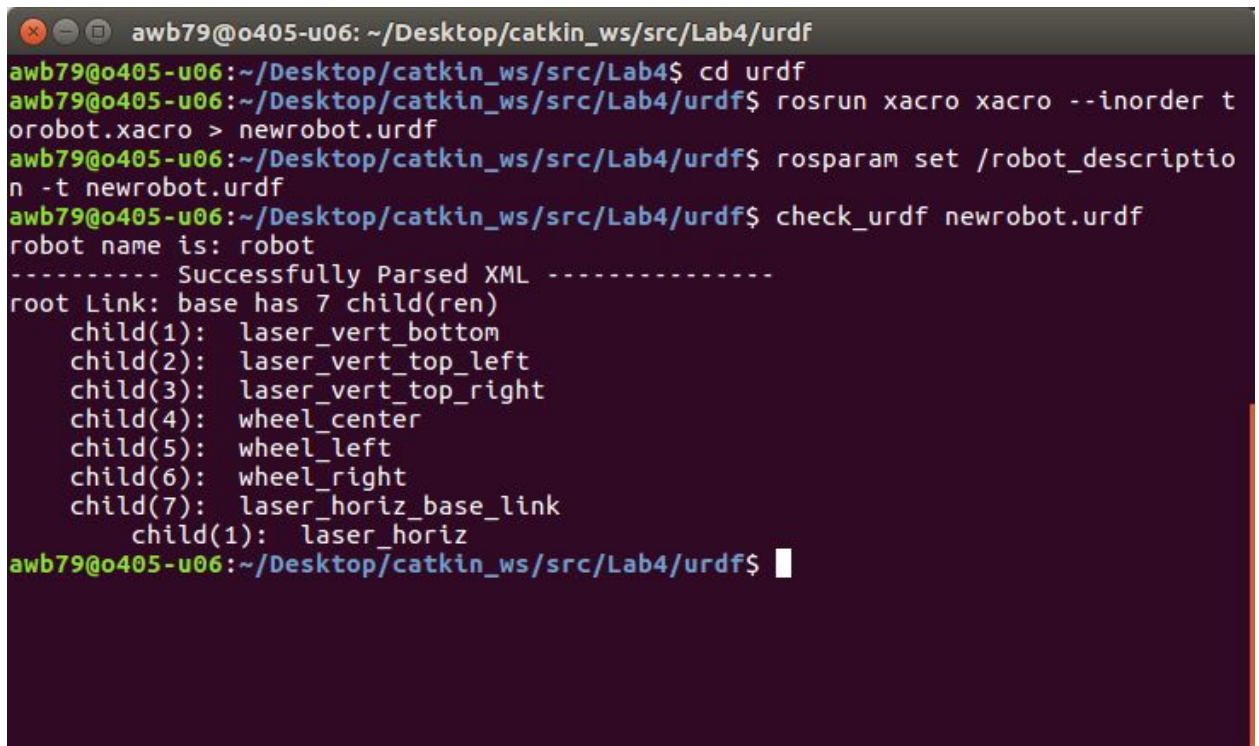


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Laboratory #4  
17 October 2019

CODE: <https://github.com/DrewBorneman/373-Lab-4>

In this lab, we stepped through the process of defining a robot using the URDF and XACRO tools, making a simple robot model based on the one that has been mapping the interior of Glennan. Aside from a base, we defined three wheels, turning them from fixed into continuous joints and running the joint state publisher so they could rotate. We also imported pre-defined sensors to more closely model the sensors of the real robot. All of this was successful, except for a minor issue with wheel rotation; the wheels rotate correctly after the `<axis>` tag has been added in, but seem to rotate about an axis that is slightly offset in the z direction from their center.

A terminal window with a dark background and light-colored text. The window title is 'awb79@o405-u06: ~/Desktop/catkin\_ws/src/Lab4/urdf'. The terminal shows a series of commands and their outputs. The commands are: 'cd urdf', 'roslaunch xacro xacro --inorder t orobot.xacro > newrobot.urdf', 'rosparam set /robot\_description -t newrobot.urdf', and 'check\_urdf newrobot.urdf'. The output of the last command shows the robot's structure: 'robot name is: robot', followed by a separator line '----- Successfully Parsed XML -----', and then a tree view of the robot's links: 'root Link: base has 7 child(ren)', with children 'laser\_vert\_bottom', 'laser\_vert\_top\_left', 'laser\_vert\_top\_right', 'wheel\_center', 'wheel\_left', 'wheel\_right', and 'laser\_horiz\_base\_link'. The 'laser\_horiz\_base\_link' has a child 'laser\_horiz'.

```
awb79@o405-u06: ~/Desktop/catkin_ws/src/Lab4/urdf
awb79@o405-u06:~/Desktop/catkin_ws/src/Lab4$ cd urdf
awb79@o405-u06:~/Desktop/catkin_ws/src/Lab4/urdf$ roslaunch xacro xacro --inorder t
orobot.xacro > newrobot.urdf
awb79@o405-u06:~/Desktop/catkin_ws/src/Lab4/urdf$ rosparam set /robot_description
-t newrobot.urdf
awb79@o405-u06:~/Desktop/catkin_ws/src/Lab4/urdf$ check_urdf newrobot.urdf
robot name is: robot
----- Successfully Parsed XML -----
root Link: base has 7 child(ren)
  child(1): laser_vert_bottom
  child(2): laser_vert_top_left
  child(3): laser_vert_top_right
  child(4): wheel_center
  child(5): wheel_left
  child(6): wheel_right
  child(7): laser_horiz_base_link
            child(1): laser_horiz
awb79@o405-u06:~/Desktop/catkin_ws/src/Lab4/urdf$
```

Figure 1: successful parsing of the XACRO file

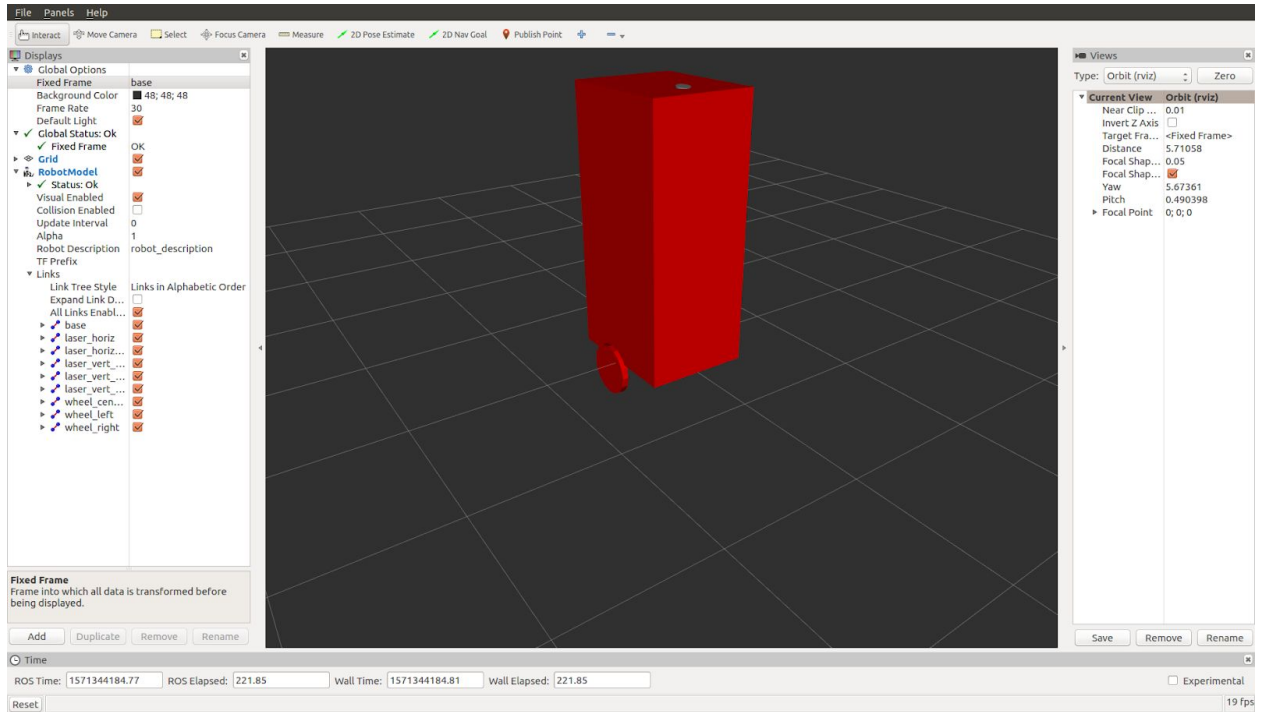


Figure 2: successful rendering of robot in RViz

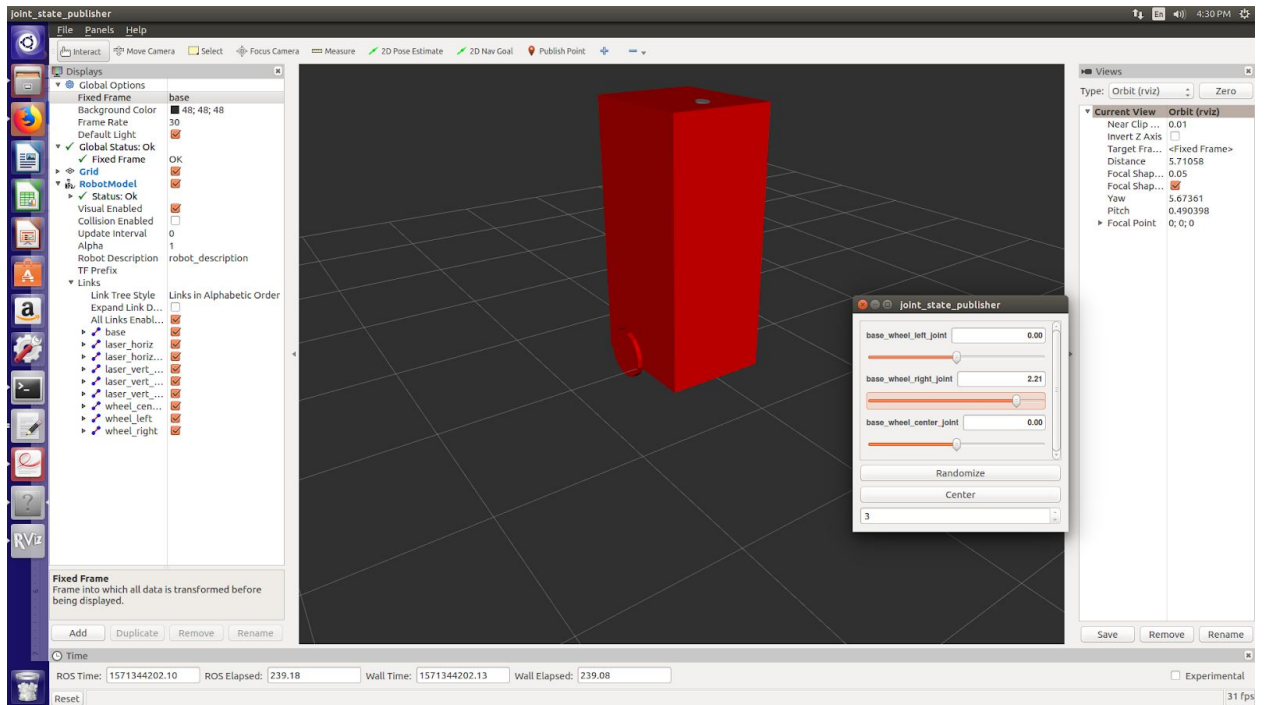


Figure 3: offset rotation when rotated in joint state publisher GUI