

Spring 2015 COMP4621 Homework Assignment #2
Due Date: March 13, 2015 (Friday)

Name: _____ ID: _____
E-Mail: _____ Section L ____

Please read the following instructions carefully before answering the questions:

- This assignment must be completed **individually**.
- When you write your answers, please try to be precise and concise.
- Fill in your name, student ID, email and Section number at the top of the first page.
- Please print this homework and fill in your answers in the space provided, or you can type your answers in the MS word file and print it out.
- **Homework Collection**: the **hardcopy** is required and the homework is collected at the **Collection BOX** outside **Room 4030 (Lift 1)**.

1. (25 points) Please briefly answer the following questions.

(a) Why do we refer that ftp is an out-of-band protocol? (5 points)

(b) What's the difference between client-server architecture and P2P architecture? (5 points)

(c) List five HTTP response status codes and explain their meanings. (5 points)

(d) What is the difference between a non-persistent HTTP protocol without parallel connections and one with parallel connections? What is the difference between a persistent HTTP protocol without pipelining and the one with pipelining? (5 points)

(e) Please briefly describe how Web caching can reduce the delay of a requested object. Can Web caching reduce the delay for all objects, even those not cached? (5 points)

2. (15 points) Please draw a graph to describe iterated query of DNS resolution. (You can take the hostname `www.cse.ust.hk` as an example)

3. (30 points) Assume that a browser is to download a web-page which consists of a base HTML file and n objects. Suppose the roundtrip time is given as RTT , and transmission time of the i -th object is given by T_i and the transmission time of the base HTML file is given by T_0 . Please answer the following questions with brief justifications

(a) Under non-persistent HTTP with no parallel TCP connections, how many TCP connections would have to be set up? Under persistent HTTP with pipelining, how many TCP connections would have to be set up (6 points)

(b) Assuming that a server can transmit one object at a time. What is the total delay under non-persistent HTTP without parallel connections (6 points)

(c) Assuming that a server can transmit all objects at once. What is the total delay under non-persistent HTTP with n parallel connection (6 points)

(d) Assuming that a server can transmit all objects simultaneously. What is the delay under persistent HTTP with pipelining (6 points)

(e) Assuming that a server can only transmit one object at a time. What is the delay under persistent HTTP without pipelining (6 points)

4. (30 points) Consider distributing a file of $F=10$ Gbits to N peers. The server has an upload rate of $u_s=20$ Mbps, and each peer has a download rate of $d_i=1$ Mbps and an upload rate of u . For $N=10, 100, 1000$, and $u=200$ Kbps, 600 Kbps, and 1 Mbps, fill the chart with the minimum distribution time for each of the combinations ($3 \times 3=9$) of N and u under both client-server distribution and peer-to-peer distribution. (Hint: Slides 2-78 and 2-79, Note: 1 Mbps = 1024 Kbps)

N	u	CS(sec)	P2P(sec)
10	200 Kbps		
	600 Kbps		
	1 Mbps		
100	200 Kbps		
	600 Kbps		
	1 Mbps		
1000	200 Kbps		
	600 Kbps		
	1 Mbps		