Namibia University of Science and Technology
Faculty of Computing and Informatics
Department of Computer Science
DSA610S Data Structures and Algorithms (DSA610S)
Semester 1, 2019

Assignment (Date Posted: 29 March 2019; Due Date: 12 April 2019)

INSTRUCTIONS

- This assignment is to be done in groups of at most FIVE (5) people.
- You must uploaded a zipped project folder named in the format yourStudentNumberApril.zip or a text file (with all your code) with the file name format yourStudentNumberApril.txt containing all your code on the eLearning platform. The names of all other group members MUST be included in the main class file as commented text before the code.
- Every member of the group MUST submit the assignment work on the eLearning platform
- It is at the lecturer's discretion to request that you present the solutions in a viva-voce session after submitting on the eLearning platform.

PROBLEM: Computer local area networks sometimes adopt a star topology. Star topology means each network node (computer, or other computing device) is connected to a central (server) node (central hub, router or switch) with a point-to-point connection. All nodes link to each other via the central (server) node. No direct connection exists between the peripheral (client) nodes. The central node is the server and serves all other nodes (clients). The peripheral nodes to the central node pass all traffic through the central node.

You decide to model the star topology using a data structure with a central node having multiple pointers/references on it and space for at least two (2) data values. The peripheral nodes only have one pointer/reference each and space for at least two (2) data values.

a. ServerNode Class
   i. Write a java class (call it *ServerNode*) for the server node. [5 marks]
   ii. The server node object must broker messages sent by client node objects. [10 marks]
b. ClientNode Class
   i. Write a java class (call it *ClientNode*) for the client node. [2 marks]
   ii. Each client node object must have a send( ) and receive( ) method, [6 marks]
   iii. Each client node must have an ID/unique name [2 marks]

   NOTE:
   - The send( ) method is naturally a wrapper around a call to an appropriate method on the server node.
   - The receive( ) method need do nothing more than print the message and the name/id of the sender. It need only be sequential.
   - e.g. client X sends "hello" to client Y who prints the message.
c. Star Class
   i. Write a java class (call it *Star*) for the model of the network. [10 marks]
   ii. The class must have the methods insertNode( ) and deleteNode( ). [10 marks]

   NOTE:
   - insertNode(zero or more parameters): adds a node to the model,
   - deleteNode(zero or more parameters): deletes a node from the model.
d. Extras (e.g. creativity, neatness, etc.) [10 marks]

Notes

- Details missing from the assignment directions e.g. return types for the methods and so on, give you the opportunity to be creative.
- None of the above classes is the main class; the main class is separate from the classes described above.
- The examiner may award bonus marks for productive creativity.
- The examiner expects copious amounts of comments in your code in order to be convinced that you understand what you are doing.

~~~~~~~~~~~~***End of Assignment***~~~~~~~~~~~~
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