WEEK – 6 .

PRIYANSHI

2016927

E – 26

Q1.

```
#include <bits/stdc++.h>
using namespace std;
void dfs(vector<int> arr[], int source, int V, bool *visited)
{
    visited[source] = true;
    for (int i = 0; i < V; i++)
    {
        if (arr[source][i] != 0 && !visited[i])
        {
            dfs(arr, i, V, visited);
        }
    }
}

bool checkPath(vector<int> arr[], int V, int source, int destination)
{
    bool visited[V];
    for (int i = 0; i < V; i++)
        visited[i] = false;
    dfs(arr, source, V, visited);
```

```
    return visited[destination];
}

int main()
{
    int n;
    cin >> n;
    vector<int> arr[n];
    int temp;
    for (int i = 0; i < n; i++)
    {
        for (int j = 0; j < n; j++)
        {
            cin >> temp;
            arr[i].push_back(temp);
        }
    }
    int source, destination;
    cin >> source >> destination;
    if (checkPath(arr, n, source - 1, destination - 1))
    {
        cout << "Yes Path Exists.\n";
    }
    else
    {
```

```
        cout << "No Such Path Exists.\n";
    }
    return 0;
}
```

OUTPUT

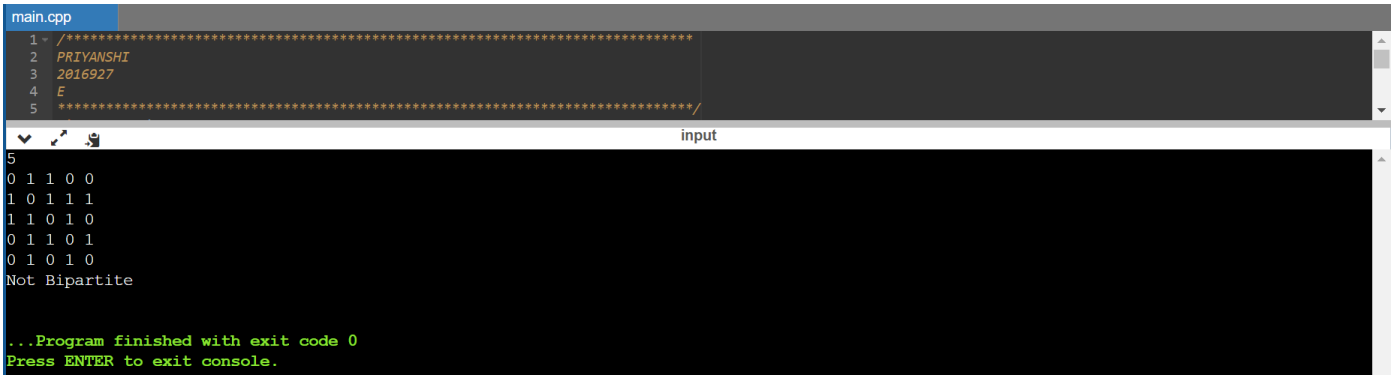
Q2.

```
#include <bits/stdc++.h>
using namespace std;

bool isBipartiteUtil(vector<int> G[], int src, int colorArr[], int V)
{
    colorArr[src] = 1;
    queue<int> q;
    q.push(src);
    while (!q.empty())
    {
        int u = q.front();
        q.pop();
        if (G[u][u] == 1)
            return false;
```

```
        for (int v = 0; v < V; ++v)
        {
            if (G[u][v] != 0 && colorArr[v] == -1)
            {
                colorArr[v] = 1 - colorArr[u];
                q.push(v);
            }
            else if (G[u][v] != 0 && colorArr[v] == colorArr[u])
                return false;
        }
    }
    return true;
}

bool isBipartite(vector<int> G[], int V)
{
    int colorArr[V];
    for (int i = 0; i < V; ++i)
        colorArr[i] = -1;
    for (int i = 0; i < V; i++)
        if (colorArr[i] == -1)
            if (isBipartiteUtil(G, i, colorArr, V) == false)
                return false;
    return true;
}
```

```
int main()
{
    int n;
    cin >> n;
    vector<int> G[n];
    int temp;
    for (int i = 0; i < n; i++)
    {
        for (int j = 0; j < n; j++)
        {
            cin >> temp;
            G[i].push_back(temp);
        }
    }
    if (isBipartite(G, n))
    {
        cout << "Yes Bipartite\n";
    }
    else
    {
        cout << "Not Bipartite\n";
    }
    return 0;
}
```

OUTPUT



Q3.

```
#include <bits/stdc++.h>
        using namespace std;



        bool CheckCycle(int node, vector<int> adj[], int vis[], int dfsvis[])
        {
            vis[node] = 1;
            dfsvis[node] = 1;
            for (auto it : adj[node])
            {
                if (!vis[it])
                {
                    if (CheckCycle(it, adj, vis, dfsvis))
                        return true;
                }
                else if (dfsvis[it])
                    return true;
            }
```

```
    dfsvis[node] = 0;
    return false;
}
bool isCycle(vector<int> adj[], int N)
{



    int vis[N + 1], dfsVis[N + 1];
    memset(vis, 0, sizeof(vis));
    memset(dfsVis, 0, sizeof(dfsVis));
    for (int i = 1; i <= N; i++)
    {
        if (!vis[i])
        {
            if (CheckCycle(i, adj, vis, dfsVis))
                return true;
        }
    }
    return false;
}
int main()
{
    int n, m;
    cin >> n >> m;
    vector<int> adj[n + 1];
```

```
    for (int i = 1; i <= m; i++)
    {
        int u, v;
        cin >> u >> v;
        adj[u].push_back(v);
    }



    if (isCycle(adj, n))
        cout << "Cycle Exists" << endl;
    else
        cout << "No Cycle Exists" << endl;
    return 0;
}
```

OUTPUT