CS3873 – Net Centric Computing
Mid-term Examination
Winter 2019

A

Q1. Multi-Choice Questions (4 points)

C, C, D, B, C, C, A, C

Q2 (3 points)

(a) Is the server supporting persistent or non-persistent HTTP?

Persistent HTTP, because `"Connection: Keep-Alive"`

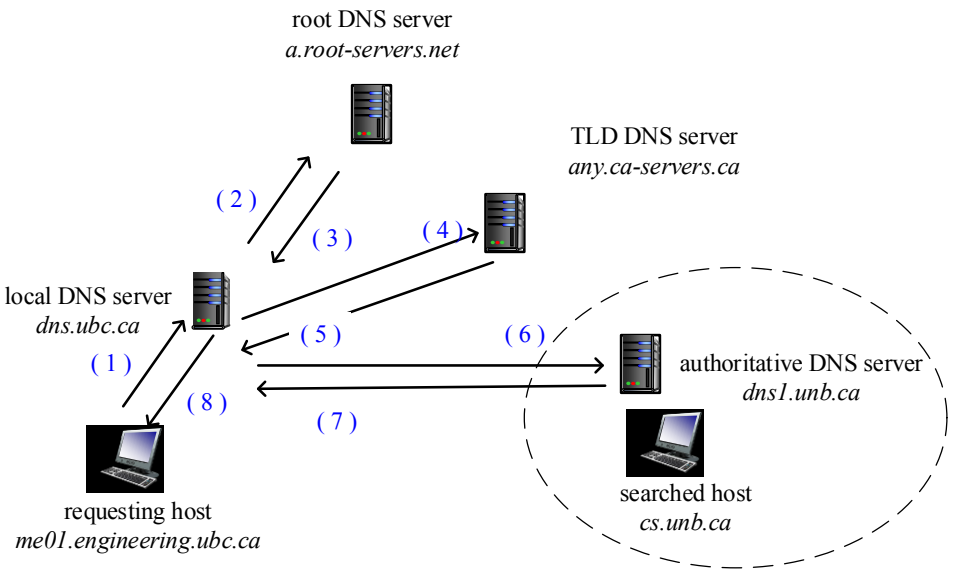
(b) How many bytes are there in the document being returned?

3874 bytes, because `"Content-Length: 3874"`

(c) When was the document last modified?

Sat, 10 Dec 2005 18:27:46GMT, because `"Last-Modified: Sat, 10 Dec 2005 18:27:46GMT"`

Q3 (3 points)



Note: The iterative approach in the above answer should be distinguished from the recursive approach. Don't confuse these two approaches.

Q4. (3 points)

a) 0 1 1 0 0 0 0 0 0 1 0 1 0 0 1 1

b) Calculating one's complement sum of the three numbers gives:

0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 (error)

Or calculating the correct checksum of the first two numbers gives:

one's complement sum: 0 1 1 0 1 1 1 1 0 0 0 0 0 0 0 0

one's complement of the sum: 1 0 0 1 0 0 0 0 1 1 1 1 1 1 1 1 (different from the given checksum)

Q5. (3 points)

a) L = 8000 bits R = 10 Gbps = 10^{10} bits/sec

$$d_{trans} = \frac{L}{R} = \frac{8000}{10^{10}} = 8 \times 10^{-7} seconds = 0.8\ \mu s$$

Note: B is used for bytes, while b is used for bits; kbps = 1000 bits/sec; Gbps = 10^9 bits/sec

b) d = 100 km = 10^5 m s = $2*10^8$ m/s

$$d_{prop} = \frac{d}{s} = \frac{10^5}{2 \times 10^8} = 5 \times 10^{-4}\ seconds = 0.5\ ms$$

Q6. (4 points)

a) P = 600, N = 4, L = 512*8*1000 bits, R = 20 Mbps, d_{trans} = L/R = 512*8*1000 / ($20*10^6$) = 0.2048 s

d_{e2e} = (P-1)*d_{trans} + N*d_{trans} = (600-1)* 0.2048 + 4*0.2048 = 123.49 seconds

OR, approximately, d_{e2e} = P*d_{trans} = 600 * 0.2048 = 122.88 seconds

b) R_1 = 5 Mbps, d_{trans} = L/R_1 = 512*8*1000 / ($5*10^6$) = 0.8192 seconds

d_{e2e} = P*d_{trans} = 600 * 0.8192 = 491.52 seconds