OSCN LAB – 3

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PROGRAM 3

Write a C++ program to Simulate Distance Vector Routing using Bellman Ford.

Enter the number of nodes: 4

Enter the cost matrix (Enter 100 for INF):

0 2 5 1

2 0 3 2

5 3 0 3

1 2 3 0

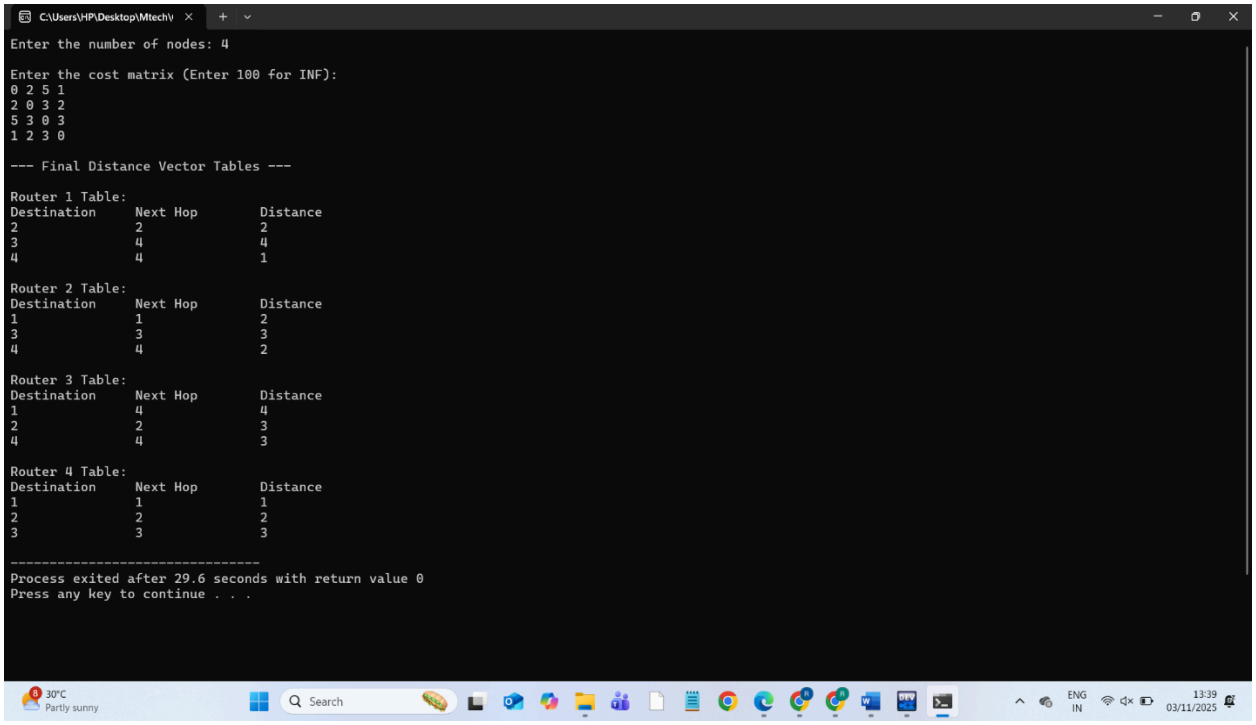
CODE:

```
#include <iostream>
using namespace std;
#define MAX 10
#define INF 100  // Large value representing no direct connection
int main()
{
   int cost[MAX][MAX];
   int dist[MAX][MAX];
   int via[MAX][MAX];
```

```
    int n;
    cout << "Enter the number of nodes: ";
    cin >> n;
    cout << "\nEnter the cost matrix (Enter 100 for INF):\n";
    for (int i = 0; i < n; i++)
    {
        for (int j = 0; j < n; j++)
        {
            cin >> cost[i][j];
            cost[i][j] = (cost[i][j] == 100) ? INF : cost[i][j];
            dist[i][j] = cost[i][j];
            via[i][j] = j;
        }
    }
// Bellman-Ford Update Rule
    for (int k = 0; k < n; k++)
    {       // Intermediate node
        for (int i = 0; i < n; i++)
        {   // Source node
            for (int j = 0; j < n; j++)
  { // Destination node
                if (dist[i][j] > cost[i][k] + dist[k][j])
     {
                    dist[i][j] = cost[i][k] + dist[k][j];
```

```
                via[i][j] = k;  // Update via node
            }
        }
    }
}
// Display Final Routing Tables
    cout << "\n--- Final Distance Vector Tables ---\n";
    for (int i = 0; i < n; i++)
  {
        cout << "\nRouter " << i + 1 << " Table:\n";
        cout << "Destination\tNext Hop\tDistance\n";
        for (int j = 0; j < n; j++)
{
            if (i != j)
                cout << j + 1 << "\t\t" << via[i][j] + 1 << "\t\t" << dist[i][j] << endl;
        }
    }
    return 0;
}
```

OUTPUT:


C:\Users\HP\Desktop\Mtech\
Enter the number of nodes: 4
Enter the cost matrix (Enter 100 for INF):
0 2 5 1
2 0 3 2
5 3 0 3
1 2 3 0
--- Final Distance Vector Tables ---
Router 1 Table:
Destination Next Hop Distance
2 2 2
3 4 4
4 4 1
Router 2 Table:
Destination Next Hop Distance
1 1 2
3 3 3
4 4 2
Router 3 Table:
Destination Next Hop Distance
1 4 4
2 2 3
4 4 3
Router 4 Table:
Destination Next Hop Distance
1 1 1
2 2 2
3 3 3
Process exited after 29.6 seconds with return value 0
Press any key to continue . . .
30°C
Partly sunny
Search
ENG
IN
13:39
03/11/2025