ASSIGNMENT - 3

(1)
```
#include <iostream>
#include <queue>
using namespace std;
int main(){
  int edges, vertices;
  cout << "Enter no of edges & vertices" << endl;
  cin >> edges >> vertices;
  int graph[vertices][vertices];
  cout << "Enter matrix " << endl;
  for(int i=0; i<vertices; i++){
    for (int j=0; j<vertices; j++){
      cin >> graph[i][j];
    }
  }
  queue <int> q;
  int visited[vertices];
  for (int i=0; i<vertices; i++)
    visited[i]=0;
  int s_node;
  cout<< "Enter starting node" << endl;
  cin >> s_node;
  int ch;
  cout<< "Enter 1 for Left to Right traversal \n Enter 2
   for Right to Left traversal" << endl;
  cin >> ch;
  q.push(s_node);
  visited[s_node] = 1;
  int minN=1, maxN=1;
  while (!q.empty()){
    int l_size = q.size();
    maxN += l_size-1;
```

```
for (int i = L_size-1; i>=0; i--){
    int node = q.front();
    q.pop();
    cout << node << " ";
    for (int j = 0; j< vertices; j++){
        if (ch=1 && graph[j][node]==1){
            q.push(j);          ⟶ if([visited[j]==0){
            visited[j]=1;
            minN++;
        }
    }
    else if (ch==2 && graph[node][j]==1){
        for (int k=vertices-1; k>=0; k--){
            if(graph[node][k]==1 && visited[k]==0){
                q.push(k);
                visited[k]=1;
                minN++;
            }
        }
    }
}
cout << endl;
}
cout << "Min nodes visited = " << minN << endl;
cout << "Max nodes visited = " << maxN << endl;
}
```

OUTPUT

Enter no of edges & vertices

6 7

Enter matrix

0 1 1 0 0 0 0
1 0 0 1 1 0 0
1 0 0 0 0 1 1
0 1 0 0 0 0 0
0 1 0 0 0 0 0
0 0 1 0 0 0 0
0 0 1 0 0 0 0

Enter starting node → 0

Enter 1 for Left to Right Traversal
Enter 2 for Right to Left Traversal

1	2
0	0
1 2	2 1
3 4 5 6	6 5 4 3

Minimum nodes visited = 7

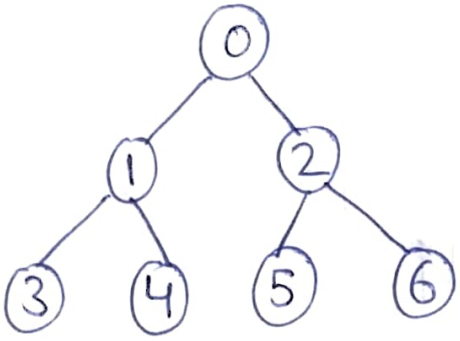
Maximum nodes visited = 4

OUTPUT ANALYSIS

Given matrix is

0	1	1	0	0	0	0
1	0	0	1	1	0	0
1	0	0	0	0	1	1
0	1	0	0	0	0	0
0	1	0	0	0	0	0
0	0	1	0	0	0	0
0	0	1	0	0	0	0

Diagram is



In this graph, all nodes are connected and the traversal starts at node 0, so all nodes will be visited atleast once. Therefore minimum no of nodes visited is equal to no of vertices.

The maximum no of nodes that will be traversed at a particular level is 4.