

National University of Computer and Emerging Sciences (Lahore Campus)

Quiz 6: Link Layer (Chapter 6)

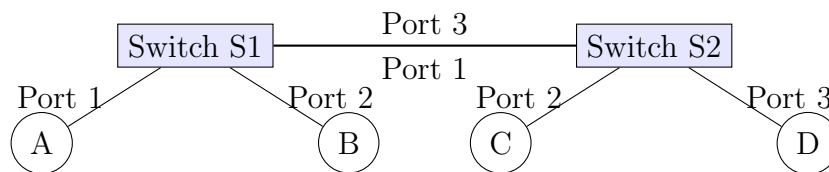
Name: _____ Roll No: _____ Section: BSE-6B1 (Spring 2026)

1. (5 points) Switch Tables

Consider the switched LAN topology shown below. The switch tables are initially empty. The following sequence of frame transmissions occurs:

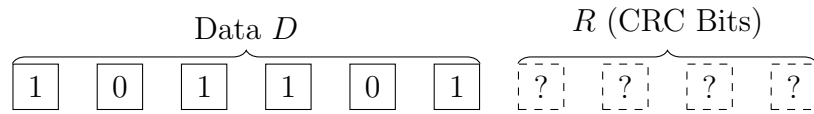
1. Node A sends a frame to Node D.
2. Node D replies with a frame to Node A.
3. Node C sends a frame to Node D.

Show the state of the Switching Table for **Switch S2** after these three events. Format: (MAC Address, Interface). Also, show the same for **Switch S1**.



2. (10 points) **Cyclic Redundancy Check (CRC) and Burst Errors**

Consider a data transmission scenario using a CRC generator polynomial $G(x) = x^4 + x + 1$. The data string to be transmitted is $D = 101101$.



1. Analytically calculate the 4-bit CRC remainder R . Show the long division in binary modulo-2 arithmetic. What is the actual bit-string transmitted by sender?
2. A "burst error" of length k is a contiguous sequence of bits in which the first and last bits are errors, and the intermediate bits may or may not be errors. Can this specific generator $G(x)$ can detect **all** burst errors of length $k = 3$. Give reason?
3. Suppose a burst error occurs during transmission such that the received bit string has the 3rd and 4th bits (counting from the left, 1-based index) inverted. Does the receiver accept or reject this frame?