Homework 6

Warning: You have already made the maximum number of submissions. Additional submissions will not count for credit. You are welcome to try it as a learning exercise.

☐ **I, Matthew Kramer, certify that my answers here are my own work, and that I completed this in accordance with the Coursera Honor Code.**

Question 1

Assume that an application makes DNS queries to a recursive resolver that has no name translations cached at the beginning of the following experiment. Let the application resolve the DNS name “foo.cs.washington.edu” and “bar.cs.washington.edu” immediately after the first name resolution. Which of the following statements is likely true assuming predictable latencies from the resolver to the various DNS servers?

- ○ the second DNS lookup will take longer than the first DNS lookup
- ○ the first DNS lookup will take longer than the second DNS lookup
- ○ the two DNS lookups will take approximately the same amount of time
- ○ any of the other options might be true

Question 2

Assume that an application makes DNS queries to a recursive resolver that has no name translations cached at the beginning of the following experiment. Let the application resolve the DNS name “foo.cs.washington.edu” and “bar.cs.vu.nl” immediately after the first name resolution. Which of the following statements is likely true assuming predictable latencies from the resolver to the various DNS servers?

- the two DNS lookups will take approximately the same amount of time
- any of the other options might be true
- the first DNS lookup will take longer than the second DNS lookup
- the second DNS lookup will take longer than the first DNS lookup

Question 3

Which of the following is not a benefit provided by an HTTP proxy cache?

- reducing amount of data transferred to the browser
- improving web page download latency for the client
- reducing the amount of network backbone bandwidth consumed
- reducing the amount of data transferred from the server

Question 4

Persistent HTTP might not be helpful, if pipelining ends up not being used, and there are no repeat requests to the webserver. In these cases the overhead of keeping a TCP connection open for the Keep-Alive time leads to an unnecessary load on the server. For which of the following web-services might a persistent HTTP connection be least useful?

- Google (the requests are generally bursty, since many queries are performed in a short period of time)
- Wikipedia (most requests are for static pages with embedded content)
- Image hosting service (most requests are single requests, for a single image file)

Question 5

A piece of content could change with time (such as a page that shows the latest news

articles), and then must be updated on all of its replicas. For the following three content distribution models, what would be the order of the time taken to update the content on all replicas? (A < B means that A can be updated quicker than B)

A: Web server. The classic server-client model, with no replicas

B: P2P CDN. Fetches parts of content from other clients on the network (e.g. bittorrent)

C: Managed CDN. A content distribution network that places the content on a geographically closer server

- A < C < B
- C < A < B
- A < B < C
- B < C < A

Question 6

Which of the following is true about RTP (Real-time Transport Protocol)?

- RTP is a transport layer protocol
- RTP is an application layer protocol
- RTP is a link layer protocol
- RTP is a network layer protocol

Question 7

Consider a router that uses fair queueing, with two queues, for flows F1 and F2 respectively. If F1 uses packets of length 1000, and F2 uses packets of length 400, to what flows do the first 5 packets sent belong?

Assume that the queues are always backlogged.

- F2, F1, F2, F1, F2
- F2, F2, F2, F2, F2

- F1, F2, F1, F2, F1
- F2, F2, F1, F2, F2

Question 8

Two flows F1 and F2 can be defined by token buckets (R1,B1) = (50 kbps, 100 bits) and (R2,B2) = (100 kbps, 50 bits).

Which of the following are true? (Multiple choices may be correct)

- [ ] F2 is more bursty than F1
- [ ] F1 is more bursty than F2
- [ ] F2 has a greater average rate than F1
- [ ] F1 has a greater average rate than F2

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