FACULDADE DE COMPUTAÇÃO – FACOM
GBC056 – Arquitetura de Redes de Computadores

“Design and Validation of Computer Protocols” - Gerard Holzmann

Problems extracted of the Text Book
Chapter 04 – Flow Control

4.1 - Describe in detail the conditions under which an X-on/X-off protocol and a Ping-Pong (stop-and-wait) protocol can fail.

4.2 - Consider the adequacy of the alternating bit protocol under message loss, duplication, and reordering.

4.3 - Change the extended alternating bit protocol from Figures 4.13 and 4.14 by also sending a negative acknowledgment when a message is received with the wrong sequence number. Show precisely what can go wrong.

4.4 - Extend the X-on/X-off protocol for full-duplex transmissions. Consider the extra problems that the loss of control messages can now cause.

4.5 - Show what happens if the timeout period in the alternating bit protocol is not chosen correctly.

4.6 - If the acknowledgment message in the alternating bit protocol is delayed long enough to trigger the sender’s timeout, a duplicate mesg from the sender is created, which in turn triggers a duplicate ack message, and so on. How would you change the protocol to solve this problem?

4.9 - In a sliding window protocol where messages are not accepted out of order, show what can happen when the window size W equals to the range of the sequence numbers M (see Figure 4.11).

4.10 - Show how you can reduce the dimensions of all four arrays in the protocol of Figure 4.11 to the maximum window size.