Ryan Franklin

CS 4310

Professor Mina Guirguis.

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Project #1

Asside: Lucas Anesti and I worked together how we think the project should work and discussing the prompt of the project.

A short design document stating the overall design decisions made and data structures used:

I decided on using two independent classes one called node the other network. I used this two-class design because it would allow for easier implementation when routing all the nodes and finally sending data down a route. Each class has two class global data structures that every node can access this is done for things like edges in the network. Each instantiation of Node has a name, routing table, an adjacency list for the neighbors, update flag, and a count of the distance vectors sent. The routing table is a list of dictionaries because I found it easier to navigate by key value pairs. Also, it is much easier to search a dictionary than a list. For most other entry besides the Distance vectors, which also is a dictionary again for ease of navigation, lists were used. While network keeps track if the file name, the data retrieved from the file, a convergence flag, a count for rounds, and a route for a send. The short design is the network will begin each round by everyone sharing their packets with their neighbors and visa versa. Once the distances vectors have been exchanged the network will begin to update each nodes Routing tables with any changes. This will continue until no nodes' distance vector exchange indicates an update this should mean convergence. Then print the routing tables of each node. I also used a helper class for some functions I didn't think factored nicely elsewhere and needed its out space.

To run:

Python3 main.py <name of the input file> <number of rounds>

•In the Results document which is name outputfile.txt, the following questions are answered (for each topology): How many rounds did it take each network to converge? **And** What is the ID of the last node to converge in each network? **And** How many DV messages were sent in total until each network converged?

•After convergence, have your simulator route the following data packets using the routing tables created, showing the path used from source to destination:

This can be found in the **outputfile.txt** after the "POST CONVERGENCE" line.

1. For the first topology: node 0 receives a data packet destined to node 3.

   Node 0 receives packet for node 23 via, Node 0 to Node 22 to Node 8 to Node 23

2. For the second topology: node 0 receives a data packet destined to node 7.

   Node 0 receives packet for node 7 via, Node 0 to Node 5 to Node 7

3. For the third topology: node 0 receives a data packet destined to node 23

   Node 0 receives packet for node 23 via, Node 0 to Node 22 to Node 8 to Node 2