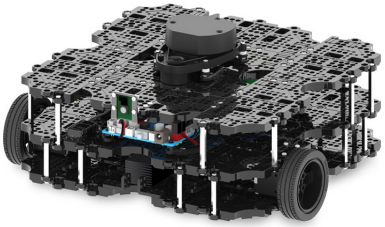
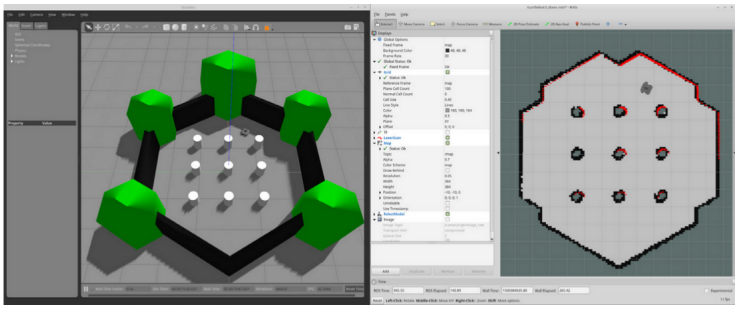
ROS - Navigation and The Turtlebot3 Simulator

ME 4140 - Introduction to Robotics - Fall 2019

What do we mean by navigation? This means different things in different places. Here, we specifically mean the naviagation stack in ROS melodic. This tutorial comes from here.





1. First creating a map by driving the robot in the virtual environmentwith and collecting lidar data.
   Install the navigation and gmapping nodes if you have not already.

```
sudo apt install ros-melodic-navigation ros-melodic-gmapping
```

Start the turtlebot3 simulator.

```
export TURTLEBOT3_MODEL=waffle_pi
roslaunch turtlebot3_gazebo turtlebot3_world.launch
```

Next, start SLAM using the gmapping node.

```
export TURTLEBOT3_MODEL=waffle_pi
roslaunch turtlebot3_slam turtlebot3_slam.launch slam_methods:=gmapping
```

Drive the robot around with the keyboard to collect data/

```
export TURTLEBOT3_MODEL=waffle_pi
roslaunch turtlebot3_teleop turtlebot3_teleop_key.launch
```

When you are finished save the map.

```
rosrun map_server map_saver -f ~/map
```

2. Now that you have made a map of the space your robot can naigative autonomously using the navigation stack, a collection of packages.

   Start the turtlebot3 simulator.

```
export TURTLEBOT3_MODEL=waffle_pi
roslaunch turtlebot3_gazebo turtlebot3_world.launch
```

   Then turn on the navigation nodes and RVIZ.

```
roslaunch turtlebot3_navigation turtlebot3_navigation.launch map_file:=$HOME/map.yaml
```

   You should see the gazebo window open containing your robot. as well as rviz. Find and test the following features of navigation in RVIZ.

   1) Pose Estimate

   2) 2D Nav Goal