

CSC 220 Homework #3

Due Monday April 17, 2006

This homework covers sections 3.1 and 3.2

1. Convert the following Boolean equation into a truth table:

$$f = a'b'c' + a'bc + abc'$$

2. Implement the truth table you just created for question 1 using a multiplexer.

3. Convert the following truth table for Boolean function g into gates:

<u>abc</u>	<u>g</u>
000	0
001	0
010	0
011	1
100	0
101	1
110	1
111	0

4. Convert the truth table in question 3 into a Boolean equation and then use DeMorgan's Law to invert it, giving you the equation for "g bar".

5. How do decoder circuits get used in a memory circuit?

6. Please inspect the schematic for a 1-bit ALU slice given on page 156. Let's define a 6-bit control word as: (F0, F1, ENA, ENB, INVA, CARRYIN). So, (01 0011) means F0=0, F1=1, ENA=0, and so on.

The A and B inputs are data variables. Go:

- Describe what each of the 4 possible F0/F1 combinations does.
- What is the output of this control word: 00 1110? Express your answer in terms of A and B for all of these.
- What is the output of: 01 1010?
- What is the output of: 10 0100?
- And finally: 11 1101?

7. From page 155, can you connect 8 full adders to get one 8-bit adder? You don't need to draw all those XOR gates and such, just connect the inputs and the outputs of the full adder boxes.