# Week 3 Homework Results for Austin Koske

Score for this attempt: 28 out of 28
Submitted Sep 22 at 10:21pm
This attempt took 3 minutes.

Correct answer

Question 1
2 / 2 pts

**2.2-01. Simple HTTP GET request response time.** Suppose an HTTP client makes a request to the gaia.cs.umass.edu web server. The client has never before requested a given base object, nor has it communicated recently with the gaia.cs.umass.edu server. You can assume, however, that the client host knows the IP address of gaia.cs.umass.edu.

*How many round trip times (RTTs) are needed from when the client first makes the request to when the base page is completely downloaded, assuming the time needed by the server to transmit the base file into the server's link is equal to 1/2 RTT and that the time needed to transmit the HTTP GET into the client's link is zero?* (You should take into account any TCP setup time required before the HTTP GET is actually sent by the client, the time needed for the server to transmit the requested object, and any propagation delays not accounted for in these amounts of time.)

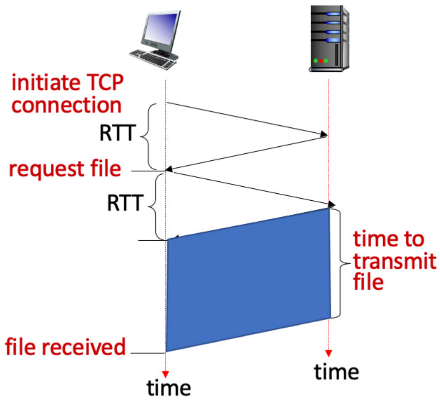
- 1.5 RTT
- 3.5 RTT
- 0.5 RTT
- 0 RTT
- (selected) 2.5 RTT

Nice. Your answer is correct.

Correct answer

Question 2
2 / 2 pts

**2.2-06. Download delays for 100 objects (HTTP 1.1).** Consider an HTTP 1.1 client and server. The RTT delay between the client and server is 2 seconds. Suppose the time a server needs to transmit an object into its outgoing link is 3 seconds, as shown below for the *first* of these 100 requests.




You can assume that any other HTTP message not containing an object sent by the client and server has a negligible (zero) transmission time. Suppose the client makes 100 requests, one after the other, waiting for a reply to a request before sending the next request.

Using HTTP 1.1, how much time elapses between the client transmitting the first request, and the receipt of the last requested object?

- 502 secs
- 500 secs
- 700 secs
- 203 secs
- 300 secs

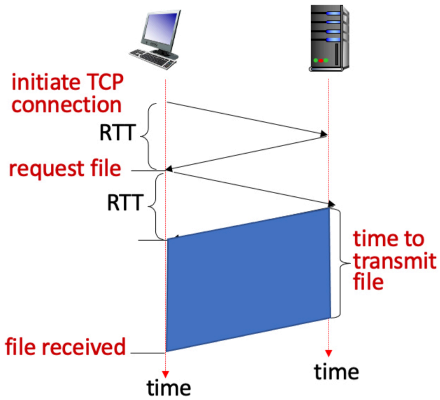
Nice! Your answer is correct.

Correct answer

Question 3

2 / 2 pts

**2.2-07. Download delays for 100 objects (HTTP 1.1 with browser caching).** Consider an HTTP 1.1 client and server. The RTT delay between the client and server is 2 seconds. Suppose the time a server needs to transmit an object into its outgoing link is 3 seconds, as shown below for the *first* of these 100 requests.




You can assume that any other HTTP message not containing an object sent by the client and server has a negligible (zero) transmission time. Suppose the client makes 100 requests, one after the other, waiting for a reply to a request before sending the next request.

Using HTTP 1.1, how much time elapses between the client transmitting the first request, and the receipt of the last requested object, a*ssuming the client uses the IF-MODIFIED-SINCE header line, and 50% of the objects requested have not changed since the client downloaded them* (before these 100 downloads are performed)?

- 203 secs
- 252 secs
- 150 secs
- 350 secs
- 352 secs

Nice! Your answer is correct.

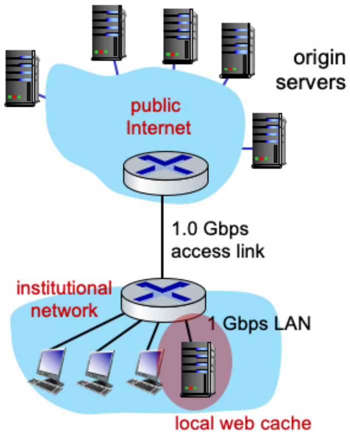
Correct answer

Question 4

2 / 2 pts

**2.2-08. Download delays for 100 objects (HTTP 1.1 with local web caching).** Consider an HTTP 1.1 client and server. The RTT delay between the client and server is 2 seconds. Suppose the time a server needs to transmit an object into its outgoing link is 3 seconds.

There is also a local web cache, as shown in the figure below, with negligible (zero) propagation delay and object transmission time. The client makes 100 requests one after the other, waiting for a reply before sending the next request. All requests first go to the cache (which also has a 2.0 sec. RTT delay to the server but zero RTT to the client).




How much time elapses between the client transmitting the first request, and the receipt of the last requested object, *assuming no use of the IF-MODIFIED-SINCE header line anywhere*, *and assuming that 50% of the objects requested are "hits"* (found) in the local cache?

- 203 secs
- 252 secs
- 352 secs
- 150 secs
- 350 secs

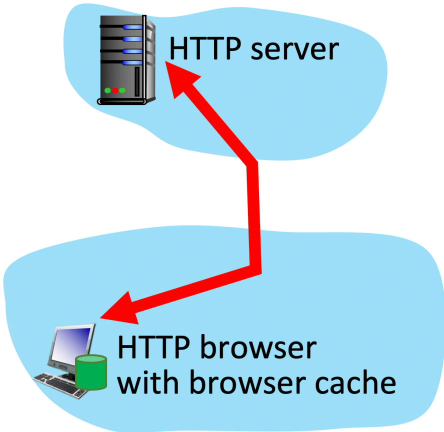
Nice! Your answer is correct.

Correct answer

Question 5

2 / 2 pts

**2.2-10a. Browser Caching (a).** Consider the following scenario, in which a Web browser (lower) connects to a web server (above). There is no web cache in this question (so make sure you understand the difference between a browser cache and a web cache). Assume that the total Round Trip Time (RTT) propagation and queueing delay between the browser and web server is 200 msec.




Suppose that the browser makes an HTTP request to the server for an HTTP object, that the browser has a copy of that object in its cache, but that copy may or may not be up-to-date in its cache (and so the browser requests the object using the HTTP `If-Modified-Since` header field). Assume that the time taken to transmit an HTTP reply (by the sender into the TCP connection) that contains a requested object in the body of an HTTP reply is 50 msec, but that the time taken to transmit a HTTP reply with a "`304 Not Modified`" reply code without an included object is negligible (e.g., zero). You can assume that a TCP connection has already been set up, so do not include that delay in your answer below.

What is the time from when the browser issues the initial HTTP GET request until it is able to display the requested object in the case that the browser does ***not*** have the requested object in its browser cache?

- 350 msec
- 200 msec
- 300 msec
- 500 msec
- 100 msec
- 550 msec
- 250 msec

Nice! Your answer is correct.

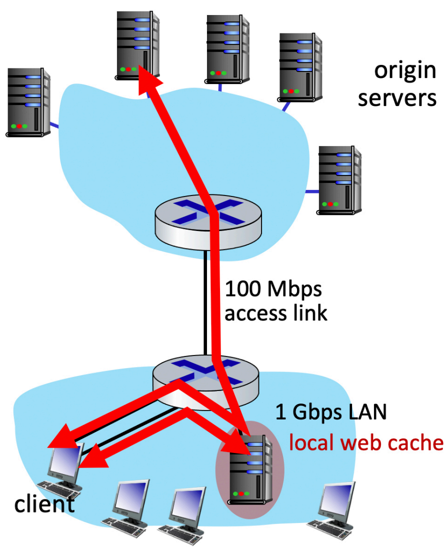
Correct answer

Question 6

2 / 2 pts

**2.2-11a. Local Web Caching (a).**

Consider the following scenario, in which a Web browser (lower) connects to a web server (above). There is also a local web cache in the bowser's access network. In this question, we will ignore browser caching (so make sure you understand the difference between a browser cache and a web cache). Assume that the total Round Trip Time propagation, queueing and object transmission delay between the browser and web server (and including TCP setup time) is 250 msec; if the object is retrieved from the local web cache, this delay is only 10 msec.




Suppose that 80 percent of the time when the browser makes a request, the requested object is found in the local web cache. What is the ***average*** time (over all requests that the browser makes to this site) from when the browser issues the initial HTTP GET request until it is able to display the requested object?

- 120 msec
- 250 msec
- 420 msec
- 230 msec
- 88 msec
- 58 msec
- 220 msec

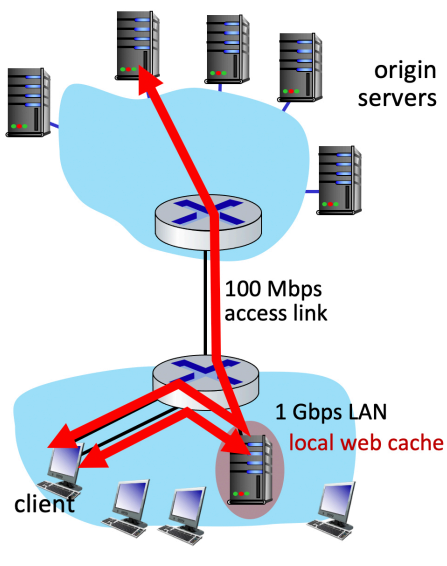
Nice! Your answer is correct.

Correct answer

Question 7

2 / 2 pts

**2.2-11c. Local Web Caching (c).** Consider the following scenario, in which a Web browser (lower) connects to a web server (above). There is also a local web cache in the bowser's access network. In this question, we will ignore browser caching (so make sure you understand the difference between a browser cache and a web cache). In this question, we want to focus on the utilization of the 100 Mbps access link between the two networks.




Suppose that each requested object is 10Mbits, and that 9 HTTP requests per second are being made to origin servers from the clients in the access network. ***Assume here that there is no web local web cache***. What is the utilization of the access link?

- 0.9
- 210 msec
- 0.0
- 1.0
- 0.1
- 0.5
- 250 msec

Nice! Your answer is correct.

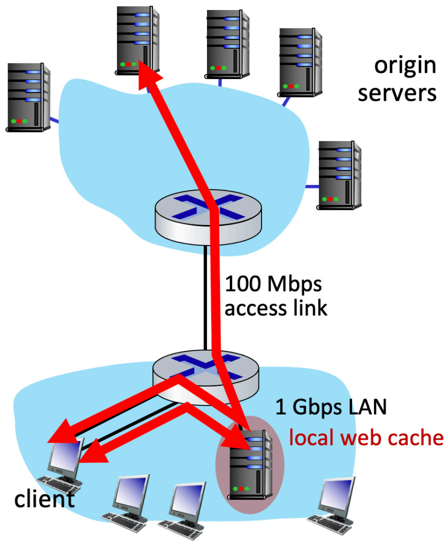
Correct answer

Question 8

2 / 2 pts

**2.2-11d. Local Web Caching (d).**

Consider the following scenario, in which a Web browser (lower) connects to a web server (above). There is also a local web cache in the bowser's access network. In this question, we will ignore browser caching (so make sure you understand the difference between a browser cache and a web cache). In this question, we want to focus on the utilization of the 100 Mbps access link between the two networks.




Suppose that each requested object is 10 Mbits, and that 9 HTTP requests per second are being made to origin servers from the clients in the access network. Suppose that 80% of the requested objects by the client are found in the local web cache. What is the **utilization** of the access link?

- 0.8
- 0.72
- 0.18
- 0.45
- 250 msec
- 1.0
- 0.2 msec

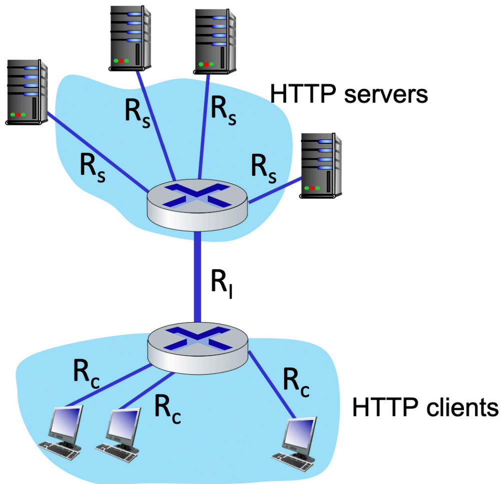
Nice! Your answer is correct.

Correct answer

Question 9

2 / 2 pts

**2.2-12a. HTTP Performance.** Consider the scenario shown below, in which HTTP servers reside in the upper network, and HTTP clients (browsers) reside in the lower network. Each server connects to the upper router via a link of capacity $R_s$; each client connects to the lower router via a link of capacity $R_c$. The two routers connect to each other via a link of capacity $R_l$.




Suppose an HTTP client makes a request to a web server (say the leftmost webserver). The client has never before communicated with this server. You can assume, however, that the client host knows the IP address of the server.

How many round trip times (RTTs) are needed from when the client first makes the request to when the base page is completely downloaded, assuming the time needed by the server to transmit the base file into the server's link is equal to 1/4 RTT and that the time needed to transmit the HTTP GET into the client's link is zero? (You should take into account any TCP setup time required before the HTTP GET is actually sent by the client, the time needed for the server to transmit the requested object, and any propagation delays included in the RTT.)

- (selected) 2.25 RTT
- 3 RTT
- 1.25 RTT
- 2 RTT
- 0 RTT

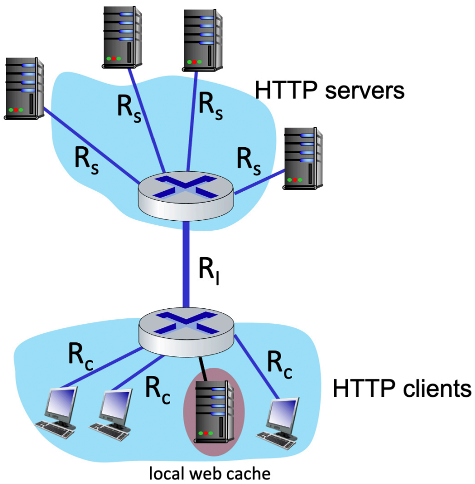
Nice. Your answer is correct.

Correct answer

Question 10

2 / 2 pts

**2.2-12d. HTTP Performance with a local web cache.** Now suppose that a web cache is added the lower network, as shown in the figure below, but that in all other aspects the network below is the same as the network above. All HTTP requests are first directed to the local web cache. You can assume that the delays (both propagation delays and any transmission delays between the cache and a client are *zero*, since both are resident in the same network). The client's browser cache is empty.




Suppose that an HTTP client makes a request to a web server and that the request object is found in the cache (a cache "hit") and known to be up-to-date in the local cache. There are no embedded object in the requested page. *How many round trip times (RTTs) are needed from when the client first makes the request to when the base page is completely downloaded.*

- 2.25 RTT
- 0 RTT
- .25 RTT
- 1.25 RTT
- 1 RTT

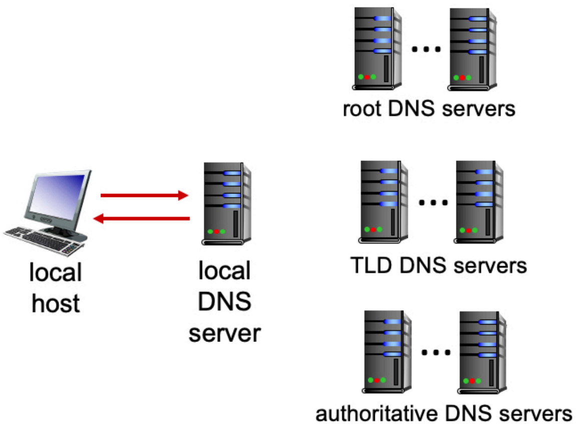
Nice. Your answer is correct.

Correct answer

Question 11

2 / 2 pts

**2.4-01a. DNS in Action.** Suppose that the local DNS server caches all information coming in from all root, TLD, and authoritative DNS servers for 20 time units. (Thus, for example, when a root server returns the name and address of a TLD server for .com, the cache remembers that this is the TLD server to use to resolve a .com name). Assume also that the local cache is initially empty, that iterative DNS queries are always used, that DNS requests are just for name-to-IP-address translation, that 1 time unit is needed for each server-to-server or host-to-server (one way) request or response, and that there is only one authoritative name server (each) for any .edu or .com domain.




Consider the following DNS requests, made by the local host at the given times:

- *t=0,* the local host requests that the name gaia.cs.umass.edu be resolved to an IP address.
- *t=1,* the local host requests that the name icann.org be resolved to an IP address.
- *t=5,* the local host requests that the name cs.umd.edu be resolved to an IP address. (Hint: be careful!)
- *t=10,* the local host *again* requests that the name gaia.cs.umass.edu be resolved to an IP address.
- *t=12*, the local host requests that the name cs.mit.edu be resolved to an IP address.
- *t=30,* the local host *again* requests that the name gaia.cs.umass.edu be resolved to an IP address. (Hint: be careful!)

Which of the requests require 8 time units to be resolved?

- [x] The request at *t=1*.
- [ ] The request at *t=5*.
- [ ] The request at *t=10*.
- [x] The request at *t=30*.
- [x] The request at *t=0*.
- [ ] The request at *t=12*.

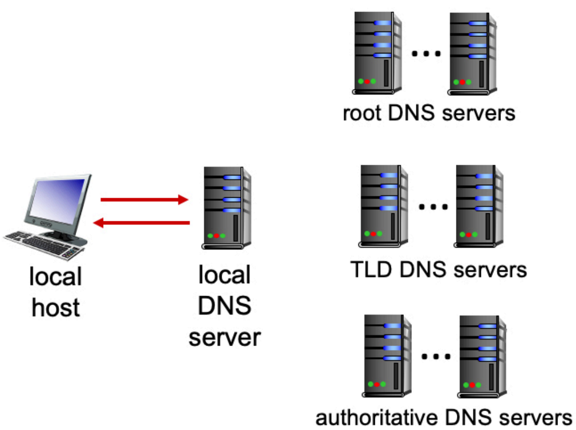
Nice!  This answer is correct.

Correct answer

Question 12

2 / 2 pts

**2.4-01b. DNS in Action.** [This question is the same as an earlier question, except for the question statement at the very end.]  Suppose that the local DNS server caches all information coming in from all root, TLD, and authoritative DNS servers for 20 time units. (Thus, for example, when a root server returns the name and address of a TLD server for .com, the cache remembers that this is the TLD server to use to resolve a .com name). Assume also that the local cache is initially empty, that iterative DNS queries are always used, that DNS requests are just for name-to-IP-address translation, that 1 time unit is needed for each server-to-server or host-to-server (one way) request or response, and that there is only one authoritative name server (each) for any .edu or .com domain.




Consider the following DNS requests, made by the local host at the given times:

- *t=0,* the local host requests that the name gaia.cs.umass.edu be resolved to an IP address.
- *t=1,* the local host requests that the name icann.org be resolved to an IP address.
- *t=5,* the local host requests that the name cs.umd.edu be resolved to an IP address. (Hint: be careful!)
- *t=10,* the local host *again* requests that the name gaia.cs.umass.edu be resolved to an IP address.
- *t=12*, the local host requests that the name cs.mit.edu be resolved to an IP address.
- *t=30,* the local host *again* requests that the name gaia.cs.umass.edu be resolved to an IP address. (Hint: be careful!)

Which of the requests require 6 time units to be resolved?

- [x] The request at *t=12*.
- [ ] The request at *t=30*.
- [x] The request at *t=5*.

- [ ] The request at *t=1*.
- [ ] The request at *t=0*.
- [ ] The request at *t=10*.

Nice!  This answer is correct.

Correct answer

Question 13

2 / 2 pts

**2.7-3. TCP client-side socket actions.** Match the genera*l client-side* action stated with the specific TCP socket-related action that implements it.

Create a socket.

Use the call socket(AF_INET,

When sending to a server, this is how a specific server is identified.

The client uses connect() to e

Send to server, using this socket.

Send using the socket createc

Other Incorrect Match Options:

- Send using a socket not explicitly created via a call to socket()
- Send using the socket created using socket(AF_INET, SOCK_DGRAM)
- As the result of an accept(), a new socket is created, which binds the client and server together via this new socket without the need to explicitly specify the destination IP address and port # when sending
- Use the call socket(AF_INET, SOCK_DGRAM)
- The client must explicitly include the server's IP address, port #, when sending

Nice. This answer is correct.

Correct answer

Question 14

2 / 2 pts

**3.3-1. Internet Checksum.** Consider the two sixteen bit numbers:

```
10110100 01000110
01001000 01101111
```

Compute the Internet Checksum of these two values

Enter the 2 bytes each as an 8-bit number with only 0's and 1's, and make a single blank space between the two 8-bit numbers (e.g., 01010101 00101000).

[Note: you can generate/solve/practice many similar instances of this question **here** **(http://gaia.cs.umass.edu/kurose_ross/interactive/internet_checksum.php)** .]

00000011 01001010

00000011 01001010

Nice! This answer is correct!

Quiz Score: 28 out of 28