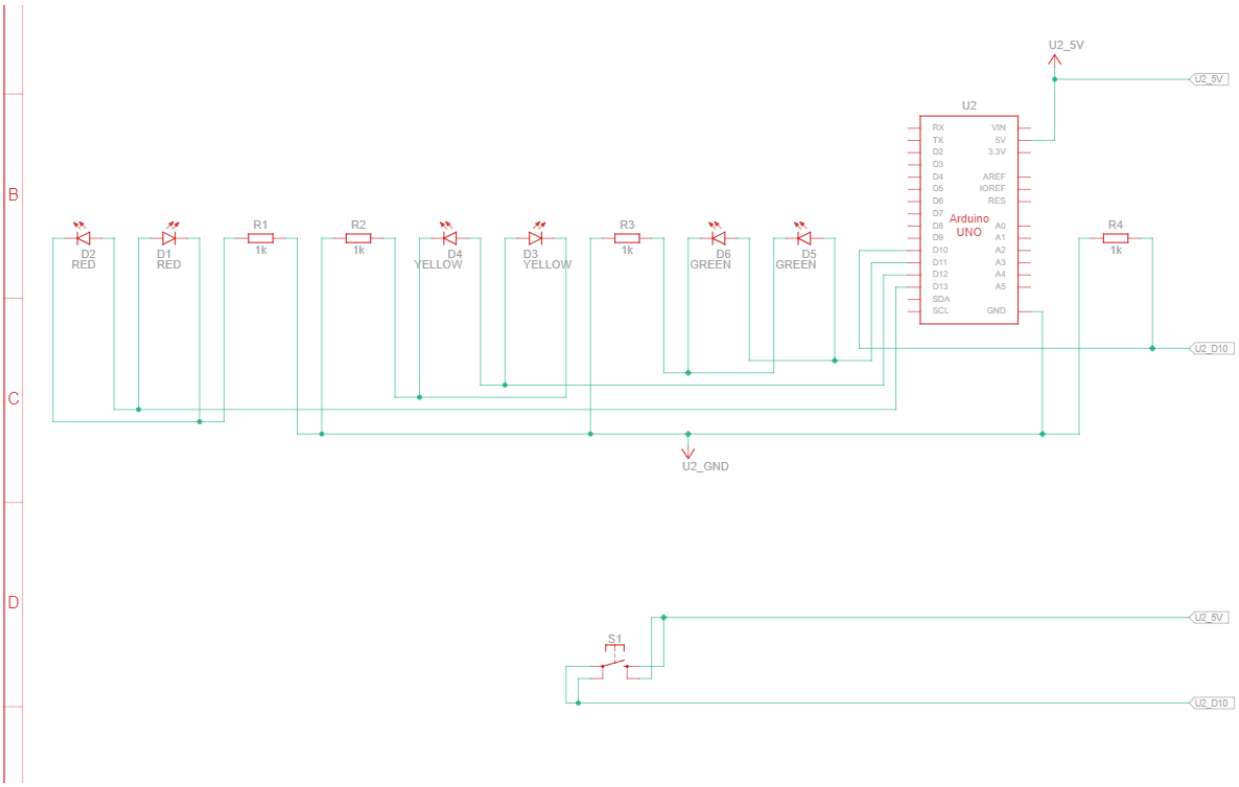


3. **6 LEDs of different colors**: An LED (light-emitting diode) is a semiconductor diode that emits light when the p-n junction is forward-biased. This effect is a form of electroluminescence.

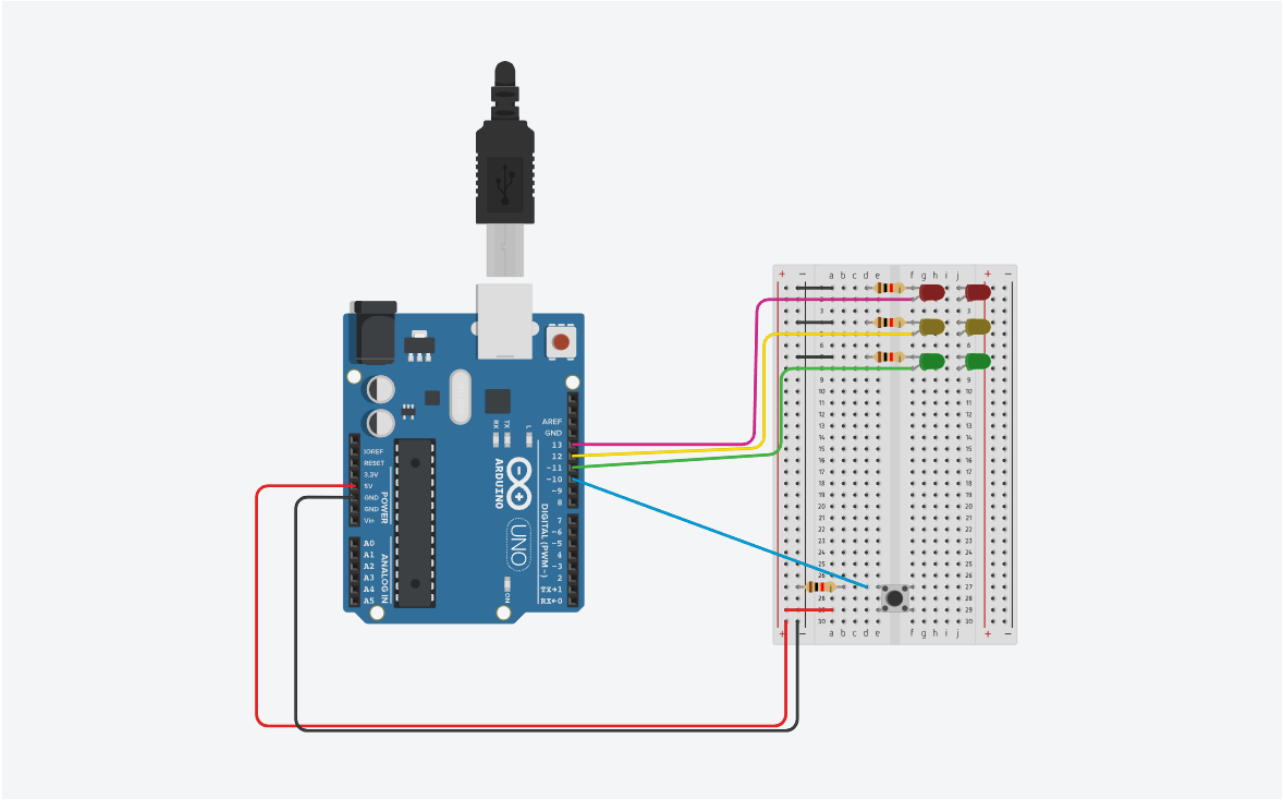
4. **4 resistors**: A resistor is a component in electrical and electronic circuits whose main property is electrical resistance. A typical resistor has two terminals; according to Ohm's Law, the electric current passing through a resistor is proportional to the voltage across its terminals. The most important parameter is the resistance, expressed in ohms.

5. **A button**: A button is a simple switching mechanism used to control some aspect of a machine or a process.

CIRCUIT DIAGRAM



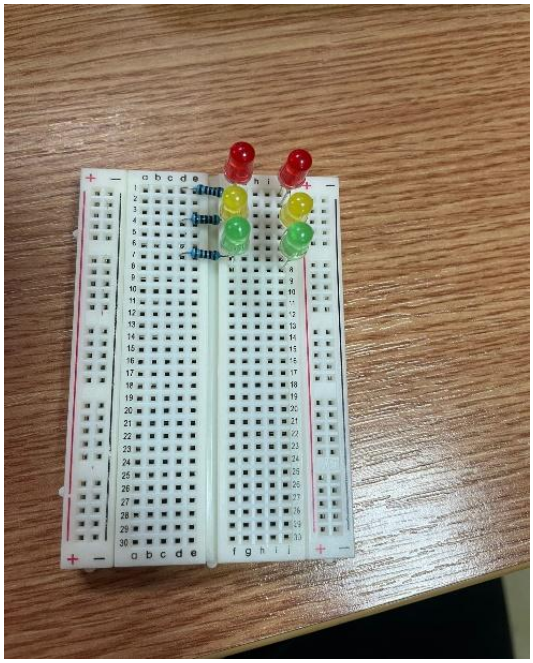
ELECTRICAL DIAGRAM



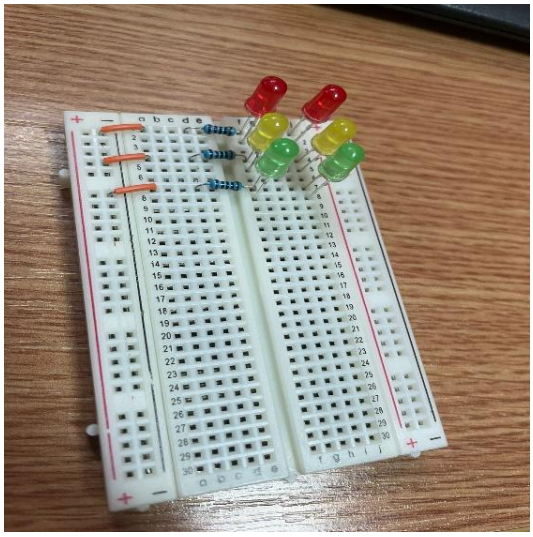
WORKING METHOD

I connected the LEDs to the breadboard, starting with slots f1 and f2 (the longer pin should be in the higher-numbered slot—in our case, f2). I left one column of space between each LED of a different color.

I placed the resistors in row d of the breadboard and in the slot of the shorter pin of each LED, as shown in the image.



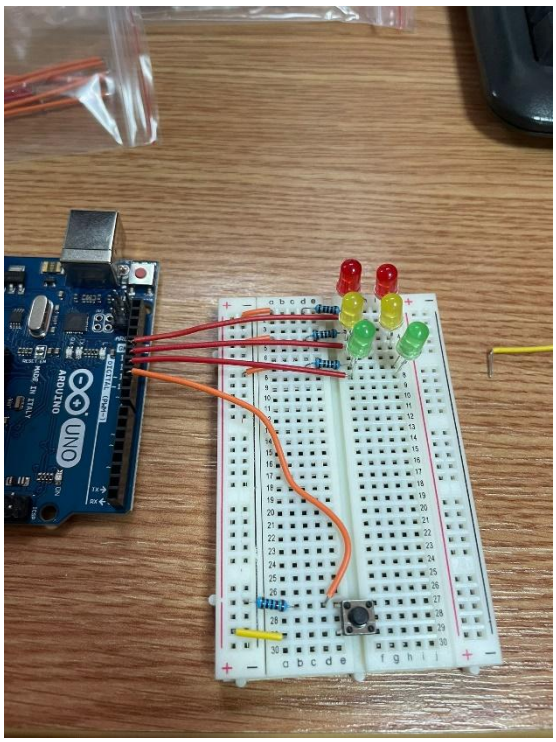
Using wires, I connected slots a1, a4, and a7 to the negative rail of the breadboard, as shown.



I connected slot f2 with slot 13 on the Arduino UNO board, slot f5 with slot 12 on the Arduino UNO board and slot f8 with slot 11 on the Arduino UNO board using wires.

I connected the button to the Breadboard in slots e27, f27, e29 and f29. Then using a wire I connected slot d27 to slot 10 on the Arduino UNO board.

I connected a resistor to slot b27 and the negative terminal and, using a wire, to slot a29 with the positive terminal.



I used two wires to connect the positive terminal to the 5V slot on the Arduino UNO board and the negative terminal to the GND slot on the Arduino UNO board.

I programmed the circuit using a USB cable.

PROGRAMMING

Software used: Arduino IDE.

Code used:

```
void setup()
{
  pinMode(10, INPUT);
  pinMode(11, OUTPUT);
  pinMode(12, OUTPUT);
  pinMode(13, OUTPUT);
}

void loop()
{
  if (digitalRead(10) == HIGH)
  {
    digitalWrite(11, HIGH);
    delay(1000); // Wait for 2000 millisecond(s)
    digitalWrite(11, LOW);
    digitalWrite(12, HIGH);
    delay(1000); // Wait for 1000 millisecond(s)
    digitalWrite(12, LOW);
    digitalWrite(13, HIGH);
    delay(1000); // Wait for 1000 millisecond(s)
```

```
    digitalWrite(13, LOW);
    digitalWrite(11, HIGH);
    delay(1000); // Wait for 2000 millisecond(s)
    digitalWrite(11, LOW);
    digitalWrite(12, HIGH);
    delay(1000); // Wait for 1000 millisecond(s)
    digitalWrite(12, LOW);
    digitalWrite(13, HIGH);
    delay(1000); // Wait for 1000 millisecond(s)
    digitalWrite(13, LOW);
    digitalWrite(12, HIGH);
    delay(1000); // Wait for 1000 millisecond(s)
    digitalWrite(12, LOW);
    digitalWrite(11, HIGH);
    delay(1000); // Wait for 2000 millisecond(s)
    digitalWrite(11, LOW);
  }
}
```

CONCLUSIONS

The project I created can help a beginner passionate about electronics to better understand the basics of electrical circuits. It is both easy and fun to build.

BIBLIOGRAPHY

- Youtube.com
- Tinkercad.com
- Wikipedia.org