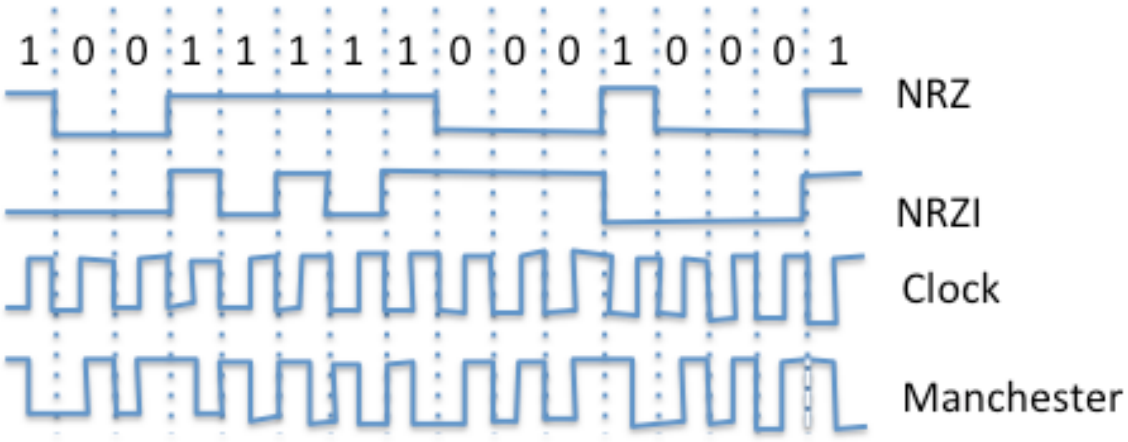
CSCI 4273/5273
Fall 2014
Homework 3 Solutions

Exercise 1



Exercise 2

11100 01011 11110 10101

Exercise 5

01111110 11010111110**0**01011111**0**01011111**0**110 01111110

Exercise 16

1. Take ones complement of the old checksum
2. Low order byte decremented: Decrement the checksum by 1
2. High order byte decremented: Decrement the checksum by 256
3. Take ones complement of the updated checksum

Exercise 18

(a)

B(x) = 11100011000

C(x) = 1001

Remainder E(x) of B(x)/c(x) = 100

Message transmitted: 11100011100

(b)

Message received M(x) = 01100011100

Remainder of M(x)/C(x) = 10

Since remainder is not zero, there was an error during transmission.

Exercise 24

Delay X BW product = $1.25 * 2 X 10^6$

SWS = $2.5 * 10^6/2^{13}$ = 306 frames

SWS < (Max seq number + 1)/2

Maximum seq number = 612

Number of bits needed = 10

Exercise 33

Sender sends frames with seq # 0, 1, and 2 that are received correctly. Receiver sends acks that are all lost. Receiver can accept frames with seq numbers 3, 4, and 5 (mod 5). Sender times out and resends old frame with seq number 0, which the receiver assumes as a new frame.

Exercise 42

(a) Minimum packet size $46.4 * 10^{-6} * 100 * 10^6 + 48 = 4688$ bits
(b) Too many padding bits will have to be transmitted for smaller sized data
(c) To permit smaller minimum packet size, specifications can be written to allow smaller delay.

Exercise 53

They can interfere with each other if they transmit to a node that is with in their transmission range.

Exercise 55

To communicate with a node B, a node A first send an RTS frame. If B has received an RTS frame from a hidden node C, it will not send a reply CTS frame to A. Since A does not receive CTS, it knows that there is a hidden node.