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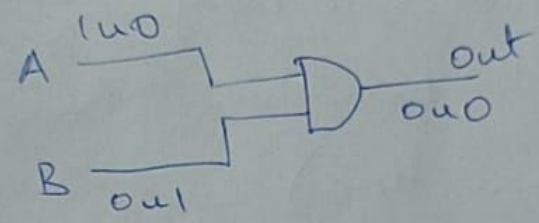
CS21M037

CS6330 MidSem

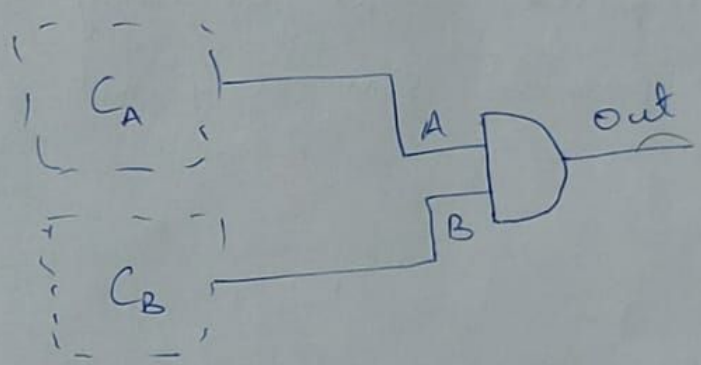
1) Using only AND gate,

a) 0u0 hazard is possible.



If A changes from 1 to 0
B changes from 0 to 1
In intermediate, we get a Spike in out,
i.e. 0u0 → Static hazard

b) For 1u1 hazard,



here,
C_A: a combinational circuit having only AND gates
C_B: another combi circuit with only AND gates

∴ A and B are results of AND operations.

For out to have 1u1 hazard,
It can happen ONLY if A: 1u1 and B: 1u1.
But since A and B are themselves results of AND operations, they can be 1u1 only if their inputs are 1u1.
If we propogate this back to the Primary Inputs, out can be 1u1 ONLY if P.Is are 1u1
which is not possible as P.Is cannot ~~only be~~ be undefined. Hence 1u1 hazard is NOT possible.

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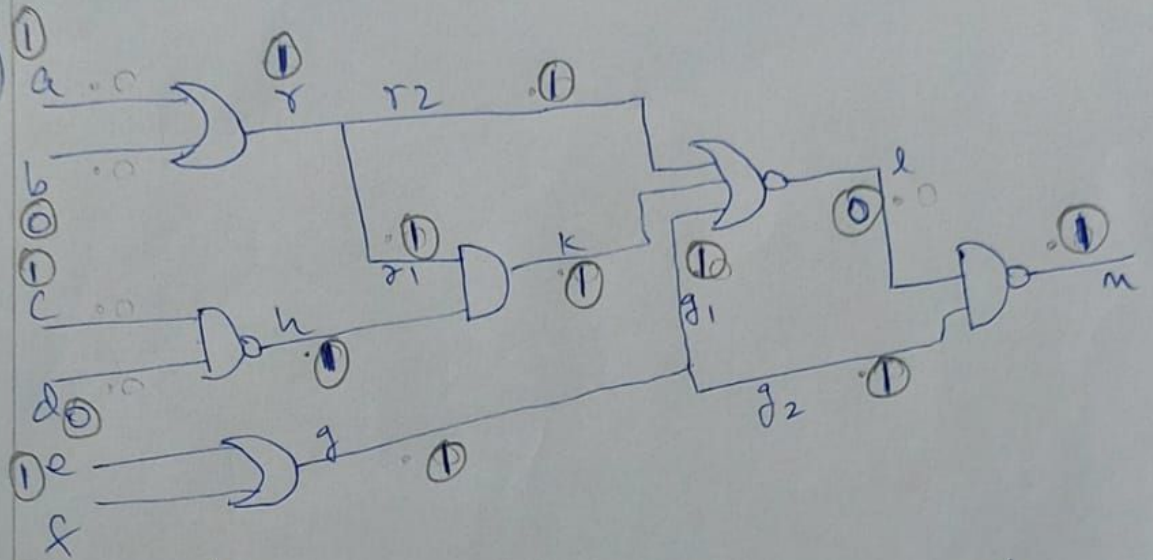
3) Advantages of Event Driven Sim over Parallel Sim are,

i) Parallel sim has to evaluate the WHOLE circuit everytime but Event driven sim only ~~event~~ evaluates a portion of the circuit based on the current events (FASTER Simulation time)

ii) Parallel Sim requires a lot of memory for it's 4 n-bit values per wire. (n = num of circuits)
Event driven sim requires lesser memory storage.
For huge circuits, parallel sim may not be feasible.

2)



Interested Faults → { g1:sa0, a:sa-0, r1: sa-1 }

$L_a = \{a:s\text{-}a\text{-}0\}$ $L_b = \{\}$ $L_c = \{\}$ $L_d = L_e = L_f = \{\}$

$L_r = \{a:s\text{-}a\text{-}0\}$ (as a is controlling)

$L_{r_2} = \{a:s\text{-}a\text{-}0\}$ $L_{r_1} = \{a:s\text{-}a\text{-}0\}$ (r_1: s-a-1 cant detected as $r_1 = 1$)

$= L_r \cup \{\}$

$L_h = L_g = \{\}$ $L_k = L_{r_1} \cup L_h \cup \{\} = \{a:s\text{-}a\text{-}0\}$

$L_{g_1} = L_g \cup \{g_1:s\text{-}a\text{-}0\} = \{g_1:s\text{-}a\text{-}0\}$

$L_{g_2} = L_g \cup \{\} = \{\}$

$L_l = (L_{r_2} \cap L_k \cap L_{g_1}) \cup \{\} = \{\}$

$L_m = (L_l - L_{g_2}) \cup \{\} = \{\}$

$L_m = \{\}$ no faults detected.

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4)