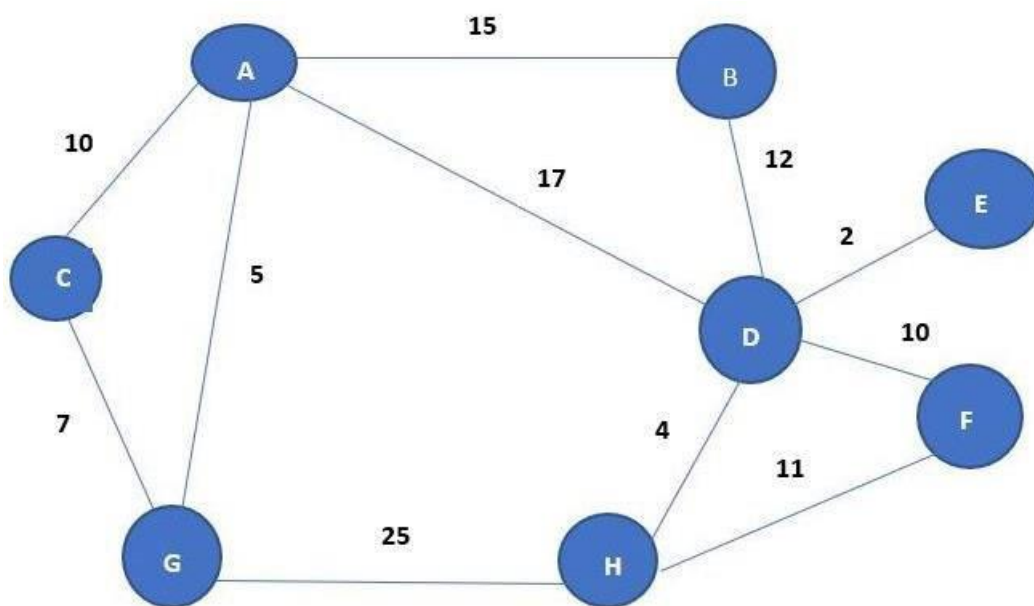


**ACI Assignment 1**  
**Question 1 B - Network Agent**

**Problem statement**

Given below are the shared and distributed servers placed at various locations in your city. Now imagine it to be in a crisis and you have been asked to compromise some communication lines and keep a minimum number of connections to keep the network up and going. You are required to find the sub set of connections for your work to go un-interrupted. Use the following algorithms to find the minimum network connections possible and help the network agent.

- a. Depth First Search and
- b. A\* Algorithm



**Note 1:**

The edge costs depicted below is an approximation towards the transmission cost between any pair of nodes. For heuristic design, consider all the possible paths between any arbitrary node  $n$  to the goal node. The average of the total transmission cost across all these paths is the heuristic value  $h(n)$ .

Evaluations will be based on the following.

1. Explain the PEAS (Performance measure, Environment, Actuator, Sensor.) for your agent. (20% marks)

2. Use Depth First Search and A\* Search implement the algorithms in PYTHON. The program should be able to take-in start and goal nodes dynamically from the user at run time. Compare to interpret the results in terms of the algorithm working, performance & shortest path if obtained relevant to the given problem. (20% + 20% = 40% marks)
3. Print the minimum connections that keeps the whole network up and running. For each incremental depth limit, corresponding node generating sequence should be legibly printed in the result. (20% marks)
4. Include code in your implementation to calculate the space complexity and time complexity and print the same. (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. Collaboration among different group members will also be considered as plagiarism.