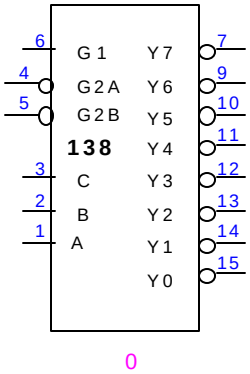
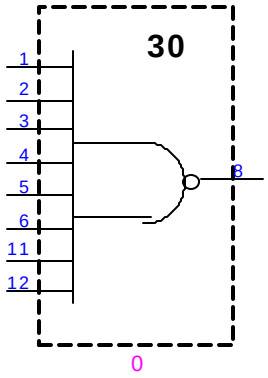
Name _____ Box _____Due date: Thursday March 29

ECE130 Homework #9 Spring 2001

(Decoders)

1 (Decoder) Implement F(A,B,C)=Σ(1,2,4,6,7) with the following 1-of-8 decoder and an 8-input NAND gate. Connect all the enable pins and unused pins on the NAND gate properly.





2 (Decoder) Problem 37 (on page 44 of Dr. Eccles' book) is to design minimal NAND-NAND logic to form the difference of two two-bit numbers EF=AB-CD, but only if the result is not negative. If the result is negative, EF=0 and the output N=1. If the result is not negative, N=0.

In this homework, you will implement E, F, and N with 74LS138 decoder chips and either 74LS20 or 74LS30 chips as needed. Simulate your design with LogicWorks 4. Notice you only need to know the truth table to do this. Submit both circuit schematic and waveforms with zero gate delay and show all input combinations. Mark the truth table on your waveforms.

(Make sure to tie unused inputs to "1" or "0" with binary switches. You need to click on the switches to activate them. Make the four input clock periods integer multiple of each other.)

	ABCD	E	F	N
0	0000			
1	0001			
2	0010			
3	0011			
4	0100			
5	0101			
6	0110			
7	0111			
8	1000			
9	1001			
10	1010			
11	1011			
12	1100			
13	1101			
14	1110			
15	1111			