Free E-Book

## Intro to Programming the Arduino Uno

Arduino Uno

RoboticsUp

Free E-Book #2

Intro to Programming the Arduino UNO

By studying the following terms, diagrams and program, you will be on your way for learning to program the Arduino microcontroller boards.

The free online development software contains the Integrated Development Environment (IDE). The IDE contains everything required for you to write, compile, and transfer your program to the Arduino Board using a serial programmer.

The IDE includes numerous tools such as text editors, code libraries, compilers and test platforms. The inexpensive Arduino UNO and its free online comprehensive IDE makes it a great choice for DIY projects.
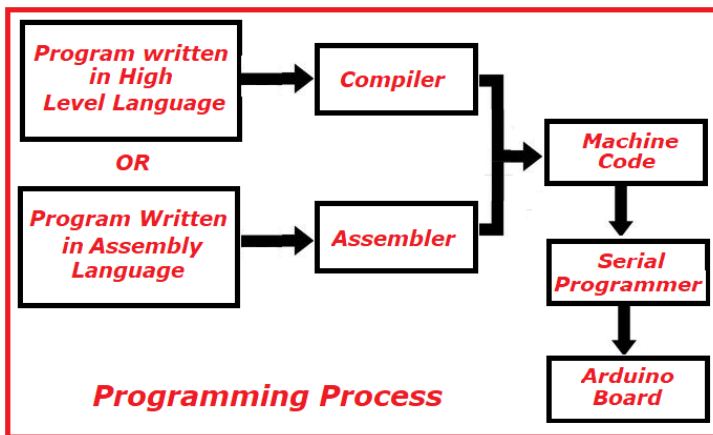
Programming Terms:

Syntax is the complete set of rules for the layout, words and symbols required to make code that will make it through the compiler

Comments, with respects to programming are notes that provide pertinent information about the origin, purpose, and commands in a program. Comments are ignored by the compiler.

An Integer is simply a whole number (no decimal points)

A variable is a container/memory location/locations that is established to hold a specific piece of data.

A function is a segment of code designed to perform a specific task. Functions are written in the IDE so they can be called when ever needed. They are designed for tasks that are repetitive in nature. A function is a way for programmers to reuse code without having to rewrite.

An Argument is what a function acts upon. It can be data, a variable and/or possibly a memory location

Tokens are the special words and symbols used by the IDE.

A declaration of a variable is where a statement is placed between the two braces of the main program establishing a name and a data type for that variable. The variable must be declared before it can be used elsewhere in the program.

Initializing a variable is to give that variable a starting point value in the declaration or in another appropriate point in the program.

Void is used to indicate that a function does not expect a result to be returned.

A Read function is used to bring a value into a variable and a Write function is used to call up a variable's value for use elsewhere.

The // symbol is used to indicate everything afterward on that code line is to be ignored by the compiler.

The /* symbol means that the compiler is to ignore everything thereafter until the*/ is used.

The final terms covered here in the microcontroller world are Low and High. Low is zero volts and High is five volts.

Before leaving relevant terms all together, I want to provide some definitions relating to electronics.

First the term Schematic. A schematic is a drawing showing the connections between all the various components in a circuit. The schematic does not indicate the physical layout. The physical layout is shown in a wiring Diagram.

Next, Component Symbols which are standardized drawings for devices that makeup the circuit.

Last is the Bill of materials that is a listing of all the material, the sources and prices related to the project.

Sample Microcontroller based Circuit schematic and program.

{
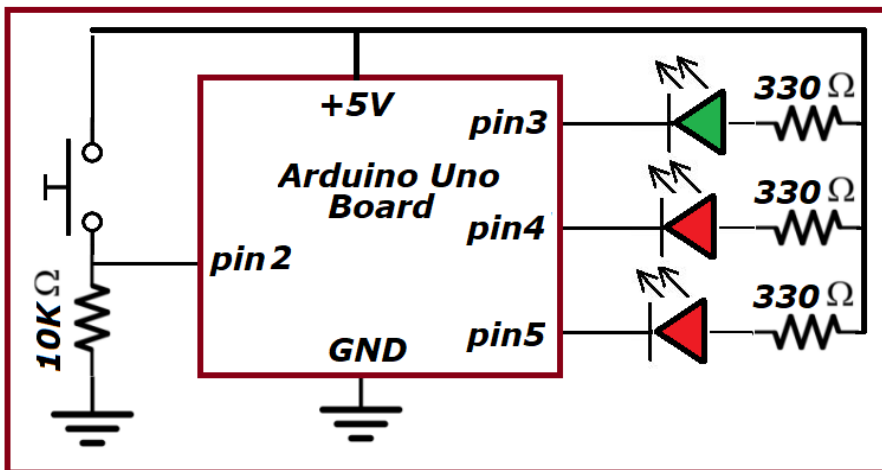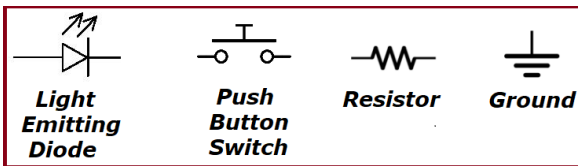
  /* This is actually a program from the Arduino Library. It is ideal for demonstrating syntax, functions, and arguments. Once the program is entered into the editor the words and symbols are color coded to show their use and help in debugging. */

```
Int  Switchstate = 0;
Void setup () {
//Declare the LED Pins as Outputs
Pinmode (3,output);
Pinmode (4,output);
Pinmode (5,output);
//Declare the switch pin as an input
Pinmode (2,input);
}
// establish a loop
Void loop () {
//digitalread() checks to see if there is voltage
//on the pin of int
Switchstate = digitalread (2);
//if the button is not pressed blink the red LEDs
If (switchstate ==low) {
digitalwrite(3,high) ; //turn the green LED on pin 3 on
digitalwrite(4,low) ; //turn the red LED on pin 4 off
digitalwrite(5,low) ; //turn the red LED on pin 5 off
}
//this else is part of the above if () statement
//if the switch is not low (the button is pressed)
//the code below will run

Else {
digitalwrite(3,low) ; //turn the green LED on pin 3 off
digitalwrite(4,High) ; //turn the red LED on pin 4 on
digitalwrite(5,High) ; //turn the red LED on pin 5 on
//wait for ¼ second before changing the light
Delay (250) ;
Digitalwrite (4, High);
Digitalwrite (5, Low);
//wait for ¼ second before changing the light
Delay (250);
{
//The End
{
```

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