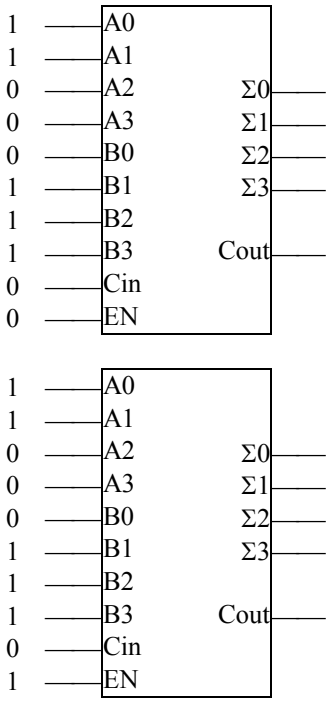
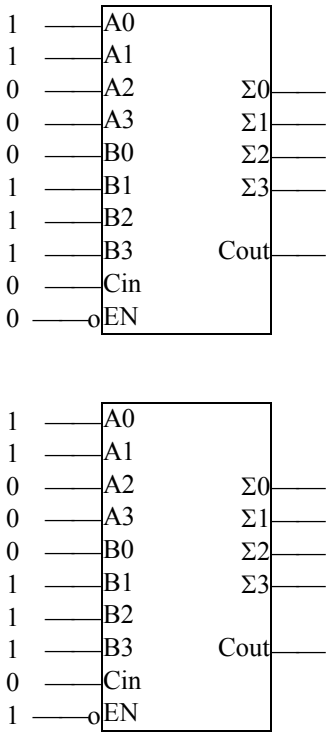
Unit 7 Practice Sheet: Multiplexers and Decoders **EGR 2131**

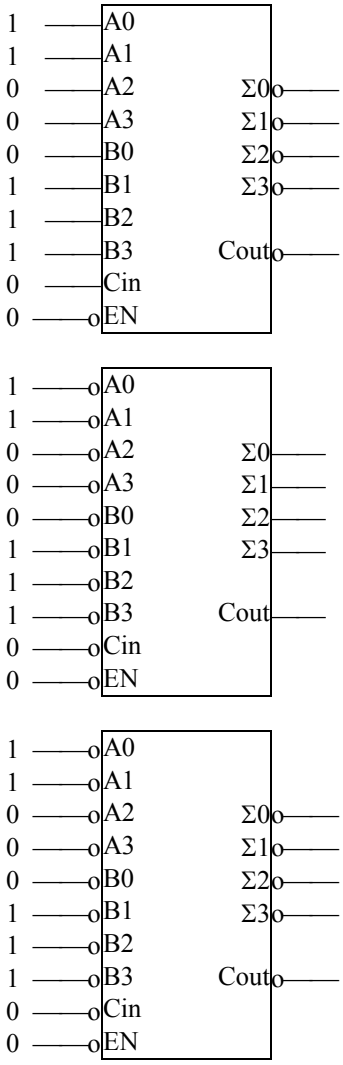
Reeder

1. For each of the 4-bit adders shown below, write the output values for the given input values.

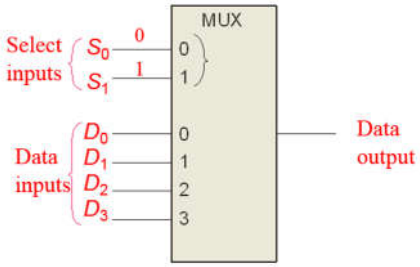


2. For each of the 4-bit adders shown below, write the output values for the given input values.

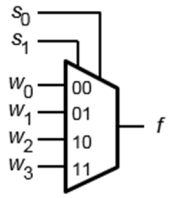


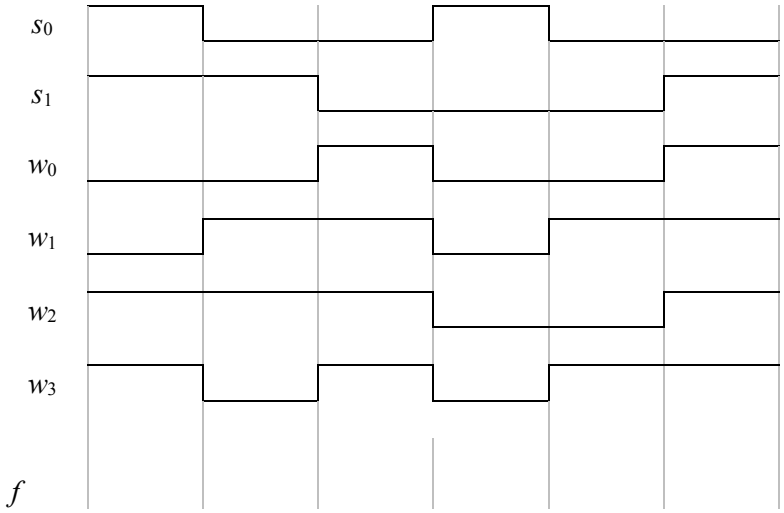


3. In the multiplexer shown below, which data input line is selected if $S_1S_0 = 10$?

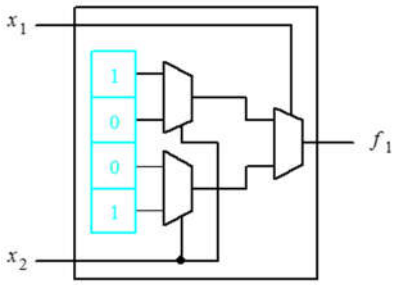


4. Draw the output waveform given the input waveforms shown below to a 4-to-1 multiplexer whose graphical symbol is:

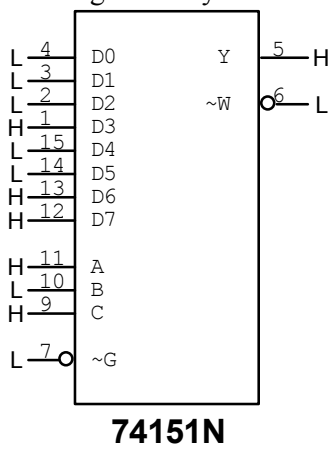




5. In the look-up table shown below, trace the signals to show which data bit is passed to the output if $x_2 = 0$ and $x_1 = 1$.

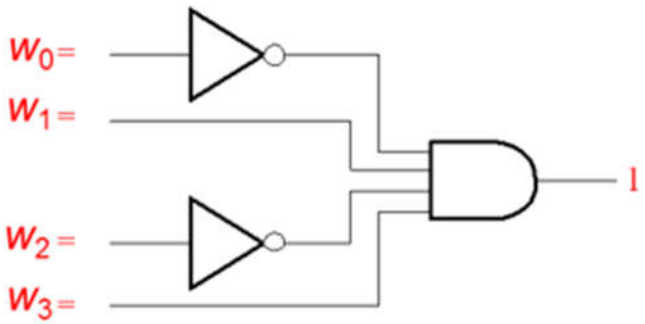


6. Suppose you measure the logic levels shown below at the pins of the 8-to-1 MUX chip. Decide whether the chip is working correctly.

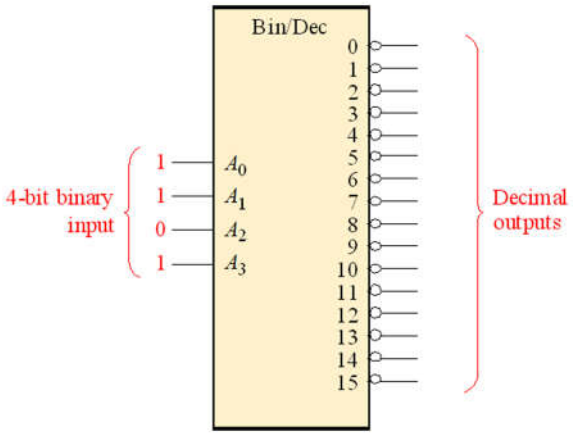


7. Consider the function $f = \sum m(1, 2, 4, 5, 7)$. Use the function's truth table to derive a circuit for f that uses a 4-to-1 multiplexer.

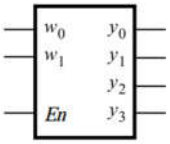
8. Assume the output of the circuit shown is a logic 1. What are the inputs to the circuit, and what decimal number does this circuit detect?



9. For the inputs shown below to the 4-to-16 decoder, what are the outputs? Note that this decoder has active-low outputs.



10. Draw the output waveforms given the input waveforms shown below to a 2-to-4 decoder whose graphical symbol is:



11. Implement the function $f(w_1, w_2, w_3) = \overline{w_1} + w_2\overline{w_3}$ by using a 3-to-8 decoder and an OR gate.