19AIE213 Robotic Operating Systems & Robot Simulation

Assignment 1

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1) Open a terminal and start the roscore

```
deepak@ydeepaknav07:~$ roscore
... logging to /home/deepak/.ros/log/57ec9bb6-69ea-11eb-b06a-bc7737e43b5d/roslaunch-ydeepaknav07-4370.log
Checking log directory for disk usage. This may take awhile.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://ydeepaknav07:41957/
ros_comm version 1.12.17


SUMMARY
========

PARAMETERS
 * /rosdistro: kinetic
 * /rosversion: 1.12.17

NODES

auto-starting new master
process[master]: started with pid [4381]
ROS_MASTER_URI=http://ydeepaknav07:11311/

setting /run_id to 57ec9bb6-69ea-11eb-b06a-bc7737e43b5d
process[rosout-1]: started with pid [4394]
started core service [/rosout]
```

2) Run turtlesim rosrun turtlesim turtlesim_node

```
deepak@ydeepaknav07:~$ rosrun turtlesim turtlesim_node
[ INFO] [1612864310.907828586]: Starting turtlesim with node name /turtlesim
[ INFO] [1612864310.920512944]: Spawning turtle [turtle1] at x=[5.544445], y=[5.
544445], theta=[0.000000]
^C
```

3) Open another terminal and type rosrun turtlesim turtle_teleop_key

```
deepak@ydeepaknav07:~$ rosrun turtlesim turtle_teleop_key
Reading from keyboard
---------------------------
Use arrow keys to move the turtle.
deepak@ydeepaknav07:~$
```
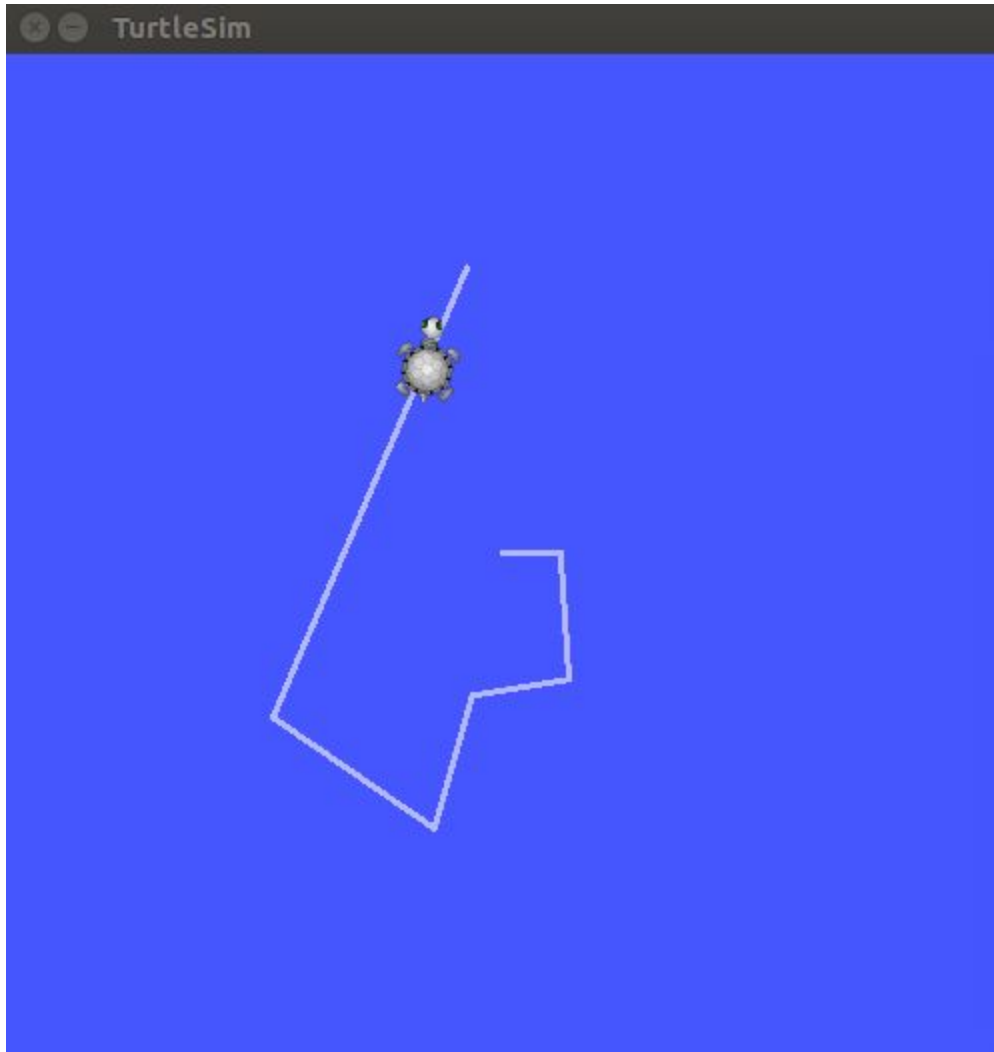
4) Create a package called assignment_1 with dependencies
rospy in your catkin workspace

ans)

deepak@ydeepaknav07:~$ cd S4_AI/devel/
deepak@ydeepaknav07:~/S4_AI/devel$ ls
cmake.lock local_setup.bash setup.bash   setup.zsh
env.sh   local_setup.sh   setup.sh   share
lib   local_setup.zsh   _setup_util.py
deepak@ydeepaknav07:~/S4_AI/devel$ source setup.bash
deepak@ydeepaknav07:~/S4_AI/devel$ cd ..
deepak@ydeepaknav07:~/S4_AI$ cd src/assignment1/src/

```
deepak@ydeepaknav07:~/S4_AI/src$ catkin_create_pkg assignment1 rospy
Created file assignment1/package.xml
Created file assignment1/CMakeLists.txt
Created folder assignment1/src
Successfully created files in /home/deepak/S4_AI/src/assignment1. Please adjust
the values in package.xml.
deepak@ydeepaknav07:~/S4_AI/src$ cd ..
deepak@ydeepaknav07:~/S4_AI$ catkin_make
Base path: /home/deepak/S4_AI
Source space: /home/deepak/S4_AI/src
Build space: /home/deepak/S4_AI/build
Devel space: /home/deepak/S4_AI/devel
Install space: /home/deepak/S4_AI/install
####
#### Running command: "cmake /home/deepak/S4_AI/src -DCATKIN_DEVEL_PREFIX=/home/
deepak/S4_AI/devel -DCMAKE_INSTALL_PREFIX=/home/deepak/S4_AI/install -G Unix Mak
efiles" in "/home/deepak/S4_AI/build"
####
-- Using CATKIN_DEVEL_PREFIX: /home/deepak/S4_AI/devel
-- Using CMAKE_PREFIX_PATH: /home/deepak/S4_AI/devel;/opt/ros/kinetic
-- This workspace overlays: /home/deepak/S4_AI/devel;/opt/ros/kinetic
-- Found PythonInterp: /usr/bin/python2 (found suitable version "2.7.12", minimu
m required is "2")
-- Using PYTHON_EXECUTABLE: /usr/bin/python2
```

5) In the source folder of your package assignment_1 create a
   publisher python file move_circle.py which makes the turtlesim
   to execute a single circular(approximate) trajectory.
   ans)
   #! /usr/bin/env python

   import rospy
   import time
   from geometry_msgs.msg import Twist

   pubspeed = rospy.Publisher('/turtle1/cmd_vel', Twist,
   queue_size=10)

   rospy.init_node('turtledemo', anonymous = True)

```
move = Twist()

i=0

while(i<7):
    rospy.loginfo('moving straight')
    move.linear.x=5
    rospy.loginfo('angular movement')
    move.angular.z=2
    pubspeed.publish(move)
    i+=1
    rospy.sleep(1)

rospy.loginfo('stop')
move.linear.x=0
move.linear.z=0
pubspeed.publish(move)
```

```
deepak@ydeepaknav07:~/S4_AI/src/assignment1/src$ rosrun assignment1 move_circle.
py
[INFO] [1612865515.624045]: moving straight
[INFO] [1612865515.624419]: angular movement
[INFO] [1612865516.626144]: moving straight
[INFO] [1612865516.627298]: angular movement
[INFO] [1612865517.630204]: moving straight
[INFO] [1612865517.631542]: angular movement
[INFO] [1612865518.634359]: moving straight
[INFO] [1612865518.635920]: angular movement
[INFO] [1612865519.638262]: moving straight
[INFO] [1612865519.639886]: angular movement
[INFO] [1612865520.643294]: moving straight
[INFO] [1612865520.644520]: angular movement
[INFO] [1612865521.647739]: moving straight
[INFO] [1612865521.649018]: angular movement
[INFO] [1612865522.651885]: stop
deepak@ydeepaknav07:~/S4_AI/src/assignment1/src$
```
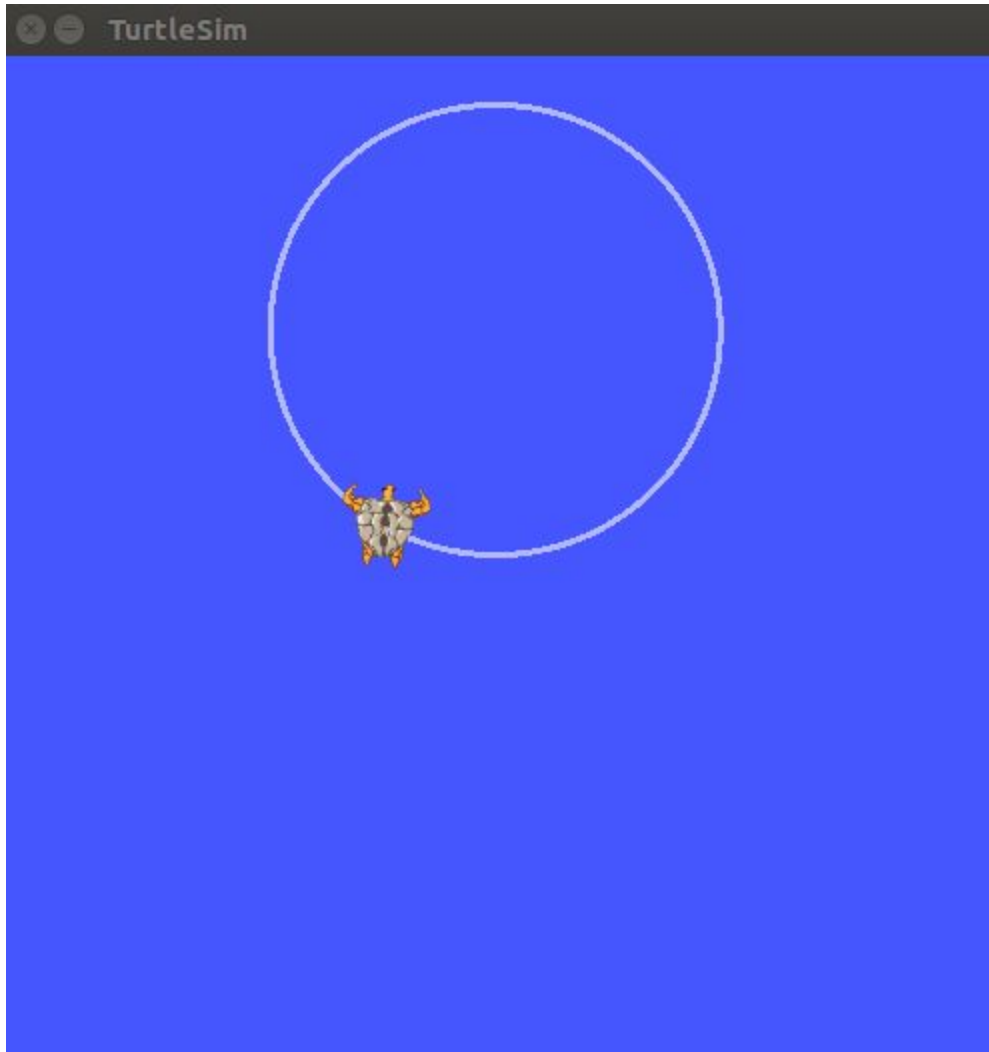
6) In the source folder of your package assignment_1 create a publisher python file move_square.py which makes the turtlesim to execute a single square(approximate) trajectory.
ans)
#running this code 4 times gives a square
#! /usr/bin/env python

import rospy
import time
from geometry_msgs.msg import Twist

```python
PI = 3.1415926535897

pubspeed = rospy.Publisher('/turtle1/cmd_vel', Twist,
queue_size=10)

rospy.init_node('turtledemo', anonymous = True)

move = Twist()


i=0
while(i<2):
    rospy.loginfo('moving straight')
    move.linear.x=2
    pubspeed.publish(move)
    i+=1
    rospy.sleep(1)
move.angular.z=90*2*PI/360

rospy.loginfo('stop')
move.linear.x=0
move.angular.z=0
pubspeed.publish(move)
```

```
deepak@ydeepaknav07:~/S4_AI/src/assignment1/src$ rosrun assignment1 move_square.
py
[INFO] [1612864389.957304]: moving straight
[INFO] [1612864390.959477]: moving straight
[INFO] [1612864391.961424]: stop
deepak@ydeepaknav07:~/S4_AI/src/assignment1/src$ rosrun assignment1 move_square.
py
[INFO] [1612864393.933538]: moving straight
[INFO] [1612864394.936089]: moving straight
[INFO] [1612864395.939407]: stop
deepak@ydeepaknav07:~/S4_AI/src/assignment1/src$ rosrun assignment1 move_square.
py
[INFO] [1612864398.148330]: moving straight
[INFO] [1612864399.150483]: moving straight
[INFO] [1612864400.153127]: stop
deepak@ydeepaknav07:~/S4_AI/src/assignment1/src$ rosrun assignment1 move_square.
py
[INFO] [1612864402.023878]: moving straight
[INFO] [1612864403.024950]: moving straight
[INFO] [1612864404.027951]: stop
```