

CS 428/528

Instructor: Anand Seetharam

Homework 2: Application Layer

Problem 1 (30 points)

Consider the following string of ASCII characters that were captured by Wireshark when the browser sent an HTTP GET message (i.e., this is the actual content of an HTTP GET message). Answer the following questions, indicating where in the HTTP GET message below you find the answer.

```
GET /kurose_ross/interactive/quotation6.htm HTTP/1.1
Host: gaia.cs.umass.edu
Accept: text/plain, text/html, image/jpeg, image/png, audio/mp4,
audio/mpeg, video/mp4, video/wmv, application/*, */*
Accept-Language: en-us, en-gb;q=0.9, en;q=0.7, fr, fr-ch, zh, da, fi, ar
If-Modified-Since: Tue, 10 Jan 2017 05:02:03 -0800
User Agent: Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/535.11 (KHTML,
like Gecko) Chrome/17.0.963.56 Safari/535.11
```

- What is the URL of the document requested by the browser?
- What version of HTTP is the browser running?
- What is the IP address of the host on which the browser is running?
- When was the last update made to this file?
- What type of browser initiates this message?

Problem 2 (30 points)

Suppose within your Web browser you click on a link to obtain a Web page. The IP address for the associated URL is not cached in your local host, so a DNS lookup is necessary to obtain the IP address. Suppose that n DNS servers are visited before your host receives the IP address from DNS; the successive visits incur an RTT of RTT_1, \dots, RTT_n . Further suppose that the Web page associated with the link contains exactly one object, consisting of a small amount of HTML text. Let RTT_0 denote the RTT between the local host and the server containing the object. Assuming zero transmission time of the object, how much time elapses from when the client clicks on the link until the client receives the object?

Problem 3 (40 points)

Referring to Problem P2, suppose the HTML file references eight very small objects on the same server. Neglecting transmission times, how much time elapses with

- a. Non-persistent HTTP with no parallel TCP connections?
- b. Non-persistent HTTP with the browser configured for 5 parallel connections?
- c. Persistent HTTP?

Submit a single pdf file with answers to the above questions. The naming convention of the file should be HW2_yourlastname.pdf