



Armstrong

School Program 2023-2024

Lesson 2



Armstrong

entertainment meets education

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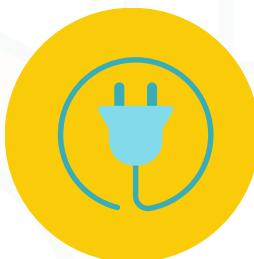
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Lesson Content



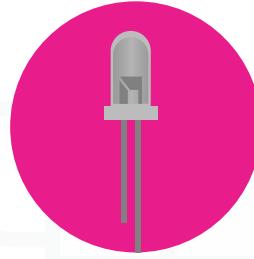
Revising previous lesson



Electrical circuit basics



Getting started with Tinkercad



Blinking LEDs



Remember

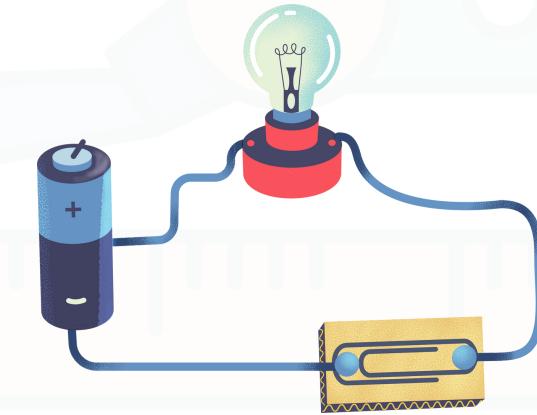
HIGH= on, LOW=off

In programming a pin is **HIGH** when it outputs electricity (led on) and **LOW** when it doesn't output electricity.



Electronic circuits

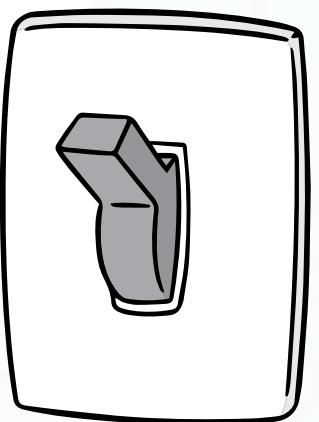
How does a flashlight work?



A flashlight is a device that produces light when you press a button.

what parts are inside a flashlight?

The batteries, the switch, the lamp.



Electronic circuits

Batteries

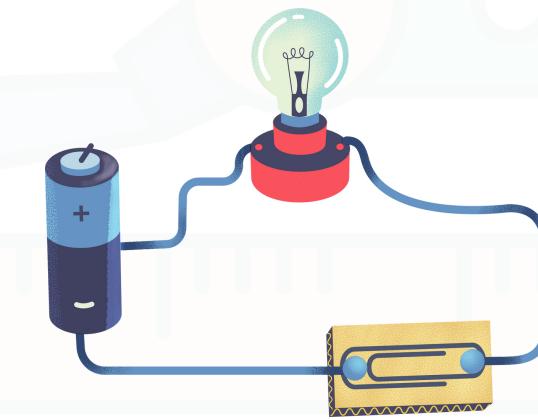
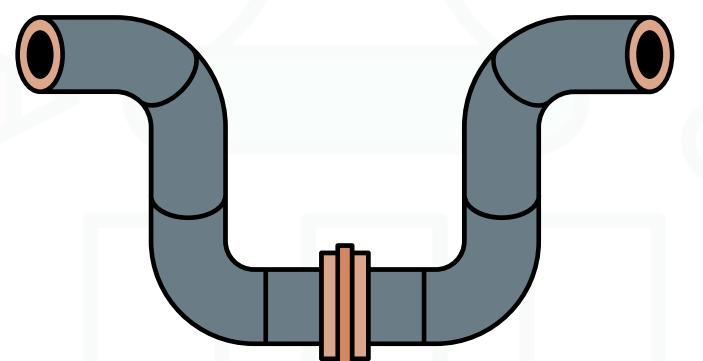


Batteries are like tiny boxes that store electricity.

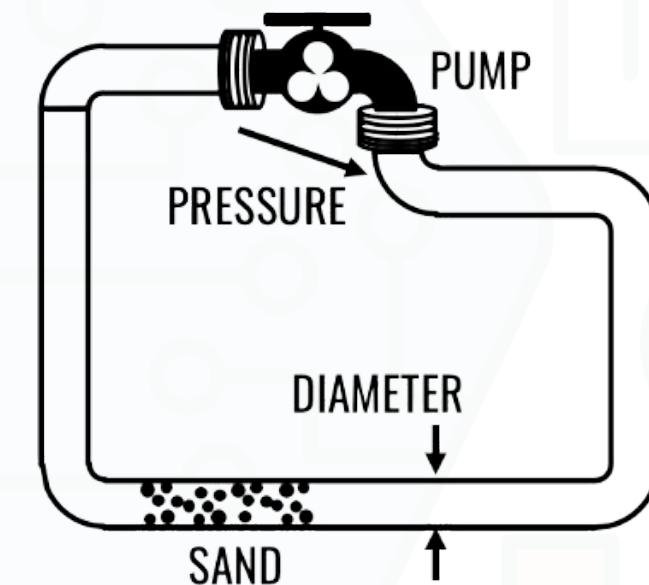
what is electricity?



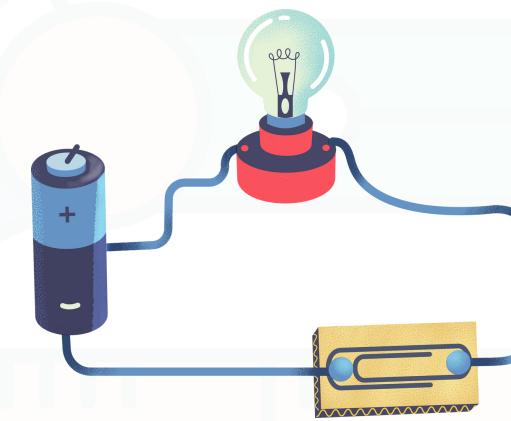
Electricity is a form of energy that can make things move or glow.
Electricity flows like water in a pipe, but it needs a path to follow.



Water



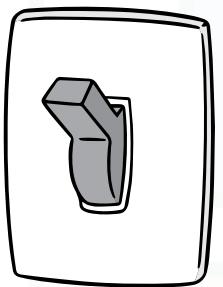
Electronic circuits



What is a circuit?

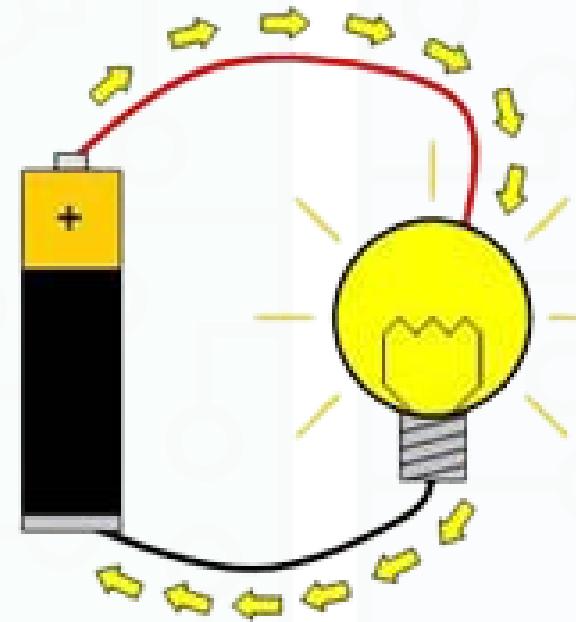
A circuit is like a circle. When a circuit is closed, the electric current can move from the power source, such as a battery, to the device, such as a light bulb, and back to the power source. This makes the device work.

Switch

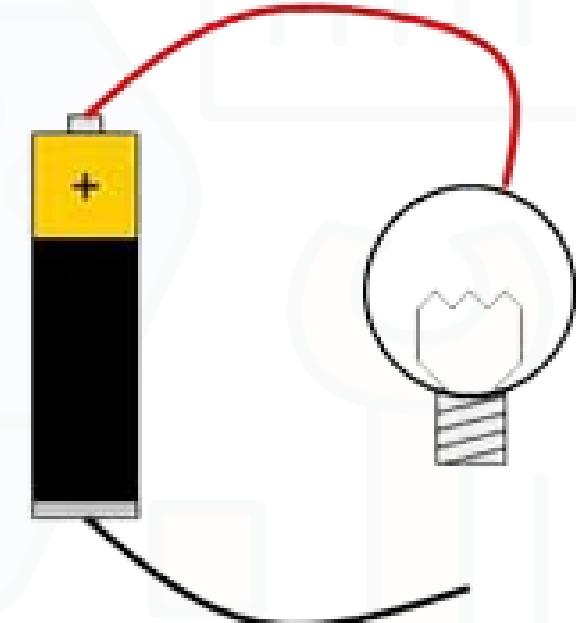


A switch is like a gate that controls the flow of electricity.

Closed circuit



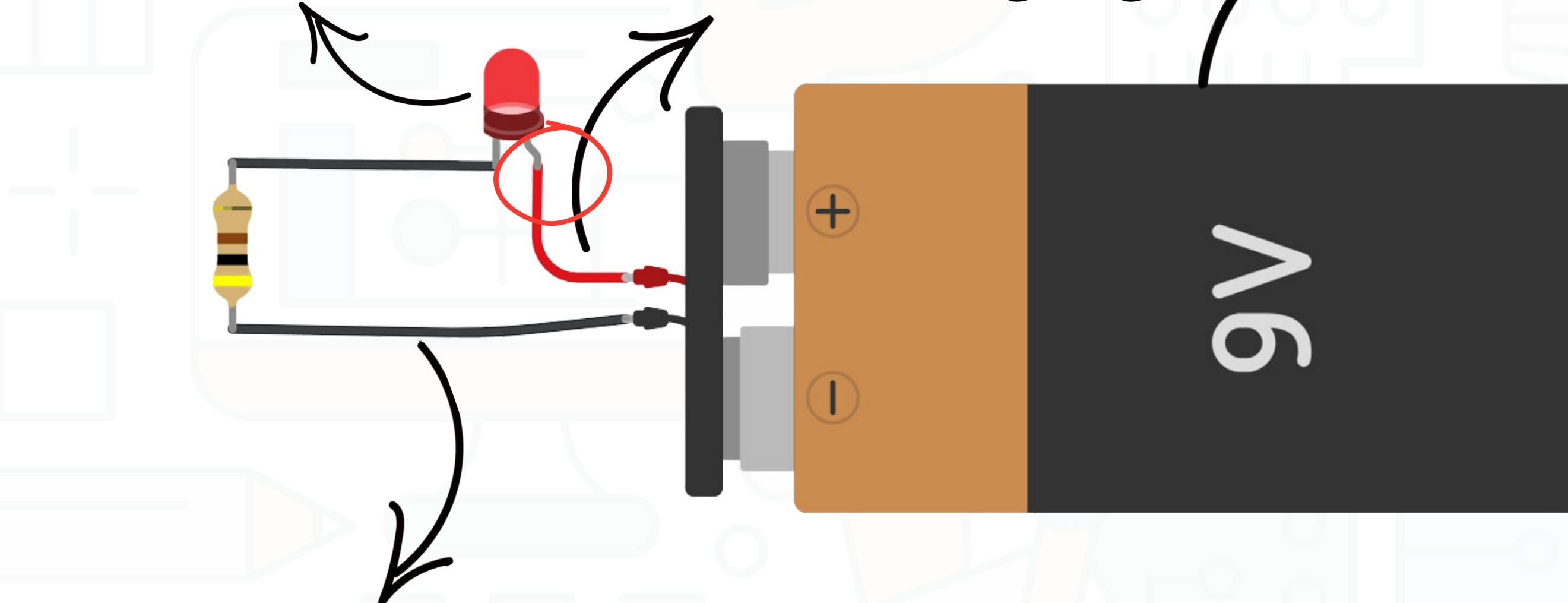
Open circuit



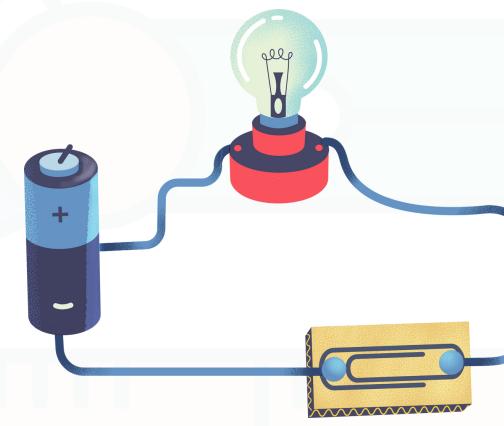
Electronic circuits

Example of a closed circuit

LED
+ connected to long leg



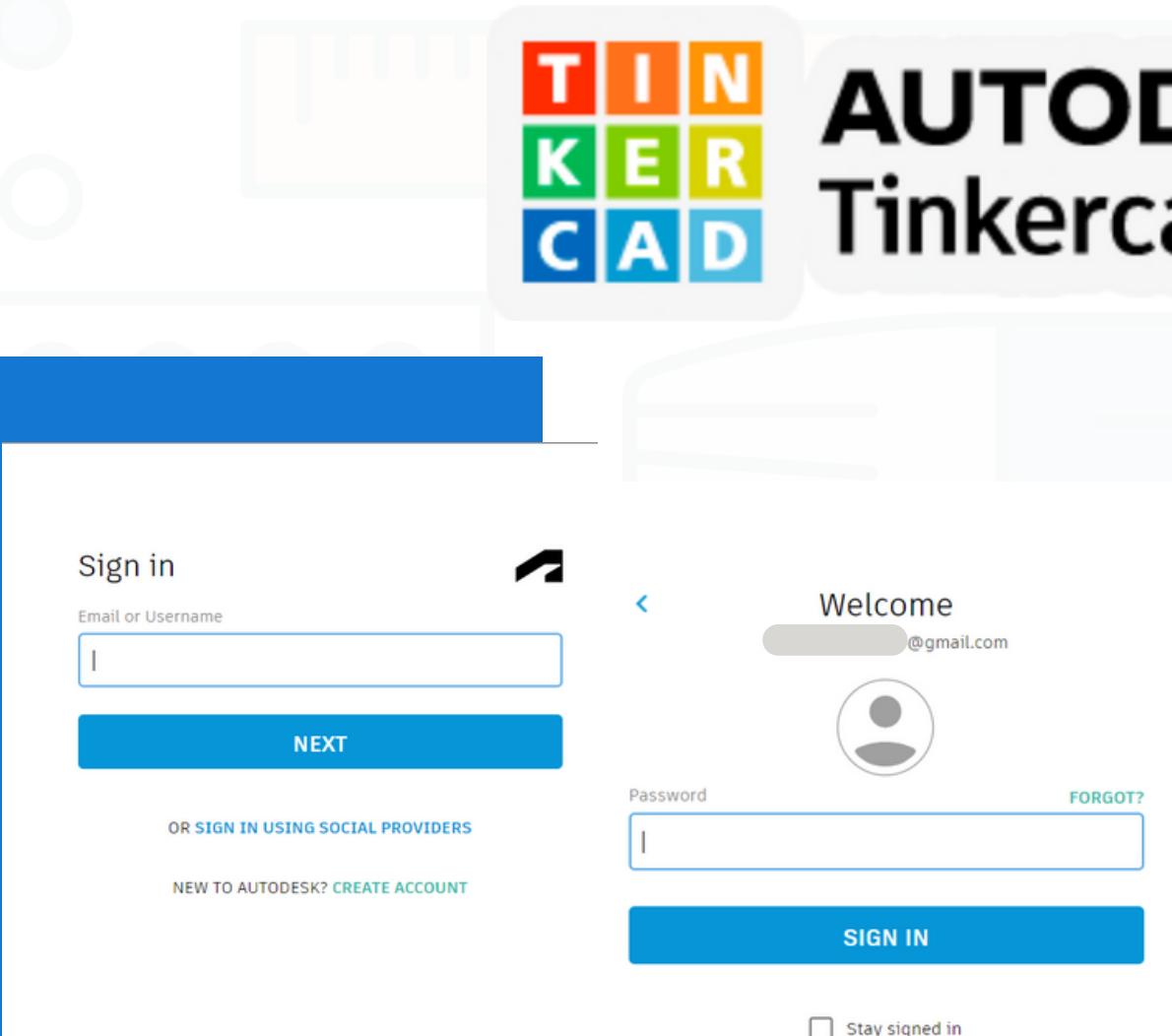
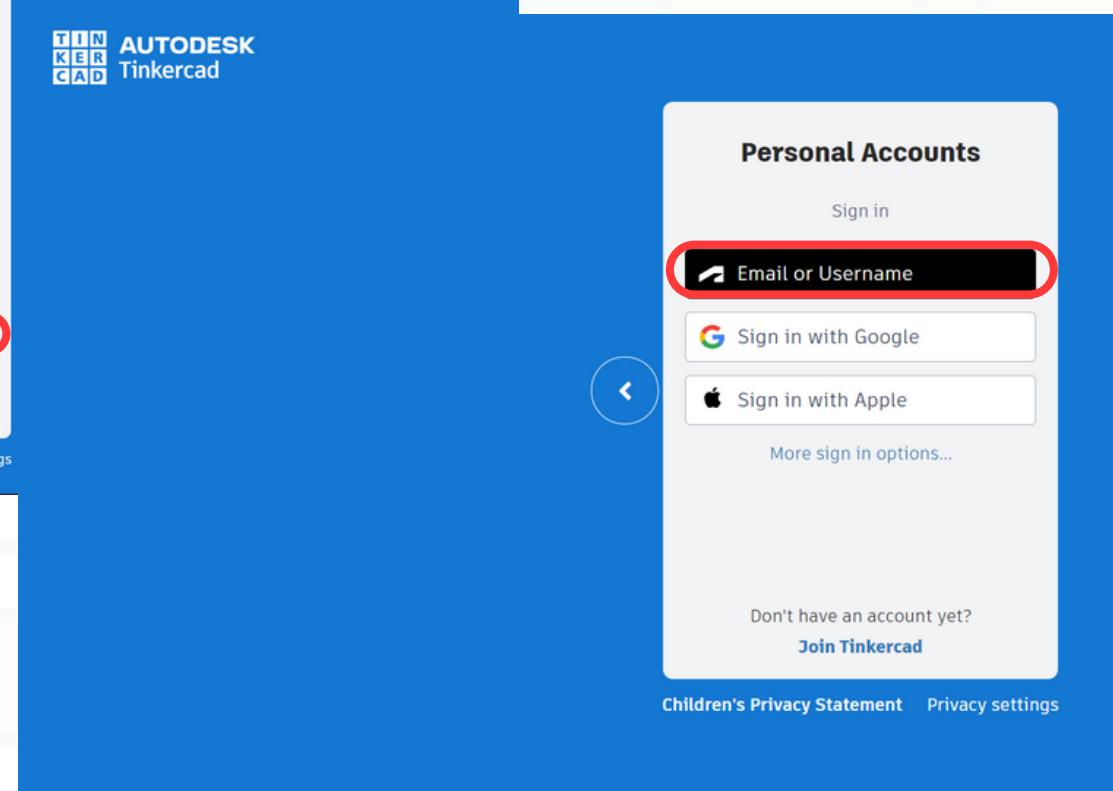
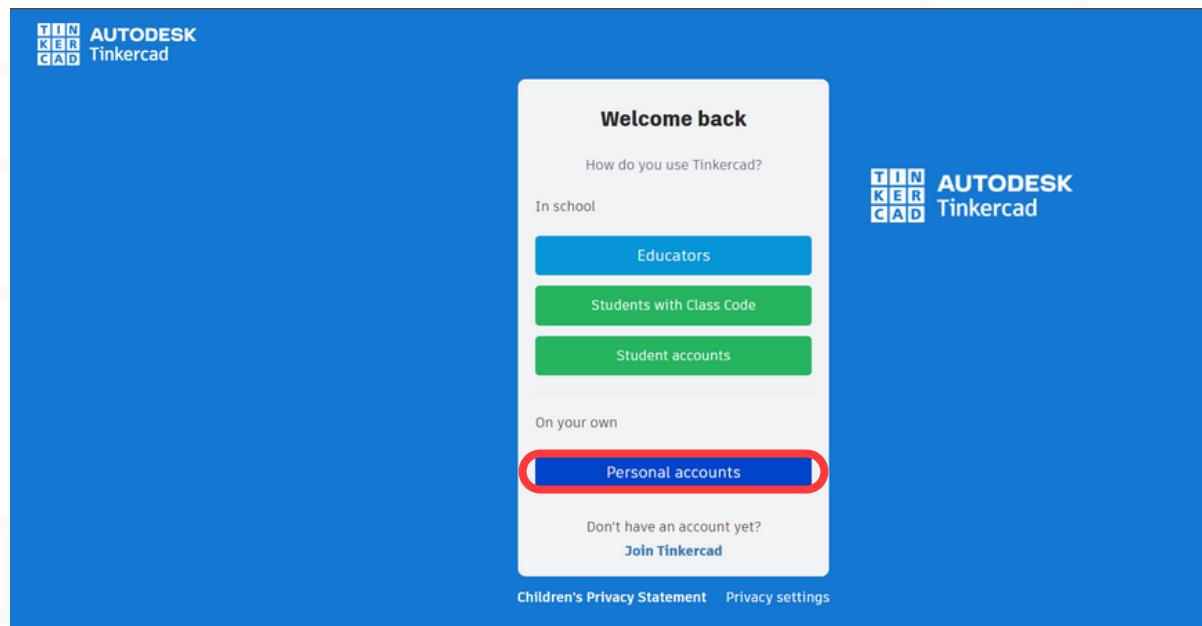
- connected to short LED's leg



battery

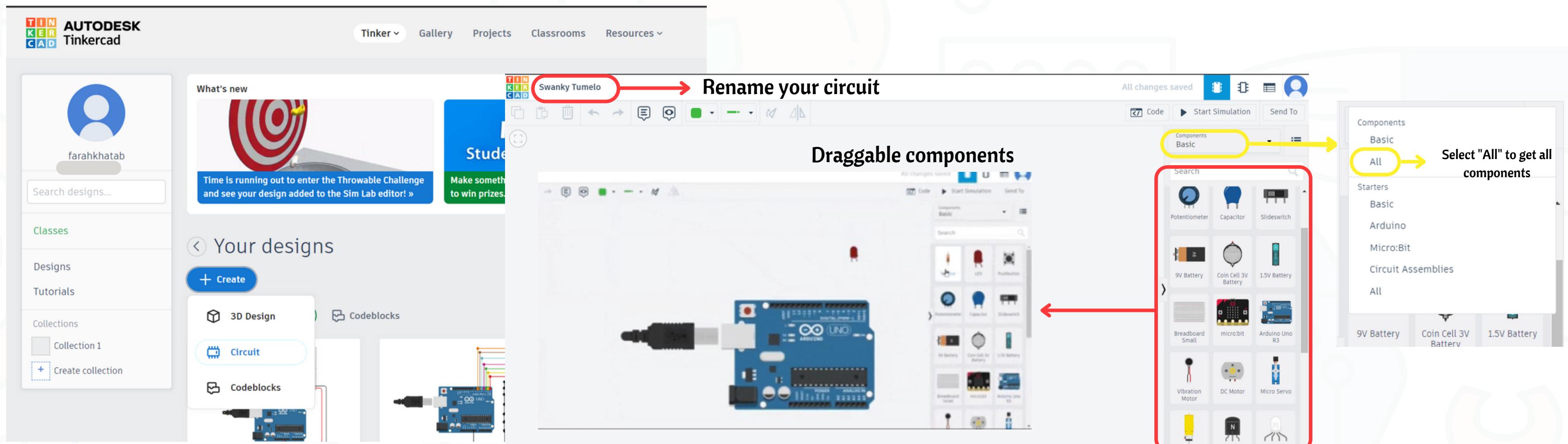
Getting started with Tinkercad

Step 1: sign in.



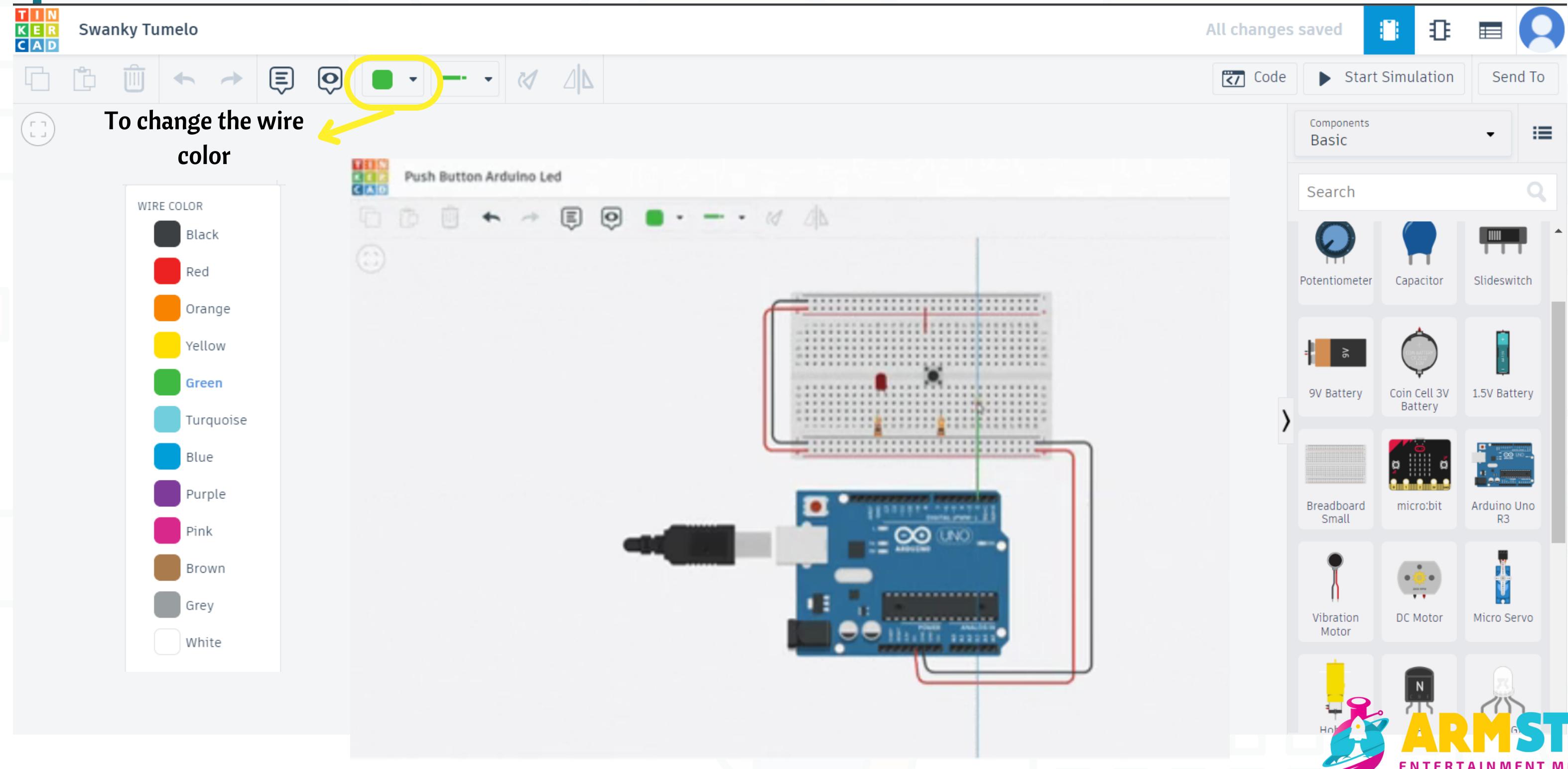
Getting started with Tinkercad

Step 2: create new circuit.

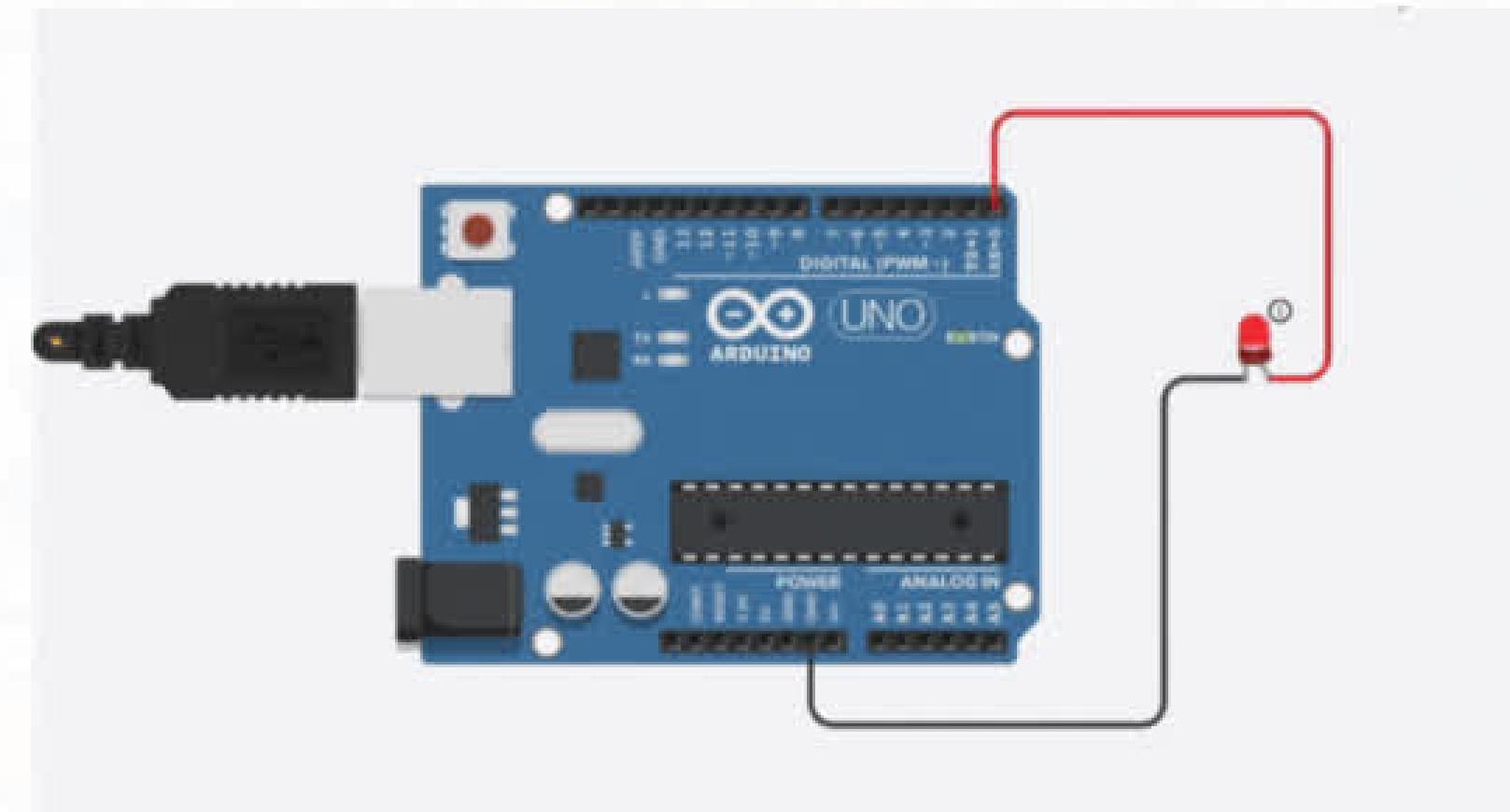


Getting started with Tinkercad

Step 3: connect and simulate.

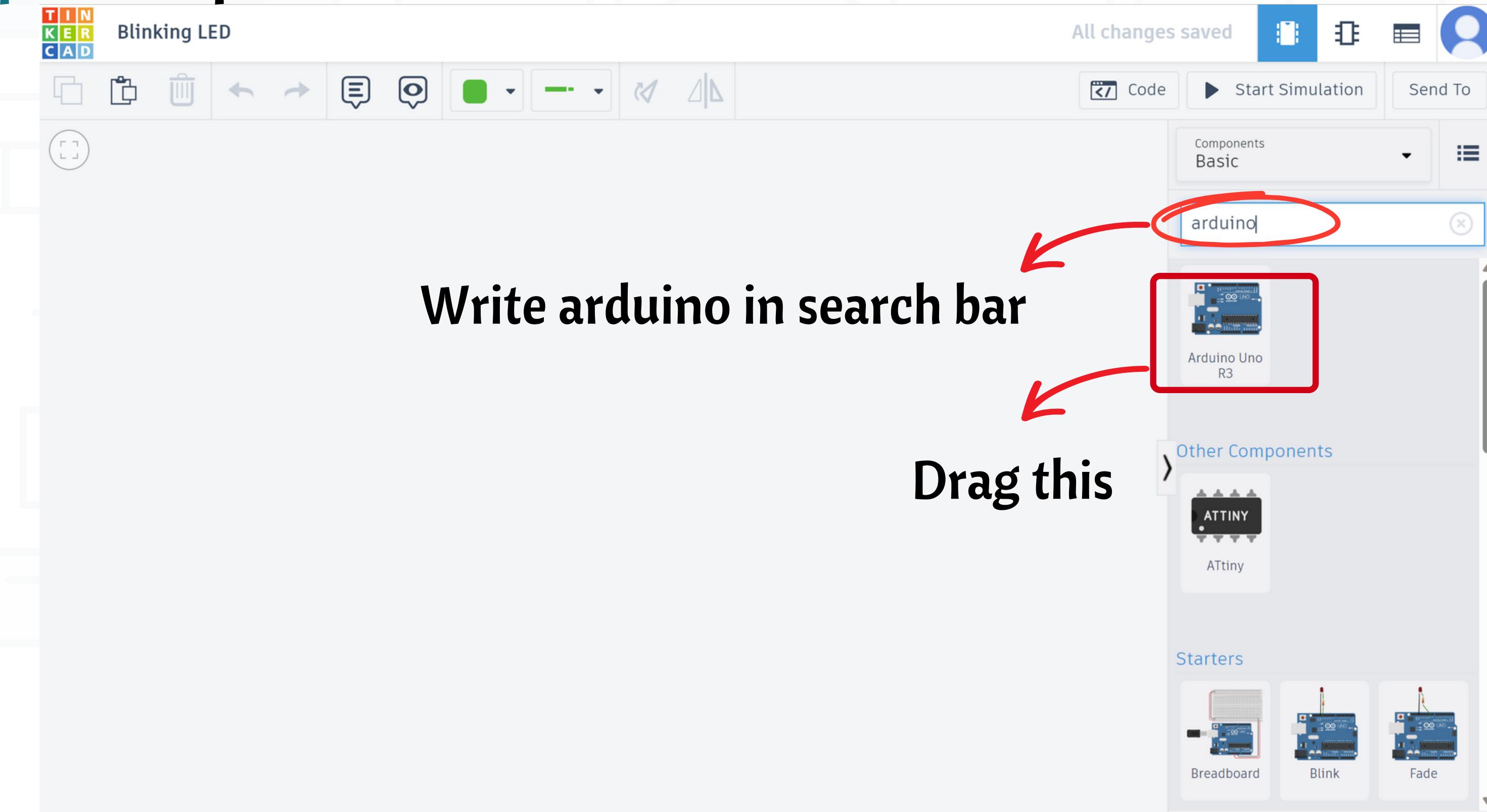


Let's start our first simulation



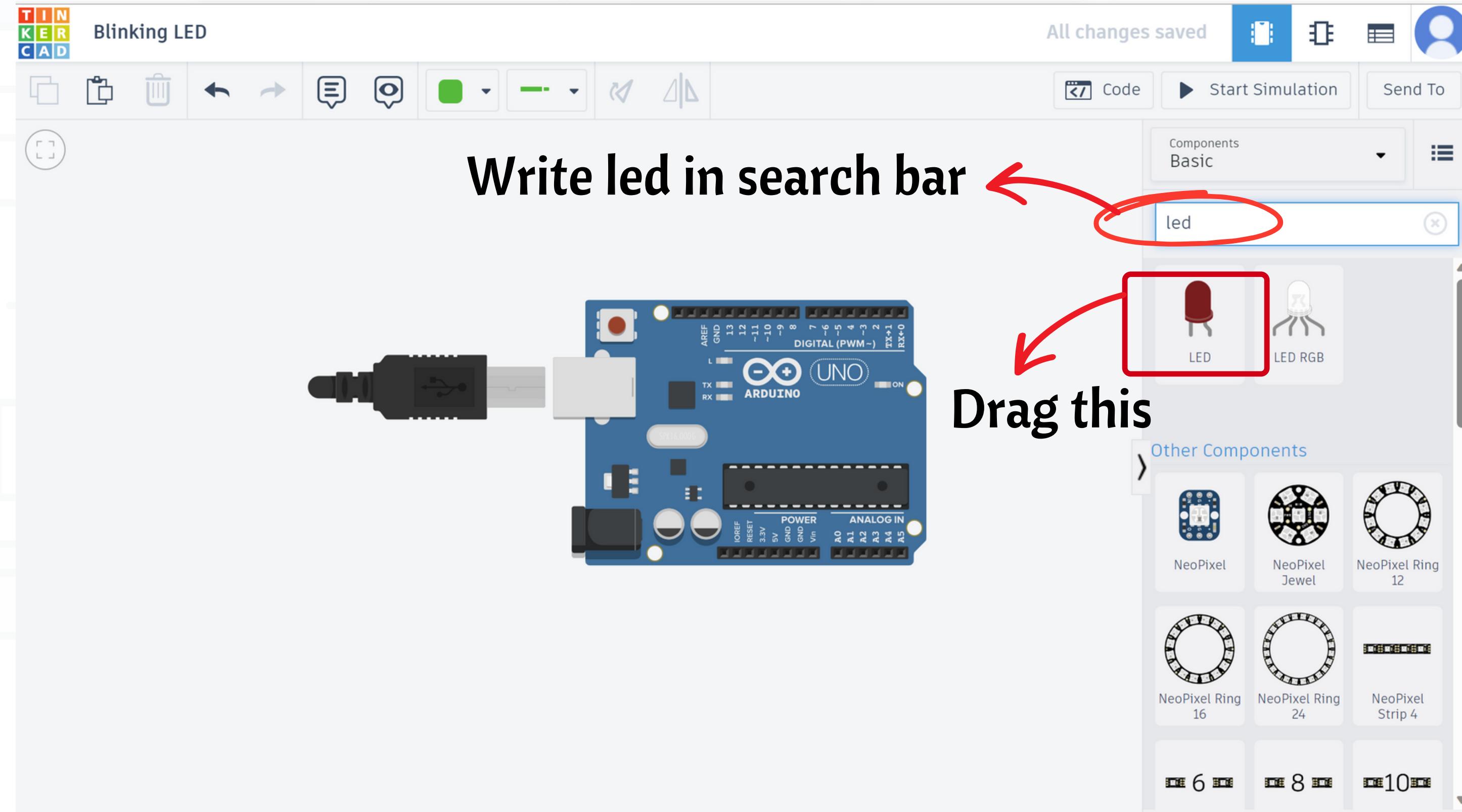
Blinking LEDs

Step 1: components



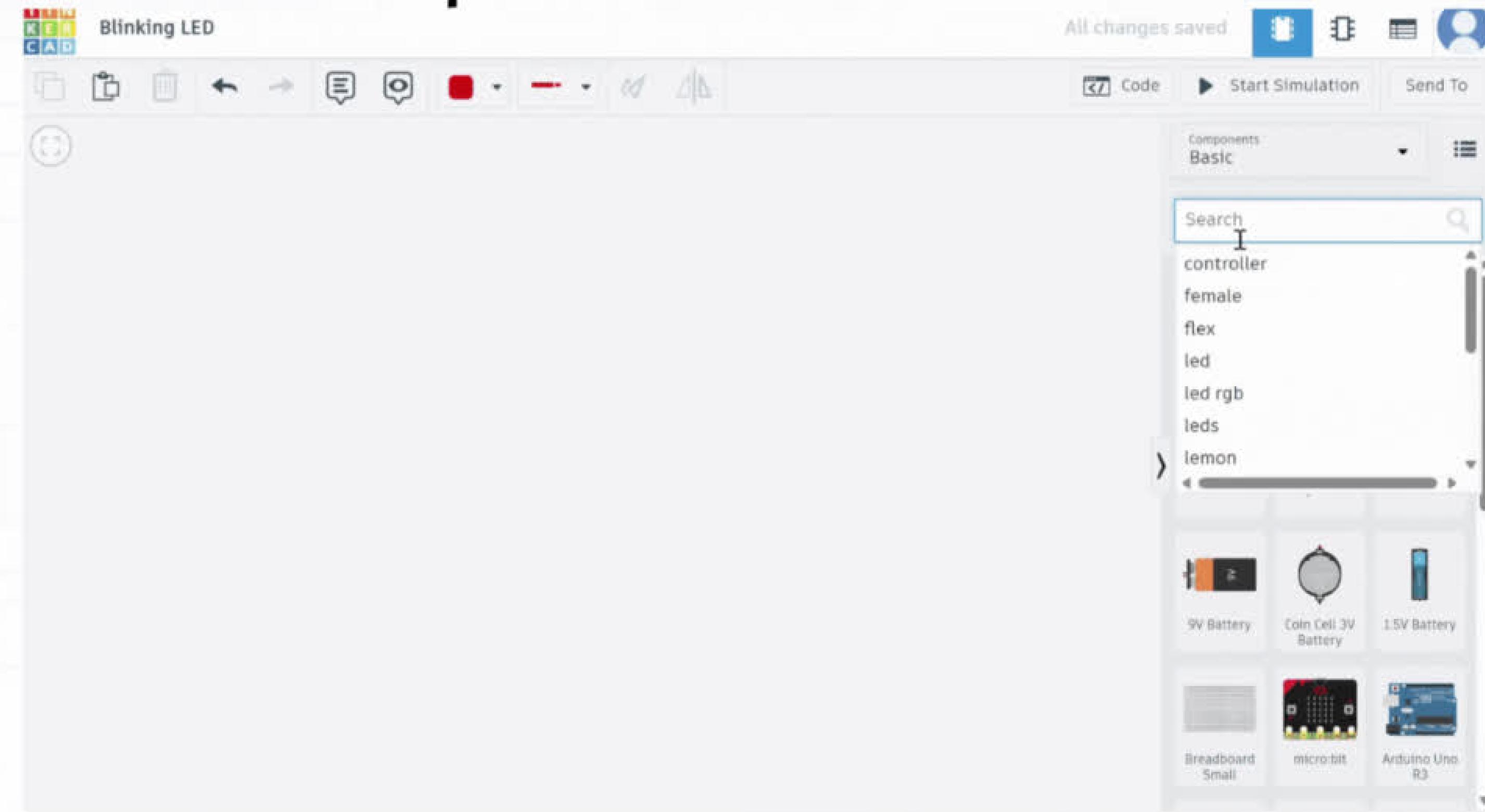
Blinking LEDs

Step 1: components



Blinking LEDs

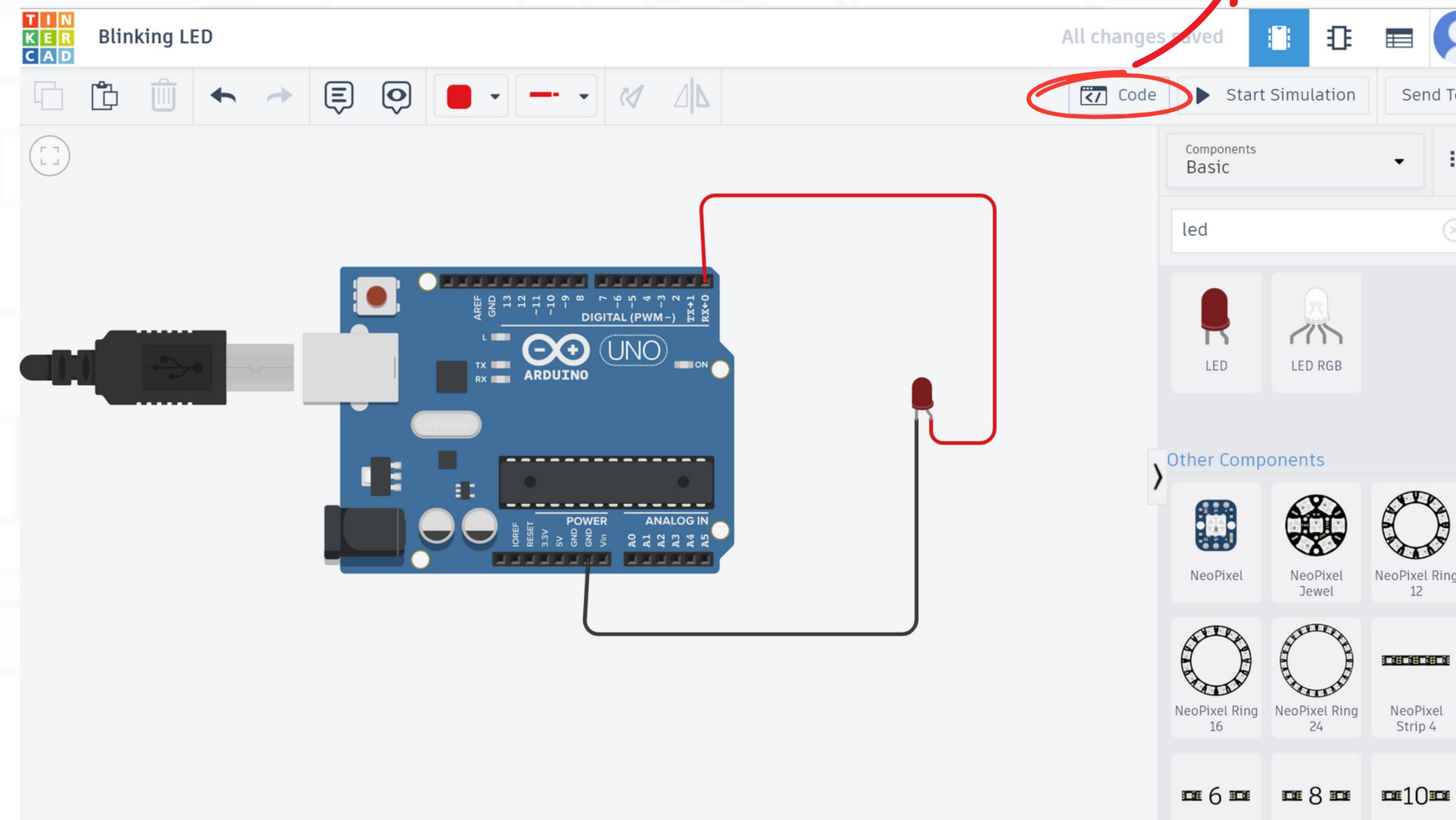
Step 2: Connect components



Blinking LEDs

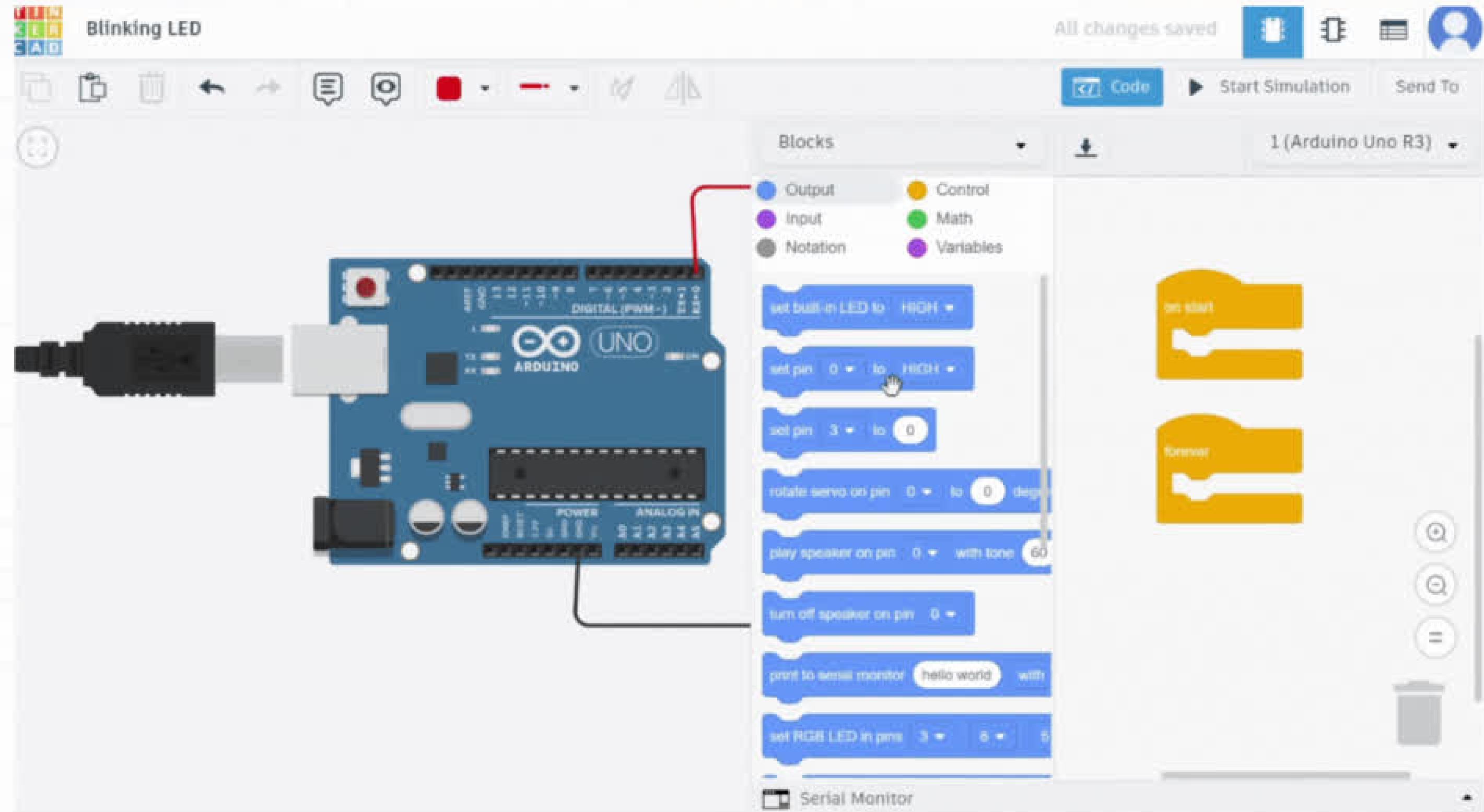
Step 3: Write code to blink one LED

Click here to write code



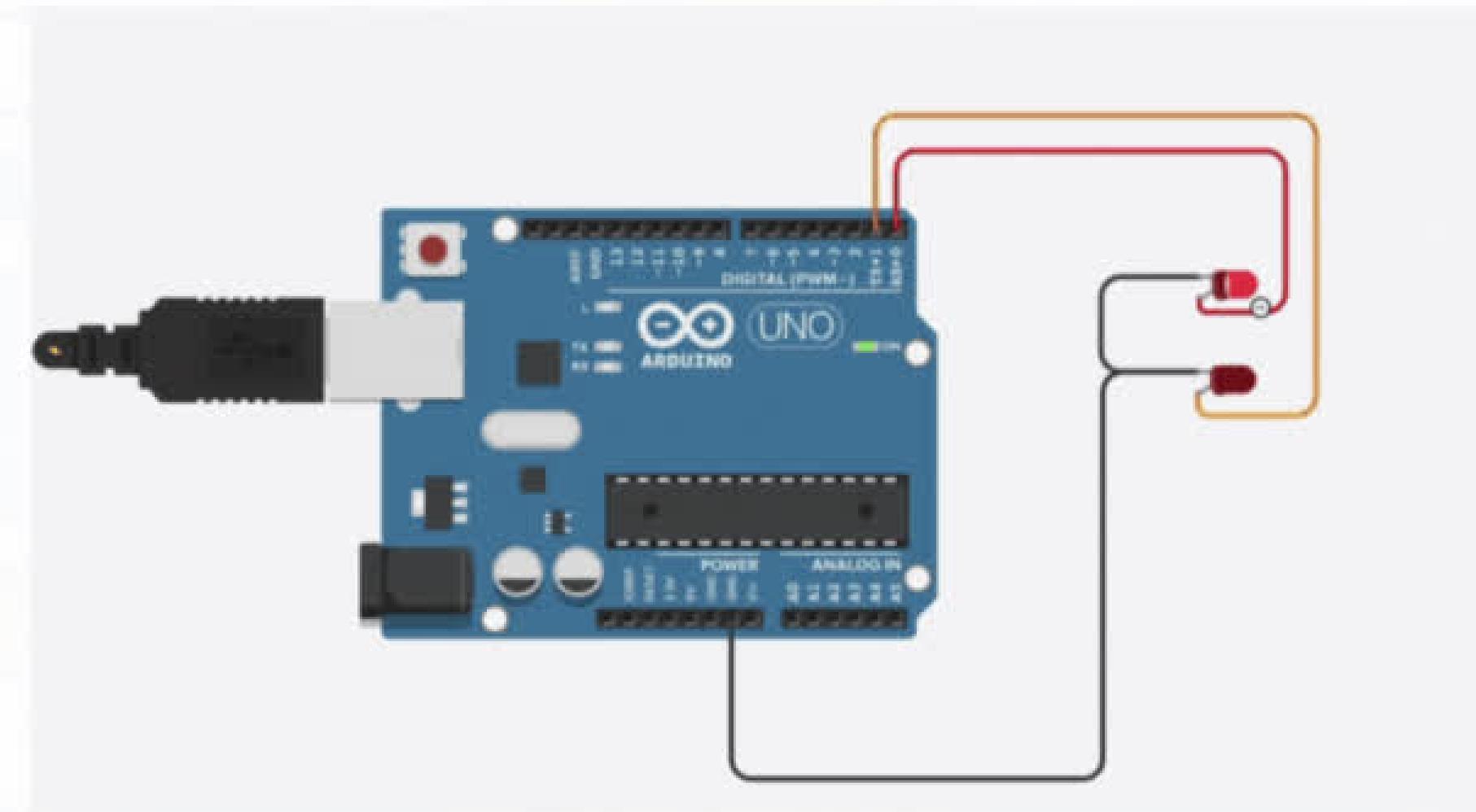
Blinking LEDs

Step 3: Write code to blink one LED



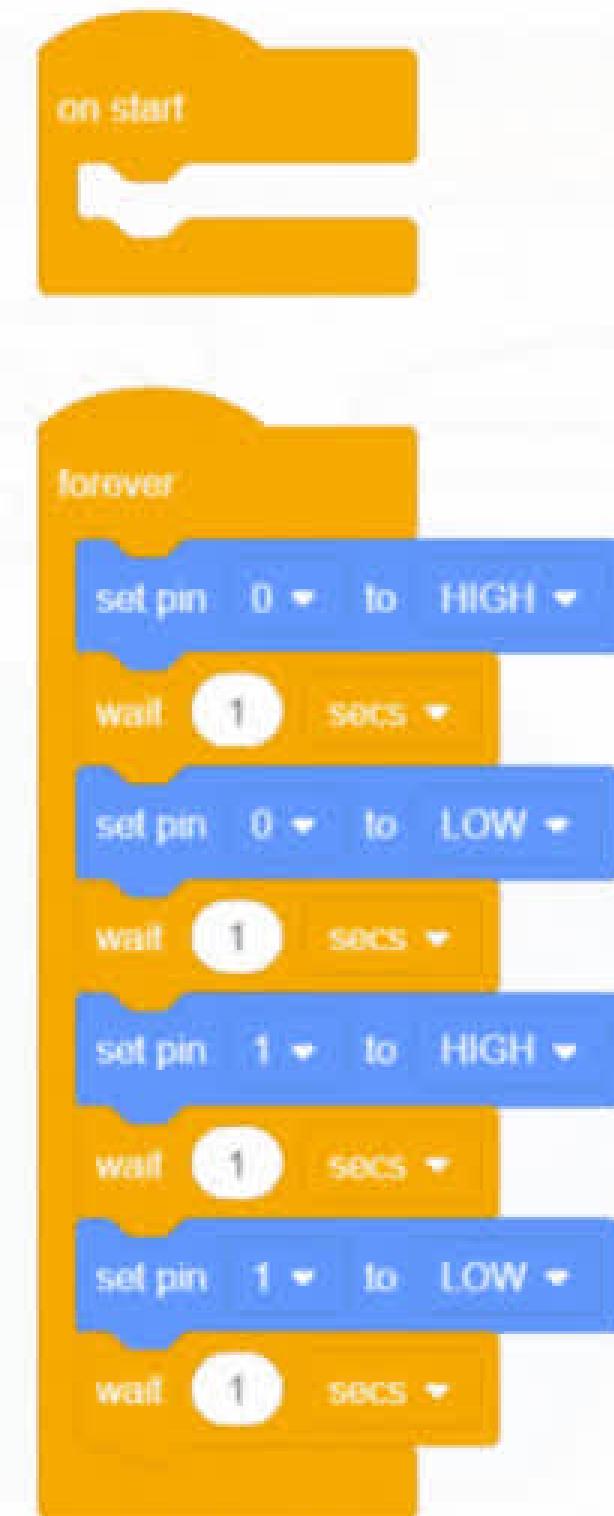
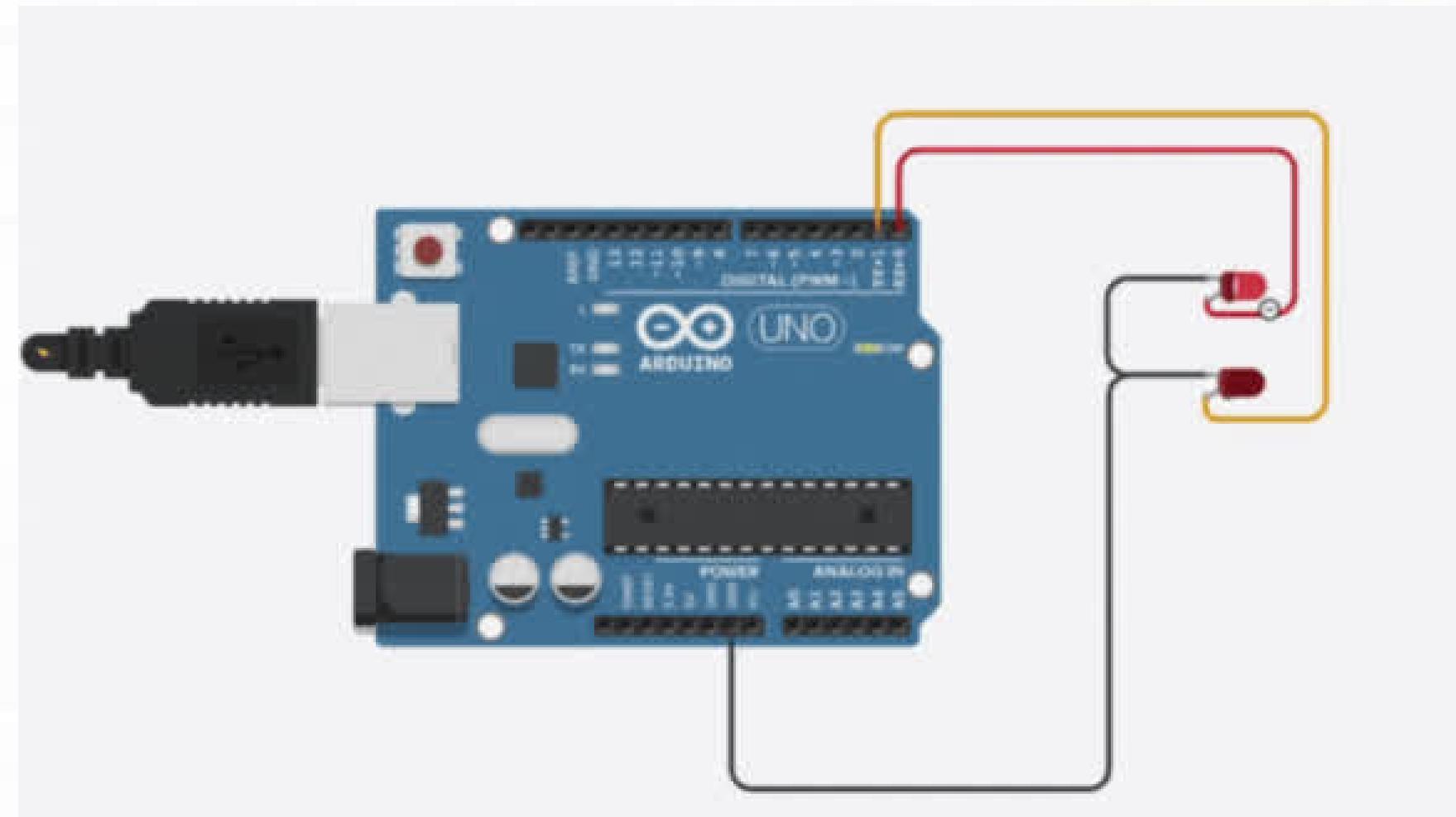
Blinking LEDs

Mission 1: Blink 2 LEDs



Blinking LEDs

Mission 1: Blink 2 LEDs

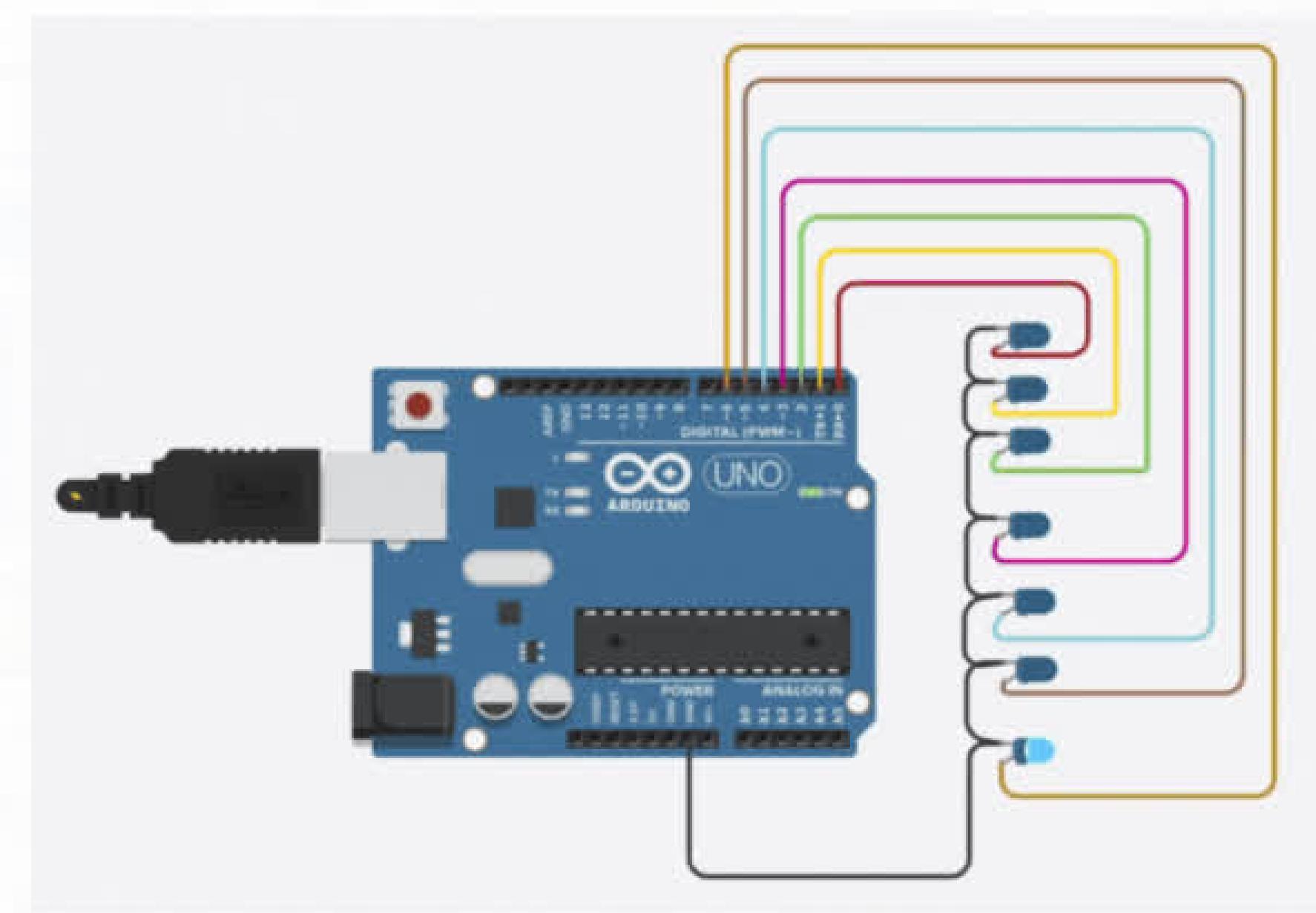


```
on start
    forever
        set pin 0 to HIGH
        wait 1 secs
        set pin 0 to LOW
        wait 1 secs
        set pin 1 to HIGH
        wait 1 secs
        set pin 1 to LOW
        wait 1 secs
```

The Scratch script consists of an 'on start' hat block followed by a 'forever' loop. Inside the loop, the script alternates between setting digital pin 0 to HIGH and LOW, with a 1-second delay for each state. It then repeats the same sequence for digital pin 1, also with a 1-second delay for each state.

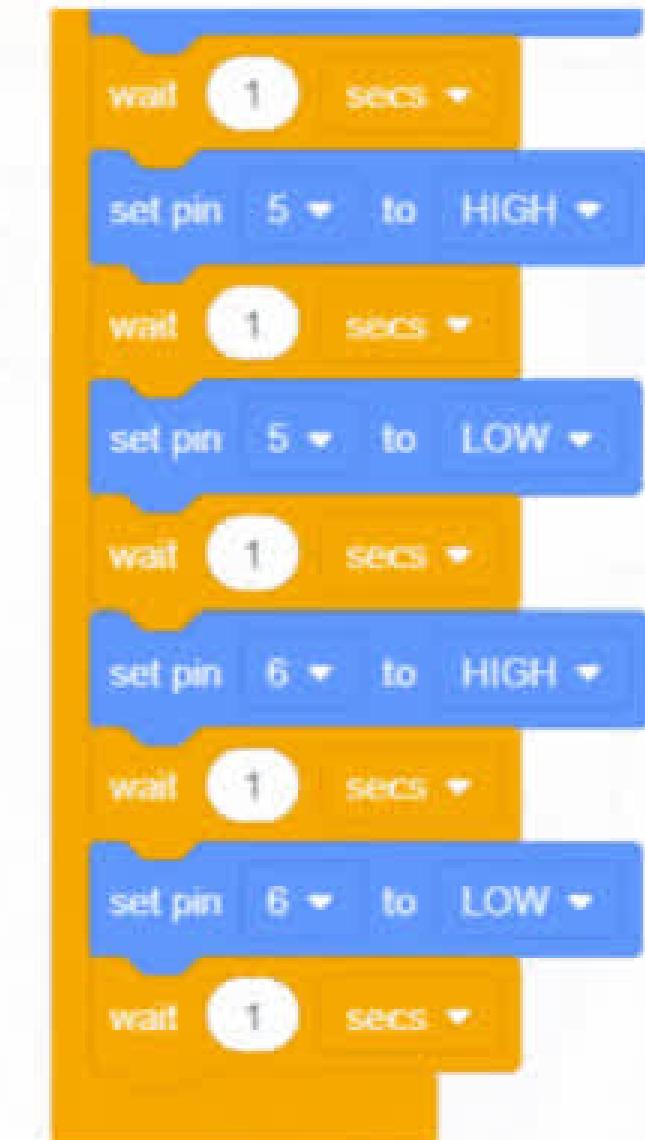
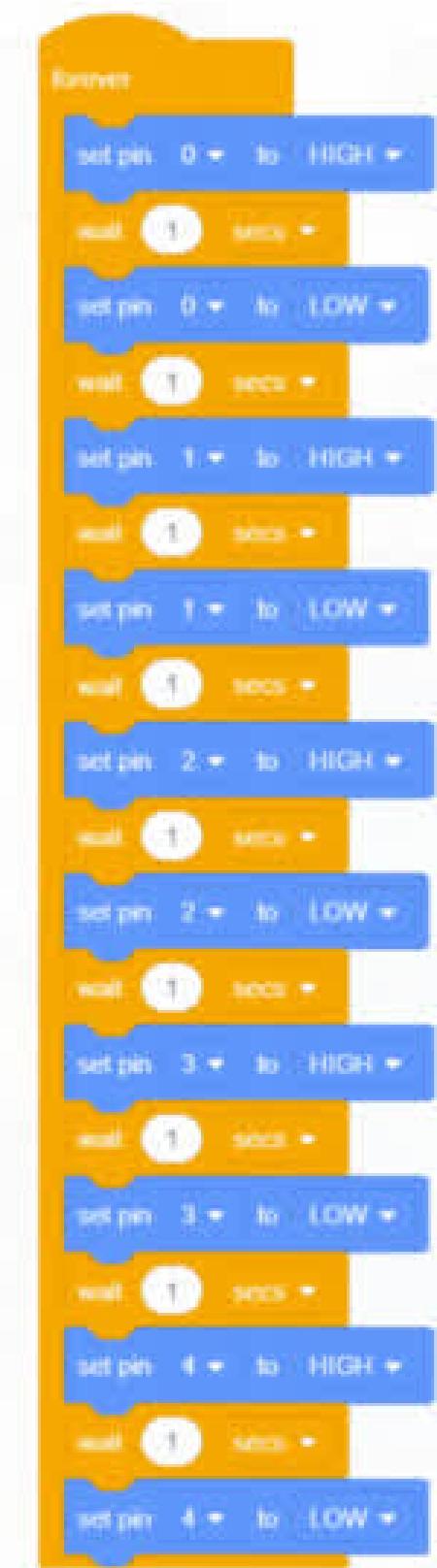
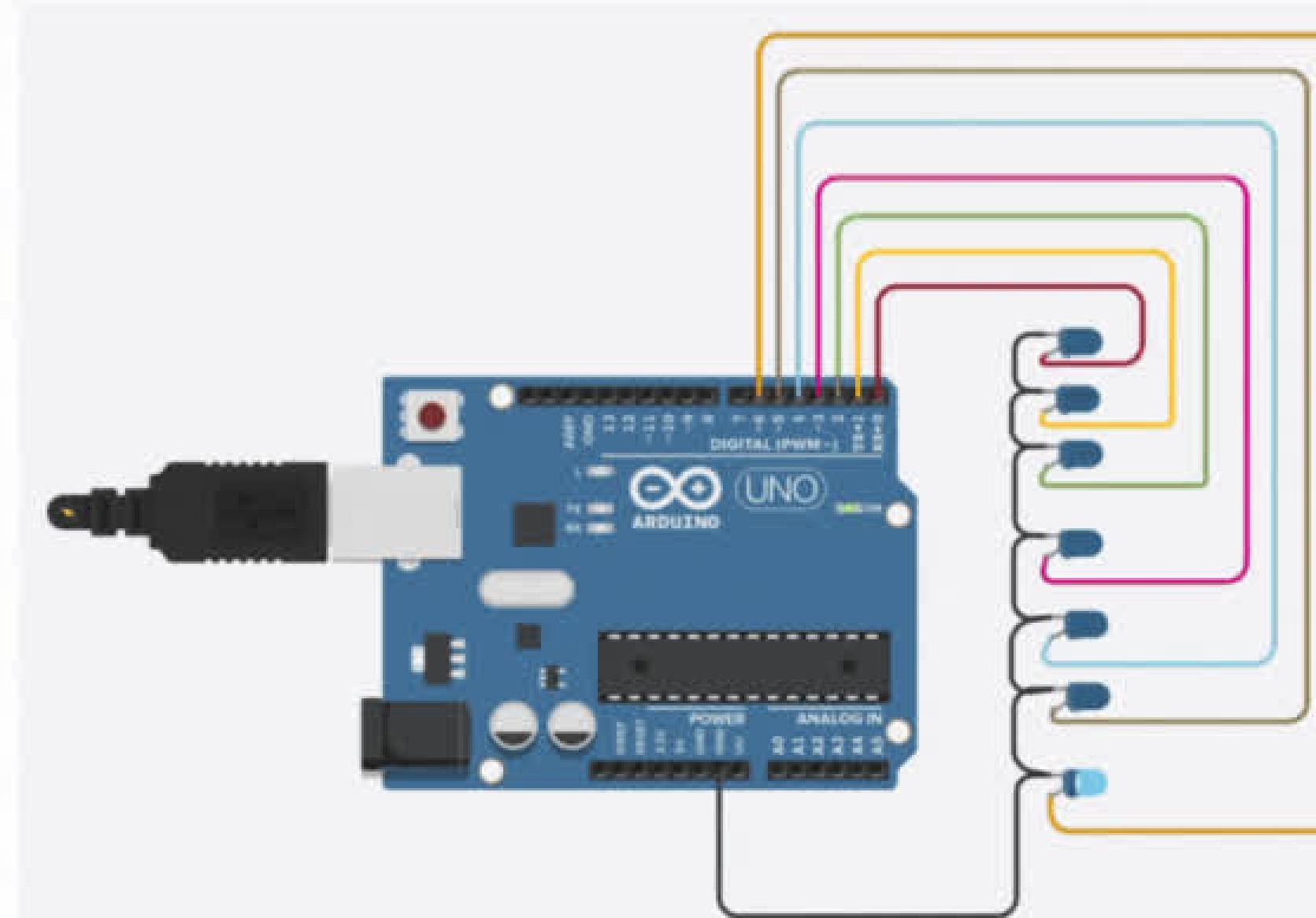
Blinking LEDs

Mission 2: Blink 7 LEDs



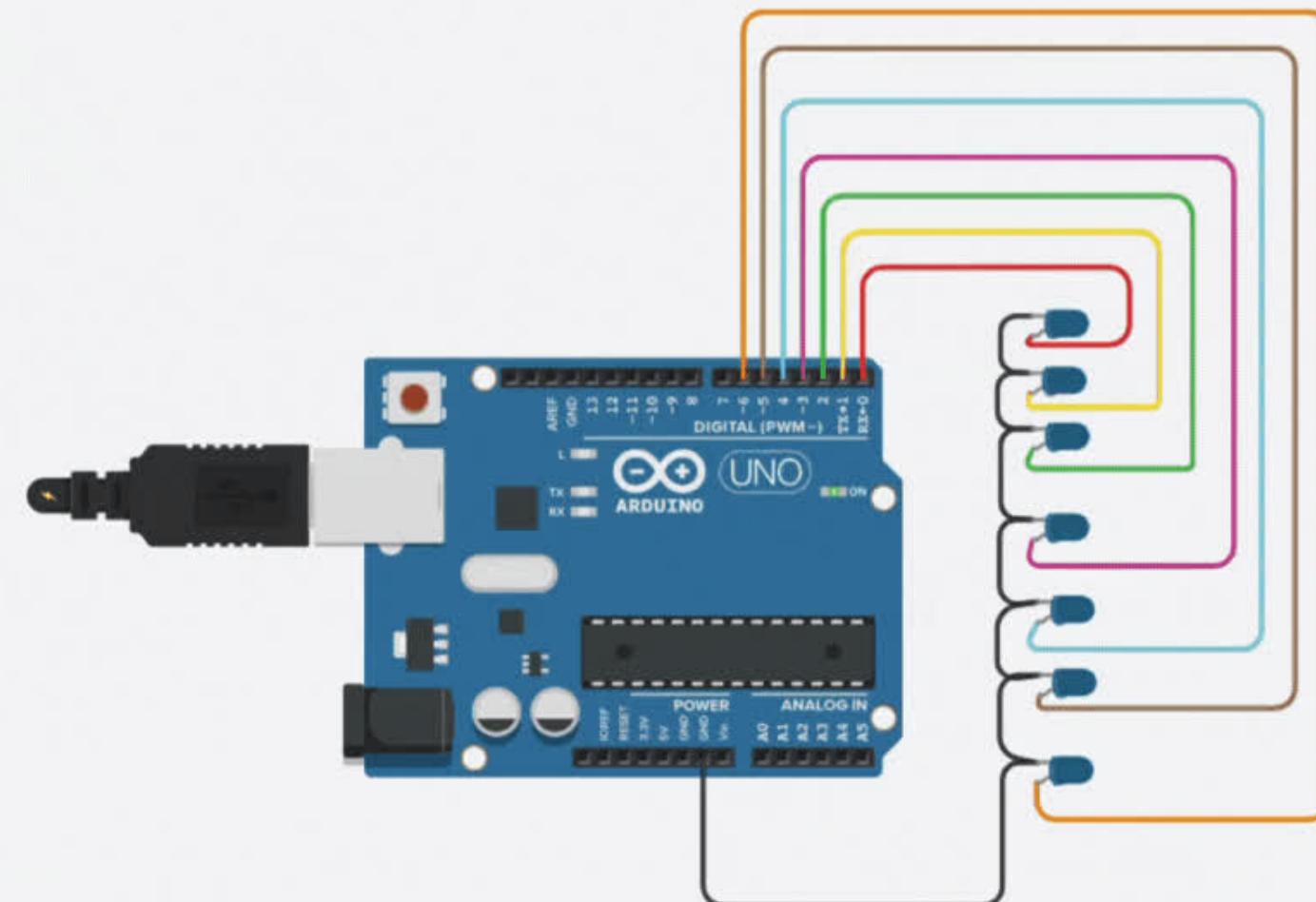
Blinking LEDs

Mission 2: Blink 7 LEDs



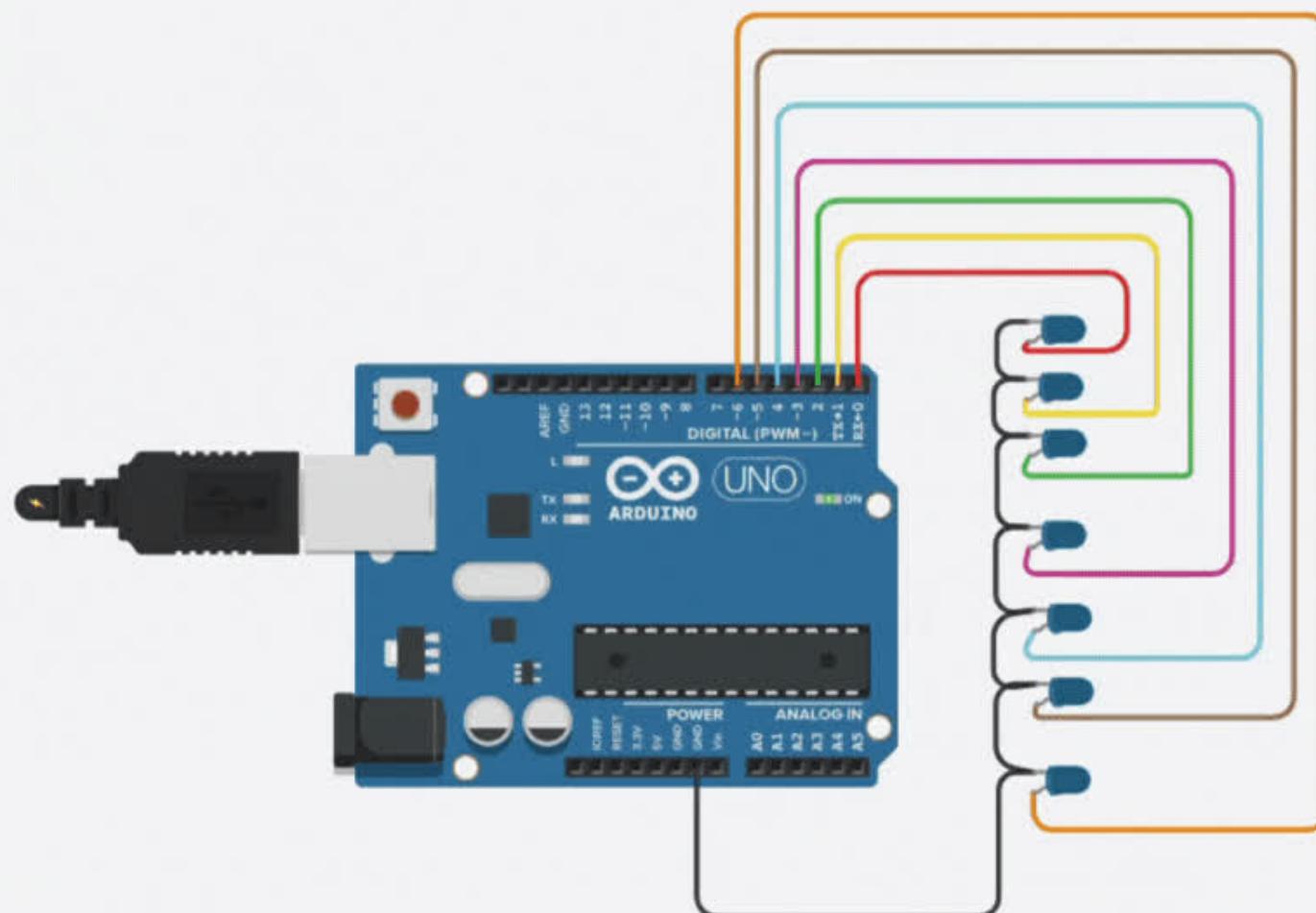
Blinking LEDs

Mission 3: Blink 7 LEDs with pattern #1



Blinking LEDs

Mission 3: Blink 7 LEDs with pattern #1



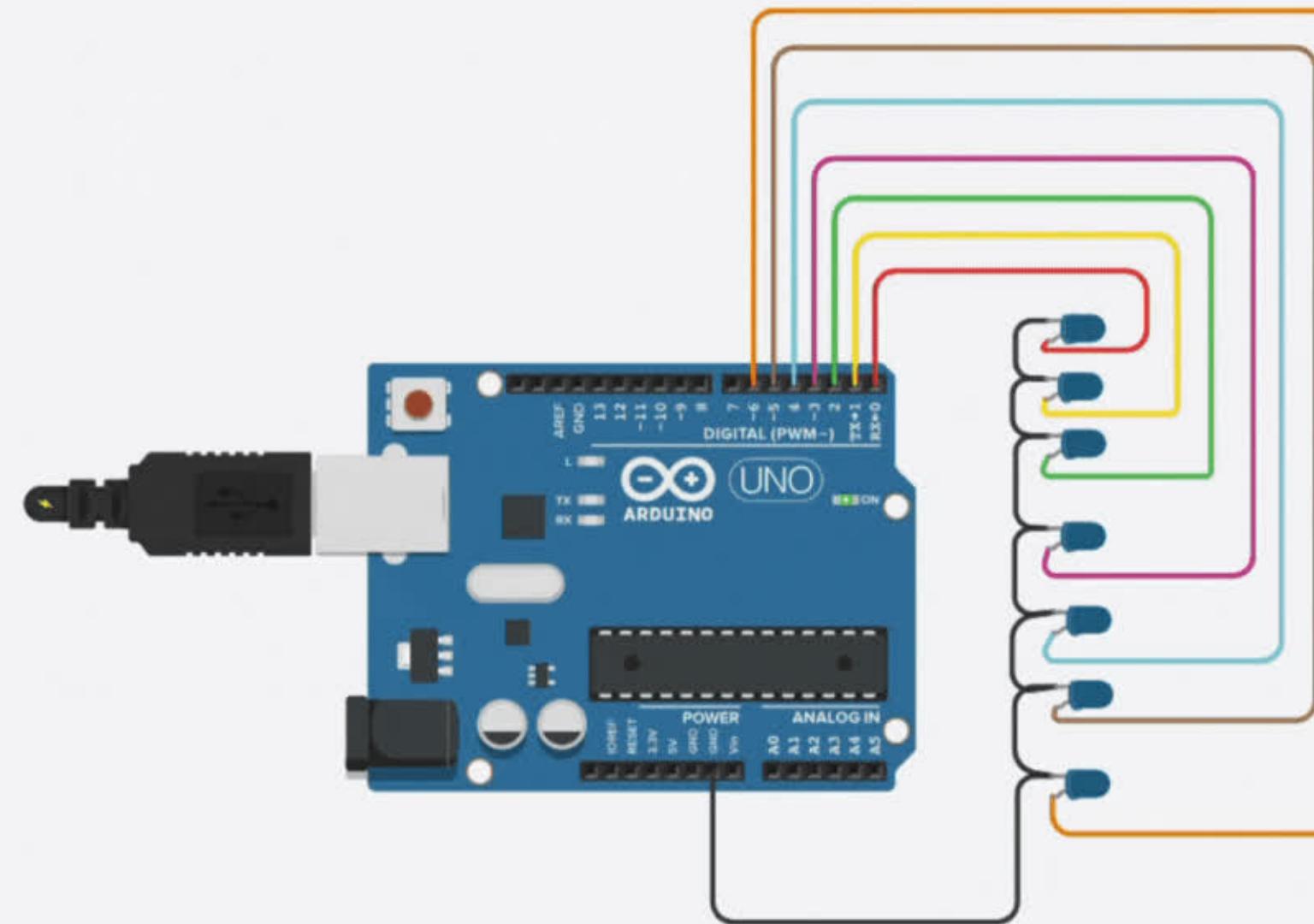
```

forever
  set pin 0 to HIGH
  wait 1 secs
  set pin 1 to LOW
  wait 1 secs
  set pin 2 to HIGH
  wait 1 secs
  set pin 3 to LOW
  wait 1 secs
  set pin 4 to HIGH
  wait 1 secs
  set pin 5 to LOW
  wait 1 secs
  set pin 6 to HIGH
  wait 1 secs
  set pin 0 to LOW
  wait 1 secs

```

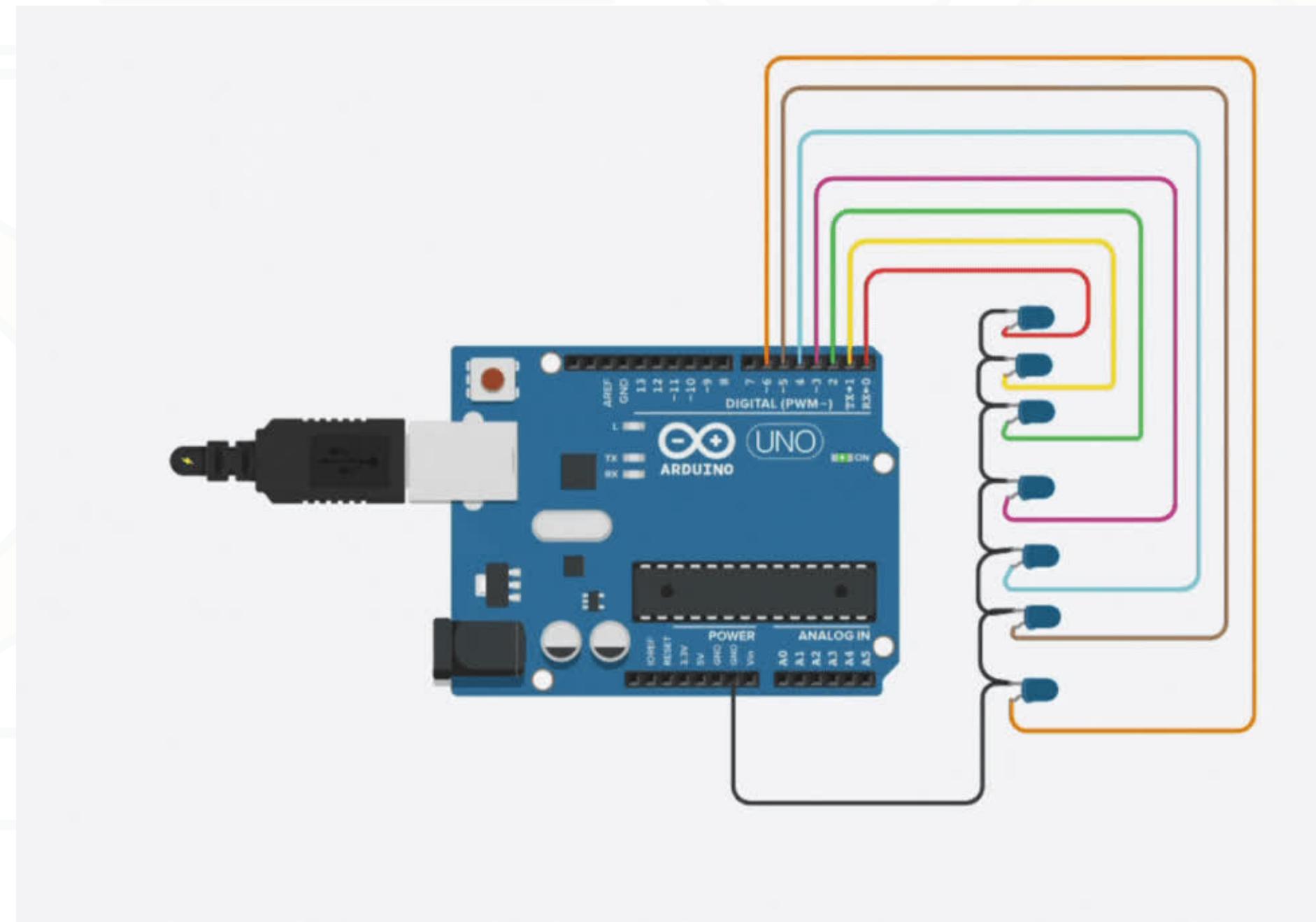
Blinking LEDs

Mission 4: Blink 7 LEDs with pattern #2



Blinking LEDs

Mission 4: Blink 7 LEDs with pattern #2



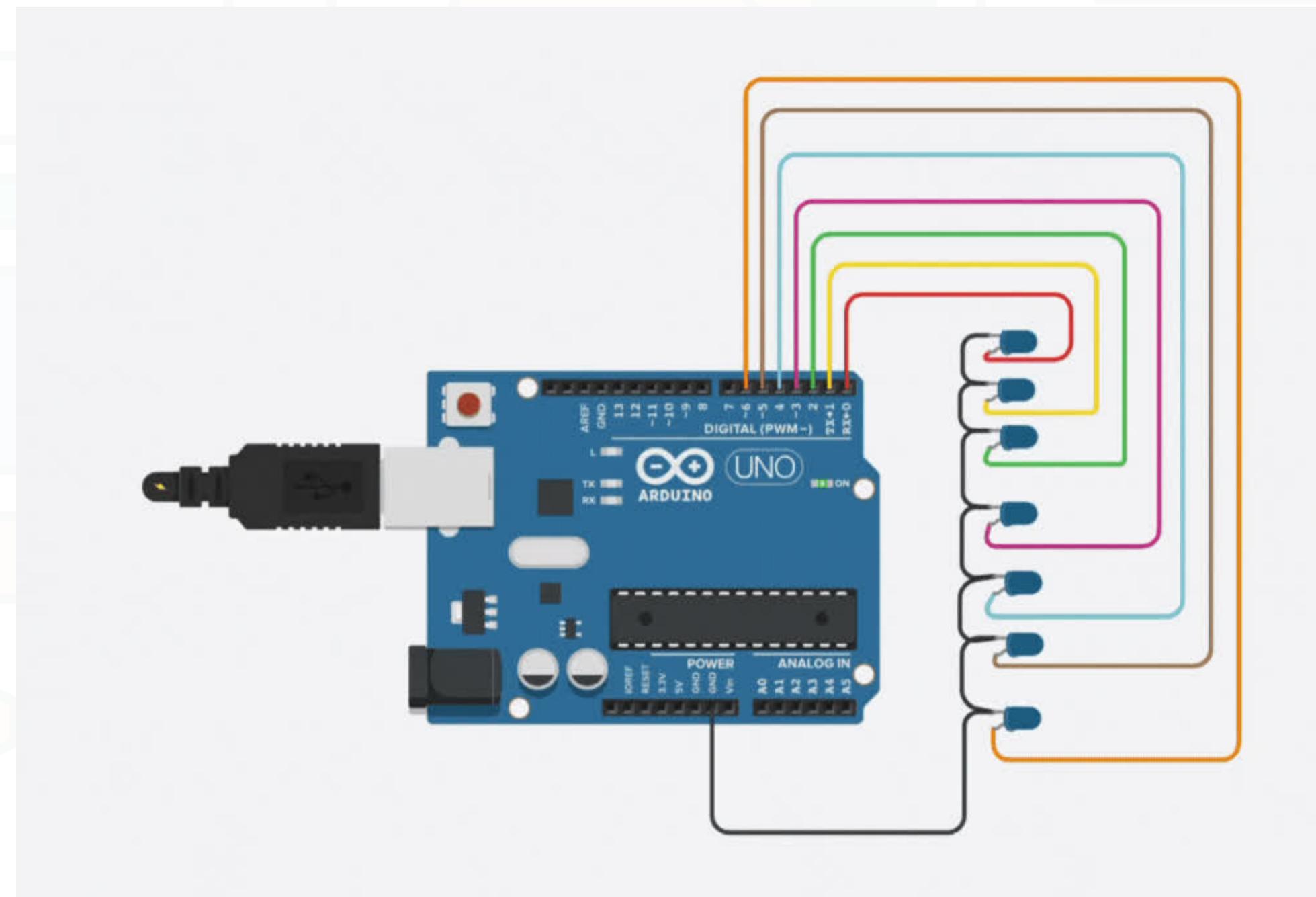
```

forever
  set pin 0 to HIGH
  set pin 1 to HIGH
  wait 1 secs
  set pin 0 to LOW
  set pin 2 to HIGH
  wait 1 secs
  set pin 2 to LOW
  set pin 3 to HIGH
  wait 1 secs
  set pin 3 to LOW
  set pin 4 to HIGH
  wait 1 secs
  set pin 4 to LOW
  set pin 5 to HIGH
  wait 1 secs
  set pin 5 to LOW
  set pin 6 to HIGH
  wait 1 secs
  set pin 6 to LOW

```

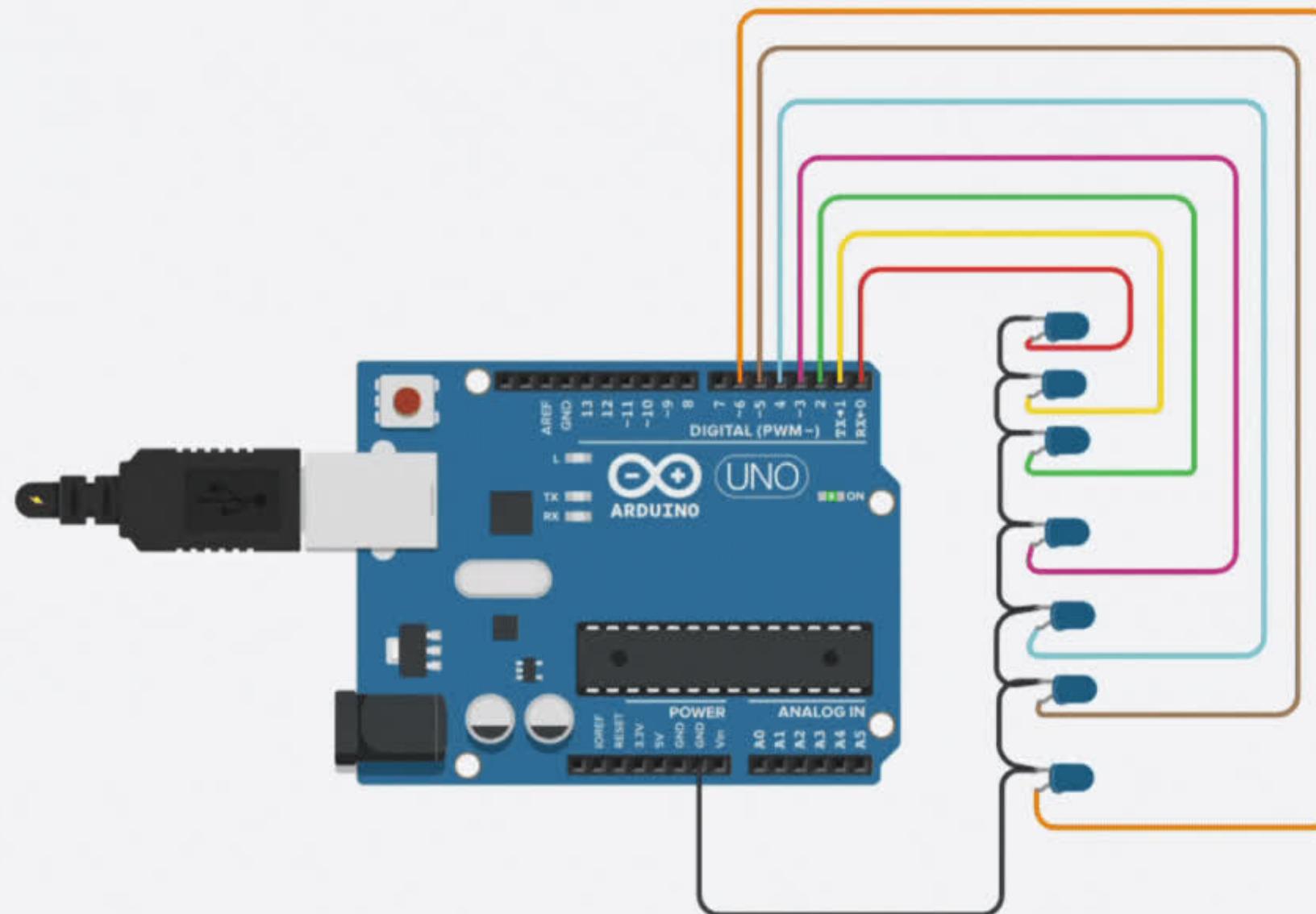
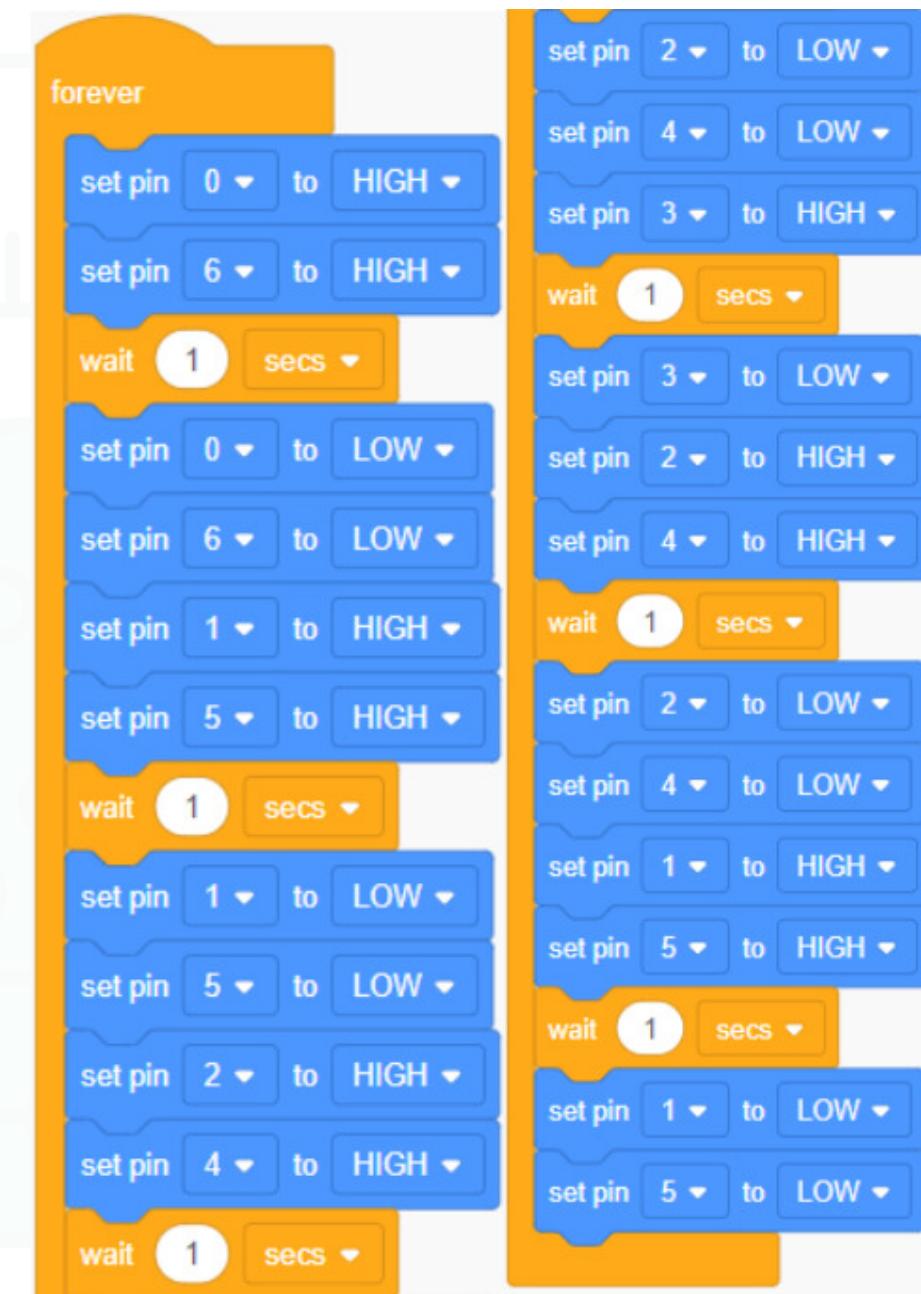
Blinking LEDs

Mission 5: Blink 7 LEDs with pattern #3



Blinking LEDs

Mission 5: Blink 7 LEDs with pattern #3

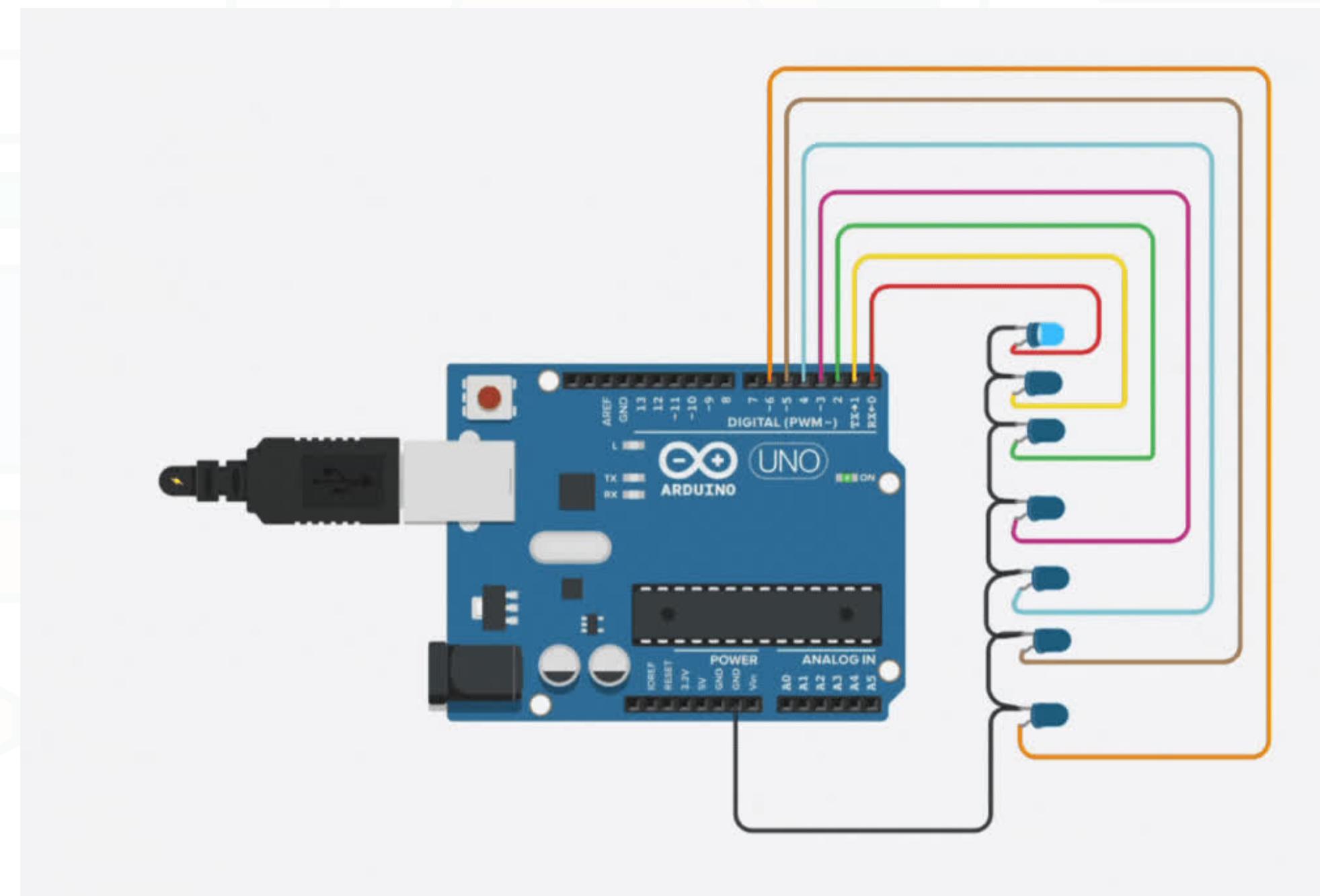
```

forever
  set pin 0 to HIGH
  set pin 6 to HIGH
  wait 1 secs
  set pin 0 to LOW
  set pin 6 to LOW
  set pin 1 to HIGH
  set pin 5 to HIGH
  wait 1 secs
  set pin 1 to LOW
  set pin 5 to LOW
  set pin 2 to HIGH
  set pin 4 to HIGH
  wait 1 secs
  set pin 2 to LOW
  set pin 4 to LOW
  set pin 1 to HIGH
  set pin 5 to HIGH
  set pin 3 to HIGH
  set pin 4 to HIGH
  wait 1 secs
  set pin 3 to LOW
  set pin 4 to LOW
  set pin 1 to HIGH
  set pin 5 to HIGH
  wait 1 secs
  set pin 1 to LOW
  set pin 5 to LOW
end

```

Blinking LEDs

Mission 6: Blink 7 LEDs with pattern #4



Blinking LEDs

Mission 6: Blink 7 LEDs with pattern #4

