# National University of Computer and Emerging Sciences (Lahore Campus)

## Quiz 3: Transport Layer (Chapter 3)

**Name:** _____ **Roll No:** _____ **Section:** BSE-6B1 (Spring 2026)

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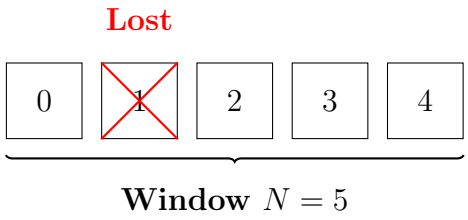
1. (5 points) **Go-Back-N vs Selective Repeat Analysis**

   Consider a pipelined protocol over a link with a very high Bandwidth-Delay Product.

   - Sender sends packets $0, 1, 2, 3, 4$. Packet 1 is lost. All other packets and ACKs arrive correctly. Timeout occurs after Packet 4 is sent. Window Size $N = 5$. Sequence Numbers: $0, 1, 2, \ldots$

   (a) If using **Go-Back-N**, mathematically calculate the total number of packet transmissions (initial + retransmissions) required to successfully deliver packets 0 through 4. If using **Selective Repeat**, calculate the same.

   (b) Will **Selective Repeat** operate correctly if N = 5 and k = 3? Consider the SR window size constraint, create a scenerio where it fails and explain it.



2. (10 points) **TCP Sequence Numbers & Re-ordering**

Host A sends 4 segments to Host B over a TCP connection.

- Segment 1: Seq = 90, Length = 20 bytes.
- Segment 2: Seq = 110, Length = 40 bytes.
- Segment 3: Seq = 150, Length = 10 bytes.
- Segment 4: Seq = 160, Length = 30 bytes.

Assume the initial Sequence Number is 90. Host B receives them in this order: **Segment 1, Segment 4, Segment 2, Segment 3**.

(a) List the ACK number Host B sends immediately after receiving EACH segment in that specific order.

(b) Draw the receive buffer state after Segment 4 arrives but before Segment 2 arrives.