# LISTA 5

## EXERCÍCIOS DE ACOMPANHAMENTO DA AULA

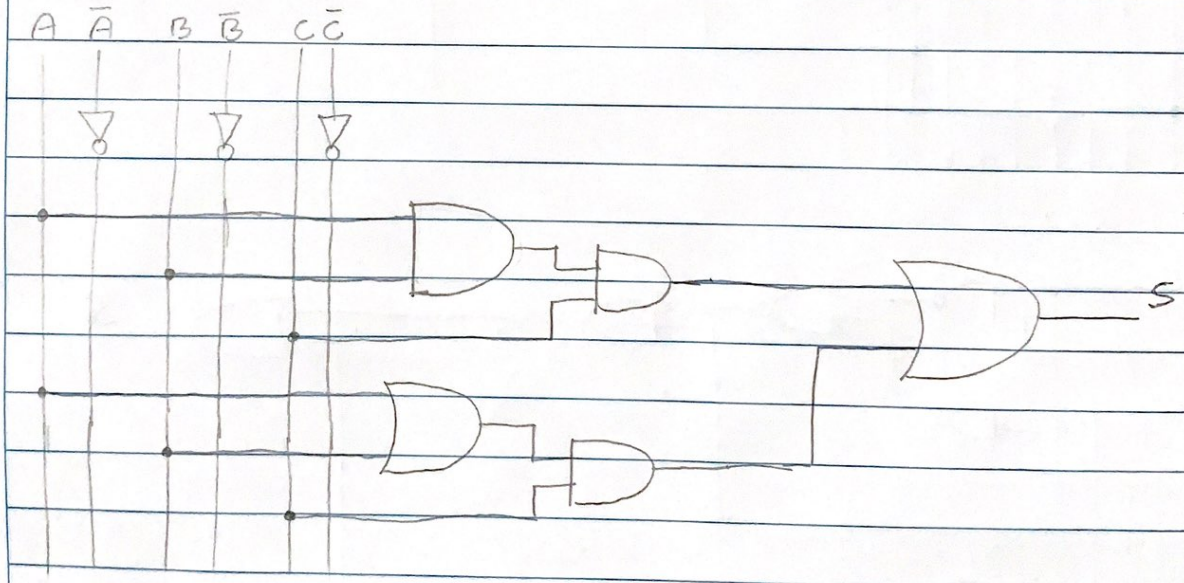
① $S = (A+B).(C+D)$

② $S = (A.B) + (\bar{C}) + \overline{(C+D)}$

$= AB + \bar{C} + \overline{(C+D)}$

③ $S = \left[\overline{(\bar{A}.B)} + \overline{(A.\bar{B})} + \bar{C}\right].(C+D)$

④ a) $S = ABC + (A+B)C$

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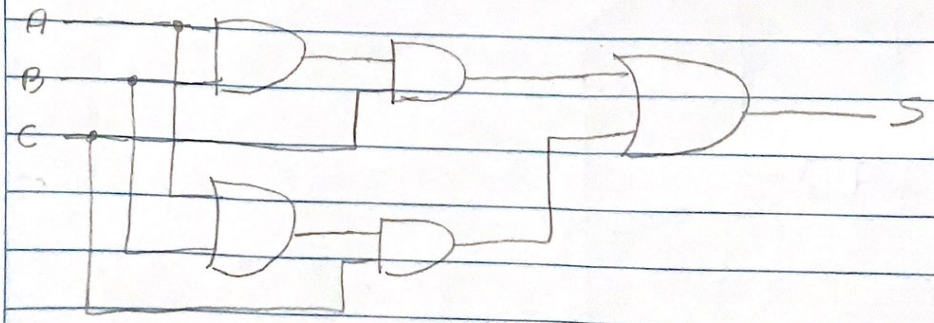
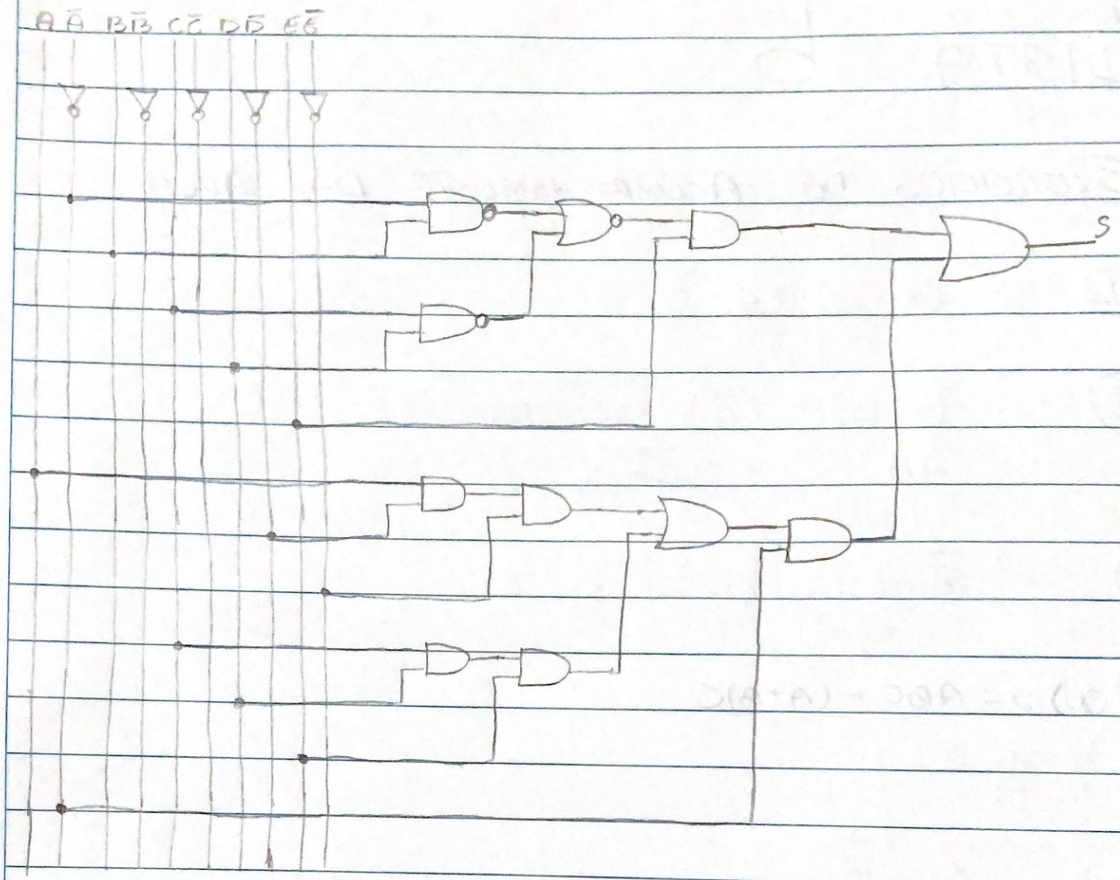


Q-) $S = \overline{[\overline{(\bar{A}.B)} + \overline{(C.\bar{D})}]}.E + \bar{A}.(A.\bar{D}.\bar{E} + CDE)$

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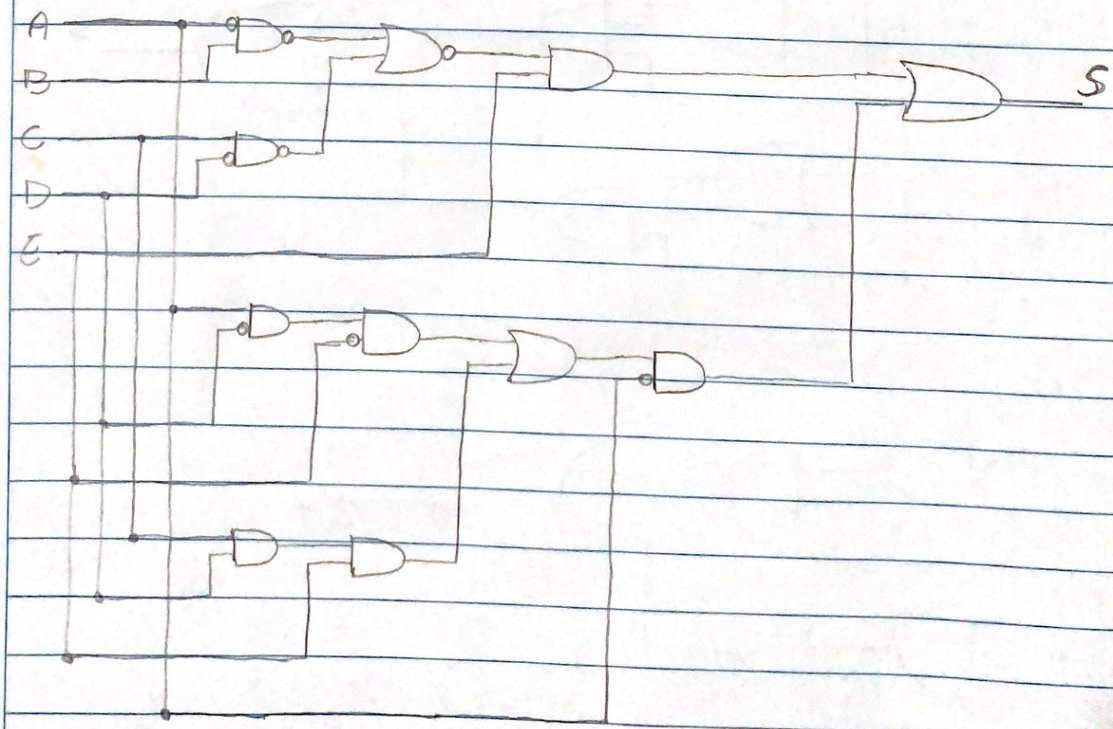


⑤ a) $S = (A+B) \cdot (B \cdot \overline{C})$

| A | B | C | $\bar{A}$ | $\bar{B}$ | $\bar{C}$ | $(A+B)$ | $(B \cdot \overline{C})$ | S |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |

b) $S = \overline{[(A+B) \cdot C]} + \overline{[D \cdot (B+C)]}$

| A | B | C | D | $[(A+B)C]$ | $[D(B+C)]$ | $\overline{[(A+B)C]}$ | $\overline{[D(B+C)]}$ | S |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |

⑥

| A | B | C | S |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

$S = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + AB\bar{C} + ABC$

Exercícios para fixação extra classe!

① $S = [\overline{(\bar{A}+\bar{B}+\bar{C}).(A+\bar{D}+B)}].\bar{A}B.\bar{C}$

Resolução no Logisim!

② $S = (\overline{\bar{A} + B \odot C + \bar{D}}) + \bar{D} + (\overline{\bar{B}.D + \bar{D}})$

Resolução no Logisim!

③ $S = \bar{A}[\overline{\bar{B}.(\overline{A+C}) + \bar{A}.\bar{B}.C}]$

| A | B | C | $\bar{A}\bar{B}\bar{C}$ | $(A+C)$ | $\overline{(A+C)}$ | $\bar{B}(\overline{A+C})$ | $\bar{A}\bar{B}C$ | $[\bar{B}(\overline{A+C})+\bar{A}\bar{B}C]$ | S |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |
| 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

④ $S = BD\{\overline{\bar{B} + C \odot D + \bar{A}[\overline{B.\bar{C} + \bar{B}C + A + B(\bar{C} + \bar{D})}]}\}$

| A B C D | $\bar{A}\bar{B}\bar{C}\bar{D}$ | $\bar{A}[B\bar{C} + \bar{B}C + A + B(\bar{C} + \bar{D})]$ | $\{\bar{B} + C \odot D + \bar{A}[B\bar{C} + \bar{B}C + A + B(\bar{C} + \bar{D})]\}$ | S |
|---|---|---|---|---|
| 0 0 0 0 | 1 | 1 | 0 | 0 |
| 0 0 0 1 | 1 | 1 | 0 | 0 |
| 0 0 1 0 | 1 | 0 | 0 | 0 |
| 0 0 1 1 | 1 | 0 | 0 | 0 |
| 0 1 0 0 | 1 | 0 | 1 | 0 |
| 0 1 0 1 | 1 | 0 | 0 | 0 |
| 0 1 1 0 | 1 | 1 | 0 | 0 |
| 0 1 1 1 | 1 | 0 | 1 | 1 |
| 1 0 0 0 | 1 | 0 | 0 | 0 |
| 1 0 0 1 | 1 | 0 | 0 | 0 |
| 1 0 1 0 | 1 | 0 | 0 | 0 |
| 1 0 1 1 | 1 | 0 | 0 | 0 |
| 1 1 0 0 | 1 | 0 | 1 | 0 |
| 1 1 0 1 | 1 | 0 | 0 | 0 |
| 1 1 1 0 | 1 | 0 | 0 | 0 |
| 1 1 1 1 | 0 | 0 | 1 | 1 |

⑤ $S = (\bar{A} + \bar{B})\{\overline{\bar{B} + (B \oplus C).[\bar{A}.B.\bar{C} + B(\overline{A + \bar{D}}) + B\bar{C} + \bar{B}D]} + ABD\}$

RESOLUÇÃO NO LOGISIM!

⑥ $\overline{(\overline{\bar{A}.B} + \overline{A.\bar{B}} + \bar{C})}.(C + D)$

⑦ $\overline{(\bar{B} + C) + \overline{(\bar{A}B + (C \oplus D))}}.(C + D + \bar{A} + \overline{(D + \bar{C} + B)}).\overline{((D\bar{C}B) + C + B + A)}$

(8)

$$\left[\overline{\left(\overline{(\bar{B}+C)+(\bar{A}B+(C\oplus D))}\right)+\left(\overline{\bar{B}(\overline{AD})}\right)}\right].B.\left[\overline{\left(\overline{(C\oplus D)+\left(\overline{\bar{B}(\overline{AD})}\right)}\right)}\right]$$

(9)

$\bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}\bar{D} + \bar{A}BC\bar{D} + AB\bar{C}D + ABCD = S$

RESOLUÇÃO DO CIRCUITO NO LOGISIM!

(10)

$\bar{A}B\bar{C}\bar{D} + \bar{A}BC\bar{D} + A\bar{B}\bar{C}\bar{D} + A\bar{B}CD = S$

RESOLUÇÃO DO CIRCUITO NO LOGISIM!

(11)

a) $f(X_1, X_2, X_3) = \sum_1 m(3,4,6,7)$ → MINTERMOS

$f(X_1, X_2, X_3) = \sum_1 (m_3, m_4, m_6, m_7)$

$= \bar{X}_1 X_2 X_3 + X_1 \bar{X}_2 \bar{X}_3 + X_1 X_2 \bar{X}_3 + X_1 X_2 X_3$

a) $f(X_1, X_2, X_3) = \sum_1 m(1,3,4,6,7)$ → MINTERMOS

$f(X_1, X_2, X_3) = \sum_1 (m_1, m_3, m_4, m_6, m_7)$

$= \bar{X}_1 \bar{X}_2 X_3 + \bar{X}_1 X_2 X_3 + X_1 \bar{X}_2 \bar{X}_3 + X_1 X_2 \bar{X}_3 + X_1 X_2 X_3$

(12)

a) $f(X_1, X_2, X_3) = \Pi M(0,2,5)$ → MAXTERMOS

$f(X_1, X_2, X_3) = \Pi(M_0, M_2, M_5)$

$= (X_1 + X_2 + X_3)(X_1 + \bar{X}_2 + X_3)(\bar{X}_1 + X_2 + \bar{X}_3)$

a) $f(x_1, x_2, x_3) = \Pi M(0, 1, 5, 7)$

$f(x_1, x_2, x_3) = \Pi(M_0, M_1, M_5, M_7)$

$= (x_1 + x_2 + x_3)(x_1 + x_2 + \bar{x}_3)(\bar{x}_1 + x_2 + \bar{x}_3)(\bar{x}_1 + \bar{x}_2 + \bar{x}_3)$

(13)

| $x_1$ | $x_2$ | $x_3$ | |
|---|---|---|---|
| 0 | 0 | 0 | |
| 0 | 0 | 1 | |
| 0 | 1 | 0 | |
| 0 | 1 | 1 | $m_3 = \bar{x}_1 x_2 x_3$ |
| 1 | 0 | 0 | |
| 1 | 0 | 1 | $m_5 = x_1 \bar{x}_2 x_3$ |
| 1 | 1 | 0 | $m_6 = x_1 x_2 \bar{x}_3$ |
| 1 | 1 | 1 | $m_7 = x_1 x_2 x_3$ |

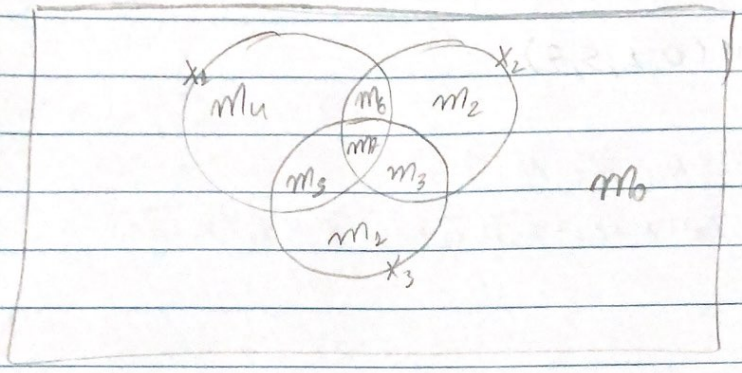
$f(x_1, x_2, x_3) = m_3 + m_5 + m_6 + m_7$

$= \bar{x}_1 x_2 x_3 + x_1 \bar{x}_2 x_3 + x_1 x_2 \bar{x}_3 + x_1 x_2 x_3$

CIRCUITO NO LOGISIM!!!

(14) a)

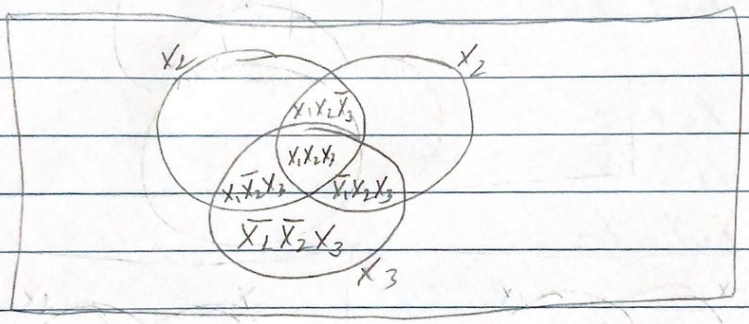
| LINHA | $x_1$ | $x_2$ | $x_3$ | MINTERMO |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | $m_0 = \bar{x}_1 \bar{x}_2 \bar{x}_3$ |
| 1 | 0 | 0 | 1 | $m_1 = \bar{x}_1 \bar{x}_2 x_3$ |
| 2 | 0 | 1 | 0 | $m_2 = \bar{x}_1 x_2 \bar{x}_3$ |
| 3 | 0 | 1 | 1 | $m_3 = \bar{x}_1 x_2 x_3$ |
| 4 | 1 | 0 | 0 | $m_4 = x_1 \bar{x}_2 \bar{x}_3$ |
| 5 | 1 | 0 | 1 | $m_5 = x_1 \bar{x}_2 x_3$ |
| 6 | 1 | 1 | 0 | $m_6 = x_1 x_2 \bar{x}_3$ |
| 7 | 1 | 1 | 1 | $m_7 = x_1 x_2 x_3$ |



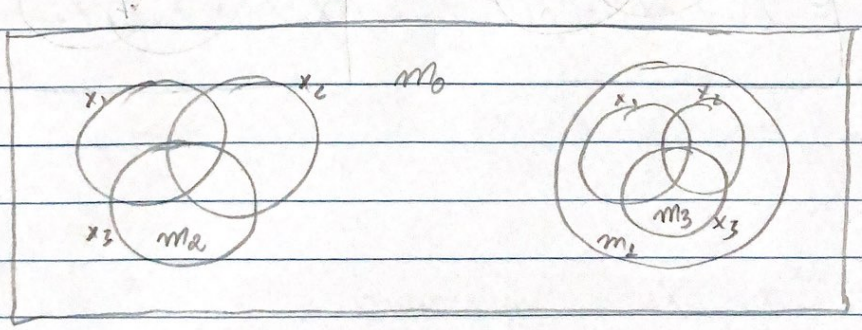

a) $f = x_1 \bar{x}_2 x_3 + x_1 x_2 + \bar{x}_1 x_3$

$= x_1 \bar{x}_2 x_3 + x_1 x_2 (x_3 + \bar{x}_3) + \bar{x}_1 x_3 (x_2 + \bar{x}_2)$

$= x_1 \bar{x}_2 x_3 + x_1 x_2 x_3 + x_1 x_2 \bar{x}_3 + \bar{x}_1 x_2 x_3 + \bar{x}_1 \bar{x}_2 x_3$




(15)




$f(x_1 x_2 x_3 x_4) = \underbrace{\bar{x}_1 \bar{x}_2 \bar{x}_3 \bar{x}_4}_{m_0} + \underbrace{\bar{x}_1 \bar{x}_2 \bar{x}_3 x_4}_{m_1} + \bar{x}_1 \bar{x}_2 x_3$

$= \bar{x}_1 \bar{x}_2 \bar{x}_3 \bar{x}_4 + \bar{x}_1 \bar{x}_2 \bar{x}_3 x_4 + \bar{x}_1 \bar{x}_2 x_3 (x_4 + \bar{x}_4)$

$= \underbrace{\bar{x}_1 \bar{x}_2 \bar{x}_3 \bar{x}_4}_{m_0} + \underbrace{\bar{x}_1 \bar{x}_2 \bar{x}_3 x_4}_{m_1} + \underbrace{\bar{x}_1 \bar{x}_2 x_3 x_4}_{m_3} + \underbrace{\bar{x}_1 \bar{x}_2 x_3 \bar{x}_4}_{m_2}$