ROB314 – Session 1 – Ex. 3

Theory

- ROS architecture
- ROS master, nodes, and topics
- Console commands
- Catkin workspace and build system
- Launch-files

Exercise

Get to know ROS by inspecting the simulation of a Husky robot.

1. Preparation :
   ```
   sudo apt update
   sudo apt-get install ros-melodic-position-controllers ros-melodic-effort-controllers ros-melodic-joint-state-controller
   ```

2. Test Gazebo:
   ```
   gazebo
   ```

   If you see this error message *"libcurl: (51) SSL: no alternative certificate subject name matches target host name 'api.ignitionfuel.org'"* : follow this link to repair Gazebo : https://varhowto.com/how-to-fix-libcurl-51-ssl-no-alternative-certificate-subject-name-matches-target-host-name-api-ignitionfuel-org-gazebo-ubuntu-ros-melodic/

   To stop the program : Ctrl + C

3. Setup the Husky simulation:
   http://wiki.ros.org/husky_gazebo/Tutorials/Simulating%20Husky
   Remember, our ROS distro version (`<distro>`) is melodic.

4. Launch a simulation, for example :
   ```
   roslaunch husky_gazebo husky_playpen.launch
   ```

   And inspect the created nodes and their topics using
   ```
   rosnode list
   rostopic list
   rostopic echo [TOPIC]
   rostopic hz [TOPIC]
   rqt_graph
   ```

   For more information take a look at the slides or:
   http://wiki.ros.org/rostopic
   http://wiki.ros.org/rosnode

5. Command a desired velocity to the robot from the terminal (`rostopic pub`

`[TOPIC])`
Hint 1: You can use this topic /husky_velocity_controller/cmd_vel
Hint 2: If the robot stops again after sending the velocity command, specify the rate of the publisher. Check out `rostopic pub --help`.

6. Use **teleop_twist_keyboard** to control your robot using the keyboard. Find it online (github) and compile it from source!
   Use `git clone` to clone the repository to the folder ~/code.
   Then link (symbolic link) this folder inside the folder *catkin_ws/src*
   Compile with the dedicate ros tool...

   For a short git overview see:
   http://rogerdudler.github.io/git-guide/files/git_cheat_sheet.pdf

7. Write a launch file with the following content:
   - husky simulation with a different world:
     Include `husky_empty_world.launch` file and change the world_name argument, e.g. `worlds/robocup14_spl_field.world` a world from the directory `/usr/share/gazebo-9/worlds`.
     Note: the world_name is with respect to /usr/share/gazebo-7/
   - `teleop_twist_keyboard` node

You can put this launch file in the new directory :
~/catkin_ws/src/teleop_twist_keyboard/launch