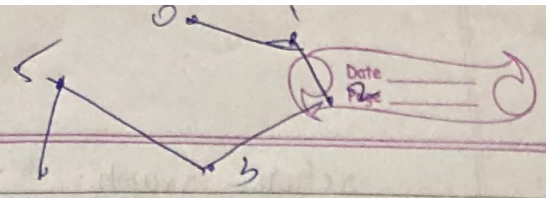
LAB-08 22/02/24

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

#define MAX_SIZE 100
struct Queue
{
    int items[MAX_SIZE];
    int front;
    int rear;
};
struct Queue* createQueue()
{
    struct Queue* queue=(struct Queue*)malloc(sizeof(
    struct Queue));
    queue->front=-1;
    queue->rear=-1;
    return queue;
}
int isEmpty(struct Queue* queue)
{
    if (queue->rear==-1)
        return 1;
    else
        return 0;
}
void enqueue(struct Queue* queue, int value)
{
    if (queue->rear == MAX_SIZE-1)
        printf("\nQueue is full!");
    else
    {
        if (queue->front==-1)
            queue->front=0;
```

```
        queue->rear++;
        queue->items[queue->rear]=value;
    }
}
int dequeue(struct Queue* queue)
{
    int item;
    if(isEmpty(queue))
    {
        printf("queue is empty");
        item=-1;
    }
    else
    {
        item=queue->items[queue->front];
        queue->front++;
        if(queue->front>queue->rear)
        {
            queue->front=queue->rear=-1;
        }
    }
    return item;
}
struct Graph
{
    int vertices;
    int** adjMatrix;
};
struct Graph* createGraph(int vertices)
{
    struct Graph* graph=(struct Graph*)malloc
    sizeof(struct Graph));
```

```
    graph->vertices = vertices;

    graph->adjMatrix = (int**)malloc(vertices *
    sizeof(int*));
    for(int i=0;i<vertices;i++)
    {
        graph->adjMatrix[i]=(int*)malloc(vertices*
        sizeof(int));
        for(int j=0;j<vertices;j++)
            graph->adjMatrix[i][j]=0;
    }
    return graph;
}
void addEdge(struct Graph* graph,int src,int dest)
{
    graph->adjMatrix[src][dest]=1;
    graph->adjMatrix[dest][src]=1;
}
void BFS(struct Graph* graph,int startVertex)
{
    int visited[MAX_SIZE]={0};
    struct Queue* queue=createQueue();
    visited[startVertex]=1;
    enqueue(queue,startVertex);
    printf("Breadth First search Traversal:");

    while(!isEmpty(queue))
    {
        int currentVertex=dequeue(queue);
        printf("%d",currentVertex);

        for(int i=0;i<graph->vertices;i++)
        {
```

```
        if (graph->adjMatrix[currentVertex][i] &&
            !visited[i])
        {
            visited[i] = 1;
            enqueue(queue, i);
        }
    }
}
printf("\n");
}
int main()
{
    int vertices, edges, src, dest;
    printf("Enter the number of vertices: ");
    scanf("%d", &vertices);
    struct Graph* graph = createGraph(vertices);
    printf("Enter the number of edges: ");
    scanf("%d", &edges);

    for (int i = 0; i < edges; i++)
    {
        printf("Enter edge %d (source destination): ",
               i + 1);
        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

```
Enter the number of vertices: 6
Enter the number of edges: 5
Enter edge 1 (source destination): 0 1
Enter edge 2 (source destination): 2 3
Enter edge 3 (source destination): 2 1
Enter edge 4 (source destination): 3 5
Enter edge 5 (source destination): 4 5
Enter the starting vertex for BFS: 0
Breadth first search Traversal: 0 1 2 3 5 4.
```

=> // DFS.

```
#include <stdio.h>
#include<stdlib.h>
#define MAX_SIZE 100
struct Graph
{
    int vertices;
    int** adjMatrix;
};
struct Graph* createGraph(int vertices)
{
    struct Graph* graph=(struct Graph*)malloc(sizeof
    (struct Graph));
    graph->vertices = vertices;
    graph->adjMatrix = (int**)malloc(vertices*
    sizeof(int*));
    for(int i=0;i< vertices;i++)
    {
        graph->adjMatrix[i]=(int*)malloc(vertices
        *sizeof(int));
        for(int j=0;j<vertices;j++)
            graph->adjMatrix[i][j]=0;
```

```
    return graph;
}
void addEdge(struct Graph* graph, int src, int dest)
{
    graph->adjMatrix[src][dest]=1;
    graph->adjMatrix[dest][src]=1;
}
void DFS(struct Graph* graph, int startVertex,
         int visited[])
{
    visited[startVertex]=1;
    for(int i=0; i<graph->vertices; i++)
    {
        if(graph->adjMatrix[startVertex][i]==1 &&
        visited[i]==0)
            DFS(graph, i, visited);
    }
}
int isConnected(struct Graph * graph)
{
    int* visited=(int*)malloc(graph->vertices*sizeof(int));
    for(int i=0; i<graph->vertices; i++)
        visited[i]=0;
    DFS(graph, 0, visited);
    for(graph, 0, visited);
    {
        if(visited[i]==0)
            return 0;
    }
    return 1;
}
int main()
```

```
int vertices, edges, src, dest;
printf("Enter the number of vertices: ");
scanf("%d", &vertices);

struct Graph* graph = createGraph(vertices);
printf("Enter the number of edges: ");
scanf("%d", &edges);

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

if(isConnected(graph))
    printf("The graph is connected.\n");
else
    printf("The graph is not connected.\n");

    return 0;
}
```

output:

Enter the number of edges: 3
Enter edge1 (source destination): 1 2
Enter edge2 (source destination): 0 3
Enter edge3 (source destination): 0 1
The graph is connected.

Ex. 1

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