EE M16 Homework #3

5.3 Represent on K-maps the functions described by the following expressions:

a. \( E(x, y, z) = \sum m(1, 5, 7) \)

b. \( E(w, x, y, z) = w'x'y + y'z + xz' \)

5.11 Design a minimal two-level single-error detector for the 2-out-of-5 code. The input is a digit in the 2-out-of-5 code and the output is 0 if the number of 1s in the input is 2. Use the Quine-McCluskey minimization method.

5.20 Using the PAL of Figure 5.21 implement a code converter from the Excess-3 to the 2-out-of-5 code.

6.1 Design a single-error detector for the 2-out-of-5 code. The input is a digit in the 2-out-of-5 code, and the output is 0 if the number of ones in the input is 2. Use only gates from the set described in Table 4.1. Try to minimize the network delay.

6.8 Design a network using only XOR gates which performs the following function:

\[
Z_i = \begin{cases} 
  x_i, & \text{if } (c = 0) \\
  x'_i, & \text{if } (c = 1) 
\end{cases}
\]

for \( 0 \leq i \leq 3 \) where \( x_i \)'s and \( c \) are the network inputs and \( z_i \)'s are the network outputs. Such a network is called a complementer.

6.11 Show a tree of multiplexers implementing the expressions:

a. \( E(a, b, c, d) = a'b + a'bc' + bc'd + abd' + b'cd \)

b. \( E(a, b, c, d, e, f) = a \oplus b \oplus c \oplus d \oplus e \oplus f \)