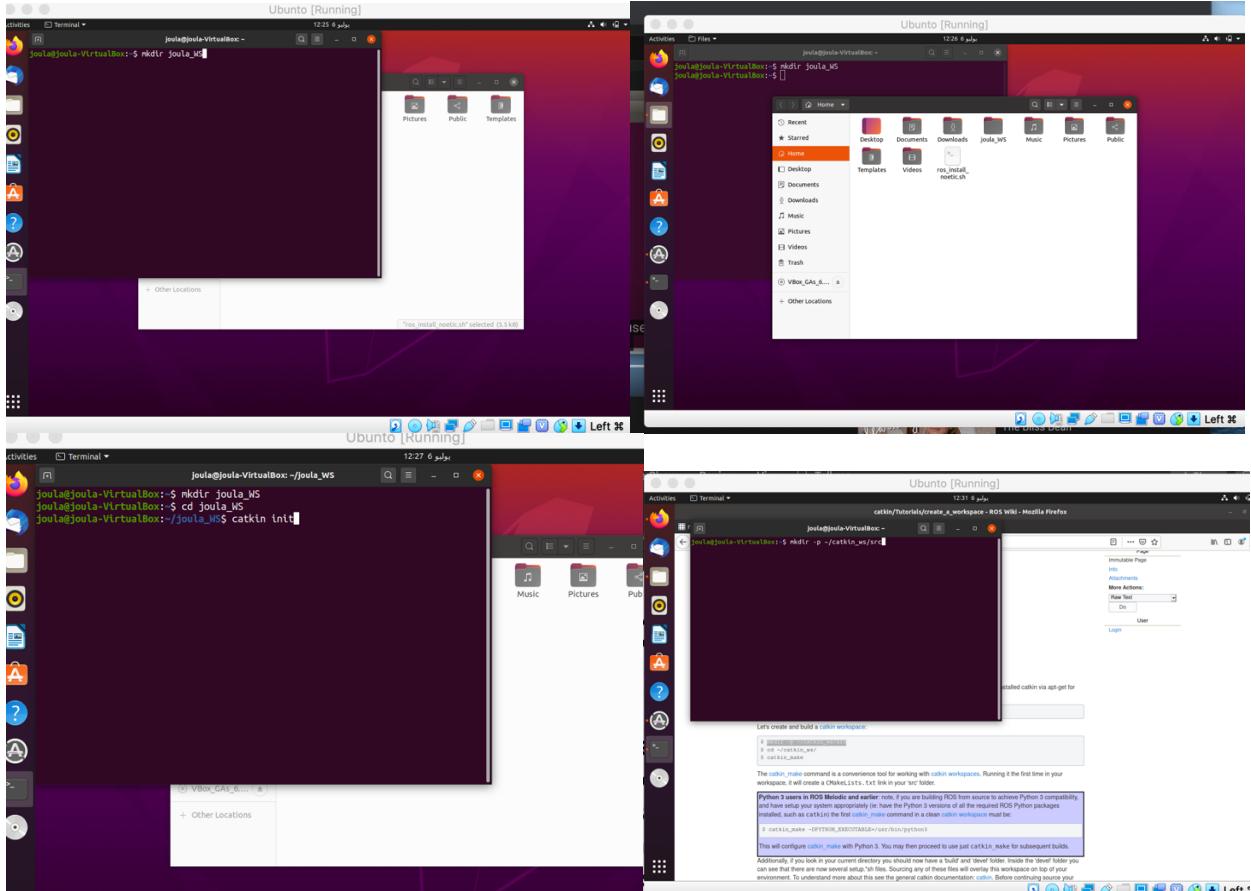


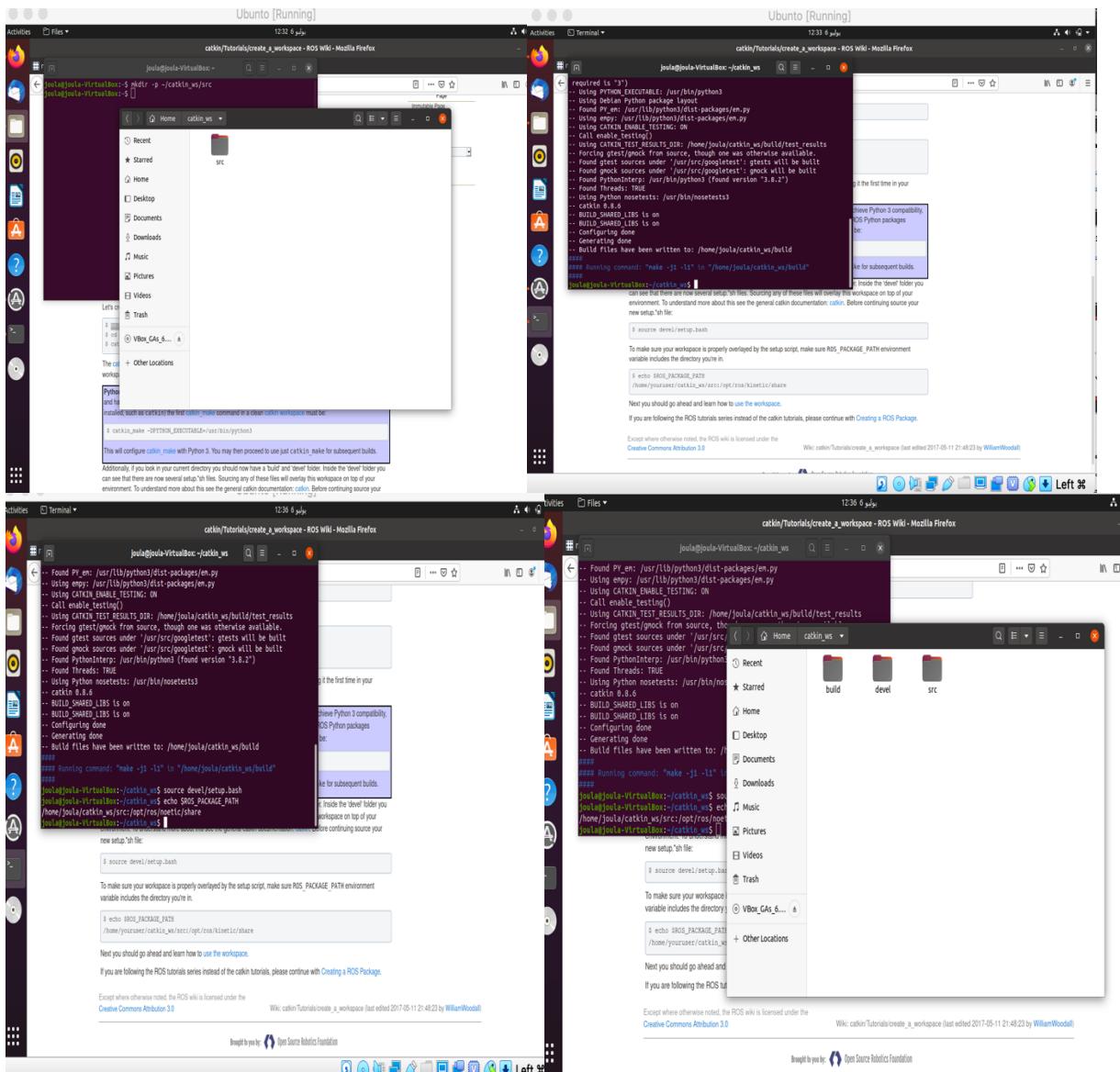
Creating a publisher “talker” and subscriber “listener” in ROS

We will go through every step and I'll talk about the errors that happened

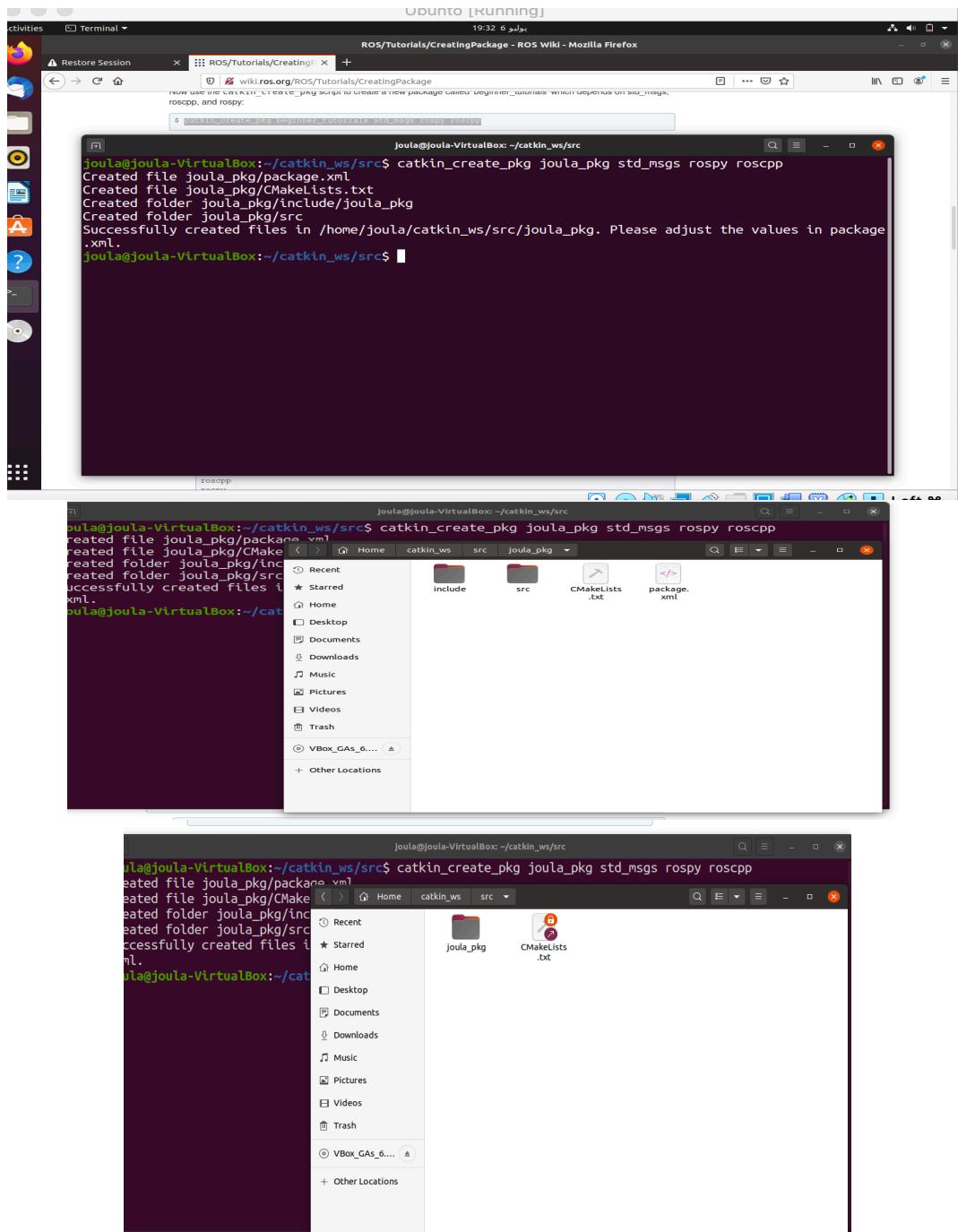
First we have to create a work space



Ros.org they have a full tutorial on how to make a work space and I follow it

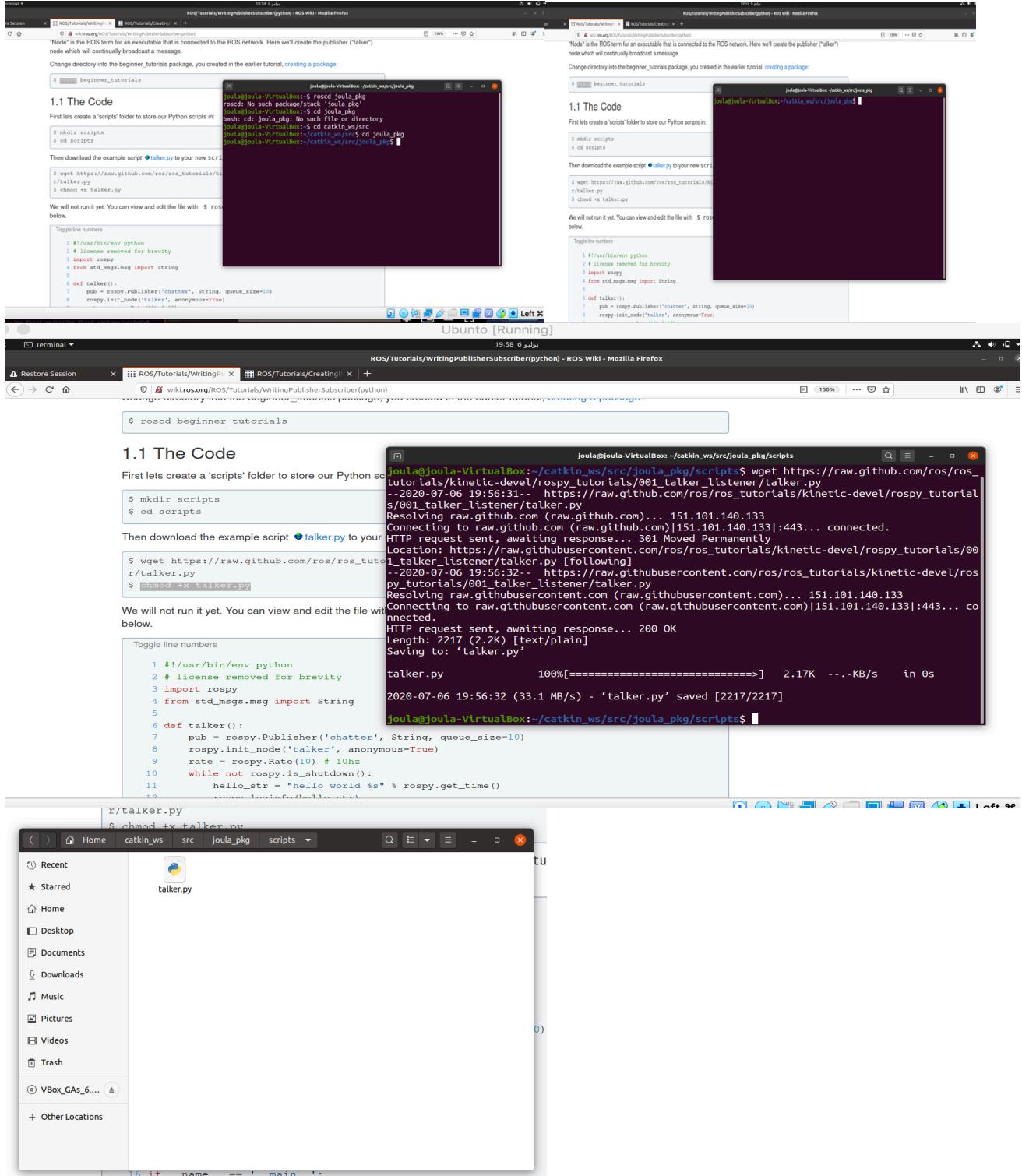


Then we have to create a package



Ros.org they have a full tutorial on how to make a package and I follow it

After finishing step 1 and 2 we will start creating the publisher and subscriber



```

$ wget https://raw.github.com/ros/ros_tutorials/kinetic-devel/rospy_tutorials/001_talker/listener/listener.py
$ chmod +x listener.py

```

We will not run it yet. You can view and below.

```

1 #!/usr/bin/env python
2 # license removed for brevity
3 import rospy
4 from std_msgs.msg import String
5
6 def talker():
7     pub = rospy.Publisher('chatter', String, queue_size=10)
8     rospy.init_node('talker', anonymous=True)
9     rate = rospy.Rate(10)
10    while not rospy.is_shutdown():
11        hello_str = "hello world %s" % rospy.get_time()
12        rospy.loginfo(hello_str)
13        pub.publish(hello_str)
14        rate.sleep()
15
16 if __name__ == '__main__':
17    try:
18        talker()
19    except rospy.ROSInterruptException:
20        pass

```

Add the following to your CMakeLists.txt. This makes sure the python script gets installed properly, and uses the right

```

11 hello_str = "hello world %s"
12 rospy.loginfo(hello_str)
13 pub.publish(hello_str)
14 rate.sleep()
15
16 if __name__ == '__main__':
17    try:
18        talker()
19    except rospy.ROSInterruptException:
20        pass

```

Add the following to your CMakeLists.txt. This makes sure the python script gets installed properly, and uses the right python interpreter.

```

catkin_install_python(PROGRAMS scripts/talker.py
DESTINATION ${CATKIN_PACKAGE_BIN_DESTINATION})

```

1.2 The Code Explained

Now, let's break the code down.

```

Toggle line numbers
1 #!/usr/bin/env python

```

Every Python ROS Node will have this declaration at the top. The first line makes sure your script is executed as a Python script.

2. Writing the Subscriber Node

2.1 The Code

Download the [listener.py](#) file into your scripts directory.

```

$ roscd beginner_tutorials/scripts/
$ wget https://raw.github.com/ros/ros_tutorials/kinetic-devel/rospy_tutorials/001_talker/listener/listener.py
$ chmod +x listener.py

```

The file contents look close to:

```

joula@joula-VirtualBox:~/catkin_ws/src/joula_pkg/scripts$ wget https://raw.github.com/ros/ros_tutorials/kinetic-devel/rospy_tutorials/001_talker/listener/listener.py
--2020-07-06 20:06:03-- https://raw.github.com/ros/ros_tutorials/kinetic-devel/rospy_tutorials/001_talker/listener/listener.py
Resolving raw.github.com (raw.githubusercontent.com)... 151.101.140.133
Connecting to raw.github.com (raw.githubusercontent.com)|151.101.140.133|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://raw.githubusercontent.com/ros/ros_tutorials/kinetic-devel/rospy_tutorials/001_talker/listener/listener.py [following]
--2020-07-06 20:06:04-- https://raw.githubusercontent.com/ros/ros_tutorials/kinetic-devel/rospy_tutorials/001_talker/listener/listener.py
Resolving raw.githubusercontent.com (raw.githubusercontent.com)|151.101.140.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 2406 (2.3K) [text/plain]
Saving to: 'listener.py'

listener.py          100%[=====]  2.35K  ---KB/s   in 0.001s

2020-07-06 20:06:05 (1.64 MB/s) - 'listener.py' saved [2406/2406]

joula@joula-VirtualBox:~/catkin_ws/src/joula_pkg/scripts$ 

```

The screenshot shows a browser window displaying the ROS Tutorials page for "WritingPublisherSubscriber(python)". Below the browser is a code editor window with two tabs: "CMakeLists.txt" and "listener.py".

```

ROS/Tutorials/WritingPublisherSubscriber(python) - ROS Wiki - Mozilla Firefox
store Session x ROS/Tutorials/WritingPublis... x ROS/Tutorials/Creating... x + 
wiki.ros.org/ROS/Tutorials/WritingPublisherSubscriber(python)
11 # name are launched, the previous one is kicked on. ine
12 # anonymous=True flag means that rospy will choose a unique
13 # name for our 'listener' node so that multiple lis...
14 # run simultaneously.
15 rospy.init_node('listener', anonymous=True)
16
17 rospy.Subscriber("chatter", String,
18
19     # spin() simply keeps python from exiting until this node is stopped
20     rospy.spin()
21
22 if __name__ == '__main__':
23     listener()

```

Then, edit the `catkin_install_python()` call in you...

```

catkin_install_python(PROGRAMS scripts/talker
DESTINATION ${CATKIN_PACKAGE_BIN_DESTINATION}
)

```

2.2 The Code Explained

The code for `listener.py` is similar to `talker.py`, except it's subscribing to messages.

```

Toggle line numbers

15     rospy.init_node('listener', anonymous=True)
16
17     rospy.Subscriber("chatter", String,
18
19         # spin() simply keeps python from exiting until this node is stopped
20         rospy.spin())

```

The terminal window shows the output of the `rosnode list` command:

```

Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://joula-VirtualBox:44375/
ros_comm version 1.15.7

SUMMARY
=====

PARAMETERS
* /rostdistro: noetic
* /rosversion: 1.15.7

NODES

auto-starting new master
process[master]: started with pid [2204]
ROS_MASTER_URI=http://joula-VirtualBox:11311

    setting /run_id to d99993b4-c04c-11ea-8ff5-371086f8997
process[rosout-1]: started with pid [2214]
started core service [/rosout]

```

The terminal window shows the output of the `rosnode info /rosout` command:

```

joula@joula-VirtualBox:~$ rosnode list
/rosout
joula@joula-VirtualBox:~$ rosnode info /rosout
Node [/rosout]
Publications:
 * /rosout_agg [rosgraph_msgs/Log]

Subscriptions:
 * /rosout [unknown type]

Services:
 * /rosout/get_loggers
 * /rosout/set_logger_level

contacting node http://joula-VirtualBox:41709/ ...
Pid: 2386

joula@joula-VirtualBox:~$ 

```

here I notice that there's something wrong

The image shows a Linux desktop environment with several windows open. In the top row, there are two text editors. The left editor contains a Python script named `testing.py` which defines a ROS node to publish a string message. The right editor contains a Python script named `testS.py` which defines a ROS node to subscribe to a string message and log it. Below these are two terminal windows. The left terminal window shows the user navigating to a directory and running `rosrun` to execute `testing.py`. The output indicates that the package 'joula_pkg' was not found. The right terminal window shows the user running `rosrun` to execute `testS.py`. The output shows multiple error messages related to file and directory permissions, as well as syntax errors in the script code.

```

testing.py
1 Import rospy
2 From std_msgs.msg Import String
3
4 def talker():
5     pub = rospy.Publisher('chatter', String, queue_size=10)
6     rospy.init_node('talker', anonymous=True)
7     rate = rospy.Rate(1) # 1hz
8     msg = String()
9
10    while not rospy.is_shutdown():
11        hello_str = "Hello world %s" % rospy.get_time()
12        msg.data = hello_str
13        rospy.loginfo(hello_str)
14        pub.publish(msg)
15
16    rospy.loginfo(hello_str)
17    #pub.publish(hello_str)
18    rate.sleep()
19
20
21 if __name__ == '__main__':
22     try:
23         talker()
24     except rospy.ROSInterruptException:
25         pass
26
27
28
29

testS.py
1 Import rospy
2 From std_msgs.msg Import String
3
4 def listener():
5     rospy.Subscriber('chatter', String, callback_function)
6
7     rospy.spin()
8
9 def callback_function(message):
10     rospy.loginfo("Received %s", message.data)
11
12
13 if __name__ == '__main__':
14     listener()
15
16

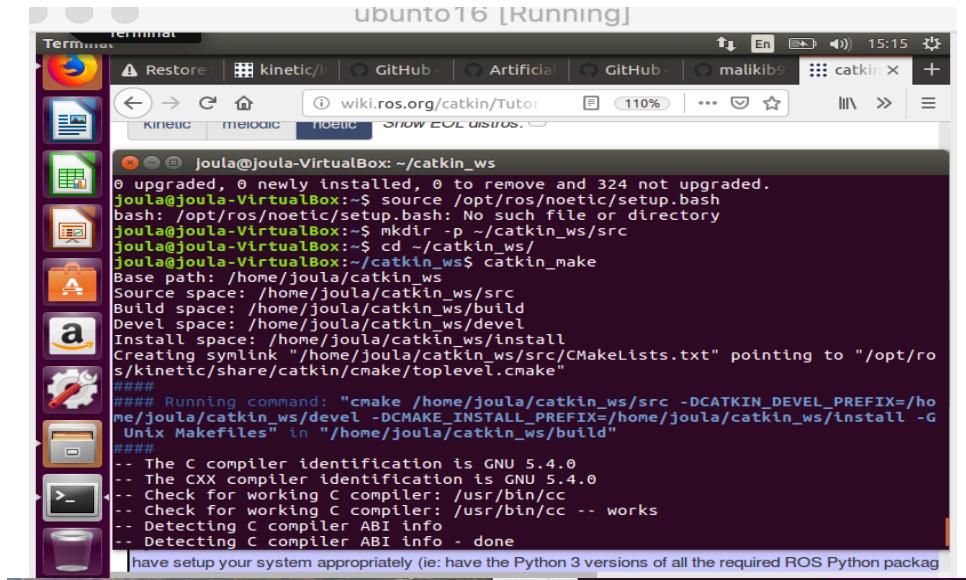
joula@joula-VirtualBox:~/catkin_ws/src/joula_pkg$ cd catkin_ws
joula@joula-VirtualBox:~/catkin_ws$ cd src
joula@joula-VirtualBox:~/catkin_ws/src$ rosrun joula_pkg testing.py
[rospack] Error: package 'joula_pkg' not found
joula@joula-VirtualBox:~/catkin_ws/src$ rosrun joula_pkg testing.py
[rospack] Error: package 'joula_pkg' not found
joula@joula-VirtualBox:~/catkin_ws/src$ chmod +x testing.py
chmod: cannot access 'testing.py': No such file or directory
joula@joula-VirtualBox:~/catkin_ws/src$ cd joula_pkg
joula@joula-VirtualBox:~/catkin_ws/src/joula_pkg$ chmod +x testing.py
joula@joula-VirtualBox:~/catkin_ws/src/joula_pkg$ ls
CMakeLists.txt include package.xml scripts src testing.py testS.py
joula@joula-VirtualBox:~/catkin_ws/src/joula_pkg$ ls
CMakeLists.txt include package.xml scripts src testing.py testS.py
joula@joula-VirtualBox:~/catkin_ws/src/joula_pkg$ ls

joula@joula-VirtualBox:~/catkin_ws/src/joula_pkg$ rosrun joula_pkg testS.py
/home/joula/catkin_ws/src/joula_pkg/testS.py: line 1: import: command not found
from: can't read /var/mail/std_msgs.msg
/home/joula/catkin_ws/src/joula_pkg/testS.py: line 4: syntax error near unexpected token `('
/home/joula/catkin_ws/src/joula_pkg/testS.py: line 4: `def listener():'
joula@joula-VirtualBox:~/catkin_ws/src/joula_pkg$ rosrun joula_pkg testS.py
/home/joula/catkin_ws/src/joula_pkg/testS.py: line 1: import: command not found
from: can't read /var/mail/std_msgs.msg
/home/joula/catkin_ws/src/joula_pkg/testS.py: line 4: syntax error near unexpected token `('
/home/joula/catkin_ws/src/joula_pkg/testS.py: line 4: `def Subscriber():'
joula@joula-VirtualBox:~/catkin_ws/src/joula_pkg$ rosrun joula_pkg testS.py
/opt/ros/noetic/bin/roslaunch: /home/joula/catkin_ws/src/joula_pkg/testS.py: /usr/bin/evn: bad interpreter: No such file or directory
/opt/ros/noetic/bin/roslaunch: line 150: /home/joula/catkin_ws/src/joula_pkg/testS.py: Success
joula@joula-VirtualBox:~/catkin_ws/src/joula_pkg$
```

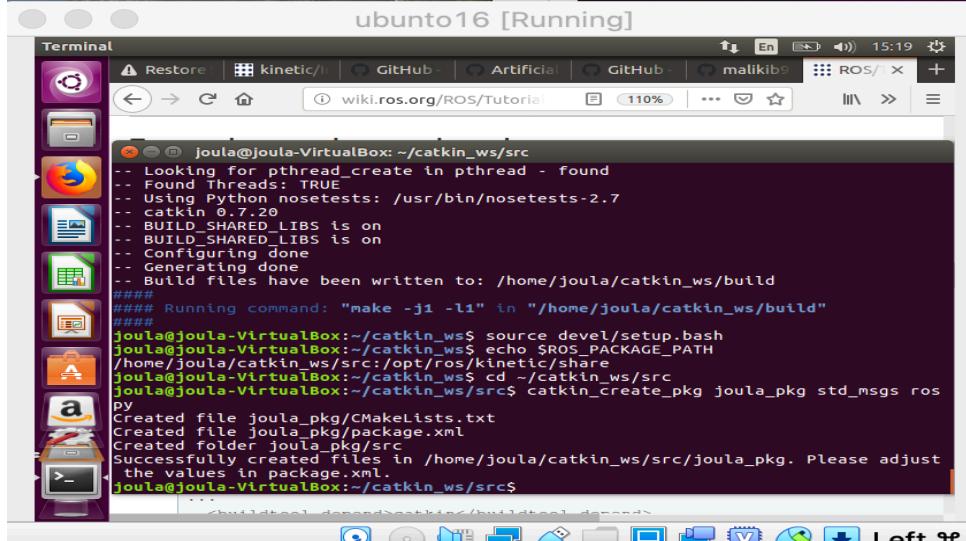
**When I run talker/listener it didn't show the message as it should
Then I knew that it was because of ubuntu 20 and ros noetic**

So I installed ubuntu 16 and ros kinetic 😊

**The first thing I notice was when I entered catkin_make
There was no failure**



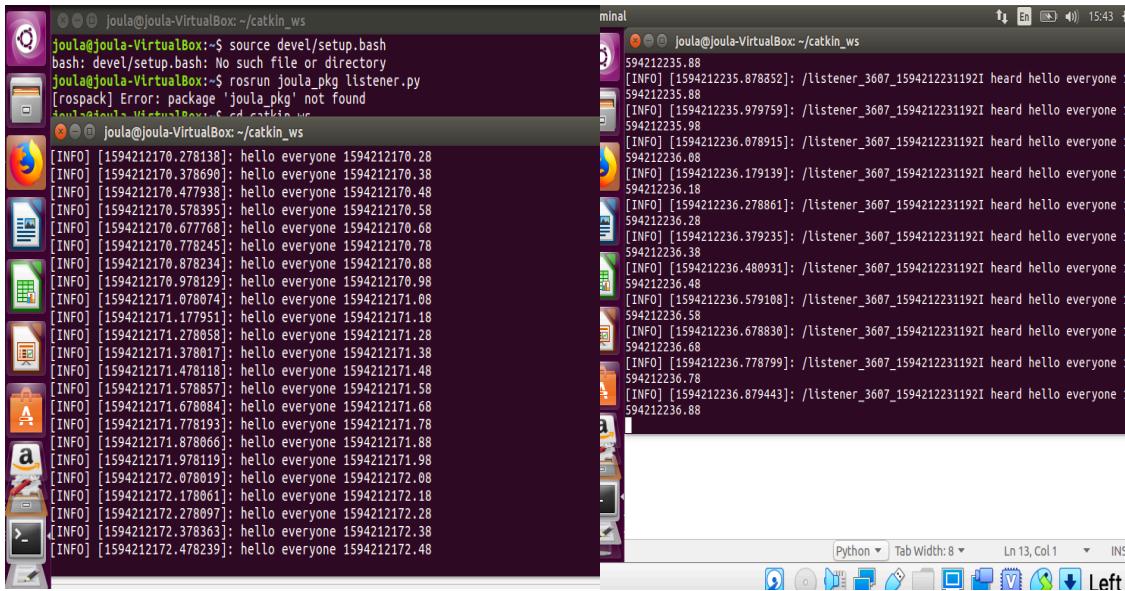
```
joula@joula-VirtualBox: ~/catkin_ws
0 upgraded, 0 newly installed, 0 to remove and 324 not upgraded.
joula@joula-VirtualBox:~$ source /opt/ros/noetic/setup.bash
bash: /opt/ros/noetic/setup.bash: No such file or directory
joula@joula-VirtualBox:~$ mkdir -p ~/catkin_ws/src
joula@joula-VirtualBox:~/catkin_ws$ catkin_make
Base path: /home/joula/catkin_ws
Source space: /home/joula/catkin_ws/src
Build space: /home/joula/catkin_ws/build
Devel space: /home/joula/catkin_ws/devel
Install space: /home/joula/catkin_ws/install
Creating symlink "/home/joula/catkin_ws/src/CMakeLists.txt" pointing to "/opt/ros/noetic/share/catkin/cmake/toplevel.cmake"
#####
## Running command: "cmake /home/joula/catkin_ws/src -DCATKIN_DEVEL_PREFIX=/home/joula/catkin_ws/devel -DCMAKE_INSTALL_PREFIX=/home/joula/catkin_ws/install -G Unix Makefiles" in "/home/joula/catkin_ws/build"
#####
-- The C compiler identification is GNU 5.4.0
-- The CXX compiler identification is GNU 5.4.0
-- Check for working C compiler: /usr/bin/cc
-- Check for working C compiler: /usr/bin/cc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
[have setup your system appropriately (ie: have the Python 3 versions of all the required ROS Python packages)]
```



```
joula@joula-VirtualBox: ~/catkin_ws/src
- Looking for pthread_create in pthread - found
- Found Threads: TRUE
- Using Python nosetests: /usr/bin/nosetests-2.7
- catkin 0.7.20
- BUILD_SHARED_LIBS is on
- BUILD_SHARED_LIBS is on
- Configuring done
- Generating done
- Build files have been written to: /home/joula/catkin_ws/build
#####
## Running command: "make -j1 -l1" in "/home/joula/catkin_ws/build"
#####
joula@joula-VirtualBox:~/catkin_ws$ source devel/setup.bash
joula@joula-VirtualBox:~/catkin_ws$ echo $ROS_PACKAGE_PATH
/home/joula/catkin_ws/src:/opt/ros/noetic/share
joula@joula-VirtualBox:~/catkin_ws$ cd ~/catkin_ws/src
joula@joula-VirtualBox:~/catkin_ws/src$ catkin_create_pkg joula_pkg std_msgs ros
py
Created file joula_pkg/CMakeLists.txt
Created file joula_pkg/package.xml
Created folder joula pkg/src
Successfully created files in /home/joula/catkin_ws/src/joula_pkg. Please adjust the values in package.xml.
joula@joula-VirtualBox:~/catkin_ws/src$
```

Repeat all steps I said it before

This is the run of talker and listener



And it showed in ros node and topic list 😊

```
from std_msgs.msg import String
def callback(data):
    ...
joula@joula-VirtualBox:~/catkin_ws
joula@joula-VirtualBox:~/catkin_ws$ rosnode list
/listener_3607_1594212231192I
/rosout
/talker_3463_1594212029829
joula@joula-VirtualBox:~/catkin_ws$ rostopic list
/chatter
/rosout
/rosout_agg
```

References that helped me:

- <http://wiki.ros.org/ROS/Tutorials>
- <https://www.youtube.com/watch?v=bJB9tv4ThV4>
- https://www.youtube.com/watch?v=GBtKo_pXrJQ
- <https://www.youtube.com/watch?v=H6bw5aw9mOQ>