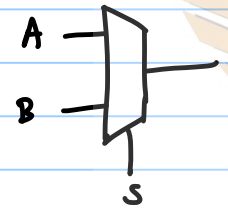
21/10/2019

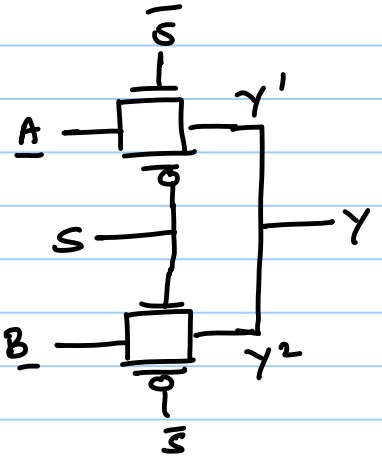
EE5311

MODULE - 4 COMBINATIONAL CIRCUITS

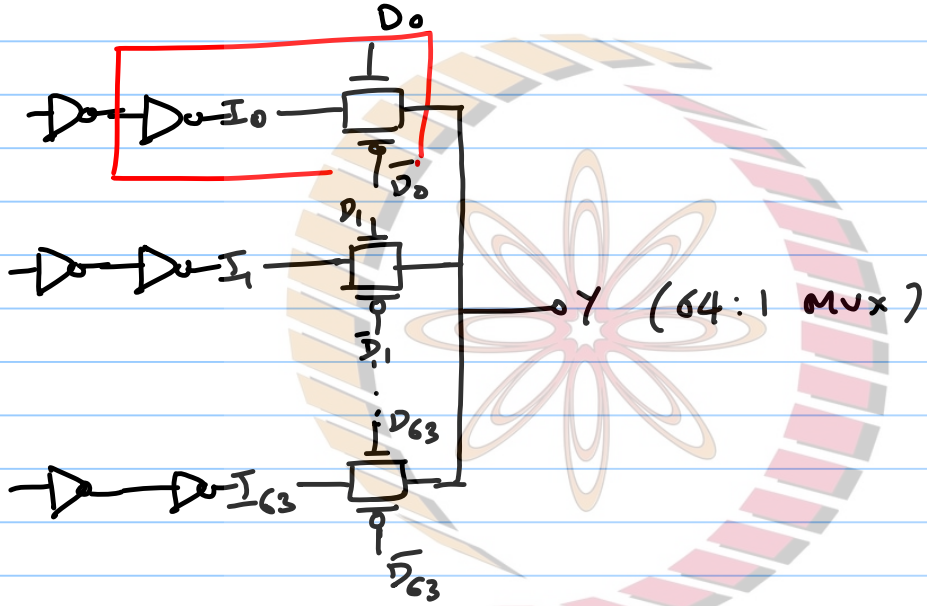
TRANSMISSION GATE CIRCUITS

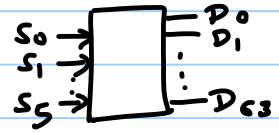


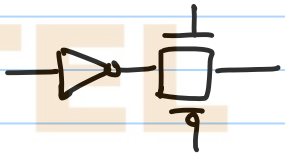
$Y = \bar{S}A + SB$

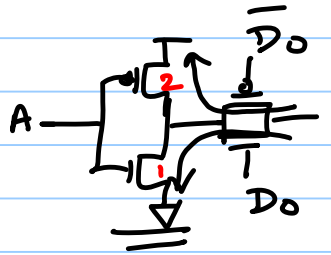


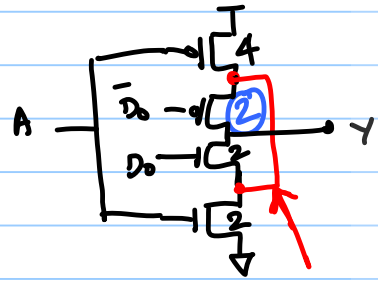
$Y = Y' \text{ (WIRE OR) } Y^2$

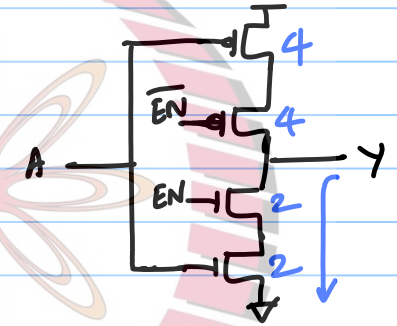






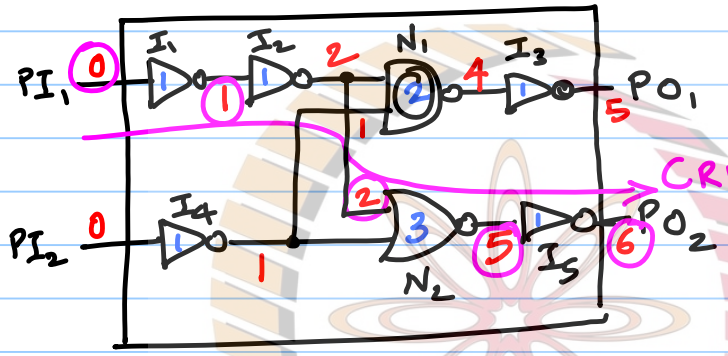






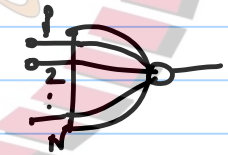
A	EN	Y
0	0	Z
0	1	1
1	0	Z
1	1	0

TRI STATE INVERTER



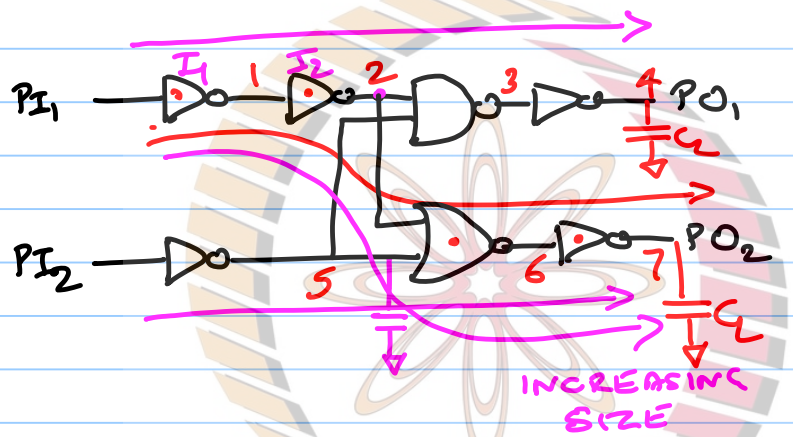
STATIC TIMING ANALYSIS (STA)

ARRIVAL TIME: MIN TIME AFTER WHICH O/P OF THE GATE IS STABLE



$a_o = \max(a_i + d_i)$

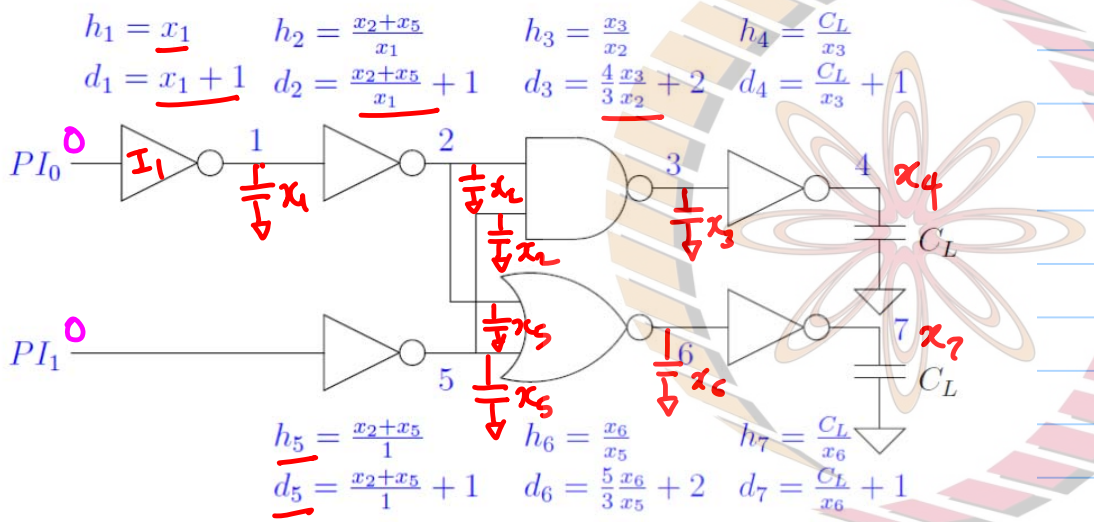
d_i = DELAY FROM i^{th} INPUT TO O/P.



PATH SIZING → NOT SCALABLE

GIVEN: TIMING SPEC

⇒ MAX AT (arrival time) at any PO ≤ T_{SPEC}



Var : $(x_1, x_2 \ldots x_7)$

$a_1 \leq (x_1 + 1)$

$a_2 \leq a_1 + d_2$

$a_3 \leq \max(a_2 + d_3, a_5 + d_3)$

$\leq d_3 + \max(a_2, a_5)$

$a_4 \leq a_3 + d_4$

$a_7 \leq a_6 + d_6$.

$\max(a_4, a_7) \leq T_{SPEC}$

$\Rightarrow$ O(N) CONST

MINIMIZE: $\sum x_k$

$\text{MAX}(a_4, a_7) \leq T_{SPEC}$

$\hookrightarrow$ $a_4 \leq T_{SPEC}$

$a_7 \leq T_{SPEC}$

CONVEX PROBLEM $\Rightarrow$ SOLUTION IS A GLOBAL MINIMUM