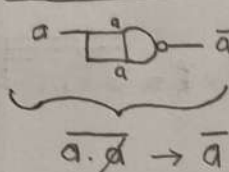


Dönüşümler - Circuit Transformations

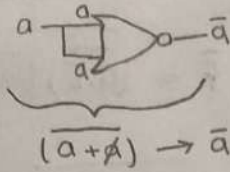
Türetilmiş Temel Kapılardan Temel Lojik Kapılara dönüşüm

NAND $\xrightarrow{a, b} \bar{a} \cdot \bar{b}$, NOR $\xrightarrow{a, b} \overline{a+b}$

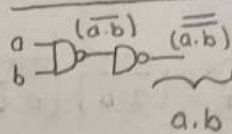
1x NAND \rightarrow 1x Not



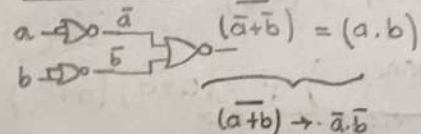
1x NOR \rightarrow 1x Not



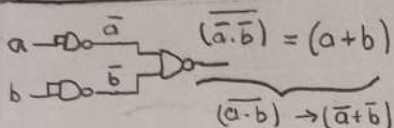
2x NAND \rightarrow 1x AND



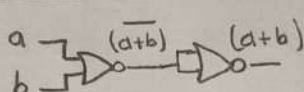
3x NOR \rightarrow 1x AND



3x NAND \rightarrow 1x OR



2x NOR \rightarrow 1x OR



İndirgenmiş İfadelerin Aynı Kapılarla Gerçekleştirilmesi

Garipimler Toplamı (SOP, minterms) \rightarrow NAND

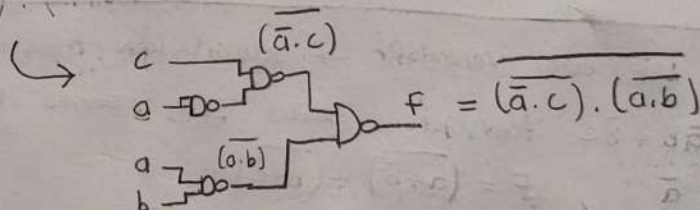
$$F = \sum \pi x_i \quad , \quad \bar{F} = \prod \pi \bar{x}_i \quad , \quad \bar{\bar{F}} = \overline{\prod \pi \bar{x}_i} = F$$

SOP POS full of NANDs

Örnek $F = \bar{a}\bar{b}c + \bar{a}bc + ab\bar{c} + abc$

	\bar{b}	b
\bar{a}	1	1
a		1
	\bar{c}	c

$$F = \bar{a}c + ab \rightarrow \bar{F} = (\bar{a}c) \cdot (\bar{a}b) \rightarrow \bar{F} \rightarrow (\bar{a}c) \cdot (\bar{a}b)$$

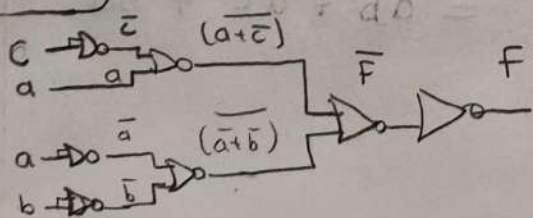


Garipimler Toplamı \rightarrow NOR

$$F = \sum \pi x_i \quad , \quad \prod \pi x_i = \sum \bar{x}_i \quad , \quad F = \sum \sum \bar{x}_i \quad , \quad \bar{F} = \sum \sum \bar{x}_i \quad , \quad \bar{\bar{F}} = F = \sum \sum \bar{x}_i$$

$\overline{ab} = (\bar{a} + \bar{b})$

Örnek $F = \bar{a}c + ab \rightarrow \bar{F} = (\bar{a} + \bar{c}) + (\bar{a} + \bar{b}) \quad , \quad \bar{\bar{F}} = F = (\bar{a} + \bar{c}) + (\bar{a} + \bar{b})$



An Extra NOR for the output

Toplamlar Çarpımı → NAND

Pos. Maxterms

$$F = \prod \sum x_i, \quad f = \prod \prod x_i, \quad \bar{F} = \prod \prod x_i, \quad \bar{\bar{F}} = F = \prod \prod x_i$$

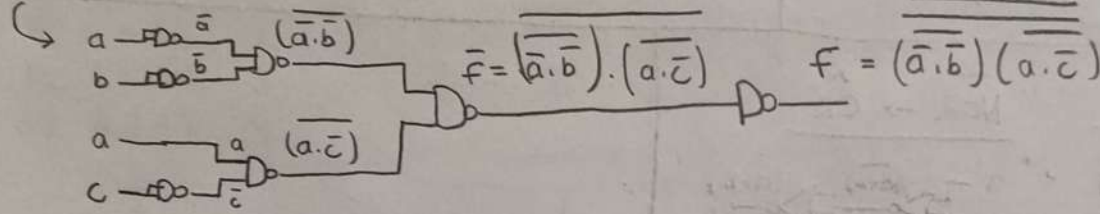
$$\sum x_i = \prod x_i$$

$$(a+b) = (\bar{a} \cdot \bar{b})$$

An extra NAND for the output

Örnek) $F = (a+b)(\bar{a}+c) \rightarrow \bar{F} = (\bar{a} \cdot \bar{b})(\bar{a} \cdot \bar{c}) \rightarrow \bar{\bar{F}} = F = (\bar{a} \cdot \bar{b})(\bar{a} \cdot \bar{c})$

$$f = (\bar{a} \cdot \bar{b}) \cdot (\bar{a} \cdot \bar{c})$$



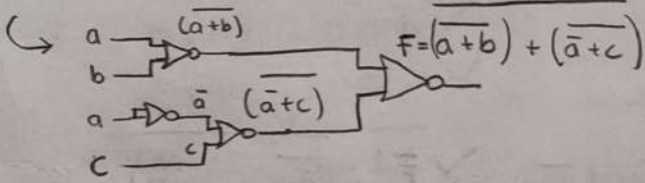
Toplamlar Çarpımı → NOR

$$F = \prod \sum x_i, \quad \bar{F} = \sum \sum x_i, \quad \bar{\bar{F}} = F = \sum \sum x_i$$

$$\prod = \sum$$

Örnek) $F = (a+b)(\bar{a}+c) \rightarrow \bar{F} = (\bar{a}+b) + (\bar{a}+c) \rightarrow \bar{\bar{F}} = F = (\bar{a}+b) + (\bar{a}+c)$

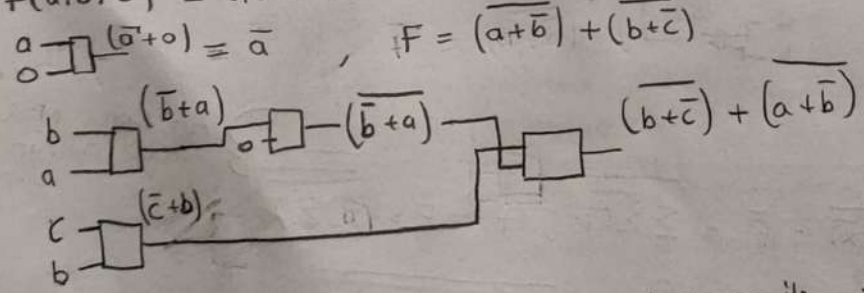
$$F = (\bar{a}+b) + (\bar{a}+c)$$



Soru Çözüm

Soru 1) Bir LKE Kapısı Verilmiştir → $K(a,b)$ için çıkış = $a' + b \rightarrow x \text{ --- } y \text{ --- } (x' + y)$

$F(a,b,c) = \bar{a}b + \bar{b}c$ fonksiyonunu sadece LKE kullanarak kurunuz.



Soru 2) Aşağıda verilen özel Karnaugh haritası ile $F = \bar{a}b\bar{c} + \bar{a}b\bar{c} + \bar{a}b\bar{c} + \bar{a}b\bar{c}$ fonk. indirge

