

Assignment 3

Question 1

Let $g_1(x) = x + 1$ and $g_2(x) = x^3 + x + 1$. Consider the information bits (1, 1, 0, 1, 1, 0).

- (a) Find the codeword if $g_1(x)$ is used as the generating polynomial.
- (b) Suppose that the codeword in part (a) has a transmission error in the third bit. What does the receiver obtain when it does its error checking?
- (c) Find the codeword if $g_2(x)$ is used as the generating polynomial.
- (d) Can $g_2(x)$ detect single errors? Why?
- (e) Find the codeword if $g(x) = g_1(x)g_2(x)$ is used as the generating polynomial.

[1.5 mark]

Question 2

Consider a Go-Back-N ARQ system with a window size of 1. Station A sends information frames to station B. Both A and B have timeout.

- (a) Sketch the sequence of frame exchanges when there is loss of an information frame.
- (b) Sketch the sequence of frame exchanges when there is loss of an acknowledgment frame.

[1 mark]

Question 3

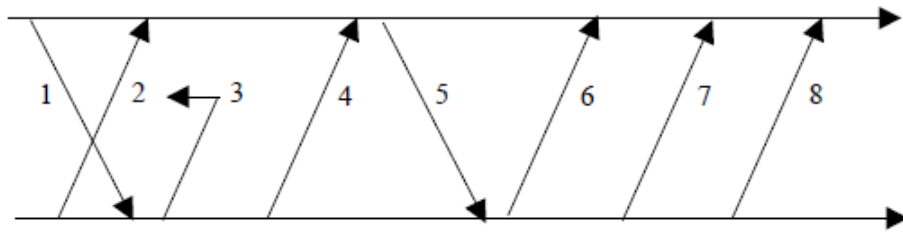
Two computers are connected by an intercontinental link. The frame size is 256 bytes. Frame overhead is 25 bytes. Assume a bit error rate of 10^{-4} . Find the efficiency for SR ARQ (round to 4 decimal places).

[0.5 mark]

Question 4

The following corresponds to an HDLC ABM frame exchange.

Station A



Station B

- | | | | |
|----------|---------|---------|---------|
| 1. BI00 | 2. AI00 | 3. xIxx | 4. xIxx |
| 5. xREJx | 6. xIyx | 7. xyxx | 8. xyxx |

- (a) Complete the diagram by completing the labeling of the frame exchanges.
- (b) Write the sequence of state variables at the two stations as each event takes place.
[1 mark]

Submission:

Answer the questions in a MS Word document file. Name the file with your student ID number, e.g. 12345678.docx. **One mark will be deducted for wrong file name.** Submit the assignment by e-mail on or before **11 April 2021**. **1 mark/day will be deducted for late submission.**