CS447-Network and Data Communication
Possible Quiz Questions for
Quiz #6 on September 28th, 2023

The following is a list of possible questions for our Quiz #6 on September 28th. Some of the questions will not be asked in the quiz. All the questions that will appear in the quiz will appear exactly as shown below (however, parameters may be changed). The quiz is closed textbook, closed notes and closed neighbors. Note that the questions, which did not appear in this quiz, still may appear in the exams.

Bring your calculator

#1: How do CRC detect transmission errors (explain “how” using an example)?

#2: Is “undetectable errors” possible using CRC? If yes, show it by an example. If not, explain why not.

#3: Can a CRC code correct transmission errors? If yes, show it by an example. If not, explain why not.

#4: What is the expected link utilization of the stop-and-wait flow-control (formula)?

#5: What is the expected link utilization of the sliding-window flow-control (formula)?

#6: Calculate the (expected) link-utilization if the stop-and-wait flow-control is used for the following case:

- Signal Propagation Delay (P): 120ms
- Packet size: 250 bytes
- Signal Transmission Rate: 10Gbps (1G = 10^9)

#7: Calculate the (expected) link-utilization if the sliding-window flow-control is used for the following case:

- Signal Propagation Delay (P): 120ms
- Packet size: 250 bytes
- Signal Transmission Rate: 10Gbps (1G = 10^9)
- Window-size: 5

    Show your work.

#8: Describe how “TCP slow-start” and “linear growth” are used for dynamically adjusting the window size.

#9: What are the two “sliding-window based ARQ methods (just name the two)?
#10: What is the primary advantage of “GBN-ARQ” over “selective-reject ARQ”?

#11: What are the primary disadvantages of “GBN-ARQ” over “selective-reject ARQ”?

#12: What is the expected link utilization of selective-reject-ARQ (formula)?

#13: What is the expected link utilization of GBN-ARQ (formula)?

#14: Calculate the (expected) link-utilization if the stop-and-wait ARQ is used for the following case:

Signal Propagation Delay (P): 120ms  
Packet size: 250 bytes  
Signal Transmission Rate: 10Gbps (1G = 10^9)  
Packet Error Rate: 0.01 (1%)

#15: Calculate the (expected) link-utilization if the selective-reject ARQ is used for the following case:

Signal Propagation Delay (P): 120ms  
Packet size: 250 bytes  
Signal Transmission Rate: 10Gbps (1G = 10^9)  
Packet Error Rate: 0.01 (1%)

#16: Calculate the (expected) link-utilization if the GBN ARQ is used for the following case:

Signal Propagation Delay (P): 120ms  
Packet size: 250 bytes  
Signal Transmission Rate: 10Gbps (1G = 10^9)  
Packet Error Rate: 0.01 (1%)

#17: Define local area networks (“LANs”) by answering the following issues:

(a) Primary purpose  
(b) Size  
(c) Ownership

#18: Define wide area networks (“WANs”) by answering the following issues:

(a) Primary purpose  
(b) Size  
(c) Ownership

#19: Define internet (the Internet) by answering the following issues:

(a) Primary purpose  
(b) Size  
(c) Ownership
#20: Define intranet by answering the following issues:

(a) Primary purpose  
(b) Size  
(c) Ownership

#21: What are “repeaters”?

#22: What are “multi-port repeaters”?

#23: How are “switches” different from “repeaters”?

#24: “Network hubs” can be two different types of network connecting devices. What are they?

#25: What are “multi-port bridges (switching hubs)”?

#26: What is the primary advantage of “switch” (compared to “repeaters”)?

#27: How are “routers” different from “switches” (mention two major differences)?

#28: Internet consists of a large number of networks, called “(network) domains” inter-connected by routers. Why not switches or repeaters used for inter-connecting domains, instead of routers?

#29: What is (are) the primary advantage(s) of routers, compared with switches?

#30: What is (are) the primary disadvantage(s) of routers, compared with switches?

#31: What is “medium access control (MAC)”?