**Sensing Your Surroundings Building Instructions**

**Materials**

LEGO NXT brick

7 port-sensor/motor wires

3 black medium axles

3 black small axles

2 gray mini axles

2 7 x 1 x 3 angle

8 yellow thin washers

2 gray washers

20 black connectors

2 black long connectors

2 5 x 3 L-shape

1 1 x 3 long

1 1 x 5 long

1 1 x 9 long

9 blue connectors

2 black axle connectors

4 gray axle-LEGO connectors

1 2 x 2 gray connector

2 large gears

1 small gear

2 medium wheels

2 motors

2 touch sensors

1 light sensor

1 sound sensor

1 ultrasonic sensor

**Step 1**



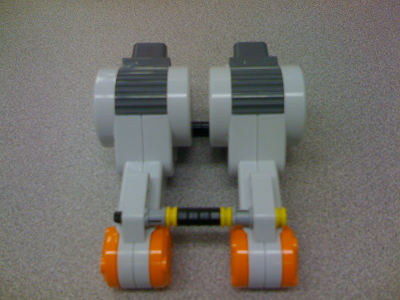
Acquire all of the pieces shown above.

**Step 2**



Obtain: 2 gray mini axles, 2 yellow thin washers, 1 black axle connector. Connect as shown above; then connect to the back of the motor, as shown in Step 3.

**Step 3**



Obtain: 2 motors, 3 small black axles, 3 yellow thin washers, 1 black axle connector, 2 gray washers. Connect as shown above.

**Step 4**



Obtain: 4 black connectors, 1 1x9 long. Connect as shown above.

**Step 5**

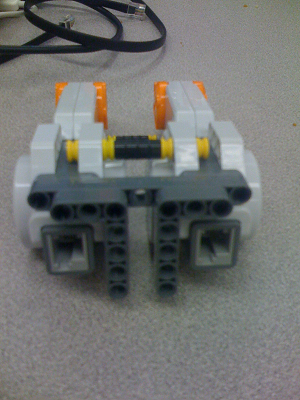
Connect piece from Step 4 to back of motors, as shown above.

**Step 6**



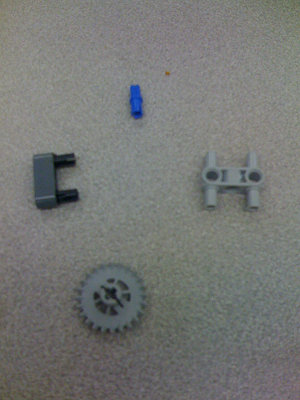
Obtain: 4 black connectors. Connect as shown above.

**Step 7**



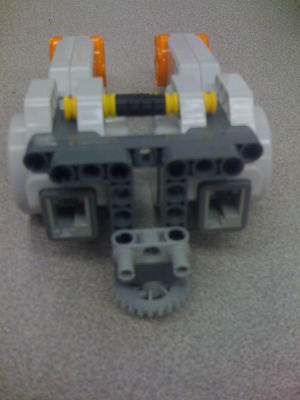
Obtain: 2 5x3 L-shapes. Connect as shown above.

**Step 8**



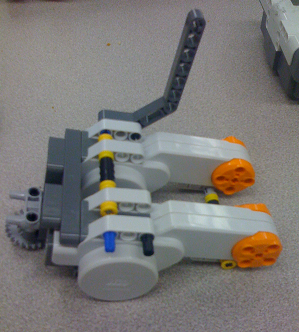
Obtain: 1 small gear, 1 1x3 long, 1 blue connector, 1 2x2 gray connector, 2 black connectors. Connect as shown above.

**Step 9**



Connect the pieces obtained from Step 8 as shown above. First, connect the 2 black connectors to the 2x2 gray connector; connect to the L shape; then, use blue connector to connect small gear.

**Step 10**



Obtain: 2 black connectors, 2 blue connectors, 2 7x1x3 angles. Connect the blue and black pieces to each side of the motors as shown above, repeat for second side.

**Step 11**



Obtain: 4 black connectors, LEGO NXT brick. Connect as shown

**Step 12**



Obtain: 2 touch sensors, 4 blue connectors, 2 black long connectors, 4 gray axle-LEGO connectors. Connect as shown.

**Step 13**



Connect: 2 gray axle-LEGO connectors to NXT brick using blue connectors; then connect touch sensor using black long connector as shown; set second touch sensor.

**Step 14**



Connect the sound sensor and light sensor in the same manner. Obtain: 1 sound sensor, 1 blue connector and 1 black connector as well as 1 light sensor, 1 blue connector and 1 black connector.

**Step 15**



Connect sound sensor with blue and black connectors to angle, as shown. Do the same for the light sensor on the other side.

**Step 16**



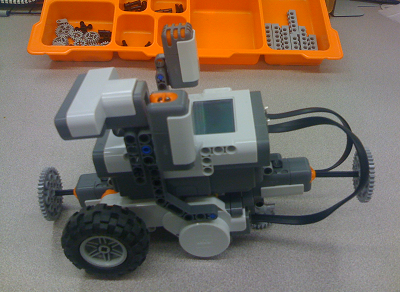
Obtain: 1 ultrasonic sensor, 1 1x5 long, 1 black long connector, 2 black connectors, and 1 black connector. Connect black long connector to light sensor. Connect ultrasonic as shown above.

**Step 17**



Obtain: touch sensor pieces from Step 13, 2 medium wheels, 1 large gear, and 3 black medium axles. Connect touch sensor as shown in Step 13; connect medium wheels with medium axle and gear with medium axle, as shown above.

**Step 18**



Obtain: 1 large gear, 1 black medium axle. Connect as shown.

**Step 19**



Obtain: port-sensor/motor wires and connect each motor/sensor to appropriate ports.