Michael Mandulak, Daniel Weitman, William Wolf

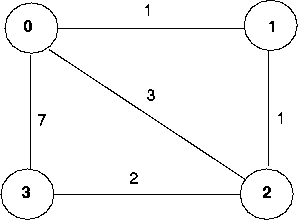
Dr. Lu

COSC 370

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Program 2: Distance Vector Routing

1. The code successfully simulates the distance vector routing algorithm in the emulated environment given the nodes, cost values and paths below.



The program creates a distance table for each node to recognize the least cost path initially based on its neighbors and as its information is updated through received packets. After initializing each distance table, each node sends its least cost path information to its direct neighbors in packets in order to update each table with the newest least cost path with respect to its neighbors. This is repeated until there are no new updates and each node confirms that it has the least cost path. The source code is commented to reflect the design choices as the program was developed.

**Links**

<http://faculty.salisbury.edu/~ealu/COSC370/cosc370_schedule.htm> (Chapter\_5)

<https://www.geeksforgeeks.org/distance-vector-routing-dvr-protocol/>

2. Group Meetings

4/20/20 (3 hours) - Initial research and implementation plan

4/23/20 (5 hours) - Function implementation, testing, and bug fixes

4/25/20 (3 hours) - Finished source code and checked final distance table output

3. N/A

**Sample Output:**

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

3| 5 3

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

**Individual Report:** Michael Mandulak

Contributions

* Algorithm implementation and coding
* Research on the Bellman Ford algorithm
* Coordinating group meeting times (approximately 10 hours total)
* Program testing and bug fixing in collaboration

Difficulties: An initial obstacle in the design process was the format of the four-by-four distance table and fitting it to the Bellman Ford algorithm inclusion of the current node in the table. This was resolved by utilizing the spaces not printed in the print function for each table as spots for calculation and for ease of data retrieval due to the cleared column. Similarly, the implementation of the algorithm was somewhat difficult, but once the key concepts were understood, the problem was negligible.

What I learned

This project focused on understanding distance vector routing and the Bellman Ford algorithm, which were well conveyed through the implementation of the algorithm. Also, the usage of the emulated packet environment contributed to the understanding of network communication and the exchanges between nodes in a given environment.

**Individual Report:** Daniel Weitman

Contributions

* Researched on distance-vector algorithmic design
* Assisted with program development and testing
* Commented source code
* Spent about 10 hours working with group members on project

Difficulties

Understanding the purpose and distinction between initialization and update functions took me a while to understand. Additionally, updating the distance table every time a node received a pointer to a packet was difficult overwriting the table with accurate and updated data. The other components to the project were proved mostly trivial with some minor issues that did not take too long to remedy.

What I learned

I learned about both Dikjstra’s greedy algorithm and Bellman-Ford distance vector routing algorithm as understanding the difference between them proved pivotal in understanding how to implement this project. Furthermore, writing code on how different nodes within a network determine the minimum cost path illustrated it well.

**Individual Report:** William Wolf

Contributions

* Applied the researched topics about networks to assist in the implementation of the protocol
* Organized project report layout
* Applied testing and bug fixing to the program as well as met with group often to discuss the problems and solutions to the program
* Group and hours are approximately 10 hours with overall problem solving and researching the topics so the transition to coding would be simple

Difficulties: Some difficulties that occurred included updating the distance tables with the information as well as understanding the format of each table.

What I learned: This project allowed me to understand the various concepts revolving around the concept of distance vector routing. This includes packing, sending, receiving, and unpacking them to send a message reliably across network connections. Also understood from the ability to program the packets to understand the data that is transferred and the idea of how the information can be shared across the nodes.