Lecture 10 - PN Sequences and Scramblers

Exercise 1: (a) How many flip-flops would be required to generate a ML PRBS of period 16383? (b) How many ones would the sequence have? (c) What is the longest sequence of 0's? (d) How many runs of 5 ones are there?

(a) $16383 = 2^k - 1$ $\quad k = \log_2(16384) = 14$

(b) $2^{k-1} = 8192$

(c) 13 (one run of $k-1$ zeros)

(d) $k - l = 5 \quad 14 - l = 5 \quad l = 9$

9 runs of 5 ones.

Exercise 2: Why not?

scrambling algorithms are public → no secrecy

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

3 errors (1 for initial error, 1 for each FF)

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