



Final Assessment Test – May 2024

Course: BECE401L - Computer Communications and Networks

Class NBR(s): 0643 / 0647 / 0651 / 0659 / 0664 / 0672 / 0678 / 0684

Slot: D2+TD2

Max. Marks: 100

Time: Three Hours

- KEEPING MOBILE PHONE/ELECTRONIC DEVICES EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

Answer ALL Questions
(100 Marks)

1. i) Match the following to one or more layers of the OSI model: [5]
 - a) Point-to-point Protocol
 - b) Electrical and Mechanical Interface
 - c) Determining which route through a subnet to choose
 - d) User Services such as Email and FTP
 - e) The layer links the network support layers and user support layers.
- ii) a) Suppose all laptops in a large city are to communicate using radio transmissions from a high antenna tower. Is the data link layer or network layer more appropriate for this situation? [5]
- b) Data link layers almost always put the CRC in a trailer, rather than in a header. Why?
2. i) Illustrate the diversity of internetworking devices used in computer networks and explain. [5]
- ii) Five stations (S1-S5) are connected to an extended LAN through transparent bridges (B1, B2 and B3), as shown in Figure 1. Initially, the forwarding tables are empty. Suppose the following stations transmit frames: S1 transmits to S5, S3 transmits to S1, S4 transmits to S3, S5 transmits to S2, S2 transmits to S5 and S3 transmits to S2. Explain the steps involved in bridge learning and fill up the forwarding tables with appropriate entries after the frames have been completely transmitted. [5]

(HINT: Port 3 and Port 6 are blocked ports)

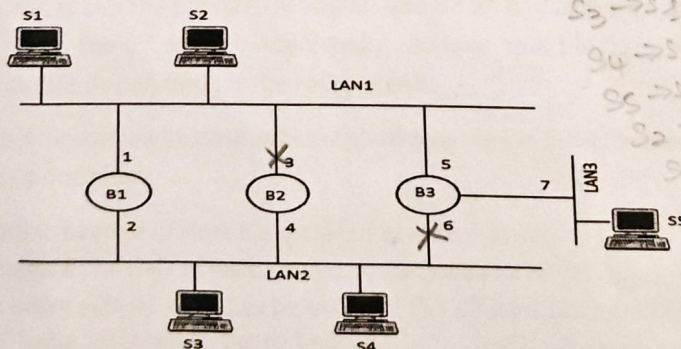


Figure 1

3. Write the Spanning tree algorithm and determine the spanning tree for the bridged LAN shown in Figure 2. [15]

- Assume that LANs 1, 3 and 5 are Gigabit Ethernet (Cost=15) and the rest are Fast Ethernet (Cost=19).

NOTE 1: MAC address is represented in hexadecimal form.

Numerical values 1, 2, 3, etc. indicate the port number of each Bridge. Also consider in Figure 2, if suppose S1 wants to send a frame to S2 but has not learned the route. Sketch the route followed by the single route broadcast frames during route discovery.

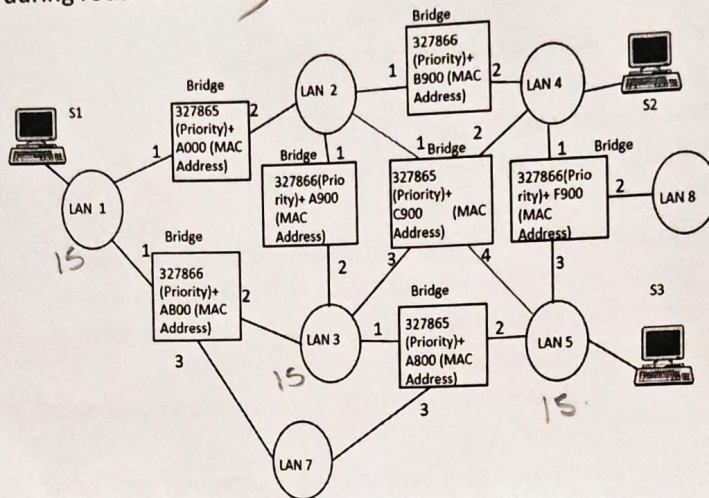


Figure 2

4. Suppose a header consists of four 16-bit words: (11111111 11111111, 11111111 00000000, 11110000 11110000, 11000000 11000000). Find the checksum for this code. [5]
- 5.(a) Analyse and complete the HDLC NRM frame exchange diagram shown in Figure 3 by completing the labeling of the frame exchanges by considering 2 bits to represent the sequence number. [10]

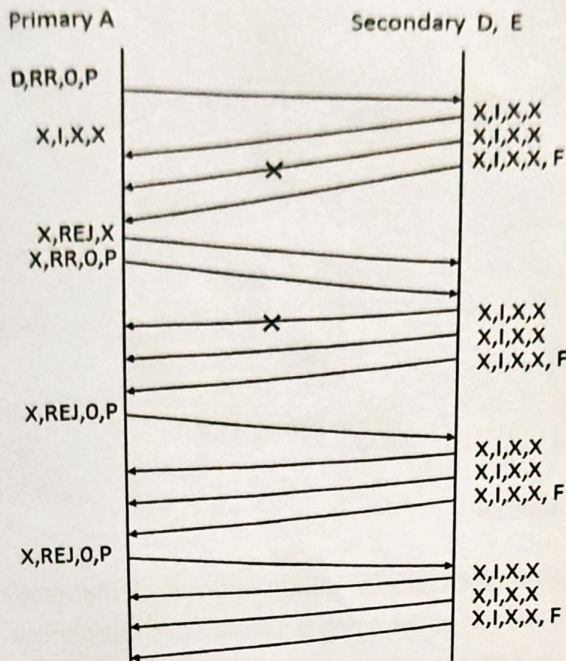


Figure 3

OR

- 5.(b) Critically analyse and enhance the HDLC ABM frame exchange diagram shown in Figure 4, incorporating 2-bit sequence numbers and completing the labeling of the frame exchanges [10]

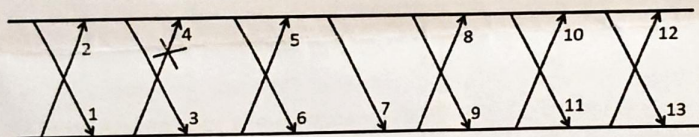


Figure 4

- 1) BI00 2) AI00 3) xIxx 4) xIxx 5) xIxx 6) xIxx 7) xSREJx 8) xIxx 9) xIxx
10) xIxx 11) xIxx 12) xRRx 13) xRRx

6. With neat diagram, explain about Pure ALOHA and Slotted ALOHA. [10]
7. Given a site's network address and mask, along with the proposal to create nine subnetworks, utilize the provided IP address **192.32.32.0** to allocate addresses, beginning with the 6th subnet. Additionally, consider that the 12th, 13th, and 14th subnets are designated for the routers' LANs. [10]

Design an efficient addressing scheme shown in Figure 5 while adhering to subnetting principles.

- Find the range of Host IDs assigned to each subnet.
- Assign 1st host ID of each subnet as the gateway address.
- In every subnet node1 to be assigned the 2nd host ID and node number 'N' to be assigned to the last host ID.
- Find the broadcast ID of each subnet.
- Redraw the network diagram by representing the Host ID, subnetwork ID and gateway address.

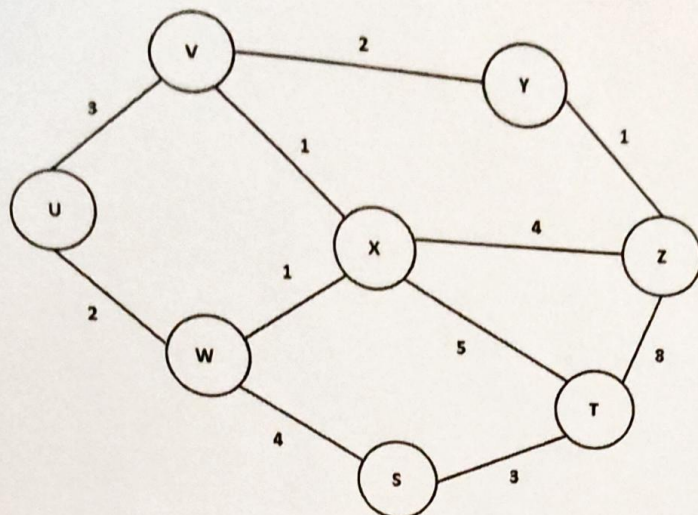


Figure 6

9. The following is a dump header of UDP HEADER in hexadecimal format
5E FA 00 FD 00 1C 32 97 *9DLC* [10]
- Determine the following metrics.
- From the given UDP header, what are the total size of the user datagram, the source port number and destination port number in decimal?
 - Based on the information in the UDP header, calculate the length of the data payload.
 - Given the nature of UDP communication, how would you determine the direction of the packet transmission, whether it's from the client to server or vice versa, using the provided header information?
 - By examining the port numbers in the UDP header, what conclusions can you draw about the specific application layer protocol being used?
 - Determine whether the sender of the UDP packet likely calculated the checksum for this packet, based on the checksum field in the provided header.
10. i) Consider different activities related to email: [3]
- m1: Send an email from a mail client to a mail server
- m2: Download an email from mailbox server to a mail client
- m3: Checking email in a web browser
- Which is the application level protocol used in each activity?
- ii) Determine, which of the following is a FQDN and which is a PQDN? [7]
- mil.
 - edu.
 - xxx.yyy.net.
 - xxx.yyy.zzz.in.
 - Also, differentiate PQDN with FQDN.

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