

1. Solve the following K-Map:

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

Solution

$$\bar{A}C + A\bar{B}$$

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

Solution

$$\bar{A}\bar{B} + A\bar{B}$$

$$\bar{B}(\bar{A} + A)$$

$$\bar{B}(1)$$

$$\bar{B}$$

	\bar{C}	C
$\bar{A}\bar{B}$	0	1
$\bar{A}B$	0	1

TEJ4M K-Map Exercise

Name: _____

AB	0	1
$\bar{A}\bar{B}$	1	1

Solution

$$C + \bar{A}\bar{B}$$

2. Simplify the truth tables into K-Maps and solve.

A	B	X
0	0	1
0	1	0
1	0	0
1	1	1

K-Map

	A	
B	1	0
1	1	0
0	0	1

Solution:

$$F = AB + \overline{A}\overline{B}$$

A	B	C	X
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

K-Map

	A	
BC	1	0
00	1	1

01	0	0
10	0	1
11	0	1

Solution:

$$\overline{B}C + \overline{A}B$$

A	B	C	D	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

K-Map

	AB			
CD	11	01	10	00
11	0	0	1	0
01	0	0	0	0
10	0	0	0	1

00	1	1	1	0
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Solution:

$$\overline{BCD} + \overline{ABCD} + \overline{ABCD}$$

3. Simplify the following equations by using K-Maps.

a. $X = \overline{A}\overline{B}C + A\overline{B}\overline{C} + \overline{A}B\overline{C}$

Truth Table

A	B	C	X
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

K-maps

	A	
BC	0	1
00	0	0
01	0	1
10	1	1
11	0	0

Simplified Solution

$\overline{B}\overline{C} + \overline{A}B\overline{C}$

b. $X = ABC + \overline{A}\overline{B}\overline{C} + \overline{A}B\overline{C} + A\overline{B}\overline{C}$

Truth Table

A	B	C	X
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

K-maps

	A	
BC	0	1
00	1	0
01	0	0
11	0	1
10	1	1

Simplified Solution

$$\overline{A}\overline{C} + AB$$

$$c. X = ABC\overline{D} + \overline{A}B\overline{C}D + \overline{A}BC\overline{D} + \overline{A}BCD$$

Truth Table

A	B	C	D	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0

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

K-Map

	AB			
CD	11	01	10	00
11	0	1	0	0
01	0	1	0	0
10	1	1	0	0
00	0	0	0	0

Simplified Solution

$$\overline{A}BD + B\overline{C}\overline{D}$$

$$d. X = AB\overline{D} + \overline{B}C\overline{D} + A\overline{B}D + \overline{A}B\overline{C}D$$

Truth Table

A	B	C	D	X
0	0	0	0	0

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

K-Map

	AB			
CD	00	01	11	10
00	0	0	1	0
01	0	1	0	1
11	0	0	0	1
10	1	0	1	1

Simplified Solution

$$\overline{A}\overline{B}D + \overline{B}C\overline{D} + AB\overline{D} + \overline{A}B\overline{C}D$$