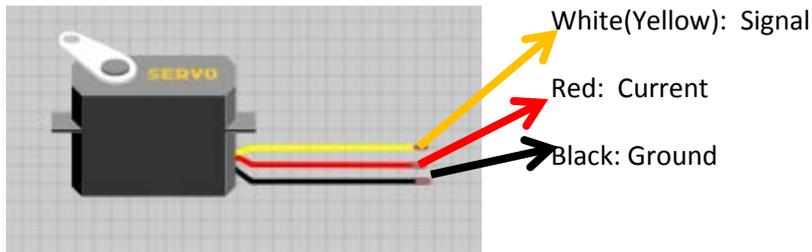


Project 4: Arduino Servos Part 1

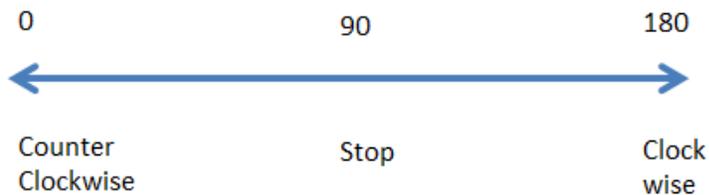
Description:

A servo is an electric motor that takes in a pulse width modulated signal that controls direction and speed. A servo has three leads:

- a. Red: Current
- b. Black: Ground
- c. White (Or Yellow): Signal



The Signal in an Arduino servo takes a range of values from 0 to 180:



Note that the value of 90 will stop the Servo.

In this lesson we will connect 1 Servo to the Arduino board and write code to turn the servo Clockwise and Counterclockwise. In Project 5 we will build a wheeled vehicle robot using two servos.

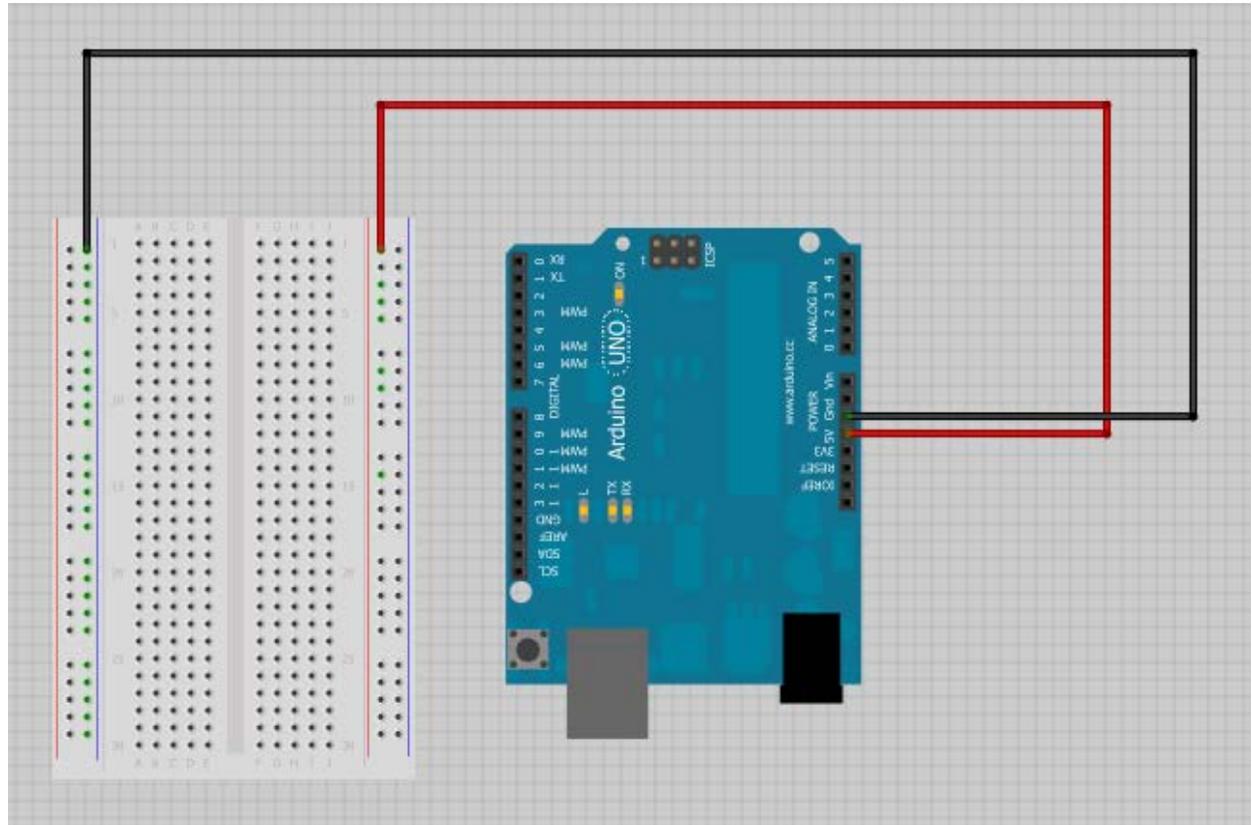
Building and Wiring:

You will need:

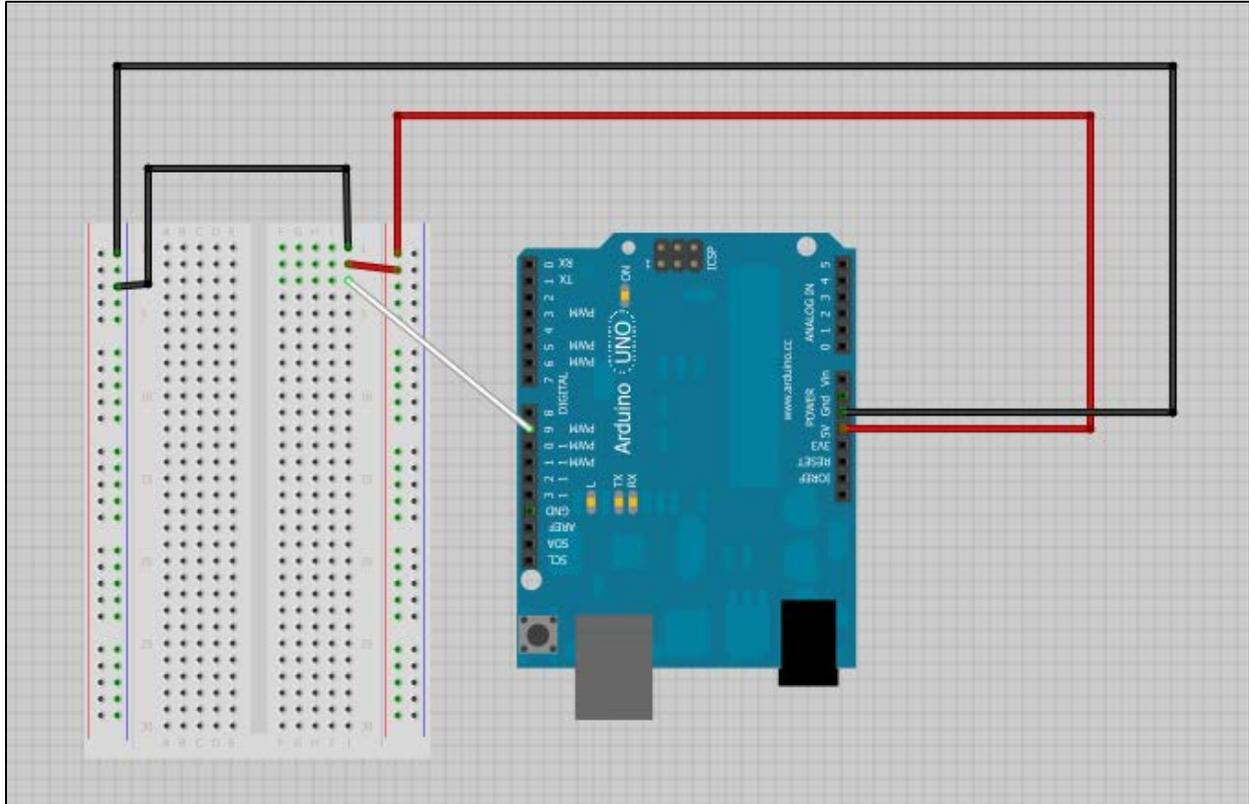
1. Arduino Board and Breadboard
2. Servo with Wheel
3. External Battery Pack with tip plug
4. External Battery Pack with lead wires
5. 2 Red wires for current
6. 2 White wires for signal
7. 2 Black (or dark colored) wires for ground

Process:

1. Remove the LED lights and Piezo Speakers from Projects 1,2, and 3. Make sure these are stored safely in the kit.
2. Remove the 330 Ohm resistors and store them in the required package.
3. Configure the Breadboard and Arduino to the following form:



4. We will now set up Rows 1, 2, and 3 on the Breadboard for servo configuration.
 - a. Run a Black wire from the Ground rail to J1
 - b. Run a Red wire from the Red Rail to J2
 - c. Run a White wire from Arduino Pin 9 to J3.

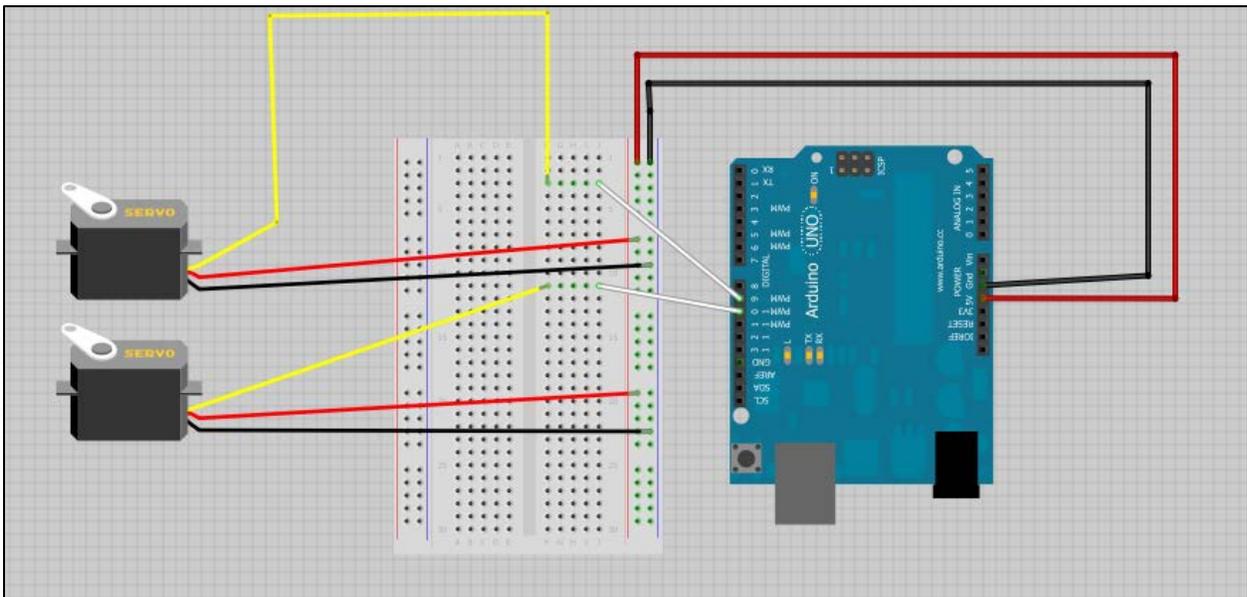
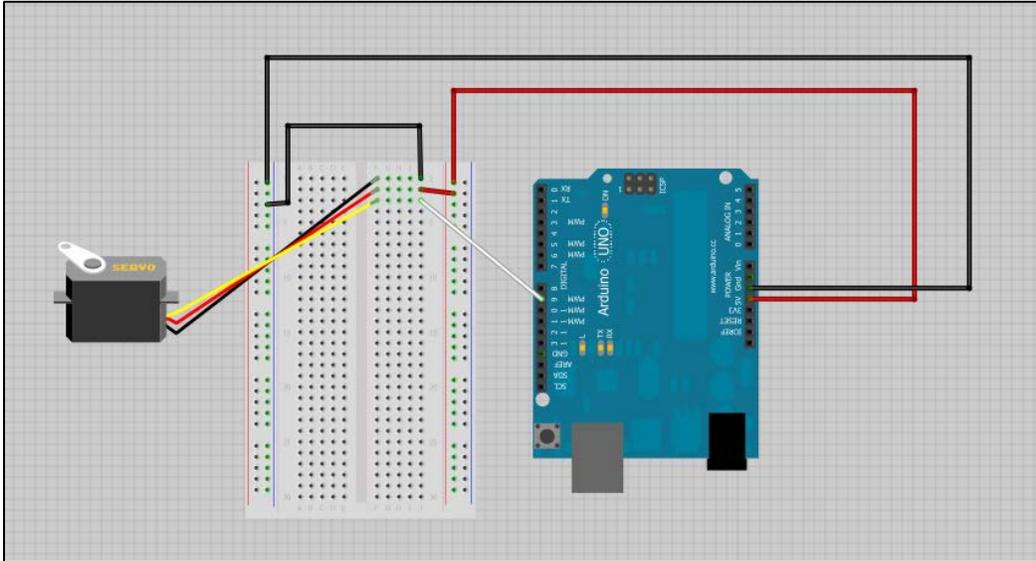


5. We can now connect the Servo.

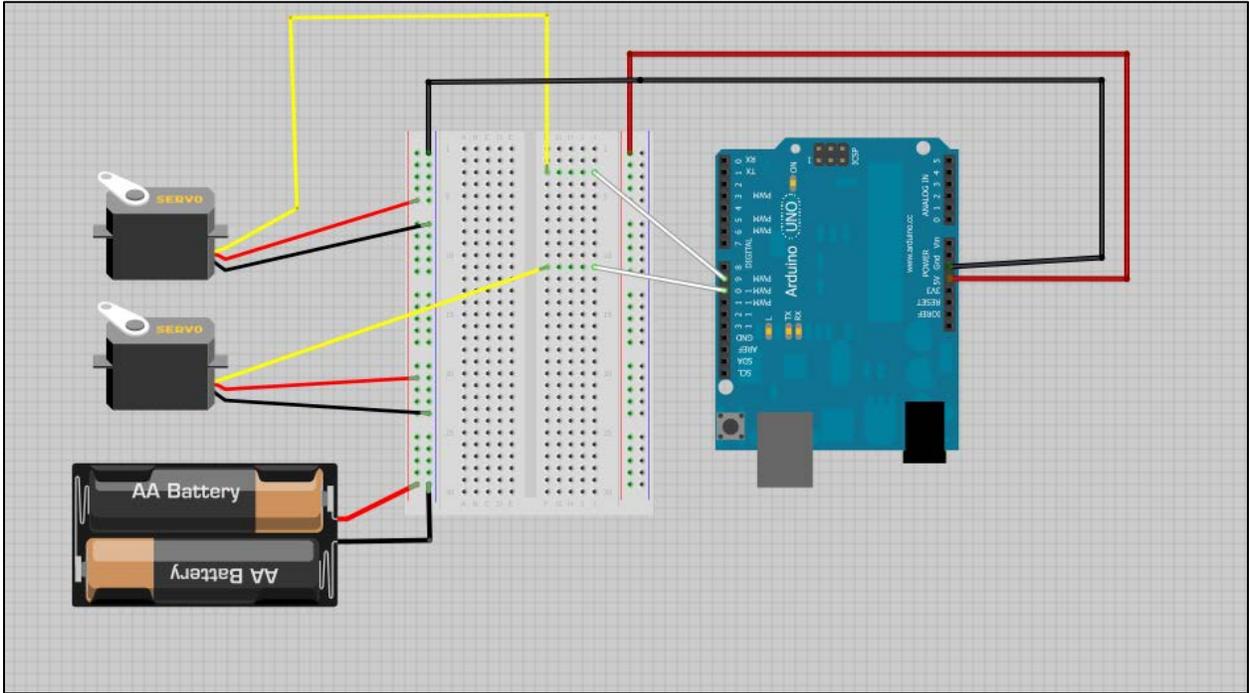
a. Wire Servo Black to F1 (Black wire)

b. Servo Red to F2 (Red wire)

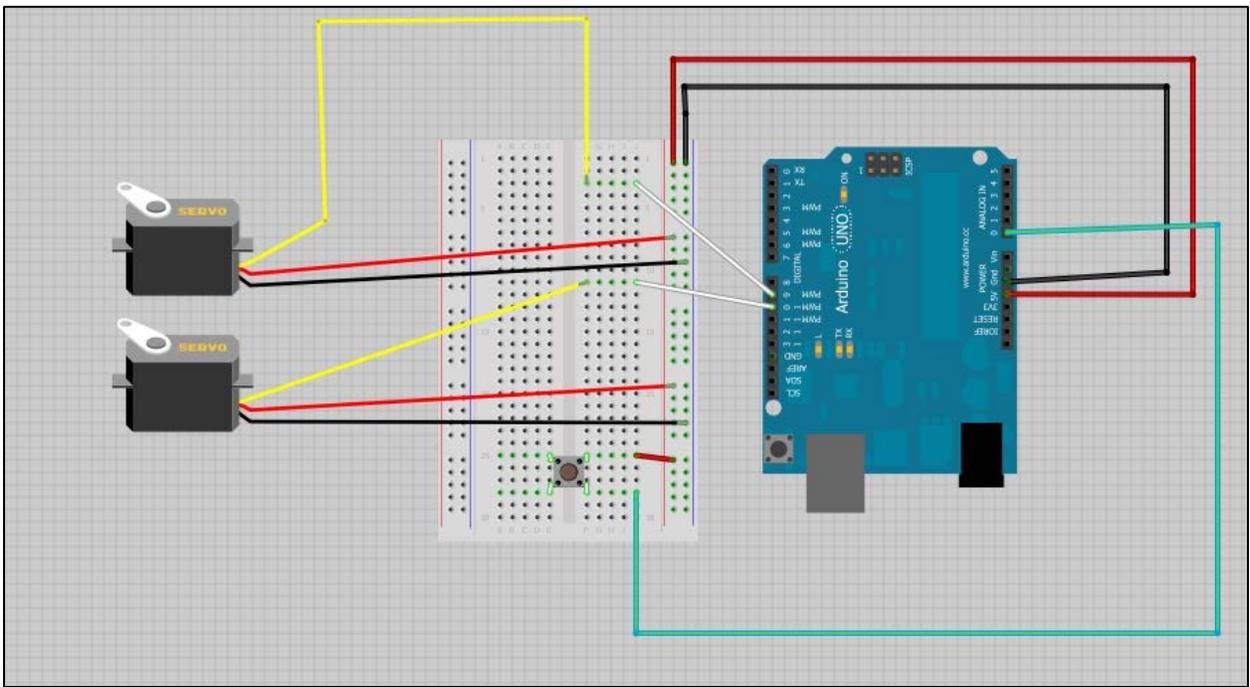
c. Servo White to F3 (White wire)



6. Alternate wiring schematics: If you need to use the external batteries to power the servos, set up the circuit as follows:



7. Two Servos with Button Sensor.



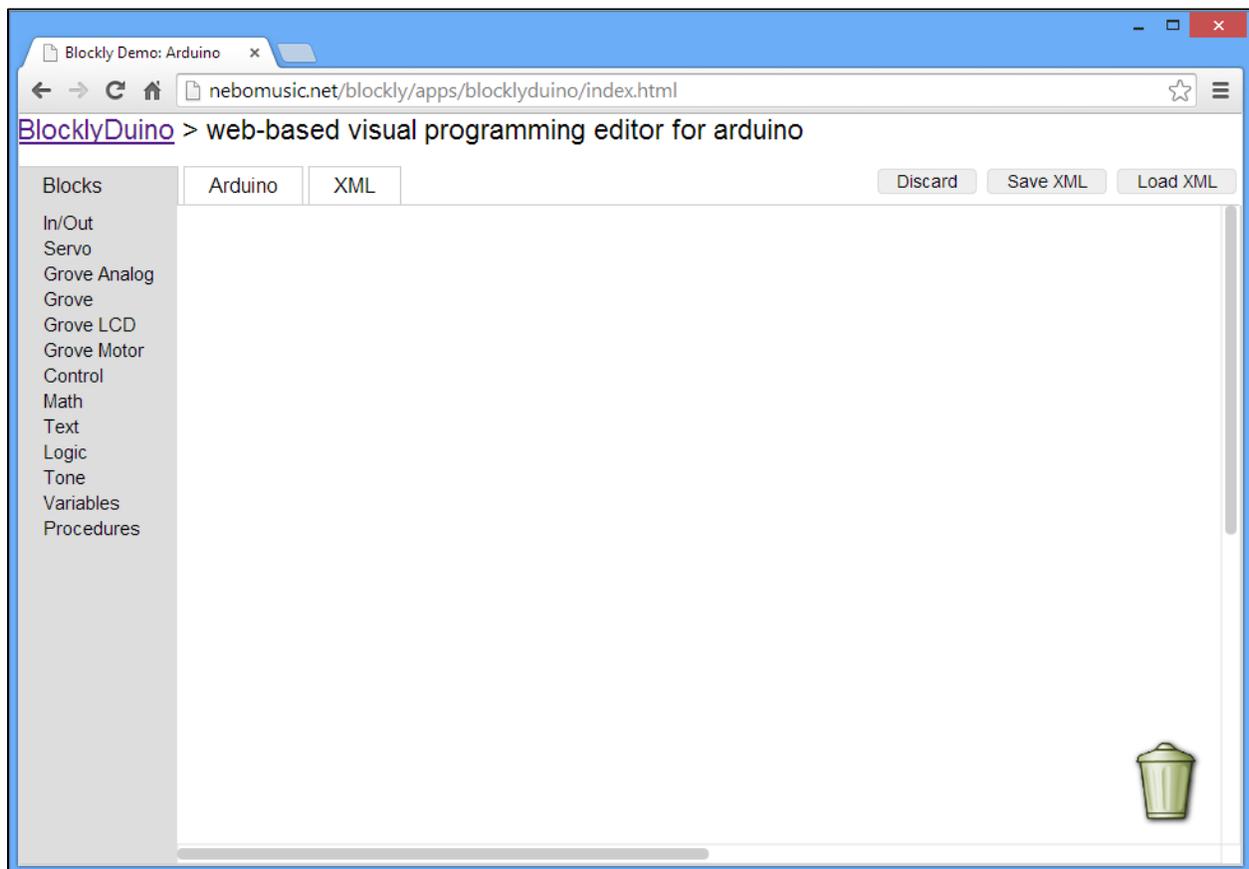
Blockly Code:

We will now program the Servo to move in the following manner:

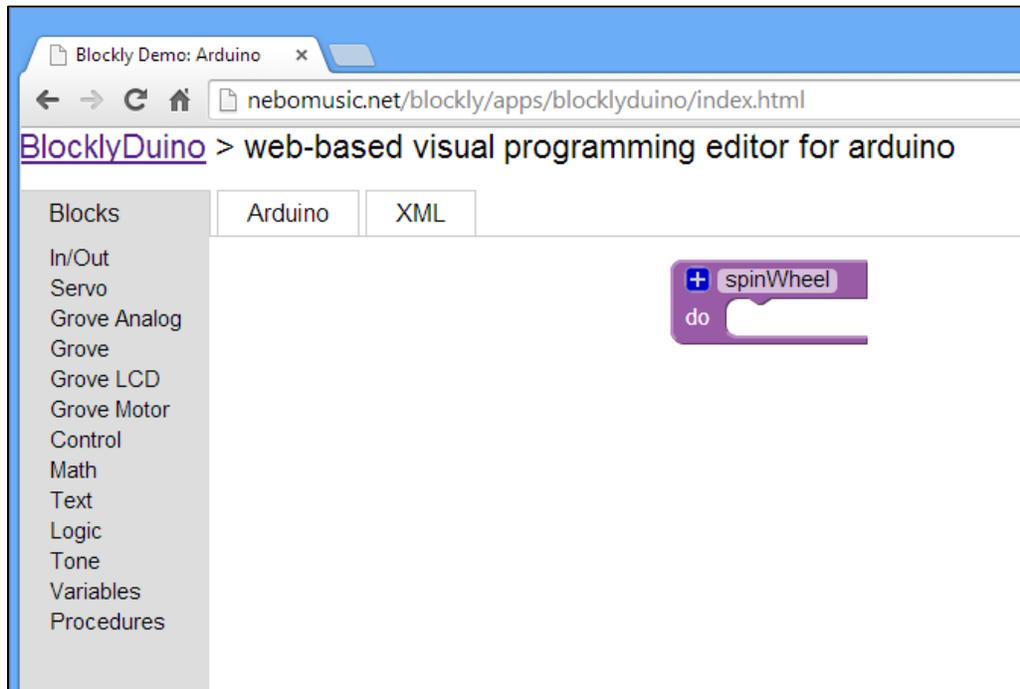
- Clockwise for 1 Second
- Wait for 1 Second
- Counterclockwise for 1 Second
- Wait for 1 Second

Process:

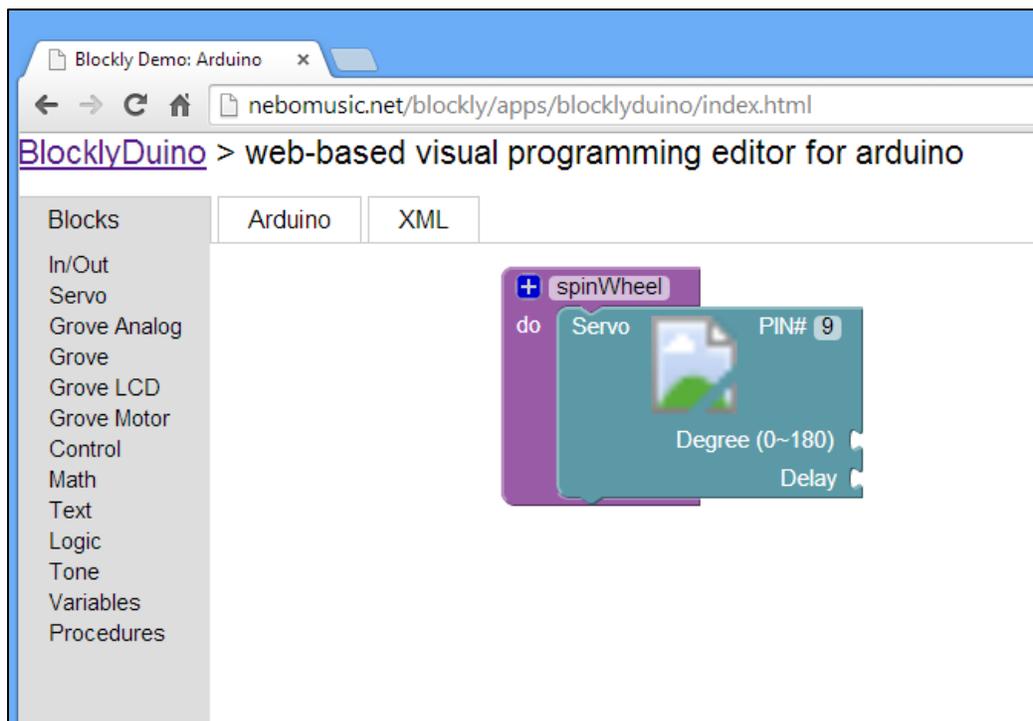
1. Go to <http://nebomusic.net/blockly/apps/blocklyduino/index.html> and remove any blocks in the programming area.



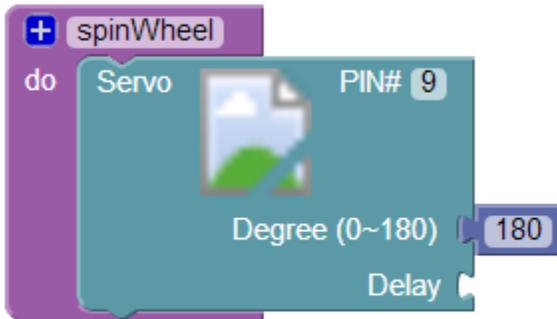
2. We will create a procedure to run the servo pattern. Drag a procedure block to the programming area and name it 'spinWheel'.



3. Click on Servo and place a Servo block into the spinWheel procedure. Change the PIN# to 9.



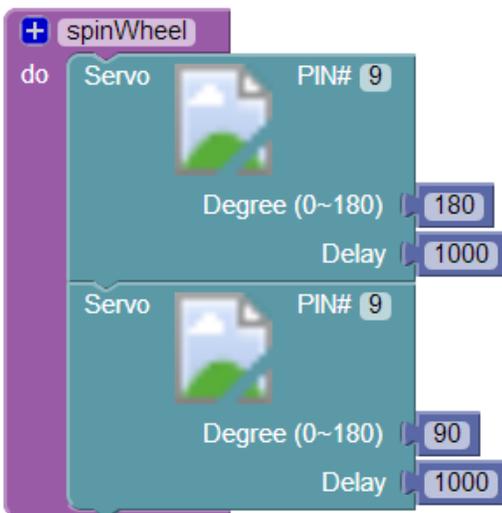
4. Place a number value '180' in the Degree socket.



5. Since we want to spin for 1 second, place a 1000 value in the Delay socket.



6. We want the wheel to stop. So, place another Servo block in the spinWheel procedure. Set the PIN# to 9, Degree to 90 (to stop), and the Delay to 1000.

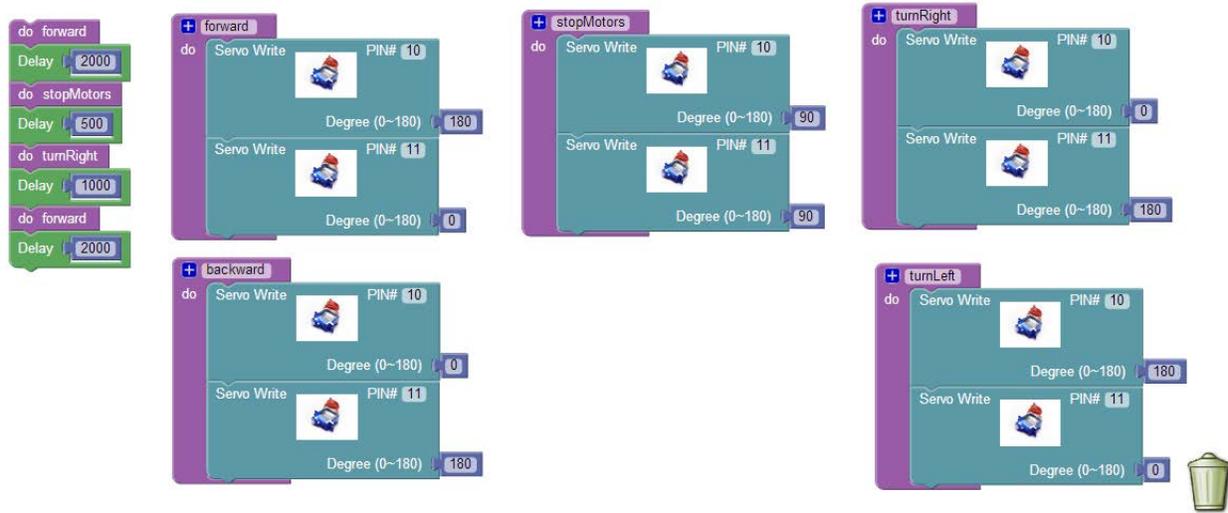


7. Now drag a 'do spinWheel' block to the programming area.



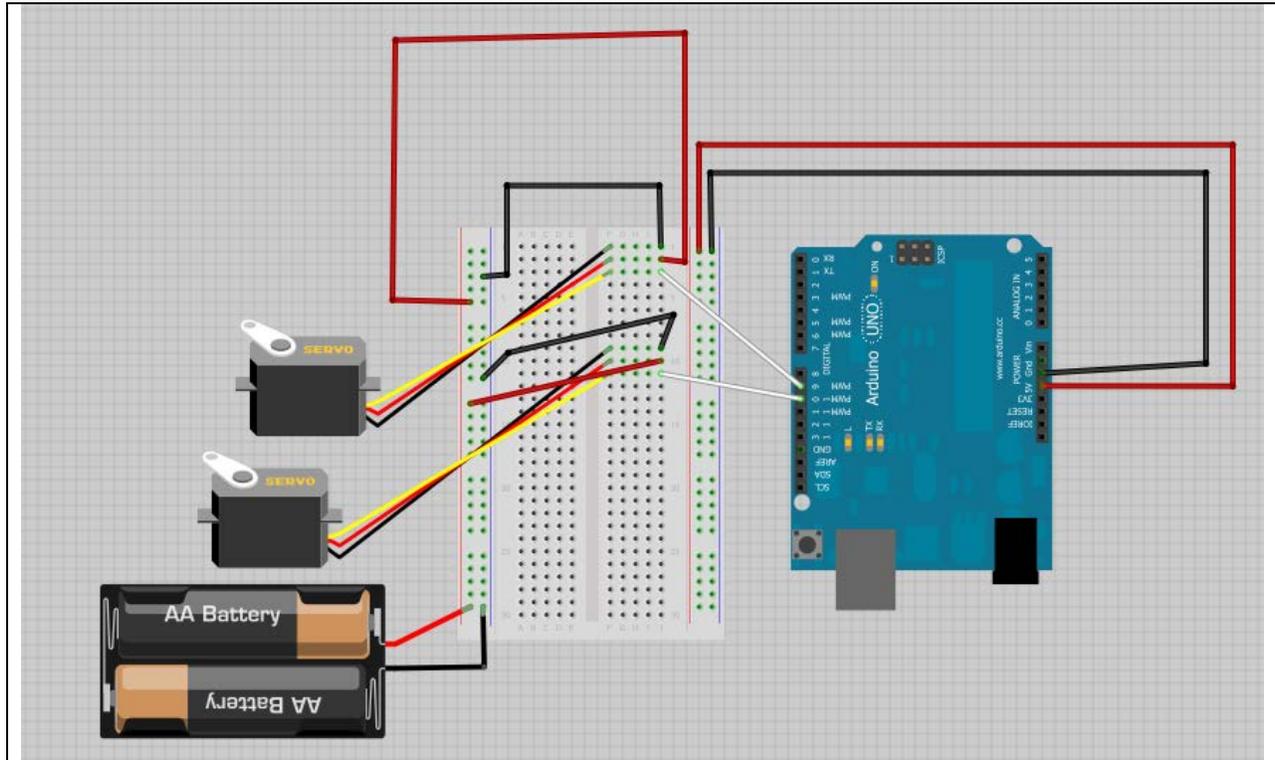
8. Copy the code from the Arduino tab to the Sketch program and download to your Arduino. The wheel on the servo should turn and stop.

9. Here is a sample program with functions for forward, backward, stopMotors, and turns:



Other Ideas:

-Add the other Servo to the system. The wiring should look something like this:



- Write a procedure to control both motors at the same time. (Hint, use the 'Servo Write' block)

Vocabulary:

Servo: An electric motor and encoder that work together to use a pulse width modulated signal to control direction and speed of motor.

External Battery Pack: Provides additional power for motors or other devices in electronic device. Wired in separately from Arduino power.