

1. Write a program Shortest path finding using c++

```
shortest.cpp - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
Start here X shortest.cpp X LCS.cpp X
1 #include <bits/stdc++.h>
2 using namespace std;
3
4 void Dijkstra(int V, vector<vector<int>>& graph, int source) {
5     vector<int> dist(V, INT_MAX);
6     vector<bool> visit(V, false);
7     dist[source] = 0;
8
9     for (int c = 0; c < V - 1; c++) {
10         int u = -1;
11         for (int i = 0; i < V; i++) {
12             if (!visit[i] && (u == -1 || dist[i] < dist[u])) {
13                 u = i;
14             }
15         }
16
17         visit[u] = true;
18
19         for (int v = 0; v < V; v++) {
20             if (graph[u][v] != 0 && !visit[v] && dist[u] + graph[u][v] < dist[v]) {
21                 dist[v] = dist[u] + graph[u][v];
22             }
23         }
24     }
25
26     cout << "Shortest distances from vertex " << source << ":\n";
27     for (int i = 0; i < V; i++) {
28         cout << "Vertex " << i << ": " << dist[i] << endl;
29     }
30 }
```

G:\3rd year 1st semester\Practical Lab\Algorithm Design and Analysis (sessional)\after ... C/C++ Windows (CR+LF) WINDOWS-1252 Line 50, Col 1, Pos 1224 Insert Read/Write default 18°C Mostly cloudy 8:04 PM 1/5/2025

```
shortest.cpp - Code::Blocks 20.03
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<global>
Start here X shortest.cpp X LCS.cpp X
21     dist[v] = dist[u] + graph[u][v];
22 }
23 }
24 }
25
26 cout << "Shortest distances from vertex " << source << ":\n";
27 for (int i = 0; i < V; i++) {
28     cout << "Vertex " << i << ": " << dist[i] << endl;
29 }
30 }
31
32 int main() {
33     vector<vector<int>> graph = {
34         {0, 1, 3, 0, 0, 10, 0},
35         {1, 0, 1, 7, 5, 0, 2},
36         {3, 1, 0, 9, 3, 0, 0},
37         {0, 7, 9, 0, 2, 1, 12},
38         {0, 5, 3, 2, 0, 2, 0},
39         {10, 0, 0, 1, 2, 0, 0},
40         {0, 2, 0, 12, 0, 0, 0}
41     };
42
43     int V = graph.size();
44     int source = 3;
45
46     Dijkstra(V, graph, source);
47
48     return 0;
49 }
50
```

```
"G:\3rd year 1st semester X
+ - _ □ X
Shortest distances from vertex 3:
Vertex 0: 7
Vertex 1: 6
Vertex 2: 5
Vertex 3: 0
Vertex 4: 2
Vertex 5: 1
Vertex 6: 8

Process returned 0 (0x0)   execution time : 0.15
6 s
Press any key to continue.
```

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2. Write a program Longest common subsequence(LCS) using c++.

```
LCS.cpp - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global> main(): int
Start here x shortest.cpp x LCS.cpp x
1 #include<bits/stdc++.h>
2 using namespace std;
3
4 void findlcs(const string &x, const string &y){
5     int m = x.length();
6     int n = y.length();
7
8     vector<vector<int>> p(m+1, vector<int>(n+1, 0));
9
10    for(int i = 1; i<=m; i++){
11        for (int j = 1; j<=n; j++){
12            if (x[i-1]==y[j-1]){
13                p[i][j] = p[i-1][j-1]+1;
14            }
15            else{
16                p[i][j]=max(p[i-1][j],p[i][j-1]);
17            }
18        }
19    }
20    string lcs = "";
21    int i = m, j = n;
22    while (i>0 && j>0){
23        if (x[i-1]== y[j-1]){
24            lcs = x[i-1]+lcs;
25            i--;
26            j--;
27        }
28        else if(p[i-1][j] > p[i][j-1]){
29            i--;
30        }
31        else{
32            j--;
33        }
34    }
35    cout<< "L C S : "<< lcs<<endl;
36    cout<< "Length OF LCS: "<< p[m][n]<<endl;
37 }
38
39 int main ()
40 {
41     string x,y ;
42     cout<< "Enter the 1st string: ";
43     cin>>x;
44     cout<<"Enter the 2nd string: ";
45     cin>>y;
46     //lullabybabies
47     //skullandbones
48
49     findlcs(x,y);
50     return 0;
51 }
52
53
54
```

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```
LCS.cpp - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global> main(): int
Start here x shortest.cpp x LCS.cpp x
25 i--;
26 j--;
27 }
28 else if(p[i-1][j] > p[i][j-1]){
29     i--;
30 }
31 else{
32     j--;
33 }
34 }
35 cout<< "L C S : "<< lcs<<endl;
36 cout<< "Length OF LCS: "<< p[m][n]<<endl;
37 }
38
39 int main ()
40 {
41     string x,y ;
42     cout<< "Enter the 1st string: ";
43     cin>>x;
44     cout<<"Enter the 2nd string: ";
45     cin>>y;
46     //lullabybabies
47     //skullandbones
48
49     findlcs(x,y);
50     return 0;
51 }
52
53
54
```

```
"G:\3rd year 1st semestre x
+ - _ x
Enter the 1st string: lullabybabies
Enter the 2nd string: skullandbones
L C S : ullabes
Length OF LCS: 7

Process returned 0 (0x0)   execution time : 17.8
40 s
Press any key to continue.
```

G:\3rd year 1st semester\Practical Lab\Algorithm Design and Analysis (sessional)\after ... C/C++ Windows (CR+LF) WINDOWS-1252 Line 48, Col 8, Pos 1013 Insert Read/Write default

