

ECE3076, Internetwork Programming, QUIZ 1 - Answers Fall 2007

Prof. John A. Copeland
E-Mail: copeland@ece.gatech.edu

Oct. 5, 2007

RULES.

- i This quiz is **not** open book. One original sheet of hand-written notes may be used. Calculators are ok.
- ii Answer all questions and show all work to receive full credit. Use back of sheets only if necessary.
- iii All sub-questions have the same weight (4 %).
- iv Please do not ask the proctors any questions during the exam about exam questions. Part of the test is understanding the question, as written, without supplemental information. If you feel additional data is needed to solve the problem, make (and state) an assumption and then work the problem.
- v. This is a time-limited test. All papers must be turned in 45 minutes after the start. The Georgia Tech Honor Code applies (see last page).

Question 1 – The Internet Write the letter of the correct answer, or answers, in the space along the right edge.

[acceptable answers (-points)]

- a. Most Internet services and intelligence is located: a) in the core, b) at the edge, c) in NAPs, d) in ISPs. b
- b. The core of the Internet is: a) high-speed links, b) switches, c) routers, d) WiFi, e) Ethernet. **[a,b,c]** a,c
- c. The backbone of the Internet is run by: a) UN, b) AT&T, c) Tier-1 ISPs, d) IETF, e) NFS. **[b,c]** c

Question 2 – Domain Names and DNS

- a. Your normal PC requests a DNS to do a search: a) recursive, b) non-recursive, c) authoritative, e) exhaustive,. a

Answers for the following questions are: a) top level, b) local, c) authoritative, d) root, e) none

- b. What type of DNS Server has the IP addresses of all names that end in "gatech.edu". c
- c. What type of DNS Server provides the IP address of the "gatech.edu" DNS. a
- e. What type of DNS Server has its own IP address in every type of DNS server. d
- f. What type of DNS Server has the IP addresses of every host on the Internet. e

Question 3 – Applications

Answers for the questions (a) - (e) are: a) TCP client, b) TCP server, c) peer-to-peer, d) UDP server, e) UDP client

- a. Type of application that listens and communicates on a single socket. **[d,e (but not e)]** d
- b. Type of application that listens on a socket and communicates on other sockets. **[c or b,c]** b
- c. Type of application that sends data without knowing if there is a ready receiver. **[d,e (but not d)]** e
- d. Type of application that receives "streaming media" (e.g. RealAudio) e
- e. Type of application being run at www.cnn.com. b
- f. Application protocol for Web servers and clients (3 or 4 letter acronym) http
- g Application protocol for email viewers that keep email in folders on the mail server (3 or 4 letter acronym). imap
[pop (-2 points)]

Question 4 – TCP

Please show calculations under these questions and integers for the answers to (a) through (e).

The sender buffer SendBase is 528. The last TCP sequence number sent was 1150 in a segment with 500 bytes of data. A segment is received with TCP acknowledgement number 650 and window 3000. The CongWin is 2048, MSS is 1024. Until another ACK is received:

- a. What is the new value of SendBase? (new acknowledgement) _650_
- b. What is the last byte (number) that can be sent with certainty that the receiver's buffer will not overflow? (new ack. no. plus window) _3650_
- c. What is the last byte (number) that can be sent without violating Congestion Control? (new ack + CongWin) _2698_
- d. What is the next byte (number) that will be sent? (last sequence no. + number bytes in segment) _1650_
- e. How many additional bytes can be sent before the sender has to stop and wait for another ACK? (2698 (smallest window limit) - 1650 (next byte)) _1048_
- f. The maximum segment size is found in: a) all TCP headers, b) only ACKs, c) SYN & SYN-ACK, d) an option. _c, d_
- g. The receiver window is found in: a) all TCP headers, b) only ACKs, c) SYN & SYN-ACK, d) an option. _a_
- h. Setting what TCP flag bit will abruptly terminate a TCP connection: A, P, S, F, R, U, ECN [F (-2 points)] _R_
- i. What is the one's compliment 4-bit checksum of the following 4-bit binary numbers: _1001_

$1000 \quad 0100 \quad 1001 \quad = 1100 + 1001 = 1 + 0101 = 0110, \text{ then compliment } \rightarrow 1001$

5– Running Average for Calculating the Retransmit Time Out

Use space under table for calculations. Round all results (including intermediate results) up to 1 ms.

Measured Round-Trip Time, M SampleRTT	Average RTT, A Alpha = 1/8 EstimatedRTT	Deviation (M - old-A) (+/-)	Average Deviation, D Beta = 1/4 DevRTT	RTO = A + 4D TimeOut
30	35	10	10	75
15	33	-20	13	85

$A = 0.875 * 35 + 0.125 * 15 = 32.5 \rightarrow 33 \quad Dev = 15 - 35 = -20 \quad D = 0.75 * 10 + 0.25 * |-20| = 12.5 \rightarrow 13$

What is the new value of Estimated RTT (round results up to 1 ms) _33_

What is the new value of RTO (round results up to 1 ms) $33 + 4 * 13$ _85_

Honor Code - I affirm that I have obeyed the rules of the Georgia Tech Honor Code*.

Signature _____

*Basically, I did not cheat, and I reported any observed cheating. A grade will not be recorded if there is no signature.