



2021 Sec 4 Advanced Physics

Arduino Part 2 – Programming: Variables and Loops

Name: _____ () Class: _____ Date: _____

Objectives: At the end of these lessons, you would be able to

1. Know some of the basics of programming an Arduino
2. Know what variables are and how to use them in an Arduino sketch
3. Understand some basic looping structures

Programming

This course is too short to go into much detail, but programming is something that you can easily learn yourself as there are many online resources to help you.

For programming the Arduino a good site would be the Arduino website:

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

<https://www.arduino.cc/en/Reference/HomePage>

Variables

Variables are little storage 'memories' – use these to store information that your program will need later.

Giving variables names like **greenPin** will make your program easier to read.

Before using a variable you will usually need to **declare** it and define its **type** some of the most common types will be integers (int), text (string) or floating-point numbers (float) – numbers that have a decimal point in them.

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

Loops

Loops allow sections of programming code to be reused over and over without needing to retype them.

There are several types of loop the most common being:

If... Loop

<https://www.arduino.cc/en/Reference/If>

If..Else Loop

<https://www.arduino.cc/en/Reference/Else>

For Loop

<https://www.arduino.cc/en/Reference/For>

Try getting a LED to Fade in and out (rather than just turn on and off)

Follow the instructions in the Arduino Sketch Example **01.Basics - Fade**

```
int led = 9;           // the pin that the LED is attached to
int brightness = 0;   // how bright the LED is
int fadeAmount = 5;   // how many points to fade the LED by

// the setup routine runs once when you press reset:
void setup() {
  // declare pin 9 to be an output:
  pinMode(led, OUTPUT);
}

// the loop routine runs over and over again forever:
void loop() {
  // set the brightness of pin 9:
  analogWrite(led, brightness);

  // change the brightness for next time through the loop:
  brightness = brightness + fadeAmount;

  // reverse the direction of the fading at the ends of the fade:
  if (brightness == 0 || brightness == 255) {
    fadeAmount = -fadeAmount ;
  }
  // wait for 30 milliseconds to see the dimming effect
  delay(30);
}
```

How would you modify the code to make it fade in and out faster?

Why was pin 9 used in this example?