ENEE 244 (01**). Spring 2006

Homework 3

Due back in class on Monday, March 27.

1. Does the function xy'z imply the function xy' + yz'?

2. Does the function x imply the function xy' + xz?

3. Does (a) xy' subsume xy'z'; and (b) x + y' subsume x?

4. Minimize the following functions using K-maps: (a) F(x,y,z) = xy'z + x'yz + xyz' + x'yz'; (b) F(w,x,y,z) = Σm(1,3,4,5,8,9,10,13).

5. Consider the function F(A,B,C,D) = Σm(1,3,5,7,8,9,13,14,15). Draw all its prime implicants on a K-map. Which ones are non-essential? How many possible minimum sum-of-products forms are there and what are they?

6. Minimize the function F(w,x,y,z) = Σm(1,3, 11, 15) + dc(5,7,10,12,14).

7. Repeat question 6, but find the minimum in terms of product-of-sums. Is your answer functionally equivalent to the minimum function you obtained in question 6?

8. Design a circuit that compares two binary numbers X and Y, each having two bits (X=x2x1; Y=y2y1). It has a single output c which is supposed to be 1 when X > Y, and 0 otherwise. Do not use adders/subtractors for this design; instead use a fundamental design process. Draw the minimum sum-of-products circuit using the correct circuit symbols for all gates. Assume complemented inputs are NOT available, but multiple input gates are. What is the delay of this circuit, assuming the delay for each gate is *d*?