Lab06

SLAM: Simultaneous Localization and Mapping with Slam Toolbox

Objectives

- Being familiar with Slam Toolbox
- Produce a map of a Gazebo world
- Navigate in a map obtained with Slam Toolbox

Exercise

In this exercise you will become familiar with Slam Toolbox, a toolbox you will need if you navigate in an environment without a map.

Task 1

In this task, you have to create a map of the turtlebot world.

Open a terminal and launch the Turtlebot world in Gazebo with the command:

```
$ ros2 launch turtlebot3_bringup gazebo.launch.py
```

Open another terminal and launch the teleop node for the Turtlebot:

```
$ ros2 run turtlebot3_teleop teleop_keyboard
```

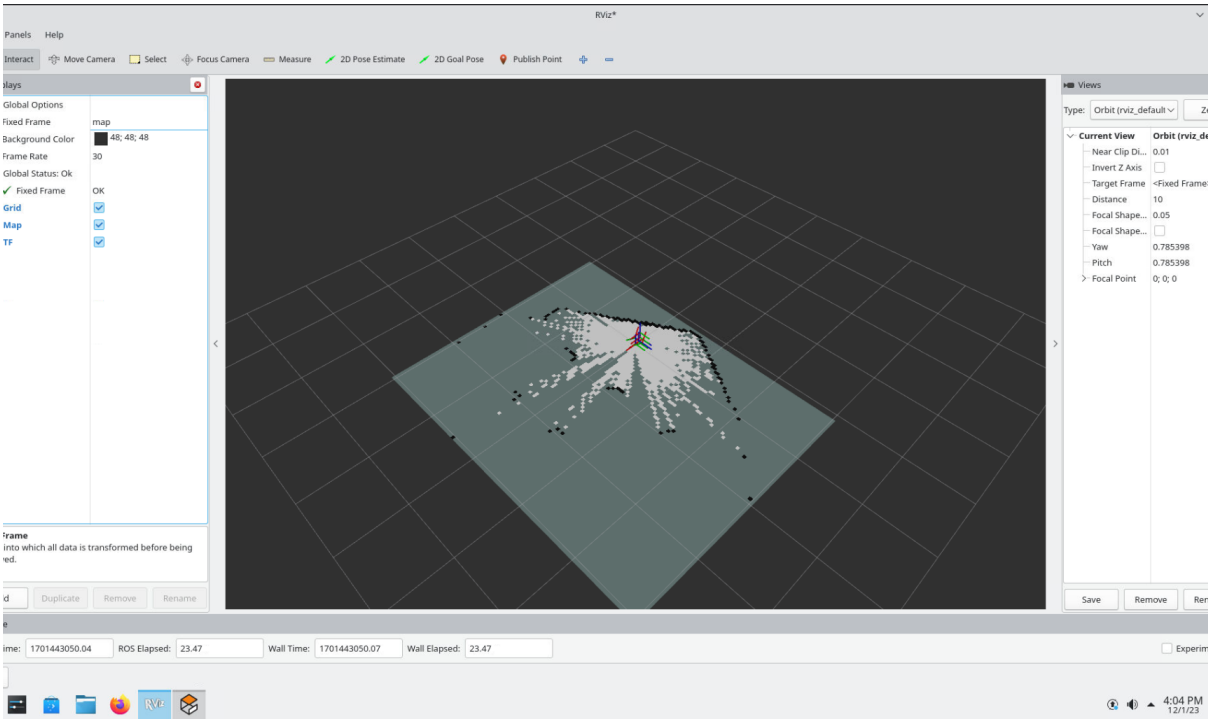
Open another terminal and launch RViz:

```
$ ros2 launch nav2_bringup rviz.launch.py
```

Open another terminal and launch Slam Toolbox:

```
$ ros2 launch slam_toolbox online_async_launch.py
```

In a new terminal open RViz, add to the displayed objects the TFs and the map topic. Your RViz window should look like this:



Now, if you move the robot with the teleop tool, you should be able to visualize the map completed in the RViz window. Move the robot and complete the map of the world.
When you have finished, save the map with the name `turtle_world_map` using the command. Create the folder where you want to save the map file (in this case, from the root of your workspace `lab07/maps`).

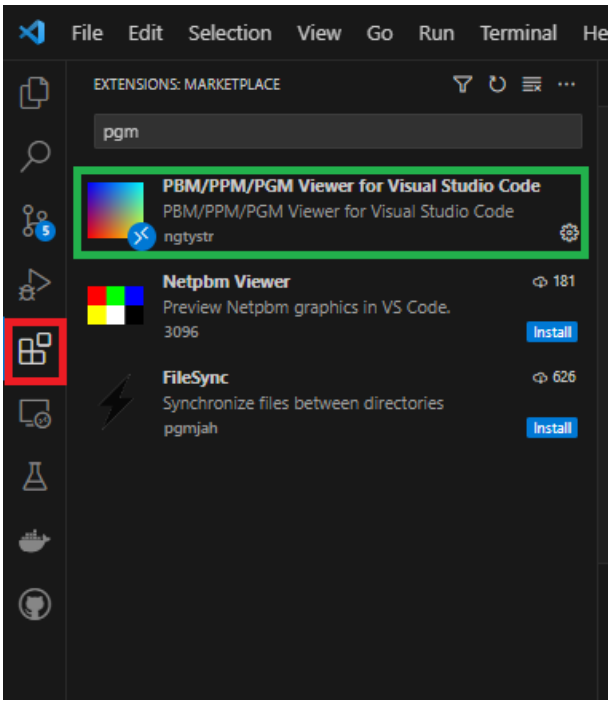
```
$ ros2 run nav2_map_server map_saver_cli -f
<path/to/map/map_name>
```

Where the map name, in this case, will be `turtle_world_map`.

You should see two new files at the base of your workspace:

- `turtle_world_map.pgm`
- `turtle_world_map.yaml`

To visualize the map as a .png file, from the extension icon, on the left VSCode activity bar (in red) install the PBM/PPM/PGM Viewer for Visual Studio Code (in green).



Then, open the `turtle_world_map.pgm` file: you should be able to visualize it. Save it as a .png file.

Task 2

In this task, you have to create a map of the world you used in the Lab03.
Open a terminal and launch the world:

```
$ ros2 launch turtlebot3_bringup lab03.launch.py
```

As you did in Task 1, launch RViz and the Slam Toolbox.
Instead of moving the robot with teleop, now you should use the controller you developed in Lab03 to move the robot.
When your map is complete, save the map.

Report requirements

In the report, clearly write and comment at least the following results:

- Task 1:
    - Include and comment the map you obtained of the Turtebot world.
- Task 2:
    - Include and comment the map you obtained of the lab03 world.