

Diagram illustrating a 4-variable Karnaugh map for the function  $Y_4$ . The map is a 4x4 grid with columns labeled  $X_1X_2$  (00, 01, 11, 10) and rows labeled  $X_3X_4$  (00, 01, 11, 10). The function  $Y_4$  is defined by the following values:

	$X_1X_2$ 00	01	11	10
$X_3X_4$ 00	0 <small>0000</small>	0 <small>0100</small>	0 <small>1100</small>	0 <small>1000</small>
01	1 <small>0001</small>	1 <small>0101</small>	1 <small>1101</small>	1 <small>1001</small>
11	0 <small>0011</small>	0 <small>0111</small>	0 <small>1111</small>	0 <small>1011</small>
10	1 <small>0010</small>	1 <small>0110</small>	1 <small>1110</small>	1 <small>1010</small>

The map shows two groups of 1s:

- A group of 4 cells (row 01) highlighted in green, representing the term  $\overline{X}_3 X_4$ .
- A group of 4 cells (row 10) highlighted in red, representing the term  $X_3 \overline{X}_4$ .

The function  $Y_4$  is the sum of these two groups:

$$Y_4 = \underline{X_3 \overline{X}_4} + \underline{\overline{X}_3 X_4}$$