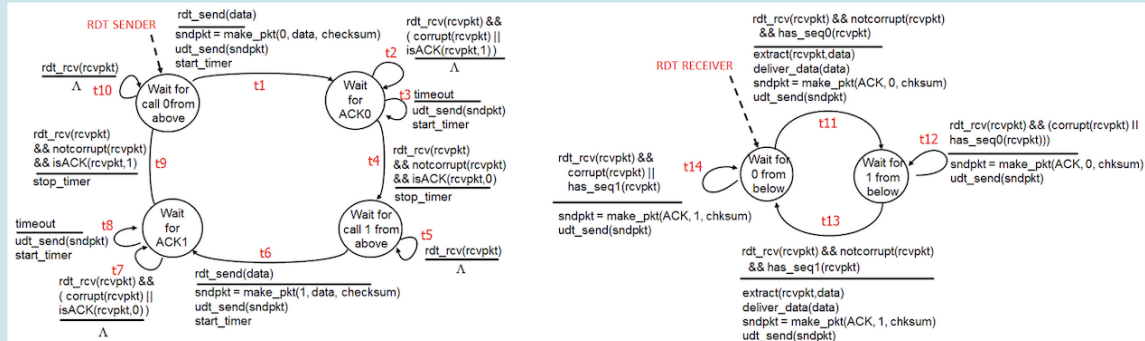


1

RDT sender and receiver are defined as finite state machines (FSM) in the figures. According to these FSMs, please give the order of the transitions (in terms of t1, t2,.. t14) for the following scenarios. Continue scenarios until all ACKs are received for the sent packets. Use commas in order to separate transitions. An exemplar format is: t1,t14.



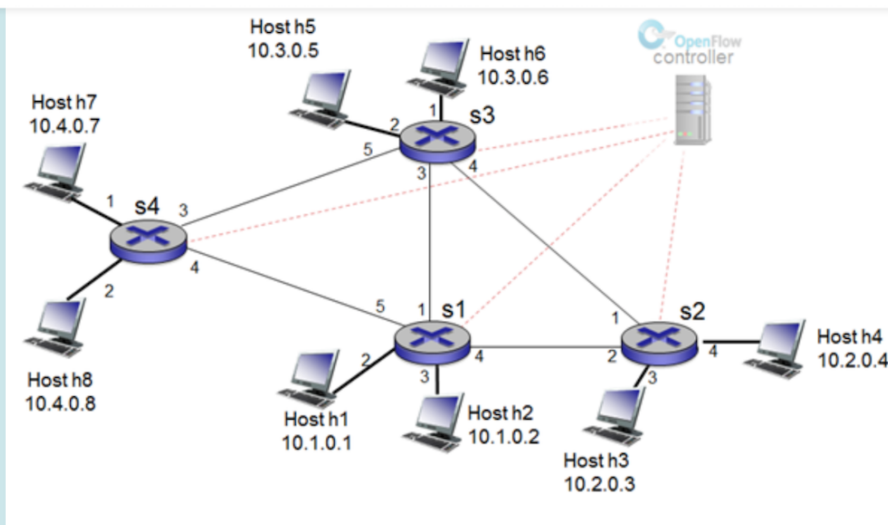
A. Both the sender and the receiver start from the initial state. The sender gets a call from the upper layer to send a message and there is no bit error in this transmission.

B. Both the sender and the receiver start from the initial state. The sender gets two calls from the upper layer to send two messages and there is no bit error in these transmissions.

C. Both the sender and the receiver start from the initial state. The sender gets a call from the upper layer to send a message and there is a bit error in the ACK packet.

D. Both the sender and the receiver start from the initial state. The sender gets two calls from the upper layer to send two messages, and the acknowledgement (ACK) for the second packet is lost.

2



Please give the forwarding table of s1 according to definitions below:

- When s4 receives packets coming from Host 7 destined to Host h3 and h4, it will forward these packets to s3.
- When s4 receives packets coming from Host 8 destined to Host h3 and h4, it will forward these packets to s1, and which then forwarded to s2.
- When s3 receives packets from its local network destined to Host h3 and h4, it will forward them through s1 (s1 then s2).
- When s1 receives packets from its local network destined to Host h3 and h4, it will directly forward them to s2.
- s2 will forward packets destined to Host h7 and h8 through s1 (s1 then s3).
- s3 will forward packets destined to Host h7 and h8 through s1 (s1 then s4).

The format of each entry:

Incoming Port, Source IP Address, Destination IP Address, Action

3

An ISP connects the following four networks:

organization 1: 200.23.64.0/20 , organization 2: 200.23.80.0/20 , organization 3: 200.23.96.0/20, organization 4: 200.23.112.0/20

organization 2 has the following two departments:

management : 200.23.80.0/21, technical : 200.23.88.0/21

According to the definitions above, please list the address(es) of the ISP that can advertise to the outside network? **Please explain your solution.**

4

Two applications running at Hosts A and B are communicating using a TCP connection. Assume that at time t , Host B has already received all the bytes from 1 up to 200 (including 200) sent from Host A, has sent their ACKs and delivered up to the application.

After time t , Host A is sending 4 TCP segments to Host B. Firstly, Host A sends Segments 1, 2, 3 together, and then when the sender window slides, it sends Segment 4. Segments 1, 2, 3, 4 carry 80, 200, 120 and 100 bytes of data payload respectively. Assume that Segment 3 arrives first to Host B, then Segment 2, then Segment 1 and finally Segment 4. After each segment is received, Host B sends an ACK to Host A immediately. Assume the size of TCP receive buffer at Host B is 400 bytes. The application at Host B does not read data from its receive buffer until the first 3 ACKs are sent. What are the acknowledgement and receive window field values in the packets sent from Host B to Host A during this communication?

Which of the following are not among the main reasons of removing the checksum field in IPv6?

- ☐ a. To speed up processing at the routers.
- ☒ b. Error detection is carried out in the end systems. ✗
- ☐ c. To decrease the size of the network header.
- ☒ d. Packet errors do not occur at the routers. ✓
- ☐ e. Error detection is carried out in transport and link layers.

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Which of the following are correct?

- ☒ a. The specifications of Skype are given in an RFC document. ✗
- ☒ b. Two DNS requests to the same local DNS server is received by the same socket. ✓
- ☒ c. Local DNS servers act both as a client and a server. ✓
- ☒ d. Peers in a P2P networks act both as a client and a server. ✓
- ☒ e. Local DNS servers act as a proxy. ✓
- ☒ f. SMTP is only used for providing communication between SMTP server. ✗

Select all that is correct about Web proxy that is installed in an organizational network.

- ☒ a. It reduces the Web traffic in the Internet. ✓
- ☐ b. It only acts as a server.
- ☒ c. It provides shorter delay in response to a Web request. ✓
- ☒ d. It provides up-to-date webpages. ✗
- ☒ e. It reduces the Web traffic in the institution. ✗

We want to send N packets. Select all that are correct about comparison of Go-Back-N and Selective Repeat.

* $base$ is the oldest unacknowledged packet.

* window size = N , $N > 3$.

- ☒ a. Go-Back-N uses more bandwidth if data packets in the following window interval $[base, base + 3]$ are lost. ✓
- ☒ b. Go-Back-N uses more bandwidth if the ack packets corresponding to data packets in the following window interval $[base, base + 3]$ are delayed. ✗
- ☐ c. Selective Repeat uses more bandwidth in case of lost data packets.
- ☐ d. Selective Repeat uses more bandwidth if data packets in the following window interval $[base + N - 3, base + N]$ are lost.

Which of the following are correct about NAT?

- ☒ a. NAT-enabled router must have a valid IP address. ✓
- ☒ b. NAT provides load balancing. ✗
- ☐ c. Ports are only used for addressing processes.
- ☐ d. Source IP: 192.168.6.6, source port : 3003 is a valid NAT translation to send the packet to the Internet.
- ☒ e. NAT-enabled router blocks all P2P network. ✗

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- ☒ c. It provides shorter delay in response to a Web request. ✓
- ☒ d. It provides up-to-date webpages. ✗
- ☒ e. It reduces the Web traffic in the institution. ✗

Select the common functionalities provided by both TCP and UDP.

- ☐ a. Connection establishment.
- ☐ b. Detecting lost packets.
- ☒ c. Delivering the payload in a transport-layer segment to the same socket for each packet destined to the same destination IP address and destination port. ✗
- ☐ d. Error checking.
- ☒ e. Multiplexing. ✓

Which of the following are correct about TCP's congestion protocol?

- ☒ a. It limits the sender's sending data rate according to the receiver's receiving data rate. ✗
- ☒ b. It shows "additive-increase" behavior in the slow start phase. ✗
- ☐ c. Packet delay could be used as an indication of network congestion.
- ☐ d. If TCP only uses three duplicate ACKs in order to indicate congestion, it performs better.