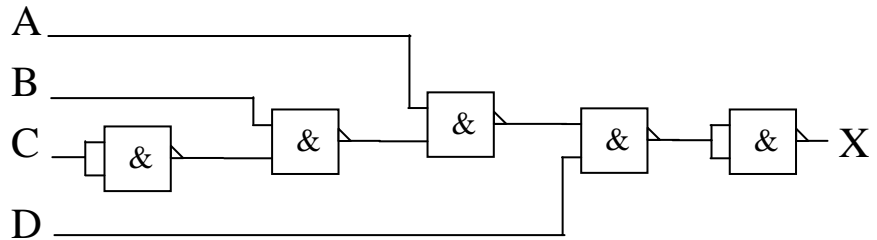


# OEFENINGEN IMPLEMENTATIE

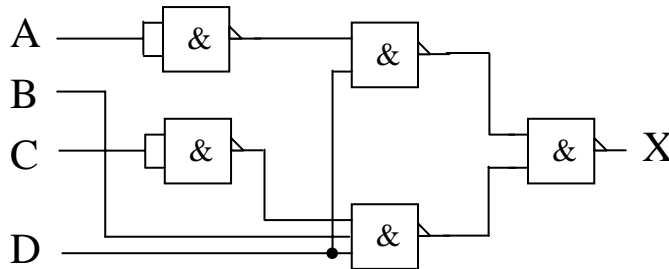
## Uitsluitend NAND – poorten

$$\begin{aligned}
 X &= (\bar{A} + B\bar{C}) \cdot D \\
 &= \overline{\overline{\bar{A} + B\bar{C}}} \cdot D \\
 &= \overline{\overline{\bar{A}} \cdot \overline{B\bar{C}}} \cdot D \\
 &= \overline{A \cdot B \cdot \bar{C}} \cdot D
 \end{aligned}$$



## (eerst de functie vereenvoudigen)

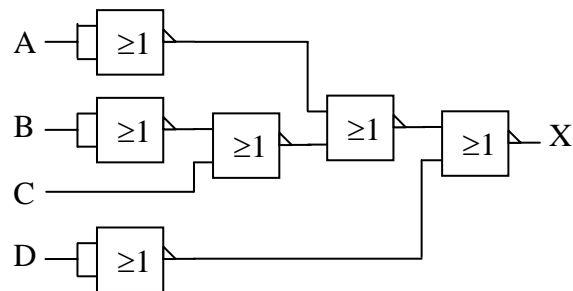
$$\begin{aligned}
 X &= (\bar{A} + B\bar{C}) \cdot D \\
 &= \bar{A}D + B\bar{C}D \\
 &= \overline{\overline{\bar{A}D} \cdot \overline{B\bar{C}D}} \\
 &= \overline{\bar{A}D \cdot B\bar{C}D}
 \end{aligned}$$



$$X = \overline{\bar{A}D \cdot B\bar{C}D}$$

## Uitsluitend NOR – poorten

$$\begin{aligned}
 X &= (\bar{A} + B\bar{C})D \\
 &= \overline{\overline{\bar{A} + B\bar{C}}}D \\
 &= \overline{\overline{\bar{A} + \bar{B} + C}}D \\
 &= \overline{\bar{A} + \bar{B} + C + \bar{D}}
 \end{aligned}$$



(eerst de functie vereenvoudigen)

$$\begin{aligned}
 X &= (\bar{A} + B\bar{C})D \\
 &= \overline{\bar{A}D} + \overline{BCD} \\
 &= \overline{\bar{A} + \bar{D} + \bar{B} + C + \bar{D}}
 \end{aligned}$$

Deze schakeling is iets complexer

$$X = A\bar{C}(B + \bar{D}) + \bar{B}\bar{C}\bar{D}$$

## OEFENINGEN OP DE VEREENVOUDIGINGSREGELS

1.

$$\begin{aligned}x &= abc + ab\bar{c} + a\bar{b}c + a\bar{b}\bar{c} \\ &= ab(c + \bar{c}) + a\bar{b}(c + \bar{c}) \\ &= ab + a\bar{b} \\ &= a(b + \bar{b}) \\ &= a\end{aligned}$$

2.

$$x = \bar{a}\bar{b} + \bar{a}b + a\bar{b}$$

3.

$$x = abc + ab\bar{c} + \bar{a}bc$$

4.

$$x = a\bar{b} + c + \bar{a}\bar{c}d + b\bar{c}d$$

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## BIJKOMENDE OEFENINGEN OP NAND/NOR

$$1) X = A\bar{B} + \bar{C}D$$

$$2) X = (\bar{A}B + CD)D + \bar{E}$$

$$3) X = \overline{\bar{A}\bar{B}\bar{C}} + \overline{\bar{A}BC}$$

$$4) X = [(AB + C) \cdot \bar{D} + E] \cdot F + \bar{G}$$

$$5) X = [(A + B) \cdot (C + \bar{D}) + \bar{A}E + \bar{F}] \cdot G \cdot H$$

Implementeer de logische functies

- a) in een schema met uitsluitend NAND poorten
- b) in een schema met uitsluitend NOR poorten