CS 372 Introduction to Computer Networks
Self-Check Exercises: Lecture 11 **Solutions**

1) A client-side history of transactions between a client and server using HTTP is called a _____Cookie_____.

2) How are these implemented in the HTTP handshaking procedure?
Server responds to client request, and includes in this response a request to use cookies. Client either sends next message with cookies enabled (to use cookies) or disabled. Sever generates cookie number and send this back to client.

3) What are the major trade-offs implied by the use of cookies?
Cookies make some web browsing more convenient by saving browsing history (e.g., shopping cart, location for weather report, etc.), but also allow servers to keep personal information about its clients, which may be seen as a violation of privacy.

4) What is the goal of caching in HTTP?
To keep information requests from having to go to the goal server. This prevents the same information from being repeatedly downloaded, which would cause additional congestion in the internet (and slow down the rate at which the internet is perceived to load at the user end.

5) If none of the links from the HTTP client to the HTTP server are congested, will a connection be faster with or without caching enabled.
It will still likely be faster with caching, because any time you request a file a second time, the proxy server will eliminate the necessity for the packets to traverse the internet, saving time.

6) A client in a network with a proxy server requests a 3MiB file from an internet server, x.y.z.com. The network's proxy server has a 1.54Mbps connection to x.y.z.com. The average response time between the network's proxy server and the internet origin server (including RTT) is 2 seconds for a small "header-only" HTTP request/response. The file requested by the client is currently in the proxy server cache, but the proxy server relays the client's request to the internet server with "if-modified since". Assume that transmissions between the proxy and the origin servers are stream (not packets) at full bandwidth, with negligible propagation delay. *How much time is saved if the file has not been modified?*
The connection and GET requests from the proxy server to the origin server, and the delivery from the proxy server to the client, are the same in either case. The only difference is in whether or not the file has been modified at the origin server, in which case the new file must be downloaded to the proxy server. As a stream download, this takes (3 x 1024 x 1024 x 8 bits) / (1,540,000 bits per second) ≈ 16.34 seconds.