ECE 729
Design Project #2

Download MATLAB from course web page. Run PC.m, look at its output & figure out how it works. What does it do?

1) You specify binary codewords as ordinary integers.
   For example to specify $x_2 = 00111$, write the MATLAB command $x(2) = 7$.

2) You select decoding sets. For example
   if $D_1 = \{00000, 00001, 00010, 00100, 01000, 10000\}$
   use the MATLAB commands
   
   \[
   D(1)(1) = 0; \quad \text{or} \quad \text{bin2dec('00000')} \\
   D(1)(2) = 1; \quad \text{(D is a cell array)} \\
   \vdots \\
   D(1)(6) = 16; \quad \text{or} \quad \text{bin2dec('10000')} 
   \]

   In PC.m, $D(1), D(2), D(3)$ & $D(3)$ are each vectors, but they can have different lengths.

3) $P_e = 1 - P_c = 1 - \frac{1}{N} \sum_{i=1}^{N} W^*(D_i | \tilde{x})$, uses for $w = \min$

   where $D_i = \{y : \Phi(y) = i\}$, $i = 1, \ldots, N$. MODIFY PC.m to handle n=7 bit words & N=4 codewords.
   Choose NEW $D_i$ sets to min. the prob. of error.