AA 274: Principles of Robotic Autonomy
Section 2: Workstation and ROS

Contributor: Karthik Pythireddi
Group 05: Gautham Dixit
SU#: 06734162
Email: karthik9@stanford.edu

Problem 1: Create your own message file consisting of multiple standard data types. This can be bool, string, float64, char, int64, and many more.

#MyMessage.msg file contents:

string str_data
int32 int_data
float32 float_data

Problem 2: Create a publisher and subscriber that publish and subscribe to your custom message type, respectively.

Below is the Publisher.py code we used in the section.

```
#!/usr/bin/env python3

import rospy
from aa274a_s2.msg import MyMessage

def publisher():
    pub = rospy.Publisher('group05_topic', MyMessage, queue_size=10)
    rospy.init_node('my_node', anonymous=True)
    rate = rospy.Rate(1)
    while not rospy.is_shutdown():
        message_to_pass = MyMessage()
        message_to_pass.str_data = 'hello world'
        message_to_pass.int_data = 2022
        message_to_pass.float_data = 10.1
        pub.publish(message_to_pass)
        rate.sleep()

if __name__ == '__main__':
    try:
```

```
        publisher()
    except rospy.ROSInterruptException:
        pass
```

Below is the subscriber.py code we used in the section.

```
#!/usr/bin/env python3

import rospy
from aa274a_s2.msg import MyMessage

def callback(msg: MyMessage):
    rospy.loginfo(rospy.get_caller_id() + " I heard %s, %d, %f",
msg.str_data, msg.int_data, msg.float_data)

def subscriber():
    rospy.init_node('my_node', anonymous=True)
    rospy.Subscriber("group05_topic", MyMessage, callback)

    rospy.spin()

if __name__ == '__main__':
    subscriber()
```

Problem 3: Include screenshots or terminal output text that shows your publisher and subscriber are working.

Console output for Publisher.py

```
group05@genbu:~$ rosrun aa274a_s2 publisher.py
```

Console output for Subscriber.py

```
group05@genbu:~$ rosrun aa274a_s2 subscriber.py
```

```
[INFO] [1665713752.640195]: /my_node_2140555_1665713751711 I heard hello
world, 2022, 10.100000
[INFO] [1665713753.640234]: /my_node_2140555_1665713751711 I heard hello
world, 2022, 10.100000
[INFO] [1665713754.640183]: /my_node_2140555_1665713751711 I heard hello
world, 2022, 10.100000
[INFO] [1665713755.640226]: /my_node_2140555_1665713751711 I heard hello
world, 2022, 10.100000
[INFO] [1665713756.640224]: /my_node_2140555_1665713751711 I heard hello
world, 2022, 10.100000
[INFO] [1665713757.640221]: /my_node_2140555_1665713751711 I heard hello
world, 2022, 10.100000
[INFO] [1665713758.639879]: /my_node_2140555_1665713751711 I heard hello
world, 2022, 10.100000
[INFO] [1665713759.640229]: /my_node_2140555_1665713751711 I heard hello
world, 2022, 10.100000
[INFO] [1665713760.640267]: /my_node_2140555_1665713751711 I heard hello
world, 2022, 10.100000
[INFO] [1665713761.640231]: /my_node_2140555_1665713751711 I heard hello
world, 2022, 10.100000
[INFO] [1665713762.640265]: /my_node_2140555_1665713751711 I heard hello
world, 2022, 10.100000
```

Problem 4: Run the first three of these to
(a) See that your topic is registered and visible
Rostopic registered:

group05@genbu:/data/home/group05$ rostopic list:

/group05_topic
/rosout
/rosout_agg

(b) Show what your publisher is publishing
#Message being published by publisher:

group05@genbu:/data/home/group05$ rostopic pub /group05_topic aa274a_s2/MyMessage "Hello world" 2 3.14 7

group05@genbu:/data/home/group05$ rostopic echo /group05_topic
data: "Hello world"
int_data: 2
float_data: 3.140000104904175
Section_data: 7

(c) Determine the frequency with which your publisher is publishing messages

Frequency of messages from publisher:

group05@genbu:/data/home/group05$ rostopic hz /group05_topic

average rate: 0.860
        min: 0.176s max: 161.242s std dev: 5.13731s window: 973

Problem 5: Once logged into the machine, determine the following

(a) How many GPUs are there?
6, Command used : nvidia-smi

(b) How much RAM is available on the machine?
256 GB, lshw -c memory

(c) How many CPU cores are there?
We have 64 cores, Command used: lscpu

(d) What version of Python is available on the machine?

Python –version, 3.8.10