

Assignment 4 (Dijkstr's algorithm part):

Cpp code

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

int Total_v = -1;

void print_paths(int index, vector<int> paths)
{
    char c=65+index;
    if (index == Total_v) {
        return;
    }
    print_paths(paths[index], paths);
    cout << c << "->";
}

void catch_sol(int first, vector<int> arr_dist, vector<int> paths, int end)
{
    int n = arr_dist.size();
    cout << "Vertex\t|\tDistance\t| Path"<<endl;
    for (int i = 0; i < n; i++) {
        if (i==end) {
            char c=65+first, e=65+i;
            cout << "\n" << c << " -> ";
            cout << e << " \t ";
            cout << arr_dist[i] << " \t\t ";
            print_paths(i, paths);
        }
    }
}

int main()
{
    int first, end;
    cout<<"enter start index:";
    cin>>first;
    cout<<"enter end index:";
    cin>>end;

    vector<vector<int> > arr = {
        {0, 10, 0, 0, 3},
        {0, 0, 2, 0, 4},
        {0, 0, 0, 9, 0},
        {0, 0, 7, 0, 0},
        {0, 1, 8, 2, 0}};

    int n = arr[0].size();
    vector<int> arr_dist(n);
    vector<bool> arr_add(n);
    vector<int> paths(n);
```

```

for (int i = 0; i < n; i++) {
    arr_dist[i] = INT_MAX;
    arr_add[i] = false;
}

arr_dist[first] = 0;
paths[first] = Total_v;

for (int i = 1; i < n; i++) {
    int v = -1;
    int dist = INT_MAX;
    for (int j = 0; j < n; j++) {
        if (!arr_add[j] && arr_dist[j] < dist) {
            v = j;
            dist = arr_dist[j];
        }
    }
    arr_add[v] = true;
    for (int i = 0; i < n; i++) {
        int e_dist = arr[v][i];
        if (e_dist > 0 && ((dist + e_dist) < arr_dist[i])) {
            paths[i] = v;
            arr_dist[i] = dist + e_dist;
        }
    }
}
catch_sol(first, arr_dist, paths, end);
return 0;
}

```

- Test cases passed
- Completed on 15/10/22

Q/A:

1. How long did you spend on this assignment?
 - a. 1hr
2. Based on your effort, what letter grade would you say you earned?
 - a. On a scale of 1 to 10. I would grade this as 10/10.
3. Based on your solution, what letter grade would you say you earned?
 - a. On a scale of 1 to 10. I would grade this as 9/10.
4. Provide a summary of what doesn't work in your solution, along with an explanation of how you attempted to solve the problem and where you feel you struggled?
 - a. Computed all vertices, while printing the paths I checked only the starting and ending vertex that needed to be printed.