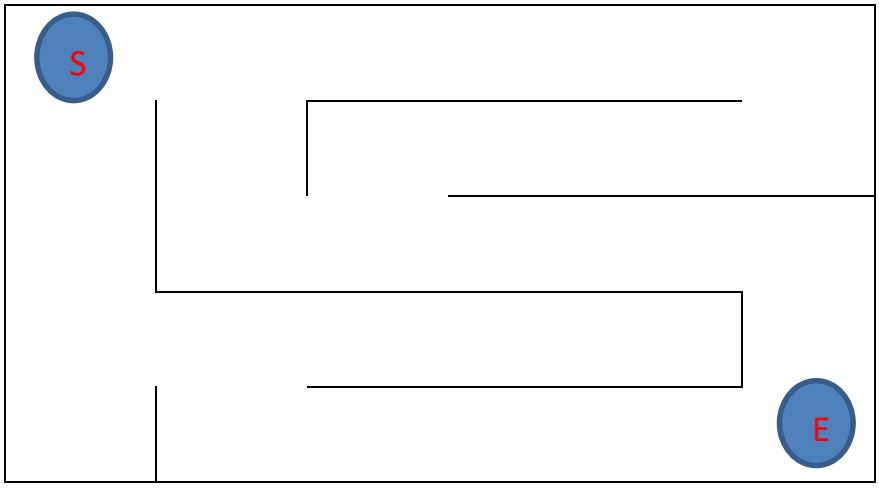
MA 251 Data Structures

Laboratory Assignment 8

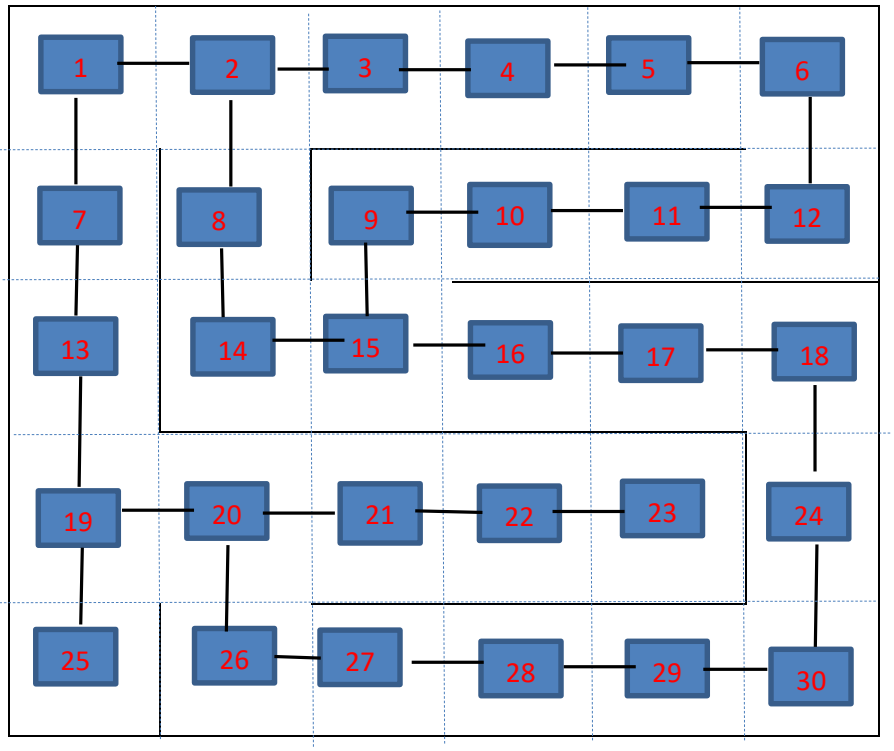
23-10-2019

Note: Upload your programs to the server (deadline: 4:30 pm)

1. **Graph Search**: In this lab, we will learn how to explore maze using graph representation. The figure of a maze is shown below along with the start and end point.



The maze can be represented by an undirected graph. We divide the maze into equal size grids and place a vertex in each grid (rectangular blue box). If there is no wall between two adjacent vertices, then the corresponding graph has an undirected edge between the vertices. The undirected graph, for the maze shown above is given in the following graph.

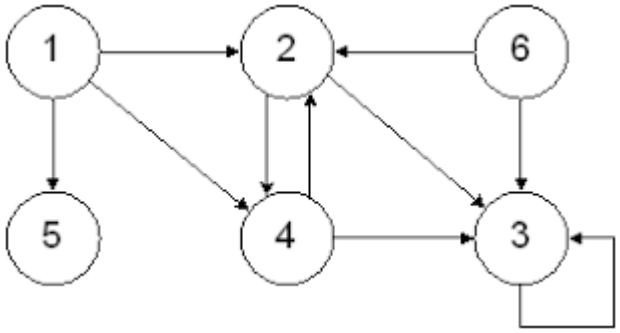


(a) Store the undirected graph in adjacency list format.

(b) Write a function shortest(v1,v30), to find the shortest path from the starting node to the last node, using BFS.

Sample Output: 1 -> 2 -> 8 -> 14 -> 15 -> 16- > 17 -> 18 -> 24 -> 30

(c) A directed graph is shown below. Store the digraph in adjacency list format.



(d) Write a function reachable(V_i,V_j), that determines whether vertex V_j is reachable from vertex V_i. The DFS traversal starts at vertex V_i. If reachable, the function should print the path starting from V_i to V_j.

Sample Output:
< V4, V5

> Not reachable

> V1, V3

Reachable, V1 –> V2 -> V3

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