Faculty of Engineering Ain Shams University
MCT431
Design of Autonomous Systems

Milestone 3

TEAM 4

Presented by:

Name:	**ID**
Kirolos Thabet Fouad	19P6754
Abdulrahman Mohammed Abdullah	19P2862
Omar Mahrous Eltoutongy	19P1060
Ahmed Amr Abdelbaki	19P7696
Yahia Ahmad Allam	19P1714

Presented to:

Dr. Eng. Omar M. Shehata

Eng. Ali Huessin

Table of Contents

Table of Figures

1. FIRST REQUIREMENT

1.1 10*10 map created in Gazebo place with Multiple random obstacles placed.

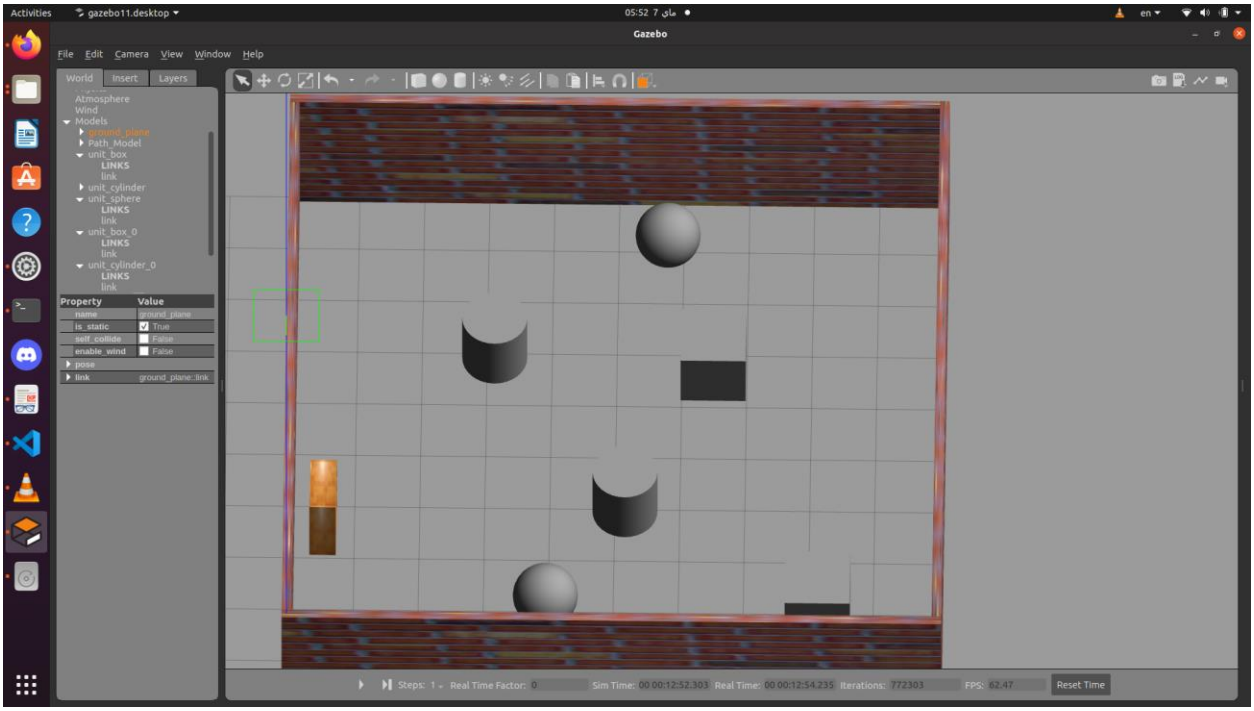


*Figure 1: 10*10 map with random placed obstacles*

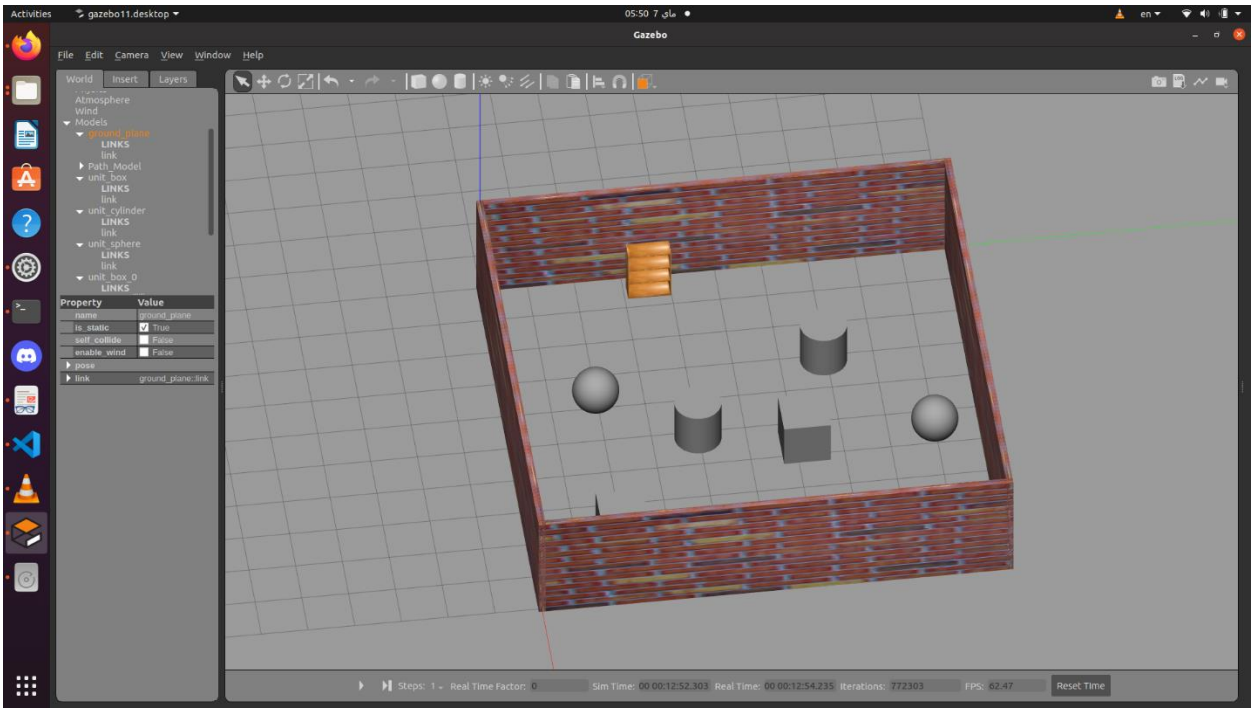


*Figure 2: 10*10 map with random placed obstacles*

2. SECOND REQUIREMENT

2.1 Importing the Turtlebot3 in the created map using a launch file.

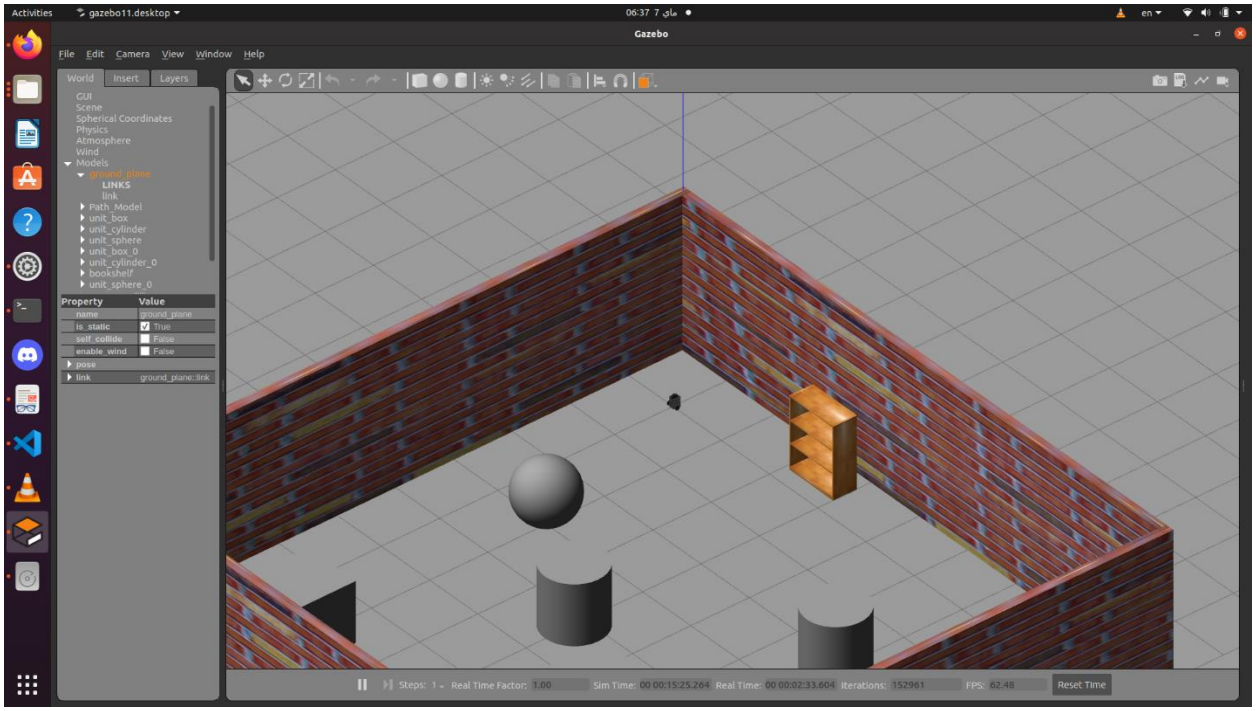


Figure 3: Gazebo launched with the map and the Turtlebot3 imported at position (1,1).

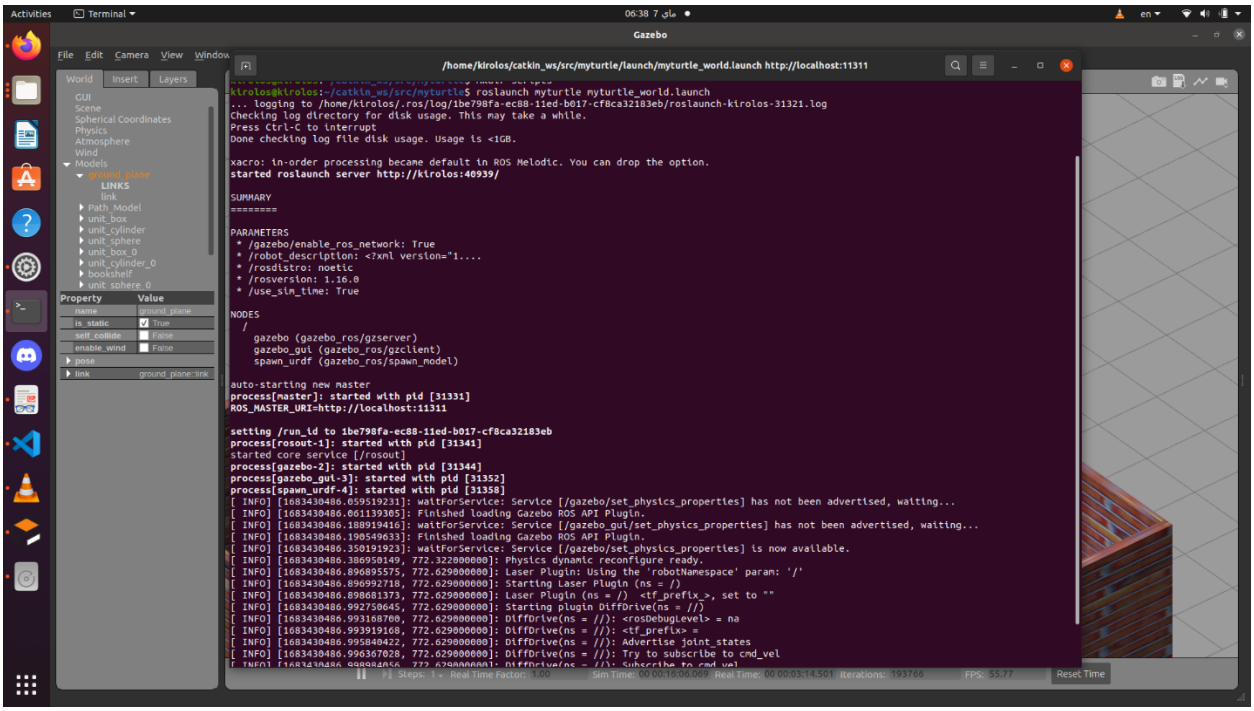
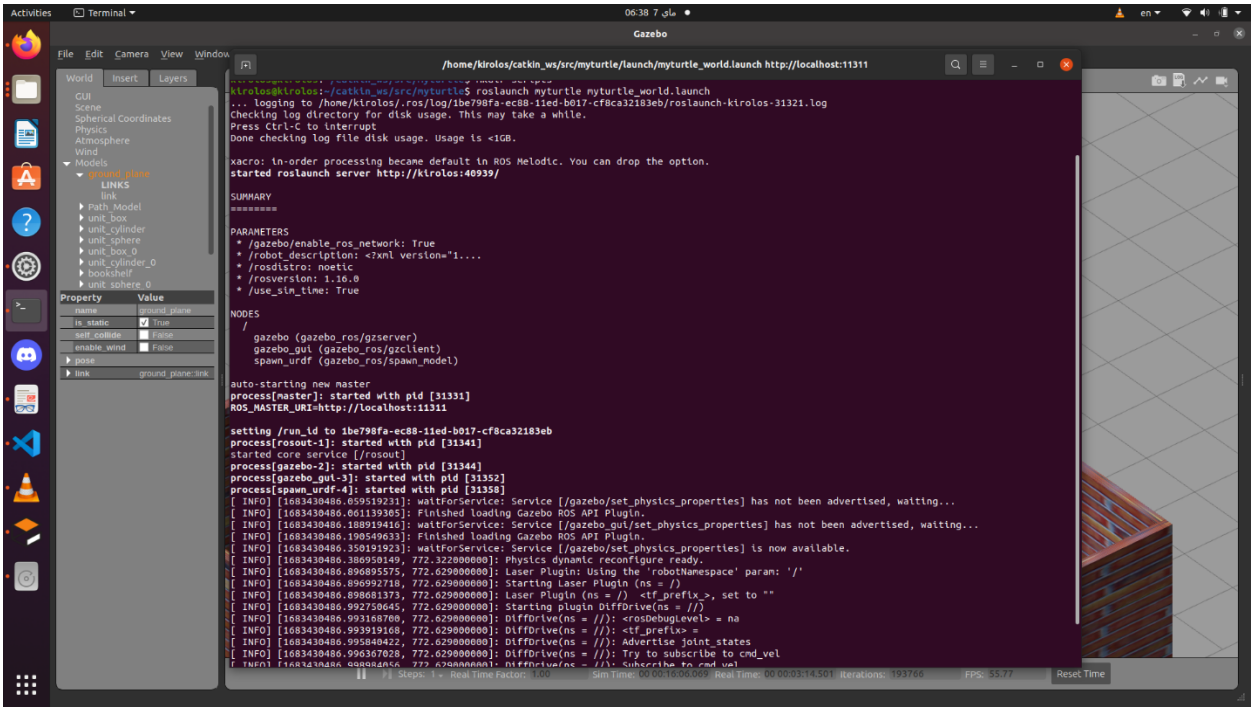
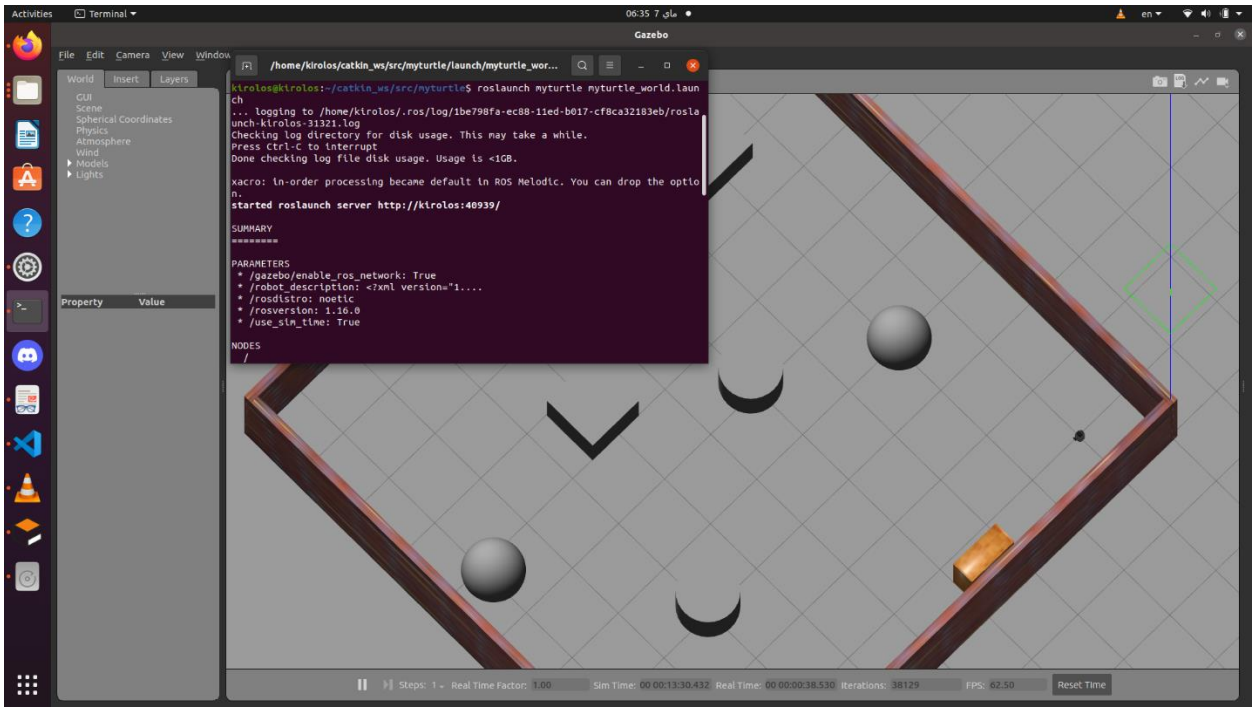
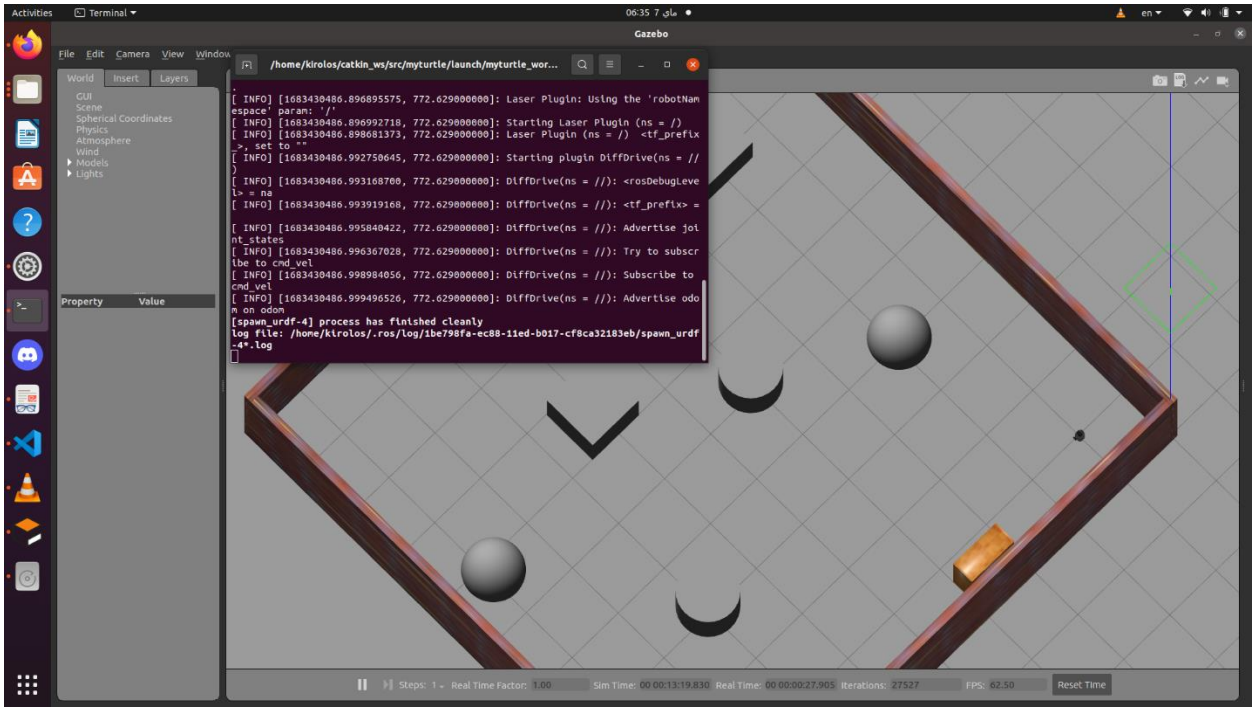


Figure 4: Snapshot of command written to launch the map with Turtlebot3.




Activities
Terminal
Gazebo
File Edit Camera View Window
World Insert Layers
/home/kirolos/catkin_ws/src/myturtle/launch/myturtle_wor...
kirolos@kirolos:~/catkin_ws/src/myturtle$ roslaunch myturtle myturtle_world.launch
... logging to /home/kirolos/.ros/log/1be798fa-ec88-11ed-b017-cf8ca32183eb/roslaunch-kirolos-31321.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.
started roslaunch server http://kirolos:40939/
SUMMARY
PARAMETERS
* /gazebo/enable_ros_network: True
* /rosdistro: noetic
* /rosversion: 1.16.0
* /use_sim_time: True
NODES
Property Value
Reset Time


Activities
Terminal
Gazebo
File Edit Camera View Window
World Insert Layers
/home/kirolos/catkin_ws/src/myturtle/launch/myturtle_wor...
[INFO] [1683430486.896895575, 772.629000000]: Laser Plugin: Using the 'robotNamespace' param: '/'
[INFO] [1683430486.896992718, 772.629000000]: Starting Laser Plugin (ns = /)
[INFO] [1683430486.898681373, 772.629000000]: Laser Plugin (ns = /) <tf_prefix_>, set to ""
[INFO] [1683430486.992750645, 772.629000000]: Starting plugin DiffDrive(ns = //)
[INFO] [1683430486.993168700, 772.629000000]: DiffDrive(ns = //): <rosDebugLevel> = na
[INFO] [1683430486.993919168, 772.629000000]: DiffDrive(ns = //): <tf_prefix> =
[INFO] [1683430486.995840422, 772.629000000]: DiffDrive(ns = //): Advertise joint_states
[INFO] [1683430486.996367028, 772.629000000]: DiffDrive(ns = //): Try to subscribe to cmd_vel
[INFO] [1683430486.998984056, 772.629000000]: DiffDrive(ns = //): Subscribe to cmd_vel
[INFO] [1683430486.999496526, 772.629000000]: DiffDrive(ns = //): Advertise odom on odom
[spawn_urdf-4] process has finished cleanly
log file: /home/kirolos/.ros/log/1be798fa-ec88-11ed-b017-cf8ca32183eb/spawn_urdf-4*.log
Property Value
Reset Time

3. THIRD REQUIREMENT

Comment on the results of Both the BFS & DFS path planning techniques algorithms and stating their differences.

3.1 Getting the robot path calculations using both techniques

Here we used the code developed in lab 7 and implemented our DFS code and tried to get the parents using tree structure but it didn't work out.

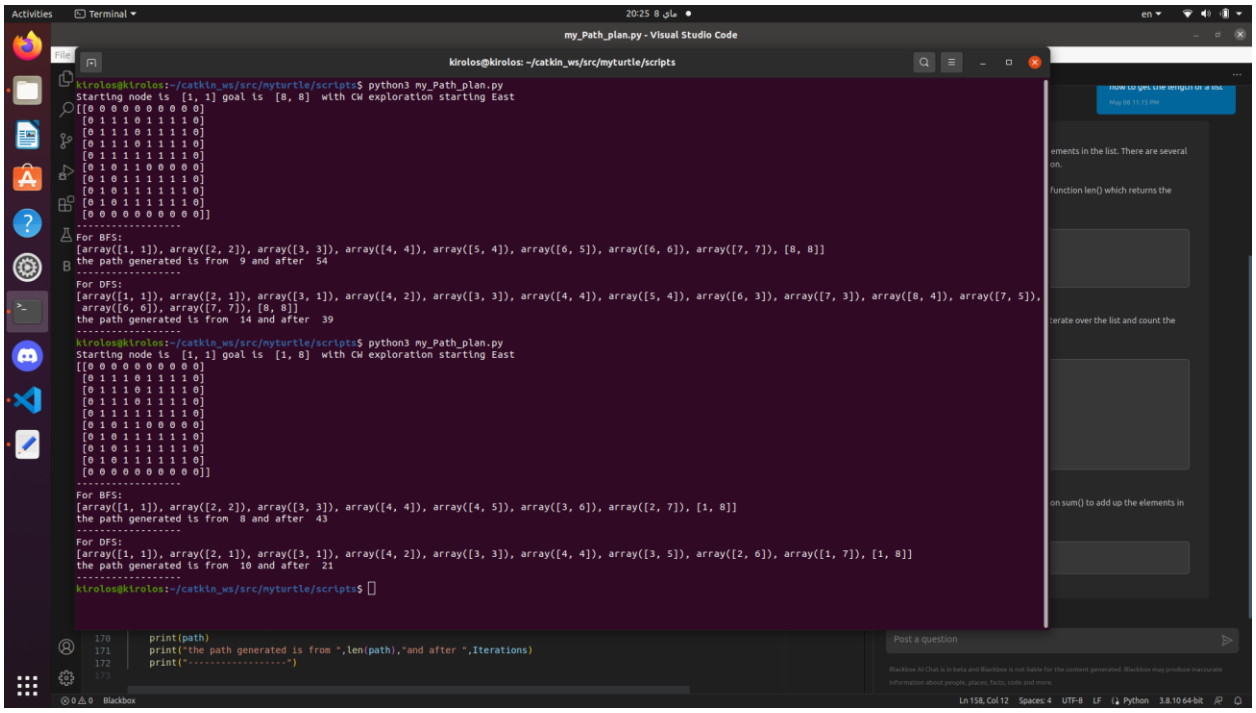


Figure 5:trying the DFS and BFS Techniques

3.2 Changing the exploration direction from CW to CCW

This affected the DFS greatly where BFS still show low performance as DFS in CW direction gets the lowest number of iterations.

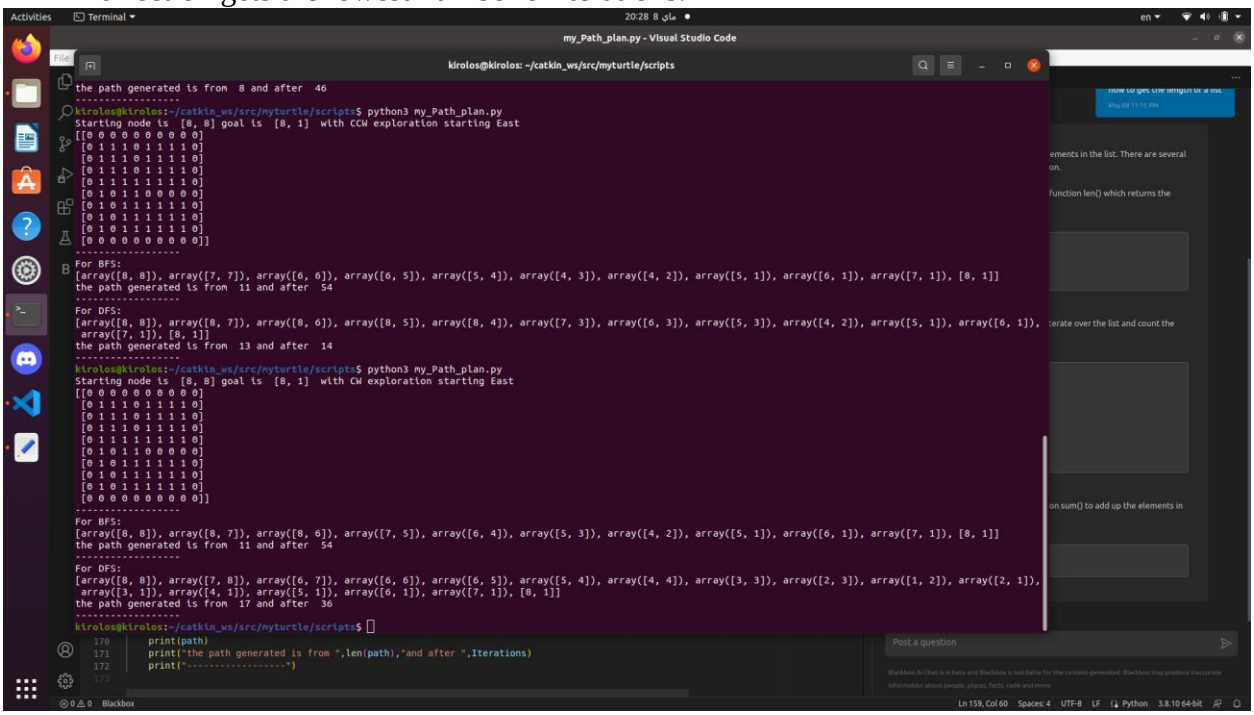
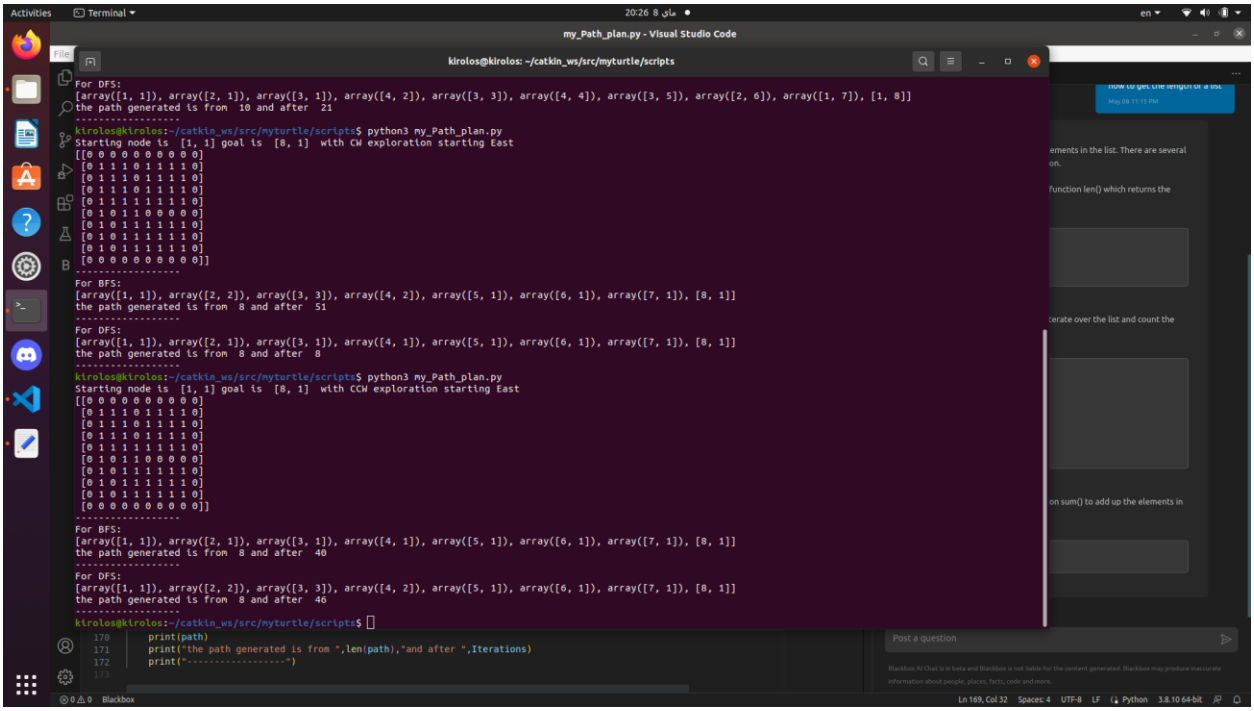


Figure 6: comparing BFS and DFS from The effect of direction of exploration point of view

here changing the direction from CCW to CW did not affect but affected badly the DFS as the previous case.



3.3 Testing who will discover the dead path first

And DFS did that first but with very low margin which can not happen in other cases

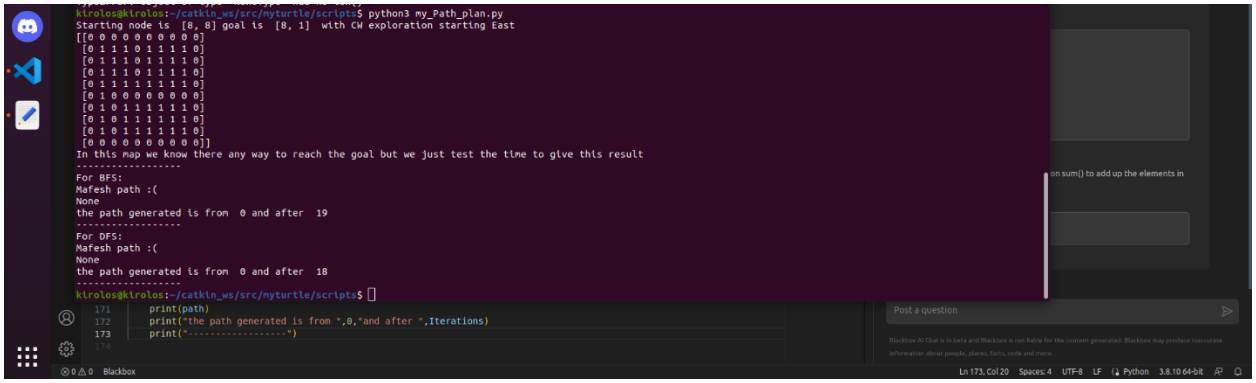


Figure 7: Dead path

4. FOURTH REQUIREMENT

Fourth requirement package can be found on the .zip file attached or in the full submission link below supported with videos.

5. DRIVE LINK

- The full submission link: https://drive.google.com/drive/folders/1weMGAgb2wcy4N27xMeyNC8GHWzh3uZBV?usp=share_link

- Requirement 4 Video link: https://drive.google.com/file/d/1Yktux017O5qRE9-1t3W1emp-Jw6q26td/view?usp=share_link