

# YZV 406E - Robotics

## Assignment #1

Due: October, 31th 23:59

*"C-3PO: Sir, the possibility of  
successfully navigating an asteroid field  
is approximately three-thousand,  
seven-hundred and twenty to one!  
Han Solo: Never tell me the odds!*

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*-The Empire Strikes Back (1980)*

### Introduction

For this assignment, you are expected to create a cleaning task for our lovely turtle in Turtlesim. For any issues regarding the assignment, you can ask your questions on Ninova Message Board. Before writing your question, please check whether your question has been asked. You can also contact T.A. Barış Bilen ([bilenb20@itu.edu.tr](mailto:bilenb20@itu.edu.tr)).

### Implementation Notes

The implementation details below are included in the grading:

1. Please follow a consistent coding style (indentation, variable names, etc.) otherwise you will get **minus** points.
2. Add comments to your code to explain each function or section of code.
3. Make sure that your code works in areas of different sizes.
4. Implement functions like "move", "rotate" and "go-to-a-point".

### Submission Notes

1. Your program should compile and run on ROS2 Foxy Fitzroy. You can (and should) code and test your program on Ubuntu 20.04. It is not recommended to test your code in different environment setups. Be sure that you have submitted all of your files.
2. Submissions are made through **only** the Ninova system and have a strict deadline. Assignments submitted after the deadline will not be accepted.
3. This is not a group assignment and getting involved in any kind of cheating is subject to disciplinary actions. Your assignment should not include any copy-paste material (from the Internet or from someone else's paper/thesis/project).

## Implementation Details

You are expected to implement a cleaning operator for Turtlesim (See Fig. 1). You can create functions and define variables according to your needs without changing what is already provided. All dependencies that you are going to need are provided inside "package.xml" and "CMakeList.txt" file. Please make no changes inside the package other than "cleaner.py" file.

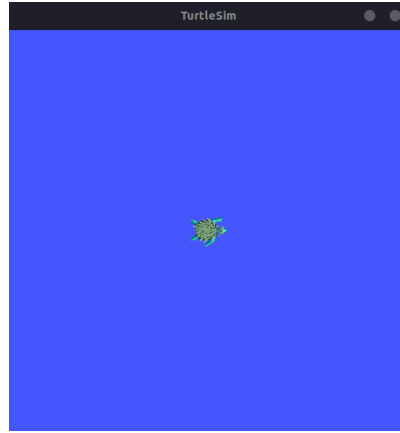


Figure 1: Turtlesim window. (Check out more about Turtlesim)

In this assignment, you are expected to clear as many areas as you can within 120 seconds without leaving the given area (small overflows can be ignored). By cleaning, we mean moving the turtle around in the given area. You can image the given area as in Fig. 2

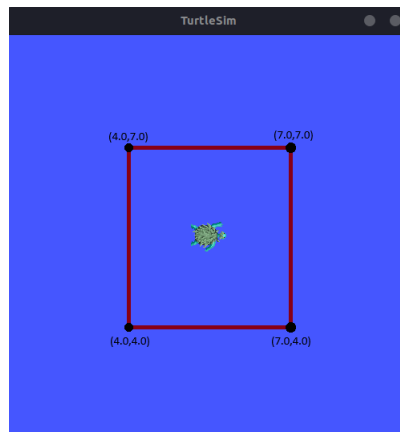


Figure 2: Turtlesim window with 4 given points.

If you examine the "tracker.py" file shared with you, you can see that the area given to you is divided in a certain proportion, and it is checked whether the turtle passes through these areas. "tracker.py" will inform you about time and cleaned area, so you don't need to write a function for these. The aim of this assignment is to familiarize you with the basic elements of ROS. You are free to move the robot around the given area in any way you want, but you must integrate simple functions like "move", "rotate" and "go-to-a-point" into your code.

After building the package once, you can run the assignment by writing "**ros2 launch assignment1 assignment1.launch.py**" in the terminal. You can utilize the "**colcon build --symlink-install**" option to make coding and testing easier.

## Submission & Evaluation

Before submitting, please make sure you are cleaning at least %20-25 of the given area in **120 seconds** and the first move you make is to **one of the 4 points** given to you. Otherwise, you might not receive a full grade from the assignment. Submit your **cleaner.py** files to Ninova.