ENTERED VARIABLE MAP REDUCTION (MEV)

N : Input variable

n : order of MAP

(n < N)

N-n : free variable = entered variable

2^{N-n} : Map key, Truth key.

(Compressed Map Cell Number) · (MAP Key) = (code Number of the first Minterm or Maxterm possible for the compressed Map cell)

$f(A,B,C) = \Sigma m(2,5,6,7)$

	Dec	A	B	C	f	
0	0	0	0	0	0	0
	1	0	0	1	0	
1	2	0	1	0	1	$\bar{C}$
	3	0	1	1	0	
2	4	1	0	0	0	C
	5	1	0	1	1	
3	6	1	1	0	1	1
	7	1	1	1	1	

$N=3$, $n=2$ $\rangle$ $N-n = 3-2 = 1$

$2^{N-n} = 2^1 = 2$

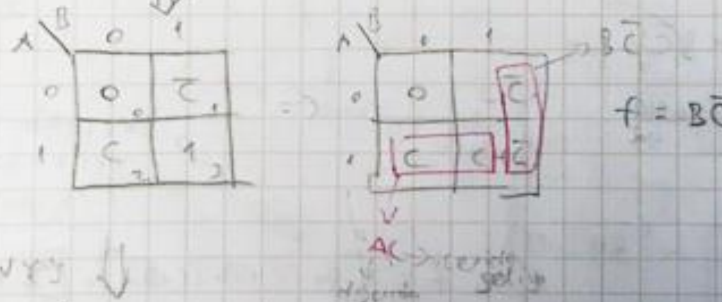
LSB: En düşük ağırlıklı değişken serbest değişken olarak seçilir

free variable : C

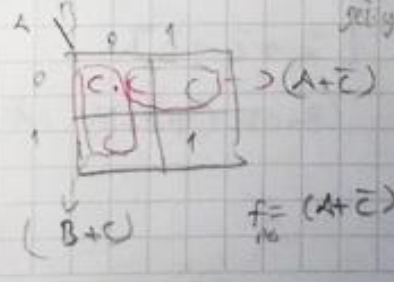
$0 \cdot 2 = 0 \rightarrow 0,1$
$1 \cdot 2 = 2 \rightarrow 2,3$
$2 \cdot 2 = 4 \rightarrow 4,5$
$3 \cdot 2 = 6 \rightarrow 6,7$

Dec	A	B	f
0	0	0	0
1	0	1	$\bar{C}$
2	1	0	C
3	1	1	1

$C+\bar{C} = 1$
$C \cdot \bar{C} = 0$



$f = B\bar{C} + AC$



$f = (A+\bar{C}) \cdot (B+C)$

ör: $f(A,B,C,D) = \Pi M(0,1,6,8,9,11,14,15)$

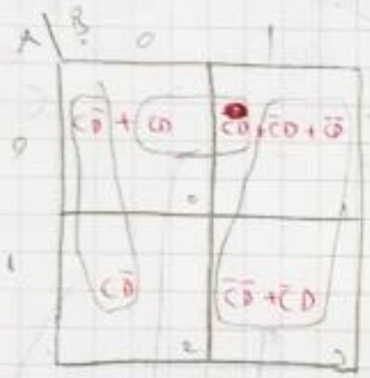
→ 2. mertebeden karnou haritasına dönüştürün

$N = 4$

$n = 2$

$N - n = 2$ (free variable) C D

$2^{N-n} = 2^2 = 4$

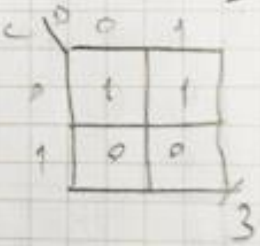


$0 \cdot 2^2 = 0 \Rightarrow 0,1,2,3$

$1 \cdot 2^2 = 4 \Rightarrow 4,5,6,7$

$2 \cdot 2^2 = 8 \Rightarrow 8,9,10,11$

$\Rightarrow 12,13,14,15$



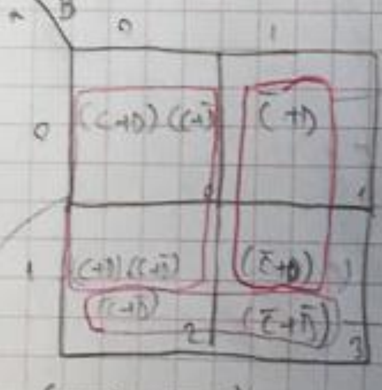
$\bar{B}C\bar{D}$

$\bar{A}CD$

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

$f = \bar{B}C\bar{D} + \bar{A}CD + B\bar{C}$

[illegible] 0'ları indirgeyerek



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

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

$B + (C+D)\cdot(C+\bar{D})$

$C \cdot C + C\bar{D} + CD + D\cdot\bar{D}$

$C \cdot (1 + D + \bar{D}) = C$

$f = [B + (C+D)\cdot(C+\bar{D})] \cdot [\bar{B} + \bar{C} + D] \cdot [\bar{A} + \bar{C} + \bar{D}]$

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

$B + (C+D)\cdot(C+\bar{D})$

Soru 3 öğretmen 3 sorudan 40, 40, 20 puanlık bir ödevi kağıdının 100 üzerinden değerlendiriyor. 1. ve 2. öğretmen 40 puanlık soruları 3 öğretmen ise 20 puanlık soruyu aşağıdaki şartlara göre değerlendiriyor.

1. öğretmen : 0, 15, 25, 40 veriyor
2. öğretmen : 0, 20, 30, 40
3. öğretmen : 0, 20 (ya 0, ya da 20 veriyor)

Öğrencinin başarı durumunu gösteren devreyi yukarıda NAND kapılarını kullanarak gerçekleştiriniz.

I. Tablo

A_1 A_0	
0 0	0
0 1	15
1 0	25
1 1	40

II. Tablo

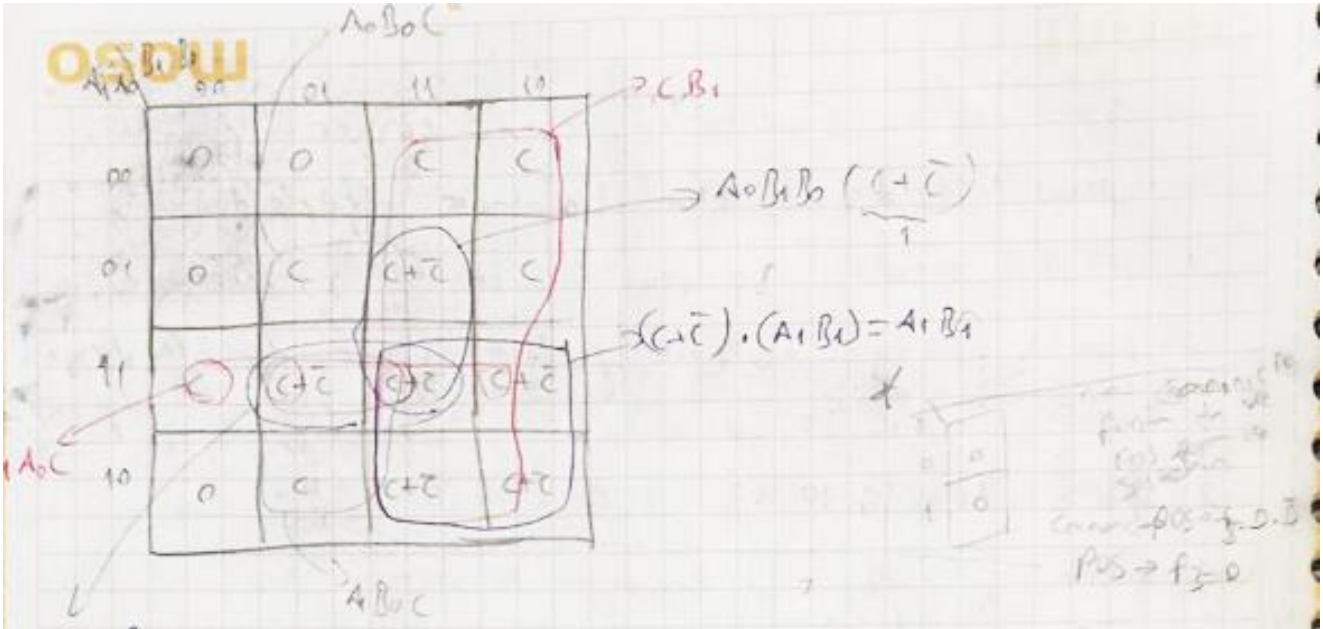
B_1 B_0	
0 0	0
0 1	20
1 0	30
1 1	40

C	
0	0
1	20

Sıra	A_1	A_0	B_1	B_0	C	f	
0	0	0	0	0	0	0	0
1	0	0	0	0	1	0	
2	0	0	0	1	0	0	0
3	0	0	0	1	1	0	
4	0	0	1	0	0	0	C
5	0	0	1	0	1	1	
6	0	0	1	1	0	0	C
7	0	0	1	1	0	1	
8	0	1	0	0	0	0	0
9	0	1	0	0	1	0	
10	0	1	0	1	0	0	C
11	0	1	0	1	1	1	
12	0	1	1	0	0	0	C
13	0	1	1	0	1	1	
14	0	1	1	1	0	1	C+$\bar{C}$
15	0	1	1	1	1	1	

Sıra	A_1	A_0	B_1	B_0	C	
16	1	0	0	0	0	0
17	1	0	0	0	1	0
18	1	0	0	1	0	C
19	1	0	0	1	1	1
20	1	0	1	0	0	1	C+$\bar{C}$
21	1	0	1	0	1	1
22	1	0	1	1	0	1	C+$\bar{C}$
23	1	0	1	1	1	1
24	1	1	0	0	0	0	C
25	1	1	0	0	1	1
26	1	1	0	1	0	1	C+$\bar{C}$
27	1	1	0	1	1	1
28	1	1	1	0	0	1	C+$\bar{C}$
29	1	1	1	0	1	1
30	1	1	1	1	0	1	C+$\bar{C}$
31	1	1	1	1	1	1

N = 5
n = 4
N − n = 1 (C)
$2^{N-n} = 2^1 = 2$



Q~ Bir hastahanede 5 tane asansör var 5. asansör yedek olarak kullanılıyor. 4 asansörden 2 veya daha fazlası meşgul olduğunda 5. asansör devreye sokuluyor. Böyle bir sisteme ait lojik devreyi yalnızca NOR kapılarını kullanarak çiziniz.

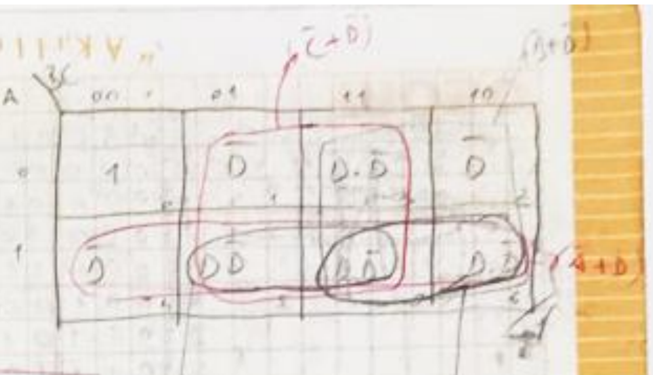
	A	B	C	D	
0	0	0	0	0	1
1	0	0	0	1	1
2	0	0	1	0	1
3	0	0	1	1	0
4	0	1	0	0	1
5	0	1	0	1	0
6	0	1	1	0	0
7	0	1	1	1	0
8	1	0	0	0	1
9	1	0	0	1	0
10	1	0	1	0	0
11	1	0	1	1	0
12	1	1	0	0	0
13	1	1	0	1	0
14	1	1	1	0	0
15	1	1	1	1	0

Bunu 3 dereceden kanonik biçimiyle gerçekleştiriniz.

N=4
n=3

N − n = 4 − 3 = 1 (Different variable)

$2^{N-n} = 2^{1} = 2$

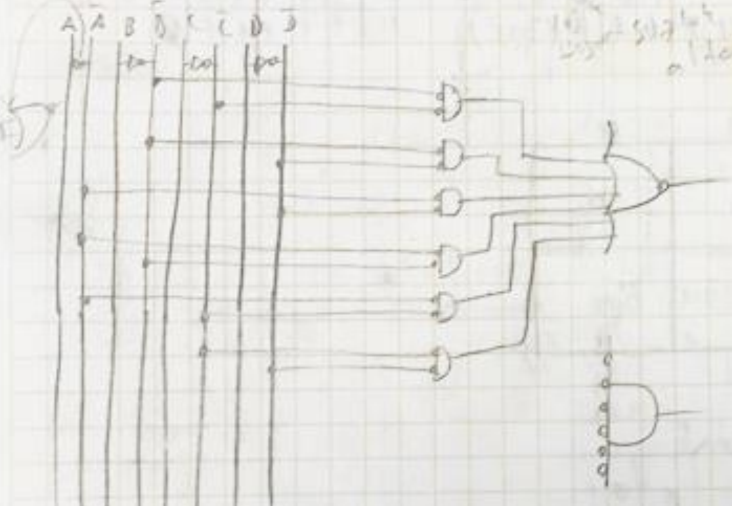


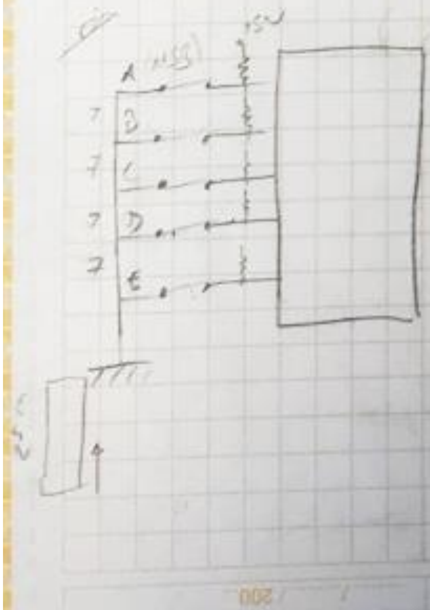
$f_{pos} = \overline{(\bar{B}+\bar{C}) \cdot (\bar{B}+\bar{D})(\bar{A}+\bar{D})(\bar{A}+\bar{B})(\bar{A}+\bar{C})(\bar{C}+\bar{D})}$

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

$f_{pos} = \overline{\overline{(\bar{B}+\bar{C})} + \overline{(\bar{B}+\bar{D})} + \overline{(\bar{A}+\bar{D})} + \overline{(\bar{A}+\bar{B})} + \overline{(\bar{A}+\bar{C})} + \overline{(\bar{C}+\bar{D})}}$ NOR

$f_{pos} = \overline{X+Y+Z+W+M+N}$ } NOR





Şekilde bir fotokopi makinesi görülüyor
A, B, C, D fotokopi makinesinde
kağıdın yolu üzerine sıralı dizilmiş
A, B, C, D çıkışı 4 ler sanki anahtarlı
Normalde kapalı kağıt anahtarlar
üzerinden geçerken açılıyor sonra
tekrar kapanıyor iki veya daha
fazla anahtar açık ile lojik
0 çıkışı verecek bir devreyi
yalnızca NOR kapılarını kullanarak
gerçekleştirin 2 mertebeden terimleri
her ikisini kullanın

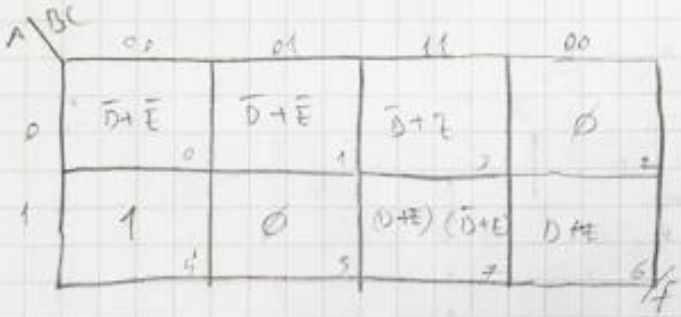
OSOW

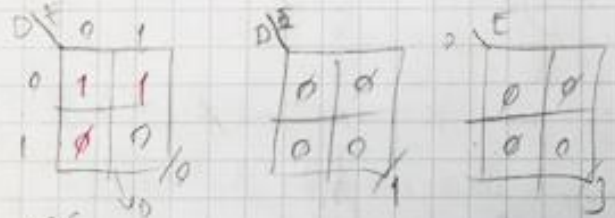
solution

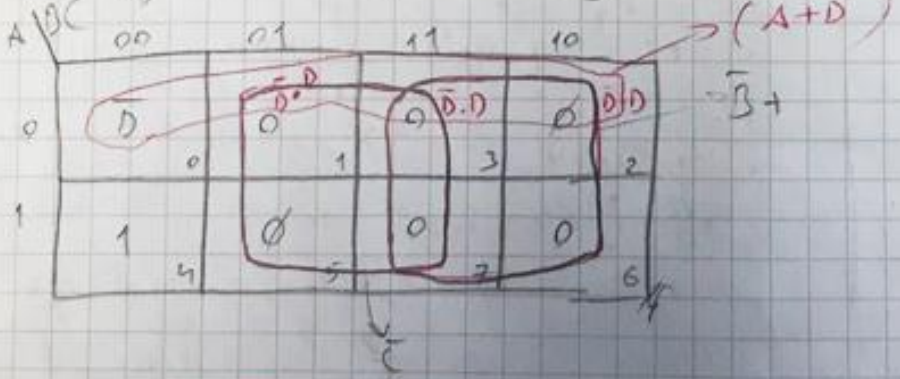
	A	B	C	D	E	f	
0	0	0	0	0	0	1	
1	0	0	0	0	1	1	
2	0	0	0	1	0	Ø	
3	0	0	0	1	1	0	$\bar{D}+\bar{E}$
4	0	0	1	0	0	Ø	
5	0	0	1	0	1	Ø	
6	0	0	1	1	0	Ø	
7	0	0	1	1	1	0	$\bar{D}+\bar{E}$
8	0	1	0	0	0	Ø	
9	0	1	0	0	1	Ø	
10	0	1	0	1	0	Ø	
11	0	1	0	1	1	Ø	
12	0	1	1	0	0	Ø	
13	0	1	1	0	1	Ø	
14	0	1	1	1	0	Ø (0)	
15	0	1	1	1	1	0	$(\bar{D}+\bar{E})$

	A	B	C	D	E	
16	1	0	0	0	0	1
17	1	0	0	0	1	Ø
18	1	0	0	1	0	Ø
19	1	0	0	1	1	Ø
20	1	0	1	0	0	Ø
21	1	0	1	0	1	Ø
22	1	0	1	1	0	Ø
23	1	0	1	1	1	Ø
24	1	1	0	0	0	0 $\bar{D}+\bar{E}$
25	1	1	0	0	1	Ø
26	1	1	0	1	0	Ø
27	1	1	0	1	1	Ø
28	1	1	1	0	0	0 $\bar{D}+\bar{E}$
29	1	1	1	0	1	Ø
30	1	1	1	1	0	0 $\bar{D}+\bar{E}$
31	1	1	1	1	1	Ø

$N=5$
$n=3$
$N-n=2$
$2^2=4$ → map key







$$f_{pos} = (A+\bar{D}).(\bar{B}).(\bar{C}) = \overbrace{\overline{A+\bar{D}}}^{NOR} + B + C \} NOR$$