

Diagram illustrating a 4-variable Karnaugh map for the function Y_2 . 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 map shows the function Y_2 as a sum of minterms.

The minterms are grouped into two groups:

- Group 1 (Red outline):** Minterms where $X_1 = 1$ and $X_2 = 0$ (0100, 0101, 0111, 0110).
- Group 2 (Green outline):** Minterms where $X_1 = 0$ and $X_2 = 1$ (0001, 0011, 0101, 0111).

The resulting Boolean expression is:

$$Y_2 = \underline{X_1 \bar{X}_2} + \underline{\bar{X}_1 X_2}$$