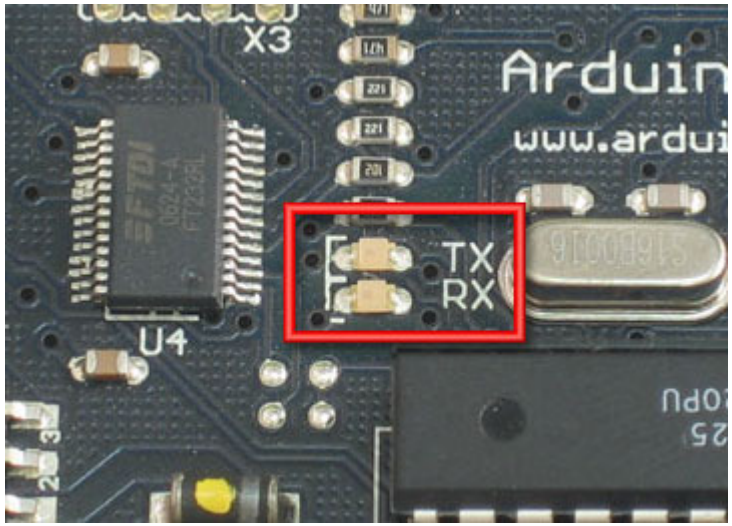
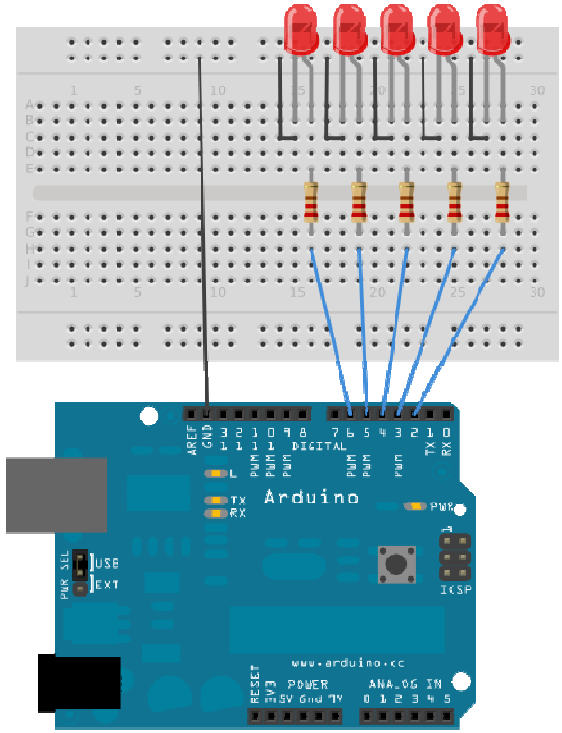


Serial Communication

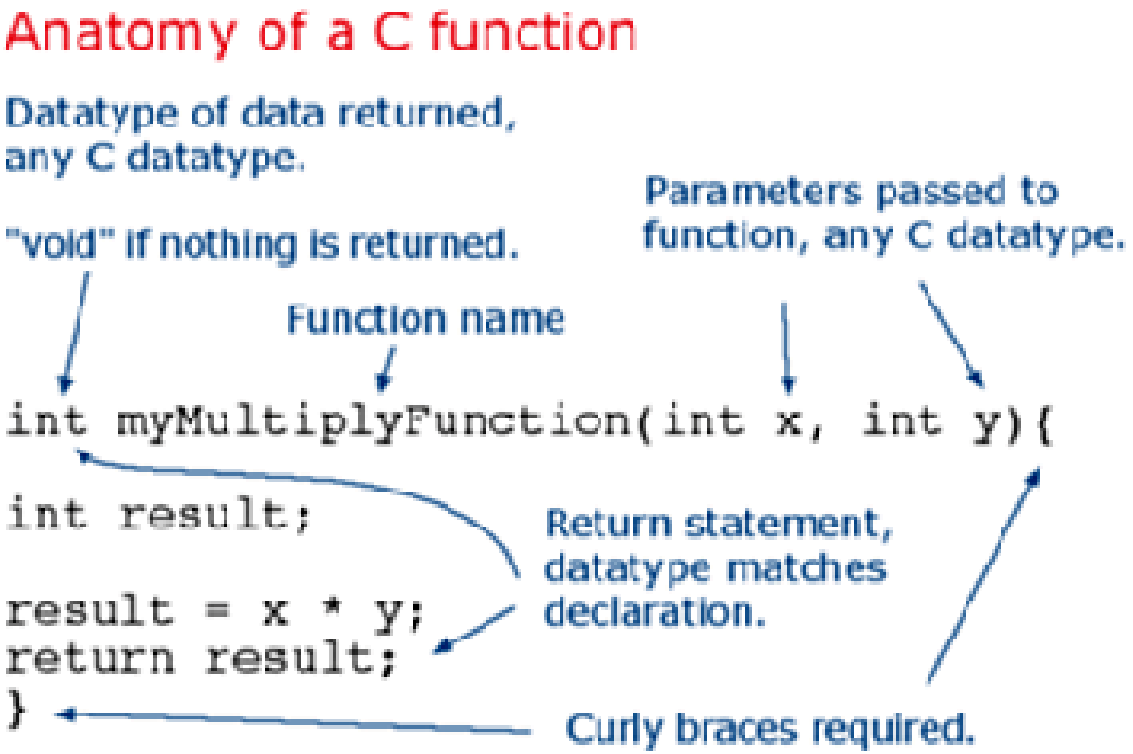
Quick Recap

Exercises we did…

- Made Arduino say “Hello World!”
- Serial.print / Serial.println
- Serial.read
- Serial.write



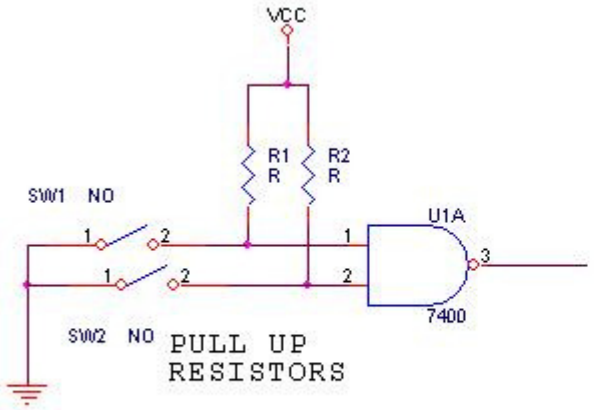
Custom Functions

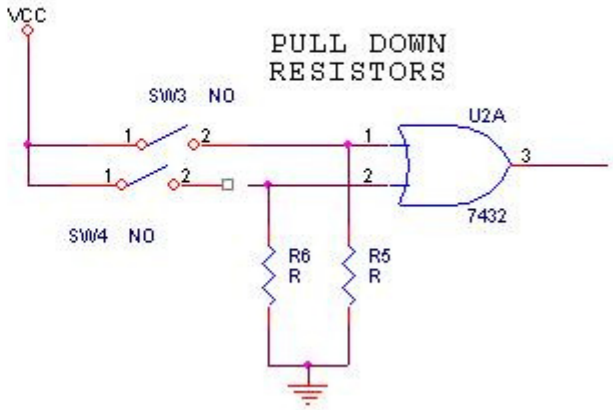


Custom Functions

```
int blinkno = 10;
int ledPin =  13;


void setup()   {
  pinMode(ledPin, OUTPUT);
}


void loop()
{
  blink(blinkno, 100, 500);
}

void blink(int x, int y, int z){
   for (int i = 0; i < x; i++){
    digitalWrite(ledPin, HIGH);
    delay(y);
    digitalWrite(ledPin, LOW);
    delay(z);
  }
  blinkno = 0;
}
```

One more Thing:





Alternate Development Environments

Processing
Flash
PD
MAX/MSP

Serial out from Arduino

- Serial.print(x, BYTE);
- Serial.println (x, BYTE);
- Serial.write(x);

Processing and Arduino

Arduino

Based on Wiring

Implements C/C++

Coding :

```
Serial.println("hello world");
    Serial.print("i = ");
    Serial.print(i);
    Serial.println();

int foo[] = { 0, 1, 2 };
```

Processing

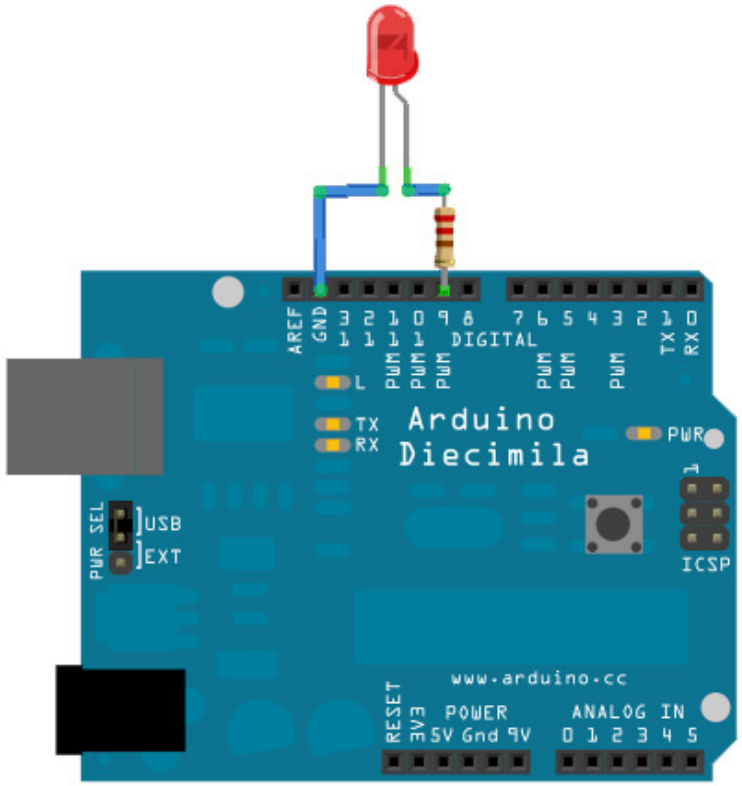
Based on Visualization

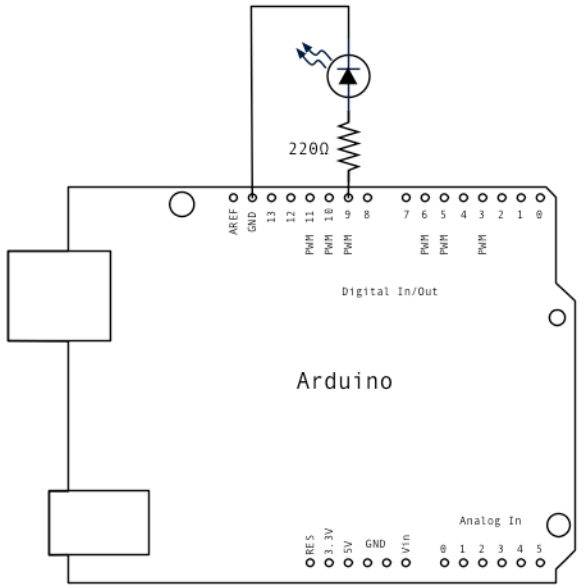
Implements Java

```
println("hello world");
println("i = " + i);

int foo[] = { 0, 1, 2 };
      or
int[] foo = { 0, 1, 2 };
```

Visual Dimmer

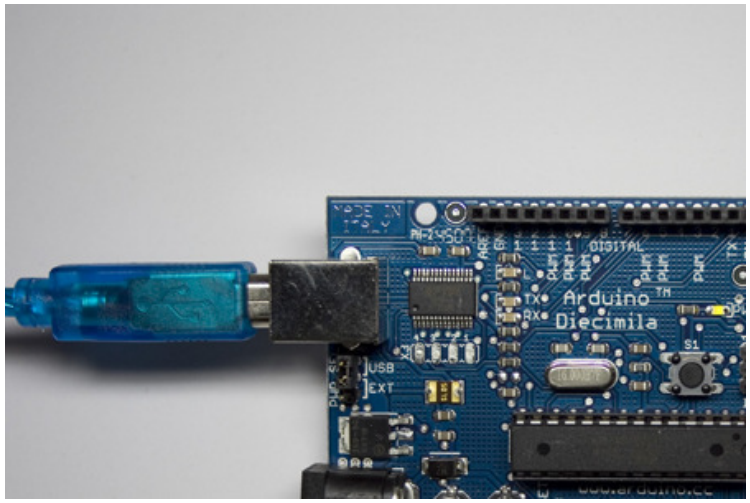
http://www.arduino.cc/en/Tutorial/Dimmer





Arduino TX

- Arduino’s signals : serial port : Serial Monitor
- Arduino’s signals : serial port : Firmata



Firmata

- It’s a protocol for communicating with Arduino / microcontrollers from software on a host computer

- Software which is capable of reading / sending data from/to serial port

http://arduino.cc/en/Reference/Firmata

Processing with Arduino library

- http://www.arduino.cc/playground/Interfacing/Processing

- Download library and copy paste into ".\processing-1.0.7\libraries" and start using processing as arduino.

Processing Language and Arduino Board

```
/******************  Processing language:
attach an analog input to port 1, like potentiometer
and 2 LED's to ports 5 and 8 on arduino
*/
// import serial and arduino classes for communication with arduino
import processing.serial.*;
import cc.arduino.*;

// declare a arduino variable,

Arduino arduino;

void setup() {
  size(512, 200);

// here we are instantiating the class Arduino into an object, now all
// the properties of arduino are available to us from this object
// the object uses this (our processing applet), and the bit rate of the serial
// communication as variables for the constructor. Make sure the bitrate matches the bitrate
// in the arduino application
  arduino = new Arduino(this, Arduino.list()[0],115200);
}

void draw() {
  background(constrain(mouseX / 2, 0, 255));

  //we are reading the analog input from input 1 - our potentiometer and printing out from the serial below
  println(arduino.analogRead(1));

  //these two calls basically replicate the analogWrite to pins 5,8 on Arduino, using values from your mouseX data in Processing for the voltage value from 0-255
  //contraint function, limits the values from the first variable, (mouseX/2), to second and third as ranges. (0,255).
  //basically everything is almost the same, we just access these calls from the arduino object now
  //by using arduino."yourarduinocall"
  arduino.analogWrite(5, constrain(mouseX / 2, 0, 255));
  arduino.analogWrite(8, constrain(255 - mouseX / 2, 0, 255));
}
```

Other Softwares

- Flash, PD, Max/MSP:
- http://file-error.net/1o1o1o1o1/?Physical_Computing_and_Interaction:Arduino:Arduino_VS_Flash