EE200-03   (062)
Homework # 5

1. Design a combinational circuit, using decoders and OR gates, that generates the 9's complement of a BCD digit. Use letters a, b, c,… for the inputs and w, x, y,…. For the outputs.

2. A combinational circuit is specified by the following three Boolean functions:

$$F_1(a,b,c) = \sum(2,4,7)$$

$$F_2(a,b,c) = \sum(0,1,5)$$

$$F_3(a,b,c) = \sum(0,2,3,4,6)$$

   Implement the circuit with a decoder constructed with NAND gates, similar to Fig. 4.19 of the textbook, and NAND or AND gates connected to the decoder outputs. Use a block diagram for the decoder. Minimize the number of inputs to the external gates.

3. Construct a 4-to-16 line decoder with five 2-to-4 line decoders with enable inputs.

4. Implement the following 4-variable Boolean function using a 4x1 multiplexer
$$F(w,x,y,z) = w'x + x'y'z + wx(y + z')$$
   Connect the variables y and z to the selection lines S_1 and S_0 respectively.