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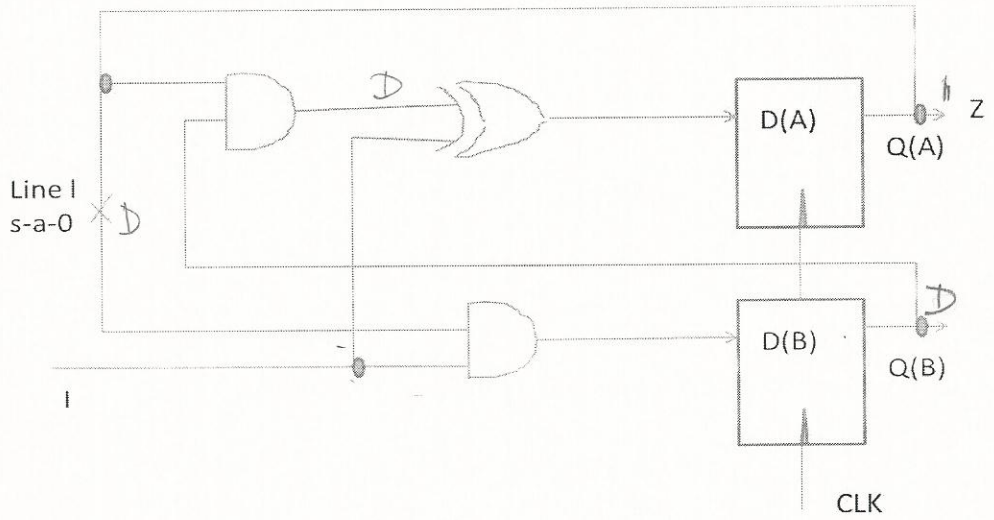
TEST 2 SOLUTIONS

TEST 2 EE 6140

NAME:

GT ID:

Prob 1: For the sequential circuit below and the stuck at zero fault on the line l as shown:



(a) Determine the shortest test sequence assuming the initial states of the flip flops are Q1Q2=00.

$I = 1$ $Q_A^0 Q_B^0 = 00$ line $l = 0$ starting condition

$I = 1$ $Q_A^1 Q_B^1 = 10$ line $l = D$

$I = 1$ $Q_A^2 Q_B^2 = 1D$ line $l = D$

$I = 1$ & 0 $Z = \bar{D}$ or D.

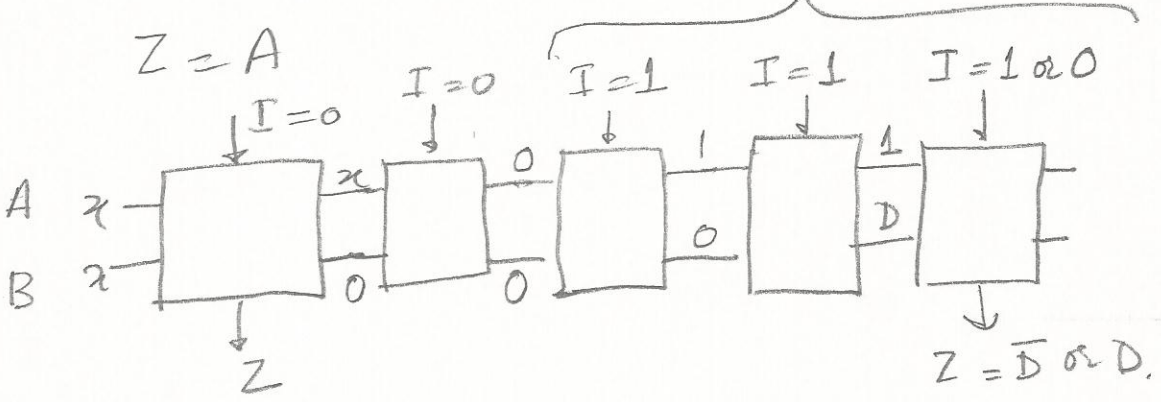
So sequence = 111 or 110

(b) Find if there is a self-initializing test sequence for the fault.

$D_A = I \oplus (A \cdot B)$

$D_B = I \cdot A$

$Z = A$



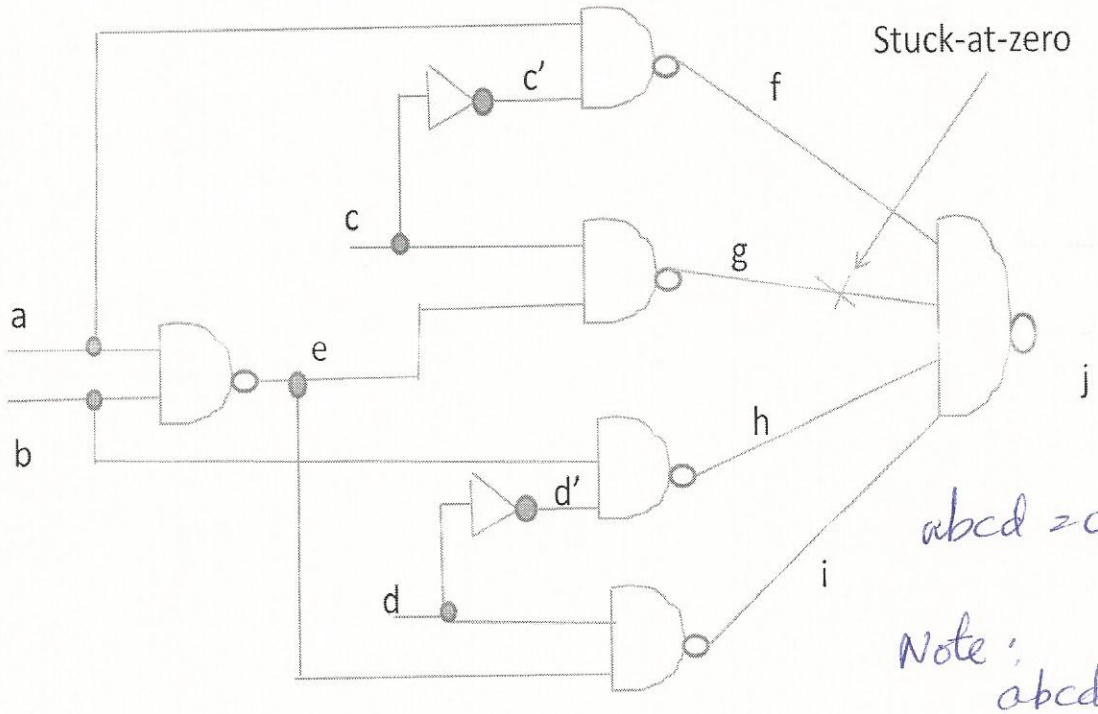
So self-initializing

sequence = 00111

or

00110

Prob 2: Use PODEM to find a test for the line g s-a-0 below.

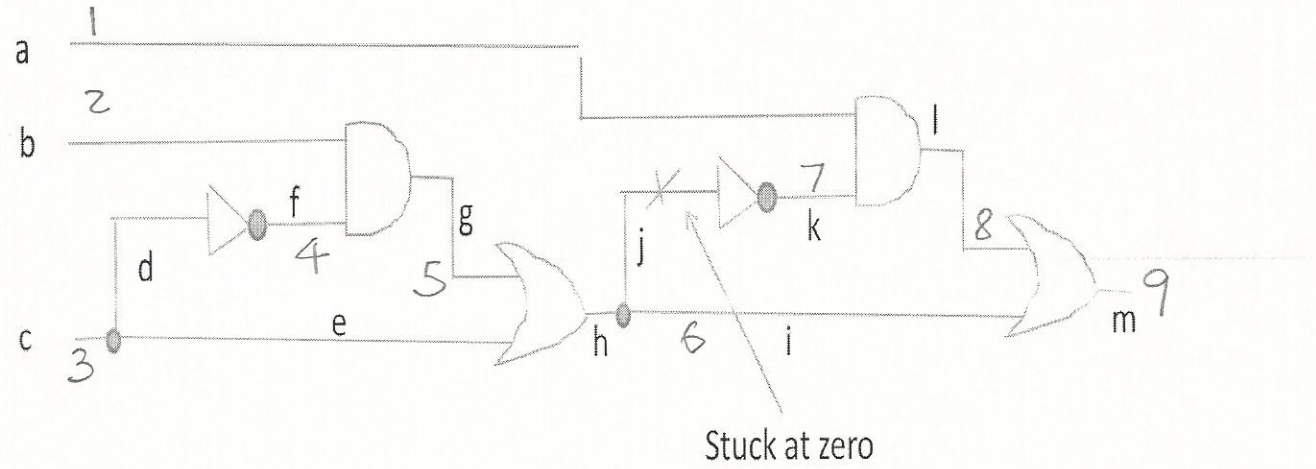


abcd = 0000 is a test.

Note: abcd = 1111 is also a test

OBJECTIVE	PI ASSIGNMENT	IMPLICATION	D-FRONTIER
$g = 1$	$c = 0$	$c' = 1$	j
$f = 1$	$a = 0$	$f = 1,\ c' = 1$ $g = D,\ e = 1$	j
$h = 1$	$b = 0$	$f = 1,\ c' = 1$ $g = D,\ e = 1,$ $h = 1$	j
$i = 1$	$d = 0$	$d' = 1,\ f = 1$ $c' = 1,\ g = D$ $e = 1,\ h = 1$ $i = 1,\ j = D$	SUCCESS

Problem 3: For the following circuit show how PODEM handles the fault line j s-a-0.



OBJECTIVE	PI ASSIGNMENT	IMPLICATION	D-FRONTIER
$d=1$	$c=1$	$d=1, f=0$ $g=0, m=1$	x-path check fails.
	$c=0$	$d=0, f=1$	
$d=1$	$b=1$	$g=1, h=1$	x-path check fails. test not possible
	$b=0$	$h=0$	
	$b=x$		
	$c=x$		FAILURE

PROBLEM 4

DECISIONS	IMPLICATIONS	NOTES
Step1 Excitation		
$g = 1$	$g = D$	J-F = {g} DF = {j}
Step2 D-Drive	$d = \overline{D}$	J-F = {g, f, h, i}
$f = h = i = 1$		DF = {NULL}

Step3 Pick a gate on J-F and set i/p to controlling value

gate = f

$c' = 0$ $\quad c = 1$

$\Rightarrow e = 0$ (since $g = 1$)

$\Rightarrow a = b = 1$

$\Rightarrow d' = 0$ (since $h = 1$)

$\Rightarrow d = 1$.

SUCCESS.

so test is abcd = 1111

Now see what happens if in step3 you pick $a = 0$ (worked out in class). YOU DO THIS AND SEE !
