



SOMAIYA
VIDYAVIHAR

K J Somaiya Institute of Technology
An Autonomous Institute Permanently Affiliated to the University of Mumbai

DEPARTMENT OF INFORMATION TECHNOLOGY

Course Name and Code: Data Structures Lab (ITL302)

Semester: III (SYIT)

Academic Year: 2024-25 (Odd Semester)

Experiment No:7

Aim: Implementation of any one Graph Traversal Technique for real-world application.

Code:

```
#include <stdio.h>
#include <stdlib.h>

#define MAX_VERTICES 100

typedef struct {
    int vertices;
    int adjacencyMatrix[MAX_VERTICES][MAX_VERTICES];
} Graph;

Graph* createGraph(int vertices) {
    Graph* graph = (Graph*)malloc(sizeof(Graph));
    graph->vertices = vertices;

    for (int i = 0; i < vertices; i++) {
        for (int j = 0; j < vertices; j++) {
            graph->adjacencyMatrix[i][j] = 0;
        }
    }

    return graph;
}

void addEdge(Graph* graph, int src, int dest) {
    graph->adjacencyMatrix[src][dest] = 1;
    graph->adjacencyMatrix[dest][src] = 1;
}
```

```

void BFS(Graph* graph, int startVertex) {
    int visited[MAX_VERTICES] = {0};
    int queue[MAX_VERTICES];
    int front = 0, rear = 0;

    visited[startVertex] = 1;
    queue[rear++] = startVertex;

    printf("Breadth-First Search starting from vertex %d:\n", startVertex);

    while (front < rear) {
        int currentVertex = queue[front++];
        printf("%d ", currentVertex);

        for (int i = 0; i < graph->vertices; i++) {
            if (graph->adjacencyMatrix[currentVertex][i] == 1 && !visited[i]) {
                visited[i] = 1;
                queue[rear++] = i;
            }
        }
    }
}

```

```

int main() {
    int vertices, edges, src, dest;

    printf("Enter number of vertices: ");
    scanf("%d", &vertices);

    Graph* graph = createGraph(vertices);

    printf("Enter number of edges: ");
    scanf("%d", &edges);

    printf("Enter edges (src dest):\n");
    for (int i = 0; i < edges; i++) {
        scanf("%d %d", &src, &dest);
        addEdge(graph, src, dest);
    }

    int startVertex;
    printf("Enter the starting vertex for BFS: ");
    scanf("%d", &startVertex);

    BFS(graph, startVertex);

    return 0;
}

```

Output:

```
itl7@22dl705:~$ gcc bfs.C
itl7@22dl705:~$ ./a.out
Enter number of vertices: 4
Enter number of edges: 4
Enter edges (src dest):
0 1
0 2
1 3
2 3
Enter the starting vertex for BFS: 0
Breadth-First Search starting from vertex 0:
0 1 2 3 itl7@22dl705:~$
```

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Date Of Performance: 27/9/2024

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