Homework 1

Robotics Fall 2017 - ShanghaiTech University

https://robotics.shanghaitech.edu.cn/teaching/robotics2017

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 16.04 with ROS Kinetic. You may also use Ubuntu 16.04 or 17.04 with ROS Lunar.

Your options are:

- **Dual Boot Laptop:** Your best options is to install Ubuntu on your Laptop alongside Windows.

- **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. (40%)

Install ROS Kinetic Lunar http://wiki.ros.org/kinetic/Installation/Ubuntu
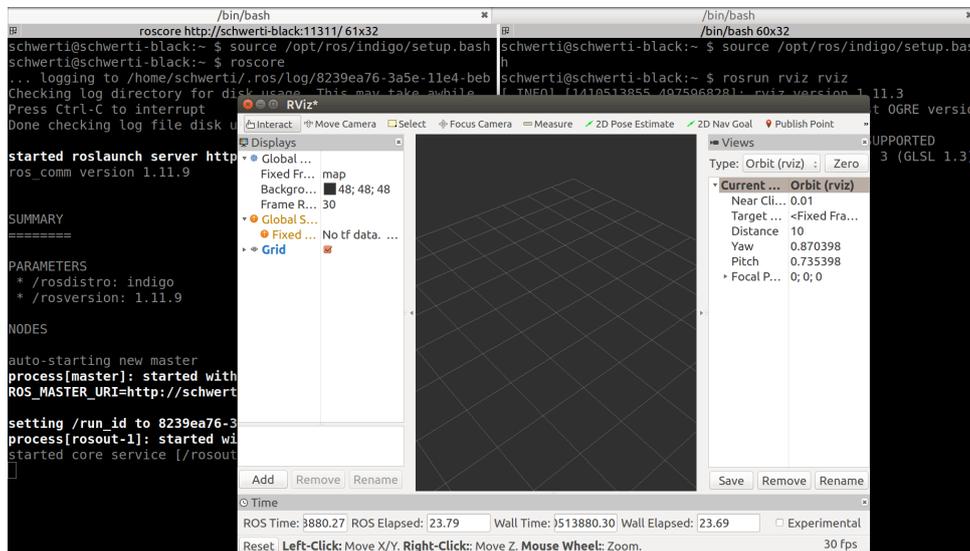
Figure 1: ROS rviz.

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 (you might want to replace "kinetic" with your version of ROS):

```
source /opt/ros/kinetic/setup.bash
roscore
```

In another terminal window run:

```
source /opt/ros/kinetic/setup.bash
rosrun 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.

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 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 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 GIT (15%)

Take a look at http://gitolite.com/gitolite/glssh.html and use `ssh-keygen` to generate a ssh key pair **if you don't already have one**. Copy your public key `id_rsa.pub` to be named the same as your email address (e.g. houjw.pub). Send the TA Hou Jiawei your public key `<name>.pub` via E-Mail (houjw@shanghaitech.edu.cn) ! Do this till Thursday, 19 19:00! We will then create a repository for you. Failure to send the key in time will result in 0 points for this task.

We will inform you on piazza once we have created the repositories. Please also refer to piazza for additional information on how to access your git!

Accessing the robotics git server will only work from within the University (for now).

5 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 LATEX, 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).

In your git repo add a folder called hw1. Put your pdf into that folder. Don't forget to add the pdf to git. Push everything to the server.

This hw is due on Sunday, Sep 24 22:00. Any later submission will result in a 33% deduction of points per 24h. You can update your submission any time - be sure to not update the hw1.pdf after the due date and time!