

Lojik fonksiyon indirgemeşi

a- görüse dayalı

b- Karna diyagramları / haritaları

c- Quene - McCluskey

d- görüse dayalı

Bildiginiz teoremlerden
yararlanarak
elle sadeleştirme

$$F(a,b,c,d) \rightarrow abc' + cd + ab'c$$



$$f(a,b,c,d) \rightarrow \bar{a}bc' + ad + bc'd'$$

f(0,0,0,0)

$$\hookrightarrow bc'(a'+d') + ad$$

$$\hookrightarrow bc'(\bar{ad}) + ad$$

$$\hookrightarrow (ad, bc')(ad + \bar{ad})$$

$$\hookrightarrow ad + bc$$

Kapıları a20/tip
gög ye mali-
yeti a20/lettik

$$\bar{0} = 0'$$

$$a' + d' \rightarrow (ad)' \text{ De Morgan}$$

$$a + bc \rightarrow (a+b)(a+c)$$

Dağılma Özelliği



çaprazlarının

\hookrightarrow giriş \rightarrow ortmasında
 maliyeti artırır

$$f = a, b, c, d \rightarrow \bar{a}bc' + ad + bc'd'$$

(bc parantezine olmaz)

$$\underbrace{bc'(\bar{a}' + d')}_{\bar{a}d} + ad$$

$$\hookrightarrow (bc' + ad)(\bar{a}d + ad)$$

1

$$f(x, y, z) \rightarrow \sum(0, 4) = M_0 + M_4$$

\hookrightarrow Minterm

$$\overbrace{000 = M_0}$$



$$\rightarrow x'y'z' + xy'z'$$

$$\overbrace{100 = M_4}$$



$$\rightarrow y'z'(x' + x)$$

1

y^2

Karnaugh Diagramı haritası

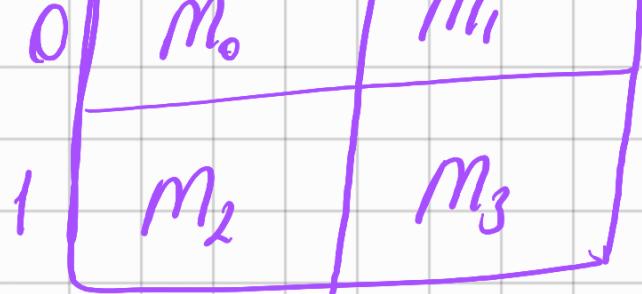
Vetch \rightarrow 1952 \rightarrow 1953 Karnaugh

101	
011	
<hr/>	
hd2	

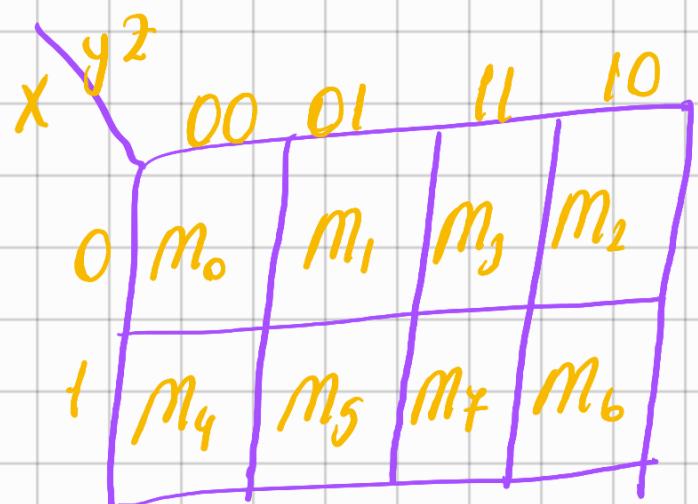
birbirinden
farklı digit
 $sayıları$

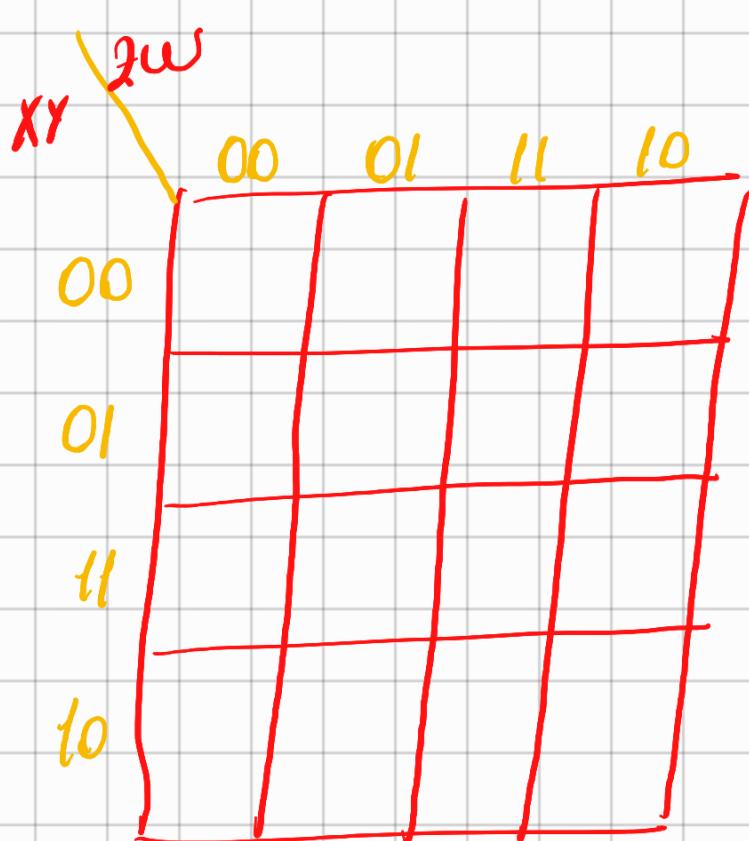
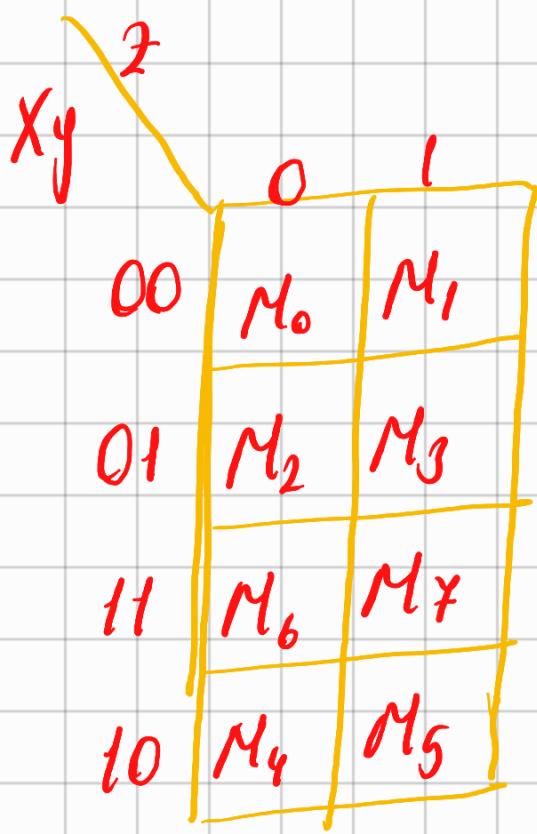
x	y	f
0	0	m_0
0	1	m_1
1	0	m_2
1	1	m_3

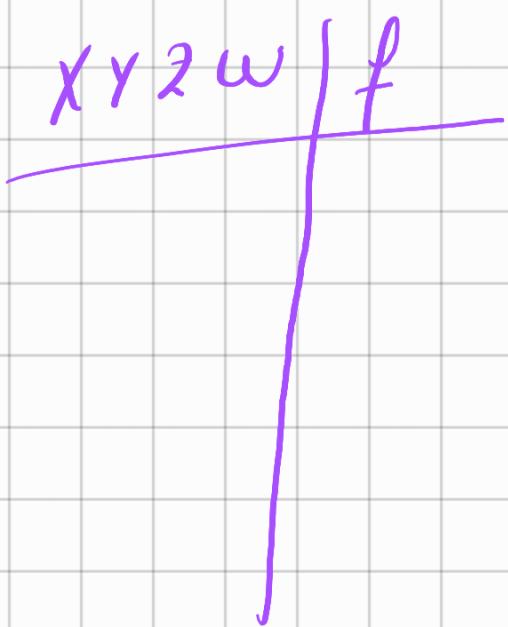
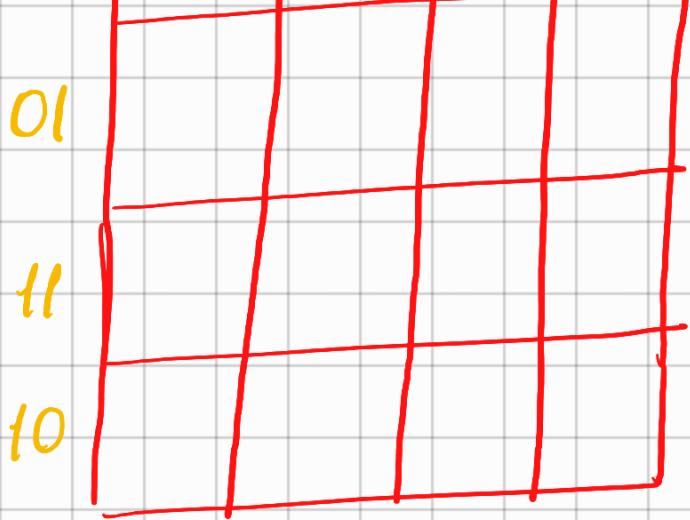




x	y	z	f
0	0	0	M_0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	M_7







Karnaugh Diyagramlarında Komşuluk Kavramı

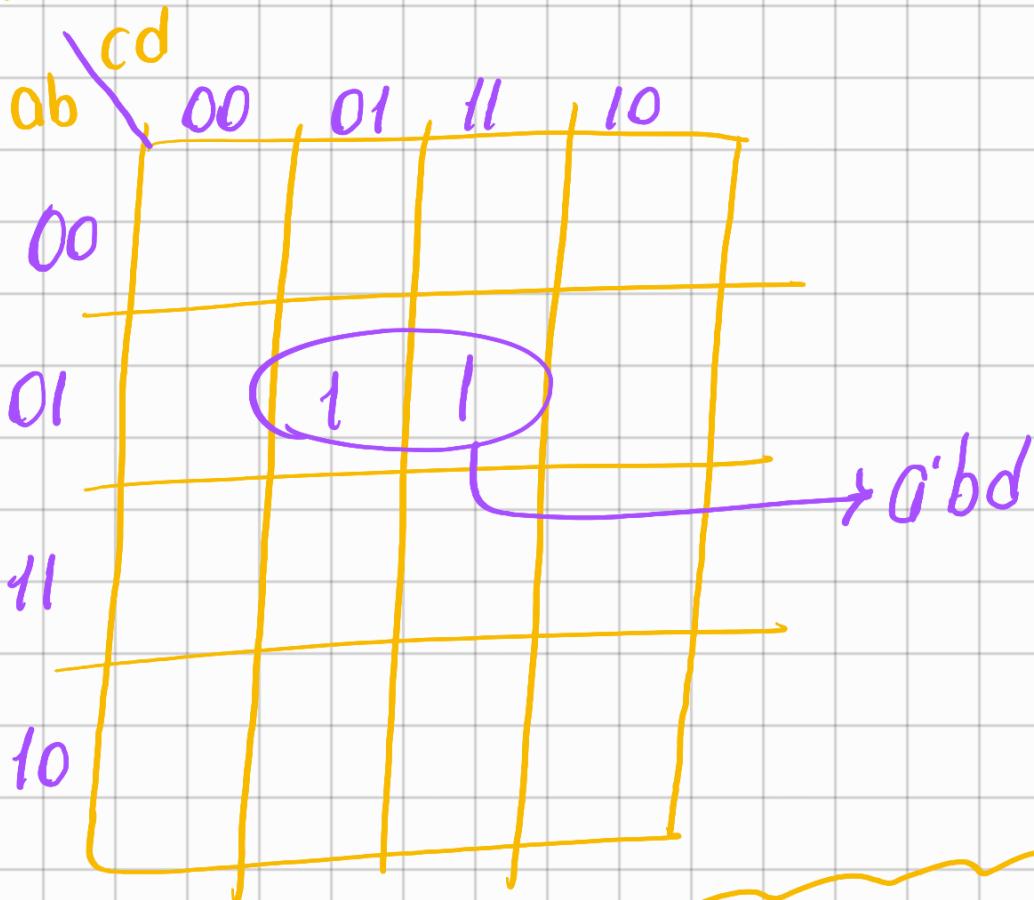
→ Komşuluk kavramı n değişkenli bir fonksiyonda 2^k ($k=1, 2, 3$) tane terimin hesaplanıp $(n-k)$ gorsuneli bir tek terime dönüştürse bu terim k . mertebeden

2^k tane var
komşudur
teorem 1 Birinci dereceden komşuluk

$$f(a, b, c, d)$$

$$n=4 \rightarrow k=1$$
$$2^k=2$$

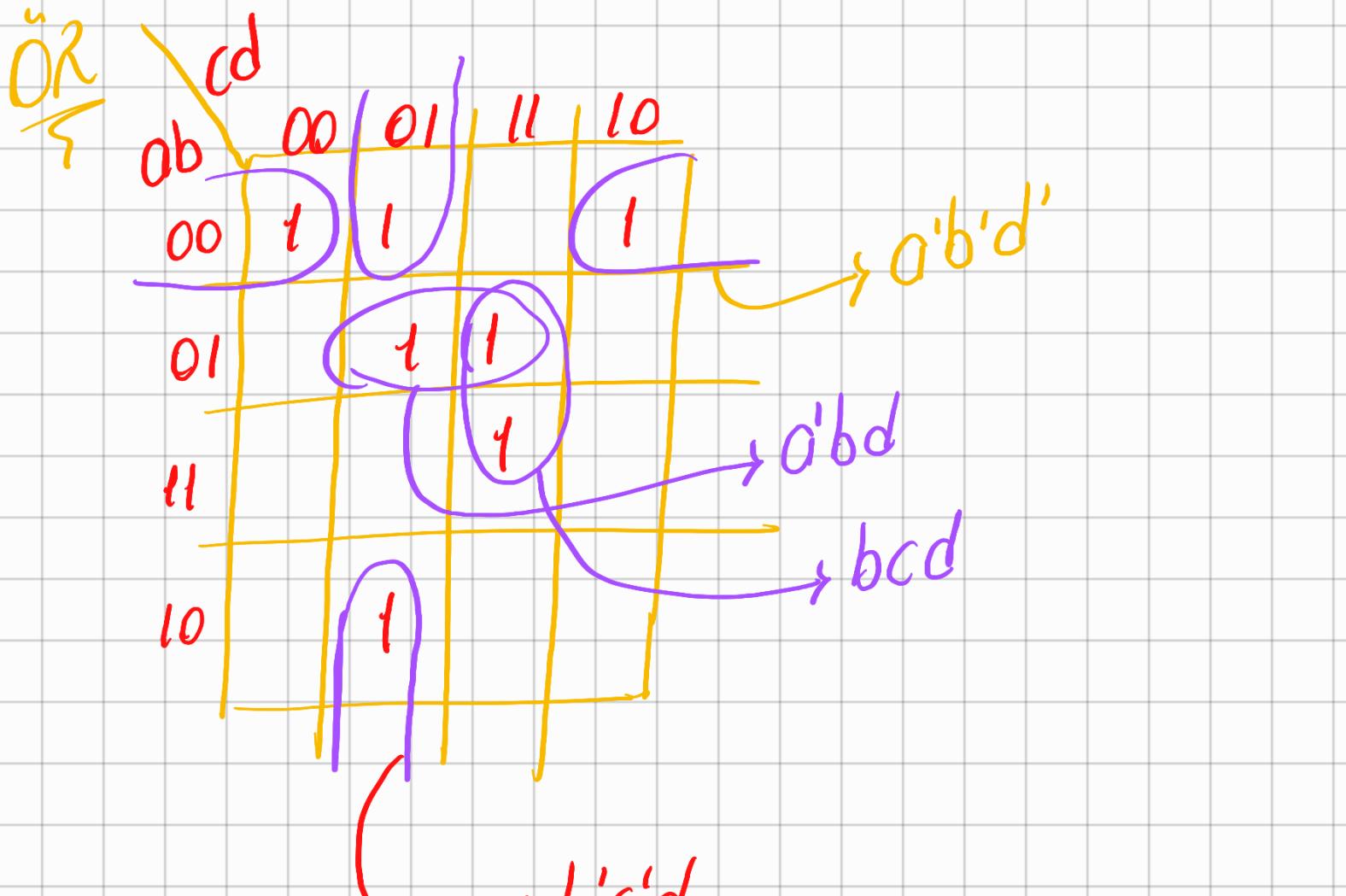
$$(n-k) = (4-1) = 3$$



$$\{ f(a, b, c, d) \rightarrow a'b'c'd + a'b'cd \\ | \quad a'b'd(c' + c) \}$$

$\overline{a'b'd}$

Burda 1'leri baz
olarak işlem yaparız
değişmeyenlerdeki 0'ları
1 yapmaya çalışırız
1'leri ellemeyiz



$$\hookrightarrow f(a,b,c,d) \rightarrow a'b'd' + a'bd' + bcd + b'c'd$$

$$f(a,b,c,d) \rightarrow a'b'c'd' + a'b'c'd$$

+

+

Yı tane minterm

Bu işlemleri
yonı torno
diyagramını
kullanmasaydık

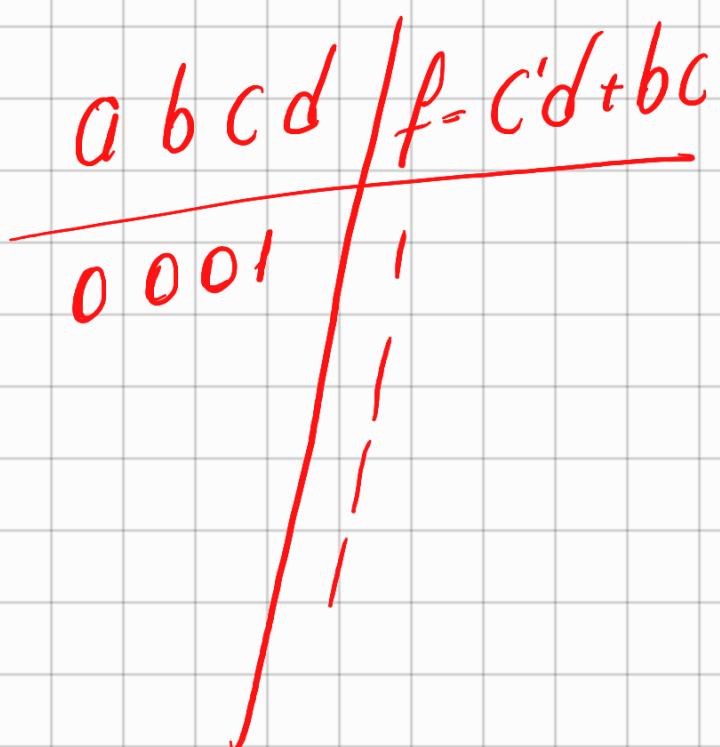
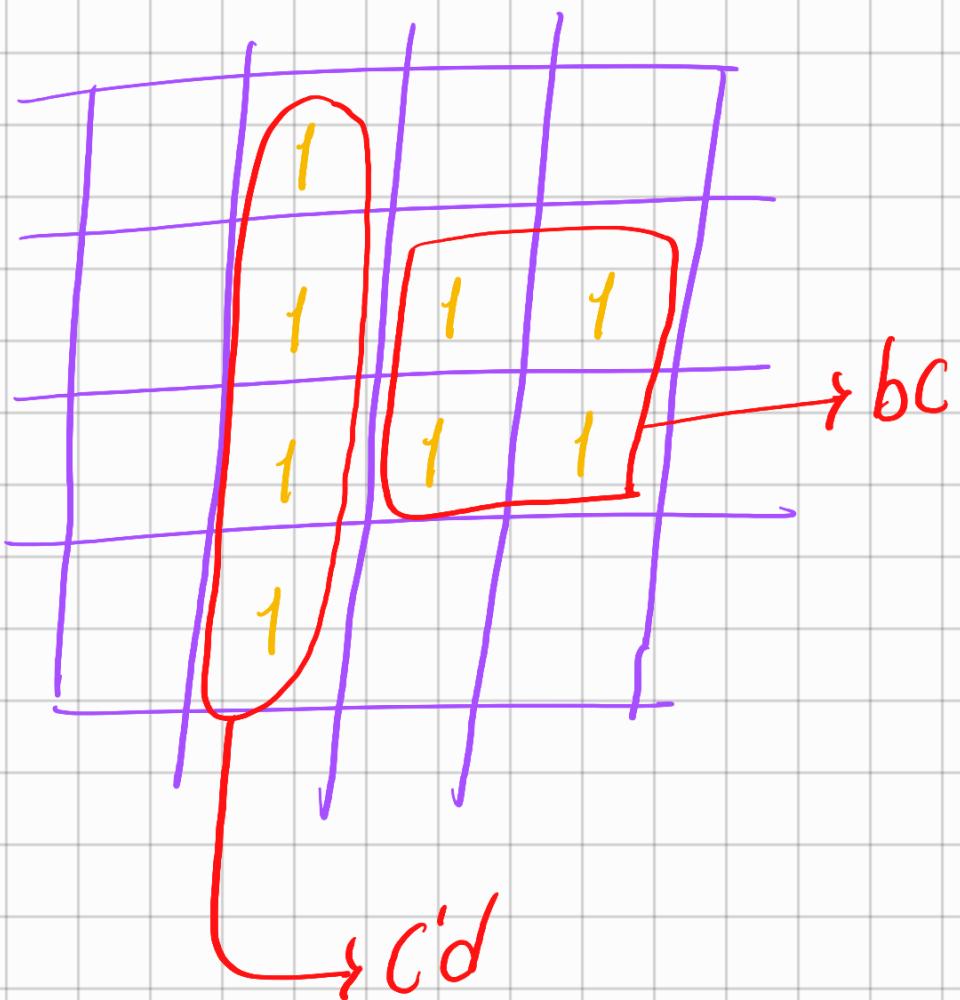
Teorem 2 ikinci dereceden komşuluk
 $k=2$

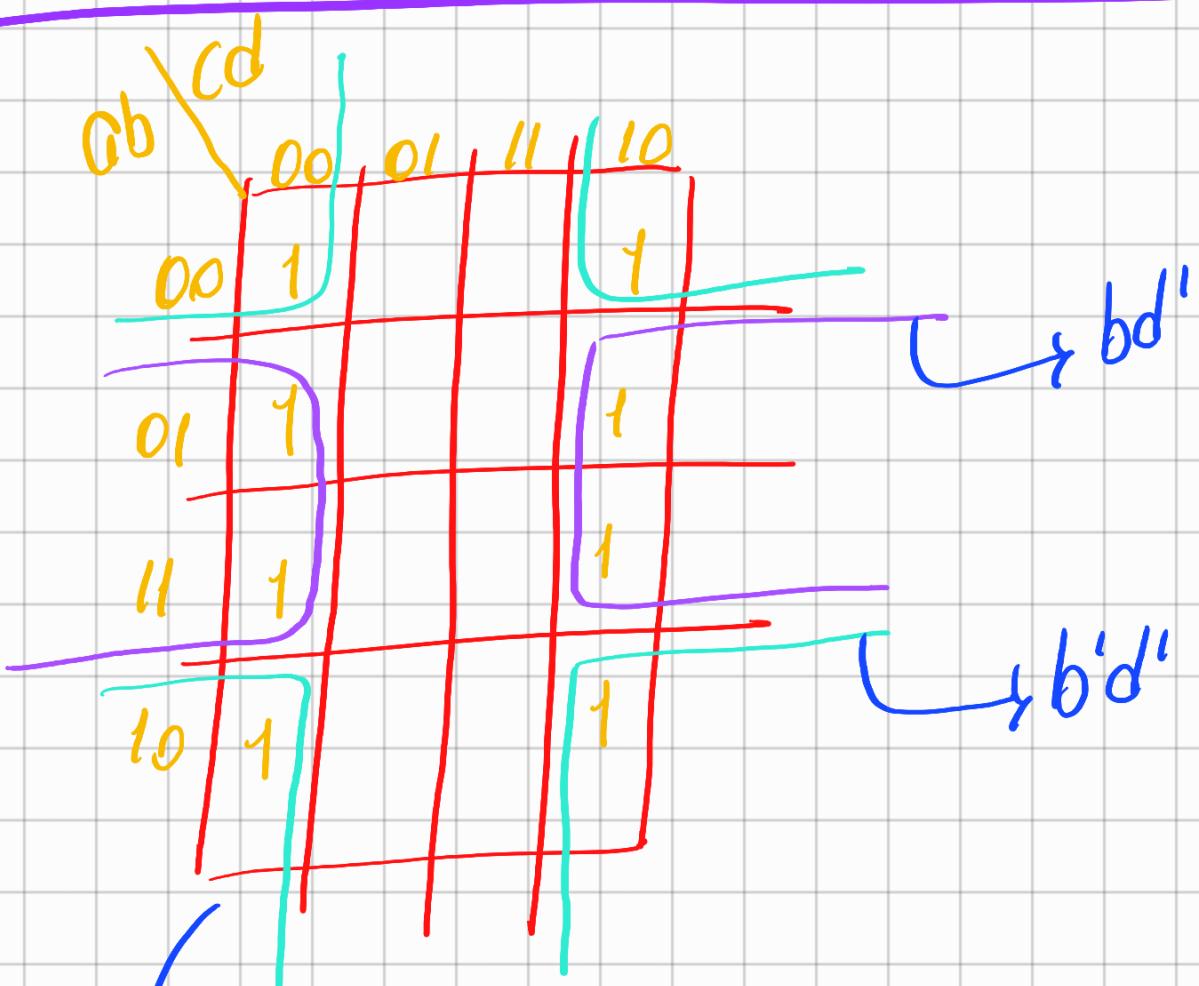
$(n-k)$
 $(4-2) \rightarrow 2$ Garpone, terim

②

1 - 0.

2^k tone term komşu olmazı
↳ 4 tone



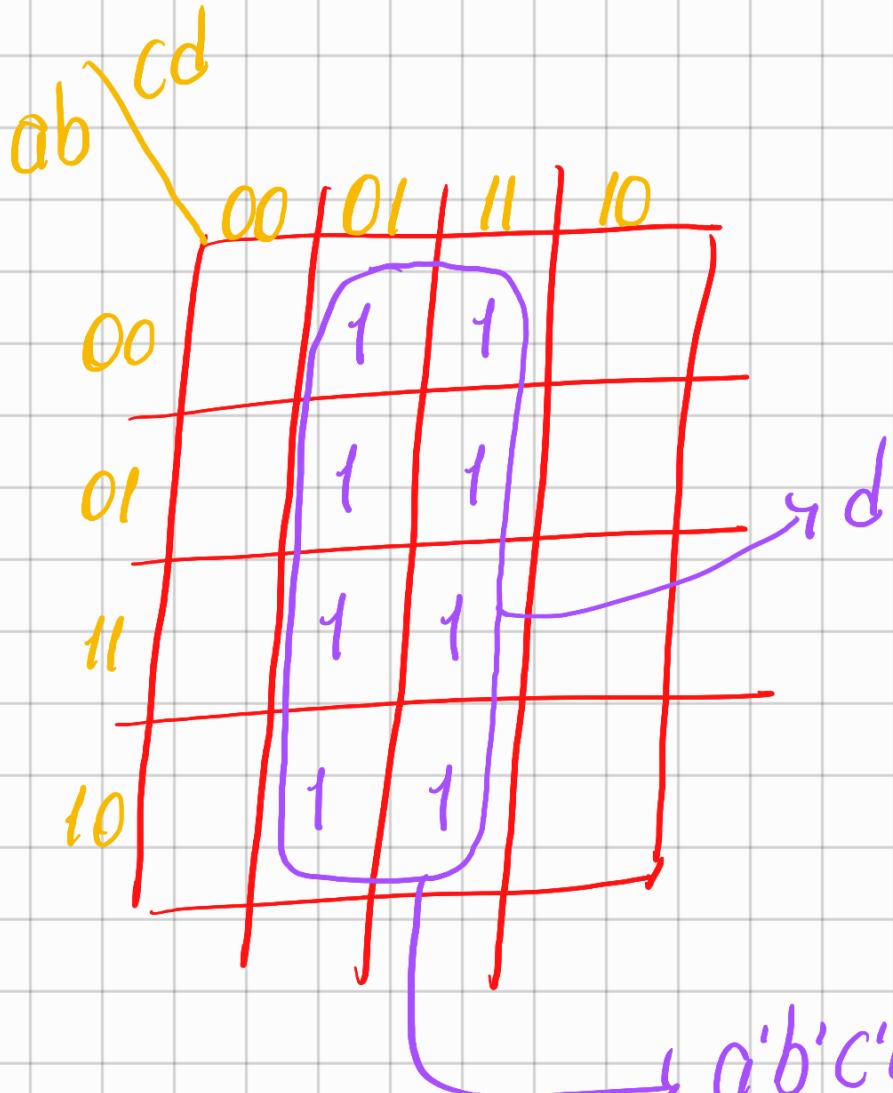


→ Gapraz
komsuluğ
yok

Teorem 3 3.dereceden
komsuluğ

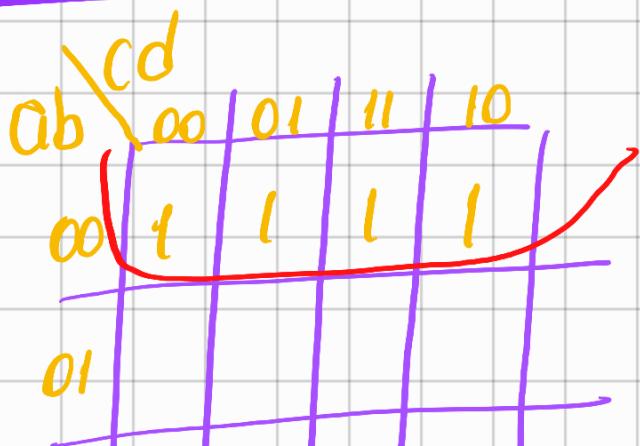
$$2^k = 8$$

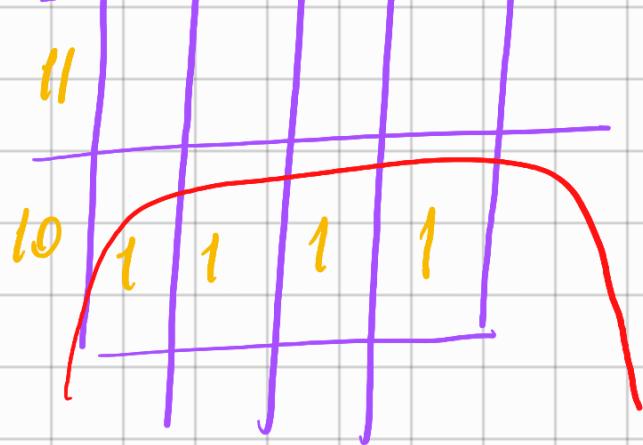
$$(n-k) \quad \frac{4-3=1}{\cancel{3}}$$



$$a'b'c'd' + a'b'cd$$

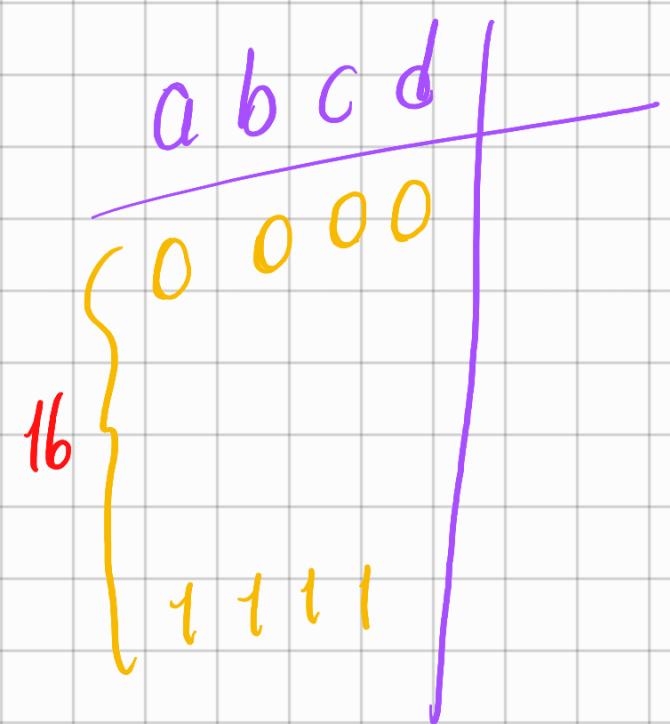
— — — — —
 eper torno horita-
 parini kukkanma-
 jaydik böyle
 gikordi





Teorem 4 $f(a, b, c, d)$

$$2^k \xrightarrow{④} 16$$



1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1

herpsi + olur

$$1 \ 1 \ | \ 1 \ | \ 1 \ | \ 1$$

$f=1$

Örnek $f(a,b,c,d) \rightarrow a'b'c' + b'cd' +$

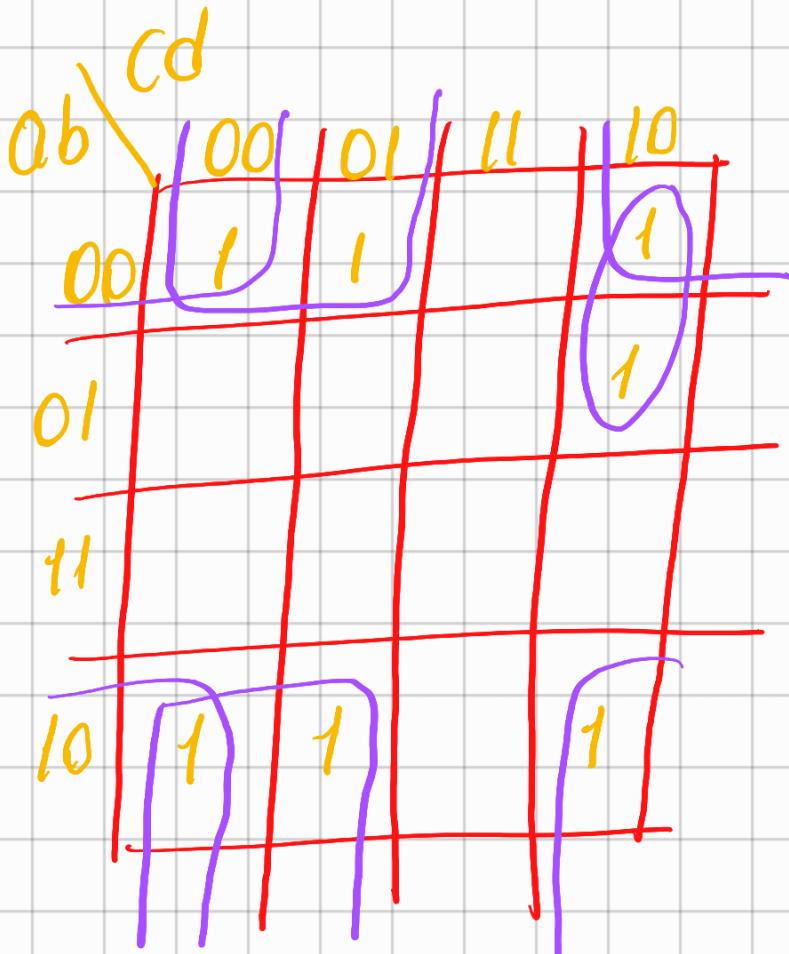
$a'bcd' + abc'$

$0110 \quad 100$

Burda a 'nın
hiçbir önemi
yok i 'de
olabilir
 0 'da

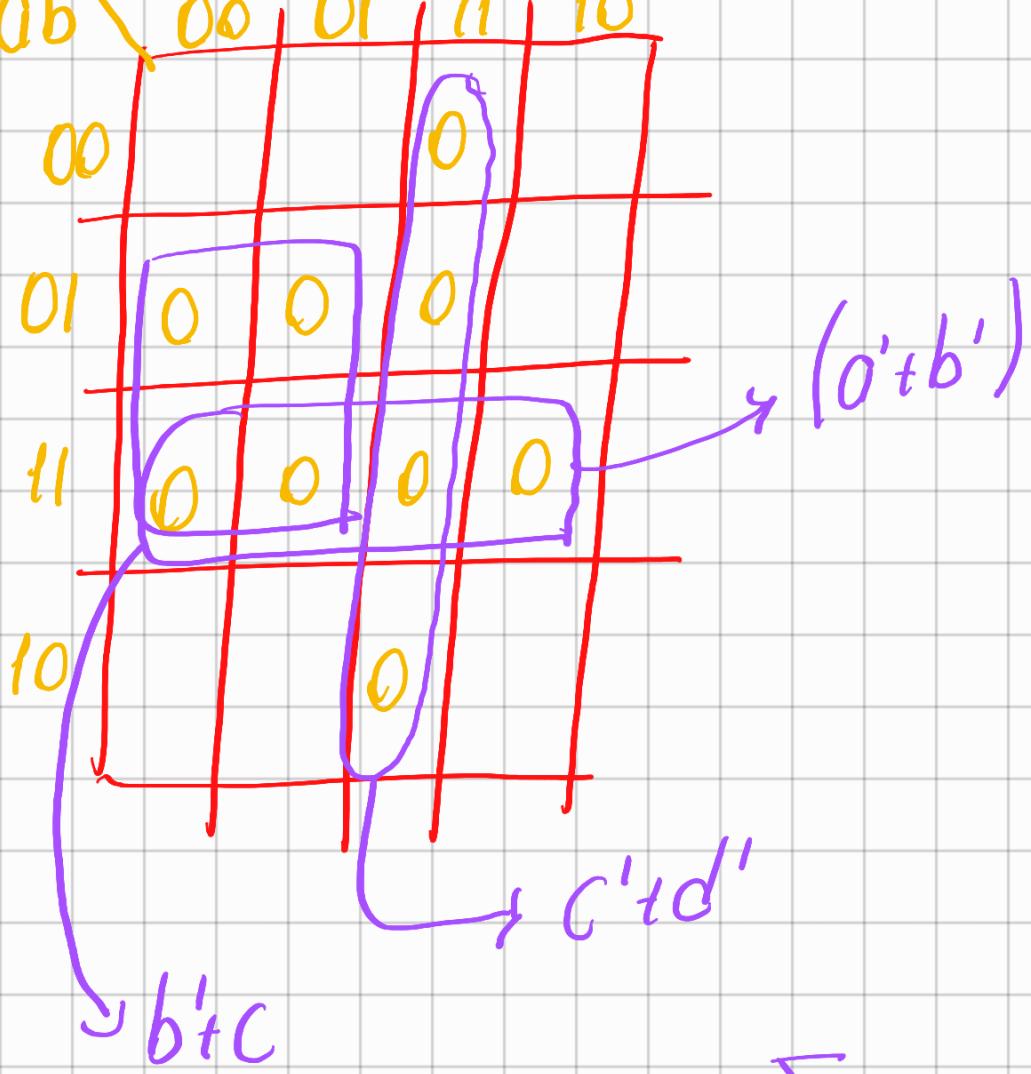
a	b	c	d	f
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	
0	1	0	1	
0	1	1	0	1

0	1	1	1	
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	



$$f(abcd) \rightarrow b'd' + b'c' + a'cd'$$

$a'b'c'd'$ $a'b'c'd'$ $a'b'c'd'$ $a'b'c'd'$



$$\sum \pi$$

$\hookrightarrow f(a, b, c, d)$

$$\hookrightarrow (a'+b')(c'+d')(b'+c)\prod \sum$$

\hookrightarrow toplamlar çarpımında o'lara bak-
arız t'leri o yapmaya çalışırız
o'ları ellemeyez

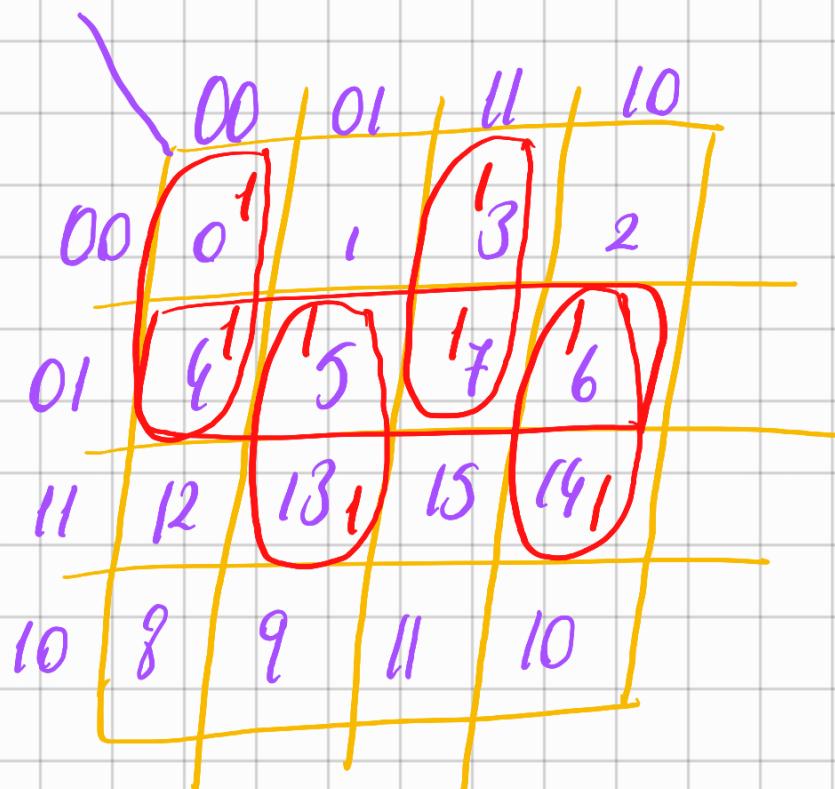
$$f(a, b, c, d) = \sum \{0, 3, 4, 5, 6, 7, 13, 14\}$$

Minterm

a	b	c	d	f
0	0	0	0	
1				
1				
1	1	1	1	

Garpimlar topla-
mi
minterm

toplolar Gar-
pimi
maxterm



$\rightarrow f = \cancel{0} + 0'c'd' + b'c'd + a'cd + bcd'$

\rightarrow Buna gerçek yok

Eksik bool işlemleri

$$f(a, b, c, d)$$

a	b	c	d	f
0	0	0	0	1 →
0	1	1	1	0
1	0	1	1	$\emptyset \rightarrow 1/0$
1	1	1	1	1 →
				0 →

Bunlar don't care durumları veya belirsizlik durumları denir

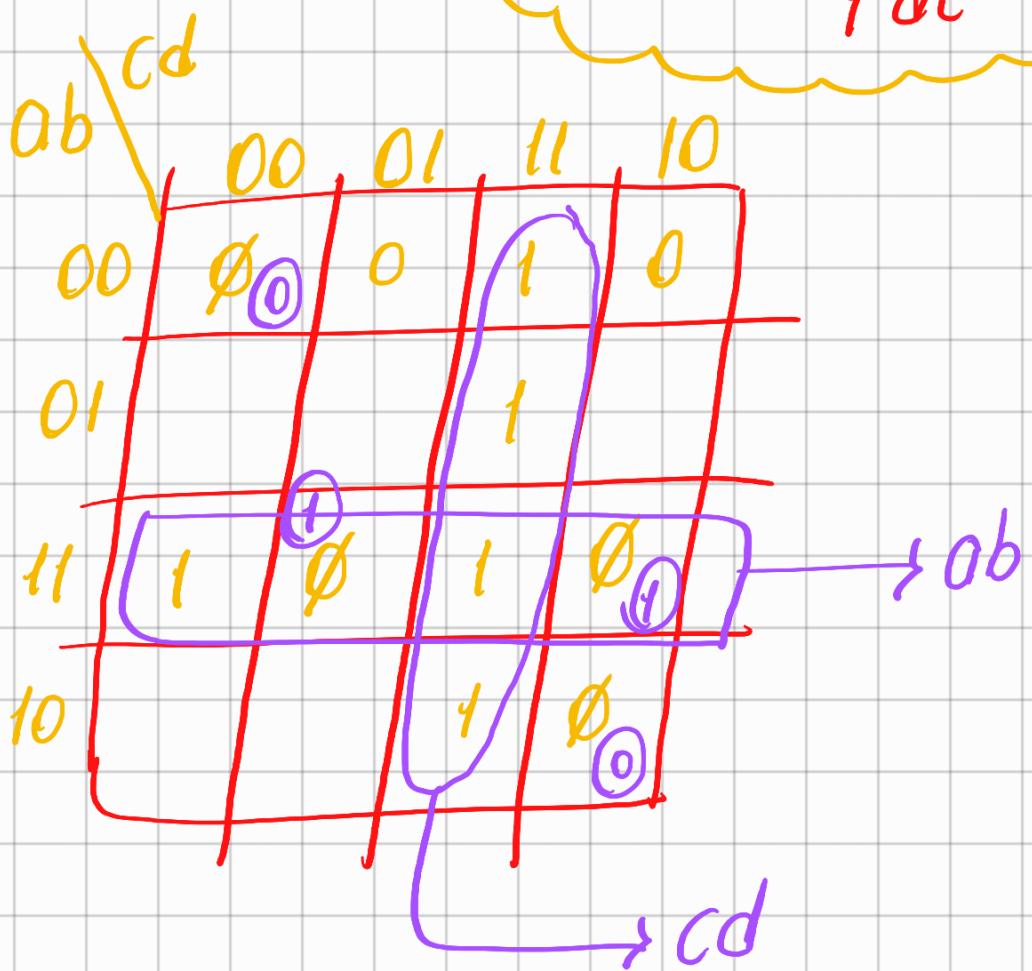
→ Joru

$$f(a, b, c, d) \rightarrow \sum 3, 7, 11, 12, 15$$

+

$$\sum 0, 10, 13, 14$$

\emptyset
 ↳ $\emptyset \rightarrow$ Bunlara istedigi-
 miş deperi
 verebiligoru²
 o'da verebilirdin
 1'de



$$f(ab, cd) \rightarrow \underline{ab + cd}$$

Quene - McCluskey yöntemi

Örnek

$$f(abc\bar{d}) = \sum_1 (3, 7, 11, 12, 13, 14, 15)$$

Minterm	ikilik tabon	lojik tabon
3	0011	2
7	0111	3
11	1011	3
12	1100	2
13	1101	3
14	1110	3
15	1111	4

1. adim

$$\begin{array}{cccc} a & b & c & d \\ 3 & 0 & 0 & 1 \\ 12 & 1 & 1 & 0 \\ \hline 7 & 0 & 1 & 1 \end{array}$$

2. adim

$$\begin{array}{cccc} a & b & c & d \\ 3,7 & 0 & - & 1 \\ 3,11 & - & 0 & 1 \\ \hline 12,13 & 1 & 1 & 0 \end{array}$$

Jadece
1 tone
depişim
olmalı

				12,14	11 - 0
11	10	11		7,15	- 111
13	11	01		11,15	1 - 11
14	11	10		13,15	11 - 1
<hr/>				14,15	111 -
15	11	11			

↳ 3. adim

$$\begin{array}{cccc}
 & a & b & c & d \\
 \text{3. 7, 11, 15} & - & - & \boxed{1 \ 1} & \\
 \text{3. 11, 7, 15} & - & - & \boxed{1 \ 1} & \\
 \text{12, 13, 14, 15} & \boxed{1 \ 1} & - & - & \xrightarrow{\text{Bunları dikkate almıyoruz}}
 \\
 \text{12, 14, 13, 15} & \boxed{1 \ 1} & - & - &
 \end{array}$$

$$f(a, b, c, d) \rightarrow ab + cd$$

