

## Lab Sheet 1

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*Output for Publisher Subscriber*

```
(base) the_architect@the-administrator:~/catkin_ws/src$ cd ..
cd.: command not found
(base) the_architect@the-administrator:~/catkin_ws/src$ cd ..
(base) the_architect@the-administrator:~/catkin_ws$ rosrunc lab
lab_1 laser_assembler laser_filters laser_geometry
(base) the_architect@the-administrator:~/catkin_ws$ rosrunc lab
lab_1 laser_assembler laser_filters laser_geometry
(base) the_architect@the-administrator:~/catkin_ws$ rosrunc lab_1 publisher.py
[INFO] [1727680581.762572]: hello world 1727680581.762432
[INFO] [1727680581.863163]: hello world 1727680581.8628378
[INFO] [1727680581.963247]: hello world 1727680581.9628823
[INFO] [1727680582.063242]: hello world 1727680582.0628915
[INFO] [1727680582.163074]: hello world 1727680582.162793
[INFO] [1727680582.263259]: hello world 1727680582.2628849
[INFO] [1727680582.363309]: hello world 1727680582.3629012
[INFO] [1727680582.463339]: hello world 1727680582.462928
[INFO] [1727680582.563297]: hello world 1727680582.5628934
[INFO] [1727680582.663272]: hello world 1727680582.6628723
[INFO] [1727680582.763248]: hello world 1727680582.7628782
[INFO] [1727680582.863312]: hello world 1727680582.862908
[INFO] [1727680582.963363]: hello world 1727680582.9629474
[INFO] [1727680583.063123]: hello world 1727680583.0628273
[INFO] [1727680583.163004]: hello world 1727680583.1627812
[INFO] [1727680583.263226]: hello world 1727680583.2628596
[INFO] [1727680583.363286]: hello world 1727680583.3629074
[INFO] [1727680583.463214]: hello world 1727680583.4628634
[INFO] [1727680583.563214]: hello world 1727680583.5628862
[INFO] [1727680583.663111]: hello world 1727680583.662826
[INFO] [1727680583.762859]: hello world 1727680583.7626438
[INFO] [1727680583.862779]: hello world 1727680583.8625896
[INFO] [1727680583.962817]: hello world 1727680583.9626215
[INFO] [1727680584.062887]: hello world 1727680584.0626967
[INFO] [1727680584.162822]: hello world 1727680584.1626716
[INFO] [1727680584.262854]: hello world 1727680584.2626808
[INFO] [1727680584.362856]: hello world 1727680584.3626828
[INFO] [1727680584.462862]: hello world 1727680584.4626856
[INFO] [1727680584.562807]: hello world 1727680584.5626674
[INFO] [1727680584.662800]: hello world 1727680584.66266
[INFO] [1727680584.762836]: hello world 1727680584.7626777
[INFO] [1727680584.862829]: hello world 1727680584.8626778
[INFO] [1727680584.962837]: hello world 1727680584.9626756
[INFO] [1727680585.062971]: hello world 1727680585.0627372
[INFO] [1727680585.163036]: hello world 1727680585.1627457
[INFO] [1727680585.262857]: hello world 1727680585.2627003
[INFO] [1727680585.362979]: hello world 1727680585.3627367
[INFO] [1727680585.462980]: hello world 1727680585.4627512
[INFO] [1727680585.563148]: hello world 1727680585.5628033
[INFO] [1727680585.663172]: hello world 1727680585.6628132
[INFO] [1727680585.762885]: hello world 1727680585.7627177
[INFO] [1727680585.863220]: hello world 1727680585.8628485
[INFO] [1727680585.963067]: hello world 1727680585.9628053
[INFO] [1727680586.062814]: hello world 1727680586.062621
[INFO] [1727680586.162773]: hello world 1727680586.1625561
```

```
(base) the_architect@the-administrator:~/catkin_ws$ roslaunch lab_1 subscriber.py
[INFO] [1727680591.265512]: /listener_15501_1727680591109I heard hello world 1727680591.2627227
[INFO] [1727680591.365654]: /listener_15501_1727680591109I heard hello world 1727680591.362592
[INFO] [1727680591.465736]: /listener_15501_1727680591109I heard hello world 1727680591.4626455
[INFO] [1727680591.564902]: /listener_15501_1727680591109I heard hello world 1727680591.5626001
[INFO] [1727680591.666215]: /listener_15501_1727680591109I heard hello world 1727680591.662737
[INFO] [1727680591.765188]: /listener_15501_1727680591109I heard hello world 1727680591.7627046
[INFO] [1727680591.865096]: /listener_15501_1727680591109I heard hello world 1727680591.8626323
[INFO] [1727680591.965853]: /listener_15501_1727680591109I heard hello world 1727680591.9627056
[INFO] [1727680592.064953]: /listener_15501_1727680591109I heard hello world 1727680592.062687
[INFO] [1727680592.165191]: /listener_15501_1727680591109I heard hello world 1727680592.1627057
[INFO] [1727680592.267404]: /listener_15501_1727680591109I heard hello world 1727680592.2628589
[INFO] [1727680592.367674]: /listener_15501_1727680591109I heard hello world 1727680592.362854
[INFO] [1727680592.466346]: /listener_15501_1727680591109I heard hello world 1727680592.4627633
[INFO] [1727680592.565025]: /listener_15501_1727680591109I heard hello world 1727680592.5626395
[INFO] [1727680592.666069]: /listener_15501_1727680591109I heard hello world 1727680592.6626945
[INFO] [1727680592.765867]: /listener_15501_1727680591109I heard hello world 1727680592.7626958
[INFO] [1727680592.866323]: /listener_15501_1727680591109I heard hello world 1727680592.8627665
[INFO] [1727680592.965228]: /listener_15501_1727680591109I heard hello world 1727680592.9627478
[INFO] [1727680593.067213]: /listener_15501_1727680591109I heard hello world 1727680593.0628748
[INFO] [1727680593.167934]: /listener_15501_1727680591109I heard hello world 1727680593.1627913
[INFO] [1727680593.267532]: /listener_15501_1727680591109I heard hello world 1727680593.2629359
[INFO] [1727680593.367220]: /listener_15501_1727680591109I heard hello world 1727680593.3628592
[INFO] [1727680593.466669]: /listener_15501_1727680591109I heard hello world 1727680593.462798
[INFO] [1727680593.565914]: /listener_15501_1727680591109I heard hello world 1727680593.562722
[INFO] [1727680593.666805]: /listener_15501_1727680591109I heard hello world 1727680593.662803
[INFO] [1727680593.767420]: /listener_15501_1727680591109I heard hello world 1727680593.7628477
[INFO] [1727680593.867358]: /listener_15501_1727680591109I heard hello world 1727680593.8628542
[INFO] [1727680593.967590]: /listener_15501_1727680591109I heard hello world 1727680593.9628453
[INFO] [1727680594.065233]: /listener_15501_1727680591109I heard hello world 1727680594.0626543
[INFO] [1727680594.165316]: /listener_15501_1727680591109I heard hello world 1727680594.1627574
[INFO] [1727680594.266968]: /listener_15501_1727680591109I heard hello world 1727680594.2628455
[INFO] [1727680594.366765]: /listener_15501_1727680591109I heard hello world 1727680594.3627985
[INFO] [1727680594.474063]: /listener_15501_1727680591109I heard hello world 1727680594.4628239
[INFO] [1727680594.565854]: /listener_15501_1727680591109I heard hello world 1727680594.5627427
[INFO] [1727680594.665654]: /listener_15501_1727680591109I heard hello world 1727680594.6628928
[INFO] [1727680594.766459]: /listener_15501_1727680591109I heard hello world 1727680594.762754
[INFO] [1727680594.865541]: /listener_15501_1727680591109I heard hello world 1727680594.8627222
[INFO] [1727680594.965425]: /listener_15501_1727680591109I heard hello world 1727680594.9626162
[INFO] [1727680595.065689]: /listener_15501_1727680591109I heard hello world 1727680595.0628502
[INFO] [1727680595.165082]: /listener_15501_1727680591109I heard hello world 1727680595.1626
[INFO] [1727680595.265954]: /listener_15501_1727680591109I heard hello world 1727680595.2627301
[INFO] [1727680595.365411]: /listener_15501_1727680591109I heard hello world 1727680595.3627155
[INFO] [1727680595.466253]: /listener_15501_1727680591109I heard hello world 1727680595.462716
[INFO] [1727680595.565106]: /listener_15501_1727680591109I heard hello world 1727680595.5627112
[INFO] [1727680595.665379]: /listener_15501_1727680591109I heard hello world 1727680595.66303
[INFO] [1727680595.765859]: /listener_15501_1727680591109I heard hello world 1727680595.7626808
[INFO] [1727680595.865086]: /listener_15501_1727680591109I heard hello world 1727680595.8625972
[INFO] [1727680595.965931]: /listener_15501_1727680591109I heard hello world 1727680595.9627028
[INFO] [1727680596.065083]: /listener_15501_1727680591109I heard hello world 1727680596.0626807
[INFO] [1727680596.165068]: /listener_15501_1727680591109I heard hello world 1727680596.1627264
[INFO] [1727680596.265193]: /listener_15501_1727680591109I heard hello world 1727680596.2626827
[INFO] [1727680596.365371]: /listener_15501_1727680591109I heard hello world 1727680596.362733
[INFO] [1727680596.465388]: /listener_15501_1727680591109I heard hello world 1727680596.462673
[INFO] [1727680596.565715]: /listener_15501_1727680591109I heard hello world 1727680596.5627618
[INFO] [1727680596.665213]: /listener_15501_1727680591109I heard hello world 1727680596.6627104
[INFO] [1727680596.765336]: /listener_15501_1727680591109I heard hello world 1727680596.7626107
[INFO] [1727680596.865597]: /listener_15501_1727680591109I heard hello world 1727680596.8627088
[INFO] [1727680596.965091]: /listener_15501_1727680591109I heard hello world 1727680596.9627273
[INFO] [1727680597.064956]: /listener_15501_1727680591109I heard hello world 1727680597.06265
[INFO] [1727680597.165410]: /listener_15501_1727680591109I heard hello world 1727680597.1627216
[INFO] [1727680597.265500]: /listener_15501_1727680591109I heard hello world 1727680597.2628105
```

- Create a package called **assignment\_1** with dependencies **rospy** in your catkin workspace

*Your Code:*

*Making Package and installing the needed dependency*

```
cd ~/catkin_ws/src
catkin_create_pkg assignment_1 rospy
```

Building workspace

```
cd ~/catkin_ws
catkin_make
```

Sourcing the workspace  
source devel/setup.bash

- In the source folder of your package assignment\_1 create a publisher python file **move\_circle.py** which makes the turtlesim to execute a single circular(approximate) trajectory.

*Your Code:*

```
#!/usr/bin/env python

import rospy
from geometry_msgs.msg import Twist

def move_circle():
    # Initialize the node
    rospy.init_node('move_circle', anonymous=True)

    # Create a publisher for the turtle's velocity
    velocity_publisher = rospy.Publisher('/turtle1/cmd_vel', Twist, queue_size=10)

    # Set a loop rate
    rate = rospy.Rate(10)

    # Create a Twist message to control the turtle's velocity
    vel_msg = Twist()

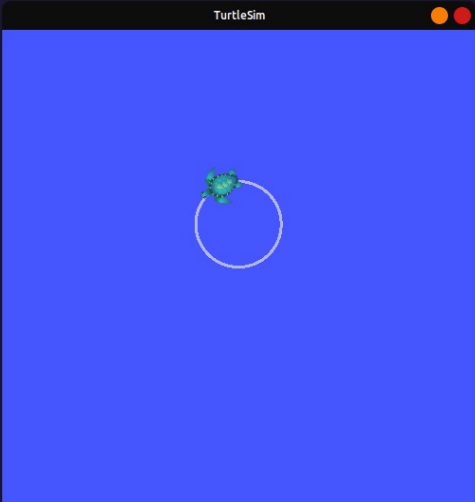
    # Set linear and angular velocity to make a circular motion
    vel_msg.linear.x = 1.0 # Constant forward speed
    vel_msg.angular.z = 1.0 # Constant turning speed

    rospy.loginfo("Moving the turtle in a circle")

    # Keep publishing the velocity command until the node is stopped
    while not rospy.is_shutdown():
        velocity_publisher.publish(vel_msg)
        rate.sleep()

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

```
1972 catkin create_pkg lab_1 std_msgs rospy roscpp
1973 cd lab_1
1974 mkdir scripts
1975 cd scripts
1976 touch subscriber.py
1977 chmod +x subscriber.py
1978 touch publisher.py
1979 chmod +x publisher.py
1980 cd ..
1981 ls
1982 cd ..
1983 ls
1984 cd lab_1/
1985 ls
1986 cd scripts/
1987 ls
1988 nano publisher.py
1989 nano subscriber.py
1990 rosrn lab_1 publisher.py
1991 cd ..
1992 ls
1993 rosrn lab_1 publisher.py
1994 cd ..
1995 ls
1996 rosrn lab_1 move_circle.py
1997 rosrn lab_1 move_square.py
1998 gedit lab_1 move_square.py
1999 history
2000 (base) the_architect@the-administrator:~/catkin_ws/src$ rosrn assignment_move_circle.py
[INFO] [1727681081.260022]: Moving the turtle in a circle
```



- In the source folder of your package assignment\_1 create a publisher python file **move\_square.py** which makes the turtlesim to execute a single square(approximate) trajectory.

*Your Code:*

```
#!/usr/bin/env python
```

```
import rospy
```

```
from geometry_msgs.msg import Twist
```

```
import time
```

```
def move_square():
```

```
    # Initialize the node
```

```
    rospy.init_node('move_square', anonymous=True)
```

```
    # Create a publisher for the turtle's velocity
```

```
    velocity_publisher = rospy.Publisher('/turtle1/cmd_vel', Twist, queue_size=10)
```

```
    # Set a rate for the loop
```

```
    rate = rospy.Rate(1)
```

```
    # Create a Twist message to control the turtle's velocity
```

```
    vel_msg = Twist()
```

```
    # Function to move forward
```

```
    def move_forward():
```

```
        vel_msg.linear.x = 2.0 # Move forward with a constant speed
```

```
        vel_msg.angular.z = 0.0
```

```
        velocity_publisher.publish(vel_msg)
```

```
        rate.sleep()
```

```
    # Function to turn the turtle
```

```
    def turn():
```

```

    vel_msg.linear.x = 0.0 # Stop moving forward
    vel_msg.angular.z = 1.57 # Turn 90 degrees
    velocity_publisher.publish(vel_msg)
    rate.sleep()

rospy.loginfo("Moving the turtle in a square")

for _ in range(4): # Move the turtle in a square (4 sides)
    move_forward()
    time.sleep(2) # Move for 2 seconds
    turn()
    time.sleep(1) # Turn for 1 second

# Stop the turtle after the loop
vel_msg.linear.x = 0.0
vel_msg.angular.z = 0.0
velocity_publisher.publish(vel_msg)

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

```

```
(base) the_architect@the-administrator:~/catkin_ws/src$ rosrunc assignment_ move_square.py
[INFO] [1727681171.305735]: Moving the turtle in a square
(base) the_architect@the-administrator:~/catkin_ws/src$ rosrunc assignment_ move_square.py
[INFO] [1727681203.841628]: Moving the turtle in a square
(base) the_architect@the-administrator:~/catkin_ws/src$ |
```

