Homework 4

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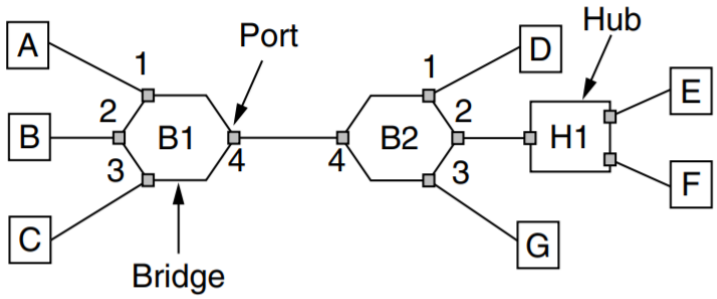
1. The maximum channel ultilization is 18.4%. So $N = \dfrac{56\text{kbps} \times 18.4\%}{1\text{kb}/100\text{s}} = 1030$.
2. Token ring protocol. Because nonpersistent CSMA will has a longer delay (random waiting), while as the messages of the video game are short and active, the token ring protocol will lead to a shorter delay and a full ultilization of the channel.
3. Yes. Obviously if a pair of station stay far away from another pair, both of them can make transmissions without disturbing each other.
4. 01010110101001100110.
5. As the sending station in 802.11 requires an acknowledgement, the stations hearing the RTS will keep silence until the ACK arrives; But in MACA, unless the stations hearing RTS also hear CTS, they only need to keep quiet till the beginning of sender station's transmission. That is, in MACA, both the hidden and exposed terminal problem are solved; But in 802.11, only hidden terminal problem is solved.
6.
    1. The channel is too bad that messages can hardly transmitted through it without encountering an error. In this case, if we use error detection and retransmission, it will need many times of retransmission to send it right.
    2. For simplex channel, there is no way for the receiver to send back a negative acknowledgement to ask for a retransmission.
7. 

(The Figure Referenced)

    a. A to C: **B1 - 2, 3, 4; B2 - 1, 2, 3** (Now B1 knows A is on port 1, B2 knows A is on port 4)

    b. E to F: **B2 - 1, 3, 4; B1 - 1, 2, 3** (Now B2 knows E is on port 2, B1 knows E is on port 4)

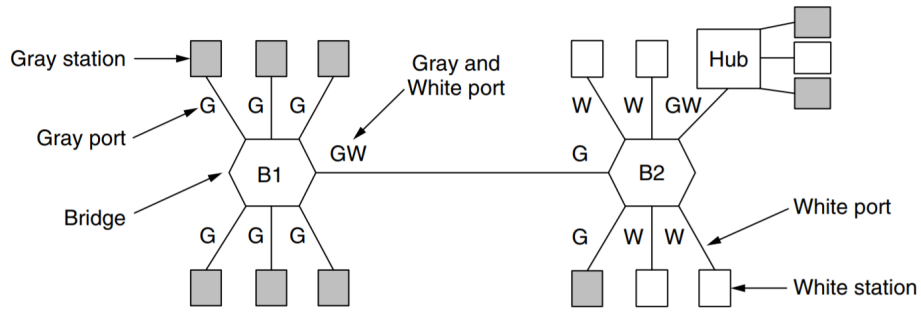
    c. F to E: **None**, because B2 knows E is on port 2. (Now B2 knows F is on port 2)

d. G to E: **B2 - 2**. (Now B2 knows G is on port 3)

e. D to A: **B2 - 4, B1 - 1**. (Now B2 knows D is on port 1, B1 knows D is on port 4)

f. B to F: **B1 - 1, 3, 4; B2 - 2**. (Now B1 knows B is on port 2, B2 knows B is on port 4)

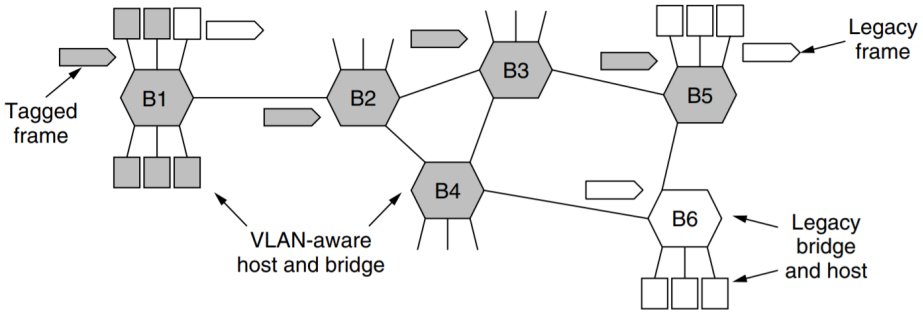
8. When store-and-forward switch receives a damaged frame, it just discard that frame; but cut-through switch will send the frame out as the error has not been noticed, which may cause some waste or exception.

9. 

(The Figure)

Figure 4-47. Two VLANs, gray and white, on a bridged LAN.

No. Even if hubs have configuration tables, it cannot control to which ports will the frames transmit (or, propagate). If hubs are used, then VLAN are more likely a multicast method, where the stations will discard the frames not meant to send to them.

10. 

(The Figure)

Figure 4-48. Bridged LAN that is only partly VLAN aware. The shaded symbols are VLAN aware. The empty ones are not.

Yes. If B5 is a legacy switch, VLAN-aware switch B3 will discard the extra VLAN fields in the frame and send a legacy frame to B5 as B3 is the last VLAN-aware machine on the way.