**Project 3**

ENPM 661

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Rohan Singh

UID: 116166331

The code is written in 2 parts. A\* code is written in Python3 (and tested only in Python3) and Simulation code is written in Python2(works only in python2 because of ros). The imported packages are as follows:

* import argparse
* import os, sys
* import math
* import numpy as np
* import matplotlib.pyplot as plt
* import matplotlib
* import time
* import heapq
* import rospy
* from sensor\_msgs.msg import LaserScan
* from geometry\_msgs.msg import Twist, Point
* from nav\_msgs.msg import Odometry
* from tf import transformations
* import cPickle

**How to run the code:**

In the directory, open terminal.

1. Type in the command : “python3 proj3\_astar.py”
2. The code will ask for start and goal node input one by one. Enter the x, y coordinates separated by a space and in units of ‘meters’.
3. The code will output goal state info followed by info of all the nodes it took to reach there, and how many nodes are in the path. It will also generate a pickle file called “path.pkl” containing all the path data.
4. Now for simulation type in Terminal : “ROBOT\_INITIAL\_POSE="-x <x-coordinate> -y <y-coordinate>" roslaunch turtlebot\_gazebo turtlebot\_world.launch world\_file:=<path of “rrl\_map” file>”
5. In second terminal window run: “roslaunch turtlebot\_gazebo amcl\_demo.launch”
6. In a third terminal window run: “pyhton proj3\_sim.py”
7. The turtlebot starts moving in Gazebo.

**NOTE:**

The code will also output goal state info and how many nodes are in the path (exluding start node).

All coordinates are in meters and origin is at the centre of the map.

In case of incorrect output the program will display error.