

Robot Operating System

Lab 1: Packages, launch files, parameters and topic remapping

1 Goals

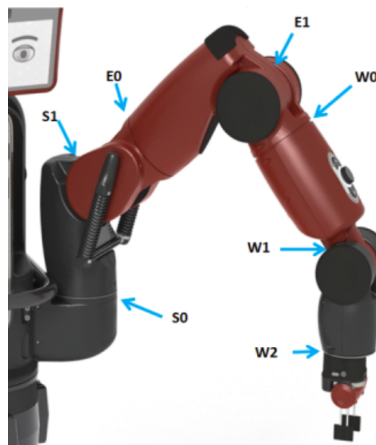
In this lab we will create a launcher that launches three nodes:

- one (`capture_key_node`) for capturing keystrokes from the keyboard and publish it in ROS.
- the other two (`move_joint_node`) that subscribe to the same type of topic published by the `capture_key_node`, moving each one a predefined articulation of the robot defined by parameter. The keys used to increment and decrement the position as well as the increment value are defined by parameters in each node `move_joint_node`.

2 Deliverables

- A text file with the answers to the questions of this sheet
- The launch files of the first task

Files should be zipped and sent by mail (G. Garcia) or through the lab upload form (O. Kermorgant).



group	1	2	3	4	5	6	7
joints (left_ & right_)	s0	s1	e0	e1	w0	w1	w2

Figure 1: Baxter joints

3 Specification of the robot and available packages

The Baxter robot has 2×7 joints as shown in Fig. 1, the names of which are listed in the table. The goal is to have each group control 2 of the joints through the same topic.

3.1 Available packages

Two packages are included in this lab:

- `capture_key` contains a single node (`capture_key_node`) that:
 - Captures the keystrokes
 - Publishes their ASCII code on the `/key_typed` topic
 - Does not subscribe to any topic
- `move_joint` contains a single node (`move_joint_node`) that:
 - Moves the joint of a robot in position mode, incrementing or decrementing it according to the key which has been typed.
 - Subscribes to:
 - * `/key_hit` as topic for the incoming key strokes
 - * `/robot/joint_states` for the current state variables of the robot
 - Publishes a joint command for the controlled joint, to the topic `/joint_command`
 - Has the following parameters:
 - * `joint_name` to tell the joint to be controlled. This parameter is mandatory and does not have a default value.
 - * `incr_key` for the increment key (default +, ASCII code 43)
 - * `decr_key` for the decrement key (default -, ASCII code 45)

4 Using launch files

Tutorials on how to use launch files can be found on internet. These files allow running several nodes in a single command.

Create a launch file to control two of the joints of the Baxter robot (1 `capture_key_node` + 2 `move_joint_node`), according to the table and your group number. The contributions of all groups will allow controlling most of the joints.

4.1 First launch file attempt

For this launch; the `<node ... /node>` sections should be minimal: no node renaming, no remapping.

- What happens when this is launched from only one computer?
- What happens when this is launched from several computers?

- Coordinate with other groups to have nodes with different names.
- Coordinate with other groups to have nodes in different namespaces (use the `group` tag).

4.2 Second launch file attempt

What is the behavior of the current launch file? Explain how to solve the issue (at this point poor Baxter has not moved yet).

4.3 Third launch file attempt

Now modify the launch file so that topics are remapped and Baxter actually moves accordingly to each group's typed keys.