Introduction of TinkerCAD

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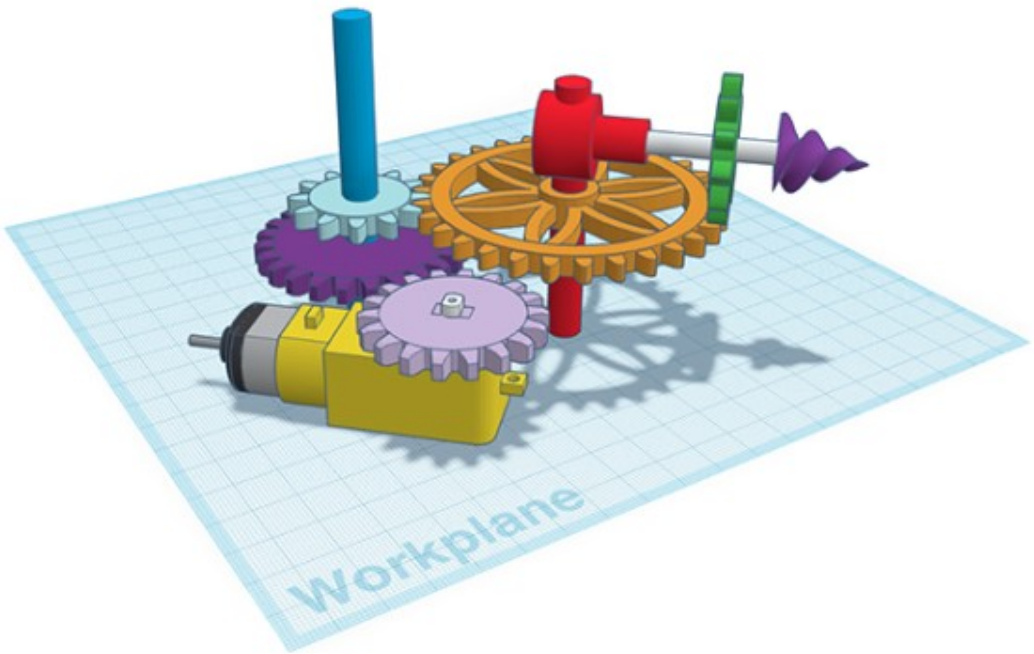
TINKERCAD®

From mind to design in minutes

Tinkercad is a free, easy-to-use web app that equips the next generation of designers and engineers with the foundational skills for innovation: 3D design, electronics, and coding!

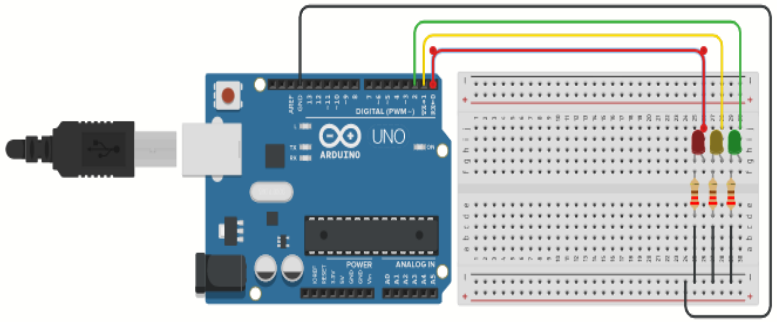
Start Tinkering | Join your class



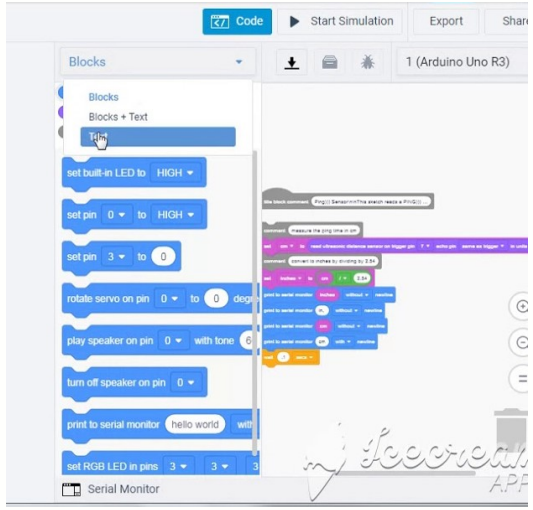
Design a Gear in 3D. Try it!

Introduction of TinkerCAD

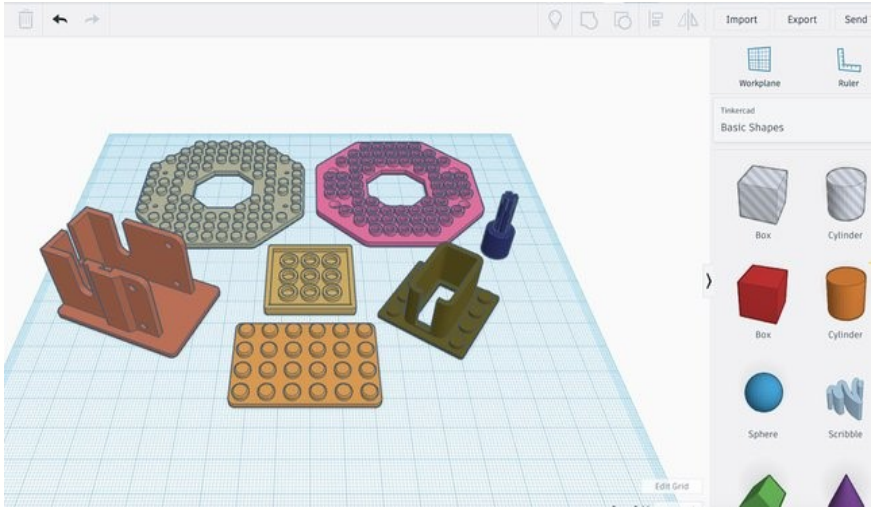
Tinkercad is a **free online collection of software tools** that help people all over the world think, create and make. We're the ideal introduction to Autodesk, the leader in 3D design, engineering and entertainment software.



CIRCUITS



Block Programming

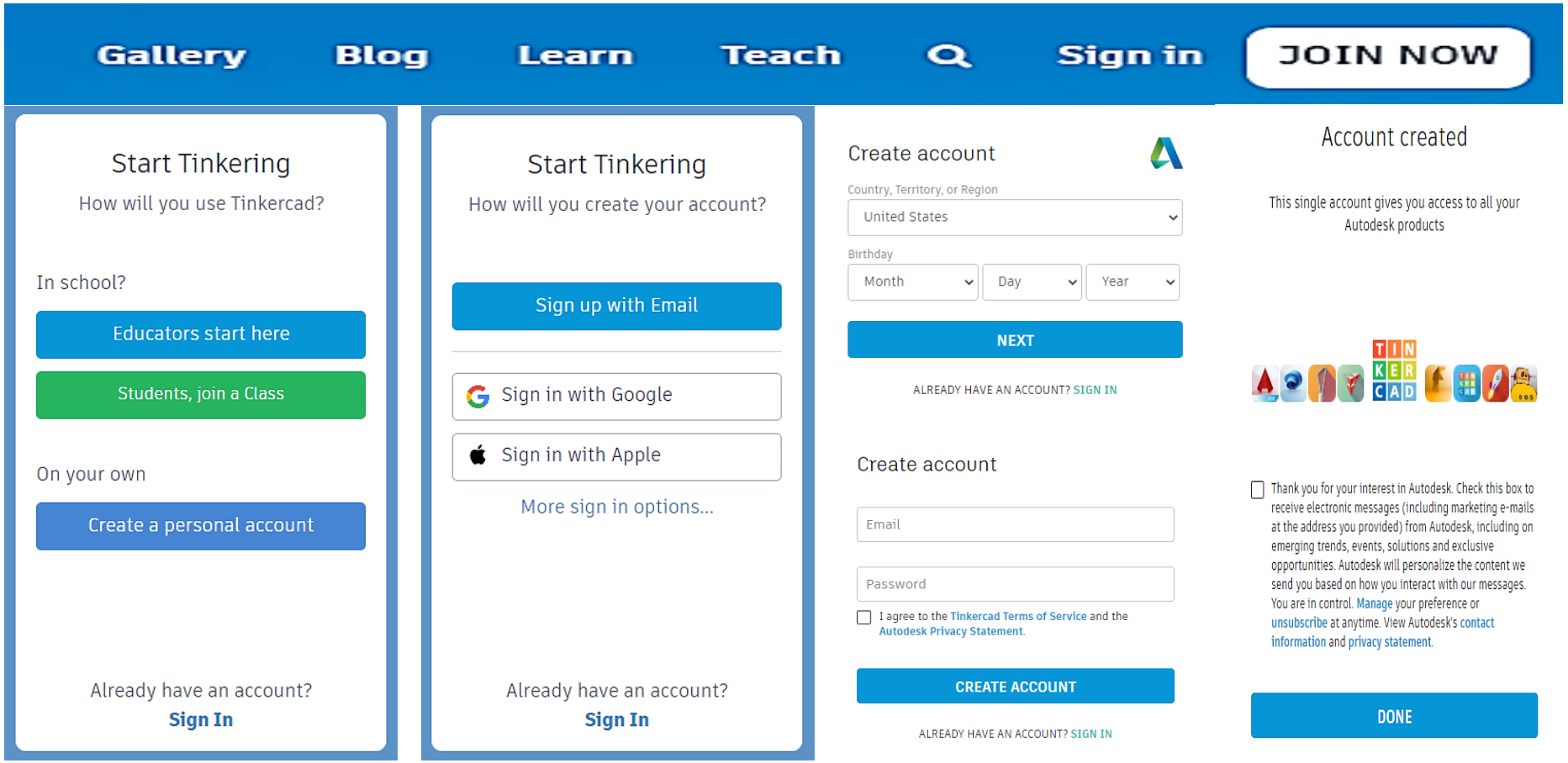


3D Design

LET GET STARTED *(Please prepare the Internet connection)*

1) Go to this link https://www.tinkercad.com/ because it is an ONLINE PLATFORM. So you need INTERNET to use it.

2) Login or Join Now to create a new account.



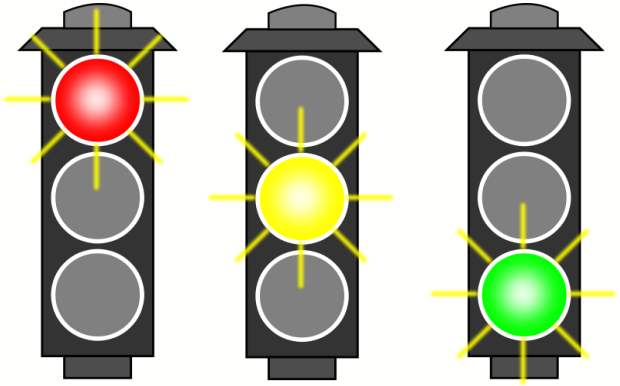
EXAMPLE 1
LED BLINKING

Learning Through Tinkercad

Example 1: LED Blinking

The process of turning on the LED for one second, then off for one second, repeatedly.

The Arduino Uno already has an on-board LED mounted on a digital pin 13.



OBJECTIVE

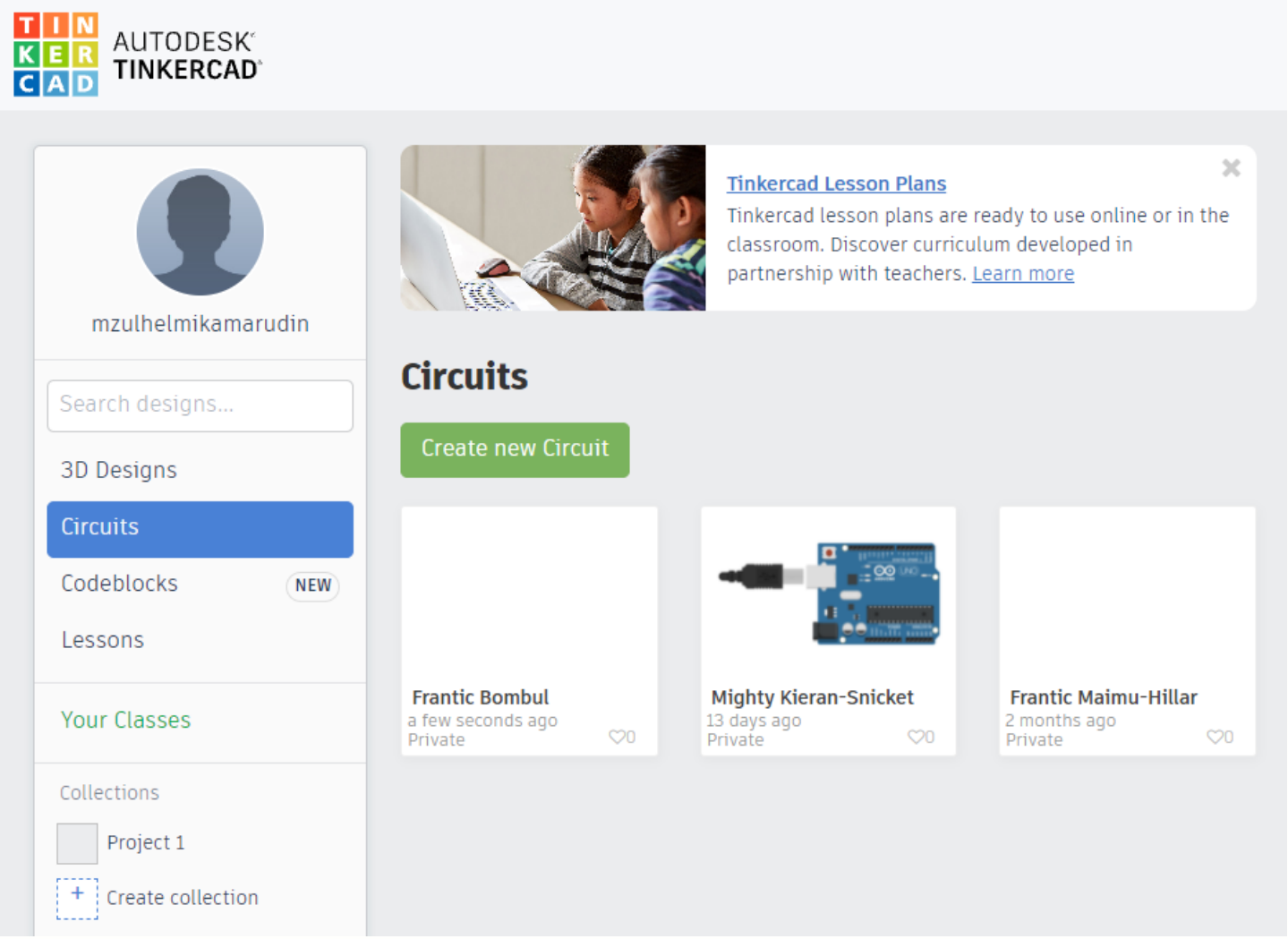
- To control the output of the arduino board.
- Serves as a guide for actuators or sensors.

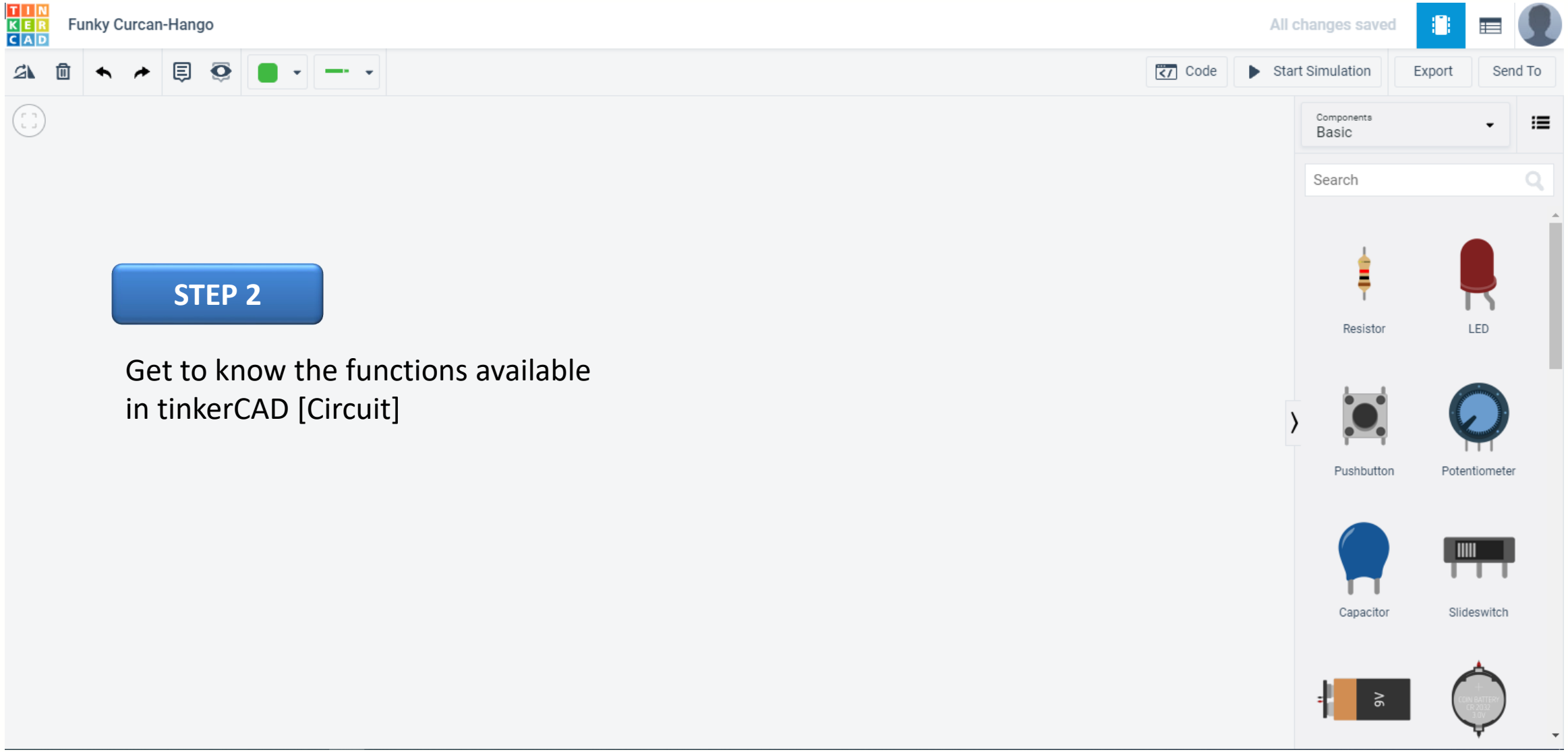
STEP 1

Go to the TinkerCAD website
https://www.tinkercad.com
Register an account and login

Go to the "Circuit" section for learning Electronics and Programming.

Select "Create New Circuit"





STEP 2

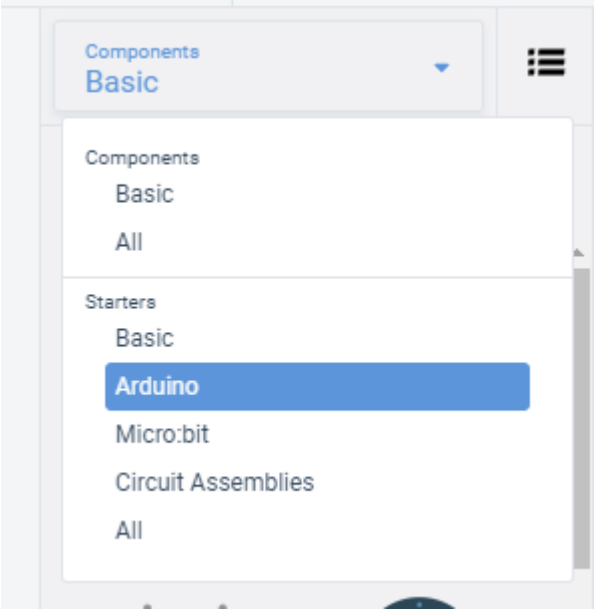
Get to know the functions available in tinkerCAD [Circuit]

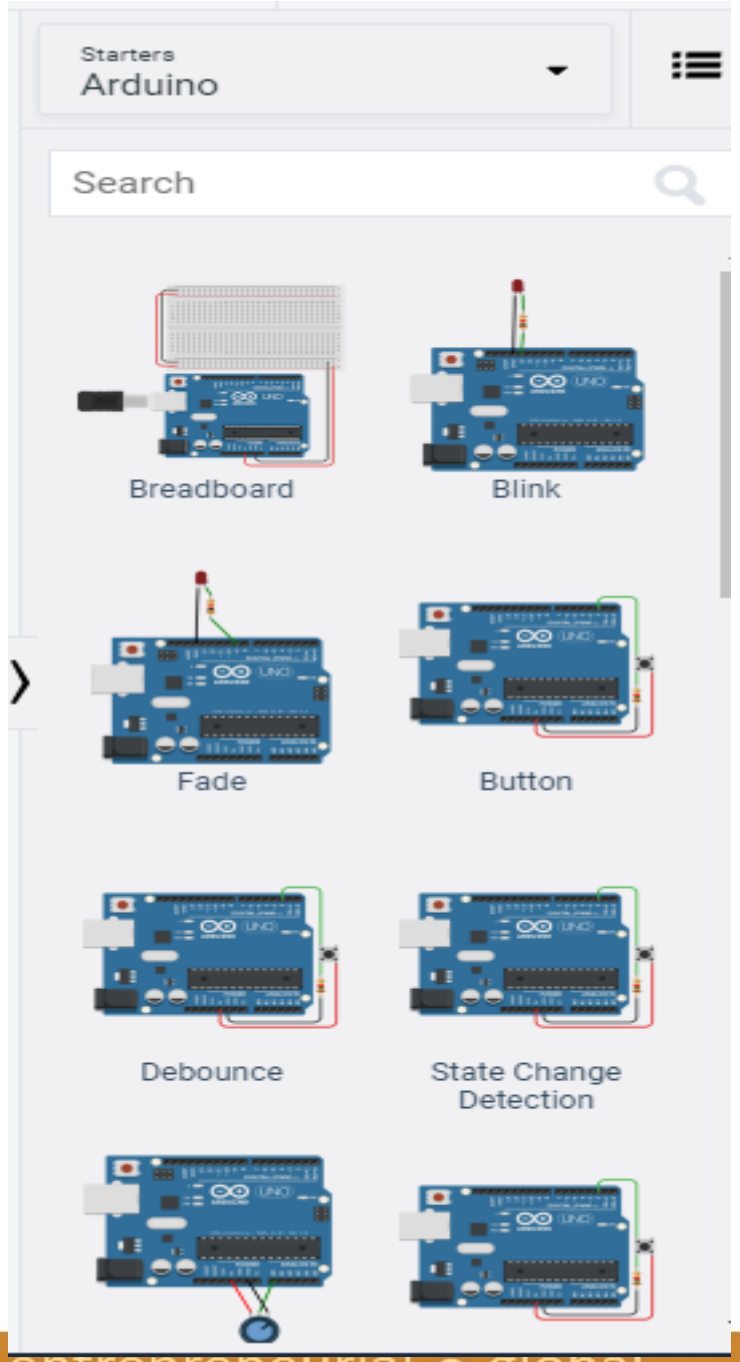
STEP 3

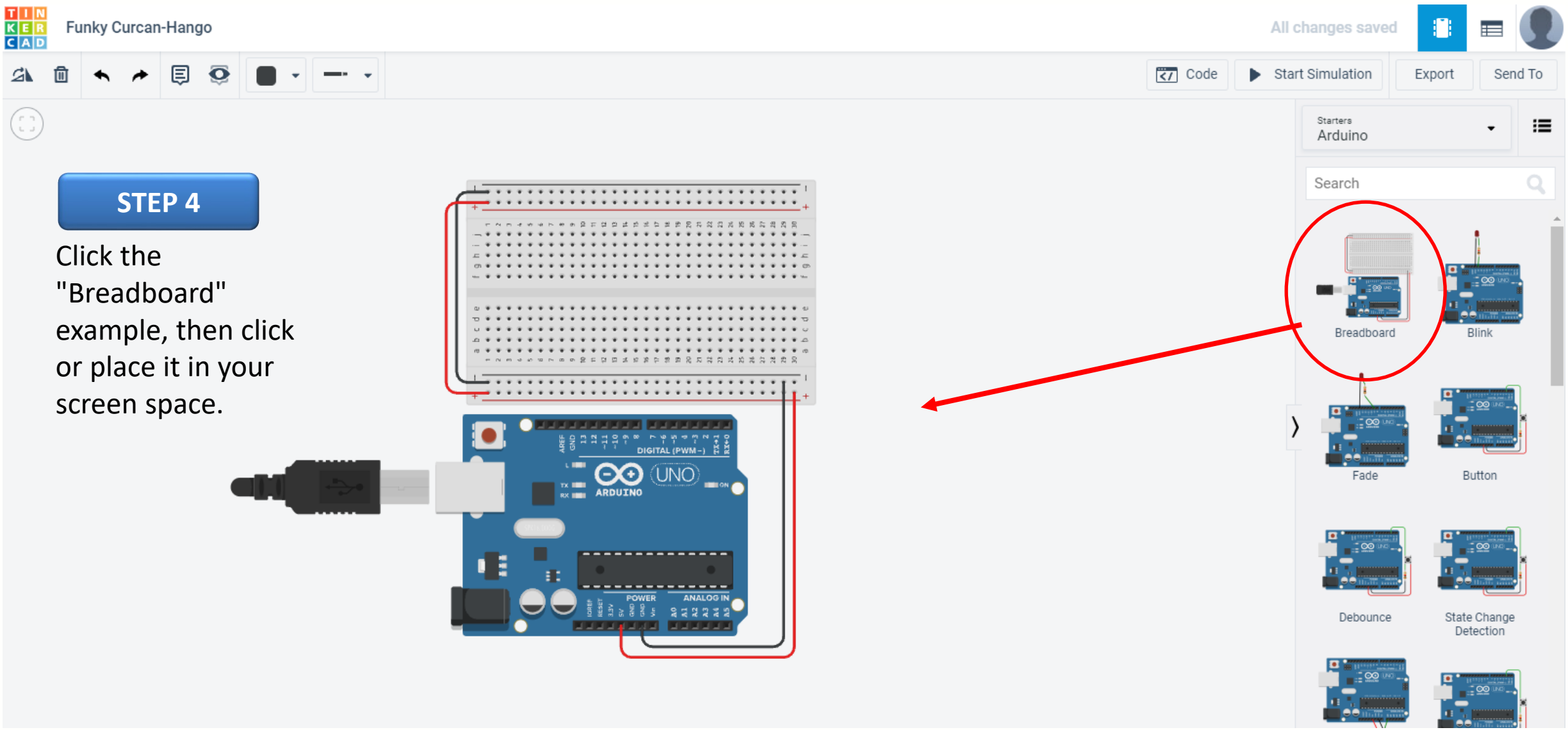
On the right, there is a list of "Components" and "Starter" for learning use.

Select Starter-> Arduino

Various examples of microcontrollers and components are available.






Funky Curcan-Hango
All changes saved
Code
Start Simulation
Export
Send To
Starters
Arduino
Search
Breadboard
Blink
Fade
Button
Debounce
State Change Detection
STEP 4
Click the "Breadboard" example, then click or place it in your screen space.
DIGITAL (PWM~)
UNO
ARDUINO
POWER
ANALOG IN

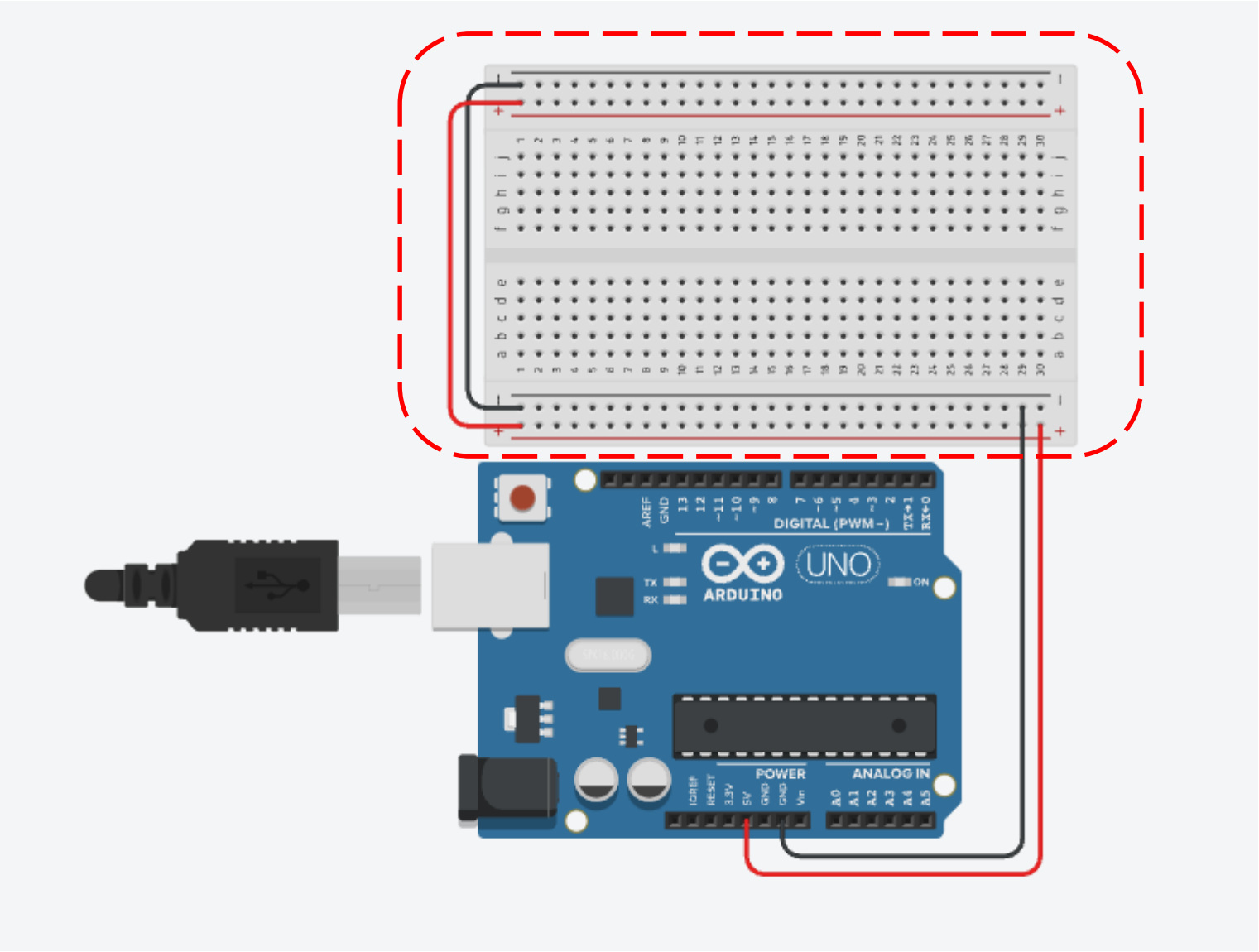
This is a workspace for installing electronics using Arduino Uno and Breadboard.

Color Reference

Red - power or Vcc / 5V / positive

Black - Ground / negative wire

Other2 Colors - Refers to input / output signals



STEP 5

Understand how to connect LEDs on an Arduino Through schematics drawings.

Components are required

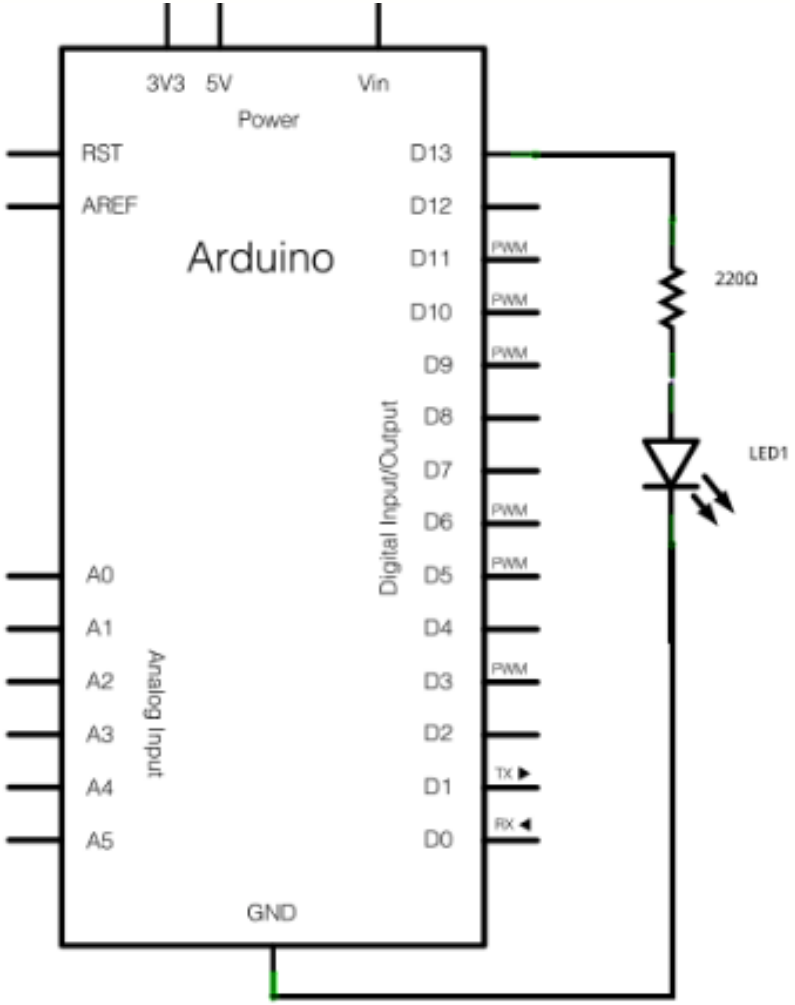
- Arduino Uno x1
- LED (red) x1
- Resistor (200 ohm) x1

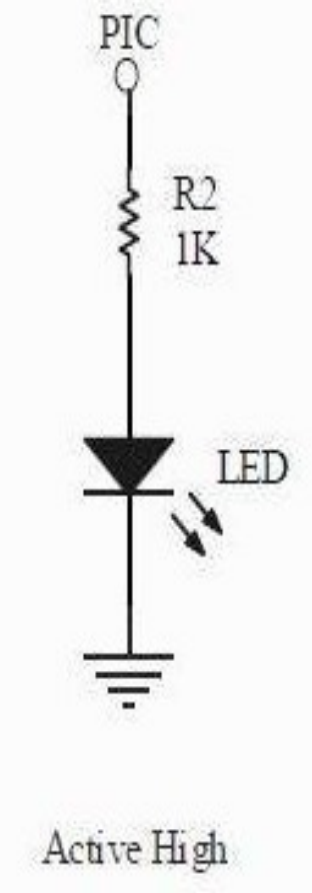
References

Connect Pin 13 of the Arduino Uno to the Resistor leg (200 ohms).

Connection from the Resistor, connected to the foot of the LED pin (anode Pin)

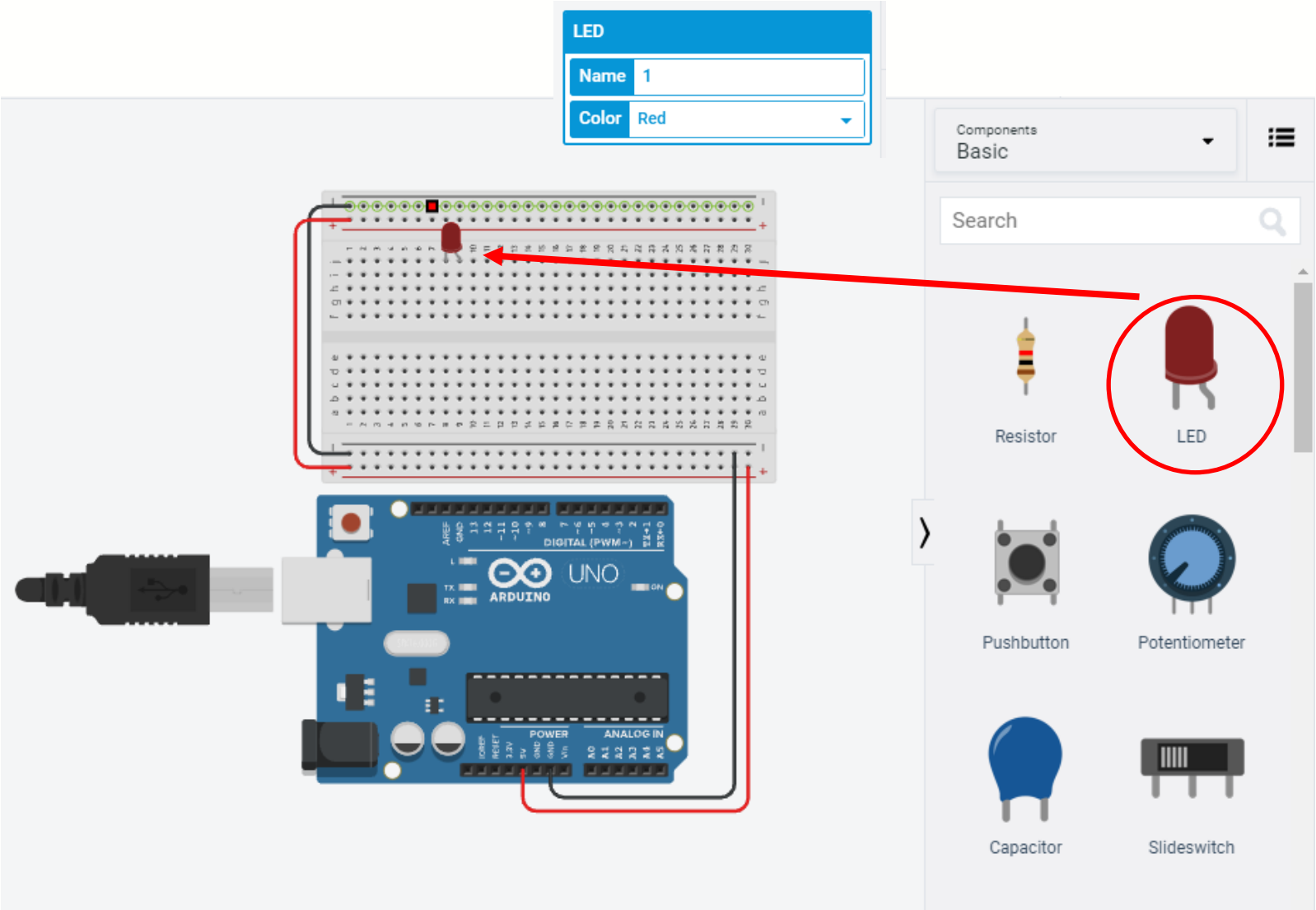
Finally, the LED (Cathode) Pin leg is connected to the Arduino Uno GND Pin





STEP 6

In the **"Component-basic"** section, select the **"LED"** component and place it on the breadboard.

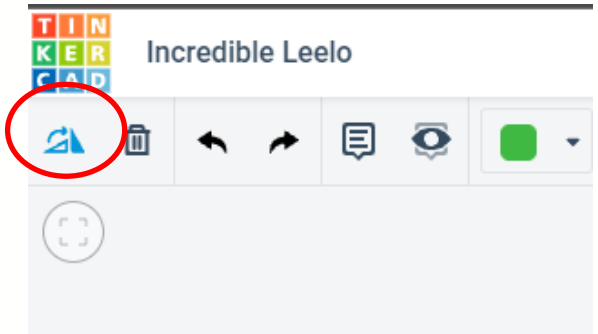


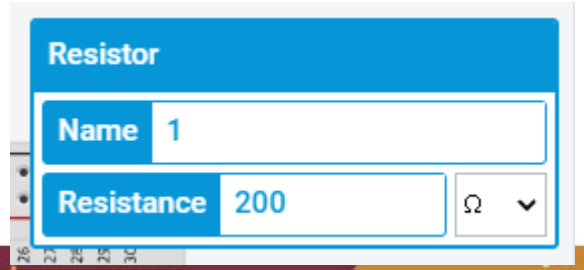
STEP 7

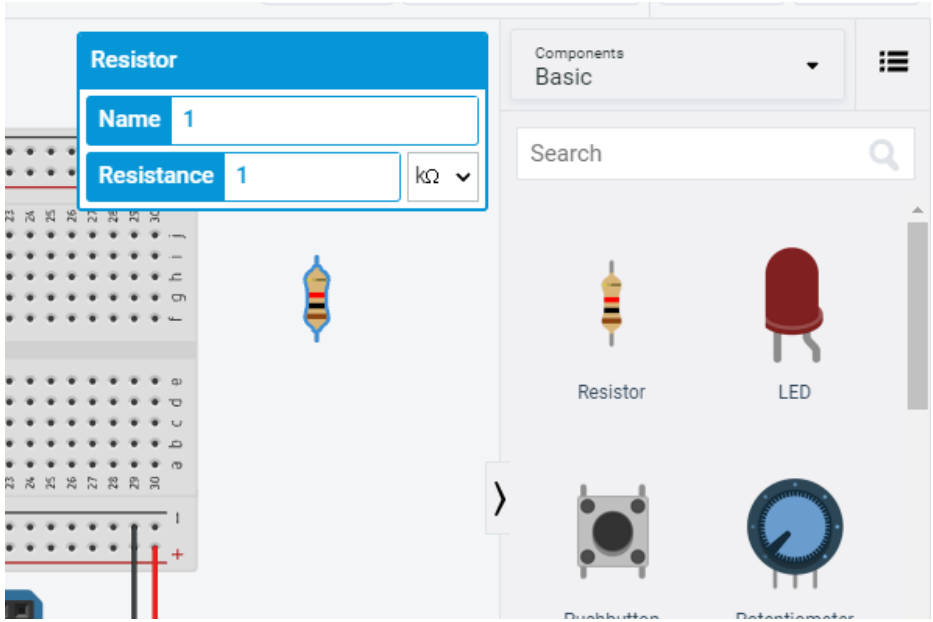
Next, select the "Resistor" component and place it in the outer space. This is because the resistor needs to be repositioned before being placed on the breadboard.

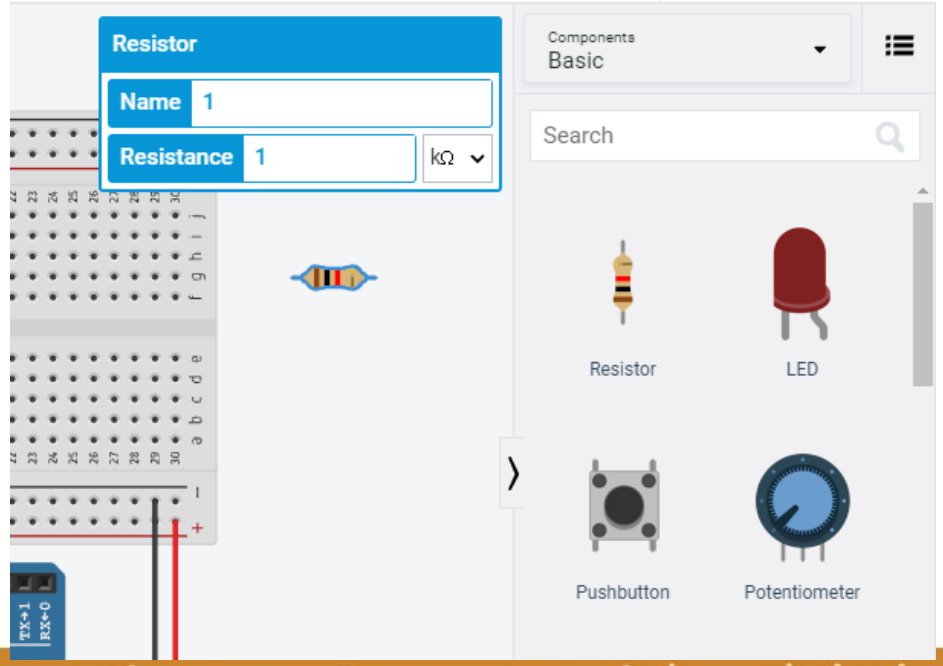
Use the "rotate" function to change the resistor to a 90 degree angle.

Then, set the value of the resistor to 200 ohms.



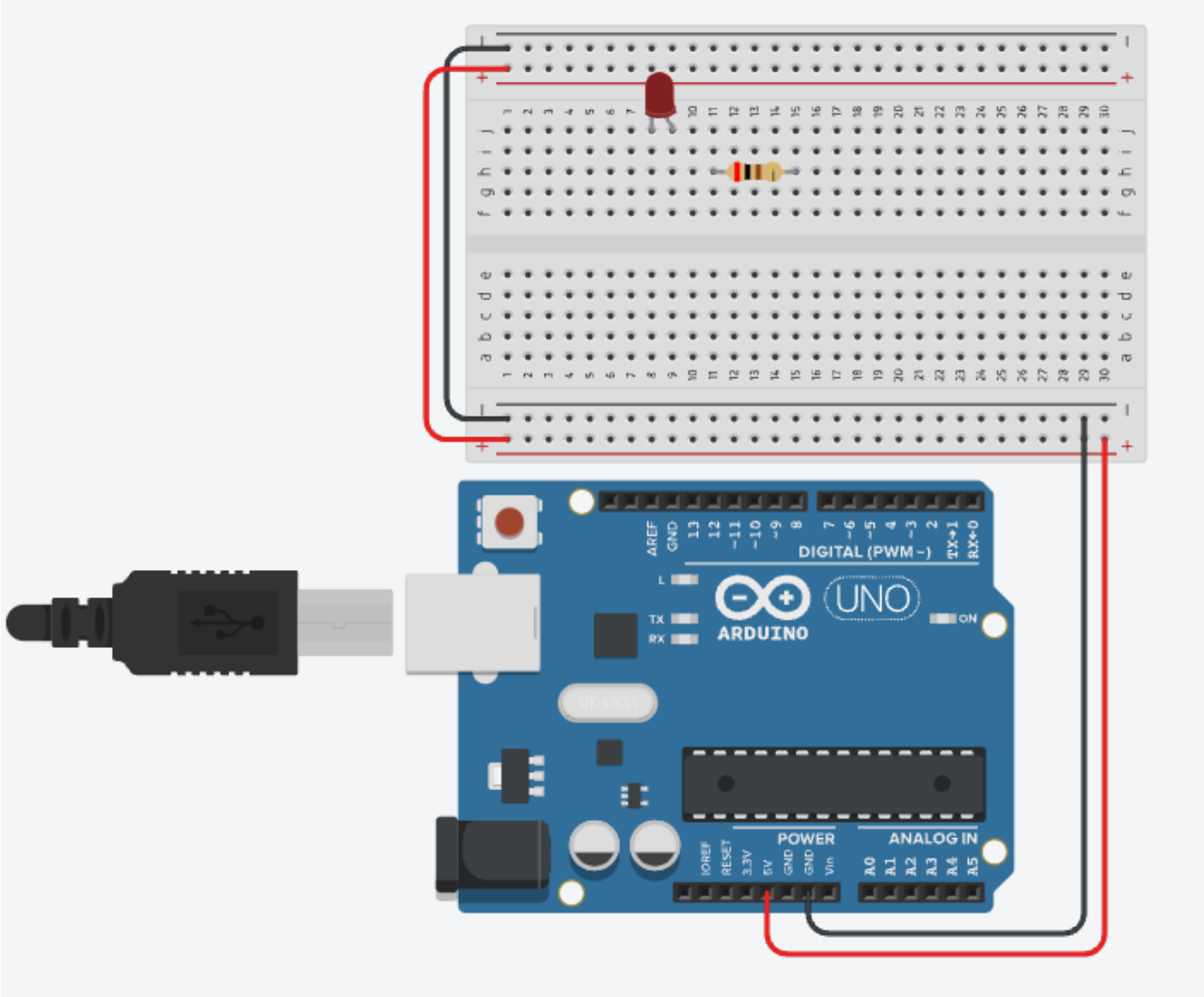


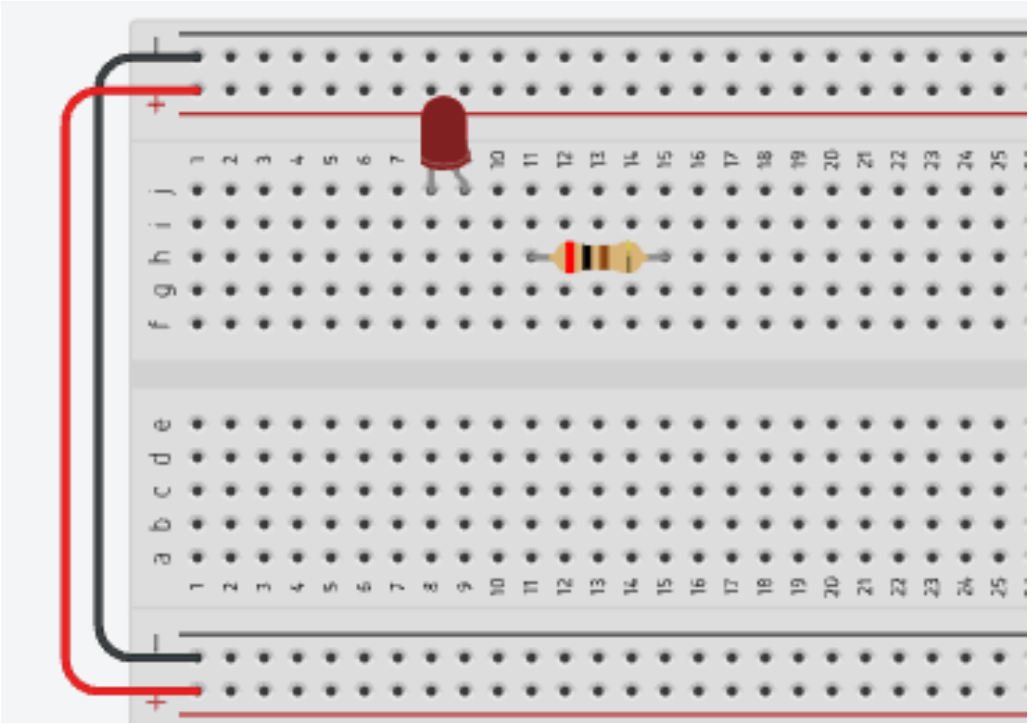


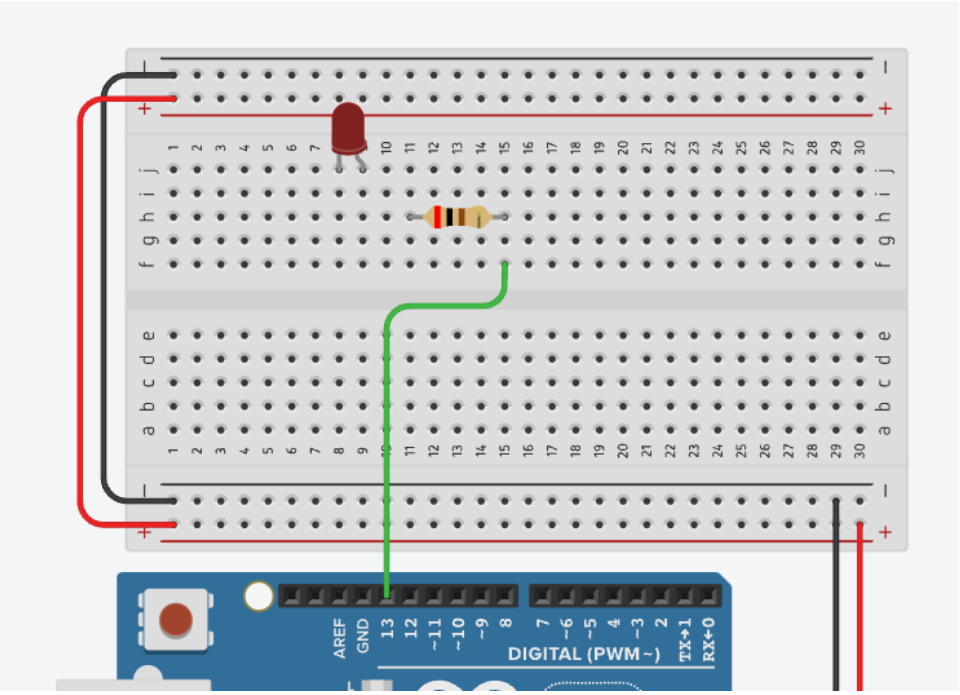


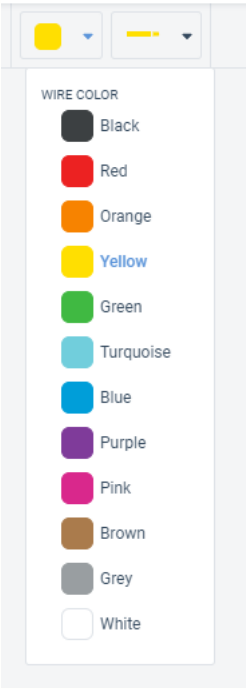
STEP 8

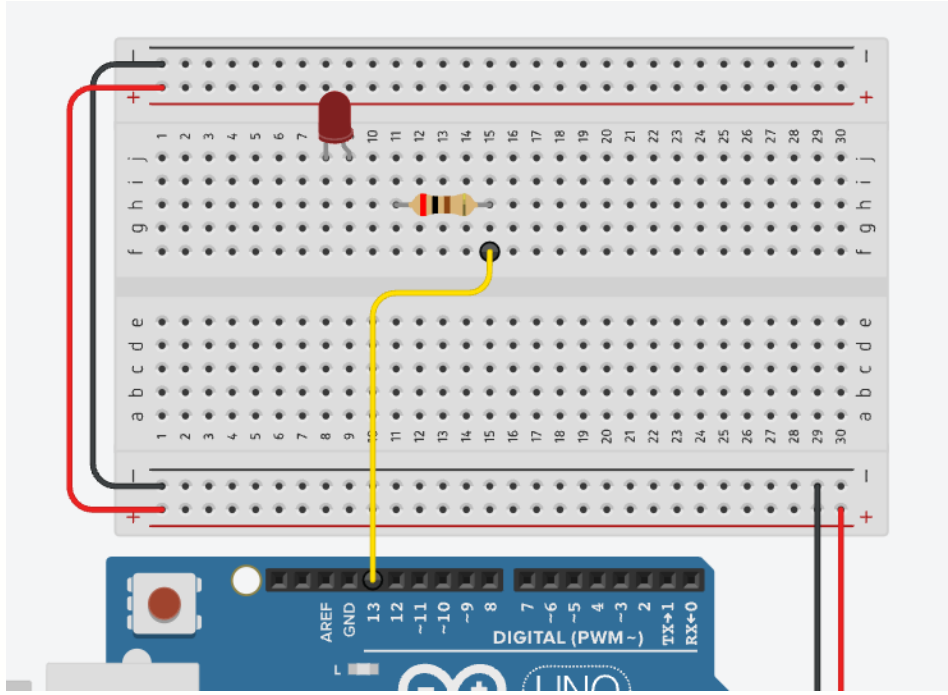
Place the resistor on the breaboard in the appropriate position as in the figure below.

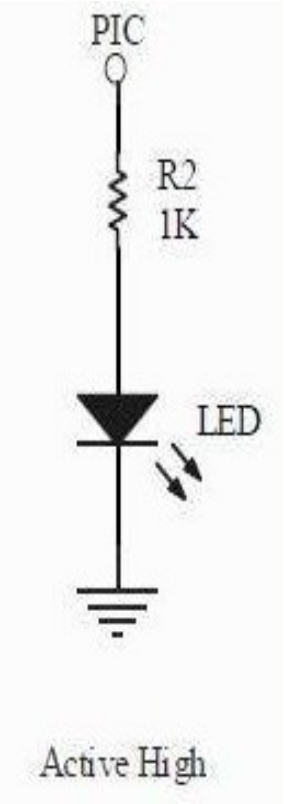








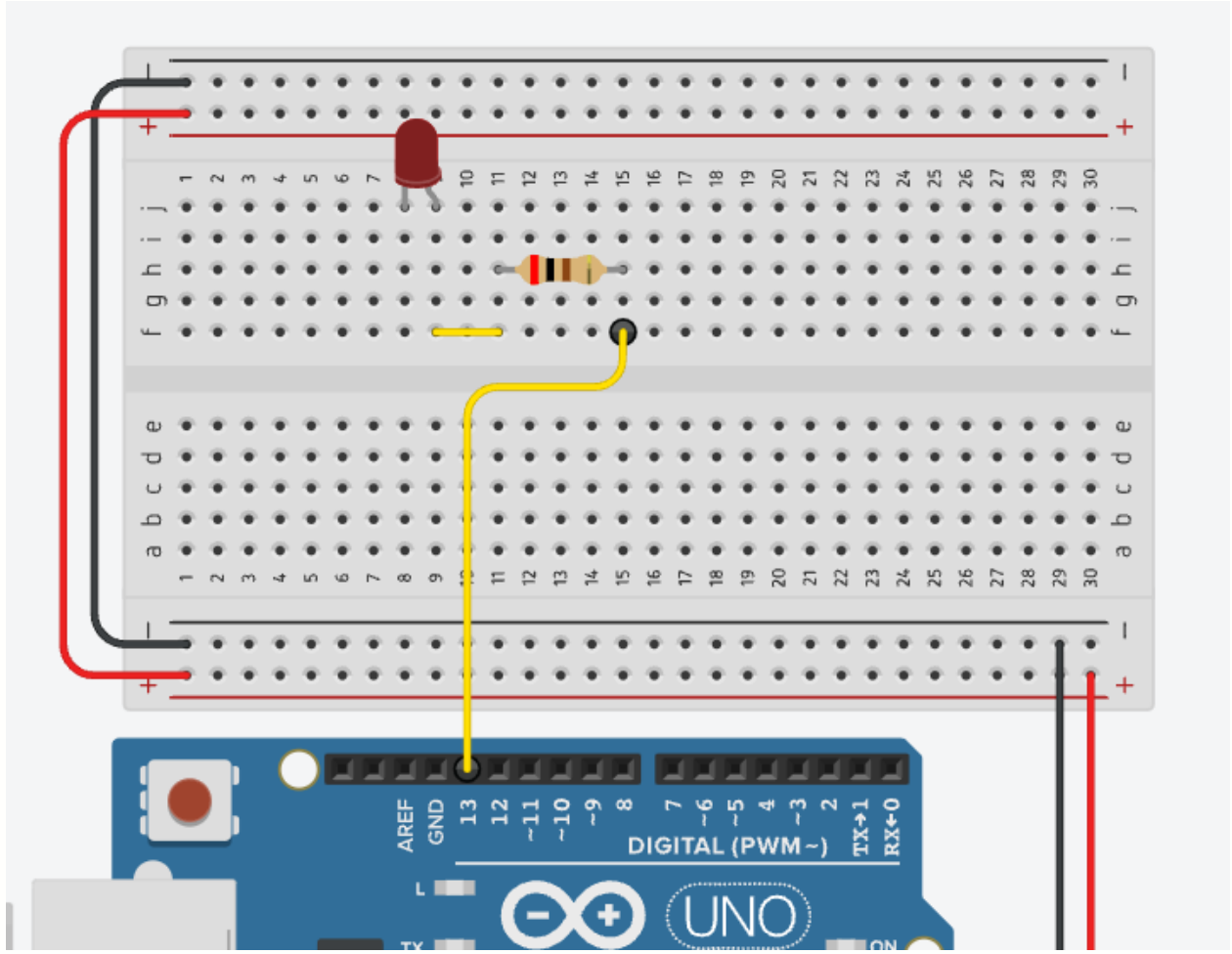


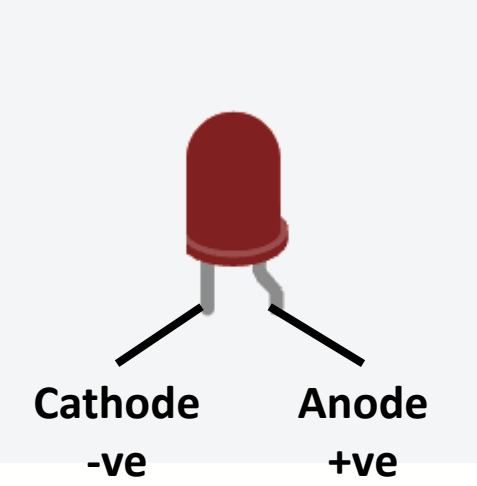


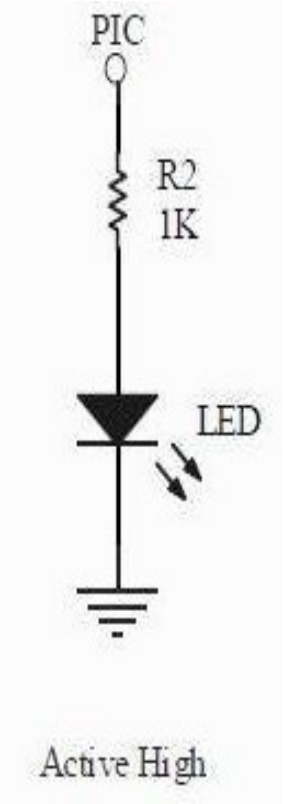
STEP 9

Make the wiring from Pin 13 of the Arduino Uno to the foot of the Resistor (200 ohms).

At the top, there is a choice of colors. Set the color of this "signal" to yellow.

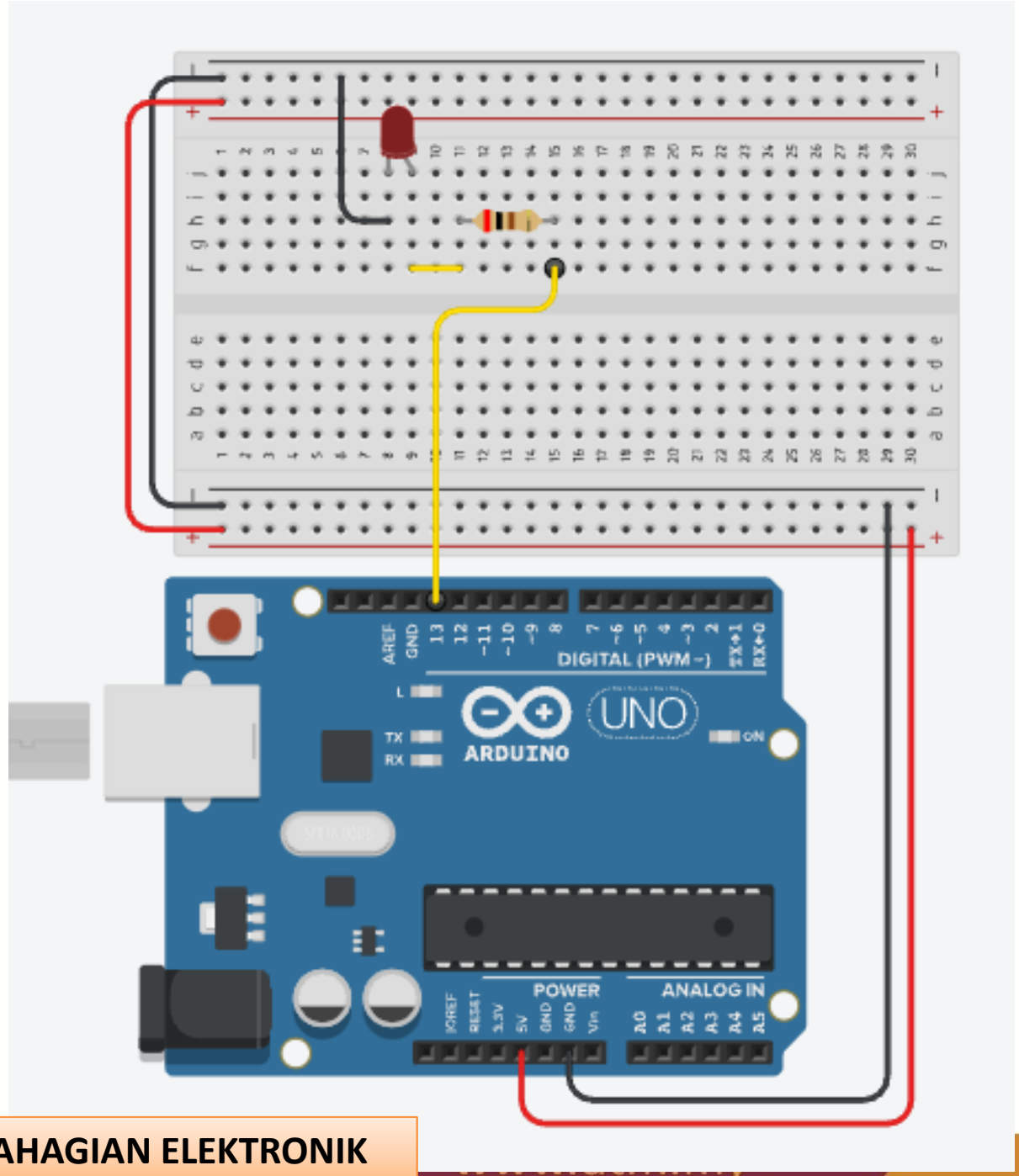






STEP 10

Connection from the Resistor, connected to the foot of the LED pin (anode Pin)

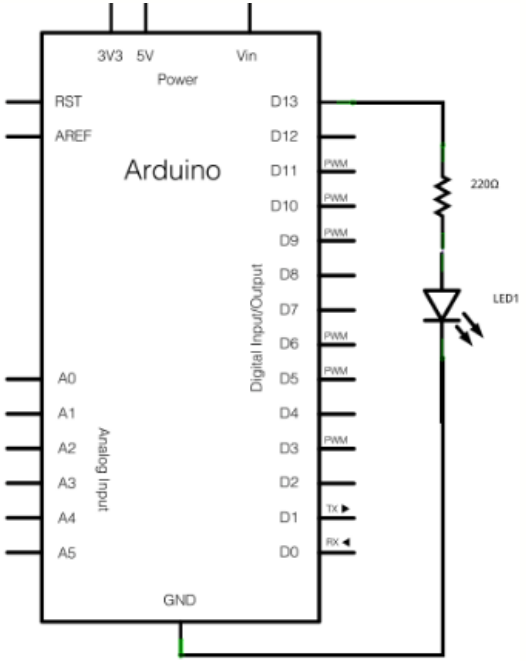


STEP 11

Finally, the LED (Cathode) Pin leg is connected to the Arduino Uno GND Pin.

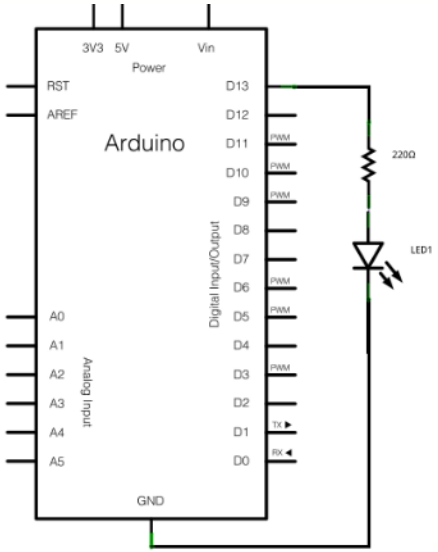
Then, set the GND color to Black.

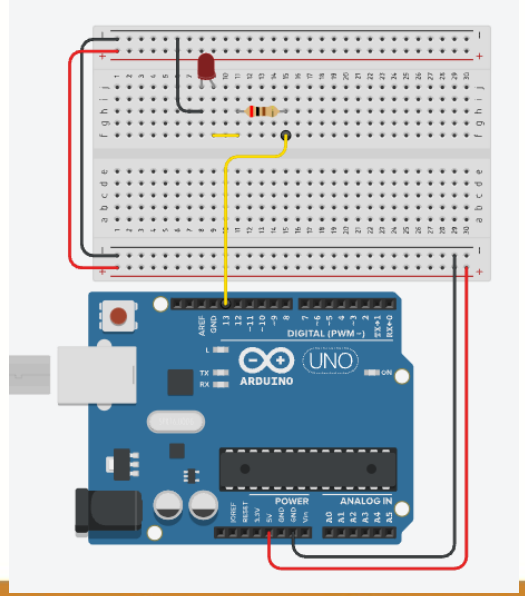
Use a location that is connected to the GND Arduino Uno.



COMPLETE Electronic Wiring.

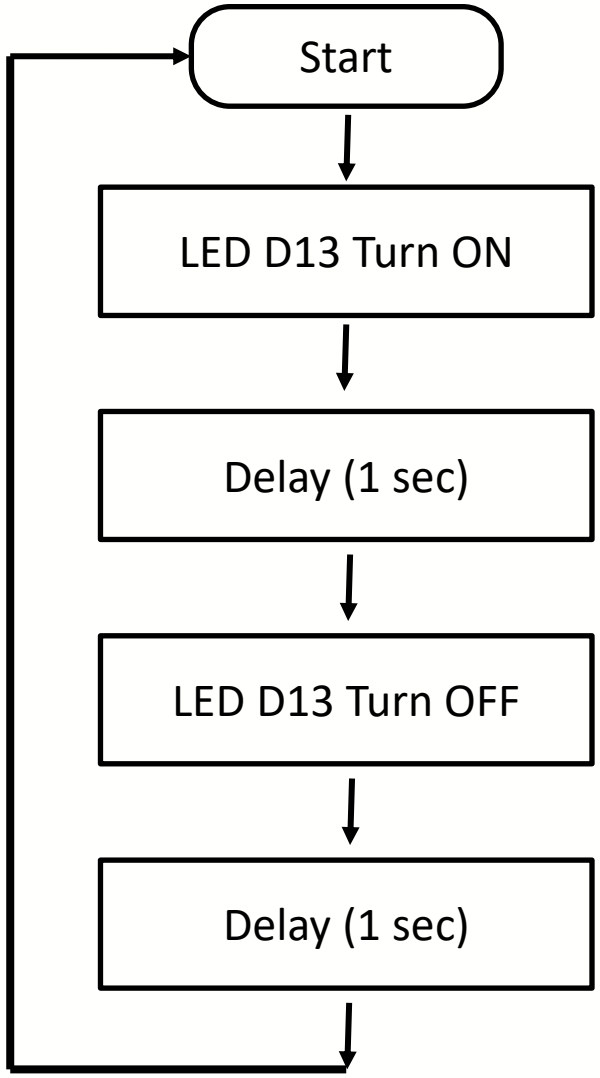
Make sure you understand the connection method by referring to circuit schematics.

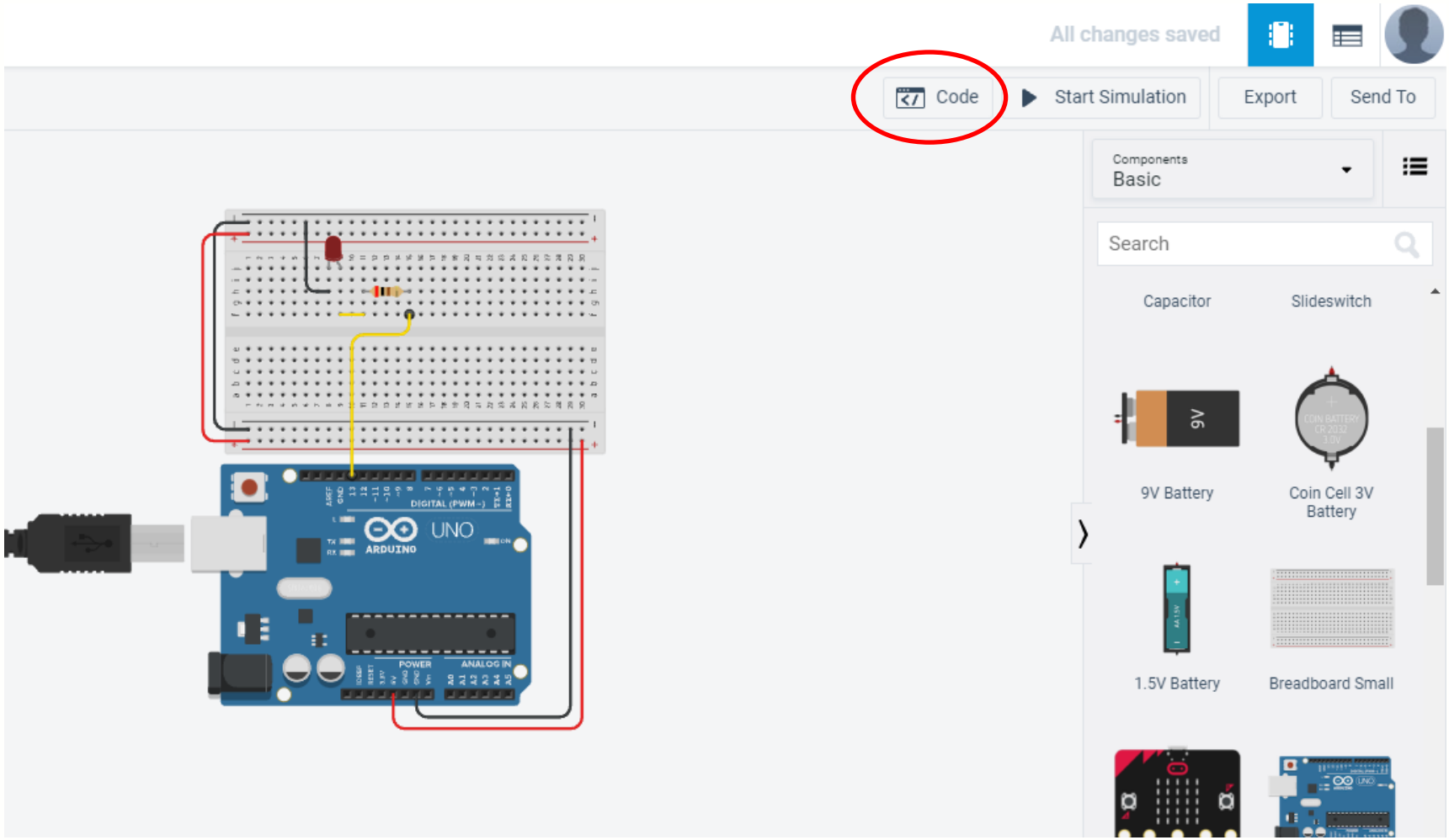




EXAMPLE 1
FLOW CHART (PROGRAMMING)

Turn on LED D13
Pause time for 1 second
Turn off the D13 LED
Pause time for 1 second
Repeat



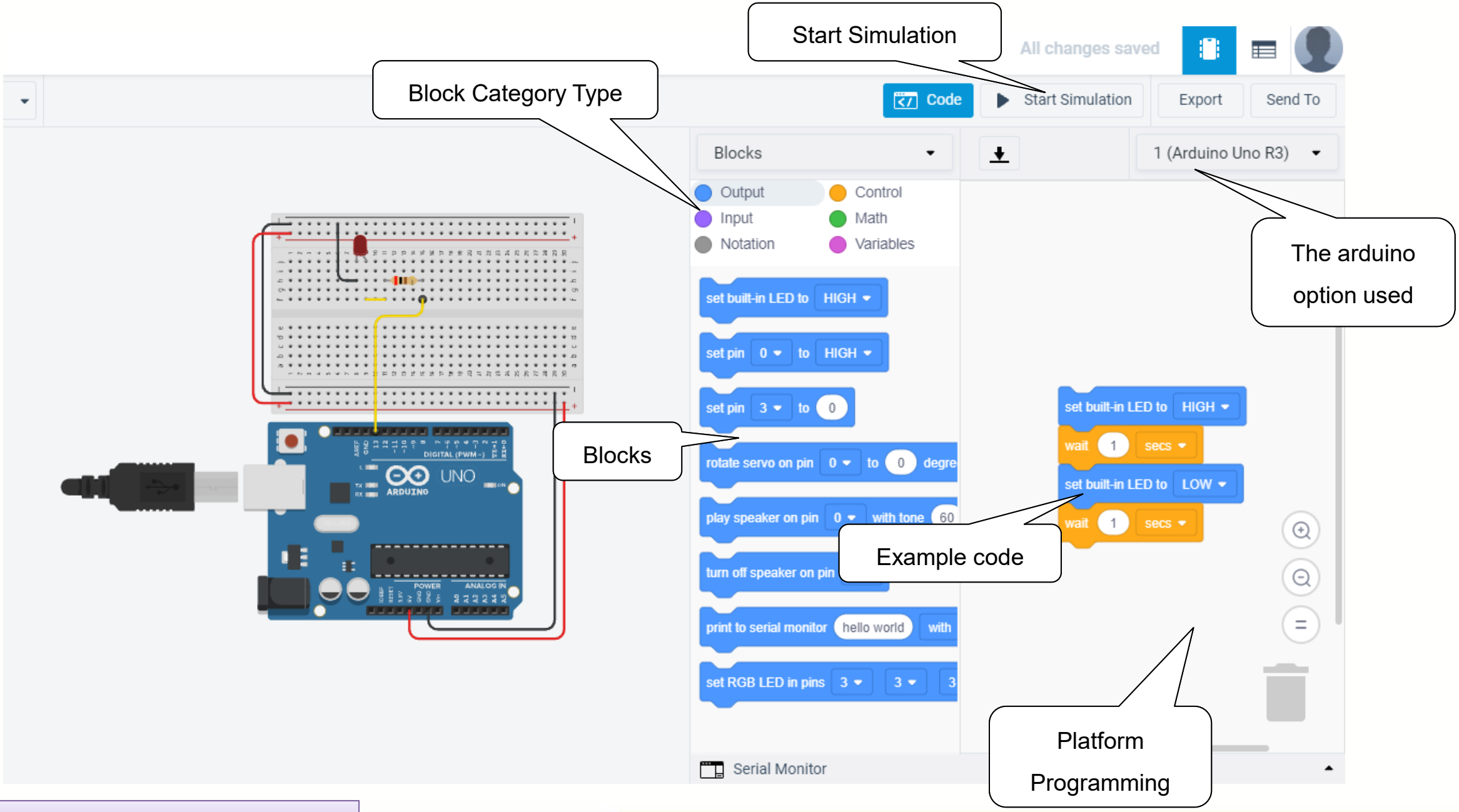


STEP 1

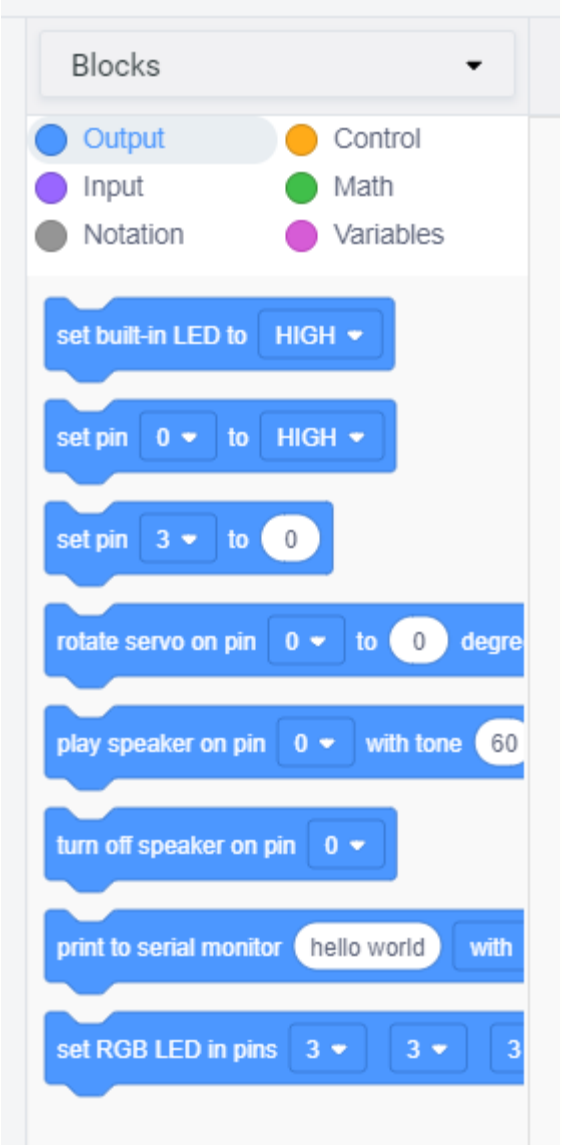
Upon completion of the wire connection process,

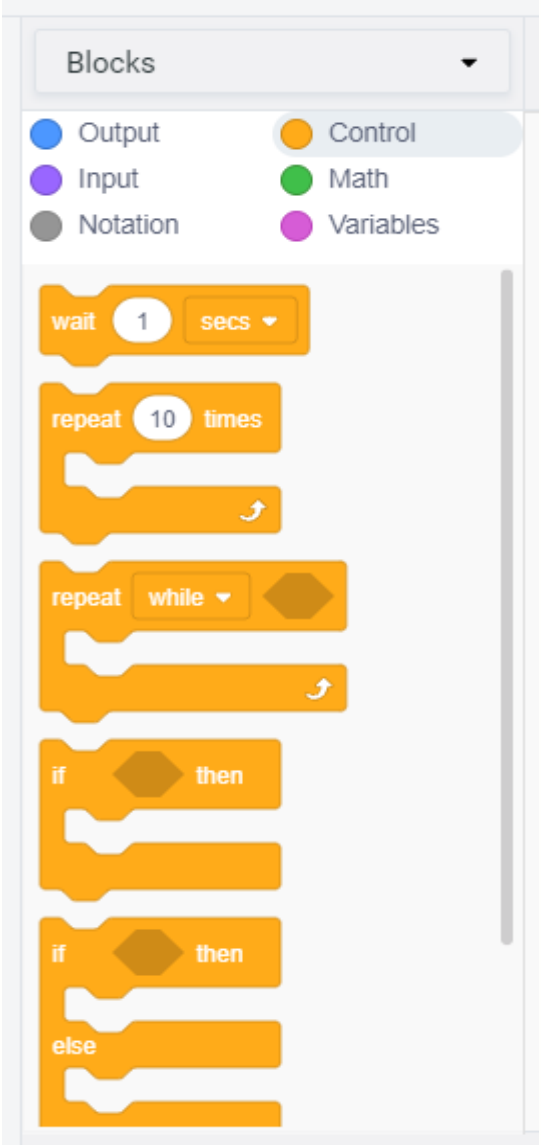
click on the "CODE" icon to display the programming section.

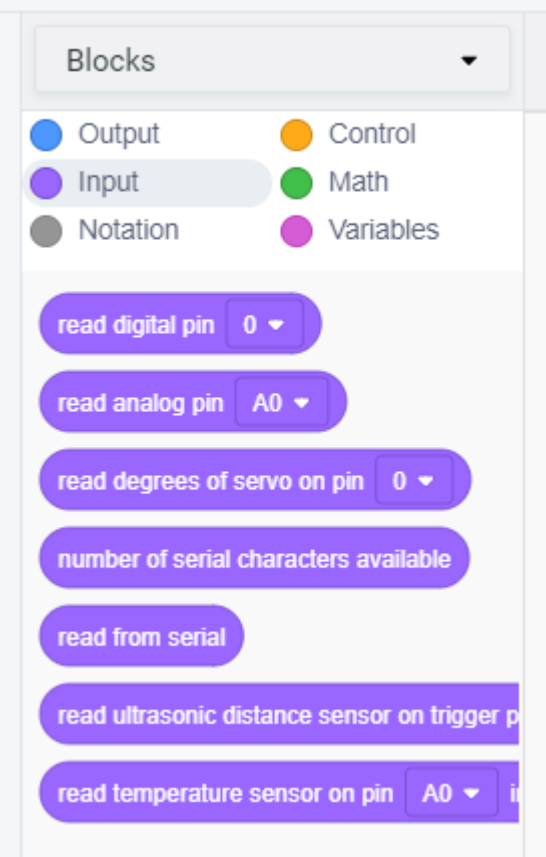
Make sure your wire connections are installed correctly.

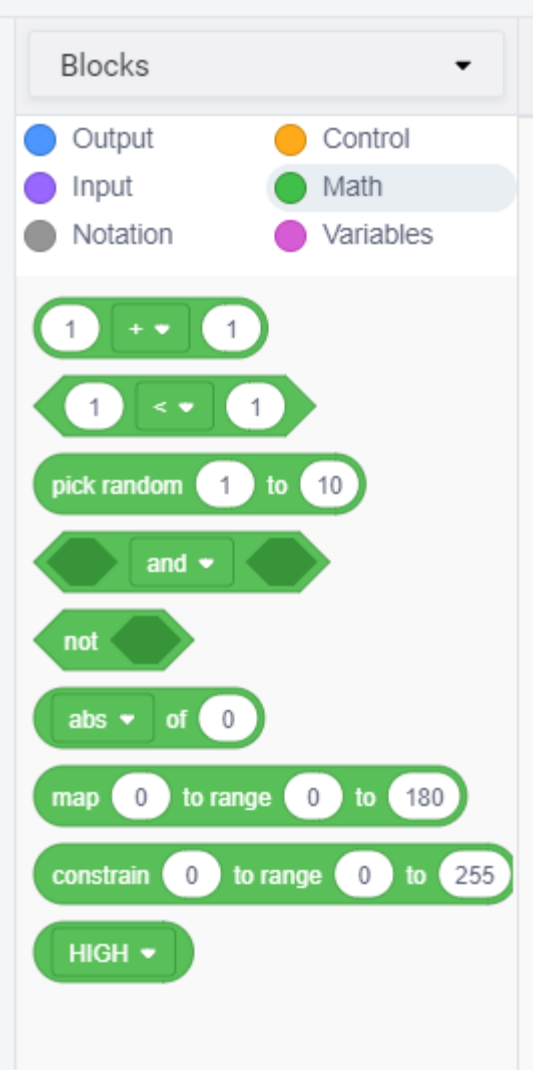

Start Simulation
All changes saved
Block Category Type
Code
Start Simulation
Export
Send To
Blocks
1 (Arduino Uno R3)
Output
Control
Input
Math
Notation
Variables
set built-in LED to HIGH
set pin 0 to HIGH
set pin 3 to 0
rotate servo on pin 0 to 0 degre
play speaker on pin 0 with tone 60
turn off speaker on pin
print to serial monitor hello world with
set RGB LED in pins 3 3 3
Blocks
set built-in LED to HIGH
wait 1 secs
set built-in LED to LOW
wait 1 secs
Example code
The arduino option used
Serial Monitor
Platform Programming

BLOCK AVAILABLE

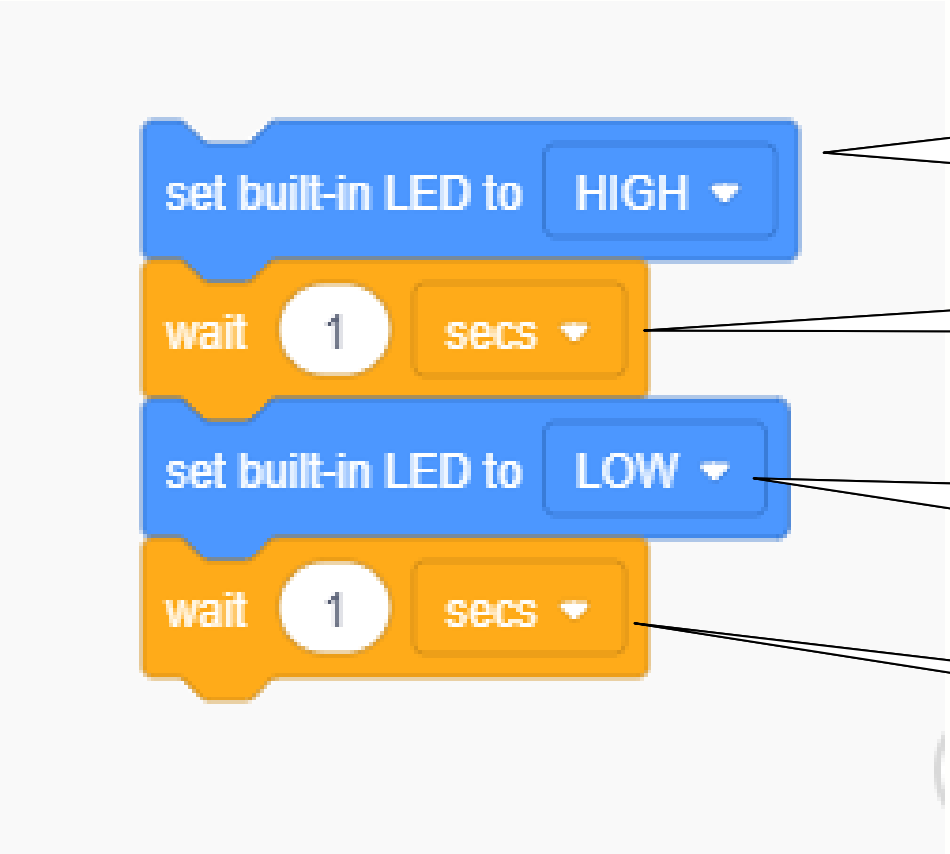








Block



Description

The “Set built-in LED” block is the same pin used on pin D13.
LED is set as HIGH which produces an output (power/voltage output)

Block "wait" for the duration of an instruction. The LED is set HIGH for a period of 1 second

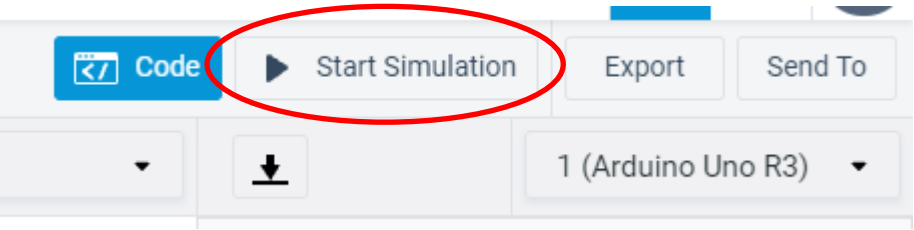
The “Set built-in LED” block is the same pin used on pin D13. Led is set as "LOW" which does not produce any output (no power/voltage)

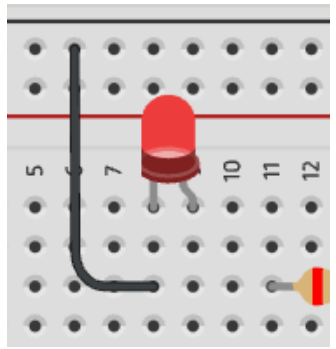
Block "wait" for the duration of an instruction. The LED is set to “LOW” for a period of 1 second

STEP 2

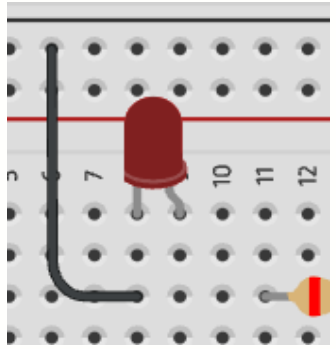
To see the results of such programming.

Click on "Start Simulation" to activate the simulation on the arduino and see the results.



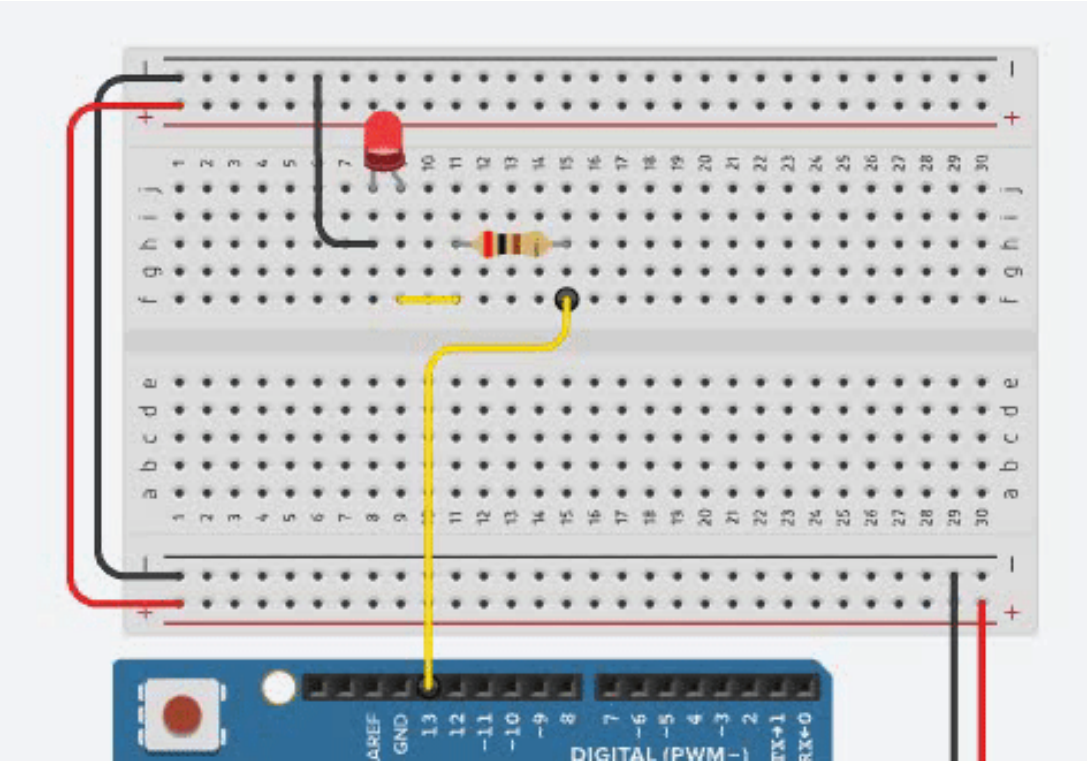


LED ON



LED OFF

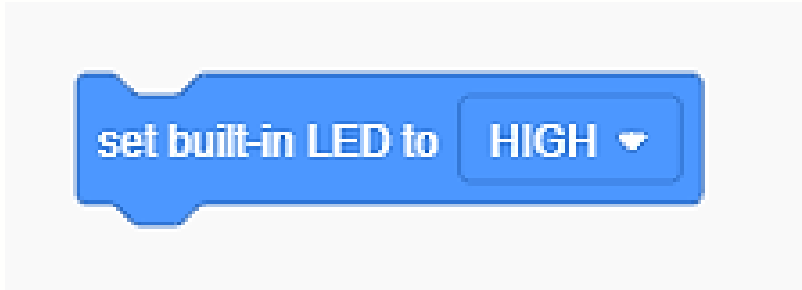
RESULT



BAHAGIAN PENGATURCARAAN

Using the “Built-in LED” Block is limited to pin D13 only. If you want to use another pin or another block.

You can use the "Set Pin" Block.



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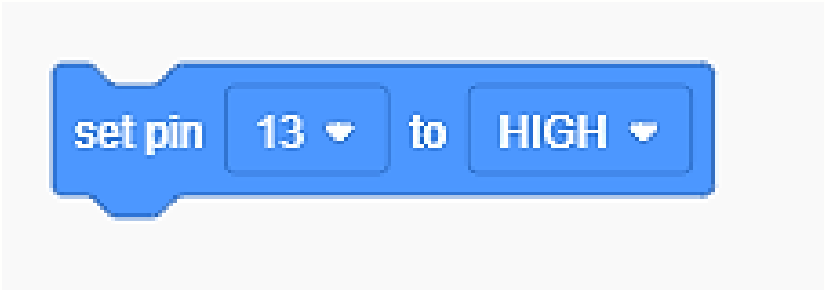
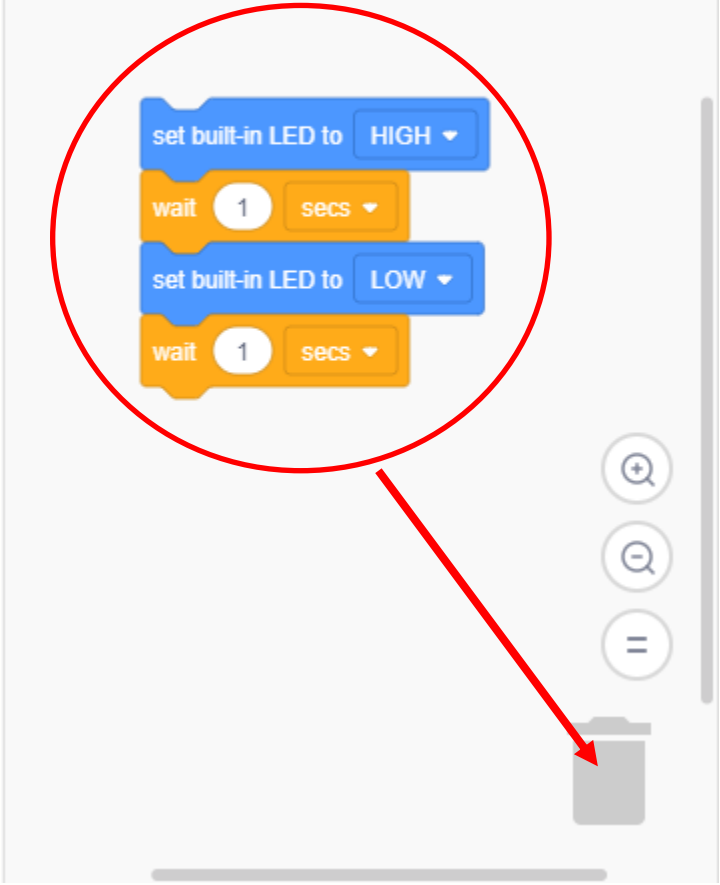


STEP 3

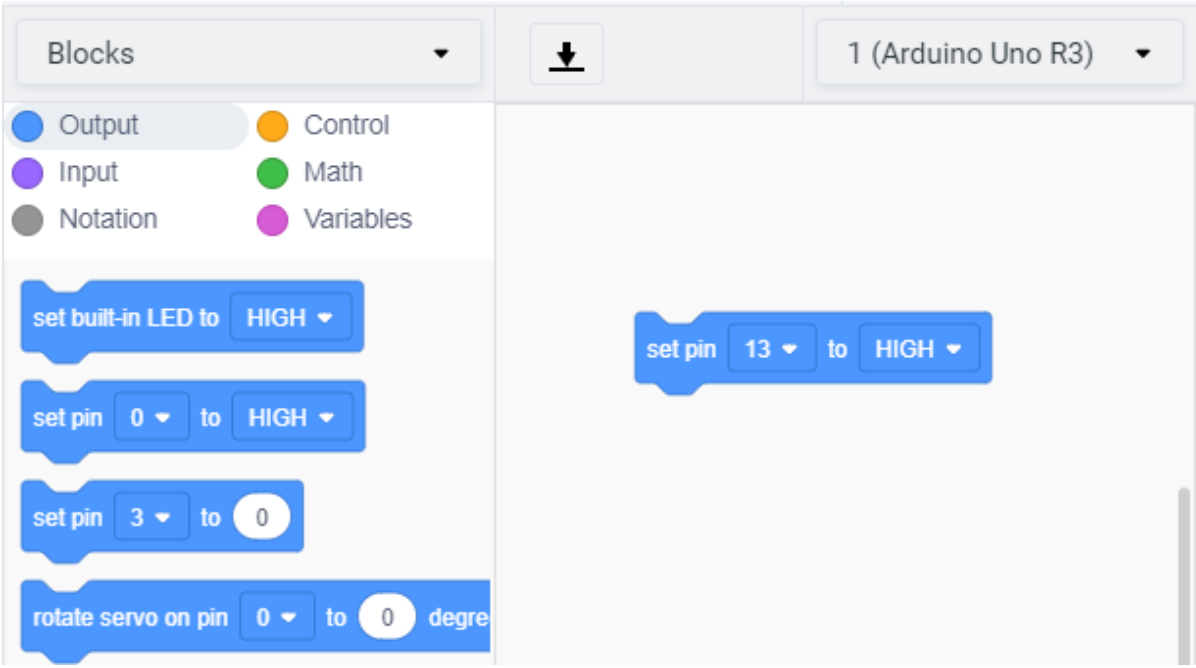
Delete the block by "drag" and aim at the trash can



STEP 4

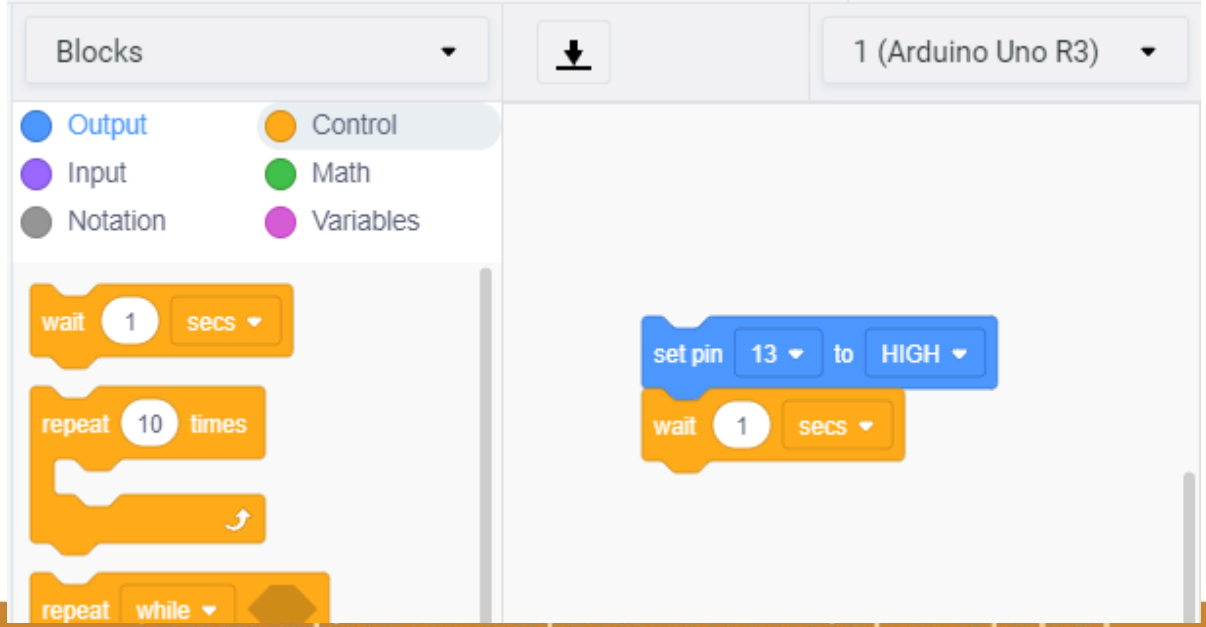
In the "output" category, select and enter the "Set Pin" block, then set pin D13.

Be sure to set it to "HIGH" to light up the LED



STEP 5

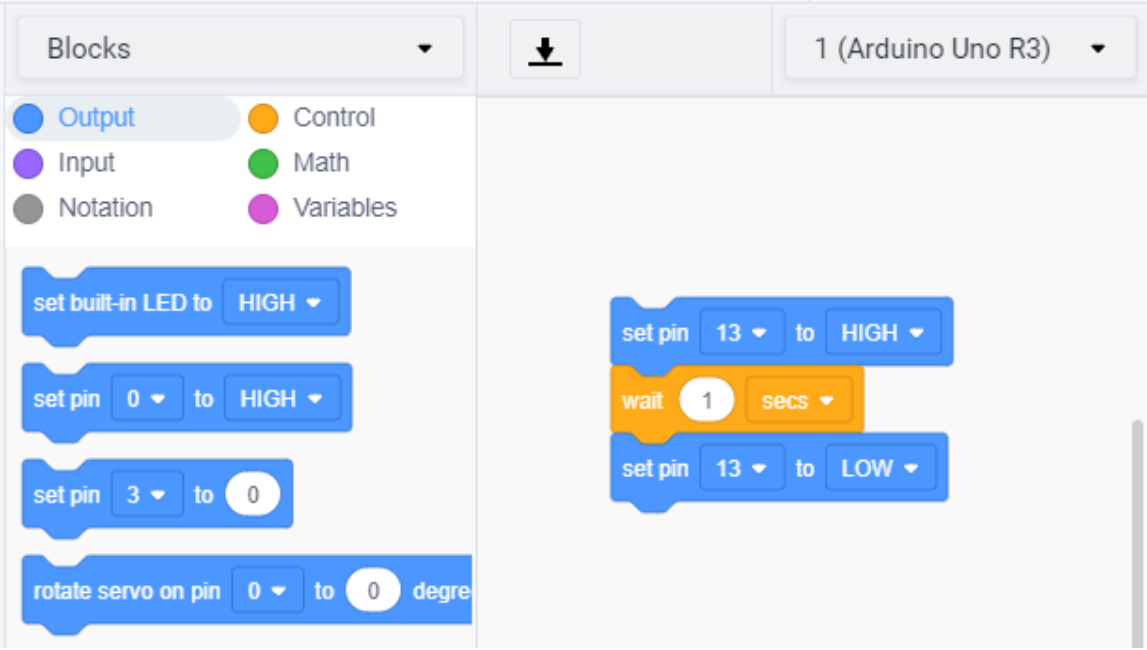
Then, in the "Control" category, select and enter the "wait" block, with a value of 1 second.



STEP 6

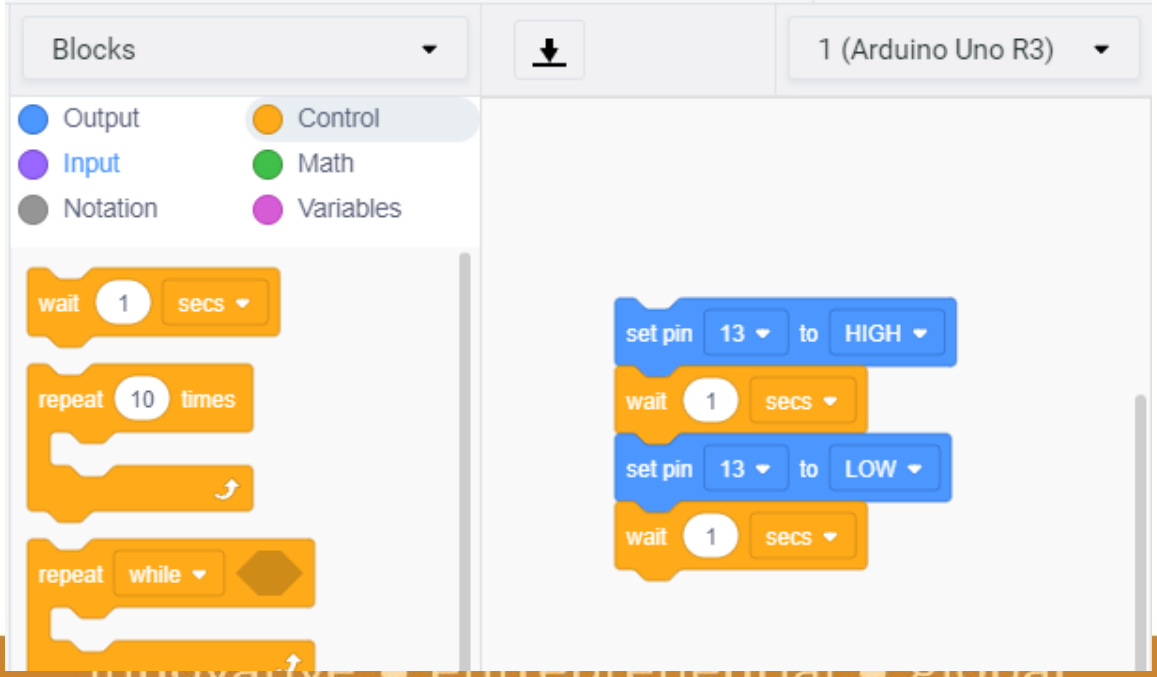
Repeat, in the “output” category, select and enter the “Set Pin” block, then set pin D13.

Be sure to set it to "LOW" to turn off the LED



STEP 7

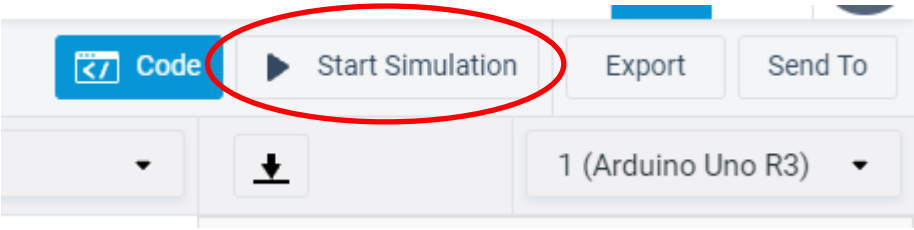
Lastly, select and enter the block "wait", with a value of 1 second.

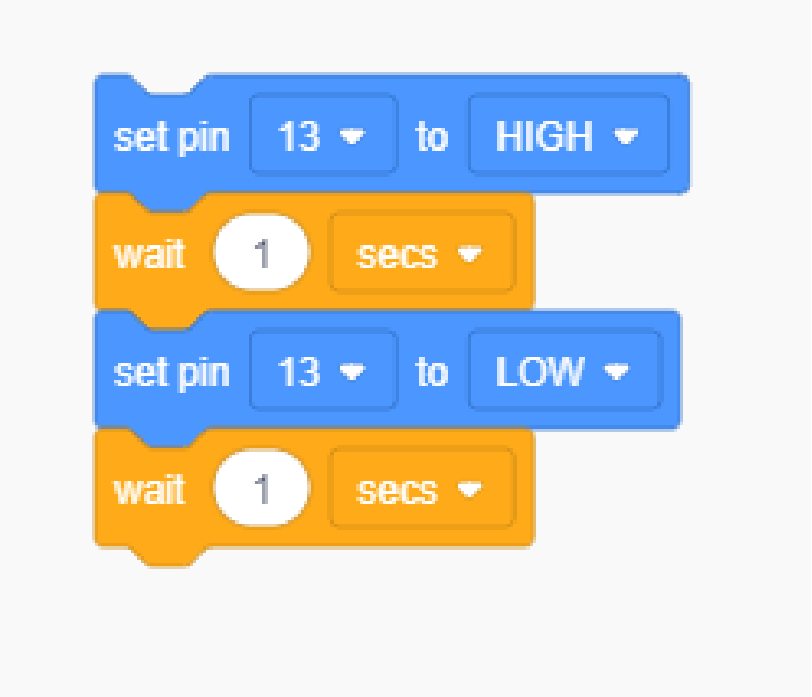


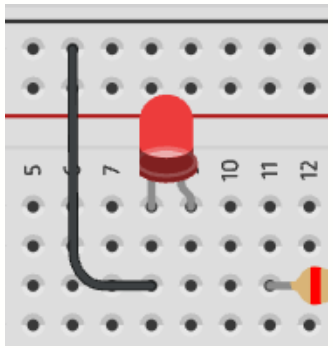
STEP 8

To see the results of such programming.

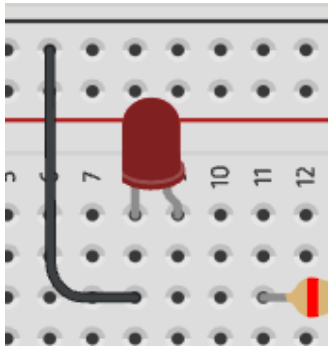
Click on "Start Simulation" to activate the simulation on the arduino and see the results.





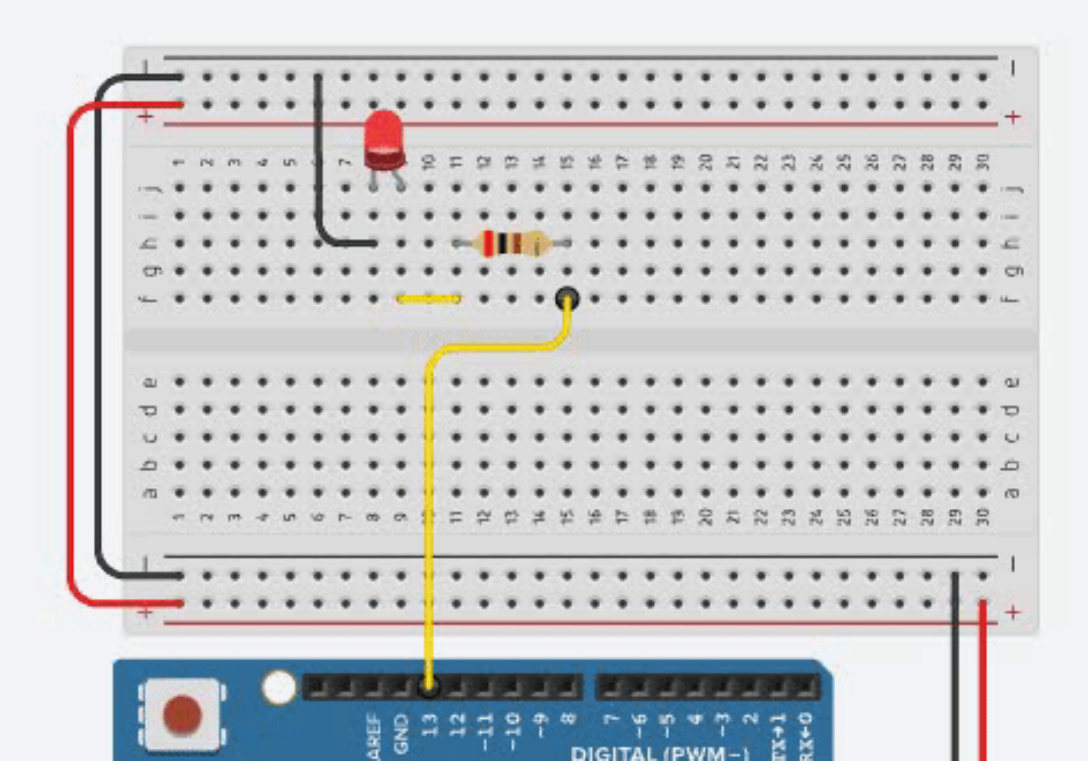


LED ON



LED OFF

RESULT



The result is the same even using a different block.

This is because its programming is the same.

The pin for ‘built-in’ is the pin used on pin D13.

EXAMPLE 2
TONE MELODY

Learning Through Tinkercad

Example 2: Tone Melody

The process of sounding a piezo buzzer tone with a certain frequency value.

Use Pin D8 for signals from the Arduino Uno

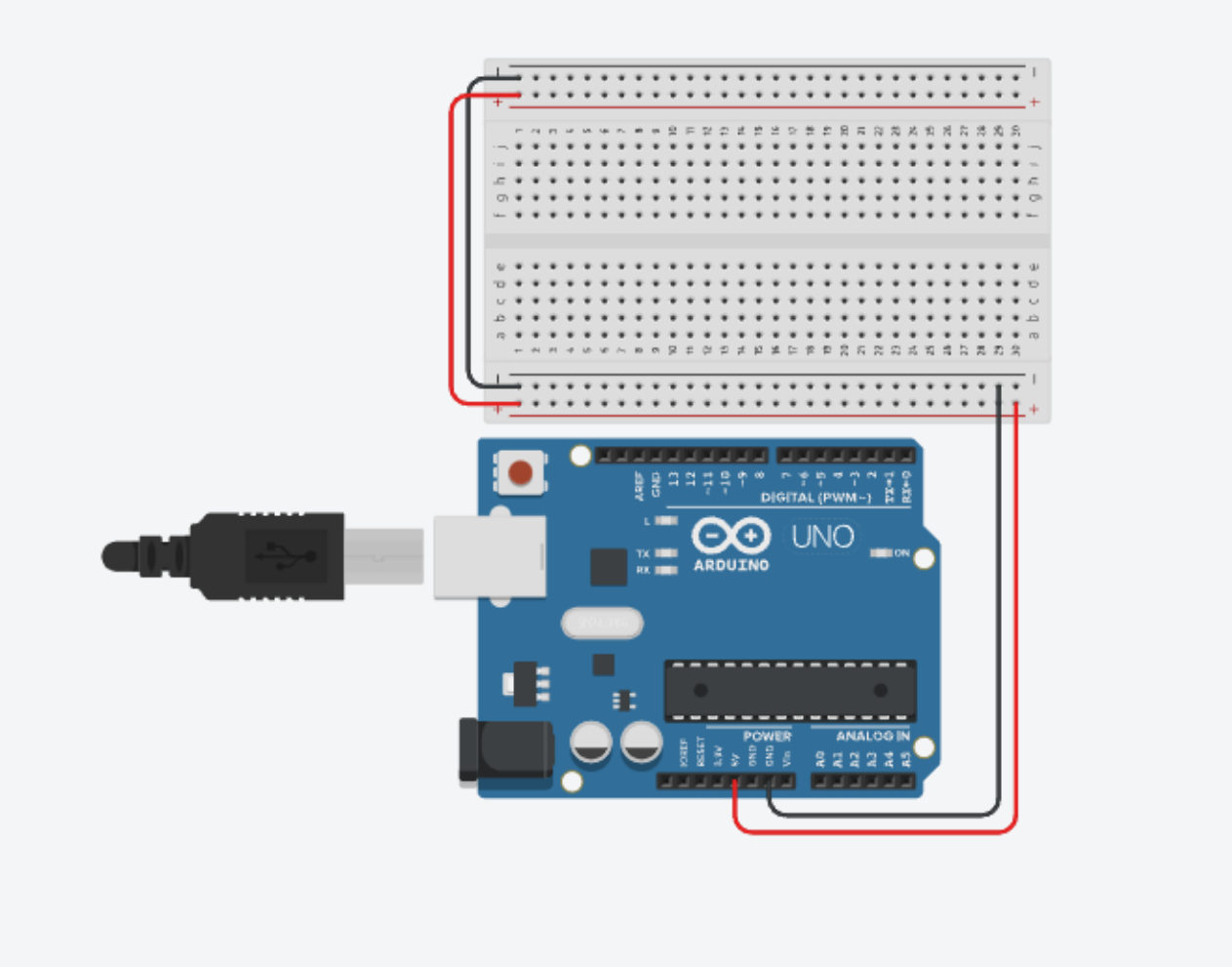
OBJEKTIF

- To control the output of the arduino board.
- Serves as a guide for actuators or sensors.

The description process will be simpler. Make sure you know the functions and position of each component that is needed.

STEP 1

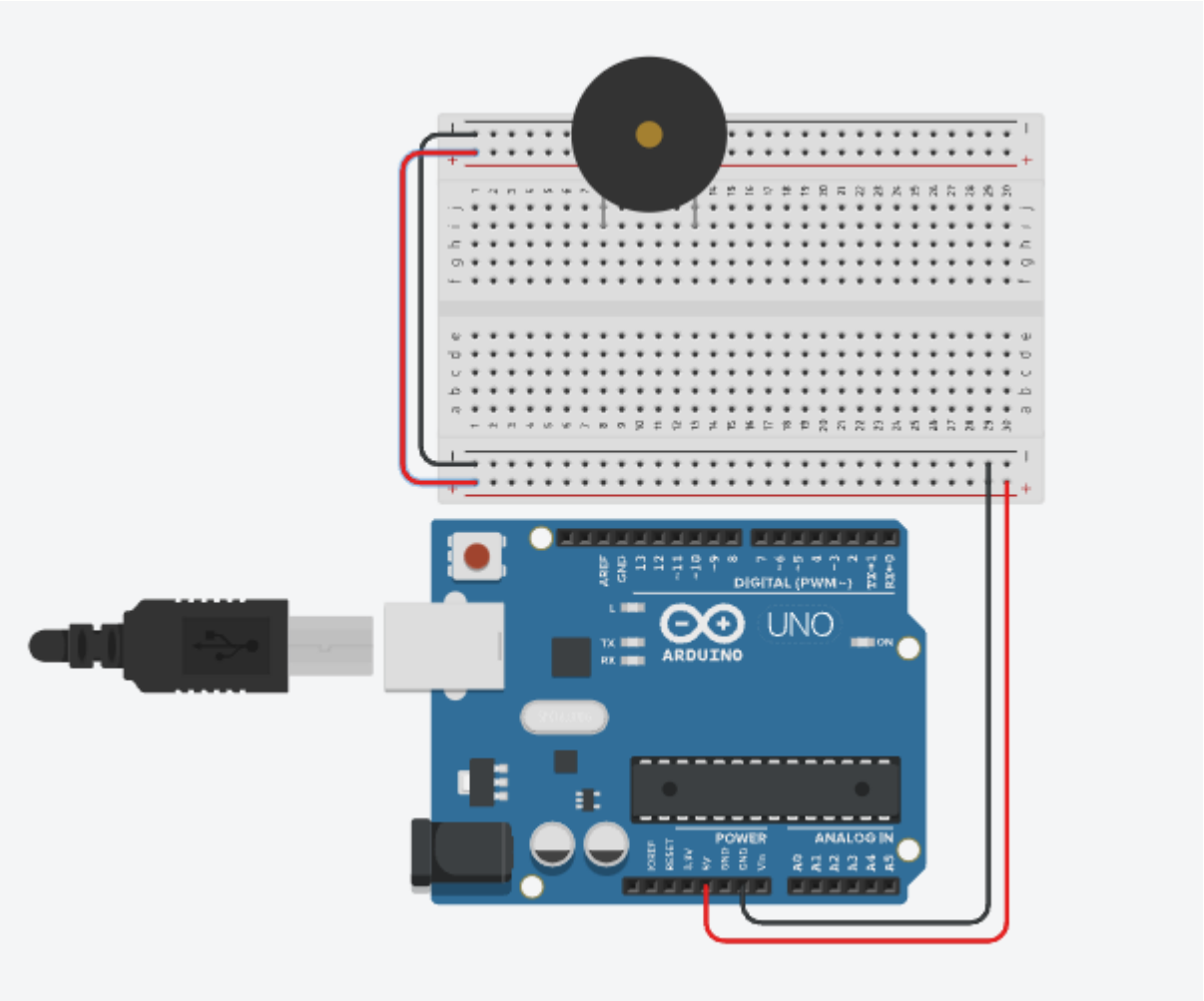
Create a new file, provide Arduino uno and Breadboard in the room available.



STEP 2

Take the “Piezo” component and place it on the breaboard.

Refer to the Piezo polarity at the foot of the pin to find out the positive and negative pins.



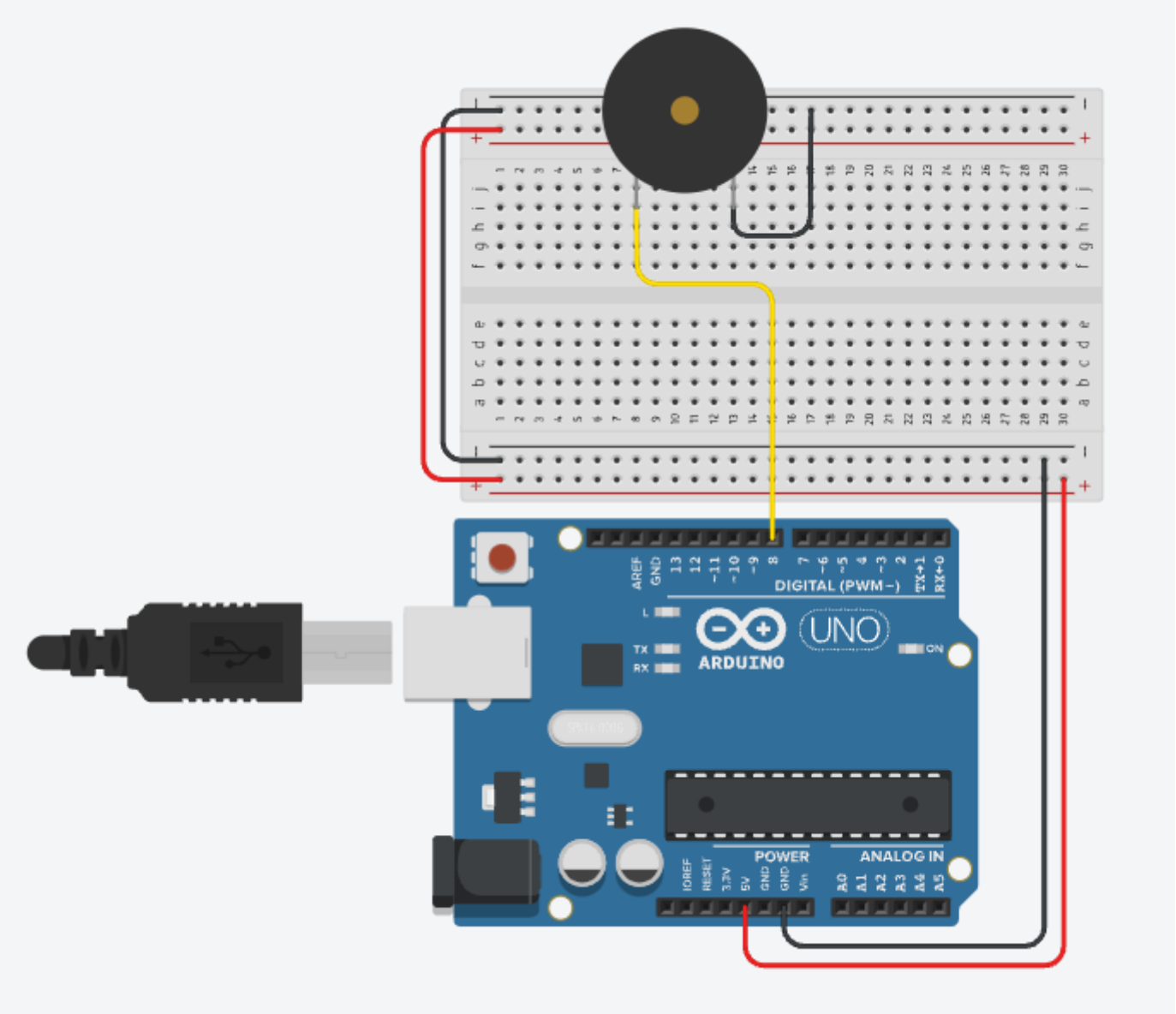
STEP 3

Connect the wire from the Arduino Uno D8 Pin to the Piezo positive Pin.

Switch to Yellow.

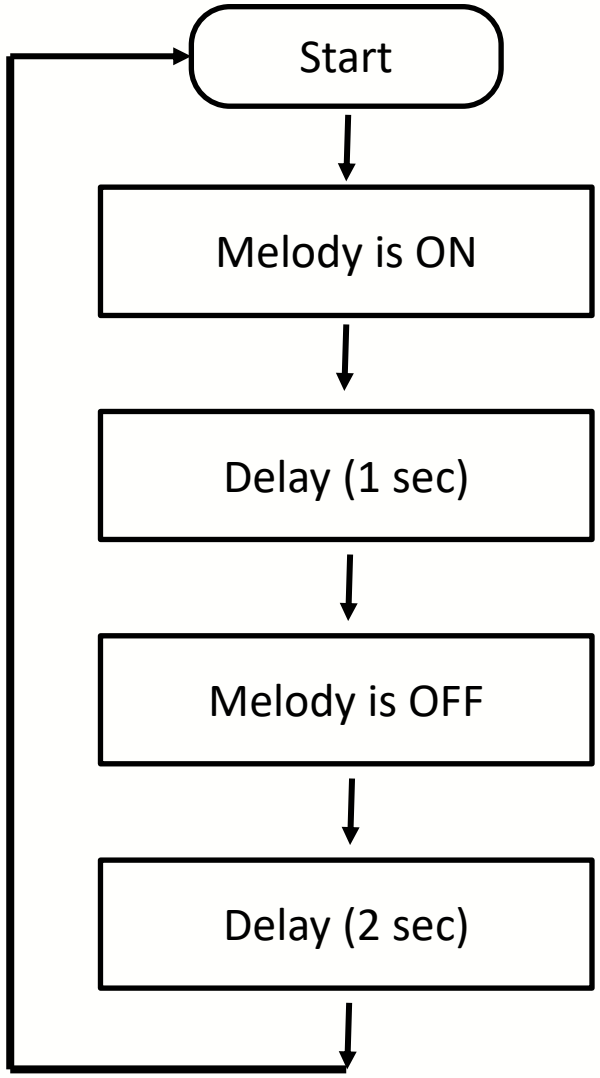
After that, connect the Piezo negative wire to the GND Arduino UNO.

Change the GND wire to Black



EXAMPLE 2
FLOW CHART (PROGRAMMING)

Play Tone D8
Pause time for 1 second
De-Sound Tone D8
Pause time for 2 seconds
Repeat



STEP 1

Go to the code section.

Delete any displayed blocks.

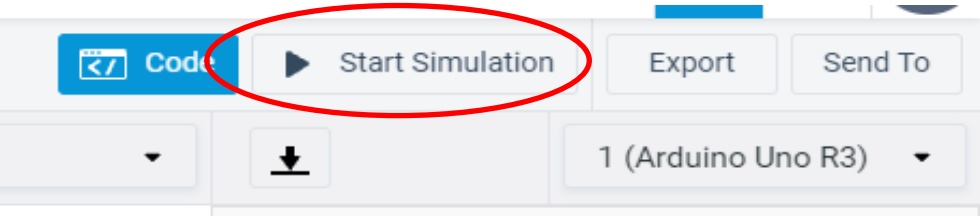
Select the "Play speaker" block and set it to Pin D8

Enter the block "Wait" for a period of 1 second

Enter the "Off Speaker" block and set it to Pin D8

Enter the block "Wait" for a period of 2 seconds

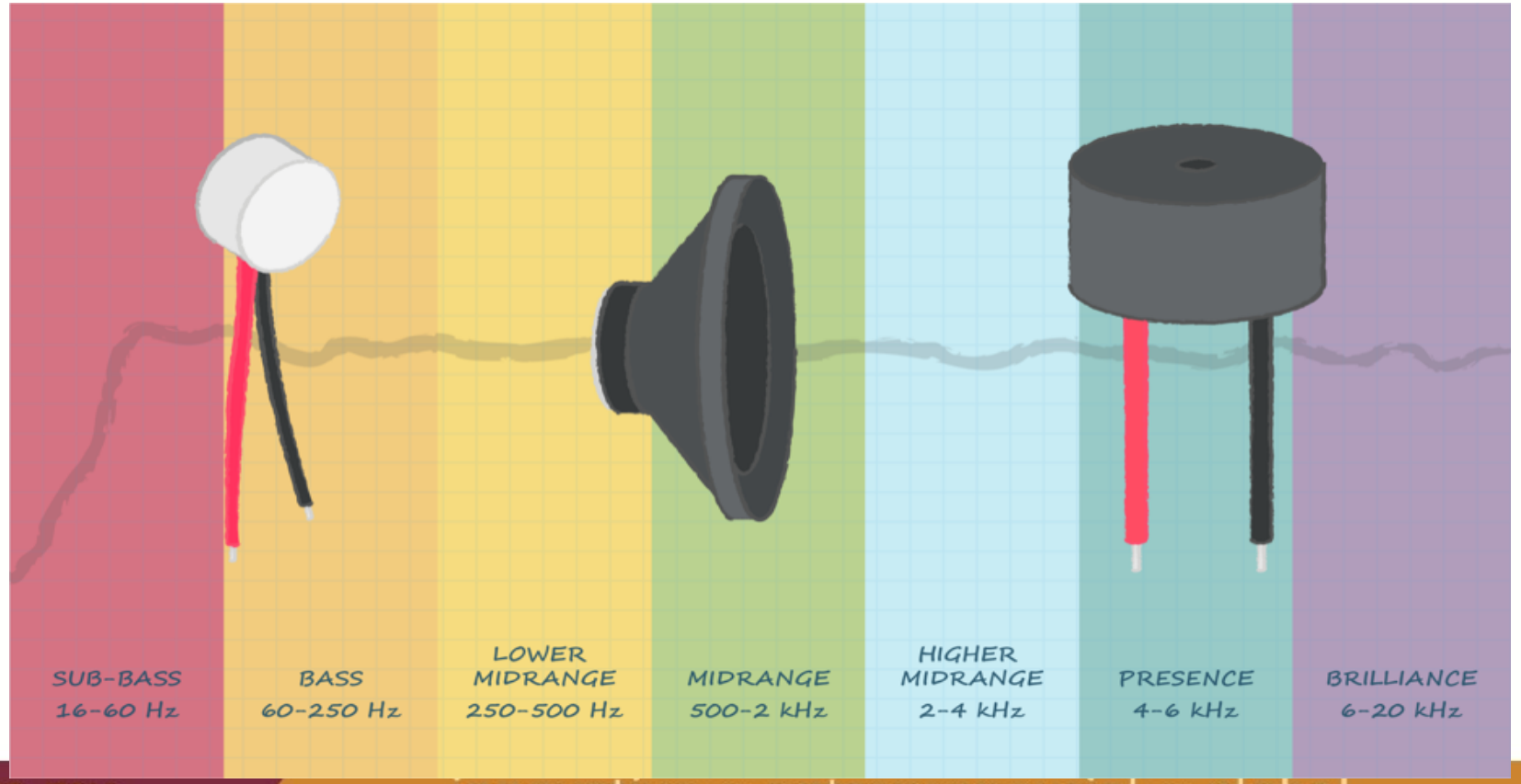
Finally, click "start simulation" to hear the resulting melody tone.



CHANGE YOUR TONE VALUE!

TRY TO PRODUCE ANOTHER TONE.

The higher the tone/note value, the louder the sound produced.

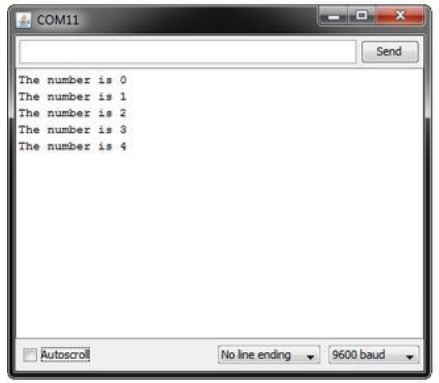


EXAMPLE 3
SERIAL DISPLAY

Learning Through Tinkercad

Example 3: Serial Display

Serial Display is the process of displaying values received or set to be displayed to the user.



OBJECTIVE

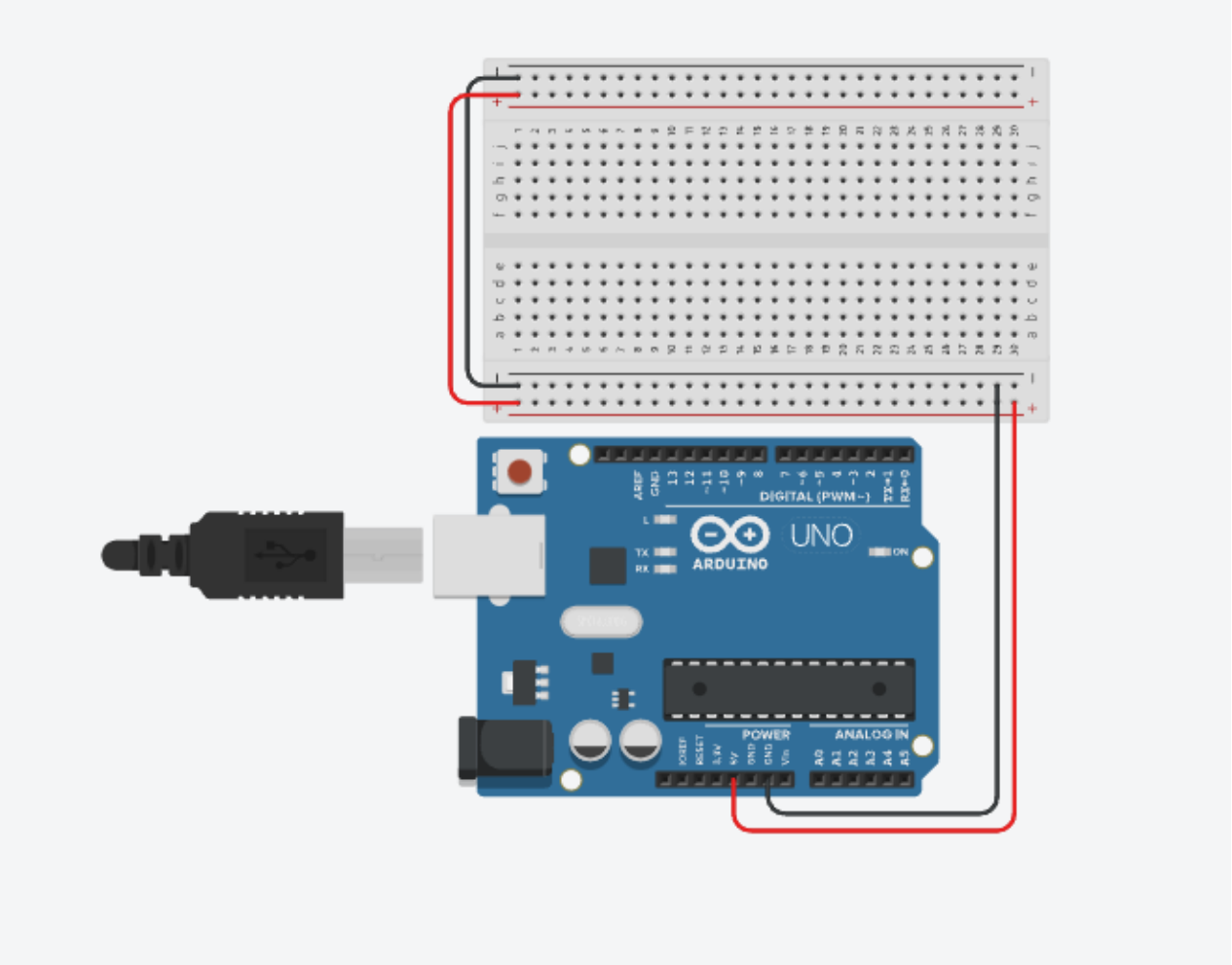
- Value display for reference

The description process will be simpler. Make sure you know the functions and position of each component that is needed.

STEP 1

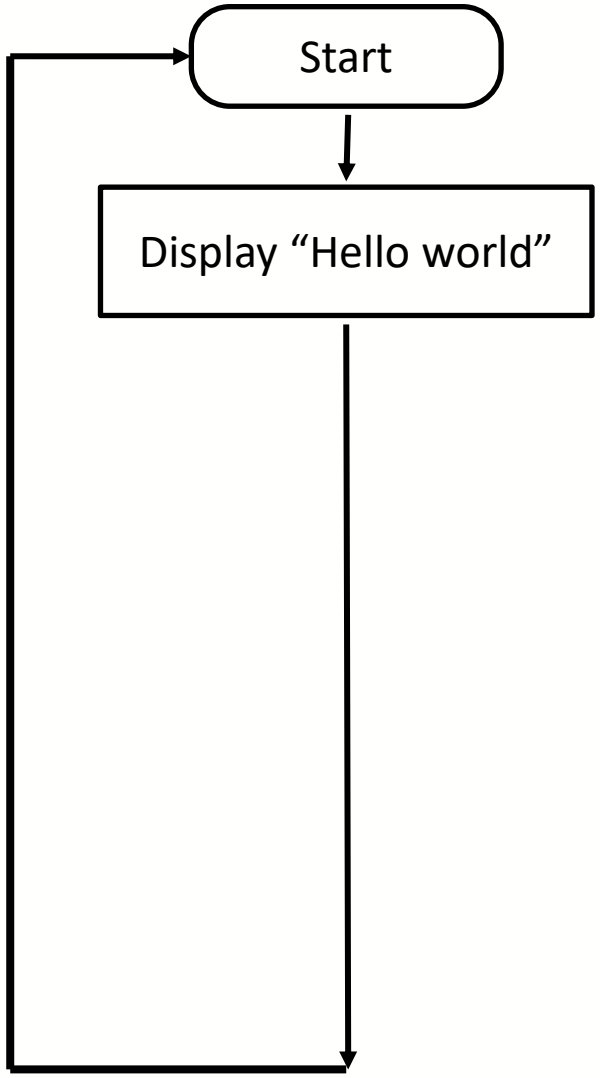
Create a new file, provide Arduino uno and Breadboard in the room available.

For the use of this Serial Display does not require other components except Arduino UNO only



EXAMPLE 3
FLOW CHART (PROGRAMMING)

Print the written result
Repeat



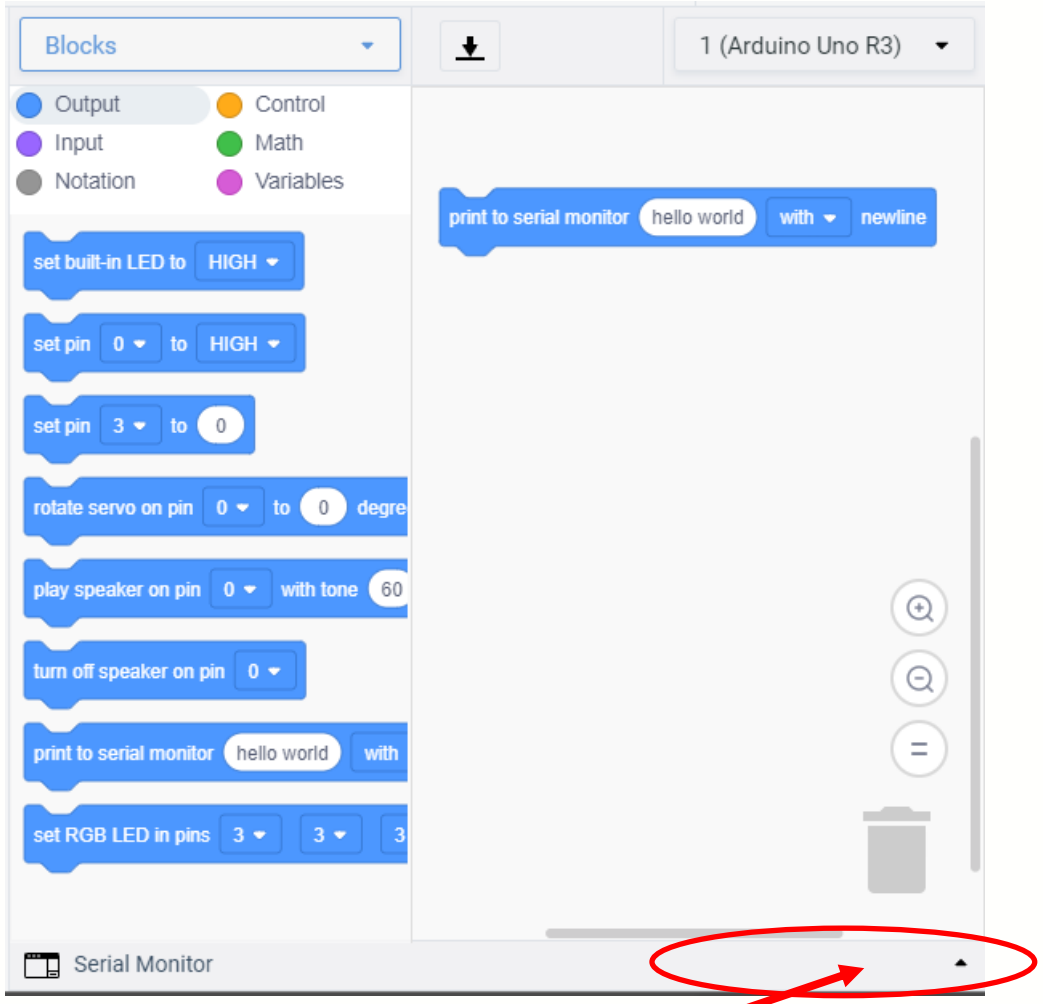
STEP 1

Go to the code section.

Delete any displayed blocks.

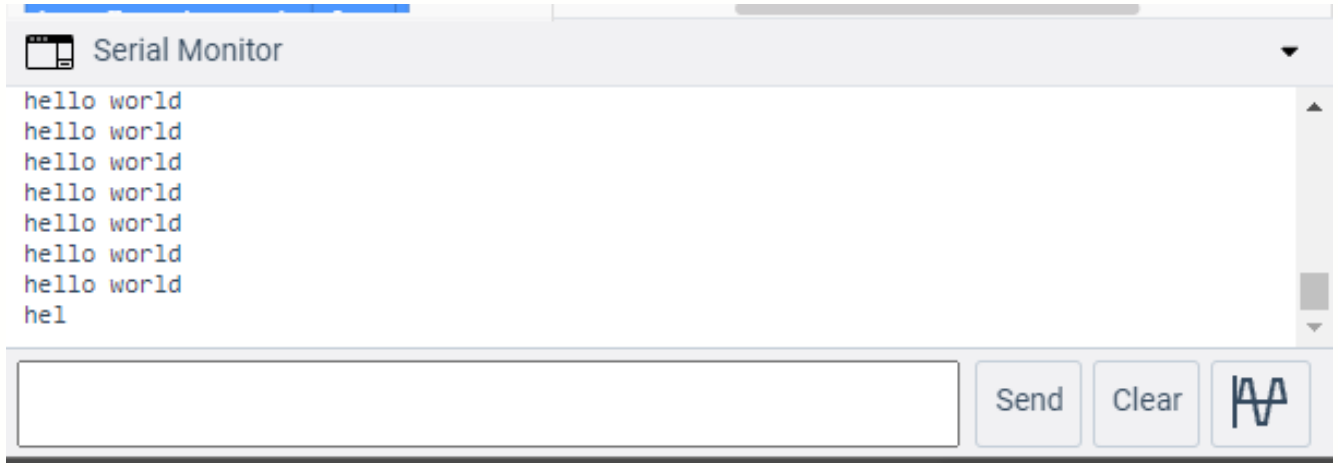
Select the output block "Print to serial monitor"
The display will display the word "hello world"

Then, click "start simulation".



Click below to remove the display.

The "hello world" display is a character that has been set to be displayed in the Monitor series.



LET'S TRY Display Increased Value

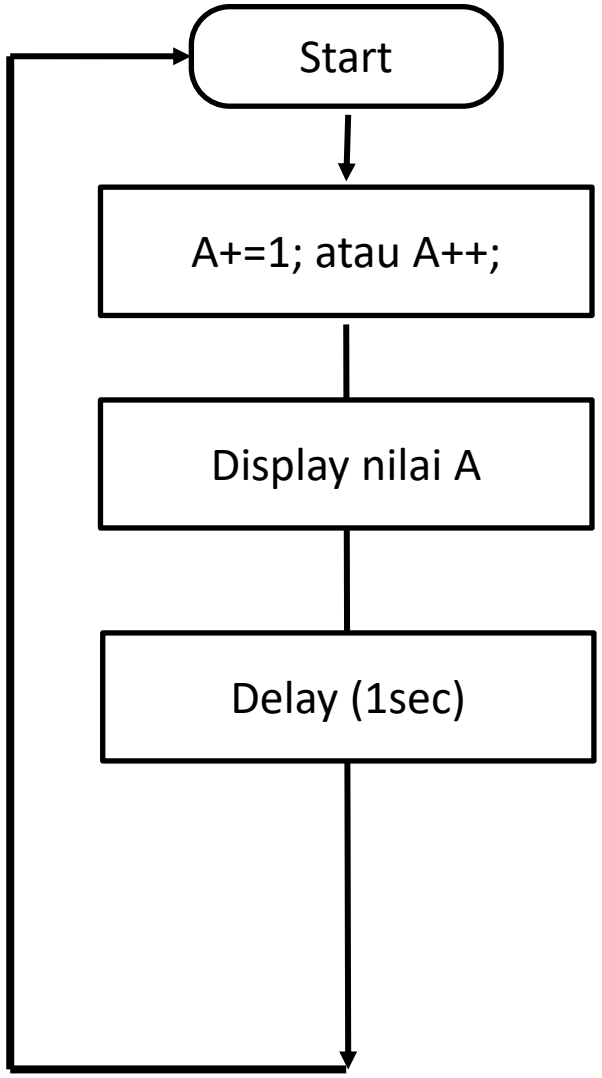
Like A = 0, then A = A+1

Then Delay (1sec)

Print the value of A

EXAMPLE 3
PSEUDOCODE (PROGRAMMING)

Value of A = 0 plus 1
Print the written result
Pause time for 1 second
Repeat



STEP 1

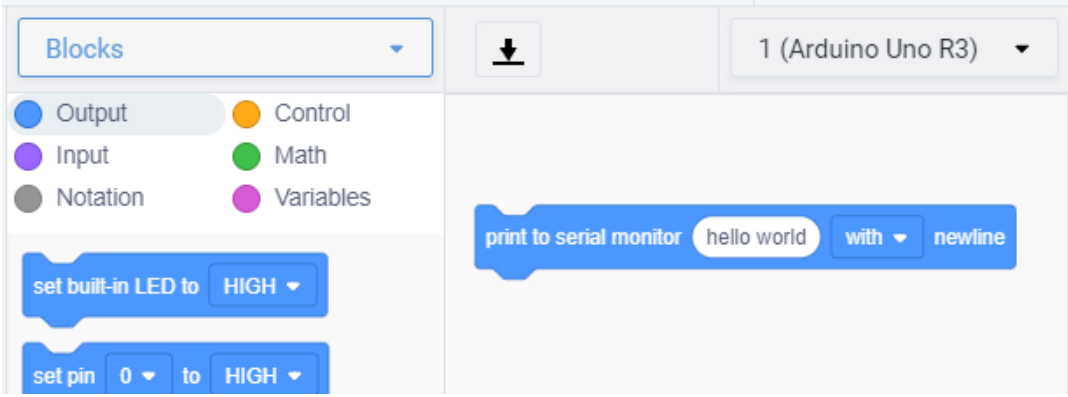
Go to the code section.

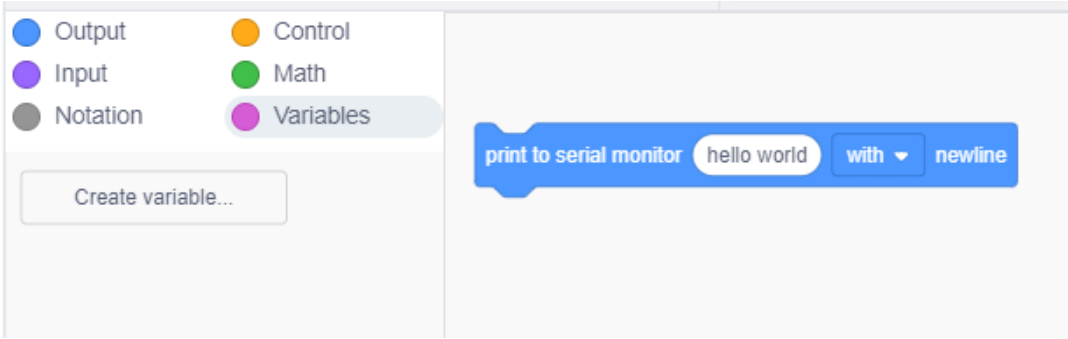
Delete any displayed blocks.

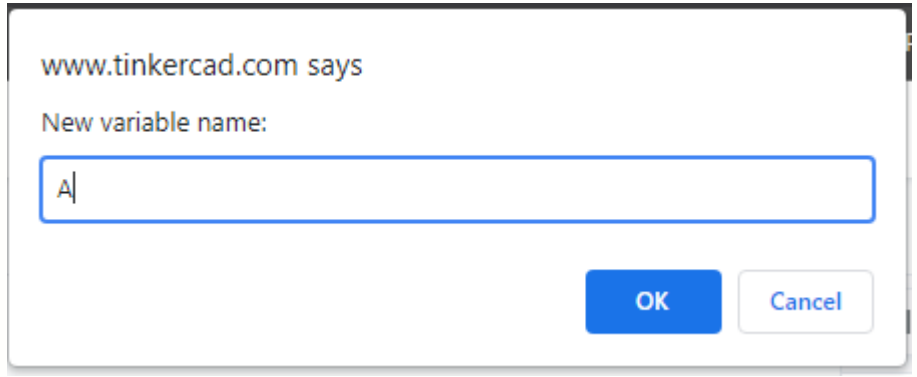
Select the output block "Print to serial monitor"

Then, go to the "Variables" category and select create variables.

Write the name of the variable as "A"







STEP 2

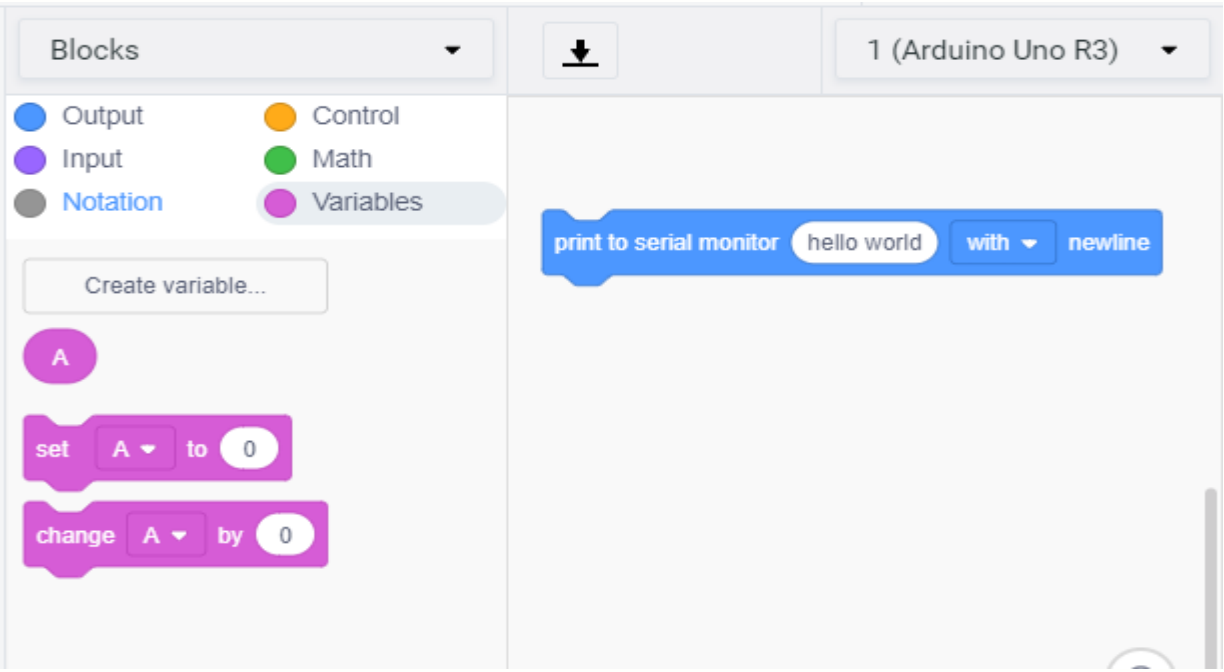
Go to the code section.

Delete any displayed blocks.

Select the output block "Print to serial monitor"

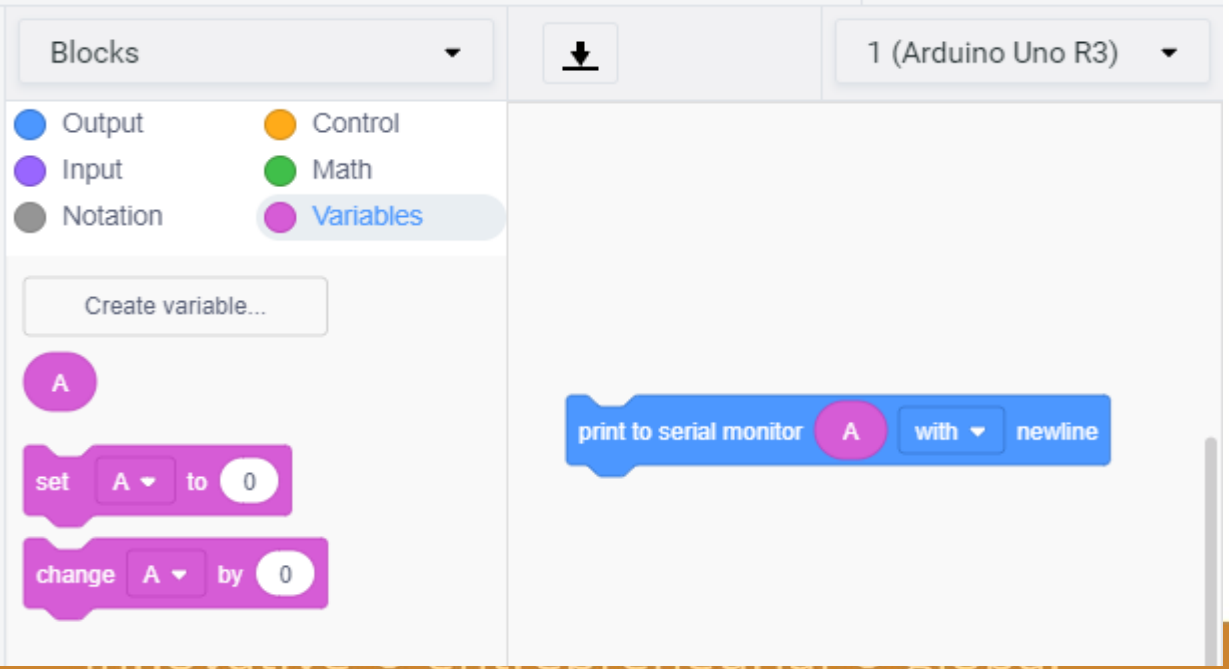
Then, go to the "Variables" category and select create variables.

Write the name of the variable as "A"



Then, replace the character "hello word" with the variable "A" that has been created.

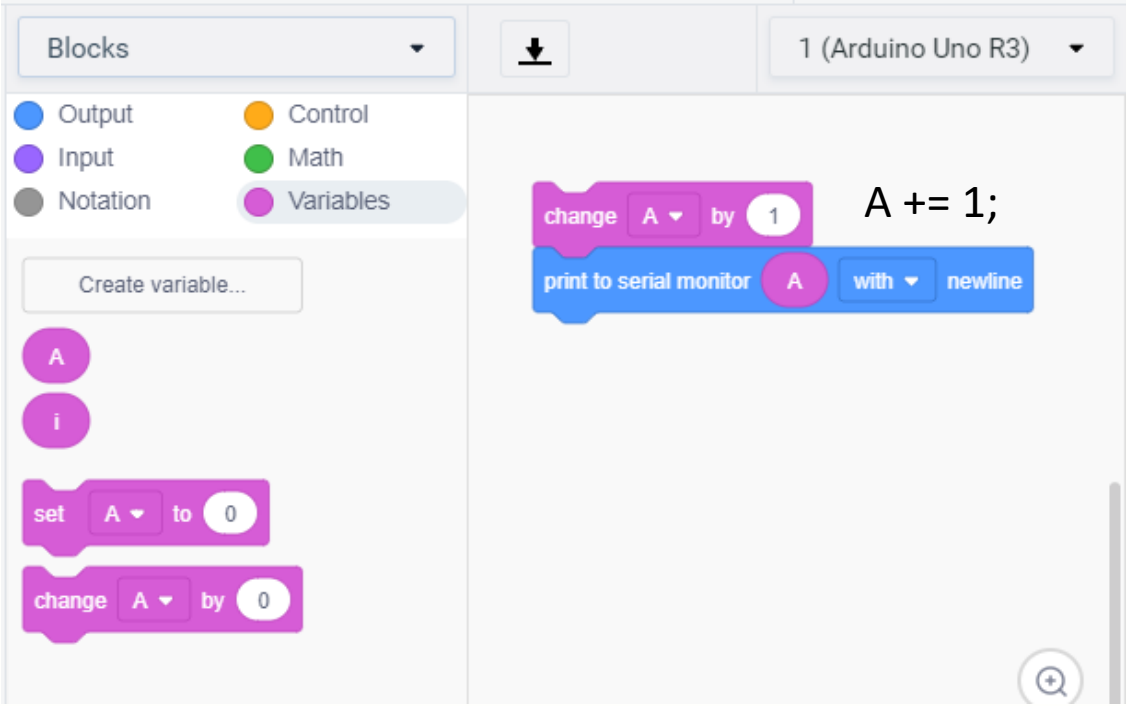
This will make the data on the value of A will be displayed.



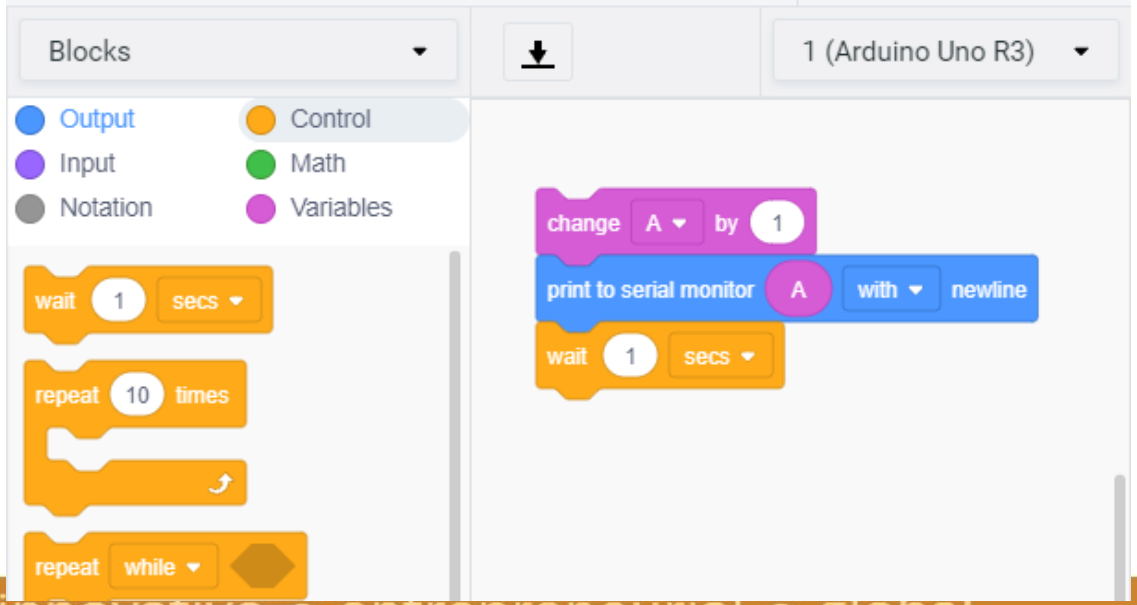
STEP 3

Next, enter the block "change A by" and place it above the block "print to serial monitor"

Change A by 1 is an abbreviation for A+= 1; or A ++;



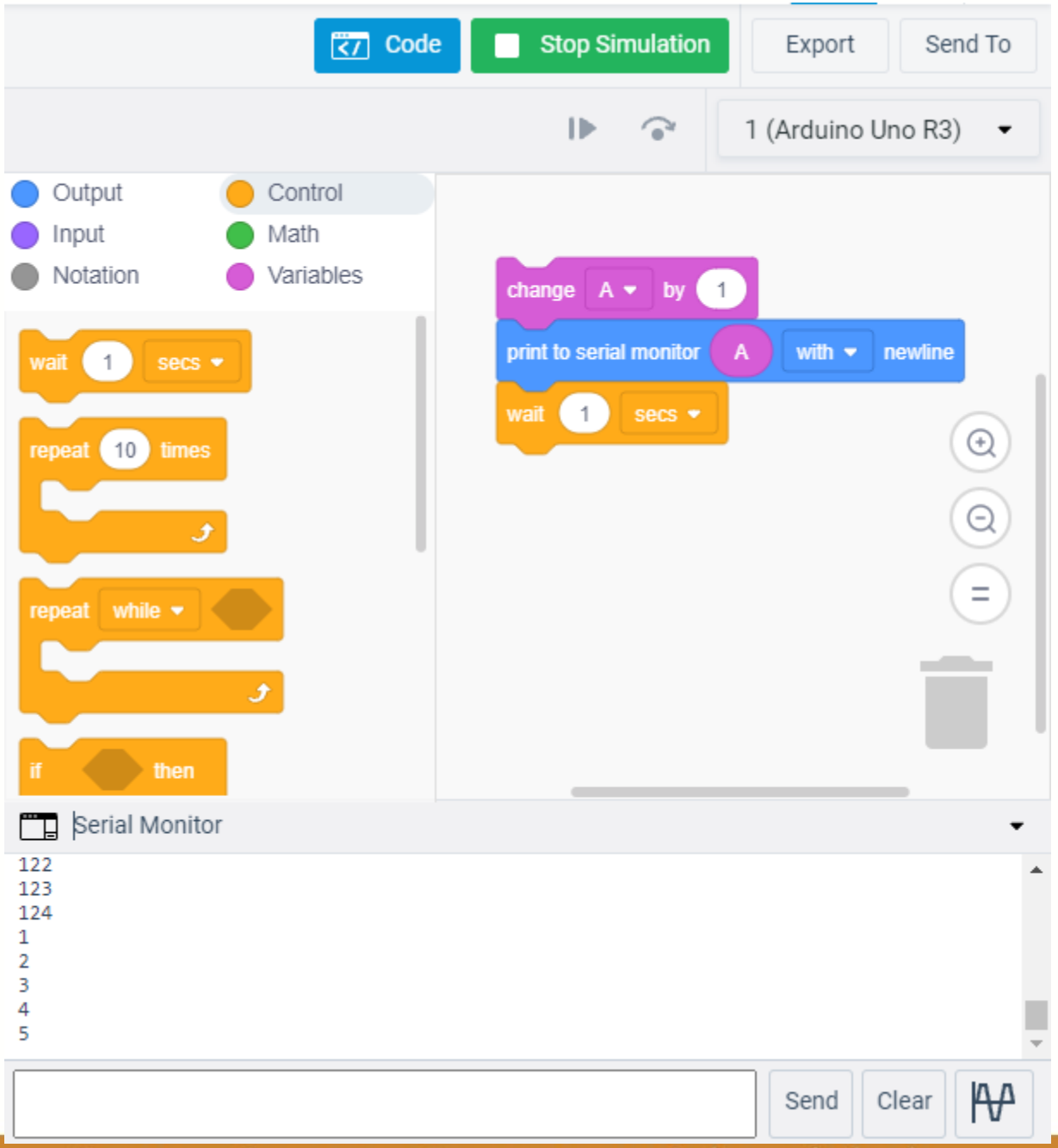
Finally, enter the block "wait" to provide a period of value change every 1 second.



STEP 4

Then, click "start simulation" and display "serial monitor".

You will see the value of A displayed will continue to increase every 1 second.



Q&A