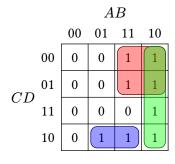
the k-mapper package 1.1.0



```
karnaugh(
   16,
   x-label: $A B$,
   y-label: $C D$,
   manual-terms: (
     0, 0, 1, 1, 0, 0, 1, 1,
     0, 1, 1, 1, 0, 0, 1, 0
   ),
   implicants: ((3, 6), (2, 10), (9, 11)),
)
```

Diagram 1: Example implementation and code of a Karnaugh map with k-mapper.

introduction

k-mapper is a Typst package for adding customizable Karnaugh maps of 2 by 2, 2 by 4, and 4 by 4 grid sizes to your Typst projects.

See the source code on the Github repository for the project <u>here</u>, and the changelog <u>here</u>.

using karnaugh()

The main function of this package is the karnaugh() function, which allows you to create and customize all sizes of Karnaugh maps. See the following pages for function arguments.

gray code position

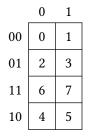
The position of implicants in k-mapper are declared via *Gray code position*. This is similar to Karnaugh map packages in LaTeX.

The Gray code position of a cell is determined from the coordinates of that cell with respect to the binary axis labels.

The empty maps shown in Diagram 2 show each cell's Gray code position. Note that the Gray code position for a cell differs depending on the Karnaugh map's grid size.

Gray code position allows you to input minterms and maxterms using manual-terms simply by copying your truth table in that order.





	00	01	11	10
00	0	1	3	2
01	4	5	7	6
11	12	13	15	14
10	8	9	11	10

Diagram 2: Gray Code positions for three sizes of Karnaugh maps.

function arguments

name	default	description	example values
<pre>grid-size int</pre>	required	The size of the Karnaugh map's grid. This value can be only 4 (2 by 2), 8 (2 by 4), or 16 (4 by 4). Any other values will throw an error.	8
			16
x-label	\$\$	The label (usually a variable	\$ A \$
content		name) to go on the top (x-axis) of the Karnaugh map.	[foo]
y-label	\$\$	The label (usually a variable	\$B\$
content		name) to go on the left (y-axis) of the Karnaugh map.	[bar]
minterms	none	The array of Gray code	(3, 4, 6)
(int) none		positions ¹ where at that position is a minterm (0). Mutually exclusive with	(1,)
		maxterms and manual-terms.	
<pre>maxterms (int) none</pre>	none	The array of Gray code positions¹ where at that position is a maxterm (1). Mutually exclusive with	(0, 1, 2, 3, 5, 11, 12)
		minterms and manual-terms.	
<pre>manual-terms (content) none</pre>	none	The array of content in each cell in order of Gray-code position ¹ . The length of this array <i>must</i> equal the grid-size. Mutually exclusive with minterms and maxterms.	// Grid-size 4 (0, "X", 1, 1)

¹See p. 1.

name	default	description	example values
<pre>implicants ((int, int),)</pre>	()	An array where each element is an array of two ints, where each int is a Gray code position ¹ corner of a <i>rectangular</i> implicant.	((0, 3), (1, 1)) ((0, 2),)
<pre>horizontal -implicants ((int, int),)</pre>	()	An array where each element is an array of two ints, where each int is a Gray code position ¹ corner of a <i>horizontal split</i> implicant — that is, one which wraps around the vertical edges of the Karnaugh map.	// Grid-size 16 ((0, 6), (8, 10))
<pre>vertical -implicants ((int, int),)</pre>	()	An array where each element is an array of two ints, where each int is a Gray code position¹ corner of a <i>vertical split</i> implicant — that is, one which wraps around the horizontal edges of the Karnaugh map.	// Grid-size 8 ((0, 4),) // Grid-size 16 ((0, 9), (2, 10))
<pre>corner -implicants bool</pre>	false	A bool which indicates whether the Karnaugh map contains a corner split implicant — that is, one which wraps around both vertical and horizontal edges of the Karnaugh map.	true
cell-size length	20pt	The size of an individual cell in the Karnaugh map.	1cm
stroke-width length	0.5pt	The stroke width of the Karnaugh map grid.	0.2pt
colors (color)	array of:	An array of RGBA colors to be used in displaying implicants.	<pre>// Grayscale K-map (rgb(</pre>

name	default	description	example values
	green blue cyan magenta yellow	The first implicant uses the first color in the array, the second implicant the second color, etc. If there are more implicants than there are colors, each subsequent implicant will use the least recently used color (i.e. it wraps around). By default, all colors in colors have alpha values of 100.	200, 200, 200, 100
<pre>implicant-inset length</pre>	2pt	The inset of implicants within each cell.	3pt
<pre>edge-implicant -overflow length</pre>	5pt	How much <i>split implicants</i> (horizontal, vertical, corner) overflow the bounds of the grid.	2mm
<pre>implicant-radius length</pre>	5pt	The corner radius of implicants.	3mm
<pre>implicant-stroke -transparentize ratio</pre>	#-100%	The ratio to transparentize the stroke color of implicants by. If set to 0%, the stroke color of implicants are the same as the fill color, darked by the factor set in implicant-stroke-darken (60% by default). Negative values mean the stroke color becomes more opaque.	-50%
<pre>implicant-stroke -darken ratio</pre>	60%	The ratio to darken the stroke color of implicants by.	100%

name default description example values

```
implicant-stroke
-width
```

0.5pt

The stroke width of implicants.

1pt

length

examples

```
// Grayscale Karnaugh map
                           #karnaugh(
                0
                             4,
                             minterms: (0, ),
                             implicants: ((1, 3), (2, 3)),
                             colors: (rgb(100, 100, 100, 100), ) // <-
                           )
                           #karnaugh(
                  C
                             8,
                             x-label: $C$,
                             y-label: $A B$,
            01
                0
                             manual-terms: (0, 1, 0, 0, 0, "X", 1, 1),
       AB
            11
                             implicants: ((6, 7), ),
                             vertical-implicants: ((1, 5), )
            10
                           #karnaugh(
             CD
        00
           01
               11
                   10
                             16,
                             x-label: $C D$,
    00
            0
                0
                             y-label: $A B$,
                1
                             maxterms: (0, 2, 5, 7, 13, 15, 8, 10),
AB
    11
        0
                1
                    0
            1
                             implicants: ((5, 15), ),
                             corner-implicants: true
    10
                           )
                           #karnaugh(
                             8,
                             manual-terms: (0, 1, 2, 3, 4, 5, 6, 7),
            00
                             implicants: (
            01
                               (0, 0), (1, 1), (2, 2), (3, 3),
            11
                               (4, 4), (5, 5), (6, 6), (7, 7)
                             )
            10
                           )
```

```
CD
                          #karnaugh(
        00 01 11 10
                             16,
                            x-label: $C D$,
                            y-label: $A B$,
                7
    01
                            manual-terms: (
AB
        12 | 13
               (15)
    11
                               0, 1, 2, 3, 4, 5, 6, 7, 8,
                              9, 10, 11, 12, 13, 14, 15
    10
            9
                11
                   10
                             implicants: ((5, 7), (5, 13), (15, 15)),
                            vertical-implicants: ((1, 11), ),
                            horizontal-implicants: ((4, 14), ),
                             corner-implicants: true,
                          )
                  C
                          // No fill Karnaugh map
                0
                          #karnaugh(
                   1
                            8,
            00
                            x-label: $C$,
            01
                    3
                            y-label: $A B$,
       AB
                    7
            11
                            manual-terms: (0, 1, 2, 3, 4, 5, 6, 7),
                             implicants: ((0, 3), (2, 7)),
            10
                4
                            horizontal-implicants: ((4, 5), ),
                             colors: (rgb(255, 255, 255, 0), ),
                             implicant-stroke-width: 1pt
```

)