

Homework 1

Mobile Robotics Fall 2015 - ShanghaiTech University

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>.

Your options are:

- **Dual Boot Laptop:** Your best options is to install Ubuntu on your Laptop alongside Windows. Supported Ubuntu versions are: Trusty (14.04), Utopic (14.10) and Vivid (15.04)
- **Virtual Machine Laptop:** You can also install Ubuntu in a virtual machine. Recommended minimum specifications: Core 2 Duo CPU, 4GB RAM, 40GB free disk space. I recommend virtualBox from Oracle.

2 Install ROS. (35%)

Install ROS indigo or jade <http://wiki.ros.org/jade/Installation/Ubuntu>

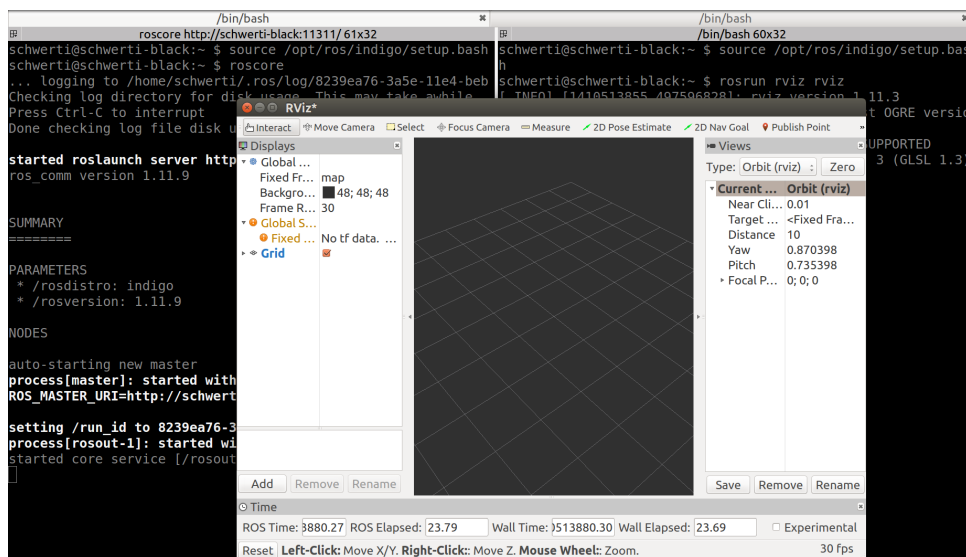


Figure 1: ROS rviz.

After the installation follow the first two tutorials <http://wiki.ros.org/ROS/Tutorials/>: <http://wiki.ros.org/ROS/Tutorials/InstallingandConfiguringROSEnvironment> and <http://wiki.ros.org/ROS/Tutorials/NavigatingTheFilesystem>.

In a terminal window run:
`source /opt/ros/jade/setup.bash`
`roscore`

In another terminal window run:
`source /opt/ros/jade/setup.bash`
`roslaunch rviz rviz`

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

Make a screen shot similar to figure 1 (showing the rviz window and at least one console) and add that to your homework document.

3 Shakey the robot. (30%)

Watch the video about Shakey from the Stanford Research Institute (SRI). <http://robotics.shanghaitech.edu.cn/static/videos/external/Shakey.mkv> Answer the following questions:

1. Name or estimate some properties 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 Robots. (30 %)

1. Make a list: Name the five coolest/ best/ most interesting robots (or types of robots) for **you**. Those have to be robots that actually exist(ed) and work(ed). (As long as you name five robots this answer is correct - it is up to you what robots you find interesting!)
2. For one of those robots, write at least three sentences **why** this is a cool robot.
3. Imagine a humanoid household robot. This robot should do lot's of things in the house, for example wash the dishes and put them back in the shelf, cook dinner, play with your kids, walk the dog, go shopping, etc. What do you think - what are the greatest challenges towards humanoid household robots? Name three to five challenges, max two sentences each.

5 Submission (5 %)

Create a pdf document with the answers for questions 3 and 4 and the screen shot from task 2. Use whichever program you like for creating the 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).

Send the pdf to yuty@shanghaitech.edu.cn by Monday, Nov 23rd, 10:00 pm. The subject should have the follow format: [Mobile Robotics] [Homework 1] [Pinyin Name]

Failure to comply with the submission guidelines will result in the deduction of those points.