<u>Lab #2 Detailed Wiring Instructions</u>

IMPORTANT LAB TIP: The 5V pin on the Arduino board can be used to supply up to 750 mA. Therefore an external power supply is not required for up to two small servos motors (assuming 350 mA maximum for each servo). In that case just you don't connect the power supply shown in the diagram. You just need to connect the 5V pin on the Arduino to the connector block with the red wires.

IMPORTANT LAB TIP: For more than two servos (or for servos with high current requirements) you should use an external 5V power supply and connect it as shown in the diagrams. This can be supplied by a 5V wall adapter (make sure to check the polarity) or a cell phone power bank battery (ask the instructor for details).

Lab Tip: Before changing the wiring / components connected to your Arduino you should first upload the Blink example and verify that it works. This will avoid mistakenly configuring some pins to output (and potentially damaging your board) if your previous program (which gets loaded automatically when you plug the Arduino in) had configured some pins to output. Input pins are normally safer than output pins.

Connecting the Arduino Components

After the polarity of your power supply has been determined you can use the following sequence of steps to connect your components. After you are done you will have a setup that looks like the following picture.
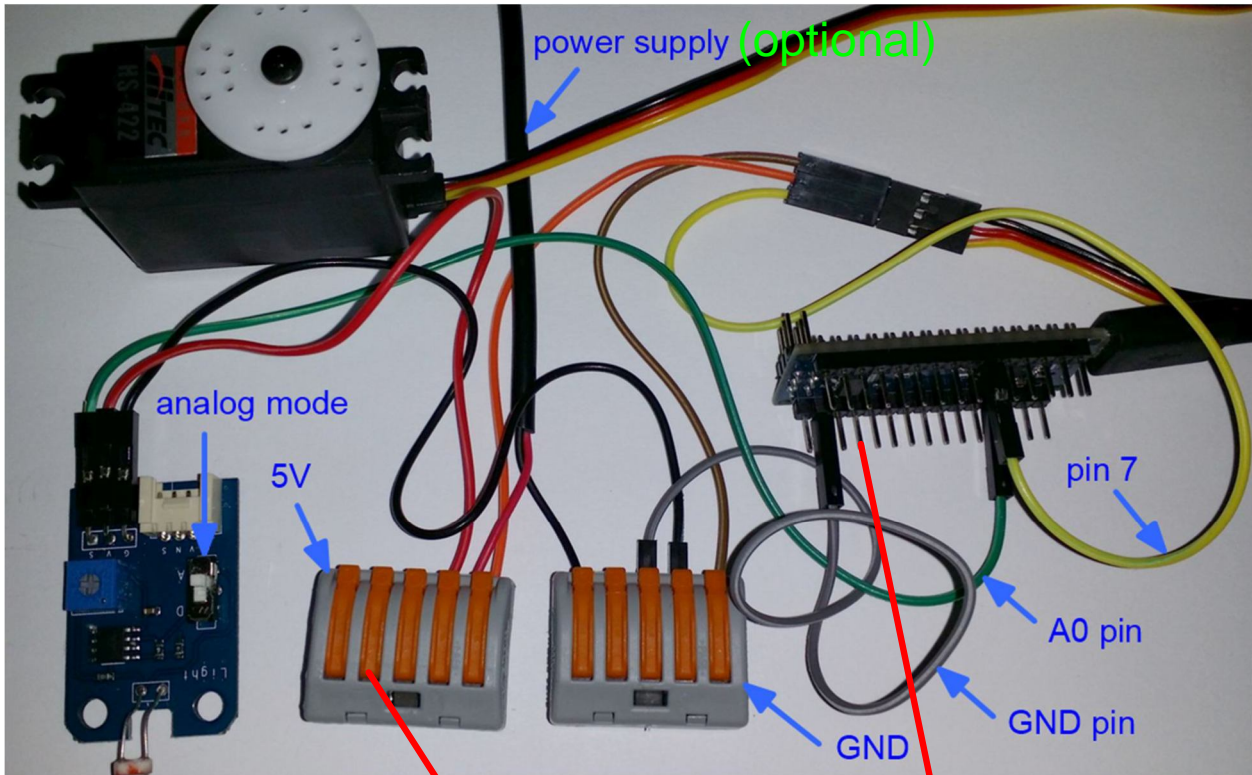

5V pin (connect only if you don't use the optional power supply)

1. Connect the power supply leads to the lever blocks as follows. At this point it doesn't matter whether you have a backwards power supply or not since we haven't connected anything else yet.

Lab Tip: This step is optional if you only need 750 mA current (i.e. you only have two small servos). In that case just you don't connect the power supply shown in the diagram. You just need to connect the 5V pin on the Arduino to the connector block with the red wires.

Lab Tip: Note that each input wire to a lever block should go into a different hole / lever. It doesn't matter which hole since they are all connected together.
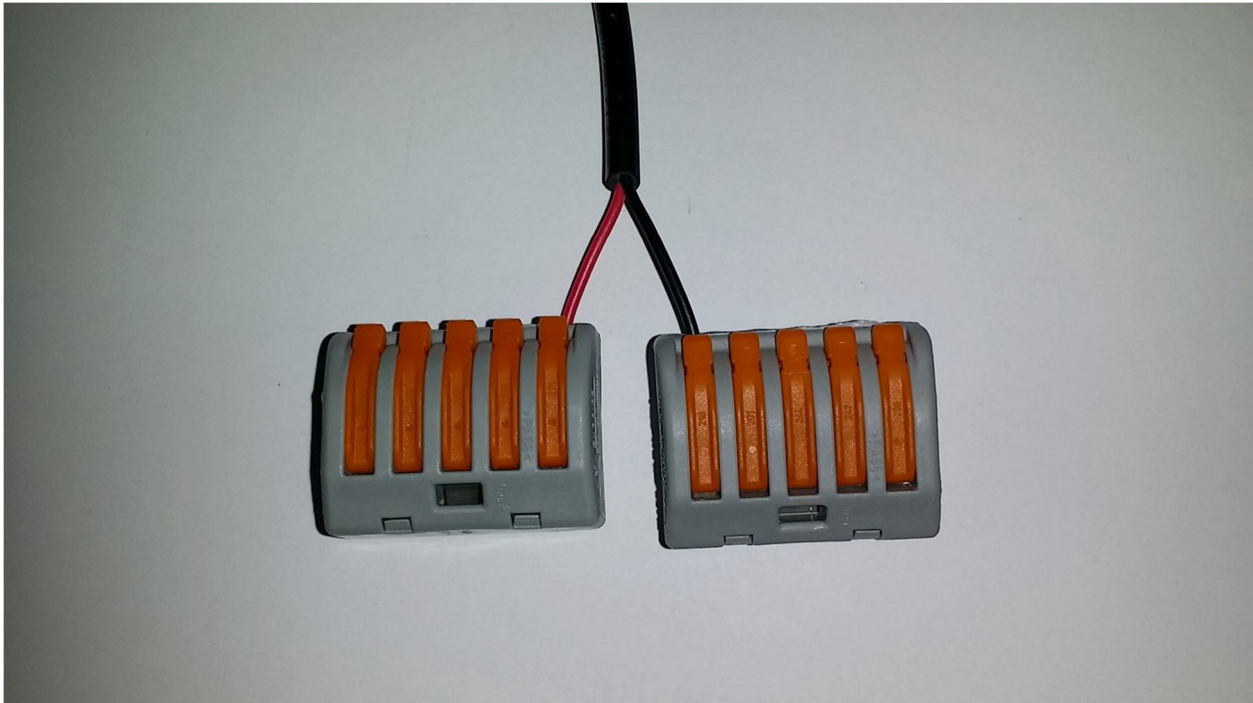
2. Get the following wires from your Arduino lab kit. Note that all the wires are male / female except for the green wire which is female / female.
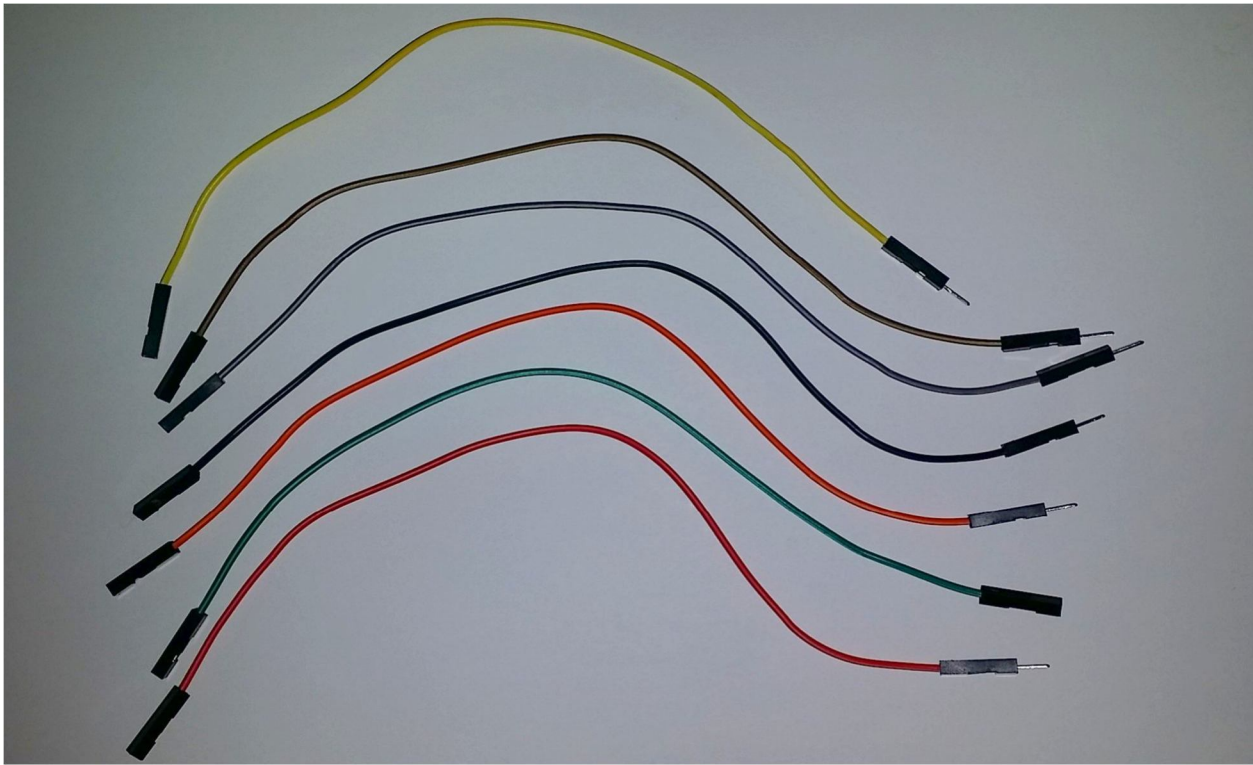

3. Remove the female connectors/ends from the brown and orange wires. Note if you have male / male brown and orange jumper wires then you don't require this step – just substitute the male / male jumpers for the stripped wires. Then strip the ends (see first picture below), bend back the ends (i.e. bend the stripped ends in half), and twist the ends as shown in the second picture.
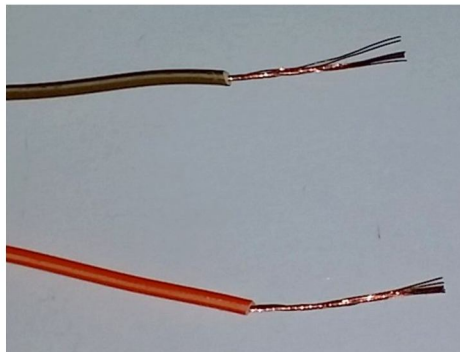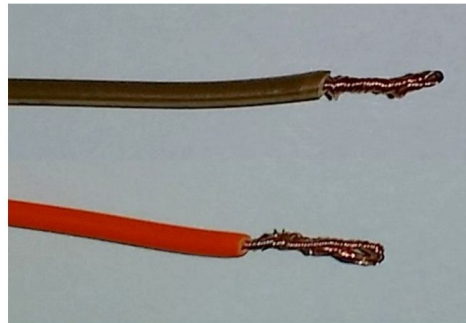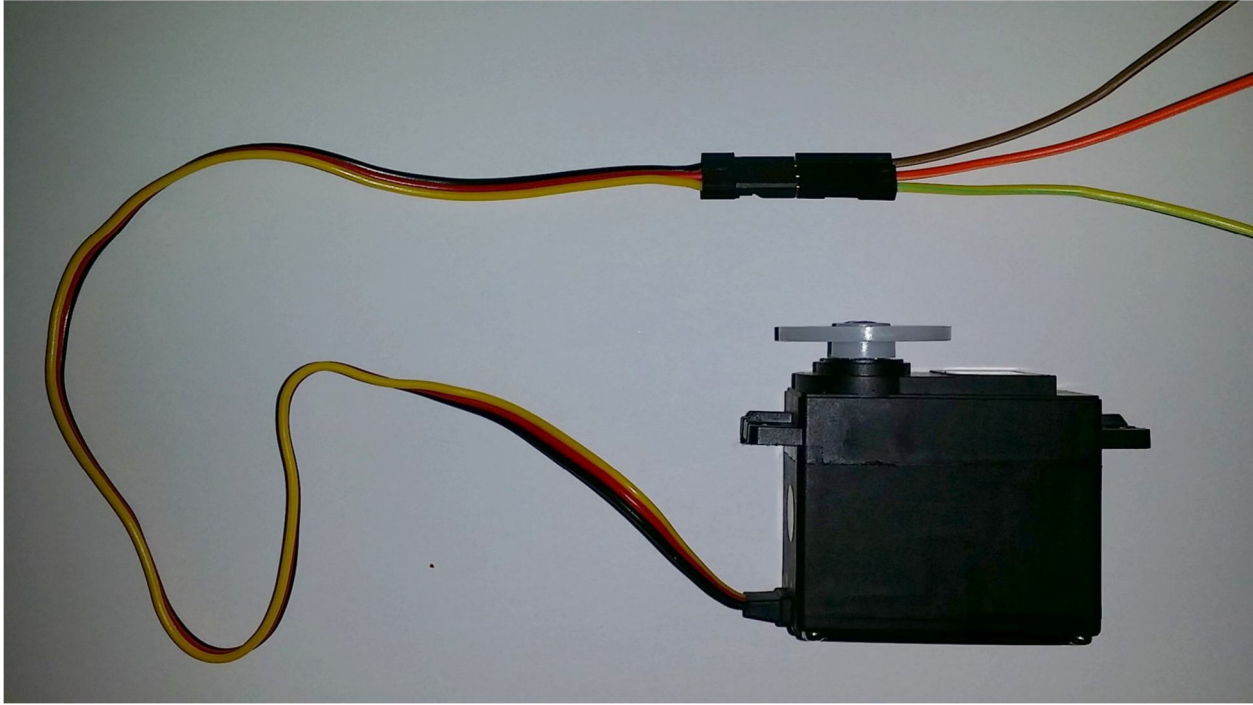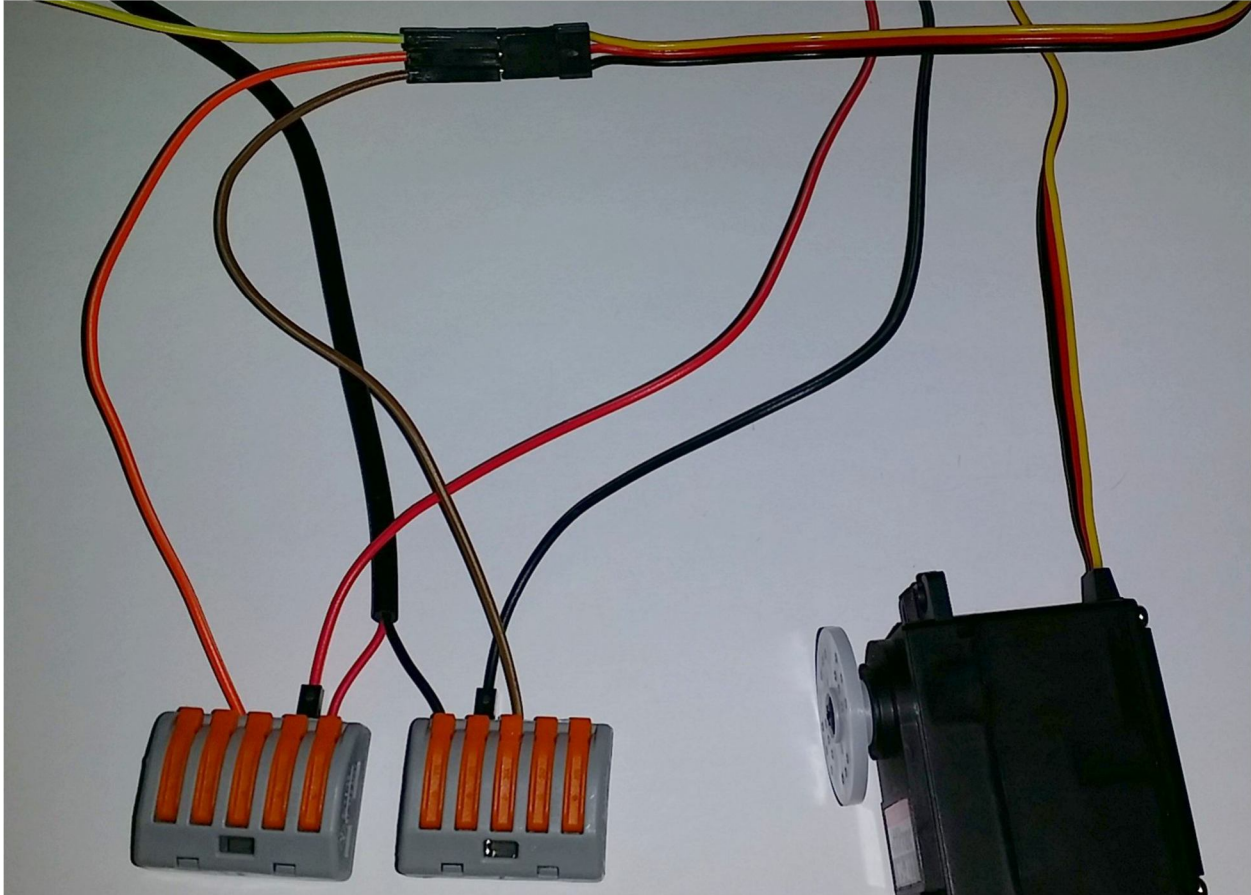
4. Connect the light sensor to the lever nut blocks as follows. Note the male pins of the red and black jumper wires can be inserted into the lever blocks. The picture below assumes a correct power supply. You should switch the red / black wires of the power supply if it is a "backwards / incorrect" power supply (see Power Supply Polarity section). Note that the other end of the green wire will be connected to the Arduino later on.
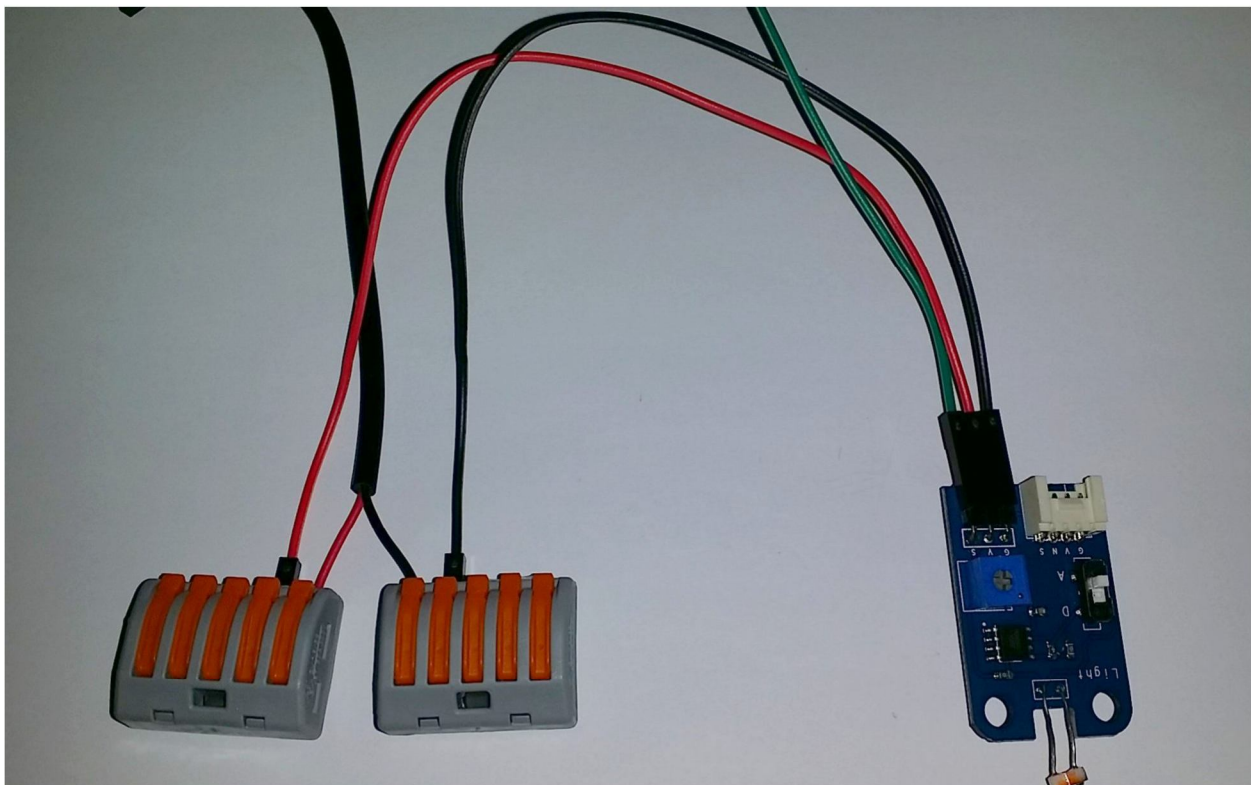
5. Connect the male ends of the brown, orange, and yellow wires into the servo motor connector as follows. Note that the yellow jumper wire goes to yellow, the orange jumper wire goes to red, and the brown jumper wire goes to black.
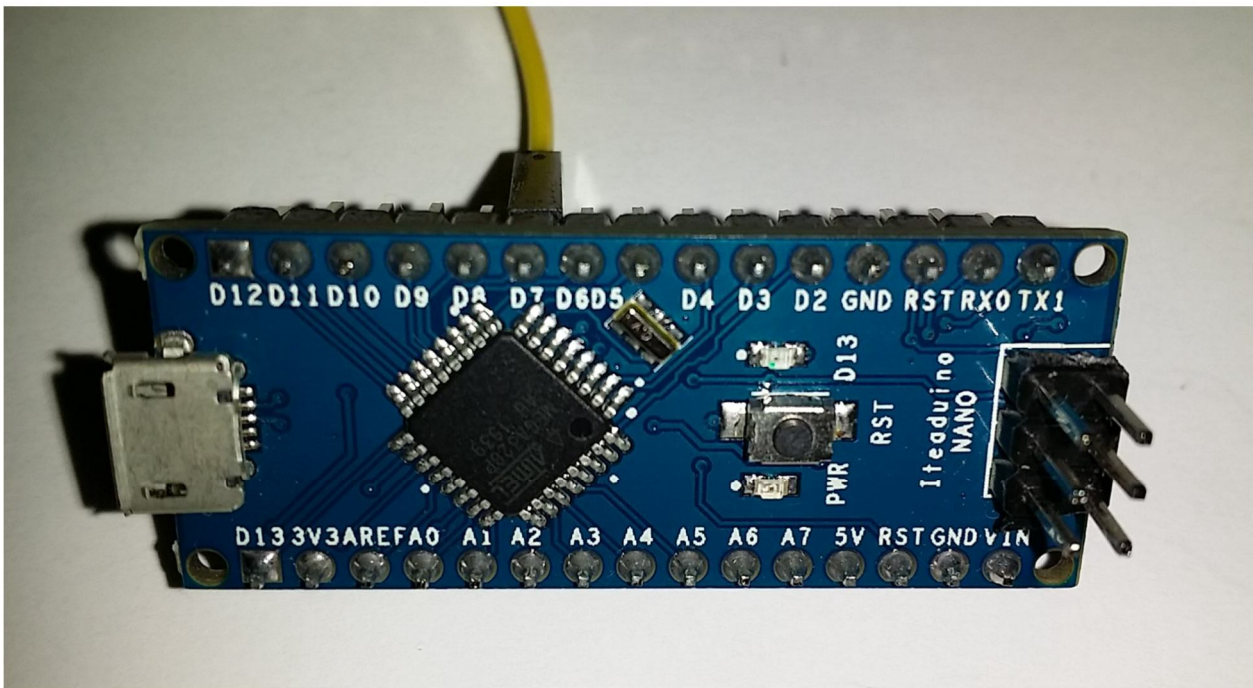
6. Connect the stripped ends of the brown and orange wires into the lever nut blocks as follows. Note that the female end of the yellow wire will be connected to the Arduino later on.
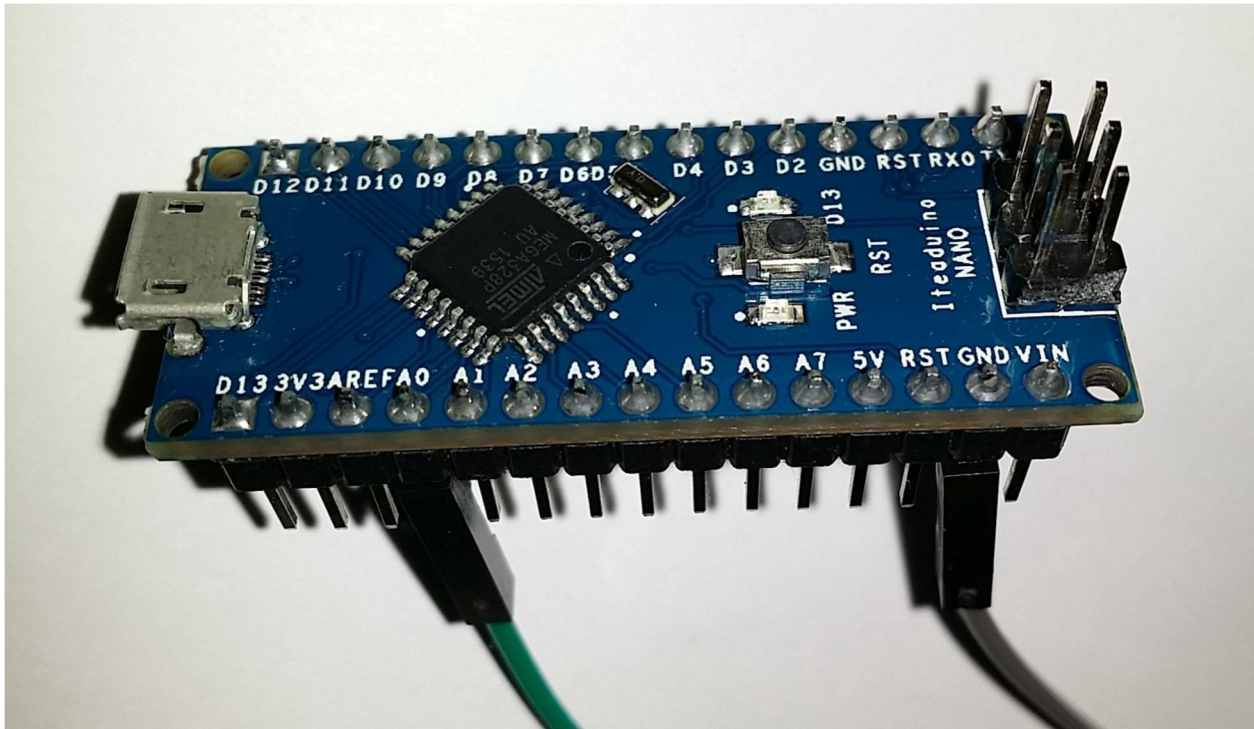
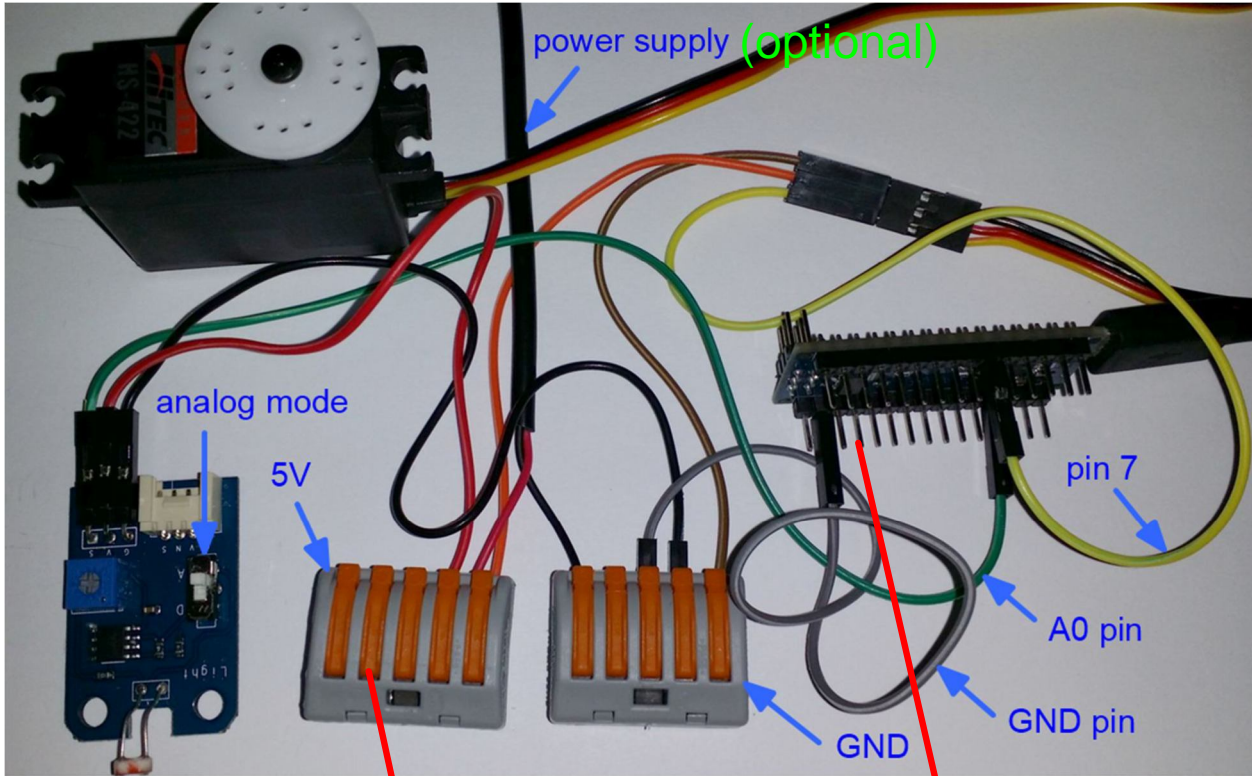7. Connect the male end of the grey wire to the lever nut block as follows.
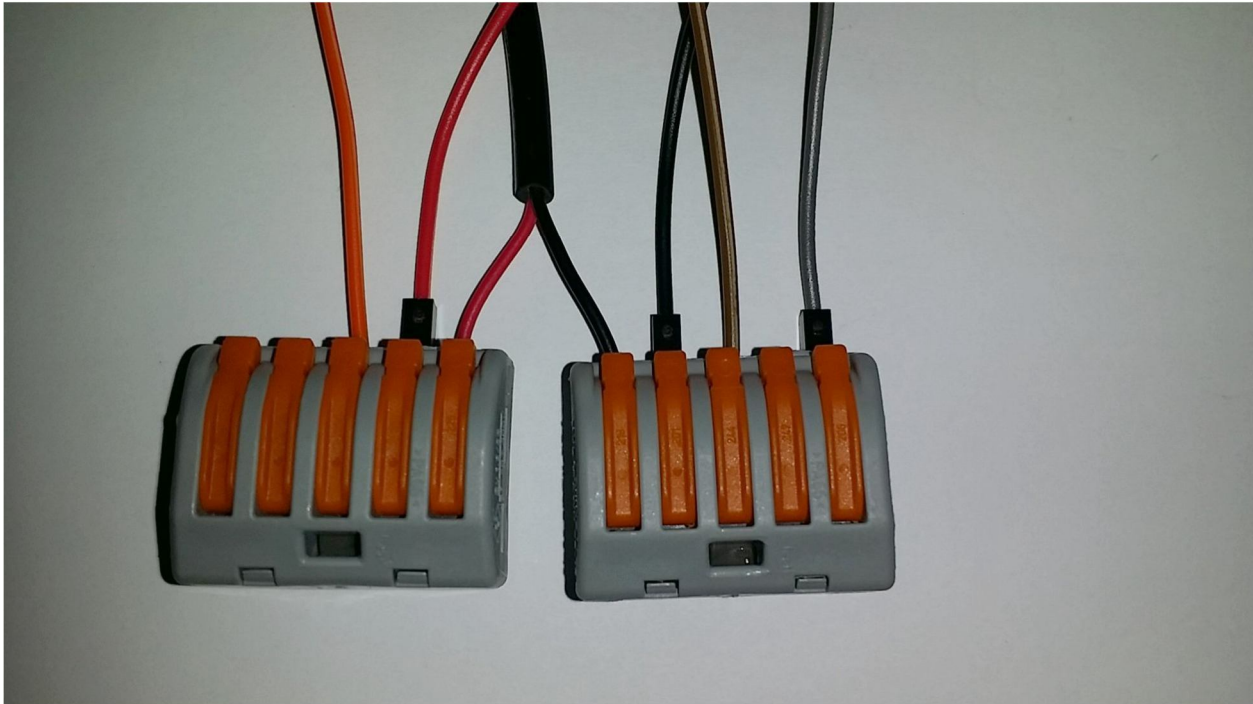
8. Connect the female end of the yellow wire to pin 7 of the Arduino as follows.

9. Connect the female ends of the grey and green wires to the GND and A0 pins, respectively (see the picture below).

10. Your setup is now complete. It should look like the following picture. Double check all your connections before proceeding. Don't connect the Arduino to the PC or the power supply to an outlet yet. At this point you should finish reading the rest of the lab and then proceed to the Arduino Programming section.

power supply (optional)

analog mode

5V

pin 7

A0 pin

GND pin

GND

5V pin (connect only if you don't use the optional power supply)