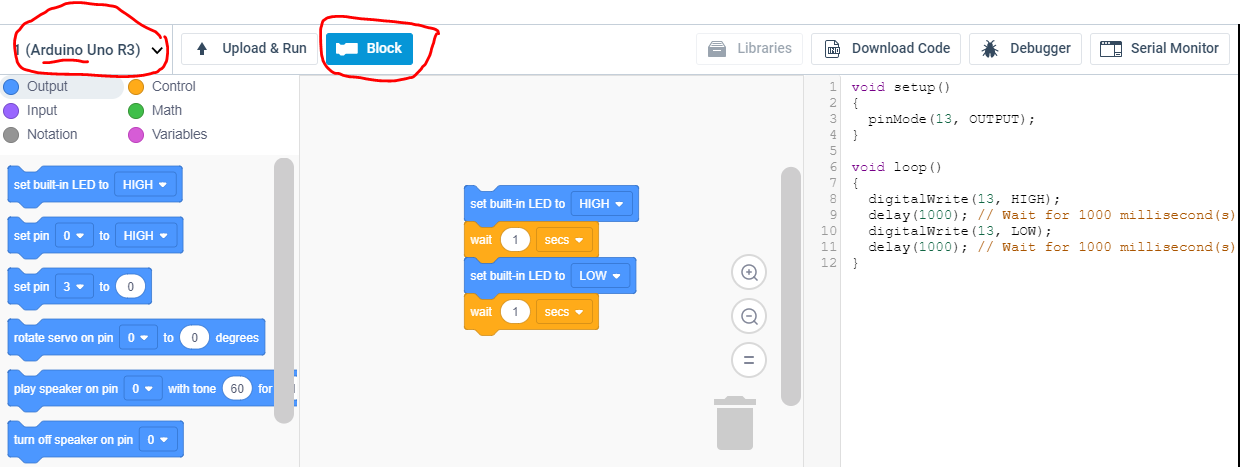
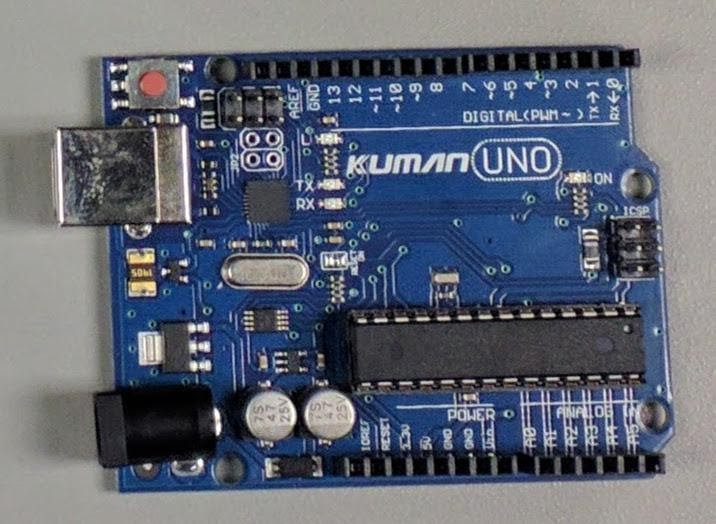
**iCREAT I - Module 2 - LAB 2:**

**Introduction to the Arduino & Tinkercad: LED**horizontal line 

# horizontal line

**Objectives**

* Learn about the Arduino IDE and Tinkercad
* Learn to read a diagram and draw one to represent your circuit
* Light up the embedded LED and manipulate it

**Required Resources:**

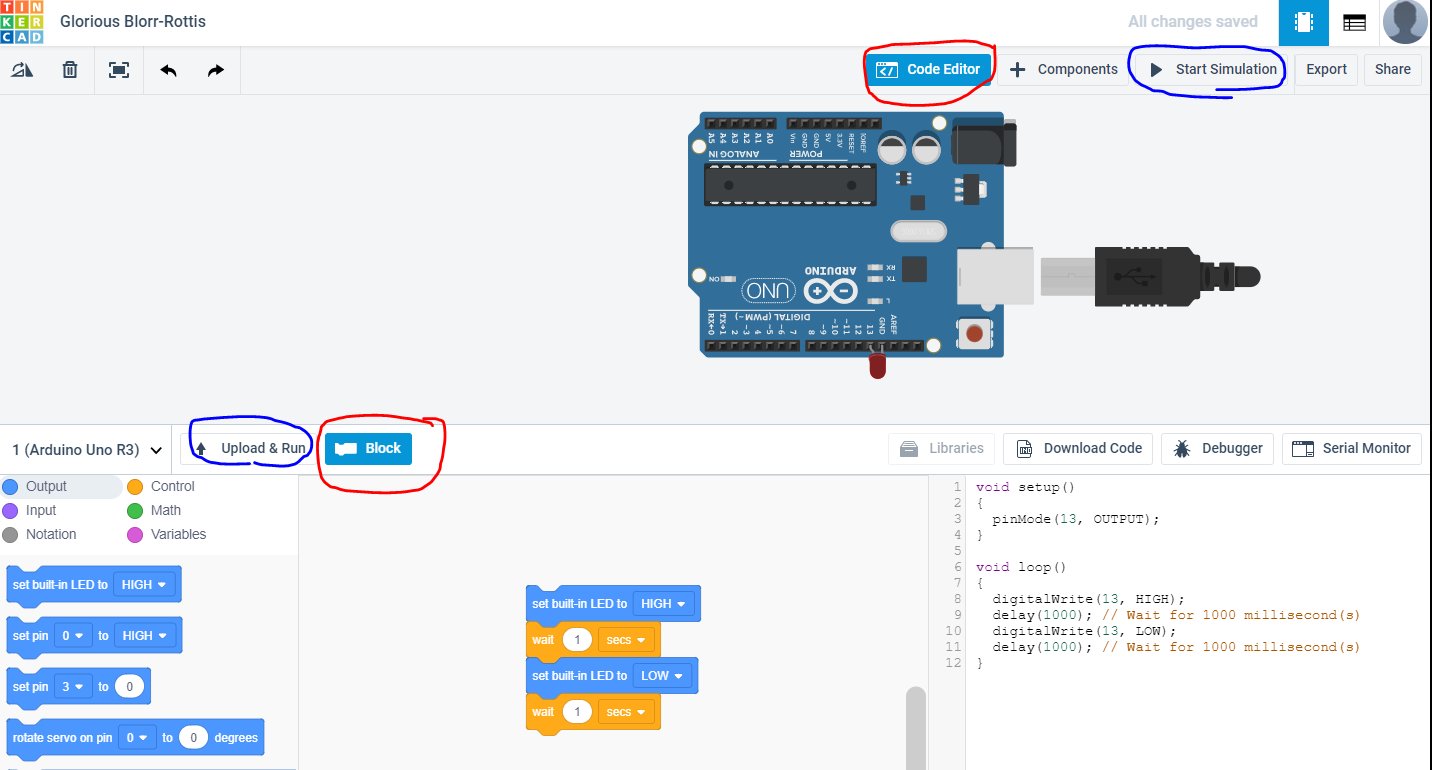
* Access to the Arduino IDE and Tinkercad
* An Arduino UNO connected to a computer
* Access to the iCREAT course and enough time to have fun!

**Part 1. Setting Up the Arduino IDE and Tinkercad**

Connect the board to the computer and click on the **Arduino IDE** icon to get started.

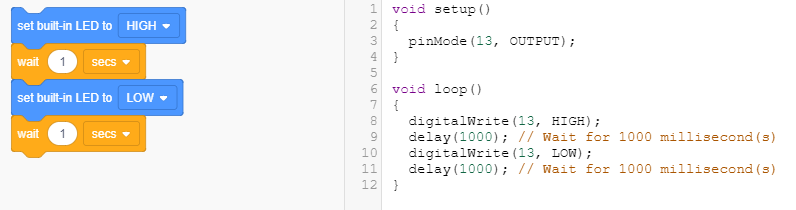
1. Under the **Tools->Board:** menu select the **Arduino/Genuino Uno** board.
2. Under **Tools->Port:** select the correct serial port assigned by your system **(COM1, COM2, . . . ).**  This may vary from computer to computer or day.
3. Once you have selected the board and port, **go to** [**https://www.Tinkercad.com**](https://www.tinkercad.com)to start **Tinkercad**, the simulation and block programming tool.  Login.
4. Tinkercad allows you to design your circuit and program it, using blocks that work very much like Scratch.  This is a simulation tool that will allow you to test your circuit design and your code before you use the hardware.
5. Once the simulation works as planned, you should copy and paste the text-based code to the **Arduino IDE** and upload it to your board.
6. Your program will control the Arduino and components as expected.
7. Changes you make in Tinkercad must be reloaded to the Arduino IDE to reflect any last minute changes.
8. If you change the Arduino code, it will **NOT** be reflected on your Tinkercad code.

**Part 2. Simulating Pin 13, the built-in LED with Tinkercad**

We will write code to blink the Arduino internal LED which is connected to **pin 13**.  But first, we simulate.  


[](https://www.tinkercad.com/)

1. Create a new circuit in **Tinkercad**.
2. Click on **Components** and drag an **Arduino Uno** and an LED to your work area.
3. Connect the LED to **pin 13** on the Arduino.  Make sure the long leg (+) is in **pin 13** and the short one on ground (**GND**).
4. Click on the **Code Editor** to see the generated blocks code.
5. Click on **Start Simulation** to run the code.
6. Does it work?

[](https://www.tinkercad.com/)

To turn on/off the internal LED, we must send (digitalWrite) voltage (HIGH) to the pin for a little while and then cut it off (LOW) for a little while. The internal LED is connected to **digital pin 13**.  To wait a little time between on/off we use a **delay** command.

1. **Copy and paste the code into the Arduino IDE**.
2. Upload it to your Arduino.
3. Does it work?
4. **Change your program** to make it blink faster.

**Part 3. Add a second LED.  Simulate and Upload**

1. **Add a second LED to your simulation.**
2. You will need to use additional wires to connect the LEDs to the Arduino.
3. Change the code (blocks or text).  Run the simulation.
4. Copy and Upload code to your Arduino.
5. Does it work?