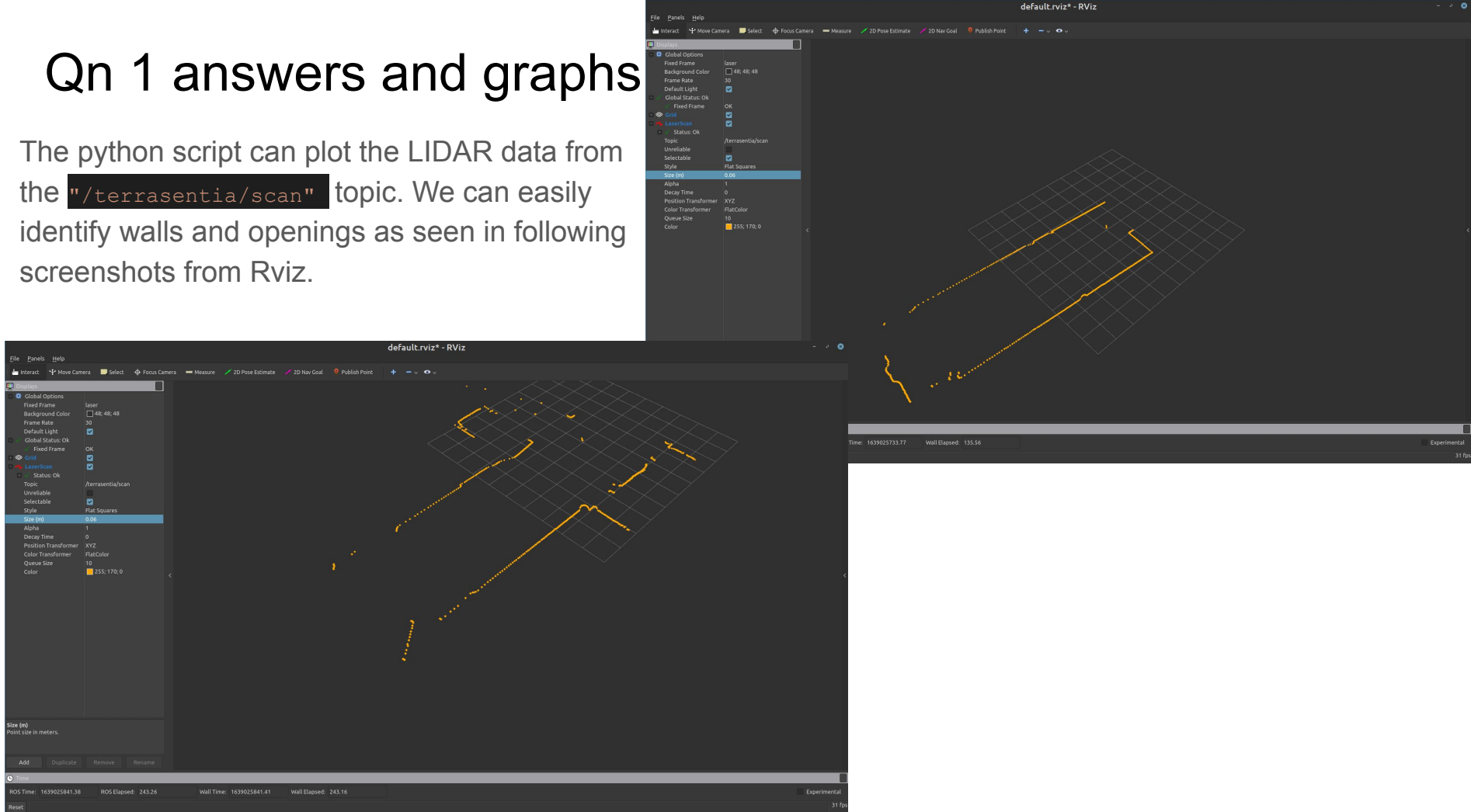# CS 498 Coding assignment 3

Kulbir

Qn 1 answers and graphs

The python script can plot the LIDAR data from the `"/terrasentia/scan"` topic. We can easily identify walls and openings as seen in following screenshots from Rviz.

Qn 1 answers and graphs (cont)

The python script can plot the LIDAR data from the `"/terrasentia/scan"` topic. We can easily identify walls and openings as seen in following screenshots from Rviz.
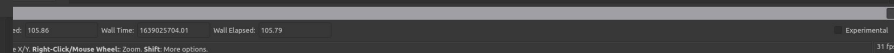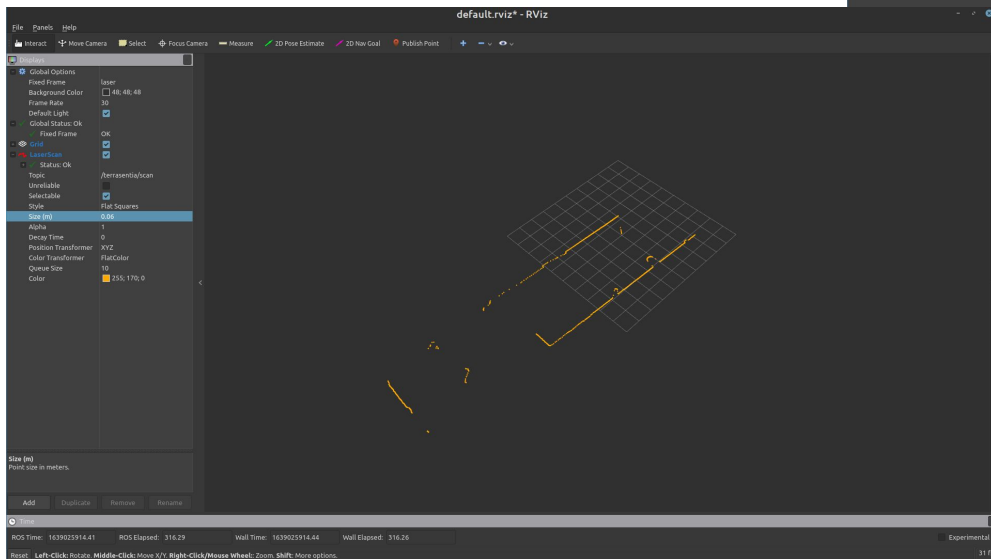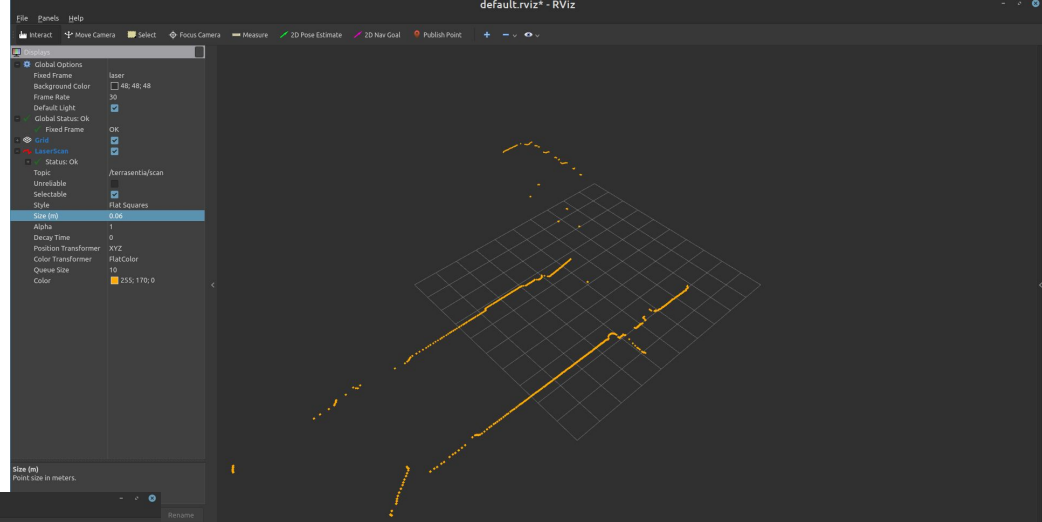
Qn 2 answers and graphs

Output of code when fitting lines and corners on the LiDAR data

- We set the pose of marker() to 0,0,0 and orientation to (0,0,0,1) to match the laser scan point cloud and show that the algorithm successfully fits lines and corners on the point cloud.

- The short lines of the algorithm ensure that accurate map is built. The lines are seen in cyan colour.
- Points from the lidar are seen as yellow points which have been increased in size for visual ease.
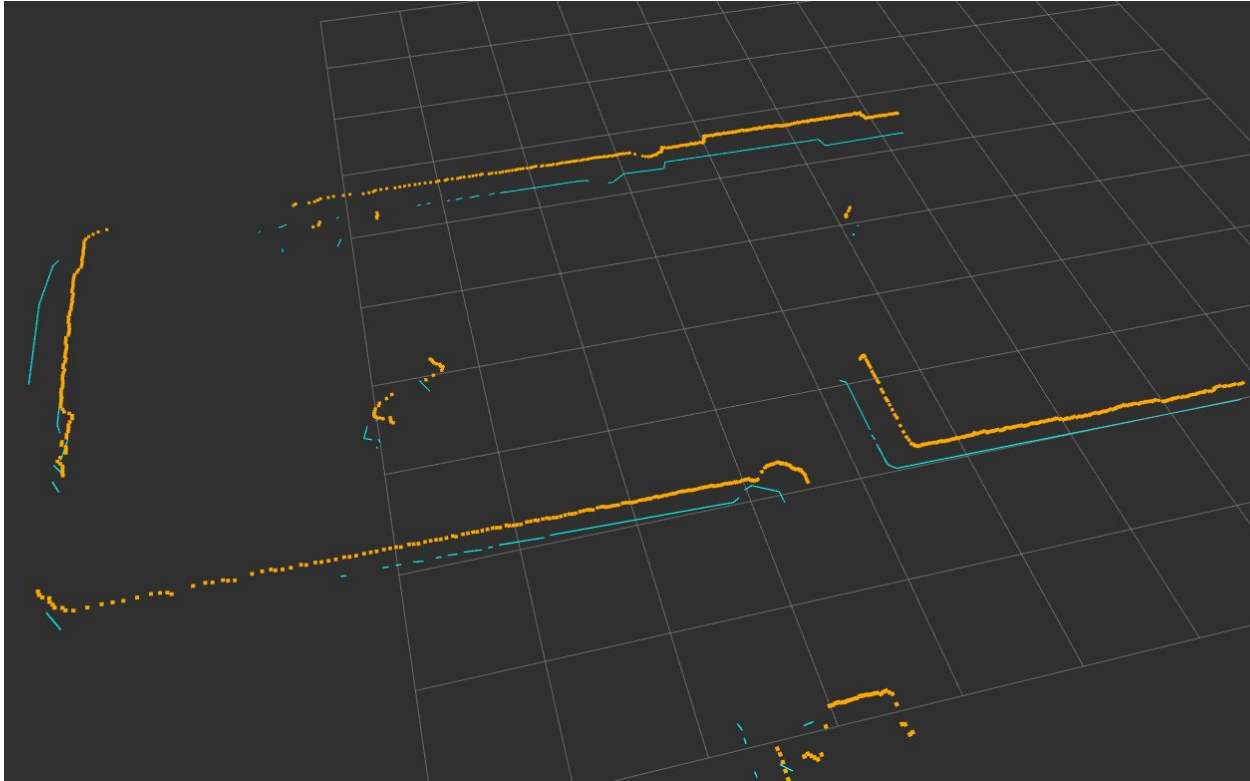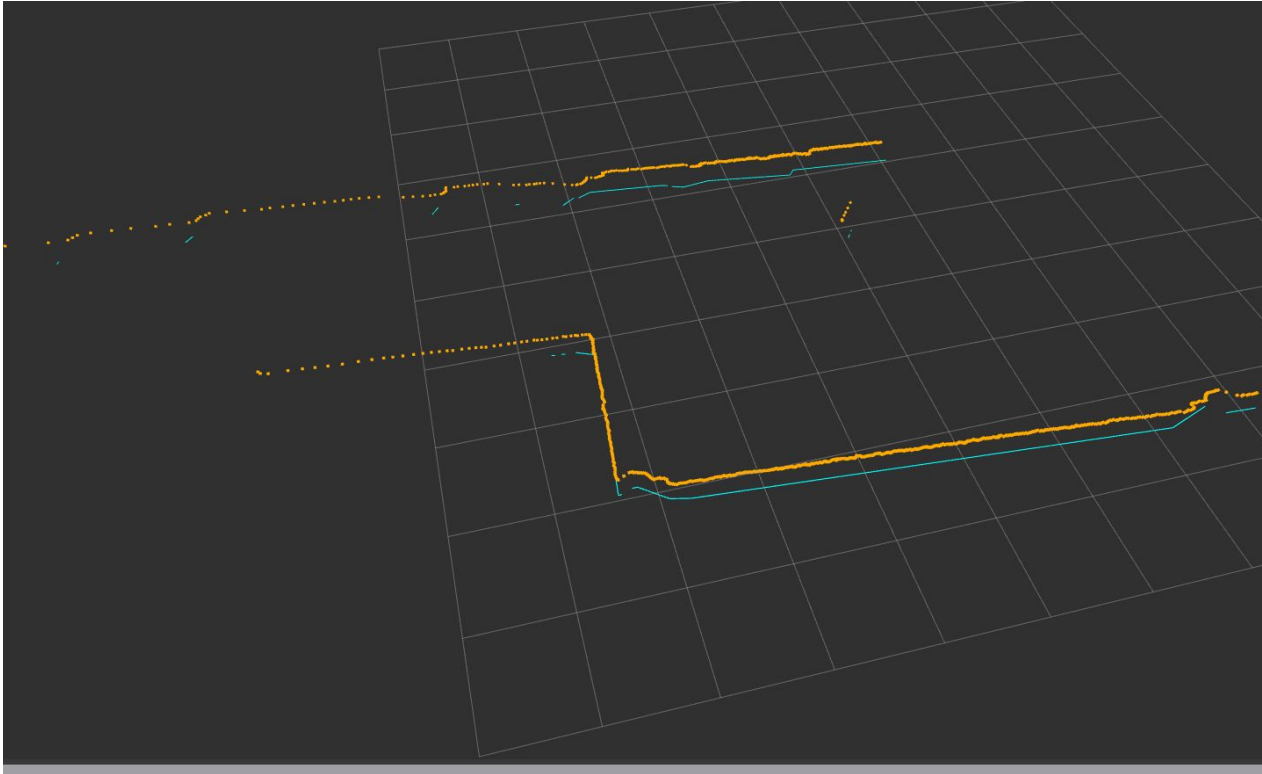
Qn 2 answers and graphs

Output of code when fitting lines and corners on the LiDAR data

- We set the pose of marker() to 0,0,0 and orientation to (0,0,0,1) to match the laser scan point cloud and show that the algorithm successfully fits lines and corners on the point cloud.

Qn 2 answers and graphs

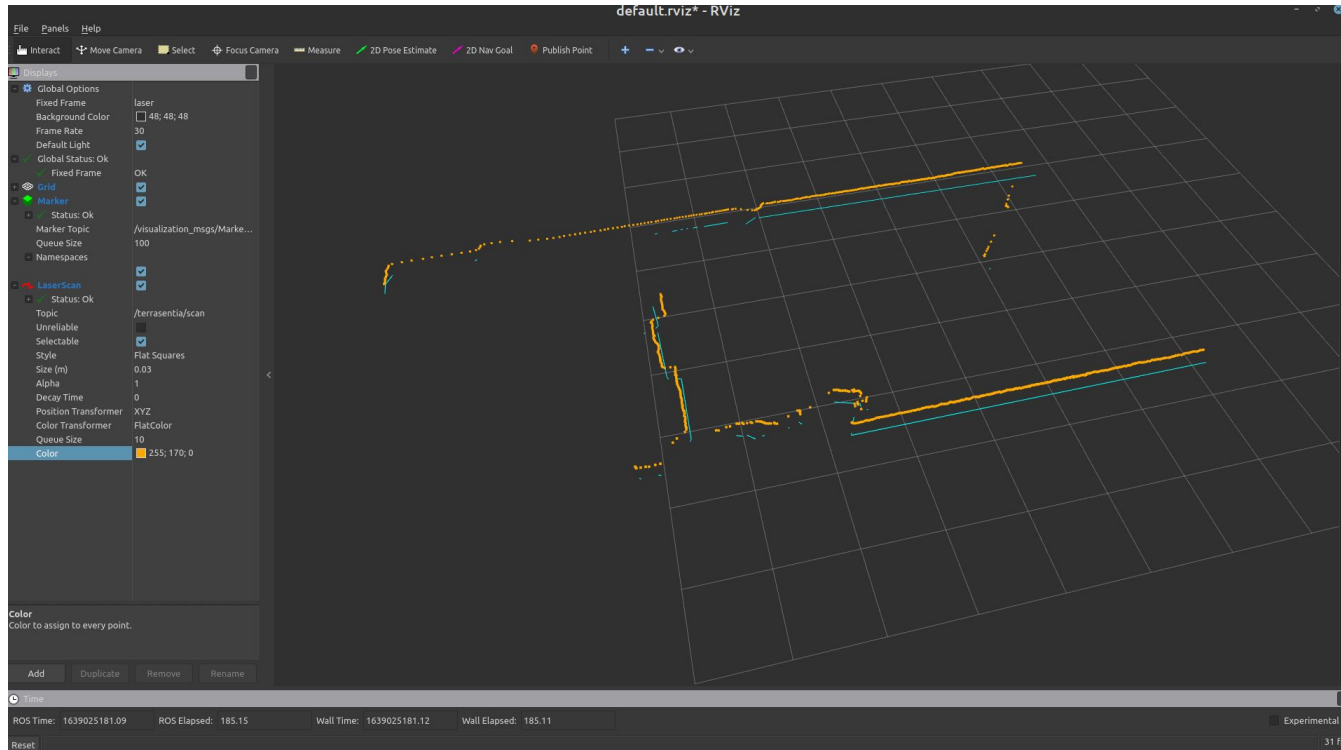Output of code when fitting lines and corners on the LiDAR data

- We set the pose of marker() to 0,0,0 and orientation to (0,0,0,1) to match the laser scan point cloud and show that the algorithm successfully fits lines and corners on the point cloud.
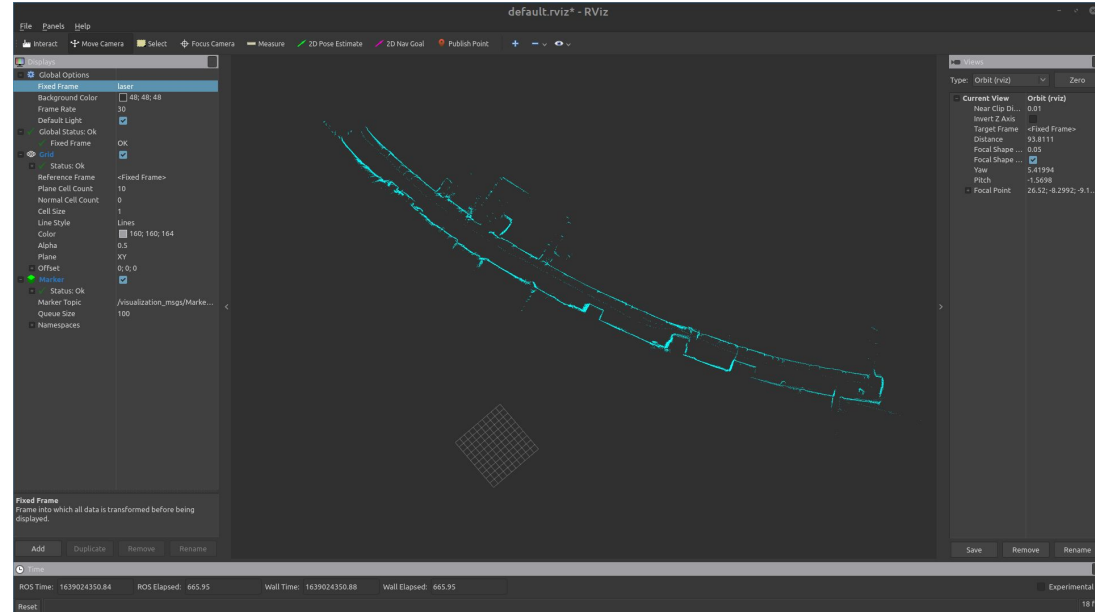
Qn 3 answers and graphs

Commands used:

1. python split_and_merge_class_version.py

1. Geometric Map of ABE dept from rosbag using our custom mapping python script using custom line fitting algorithm.
2. We set the pose of marker to match the x,y,quaternion from /terrasentia/ekf topic.
3. We use `marker.LINE_LIST` and pass only the start and end points of lines to it. Then we publishes the lines in Rviz using `pub_rviz.publish(self.marker_2_new)`.
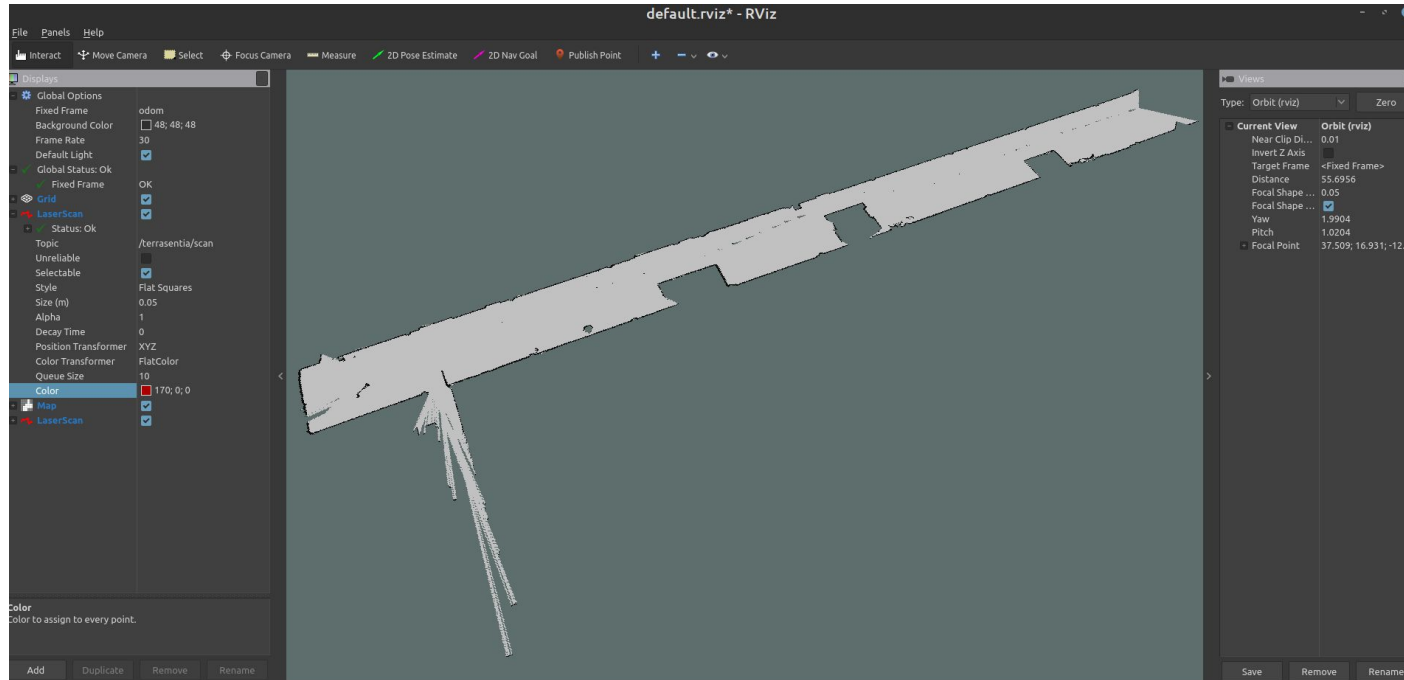
Qn 4 answers and graphs

Map of ABE dept from rosbag using "gmapping". It uses Rao-blackwellized particle filter for building the map. This map is our reference map.

Commands used:

1. sudo apt install ros-melodic-gmapping
2. rosrun gmapping slam_gmapping scan:=/terrasentia/scan

Qn 4 answers and graphs

Commands used:

1. roscore
2. rosbag play -l 2020-11-13-14-39-36.bag
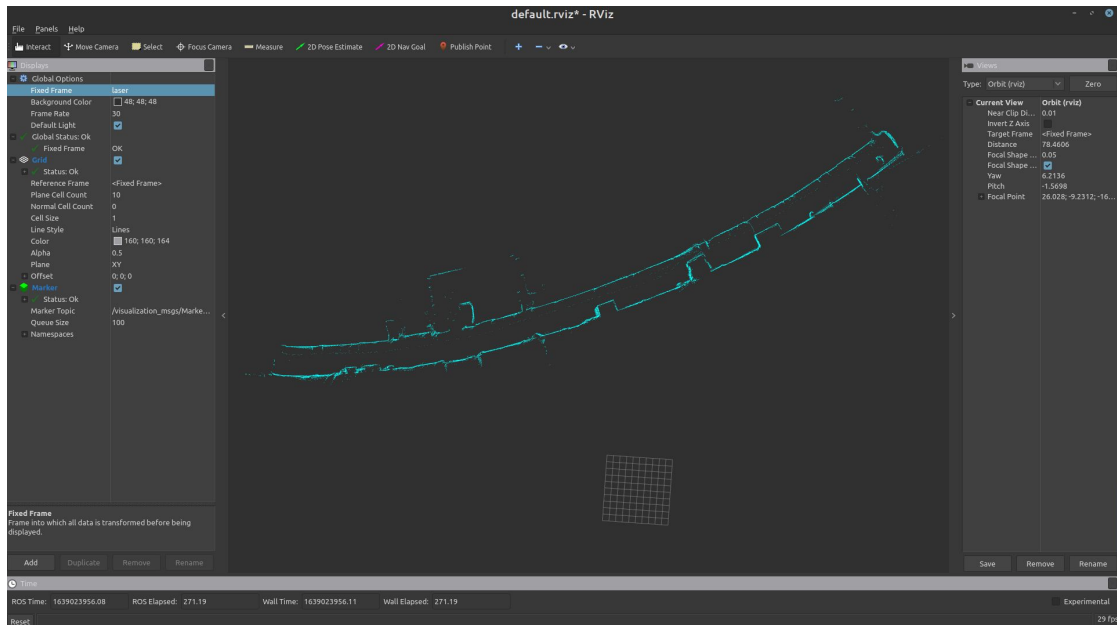3. python split_and_merge_class_version.py
4. Rviz (then add marker)

Geometric Map of ABE dept from rosbag using our custom mapping python script using custom line fitting algorithm.

We see that the map matches the map made by gmapping in previous slide.

The corridor seems to have increased in length and turning (bent) because of errors in predictions of x,y,quaternion from the Extended Kalman Filter.

THANK YOU!!