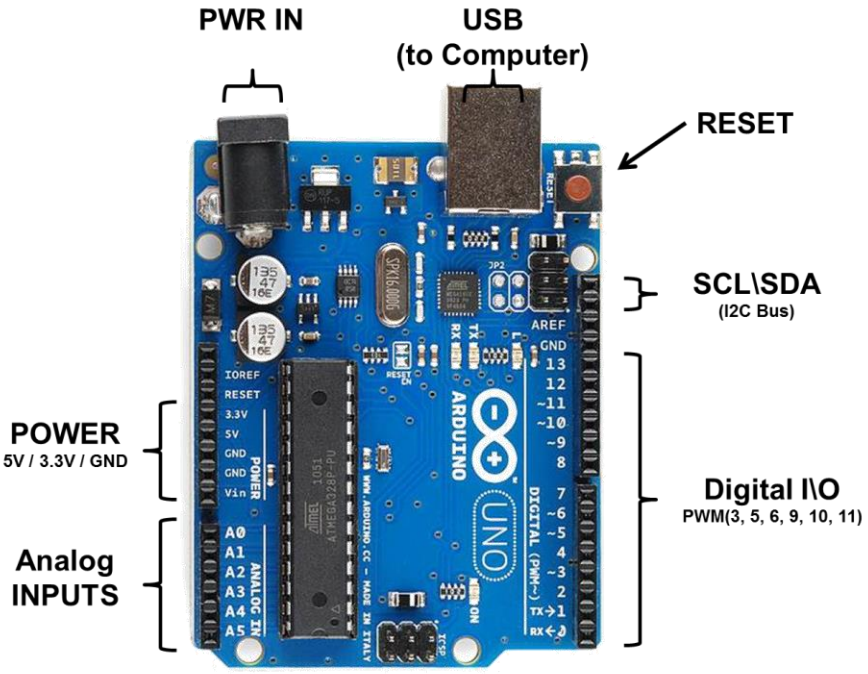
PRACTICAL –3

Aim: - Arduino architecture and basic programming.

Theory:

Arduino is an open-source physical computing platform designed to make experimenting with electronics and programming more fun and intuitive. Arduino has its own unique, simplified programming language and a lots of premade examples and tutorials exists. With Arduino you can easily explore lots of small-scale sensors and actuators like motors, temperature sensors, etc.

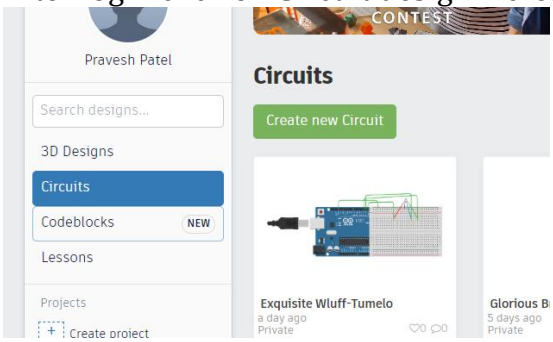


Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
Length	68.6 mm
Width	53.4 mm
Weight	25 g

1. Arduino Programming On Tinkercad

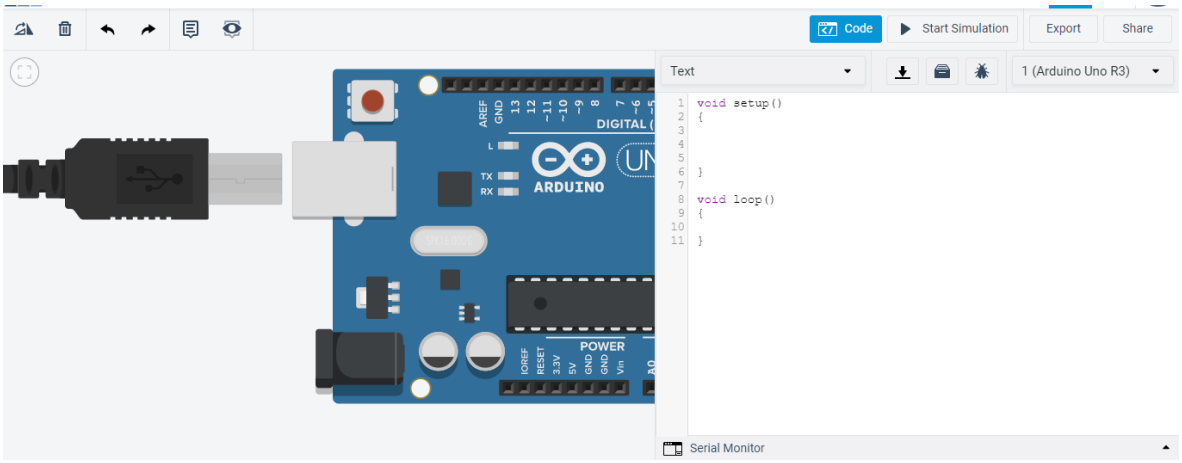
The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them.

1. Open www.tinkercad.com
2. Login using Google Account
3. After login click on Circuit design > create new Circuit



4. Search Arduino board and drag & drop in workspace

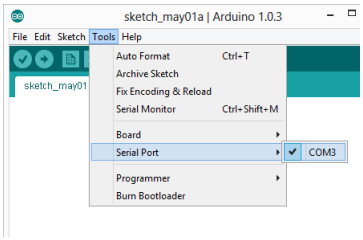
5. Write code



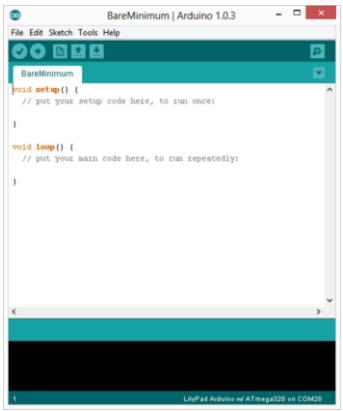
2. Arduino Programming Environment (IDE)

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them.

1. Install IDE in your system from https://www.arduino.cc/en/Main/Software
2. Connect Arduino UNO with system.
3. Select COM Port of Arduino



4. Write code



Two required functions / methods / routines:

```
void setup()
{
      // runs once
}

void loop()
{
      // repeats
}
```

Auduino function

- pinMode( )
- digitalRead( )
- digitalWrite( )
- delay( )
- analogRead( )
- analogWrite( )
- Serial.begin( )
- Serial.end( )
- Serial.read( )
- Serial.write( )
- Serial.print( )
- Serial.println( )
- Serial.available( )

Experiment Part – I (On Tinkercard)

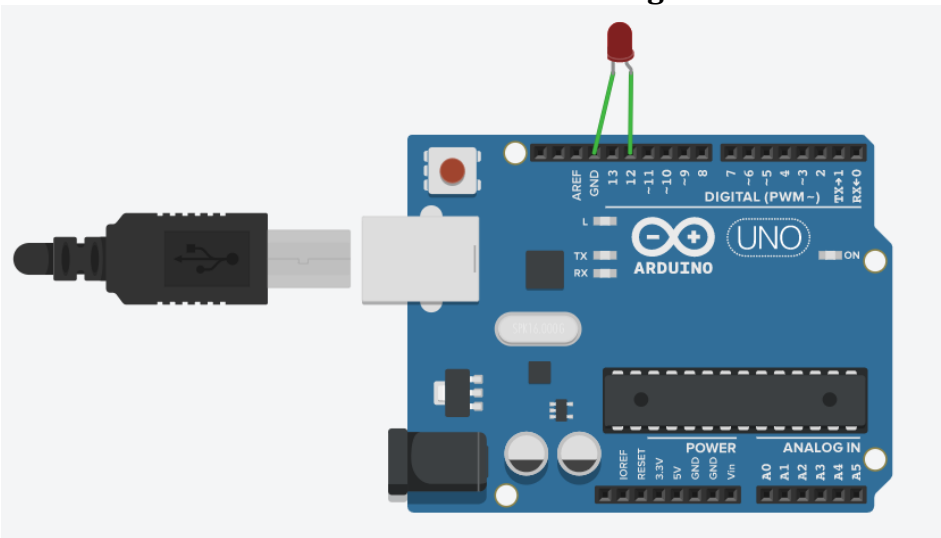
1. **Working with LED**
    a. LED ON
    b. LED Blinking
    c. LED ON/OFF using push button
    d. Working with RGB LED
2. **Increase and decrease the brightness of LED**
3. **Increase and decrease the brightness of LED using potentiometer display the voltage level on serial monitor**
4. **Take Input from serial Monitor and ON/OFF LED**

Experiment Part – II (On Arduino Uno Board)

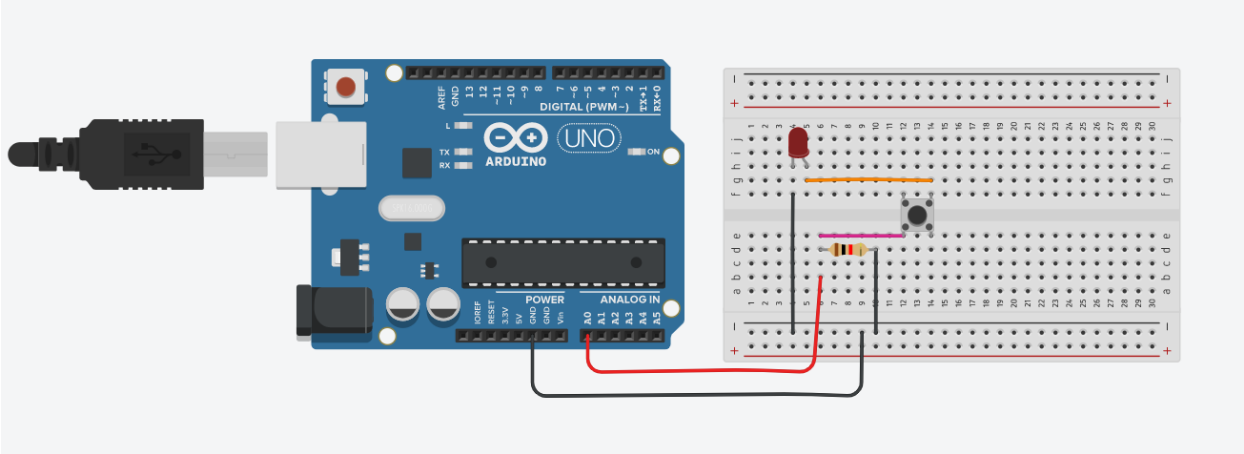
1. **Working with LED**
    a. LED ON
    b. LED Blinking
    c. LED ON/OFF using push button
    d. Increase and decrease the brightness of LED
2. **Increase and decrease the brightness of LED and display voltage level in serial Monitor**

Connection for Experiment Part – I (On Tinkercard)

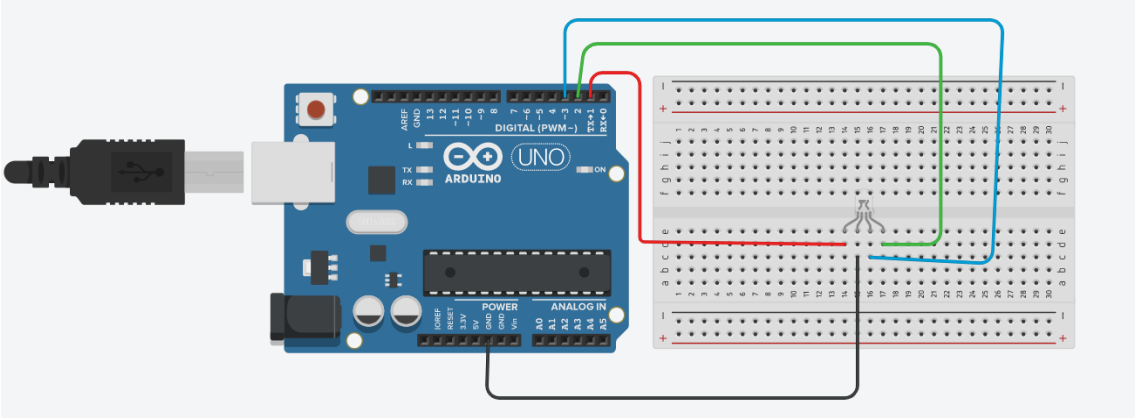
1. **Circuit for LED ON and 2. LED Blinking**



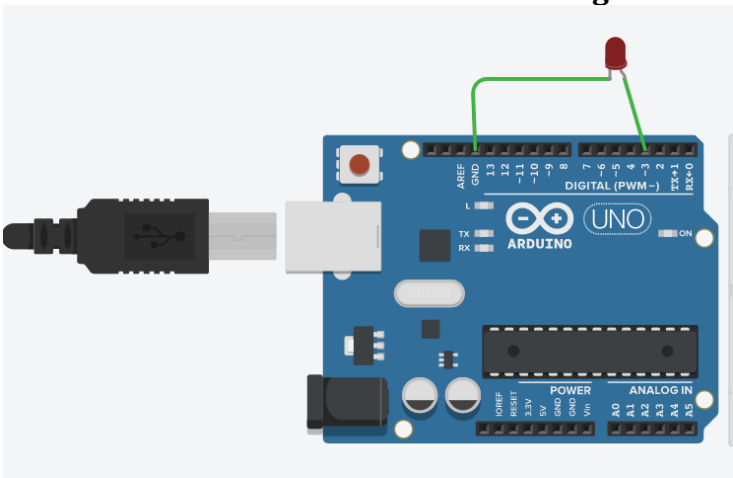
2. **Circuit for LED ON/OFF using Push button**



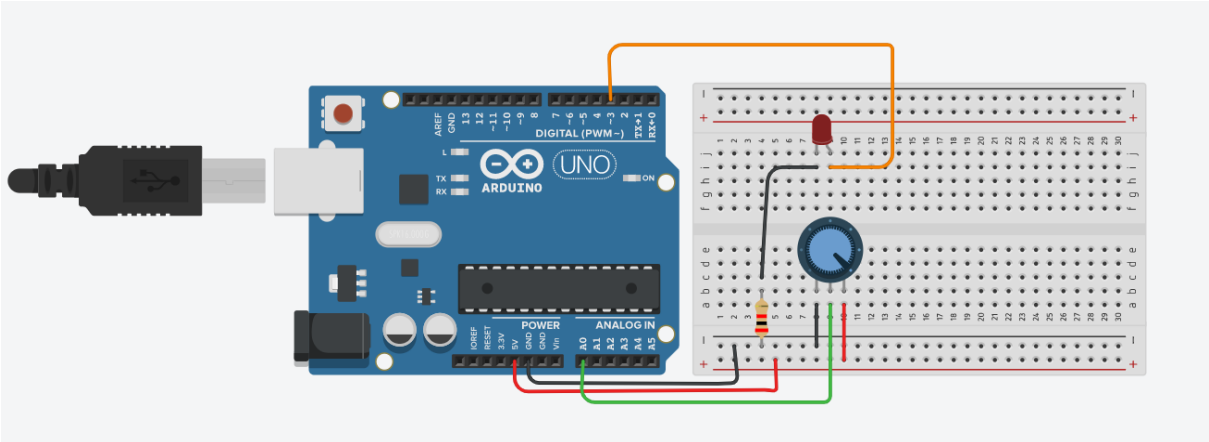
5. **Circuit for RGB LED**



6. **Circuit for Increase and decrease the brightness of LED**



7. **Circuit for Increase and decrease the brightness of LED using Potentiometer**



Experiment

Connection for Experiment

1. **Working with LED/Brightness of LED**