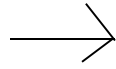


## Class 3 - Making things move

1. Review (LED blink)
2. Understanding the breadboard
3. build the circuit for your moving robot puppet
4. make a robot puppet
5. make your robot move

# Microcontrollers in Everyday Life

MOTION SENSORS: sliding doors, faucets



LIGHT SENSORS: street lamps



CARD READERS: Metrocard kiosks

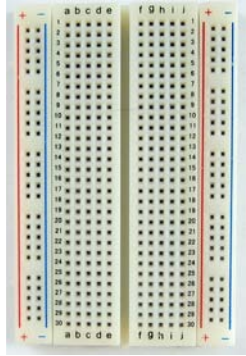


BUTTONS: ATM, Arcades



# What we will need to set up the breadboard

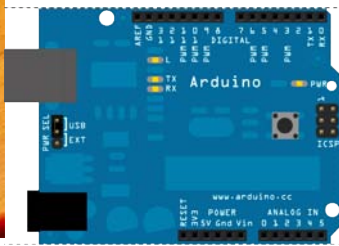
1. Breadboard



2. motor



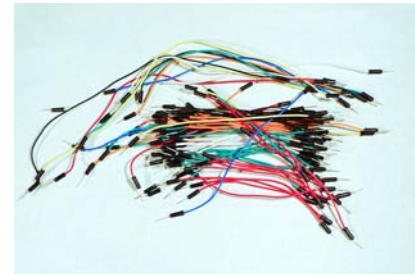
3. Arduino



4. USB



5. wires



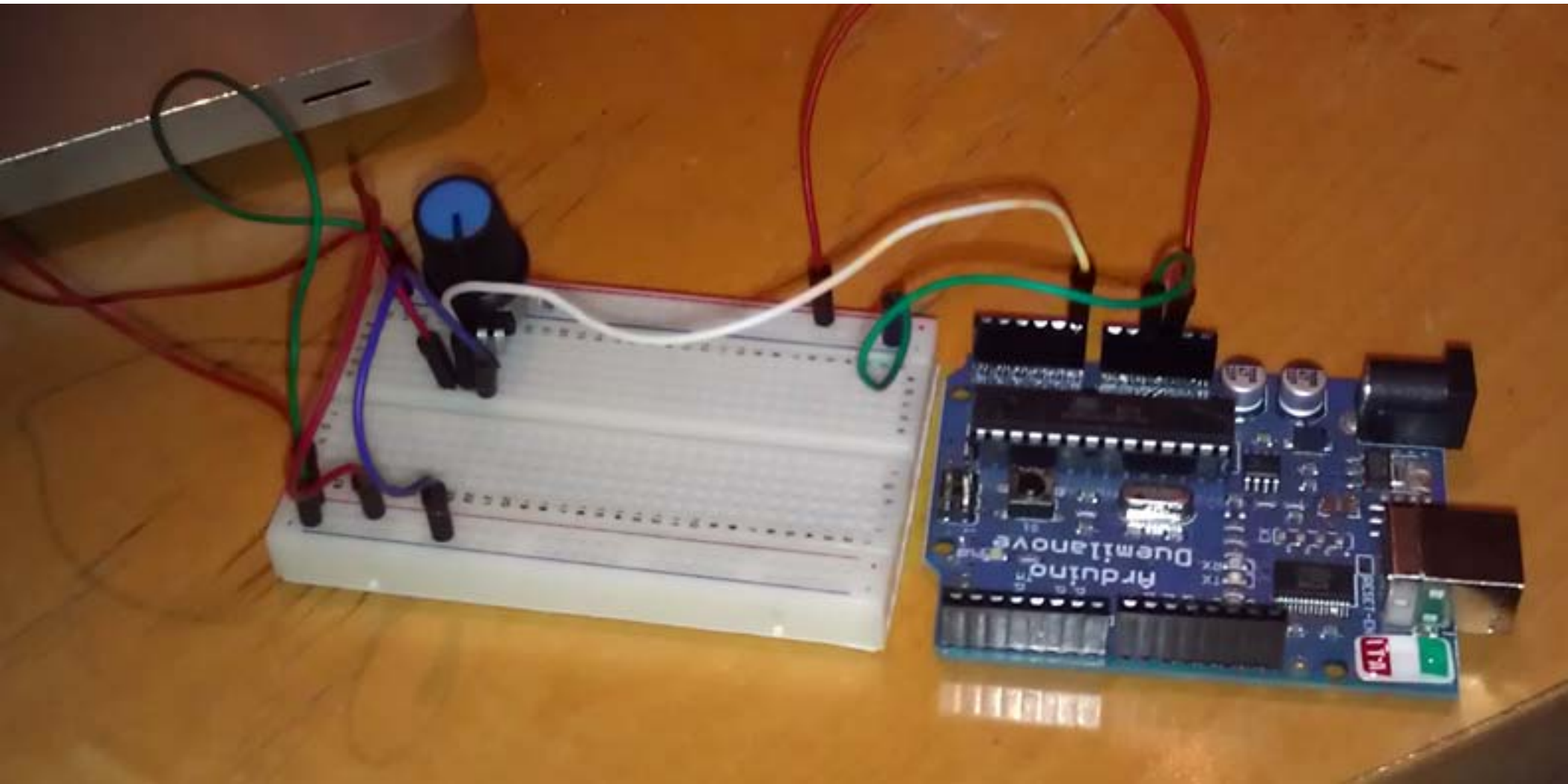
6. knob



CAN YOU FIND ALL OF THIS IN FRONT OF YOU?

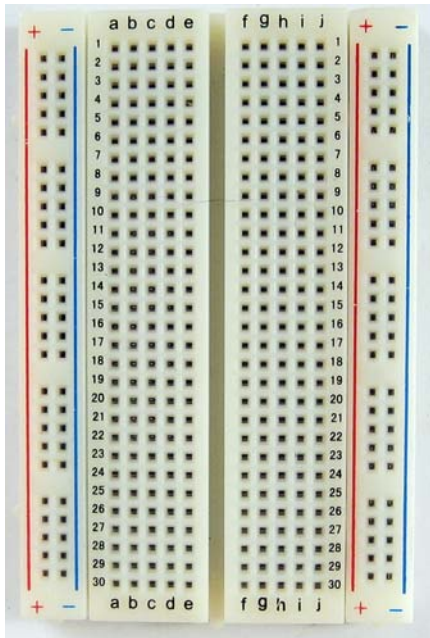
You should see something that looks like this at your computer?

WHAT are these elements?





# THE BREADBOARD

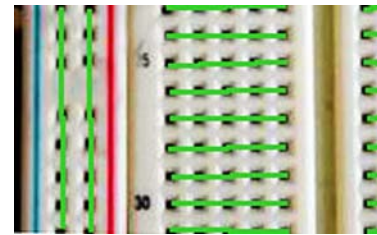


The breadboard is basically a chunk of plastic with a bunch of holes in it. But there is something special going on:

There is electrical connection. Basically this means that even though you can't see it, if you poked inside, there are metal strips that connect the ROWS and the COLUMNS together. LIKE THIS:



here's a CLOSE UP

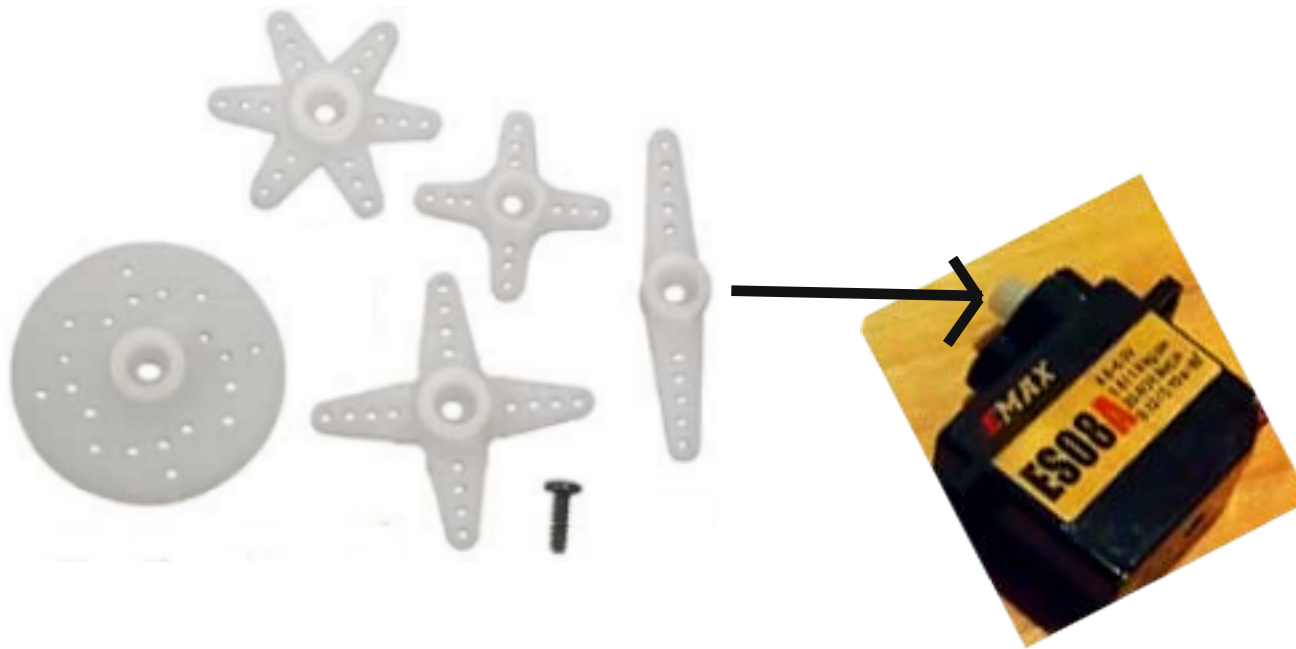


columns

rows

You should see some things that look like this in a small bag in your box

Choose one of these to be the arm that rotates on your motor



Pick your favorite one and insert the round hole onto the top of your motor

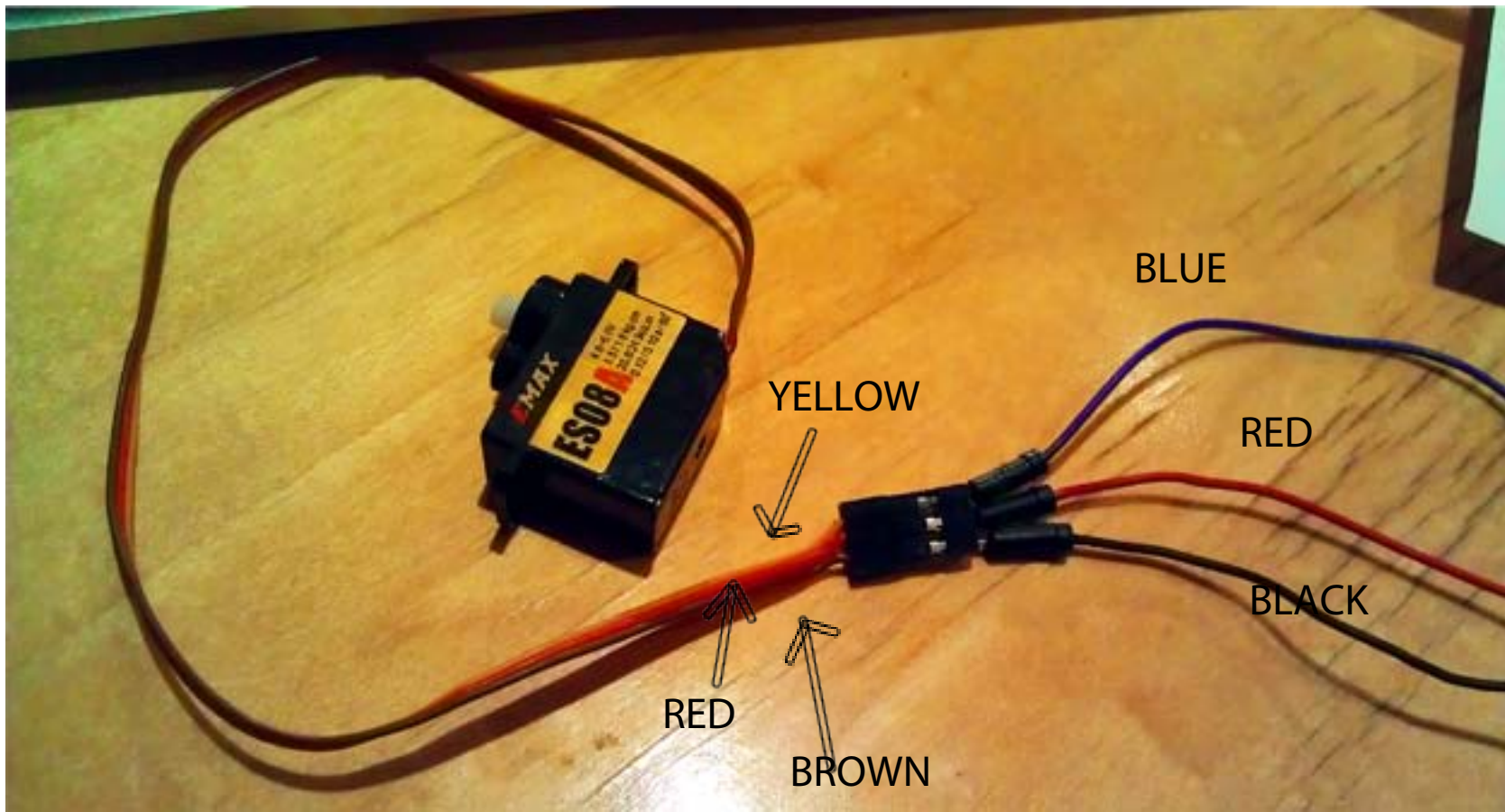
PUSH it down - it should stick in place.

## Step 1. Build the motor

A. Attach a BLACK wire from your kit to the BROWN wire on the motor

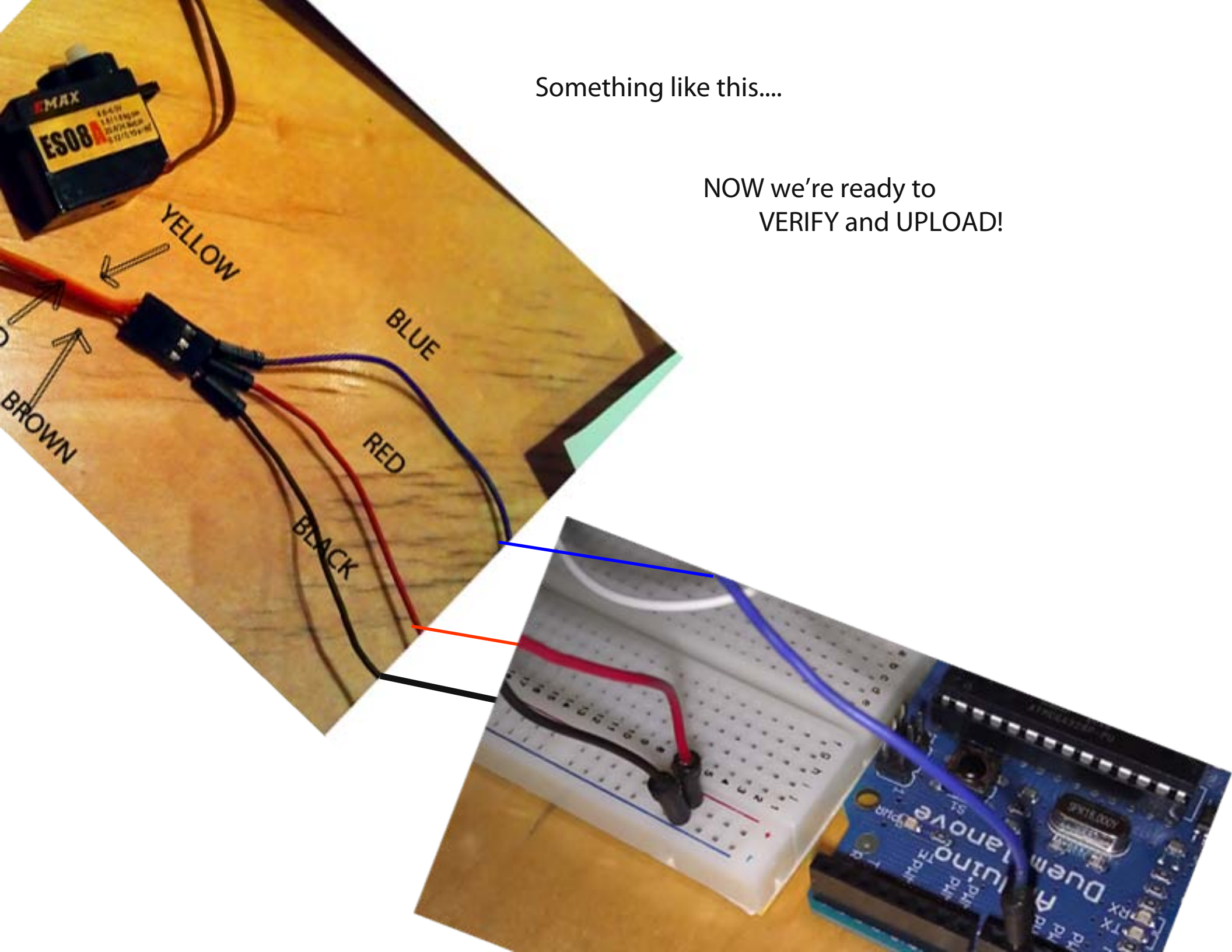
B. Attach a RED wire from your kit to the RED wire on the motor

C. Attach a BLUE wire from your kit to a YELLOW wire on the motor

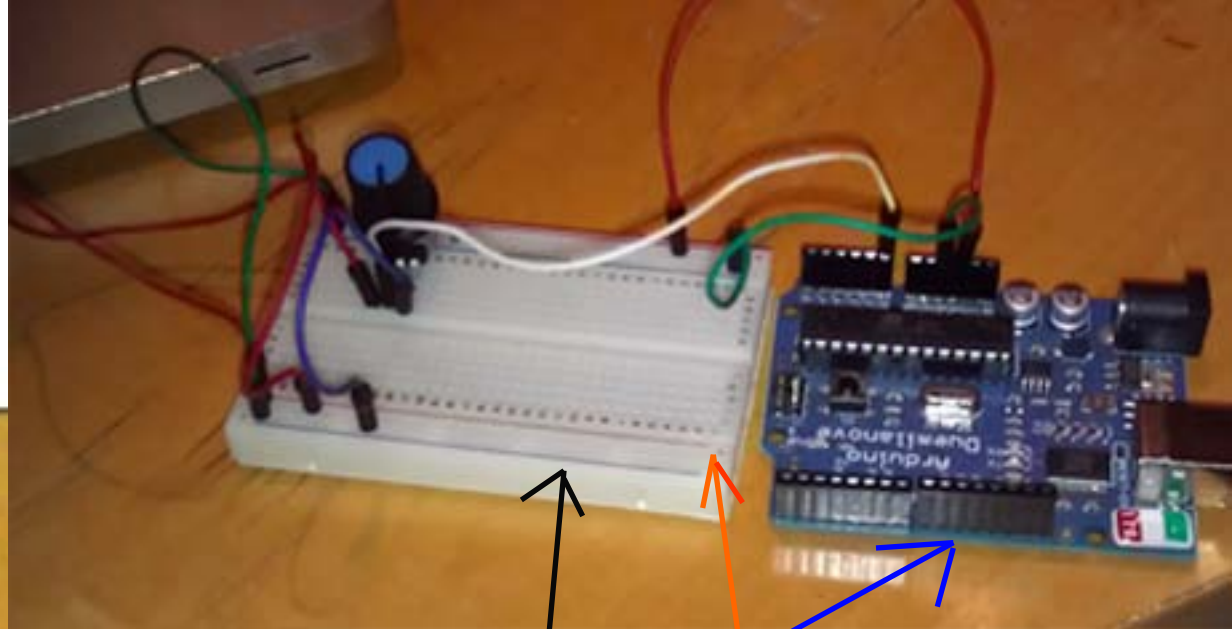
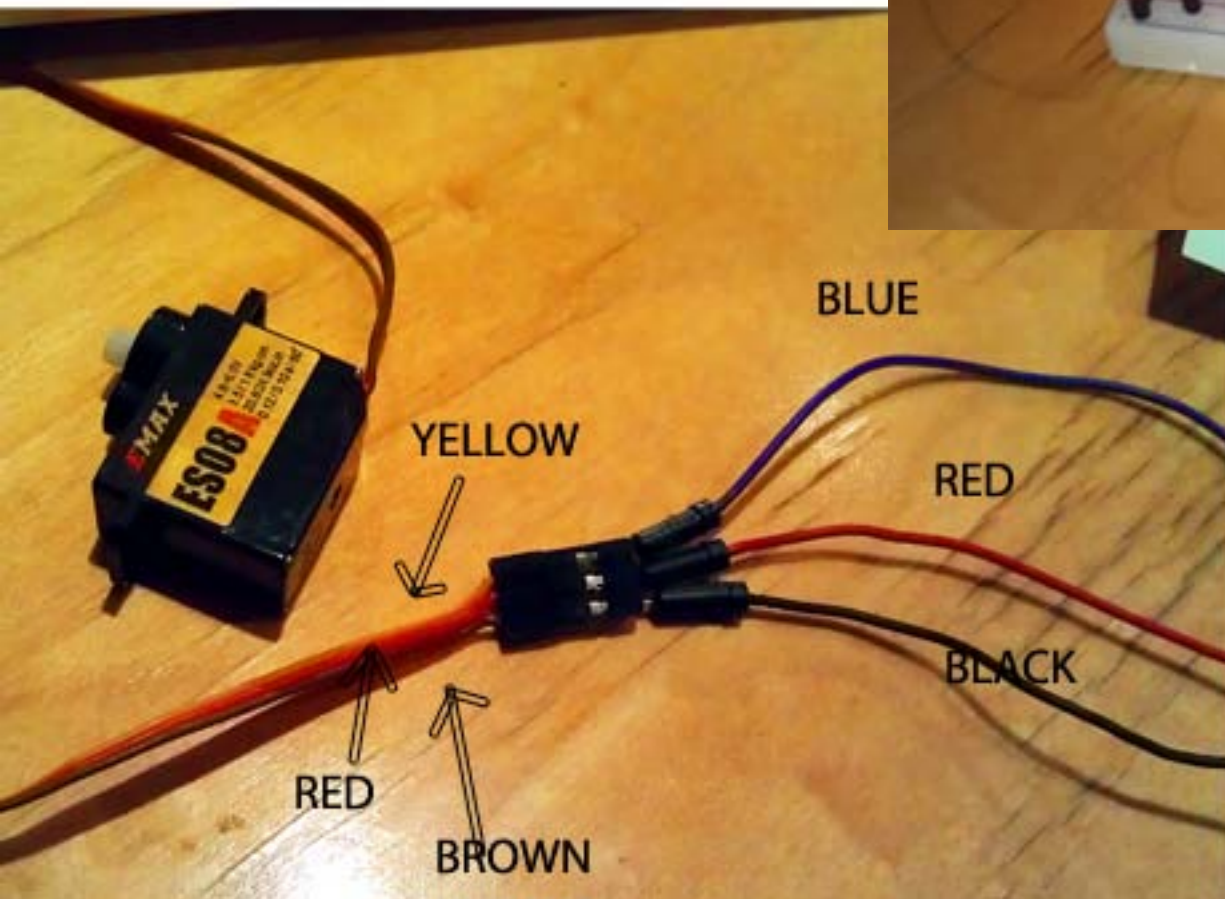


Something like this...

NOW we're ready to  
VERIFY and UPLOAD!







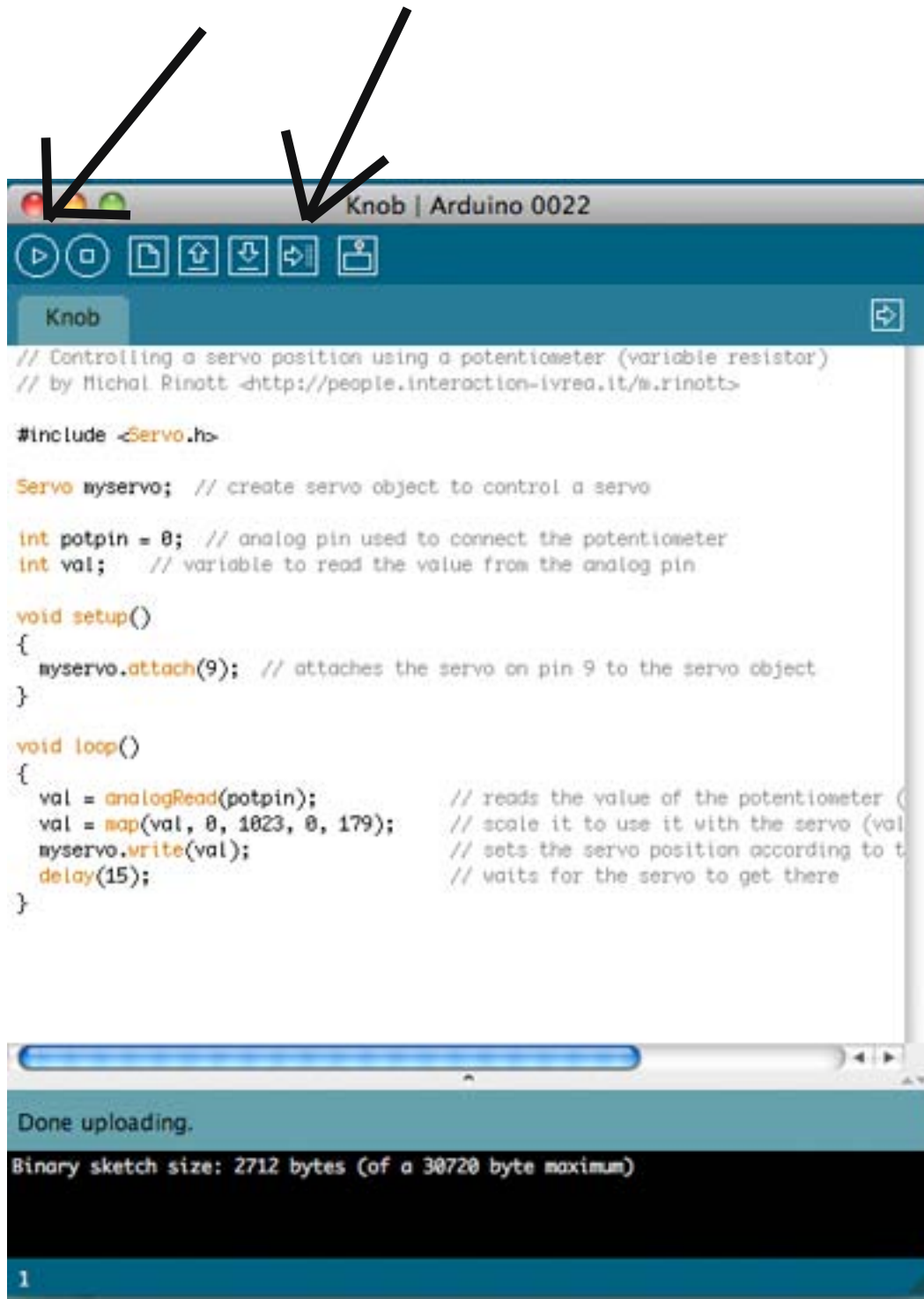
Blue wire goes to hole in Arduino that says "9" next to it

Red wire goes to hole in breadboard near the red stripe

Black wire goes to the hole in breadboard next to blue stripe



VERIFY and UPLOAD!



The screenshot shows the Arduino IDE interface with a sketch named "Knob" open. The sketch code is as follows:

```
// Controlling a servo position using a potentiometer (variable resistor)
// by Michal Rinott <http://people.interaction-ivrea.it/m.rinott>

#include <Servo.h>

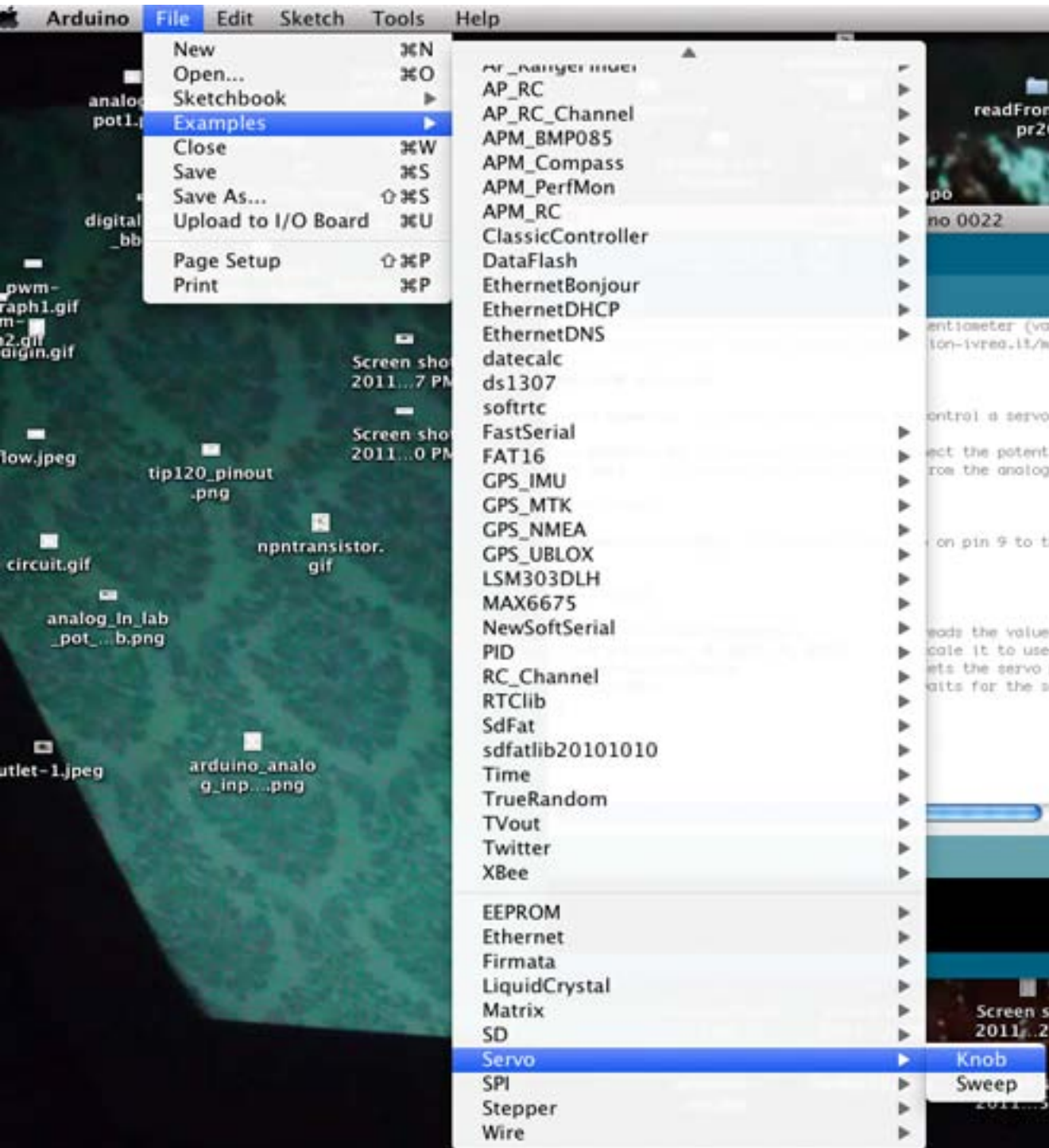
Servo myservo; // create servo object to control a servo

int potpin = 0; // analog pin used to connect the potentiometer
int val; // variable to read the value from the analog pin

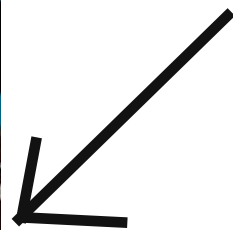
void setup()
{
  myservo.attach(9); // attaches the servo on pin 9 to the servo object
}

void loop()
{
  val = analogRead(potpin); // reads the value of the potentiometer (
  val = map(val, 0, 1023, 0, 179); // scale it to use it with the servo (val
  myservo.write(val); // sets the servo position according to t
  delay(15); // waits for the servo to get there
}
```

At the bottom of the IDE, a status bar indicates "Done uploading." and "Binary sketch size: 2712 bytes (of a 30720 byte maximum)".



CLICK on FILE ---> Examples  
--->Servo--->Knob



Some cool websites:

[hackaday.com](http://hackaday.com) - super neat projects using arduino

[adafruit.com/tutorials](http://adafruit.com/tutorials) - super helpful tutorials about getting started with arduino

<http://blog.makezine.com/video//> - Make Magazine - cool videos and tutorials

Arduino.cc - TONS of stuff here, from tutorials, to ideas...

Instructables.com