IT-Midterm Study guideline for grade 7

The exam will be two parts:
(written(10 marks) + practical(10 marks)) includes these experiments:

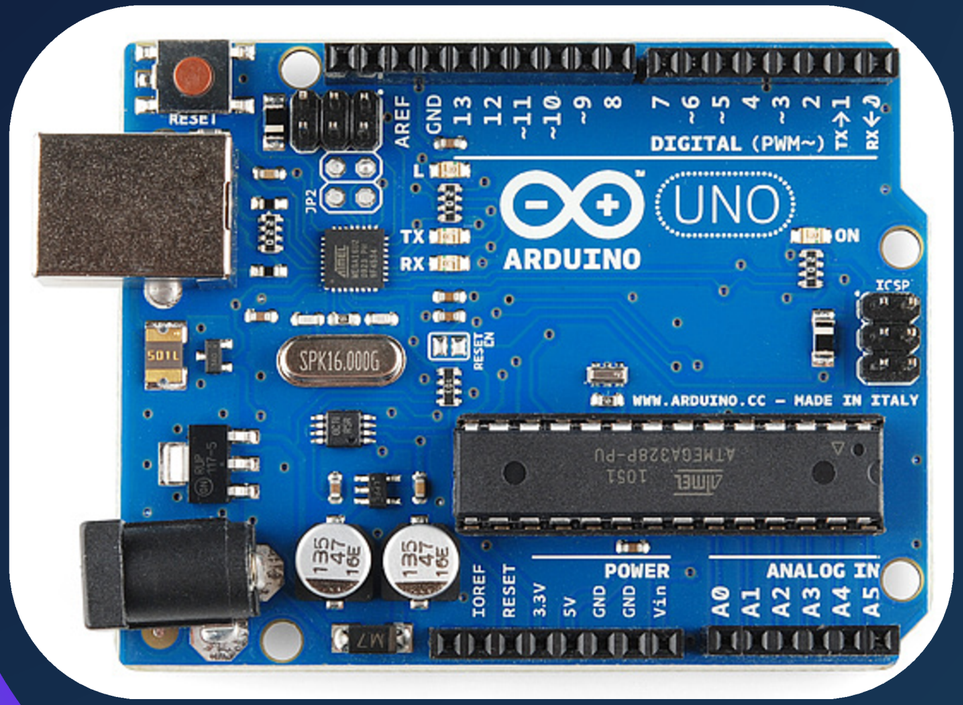
1- Blinking LED.
2-RGB LED.
3-Servo motor

- **Written part includes all material related to the 3 experiments.**
- **Practical part includes designing circuits using Tinkercad.(with coding for Blinking LED & Servo motor) (without coding for RGB LED)).**

Type of questions **(Written): Tick True or False, Fill in the blank, match.**

The material is on LMS - Resources section.

Arduino Experiment 1: Blinking LED



Rose Barakat

WHAT IS TINKER CAD?

A simulation tool to build and test circuits online.

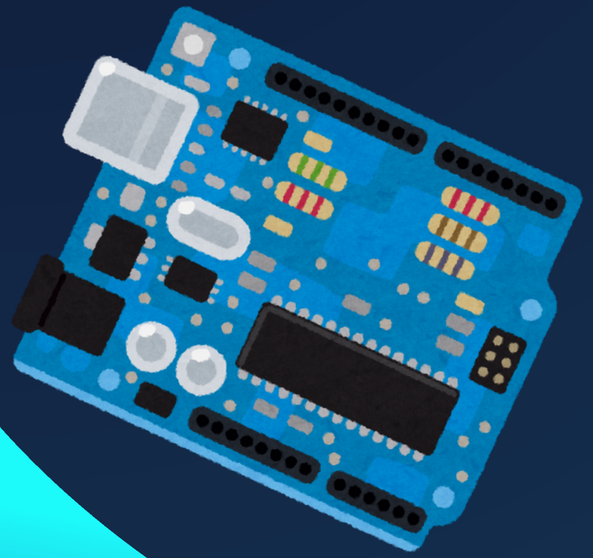
Why Use It?

No need for physical components, easy debugging

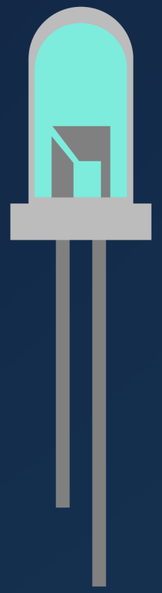
SETTING UP THE CIRCUIT

Components Needed:

1- Arduino

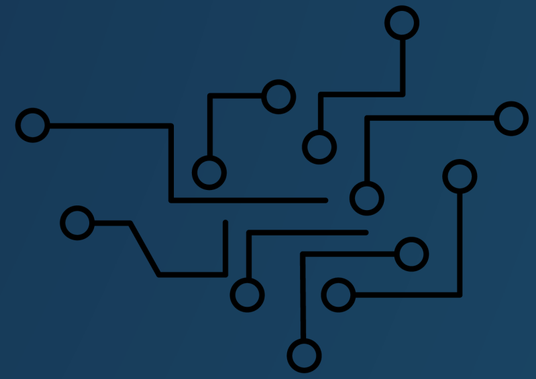


2- LED

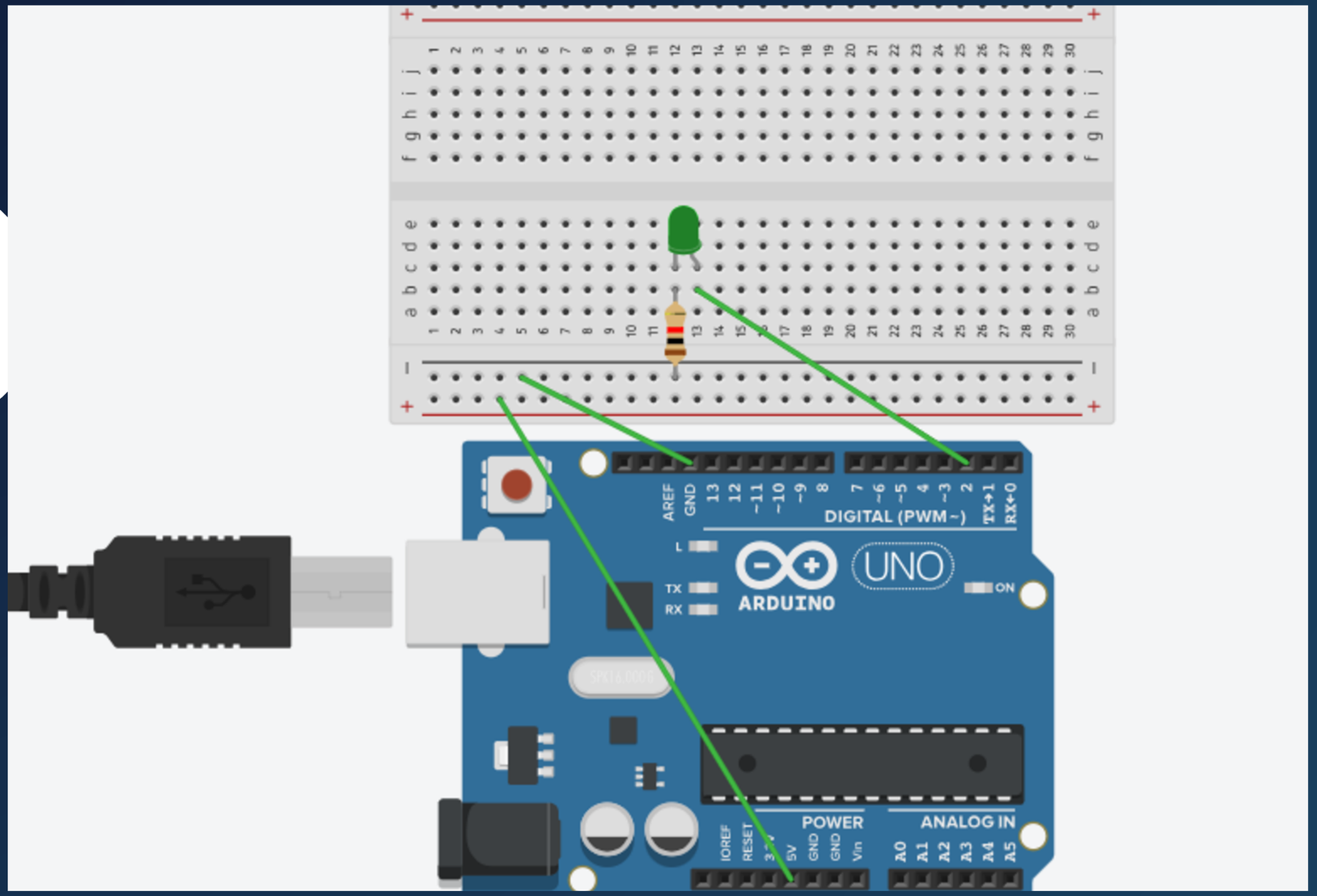


3- Resistor

4- Wires



THE CIRCUIT



CODE PART

Explanation

void setup() {} Runs once, setting pin modes
void loop() {} Repeats, controlling the LED
digitalWrite(Pin_Number, HIGH); Turns LED on
delay(1000); Waits for 1 second
digitalWrite(Pin_Number, LOW); Turns LED off
delay(1000); Waits again

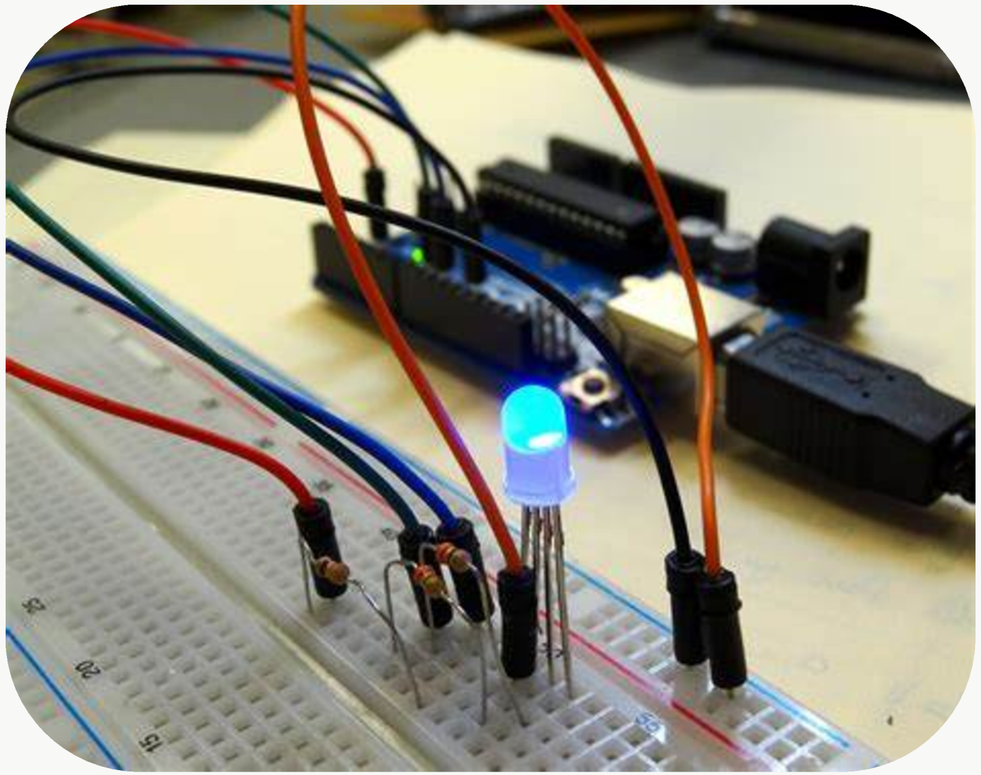
```
void setup()
{
  pinMode(2, OUTPUT);
}

void loop()
{
   digitalWrite(2, HIGH);
   delay(1000); // Wait for 1000 millisecond(s)
   digitalWrite(2, LOW);
   delay(1000); // Wait for 1000 millisecond(s)
}
```

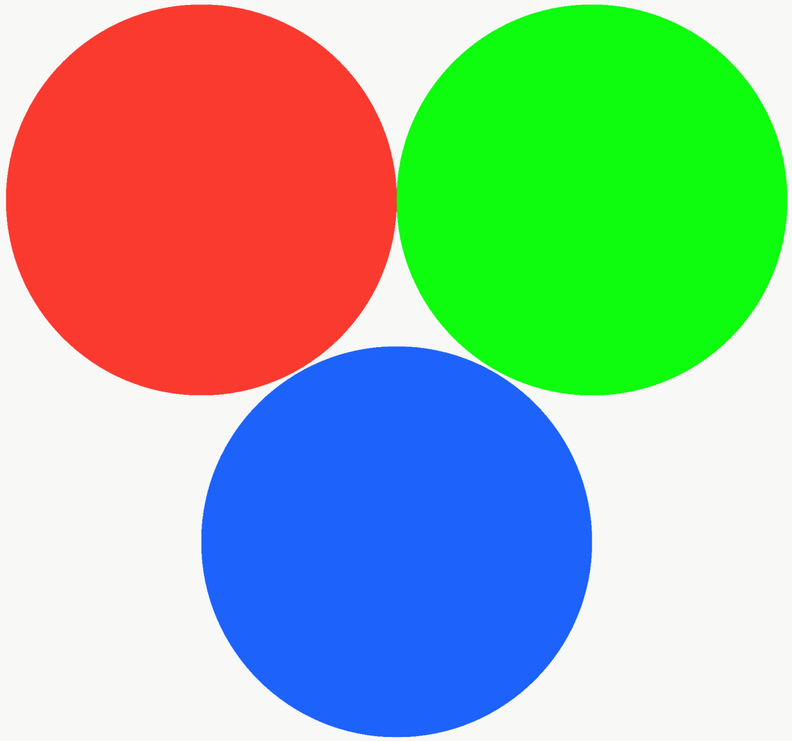
CODING CHALLENGE

Modify the delay time to make the LED blink faster/slower.

Arduino Experiment 2: RGB LED



WHAT IS RGB?



These three colors combine to create other colors by adjusting their intensity.

- Red: R
- Green: G
- Blue: B

"WHAT IS AN RGB LED?"

RGB LEDs are special lights that can emit different colors by adjusting the brightness of each individual LED (red, green, blue).

- Example: "By turning on all three LEDs (R, G, and B) at different intensities, we can create millions of colors."

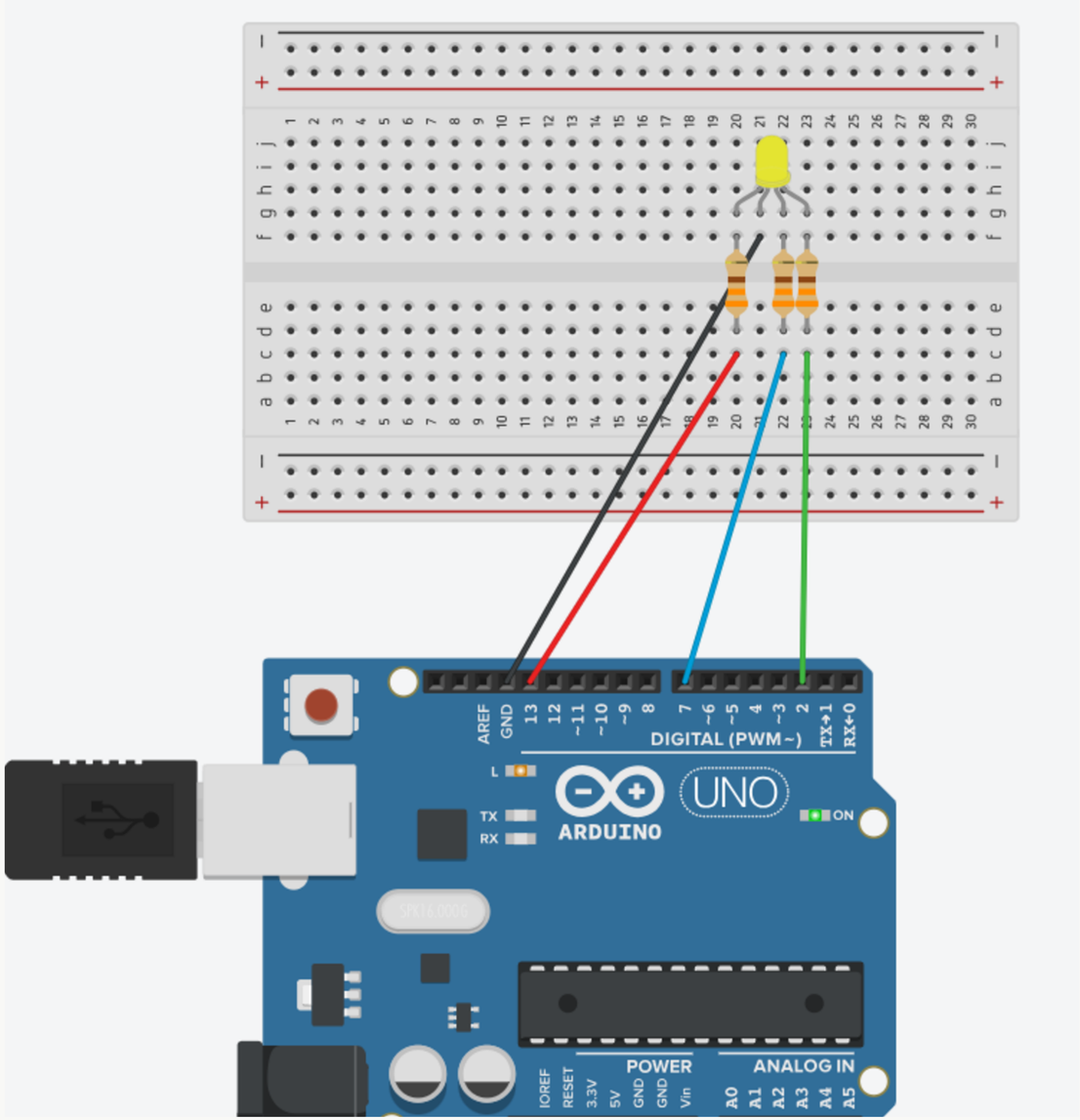
HOW RGB LEDS WORK WITH ARDUINO”

RGB LEDs have 4 pins:

Common Cathode (Ground), Red Pin, Green Pin and Blue Pin

- **"Each pin can be controlled by the Arduino to adjust the brightness of the color."**

THE CIRCUIT



CODE PART

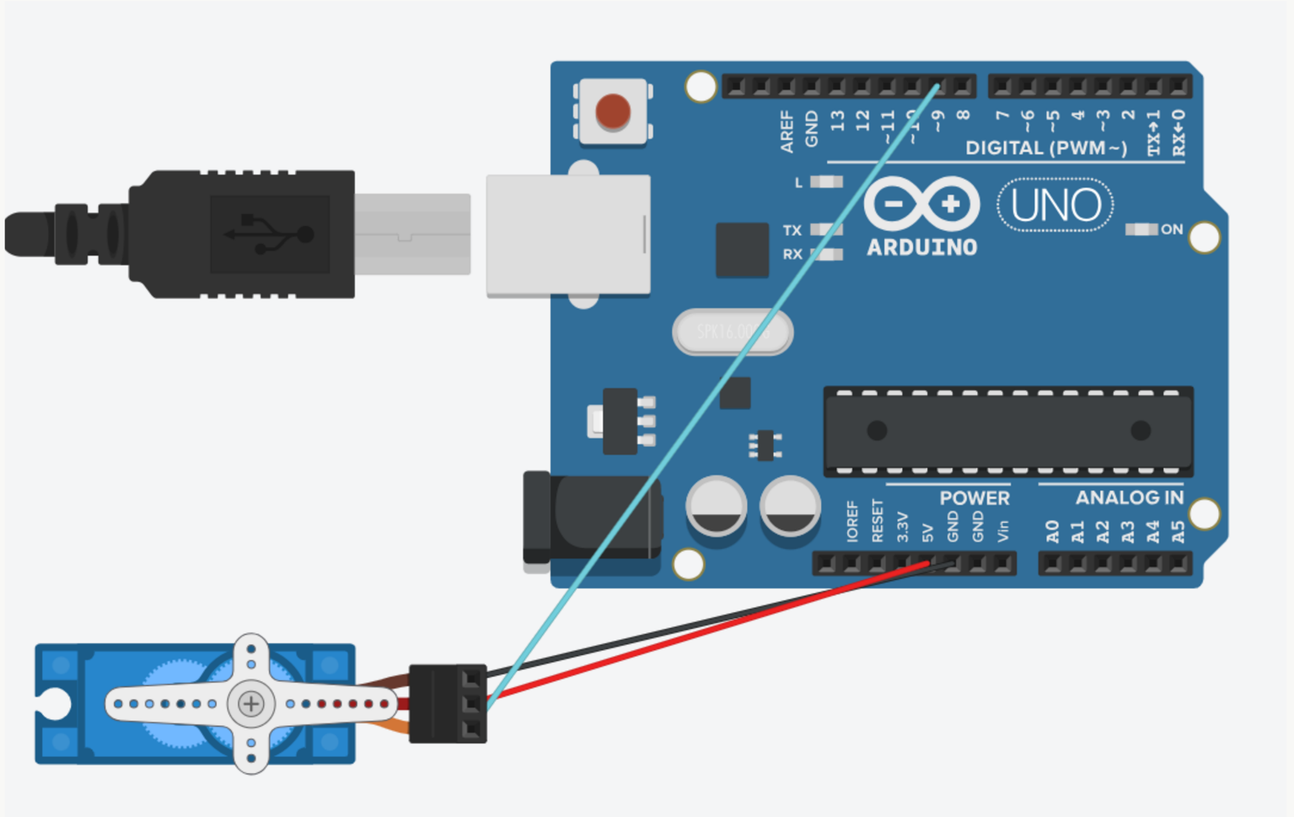
```
void setup()
{
  pinMode(2, OUTPUT);
  pinMode(7, OUTPUT);
  pinMode(13, OUTPUT);
}
```

```
void loop()
{
  analogWrite(2,255);
  analogWrite(7,0);
  analogWrite(13,255);
  delay(1000);

  analogWrite(2, 0);
  analogWrite(7, 255);
  analogWrite(13, 0);
  delay(1000);

  analogWrite(2, 0);
  analogWrite(7, 0);
  analogWrite(13, 255);
  delay(1000);
}
```

Arduino Experiment 3: Servo motor



WHAT IS SERVO MOTOR?

- **A servo motor is a small, powerful motor . It is commonly used in robotics, automation systems, and remote-controlled devices.**

MATERIALS NEEDED:

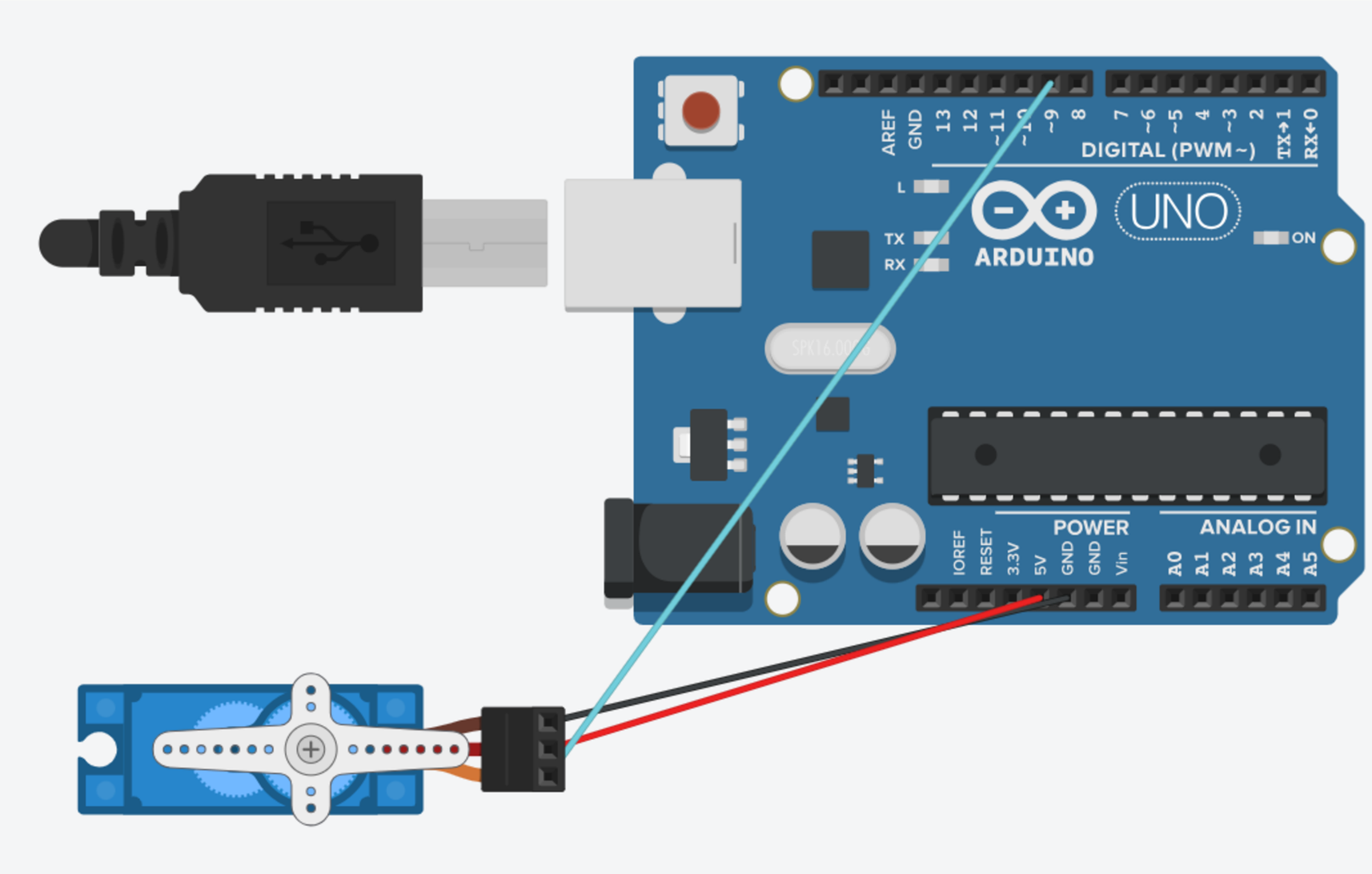
- Arduino board (e.g., Arduino Uno)
- Servo motor
- Jumper wires
- Breadboard (optional)

HOW SERVO MOTOR WORKS WITH ARDUINO"

A servo motor has three pins:

- **Power (VCC): Connect this to the 5V pin of the Arduino.**
- **Ground (GND): Connect this to the ground (GND) on the Arduino.**
- **Control (Signal): This connects to one of the pins on the Arduino (e.g., pin 9, pin 10).**

THE CIRCUIT


AREF
GND
13
12
~11
~10
~9
8
7
~6
~5
4
~3
2
TX→1
RX←0
DIGITAL (PWM~)
L
TX
RX
ARDUINO
UNO
ON
POWER
ANALOG IN
IOREF
RESET
3.3V
5V
GND
GND
Vin
A0
A1
A2
A3
A4
A5

CODE PART

```
void setup()


{
  servo.attach(9);
}
```

```
void loop()
{
  servo.write(180);
  delay(1000);
 }
```

you need to include <servo.h> library.