Georgia Tech

College of Computing

Georgia Institute of Technology

CS 6250: Computer Networking: Spring 2014

Quiz I

There are 13 questions (and one bonus question) and 11 pages in this quiz booklet (including this page). Answer each question according to the instructions given. You have **85 minutes**.

If you find a question ambiguous, write down any assumptions you make. **Be neat and legible.** If I can't understand your answer, I can't give you credit! There are three pretty challenging questions (clearly marked); you may want to look through the whole quiz and save those for last.

Use the empty sides of this booklet if you need scratch space. You may also use them for answers, although you shouldn't need to. *If you do use the blank sides for answers, make sure to clearly say so!*

Note well: Write your name in the space below AND your initials at the bottom of each page of this booklet.

THIS IS AN "CLOSED BOOK" QUIZ.
YOU ARE PERMITTED ONE DOUBLE-SIDED SHEET OF PAPER FOR NOTES.
ABSOLUTELY NO EMAIL OR MESSAGING OF ANY KIND!
MAKE SURE YOU'VE READ ALL THE INSTRUCTIONS ABOVE!

Initial here to indicate that (1) you've read the instructions and (2) you agree to abide by the Georgia Tech Honor Code:

The last page has easy bonus questions, which you can answer outside of the allotted time. Rip the last page off of your quiz for five bonus points. Turn it in anonymously if you like.

Do not write in the boxes below

1-5 (xx/20)	6-12 (xx/49)	13-15 (xx/16)	Bonus (xx/5)	Total (xx/85)
20	49	16	5	90.

Name: George Burdell (Key)

I Warmup

1. [4 points]: From the Dave Clark paper, *Design Principles of the DARPA Internet Protocols*, which was the first and foremost fundamental design goal of the Internet?

(Circle the BEST answer)

A. Security of end hosts and traffic.

B. Multiplexed utilization of existing interconnected networks.

C. Cost-effectiveness.

D. East of management

E. None of the above.

2. [4 points]: Which of the following are characteristics of packet switching?

(Circle ALL that apply)

A. Variable delay.

B. "Busy signals"

C. Sharing of network resources among multiple recipients.

D. Dedicated resources between each pair of sender and receiver.

E. None of the above.

3. [4 points]: Which of the following most accurately describes the *most common* uses for eBGP, iBGP, and IGP?

(Circle the BEST answer)

A. eBGP is used within an AS for external destinations, iBGP is used between ASes for external destinations, and IGP is used within an AS for internal destinations.

B. eBGP is used between ASes for external destinations, iBGP is used within an AS for external destinations, and IGP is used within an AS for destinations within an AS.

C. eBGP is used between ASes for external destinations, iBGP is used within an AS for internal destinations, and IGP is used within an AS for external destinations.

D. None of the above

Name:

4. [4 points]: Which of the following is true about required router buffer sizing if TCP senders are *not* synchronized?

(Circle ALL that apply)

A. The amount of buffering to sustain complete utilization is more than the bandwidth-delay product.

B. The amount of buffering required to sustain complete utilization is less than the bandwidth-delay product.

C. Packets from different TCP flows will experience packet drops at different times.

D. The total amount of packets in the bottleneck buffer at any time will be a normal random variable whose standard deviation is inversely proportional to the square root of the number active flows.

E. None of the above

5. [4 points]: Which of the following are characteristics of interdomain routing policies that are commonly applied?

(Circle ALL that apply)

A. Given multiple routes to the same IP prefix, an AS will prefer a route through a provider over a route through its customer.

B. Given multiple routes to the same IP prefix, an AS will prefer a route through a customer over a route through its peer.

C. An AS will not advertise a route that it learns via a provider to a peer.

D. An AS will not advertise a route that it learns via a provider to another provider.

E. All of the above

Name:

II Potpourri

6. [5 points]: What is the main difference between simulation and emulation? Describe two advantages of using an emulation tool like Mininet over a simulator.

(Answer legibly in the space below.)

Main difference: Emulations run in real time.

Advantages:

- Emulation can run real software.
- Can run real control programs and transfer to real network unchanged.

7. [4 points]: The paper *Dynamics of DNS Scam Hosting Infrastructure* describes certain characteristics of DNS records for scam sites that are different from the DNS records for "legitimate" sites. What is one such difference? What would be a reason for the host of that scam DNS domain to use DNS records be different in this way?

(Answer legibly in the space below.)

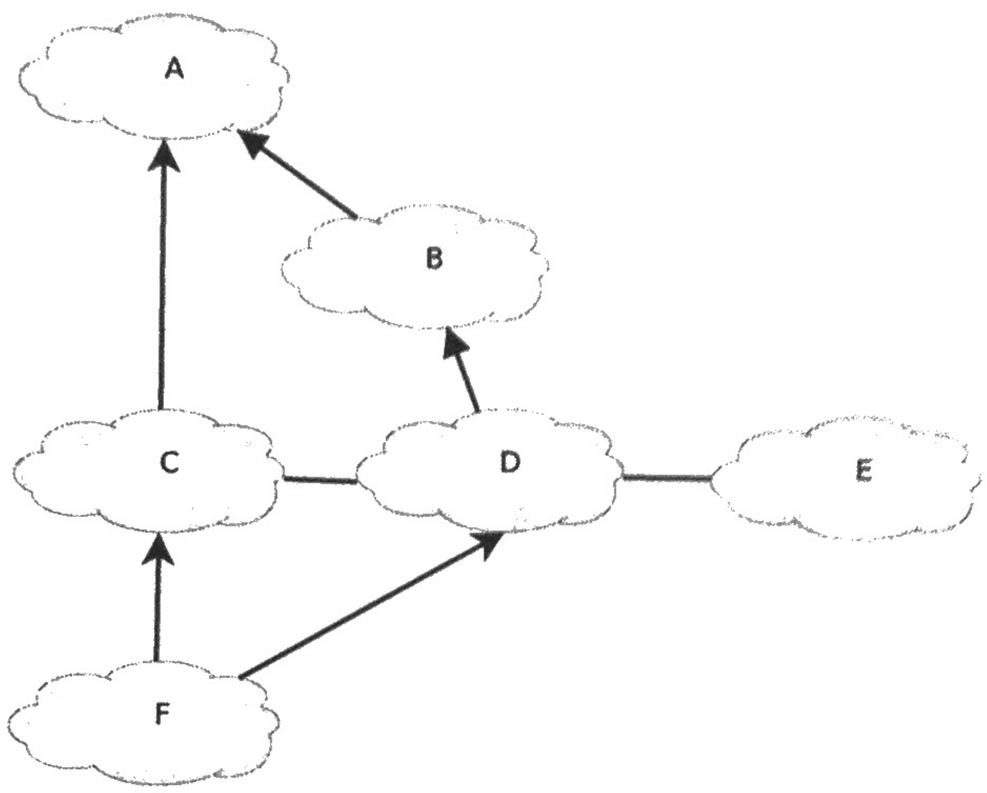
- TTLs for IP for NS records are shorter.
- TTLs are shorter in general.
- The # of IP addresses for a given domain over time becomes quite large.

(other answers possible)

Reason: "Agility" scammers need to move to evade detection.

Name:

8. [10 points]: Consider the AS graph below, which shows a set of ASes and their business relationships. Consider the following questions about their relationships.



A. Would the stub AS F readvertise routes it learned from provider C to its other provider, D? Why or why not?

B. Would E ever learn a route to a destination advertised by F? If so, what would be the AS path of the route it learned? If not, why would it not learn a route?

C. If A does not set any local preference values on routes that are advertised by F, and all ASes advertise routes according to common route export rules, then what is the AS path of the route that A will prefer to a destination that is advertised by F?

D. Suppose that AS F wants AS A to use the route $ABDF$ to reach an IP prefix that F advertises. Describe one way that AS F can try to cause AS A to send traffic for the prefix along that path. Will the approach guarantee that AS A always chooses that path? Why or why not?

(Answer legibly in the space below.)

Name:

A. No. Provider routes never advertised to another provider.
AS F would pay twice! (Upstream & downstream).

B. Yes. E D F.

C. A C F (shortest AS path length)

D. Two possible answers:
- IP prefix splitting (yes, guaranteed; Longest pfx match)
- AS path prepend (no, not guaranteed; Local pref might