Consider a discrete memoryless binary source \( \{X_i\} \) with \( P(X_i = 1) = p \). Suppose you need to compress \( n \)-bit sequences where \( n = 5 \) is specified. You are also told that the set \( A_n \) should satisfy \( P((X_1, \ldots, X_n) \notin A_n) < \lambda \).

Write a MATLAB script that uses specified values of \( p \) and \( \lambda \) to print out a list of 5-bit sequences for \( A_n \) such that \( P((X_1, \ldots, X_n) \notin A_n) < \lambda \). The constraint is that your list should be as short as possible. Write your script assuming \( p < 1/2 \).

Test your script different values of \( p \) and \( \lambda \).

Values of \( p \) and \( \lambda \) will be given later for you to use when you turn in your results, which should include:

1. A description of your analysis and how your script works.
2. A copy of your script.
3. A copy of your script’s output using the given values of \( p \) and \( \lambda \).
4. Your script should also print the number of sequences you put in \( A_n \) and the value of \( P((X_1, \ldots, X_n) \notin A_n) \), which, of course, should be less than \( \lambda \).

Due: Feb. 8, 2006