PN Sequences and Scramblers

Exercise 1: How many flip-flops would be required to generate a ML PRBS of period 16383? How many ones would the sequence have? What is the longest sequence of 0's?

period = $2^k - 1 = 16383$

2^{k-1} ones

$2^{k-1} - 1$ zeros

$k = 14$

$2^{k-1} = 2^{14-1} = 8192$

$k-1$

0 ... 0 - 00...00

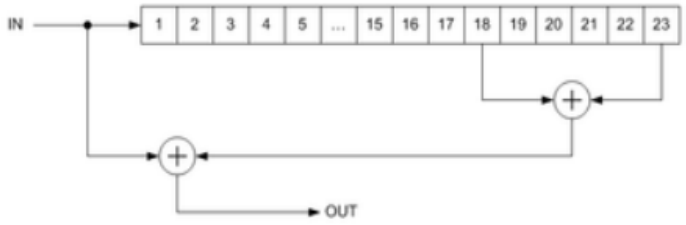
$k-1$ is longest run of zeros

It is important to understand that a scrambler does not provide secrecy (encryption).

Exercise 2: Why not?

de-scrambling algorithms are known.

Exercise 3: How many errors will appear in the output of a V.34 descrambler if there is one input error?



- one error when the error appears at the input
- one error each time the error reaches one of the two inputs to the xor gate

total: 3 errors.

Exercise 4: In the diagram above, what two signals would the receiver compare to detect errors?