Assembly

Kit Contents

1	3d printed plastic chassis	Bottom rear Bottom front
2	rear wheel inside	
2	rear wheel outside	
~5cm	3mm plastic wire	No image.
2	front wheel	
2	servo with bag of accessories	
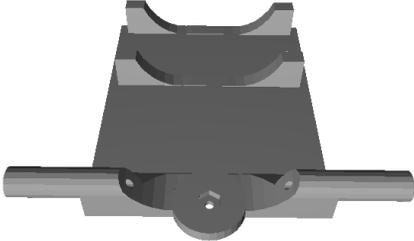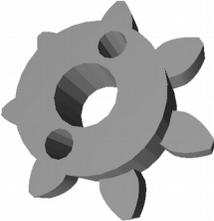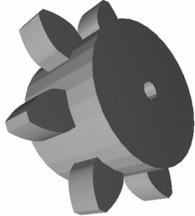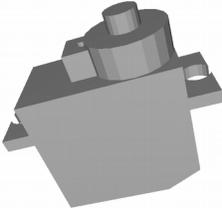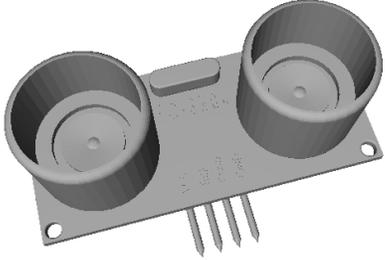
1	sonic sensor	
1	3d printed sonic sensor mount	
4	jumper wires with male to female connectors	No image.
1	battery pack	No image.
1	breadboard	
1	arduino nano	
1	optional header pins (unattached)	Red circle above; pins are not used at this time, but have been included for advanced use.
2	jumper wires (red, black) with male to male connectors	No image.
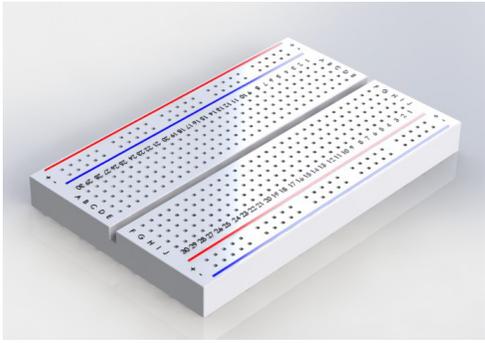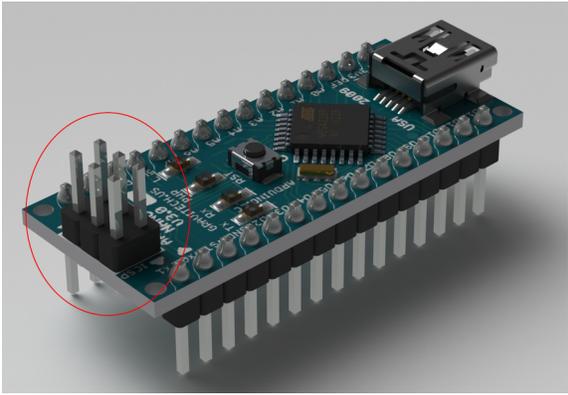
2	tank treads	No image.
1	mustache	

Tools Required:

- small Philips screwdriver
- hot glue gun
- side cutters or sharp knife

Basics:

How does a breadboard work?   http://goo.gl/T5ImYK
What is an arduino?   http://goo.gl/UwUVhT

Note:

The following sections, Electronics and Mechanical, can be completed in any order. For clarity, the pictures show only the section being assembled.

For support, contact tgray.projects@gmail.com; phone support and video support can be arranged.

Electronics:

1. Arduino

1. Connect the arduino nano circuit board to the breadboard, in the middle.
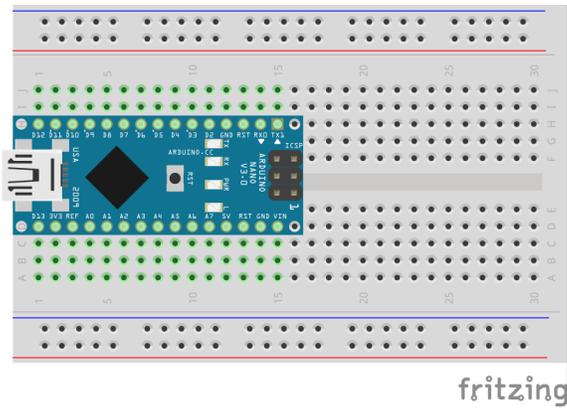
2. Servos:

1. Servo purple to the ground (blue) rail of the bread board.
2. Servo red to the power (red) rail of the bread board.
3. Servo orange to pins 2 (right) and 3 (left) on the arduino.
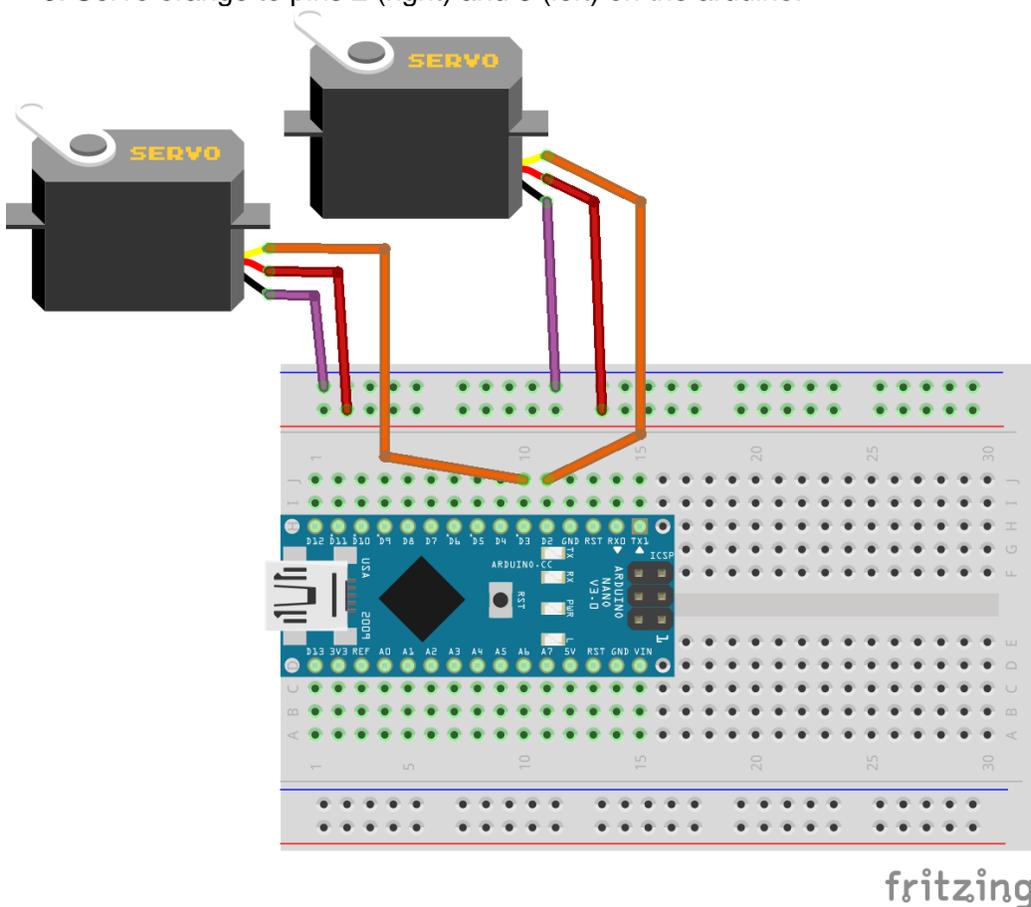
3. Sensors:

1. Connect the jumper wires with male to female connectors to the sonar sensor.
2. Sensor Trig to pin 12 on the arduino.
3. Sensor Echo to pin 11 on the arduino.
4. Sensor 5V to the 5V pin on the arduino.
5. Sensor Gnd to any ground pin on the arduino.
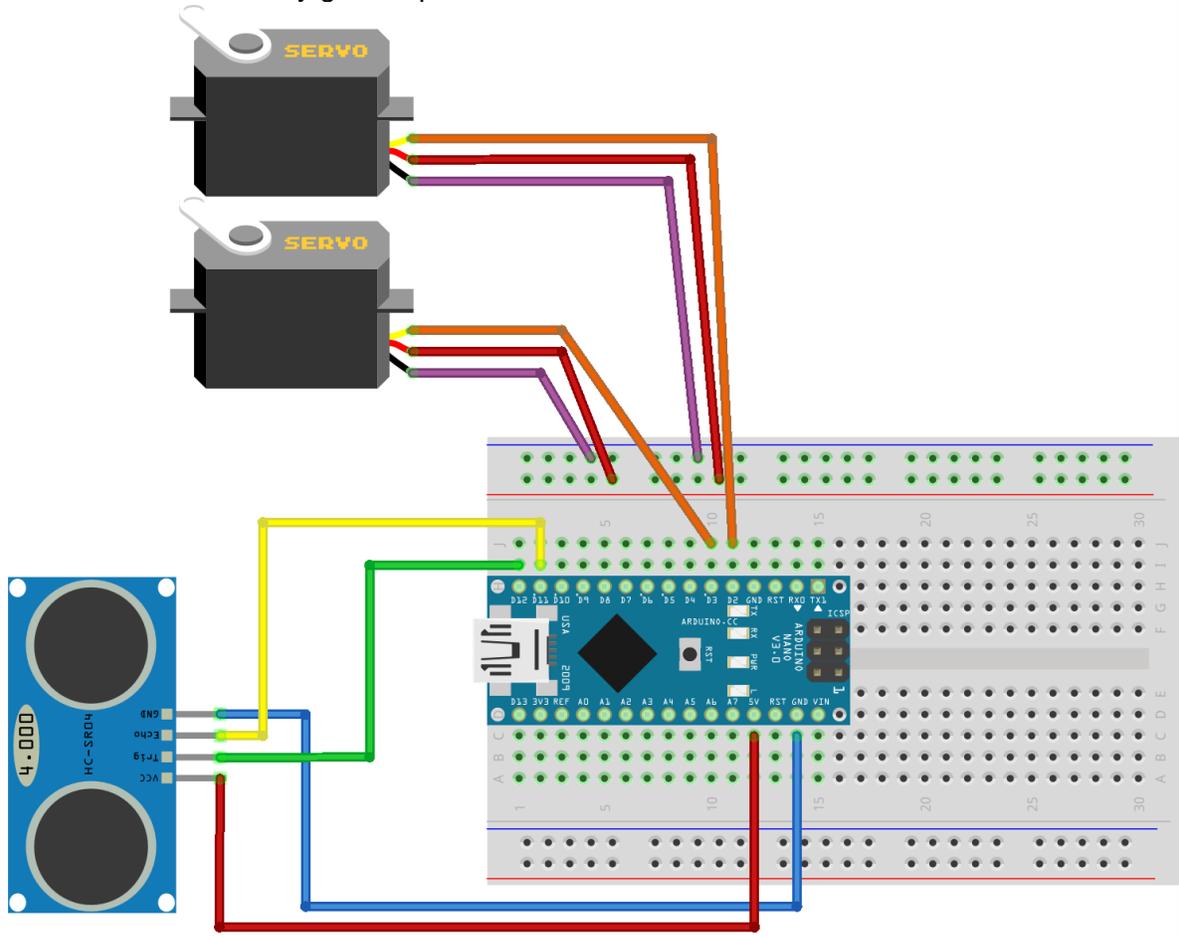
4. Power

1. Red jumper wire from the red rail of the bread board to VIN on the arduino.
2. Black jumper wire from the black rail of the bread board to the same ground pin as used in step 7.
3. Battery red wire to the red rail on the bread board.
4. Battery black wire to the black rail on the bread board.
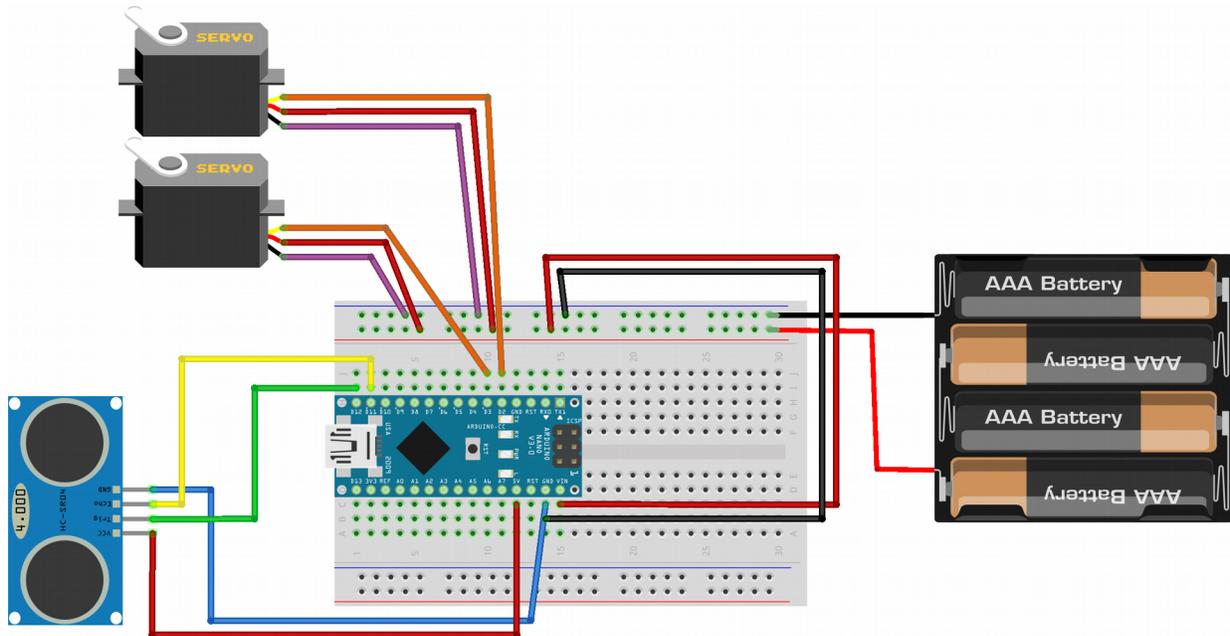

Verify

- Ensure the sonar sensor is pointed up and there is nothing above it.
- Turn the battery power on.
- You should see an LED light up on the arduino. If this light does not appear:
    - turn off battery pack and check batteries
    - verify and correct circuit, retest by turning on the power, and checking the light
    - remove sonar sensor and servo wires from the bread board, retest by turning on the power, and checking the light
    - If still failing, contact tgray.projects@gmail.com.
- The servos should start turning. If they do not turn:
    - turn off battery pack and check batteries
    - verify and correct circuit, retest by turning on the power, and checking the servos
    - remove sonar sensor wires from the bread board, retest by turning on the power, and checking the servo motion
    - Test with just one servo connected, then the other.
    - Note whether or not servos have initial movement when power is turned on, contact tgray.projects@gmail.com.
- Place your hand or another object 30 cm above the sonar sensor. Slowly lower it towards the sensor. At about 10cm above the sensor, one of the servos should change direction.
    - If not, verify sonar sensor circuit and connections.
   - Contact tgray.projects@gmail.com.

Mechanical:

1. Attach the front wheels to the front axle using the long screws that come with the servo.


2. Snap the sonar sensor into the mount, with the wires facing upwards.
3. Hot glue the sonar mount to the chassis, facing the front.
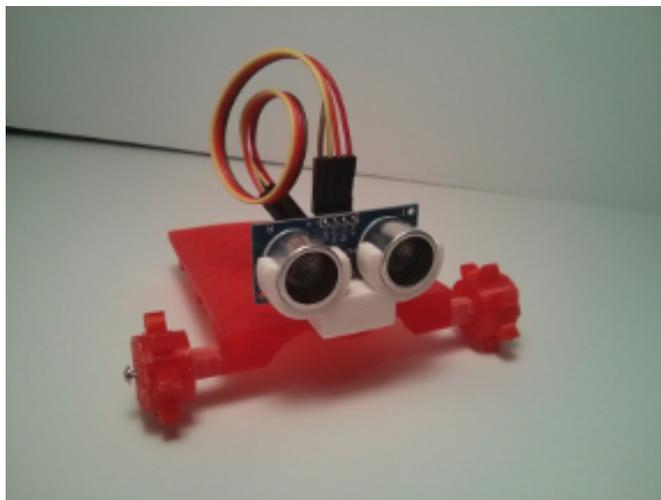
4. Assemble the rear wheels:
    1. Glue the long, thin servo horn into the thin part of the rear wheel, trim off any that sticks out (trimmed horn not shown in images).
    2. Glue the plastic wire into the holes so it is facing the open side of the wheel.
    3. Glue the top of the wheel in place, using the plastic wire to line it up.
   4. Trim off any excess plastic wire that sticks out.
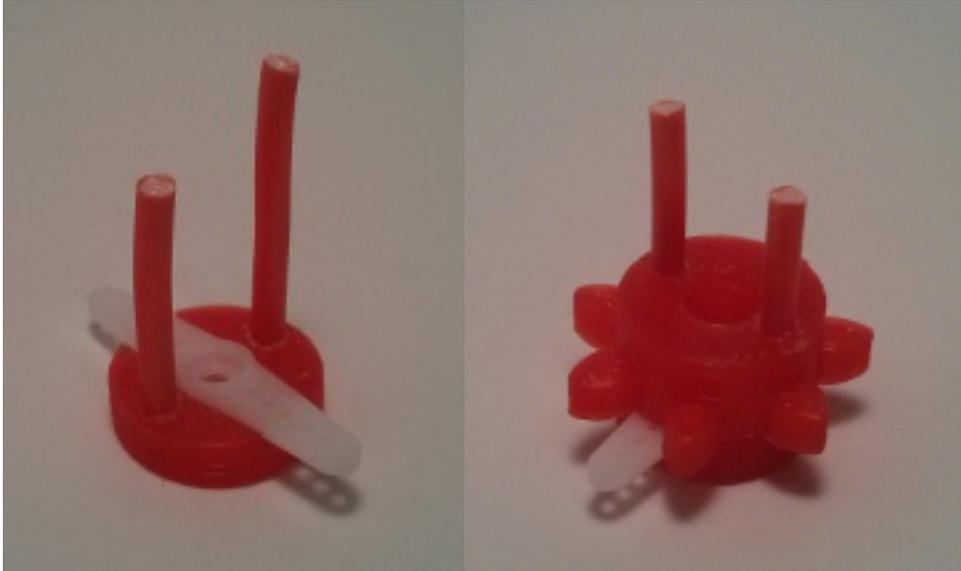
5. Mount the servos in place at the rear of the chassis with hot glue.
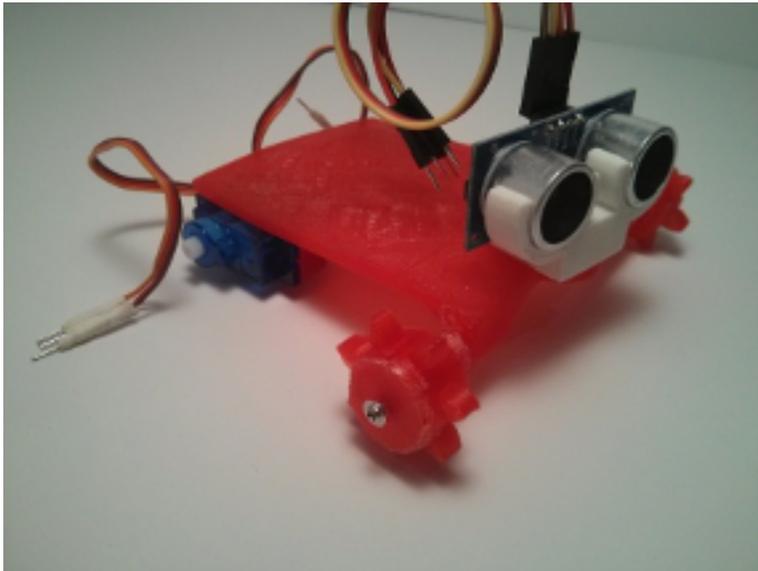
6. Attach the rear wheels to the servo using the small servo screw.

7. Glue the battery pack to the chassis - ensure that the switch and power cables are accessible.
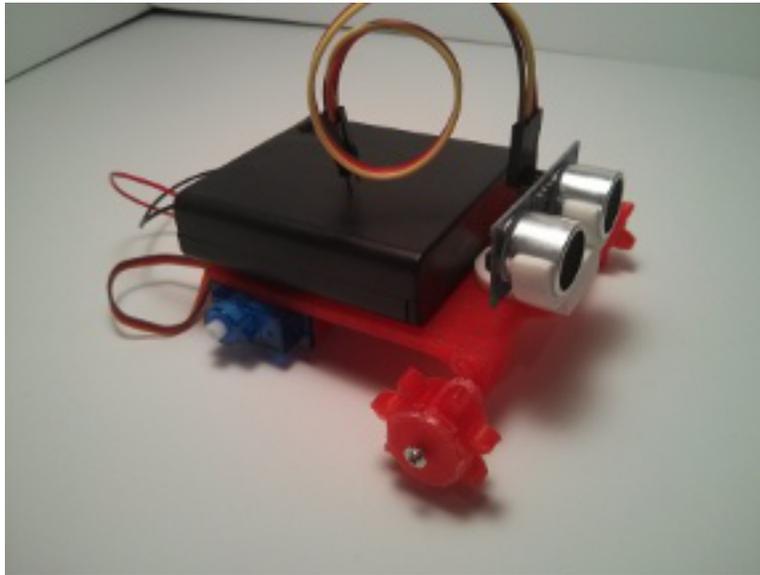
8. Remove the backing from the bread board and stick it to the battery pack, ensuring the power button is accessible.
9. Connect the treads to the wheels by placing them around the front wheels, then stretching them to fit around the rear wheels.
10. Attach mustache to sonar sensor.

Reprogramming:

1. Download the arduino IDE from http://goo.gl/n0nufe
2. Connect the arduino board to your computer via USB cable (not included).
3. Choose Arduino Nano w/ Atmega 328 as the board type under Tools.
4. Choose the appropriate USB port under Tools.
5. Download the sketch from http://goo.gl/tvsn63 and open it.
6. Upload the sketch to the arduino board.
7. Use the supplied arduino libraries and examples to explore and expand your robot's capabilities.