

Homework 1

Robotics Spring 2024 - ShanghaiTech University

<https://robotics.shanghaitech.edu.cn/teaching/robotics2024>

1 Prepare Ubuntu

We are going to use the Ubuntu and the Robot Operating System throughout the course. So your first task is to make sure that you have access to a computer with a compatible operating system - the best option is Ubuntu <http://ubuntu.com>.

The suggested OS/ ROS version combination is: Ubuntu 22.04 with ROS 2 Iron Irwini. Newer or older versions might work, but we will not support them.

It is strongly recommended to install Ubuntu directly (side by side to your existing OS through some Dual Boot technique if you don't have multiple PCs). You should not be using a Virtual Machine, as you will be using a robot simulator later on which will not run fast enough in a VM.

2 Install ROS. (55%)

Follow the [installation tutorial](#) to install ROS 2 Iron Irwini. Use mirror server if you encounter network issues (simply change the url <http://packages.ros.org/ros2/ubuntu> to <https://mirrors.cloud.tencent.com/ros2/ubuntu> when the tutorial tells you to modify the source list)

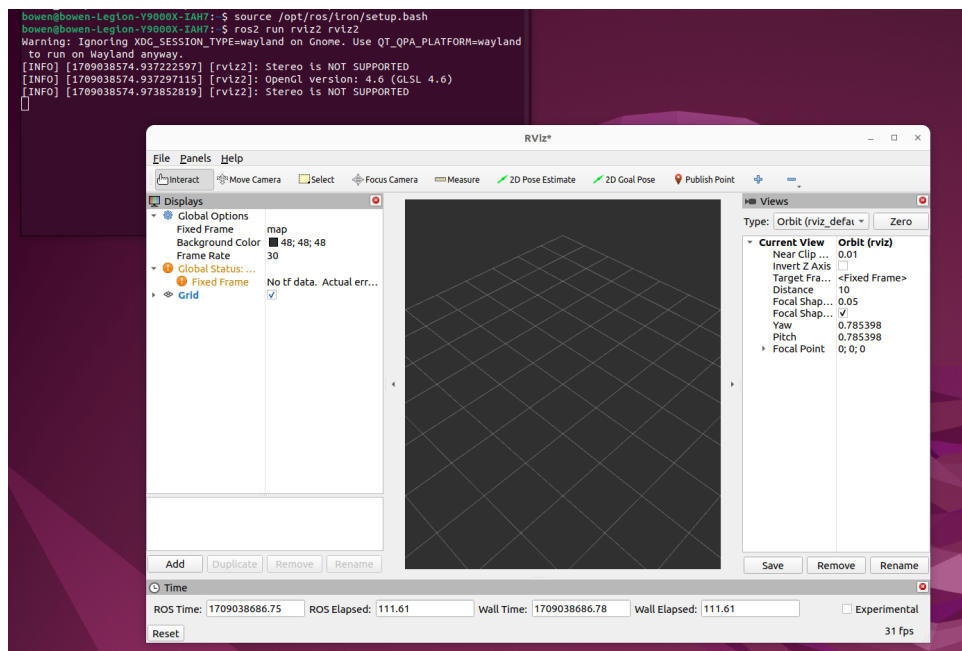


Figure 1: RViz.

After the installation, in a terminal window run:

```
source /opt/ros/iron/setup.bash
ros2 run rviz2 rviz2
```

You should see a window similar to figure 1. RViz is a program to visualize all kinds of data. If you see the window, all of ROS 2 should be properly installed - such that you are ready for next weeks homework...

Make a screen shot similar to figure 1 (showing both RViz and terminal window) and add that to your homework document.

We suggest you to follow these two tutorials to have a first glance at ROS 2: [Configuring environment](#) and [Using turtlesim, ros2, and rqt](#).

If you have any problems during this process ask on piazza and you will be helped. If there is demand we will organize an installation session towards the end of next week where we will help you! **Only** for this task and task 1 it is actually allowed to get help from other students, too, if you want to. Everybody has to do this with their own laptop. Do not use another students laptop!

3 Shakey the Robot. (35%)

Watch [this video](#) about Shakey from the Stanford Research Institute (SRI). Answer the following questions:

1. Name or estimate some **quantitative** properties (e.g. numbers - like 500kByte) of Shakey's hardware, for example CPU speed, computer size, RAM, camera resolution, speed, ... - whatever you find interesting (min 5 items).
2. Where it makes sense, compare the values from 1. to your cell phone.
3. How does Shakey recognize objects?

4 Submission (10 %)

Create a pdf document with the answers for question 3 and the screen shot from task 2. Use whichever program you like for creating the pdf - lateron I will ask you to use L^AT_EX, so you might start using it already now. The pdf file has to have the following name "hw1.pdf".

At the beginning of the pdf please include: Your name (Chinese and Pinyin), your student id and your email. Also include the course name and the number of the homework (number 1).

You should have access to the STAR Center gitlab at <https://star-center.shanghaitech.edu.cn/gitlab/>. You should have access to a repo called "r24hw_youremail". In that repo create a folder called "HW1". Add your hw1.pdf to that folder and push to gitlab. Double check (e.g. via the website) that hw1.pdf is successfully pushed.

This hw is due on Friday, Mar 8 23:59. Any later submission will result in a 33% deduction of points per 24h.