Exercise Session 2

Theory

- ROS package structure
- Integration and programming with Eclipse
- ROS C++ client library (roscpp)
- ROS subscribers and publishers
- ROS parameter server
- RViz visualization

Exercise

In this exercise, you will create your first ROS package. The package should in the end be able to subscribe to a laser scan message from the Husky robot and process the incoming data. This node will be the basis for the next exercises. Use Eclipse to edit your package (Lecture 2 Slides 10-13).

1. **OPTIONAL** (more difficult): Create the package `husky_highlevel_controller` from scratch (look at the ROS template for reference https://github.com/ethz-asl/ros_best_practices). Use the command `catkin_create_pkg` to create a new package with the dependencies `roscpp` and `sensor_msgs`.

2. **OR** (easy): Download the Zip archive containing prepared files of the package `husky_highlevel_controller` from the course website.

3. Inspect the `CMakelists.txt` and `package.xml` files. (Lecture 2 Slides 5-7)

4. Create a subscriber to the `/scan` topic. (Lecture 2 Slides 17/19)

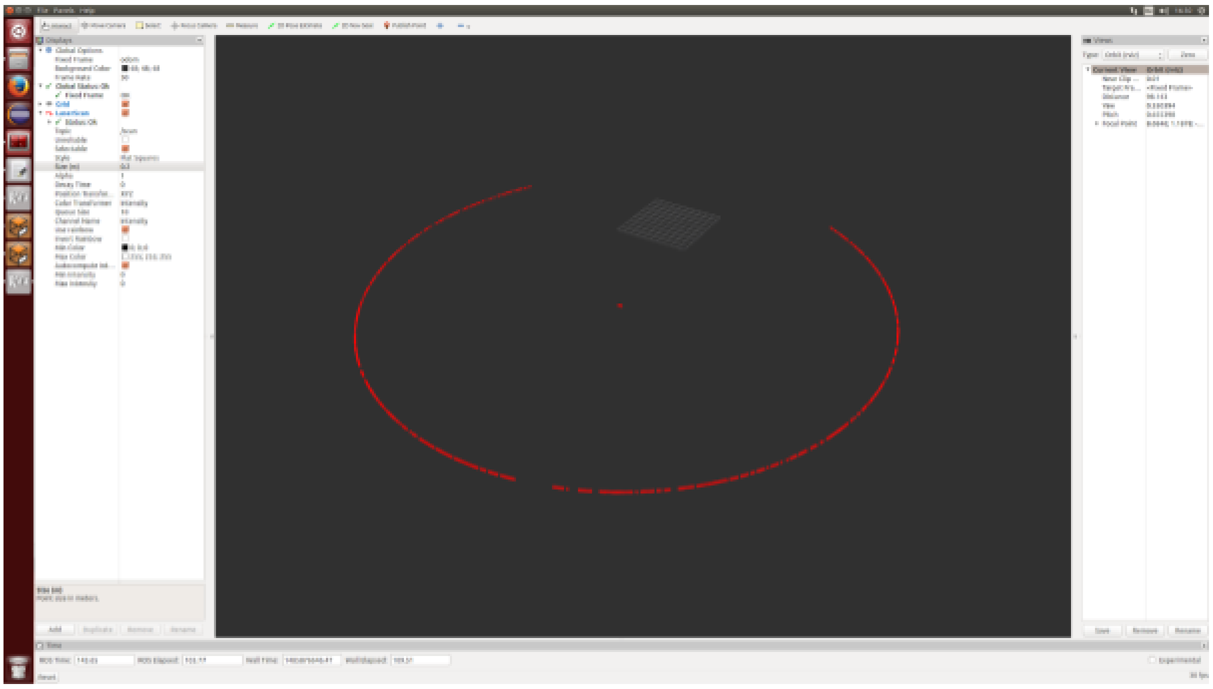
5. Add a parameter file with topic name and queue size for the subscriber of the topic `/scan`. (Lecture 2 Slides 20/21)

6. Create a callback method for that subscriber which outputs the smallest distance measurement from the laser scanner to the terminal. Inspect the message type here http://docs.ros.org/kinetic/api/sensor_msgs/html/msg/LaserScan.html.

7. Add your launch file from Exercise 1 and additionally add:
   - running the `husky_highlevel_controller` node.
   - loading the parameter file.

8. Pass the argument `laser_enabled` from your launch file to the `husky_empty_world.launch` file with value `true`.

9. Show the laser scan in RViz and add RViz to your launch file. Make sure to set *odom* as the *Fixed Frame* (under *Global Options*) and adapt the size of the laser scan points. (Lecture 2 Slides 22-24)


RViz visualization of a single laser scan. An obstacle can be seen in the middle. Note the changed "Fixed Frame" as well as "Size (m)".

Evaluation

- ❏ Start the launch file and drive around with Husky. There should be changing output from the laser scanner in the terminal. [40%]
- ❏ Check if the node is implemented as the template suggests. [30%]
- ❏ Is a parameter file used? [15%]
- ❏ Is the laser scan visualized in RViz as shown in the image? [15%]