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Cp Eng 111, Section B
Fall 1999

Exam 3 11/19/99

Name: Jesse Thi 11/19/99 paper

Show all work on the exam papers. If you need additional space, use the reverse side of the paper. Closed book, closed notes, no calculator.

1. (12) (a) Find the 8-bit 1's complement of 10100111

01011000

(b) Find the 8-bit 2's complement of 10010010

1s: 01101101

2s: 01101110

01101101
01101110

(c) If 1000111 is a signed number with the most significant bit representing the sign and the remainder of the number representing its magnitude, what decimal number does this binary number represent?

1 = neg

-7

(d) If 1000111 is a signed number with the most significant bit representing the sign and the remainder of the number in 2's complement, what decimal number does this binary number represent?

-64

-57

64
-7
57
-60

Name: Jesse Lee

2. (12) Determine whether each of the following is True (T) or False (F). Circle the appropriate choice.

(a) A gate whose output depends only on the current input combination is called a combinational circuit.

T (F) X

(b) To represent the 8-bit word, 10111010, in an extended word with even parity, the parity bit would be 1.

(T) F

(c) Using a parity bit with odd parity, you can detect if an odd number of errors has occurred.

(T) F

(d) Using a parity bit with even parity, you can detect if an even number of errors have occurred.

even parity
01011 1 error 3 errors
11011 0 errors 2 errors 4 errors Know
Don't Know

odd

T (F)

01011 0 errors 2 errors 4 errors Don't Know
11011 1 error 3 errors Know

3. (12) For each of the following, consider an 8-bit register whose initial value is 10101001. Assume this initial state for each operation below; determine the contents of the register after each operation.

10101001 0

(a) SHL 1 01010010

(b) SHR 2 00101010

00 101010 1

(c) ROL 2 10100110

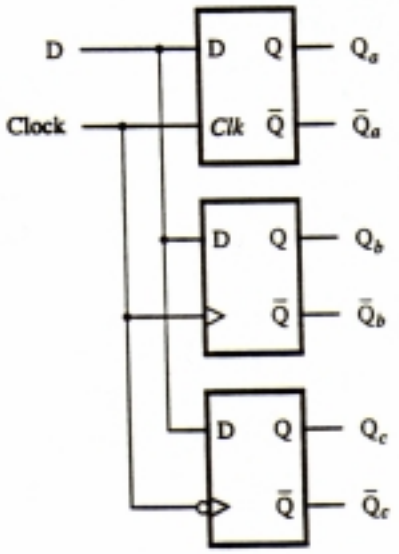
10 10100110

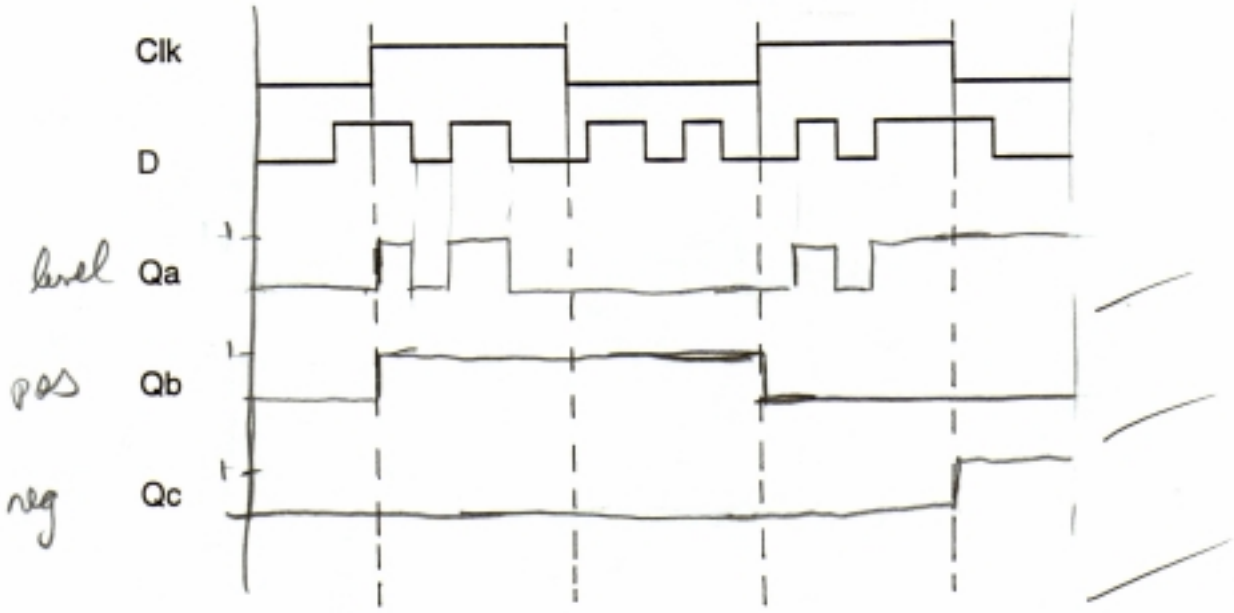
(d) ROR 3 00110101

001 10101001

Name: Jesse Ha

4. In the circuit below, assume an initial value of 0 for Q.
(12) Complete the timing diagram for Qa, for Qb, and for Qc.

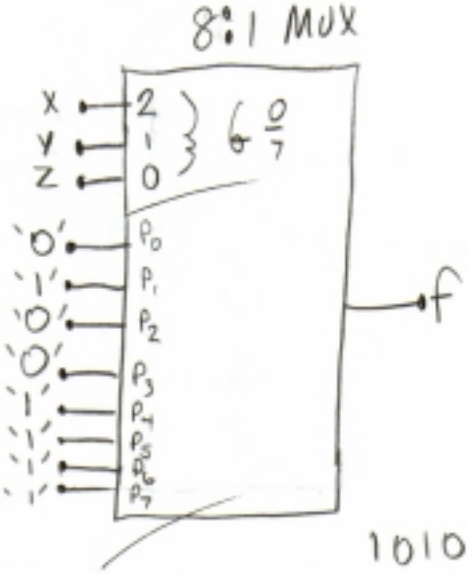




Name: Jose Diaz

5. (10) Use a multiplexor unit to implement the function G defined by the following Karnaugh map.

x \ yz	00	01	11	10
0	0	1	0	0
1	1	1	1	1



6. (12) Perform the following binary operations without converting to decimal; you can convert to decimal to check your answer.

(a) 10110110 + 01010101

00001011

(b) 10110110 − 01010101

01100001

(c) 1011 x 0111

1001101

Name: Jessa Lin

7. (12) (a) In most cases, the product of two n-bit 2's complement numbers requires fewer than 2n bits to represent it. In fact, there is only case which requires the full 2n bits. What is it?

each digit must be a 1
ex. 11 and 11

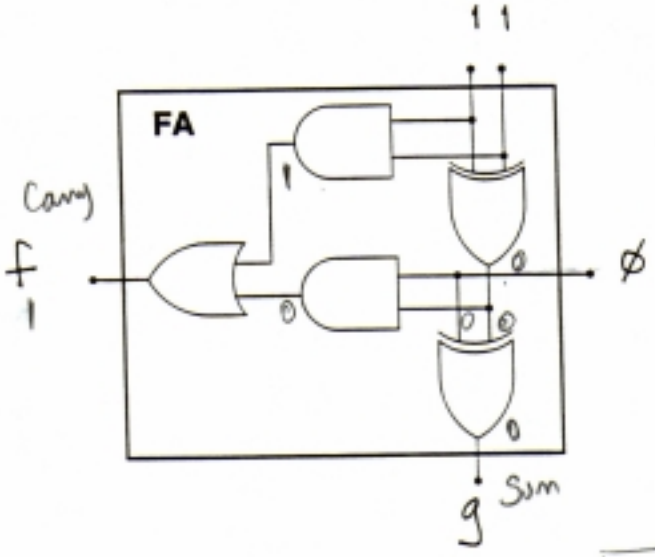
(e) In a ternary (base 3) system, there are three digits: 0, 1, 2. Complete the following table to define a ternary half-adder:

a	b	sum	carry
0	0	0	0
0	1	1	0
0	2	2	0
1	0	1	0
1	1	2	0
1	2	0	1
2	0	2	0
2	1	0	1
2	2	1	1

Name: Jesse Kai

8. (18) Given each of the following with input values as shown, determine the output.

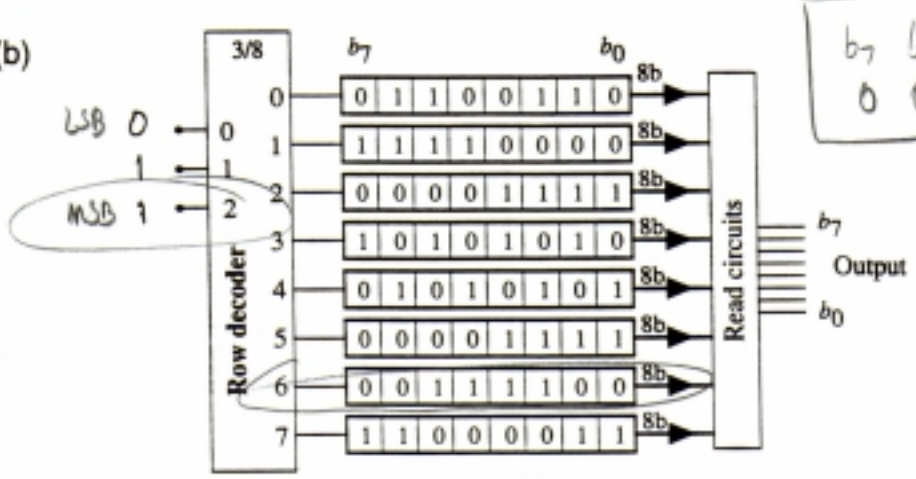
(a)



f = '1'
g = '0'

1 1 0
1 1
1 0

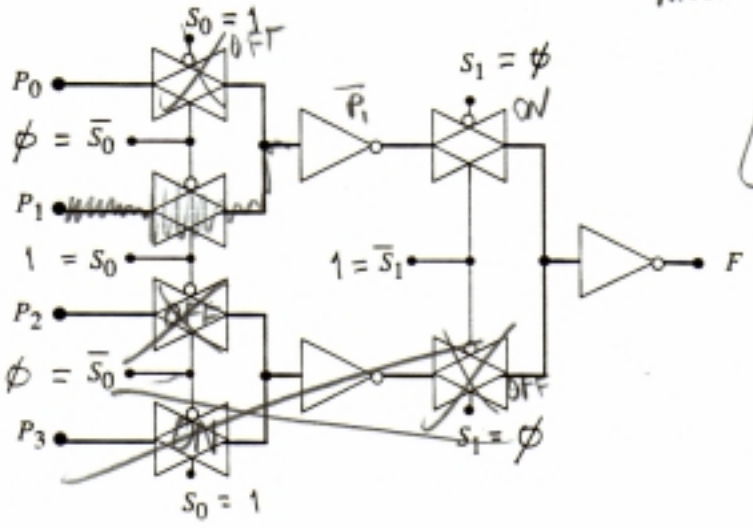
(b)



b_7	b_6	b_5	b_4	b_3	b_2	b_1	b_0
0	0	1	1	1	1	0	0

4 2
1 1 0

(c)



MUX 4:1

$S_0 = 1$
$S_1 = 0$

F = P_1