AA274A Section 5
Writeup

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Problem 1: What topics does the navigator subscribe to? What is the purpose of each of these topics? What topics does it publish to, and why?

Subscribes:

/map - occupancy grid

/map_metadata - Includes characteristics of the occupancy grid, time loaded, height of cells, origin of the map

/cmd_nav - Commanded position to navigate to

Publish:

/cmd_vel - control commands for the robot

/plannedpath, /smoothedpath

Problem 2: Describe what each mode of the state machine does, and intuitively when the node switches between modes.

Mode.Idle - “else” state, vel and omega are zero; robot is not moving

Mode.Align - robot is not translating but only rotating until desired orientation is achieved (heading controller)

Mode.Track - robot is tracking a planned trajectory (trajectory tracker)

Mode.Park - robot is trying to achieve a specific pose when the robot is near a goal state (pose stabilization)

Problem 3: What is the command to create a new package? (Hint: Take a look at Section 2's handout for a starting point). What do each of the arguments do? What modifications do you need to make for the section5 package?

<u>Command to create a new package as described in the task</u>

catkin_create_pkg section5 rospy visualization_msgs

<u>Description of arguments</u>

catkin_create_pkg: general command to create new package with catkin

section5: name of the package

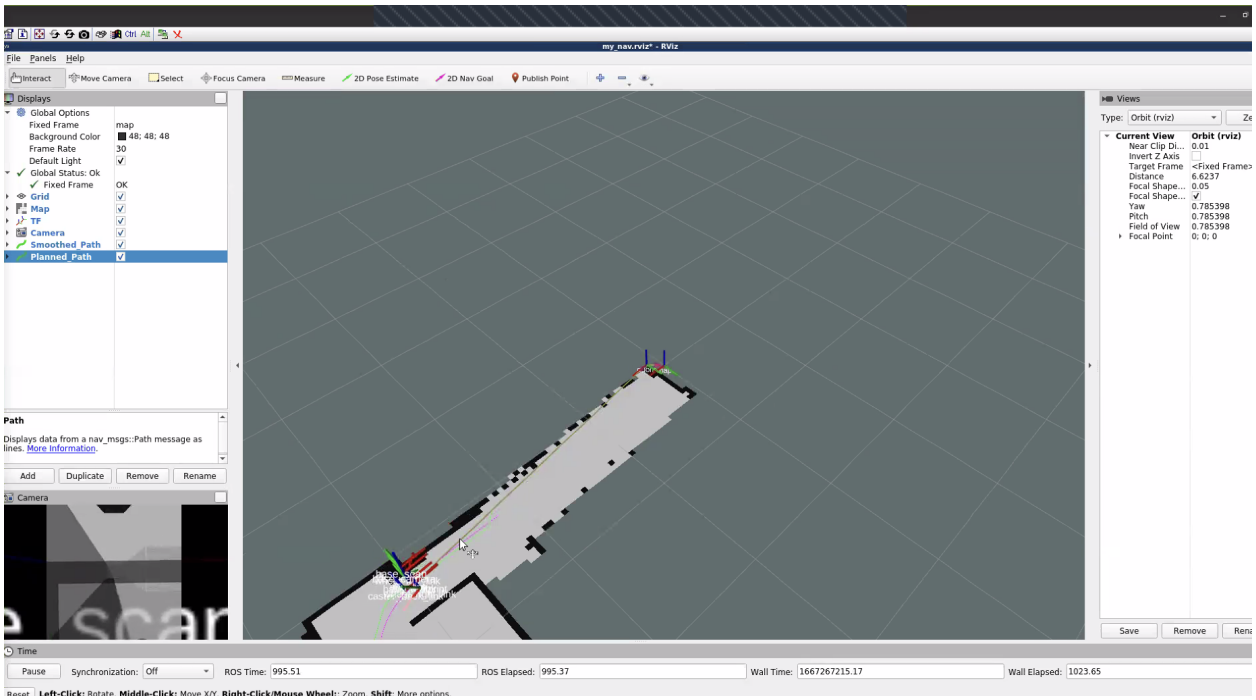
rospy visualization_msgs: library dependencies that this package will require to run for a marker_pub.py

rospy: Generic package for all rospy inputs

visualization_msgs: Messages for displays in rviz

Further, we commented in generate_messages in CMakeLists.txt

Problem 4: Test this out. Include a screenshot of rviz as your robot navigates the map.



Problem 5: Describe at a high level how your goal visualizer works. Some questions to get you started are:

• What topics should it subscribe to in order to stay up to date with the current navigation target?

cmd_nav: this topic outputs the next goal

• What message type should it publish, and to what topic?

marker_topic: this topic includes the position of the marker (sphere) at the goal position

Include this code in your submission.

rostopic type cmd_nav

```
#!/usr/bin/env python
import rospy
from visualization_msgs.msg import Marker
from geometry_msgs.msg import Pose2D


def callback(data):
#Refer to navigator.py for the callback function if we have complex implementation.
```

```
    vis_pub = rospy.Publisher('marker_topic', Marker, queue_size=10)
    rate = rospy.Rate(1)

    #Subscriber to pull in information

    marker = Marker()

    marker.header.frame_id = "map"
    marker.header.stamp = rospy.Time()

    # IMPORTANT: If you're creating multiple markers,
    #            each need to have a separate marker ID.
    marker.id = 0

    marker.type = 2 # sphere

    marker.pose.position.x = data.x
    marker.pose.position.y = data.y
    marker.pose.position.z = 0

    marker.pose.orientation.x = 0.0
    marker.pose.orientation.y = 0.0
    marker.pose.orientation.z = 0.0
    marker.pose.orientation.w = 1.0

    marker.scale.x = 0.1
    marker.scale.y = 0.1
    marker.scale.z = 0.1

    marker.color.a = 1.0 # Don't forget to set the alpha!
    marker.color.r = 0.0
    marker.color.g = 1.0
    marker.color.b = 0.0

    vis_pub.publish(marker)
    print('Published marker!')

def subscriber():
    rospy.init_node('my_subscriber', anonymous=True)

    rospy.Subscriber("cmd_nav", Pose2D, callback)

    rospy.spin()
```

```
if __name__ == '__main__':
    try:
        subscriber()
    except rospy.ROSInterruptException:
        pass
```

Problem 6: Describe the components included in your launch file. Did you use any of the Asl_turtlebot launch files as an example? If so, what changes did you make? Include the contents of this launch file in your submission

Asl_turtlebot_core.launch
Added lines to call the .py files
Added line for rviz

Packages call out the catkin_make, type is file to call, name is the name of the node

```
#my_nav.launch
<launch>
  <node pkg="asl_turtlebot" type="navigator.py" name="navigator" />
  <node pkg="section5" type="marker_pub.py" name="Marker_pub" />
  <node type="rviz" name="rviz" pkg="rviz" args="-d $(find section5)/rviz/my_nav.rviz" />
</launch>
```