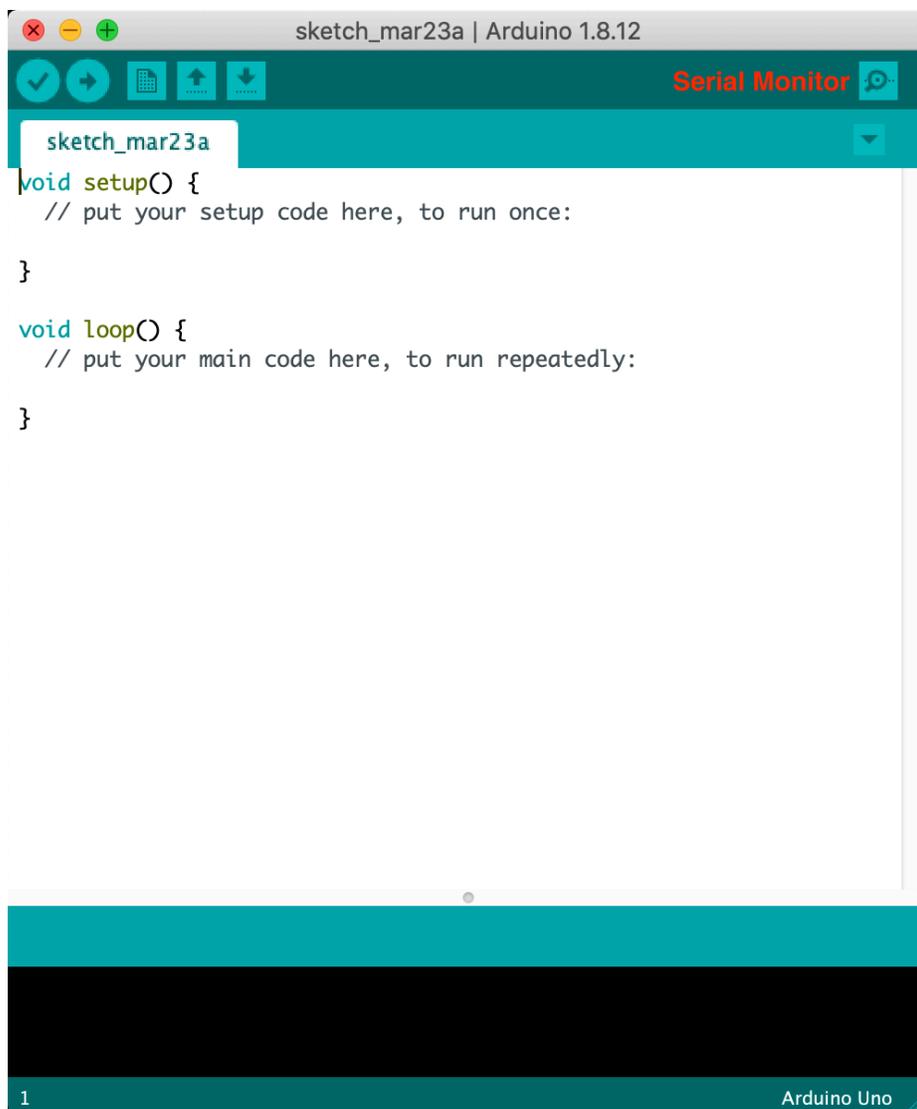


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Arduino Basics. **Getting started**

1. Start Arduino by navigating through your installed application or click the short cut icon for Arduino shown next.



2. You will see the following screen once Arduino loads up.



The **top panel** shows the important shortcuts: the verify (used to compile your code does not have syntax errors), the upload (uploads code to the Arduino UNO assuming it is connected), and serial monitor (to see output of the code)



In the code we see two functions `setup()` and `loop()`. All Arduino code need to have the two functions else there will be compiling errors.

setup() is called first and ONLY once in the code

loop() is called after `setup()`. The commands in loop are continuously executed in an infinite loop.

With this we are ready to start our explorations.

3. Loading your first program

i) Open a new blank file by clicking Open -> New

ii) Copy paste the following

```
void setup() {  
  Serial.begin(9600);  
}  
  
void loop() {  
  Serial.println("Hello\n");  
}
```

iii) File -> Save -> hello.ino

iv) Connect your Arduino UNO to the computer via the USB cable.

v) Go to Tools -> Boards —> Arduino UNO

Tools -> Port -> Choose the correct USB (choose one for now, you can change if this does not work)

vi) Click the quick link “verify” then “upload”. Then click the quick link “serial monitor” and you should see “Hello” printed on the screen repeatedly.

NOTE: if “upload” does not work, you chose the wrong “port”. Go back to (v) and change the port and re-try.

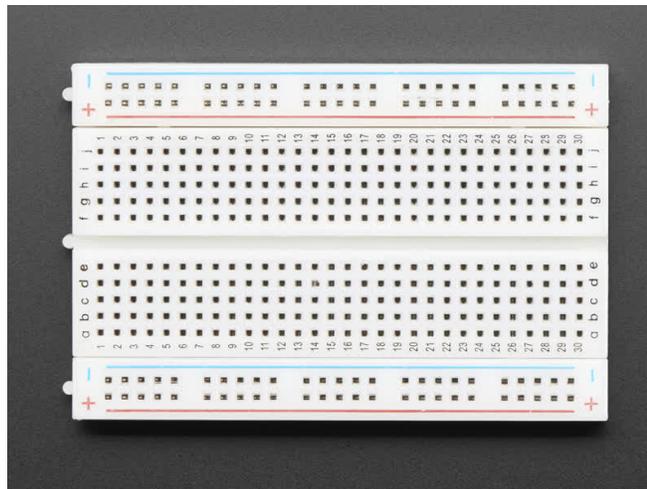
4. Blink (ON-OFF) an LED using DigitalWrite()

Some basics before we get started:

A **resistor** is an electrical element that resists the flow of electricity. Higher the resistance lower is the current flow. Resistance is measured in Ohm. The leads of the resistor do not have polarity (i.e., they can be connected either way)

A **Light Emitting Diode** (LED) emits light when current flows through it. The leads have a polarity. When the longer leg is connected to + (anode) and shorter leg is connected to - (cathode) and sufficient current is passed, it will glow. The figure below shows the symbols and polarity when connecting the LED.

A **breadboard** is useful for prototyping electric circuits and is shown below. The horizontal + rail going from left to right is internally connected and is at the same potential. Same for the horizontal - rail. Similarly, each of the vertical rails (e.g, 1a, 1b, 1c, 1d) are connected and are at the same potential.



Equipment: 1 LED, 1 resistor, 1 breadboard

<https://www.arduino.cc/en/Tutorial/Blink>

5. Fade the LED using AnalogWrite()

Equipment: 1 LED and 220 Ohm resistor (same as above)

<https://www.arduino.cc/en/Tutorial/Fade>

6. Measure resistance of a potentiometer using AnalogRead()

A **potentiometer** is a variable resistor. When the knob of the potentiometer is turned, the resistance is adjusted.

Equipment: 1 potentiometer

<https://www.arduino.cc/en/Tutorial/AnalogReadSerial>

7. Measure the switch state using DigitalRead()

Equipment: 10K ohm resistor and Button switch

<https://www.arduino.cc/en/Tutorial/DigitalReadSerial>

In addition, add a LED to the circuit with long lead connected to + and other one to ground. That way when you push the switch, the LED will turn ON.