

## Simulation and Modelling

### Lab 4: Turtle Sim moving in different Shapes

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20BRS1193

#### Instructions:

Already we have tried the circular movement of turtle sim last week. today you can try various shapes movement namely Square, Triangular movement and Rectangular movement.

#### Square

square\_movement.py

```
#!/usr/bin/env python3
# license removed for brevity
import rospy
import math
from geometry_msgs.msg import Twist

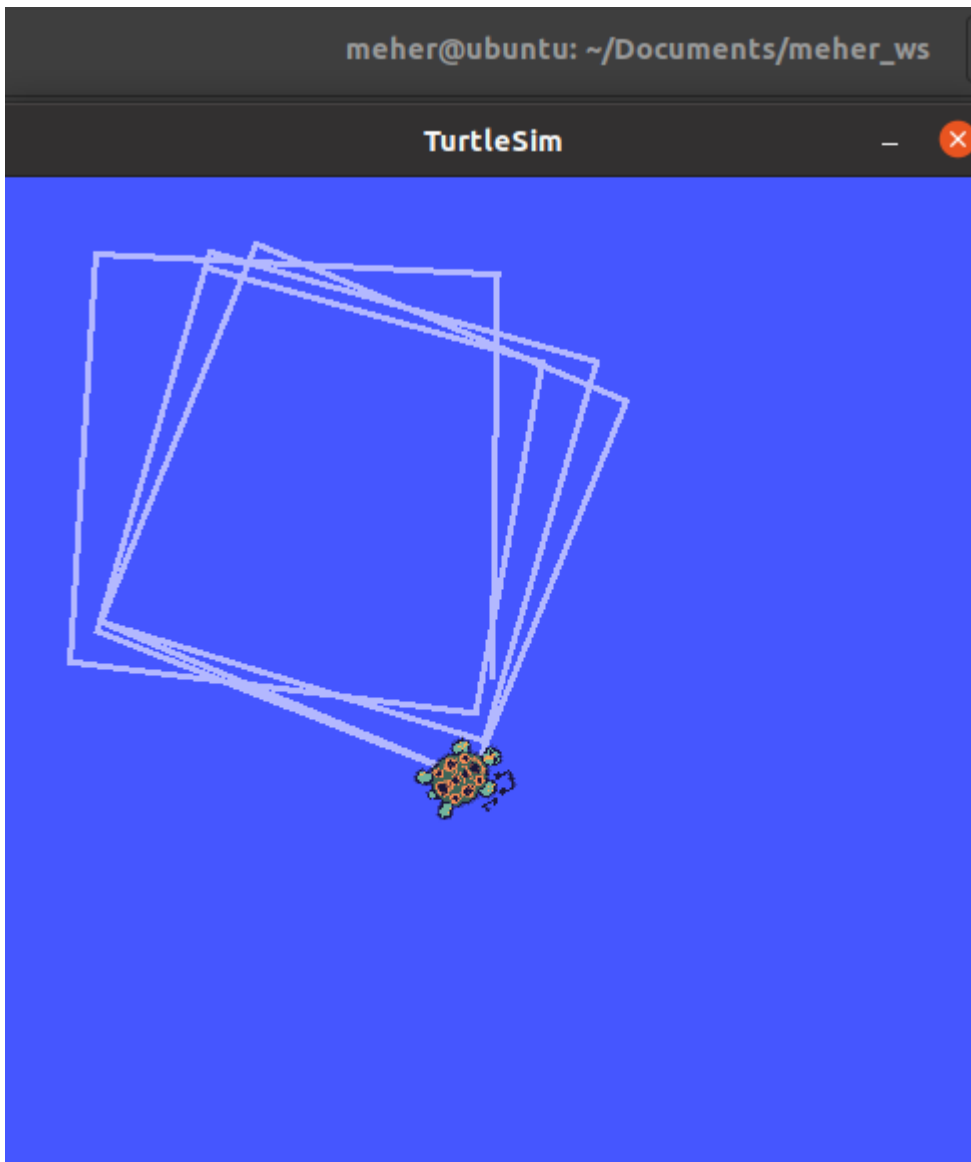
def square_movement_node():
    pub = rospy.Publisher('/turtle1/cmd_vel', Twist, queue_size=10)
    rospy.init_node('tbsim_driver', anonymous=True)
    rate = rospy.Rate(1)
    i = 0
    while not rospy.is_shutdown():
        robot_velocity = Twist()
        if i < 1:
            robot_velocity.linear.x = 4.5
            robot_velocity.angular.z = 0
            i += 1
        else:
            robot_velocity.linear.x = 0
            robot_velocity.angular.z = math.pi/2
            i = 0

        pub.publish(robot_velocity)
        rate.sleep()

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

```
meher@ubuntu: ~/Documents/meher_ws
meher@ubuntu: ~/Documents/mehe... x meher@ubuntu: ~/Documents/mehe... x
meher@ubuntu:~/Documents/meher_ws$ source ./devel/setup.bash
meher@ubuntu:~/Documents/meher_ws$ rosrn turtlesim turtlesim_node
[ INFO] [1680850036.388224139]: Starting turtlesim with node name /turtlesim
[ INFO] [1680850036.396548231]: Spawning turtle [turtle1] at x=[5.544445], y=[5.544445], theta=[0.000000]
```

```
meher@ubuntu: ~/Documents/meher_ws
meher@ubuntu: ~/Documents/mehe... x meher@ubuntu: ~/Documents/mehe... x
meher@ubuntu:~/Documents/meher_ws$ source ./devel/setup.bash
meher@ubuntu:~/Documents/meher_ws$ rosrn ros_tutorial1 square_movement.py
```



## Triangular

triangular\_movement.py

```
#!/usr/bin/env python3
# license removed for brevity
import rospy
import math
from geometry_msgs.msg import Twist

def triangular_movement_node():
    pub = rospy.Publisher('/turtle1/cmd_vel', Twist, queue_size=10)
    rospy.init_node('tbsim_driver', anonymous=True)
    rate = rospy.Rate(1)
    i = 0
    while not rospy.is_shutdown():
        robot_velocity = Twist()
```

```

    if i < 1:
        robot_velocity.linear.x = 4.5
        robot_velocity.angular.z = 0
        i += 1
    else:
        robot_velocity.linear.x = 0
        robot_velocity.angular.z = math.pi/1.5
        i = 0

    pub.publish(robot_velocity)
    rate.sleep()

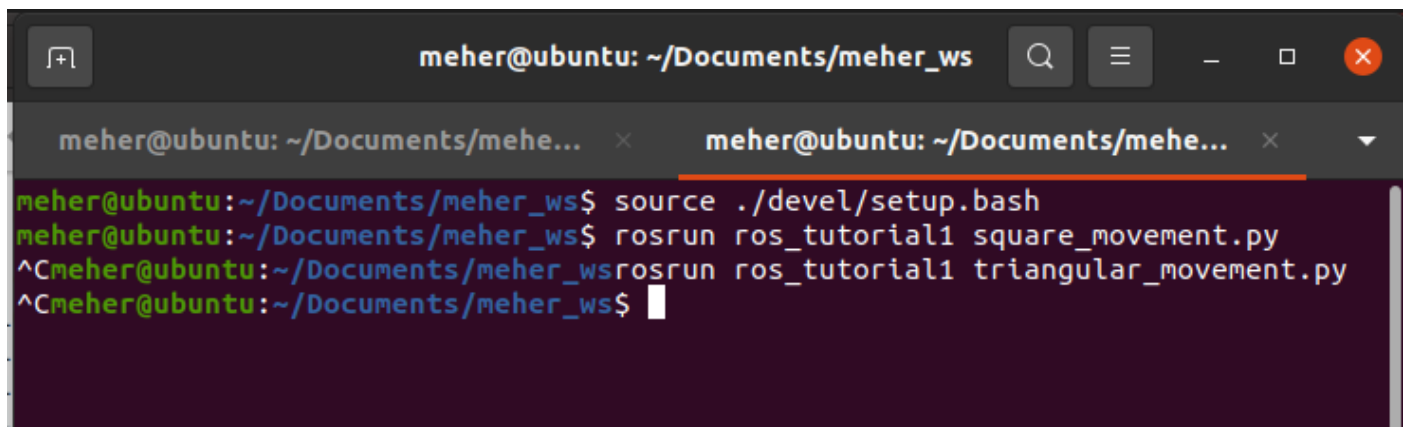
if __name__ == '__main__':
    try:
        triangular_movement_node()
    except rospy.ROSInterruptException:
        pass

```

```

meher@ubuntu:~/Documents/meher_ws$ rosrn turtlesim turtlesim_node
[ INFO] [1680850284.359699656]: Starting turtlesim with node name /turtlesim
[ INFO] [1680850284.367603161]: Spawning turtle [turtle1] at x=[5.544445], y=[5.544445], theta=[0.000000]

```

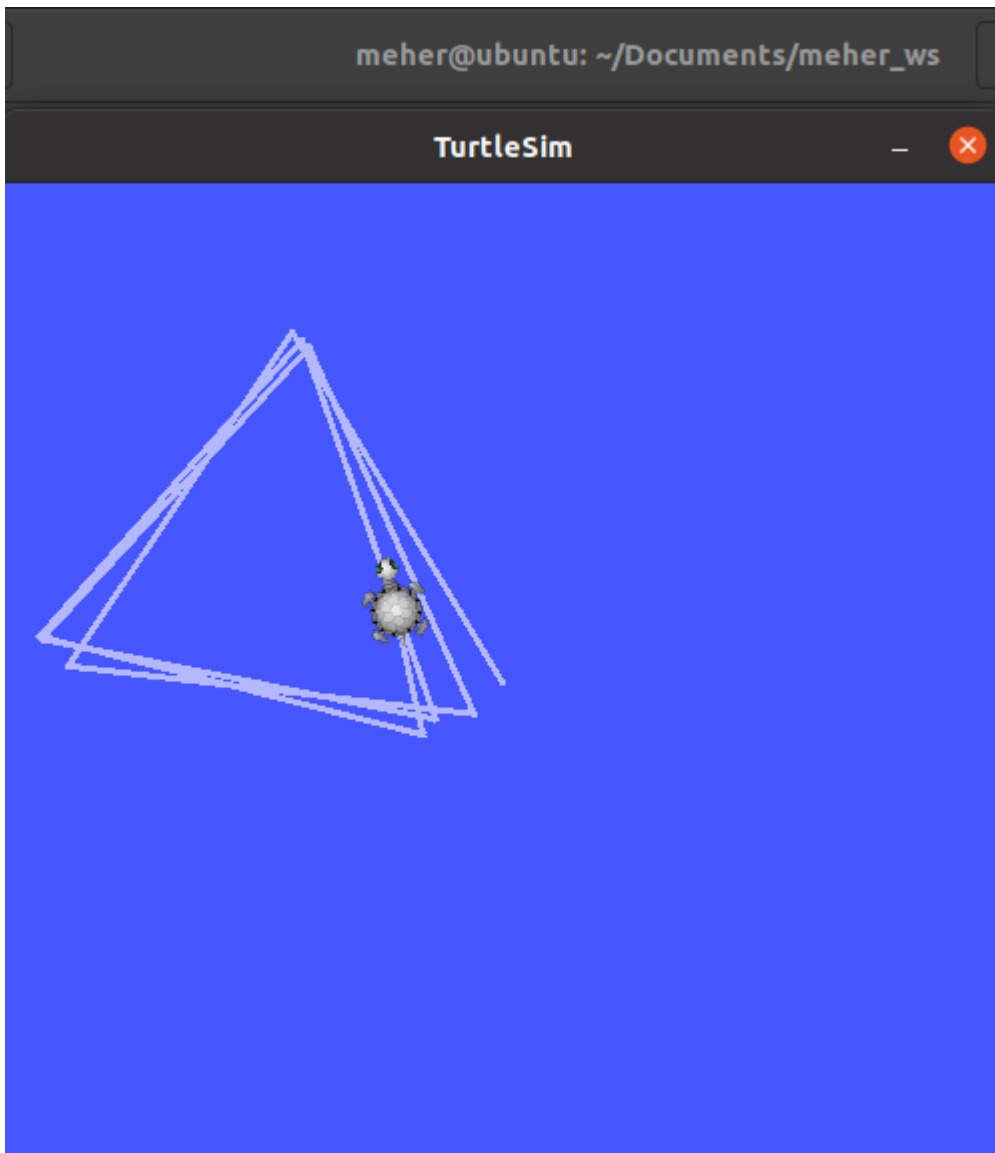


The image shows a terminal window with a title bar that reads "meher@ubuntu: ~/Documents/meher\_ws". The window contains two tabs, both labeled "meher@ubuntu: ~/Documents/mehe...". The active tab shows the following commands and output:

```

meher@ubuntu:~/Documents/meher_ws$ source ./devel/setup.bash
meher@ubuntu:~/Documents/meher_ws$ rosrn ros_tutorial1 square_movement.py
^Cmeher@ubuntu:~/Documents/meher_ws$ rosrn ros_tutorial1 triangular_movement.py
^Cmeher@ubuntu:~/Documents/meher_ws$

```



## Rectangular

rectangular\_movement.py

```
#!/usr/bin/env python3
# license removed for brevity
import rospy
import math
from geometry_msgs.msg import Twist

def rectangular_movement_node():
    pub = rospy.Publisher('/turtle1/cmd_vel', Twist, queue_size=10)
    rospy.init_node('tbsim_driver', anonymous=True)
    rate = rospy.Rate(1)
    i = 0
    f = 0
    while not rospy.is_shutdown():
        robot_velocity = Twist()
        if i == 0:
```

```

        if f == 0:
            i = 1
            f = 1
            robot_velocity.linear.x = 4.5
            robot_velocity.angular.z = 0
        else:
            robot_velocity.linear.x = 1.5
            robot_velocity.angular.z = 0
            i = 1
            f = 0

    else:
        robot_velocity.linear.x = 0
        robot_velocity.angular.z = math.pi/2
        i = 0

    pub.publish(robot_velocity)
    rate.sleep()

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

```

```

meher@ubuntu:~/Documents/meher_ws$ rosrn turtlesim turtlesim_node
[ INFO] [1680850793.144776379]: Starting turtlesim with node name /turtlesim
[ INFO] [1680850793.149327181]: Spawning turtle [turtle1] at x=[5.544445], y=[5.544445], theta=[0.000000]

```

```

meher@ubuntu: ~/Documents/meher_ws
meher@ubuntu: ~/Documents/meher_ws$ source ./devel/setup.bash
meher@ubuntu:~/Documents/meher_ws$ rosrn ros_tutorial1 square_movement.py
^Cmeher@ubuntu:~/Documents/meher_ws$ rosrn ros_tutorial1 triangular_movement.py
^Cmeher@ubuntu:~/Documents/meher_ws$ ^C
meher@ubuntu:~/Documents/meher_ws$ rosrn ros_tutorial1 triangular_movement.py
^Cmeher@ubuntu:~/Documents/meher_ws$ rosrn ros_tutorial1 rectangular_movement.py
^Cmeher@ubuntu:~/Documents/meher_ws$ rosrn ros_tutorial1 rectangular_movement.p
y

```

meher@ubuntu: ~/Documents/meher\_ws

TurtleSim

