Midterm

Course: Computer Networks

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December 1, 2011

Total (105 points)

A. (48 points, 4 points each)

1.(c) Internet is built and operated by following a common set of technical documents which influence the way people design, use, and manage the Internet. Which organization is responsible for hosting, organizing and managing the process?

(a) ISO

(b) IEEE

(c) IETF

(d) ITU

2.(d) Which is not included in the scope of protocol?

(a) Defining response status code

(b) Defining the syntax and semantics of the fields in the protocol header

(c) Defining the byte order of the protocol data unit

(d) Defining the syntax and semantics of the payload of a protocol data unit

3.(d) Which of the following statements is not true?

(a) Internet provides best-effort service

(b) HTTP protocol provides reliable data transfer between web browser and web server.

(c) SMTP protocol may support email account black list service.

(d) FTP protocol performs in-band control.

4.(b) HTTP runs on top of TCP. In which TCP message it carries the HTTP request from the client to server?

(a) SYN

(b) ACK

(c) RST

(d) SYN/ACK

5.(c) About physical media, which of the following statement is true?

(a) The HFC (hybrid fiber coax) of cable modems is a broadband coaxial cable using TDM.

(b) Fiber optic cable immunes to electromagnetic noise and has similar bit error rate

as coaxial cables.

(c) Wireless communication usually suffers from signal interference, therefore having higher bit error rate.

(d) Given the same geographic distance, the propagation delay for fiber optic transmission is less than that for wireless packet radio transmission.

6.(d) For circuit switching, which is not true?

(a) Resources like link bandwidth and switch capacity are reserved for an end-to-end connection.

(b) Connection performance is guaranteed in accordance with the resource reservation.

(c) It is a connection-oriented service.

(d) Control can be implemented either in-band or out-of-band.

7.(b) In packet switching, which is not true?

(a) Packets are delivered hop-by-hop in a store-and-forward fashion.

(b) Packet's propagation delay only depends on geographic distance between routers.

(c) Buffer queue builds up when packet arrival rate to link exceeds output link transmission rate.

(d) Packets are dropped in the presence of congestion.

8.(d) Which is not the source to end-to-end delay?

(a) processing of bit error checking

(b) determine output link

(c) traffic intensity

(d) buffer size

9. About throughput, which of the following statement is true?

(a) Per-connection end-to-end throughput is limited by the bottleneck link throughput of the transmission path.

(b) The throughput of a HTTP session is independent of the version of the HTTP protocol used.

(c) The throughput of a TCP connection is measured as the number of packets sent per second.

(d) The throughput of a transmission link refers to the utilization of the link.

10. (a) About application layer protocol, which of the following statement is true?

(a) HTTP uses cookies to keep session state.

(b) In SMTP all message exchanged between MTAs (Mail Transfer Agent) are not transmitted in plain text.

(c) The use of web proxy may increase traffic load while reducing response time for web page retrieval.

(d) The effectiveness of web caching only depends on the size of cache.

11. (a) Which of the following statement is not true?

(a) UDP is an unreliable data transfer; it performs no error detection.

(b) Delivering packets received from the network interface to correct socket is called demultiplexing.

(c) Transport layer is for data transfer between processes running on different hosts.

(d) Network layer is for data transfer between hosts.

12. (a) For error control and recovery, which of the following statement is true?

(a) Use positive acknowledgement, timer and retransmission at sender.

(b) Use positive acknowledgement at sender and timer at receiver.

(c) Use negative acknowledge at receiver.

(d) Use negative acknowledge at receiver plus timer at sender.

B. (40 points) Multiple choice and Multiple-selection

1. (abcd) Reliable data transfer including error detection and recovery may be necessary in which of the following layers

(a) Data link layer

(b) Network layer

(c) Transport layer

(d) Application layer

2. (b) In DNS, which of the following statements are true?

(a) Type NS record is used to provide name of the local name server for a domain.

(b) To find IP address of a mail server, both types A and MX records are needed.

(c) A canonical hostname may be associated with only one IP addresses.

(d) DNS uses TCP protocol to assure reliable transfer.

3. (abcd) About building a large scale web site,

(a) One may use DNS rotation to perform "load-balanced" workload distribution

among multiple servers having the same alias name.

(b) Because the URL in HTTP GET request message is transmitted in plain text,   so one may inspect the field for content based request dispatching.

(c) CDN helps to deliver content according to the proximity of the web user.

(d) CDN is suitable for static and streaming content.

4. (ac) Internet structure is hierarchical. Which of the following statements are true?

(a) Network edge routers in an ISP typically may have a number of network interface cards to connect to different types of access networks such as ADSL, 3G, wi-fi, etc.

(b) A cable modem subscriber usually connects to network core router.

(c) End systems may connect to edge router through residential access nets.

(d) A CDN company installs CDN servers both in tier-1 and lower-tier ISPs which replicate its customers' content.

5. (abcd) Which of the following statements about packet switching are true?

(a) It has statistical multiplexing gain.

(b) TDM can be used.

(c) FDM can be used

(d) May support logical circuit switching service

6. (abcd) about residential access, which of the following statements are true?

(a) ADSL service makes use of existing telephone infrastructure.

(b) The asymmetric upstream and downstream access speeds in ADSL and cable modem are due to the limitation of physical lines.

(c) The bandwidth of ADSL line from telephone central office to subscriber premise is dedicated to the subscriber.

(d) The bandwidth of cable modems from fiber node to subscriber premises is a shared access.

7. (abcd) What are the sources contributing to end-to-end delay?

(a) Processing of bit error checking

(b) determine output link

(c) wait for link use

(d) packet length

8. (cd) In TCP, which of the following statements are true?

(a) After fast retransmit, the state of TCP connection enters slow-start phase to aggressively boot up throughput.

(b) The goal of performing fast recovery is to avoid congest the network.

(c) In fast recovery, ssthresh=cwnd/2; cwnd =ssthresh + 3 segments.

(d) There are two cases to enter Slow-Start Phase: when a connection begins and after a timeout.

C. Essay

1.

(17 points) In circular Distributed Hash Table (DHT), consider a peer leaves the 4 overlay network. Suppose every participating peer maintains TCP connections to at least four distinct peers at all times,. Suppose Peer X, which has five TCP connections to other peers, wants to leave.

(a) Suppose Peer X explicitly closes its application and thereby the five TCP connections. What actions would each of the five formerly connected peers take?

(b) Suppose Peer X abruptly disconnects from the Internet without notifying its five neighbors that it is closing the TCP connections. What would happen? Can you suggest a mechanism to help its neighbors to detect abrupt disconnection of a TCP connection?

(a) 主要需要回答出 X 需要通知其 peers 更新他的 connection list 而其他 connect 的 peers 能夠通過更新過的 peers(包含 X 所擁有的資訊) 保持其 connection 數量為 4 以上

(b) 主要需要描述斷線的情境 會造成很多無效的封包 造成網路壅塞情形 設計 Time out 來減緩壅塞及定期檢查的機制來確保 connection 的有效性