KJ's Educational Institutes
K J College Of Engineering & Management Research, Pune.
Department of E & TC

CLASS: S. E. (E &TC) **SUBJECT:-DSA**

Ex. No: 5 **Date:**

AIM
Graph Traversal

You are designing a navigation system for a campus with multiple buildings. The system should explore possible paths (routes) using BFS or DFS.
Create a graph using an adjacency matrix and implement Breadth-First Search and Depth-First Search to explore the building connectivity.

OBJECTIVES

i) To implement logic for constructing graph using adjacency matrix.

ii) To implement following primitive operations-

Create, Insert, Search, Delete.

THEORY

Graph:

In computer science, a graph is an abstract data structure that is meant to implement the graph concept from mathematics
A graph data structure consists mainly of a finite (and possibly mutable) set of ordered pairs, called edges or arcs, of certain entities called nodes or vertices. As in mathematics, an edge (x,y) is said to point or go from x to y. The nodes may be part of the graph structure, or may be external entities represented by integer indices or references.
Formal Definition: A graph G can be defined as a pair (V,E), where V is a set of vertices, and E is a set of edges between the vertices $E \subseteq \{(u,v) \mid u, v \in V\}$.

Adjacency matrix:
In mathematics and computer science, an adjacency matrix (or one-hop connectivity matrix) is a means of representing which vertices of a graph are adjacent to which other vertices. Another matrix representation for a graph is the incidence matrix Specifically, the adjacency matrix of a finite graph G on n vertices is the n × n matrix where the nondiagonal entry aij is the number of edges from vertex i to vertex j, and the diagonal entry aii, depending on the convention, is either once or twice the number of edges (loops) from vertex i to itself.

Undirected graphs often use the former convention of counting loops twice, whereas directed graphs typically use the latter convention. There exists a unique adjacency matrix for each graph (up to permuting rows and columns), and it is not the adjacency matrix of any other graph. In the special case of a finite simple graph, the adjacency matrix is a (0,1)-matrix m with zeros on its diagonal. If the graph is undirected, the adjacency matrix is symmetric.

Operations:

1) Create a graph.
2) Insert new node in created graph.
3) Delete node from the graph.
4) Search a node (DFS/BFS).

Input:

1) Adjacency matrix.
2) Enter the starting vertex for DFS/BFS.

Output:

Founded element by DFS/BFS.

CONCLUSION:-