

# Programming Arduino

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# What is Arduino?

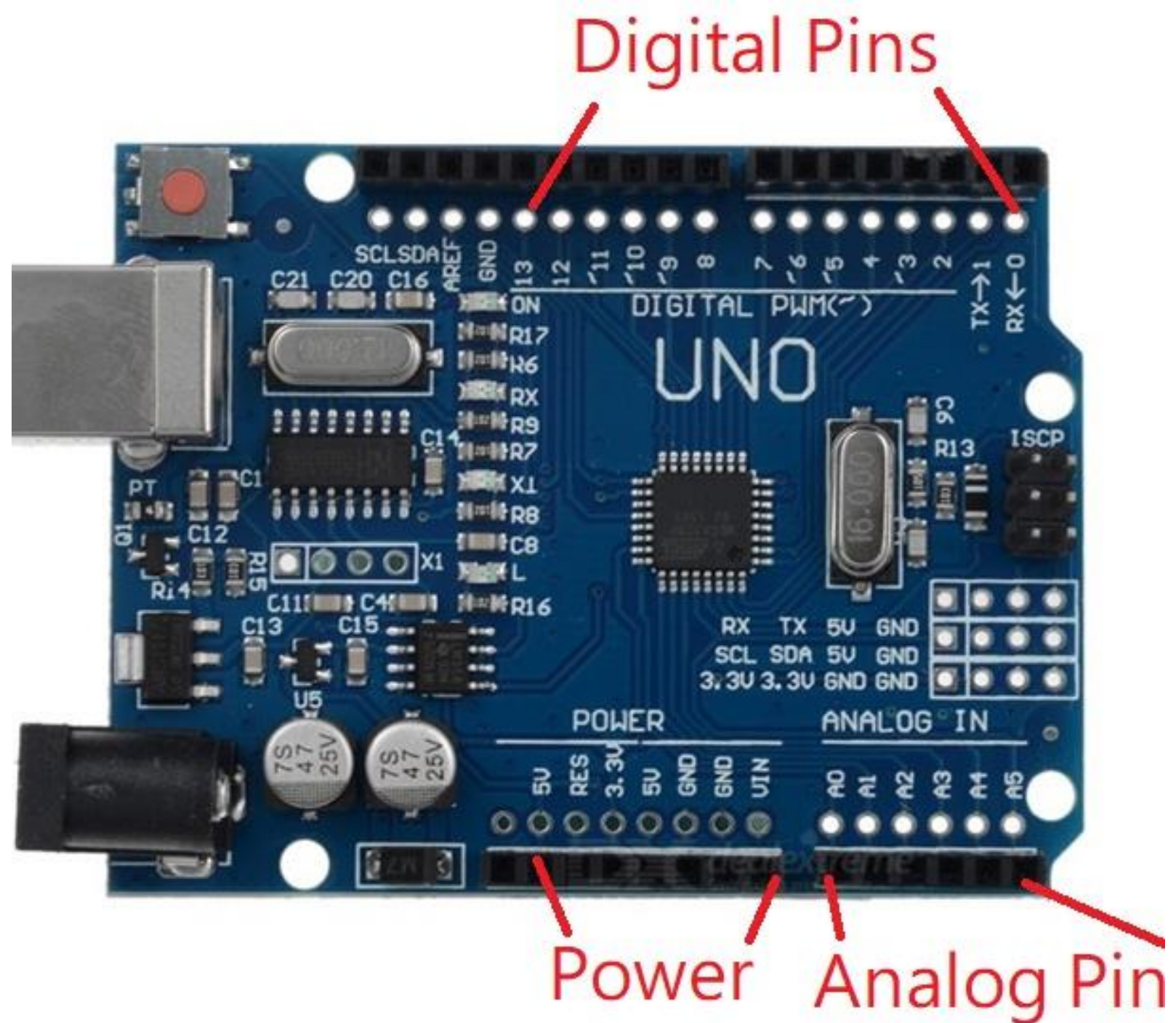
- Arduino is a micro-controller which with pins to control LEDs, motors , sensors and other electronic components
- You can program the behavior of the pins using computer and then upload to the Arduino
- Once uploaded, the program stay in the Arduino board only power supply is required

# The Arduino family

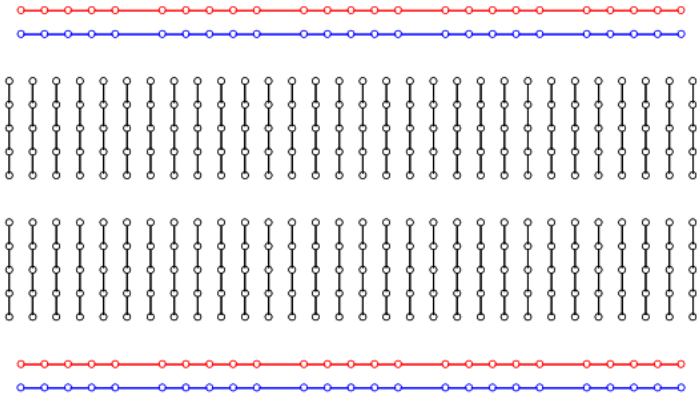
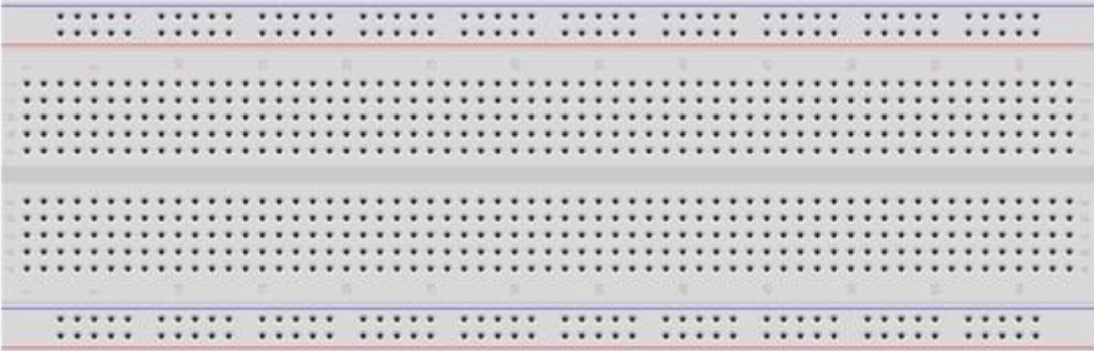
- Arduino UNO
- Arduino Mega
- Arduino Leonardo
- Arduino Nano
- Arduino Micro
- Arduino LilyPad
- Arduino Yun
- .... etc

# The Arduino Uno R3

- **Digital Pins (0-13)** can be used for Input or Output
- **Analog Pins (A0-A5)** can be used for Input only
- **Power** provide voltage and GND for closing circuit
- **USB connector** for power supply / program upload / data communication
- **Power socket** for power supply



# The Breadboard



# Program structure

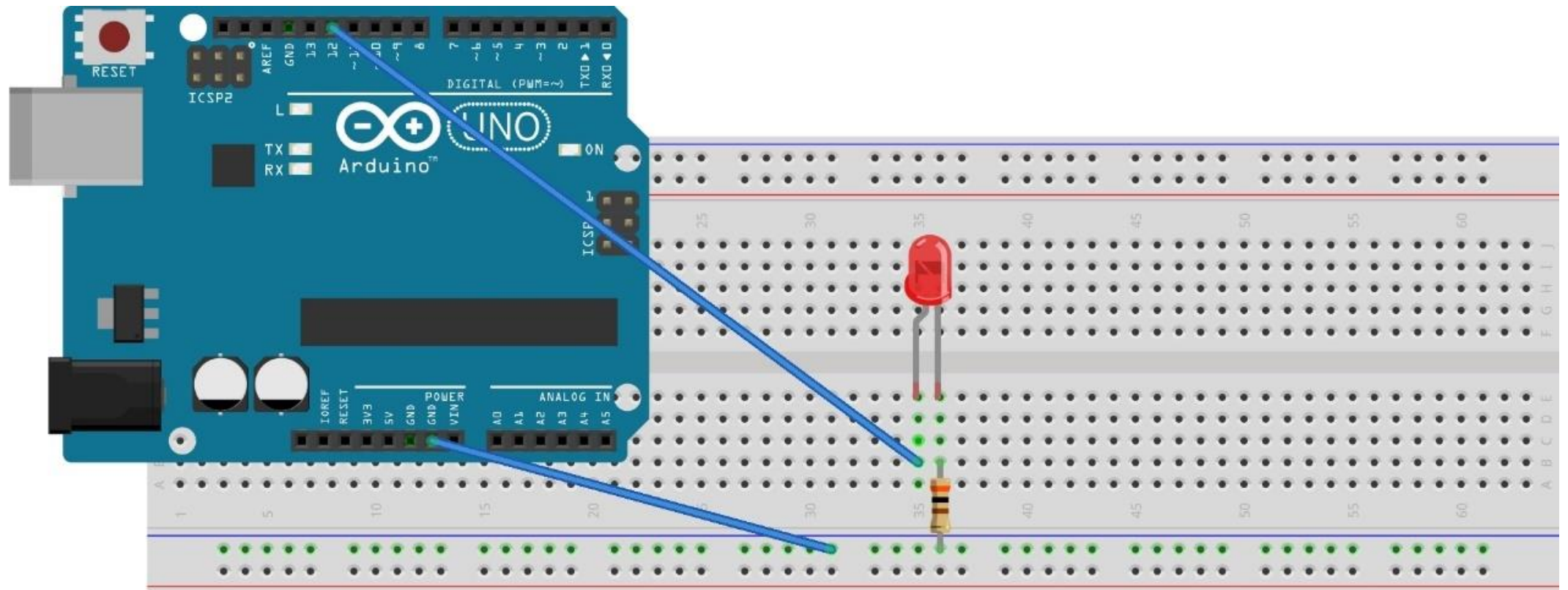
```
void setup() {
```

```
}
```

```
void loop() {
```

```
}
```

# Blink (digital output)

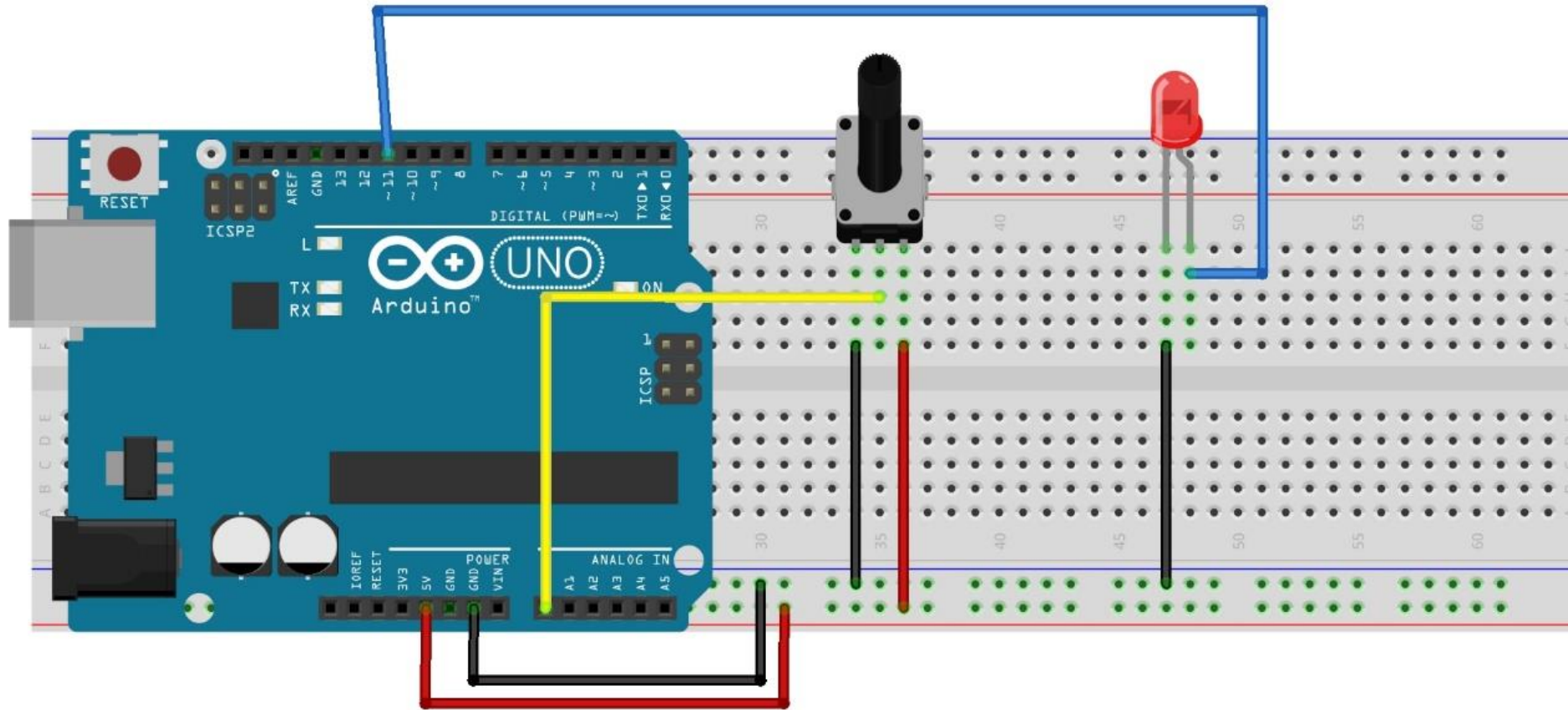


# Blink

```
void setup() {  
    pinMode(12, OUTPUT);  
}  
  
void loop() {  
    digitalWrite(12, HIGH);  
    delay(1000);  
    digitalWrite(12, LOW);  
    delay(1000);  
}
```



Knob (analog input)  
Dimmer (analog output)

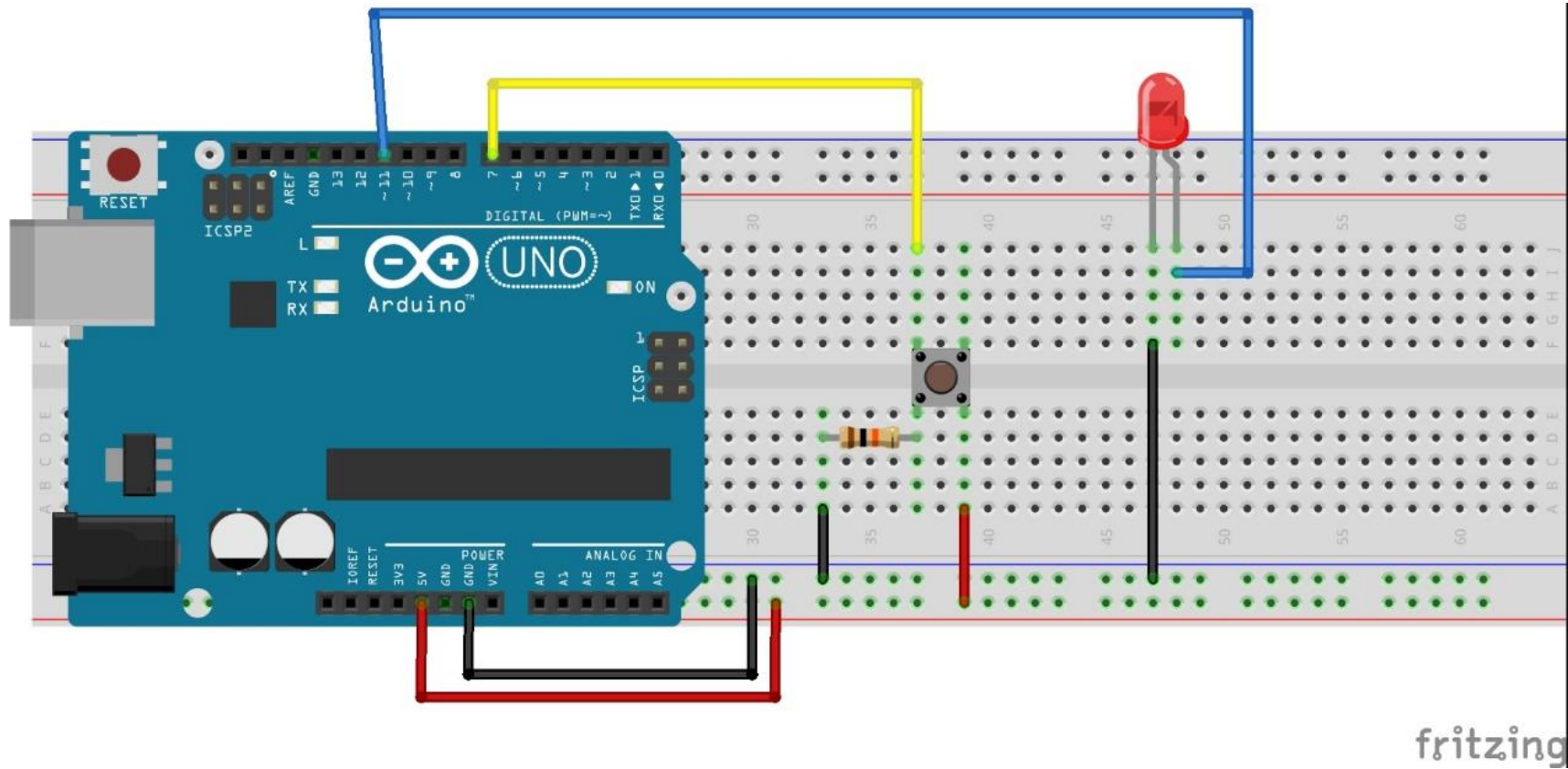


```
int brightness = 0;
int sensorValue = 0;

void setup() {
  pinMode(11, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  sensorValue = analogRead(A0);
  Serial.println(sensorValue);
  brightness = map(sensorValue, 0, 1024, 0, 255);
  analogWrite(11, brightness);
}
```

# Push button (digital input)



```
int buttonState = 0;

void setup() {
  pinMode(11, OUTPUT);
  pinMode(7, INPUT);
}

void loop(){
  buttonState = digitalRead(7);
  if (buttonState == 1) {
    digitalWrite(11, HIGH);
  }
  else {
    digitalWrite(11, LOW);
  };
};
```

# Using sensor modules

- The knob is a analog signal module
- The push button with a resistor is a digital signal module
- When using analog signal sensor modules , the A0 pin should be connected to analog pins
- When using digital signal sensor modules, the D0 pin should be connected to digital pins