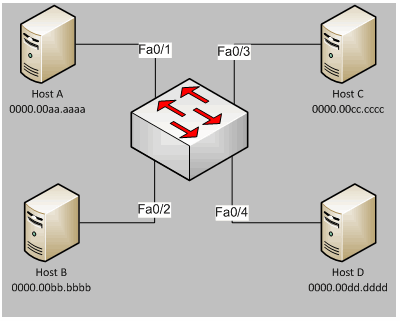
1. Match the numbers to the letters:
2. HDLC \_\_\_\_6\_\_\_\_\_
3. Hamming \_\_\_\_\_5\_\_\_\_
4. FCS \_\_\_\_\_7\_\_\_\_
5. Host \_\_\_\_\_9\_\_\_\_
6. Switch \_\_\_\_2\_\_\_\_\_
7. Router \_\_\_\_3\_\_\_\_
8. Packet Switching \_\_\_\_8\_\_\_\_\_
9. RNR \_\_\_\_4\_\_\_\_\_
10. SNR \_\_\_\_10\_\_\_\_\_
11. TCP \_\_\_\_1\_\_\_\_\_
12. A method in the network layer used to transfer information through a network
13. Link layer equipment that transfers frames between LANs
14. Network layer equipment that transfers packets between bridged LANs.
15. Command used to control flow in the protocol at the link layer.
16. Encoding method for detection and correction of errors without retransmission
17. A link layer Protocol.
18. A field used to check the integrity of the frame
19. A protocol that segments the information and each segment is sent over the network separately
20. An end unit that receives and sends information on the network
21. A parameter that limits the capacity of a channel
22. Are the following statements TRUE or FALSE
    1. Increasing the physical length of a line, decreases the Propagation Delay.   
       TRUE / FALSE
    2. Increasing the data rate of a line will decrease the propagation delay.  
       TRUE / FALSE
    3. Point to point Layer 2 frames, sent between adjacent nodes in the network, are always sent in the Connection Oriented mode.  
       TRUE / FALSE
    4. The losses of packets in an IP network are detectable in the network layer by tracking the IP packet sequence numbers.  
       TRUE / FALSE sequence number is in the 4th layer.
    5. Packets belonging to a Virtual Circuit Switched connection that are sent and received without errors, can arrive at their destination out of order  
       TRUE / FALSE
23. Select the most correct answer from the following choices. Only one answer per question, however each choice may be the answer to more than one question.
24. physical layer
25. data link layer
26. network layer
27. transport layer
28. application layer
    1. Which layer establishes, maintains, and terminates communications directly between applications located on different devices? \_\_\_d\_\_\_\_
    2. Packets are found at which layer? \_\_\_c\_\_\_\_
    3. Bit synchronization is handled at which layer? \_\_\_a\_\_\_\_
    4. Which layer is responsible for Network wide (end-to-end) packet sequencing, acknowledgments, and requests for retransmission? \_\_\_\_d\_\_\_
    5. Segmentation of a data stream happens at which layer of the OSI model? \_\_\_\_\_d\_\_\_\_\_?
29. Select the most correct answer for each of the following questions:
    1. As a frame travels through a routed network   
       the MAC address will always:
30. change to reflect the current source and destination
31. remain the same
32. the source address will remain the same but the destination address will change
33. the source address will change and the destination address will change
34. none of the above
    1. An IP address is a numeric quantity that identifies :
35. a network adapter to other devices on the network
36. the manufacturer of a computer
37. the physical location of a computer
38. none of the above
    1. Why will a bridge never learn a broadcast address?
39. Broadcasts only use network layer addressing.
40. A broadcast frame is never forwarded by a bridge.
41. A broadcast address will never be the source address of a frame.
42. Broadcast addresses use an incorrect format for the forwarding table.
43. Broadcast frames are never sent to bridges.
44. The bridge shown below behaves as a transparent bridge that learns automatically and has just been turned on and its forwarding tables are empty.



The following frame is the first frame to enter the bridge.



To which port(s) will the bridge forward this frame?:\_\_\_\_\_\_\_\_\_\_  
(select one or more answers)

1. Fa0/1
2. Fa0/2
3. Fa0/3
4. Fa0/4
5. None

The bridge does not yet know where to send the frame so he will flood the network

1. The following is a snapshot of a sequence of bits that   
   Layer 1 passed to Layer 2. (read left to right):  
   The frame is protected from errors with CRC-4 whose polynomial representation is X4+X+1. The flags used are the common 8-bit flag.

10110011111101000000001111101010100111111001

* 1. Please mark off the following - if indeed they are in the sequence:
     + Flags
     + stuff bits
     + FCS
  2. Show, by calculation, if the above frame was received without errors

10011 1000000001111110101

10011 10011

11000 10011

10011 10011

10110 00000 frame was received with no errors

10011

10111

10011

10011

10011

00000 go back to the top, since no remainder

1. Select the most correct answer for each of the following questions:
   1. In a network with ip address 192.168.100.0/27 what is the resulting maximum number of available hosts? \_\_\_\_\_2^5\_\_\_\_\_\_
2. 64 host addresses
3. 32 host addresses
4. 16 host addresses
5. 27 host addresses
6. 5 host addresses
   1. Your organization doubled in size during the past year and more growth is projected in the near future as shown in the exhibit:   
      Accounting: Currently 50 users. Projected size 100 users  
      Marketing: Currently 20 users. Projected size 60 users  
      IT: Currently 15 users. Projected size 32 users  
      Client services: Currently 50 users. Projected size 100 users   
      projected: 100+60+32+100=292>2^8 we need at least 2^9  
      Currently all hosts in the organization are in the 10.20.20.0/24 range. What steps should you take to correct the situation, guarantee future expansion yet not waste address space? \_\_\_\_\_\_\_\_\_\_\_\_.
7. Change the subnet mask of all hosts to 255.255.255.0
8. No action, the current range will accommodate future growth
9. Change the subnet mask of all hosts to 255.255.254.0
10. Change the subnet mask of all hosts to 255.255.252.0
11. Change the subnet mask of all hosts to 255.255.0.0
12. Given the following IP Network:



• Stations 1-8 are hosts in the local networks. In MACi we denote the MAC address of host i, and in IPi the IP address of host i.

• The 2 local networks are of the same technology and with the same MTU (Max Transfer Unit).

• No LLC-level protocol is enabled on the network

• R1 is an IP router. It can be assumed that his routing table is complete and correct.

Bridges B2, B1 are transparent bridges that connect the bridged local networks. They learn the topology of the network automatically and not manually. At first their forward tables are empty. The bridges operate in a store and forward policy, which means that if the frame is required to be moved on, the transfer will only take place after the frame has been completely received and checked by the bridge.

• Each station knows the MAC addresses of all the other stations that are on the same local area network and the router that is on the same local area network. For example, station 1 knows the MAC addresses of station 2, 3 and 4 and of the router R1 on LAN1.

• Each station knows the IP addresses of all other stations. For example, station 1 knows the IP addresses of stations 2-8. Also each station knows its network mask.

• All of the ARP tables are complete and correct

• Each of the two local networks has its own class C network address.

* 1. Suppose that station number 1 sends an IP packet to station number 8 and this is the first packet transmitted on the network. What will the R1 router do with this package?

After making sure that there are no errors R1 will look at its routing table and see if he knows the network. R1 will see that the network matches the network below him and will look up the mac address on his ARP table. Since his ARP table is updated he will find it and set the source mac address to himself and destination mac address to the MAC-8. And send it out on the line that goes to b2.

* 1. Suppose host 3 received an IP packet from host 2.   
     How is the network layer layer header in the package sent from host 2 different from the network layer layer header in the package that arrives at host 3?

Nothing should be changed. Host 2 & 3 are both on the same LAN so when host 2 sends the packet he looks at his ARP table, sees where to send the frame to, and he sends it to MAC-3. Therefore no one else but MAC-3 should even have looked passed the layer 2.

* 1. Suppose host 3 received an IP packet from host 6.  
     How is the network layer header in the packet sent from station 6 different from the network layer header in the packet arriving at station number 3?

In this case the IP packet travels through a router. So the router will look at the open the network layer. And decrement the TTL. Otherwise, nothing else should be changed.

1. A:6 B:5, C:7 D:9 E:2 F:3 G:8 H:4 I:10 J:1
2. All False.
3. 1:d 2:c 3:a 4:d 5:d
4. 1:a 2:a 3:c
5. A&c&d
6. See page 5.
7. 1:b 2:c
8. See page 8.

Some explanations given on pages, where I felt necessary.

Thank you!! I enjoyed your class.

Wishing you all the best,

Chaim