11 Distance Vector Routing Protocol

11.1 Aim

Implement and simulate algorithm for Distance vector routing protocol.

11.2 Theory

The Distance Vector Routing Protocol is used to find the best route for sending a packet to another router.It uses Bellman-Ford Algorithm to find the shortest path between two routers.The algorithm first considers two nodes,i & j ,compare the distance between node i,j and the distance from i to some node k + node k to j.This helps in computing the shortest path between the nodes i and j.This is repeated for each and every node in the network.

11.3 Algorithm

Algorithm 1 Bellman Ford Algorithm

```
procedure BellManFord
    for i = 0;i<N;i++ do
        for j = 0;j<N;j++ do
            for k = 0;k<N;k++ do
                distance[i][j] = min(distance[i][j],cost[i][k]+distance[k][j])
            end for
        end for
    end for
end procedure
```

11.4 Code

Server

```
#include<iostream>
using namespace std;


int main(){
    int N;
    cout<<"Enter the size of the matrix \n";
    cin>>N;
    int cost[N][N]={0};
    int distance[N][N] = {0};
    cout<<"Enter the cost matrix \n";
    for(int i = 0;i<N;i++)
        for(int j = 0;j<N;j++){
```

```
            cin>>cost[i][j];
            distance[i][j] = cost[i][j];
        }
    for(int i = 0;i<N;i++)
        for(int j = 0;j<N;j++)
            for(int k = 0;k<N;k++)
            distance[i][j] = min(distance[i][j],cost[i][k]+distance
    [k][j]);
    cout<<"The distance matrix of the network is \n";
    for(int i = 0;i<N;i++){
        cout<<"\n";
        for(int j = 0;j<N;j++)
            cout<<distance[i][j]<<" ";
    }

    return 0;
}
```

11.5 Output

- **Server**

```
Enter the size of the matrix
3
Enter the cost matrix
0 1 5
1 0 2
5 2 0
The distance matrix of the network is

0 1 3
1 0 2
3 2 0
```

11.6 Result

Distance Vector Routing Protocol was implemented using C++.The compiler version is 8.2.1.