DSA Assignment: 11

EXP 11: Implementation of BFS and DFS on a directed graph using adjacency matrix.

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D10A Roll No: 60

AIM: In this experiment, we will implement BFS and DFS on a directed graph using adjacency matrix.

CODE:

BFS-

```c
#include <stdio.h>
#include <stdlib.h>
int vertex = 5;
int adjacencyMatrix[20][20] = {
    {0, 1, 1, 1, 0},
    {1, 0, 1, 0, 0},
    {1, 1, 0, 0, 1},
    {1, 0, 0, 0, 0},
    {0, 0, 1, 0, 0}};
int queue[20], front = -1, rear = -1;
int visited[20];
int deleted;
int indexVisited = 0;
void insert(int item)
{
    if (front == -1)
    {
        front++;
    }
    rear++;
    queue[rear] = item;
}
void del(int *deleted)
{
    if (front == -1 || front > rear)
    {
        return;
    }
    *deleted = queue[front];
    front++;
}
int isPresentVisited(int num)
{
    int i;
    for (i = 0; i < indexVisited; i++)
    {
        if (visited[i] == num)
        {
            return 1;
        }
    }
    return 0;
}
int isPresentQueue(int num)
```

```
{
    for (int i = front; i <= rear; i++)
    {
        if (queue[i] == num)
        {
            return 1;
        }
    }
    return 0;
}
void bfs(int start, int vertex)
{

    visited[indexVisited++] = start;
    int i = 0;
    while (i < vertex)
    {
        if (adjacencyMatrix[start][i] && !isPresentVisited(i))
        {
            insert(i);
        }
        i++;
    }
    while (front <= rear)
    {
        del(&deleted);
        visited[indexVisited++] = deleted;
        for (i = 0; i < vertex; i++)
        {
            if (adjacencyMatrix[deleted][i] && !isPresentVisited(i) &&
!isPresentQueue(i))
            {
                insert(i);
            }
        }
        printf("\n");
    }
}
int main()
{
    printf("D10A_60_Shashwat Tripathi\n");
    bfs(0, vertex);
    for (int i = 0; i < vertex; i++)
    {
        printf("%d\t", visited[i]);
    }
}
```

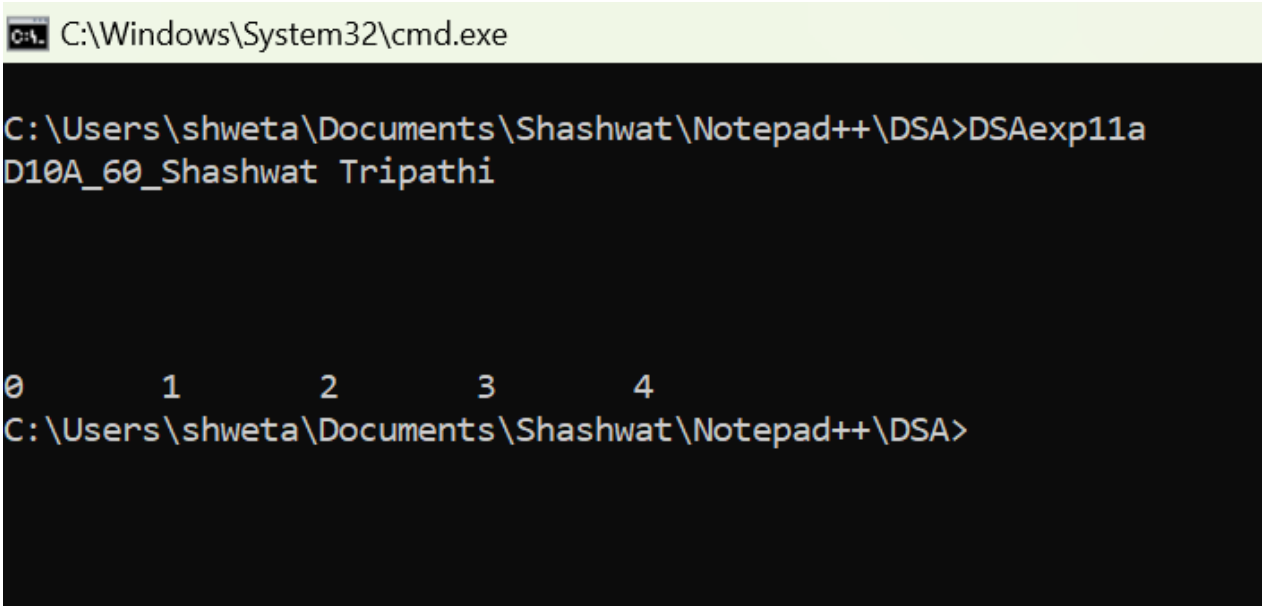
DFS-

```c
#include <stdio.h>
#include <stdlib.h>
#define MAX 50 // Max size of stack
int popped;
int stack[MAX]; // Defining stack
int vertex = 6;
int adjacencyMatrix[20][20] = {
    {0, 1, 1, 1, 0},
    {1, 0, 1, 0, 0},
    {1, 1, 0, 0, 1},
    {1, 0, 0, 0, 0},
    {0, 0, 1, 0, 0}};
int top = -1;
int visited[10]; // for printing and preventing repetition
int deleted;
int indexVisited = 0; // index of visited array
void push(int elem)
{
    top++;
    stack[top] = elem;
}
void pop(int *popped)
{
    *popped = stack[top];
    top--;
}
int isPresentVisited(int num)
{ // check presence of number in visited
    int i;
    for (i = 0; i < indexVisited; i++)
    {
        if (visited[i] == num)
        {
            return 1;
        }
    }
    return 0;
}
void dfs(int start, int vertex)
{
    push(start);
    visited[indexVisited++] = start;
    while (top >= 0)
    {
        for (int i = 0; i < vertex; i++)
        {
            if (adjacencyMatrix[stack[top]][i] && !isPresentVisited(i))
            {
                visited[indexVisited++] = i;
                push(i);
                break;
            }
            if (i == vertex - 1)
            {
```

```
                    pop(&popped);
                }
            }
        }
    }
    int main()
    {
        printf("D10A_60_Shashwat Tripathi\n");
        dfs(2, vertex);
        for (int i = 0; i < vertex; i++)
        {
            printf("%d\t", visited[i]);
        }
    }
```

OUTPUT:

BFS-



DFS-