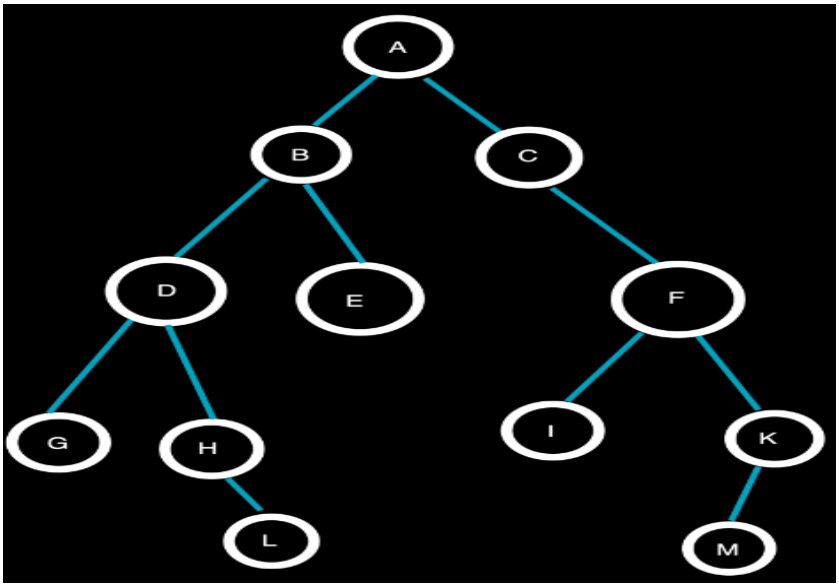
Practice Problems

Q1. Consider the given graph G, where Source Node = A and Target Node=H.

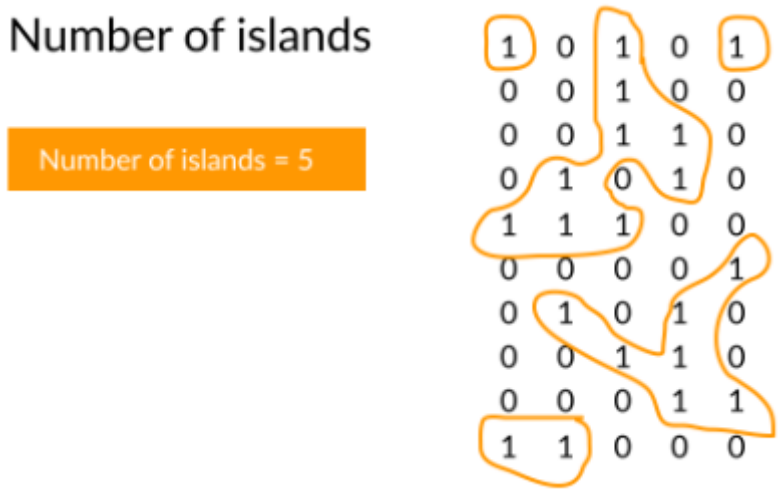


A. Find the order of visits of the nodes and the path returned by BFS, DFS search.
B. Find the order of visits of the nodes and the path returned by DLS search (Consider the Depth Limit(l)=2). Are you able to visit the Target Node(H)?
C. Find the order of visits of the nodes and the path returned by DLS search (Consider the Depth Limit(l)=3). Are you able to visit the Target Node(H)?
D. Write your comments on Time and Space complexity of above search methods.

Q2. Consider a classical vacuum cleaner problem where we have two rooms and one vacuum cleaner. There is dirt in both the rooms and it is to be cleaned. The vacuum cleaner is present in any one of these rooms. So, we have to reach a state in which both the rooms are clean and are dust free.

Explain all possible states in vacuum cleaner problem with the help of state representation diagram.

Q3. Consider the given island matrix, where 0 represents water, 1 represents land and group of 1s form an island as shown below.



E. Design an algorithm (step by step logic) to find the number of islands in a given matrix.

F. Find the total number of islands in given matrix using designed algorithm.

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mat[][] = {{1, 1, 0, 0, 0},
           {0, 1, 0, 0, 1},
           {1, 0, 0, 1, 1},
           {0, 0, 0, 0, 0},
           {1, 0, 1, 0, 0}}
```