

# Arduino Programming Part 2

EAS 199A  
Lecture 6  
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## Overview

- Variables: assigning and using
  - ❖ int
  - ❖ float
- Loops
  - ❖ for loops

## Assigning and Using Variables

### Arduino web site

- ❖ <http://www.arduino.cc/en/Tutorial/Variables>
- ❖ <http://arduino.cc/en/Tutorial/Foundations>

### Defining and using variables:

- ❖ All variables must be declared before use
- ❖ Declaration consists of a type specification and the variable name
- ❖ A declaration may also include an assignment
- ❖ Use meaningful variable names
- ❖ Add comments to further clarify meaning

```
int    red_pin;           // declaration only
int    blue_pin = 5;      // declaration and assignment
int    greenPin = 0;
float  scale = 5.0/1024.0; // Convert 10-bit value
                          // to 5V scale
char   name = 'Bob';
```

## int Variables

An int is a 16 bit, signed integer

- ❖ See: <http://www.arduino.cc/en/Reference/Int>
- ❖ Storage requires two bytes or 16 bits
- ❖  $2^{16} = 65536$
- ❖ Split into negative and positive range:  $-32,768$  to  $32,767$
- ❖ Computations are rounded and rolled-over as needed

Examples:

```
int sensorVal;           // declaration only
int sensorPin = 3;      // declaration and assignment

sensorVal = analogRead(sensorPin); // assignment
```

## float Variables

A float is a signed number with a fractional part

- ❖ See: <http://www.arduino.cc/en/Reference/Float>
- ❖ Stored in 32 bits (twice as much memory as an int)
- ❖ Range:  $-3.4028235 \times 10^{38}$  to  $3.4028235 \times 10^{38}$
- ❖ Floating point arithmetic introduces rounding

Examples:

```
int sensorVal;           // value returned from analog input
int sensorPin = 3;      // pin assigned to analog input
int range = 1024;       // Maximum range of 10 bit value
float voltage;          // Voltage of the input signal
float maxVoltage = 5.0; // Maximum range of analog input

sensorVal = analogRead(sensorPin); // get reading

// convert to floating point voltage
voltage = float(sensorVal)*maxVoltage/float(range);
```

## Try it! Measure photoresistor output

Build the photoresistor circuit and run this program

```
int sensorVal;
int sensorPin = 3;
float voltage;
float input2volts = 5.0/1024.0;

void setup () {
  Serial.begin(9600);
}

void loop () {
  sensorVal = analogRead(sensorPin);
  voltage = float(sensorVal)*input2volts;
  Serial.print("Voltage = ");
  Serial.println(voltage);
}
```





