

# AI & Robotics

Robot simulations with Webots and ROS

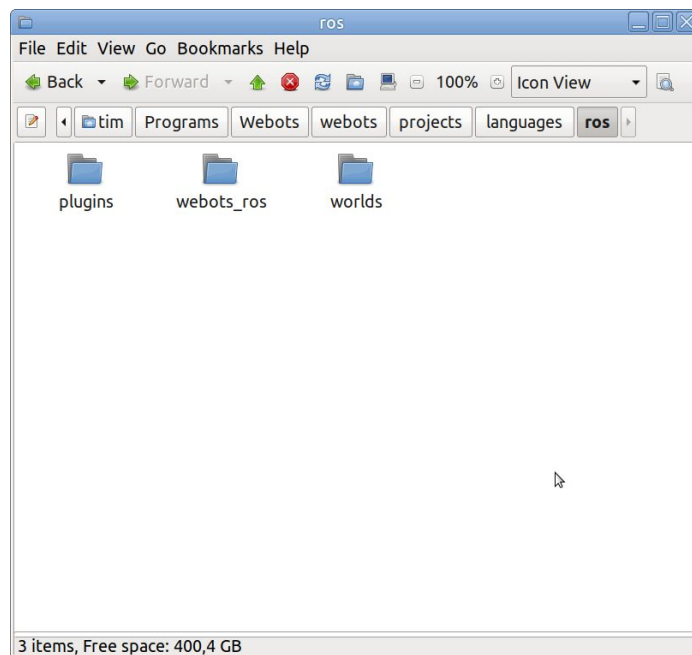
# Goals



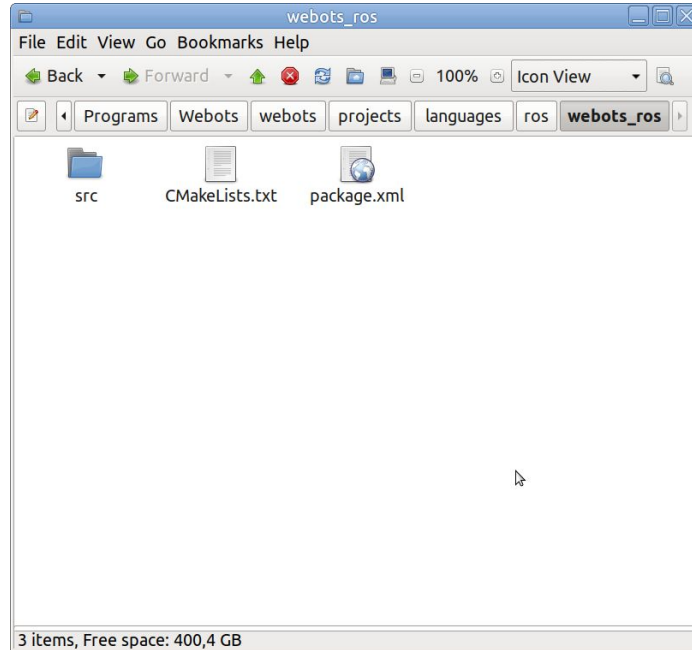
## The **junior-colleague**

- can connect ROS to Webots

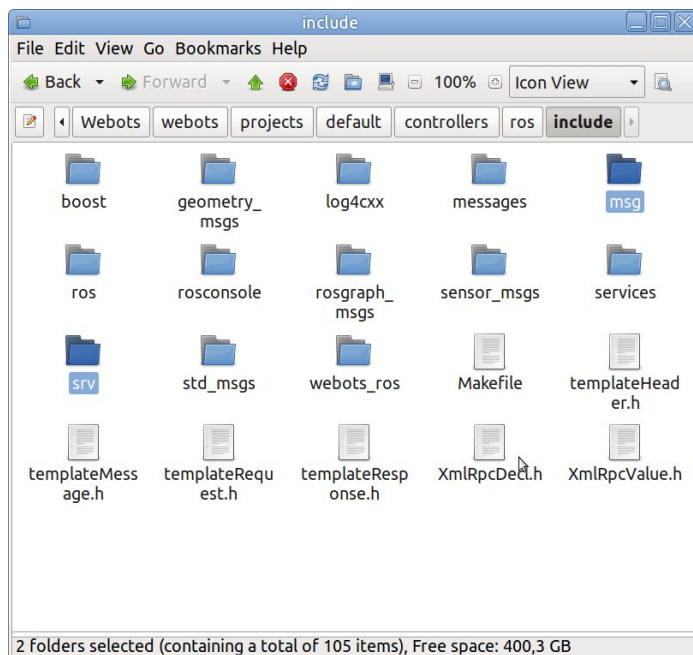
# The webots\_ros package



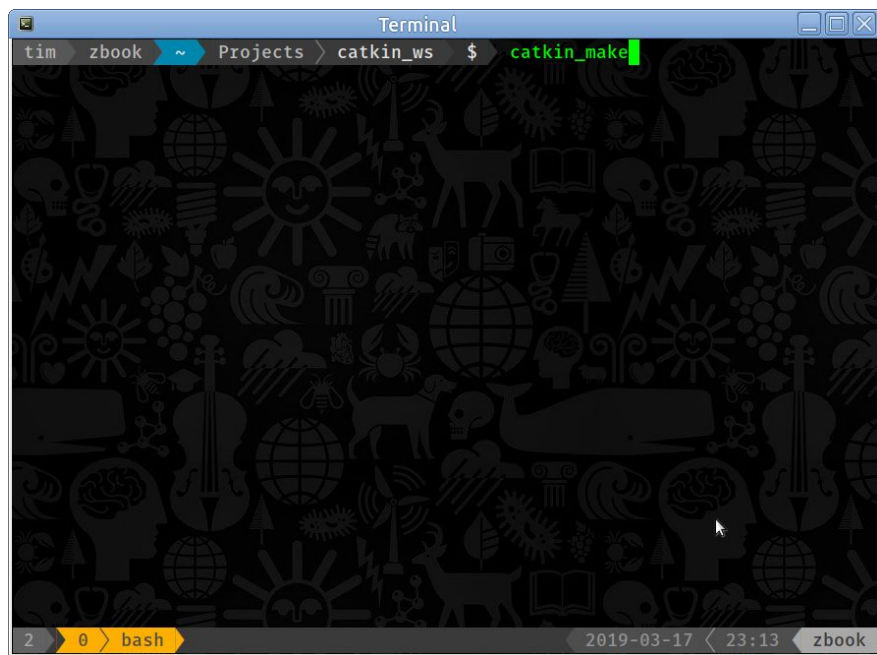
# The webots\_ros package



# The ROS messages and service files



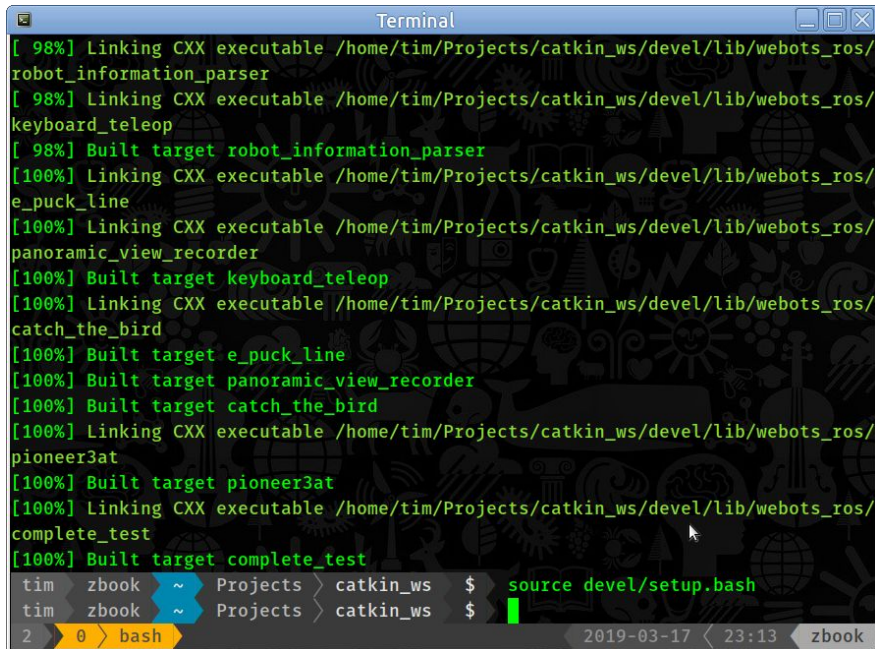
# Building



# Building

```
test.cpp.o
[ 98%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/
robot_information_parser
[ 98%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/
keyboard_teleop
[ 98%] Built target robot_information_parser
[100%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/
e_puck_line
[100%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/
panoramic_view_recorder
[100%] Built target keyboard_teleop
[100%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/
catch_the_bird
[100%] Built target e_puck_line
[100%] Built target panoramic_view_recorder
[100%] Built target catch_the_bird
[100%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/
pioneer3at
[100%] Built target pioneer3at
[100%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/
complete_test
[100%] Built target complete_test
tim zbook ~ Projects > catkin_ws $
2 > 0 > bash 2019-03-17 23:13 zbook
```

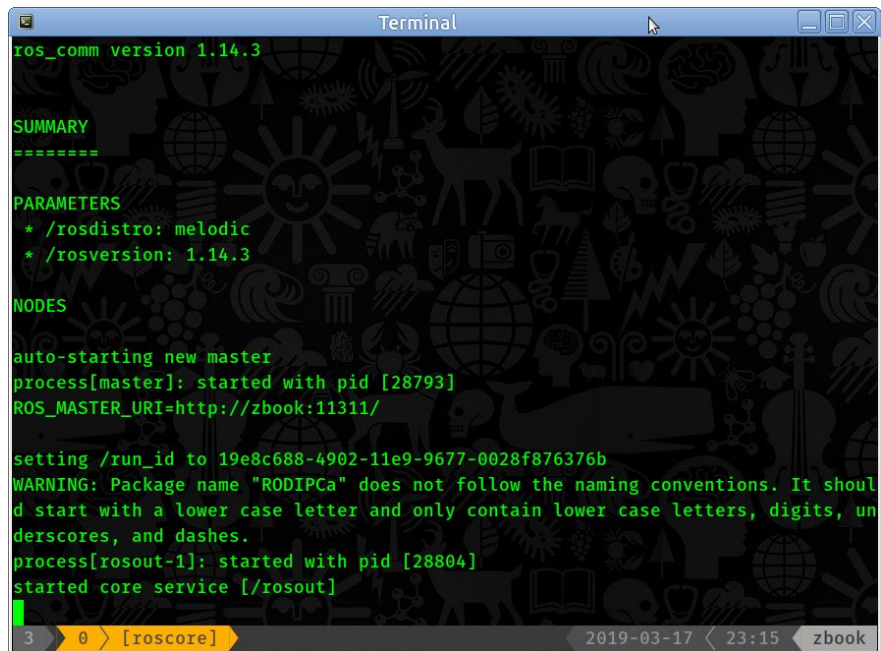
# Building

A terminal window titled "Terminal" with a dark background and light green text. It shows the progress of building ROS packages. The output includes linking and building targets for robot\_information\_parser, keyboard\_teleop, e\_puck\_line, panoramic\_view\_recorder, catch\_the\_bird, and pioneer3at. The final step is building the complete\_test target. The terminal also shows the user's prompt and the command to source the setup file.

```
Terminal
[ 98%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/robot_information_parser
[ 98%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/keyboard_teleop
[ 98%] Built target robot_information_parser
[100%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/e_puck_line
[100%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/panoramic_view_recorder
[100%] Built target keyboard_teleop
[100%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/catch_the_bird
[100%] Built target e_puck_line
[100%] Built target panoramic_view_recorder
[100%] Built target catch_the_bird
[100%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/pioneer3at
[100%] Built target pioneer3at
[100%] Linking CXX executable /home/tim/Projects/catkin_ws/devel/lib/webots_ros/complete_test
[100%] Built target complete_test
tim zbook ~ Projects > catkin_ws $ source devel/setup.bash
tim zbook ~ Projects > catkin_ws $
2 > 0 > bash 2019-03-17 23:13 zbook
```



# Starting roscore

A terminal window titled "Terminal" with a dark background and a pattern of small icons. The text is displayed in green. The output shows the version of ros\_comm, a summary section, parameters for rosdistro and rosversion, and the start of the roscore master process. It includes a warning about a package name and the start of the rosout service. The bottom status bar shows the terminal is in a shell, the current directory is [roscore], and the date and time are 2019-03-17 23:15. The user is zbook.

```
ros_comm version 1.14.3

SUMMARY
=====

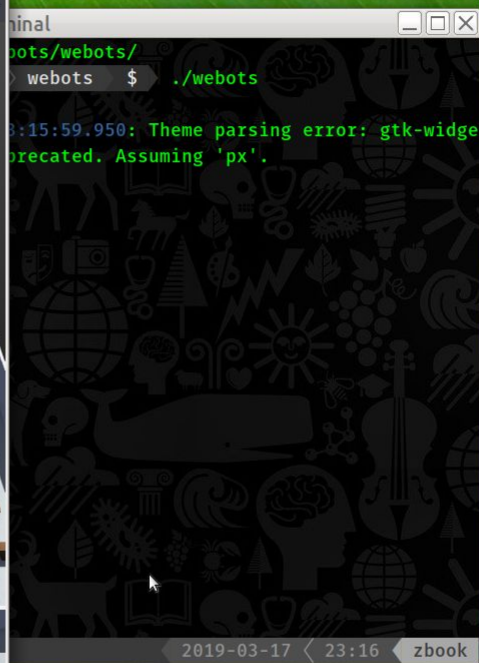
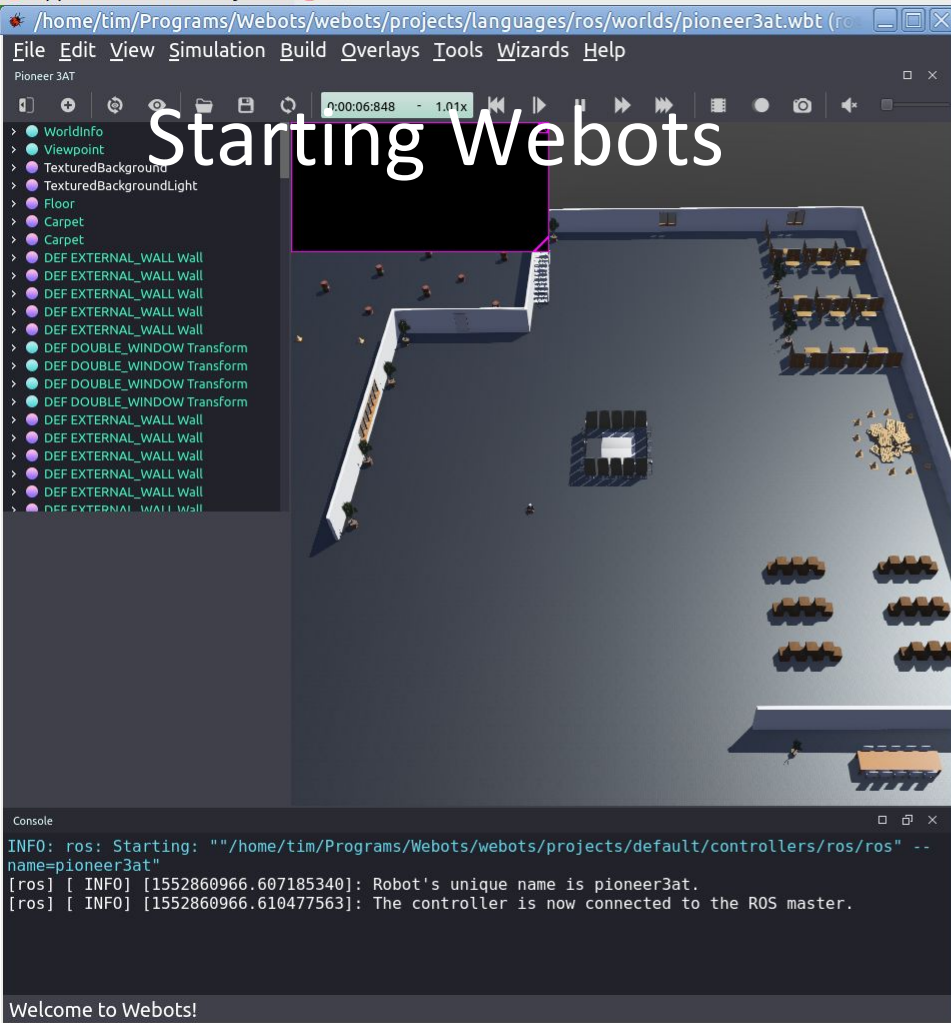
PARAMETERS
* /rosdistro: melodic
* /rosversion: 1.14.3

NODES

auto-starting new master
process[master]: started with pid [28793]
ROS_MASTER_URI=http://zbook:11311/

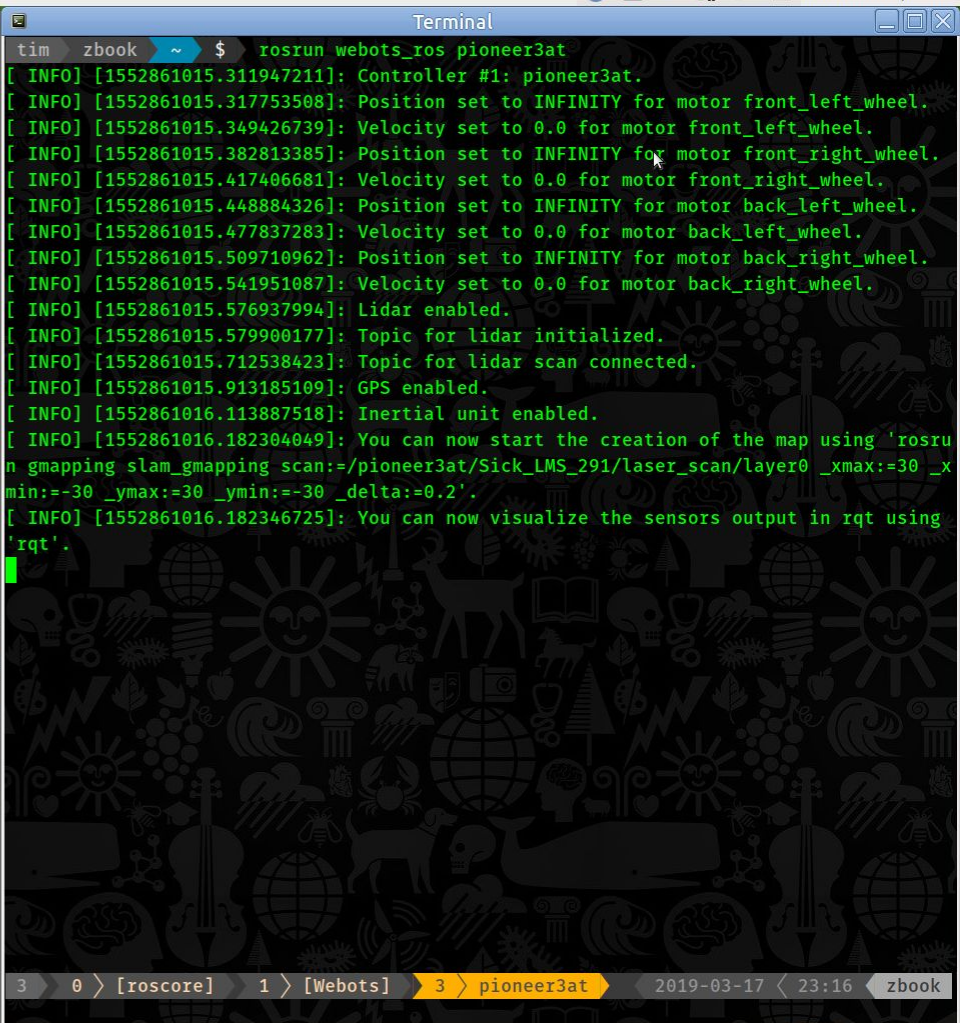
setting /run_id to 19e8c688-4902-11e9-9677-0028f876376b
WARNING: Package name "RODIPCa" does not follow the naming conventions. It should start with a lower case letter and only contain lower case letters, digits, underscores, and dashes.
process[rosout-1]: started with pid [28804]
started core service [/rosout]

3 0 > [roscore] 2019-03-17 23:15 zbook
```



Start Webots and open the example ROS world via  
File > Open sample world > ROS > pioneer3at

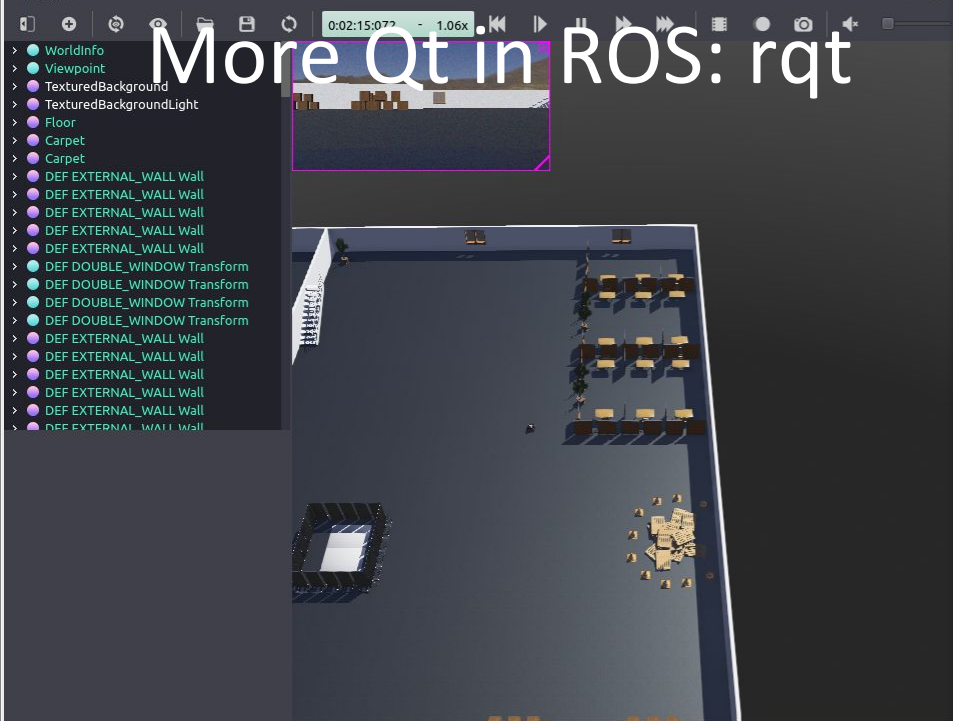




/home/tim/Programs/Webots/webots/projects/languages/ros/worlds/pioneer3at.wbt (ro

File Edit View Simulation Build Overlays Tools Wizards Help

Pioneer 3AT



Console

```
INFO: ros: Starting: "/home/tim/Programs/Webots/webots/projects/default/controllers/ros/ros" --name=pioneer3at"
[ros] [ INFO] [1552860966.607185340]: Robot's unique name is pioneer3at.
[ros] [ INFO] [1552860966.610477563]: The controller is now connected to the ROS master.
```

Welcome to Webots!

Terminal /home/tim/Programs/...

Terminal

```
tim zbook ~ $ cd Projects/catkin_ws/src/webots_ros/src/
tim zbook ~ Projects > ... > src > webots_ros > src $ ll
total 260
drwxrwxr-x 2 tim tim 4096 Feb 13 16:47 ./
drwxrwxr-x 5 tim tim 4096 Mar 17 22:35 ../
-rw-rw-r-- 1 tim tim 7424 Feb 13 16:47 catch_the_bird.cpp
-rw-rw-r-- 1 tim tim 135328 Feb 13 16:47 complete_test.cpp
-rw-rw-r-- 1 tim tim 22738 Feb 13 16:47 e_puck_line.cpp
-rw-rw-r-- 1 tim tim 5647 Feb 13 16:47 keyboard_teleop.cpp
-rw-rw-r-- 1 tim tim 10288 Feb 13 16:47 panoramic_view_recorder.cpp
-rw-rw-r-- 1 tim tim 12335 Feb 13 16:47 pioneer3at.cpp
-rw-rw-r-- 1 tim tim 39260 Feb 13 16:47 pr2_beer.cpp
-rw-rw-r-- 1 tim tim 4877 Feb 13 16:47 robot_information_parser.cpp
tim zbook ~ Projects > ... > src > webots_ros > src $
```

3 > 0 > [roscore] 1 > [Webots] 2 > [EDITING] > 2019-03-17 < 23:18 zbook

