

CS 447-002 Networks and Data Communications  
Spring 2024

Quiz #5 on February 19, 2023 (**SOLUTIONS**)

Your Last Three Digits: \_\_\_\_\_

(please do NOT write all of your student ID or your name)

Grade: \_\_\_\_\_

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(1) Is “undetectable errors” possible using CRC? If yes, show it by an example. If not, explain why not.

**YES.** Undetectable errors happen using CRC, if the bit-error patterns match with that of the “detection key bits”.

(2) Can a CRC code correct transmission errors? If yes, show it by an example. If not, explain why not.

**NO.** CRC code can not correct transmissions errors (i.e., the bit errors ). It is impossible because the CRC codes do not have any information to detect where bit errors happened.

(3) How does “sliding-window flow control” work?


**Sliding Window Flow Control**

**Sender Side**

- Transmit the 1st packet in the open window (if  $N_{WIN} > 0$ )
- Shift the LHS of the open window to the right by one position
- When the sender receives an ACK, shift the RHS of the open window to the right by one position

**Receiver Side**

- When the receiver receives a packet, shift the LHS of the open window to the right by one position
- When the receiver sends an ACK, shift the RHS of the open window to the right by one position

SlidingWindow/001 **SIU**

- (4) What is the primary advantage of “sliding-window flow-control” over “stop-and-wait flow-control”?

The primary advantage of “sliding-window flow-control” over “stop-and-wait flow-control” is the improved (better) link-utilization.

- (5) If the sliding-window flow-control is used in the Internet, what are the two primary weaknesses in the sliding-window flow-control?

- ① If the sliding-window is used in the Internet, it is not easy to determine the best window size, because we will never know the distance for each TCP connection (the more far your destination is, the larger the window size should be - the closer your destination is, the smaller the window size should be).
- ② If the sliding-window is used in the Internet, it is not easy to determine the best window size, because the windows size depends on the amount of the on-going network traffic in the Internet (the less congested, the larger the window size should be – the more congested, the smaller the window size should be\_ but we never know until we start transmission for each TCP connection.