Programming the Arduino

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5-7 PM
Today we'll be covering:

- Syntax
- Branches
- Loops
- Functions
- Classes
Structure and Syntax
Magic Words
Storing information
That's enough talking.
Let's make stuff
Controlling LEDs with “if”
Turn LED on from Serial Command Line

```cpp
// defines what pin the LEDs are on
int LEDGreen = 11;
int LEDYellow = 12;
int LEDRed = 13;

void setup(){
    pinMode(LEDRed, OUTPUT);
    Serial.begin(9600);
}

void loop(){
    if (Serial.available){
        char value = Serial.read();
        if (value == 'r'){
            digitalWrite(LEDRed, HIGH);
        }
    }
}
```
Put functionality in your functions
Toggling LEDs

Code: Part I/III

```
//defines what pin the LEDs are on
int LEDGreen = 11;
int LEDYellow = 12;
int LEDRed = 13;

//these lines define the variable where
//we keep track of what state the LEDs
//are in
int LEDState_R = 0;
int LEDState_Y = 0;
int LEDState_G = 0;

void setup(){
    //the pinMode commands define the state
    //of the digital I/O pins being used by
    //the 3 LEDs
    pinMode(LEDRed, OUTPUT);
    pinMode(LEYellow, OUTPUT);
    pinMode(LEDGreen, OUTPUT);
    //sets up serial communication
    Serial.begin(9600);
}
```

Code: Part II/III

```
void loop(){
    //if there is serial information available
    //then do what's in my branch (i.e. if statement)
    if (Serial.available){
        //save the byte in the serial buffer to a
        //variable so I can make multiple comparisons
        //if need be
        char value = Serial.read();
        //if I have sent an 'r', turn on the Red LED
        if (value == 'r'){
            LEDState_R = toggleLED(LEDRed, LEDState_R);
        }
        //if I have sent a 'g', turn on the green LED
        if (value == 'g'){
            LEDState_G = toggleLED(LEDGreen, LEDState_G);
        }
        //if I have sent a 'y', turn on the yellow LED
        if (value == 'y'){
            LEDState_Y = toggleLED(LEYellow, LEDState_Y);
        }
    }
}
```
Toggling LEDs

Code: Part III/III

```c
// this new function makes it easier to turn LEDs on and off: every time I need to do either thing
// I call this function (toggleLED) and it will take the appropriate action
// it returns (gives me back) the value inside LEDState
// which is why it has an 'int' return type listed
// at the beginning of the function definition
int toggleLED(int LEDpin, int LEDState) {
    // if the LED is off (it's state is 0), turn it on
    // otherwise, turn it on
    if (LEDState == 0) {
        // turn on LED
        digitalWrite(LEDpin, HIGH);
        // make sure LEDState reflects the fact that
        // now the LED is on
        LEDState = 1;
    } else {
        // turn off LED
        digitalWrite(LEDpin, LOW);
        // make sure LEDState reflects the fact that
        // now the LED is off
        LEDState = 0;
    }
    // make sure I know the state of the LED in
    // the rest of my code
    return LEDState;
}
```