

# Assignment 1

1. What is ROS? Why would we use it?

ROS is a middle-ware or framework used for writing software for robots. We use it because it contains several packages and tools that help us to simplify the task of creating robot's software.

2. Mention one useful package in ROS.

Turtlesim : Used for Teaching ROS for beginners.

Rqt\_graph: Used for visualizing ROS computation graph.

3. What is turtlesim package? explain it in your words

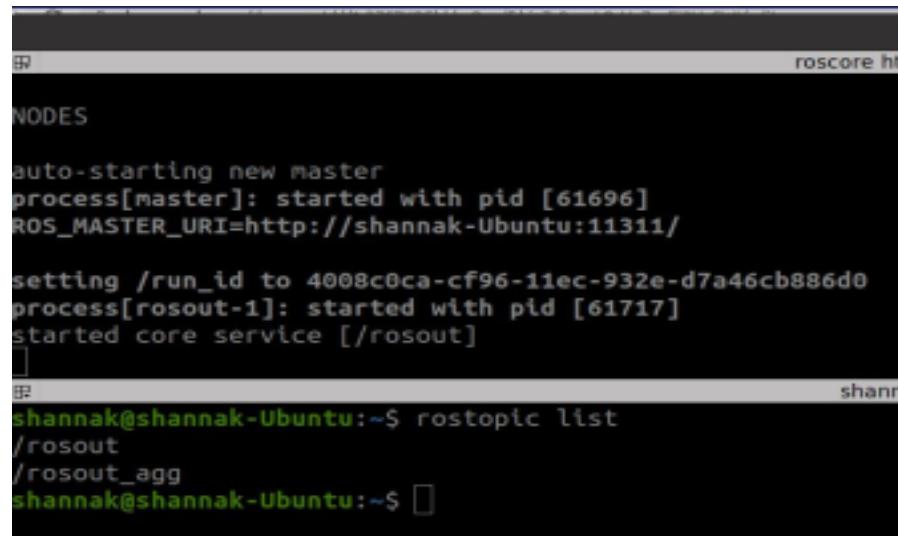
Turtlesim package is used for teaching ROS for beginners by visualizing an object or more and seeing the position on the screen in the form of linear or angular (x,y,z). Also we can connect it with other node to control the motion of the object to move it and see the change happened in position or velocity.

4. What is the difference between rostopics and rosnodes?

Rostopics : it the link connect between the publisher and subscriber that show the type of message.

Rosnode : is the program script that written by programming language like c++ , python ,.. that perform some kind of task

5. If the response for rostopic list was only /rosout and /rosout\_agg (See screenshot 1) How many nodes are running ? Which node is running?



```
roscore [shannak@shannak-Ubuntu: ~]$ roscore
[shannak@shannak-Ubuntu: ~]$ rostopic list
/rosout
/rosout_agg
[shannak@shannak-Ubuntu: ~]$ 
```

The screenshot shows a terminal window with the title "roscore [shannak@shannak-Ubuntu: ~]\$". It displays the output of the "rostopic list" command, which shows two topics: "/rosout" and "/rosout\_agg". Above this, there is a section titled "NODES" with logs about the master node starting and a process named "rosout-1" starting with PID 61717. The terminal prompt is "[shannak@shannak-Ubuntu: ~]\$".

One Node : /rosout

6. After writing rostopic in the terminal and pressing Tab twice I got this response (screenshot 2)  
Pick three commands and explain their usage.

The screenshot shows a terminal window with two tabs. The top tab is titled 'shannak@shannak-Ubuntu: ~' and shows the output of 'roscore'. It includes the message 'auto-starting new master', process IDs for 'master' and 'rosout-1', and the setting of the ROS\_MASTER\_URI. The bottom tab is also 'shannak@shannak-Ubuntu: ~' and shows the user typing 'rostopic' followed by several command completions: 'bw', 'echo', 'find', 'info', 'list', 'pub', and 'type'. The terminal window has a dark background with light-colored text.

Rostopic	
bw	Display bandwidth used by topic
echo	Print messages to screen
find	Find topics by type
info	Print information about active topic
list	List active topics
pub	Publish data to topic
type	Print topic or field type

7. Mention at least two informations you could get from the command rosnode info  
Rosnode info shows information about the node
- Publication
  - Subscription
  - Services

8. Do the following :

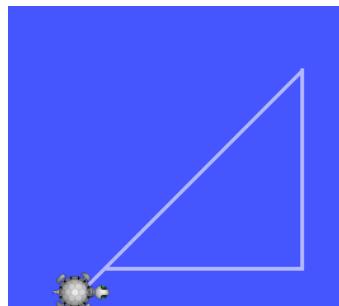
In the first terminal : Run → roscore

In the second terminal Run the turtle sim node → rosrun turtlesim turtlesim\_node

Question:

What shall you write in a third terminal to make the turtle draw a circle

```
alie@alie-Lenovo-G50-80:~$ rostopic pub -r 10 /turtle1/cmd_vel geometry_msgs/Twist '{linear: {x: 0.5, y: 0.0, z: 0.0}, angular: {x: 0.0, y: 0.0, z: 0.5}}'
```



For drawing triangle

```
rostopic pub -r 10 /turtle1/cmd_vel geometry_msgs/Twist '{linear: {x: 0.5, y: 0.0, z: 0.0}, angular: {x: 0.0, y: 0.0, z: 0.0}}'
```

```
rostopic pub -r 10 /turtle1/cmd_vel geometry_msgs/Twist '{linear: {x: 0.0, y: 0.5, z: 0.0}, angular: {x: 0.0, y: 0.0, z: 0.0}}'
```

```
rostopic pub -r 10 /turtle1/cmd_vel geometry_msgs/Twist '{linear: {x: -0.5, y: -0.5, z: 0.0}, angular: {x: 0.0, y: 0.0, z: 0.0}}'
```

# Assignment 1

Bouns:

A friend of you heard that you are good in ROS. So he asked you to monitor his drone which works with ROS. After getting access to the hardware of the drone (raspberry pi) .You wrote rostopic list and the response was :

```
/rosout  
/rosout_agg  
/motor1/cmd_vel  
/motor2/cmd_vel
```

You want to control the first motor but you do not know what to write to get the message type.

- 1) Write down the right command.

Hint: search for ros cheat sheet.

After running the right command you found that the message type is (screenshot 3)

So you googled it and you found this link

[http://docs.ros.org/en/noetic/api/geometry\\_msgs/html/msg/Twist.html](http://docs.ros.org/en/noetic/api/geometry_msgs/html/msg/Twist.html)

- 2) What do you understand from it? Explain in your own words



Type: geometry\_msgs/Twist

Screenshot 3

1. rostopic type motor1/cmd\_vel
2. geometry\_msg/Twist express velocity in 3d space and it divides into two parts
  - a. Linear velocity
    - i. Vx
    - ii. Vy
    - iii. Vz
  - b. Angular velocity
    - i. Wx (Roll)
    - ii. Wy (Pitch)
    - iii. Wz (Yaw)