Green University

Green University of Bangladesh

CLP - 01

Implementation of DFS Algorithm

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CSE 206

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Paper Due Date

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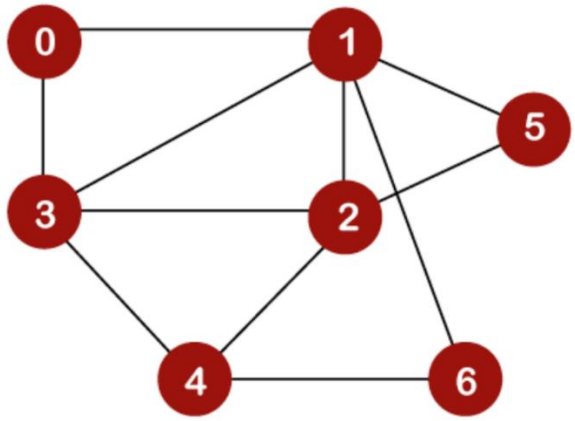
Experiment Name:

Implement DFS algorithm.

a. Create an Adjacent Matrix to take input the following graph.

b. Calculate the start time and finish time for the complete graph.



Source Code:

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

#define maxVertices 7

int adjacencyMatrix[maxVertices][maxVertices];

int visited[maxVertices];
int startTime[maxVertices];
int finishTime[maxVertices];
int currentTime = 0;

void enqueue(int vertex) {
    visited[vertex] = 1;
    startTime[vertex] = ++currentTime;

    for (int i = 0; i < maxVertices; i++) {
        if (adjacencyMatrix[vertex][i] == 1 && !visited[i]) {
            enqueue(i);
        }
```

```
    }

    finishTime[vertex] = ++currentTime;
}

void inputGraph(int vertices) {
    printf("Enter the adjacency matrix for the graph:\n");
    for (int i = 0; i < vertices; i++) {
        for (int j = 0; j < vertices; j++) {
            scanf("%d", &adjacencyMatrix[i][j]);
        }
    }
}

int main() {
    int vertices = maxVertices;

    for (int i = 0; i < vertices; i++) {
        visited[i] = 0;
    }

    inputGraph(vertices);

    printf("Depth-First Search Start and Finish Times:\n");
    for (int i = 0; i < vertices; i++) {
        if (!visited[i]) {
            enqueue(i);
        }
    }

    for (int i = 0; i < vertices; i++) {
        printf("Vertex %d: Start Time = %d, Finish Time = %d\n", i, startTime[i],
finishTime[i]);
    }

    return 0;
}


    /*

    0 1 0 1 0 0 0
    1 0 1 1 0 1 1
    0 1 0 1 1 1 0
    1 1 1 0 1 0 0
```

```
0 0 1 1 0 0 1
0 1 1 0 0 0 0
0 1 0 0 1 0 0

*/
```

Output:

```
PS E:\4th Semester FALL 23\CSE 206 Algorithms LAB\Graph> cd "e
{ .\dfsclp }
Enter the adjacency matrix for the graph:
0 1 0 1 0 0 0
    1 0 1 1 0 1 1
    0 1 0 1 1 1 0
    1 1 1 0 1 0 0
    0 0 1 1 0 0 1
    0 1 1 0 0 0 0
    0 1 0 0 1 0 0
Depth-First Search Start and Finish Times:
Vertex 0: Start Time = 1, Finish Time = 14
Vertex 1: Start Time = 2, Finish Time = 13
Vertex 2: Start Time = 3, Finish Time = 12
Vertex 3: Start Time = 4, Finish Time = 9
Vertex 4: Start Time = 5, Finish Time = 8
Vertex 5: Start Time = 10, Finish Time = 11
Vertex 6: Start Time = 6, Finish Time = 7
PS E:\4th Semester FALL 23\CSE 206 Algorithms LAB\Graph>
```