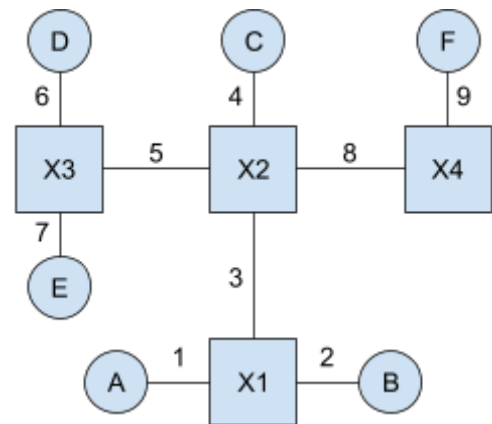


Module 5 Assessment: The Link Layer

You may use any resource (except for other people) to help you answer these questions. You may ask LLMs questions to help you understand concepts however the answers you submit should represent your understanding of the material, not merely the output of an AI tool. Questions should be answered within the context of this course's material.

- Consider the switched network to the right. Squares designate switches, circles designate host systems, and lines designate the links connecting the systems. Each link is labeled with a number, as are the hosts and switches. The switches in this network are self-learning switches. Your job for this problem is to explain how information flows through the network as a specific series of packets is sent out. **Assume that the switching tables start out empty, and that each problem builds on the switching table constructed in the previous part of the problem (i.e. copy the contents of your answer for part N into N+1 before updating it)**



Each entry in the switching table consists of a host name and the link the switch should forward a packet to in order to reach that host. For example, to reach **B**, **X1** would forward a packet to link **2**; in contrast, to reach **B**, **X3** would forward a packet to link **5**.

- Host F sends a packet to Host C.

Which switches (e.g. X1, X2, X3,...) receive this Packet?: _____ X2 and X4 _____

What is the contents of the switching tables after the packet has finished moving through the network?

Switch X1		Switch X2		Switch X3		Switch X4	
Host	Link	Host	Link	Host	Link	Host	Link
		F	8			F	9
		C	4			C	8

b. Host C responds to Host D with a packet.

Which switches (e.g. X1, X2, X3, X4) receive this packet?: _____X2 and X3_____

What is the contents of the switching tables after the packet has finished moving through the network?

Switch X1		Switch X2		Switch X3		Switch X4	
Host	Link	Host	Link	Host	Link	Host	Link
		F	8	C	5	F	9
		C	4	D	6	C	8
		D	5				

c. Host B sends a packet to Host C.

Which switches (e.g. X1, X2, X3, X4) receive this packet?: __X1 and X2_____

What is the contents of the switching tables after the packet has finished moving through the network?

Switch X1		Switch X2		Switch X3		Switch X4	
Host	Link	Host	Link	Host	Link	Host	Link
B	2	F	8	C	5	F	9
C	3	C	4	D	6	C	8
		D	5				
		B	3				

d. Host E sends a packet to Host B

Which switches (e.g. X1, X2, X3, X4) receive this packet?: __X1 X2 and X3_____

What is the contents of the switching tables after the packet has finished moving through the network?

Switch X1		Switch X2		Switch X3		Switch X4	
Host	Link	Host	Link	Host	Link	Host	Link
B	2	F	8	C	5	F	9
C	3	C	4	D	6	C	8
E	3	D	5	E	7		
		B	3	B	5		
		E	5				

e. Host A sends a packet to Host F.

Which switches (e.g. X1, X2, X3, X4) receive this packet?: __X1 X2 and X4_____

What is the contents of the switching tables after the packet has finished moving through the network?

Switch X1		Switch X2		Switch X3		Switch X4	
Host	Link	Host	Link	Host	Link	Host	Link
B	2	F	8	C	5	F	9
C	3	C	4	D	6	C	8
E	3	D	5	E	7	A	8
A	1	B	3	B	5		
		E	5				
		A	3				

4. For each of the following signals, decode it using each of the four methods we discussed in class (NRZ, NRZI, Manchester, and 4B5B encoding). If the signal cannot be decoded into a string of 0's and 1's, say so instead of decoding it.

a)



NRZ	NRZI	Manchester	4B5B
0110101010100110100 10110100101	0101111111110101110 11101110111	001111001010101	Cannot be decoded

b)



NRZ	NRZI	Manchester	4B5B
1111001001011101101 11001011101	1000102201110011011 00101110011	101101010100101	Cannot be decoded

c)



NRZ	NRZI	Manchester	4B5B
0101110001101001001 01110010110	0111001001011101101 11001011101	010100101110010	Cannot be decoded

