

CS193I Midterm

**Closed Book, Closed Notes
1 8x11 Cheat Sheet
Calculator okay – NO computer.
(Total time = 110 minutes)**

Name (*please print*): _____

I agree to abide by the terms of the Honor Code while taking this exam.

Signature: _____

| | <i>Score</i> | |
|--------------|--------------|-------|
| 1. | (15) | _____ |
| 2. | (20) | _____ |
| 3. | (15) | _____ |
| 4. | (20) | _____ |
| 5. | (15) | _____ |
| 6. | (15) | _____ |
| TOTAL | (100) | _____ |

Make sure you state all your assumptions.

SCPD Students: Please attach a routing slip to the midterm.

Question 1 (15 pts)

Internet Protocol Stack

- a) Label the different layers of the protocol stack below. For each layer, also describe
- 1) the addressing scheme used
 - 2) functionality provided, and
 - 3) an example protocol/application.

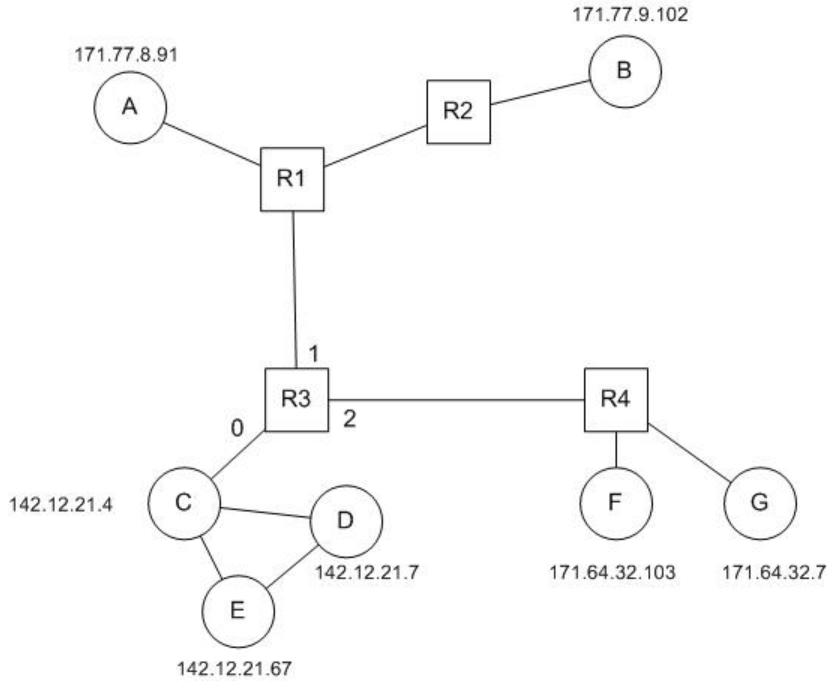
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| |

- b) Which level allows computers to communicate across multiple network types?

Question 2 (20 pts)

Routing

a) Given the network below, fill in the routing table for R3 without using prefixes.



| Destination | Port |
|-------------|------|
| 142.12.21.4 | 0 |

b) Compress the routing table by using prefixes whenever possible.

| Destination | Port |
|-------------|------|
|-------------|------|

Question 3 (15 pts)

HTTP

a) Suppose the following HTML anchor tags occur in a document whose URL is

<http://www.fuzzypets.com/dogs/retrievers.html>.

When each link is clicked, a HTTP/1.0 request,

GET *path* HTTP/1.0\r\n\r\n

is sent to the server. For each request below, indicate what the *path* will be in the request.

`Friendly Ragdolls`

`Bunnies`

`Yellow Retrievers`

b) Suppose the machine associated with <http://www.pets.com> also serves as the server for several other web sites, including <http://www.potbelliedpigs.com> and <http://www.frogsrus.com>. Assume the web site uses the HTTP/1.1 protocol. Write the request (including any necessary headers) to access the page <http://www.frogsrus.com/poisonous/amazon.html>.

Question 4 (20 pts)

Performance

a) Suppose you are trying to access a web page including both text and 2 images. Draw a timeline (similar to the ones discussed in class) of the communication between the client and server assuming HTTP/1.0. Suppose each one-way communication across the network takes 10s. What is the latency for downloading the page?

b) Suppose instead of using HTTP/1.0, you used HTTP/1.1 which allows both persistent connections and pipelining. How does the latency change?

c) Suppose you have accessed this page previously and have it cached locally. What information will you need to send to the server? If your cached copy is still valid, what will be the total latency for accessing the page?

Question 5 (15 pts)

Authentication and Security

You are considering requiring users to authenticate themselves before entering your local chat room. Your first thought is to require a password. However, you don't want to bother people with hard to remember passwords so you make passwords 6 characters long where characters can be upper or lowercase letters or digits.

a) If a person you had explicitly not invited to join wanted to log in as someone else, how many different password combinations would they need to try?

b) Sadly, this malcontent broke into your account last week and insulted everyone in the chat room on your behalf. One of your buddies said maybe you should use a challenge/response system for authentication. What did they mean? Give an example of a challenge that could be used.

