K-Map Exercises

2-Vairable

| x | 1 ×2 | |
|---|------|----------------|
| 0 | 0 | m_0 |
| 0 | 1 | m_1 |
| 1 | 0 | m ₂ |
| 1 | _1 | m_3 |
| | | |

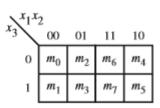
 x_2 x_1 x_2 x_1 x_2 x_1 x_2 x_3 x_4 x_4 x_4 x_5 x_5

(a) Truth table

(b) Karnaugh map

3-Variable K-Map

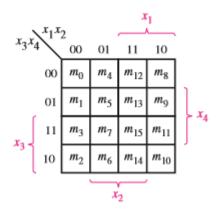
| х | 1 | x ₂ | <i>x</i> ₃ | |
|---|---|----------------|-----------------------|-------|
| (|) | 0 | 0 | m_0 |
| (|) | 0 | 1 | m_1 |
| (|) | 1 | 0 | m_2 |
| (|) | 1 | 1 | m_3 |
| 1 | l | 0 | 0 | m_4 |
|] | l | 0 | 1 | m_5 |
|] | l | 1 | 0 | m_6 |
|] | l | 1 | 1 | m_7 |
| | | | | |



(b) Karnaugh map

(a) Truth table

4-Variable K-Map



K-Map exercises

Example 1.

| A | В | С | F |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 |

 $F=B\sim C+AB$;

Exercise 1. Write Minimized Boolean Expression for this functions

| A | В | С | F1 | F2 | F3 | F4 |
|---|---|---|----|----|----|----|
| 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 | 1 | 1 | 1 |

K-Map Exercises

Exercise 2. Write the Simplest Boolean expression for below sum of product (SOP) and POS expression

- A. $\sum m(5,7,13,15)$.
- B. $\sum m(4,6,12,14)$.
- C. $\sum m(5,6,7,9,10,11,13,14,15)$
- D. ∏M(11,10,15,14).