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Truth Table

Kmap with Don't cares

Kmap without Don't cares

SUM of PRODUCTS

Map

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	0	1	1	1
AB	1	1	1	1
$A\bar{B}$	1	1	1	1

Map Layout

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	0	1	3	2
$\bar{A}B$	4	5	7	6
AB	12	13	15	14
$A\bar{B}$	8	9	11	10

Groups

(2,3,6,7,10,11,14,15)	C
(8,9,10,11,12,13,14,15)	A
(0,2,8,10)	$\bar{B}\bar{D}$
(5,7,13,15)	$\bar{B}D$

Clear

$$y = C + A + \bar{B}\bar{D} + \bar{B}D$$

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	0	1	1	1
AB	1	1	1	1
$A\bar{B}$	1	1	1	1

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	0	1	1	1
AB	1	1	1	1
$A\bar{B}$	1	1	1	1

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	0	1	1	1
AB	1	1	1	1
$A\bar{B}$	1	1	1	1

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	0	1	1	1
AB	1	1	1	1
$A\bar{B}$	1	1	1	1

Truth Table

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

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A

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Map

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	1	1	1
$\bar{A}B$	1	0	1	0
AB	0	1	0	0
$A\bar{B}$	1	1	1	1

Map Layout

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	0	1	3	2
$\bar{A}B$	4	5	7	6
AB	12	13	15	14
$A\bar{B}$	8	9	11	10

Groups

(0,1,2,3,8,9,10,11)	\bar{B}
(0,4)	$\bar{A}\bar{C}\bar{D}$
(3,7)	$\bar{A}C\bar{D}$
(9,13)	$\bar{A}C\bar{D}$

Clear

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

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	1	1	1
$\bar{A}B$	1	0	1	0
AB	0	1	0	0
$A\bar{B}$	1	1	1	1

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	1	1	1
$\bar{A}B$	1	0	1	0
AB	0	1	0	0
$A\bar{B}$	1	1	1	1

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	1	1	1
$\bar{A}B$	1	0	1	0
AB	0	1	0	0
$A\bar{B}$	1	1	1	1

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	1	1	1
$\bar{A}B$	1	0	1	0
AB	0	1	0	0
$A\bar{B}$	1	1	1	1

Truth Table

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

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B

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SUM of PRODUCTS

Close $y = AC + AD + CD + AB + AB$

Map

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	1	1	0
$\bar{A}B$	1	1	1	1
AB	0	1	0	0
$A\bar{B}$	1	1	1	1

Map Layout

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	0	1	3	2
$\bar{A}B$	4	5	7	6
AB	12	13	15	14
$A\bar{B}$	8	9	11	10

Groups

(0,1,4,5)	$\bar{A}\bar{C}$
(1,3,5,7)	$\bar{A}D$
(1,5,9,13)	$\bar{C}D$
(4,5,6,7)	$\bar{A}B$
(8,9,10,11)	$\bar{A}\bar{B}$

Truth Table

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

C

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SUM of PRODUCTS

Close $y = CD + BC + BD + AC + BCD$

Map

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	1	0
$\bar{A}B$	1	1	0	1
AB	1	1	0	1
$A\bar{B}$	1	1	1	0

Map Layout

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	0	1	3	2
$\bar{A}B$	4	5	7	6
AB	12	13	15	14
$A\bar{B}$	8	9	11	10

Groups

(0,4,8,12)	$\bar{C}\bar{D}$
(4,5,12,13)	$\bar{B}\bar{C}$
(4,6,12,14)	$\bar{B}\bar{D}$
(8,9,12,13)	$\bar{A}\bar{C}$
(3,11)	$\bar{B}CD$

Truth Table

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

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Map

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	1	0
$\bar{A}B$	1	1	1
AB	0	0	0
AB	1	1	1

Map Layout

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	0	1	3
$\bar{A}B$	4	5	7
AB	12	13	15
AB	8	9	11

Groups

(0,1,5,9)	$\bar{B}\bar{C}$
(1,3,5,7)	$\bar{A}D$
(4,5,6,7)	$\bar{A}B$
(8,10)	$AB\bar{D}$

Clear

$$y = B\bar{C} + \bar{A}D + \bar{A}B + AB\bar{D}$$

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	1	0
$\bar{A}B$	1	1	1
AB	0	0	0
AB	1	1	0

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	1	0
$\bar{A}B$	1	1	1
AB	0	0	0
AB	1	1	0

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	1	0
$\bar{A}B$	1	1	1
AB	0	0	0
AB	1	1	0

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	1	0
$\bar{A}B$	1	1	1
AB	0	0	0
AB	1	1	0

Truth Table

	A	B	C	D	Y
0	0	0	0	0	1
1	0	0	0	1	1
2	0	0	1	0	0
3	0	0	1	1	1
4	0	1	0	0	1
5	0	1	0	1	1
6	0	1	1	0	1
7	0	1	1	1	1
8	1	0	0	0	1
9	1	0	0	1	1
10	1	0	1	0	1
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

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Map

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	0	1
$\bar{A}B$	1	1	0
AB	0	0	0
AB	1	1	0

Map Layout

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	0	1	3
$\bar{A}B$	4	5	7
AB	12	13	15
AB	8	9	11

Groups

(0,2,4,6)	$\bar{A}\bar{D}$
(2,3)	$\bar{A}B\bar{C}$
(4,5)	$\bar{A}B\bar{C}$
(8,9)	$\bar{A}B\bar{C}$

Clear

$$y = \bar{A}\bar{D} + \bar{A}B\bar{C} + \bar{A}B\bar{C} + \bar{A}B\bar{C}$$

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	0	1
$\bar{A}B$	1	1	0
AB	0	0	0
AB	1	1	0

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	0	1
$\bar{A}B$	1	1	0
AB	0	0	0
AB	1	1	0

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	0	1
$\bar{A}B$	1	1	0
AB	0	0	0
AB	1	1	0

$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	CD
$\bar{A}\bar{B}$	1	0	1
$\bar{A}B$	1	1	0
AB	0	0	0
AB	1	1	0

Truth Table

	A	B	C	D	Y
0	0	0	0	0	1
1	0	0	0	1	0
2	0	0	1	0	1
3	0	0	1	1	1
4	0	1	0	0	1
5	0	1	0	1	1
6	0	1	1	0	1
7	0	1	1	1	0
8	1	0	0	0	1
9	1	0	0	1	1
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

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Map

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	0	1
$\bar{A}B$	0	0	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

Map Layout

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	0	1	3	2
$\bar{A}B$	4	5	7	6
AB	12	13	15	14
$A\bar{B}$	8	9	11	10

Groups

(0,2)	$\bar{A}\bar{B}\bar{D}$
(2,6)	$\bar{A}\bar{B}C$
(8,9)	$A\bar{B}C$

Clear

$$y = \bar{A}\bar{B}\bar{D} + \bar{A}\bar{B}C + A\bar{B}C$$

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	0	1
$\bar{A}B$	0	0	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	0	1
$\bar{A}B$	0	0	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	0	1
$\bar{A}B$	0	0	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	0	1
$\bar{A}B$	0	0	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	0	1
$\bar{A}B$	0	0	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	0	1
$\bar{A}B$	0	0	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

Truth Table

	A	B	C	D	Y
0	0	0	0	0	1
1	0	0	0	1	0
2	0	0	1	0	1
3	0	0	1	1	0
4	0	1	0	0	0
5	0	1	0	1	0
6	0	1	1	0	1
7	0	1	1	1	0
8	1	0	0	0	1
9	1	0	0	1	1
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

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Map

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	1	1	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

Map Layout

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	0	1	3	2
$\bar{A}B$	4	5	7	6
AB	12	13	15	14
$A\bar{B}$	8	9	11	10

Groups

(0,2,4,6)	$\bar{A}\bar{B}$
(2,3)	$\bar{A}B\bar{C}$
(4,5)	$\bar{A}B\bar{C}$
(8,9)	$A\bar{B}\bar{C}$

Clear

$$y = \bar{A}\bar{D} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + AB\bar{C}$$

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	1	1	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	1	1	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	1	1	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	1	1	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	1	1	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	0	1	1
$\bar{A}B$	1	1	0	1
AB	0	0	0	0
$A\bar{B}$	1	1	0	0

Truth Table

	A	B	C	D	Y
0	0	0	0	0	1
1	0	0	0	1	0
2	0	0	1	0	1
3	0	0	1	1	1
4	0	1	0	0	1
5	0	1	0	1	1
6	0	1	1	0	1
7	0	1	1	1	0
8	1	0	0	0	1
9	1	0	0	1	1
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

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