BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

Department Of Electronics And Telecommunication

VI SEMESTER

COMPUTER COMMUNICATION NETWORKS (18TE63)

DISTANCE VECTOR ROUTING ALGORITHM IN MATLAB

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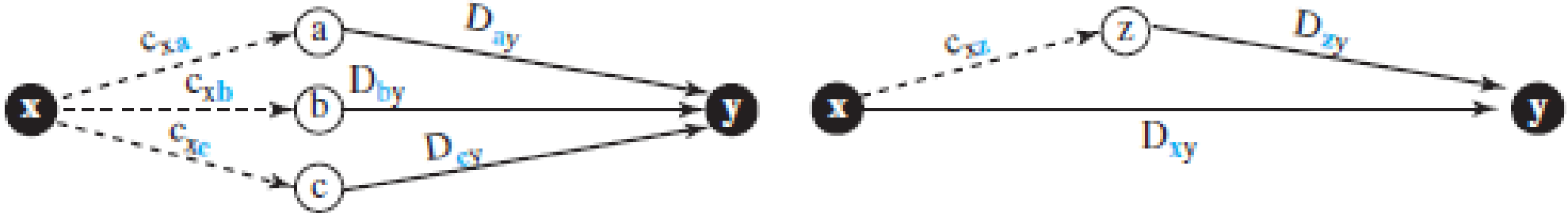
INTRODUCTION

- Unicast routing is when a datagram is destined for only one destination (one-to-one delivery).
- Unicast routing in the Internet can be done only by using hierarchical routing: routing in several steps using different routing algorithms.
- In distance-vector routing, the first thing each node creates is its own least-cost tree with the rudimentary information it has about its immediate neighbors.
- The incomplete trees are exchanged between immediate neighbors to make the trees more and more complete and to represent the whole internet.

Bellman-Ford equation

$$Dxy = \min\{(cxa + Day), (cxb + Dby), (cxc + Dcy), \ldots\}$$

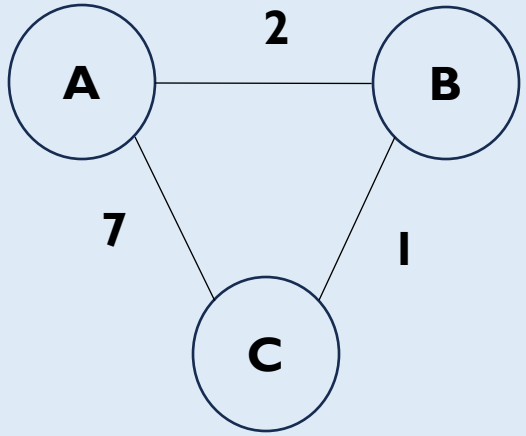
Figure 20.3 *Graphical idea behind Bellman-Ford equation*



a. General case with three intermediate nodes

b. Updating a path with a new route

EXAMPLE



	A	B	C
A	0	2	7
B	2	0	1
C	7	1	0

	A	B	C
A	0	2	3
B	2	0	1
C	3	1	0

PROGRAM

```
dist=zeros(1,20);
from=zeros(1,20);
rt=zeros(1,10);
rt=struct ;
rt.dist='';
rt.from='';
costmat=zeros(20,20);
i=0;
j=0;
k=0;
count=0;
nodes=input("Enter the number of nodes : ");
disp("Enter the cost matrix :");
```

```
for i=1:nodes
    for j=1:nodes
        fprintf('enter cost(%d,%d): ',i,j);
        costmat(i,j)=input('');
        costmat(i,i)=0;
        rt(1,i).dist(1,j)=costmat(i,j);
        rt(1,i).from(1,j)=j;
    end
end
```

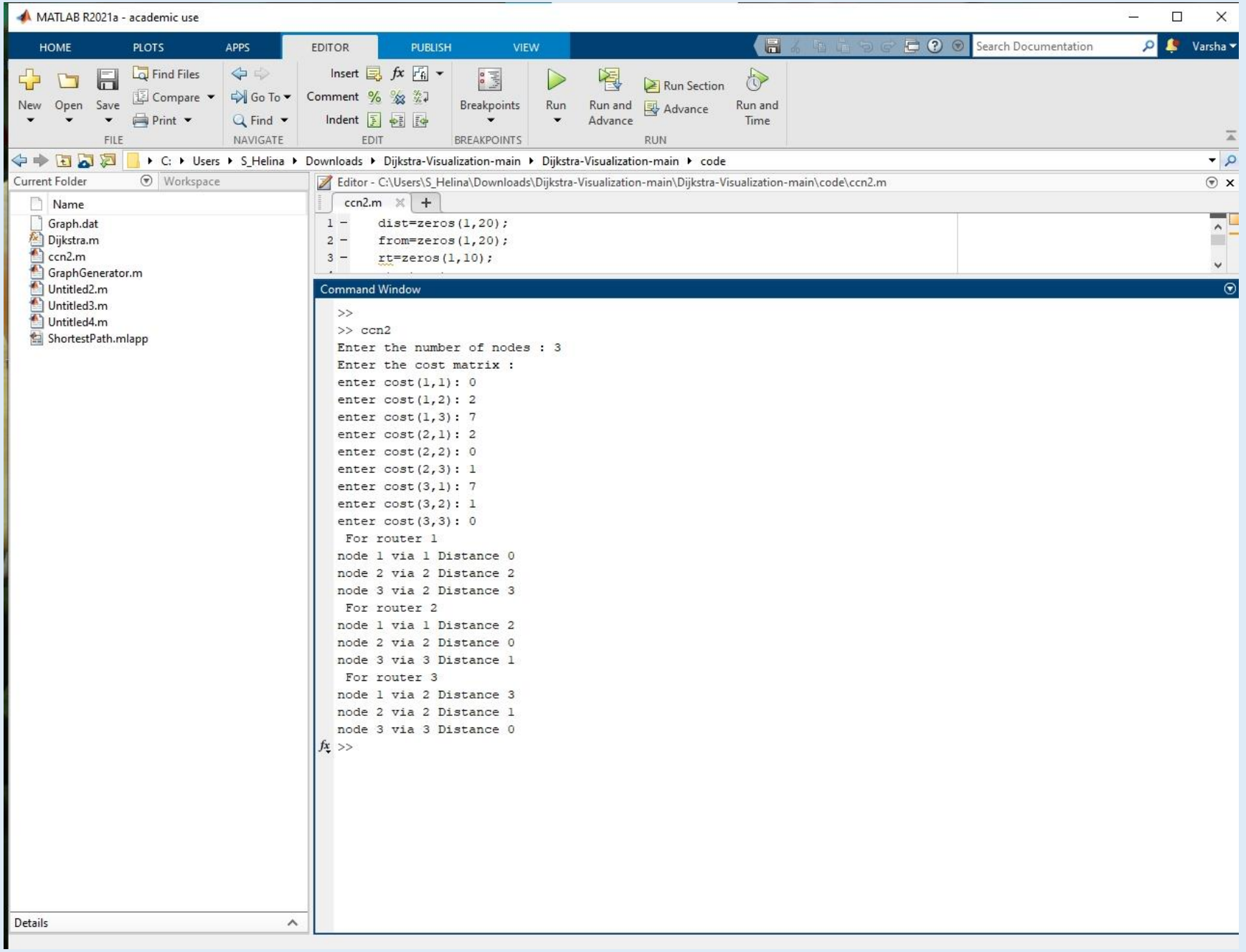
```
while 1
    count=0;
    for i=1:nodes
        for j=1:nodes
            for k=1:nodes

if(rt(1,i).dist(1,j)>costmat(i,k)+rt(1,k).dist(1,j))

rt(1,i).dist(1,j)=rt(1,i).dist(1,k)+rt(1,k).dist(1,j);
                    rt(1,i).from(1,j)=k;
                    count=count+1;
                end
            end
        end
    end
    if count==0
        break;
    end
end
```

```
for i=1:nodes
    fprintf(" For router %d",i);
    disp(' ');
    for j=1:nodes
        fprintf("node %d via %d Distance
%d",j,rt(1,i).from(1,j),rt(1,i).dist(1,j));
        disp(' ');
    end
end
end
```

OUTPUT


MATLAB R2021a - academic use
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Workspace
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GraphGenerator.m
Untitled2.m
Untitled3.m
Untitled4.m
ShortestPath.mlapp
Details
Editor - C:\Users\S_Helina\Downloads\Dijkstra-Visualization-main\Dijkstra-Visualization-main\code\ccn2.m
ccn2.m
1 – dist=zeros(1,20);
2 – from=zeros(1,20);
3 – rt=zeros(1,10);
Command Window
>>
>> ccn2
Enter the number of nodes : 3
Enter the cost matrix :
enter cost(1,1): 0
enter cost(1,2): 2
enter cost(1,3): 7
enter cost(2,1): 2
enter cost(2,2): 0
enter cost(2,3): 1
enter cost(3,1): 7
enter cost(3,2): 1
enter cost(3,3): 0
For router 1
node 1 via 1 Distance 0
node 2 via 2 Distance 2
node 3 via 2 Distance 3
For router 2
node 1 via 1 Distance 2
node 2 via 2 Distance 0
node 3 via 3 Distance 1
For router 3
node 1 via 2 Distance 3
node 2 via 2 Distance 1
node 3 via 3 Distance 0
>>