N3/CN3: EXERCISE 4

Submission deadline: 2019/11/26

(Please submit your report as one PDF file to taizucourse@gmail.com)

Lab questions:

*Note: In your answers, you should show the **new/modified code lines.** Also, show the **results** by the screen capture.*

In this exercise, you will build a simple HTTP server. You can use the provided template, in which the lines with "……" should be completed.

1. Complete and run the server program. Store an image (e.g. Image.jpg) to the server's folder and record the server IP address. Then use a Web browser to request that image. In your report, please show the codes of the server program and the window of the browser. (20 points)
   (Hint: see Programming part of Lecs 9-10).

2. Now modify the server program so that it can handle errors by returning a 404 error message. Then use the browser to request a wrong file name (e.g. Imige.jpg) and receive the error message from the server. In your report, please show the new codes of the server and the error message on the browser's window. (20 points)
   (Hint: use the error exception in Lecs 9-10).

3. Modify the code in question 2 so that the error message also contains the IP addresses and port numbers of the server and the client (i.e. web browser). In the report, please show the new codes and the new error message. (10 points)

Bonus question: (**not mandatory**, 20 points)

See the figure of slide 55, Lecs 9-10. Now an Image2.jpg is stored at the (origin) server. The client (web browser) sends the request for Image2.jpg to the proxy server. For this, the proxy server retrieves Image2.jpg from the origin server, and then sends Image2.jpg to the client. Write the codes of the proxy server. In your report, show the codes and the browser's window.

Homework questions (each question = 5 points)

Please answer the following questions. (You may ask teacher or TAs to help)

1) What is the relationship between HTTP and Web?
2) What are the differences between non-persistent and persistent connections of HTTP? Which one has lower delay?
3) What are the roles of cookies?
4) What are the advantages of using proxies?

5) What are the differences between HTTP and SMTP?
6) Please describe the steps when a user (e.g. Bob) requests and receives a video over a Content delivery network (CDN).
7) Please list typical services that are based on (i) client-server architecture and (ii) peer-to-peer architecture.
8) Please describe the advantages of SDN.
9) What are the differences between application-layer protocols and transport-layer protocols?
10) What are the differences between Client-server architecture and Peer-to-peer architecture?