Sharif University of Technology
Department of Computer Engineering

CE 693: Advanced Computer Networks

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Homework 3

Please email your answers/report in **PDF format** to Mr. Jafari "mjafari@ce.sharif.edu" and CC me at "kharrazi@sharif.edu". The HW file name should be **"Your Lastname-693-HW-3"**. It should be used as the subject of your email, too. In order for us not to miss your homework please follow the formatting. This homework is due by **Azar 4th, 11:59 PM**. You are also supposed to have a face-to-face delivery, the time of which will be announced later.

In this assignment, we get familiar with **Socat** tool which makes it possible to send/receive packets to/from another system. It is recommended to study Socat manual in order to have a better comprehension of its features. You are supposed to do the three parts of this homework by using Shell scripting and Socat.
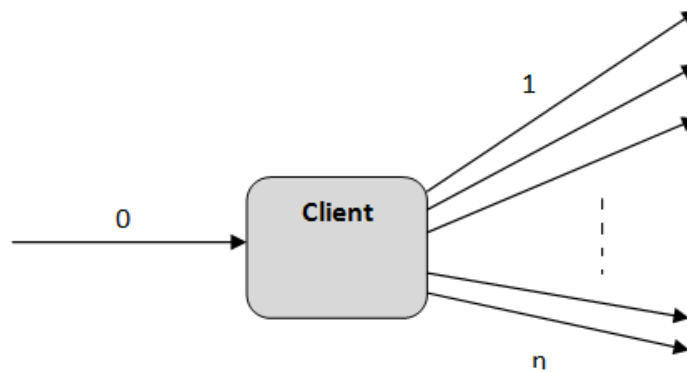
Part I

In this part, you should write a Shell script which receives URL of a website by sending your student number to a server and after creating and sending HTTP request for this URL, receives the desired content. Finally the content should be saved in an HTML file. (40 Points)

- Step 1: Connect to port 4000 of the server and send the massage which includes your student number (e.g. 89207704) to the server in a string form.

- Step 2: Receive the URL in the form of http://www.example.com, and then connection will be closed.

- Step 3: Create the HTTP request and send it to the website's server.

- Step 4: Receive the content of the URL from the website.

- Step 5: Save the content in the HTML file.
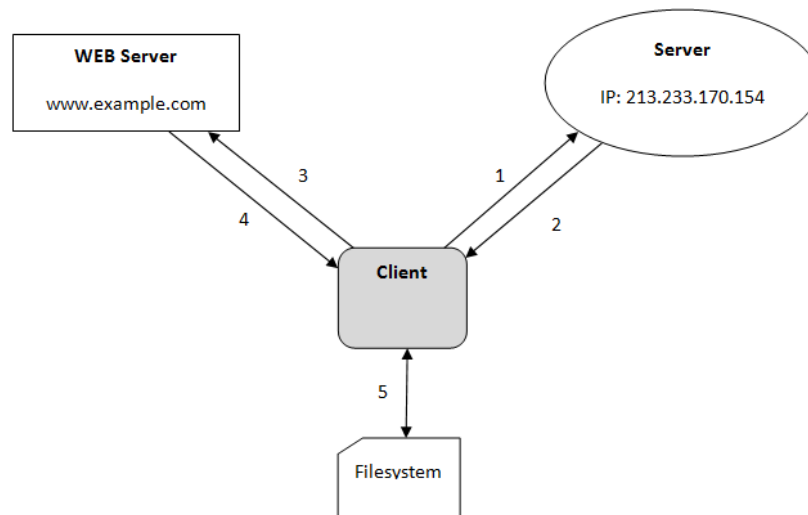
Part II

In this part, you are supposed to write a Shell script which gets several IP addresses when you run it, (example: *./yourscript 192.168.0.1 192.168.0.2 ...*). This script sends any received message on its own port 5000 to all input IP addresses on port 5000 and then prints the message on the screen. (30 Points)


Part III

The Shell script that should be written in this part is capable of receiving three types of messages, as explained in the following: (30 Points)

- Graft: The sender's IP address is added to multicast group after receiving *graft* message. The word *graft* should be sent in the form of string.

- Prune: The sender's IP address is removed from multicast group after receiving *prune* message. The word *prune* should be sent in the form of string.

- Send: This message will finally be sent to all members of multicast group after receiving *send example* message. The sentence *send example* should be sent in the form of string.
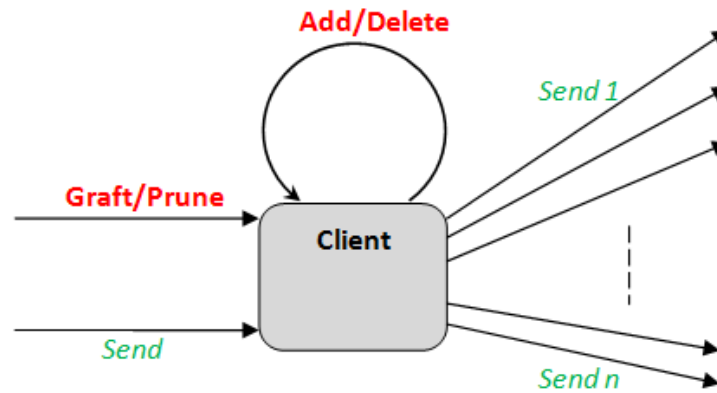
After completing all these tasks, create a topology like the following figure by running proper commands and plot a graph of message volume vs. total time of transfering for all nodes by using a tool like *wireshark* or *tcpdump*. You should change message volumes ranged from 10KB to 100 KB which increase by 10KB. The N value (the number of nodes) is arbitrary and more than 3.
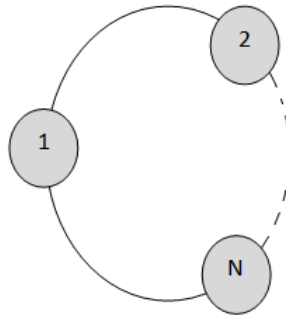
Note: Give thorough explanations in your report and attach all scripts to your email.