CSCE 4753 Computer Networks Homework #3

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32 points
6 questions with multiple parts
Instructions
- Type your work, print it to a **single** PDF, and upload it to Blackboard before the due date and time. It is strongly suggested that you use the given document.
- Show all of your work. Correct answers alone may not carry full credit without proper justification and details of steps.
- -2 points if you do not insert your name and ID at the top of the document.
- -5 points if it is not typed. For this homework, you may scan it with something like the CamScanner app, but just make sure it is a legible PDF.
- -5 points if it is not a PDF file.
- -5 points if it is not a single PDF file. Submit one PDF file. Do not submit zip files containing one or more files.
- -5 points if you present the worked problems out of order. In other words, please show the problems in the order assigned, 1, 2, 3, …

1. (5 pts.) What are used to create shopping carts over the stateless HTTP protocol? Explain the required steps.
    Cookies are used to create shopping carts. When client-Host makes a request for a site, the server checks for a cookie (stored on the users machine) containing a unique session ID. If it does not exist then a new session is created. Then the server creates a new shopping cart for the user, tied to the session ID. When the user adds a new item to their shopping cart the browser checks the cookie file, extracts the session ID, and stores the item in the cookie file under the session ID.

2. (4 pts.) Compare and contrast the POP3 and IMAP email protocols.
    Both protocols are identified as "mail access" protocols. POP3 takes the local storage approach by downloading all emails from the server to the client, then typically deleting them on the server. This makes the Emails accessible online. Compared to IMAP which allows the user to manage emails on the server, meaning everything is stored on the server such as GMAIL. POP3 does not allow you to manage emails across multiple devices while IMAP does.

3. (4 pts.) List and describe differences between iterative and recursive DNS queries.
    In the iterative approach the DNS will respond to the client with the best information it has. If the server does not have the complete information, it provides a referral to another DNS server who might have the rest of the information. It is the duty of the Client to query the provided DNS server in sequence until all information is retrieved, or it encounters an error.
3. (8 pts.) List and describe the four types of DNS resource records discussed in class..

- A Record: simply maps a name to a value or IP maps to a Hostname
- CNAME: the name is a alias for the real name and value is the canonical name.
- NS: The name is the domain name and the value is the hostname of the authoritative DNS server which can obtain the IP addresses of hosts in the domain. It notifies the internet where the IP address of the domain is
- MX: The value is the name of the mail server and the name is an alias hostname.

5. (6 pts.) Suppose a client sends an HTTP GET request message to a web server, csce.uark.edu. Suppose the client-to-server HTTP GET message is the following:

```
GET /computer-networks/interactive/index.htm HTTP/1.1
Host: csce.uark.edu
Accept: text/plain, text/html, text/xml, image/jpeg, image/gif,
audio/mpeg, audio/mp4, video/wmv, video/mp4,
Accept-Language: en-us, en-gb;q=0.1, en;q=0.7, fr, fr-ch, da, de, fi
If-Modified-Since: Wed, 09 Sep 2020 16:06:01 -0700
User Agent: Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/535.11
(KHTML, like Gecko) Chrome/17.0.963.56 Safari/535.11
```

1) (2 pts.) What version of HTTP is the client using?
HTTP version 1.1

2) (2 pts.) What language would the client prefer least to get a response in? [You may have to search the Web to answer this.]
British English (en-gb)

3) (2 pts.) Does the client have a cached copy of the object being requested? Please explain your answer.
Yes, the presence of the If-Modified-Since indicates that the client has a cached copy. Only if the copy is modified does the client want the server to send the resource.

6. (5 pts.) Consider an HTTP 1.1 client and server. The RTT delay between the client and server is 2 seconds. Suppose a server takes 3 seconds to transmit an object into its outgoing link, as shown below for the first of these 100 requests.
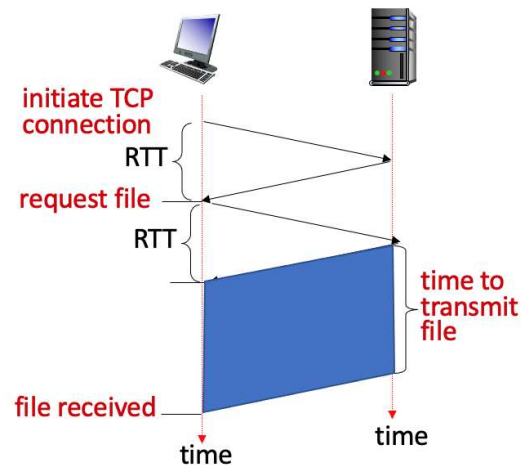
You can assume that any other HTTP message not containing an object sent by the client and server has a negligible (zero) transmission time. Suppose the client makes 100 requests, one after the other, waiting for a reply (to a request) before sending the next request. Using HTTP 1.1, how much time elapses between the client transmitting the first request and the receipt of the last requested object?

Total time of the first Request
RRT = 2 seconds
Transmission time = 3 seconds
There are 2 RRT requests
Total Time First = 2 + 2 + 3 = 7 seconds

Total Time subsequent
One RRT request
Total Time for subsequent requests = 5 seconds

Total Time for all 100 requests

First request = 7 seconds
Remaining 99 requests = 99 * 5 = 495 seconds
Total Time for all 100 requests = 502 seconds