Lab 2 – Report

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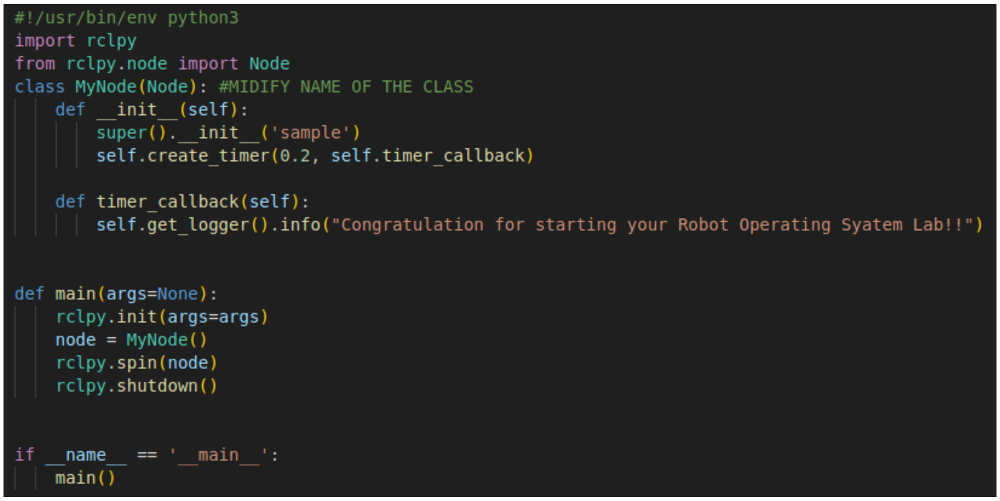
Aim: To familiarize with ROS2 by creating and executing sample codes, publisher-subscriber models.

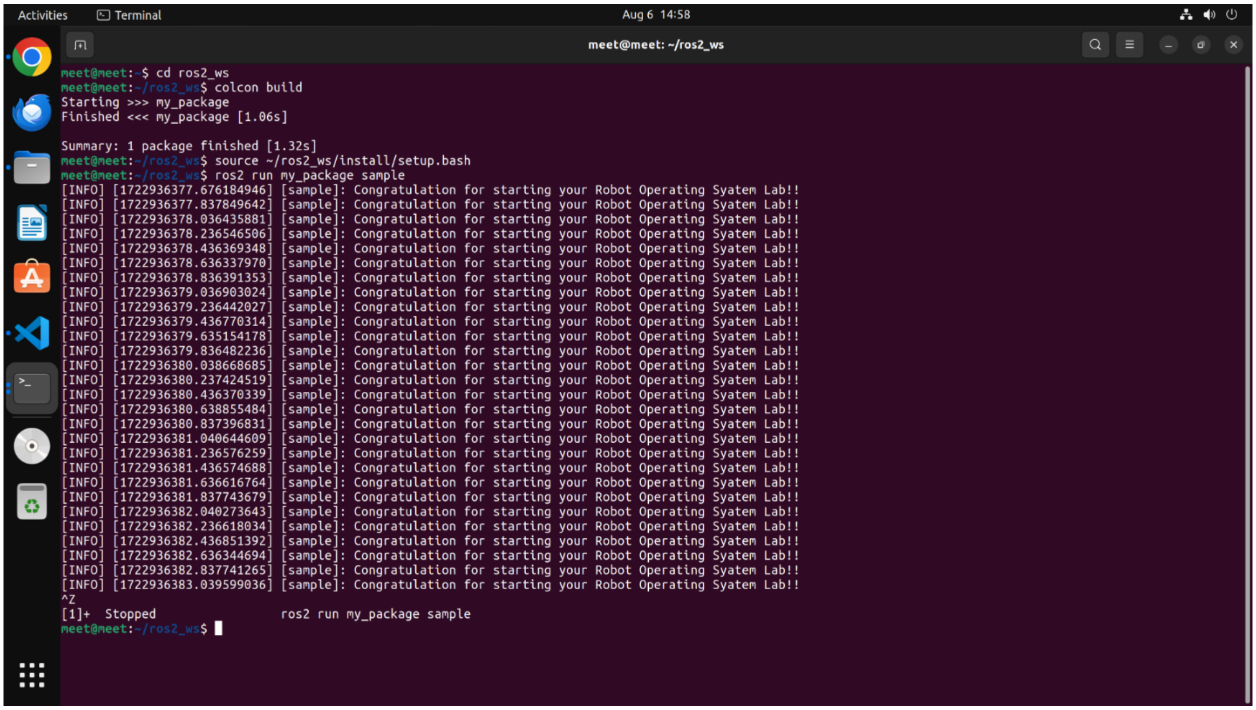
Code Execution and analysis:

- Nodes: sample, publisher, subscriber
- Topic: robot_news
- Messages displayed:
    a. Congratulation for starting your Robot Operating System Lab!!
    b. Hello ROBOT
    c. Greetings from COBOT

1. Writing and Executing a Sample Node

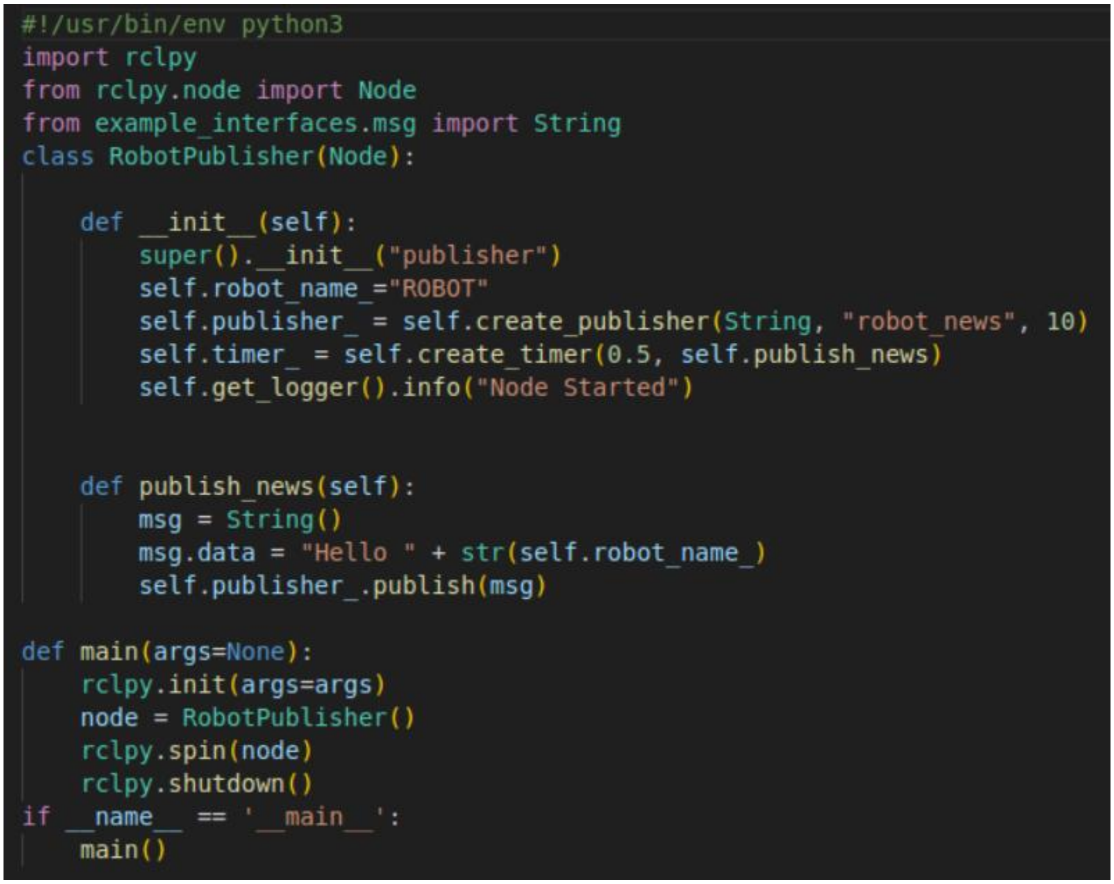


```python
#!/usr/bin/env python3
import rclpy
from rclpy.node import Node
class MyNode(Node): #MIDIFY NAME OF THE CLASS
    def __init__(self):
        super().__init__('sample')
        self.create_timer(0.2, self.timer_callback)

    def timer_callback(self):
        self.get_logger().info("Congratulation for starting your Robot Operating Syatem Lab!!")


def main(args=None):
    rclpy.init(args=args)
    node = MyNode()
    rclpy.spin(node)
    rclpy.shutdown()


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

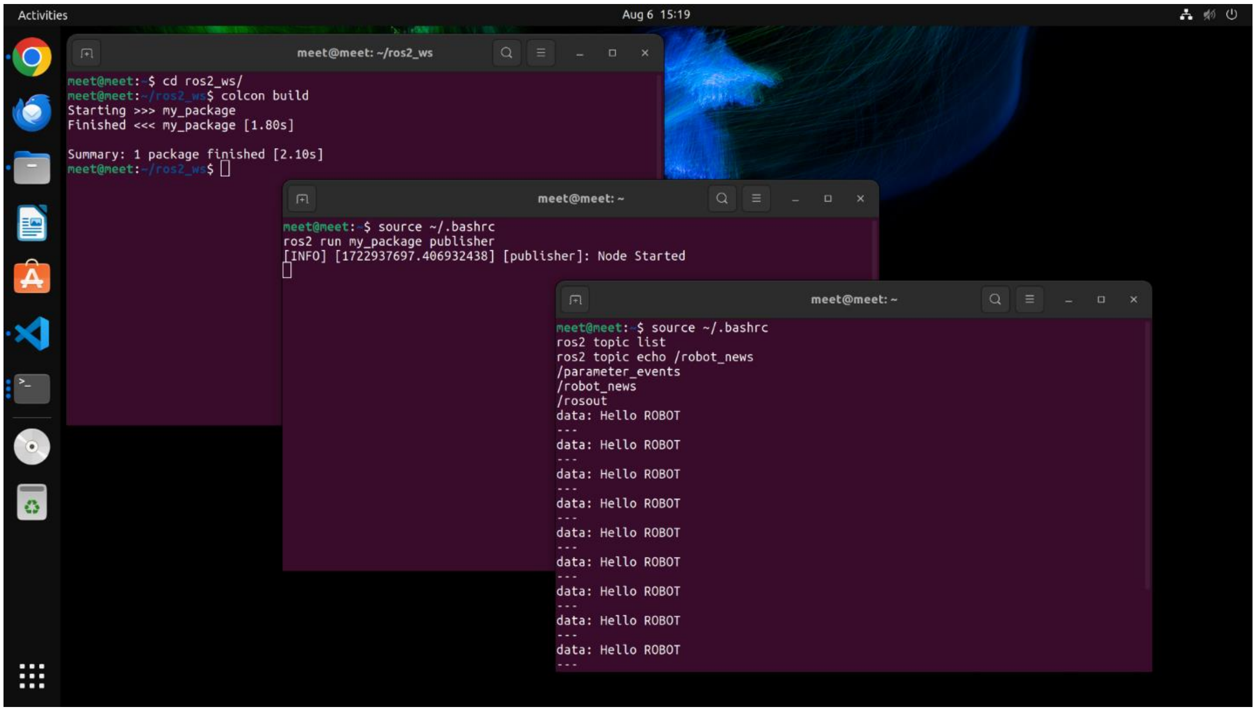


```
meet@meet:~$ cd ros2_ws
meet@meet:~/ros2_ws$ colcon build
Starting >>> my_package
Finished <<< my_package [1.06s]

Summary: 1 package finished [1.32s]
meet@meet:~/ros2_ws$ source ~/ros2_ws/install/setup.bash
meet@meet:~/ros2_ws$ ros2 run my_package sample
[INFO] [1722936377.676184946] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936377.837849642] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936378.036435881] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936378.236546506] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936378.436369348] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936378.636337970] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936378.836391353] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936379.036903024] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936379.236442027] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936379.436770314] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936379.635154178] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936379.836482236] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936380.038668685] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936380.237424519] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936380.436370339] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936380.638855484] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936380.837396831] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936381.040644609] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936381.236576259] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936381.436574688] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936381.636616764] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936381.837743679] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936382.040273643] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936382.236618034] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936382.436851392] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936382.636344694] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936382.837741265] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
[INFO] [1722936383.039599036] [sample]: Congratulation for starting your Robot Operating Syatem Lab!!
^Z
[1]+  Stopped                 ros2 run my_package sample
meet@meet:~/ros2_ws$ 
```

2. Creating a Publisher Node



```python
#!/usr/bin/env python3
import rclpy
from rclpy.node import Node
from example_interfaces.msg import String
class RobotPublisher(Node):

    def __init__(self):
        super().__init__("publisher")
        self.robot_name_="ROBOT"
        self.publisher_ = self.create_publisher(String, "robot_news", 10)
        self.timer_ = self.create_timer(0.5, self.publish_news)
        self.get_logger().info("Node Started")


    def publish_news(self):
        msg = String()
        msg.data = "Hello " + str(self.robot_name_)
        self.publisher_.publish(msg)

def main(args=None):
    rclpy.init(args=args)
    node = RobotPublisher()
    rclpy.spin(node)
    rclpy.shutdown()
if __name__ == '__main__':
    main()
```



meet@meet: ~/ros2_ws

```
meet@meet:~$ cd ros2_ws/
meet@meet:~/ros2_ws$ colcon build
Starting >>> my_package
Finished <<< my_package [1.80s]

Summary: 1 package finished [2.10s]
meet@meet:~/ros2_ws$
```

meet@meet: ~

```
meet@meet:~$ source ~/.bashrc
ros2 run my_package publisher
[INFO] [1722937697.406932438] [publisher]: Node Started
```

meet@meet: ~

```
meet@meet:~$ source ~/.bashrc
ros2 topic list
ros2 topic echo /robot_news
/parameter_events
/robot_news
/rosout
data: Hello ROBOT
---
data: Hello ROBOT
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data: Hello ROBOT
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data: Hello ROBOT
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data: Hello ROBOT
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data: Hello ROBOT
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data: Hello ROBOT
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data: Hello ROBOT
---
data: Hello ROBOT
---
```
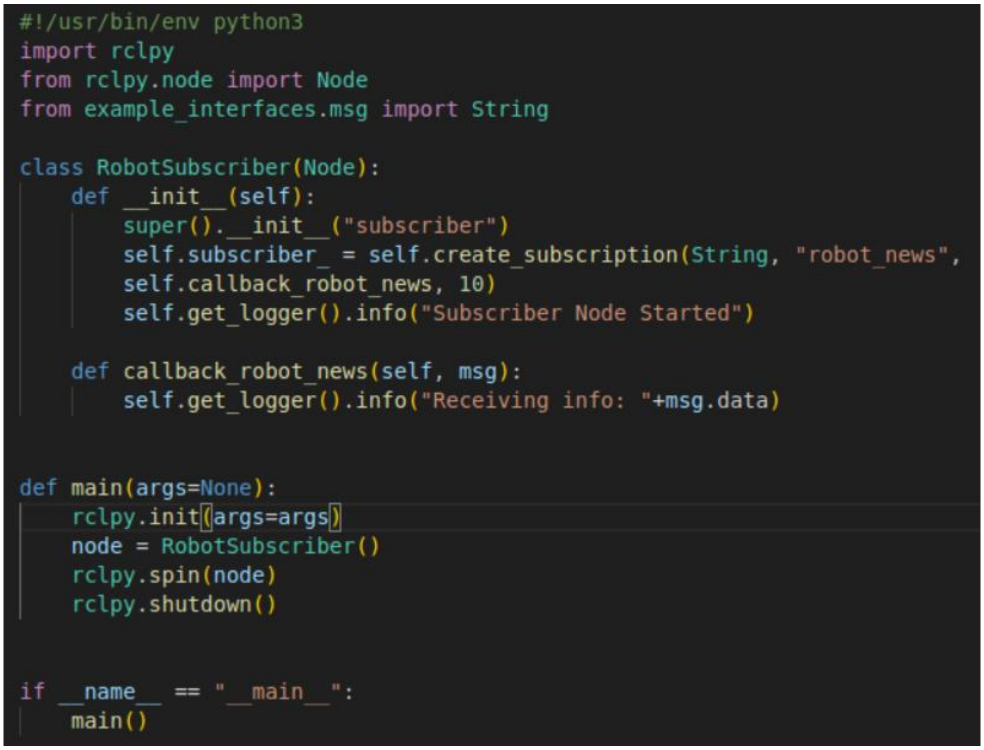
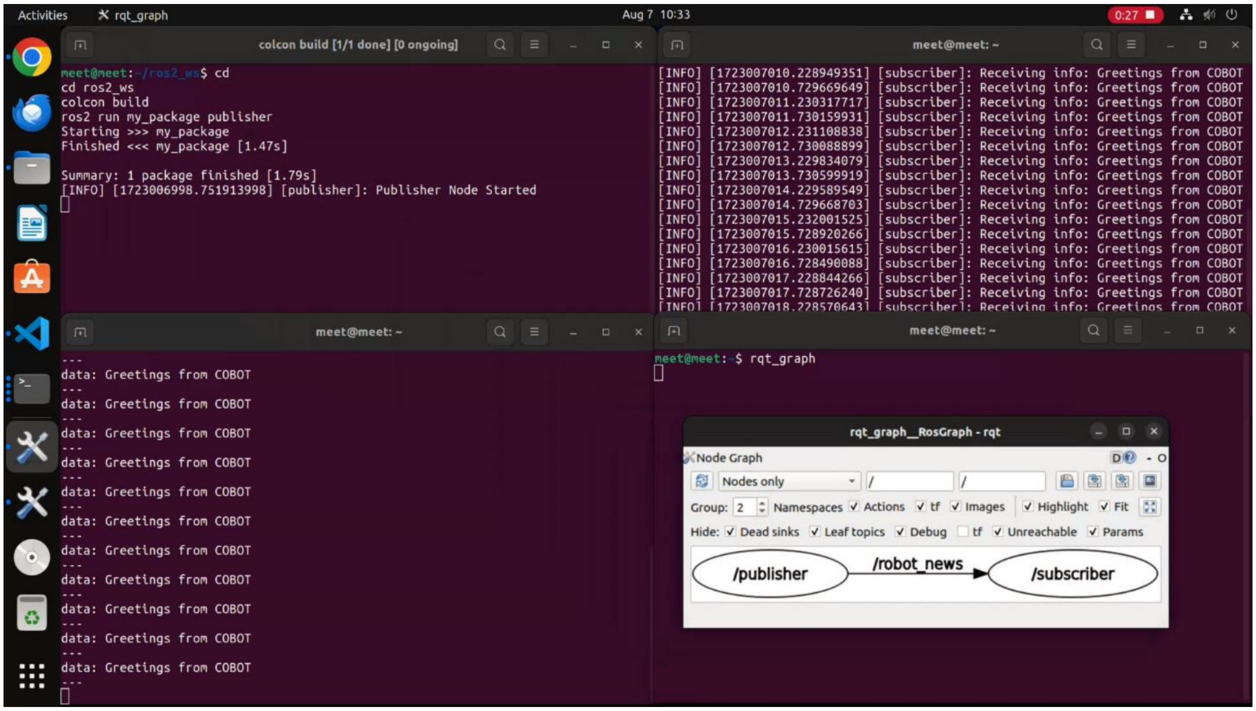

3. Creating a Subscriber Node



```python
#!/usr/bin/env python3
import rclpy
from rclpy.node import Node
from example_interfaces.msg import String

class RobotSubscriber(Node):
    def __init__(self):
        super().__init__("subscriber")
        self.subscriber_ = self.create_subscription(String, "robot_news",
        self.callback_robot_news, 10)
        self.get_logger().info("Subscriber Node Started")

    def callback_robot_news(self, msg):
        self.get_logger().info("Receiving info: "+msg.data)


def main(args=None):
    rclpy.init(args=args)
    node = RobotSubscriber()
    rclpy.spin(node)
    rclpy.shutdown()


if __name__ == "__main__":
    main()
```



```
meet@meet:~/ros2_ws$ cd
cd ros2_ws
colcon build
ros2 run my_package publisher
Starting >>> my_package
Finished <<< my_package [1.47s]

Summary: 1 package finished [1.79s]
[INFO] [1723006998.751913998] [publisher]: Publisher Node Started
```

```
[INFO] [1723007010.228949351] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007010.729669649] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007011.230317717] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007011.730159931] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007012.231108838] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007012.730088899] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007013.229834079] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007013.730599919] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007014.229589549] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007014.729668703] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007015.232001525] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007015.728920266] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007016.230015615] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007016.728490088] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007017.228844266] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007017.728726240] [subscriber]: Receiving info: Greetings from COBOT
[INFO] [1723007018.228570643] [subscriber]: Receiving info: Greetings from COBOT
```

```
---
data: Greetings from COBOT
---
data: Greetings from COBOT
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data: Greetings from COBOT
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data: Greetings from COBOT
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data: Greetings from COBOT
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data: Greetings from COBOT
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data: Greetings from COBOT
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```

```
meet@meet:~$ rqt_graph
```

Nodes only / /

Group: 2 Namespaces ☑ Actions ☑ tf ☑ Images ☑ Highlight ☑ Fit

Hide: ☑ Dead sinks ☑ Leaf topics ☑ Debug □ tf ☑ Unreachable ☑ Params

Conclusion: The lab successfully introduced ROS2 basics, enabling effective creation and execution of nodes for robotic applications.