

ASSIGNMENT NO :- 2
ROLL NO:- 33252

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

int main() {
    int n;
    cin >> n;

    vector<pair<pair<char, char>, int>> edgelist;

    for (int i = 0; i < n; ++i) {
        char startvertex, endvertex;
        int weight;
        cin >> startvertex >> endvertex >> weight;
        edgelist.push_back(make_pair(make_pair(startvertex, endvertex), weight));
    }

    unordered_map<char, int> dist;
    unordered_set<char> vertices;

    for (auto edge : edgelist) {
        vertices.insert(edge.first.first);
        vertices.insert(edge.first.second);
    }

    for (auto vertex : vertices) {
        dist[vertex] = INT_MAX;
    }

    char source;
    cin >> source;
    dist[source] = 0;

    for (int i = 0; i < vertices.size() - 1; ++i) {
        for (auto edge : edgelist) {
            char u = edge.first.first;
            char v = edge.first.second;
            int weight = edge.second;
            if (dist[u] != INT_MAX && dist[u] + weight < dist[v]) {
                dist[v] = dist[u] + weight;
            }
        }
    }

    bool isnegativecycle = false;

    for(auto edge : edgelist){
        char u = edge.first.first;
        char v = edge.first.second;
        int weight = edge.second;
```

```

        if (dist[u] != INT_MAX && dist[u] + weight < dist[v]) {
            isnegativecycle = true;
            break;
        }
    }

    if(isnegativecycle){
        cout << "Graph contains a negative weight cycle" << endl;
    }
    else{
        for (auto vertex : vertices) {
            cout << "Shortest distance from " << source << " to " << vertex
                << " is " << dist[vertex]<< endl;
        }
    }

    return 0;
}

```

OUTPUT

```

mllab20@mllab20:~/Desktop/33252/0$ cd "/home/mllab20/Desktop/33252/0/" && g++
bellmenford.cpp -o bellmenford && "/home/mllab20/Desktop/33252/0/"bellmenford
4

```

```

A B 1
B C 2
C D 3
D A 4
A
Shortest distance from A to D is 6
Shortest distance from A to C is 3
Shortest distance from A to B is 1
Shortest distance from A to A is 0

```

```

mllab20@mllab20:~/Desktop/33252/0$ cd "/home/mllab20/Desktop/33252/0/" && g++
bellmenford.cpp -o bellmenford && "/home/mllab20/Desktop/33252/0/"bellmenford
6

```

```

A B 5
B C 1
B D 2
C E 1
D F 2
F E -3
A
Shortest distance from A to F is 9
Shortest distance from A to E is 6
Shortest distance from A to D is 7
Shortest distance from A to C is 6
Shortest distance from A to B is 5
Shortest distance from A to A is 0

```

```
mllab20@mllab20:~/Desktop/33252/0$ cd "/home/mllab20/Desktop/33252/0/" && g++  
bellmenford.cpp -o bellmenford && "/home/mllab20/Desktop/33252/0/"bellmenford  
4
```

A B 1

B C 1

C D -3

D B -1

A

Graph contains a negative weight cycle