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91.413

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Programming 2

For this distance vector algorithm implementation for the 4 nodes I started off by creating the `rtinit()` function. Given that the distance table `dt*` was already declared, I started initializing the tables with the distance from the node to their neighboring nodes. Any nodes that are not a neighbor get assigned a distance of infinity. I assigned the nodes own via column with the current distance to the n nodes and then I assigned the self-designated via nodes with the same distances because those are the only ones known at the current time. After the initialization was done, I created an array of `rtpackets` that would be defined with the appropriate source and destination ids and the current nodes min costs. I would then send each of these packets to layer 2.

I then proceeded to work on the `rtupdate` functions for each of the 4 nodes. This functions starts off by finding out the source of the received `rtpacket` and assigns it as the `vianode id`. I then create a flag that will be set to 1 if the nodes min distances get updated. I add the min costs from the `rtpacket` with the distance to that node and call it `newCost`. If the `mincost` from the `rtpacket` is not infinity and the prior cost to that destination via the `rtpacket` node is the same as the `newCost`, the distance table at the proper destination node and via node index gets updated. If the cost to the current node at `i` is closer than then previous minimum distance to that destination node, the updated flag gets set as 1 and then all its neighboring nodes will receive its new set of minimum costs.

This program works after testing out the minimum distances on paper. Here are the resulting tables I get after the program is done.

```
via
D0 | 1  2  3
----|-----
1 | 1  4 10
dest 2 | 2  3  9
3 | 4  5  7
```

```

      via
D1 | 0 2
----|-----
0 | 1 3
dest 2 | 3 1

```

```

      via
D2 | 0 1 3
----|-----
0 | 3 2 6
dest 1 | 4 1 5
3 | 7 4 2

```

```

      via
D3 | 0 2
----|-----
0 | 7 4
dest 1 | 8 3
2 | 9 2

```

Here is the output from running my program.

```

ycha@cs3:~/413/Programming 2$ ./p2
Enter TRACE:0
rtinit0 called at 0.000000.
      via
D0 | 1 2 3
----|-----
1| 1 999 999
dest 2| 999 3 999
3| 999 999 7

rtinit1 called at 0.000000.
      via
D1 | 0 2
----|-----
0| 1 999
dest 2| 999 1
3| 999 999

rtinit2 called at 0.000000.
      via
D2 | 0 1 3
----|-----
0| 3 999 999
dest 1| 999 1 999
3| 999 999 2

rtinit3 called at 0.000000.
      via
D3 | 0 2
----|-----
0| 7 999
dest 1| 999 999
2| 999 2

rtupdate3 called at 0.946640. Received rtpkt from node 0
      via
D3 | 0 2
----|-----
0| 7 999
dest 1| 8 999
2| 10 2
Node 3's minimum costs have been updated.
Sending updates to 0 2 , contents: 7 8 2 0

rtupdate0 called at 0.992243. Received rtpkt from node 1
      via
D0 | 1 2 3
----|-----
1| 1 999 999
dest 2| 2 3 999
3| 999 999 7
Node 0's minimum costs have been updated.
Sending updates to 1 2 3 , contents: 0 1 2 7

rtupdate3 called at 1.209223. Received rtpkt from node 2
      via
D3 | 0 2
----|-----
0| 7 5
dest 1| 8 3
2| 10 2
Node 3's minimum costs have been updated.
Sending updates to 0 2 , contents: 5 3 2 0

rtupdate3 called at 1.275716. Received rtpkt from node 0
      via
D3 | 0 2
----|-----
0| 7 5
dest 1| 8 3
2| 9 2

```

rtupdate3 called at 1.275716. Received rtpkt from node 0
via

D3	0	2
dest 0	7	5
dest 1	8	3
dest 2	9	2

Node 3's minimum costs have not been updated.

rtupdate2 called at 1.641910. Received rtpkt from node 0
via

D2	0	1	3
dest 0	3	999	999
dest 1	4	1	999
dest 3	10	999	2

Node 2's minimum costs have not been updated.

rtupdate1 called at 1.870574. Received rtpkt from node 0
via

D1	0	2
dest 0	1	999
dest 2	4	1
dest 3	8	999

Node 1's minimum costs have been updated.

Sending updates to 0 2 , contents: 1 0 1 8

rtupdate2 called at 2.165707. Received rtpkt from node 1
via

D2	0	1	3
dest 0	3	2	999
dest 1	4	1	999
dest 3	10	999	2

Node 2's minimum costs have been updated.

Sending updates to 0 1 3 , contents: 2 1 0 2

rtupdate0 called at 2.406722. Received rtpkt from node 2
via

D0	1	2	3
dest 1	1	4	999
dest 2	2	3	999
dest 3	999	5	7

Node 0's minimum costs have been updated.

Sending updates to 1 2 3 , contents: 0 1 2 5

rtupdate2 called at 2.421268. Received rtpkt from node 3
via

D2	0	1	3
dest 0	3	2	9
dest 1	4	1	999
dest 3	10	999	2

Node 2's minimum costs have not been updated.

rtupdate1 called at 2.810933. Received rtpkt from node 2
via

D1	0	2
dest 0	1	4
dest 2	4	1
dest 3	8	3

Node 1's minimum costs have been updated.

Sending updates to 0 2 , contents: 1 0 1 3

rtupdate2 called at 3.292663. Received rtpkt from node 3
via

D2	0	1	3
----	---	---	---

rtupdate2 called at 3.292663. Received rtpkt from node 3
via

D2	0	1	3
----	-----	-----	-----
0	3	2	9
dest 1	4	1	10
3	10	999	2

Node 2's minimum costs have not been updated.

rtupdate3 called at 3.601910. Received rtpkt from node 2
via

D3	0	2
----	-----	-----
0	7	4
dest 1	8	3
2	9	2

Node 3's minimum costs have been updated.

Sending updates to 0 2 , contents: 4 3 2 0

rtupdate2 called at 4.063167. Received rtpkt from node 0
via

D2	0	1	3
----	-----	-----	-----
0	3	2	9
dest 1	4	1	10
3	10	999	2

Node 2's minimum costs have not been updated.

rtupdate0 called at 4.103641. Received rtpkt from node 3
via

D0	1	2	3
----	-----	-----	-----
1	1	4	999
dest 2	2	3	9
3	999	5	7

Node 0's minimum costs have not been updated.

rtupdate2 called at 4.169482. Received rtpkt from node 3
via

D2	0	1	3
----	-----	-----	-----
0	3	2	7
dest 1	4	1	5
3	10	999	2

Node 2's minimum costs have not been updated.

rtupdate0 called at 4.330418. Received rtpkt from node 3
via

D0	1	2	3
----	-----	-----	-----
1	1	4	15
dest 2	2	3	9
3	999	5	7

Node 0's minimum costs have not been updated.

rtupdate1 called at 4.643052. Received rtpkt from node 0
via

D1	0	2
----	-----	-----
0	1	4
dest 2	3	1
3	8	3

Node 1's minimum costs have not been updated.

rtupdate0 called at 5.212747. Received rtpkt from node 3
via

D0	1	2	3
----	-----	-----	-----
1	1	4	10
dest 2	2	3	9
3	999	5	7

rtupdate0 called at 5.212747. Received rtpkt from node 3

via
D0	1 2 3
1| 1 4 10
dest 2| 2 3 9
3| 999 5 7

Node 0's minimum costs have not been updated.

rtupdate3 called at 5.383835. Received rtpkt from node 0

via
D3	0 2
0| 7 4
dest 1| 8 3
2| 9 2

Node 3's minimum costs have not been updated.

rtupdate1 called at 5.820477. Received rtpkt from node 2

via
D1	0 2
0| 1 3
dest 2| 3 1
3| 8 3

Node 1's minimum costs have not been updated.

rtupdate2 called at 6.042466. Received rtpkt from node 1

via
D2	0 1 3
0| 3 2 7
dest 1| 4 1 5
3| 10 9 2

Node 2's minimum costs have not been updated.

rtupdate0 called at 6.071281. Received rtpkt from node 1

via
D0	1 2 3
1| 1 4 10
dest 2| 2 3 9
3| 9 5 7

Node 0's minimum costs have not been updated.

rtupdate1 called at 6.532176. Received rtpkt from node 0

via
D1	0 2
0| 1 3
dest 2| 3 1
3| 6 3

Node 1's minimum costs have not been updated.

rtupdate0 called at 7.020665. Received rtpkt from node 2

via
D0	1 2 3
1| 1 4 10
dest 2| 2 3 9
3| 9 5 7

Node 0's minimum costs have not been updated.

rtupdate2 called at 7.160166. Received rtpkt from node 0

via
D2	0 1 3
0| 3 2 7
dest 1| 4 1 5
3| 8 9 2

```

rtupdate2 called at 7.160166. Received rtpkt from node 0
via
  D2 |    0    1    3
  ----|-----
    0|    3    2    7
dest 1|    4    1    5
    3|    8    9    2
Node 2's minimum costs have not been updated.

rtupdate0 called at 7.405163. Received rtpkt from node 1
via
  D0 |    1    2    3
  ----|-----
    1|    1    4   10
dest 2|    2    3    9
    3|    4    5    7
Node 0's minimum costs have been updated.
Sending updates to 1 2 3 , contents: 0 1 2 4

rtupdate3 called at 7.579368. Received rtpkt from node 0
via
  D3 |    0    2
  ----|-----
    0|    7    4
dest 1|    8    3
    2|    9    2
Node 3's minimum costs have not been updated.

rtupdate1 called at 7.941363. Received rtpkt from node 0
via
  D1 |    0    2
  ----|-----
    0|    1    3
dest 2|    3    1
    3|    5    3
Node 1's minimum costs have not been updated.

rtupdate0 called at 8.085963. Received rtpkt from node 3
via
  D0 |    1    2    3
  ----|-----
    1|    1    4   10
dest 2|    2    3    9
    3|    4    5    7
Node 0's minimum costs have not been updated.

rtupdate2 called at 8.638953. Received rtpkt from node 1
via
  D2 |    0    1    3
  ----|-----
    0|    3    2    7
dest 1|    4    1    5
    3|    8    4    2
Node 2's minimum costs have not been updated.

rtupdate2 called at 8.942584. Received rtpkt from node 3
via
  D2 |    0    1    3
  ----|-----
    0|    3    2    6
dest 1|    4    1    5
    3|    8    4    2
Node 2's minimum costs have not been updated.

rtupdate2 called at 9.959651. Received rtpkt from node 0
via
  D2 |    0    1    3
  ----|-----
    0|    3    2    6
dest 1|    4    1    5
    3|    7    4    2

```

rtupdate2 called at 9.959651. Received rtpkt from node 0

via

D2		0	1	3
0		3	2	6
dest 1		4	1	5
3		7	4	2

Node 2's minimum costs have not been updated.

Simulator terminated at t=20000.000000, no packets in medium