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**MEEM 4707: Autonomous system**

**Spring, 2024**

**Lab – 3**

**By**

**Students Name**

**Problem 1.** What will be the last printed value of “count” before the while loop gets terminated?

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| rate=rospy.Rate(5)  Stop = False  count = 0  while ~Stop:  count = count+1  time = count/5  if time < 2  print(count)  else  Stop = True |

**Problem 2.** This file is named “controller\_lab3\_cw.py” and is present in the package named turtlebot3\_gazebo\_lab\scripts

**Text, letter

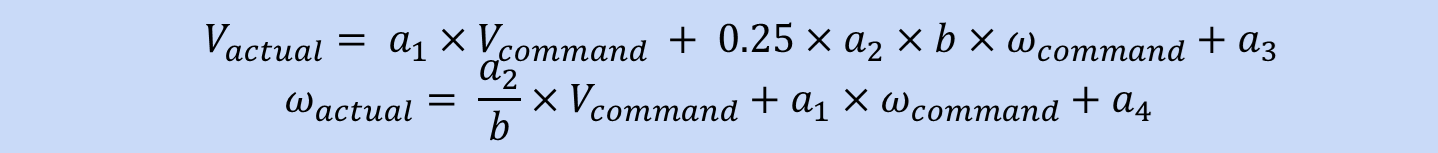
Description automatically generated**

In this code, “rate=rospy.Rate(20)” means the while loop will run 20 times per second. Also, the count will be added every iteration if you put “count=count+1” in the while loop as you did in problem 1.

1. If your velocity is 0.2m/s, rate=rospy.Rate(20) and count=100; where would the turtlebot be located?

1. Try to make the turtlebot move straight forward 1m. (\*Show us your code)
2. Spin the robot clockwise until it reaches 90 degrees on the x-axis using “if / else” conditions in Gazebo. (\*Show us your code)
3. Repeat (2) and (3) to drive a square path. Record the trajectory of the robot in Gazebo and plot the trajectory. **Note: Your robot will not strictly follow square paths on the floor. They are for reference only. Do not try to make it run perfect square.** (\*Show us your code and the resultant path)

**Problem 3.** You can calibrate the robot’s performance based on the relationship between the command and actual velocities as below. Note that represents the distance between the wheels here.

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**Calculate using path trajectory (the content of csv file) that you made in Problem 2.** Note: Refer to pages 17&18 Simulation2. Use the values obtained in Gazebo environment (You have 4 variables and 4 equations)