CP 372: Computer networks

Winter 2008 Test 1

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This is a closed book exam
No additional material permitted

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Write all answers in the space provided. Do not write answers on the back of these exam pages (except as scratch paper), they will not be marked.
There are 6 pages in this exam. Please check to make sure you have all the pages.

[]: Marks for each question are indicated in square brackets.

The following table is for purpose of marking. Please do not write in it.

Page:	Marks	Out of:
2	10	10
3	10	10
4	9	9
5	15	16
6	9	10
	Total marks available:	55

Total 53 / out of 50

[20] 1. State whether each of the following is true or false. **If a statement is false, briefly explain why?**

a. With non-persistent connection between browser and origin server, it is possible for a single TCP segment to carry two distinct HTTP request messages.

No. With non-persistent HTTP, every request must be sent through its own TCP connection

2

b. A user requests a Web page that consists of some text and six images. For this page the client will send one request message and receive seven response messages.

False The client will send 7 requests - 1 for the page and 1 for each image

2

c. An application can not enjoy reliable data transfer when the application runs over UDP.

False. The application can implement its own reliable channel over UDP

2

d. Two distinct web pages (for example www.wlu.ca/research.html and www.wlu.ca/students.html) can be sent over the same persistent connection.

True

2

e. In a packet switching network each router in the network core maintains connection state information for each of the connections passing through it.

False. State information is only maintained by state-based protocols on end hosts.

2

f. In the UDP protocol, congestion control regulates the amount of data that an application can send into the network, helping to prevent congestion in the network core.

False. there is no congestion control in UDP by default

2

g. The root name server knows the IP address of an authoritative name server for every hostname.

False. The root name server knows IPs for TLD servers.

2

h. If type of DNS record is NS, then `Name` field is a domain (such as `wlu.ca`) and `Value` field is the name of an authoritative DNS server that knows how to obtain IP addresses for hosts in the domain.

True

2

i. The alternating-bit (stop and wait) protocol is the same as Go-Back-N protocol with a sender window of size 4.

False. window size would be 2

2

j. The job of delivering data in a transport level segment to the correct socket is called **demultiplexing**.

True

2

[9] 2. Answer the following questions:

a) Why do HTTP, FTP, SMTP and POP3 run on top of TCP rather than on UDP?

These protocols require reliable data transfer. Since the content they deliver is not loss-tolerent, all bits must get from A to B. Rather than implement an application-layer reliable transfer service, they are designed to let TCP handle this for them. 3

b) Describe how Web caching can reduce the delay in receiving a requested object.

When Browsing by Proxy, a proxy ~~server~~ server on the local network will be caching web objects. When your host requires an object that is cached, the proxy server will deliver its cached copy of the object, rather than requesting it over the internet. Since your host is only waiting for the object from your LAN, it stands to a faster (less$ distance/hops over network) 3

c) Will Web caching reduce the delay for all objects requested by a user or for only some of objects? Give an example.

It will not. Objects which are not yet cached will have to be retrieved from the net. ~~Eh~~ In this case, the delay is actually increased slightly, since the proxy server must repeat your host's request to the net.

~~Also, some resources over http are~~ 3

Eg Browsing to a site which has not been visited by a host behind the proxy

Eg Conditional Getting by the proxy server to get updated versions of objects.

[16] 3. Provide answer to the following questions:

a. For a communication session between pair of processes, which process is the client and which is the server?

This depends on the nature of the communication session. In Many such connections, both processes have server-like properties (Response) and client aspects (Request), but generally, the process which initiated the ~~cont~~ connection is referred to as the client. 3

b. What information is used by a process running on one host to identify a process running on another host?

IP address & Port # 4

c. What is the difference between persistent HTTP with pipelining and persistent HTTP without pipelining?

persistent HTTP w/ pipelining allows the user-agent to make multiple requests for objects without waiting for responses. without pipelining, the user-agent must wait for each object to be received before requesting the next. 4

d. Consider an HTTP client that wants to retrieve a web document at a given URL. The IP address of the HTTP server is initially unknown. What transport and application-layer protocols are needed in this scenario?

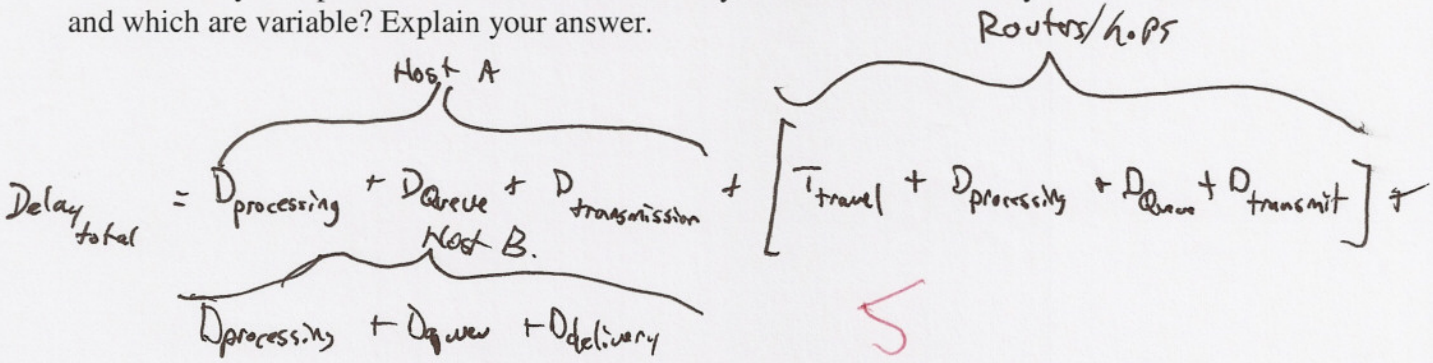
application transport

DNS over UDP to get the IP addy

HTTP over TCP to get the page

4

[5] 4. Consider sending a packet from a sending host to a receiving host over fixed route. List the delay components in the end-to-end delay. Which of these delays are constant and which are variable? Explain your answer.



5

The travel times over the physical media will be constant, while processing and transmission time are proportional to segment/packet size. The queuing delay is random w.r.t. packet size.

[5] 4. List three fundamental differences between Go-Back-N and Selective Repeat protocols.

Go-Back-N		Selective Repeat
Comulative Acknowledgement	vs.	Individual Acks.
~~GBN~~ Drops out of order Packets	vs.	Queues out of order Packets
~~Uses duplicate Acks to resend~~ resends on duplicate Acks. ~~Resends all packets~~	vs.	Uses timeout to resend

2

What are major advantages and disadvantages of Go-Back-N compared to Selective Repeat?

Adv. Go Back N ~~re~~doesn't require a Buffer

Adv. Go Back N saves on Ack packets by ~~sen~~ using Comulative Acks.

2

Disadv. Go Back N wastes packets by dropping out of order packets