# IT-Midterm Study guideline for grade 8

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

**1- Blinking LED.**
**2-Blinking LED with push button.**
**3-RGB LED.**

- **Written part includes all material related to the 3 experiments.**
- **Practical part includes designing circuits using Tinkercad.( without writing code).**

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

**The material is on LMS - resources part.**

# 1. The setup() Function

```
2  void setup() {
3    // put your setup code here, to run once:
4
5  }
6
7  void loop() {
8    // put your main code here, to run repeatedly:
9
10 }
```

- The setup() function runs once when the Arduino is turned on or reset.
- It is used to set up everything you need, like setting pins as inputs or outputs and starting communication (e.g., with the serial monitor).

Why is it important?

- This function prepares everything for the program to work properly.

# 1. The loop() Function

```
2  void setup() {
3    // put your setup code here, to run once:
4
5  }
6
7  void loop() {
8    // put your main code here, to run repeatedly:
9
10 }
```

- The loop() function runs over and over as long as the Arduino is powered.
- It is where most of the actions happen — this function keeps running your code, like reading sensors or turning on/off devices.

Why is it important?

- This function allows your Arduino to repeat tasks continuously without stopping.

# Example:

```
void setup() {
  pinMode(13, OUTPUT);  // Set pin 13 as an output pin
}

void loop() {
  digitalWrite(13, HIGH);  // Turn the LED on
  delay(1000);             // Wait for 1 second
  digitalWrite(13, LOW);   // Turn the LED off
  delay(1000);             // Wait for 1 second
}
```

# What is pinMode?

- **pinMode() is a function used to set a pin on the Arduino board as either an input or an output.**
-

# Synatex:

## pinMode(pin, mode);

- pin: The pin number (e.g., 13, A0, etc.).
- mode: The mode you want to set for the pin:
- INPUT: For reading data.
- OUTPUT: For sending data.

## digitalWrite()

- **Purpose: This function is used to send a HIGH or LOW signal to a digital pin (turn it on or off).**

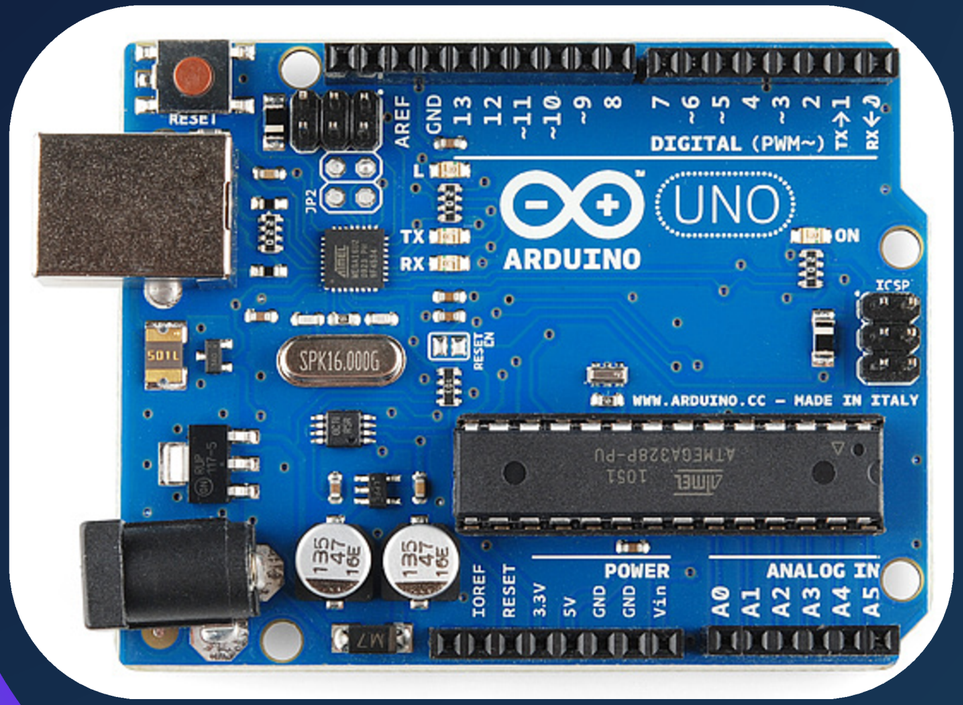
digitalWrite(13, HIGH);  (Turn on the LED connected to pin 13)
digitalWrite(13, LOW);  ( Turn off the LED)

## digitalRead()

**Purpose: This function reads the state of a digital pin (either HIGH or LOW).**

**digitalRead(pin);**

# Arduino Experiment 1: Blinking LED

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# WHAT IS TINKER CAD?

**A simulation tool to build and test circuits online.**

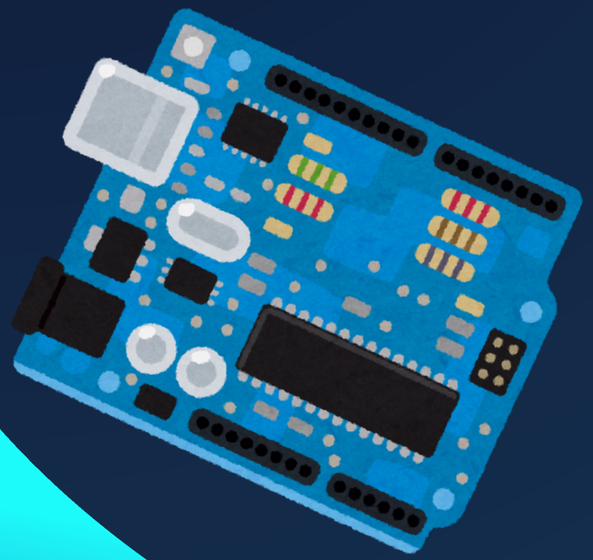
## Why Use It?

No need for physical components, easy debugging

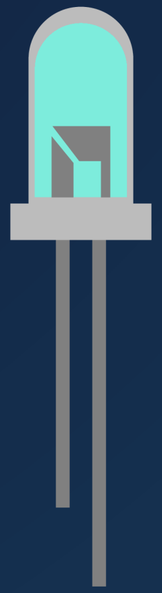
# SETTING UP THE CIRCUIT

## Components Needed:

1- Arduino

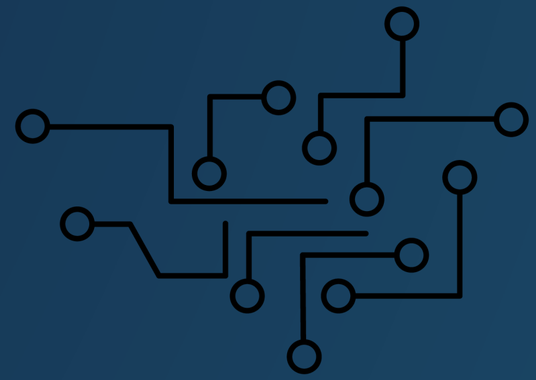


2- LED

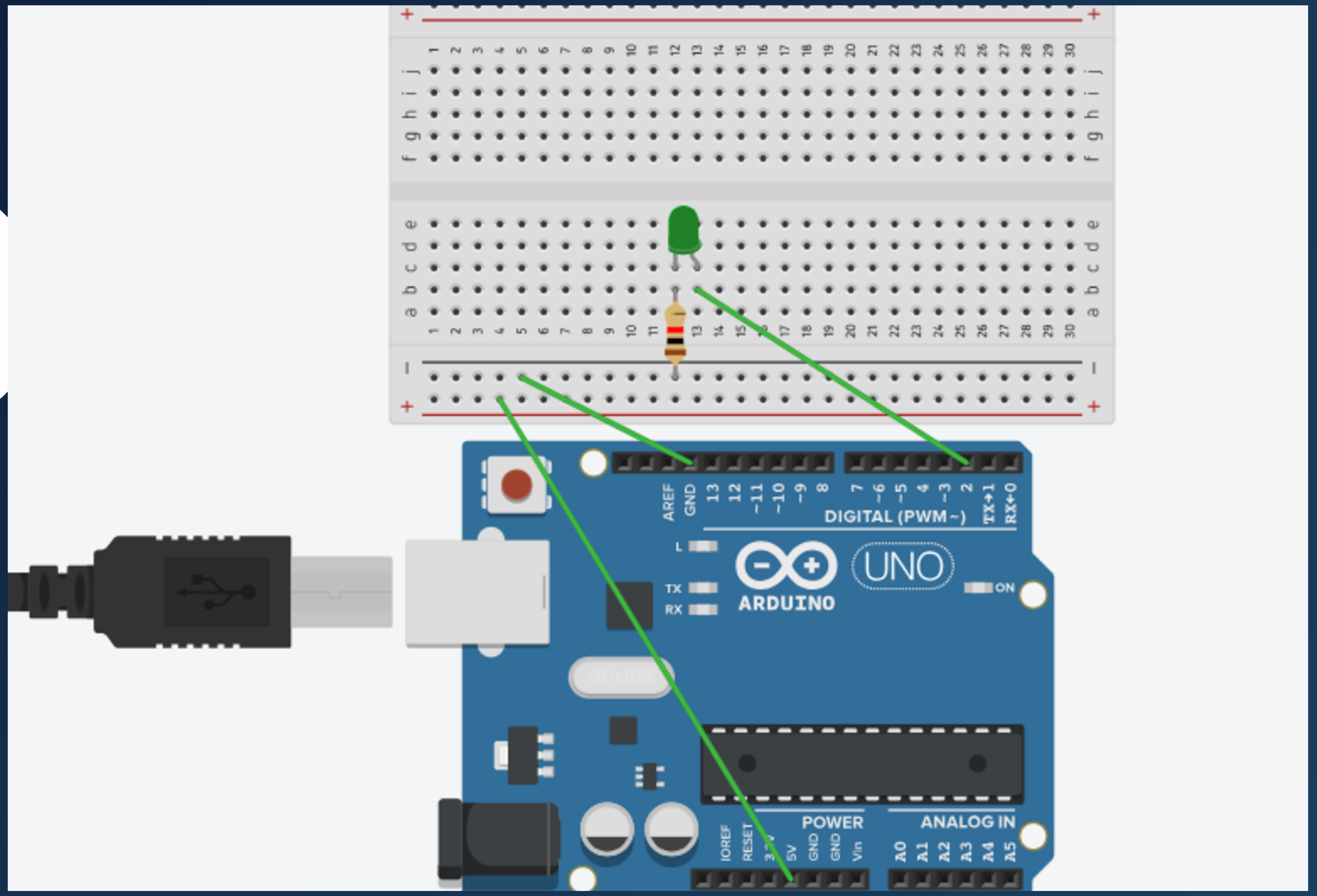


3- Resistor

4- Wires



# THE CIRCUIT



# CODE PART


```
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)
}
```

## 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

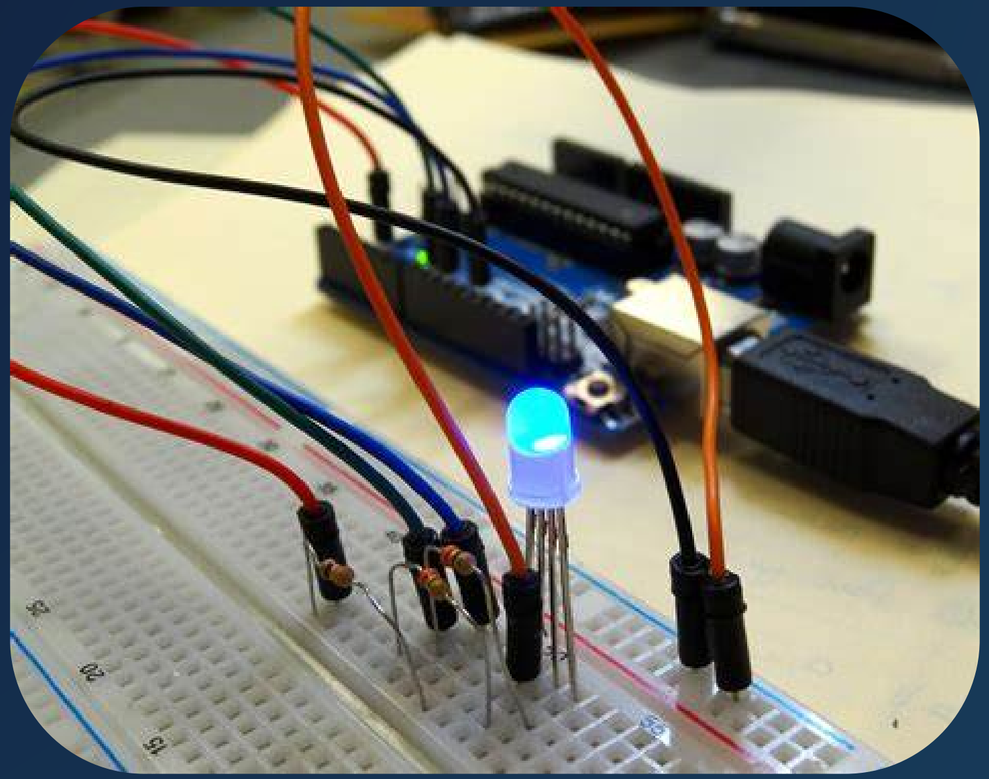
**digitalWrite(Pin_Number, LOW);** Turns LED off

**delay(1000);** Waits again

# CODING CHALLENGE

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

# Arduino Experiment 2:  RGB LED

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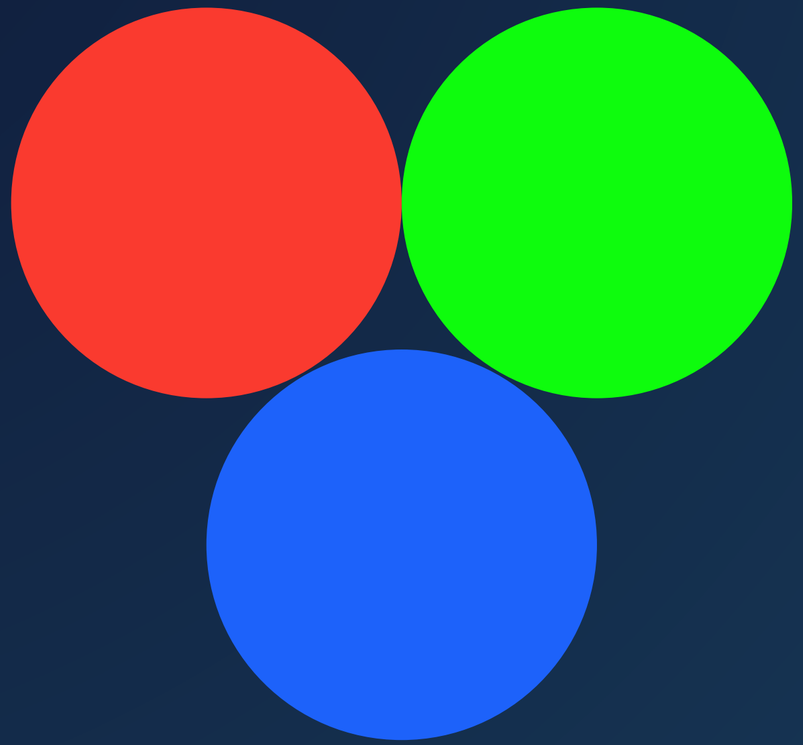
# WHAT IS RGB?



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).

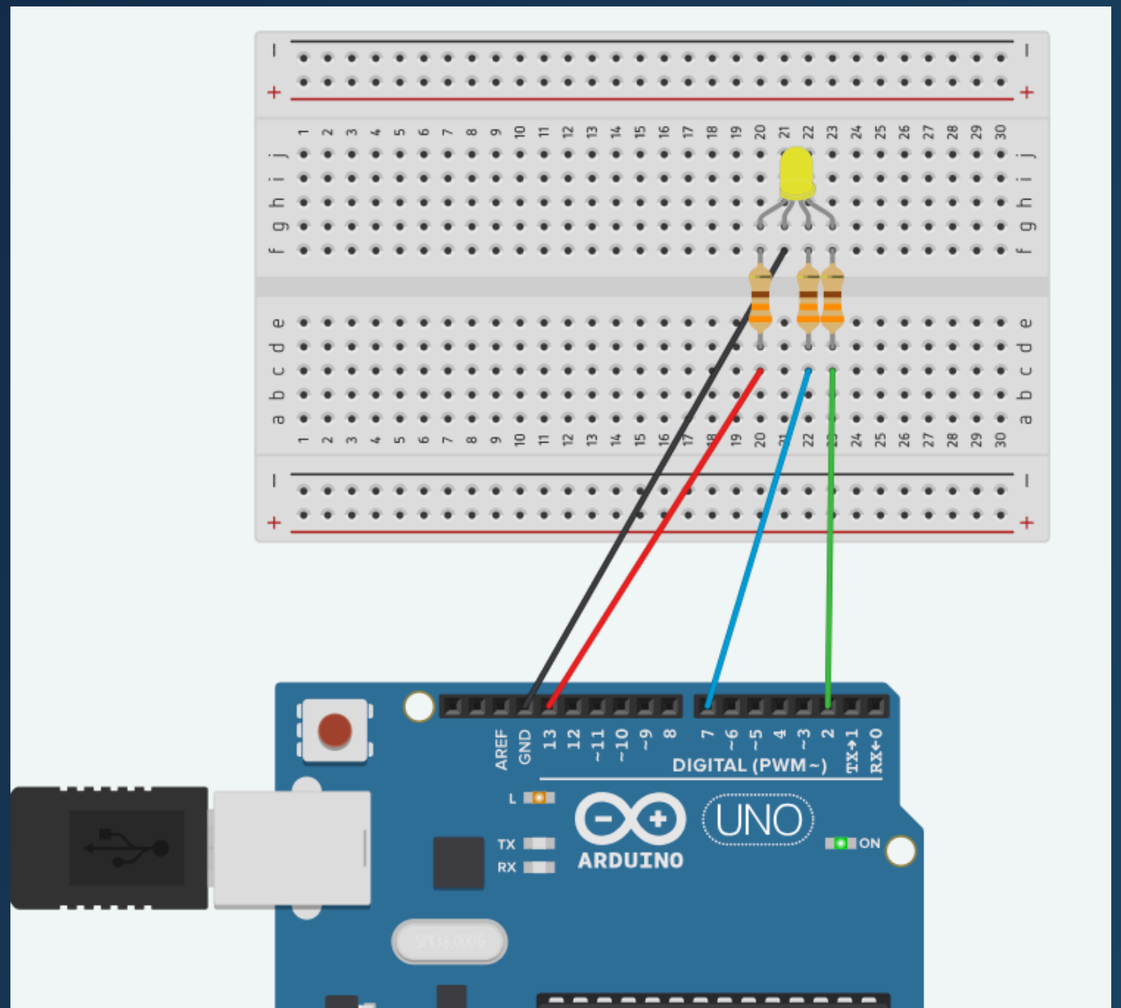
- Example: "By turning on all three LEDs (R, G, and B) at different intensities, we can create millions of colors."

# 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


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

# CODE PART

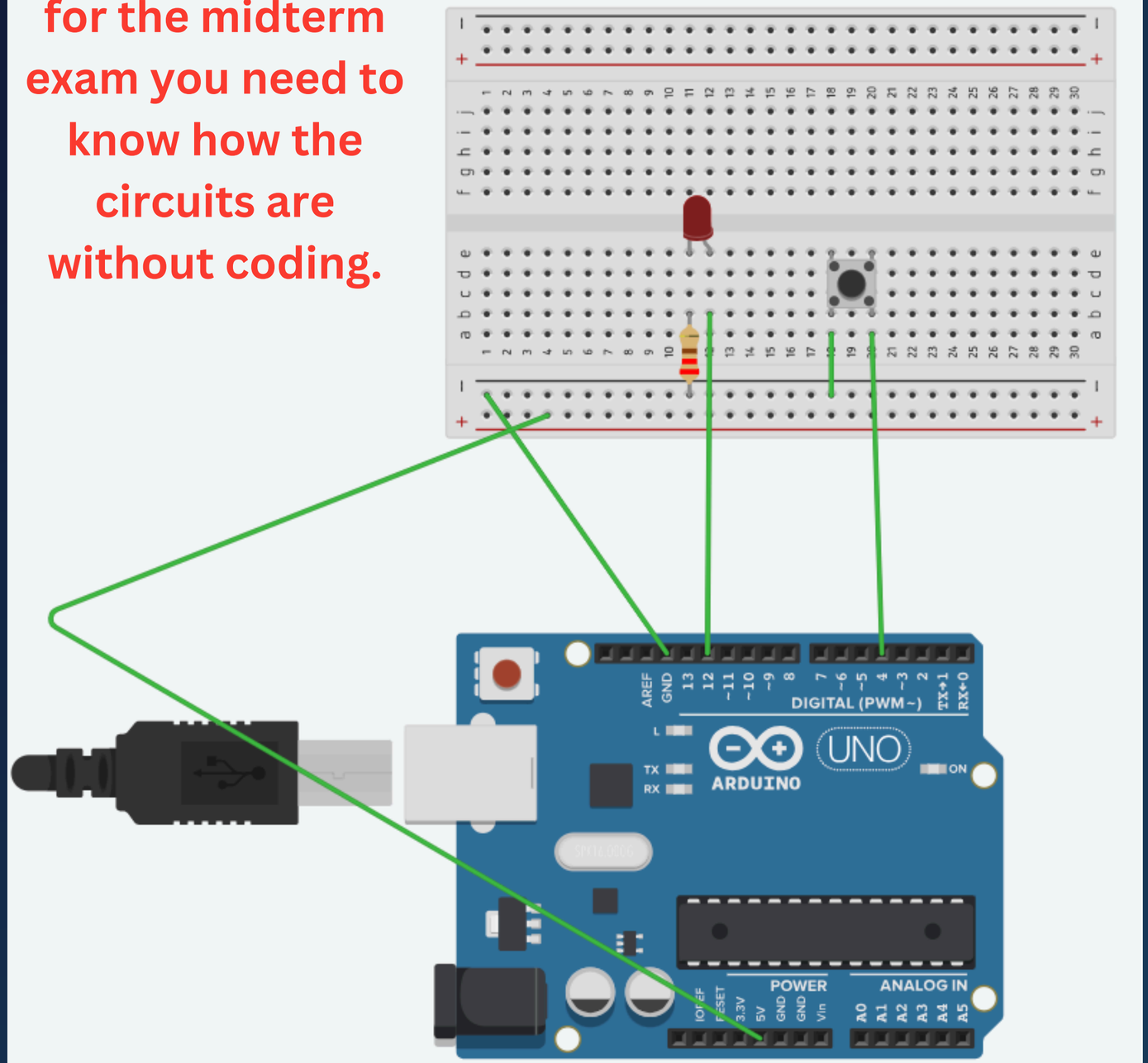
```
void setup()
{
  pinMode(2, OUTPUT);
  pinMode(7, OUTPUT);
  pinMode(13, OUTPUT);
}
```

```
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);
}
```

for the midterm exam you need to know how the circuits are without coding.




# adding push button to control a LED