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Experiment No 9: Depth First Search and Breadth First Search

Objective:

1. Understand the Graph data structure and its basic operations.

2. Understand the method of representing a graph.

3. Understand the method of constructing the Graph ADT and defining its operations

Theory:

A graph is a collection of nodes or vertex, connected in pairs by lines referred as edges. A graph can be directed or undirected graph.

One method of traversing through nodes is depth first search. Here we traverse fromstarting node and proceeds from top to bottom. At a moment we reach a dead end from where

the further movement is not possible and we backtrack and then proceed according to leftright order. A stack is used to keep track of a visited node which helps in backtracking.

Algorithm : 1. if gptr = NULL then

print “Graph is empty” exit

2. u=v

3. OPEN.PUSH(u)

4. while OPEN.TOP !=NULL do

u=OPEN.POP()

if search(VISIT,u) = FALSE then

INSERT\_END(VISIT,u)

Ptr = gptr(u)

While ptr.LINK != NULL do

Vptr = ptr.LINK

OPEN.PUSH(vptr.LABEL)

End while

End if

End while

5. Return VISIT

6. Stop

Code:

#include <stdio.h>

int n, i, j, visited[10], queue[10], front = -1, rear = -1;

int adj[10][10];

void bfs(int v)

{

for (i = 1; i <= n; i++)

if (adj[v][i] && !visited[i])

queue[++rear] = i;

if (front <= rear)

{

visited[queue[front]] = 1;

bfs(queue[front++]);

}

}

void main()

{

int v;

printf("Enter the number of vertices: ");

scanf("%d", &n);

for (i = 1; i <= n; i++)

{

queue[i] = 0;

visited[i] = 0;

}

printf("Enter graph data in matrix form: \n");

for (i = 1; i <= n; i++)

for (j = 1; j <= n; j++)

scanf("%d", &adj[i][j]);

printf("Enter the starting vertex: ");

scanf("%d", &v);

bfs(v);

printf("The node which are reachable are: \n");

for (i = 1; i <= n; i++)

if (visited[i])

printf("%d\t", i);

else

printf("BFS is not possible. Not all nodes are reachable");

return 0;

}

OUTPUT :

Enter the number of vertices: 2

Enter graph data in matrix form:

1

2

3

4

Enter the starting vertex: 5

The node which are reachable are:

BFS is not possible. Not all nodes are reachable BFS is not possible. Not all nodes are reachable