ELEC2200   Homework #7   Spring 2021

Submit a single PDF file online (Canvas) by 10:50 a.m., 3/18 (Thursday).

You must show how you get your answer in each problem. The final answer only will receive no credit.

1. Realize the following set of functions using a 4x16 decoder module with active-low outputs and (output) logic gates. Use NAND or AND gates and minimize the fan-in of the logic gates:

f_1(a,b,c,d) = $\sum m$(0,1,7,13)
f_2(a,b,c,d) = ab$\bar{c}$ + acd
f_3(a,b,c,d) = $\prod M$(0,1,2,5,6,7,8,9,11,12,15)

2. Design an 8x1 multiplexer using only 4x1 multiplexer modules without enable inputs. Do not use any logic gates.

3. Realize the function, f(a,b,c) = $\sum m$(2,4,5,7), using a 4x1 multiplexer module.

4. Design a 3x8 decoder with an active-low enable, using only NAND gates. The outputs of the decoder are to be active-low.

5. Design a 3-bit carry-look-ahead adder. Two 3-bit numbers are (A_2, A_1, A_0) and (B_2, B_1, B_0). Use any gates.

6. Design a magnitude comparator of which output is 1 when A is less than or equal to B where A and B are 2-bit unsigned numbers. Use only NAND gates.