CS118 Quiz 1

Thilan Tran

TOTAL POINTS

85 / 90

QUESTION 1

Problem 1 45 pts

1.1 1 / 3

✓ **- 2 pts** Not all correct answers are selected.

1.2 3 / 3

✓ **- 0 pts** Correct

1.3 3 / 3

✓ **- 0 pts** Correct

1.4 3 / 3

✓ **- 0 pts** Correct

1.5 3 / 3

✓ **- 0 pts** Correct

1.6 3 / 3

✓ **- 0 pts** Correct

1.7 3 / 3

✓ **- 0 pts** Correct

1.8 3 / 3

✓ **- 0 pts** Correct

1.9 0 / 3

✓ **- 3 pts** One or more wrong answer are selected.

1.10 3 / 3

✓ **- 0 pts** Correct

1.11 3 / 3

✓ **- 0 pts** Correct

1.12 3 / 3

✓ **- 0 pts** Correct

1.13 3 / 3

✓ **- 0 pts** Correct

1.14 3 / 3

✓ **- 0 pts** Correct

1.15 3 / 3

✓ **- 0 pts** Correct

QUESTION 2

Problem 2 15 pts

2.1 3 / 3

✓ **- 0 pts** Correct

2.2 3 / 3

✓ **- 0 pts** Correct

2.3 3 / 3

✓ **- 0 pts** Correct

2.4 3 / 3

✓ **- 0 pts** Correct

2.5 3 / 3

✓ **- 0 pts** Correct

QUESTION 3

3 Problem 3 8 / 8

✓ **- 0 pts** Correct

QUESTION 4

Problem 4 8 pts

4.1 4 / 4

✓ - 0 pts Correct

4.2 4 / 4

✓ - 0 pts Correct: 0.016 s or 16 ms

QUESTION 5

Problem 5 14 pts

5.1 2 / 2

✓ - 0 pts Correct

5.2 5 / 5

✓ - 0 pts Correct

5.3 5 / 5

✓ - 0 pts Correct

5.4 2 / 2

✓ - 0 pts Correct

QUESTION 6

6 Survey 0 / 0

✓ - 0 pts Correct

THILAN TRAN
605 140 530

CS 118 Quiz #1

Problem 1

1. A, C
2. A, B
3. B, C, D
4. A, D
5. B, C, D, E
6. B, D, E
7. A, D
8. B, E
9. A, B, D
10. A, B, D, E
11. C
12. C, E
13. C, E
14. A
15. B, E

1.1 **1 / 3**

✓ **- 2 pts** Not all correct answers are selected.

1.2 3 / 3

✓ **- 0 pts** Correct

1.3 3 / 3

✓ **- 0 pts** Correct

1.4 3 / 3

✓ **- 0 pts** Correct

1.5 3 / 3

✓ **- 0 pts** Correct

1.6 3 / 3

✓ **- 0 pts** Correct

1.7 3 / 3

✓ **- 0 pts** Correct

1.8 3 / 3

✓ **- 0 pts** Correct

1.9 **0 / 3**

✓ **- 3 pts** One or more wrong answer are selected.

1.10 3 / 3

✓ - 0 pts Correct

1.11 3 / 3

✓ - 0 pts Correct

1.12 3 / 3

✓ - 0 pts Correct

1.13 3 / 3

✓ - 0 pts Correct

1.14 3 / 3

✓ - 0 pts Correct

1.15 3 / 3

✓ - 0 pts Correct

1. In iterative queries, the user system reaches out to the local DNS server. Then, the local DNS server repeatedly makes queries through the hierarchy, and replies are returned directly to the local DNS server. Thus, the local DNS server is making all the DNS queries and the resolution load is heaviest at the local DNS server. For recursive queries, each DNS server in turn requests another DNS server to resolve the mapping on its behalf. Thus, after the user system reaches out to the local DNS server, the local DNS server will make a recursive query to the DNS hierarchy, expecting the request to be resolved for it. Thus, the resolution load is heaviest at the upper levels of the DNS hierarchy.

2. After clicking the link, the DNS request will go find the authoritative DNS server for v-start.com. Instead of referring the IP of a v-start.com website, the DNS server can redirect to the CDN by returning the IP of the most optimal CDN server based on the user's location and other factors. This will improve the latency of the video streaming since they are redirected to the CDN.

3. SMTP needs to verify that the user attempts to send emails is authorized to do so, ie. that they own the email account. This is not needed for HTTP since clients are free to browse the web and access websites freely, without being authenticated.

4. L - bit packets
   R bps transmission rate
   N packets arrive at buffer @ $t=0$

   Second Packet Delay : $\frac{L}{R}$ sec
   Third Packet Delay : $2\frac{L}{R}$ sec
   ⋮
   N^{th} Packet Delay : $\boxed{(N-1)\frac{L}{R} \text{ sec}}$

5. A Peer 2 Peer architecture should be used, since client's computers will not be on all the time, so client-server is not feasible. In addition, P2P will scale better than client-server model to support a large number of users since every user can upload and download.

2.1 3 / 3

✓ **- 0 pts** Correct

2.2 3 / 3

✓ **- 0 pts** Correct

2.3 3 / 3

✓ **- 0 pts** Correct

2.4 3 / 3

✓ **- 0 pts** Correct

2.5 3 / 3

✓ **- 0 pts** Correct

Problem 3

Error #1 : `if((server_fd = socket(AF_INET, SOCK_STREAM, 0)) > 0) {`
`... error...`
`}`

an error occurs when the return code is <0, not >0

Error #2 : `address.sin_port = ntohs(PORT);`

the htons function should be used instead, since we want to convert from host's endianness to network endianness

Error #3: `if(accept(server_fd, 3)<0)`
`...`

have to listen before accepting a connection; listen does not return a file descriptor, while accept does

`if((new_fd = listen ...)`

Error #4: `int valread = read(server_fd, buffer, 1024);`

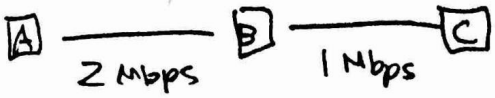
should not be ready from the server's file descriptor, should read from the newly accepted new_fd instead.

3 Problem 3 8 / 8

✓ - 0 pts Correct

Problem 4

1.



- 3 Packets, 500 bytes each.
- 1 msec propagation delay between A-B, B-C

A → B

$$T_{trans} = \frac{500 \times 8 \text{ bits}}{2 \text{ Mbps}} = \frac{4000 \text{ b}}{2 \times 10^6 \text{ bps}} = 2 \text{ ms}$$

$T_{prop} = 1$ ms.

1st Packet @ B = 2 ms + 1 ms

2nd Packet @ B = 2 ms + 2 ms + 1 ms

Difference @ B = 2 ms

A → C

$$T_{trans} = \frac{4000 \text{ b}}{1 \times 10^6 \text{ bps}} = 4 \text{ ms}$$

1st Packet @ C = 2 ms + 1 ms + 4 ms + 1 ms = 8

2nd Packet @ C = 2 ms + 2 ms + 1 ms + 2 ms + 4 ms + 1 ms = 12

Difference @ C = 12 − 8 = **4 ms**

only has to wait 2 ms instead of 4 since 1st packet arrived 2 ms earlier

2.

1st packet @ C = 8 ms

2nd packet @ C = 12 ms

3rd packet @ C = 2 ms + 2 ms + 2 ms + 1 ms + 4 ms + 4 ms + 1 ms = 16

All packets arrive @ C after **16 ms**

(also 8 + 4 × 2 = 16)

8 = 1st Packet; 4 × 2 = 2 × gating gap

4.1 4 / 4

✓ - 0 pts Correct

4.2 4 / 4

✓ - 0 pts Correct: 0.016 s or 16 ms

Problem 5

1. At the application layer, first DNS protocol is used to get IP, and then HTTP to request a web page. At the transport layer, UDP is used for DNS and TCP is used for HTTP.

2. The client first makes a DNS request for google.com's IP. This request is intercepted by the local DNS server, who then either makes a series of DNS requests to get the IP, or has it cached. After obtaining the IP, the client opens up a TCP connection to the IP at port 80, and performs a three way-handshake to connect to google's server. It then piggybacks off the handshake to make an HTTP GET request to google.com's default webpage, usually index.html. The client then receives an HTTP message containing the webpage, which is displayed in the browser. Then, after searching "news today," the client will send a GET (could also be a POST) w/ the search query, over a new HTTP connection if it is non-persistent, or over the same connection if it is persistent. The search results webpage will be responded in the HTTP response. After clicking on cnn.com, the same DNS lookup and TCP connection process occurs, and another GET request for cnn.com is made, and the response is displayed in the browser.

Problem 5

3. Persistnt, w/out pipelining: $2\,RTT + 20 \cdot 1\,RTT$

↑ bootstrap, main.html ← 20 objects

$= \boxed{22 \text{ sec}}$

Non-persistnt connection: $21 \cdot 2\,RTT$

↑ 21 objects total

↑ bootstrap time, + object have to reconnect each time

$= \boxed{42 \text{ sec}}$

Non-persistnt w/ parallel: $2\,RTT + \left(\frac{20}{5}\right) \cdot 2\,RTT$

(5 max connctns)

↑ bootstrap, index.html

↑ 5 parallel

↑ bootstrap + object

$= \boxed{10 \text{ sec}}$

Non-persistnt w/ parallel is the fastest

4.

Application Layer: SMTP to send email
HTTP for mail access w/ google mail
DNS to lookup mail server IP

Transport Layer: TCP for SMTP + HTTP
UDP for DNS

5.1 2 / 2

✓ **- 0 pts** Correct

5.2 5 / 5

✓ **- 0 pts** Correct

5.3 5 / 5

✓ **- 0 pts** Correct

5.4 2 / 2

✓ **- 0 pts** Correct

Survey

1. (12) above expectations

2. (11) average

3. (8) average

4. (11) no

5. Instructor: Is it possible to look at the chat during lecture?

TA: More practice problems.

6 Survey 0 / 0

✓ - 0 pts Correct