Homework 1: Networking Terminology
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1) Circuit Switching and Packet Switching are the two methods that data can be transferred over communication links. Circuit Switching involves a dedicated link between users, giving guaranteed connection. However, only the linked users can utilize it and it requires direct manual labor to fix. Packet Switching involves decomposing the sent documents into packets that are sent to the other users through various network routers. There is no dedicated equipment, and everyone can use it, but packets can be dropped or loss.

2) A token ring is deterministic and contains routing information while Ethernet does not. Moreover, a token ring has error checking when it sends data while Ethernet utilizes a “trial and error” approach where it sends it multiple times if it fails to successfully send the data. In an Ethernet network: a Repeater regenerates the signal over the network if its signal becomes too weak, a Bridge filters content by reading MAC addresses of the source and destination, a Switch is a Bridge with several ports to boost efficiency (also with error checking), and a Router routes data packets based on their IP addresses.

3) SMTP transports e-mail among mail servers wile POP only transfer messages from mail server to the client machines. IMAP only copies the message headers and only sends the message when the user clicks the header.

4) The OSI model has a Presentation and Session Layer before the Transport Layer but follows the same structure as the five-layer model otherwise. The Presentation Layer provides mapping between potentially different syntaxes from the user and receiver. The Session Layer controls connections between the local and remote applications. However, the Session Layer is now often part of the TCP in the Transport Layer of the five-layer model.

5) A datagram Is a basic transfer unit associated with a packet-switch network. TCP ensures reliable connections, but UDP can’t. However, UDP is simpler and therefore faster and more efficient as a result.

6) The Apache Web Server is open sourced and runs on all major operating systems. It has server-side programming language support, virtual hosting (one machine simultaneously host several websites) and strong authentication. IIS Web Server only runs on Windows but is backed by Microsoft, giving it strong support for Microsoft products and features.

7) Modern phone modems have speeds around 40-50 kbit/s. This much slower than DSL modems with 1-400 Mbps, cable modems with 30-100 Mbps, ISDN 144/192 kbps, T1 1.544 Mbps, T2 6.312 Mbps, and T3 44.736 Mbps. T2 and T3 lines are circuit channels carrying multiple T1 channels. Optic cables have speeds up to 940 Mbps. The bit rate for wireless LAN networks is generally around 6-54 Mbit/s, while satellite transmissions can go up to 506 Mbit/s. I have optic cable so my download speed is currently 826.4 Mbps.

8) A MIME (Multipurpose Internet Mail Extensions) type indicates the format/type of a document/data. Exampls are gif, htm and html. This gives more control and security in interactions between the browser and server.

9) An HTTP transaction involves: Connection, client connects to server, Request, client requests information from server, Response, server provides/denies the information to client. Close, the transaction is terminated. GET requests a representation of the specified resource while POST asks the web server to accept the message body as a new resource. Essentially, the former is the client requesting data and the later is the client “posting” data.

10) CGI allows web servers to execute external programs to process user requests. This allows web pages to be interactive for the user.