Artificial and Computational Intelligence

Assignment 1

Delivery Agent

Problem Statement :

You are tasked with developing an intelligent agent for a delivery robot employed to deliver groceries in a bustling city. You are provided with a map of the city with important locations marked, including the households and the roads connecting them. The distance between each pair of households is given, representing the cost (in terms of travel distance) to deliver groceries from one household to another. The Grocery Delivery Agent is tasked with finding the shortest route that covers all the households in a given neighborhood, starting from any node. For heuristic design, consider all the possible paths between any arbitrary node n to the goal node. The average of the total distance cost across all these paths is the heuristic value h(n).

Graph representation
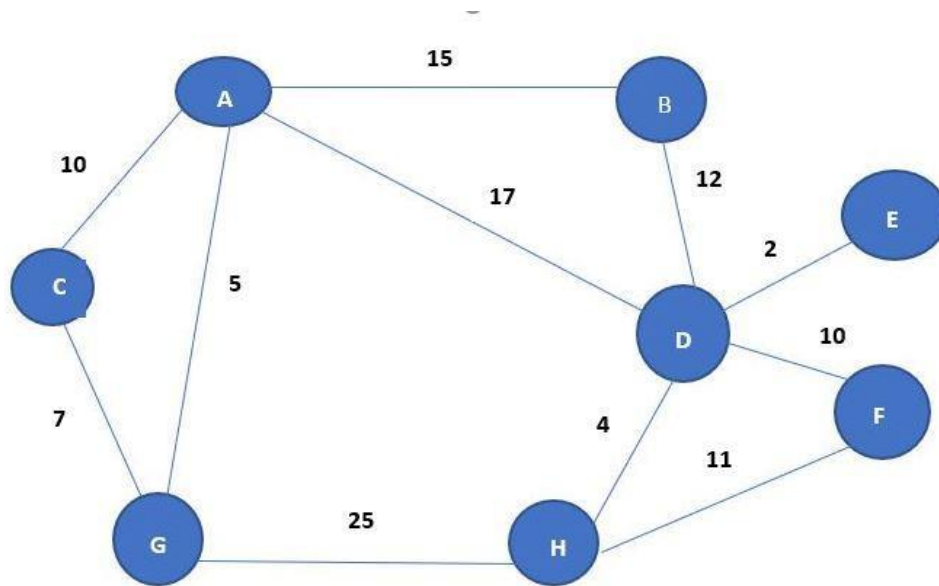
Use the following algorithms to solve the problem:

1. **Recursive Best First Search A***
2. **Hill climbing algorithm**

Answer the following:

1. Explain the environment of the agent [20% weightage]
2. Define the heuristic and or fitness function for the given algorithms and the given problem. [20% weightage]
3. Use appropriate data structures and implement given informed and local search algorithm and Print the path taken by the agent to reach home. [40% weightage]
4. Find and print space and time complexity using code in your implementation. [20% weightage]

Note:

- 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.