# Week 09:
# Serial Communication , Node.JS and Arduino

# Make your projects talk!

# Download Files

http://lovepaweena.com/CCLab/week09-examples.zip

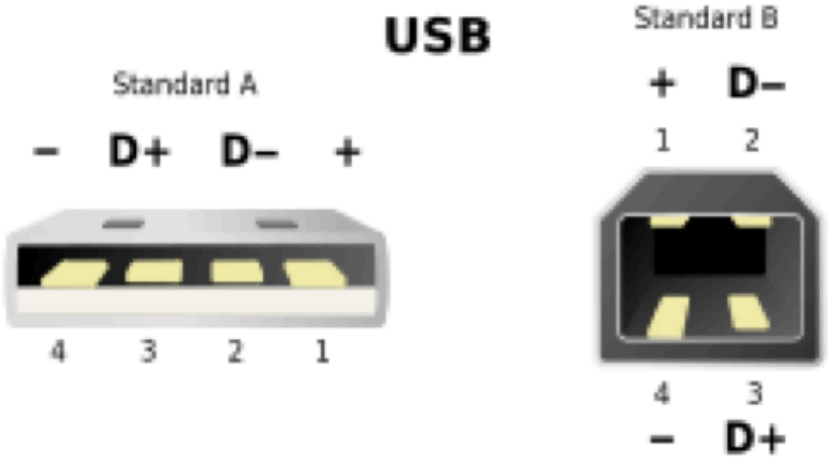
# Serial? What?

- a standard for **communicating electronically**
- the **“process of sending data one bit at a time, sequentially, over a communication or computer bus”**

# Serial communication

- a way for **machines** to **speak** to each other
- USB stands for **Universal Serial Bus**
- in Processing we had a **console** to println() data
- in Arduino we can **println()** over a serial connection to our computers or other devices

# USB (Universal Serial Bus)




- an industry standard for **wired communication between computers and peripheral devices** (keyboard, mouse, smartphone, arduinos)

# Other serials

- Bluetooth Connections
- RS-232
- SPI (Serial Peripheral Interface)
- I²C (Inter-Integrated Circuit) aka 2-wire
- Ethernet (IEEE 1394)
- FireWire
- MIDI

# Cool, so?

- SO, we can specifically tell **Arduino** to **send** out bytes of **serial data** through a USB connection to our computer

- we can also tell **Arduino** to **listen** for bytes or **serial data** coming from our computer

# And?

- AND, we can tell **Node to listen** for Arduino's bytes of **data** coming through the USB pipeline
- we can also **send** messages **from Node** to your Arduino

It's a party!!

# Testing communication/Arduino

```
int led = 13;

void setup() {
  //activate serial port on 9600 baud rate and LED on pin 13
  pinMode( led, OUTPUT);
  Serial.begin( 9600);
}

void loop() {
  //write HIGH on pin 13 and then send a message "LEAD is HIGH" to
serial port
  digitalWrite( led, HIGH);
  Serial.write(" LEAD is HIGH");
  delay( 1000);
  //write LOW on pin 13 and then send a message "LEAD is LOW" to
serial port
  digitalWrite( led, LOW);
  Serial.write(" LEAD is LOW");
}
```

FILE:_01_arduino_node

# Open terminal!

Type: `npm install serialport` to install serialport

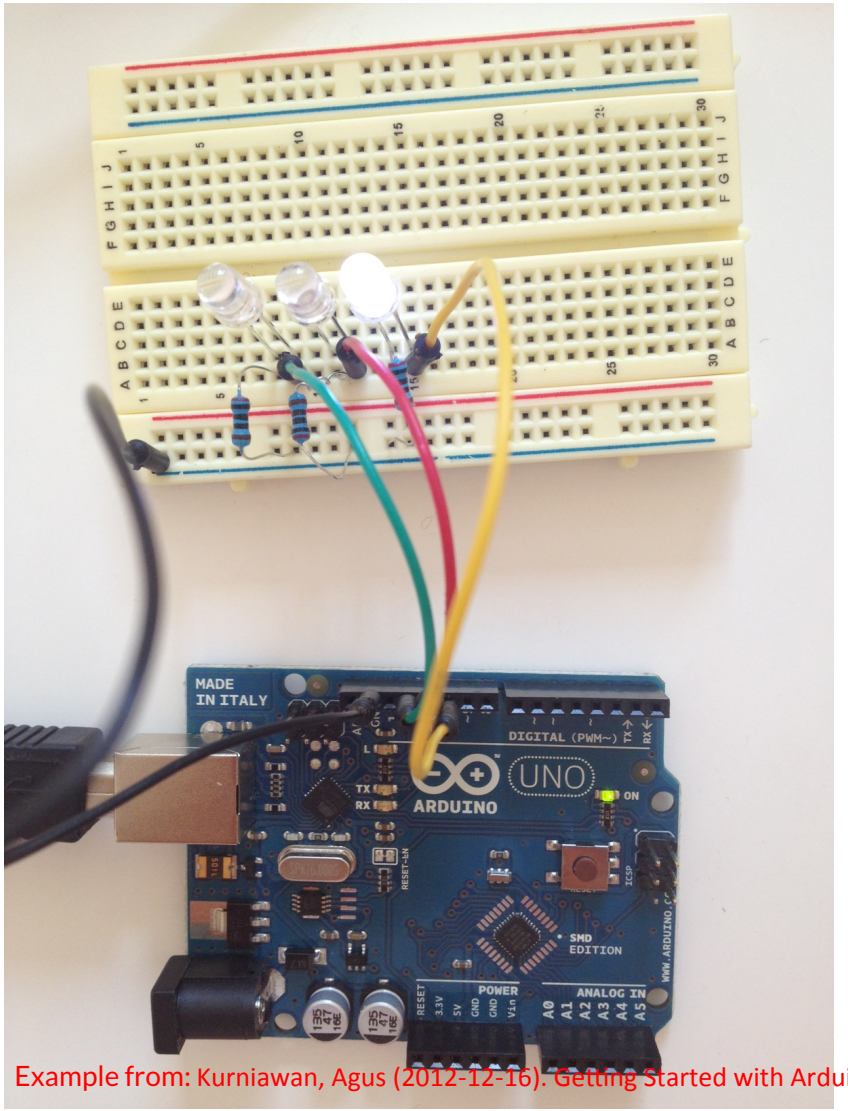
Type: `ls /dev/tty.*` to check serialport

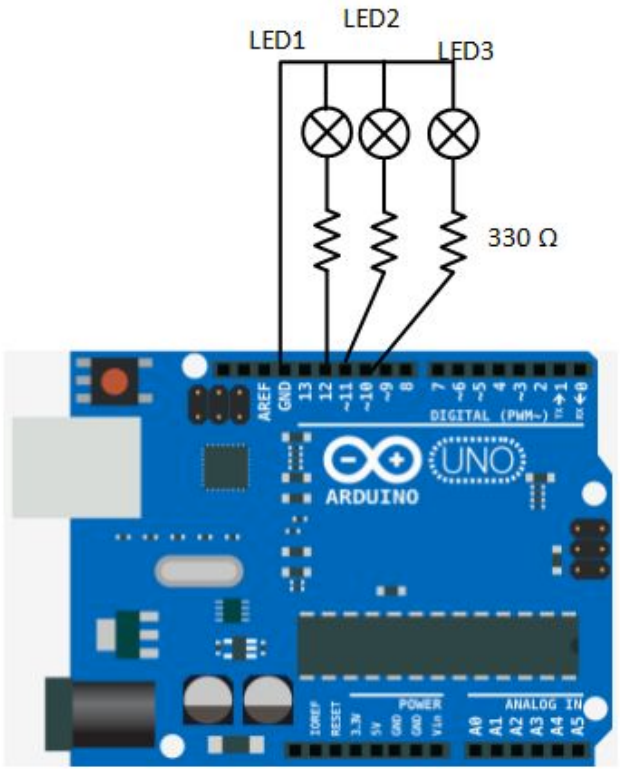
# Testing communication/Node

```
var serialport = require("serialport");
var SerialPort = serialport.SerialPort;

var myserial = new SerialPort ("/dev/tty.usbmodemfd121",{
    //initialize serial port with baud rate 9600
    baudrate: 9600,
    //attach message parser for serial port with "\n"
    parser: serialport.parsers.readline("\n")
});

//listen for incoming messages from serial port, can use on('data')
myserial.on('data', function (data){
    var str = new String(data);
    if(str!='')
    console.log(data);
});
```

FILE:01-arduino-node.js

# Controlling LEDs from Node through Arduino




Example from: Kurniawan, Agus (2012-12-16). Getting Started with Arduino and Node.js (Kindle Locations 292-295). PE Press. Kindle Edition.

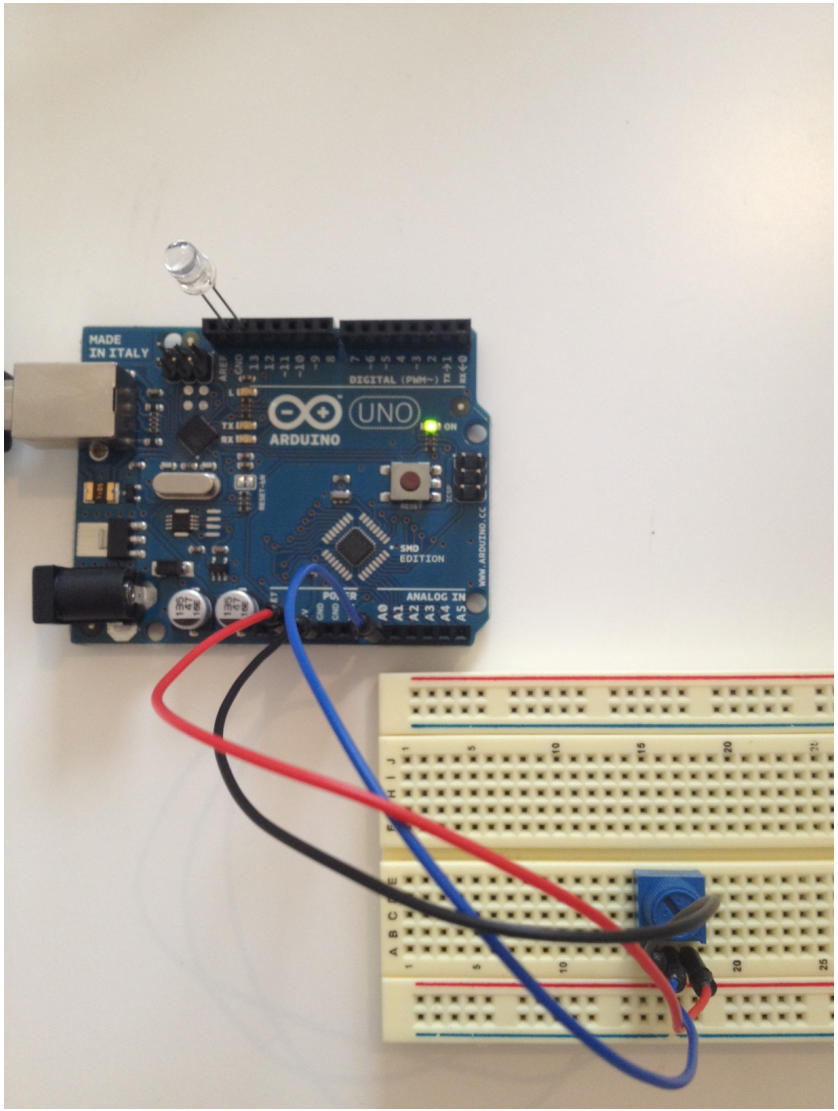

# LED controller/ Arduino

FILE:_02_led_blink


# LED controller/ Node

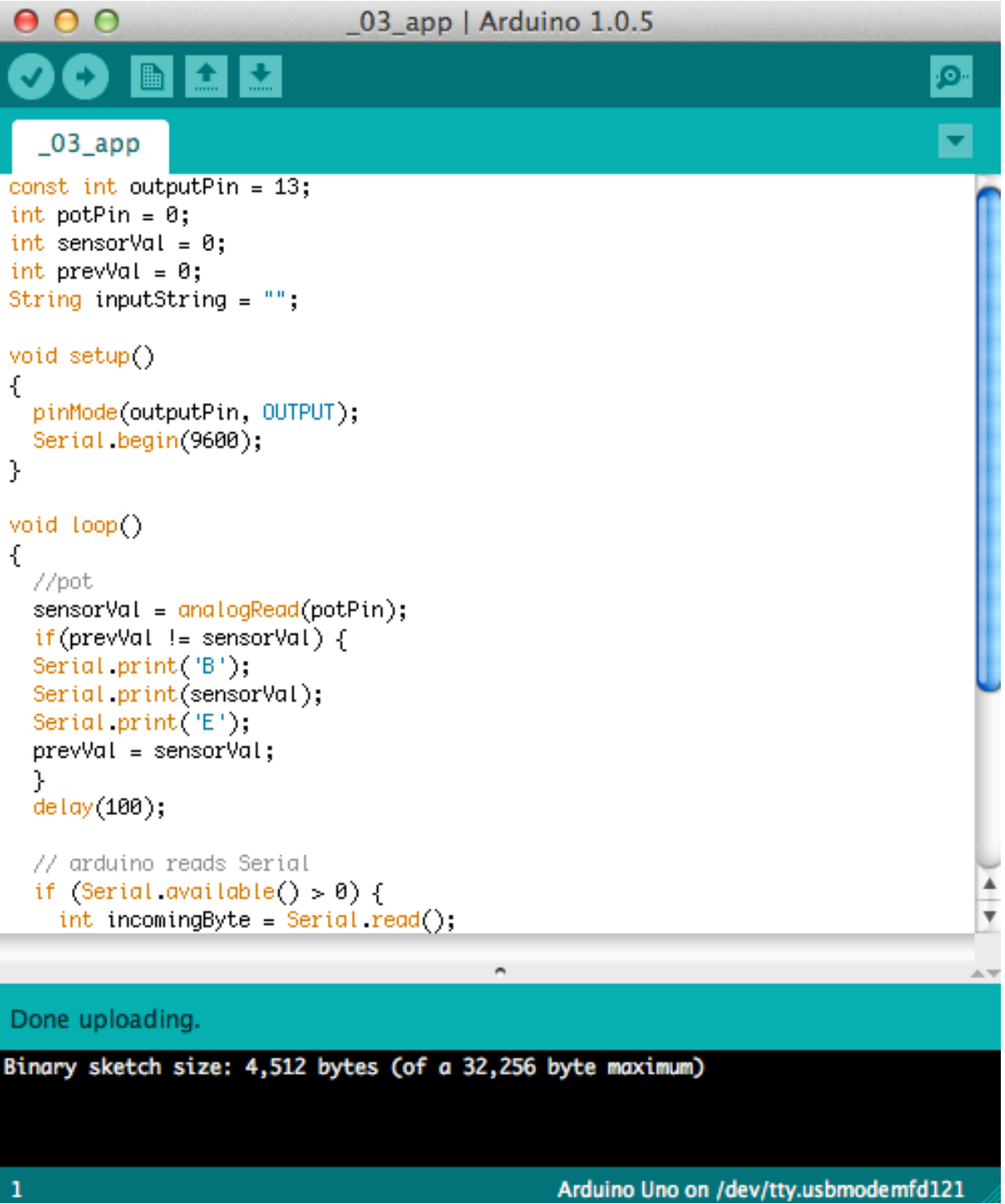
FILE:02-led-blink.js

# Fancy example




LED in GND and 13

Potentiometer connects to 5V, GND and A0

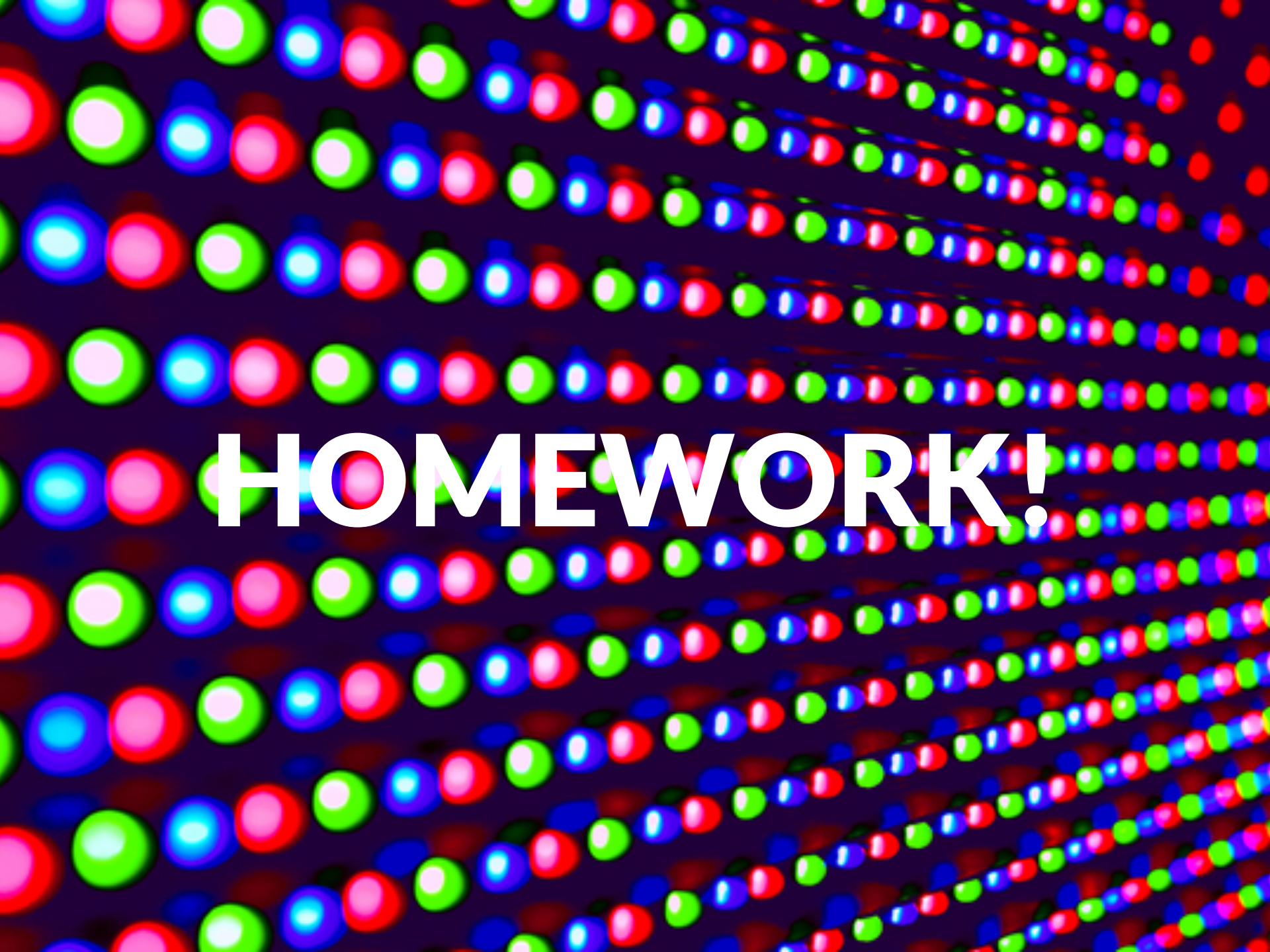



# Fancy example

FILE:_03_app


# Fancy example

FILE:03-app.js


HOMEWORK!

# Homework

1. **CATCH UP ON YOUR HOMEWORK!**
2. Control something with Node through Arduino
    1. Post a video to the blog
    2. Post code and references to the blog
    3. Draw the schematic or use Fritzing and post
3. **Midterm DUE: 11/05**

# Midterm assignment

Make a game, toy, data visualization, **something creative** that

a) uses at least two things that we covered in JavaScript (i.e. canvas, API, Node, etc.)

or…

b) uses serial communication to connect to Arduino

**DUE: 11/05/13**

# References


http://fritzing.org/

http://arduino.cc/en/Tutorial/HomePage

http://www.instructables.com/index

Kurniawan, Agus (2012-12-16). Getting Started with Arduino and Node.js