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The Romania Problem

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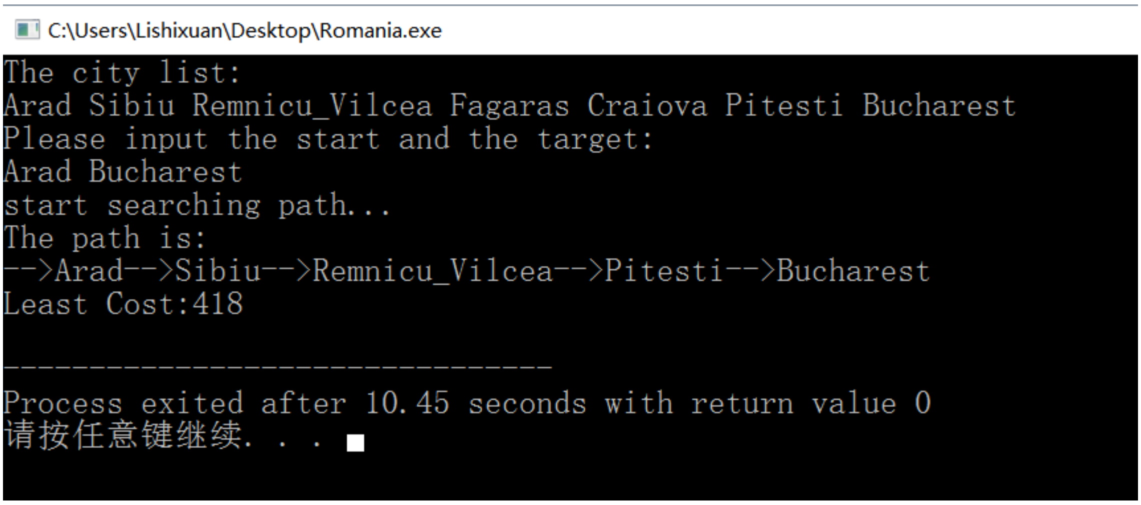
Contents

1 codes

```
#include <iostream>
#include <queue>
#include <string.h>
#include <stack>
using namespace std;

int map[7][7];
string name[] = {"Arad", "Sibiu", "Remnicu_Vilcea", "Fagaras", "Craiova"
    , "Pitesti", "Bucharest"};
const int max_n = 0x3f3f3f3f;

struct Node{
        int id;
        int cost;
        bool visit;
        int pre;
        Node(){};
        Node(bool ncity, int ncost, int nid, int npre){
                visit = ncity; cost = ncost; id = nid; pre = npre;
        }
        bool operator<(const Node &s) const{
                return cost > s.cost;
        }
        bool operator>(const Node &s) const{
                return cost < s.cost;
        }
        bool operator==(const Node &s) const{
                return cost == s.cost;
        }
}city[7];



void initialize(){
        for(int i =0; i < 7; i++){
                for(int j = 0; j < 7; j++){
                        map[i][j] = max_n;
                }
        }
        map[0][1] = map[1][0] = 140;
        map[1][2] = map[2][1] = 80;
        map[1][3] = map[3][1] = 99;
        map[2][4] = map[4][2] = 146;
        map[2][5] = map[5][2] = 97;
        map[3][6] = map[6][3] = 211;
        map[4][5] = map[5][4] = 138;
        map[5][6] = map[6][5] = 101;
        for(int k = 0; k < 7; k++){
                city[k].id = k;
                city[k].visit = 0;
        }
}

void printpath(int id){
        if(city[id].pre != -1) printpath(city[id].pre);
        cout << "-->" << name[id];
}

void searchpath(int sta, int end){
        priority_queue<Node> path;
        city[sta].cost = 0;
        city[sta].pre = -1;
        path.push(city[sta]);
        cout << "start␣searching␣path..." << endl;
        while(!path.empty()){
                int dis;
                Node temp = path.top();
                city[temp.id].visit = true;
                path.pop();
                if(temp.id == end) {
                        cout << "The␣path␣is:" << endl;
                        printpath(end);
                        cout << endl;
                        cout << "Least␣Cost:" << city[end].cost << endl;
                        return;
                }
                for(int i = 0; i < 7; i++){
                        if(map[temp.id][i] != max_n && city[i].visit !=
                           true){
                                city[i].pre = temp.id;
                                city[i].cost = temp.cost + map[temp.id][
                                   i];
                                path.push(city[i]);
                        }
                }
        }
        cout << "No␣way␣to␣" << name[end] << endl;
}

int main(){
        initialize();
        string start, target;
        int sta, end;
        cout << "The␣city␣list:" << endl;
        for(int k = 0; k < 7; k++)
                cout << name[k] << "␣";
        cout << endl;
        cout << "Please␣input␣the␣start␣and␣the␣target:" << endl;
        cin >> start >> target;
        int i = 0;
        for(i; i < 7; i++){
                if(!start.compare(name[i])) {sta = i; break;}
        }
        if(i == 7){
                cout << "No␣such␣a␣city!" << endl;
                return 0;
        }
        int j = 0;
        for(j ; j < 7; j++){
                if(!target.compare(name[j])) {end = j; break;}
        }
        if(j == 7){
                cout << "No␣such␣a␣city!" << endl;
                return 0;
        }
        searchpath(sta, end);
        return 0;
}
```

2 Results



```
The city list:
Arad Sibiu Remnicu_Vilcea Fagaras Craiova Pitesti Bucharest
Please input the start and the target:
Arad Bucharest
start searching path...
The path is:
-->Arad-->Sibiu-->Remnicu_Vilcea-->Pitesti-->Bucharest
Least Cost:418

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Process exited after 10.45 seconds with return value 0
请按任意键继续. . .
```