

# Midterm Test

(1) (a)  $2 \times 8 = 16$  <sup>transistor stuck-on or</sup>  
 single stuck open fault

(b). stuck-open faults in a group of series transistors are indistinguishable

- stuck-on faults in a group of parallel transistors are indistinguishable

- After collapse, the total # of faults is

$$2 \times 8 - 4 + 2 - 4 + 2 = 16 - 8 + 4 = 12$$

# of transistors in series

2 ~~sets~~ groups of transistors in series

# of transistors in parallel

2 groups of transistors in parallel

(5) stuck-at-1

(2)

POD & M

Objective

PI asset

Implicit

D-frontier

$$D=0$$

$$A=0$$

$$D=0, D1=9\%$$

G5, G6.

$$D3=9\%, A4=0,$$

$$A5=1,$$

$$H3=1$$

$$C=0$$

$$E=0$$

$$H3=1$$

$$B=1$$

$$B2=1, B4=1$$

$$B5=0, H=0,$$

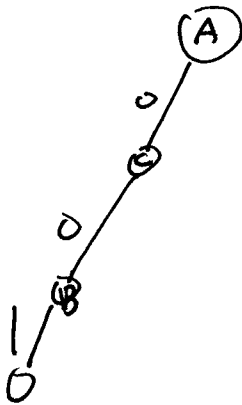
$$H2=0, H3=1,$$

$$I=0\%, H1=0$$

$$J=0$$

$$G7=0\%$$

Decision tree:



(3)

FAN:

Step 1: To activate the fanet, assign  $D=1$ ,  
this implies

$$D_1 = 0/1, \quad D_2 = 0/1, \quad D_3 = 1/0.$$

$$D\text{-frontier} = \{G5, G6\}$$

There is a choice between G5 & G6,  
So select G5 as requested

Step 2: To propagate 0/1 through G5.

$$\text{initial objective} = (H3, 0, 1)$$

D is unjustified.

$$\therefore \text{the current objective} = (H3, 0, 1) \\ (D, 1, 0)$$

Step 3: Perform M-backtrack.

$$(A1, 1, 0) \leftarrow$$

$$(H2, 1, 0) \rightarrow (E, 1, 0) \rightarrow (A3, 1, 0) \\ (F, 1, 0) \rightarrow (A5, 1, 0) \rightarrow (A4, 0, 1)$$

$$\rightarrow (A2, 1, 1) \rightarrow (A, 2, 1)$$

$\rightarrow$  A is assigned logic 0.

Get decision tree



Step 4: perform implication

$$A=0 \rightarrow D=0 \rightarrow D_1=0/1$$
$$\quad \quad \quad \downarrow$$
$$\quad \quad \quad \rightarrow E=0 \rightarrow A_4=0, A_5=1$$

Step 5: initial object ~~not~~  $(H_3, 0, 1)$  not met.

Current object  $(H_3, 0, 1)$ ,

 M-backtrack

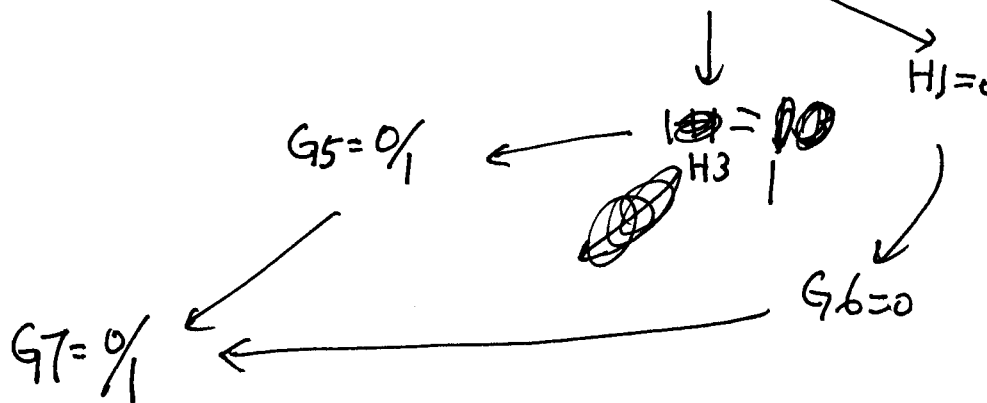
~~$H_3$~~   $(H_2, 1, 0) \rightarrow (F, 1, 0) \rightarrow (B_5, 1, 0)$

$$\downarrow$$
$$(B_4, 0, 1)$$
$$\downarrow$$
$$(B_3, 0, 1)$$
$$\downarrow$$
$$(B, 0, 1)$$

$\rightarrow B$  is assigned 1.

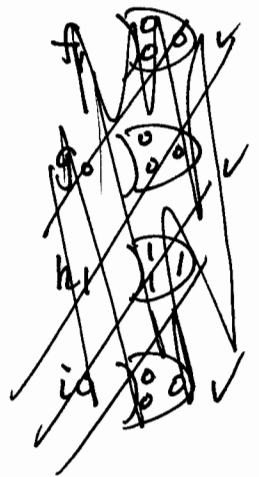
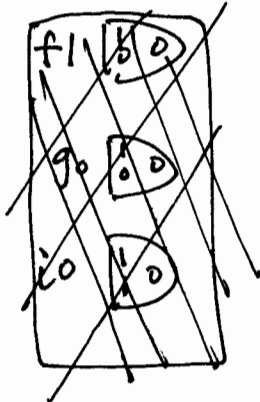
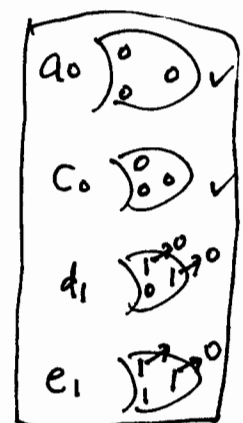
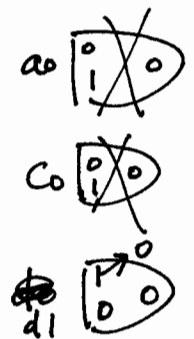
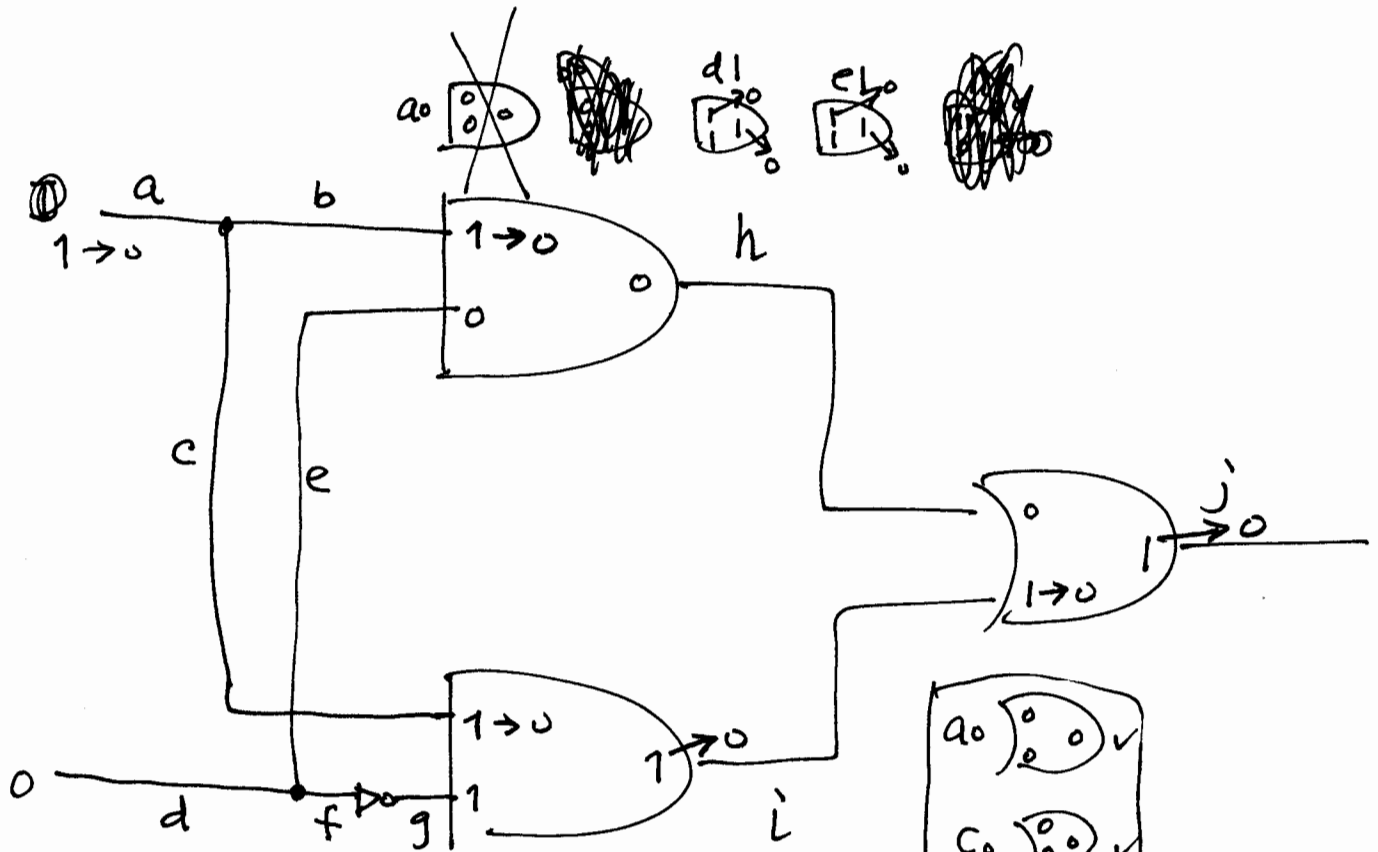
Step 6: perform implicat.

$$B=1 \rightarrow B_4=1 \rightarrow B_5=0 \rightarrow F=0 \rightarrow H=0$$



(4)

$a_0, c_0, c_1, d_1, e_1$



- $a_0, c_0, f_1, g_0, i_0$  detected by the 1st pattern
- $c_1$  detected by the 2nd pattern.