LESSON 8: POTENTIOMETER

INTRODUCTION

Potentiometers are variable resistors and they function to alter their resistance via a knob or dial. You have probably used one before by adjusting the volume on your stereo or using a light dimmer. Potentiometers have a range of resistance. They can be attuned from zero ohms to whatever maximum resistance that is specific to it. For example, a potentiometer of 10 kΩ can be adjusted from 0 Ω to its maximum of 10 kΩ.

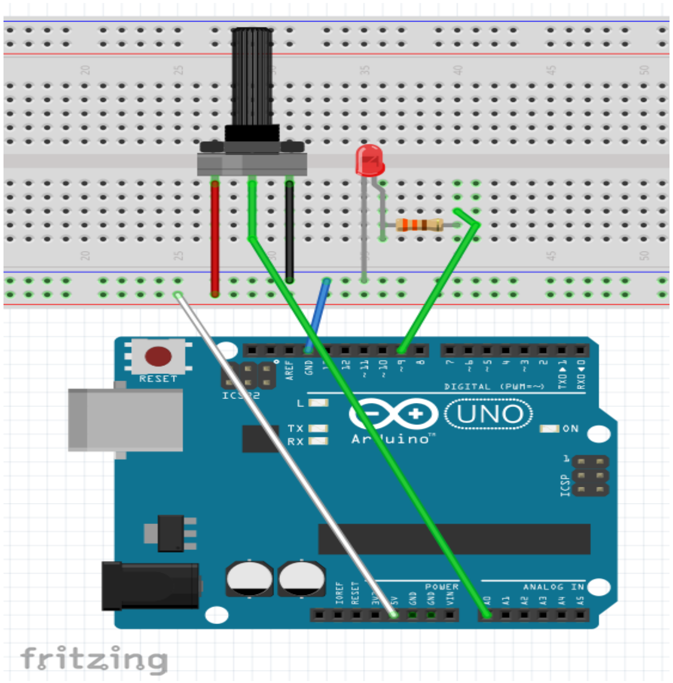
In this tutorial you will learn how to use a potentiometer with Arduino board to create an LED with adjustable brightness. The brightness will be set based on the position of the potentiometer. In order to do this, we need to set the potentiometer up as a voltage divider, and we need to drive the LED from one of the analog pins. For this example, I am using pin 9.

COMPONENTS

- Arduino uno
- Breadboard
- LED
- 330 Ohm resistor
- Potentiometer (10K)
- Jumper wire

CONNECTION

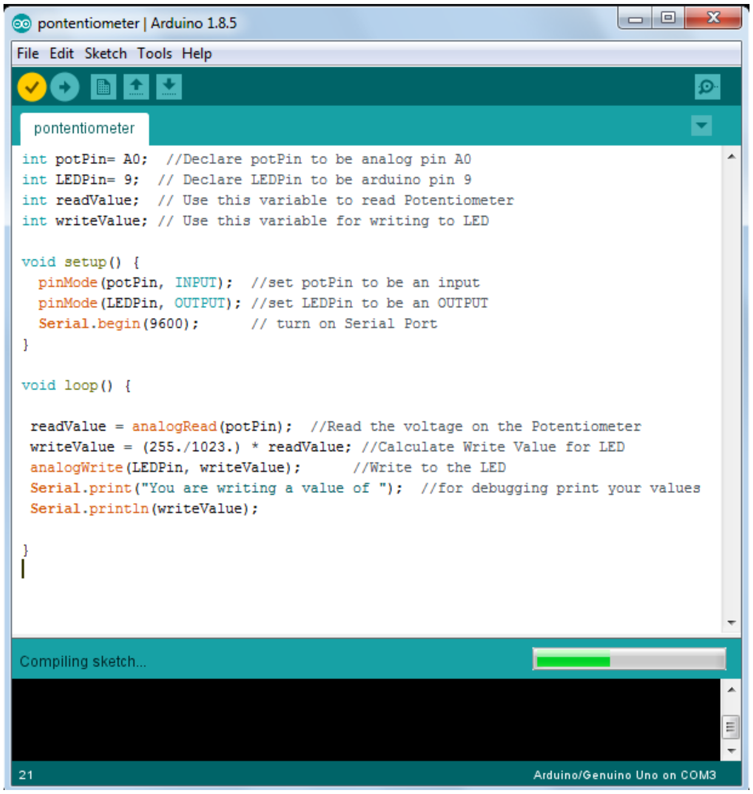
STEP 1: The circuit



STEP 2: Program. With this code, you should be able to set the brightness from the potentiometer. You read the voltage from the potentiometer and then scale the value you write to the LED based on the reading from the potentiometer.

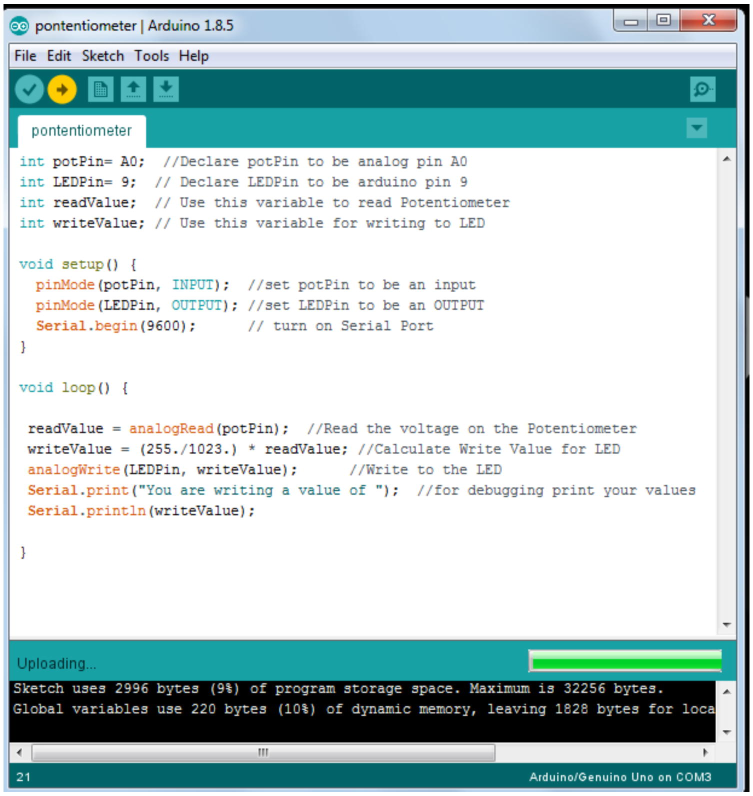
```
int potPin= A0;  //Declare potPin to be analog pin A0
int LEDPin= 9;  // Declare LEDPin to be arduino pin 9
int readValue;  // Use this variable to read Potentiometer
int writeValue; // Use this variable for writing to LED

void setup() {
pinMode(potPin, INPUT);  //set potPin to be an input
pinMode(LEDPin, OUTPUT); //set LEDPin to be an OUTPUT
Serial.begin(9600);      // turn on Serial Port
}

void loop() {

readValue = analogRead(potPin);  //Read the voltage on the Potentiometer
writeValue = (255./1023.) * readValue; //Calculate Write Value for LED
analogWrite(LEDPin, writeValue);      //Write to the LED
Serial.print("You are writing a value of ");  //for debugging print your values
Serial.println(writeValue);

}
```

STEP 3: Compile the code. Click the Verify button on the top left. It should turn orange and then back to blue.


pontentiometer | Arduino 1.8.5
File Edit Sketch Tools Help
pontentiometer
Compiling sketch...
21
Arduino/Genuino Uno on COM3

```
int potPin= A0;  //Declare potPin to be analog pin A0
int LEDPin= 9;  // Declare LEDPin to be arduino pin 9
int readValue;  // Use this variable to read Potentiometer
int writeValue; // Use this variable for writing to LED

void setup() {
  pinMode(potPin, INPUT);  //set potPin to be an input
  pinMode(LEDPin, OUTPUT); //set LEDPin to be an OUTPUT
  Serial.begin(9600);      // turn on Serial Port
}

void loop() {

 readValue = analogRead(potPin);  //Read the voltage on the Potentiometer
 writeValue = (255./1023.) * readValue; //Calculate Write Value for LED
 analogWrite(LEDPin, writeValue);      //Write to the LED
 Serial.print("You are writing a value of ");  //for debugging print your values
 Serial.println(writeValue);

}
```

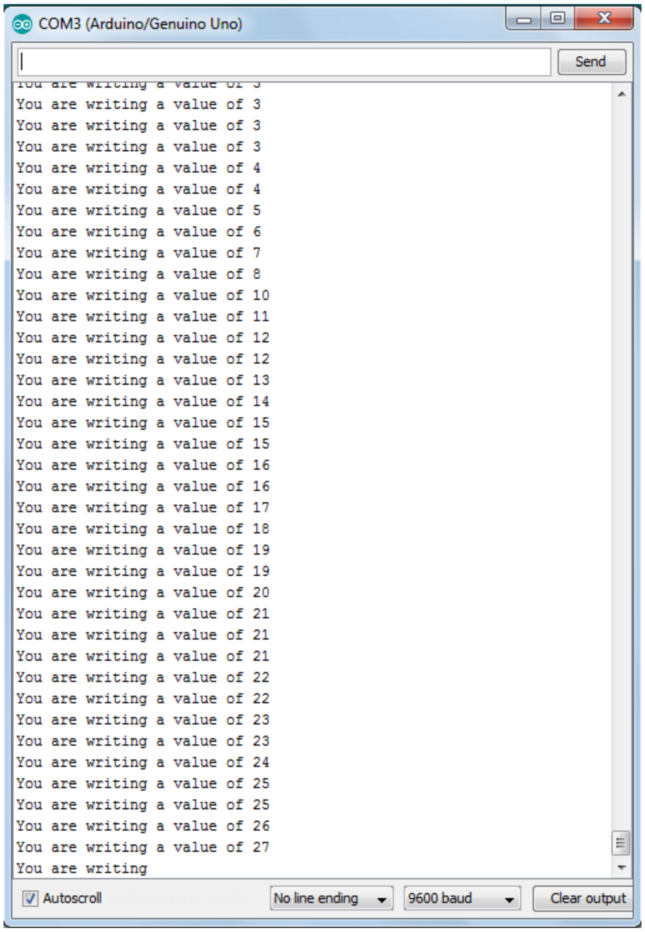
STEP 4: Upload the sketch to Arduino UNO. Click the Upload button. It will also turn orange and then blue once the sketch has finished uploading to your Arduino board.


pontentiometer | Arduino 1.8.5
File Edit Sketch Tools Help
pontentiometer
Uploading...
21
Arduino/Genuino Uno on COM3

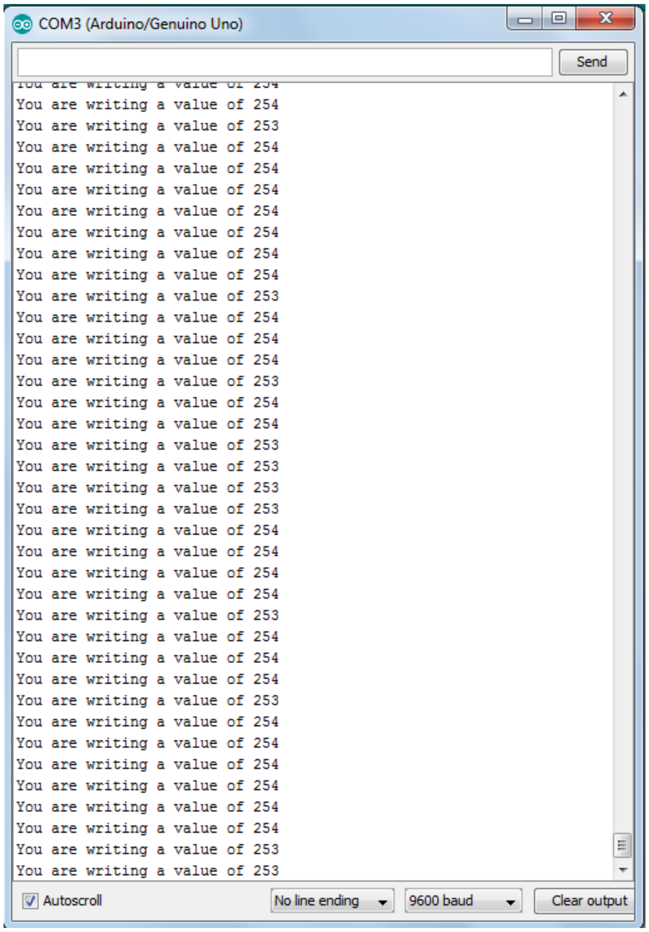
```
int potPin= A0;  //Declare potPin to be analog pin A0
int LEDPin= 9;  // Declare LEDPin to be arduino pin 9
int readValue;  // Use this variable to read Potentiometer
int writeValue; // Use this variable for writing to LED

void setup() {
  pinMode(potPin, INPUT);  //set potPin to be an input
  pinMode(LEDPin, OUTPUT); //set LEDPin to be an OUTPUT
  Serial.begin(9600);      // turn on Serial Port
}

void loop() {

 readValue = analogRead(potPin);  //Read the voltage on the Potentiometer
 writeValue = (255./1023.) * readValue; //Calculate Write Value for LED
 analogWrite(LEDPin, writeValue);      //Write to the LED
 Serial.print("You are writing a value of ");  //for debugging print your values
 Serial.println(writeValue);

}
```

```
Sketch uses 2996 bytes (9%) of program storage space. Maximum is 32256 bytes.
Global variables use 220 bytes (10%) of dynamic memory, leaving 1828 bytes for loca
```

RESULT:



```
You are writing a value of 3
You are writing a value of 3
You are writing a value of 3
You are writing a value of 3
You are writing a value of 4
You are writing a value of 4
You are writing a value of 5
You are writing a value of 6
You are writing a value of 7
You are writing a value of 8
You are writing a value of 10
You are writing a value of 11
You are writing a value of 12
You are writing a value of 12
You are writing a value of 13
You are writing a value of 14
You are writing a value of 15
You are writing a value of 15
You are writing a value of 16
You are writing a value of 16
You are writing a value of 17
You are writing a value of 18
You are writing a value of 19
You are writing a value of 19
You are writing a value of 20
You are writing a value of 21
You are writing a value of 21
You are writing a value of 21
You are writing a value of 22
You are writing a value of 22
You are writing a value of 23
You are writing a value of 23
You are writing a value of 24
You are writing a value of 25
You are writing a value of 25
You are writing a value of 26
You are writing a value of 27
You are writing
```



```
You are writing a value of 254
You are writing a value of 254
You are writing a value of 253
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 253
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 253
You are writing a value of 254
You are writing a value of 254
You are writing a value of 253
You are writing a value of 253
You are writing a value of 253
You are writing a value of 253
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 253
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 253
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 254
You are writing a value of 253
You are writing a value of 253
```