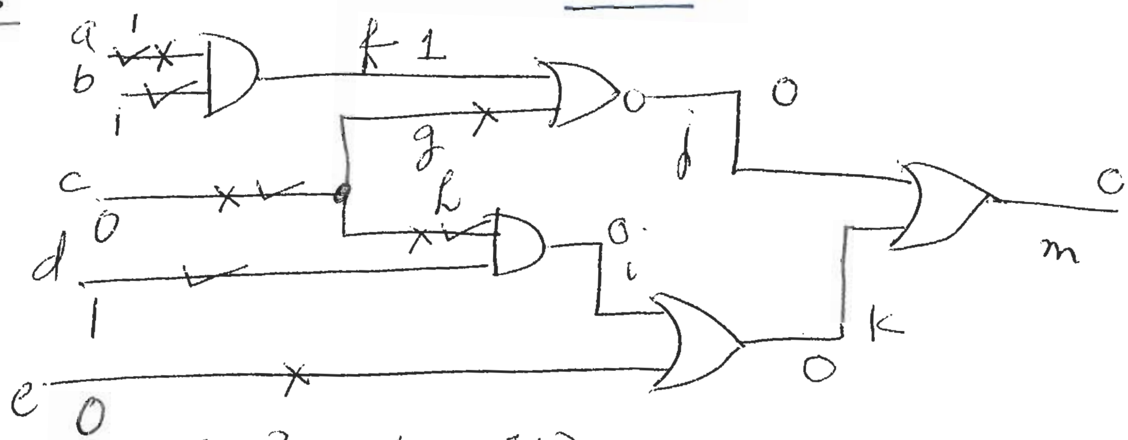
HW#2 Solutions

5.3




$L_a = \{a_0\}, \quad L_b = \{\phi\}$

$L_f = \{a_0\} = L_a \cup L_b$

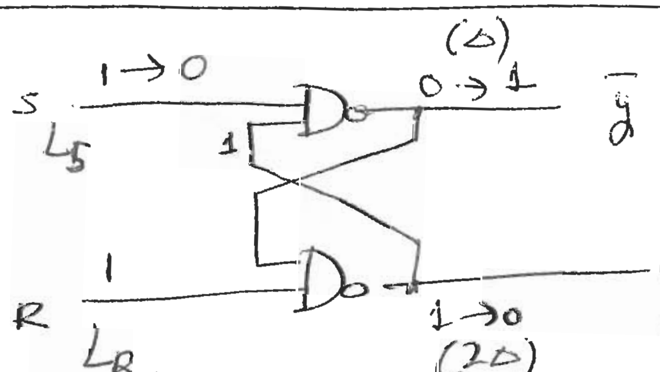
$L_g = \{c_1\}, \quad L_h = \{c_1, h_1\}, \quad L_d = \{\phi\}, \quad L_e = \{\phi\}$

$L_j = L_f - L_g = \{a_0\}, \quad L_i = L_h - L_d = \{c_1, h_1\}$

$L_k = L_e \cup L_i = \{c_1, h_1\}, \quad L_m = L_k \cup L_j = \{a_0, c_1, h_1\}$

So detected faults $= a_0, c_1, h_1$

5.5




Assume $L_S$ = fault list on S with $S = 0$.

$\Delta$ = delay of NAND

at time $\Delta$, $L_{\bar{y}} = (L_S - L_y) \cup \bar{y}$s-a-0

" " $2\Delta$, $L_y = (L_S - L_y) \cup \bar{y}$s-a-0 $\cup L_R \cup y$s-a-1.

" " $3\Delta$, $L_{\bar{y}} = L_S \cap ((L_S - L_y) \cup \bar{y}$s-a-0 $\cup L_R \cup y$s-a-1$)$

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So at $3\Delta$, $L_{\bar{y}} = L_S \cap ((L_S - L_y) \cup L_R)$

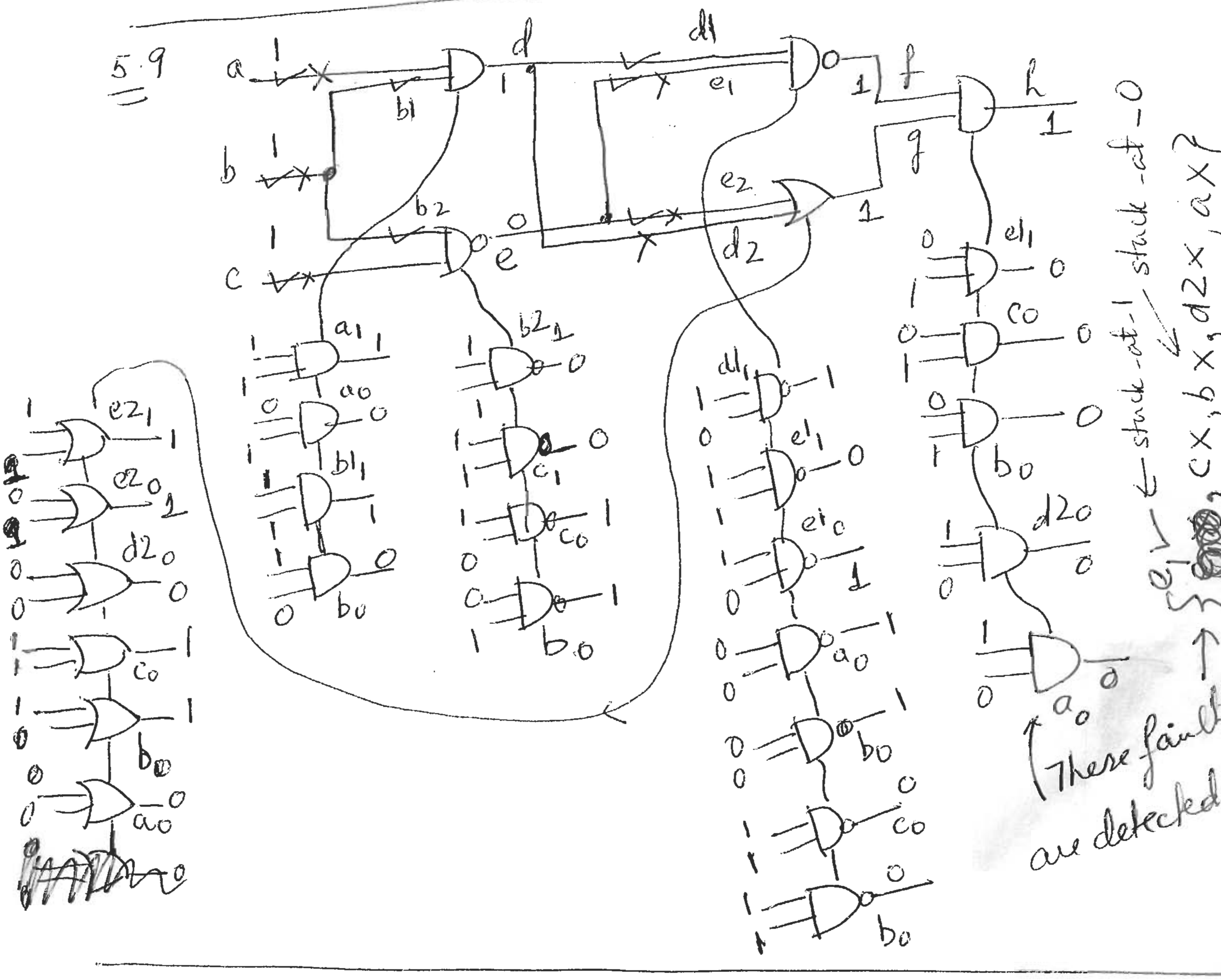
(because $L_S \cap \bar{y}$ s-a-0 $= \phi$ and $L_S \cap y$ s-a-1 $= \phi$
assuming $L_S$ and $L_R$ do not contain faults on the o/ps of the latch.

So at $4\Delta$, $L_y = L_S \cap ((L_S - L_y) \cup L_R)$

At $5\Delta$, $L_{\bar{y}} = L_S \cap ((L_S - L_y) \cup L_R) \cap L_S$
$= L_S \cap ((L_S - L_y) \cup L_R)$

Note. because $L_{\bar{y}}(3\Delta) = L_{\bar{y}}(5\Delta)$ convergence is achieved.

5.9




c0 ← stuck-at-1 stuck-at-0

{c×, b×, d2×, a×}

These faults are detected!