

Explore the foundations of Arduino programming

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

These questions are 5 points each:

1. What is Arduino? Who invented Arduino? <https://www.arduino.cc/en/Guide/Introduction>

Arduino is an open-source microcontroller aimed to increase user engagement with DIY hardware and software packages purpose designed for fast prototyping. Arduino began at Ivrea Interaction Design Institute as a project called Wiring. In 2005, Wiring was forked to Arduino and started by Massimo Banzi, with David Mellis, another IDII student, and David Cuartielles.

2. How do the pins work and what does it means for them to be configured as inputs or outputs?

Pins work by sending or receiving analog or digital signals. These signals are classified as either inputs or outputs depending on what the user is wishing to execute. An LED should be programed as a device requiring output signals because the microcontroller is transmitting signals to the LED. Whereas a sensor of any kind (moisture sensor, mic sensor, etc.) are devices requiring input signals because they are receiving signals to transmit back to the microcontroller.

3. What is a variable in Arduino sketch? Provide an example and explain.

A variable is a place to store specific values and providing useful or recognizable names for later recall in any given sketch. `int buttonState = 0` << the type of variable is an integer with the name `buttonState`. The integer variable named `buttonState` has a value of zero. The equal sign is what assigns the integer to it given name `buttonState`. For integers we can only save values that are whole numbers.

4. Explain what does this code do?

```
Void setup()
{
  int pin = 13;
  pinMode(pin, OUTPUT);
  digitalWrite(pin, HIGH);
}
```

This code initializes the LED located at pin 13. `digitalWrite(pin, HIGH)` changing the intermittent LED flashing to a constant power output illuminating the LED at 5v. Verified by changing `HIGH` to `LOW` which then turned the LED off.

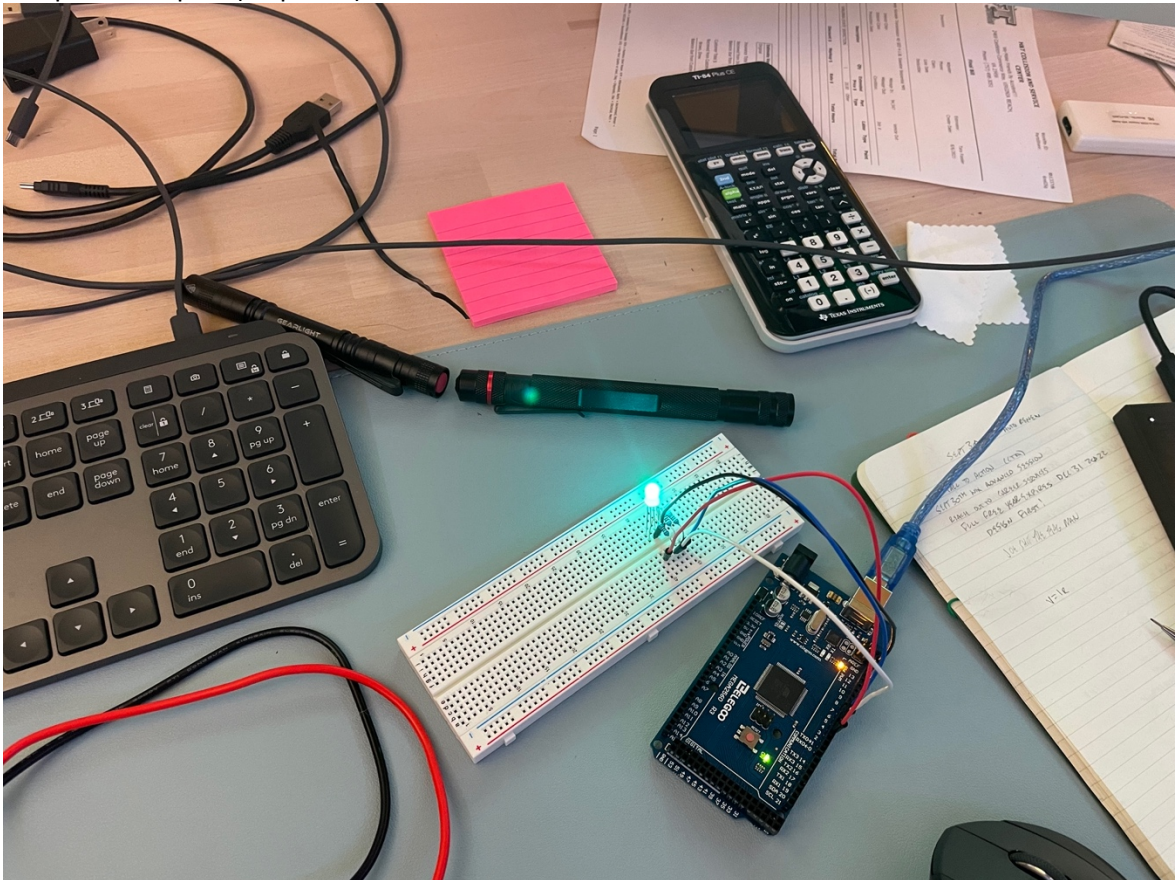
5. What is `DigitalWrite` function? Did you use it for something in your code?

<https://www.arduino.cc/reference/en/language/functions/digital-io/digitalwrite/>

DigitalWrite enables the user to write HIGH or LOW values to a digital pin of the users choice. Syntax of the digitalWrite command: digitalWrite(pin, value). Parameters for the input values are pin: Arduino pin number and value: HIGH or LOW.

6. What is does the USB stands for? <https://itp.nyu.edu/physcomp/lessons/serial-communication-the-basics/>
Universal Serial Bus. It allows several different types of devices to communicate using the same connections. It supports communication for human interactive devices and mass storage devices. It can support several other types of devices as well so long as the machine receiving the data has the appropriate drivers to allow for proper communications.
7. What are Arduino shields? <https://www.makerspaces.com/arduino-uno-tutorial-beginners/>
Arduino Shields add specific functionalities to the base microcontroller. Shields enable the user to implement WiFi, Bluetooth, GPS, among other options.
8. What kind of tools would help you work with Arduino? <https://www.makerspaces.com/arduino-uno-tutorial-beginners/>
 - Needle-nose Pliers
 - Wire Strippers
 - Precision Screwdriver Set
 - Flush Cutters
 - Fine Tip Straight Tweezers
 - Digital Multimeter
 - Soldering Iron
 - Panavise Jr
 - Solder Sucker
9. Provide the description of the code and circuit you did to control built in LED and another external LED or LEDs. Complete lessons 3 and 4 from the most complete started kit for MEGA

and provide report (60 points)



Using RGB_LED code the pins were defined with Blue at pin 3, green at pin 5, red at pin 6. The pins were then initialized to OUTPUT mode followed by assigning the voltage levels for each RGB pin. The sketch defined integer variable values naming them their respective colors: redValue, greenValue, blueValue. The main loop then defines the delay time between transitioning from one color to the next. The rest of the code uses analog write to smoothly transition between the various defined values 0-255. The code executes in an infinite loop.