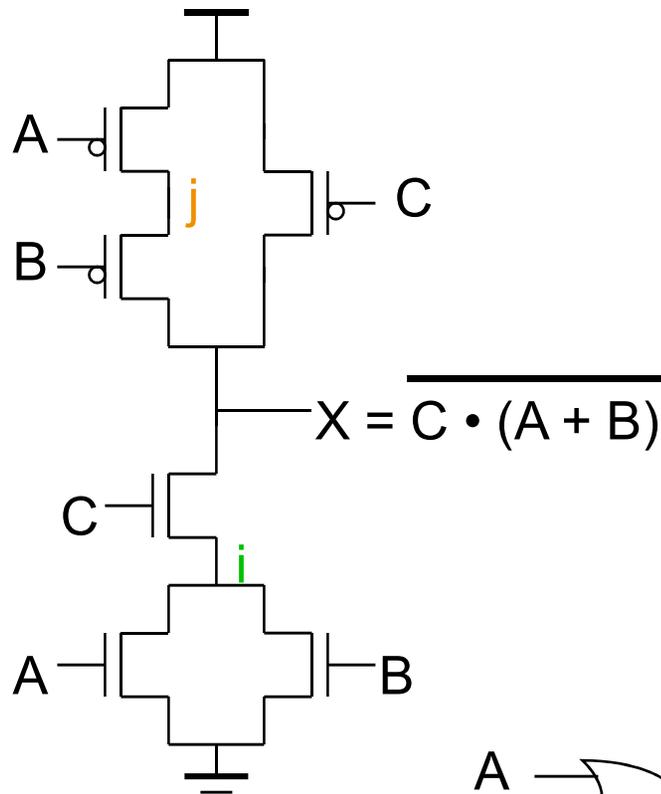
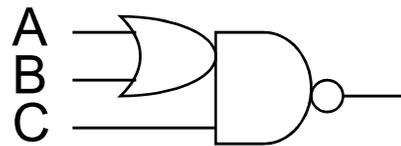


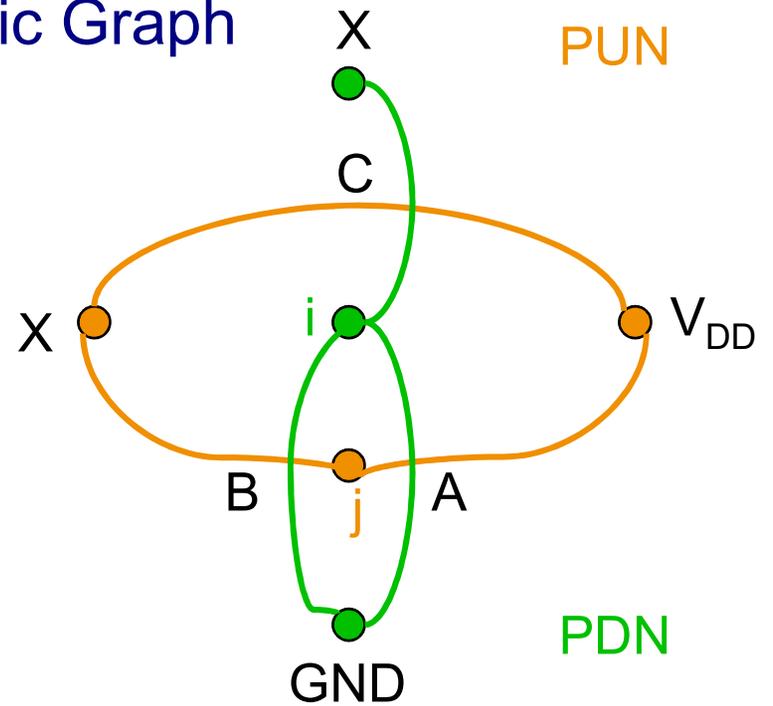
# Stick Diagrams



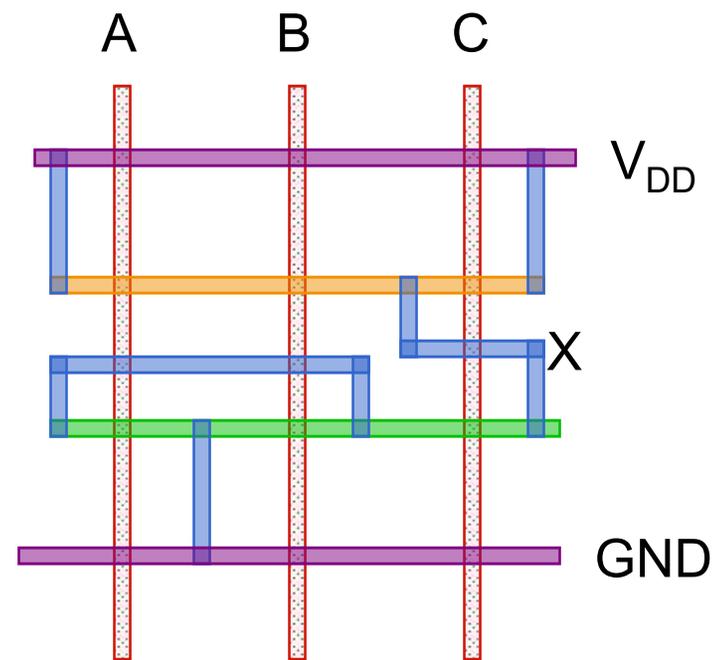
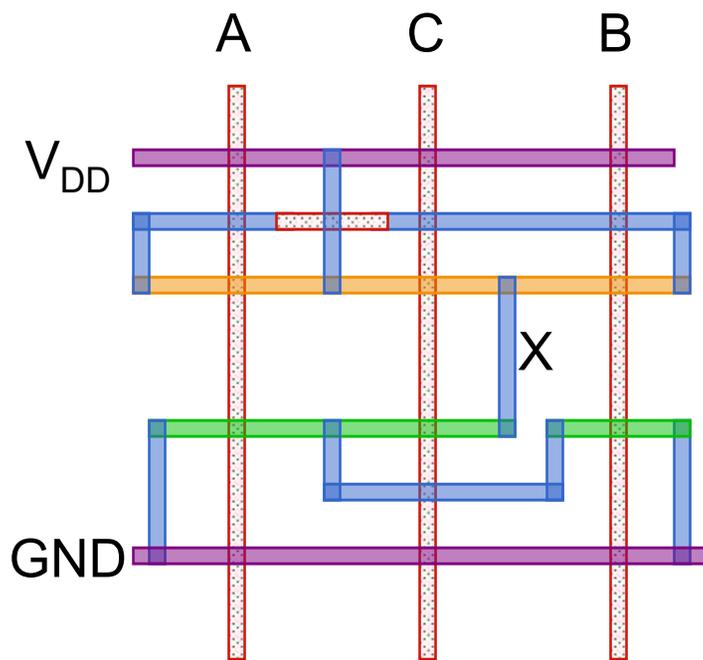
$$X = \overline{C \cdot (A + B)}$$



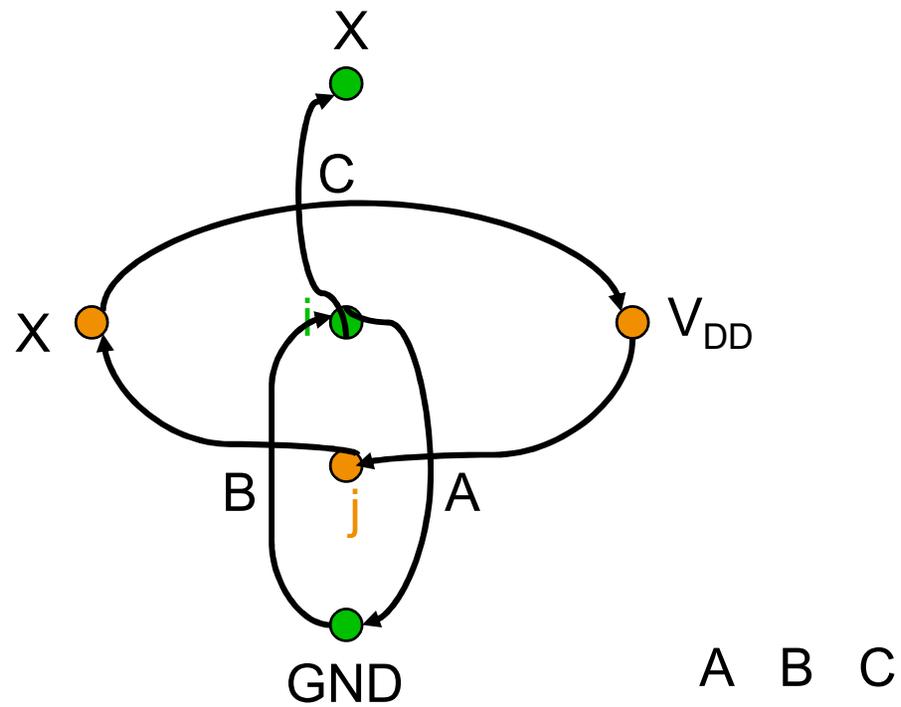
Logic Graph



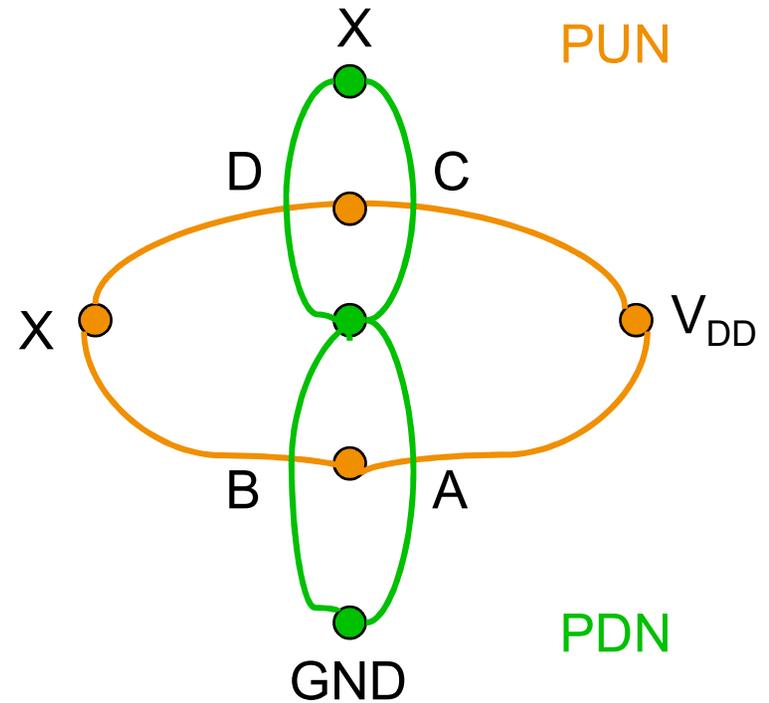
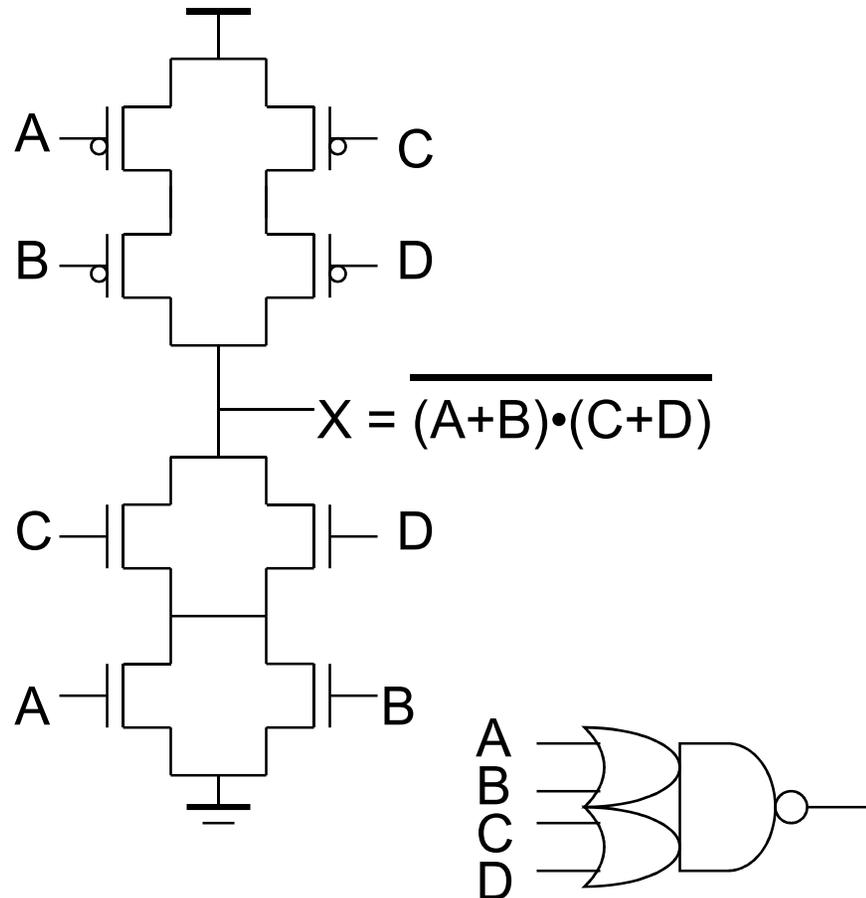
# Two Versions of $C \cdot (A + B)$



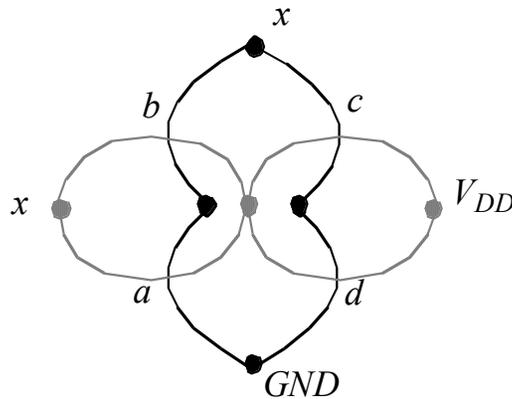
# Consistent Euler Path



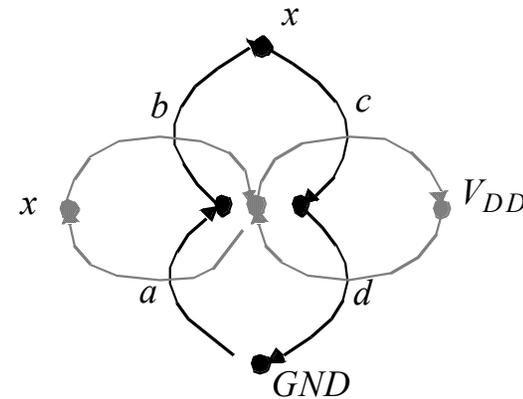
# OAI22 Logic Graph



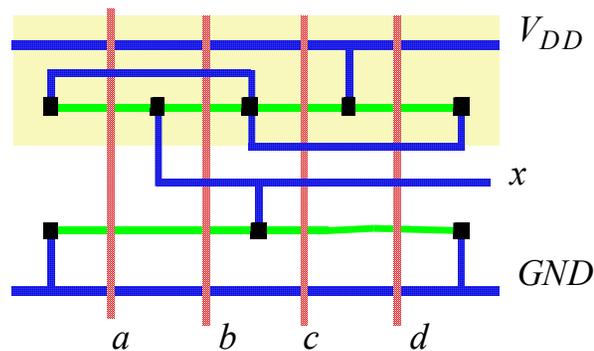
# Example: $x = ab + cd$



(a) Logic graphs for  $\overline{(ab+cd)}$



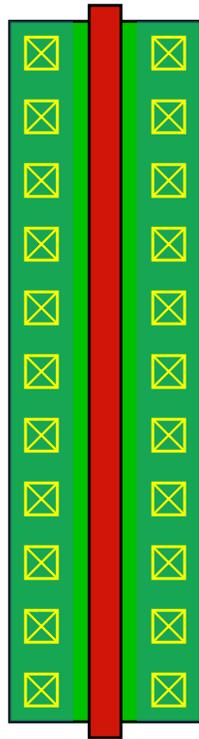
(b) Euler Paths  $\{a b c d\}$



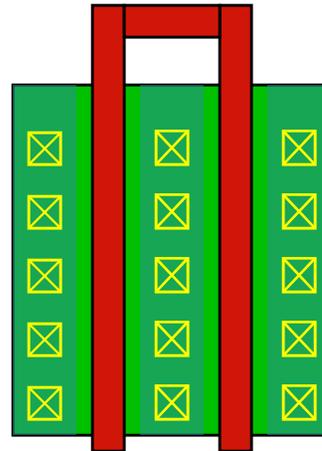
(c) stick diagram for ordering  $\{a b c d\}$

# Multi-Fingered Transistors

One finger



Two fingers (folded)



Less diffusion capacitance

# Properties of Complementary CMOS Gates

## Snapshot

*High noise margins:*

$V_{OH}$  and  $V_{OL}$  are at  $V_{DD}$  and  $GND$ , respectively.

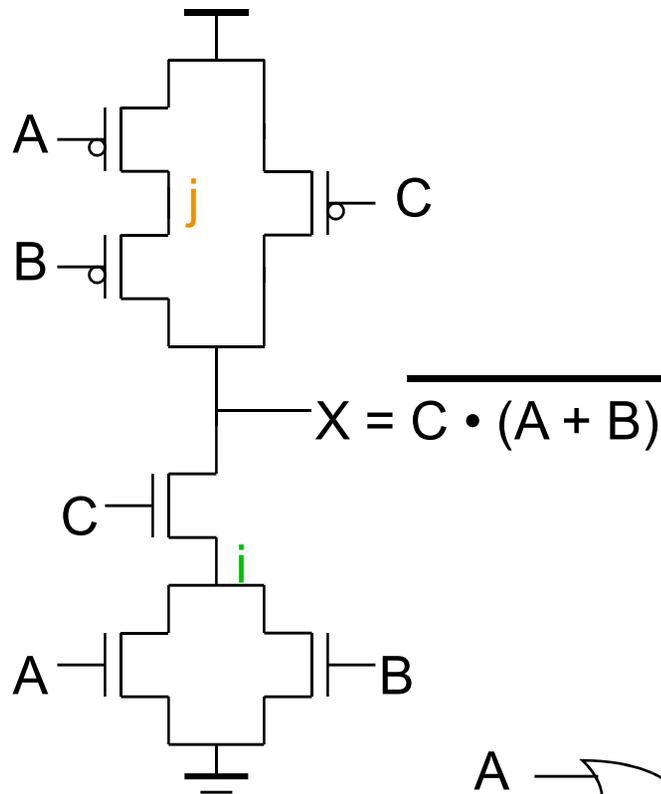
*No static power consumption:*

There never exists a direct path between  $V_{DD}$  and  $V_{SS}$  ( $GND$ ) in steady-state mode.

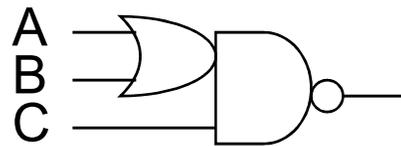
*Comparable rise and fall times:*

(under appropriate sizing conditions)

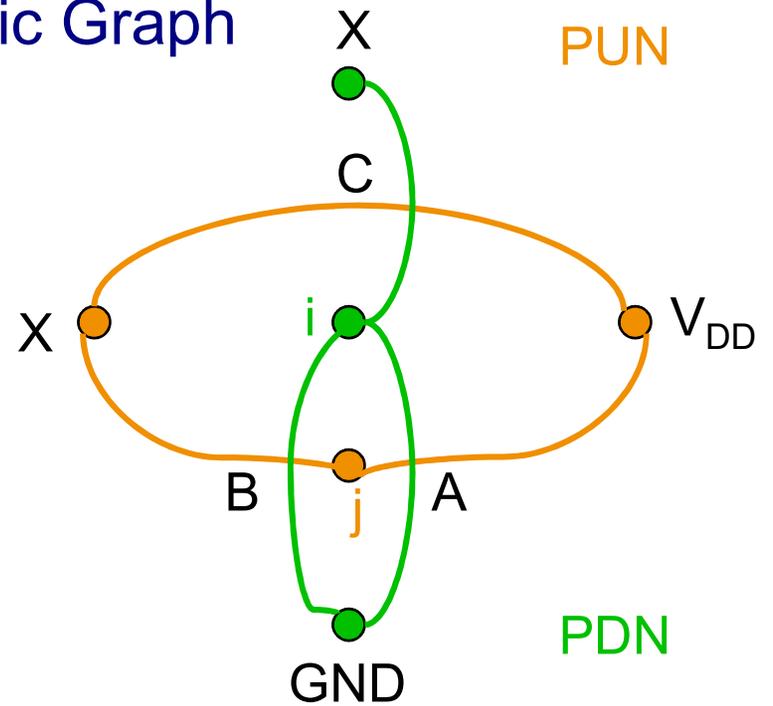
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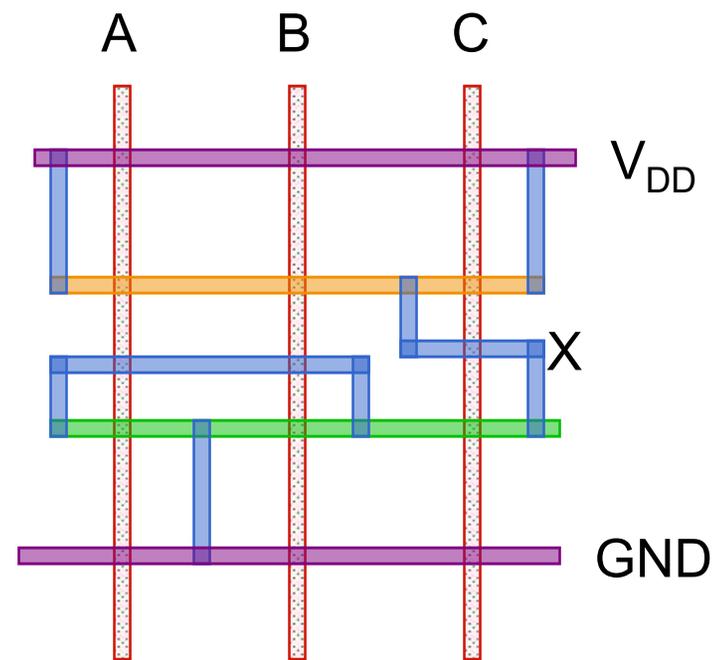
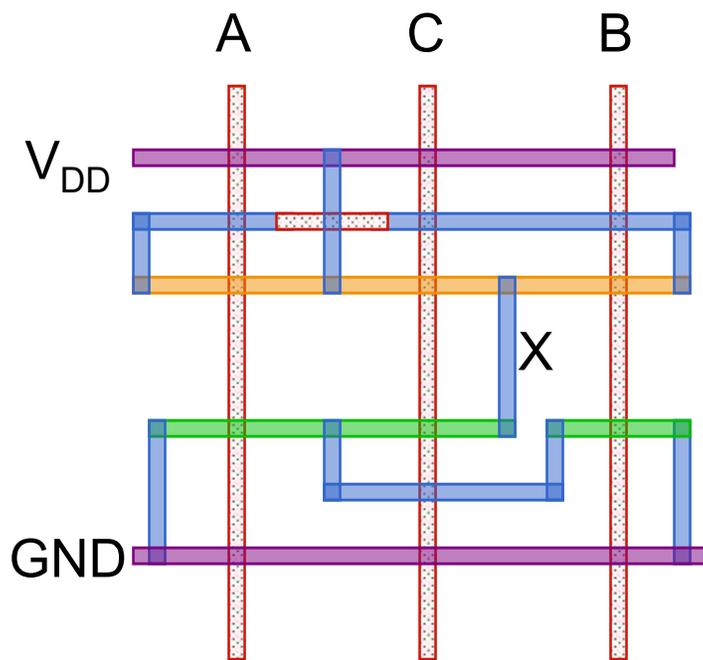
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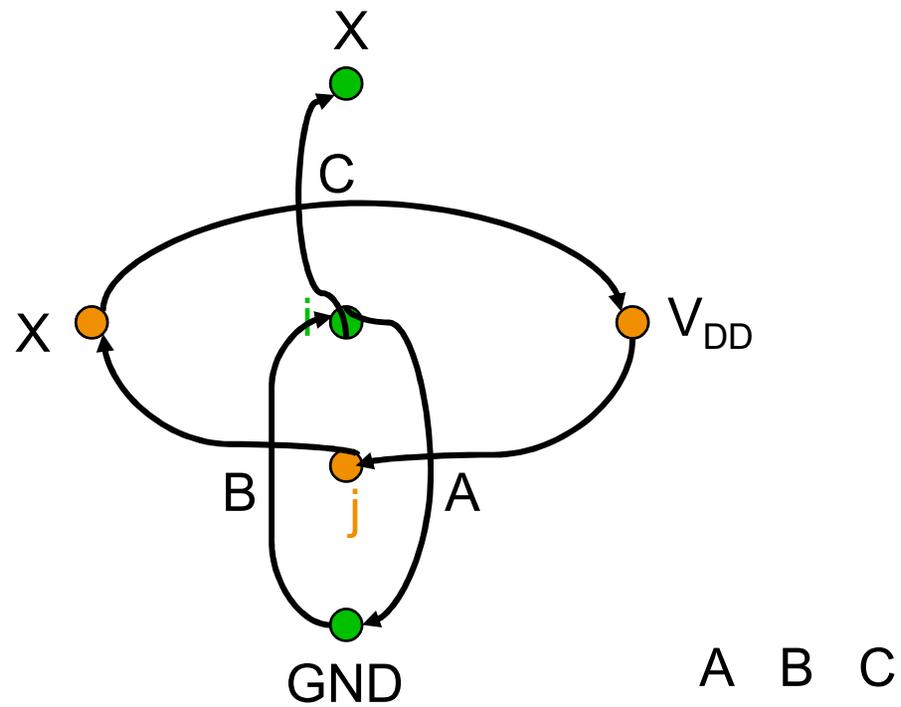
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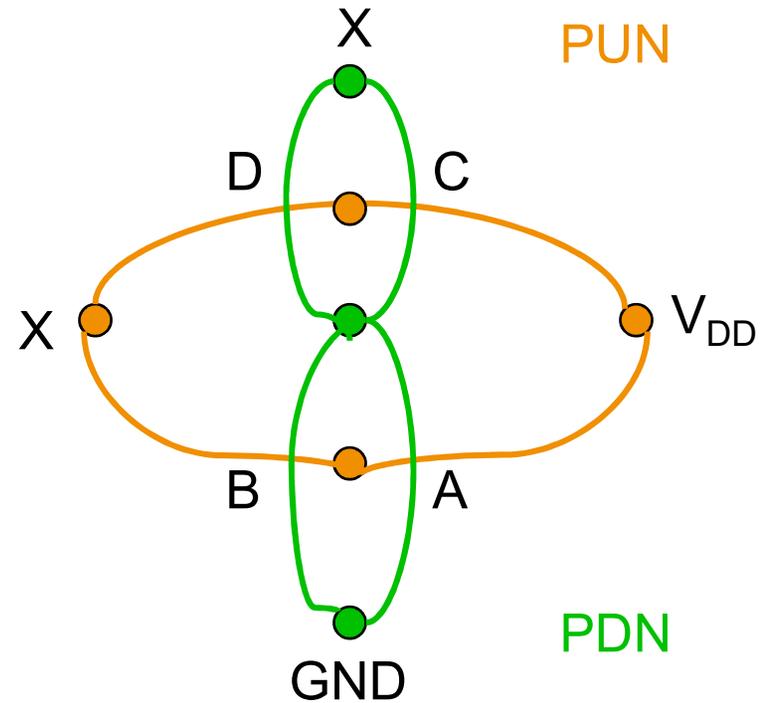
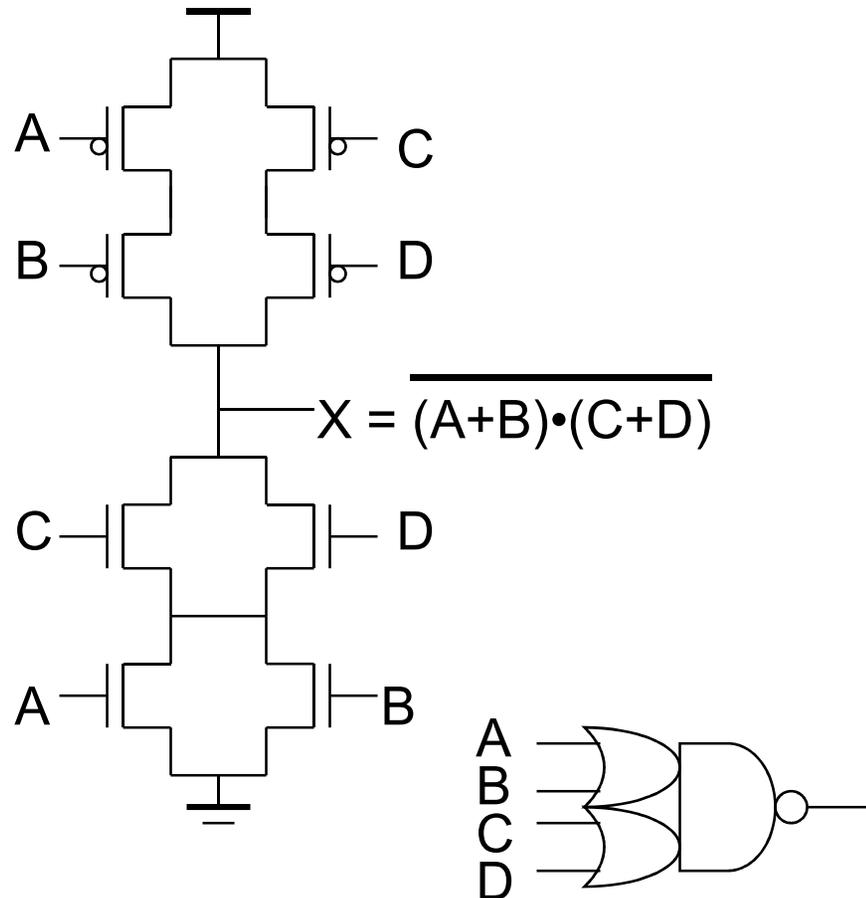
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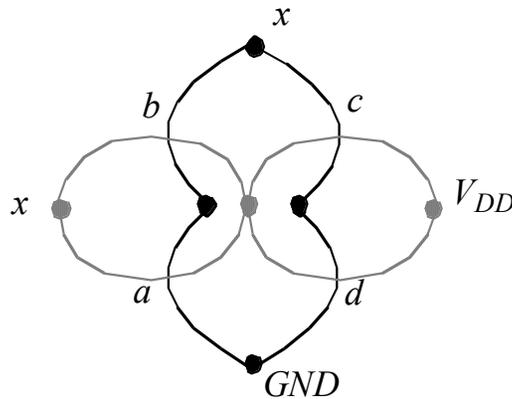
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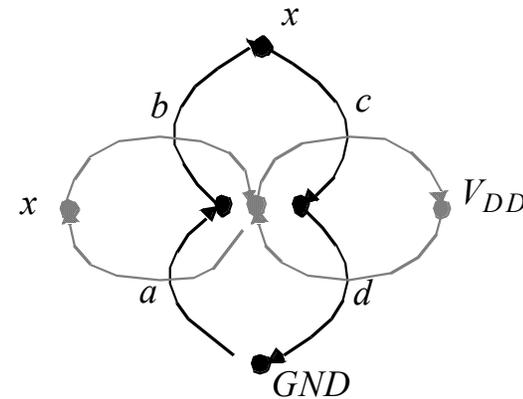
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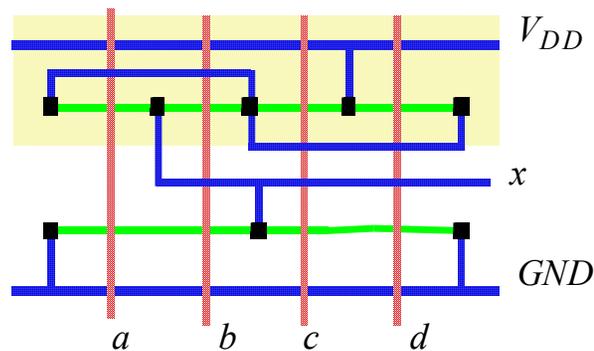
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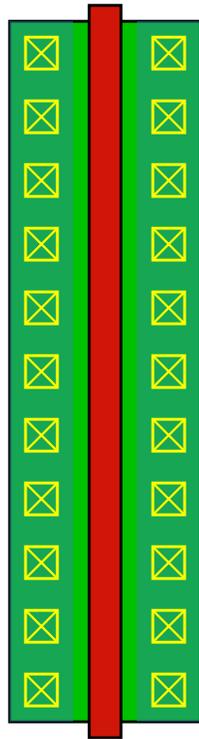
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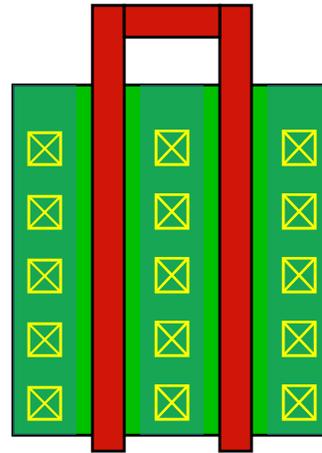
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