PN Sequences and Scramblers

Exercise 1: Make a table showing the number of runs of a given length for $m = 6$. How many runs are there in total? How many bits are there in the sequence?

63 bits

# bits	length	# runs of 1s	# runs 0's			
6	m	1	0	6		
5	m−1	0	1	5	11	
4	m−2	2	2	16		45
3	m−3	3	3	18	34	
2	m−4	4	4	16	26	
1	m−5	5	5	10		91
		15	15			

30 runs,

Exercise 2: How many flip-flops would be required to generate a ML PRBS of period 8191? How many ones would the sequence have? What is the longest sequence of 0's? How many runs of 5 ones are there?

Exercise 3: Why not?

Exercise 4: How many errors will appear in the output of a V.34 descrambler if there is one input error?

Exercise 5:   In the diagram above, what two signals would the receiver compare to detect errors?