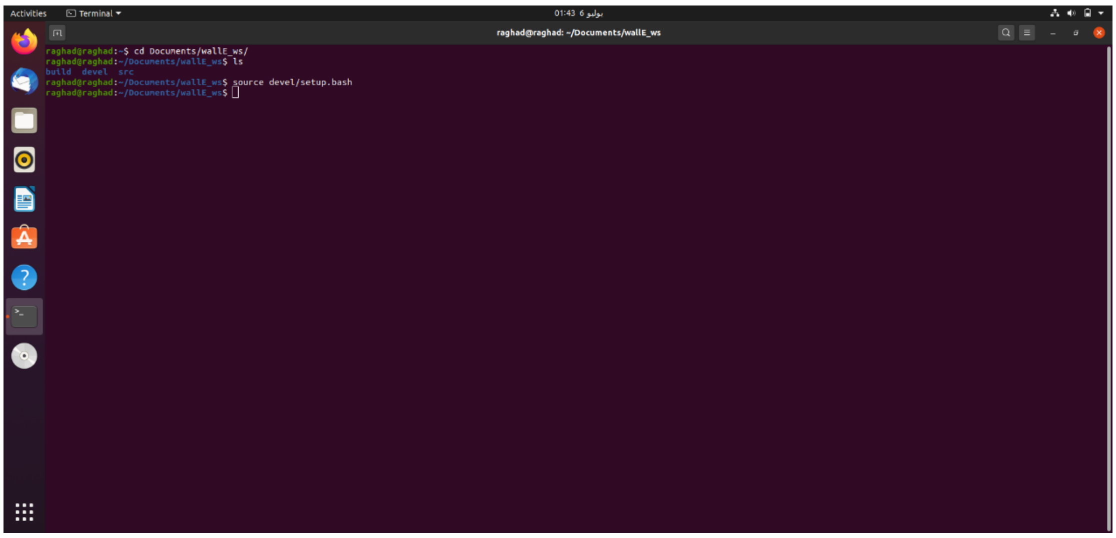
Create two nodes sharing a string message

Overview:

Create a workspace then create a package that contains 2 nodes: publisher and subscriber that are sharing a string message through a topic.

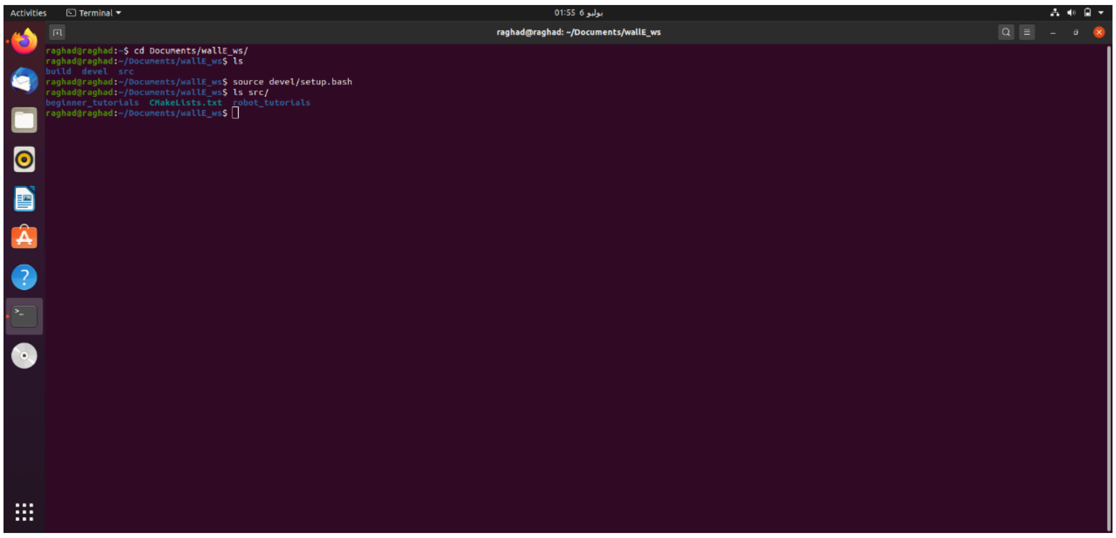
Steps with pictures:

1. **Create a workspace for catkin**
    a. Run "roscore", make directory where you want to make your workspace with the name you want "here named wallE-ws" and make directory called "src" inside it
    b. Change directory to "wallE-ws" and write catkin_make command wich is a convenience tool for working with catkin workspaces, it will create a CMakeLists.txt link in your 'src' folder.
    c. Additionally, if you look in your current directory you should now have a 'build' and 'devel' folder, source the "setup.bash" to make sure your workspace is properly overlayed by the setup script.



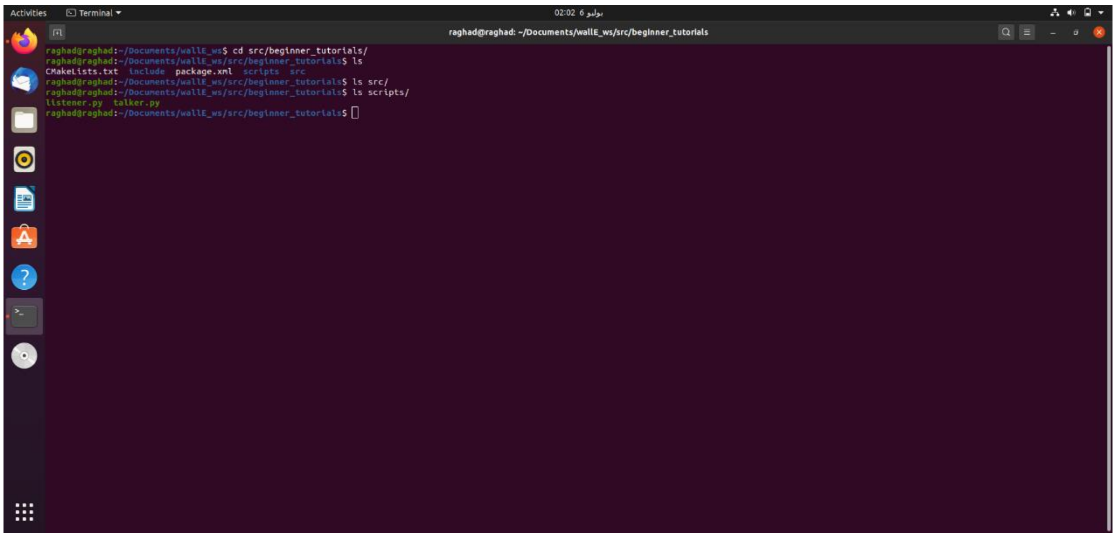
```
raghad@raghad:~$ cd Documents/wallE_ws/
raghad@raghad:~/Documents/wallE_ws$ ls
build  devel  src
raghad@raghad:~/Documents/wallE_ws$ source devel/setup.bash
raghad@raghad:~/Documents/wallE_ws$ 
```

2. **Create a package**
    a. By writing "catkin_create_pkg beginner_tutorials std_msgs rospy roscpp"in the "src"' folder will create a beginner_tutorials folder which contains a package.xml and a CMakeLists.txt.
    b. Now you need to build the packages in the catkin workspace by writing "catkin_make" in the workspace and source the .bash file.
    c. You can custmisze your wrk space by editing the .xml file and the CMakeLists.txt.



```
raghad@raghad:~$ cd Documents/wallE_ws/
raghad@raghad:~/Documents/wallE_ws$ ls
build  devel  src
raghad@raghad:~/Documents/wallE_ws$ source devel/setup.bash
raghad@raghad:~/Documents/wallE_ws$ ls src/
beginner_tutorials  CMakeLists.txt  robot_tutorials
raghad@raghad:~/Documents/wallE_ws$ 
```

3. **Create the script folder “mkdir” inside the “beginner_tutorials” file and write the python codes for the publisher “talker” and subscriber “listener” inside it.**



```
raghad@raghad:~/Documents/wallE_ws$ cd src/beginner_tutorials/
raghad@raghad:~/Documents/wallE_ws/src/beginner_tutorials$ ls
CMakeLists.txt  include  package.xml  scripts  src
raghad@raghad:~/Documents/wallE_ws/src/beginner_tutorials$ ls src/
raghad@raghad:~/Documents/wallE_ws/src/beginner_tutorials$ ls scripts/
listener.py  talker.py
raghad@raghad:~/Documents/wallE_ws/src/beginner_tutorials$ 
```

Don’t forget to write “chmod +x talker.py” to make the code executable.

a. The publisher code:

```python
#!/usr/bin/env python3
# license removed for brevity
import rospy
from std_msgs.msg import String

def talker():
    pub = rospy.Publisher('chatter', String, queue_size=10)
    rospy.init_node('talker', anonymous=True)
    rate = rospy.Rate(10) # 10hz
    while not rospy.is_shutdown():
        hello_str = "hello world %s" % rospy.get_time()
        rospy.loginfo(hello_str)
        pub.publish(hello_str)
        rate.sleep()

if __name__ == '__main__':
    try:
        talker()
    except rospy.ROSInterruptException:
        pass
```

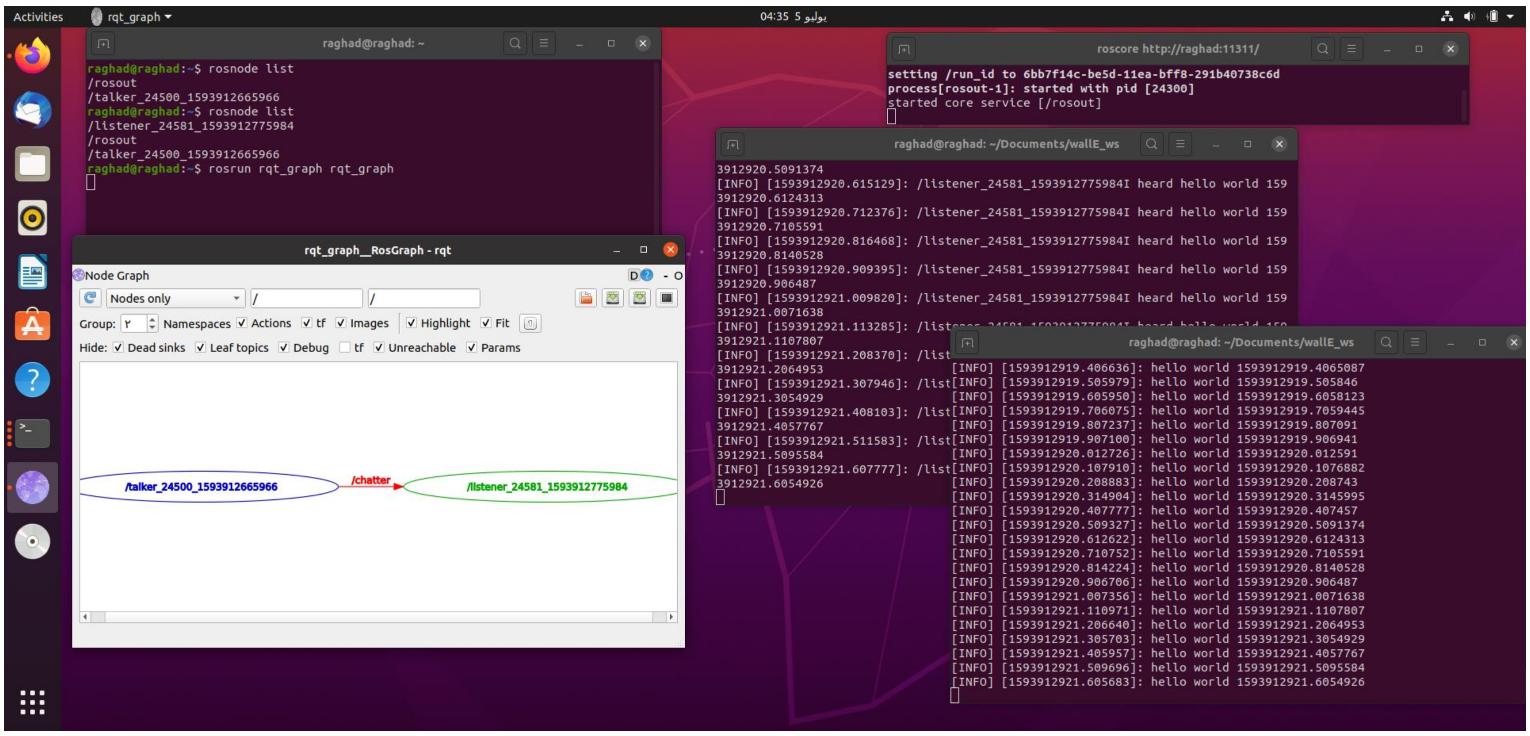
b. The subscriber code:

```python
#!/usr/bin/env python3
import rospy
from std_msgs.msg import String

def callback(data):
    rospy.loginfo(rospy.get_caller_id() + "I heard %s", data.data)

def listener():

    # In ROS, nodes are uniquely named. If two nodes with the same
    # name are launched, the previous one is kicked off. The
    # anonymous=True flag means that rospy will choose a unique
    # name for our 'listener' node so that multiple listeners can
    # run simultaneously.
    rospy.init_node('listener', anonymous=True)

    rospy.Subscriber("chatter", String, callback)

    # spin() simply keeps python from exiting until this node is stopped
    rospy.spin()

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

c. Build the nodes by writing “catkin_make” in the workspace.

4. Run the publisher and subscriber and show the rqt_graph

a. Run roscore
b. Go to the workspace and source “setup.bash”
c. Write “rosrun beginner_tutorials talker.py” & “rosrun beginner_tutorials listener.py” in new terminals to run he codes.
d. Write “rosnode list” to see the active nodes and show the rqt_graph by writing the following commands:


Activities
rqt_graph
04:35 5 يوليو
raghad@raghad: ~
rqt_graph__RosGraph - rqt
Node Graph
Nodes only
Group: ٢ Namespaces ✓ Actions ✓ tf ✓ Images ✓ Highlight ✓ Fit
Hide: ✓ Dead sinks ✓ Leaf topics ✓ Debug tf ✓ Unreachable ✓ Params
/talker_24500_1593912665966
/chatter
/listener_24581_1593912775984
roscore http://raghad:11311/
raghad@raghad: ~/Documents/wallE_ws
raghad@raghad: ~/Documents/wallE_ws

```
raghad@raghad:~$ rosnode list
/rosout
/talker_24500_1593912665966
raghad@raghad:~$ rosnode list
/listener_24581_1593912775984
/rosout
/talker_24500_1593912665966
raghad@raghad:~$ rosrun rqt_graph rqt_graph
```

```
setting /run_id to 6bb7f14c-be5d-11ea-bff8-291b40738c6d
process[rosout-1]: started with pid [24300]
started core service [/rosout]
```

```
3912920.5091374
[INFO] [1593912920.615129]: /listener_24581_1593912775984I heard hello world 159
3912920.6124313
[INFO] [1593912920.712376]: /listener_24581_1593912775984I heard hello world 159
3912920.7105591
[INFO] [1593912920.816468]: /listener_24581_1593912775984I heard hello world 159
3912920.8140528
[INFO] [1593912920.909395]: /listener_24581_1593912775984I heard hello world 159
3912920.906487
[INFO] [1593912921.009820]: /listener_24581_1593912775984I heard hello world 159
3912921.0071638
[INFO] [1593912921.113285]: /list
3912921.1107807
[INFO] [1593912921.208370]: /list
3912921.2064953
[INFO] [1593912921.307946]: /list
3912921.3054929
[INFO] [1593912921.408103]: /list
3912921.4057767
[INFO] [1593912921.511583]: /list
3912921.5095584
[INFO] [1593912921.607777]: /list
3912921.6054926
```

```
[INFO] [1593912919.406636]: hello world 1593912919.4065087
[INFO] [1593912919.505979]: hello world 1593912919.505846
[INFO] [1593912919.605950]: hello world 1593912919.6058123
[INFO] [1593912919.706075]: hello world 1593912919.7059445
[INFO] [1593912919.807237]: hello world 1593912919.807091
[INFO] [1593912919.907100]: hello world 1593912919.906941
[INFO] [1593912920.012726]: hello world 1593912920.012591
[INFO] [1593912920.107910]: hello world 1593912920.1076882
[INFO] [1593912920.208883]: hello world 1593912920.208743
[INFO] [1593912920.314904]: hello world 1593912920.3145995
[INFO] [1593912920.407777]: hello world 1593912920.407457
[INFO] [1593912920.509327]: hello world 1593912920.5091374
[INFO] [1593912920.612622]: hello world 1593912920.6124313
[INFO] [1593912920.710752]: hello world 1593912920.7105591
[INFO] [1593912920.814224]: hello world 1593912920.8140528
[INFO] [1593912920.906706]: hello world 1593912920.906487
[INFO] [1593912921.007356]: hello world 1593912921.0071638
[INFO] [1593912921.110971]: hello world 1593912921.1107807
[INFO] [1593912921.206640]: hello world 1593912921.2064953
[INFO] [1593912921.305703]: hello world 1593912921.3054929
[INFO] [1593912921.405957]: hello world 1593912921.4057767
[INFO] [1593912921.509696]: hello world 1593912921.5095584
[INFO] [1593912921.605683]: hello world 1593912921.6054926
```