

Name: Key

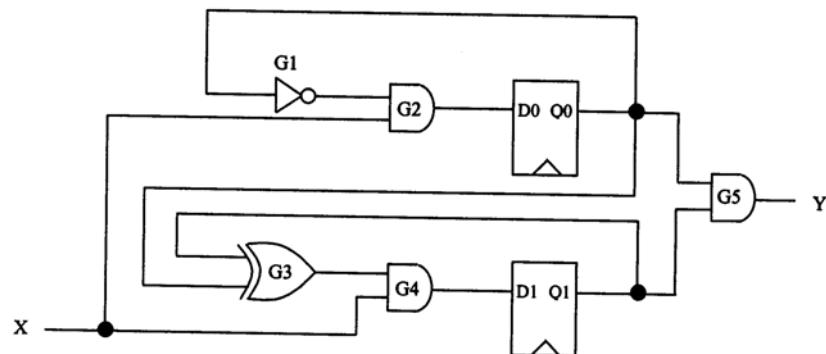
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COE 464, Term 042
Testing of Digital Circuits

Quiz# 2

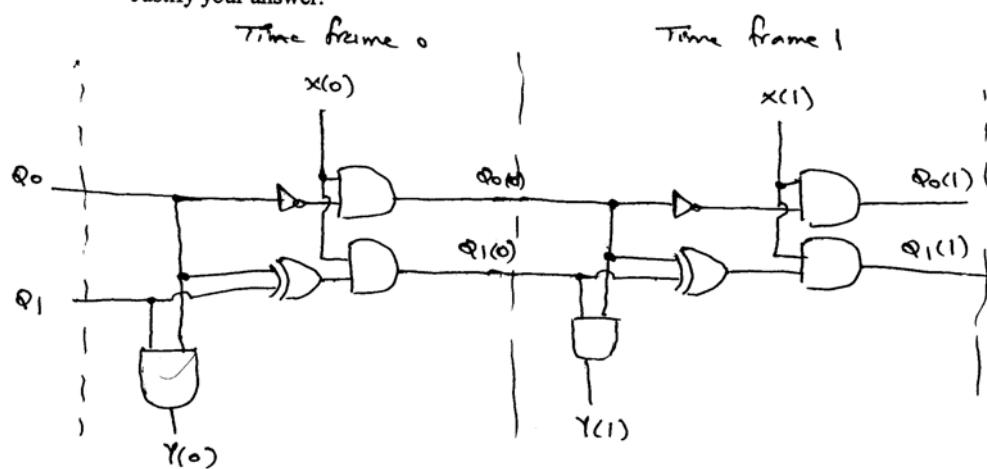
Date: Tuesday, March 15, 2005

Q1. Consider the sequential circuit shown below, where Y is a primary output and X is a primary input:



- i. Show an iterative array model of two time frames for this circuit.
- ii. Derive a test sequence for detecting the fault $Y \text{ s-a-0}$.
- iii. Consider the fault $X \text{ s-a-0}$. Show the state tables of the fault-free and faulty machines. Is the fault detectable, strongly detectable, partially testable or redundant? Justify your answer.

(2)



(ii)

	$x=0$	$x=1$	$x=1$	$x=1$	x
	q_0	$q_0=0$	$q_0=1$	$q_0=0$	$q_0=1$
	q_1	$q_1=0$	$q_1=0$	$q_1=1$	$q_1=1$
	y	y	y	y	y_0

The test sequence for detecting the fault y_{sano}
is $x = \{0, 1, 1, 1, x\}$

(iii)

fault-free

p.s	$x=0$	$x=1$
00	00, 0	01, 0
01	00, 0	10, 0
10	00, 0	11, 0
11	00, 1	00, 1

Next State, output

faulty

p.s	$x=0$	$x=1$
00	00, 0	00, 0
01	00, 0	00, 0
10	00, 0	00, 0
11	00, 1	00, 1

The fault y_{sano} is detectable and can be detected
by the test sequence $x = \{0, 1, 1, 1, x\}$

Fault free

$$xx \xrightarrow[x]{0} 00 \xrightarrow[0]{1} 01 \xrightarrow[0]{1} 10 \xrightarrow[0]{1} 11 \xrightarrow{x} \boxed{xx}$$

Faulty

$$xx \xrightarrow[x]{0} 00 \xrightarrow[0]{1} 00 \xrightarrow[0]{1} 00 \xrightarrow[0]{1} 00 \xrightarrow{x} \boxed{xx}$$