

## Homework 3

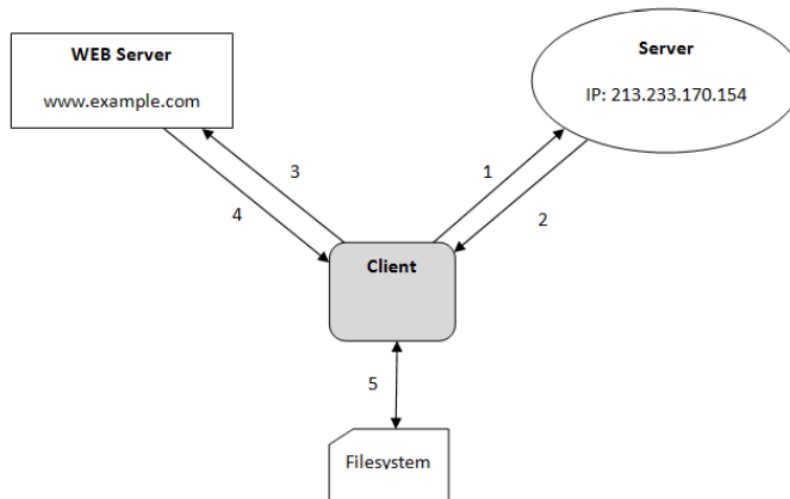
Please email your answers/report in **PDF format** to Mr. Baki “baki@ce.sharif.edu” and CC me at “kharrazi@sharif.edu”. The HW file name should be “**Your Lastname-693-HW-3**”. It should be used as the subject of your email, too. In order for us not to miss your homework please follow the formatting. This homework is due by **Azar 10th, 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.

- Step 1: Connect to port 4000 of the server and send the message which includes your student number (e.g. 89207704) to the server.
- Step 2: Receive the URL in the form of http://www.example.com.
- 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.



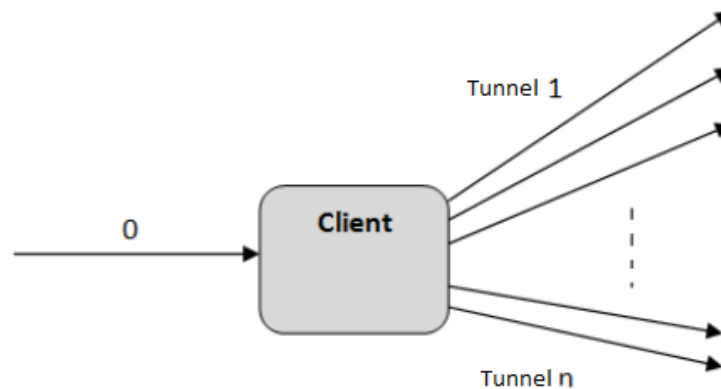
## Part II

In this part, you are supposed to write a Shell script which gets a list of `< IP address, CIDR network address >` pairs when you run it, `./yourscript IP1 NetAdd1 IP2 NetAdd2 ...`. This script creates secure tunnel to all input IP addresses, network address of each tunnel which your script should create come after IP address in input of your script (It should create secure tunnel to  $IP_i$ s with given  $NetAdd_i$ s). Also your script should listen on port 5000 and if any message received on this port send it through all tunnels which have been created (on port 5000).

**Example:** `./yourscript 213.233.168.110 10.10.12.1/24 213.233.170.23 10.10.13.1/24 ...`

In above example your script should create a tunnel between your host and host with IP address 213.233.168.110 with network address of 10.10.12.1/24 for tunnel and another tunnel between your host and host with IP address 213.233.170.23 with network address of 10.10.13.1/24 .

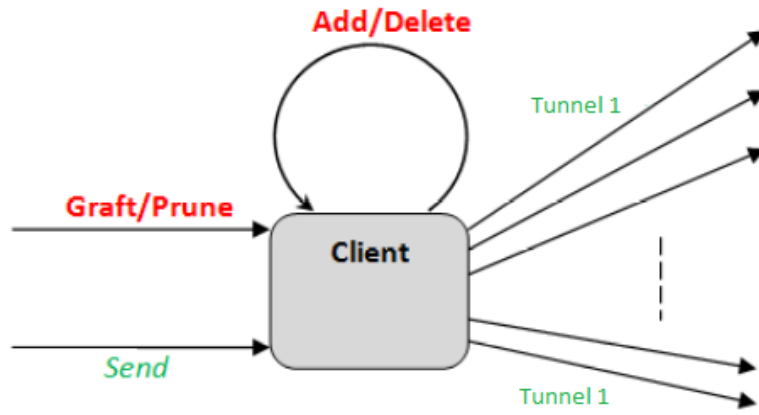
**NOTE:** in order to send message for each tunnel you should add another IP address for that host which is in tunnel's network address range and then send message to this address, in above example for first tunnel you should add IP address of 10.10.12.3 to the network interface of 213.233.168.110 and send message to 10.10.10.3.



## 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:

- Graft IFADDR: Create secure tunnel to sender's IP address with given network address after receiving *graft* message. The word *graft* should be sent in the form of string.
- Prune: Tunnel which created for Sender's IP address must be terminated after receiving *prune* message.
- Send [ example ] `< host1 > < host2 > ... < hostN >`: This message will finally be sent to all hosts tunnels after receiving *send example* message. The sentence *send example* should be sent in the form of string.



Note: Attach all scripts to your email.