Robot Practical Course
## Assignment #2
Due: 14.05.2021, 13.00

This assignment is supposed to deepen your knowledge and understanding of DH Parameters and URDF descriptions.

Missing package: Before starting with the following task, you may need to install an additional package: `sudo apt install ros-melodic-joint-state-publisher-gui`

The physical properties of the `Universal Robot UR5` are given in the following picture. The red markers indicate the axis of rotation. If any dimensions are missing, you can measure them in the image. Assume the proportions are correct.
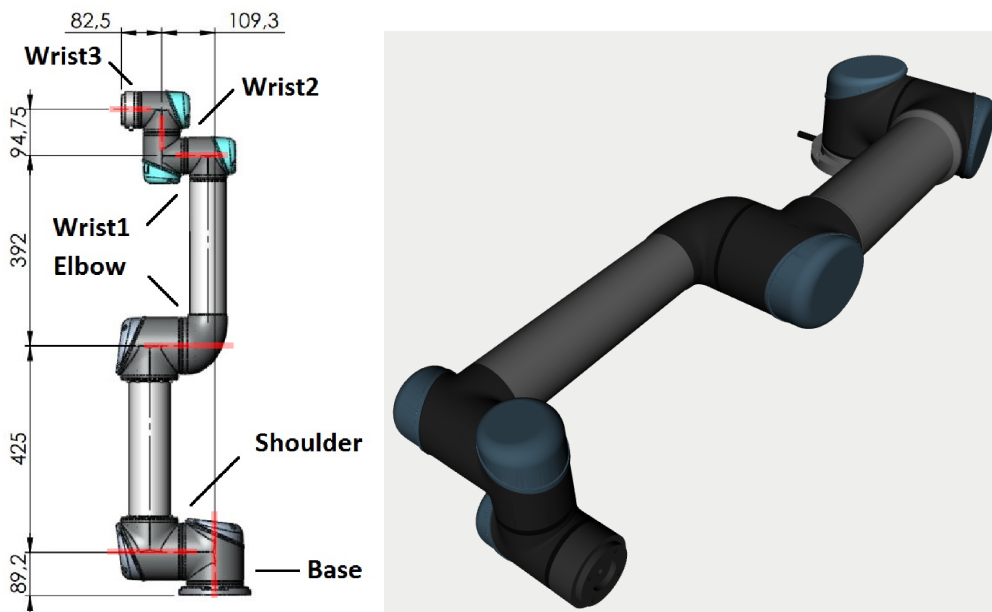
Task 2.1 URDF description: Create a URDF file using geometric primitives which represents the properties of the UR5. Use the pose in the right picture above as the zero positions for your joints. Visualize the arm in the visualization tool (rviz) to verify your URDF description and show your result to a supervisor. Keep in mind, that the conversions for URDF may differ from the DH Parameters.

Check the following link for available Syntax in URDF: `https://wiki.ros.org/urdf/XML`

Visualization-Workflow:

- `roslaunch itr_rpc task_2.launch` launches the visualization tool. You can keep this window open as long as you do not get any errors. At first, the `RobotModel` will be marked red and you will not see a robot model.

- `roslaunch itr_rpc upload_robot_model.launch` loads the urdf model of a simple cylinder. You need to manually refresh the visualization by unchecking and checking the `RobotModel` checkbox.

- Create your own URDF file. You may place this file anywhere you would like.

- Repeat the following steps everytime you have altered your robot model

  - CTRL+C the previous `roslaunch itr_rpc upload_robot_model.launch`

- `roslaunch itr_rpc upload_robot_model.launch robot:=full/path/to/robot.urdf` uploads the new description file. The path to the description file must be fully specified relative to the folder you are currently in
- Refresh the `RobotModel` in Rviz
- To test the movement of your robot, use the `joint_state_publisher_gui`. If it's not starting automatically run `rosrun joint_state_publisher_gui joint_state_publisher_gui`.

Task 2.2 DH Parameters: Calculate the DH Parameters of the UR5 and present the table to a supervisor.

Joint	a	α	d	θ
1				
2				
3				
4				
5				
6				