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]

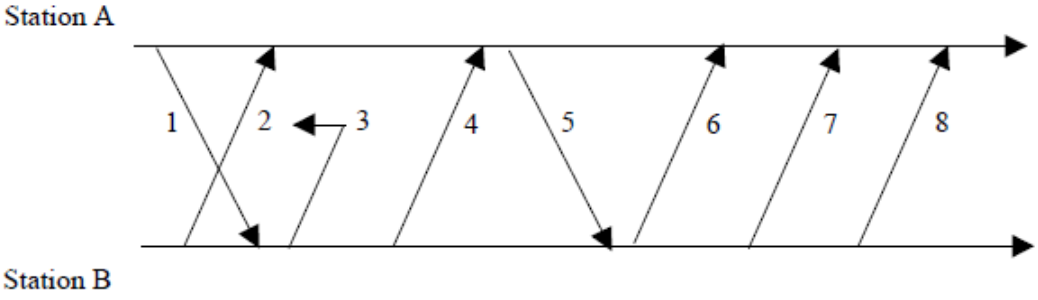
Question 3

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.



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.**