GANPAT UNIVERSITY

U. V. Patel College of Engineering

Arduino architecture and basic programming.

2CEIT6PE9: Internet of Things

B.Tech Semester: VI

Computer Engineering/ Information Technology

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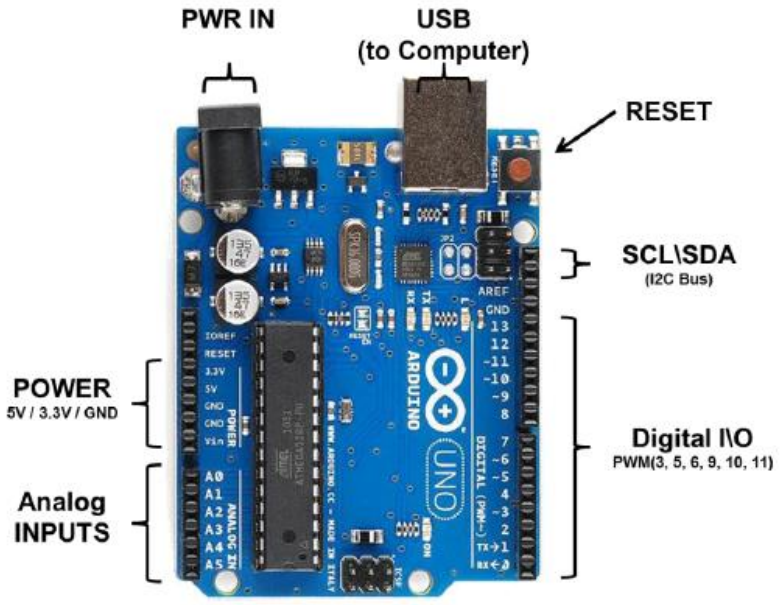
Aim: Arduino architecture and basic programming.

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.



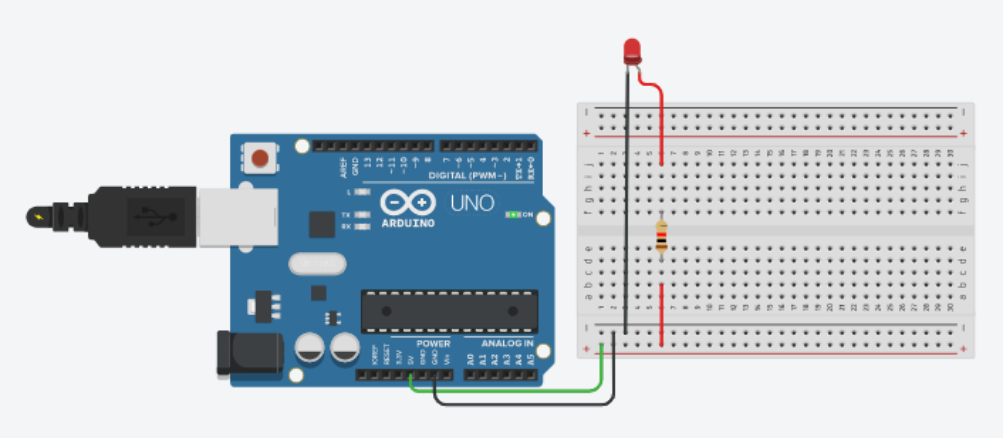
Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 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

Experiment

1. **Working with LED**

a. LED ON

Circuit:

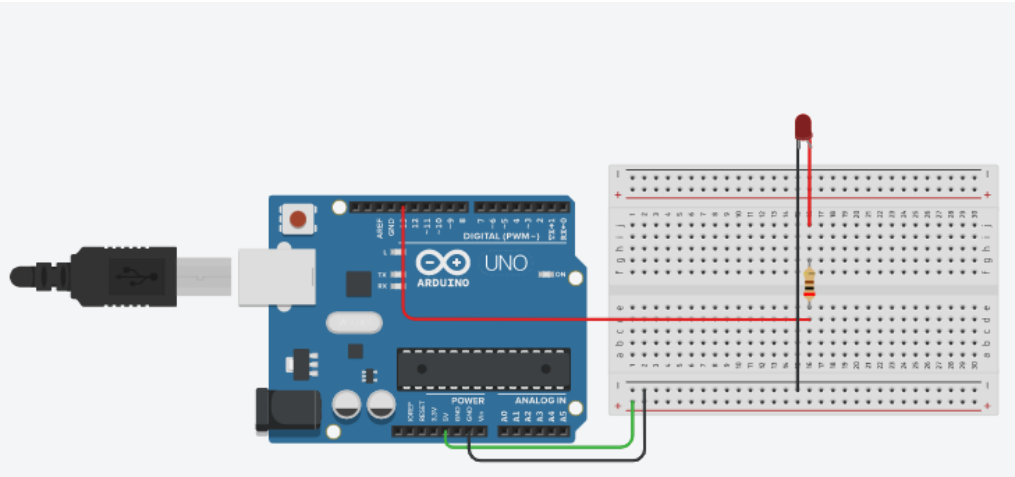


b. LED Blinking

Code:

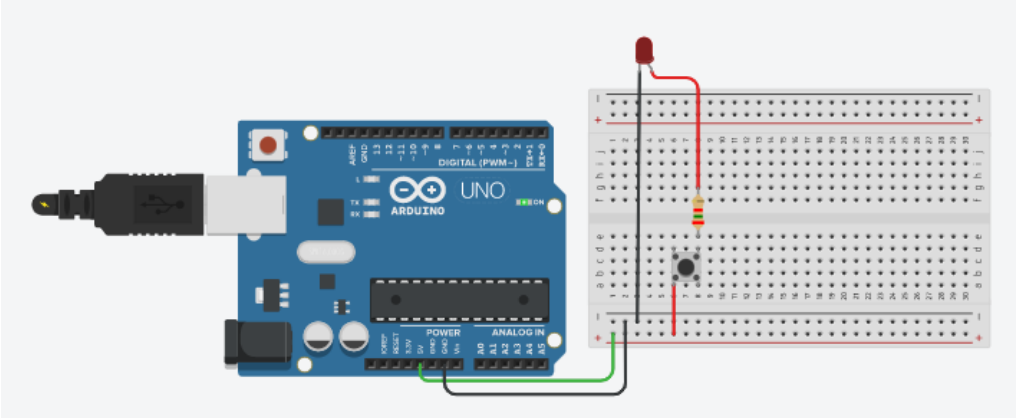
```
#define red 13
void setup()
{
 pinMode(red, OUTPUT);
}

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

Circuit:



c. LED ON/OFF using push button

Circuit:

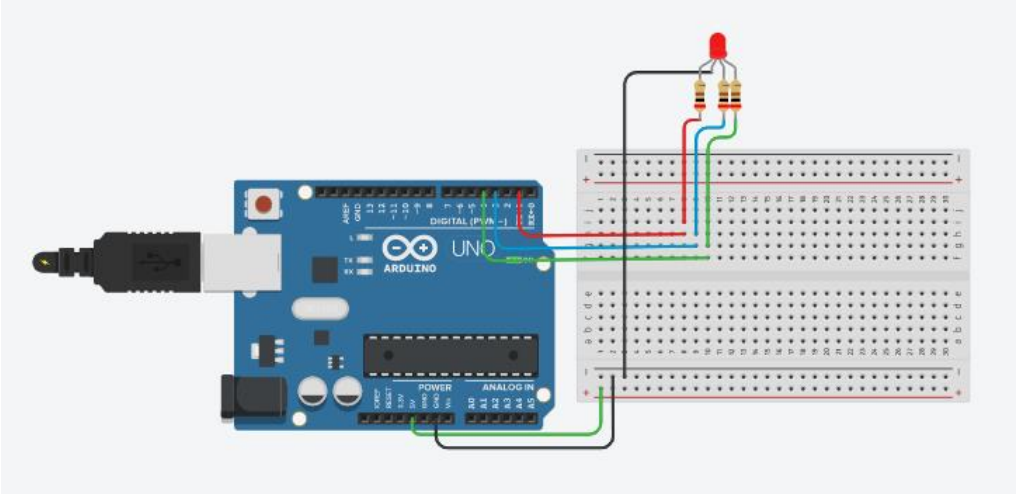


d. Working with RGB LED

Code:

```
#define r 1
#define b 3
#define g 4
void setup()
{
  pinMode(r, OUTPUT);
  pinMode(b, OUTPUT);
  pinMode(g, OUTPUT);
}

void loop()
{
  digitalWrite(r, HIGH);
  delay(2000);
  digitalWrite(r, LOW);
  delay(2000);
  digitalWrite(b, HIGH);
  delay(2000);
  digitalWrite(b, LOW);
  delay(2000);
  digitalWrite(g, HIGH);
  delay(2000);
  digitalWrite(g, LOW);
  delay(2000);
}
```

Circuit

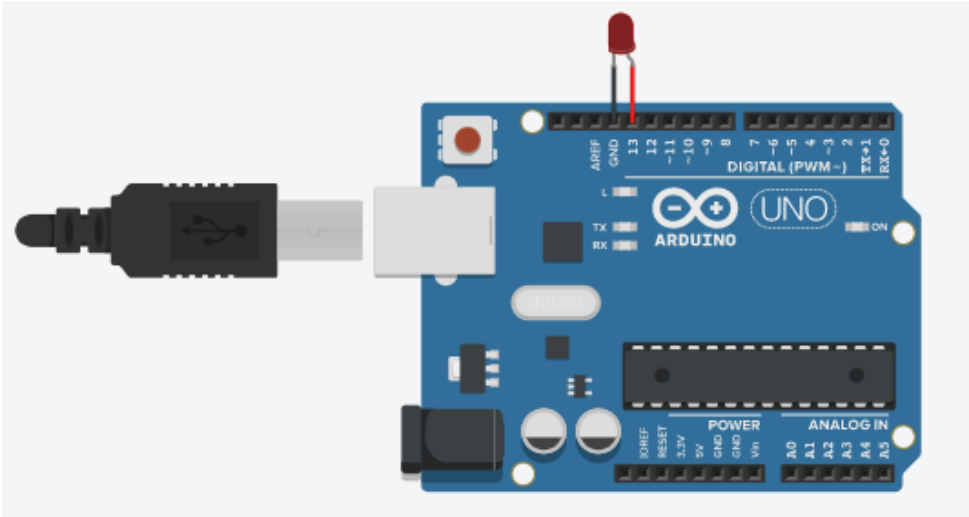


2. Increase and decrease the brightness of LED

Code:

```
int a = 0;
void setup() {
  pinMode(13, OUTPUT);
}

void loop() {
  for (a = 0 ; a < 256 ; a++) {
    analogWrite(13, a);
    delay(5);
  }
  for (a = 255 ; a >= 0 ; a--) {
    analogWrite(13, a);
    delay(5);
  }
  delay(200);
}
```

Circuit:



3. Increase and decrease the brightness of LED using potentiometer

Code:

```
#define inp A2
#define out 3
void setup()
{
  pinMode(out, OUTPUT);
  pinMode(inp, INPUT);

}

void loop()
{
  int input_value = analogRead(inp);
  int t = map (input_value,0,1023,0,255);
  analogWrite(out,t);
}
```

Circuit: