CMPE 565 AUTONOMOUS ROBOTS
Assignment 1: Installation and Introduction

Deadline: 15.02.2018

1 Introduction

In the lab section of the course, you are supposed to complete the weekly assignments. The general procedures for the assignments are to submit a wiki page under your name in the *Groups* section for the given assignment. You will write a simple document which should address the following questions:

- What is the problem?
- How did you solve the problem? (show critical part of your code)
- How good are your solutions? (show the result of your solution as a video. This video is expected to show that the robot does the given task. You can upload your weekly videos to youtube.com)

2 Installation

In this lab, you will make necessary installations and get familiar with the environment to work. You are going to install necessary tools. The setup is as follows:

- Ubuntu 16.04 64-bit from `https://www.ubuntu.com/download/alternative-downloads`
- Synaptic Package Manager (this can be installed by Ubuntu Sofware Center)
- V-REP 3.4.0 64 bit (you can download from `http://www.coppeliarobotics.com/previousversions.html`)
- ROS Kinetic desktop full and joystick package (ros-kinetic-desktop-full, ros-kinetic-joy) (you can install these packages synaptic package manager on Ubuntu)
- git (you can install via synaptic package manager on Ubuntu)
- smartgit (you can download from `http://www.syntevo.com/smartgit/` (**If you are comfortable with command line interface, you do not need smartgit**)

If you are new to Linux and the terminal environment, you will see that the installation process requires you to follow a strict procedure. This procedure is detailed on the additional readme file that will be sent to you separately.

After installations, you are supposed to use ROS nodes which are developed for the course. You need to clone our simulation project from here `http://robot.cmpe.boun.edu.tr/gitlab/cmpe-565-spring-2018/simulation`. You also need to clone the ROS nodes project from here `http://robot.cmpe.boun.edu.tr/gitlab/cmpe-565-spring-2018/ros-ws`. The commands are as follows:

```
git clone http://robot.cmpe.boun.edu.tr/gitlab/cmpe-565-2018/ros-ws.git
git clone http://robot.cmpe.boun.edu.tr/gitlab/cmpe-565-2018/simulation.git
```

If roscore (ROS Master) is running at the starting of V-REP, it will load the ROS Plugin. You can also check the names of the plugins loaded by V-REP in the terminal output of V-REP.

You will setup ros workspace by following steps in the readme file:

- run `cd ros-ws`
- run `catkin_make` and make sure there are no errors.
- edit /.bashrc, and add "source ¡*path to ros-ws*¿/devel/setup.bash" to the end of the document.
- close the terminal and reopen the terminal.
- run roscore.
- run vrep and open scenes/assignment1.ttt from the simulation folder.
- run `roslaunch vrep_apps base.launch` and control the robot with arrow buttons in this terminal.
- run rviz with `rviz`

3 The Assignment

After you complete the installation, you are supposed to run the simulation with the following commands:

- run roscore
- run vrep, open simulation/scenes/assignment1.ttt
- run `roslaunch vrep_apps base.launch` you can control the robot with arrow buttons in this terminal.
- run rviz with `rviz`

(note that to be able to send keyboard commands to the simulated robot, terminal should have the focus)

3.1 Deliverables

- A very short information about your installation of the system on wiki page in *Groups* section.
- A video showing that you can control the robot using the keyboard.

4 Further Information

You can check these online documents with the corresponding questions in your mind.

- What is ROS? `http://wiki.ros.org/ROS/Tutorials`
- What is ROS workspace? `http://wiki.ros.org/catkin/Tutorials/create_a_workspace`
- What is V-REP simulator? `http://www.coppeliarobotics.com/helpFiles/index.html`
- What is Git? `http://git-scm.com/docs/gittutorial`