

## 1 Introduction

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## 2 Truth table

The table may be way to big to be displayed on the page. At generation time no calculation was done on the size of the table with respect to the width/height of the page.

### 2.1 Compacted truth table

<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>D</i>	<i>C</i>	<i>B</i>	<i>A</i>
0	0	0	0	—	—	—	—	—
0	0	0	1	0	—	—	—	—
0	0	0	1	1	0	1	0	0
0	0	1	0	0	—	—	—	—
0	0	1	0	1	0	1	0	1
0	0	1	1	0	0	1	1	0
0	—	1	1	1	—	—	—	—
0	1	0	0	0	—	—	—	—
0	1	0	0	1	0	1	1	1
0	1	0	1	0	1	0	0	0
0	1	0	1	1	—	—	—	—
0	1	1	0	0	1	0	0	1
0	1	1	0	1	—	—	—	—
—	1	1	1	0	—	—	—	—
1	0	0	0	0	—	—	—	—
1	—	—	—	1	—	—	—	—
1	0	0	1	0	1	0	1	1
1	0	1	0	0	1	1	0	0
1	0	1	1	0	—	—	—	—
1	1	0	0	0	0	0	1	1
1	1	0	1	0	—	—	—	—
1	1	1	0	0	—	—	—	—

## 2.2 Complete truth table

<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>D</i>	<i>C</i>	<i>B</i>	<i>A</i>
0	0	0	0	0	—	—	—	—
0	0	0	0	1	—	—	—	—
0	0	0	1	0	—	—	—	—
0	0	0	1	1	0	1	0	0
0	0	1	0	0	—	—	—	—
0	0	1	0	1	0	1	0	1
0	0	1	1	0	0	1	1	0
0	0	1	1	1	—	—	—	—
0	1	0	0	0	—	—	—	—
0	1	0	0	1	0	1	1	1
0	1	0	1	0	1	0	0	0
0	1	0	1	1	—	—	—	—
0	1	1	0	0	1	0	0	1
0	1	1	0	1	—	—	—	—
0	1	1	1	0	—	—	—	—
0	1	1	1	1	—	—	—	—
1	0	0	0	0	—	—	—	—
1	0	0	0	1	—	—	—	—
1	0	0	1	0	1	0	1	1
1	0	0	1	1	—	—	—	—
1	0	1	0	0	1	1	0	0
1	0	1	0	1	—	—	—	—
1	0	1	1	0	—	—	—	—
1	0	1	1	1	—	—	—	—
1	1	0	0	0	0	0	1	1
1	1	0	0	1	—	—	—	—
1	1	0	1	0	—	—	—	—
1	1	0	1	1	—	—	—	—
1	1	1	0	0	—	—	—	—
1	1	1	0	1	—	—	—	—
1	1	1	1	0	—	—	—	—
1	1	1	1	1	—	—	—	—

## 3 Karnaugh diagrams

This section shows various versions of the Karnaugh diagrams of the given functions.

### 3.1 Empty Karnaugh diagrams

<i>D</i> <i>X, Y, Z</i>									
<i>V, W</i>		000	001	011	010	110	111	101	100
00									
01									
11									
10									

*C* *X, Y, Z*

*V, W*

	000	001	011	010	110	111	101	100
00								
01								
11								
10								

*B* *X, Y, Z*

*V, W*

	000	001	011	010	110	111	101	100
00								
01								
11								
10								

*A* *X, Y, Z*

*V, W*

	000	001	011	010	110	111	101	100
00								
01								
11								
10								

### 3.2 Filled in Karnaugh diagrams

*D* *X, Y, Z*

*V, W*

	000	001	011	010	110	111	101	100
00	-	-	0	-	0	-	0	-
01	-	0	-	1	-	-	-	1
11	0	-	-	-	-	-	-	-
10	-	-	-	1	-	-	-	1

*C* *X, Y, Z*

<i>V, W</i>	000	001	011	010	110	111	101	100
00	-	-	1	-	1	-	1	-
01	-	1	-	0	-	-	-	0
11	0	-	-	-	-	-	-	-
10	-	-	-	0	-	-	-	1

*B* *X, Y, Z*

<i>V, W</i>	000	001	011	010	110	111	101	100
00	-	-	0	-	1	-	0	-
01	-	1	-	0	-	-	-	0
11	1	-	-	-	-	-	-	-
10	-	-	-	1	-	-	-	0

*A* *X, Y, Z*

<i>V, W</i>	000	001	011	010	110	111	101	100
00	-	-	0	-	0	-	1	-
01	-	1	-	0	-	-	-	1
11	1	-	-	-	-	-	-	-
10	-	-	-	1	-	-	-	0

### 3.3 Filled in Karnaugh diagrams with covers

*D* *X, Y, Z*

<i>V, W</i>	000	001	011	010	110	111	101	100
00	-	-	0	-	0	-	0	-
01	-	0	-	1	-	-	-	1
11	0	-	-	-	-	-	-	-
10	-	-	-	1	-	-	-	1

*C* X, Y, Z

V, W	000	001	011	010	110	111	101	100
00	-	-	1	-	1	-	1	-
01	-	1	-	0	-	-	-	0
11	0	-	-	-	-	-	-	-
10	-	-	-	0	-	-	-	1

*B* X, Y, Z

V, W	000	001	011	010	110	111	101	100
00	-	-	0	-	1	-	0	-
01	-	1	-	0	-	-	-	0
11	1	-	-	-	-	-	-	-
10	-	-	-	1	-	-	-	0

*A* X, Y, Z

V, W	000	001	011	010	110	111	101	100
00	-	-	0	-	0	-	1	-
01	-	1	-	0	-	-	-	1
11	1	-	-	-	-	-	-	-
10	-	-	-	1	-	-	-	0

## 4 Minimal expressions

$$D = V \cdot \overline{W} + \overline{V} \cdot W \cdot \overline{Z}$$

$$C = \overline{W} \cdot X + Z$$

$$B = \overline{W} \cdot Y \cdot \overline{Z} + \overline{X} \cdot \overline{Y}$$

$$A = V \cdot \overline{X} + \overline{V} \cdot \overline{Y}$$