Lab 2 - Task 3

In Task 2, we initialized the routing table for all nodes using local information about each node and its neighbors. In this task, we will learn how each node can use the distance vector algorithm to update its routing table iteratively based on its current routing table and information (advertisements) from its nearest neighbors. Eventually, the routing tables will converge to the optimal routing tables for the network that will enable packets to get from a source to a destination node following a path with least cost.

INSTRUCTIONS

In this exercise, your task is to revise the code to construct the routing table of all nodes by iteratively broadcasting and updating the tables. For ease of simulation, we assume the broadcasting process is perfect and the tables of other nodes will be available in each iteration.

The initial MATLAB code first loads the three variables that we initialized in Task 2:

- **neighbors{i}**: contains the list of neighbors of node **i**
- **costs{i}**: contains the cost of the links to the neighbors
- **RT{i}**: contains the initial routing table we obtained in Task 2.

Then, the code executes the main loop for a specified maximum number of iterations **max_time**. Because we have a fairly simple network, the routing tables will converge quickly to their optimal values, so we set **max_time** to a small value.

Within each iteration, the algorithm then loops over all nodes in the network.

In practice, each node **n** receives advertisements containing the current the routing tables from its neighbors (actually only the costs are needed) and uses that information to updates its own routing table. For simplicity, in our code, we will have each node **n** grab the required information from its neighbors.

Each node **n** loops over all of its neighbors (contained in the variable **neighbors{n}**).

For each neighbor, which is referred to by the variable **linked** and which it can reach with the value stored in **cost**, the node will the loop over all nodes **k** in the network.

For each node **k**, node **n** computes the cost to reach node **k** through that node **linked**, which is the sum of the cost to get to the node **linked** and the cost to get from **linked** to **k**. If it can reach **k** through **linked** with a lower cost than the cost to node **k** stored in its current routing table, **RT{n}(k,2)**, then it will update the **k**th row of routing table to indicate that packets destined for **k** should be forwarded to the node **linked**, and update the cost to get to node **k**.

After node n has updated its routing table based on information gathered from its neighbors, it advertises that routing table using the function **sendAdvertisement**.

Your task is to revise the code to update the routing table. Basically, you need to complete the last step of each iteration where node **n** compares the cost of its current route to node **k**, **RT{n}(k,2)**, with the route through its neighbor **linked**. If the route through **linked** is better, node **n** will update the values of both **RT{n}(k,1)** and **RT{n}(k,2)**.

Please, revise the code between the lines

```
% % % % Revise the following code   % % % %
```

and

```
% % % % Do not change the code below % % % %
```

Do not change other parts of the code.

Your Solution

Save Reset MATLAB Documentation (https://www.mathworks.com/help/)

```
80              end
81          end
82          sendAdvertisement(RT{n});
83      end
84      % show the new routing table for the node 1
85      RT{1}
86  end
```

Assessment Tests: Failed

✔ **Is the problem unchanged?**

✘ **Is the routing table correct?**
The variable RT{3} at time 2 is incorrect.

Output

```
ans =

     0     0
     2     2
     4     4
     4     1
     4     2
     3    10


ans =

     0     0
     2     2
     4     3
     4     1
     4     2
     4     4


ans =

     0     0
     2     2
     4     3
     4     1
     4     2
     4     4
```