ACI Assignment 1

GPS Navigation Agent

Problem statement

Given below is the picture of a city as a grid. Due to road maintenance activities after heavy rains, some paths are blocked for traffic. You are in your office and have to reach home. You have a GPS agent to help you find the shortest, quickest, and safest route through the available paths avoiding the blockades so that you reach home safely. You are provided with the map of the city with the current situation marked. Use the following algorithms to find the shortest, and safest path.

a. Recursive Best First Search
b. Uniform Cost search

Take into consideration the following while calculating the cost:

No diagonal movements allowed. If there are no straight paths, you can move diagonally with a penalty of 3 points. You cannot pass through other buildings. 5 points to be added when your path passes adjacent (next) to other buildings. 3 points to be detected when your path passes adjacent(next) to road blocks. Find the optimum path which passes through minimum number of squares and maximum points is the shortest and safest path. Safety is of first concern. You cannot travel through buildings and road blocks.

Evaluations will be based on the following.

1. Explain the PEAS (Performance measure, Environment, Actuator, Sensor.) for your agent. (20% marks)
2. Use given algorithms and implement the algorithms in PYTHON (20% + 20% = 40% marks)
3. Print the path, the total points for the path and the number of squares in the path. (20% marks)
4. Include code in your implementation to calculate the space complexity and time complexity and print the same. For complexity calculations, refer to the prescribed text book for ACI. (20% marks)

Note 2:

- You are provided with the python notebook template which stipulates the structure of code and documentation. Use well intended python code.
- Use separate MS word document for explaining the theory part. Do not include theory part in the Python notebook except Python comments.

- The implementation code must be completely original and executable.
- Please keep your work (code, documentation) confidential. If your code is found to be plagiarized, you will be penalized severely. Parties involved in the copy will be considered equal partners and will be penalized severely.