Lab: Arduino

CS4501/6501: Engineering Interactive Technologies

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Spring 2020, Department of Computer Science

http://www.ladyada.net/learn/arduino/lesson1.html

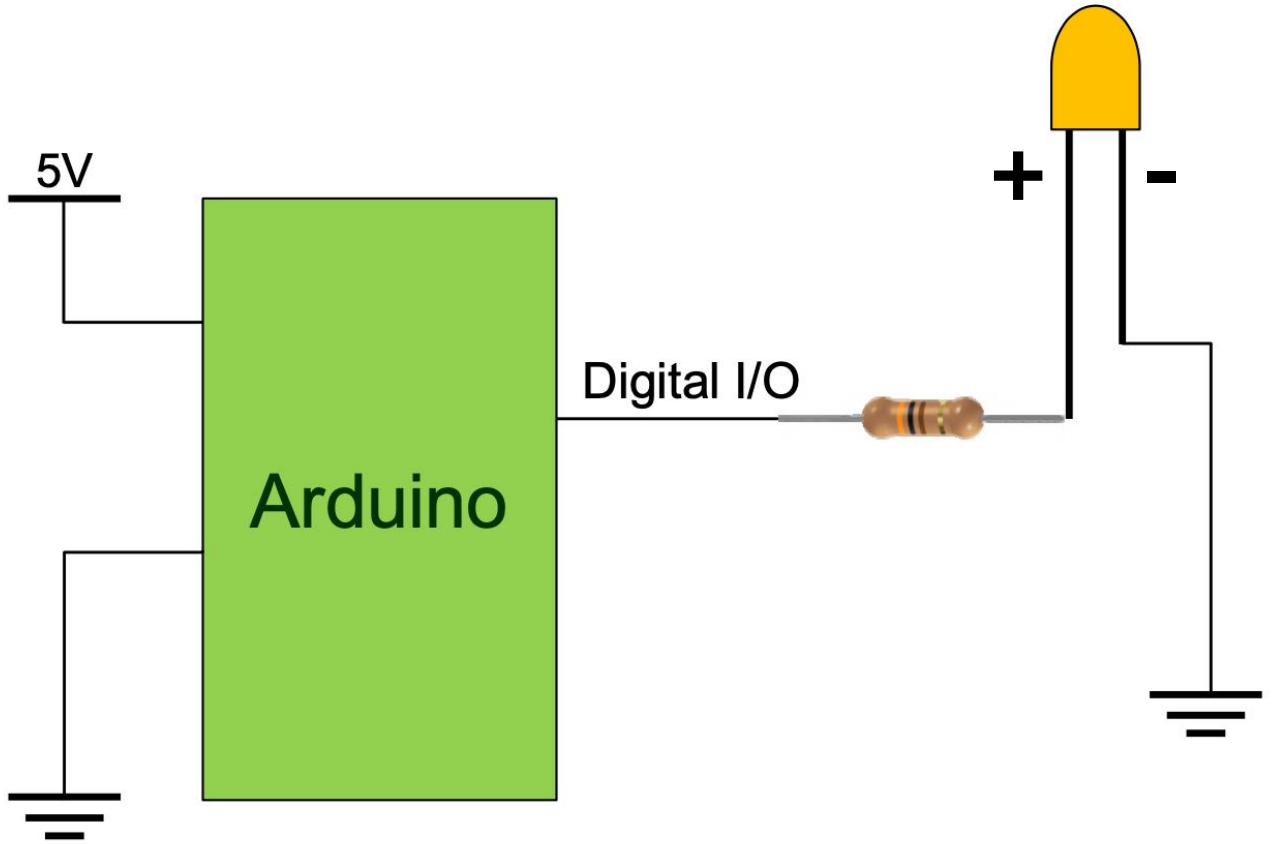
University of Virginia | School of Engineering & Applied Science

Let there be blink!

- What you need
  - Arduino board (RedBoard)
  - USB cable
  - Breadboard
  - LED (any color)
  - Resistor (330 Ohm)

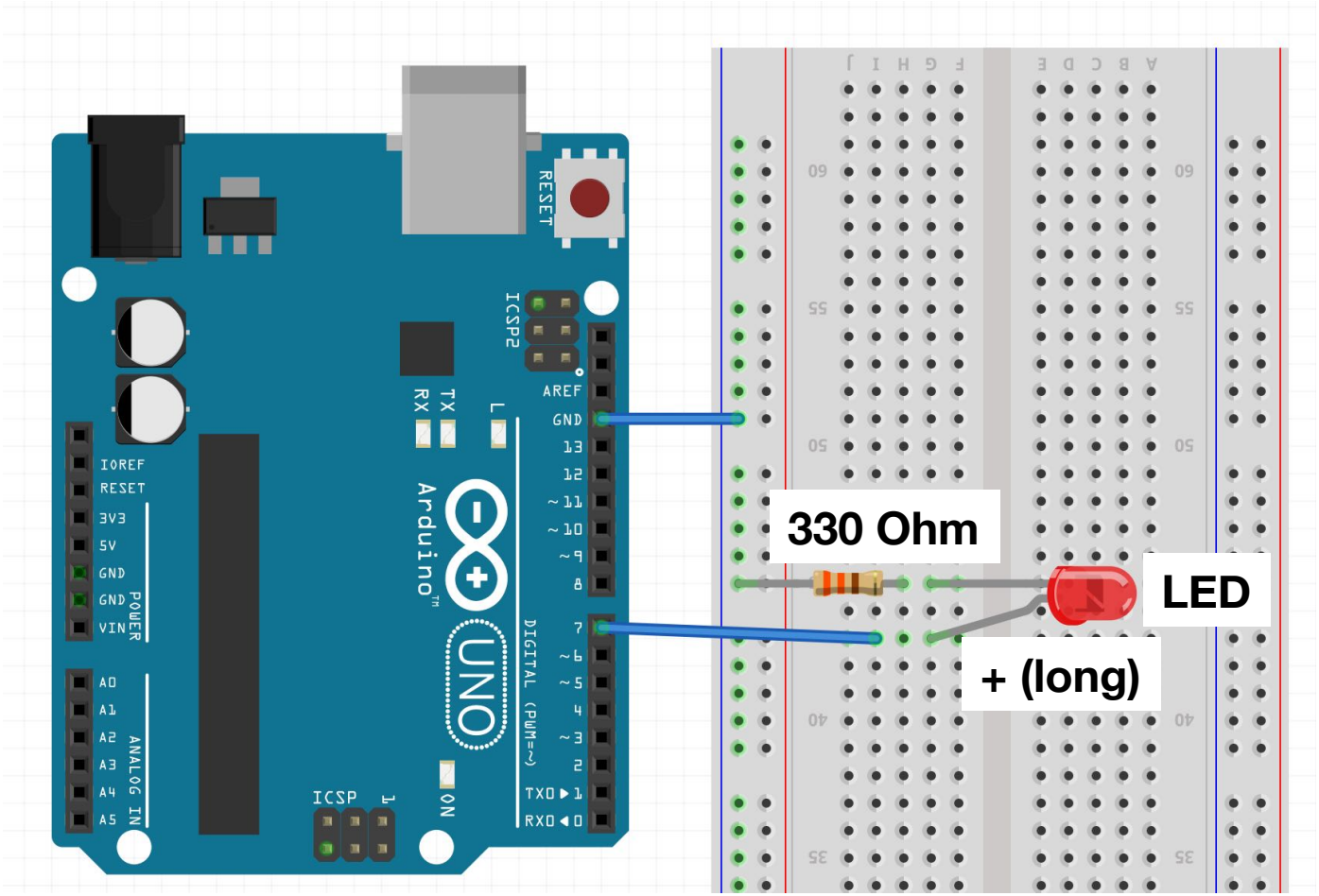
Let there be blink!

- Build a circuit



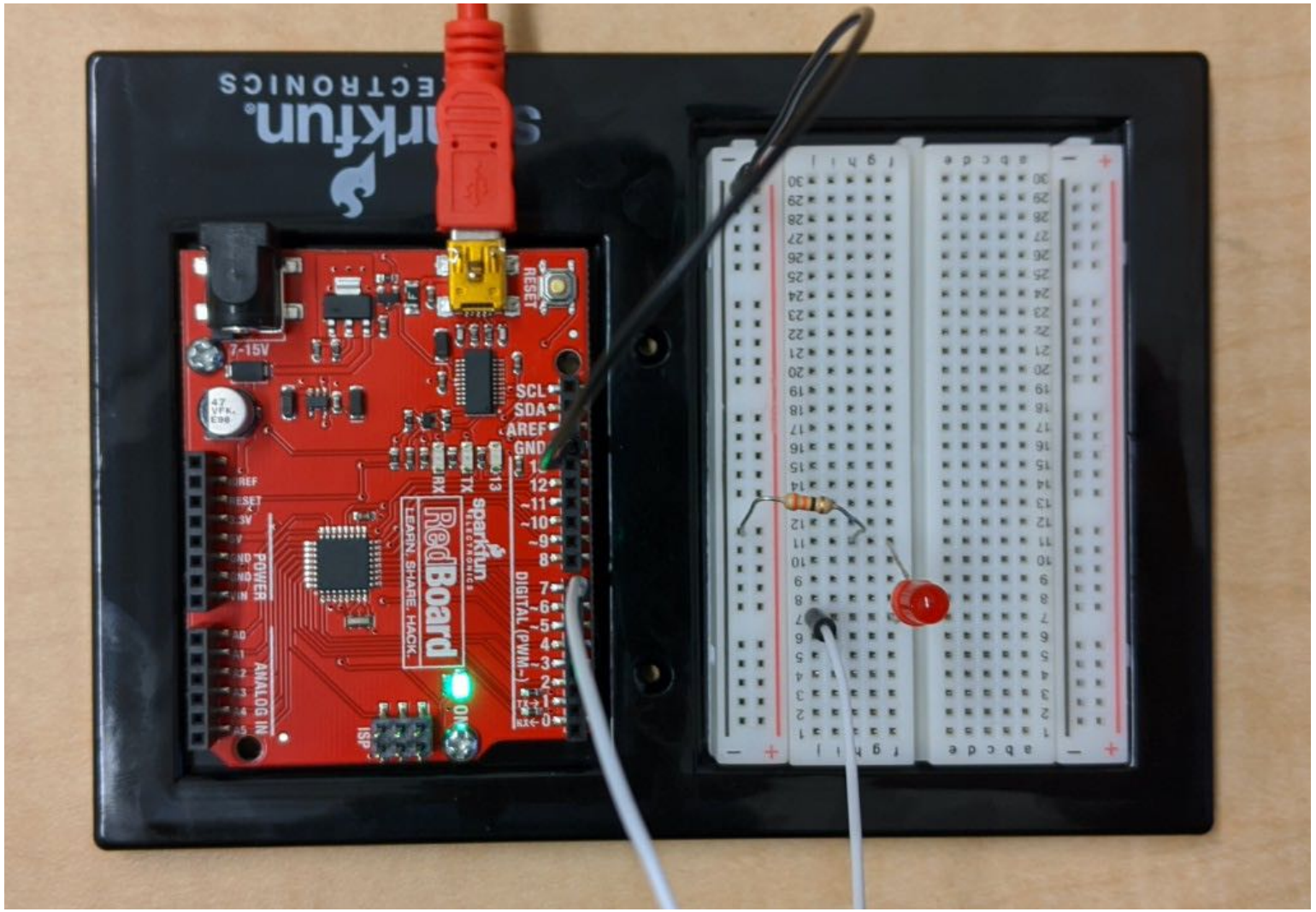
Let there be blink!

- Build a circuit



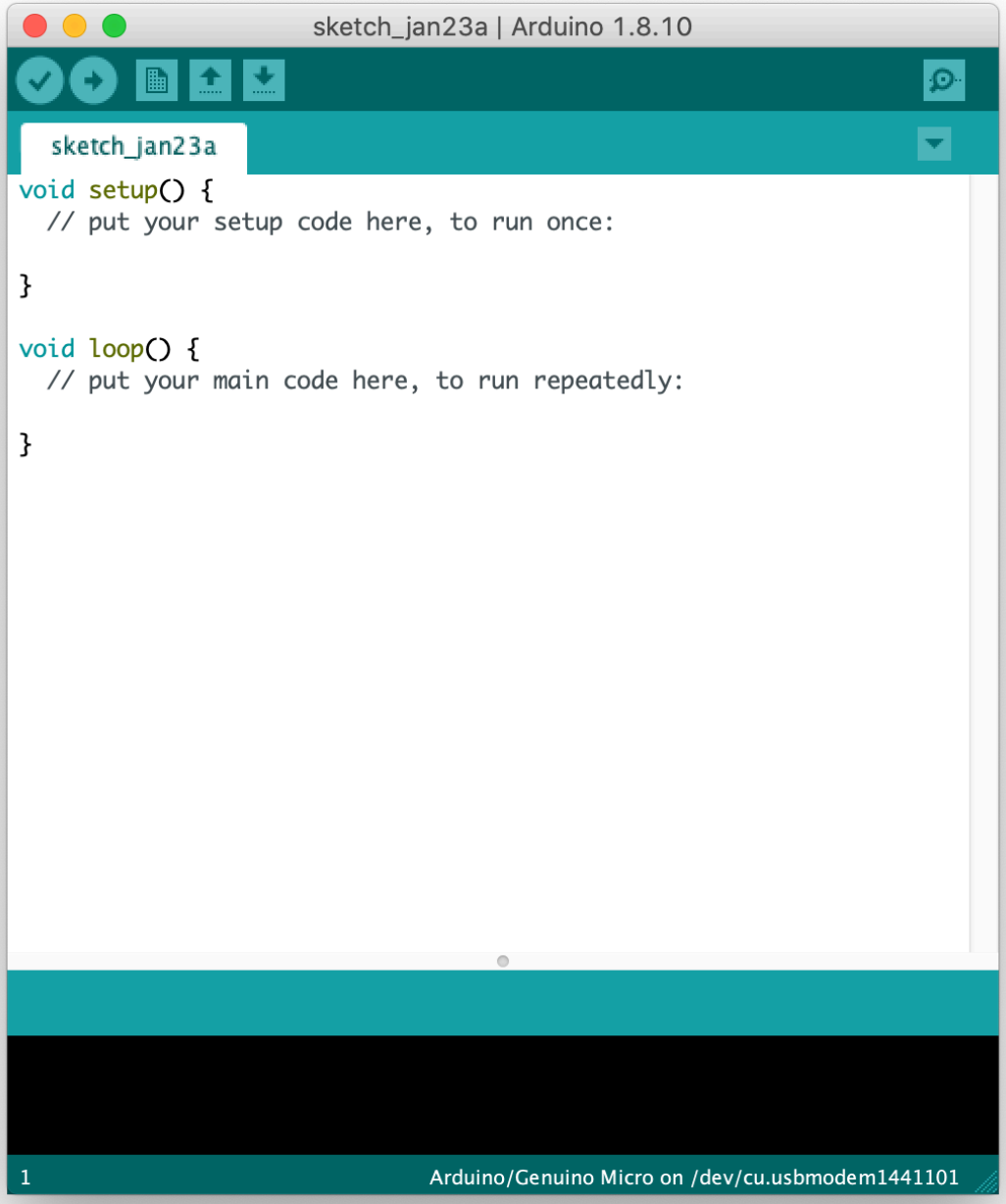
Let there be blink!

- Build a circuit



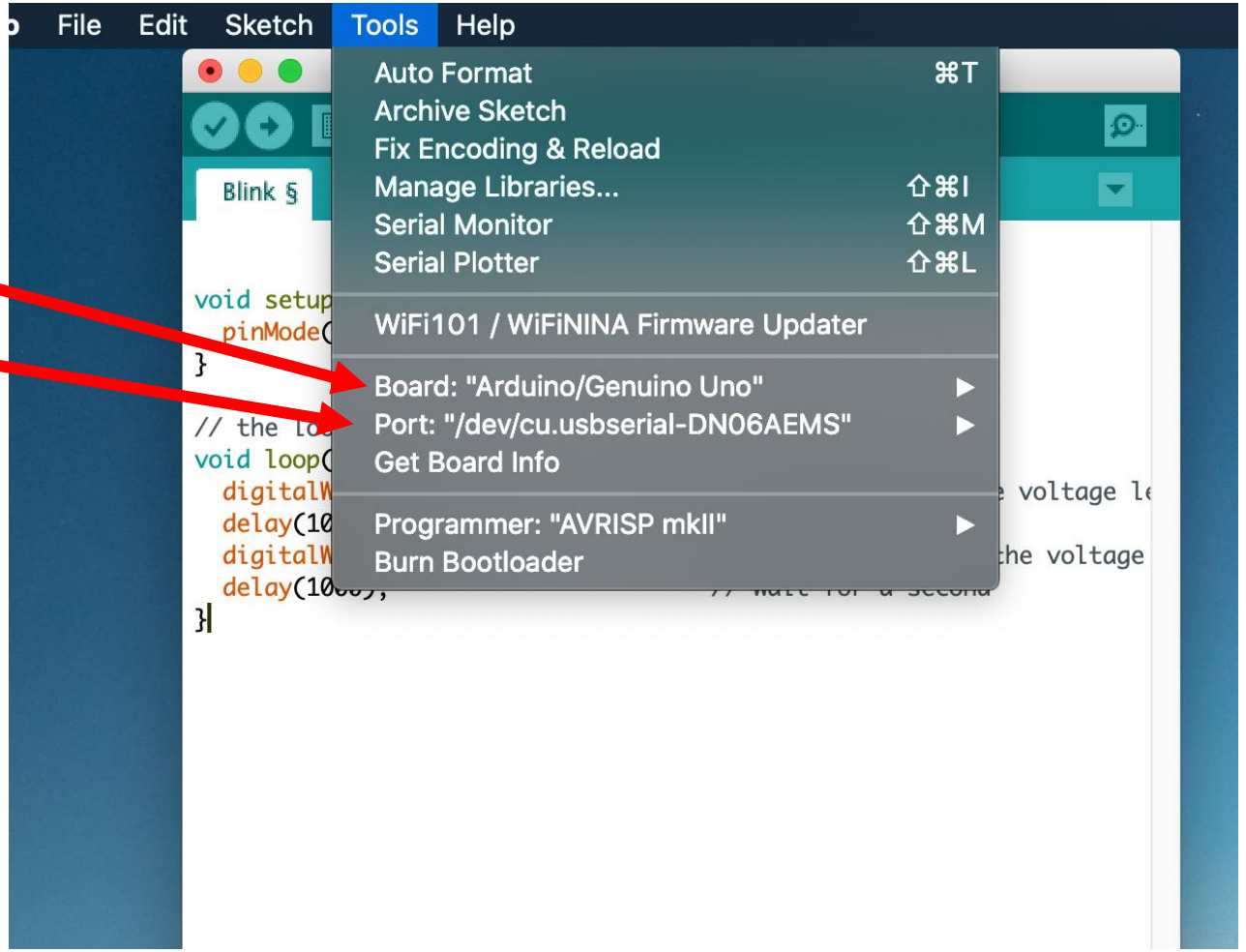
Let there be blink!

- Start Arduino IDE



Let there be blink!

- Select Board
  - Arduino Uno
- Select Port
  - cu.sbserial-XXX (mac)
  - COMX (windows)
  - Port name may be different on your computer.
    Remove and reconnect the USB cable and see which port is added



Let there be blink!

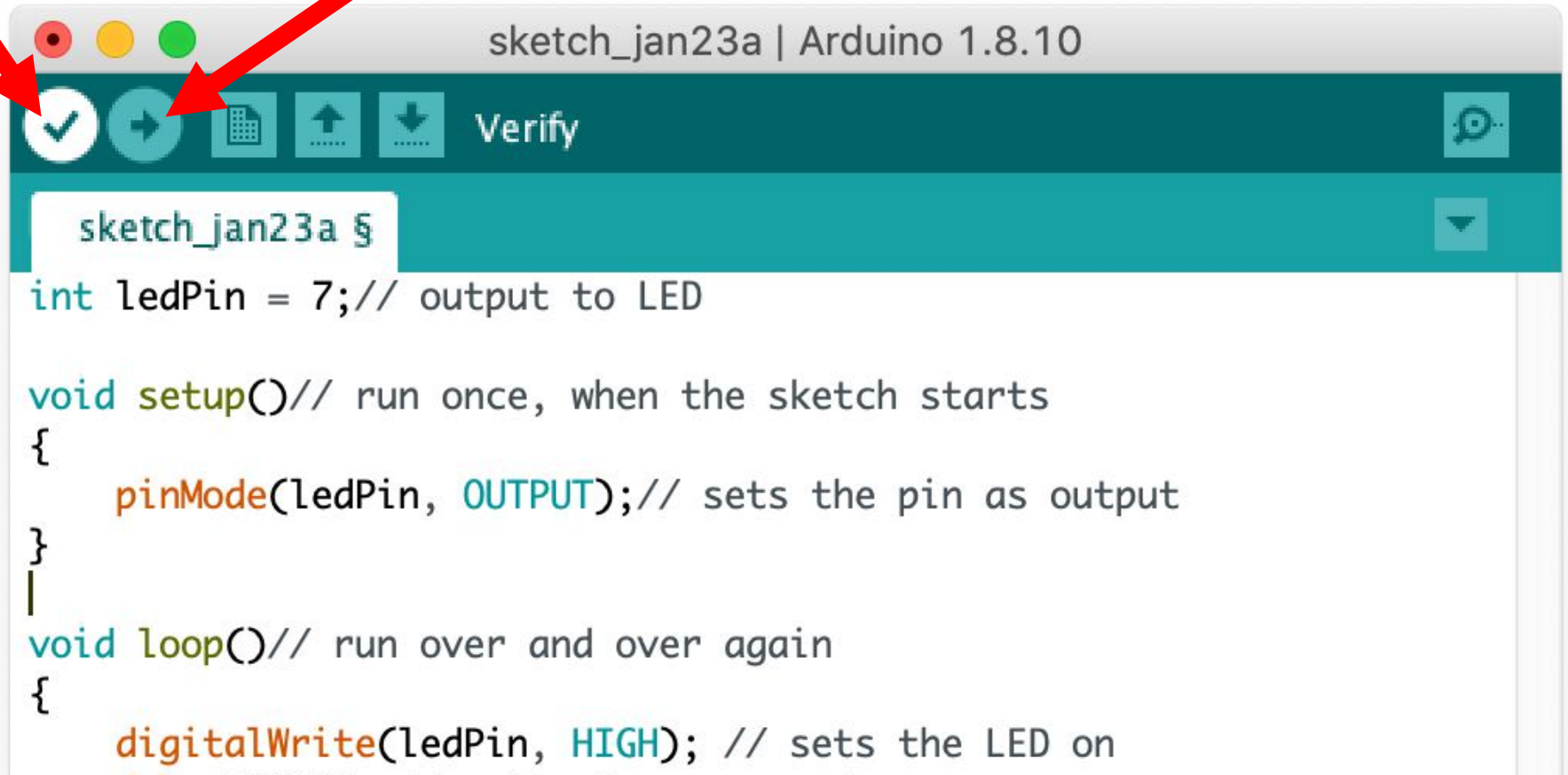
- Write your first Arduino program

```
int ledPin = 7;                  // output to LED. You can use any pin

void setup()                     // runs once, when the sketch starts
{
    pinMode(ledPin, OUTPUT); // sets the pin as output pin
}

void loop()                      // runs over and over again forever
{
    digitalWrite(ledPin, HIGH); // sets the LED on (HIGH is 5V)
    delay(1000);                 // waits for a second (1000 ms)
    digitalWrite(ledPin, LOW);  // sets the LED off (LOW is 0V)
    delay(1000);                 // waits for a second
}
```

Let there be blink!

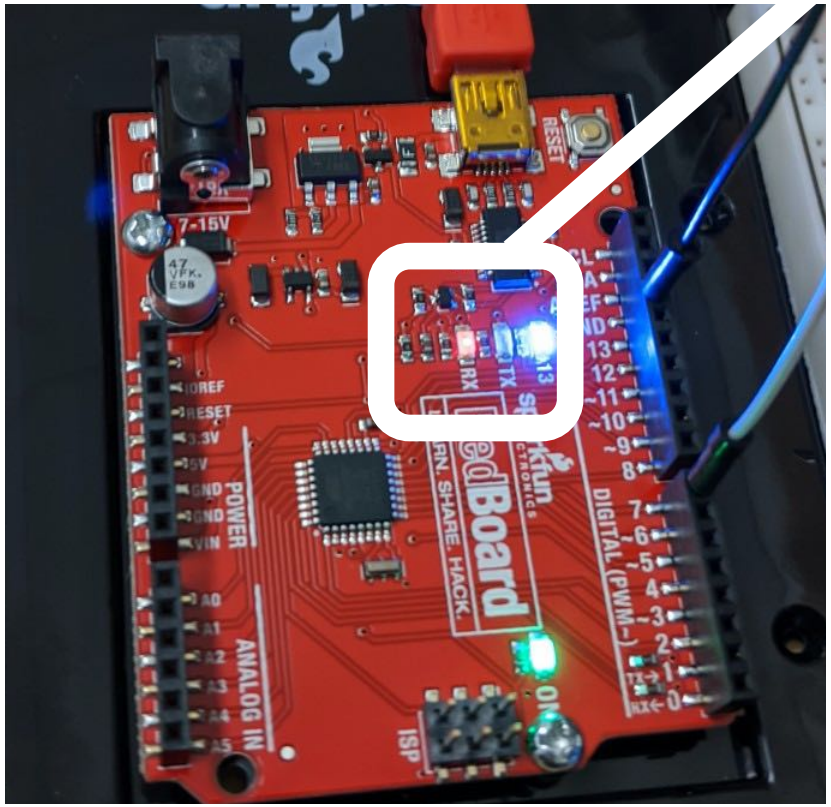
Verify / Compile

Upload to Arduino

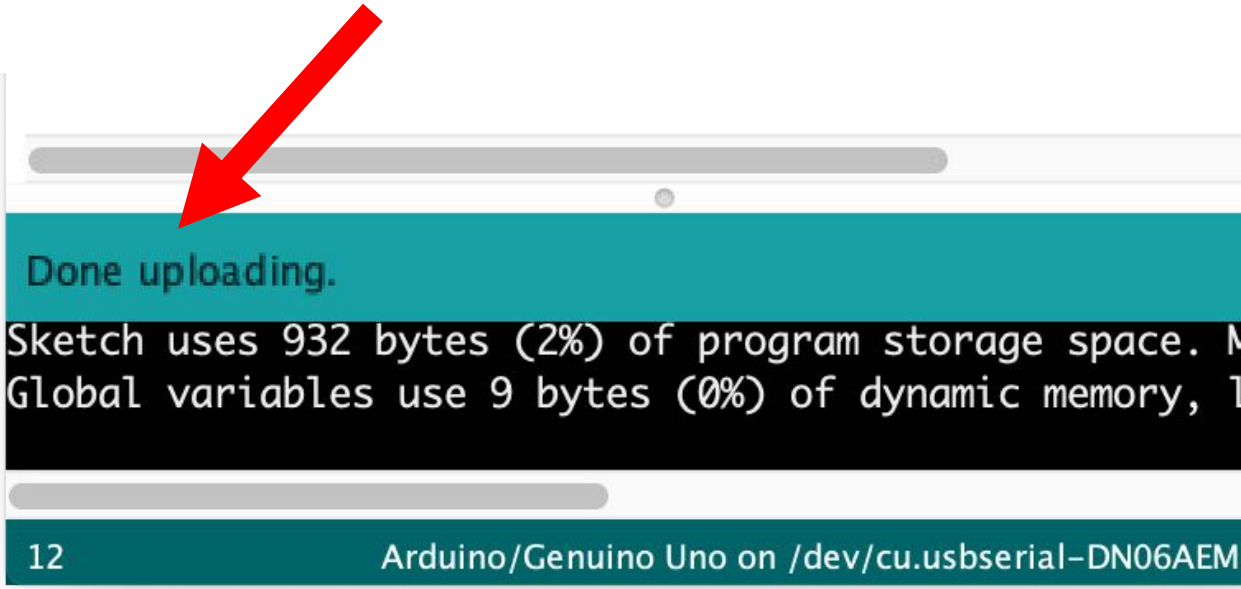


Let there be blink!

You'll see TX/RX LEDs blinking while uploading



You'll see this message after uploading



Exercises

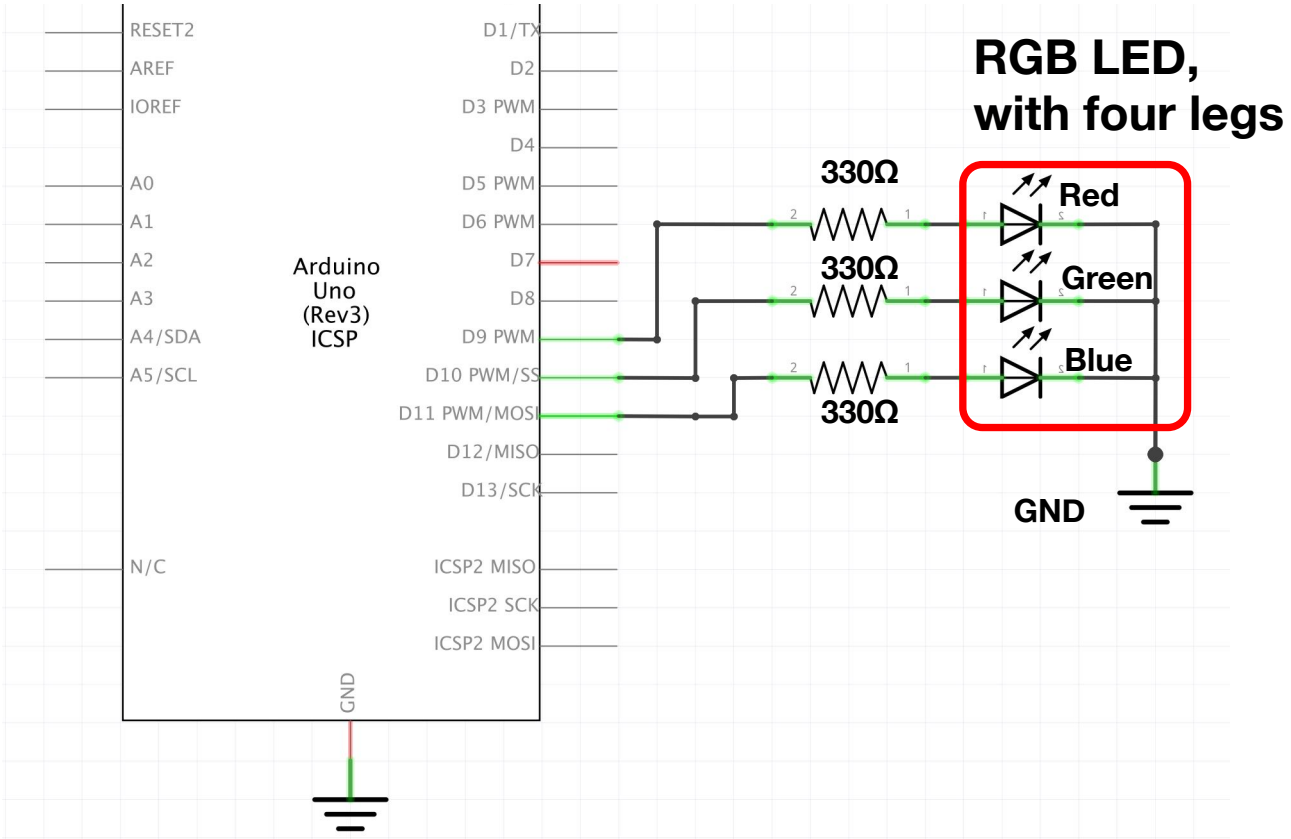
1. Modify the code so that the light is on for 100 ms and off for 900 ms. What happens?

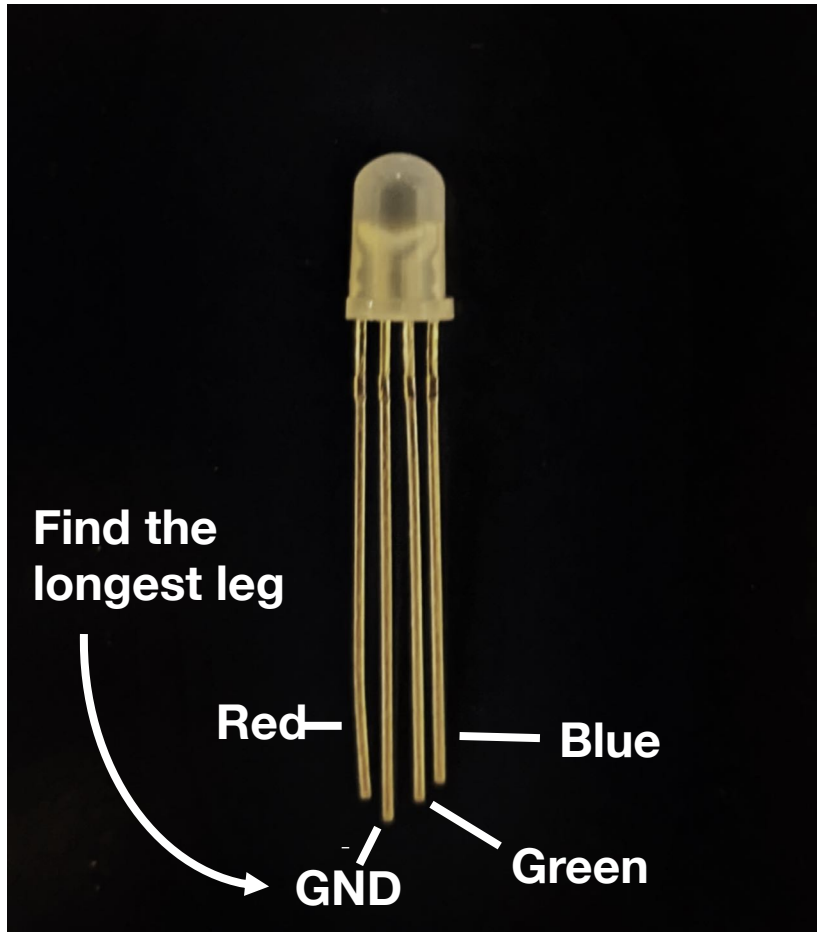
2. Modify the code so that the light is on for 50 ms and off for 50 msec. What happens?

3. Modify the code so that the light is on for 10 ms and off for 10 ms. What happens?

Assignment

- Test the RGB LED
  (with four legs, in a different bag)





Note that the polarity of a LED in is opposite to exercise (long leg is GND)

Assignment

- Program Arduino so that the RGB LED may **change color** as follows (A color is represented by a tripple (R, G, B)):
  - **(1, 0, 0) → (1, 1, 0) → (0, 1, 0) → (0, 1, 1) → (0, 0, 1) → (1, 0, 1) → (1, 0, 0)**

- Program Arduino so that the RGB LED may change color as before but **smoothly** this time.
  - Hint: Use the Arduino function **analogWrite (pin, value (0-255)).**

Lab Report

- **Individual report,** that includes
  - **Answers** to exercise questions
  - **Pictures** of **1) your setup** and the **2) result** for assignments
  - Your **source code** for assignments

- Due **1/30, 11:59 pm**
- Upload to Collab as PDF

Thank you!