ISTM 214 Homework 7 (Due day: 11/22)

Name:_____ ID:_____

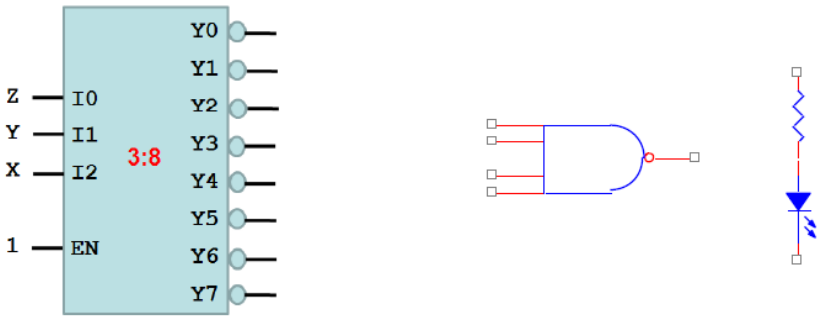
1. Draw the logic diagram of a 2-to-4-line decoder using (a) NOR gates only and (b) NAND gates only. (Include an enable input.)

2. Construct a 5-to-32-line decoder with four 3-to-8-line decoders with enable and a 2-to-4-line decoder.

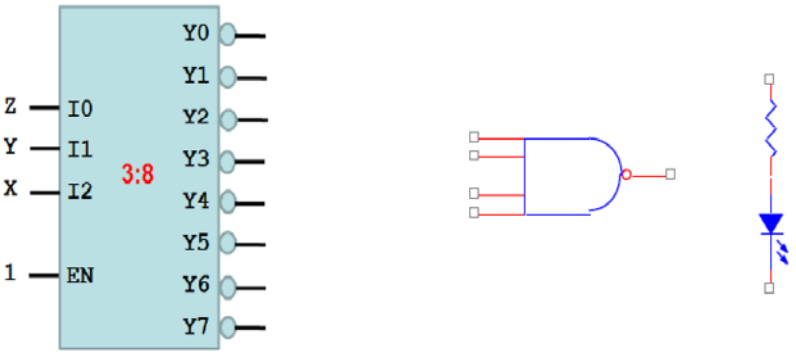
3. Construct a 16 x 1 multiplexer with two 8 x 1 and one 2 x 1 multiplexers.

4. Demonstrate that you can implement any arbitrary 3-variable Boolean function using just a 3:8 decoder with active low outputs and a single 4-input NAND gate (plus some resistors and an LED).
   (HINT: The LED may be connected in either a sourcing or a sinking configuration.)

   (a) Complete the Schematic to implement the function F(X,Y,Z) = X'·Z + X·Y·Z'



   (b) Complete the Schematic to implement the function F(X,Y,Z) = X·Y·Z'+ Y'·Z+ X·Z'



5. Demonstrate you can implement any arbitrary 3-variable Boolean function using only an 8:1 multiplexer by determining the data input settings (D0-D7) required to implement the function F(X,Y,Z) = X·Z' + X'·(Y⊕Z).