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Sec E

Batch E-4

Roll 59

Branch: AIML

Course Computer network Lab

Practical 9

Implement Dijkstra's algorithm to compute the shortest path thru a graph Take an

example subnet graph with weights indicating delay between nodes, now obtain Routing

table for each node using distance vector routing algorithm, Take subnet of hosts as an

example. Obtain broadcast tree for It

Programme

```

8 *****/
9 #include <stdio.h>
10 #define INFINITY 9999
11 #define MAX 10
12
13 void Dijkstra(int Graph[MAX][MAX], int n, int start);
14
15 void Dijkstra(int Graph[MAX][MAX], int n, int start) {
16     int cost[MAX][MAX], distance[MAX], pred[MAX];
17     int visited[MAX], count, mindistance, nextnode, i, j;
18
19     // Creating cost matrix
20     for (i = 0; i < n; i++)
21         for (j = 0; j < n; j++)
22             if (Graph[i][j] == 0)
23                 cost[i][j] = INFINITY;
24             else
25                 cost[i][j] = Graph[i][j];
26
27     for (i = 0; i < n; i++) {
28         distance[i] = cost[start][i];
29         pred[i] = start;
30         visited[i] = 0;
31     }
32
33     distance[start] = 0;
34     visited[start] = 1;
35     count = 1;
36
37     while (count < n - 1) {
38         mindistance = INFINITY;
39
40         for (i = 0; i < n; i++)
41             if (distance[i] < mindistance && !visited[i]) {

```



input

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main.c
18
19 // Creating cost matrix
20 for (i = 0; i < n; i++)
21 for (j = 0; j < n; j++)
22 if (Graph[i][j] == 0)
23 cost[i][j] = INFINITY;
24 else
25 cost[i][j] = Graph[i][j];
26
27 for (i = 0; i < n; i++) {
28 distance[i] = cost[start][i];
29 pred[i] = start;
30 visited[i] = 0;
31 }
32
33 distance[start] = 0;
34 visited[start] = 1;
35 count = 1;
36
37 while (count < n - 1) {
38 mindistance = INFINITY;
39
40 for (i = 0; i < n; i++)
41 if (distance[i] < mindistance && !visited[i]) {
42 mindistance = distance[i];
43 nextnode = i;
44 }
45
46 visited[nextnode] = 1;
47 for (i = 0; i < n; i++)
48 if (!visited[i])
49 if (mindistance + cost[nextnode][i] < distance[i]) {
50 distance[i] = mindistance + cost[nextnode][i];
51 pred[i] = nextnode;
52 }

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main.c

60 }
61 }
62 int main() {
63 int Graph[MAX][MAX], i, j, n, u;
64 n = 6;
65
66 Graph[0][0] = 0;
67 Graph[0][1] = 0;
68 Graph[0][2] = 1;
69 Graph[0][3] = 2;
70 Graph[0][4] = 0;
71 Graph[0][5] = 0;
72 Graph[0][6] = 0;
73
74 Graph[1][0] = 0;
75 Graph[1][1] = 0;
76 Graph[1][2] = 2;
77 Graph[1][3] = 0;
78 Graph[1][4] = 0;
79 Graph[1][5] = 3;
80 Graph[1][6] = 0;
81
82 Graph[2][0] = 1;
83 Graph[2][1] = 2;
84 Graph[2][2] = 0;
85 Graph[2][3] = 1;
86 Graph[2][4] = 3;
87 Graph[2][5] = 0;
88 Graph[2][6] = 0;
89
90 Graph[3][0] = 2;
91 Graph[3][1] = 0;
92 Graph[3][2] = 1;
93 Graph[3][3] = 0;
94
95 }
96 }

input
Press ENTER to exit console

ENG 00:26

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```
87 Graph[2][5] = 0;  
88 Graph[2][6] = 0;  
89  
90 Graph[3][0] = 2;  
91 Graph[3][1] = 0;  
92 Graph[3][2] = 1;  
93 Graph[3][3] = 0;  
94 Graph[3][4] = 0;  
95 Graph[3][5] = 0;  
96 Graph[3][6] = 1;  
97  
98 Graph[4][0] = 0;  
99 Graph[4][1] = 0;  
100 Graph[4][2] = 3;  
101 Graph[4][3] = 0;  
102 Graph[4][4] = 0;  
103 Graph[4][5] = 2;  
104 Graph[4][6] = 0;  
105  
106 Graph[5][0] = 0;  
107 Graph[5][1] = 3;  
108 Graph[5][2] = 0;  
109 Graph[5][3] = 0;  
110 Graph[5][4] = 2;  
111 Graph[5][5] = 0;  
112 Graph[5][6] = 1;  
113  
114  
115  
116 u = 0;  
117 Dijkstra(Graph, n, u);  
118  
119 return 0;  
120 }
```

Input

Output:

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main.c

87 Graph[2][5] = 0;

88 Graph[2][6] = 0;

89

90 Graph[3][0] = 2;

91 Graph[3][1] = 0;

input

Distance from source to 1: 3

Distance from source to 2: 1

Distance from source to 3: 2

Distance from source to 4: 4

Distance from source to 5: 6

...Program finished with exit code 0

Press ENTER to exit console.