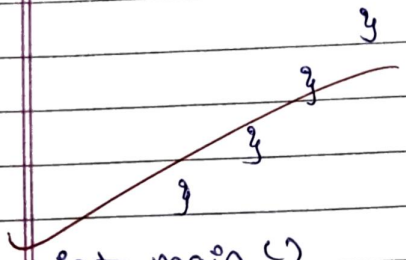
22/2/24

Week-9.

BFS

```
#include<stdio.h>
#define MAX_VERTICES 10
int n, i, f, visited[MAX_VERTICES],
  queue[MAX_VERTICES], front=0, rear=0;
int adj[MAX_VERTICES][MAX_VERTICES];

void bfs(int v)
{
   visited[v] = 1;
   queue[rear++] = v;
   while (front < rear)
      int current = queue[front++];
      printf("%d\t", current);
      for(int i=0; i<n; i++)
         {
            if(adj[current][i] && !visited[i])
              {
                visited[i]=1;
                queue[rear++] = i;
```



```
int main()
{
   int v;
   printf("Enter the number of vertices: ");
   scanf("%d", &n);
```

```
for(i=0; i<n; i++)
{
    visited[i]=0;
}
printf("Enter graph data in matrix
        form:\n");
for(i=0; i<n; i++)
    for(j=0; j<n; j++)
        scanf("%d", &adj[i][j]);

printf("Enter the starting vertex:");
scanf("%d", &v);
bfs(v);
for(i=0; i<n; i++)
{
    if(!visited[i])
    {
        printf("\n BFS is not possible.
                Not all nodes are
                reachable.\n");
        return 0;
    }
}
return 0;
}
```

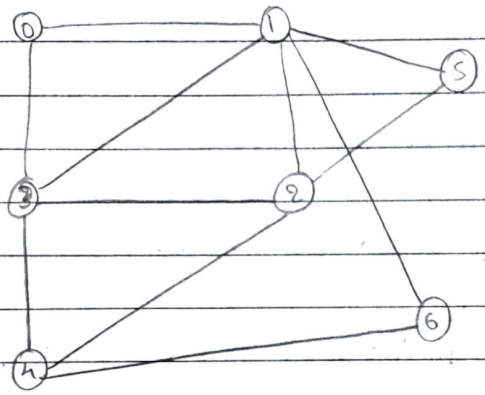
Output

Enter the number of vertices: 7
Enter graph data in matrix form:
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.

Enter the starting vertex: 0.

0, 1, 3, 2, 5, 6, 4.



DFS

```
#include <stdio.h>
#include <stdbool.h>
#define MAX_VERTICES 10.

void dfs(int graph[MAX_VERTICES]
        [MAX_VERTICES, int num_vertices,
    bool visited[MAX_VERTICES], int vertex)
 {
    visited[vertex] = true;
    int i;
    for(i=0; i<num_vertices; ++i)
      {
       if(graph[vertex][i]==1 && !visited[i])
       {
         dfs(graph, num_vertices, visited, i);
       }
      }
    }
bool is_connected(int graph[MAX_VERTICES]
        [MAX_VERTICES], int num_vertices)
{
    bot bool visited[MAX_VERTICES]={false};
    dfs(graph, num_vertices, visited, 0);
    int i;
    for(i=0; i<num_vertices; ++i)
    {
      if(!visited[i])
      {
        return false;
      }
```

```
    }
    return true;
}
int main()
{
    int num_vertices;
    printf("Enter the number of vertices: ");
    scanf("%d", &num_vertices);
    int i, j;
    int graph[MAX_VERTICES][MAX_VERTICES];
    printf("Enter the adjacency matrix:\n");
    for(i=0; i<num_vertices; ++i)
    {
        for(j=0; j<num_vertices; ++j)
        {
            scanf("%d", &graph[i][j]);
        }
    }
    if(is_connected(graph, num_vertices))
    {
        printf("The graph is connected.\n");
    }
    else {
        printf("The graph is not connected.\n");
    }
    return 0;
}
```

output

Enter the number of vertices: 7
Enter the adjacency matrix:
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
The graph is connected.