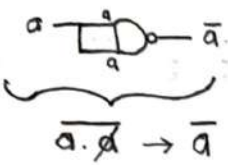


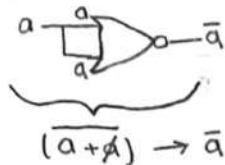
Dönüşümler - Circuit Transformations

Türetilmiş Temele Kapılarından Temel Lojik Kapılara dönüşüm

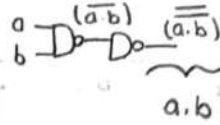
1x NAND → Not



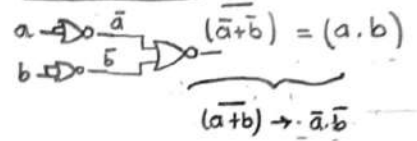
1x NOR → Not



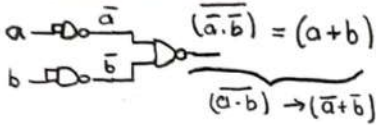
2x NAND → AND



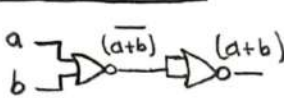
3x NOR → AND



3x NAND → OR



2x NOR → OR



İndirgenmiş İfadelerin Aynı Kapılarla Gerçekleştirilmesi

Çarpımlar Toplamı (SOP, minterms) → NAND

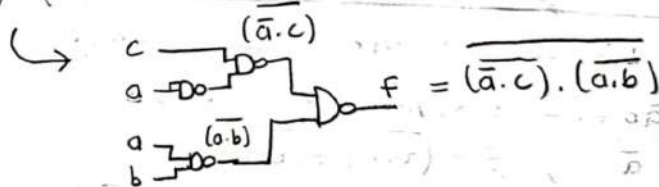
$$F = \sum \prod x_i \quad , \quad \bar{F} = \prod \prod \bar{x}_i \quad , \quad \bar{\bar{F}} = \overline{\prod \prod \bar{x}_i} = F$$

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	1
	\bar{c}	c	\bar{c}

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

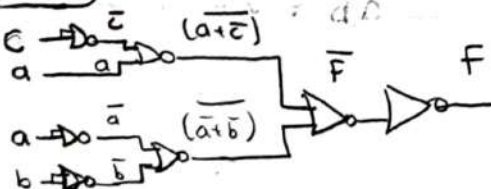


Çarpımlar Toplamı → NOR

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

ab = (a+b)

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



An Extra NOR for the output

Toplamlar Çarpımı → NAND

Pos. Maxterms

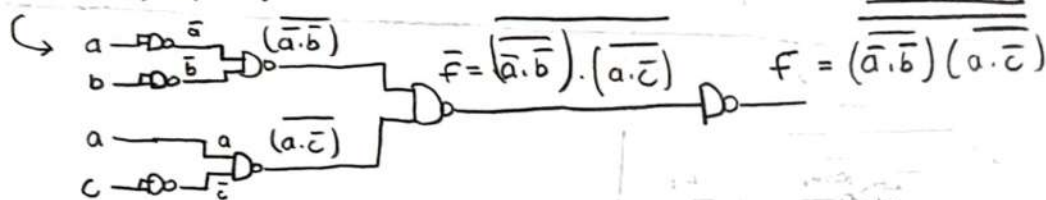
$$F = \prod \sum x_i, \quad f = \prod \prod x_i, \quad \bar{F} = \prod \prod \bar{x}_i, \quad \bar{\bar{F}} = F = \prod \prod x_i$$

$$\sum x_i = \prod \bar{x}_i$$

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

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

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



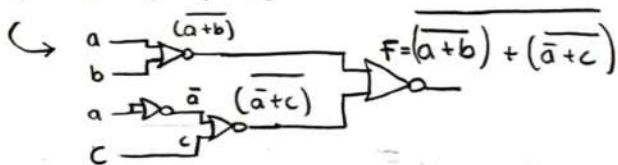
Toplamlar Çarpımı → NOR

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

$$\prod = \sum$$

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

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

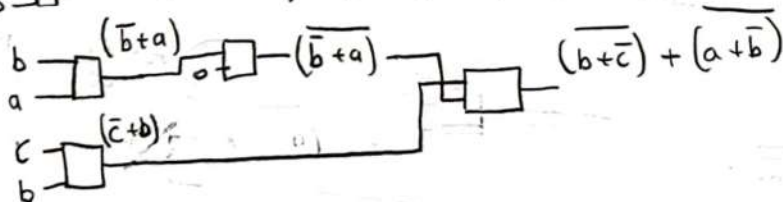


Soru Çözüm

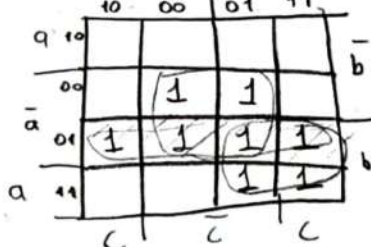
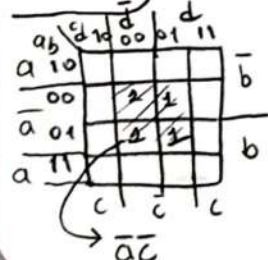
Soru 1) Bir LKE Kapısı Verilmiştir $\rightarrow K(a,b)$ için $a+b \rightarrow x \text{ } \boxed{LKE} \text{ } (x'+y)$

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

$$a \text{ } \boxed{LKE} \text{ } (\bar{a}+0) = \bar{a}, \quad F = (\bar{a}+b) + (\bar{b}+c)$$



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



$$= \bar{a}\bar{b} + \bar{a}\bar{c} + bd$$