Getting started with ROS

1. Create a folder for your workspace (Workspace is a place that wrap all of your used packages)

```
mkdir -p hello_workspace/src
```

2. Go to workspace folder

```
cd hello_workspace
```

3. Initialize workspace

```
catkin_make
```

4. Go to src folder

```
cd src
```

5. Create a package (Here we are specifying the name of the package as `hello_pkg` and specifying `std_msgs` and `rospy` as additional dependencies for our package

```
catkin_create_pkg hello_pkg std_msgs rospy
```

6. Go to package folder

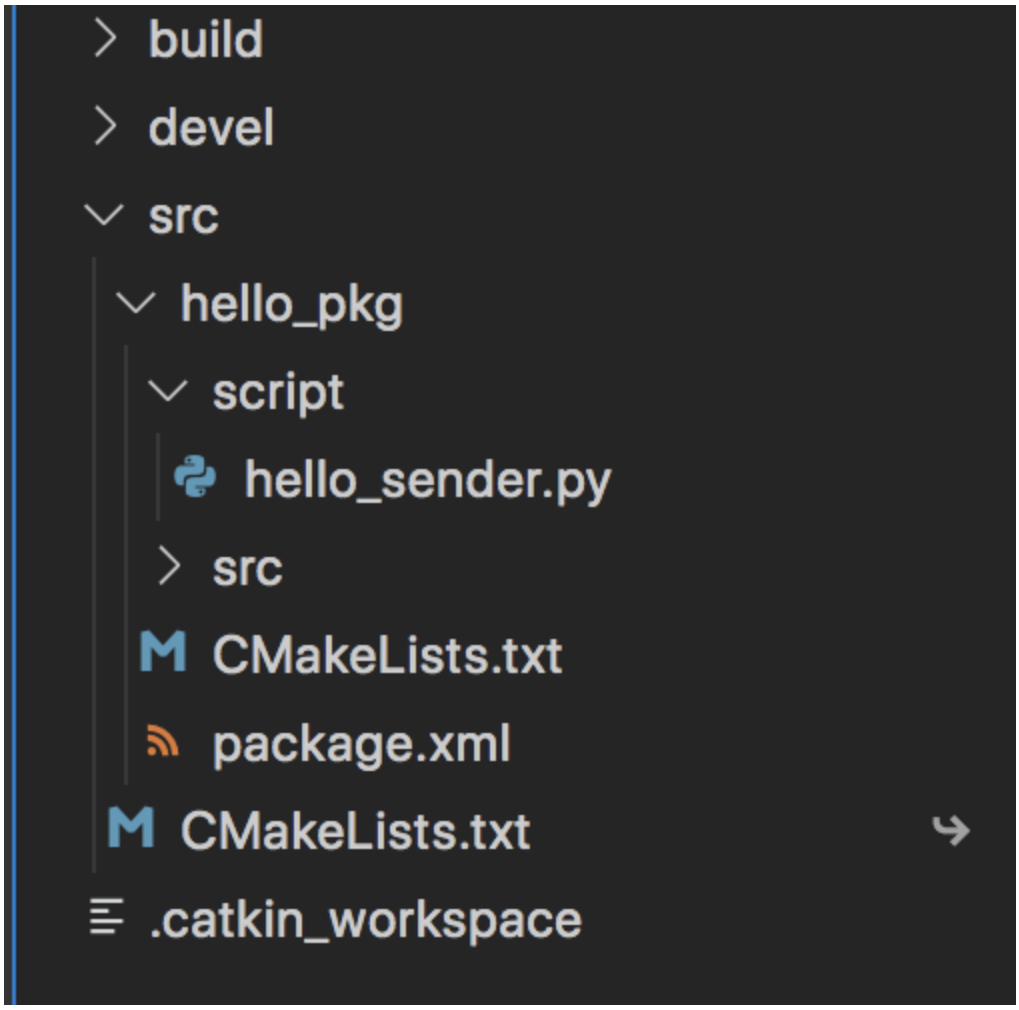
```
cd hello_pkg
```

7. Make a script folder, script folder is the holder for our modules that are written in python3

```
mkdir script
```

8. Open vscode, and go file→open folder, browse to the workspace folder `hello_workspace` and open it
9. Create a file named `hello_sender.py` in src/hello_pkg/script folder

   After this step, your project folder structure should be like this:



10. Copy the following code to `hello_sender.py`

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

import rospy
```

```
from rospy.rostime import Time
from std_msgs.msg import String


def main():
    # Initialize Node with node name
    rospy.init_node('hello_sender')
    # Assign node as a publisher to this topic
    pub = rospy.Publisher('/hello_topic', String, queue_size=10)
    # Get the current time in seconds
    start = Time.now().to_sec()

    while not rospy.is_shutdown():
        # If 5 seconds are passed
        if Time.now().to_sec() - start >= 5:

            msg = String()

            start = Time.now().to_sec()
            msg.data = 'Hello world at {}'.format(start)

            # Broadcast the message to the topic hello_sender
            pub.publish(msg)

            print('msg sent')


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

11. Go back to your terminal, and do `cd ..` command till you reach the workspace folder `hello_workspace`
12. Source your files

```
source ./devel/setup.bash
```

13. Make your python file executable

```
chmod +x src/hello_pkg/script/hello_sender.py
```

14. Open another terminal, and run the master node

```
roscore
```

15. Go back to your original terminal, and create a node from the script

```
rosrun hello_pkg hello_sender.py
```

16. Open another terminal, and navigate to `hello_workspace` folder, and source the files

```
source ./devel/setup.bash
```

17. View all topics

```
rostopic list
```

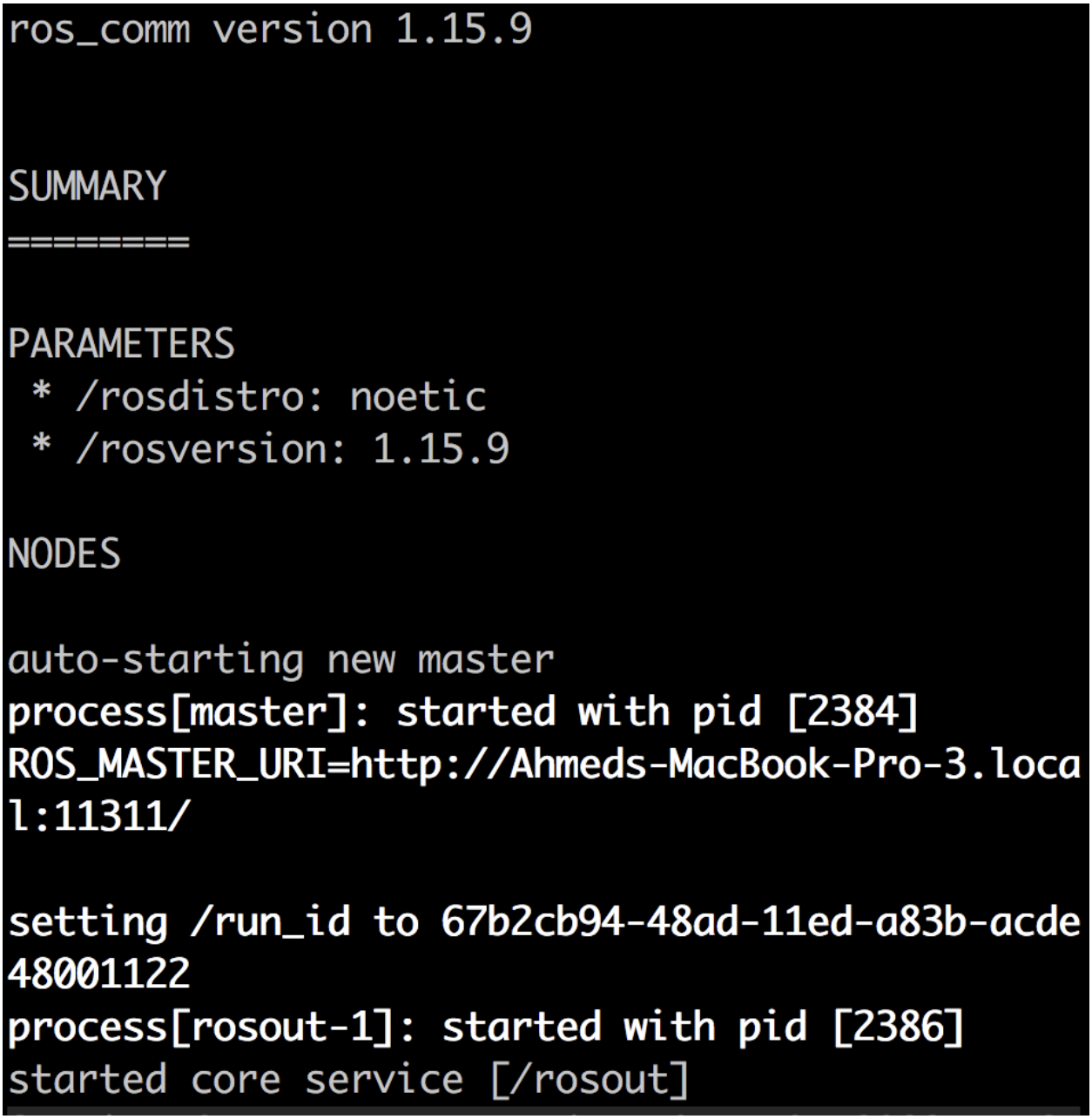
one of the topics must be `hello_topic`

18. Show the logs of `hello_topic`

```
rostopic echo /hello_topic
```

Expected outputs

The terminal of master node:



The terminal running hello_sender.py:

```
msg sent
msg sent
msg sent
msg sent
msg sent
msg sent
msg sent
```

The terminal running `rostopic echo /hello_topic` :

```
data: "Hello world at 1665421803.856981"
---
data: "Hello world at 1665421808.8569899"
---
data: "Hello world at 1665421813.856997"
---
data: "Hello world at 1665421818.8570051"
---
```