HOMEWORK II

I. Multiple Choice

1. An application can rely on the connection to deliver all its data without error and in the proper order. The sentence describes ( ).
   A flow control B congestion-control
   C reliable data transfer D connection-oriented service
2. The Internet's connection-oriented service has a name, it is ( ).
   A TCP B UDP
   C TCP/IP D IP
3. The Internet's connectionless service is called ( ).
   A TCP B UDP
   C TCP/IP D IP
4. In the following applications, which one is a loss-tolerant application?
   A E-mail B file transfer
   C instant messaging D real-time audio
5. In the following applications, which one uses UDP?
   A E-mail B web application C file transfer D DNS
6. In the following descriptions about HTTP, which one is not correct?
   A HTTP uses non-persistent connections in its default mode.
   B HTTP uses TCP as its underlying transport protocol.
   C HTTP is a stateless protocol.
   D HTTP is client-server architecture.
7. Suppose a web page consists of a base HTML file, 5 JEPG images and a java applet, and also suppose HTTP uses persistent connection without pipelining, the total response time is _____.
   A 2RTT B 8RTT C 12 RTT D 14RTT
8. FTP uses two parallel TCP connections to transfer a file, there are _____.
   A control connection and data connection
   B receiving connection and sending connection
   C client connection and sever connection
   D program connection and process connection
9. In the following descriptions about FTP, which one is correct?
   A FTP is p2p architecture.
   B FTP sends its control information out-of-band.
   C FTP uses persistent connection.
   D FTP is a stateless protocol.
10. The Internet mail system has three components which they are _____.
    A user agent, SMTP, POP3 B SMTP, POP3, IMAP
    C user agent, SMTP, IMAP D user agent, SMTP, mail server
11. In the following protocol, which one is stateless?
    A HTTP B SMTP C FTP D IMAP
12. The time it takes for a small packet to travel from client to server and then back to the client

is _____.

A round-travel time B next-hop time

C round-trip time D prefix-matching time

13. Suppose A (with a Web-based e-mail account) sends a message to B (who accesses his mail server using POP3), which application-layer protocol is not used?

A HTTP B SMTP C POP3 D IMAP

14. A process sends messages into, and receives messages from, the network through its _____.

A socket B program C client D peer

15. _____ takes for a small packet to travel from client to server and then back to the client.

A RDT B threshold C RTT D overhead

16. The default mode of HTTP uses _____.

A non-persistent connection with pipelining

B non-persistent connection without pipelining

C persistent connection with pipelining

D persistent connection without pipelining

17. In the following four options about web cache, which one is not correct?

A A web cache is both a server and a client at the same time.

B A web cache is purchased and installed by an ISP.

C A web cache can raise the response time for a client request.

D A web cache can reduce traffic on an institution's access link to the Internet.

18. There are three classes of DNS servers, there are _____.

A root DNS server, top-level domain DNS server and local DNS server

B root DNS server, top-level domain DNS server and authoritative DNS server

C root DNS server, local DNS server and authoritative DNS server

D root DNS server, local DNS server and top-level domain DNS server

19. If the header line Connection is close, it means that the client wants _____.

A persistent connection with pipelining

B persistent connection without pipelining

C nonpersistent connection

D not connection

20. In HTTP response message, if the Date: header ;one indicates the time Fri. 08 Aug. 2008 12:00:00 GMT, the Last-Modified: header line can not be _____.

A Fri. 08 Aug. 2008 11:00:00 GMT B Fri. 08 Aug. 2008 11:30:00 GMT

C Fri. 08 Aug. 2008 10:00:00 GMT D Fri. 08 Aug. 2008 12:30:00 GMT

21. In the following four options, which one is not the part of cookie technology?

A Cookie header lines in the HTTP response message and request message.

B One cookie header file kept on the user's end system and managed by the user's browser.

C A network entity that satisfies HTTP requests on the behalf of an origin Web server.

D A back-end database at the Web site

II. True or False

1. A user requests a Web page that consists of some text and three images. For this page, the client will send one request message and receive four response messages.

2. With nonpersistent connection between browser and origin server, it is possible for a single TCP segment to carry two distinct HTTP request messages.
3. The Date: header in the HTTP response message indicates when the object in the response was last modified.
4. FTP sends control information out of band
5. HTTP response messages never have an empty message body.

III. Please Answer Following Questions Briefly

1. What information is used by a process running on one host to identify a process running on another host?
2. For a P2P file-sharing application, do you agree with the statement, "There is no notion of client and server sides of a communication session"? Why or why not?
3. Suppose Alice, with a Web-based e-mail account (such as Hotmail or gmail), sends a message to Bob, who accesses his mail from his mail server using POP3. Discuss how the message gets from Alice's host to Bob's host. Be sure to list the series of application-layer protocols that are used to move the message between the two hosts.

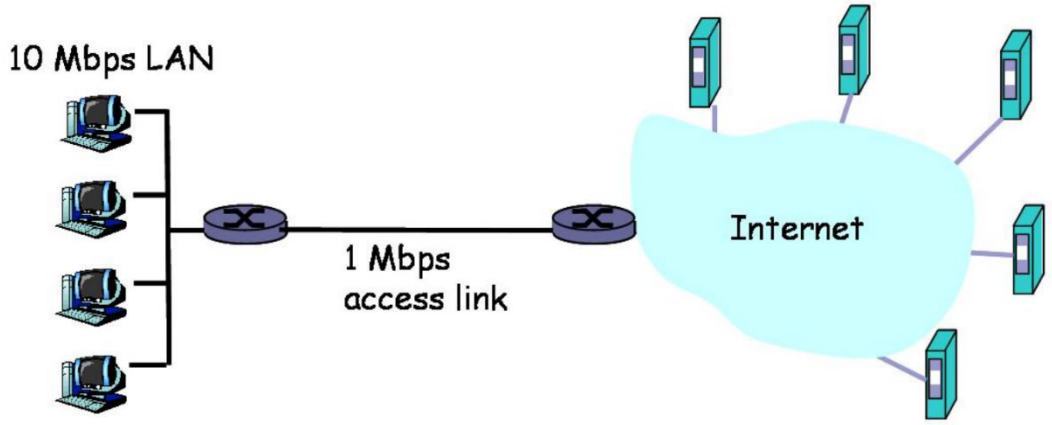
IV. Calculus & Analysis

1. Suppose within your web browser you click on a link to obtain a web page. Suppose that the IP address for the associated URL is not cached in your local host, so that a DNS look up 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 a RTT of RTT1 , ..., RTTn. Further suppose that web page associated with the link contains exactly 3 objects, a small amount of HTML text. Let RTT0 denote the RTT between the local host and the server containing the object. Assuming zero transmission time of the objects, how much time elapses from when the client clicks on the link until the client receives the whole web page with (a) nonpersistent HTTP with no parallel TCP connections, (b) nonpersistent HTTP with parallel connections, (c) persistent HTTP with pipelining.

2. Consider a short, 10-meter link, over which a sender can transmit at a rate of 150 bits/sec in both directions. Suppose that packets containing data are 100,000 bits long, and packets containing only control (e.g., ACK or handshaking) are 200 bits long. Assume that N parallel connections each get 1/N of the link bandwidth. Now consider the HTTP protocol, and suppose

that each downloaded object is 100 Kbits long, and that the initial downloaded object contains 10 referenced objects from the same sender. Would parallel downloads via parallel instances of non-persistent HTTP make sense in this case? Now consider persistent HTTP. Do you expect significant gains over the non-persistent case? Justify and explain your answer.

3. At the following networking environment, many users who use Web browsers at the 10 Mbps LAN have suffered long latency to access Internet through the 1Mbps access link. Suggest two different solutions to reduce latency problems



4. Suppose you can access the caches in the local DNS servers of your department. Can you propose a way to roughly determine the Web servers (outside your department) that are most popular among the users in your department? Explain.

5. Suppose you open a startup company "starwar" and want to set up your company network. Your network has the following servers:
   [1]. DNS server: "dns1.starwar.com.cn" with IP as "128.119.12.40"
   [2]. Web server: "www.starwar.com.cn" with two IP as "128.119.12.55" and "128.119.12.56".
   [3]. Email server: "galaxy.starwar.com.cn" with IP as "128.119.12.60"
   [4]. Your company's email address is "username@starwar.com.cn".
   (1)What resource records (RRs) do you need to provide to the upper-level name server?
   (2). What RRs do you need to put in your company's DNS server?
   (3). let's suppose the iterated query is used. How do people get IP address of your Web site?