TF command line tools

In this second assignment you will get a chance to implement the theory about the TF package that you have learned during this week.
We learned about three different TF command line tools in the videos 5.3.1 and 5.3.2, namely `tf_echo`, `view_frames` and `static_transform_publisher`.

In this assignment we will explore some of those command line tools.

Important Note:
For this assignment to work, you need to have completed assignment 1.

Week 5 - Assignment 2 - part 1 (of 2) --- 1 Point

This part of the assignment is very simple, it's intended to remind you of the usage if the `view_frames` and `tf_echo` command line tools.

For this you need to test some commands on the prompt and then put them in a launch file.

Step 1: Launch the completed factory simulation, using the launcher for assignment 1:

```
$ roslaunch hrwros_week5_assignment
week5_assignment1.launch
```

Note: *If you have not completed assignment 1 this may not work.*

Step 2: run the `view_frames` command, you should know how to complete this

```
$ rosrun <correct package> <correct node name>
```

Step 3: Open the `frames.pdf` file generated by the command.

Verify that the TF frames `new_logical_camera_1_frame` and `new_logical_camera_2_frame` are now a part of the TF tree and that the entire TF tree is connected

Step 4: run the `tf_echo` command, to get the transformation between the `new_logical_camera_2_frame and the camera_rgb_frame.`

You should know how to complete this:

```
$ rosrun <correct package> <correct node name> <correct argument> <correct argument>
```

You will first see some warnings and eventually the `tf_echo` command will start printing the TF information between the above-mentioned frames.

Now that you know and have tested the commands, let's put them on a launch file.

Step 5: Edit the `week5_assignment2_part1.launch` file, you will find it in the in the `hrwros_week5_assignment/launch` folder.

You will find the `<add-solutiontion-here>` marks corresponding to this part.

Step 6: Once it's completed test the launch file with

```
$ roslaunch hrwros_week5_assignment week5_assignment2_part1.launch
```

It should just re-do the previous steps.

You can now continue to the part 2 of the assignment.

Week 5 - Assignment 2 - part 2 (of 2) --- 2 Points

In this part you will use the `static_transform_publisher` to create a new transformation, and we will visualize it in RViz.

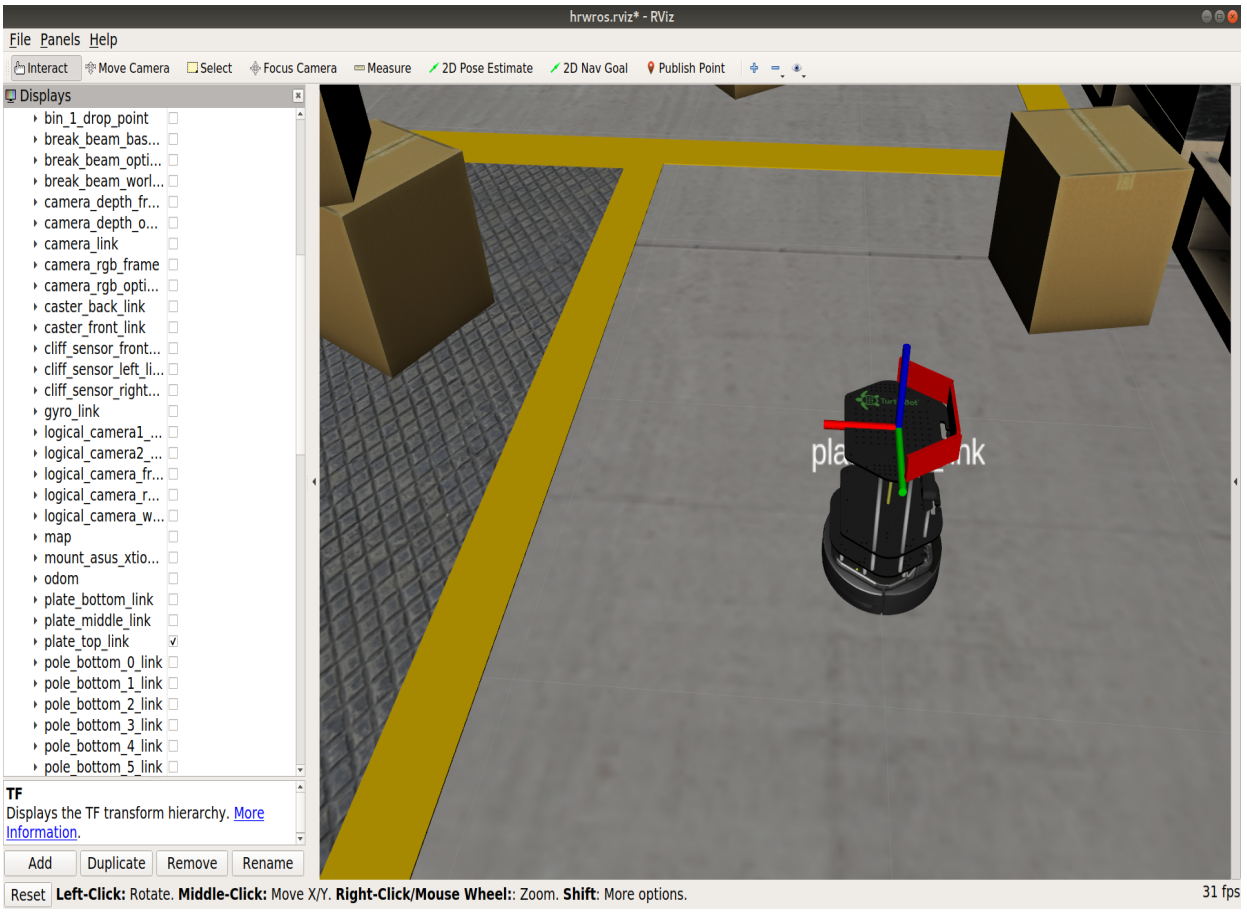
The goal is to publish a new static transform between the `plate_top_link` and a new frame called `turtlebot_object_top` which will be located 30cm on top of the TurtleBot. As with the previous, part you will test some the commands on the prompt and then put them in a launch file.

Step 1: Make sure, you terminate the factory simulation and any other CCS that may be running.

Step 2: Re-start the factory simulation without the Gazebo gui and starting RViz (we can do this with the launch arguments).

```
$ roslaunch hrwros_week5_assignment
week5_assignment1.launch gui:=false rviz:=true
```

Step 3: Make sure you enable the TF visualization such that only the `plate_top_link` frame is shown, like in the screenshot below.



Step 4: On a new CCS, publish a static transform from the `plate_top_link` to a new child frame named `turtlebot_object_top`.

The `turtlebot_object_top` frame should be **0.3 m above** the plate_top_link with the same orientation.

Now we can publish a new static transformation:

```
$ rosrun <correct package> <correct node name> <correct arguments>
```

Note: You can review in unit 5.3.2 how to use the `static_transform_publisher` command line tool

Step 5: Go back to RViz and enable the newly published frame `turtlebot_object_top`. It should show up exactly on top of the reference frame for `plate_top_link`.

Step 6: In a new CCS, start the turtlebot teleoperation with:

```
$ roslaunch turtlebot_teleop keyboard_teleop.launch
```

Move the TurtleBot around with the keyboard to a different location of your choice, you should notice that the newly published TF frame `turtlebot_object_top` moves along with the TurtleBot.

Step 7: Now that you know and have tested the commands, let's put them on a launch file.

Edit the `week5_assignment2_part2.launch` file, you will find it in the in the `hrwros_week5_assignment/launch` folder. You will find the `<add-solutiontion-here>` marks corresponding to this part.

Step 8: Once it's completed, test the launch file with

```
$ roslaunch hrwros_week5_assignment
week5_assignment2_part2.launch
```

You should be able to see same results as with the previous steps.

This completes the second assignment of week 5!

As with previous weeks, you only need to upload your files after completing all 3 assignments of this week.