

Exercise #1

1. Write a Python program for a robot to drive in a square motion.

For this, create a class called Robot. This robot class will have the following attributes (minimally):

- a. Current position (initialized to the origin)
- b. Current direction (initialized to positive x direction [1, 0])
- c. Current time (initialized to 0.0)
- d. The speed of the robot (set to the value of 0.5)

These attributes define the current state of the robot.

2. Update the `__repr__` method of the class to return the current position, direction and time as a string.
3. Create four methods in the above class that update the attributes of the class:

- (i) `def wait(self, time):`

`# this function is called when the robot has to be in the current position for a specified time.`

- (ii) `def move_forward(self, time):`

`# this function is called when the robot has to move along the current direction for the specified time using the set speed.`

- (iii) `def rotate_right(self):`

`# this function is called when the robot has to change the current direction by 90 degrees clockwise.`

- (iv) `def rotate_left(self):`

`# this function is called when the robot has to change the current direction by 90 degrees counter-clockwise.`

These function help in moving the robot in proper directions for the desired time to produce motion. Assume, the distance covered to be negligible while taking turns.

4. Create a function “`move_square(side_length)`” which instantiates the robot class and traverses a square starting at origin as shown in the figure. This function will

take input the side length of the square and execute the instructions. Additionally, print the robot state after every robot action. In the main code, call this function with the side_length argument as 10.

