Robotics Lab - 221 LIA 001 Assignment 1
Due:October 25, 2024, 2.00 pm IST

Submission via Github classroom
- All final code files to be pushed to your assignment repo
- The questions below are to be answered serial order in a text file them pushed to your assignment repo as a **single file named** *<your first name_ assignment1_ answers.txt* **file**

1. **ROS nodes**: Launch ROS core and carry out the following tasks

   (a) List the currently running nodes

   (b) What is the purpose of node */rosout*

   (c) List the currently running topics

   (d) What topics are subscribed by the node */rosout*

   (e) What topics are published by the node */rosout*

   (f) What are the services provided by the node */rosout*

   (g) Kill the node */rosout* and again list the running nodes. What is your observation.

   (h) What are the functions of commands `cleanup`, `info`, `kill`, `list`, `machine` & `ping` of the *rosnode* command-line tool

   (i) Run the command `rosnode info /rosout` and Save its screenshot as question1_rqt1.png.

   (j) Run the rqt_graph tool (Uncheck the debug option in the RosGraphwindow if the rqt_graph is empty) and Save its screenshot as question1_rqt2.png.

2. **ROS publisher node** : Create a ROS publisher node with the following features.
   Node name : '<your first name_pubnode'
   Topic published : 'Greetings'
   Message : 'Hello, I am <your first name>'
   Message type : std_msgs_String
   Rate of publishing message : 10 Hz
   Use rospy.loginfo to echo the message published on to the terminal

   (a) Run the publisher node and save the terminal screenshot as question2_terminal1.png.

   (b) Launch rqt_graph. Save its screenshot as question2_rqt1.png Comment on your observations from rqt_graph.

   (c) List the running nodes in the terminal. Save terminal screenshot as question2_terminal2.png

   (d) Modify the publisher code to run concurrently three publisher nodes with the name '<your first name_node1'. Run rqt_graph and save the screenshot as question2_rqt2.png . Comment on your observations from rqt_graph.

3. **ROS subscriber node** : Create a ROS subscriber with the name 'RAA24_subnode' that subscribes to the topic 'Greetings'

   (a) Run the publisher (from question 2) and the subscriber and save the terminal screenshots question3_terminal1.png.

(b) Run rqt_graph and save the screenshot as question3_rqt1.png. Comment on your observations from rqt_graph.

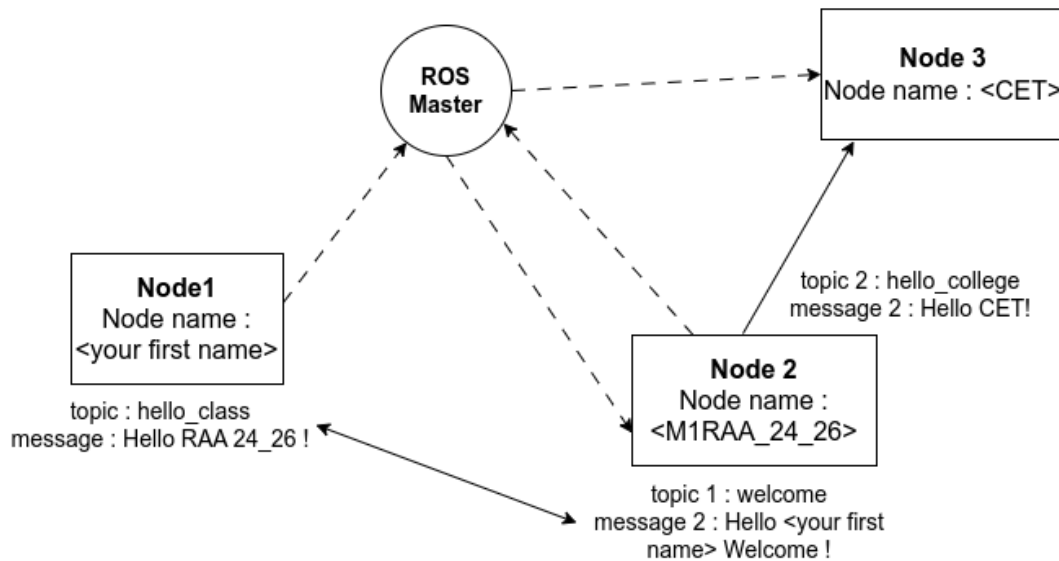4. **ROS publisher-subscriber node** Realize the ROS nodes and messages as shown in the figure 1 below

Figure 1: Illustration of nodes and messages for assignment 1 question 3

Run the code for the nodes and answer the questions below.

(a) List the currently running nodes

(b) List the currently running topics

(c) What is the role of the node *rosout*

(d) Change the name of node 2 to 'M1RAA 2024' and rerun the code. Write down any error message displayed.

(e) Run the rqt_graph tool and and save the screenshot as question4_rqt1.png'

References :

1. https://wiki.ros.org/ROS/Tutorials

2. https://wiki.ros.org/std_msgs

3. https://wiki.ros.org/Names

4. https://jim79.github.io/robotics-lab