Practice Questions

What is the retransmission ambiguity problem? How does the Karn’s algorithm solve the problem?

- The transmission ambiguity problem occurs when an acknowledgment arrive but the corresponding segment has been retransmitted. In such cases, it is not clear the new RTT sample is the gap between the original transmission to the ack, or from the retransmission to the ack.
- The Karn’s algorithm resolve the problem by doubling the timeout interval without updating the RTT variable (discarding the new sample).

In an operating system X, the data link layer is part of the device driver, the network layer is in the OS kernel, and the transport layer is implemented as a user-space library.

Point out where each of the algorithms is implemented.

- Nagle’s algorithm (transport, library)
- Exponential backoff (DLL, driver)
- Dijkstra’s algorithm (network, kernel)
- Karn’s algorithm (transport, library)
- MD5 (application)
Point out to which layer in the OSI reference model the following devices belong.

- Routers (network)
- Ethernet switches (data link)
- Bridges (data link)
- Repeaters (physical)
- DNS servers (application!!!)
- FTP servers (application)
- Address translation boxes (network)
- Web servers (application)

Show that the slow start mechanism increases cwnd exponentially relative to RTTs.

**Ignore this question. No covered this semester.**

A TCP sender sees duplicates of identical acknowledgments. Give two explanations of how this could happen.

1. Loss of the packet with the duplicated sequence number
2. Out of order arrival of the packets following the sequence number
What is fast retransmission?
– Discard this question. Again not covered

What is fast recovery
– Discard this question. Again not covered

A user logs into an FTP server, downloads 3 files, and logout. How many TCP connections are involved in the session?
– Discard this question. Again not covered

Which of the following protocols(s) is/are mostly likely to trigger the Nagle’s algorithm.
– FTP
– TELNET
– SMTP
– HTTP
Circle the host ID parts of the following IP addresses.

200.100.10.1 20.20.20.20 130.13.13.13

Note: without network masks, network IDs are determined in the by the three classes: A, B, and C.

A host X is configured with the IP address 202.79.55.33/255.255.248.0. Answer the following questions.

– Calculate the network and host IDs of X.
  ⇨ Network ID = 202.79.48.0
  ⇨ Host ID = 0.0.7.33

– The gateway router of X has the host ID 0.0.0.1. Give the IP address of the gateway.
  ⇨ 202.79.48.1

– X is sending a packet to 202.78.98.40. Will this delivery involve the X's gateway? Give your reasons.
  ⇨ Recipient's network ID = 202.78.96, not on the same network
  ⇨ Yes gateway is involved
Circle correct statements about TCP connections.

- When a connection is established, sequence numbers start from 0. (N)
- When a connection is established, window size is set to one segsize (Y).
- All segments of a connection follow the same network path to reach the destination. (N)
- All segments of a connection have the same ID values in their IP headers. (N)
- All segments of a connection have the same source and destination port numbers in their TCP headers. (Y)
- Segments of a connection are delivered to the destination machine in order. (N)
- Data of a connection are delivered to the destination application in order. (Y)
- Lost segments will be retransmitted (Y)