

Quiz 1

40 minutes

1. (5) Convert the decimal number 113 to binary. Show your work.

2. (10) a) Add the two pairs of binary numbers and show the results in binary. (Be sure to show the carry as you add.)

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0 0 1 0 1
1 0 1 1 1
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b) Show both operands and the result of the addition in decimal if the numbers are

i) unsigned

ii) signed (two's complement)

3. (10) Each of the following 8-bit numbers was found in a computer. Show the decimal equivalent (if it exists) if each is

0 0 0 1 0 1 1 0

1 1 0 0 1 0 1 0

a) unsigned binary

b) signed binary

c) BCD (8421 code)

4. (10) Complete the truth table for a system with 3 inputs, a, b, and c, and 4 outputs, w, x, y, z. The output is a binary number equal to the smallest integer that meets the input conditions:

a = 0: odd

a = 1: even

b = 0: prime

b = 1: not prime

c = 0: less than 8

c = 1: greater than or equal to 8

Some inputs may never occur; the output is never all 0's.

(A prime is a number that is only evenly divisible by itself and 1.)

To be sure you understand the problem, I have completed one output row.

a	b	c	w	x	y	z
0	0	0				
0	0	1				
0	1	0	X	X	X	X
0	1	1				
1	0	0				
1	0	1				
1	1	0				
1	1	1				

5. (15) Reduce the expression below (using the algebraic properties) to a sum of products expression with 2 terms and 3 literals. Show each step.

$$x' y' z' + x' y' z + x' y z' + x' y z + x y z'$$