# LABSHEET-2

1. **Create a publisher node subscriber node to publishes consecutive integers on the topic counter at a rate of 2Hz and subscribe the count .**

## Code :

publisher.py 2 × subscriber.py 2

Ubuntu-20.04 > home > anuvindmp > catkin_ws > src > lab_2 > publisher.py > ...

```python
#!/usr/bin/env python3
# license removed for brevity
import rospy
from std_msgs.msg import Int32

def talker():
    pub = rospy.Publisher('/counter', Int32, queue_size=10)
    rospy.init_node('counter_publisher', anonymous=True)
    rate = rospy.Rate(2)
    num = 0
    while not rospy.is_shutdown():
        num+=1
        rospy.loginfo(num)
        pub.publish(num)
        rate.sleep()

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

publisher.py 2 subscriber.py 2 ×

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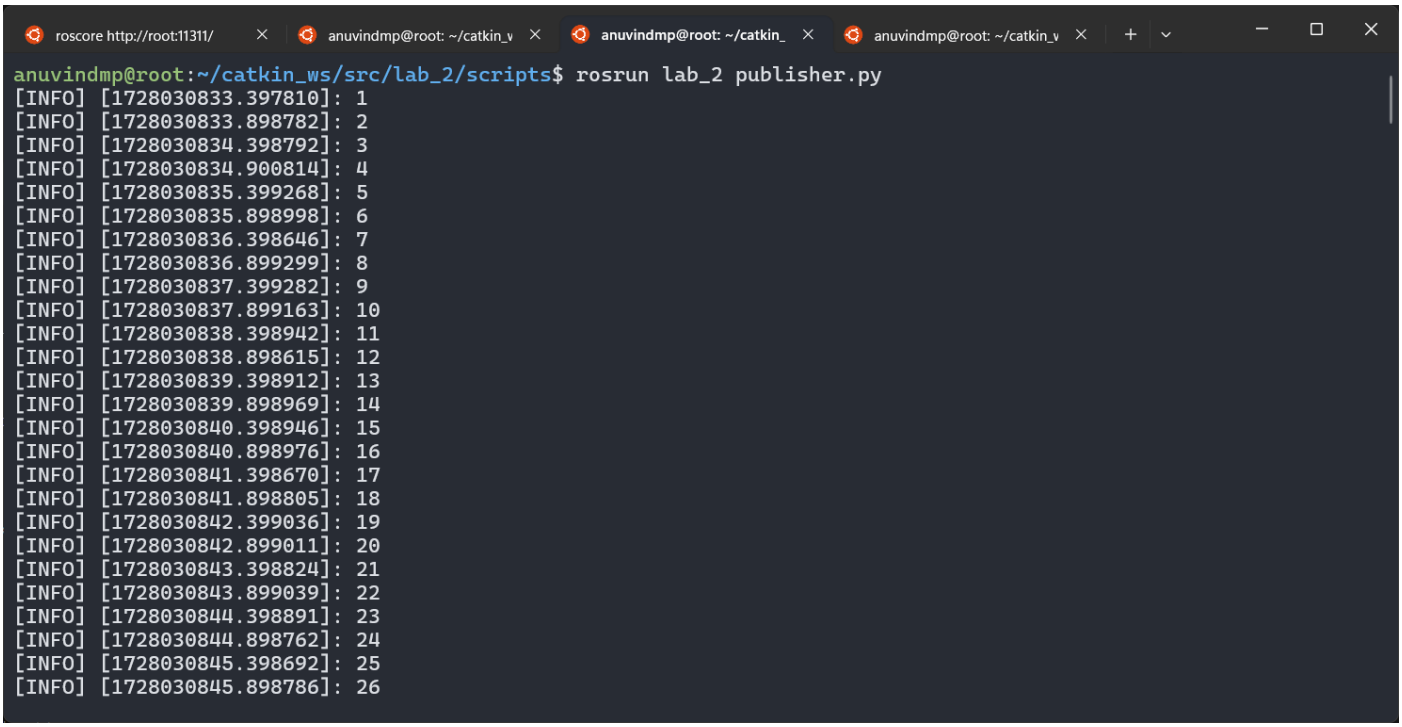
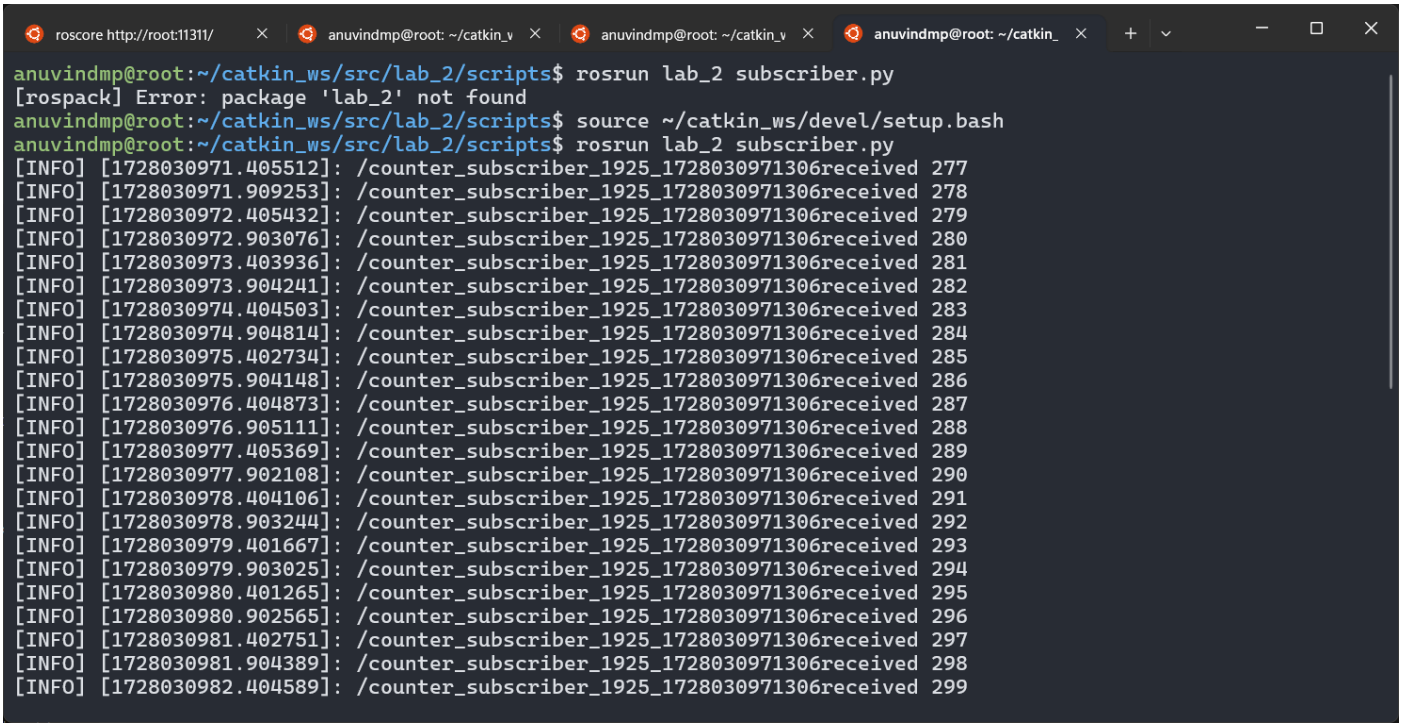
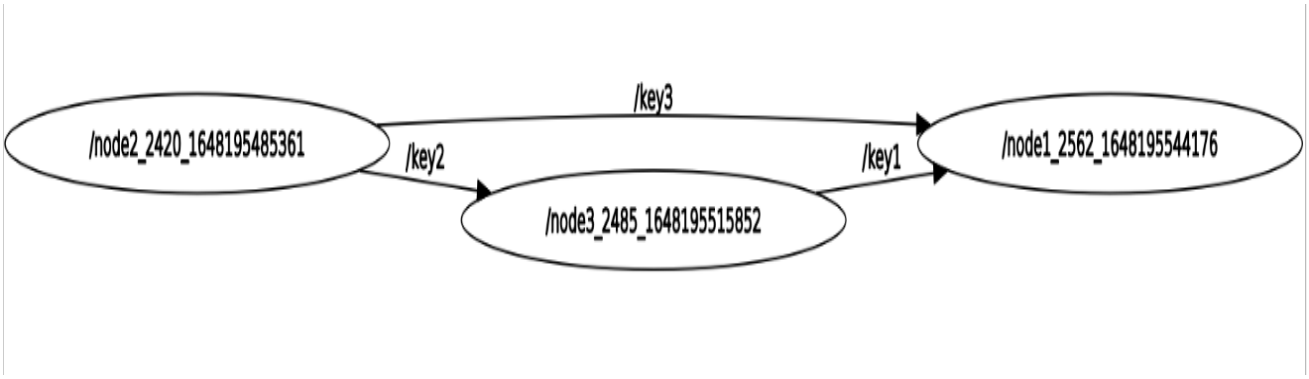
```python
#!/usr/bin/env python3
import rospy
from std_msgs.msg import Int32

def callback(data):
    rospy.loginfo(rospy.get_caller_id() + "received %d", data.data)

def counter_subscriber():

    # 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('counter_subscriber', anonymous=True)

    rospy.Subscriber("/counter", Int32, callback)

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

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

# Output :


roscore http://root:11311/
anuvindmp@root: ~/catkin_v
anuvindmp@root: ~/catkin_
anuvindmp@root: ~/catkin_v
anuvindmp@root:~/catkin_ws/src/lab_2/scripts$ rosrun lab_2 publisher.py
[INFO] [1728030833.397810]: 1
[INFO] [1728030833.898782]: 2
[INFO] [1728030834.398792]: 3
[INFO] [1728030834.900814]: 4
[INFO] [1728030835.399268]: 5
[INFO] [1728030835.898998]: 6
[INFO] [1728030836.398646]: 7
[INFO] [1728030836.899299]: 8
[INFO] [1728030837.399282]: 9
[INFO] [1728030837.899163]: 10
[INFO] [1728030838.398942]: 11
[INFO] [1728030838.898615]: 12
[INFO] [1728030839.398912]: 13
[INFO] [1728030839.898969]: 14
[INFO] [1728030840.398946]: 15
[INFO] [1728030840.898976]: 16
[INFO] [1728030841.398670]: 17
[INFO] [1728030841.898805]: 18
[INFO] [1728030842.399036]: 19
[INFO] [1728030842.899011]: 20
[INFO] [1728030843.398824]: 21
[INFO] [1728030843.899039]: 22
[INFO] [1728030844.398891]: 23
[INFO] [1728030844.898762]: 24
[INFO] [1728030845.398692]: 25
[INFO] [1728030845.898786]: 26


roscore http://root:11311/
anuvindmp@root: ~/catkin_v
anuvindmp@root: ~/catkin_v
anuvindmp@root: ~/catkin_
anuvindmp@root:~/catkin_ws/src/lab_2/scripts$ rosrun lab_2 subscriber.py
[rospack] Error: package 'lab_2' not found
anuvindmp@root:~/catkin_ws/src/lab_2/scripts$ source ~/catkin_ws/devel/setup.bash
anuvindmp@root:~/catkin_ws/src/lab_2/scripts$ rosrun lab_2 subscriber.py
[INFO] [1728030971.405512]: /counter_subscriber_1925_1728030971306received 277
[INFO] [1728030971.909253]: /counter_subscriber_1925_1728030971306received 278
[INFO] [1728030972.405432]: /counter_subscriber_1925_1728030971306received 279
[INFO] [1728030972.903076]: /counter_subscriber_1925_1728030971306received 280
[INFO] [1728030973.403936]: /counter_subscriber_1925_1728030971306received 281
[INFO] [1728030973.904241]: /counter_subscriber_1925_1728030971306received 282
[INFO] [1728030974.404503]: /counter_subscriber_1925_1728030971306received 283
[INFO] [1728030974.904814]: /counter_subscriber_1925_1728030971306received 284
[INFO] [1728030975.402734]: /counter_subscriber_1925_1728030971306received 285
[INFO] [1728030975.904148]: /counter_subscriber_1925_1728030971306received 286
[INFO] [1728030976.404873]: /counter_subscriber_1925_1728030971306received 287
[INFO] [1728030976.905111]: /counter_subscriber_1925_1728030971306received 288
[INFO] [1728030977.405369]: /counter_subscriber_1925_1728030971306received 289
[INFO] [1728030977.902108]: /counter_subscriber_1925_1728030971306received 290
[INFO] [1728030978.404106]: /counter_subscriber_1925_1728030971306received 291
[INFO] [1728030978.903244]: /counter_subscriber_1925_1728030971306received 292
[INFO] [1728030979.401667]: /counter_subscriber_1925_1728030971306received 293
[INFO] [1728030979.903025]: /counter_subscriber_1925_1728030971306received 294
[INFO] [1728030980.401265]: /counter_subscriber_1925_1728030971306received 295
[INFO] [1728030980.902565]: /counter_subscriber_1925_1728030971306received 296
[INFO] [1728030981.402751]: /counter_subscriber_1925_1728030971306received 297
[INFO] [1728030981.904389]: /counter_subscriber_1925_1728030971306received 298
[INFO] [1728030982.404589]: /counter_subscriber_1925_1728030971306received 299

2. **Create a Communication System in ROS with multiple publisher and subscriber.**




Key1-int

Key2-float

Key3-String

## Code :

node1.py 2 | node2.py 2 | node3.py 2

Ubuntu-20.04 > home > anuvindmp > catkin_ws > src > lab_2 > scripts > node2.py > ...

```
from std_msgs.msg import Float32, String
def talker():
    pub = rospy.Publisher('/key2', Float32, queue_size=10)
    pub1 = rospy.Publisher('/key3', String, queue_size=10)
    rospy.init_node('node2_2420_1648195485361', anonymous=True)
    rate = rospy.Rate(3) # 3 Hz rate
    c = 1.5
    d = 'Hello World'

    while not rospy.is_shutdown():
        rospy.loginfo(f"Publishing Float32: {c}")
        pub.publish(c)

        rospy.loginfo(f"Publishing String: {d}")
        pub1.publish(d)

        c += 0.16 # Increment c by 0.16
        rate.sleep()

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

node1.py 2 | node2.py 2 | node3.py 2

Ubuntu-20.04 > home > anuvindmp > catkin_ws > src > lab_2 > scripts > node2.py > ...

```python
def talker():
    pub = rospy.Publisher('/key2', Float32, queue_size=10)
    pub1 = rospy.Publisher('/key3', String, queue_size=10)
    rospy.init_node('node2_2420_1648195485361', anonymous=True)
    rate = rospy.Rate(3) # 3 Hz rate
    c = 1.5
    d = 'Hello World'

    while not rospy.is_shutdown():
        rospy.loginfo(f"Publishing Float32: {c}")
        pub.publish(c)

        rospy.loginfo(f"Publishing String: {d}")
        pub1.publish(d)

        c += 0.16 # Increment c by 0.16
        rate.sleep()

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

node1.py 2 | node2.py 2 | node3.py 2

Ubuntu-20.04 > home > anuvindmp > catkin_ws > src > lab_2 > scripts > node3.py > ...

```python
# license removed for brevity
import rospy
from std_msgs.msg import Int32, Float32
def callback(data):
    rospy.loginfo("%s I heard %s", rospy.get_caller_id(), data.data)
def talker():
    pub = rospy.Publisher('/key1', Int32, queue_size=10)
    rospy.init_node('node3_2465_1648195515852', anonymous=True)

    rospy.Subscriber("/key2", Float32, callback)

    rate = rospy.Rate(2) # Set rate to 2 Hz
    c = 1
    while not rospy.is_shutdown():
        rospy.loginfo("Publishing: %d" % c)
        pub.publish(c)
        c += 1

        rate.sleep()

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

## Output :

Open | lab2.launch ~/catkin_ws/src/lab_2/scripts | Save

```
1 <launch>
2     <node pkg="lab_2" type="node2.py" name="node2" output="screen" />
3     <node pkg="lab_2" type="node3.py" name="node3" output="screen" />
4     <node pkg="lab_2" type="node1.py" name="node1" output="screen" />
5 </launch>
6
```

roscore http://root:11311/ | /home/anuvindmp/catkin_ws,

```
NODES
  /
    node1 (lab_2/node1.py)
    node2 (lab_2/node2.py)
    node3 (lab_2/node3.py)

ROS_MASTER_URI=http://localhost:11311

process[node2-1]: started with pid [1475]
process[node3-2]: started with pid [1476]
process[node1-3]: started with pid [1477]
INFO: cannot create a symlink to latest log directory: [Errno 2] No such file or directory: '/home/anuvindmp/.
ros/log/latest'
[INFO] [1728063739.916477]: Publishing Float32: 1.5
[INFO] [1728063739.918555]: Publishing: 1
[INFO] [1728063739.920644]: Publishing String: Hello World
[INFO] [1728063740.250420]: Publishing Float32: 1.66
[INFO] [1728063740.253277]: Publishing String: Hello World
[INFO] [1728063740.254561]: /node3 I heard 1.659999966621399
[INFO] [1728063740.256071]: /node1I heard Hello World
[INFO] [1728063740.419363]: Publishing: 2
[INFO] [1728063740.423138]: /node1I heard 2
[INFO] [1728063740.583884]: Publishing Float32: 1.8199999999999998
[INFO] [1728063740.586627]: Publishing String: Hello World
[INFO] [1728063740.588519]: /node3 I heard 1.8200000524520874
[INFO] [1728063740.590069]: /node1I heard Hello World
[INFO] [1728063740.917251]: Publishing Float32: 1.9799999999999998
```