# Folha de exercícios #6

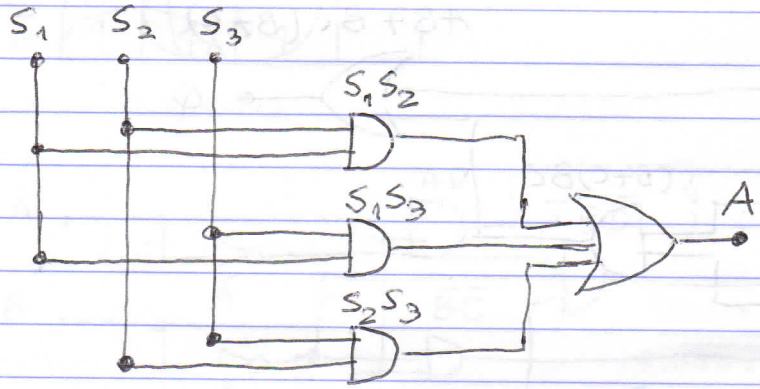
1. Sensores: $S_1, S_2, S_3$
   Alarme: $A = A(S_1, S_2, S_3)$

| $S_1$ | $S_2$ | $S_3$ | A |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

$$A = \bar{S}_1 S_2 S_3 + S_1 \bar{S}_2 S_3 + S_1 S_2 \bar{S}_3 + S_1 S_2 S_3$$

| | $\bar{S}_2\bar{S}_3$ | $\bar{S}_2 S_3$ | $S_2 S_3$ | $S_2\bar{S}_3$ |
|---|---|---|---|---|
| $\bar{S}_1$ | | | 1 | |
| $S_1$ | | 1 | 1 | 1 |

$$A = S_2 S_3 + S_1 S_2 + S_1 S_3$$



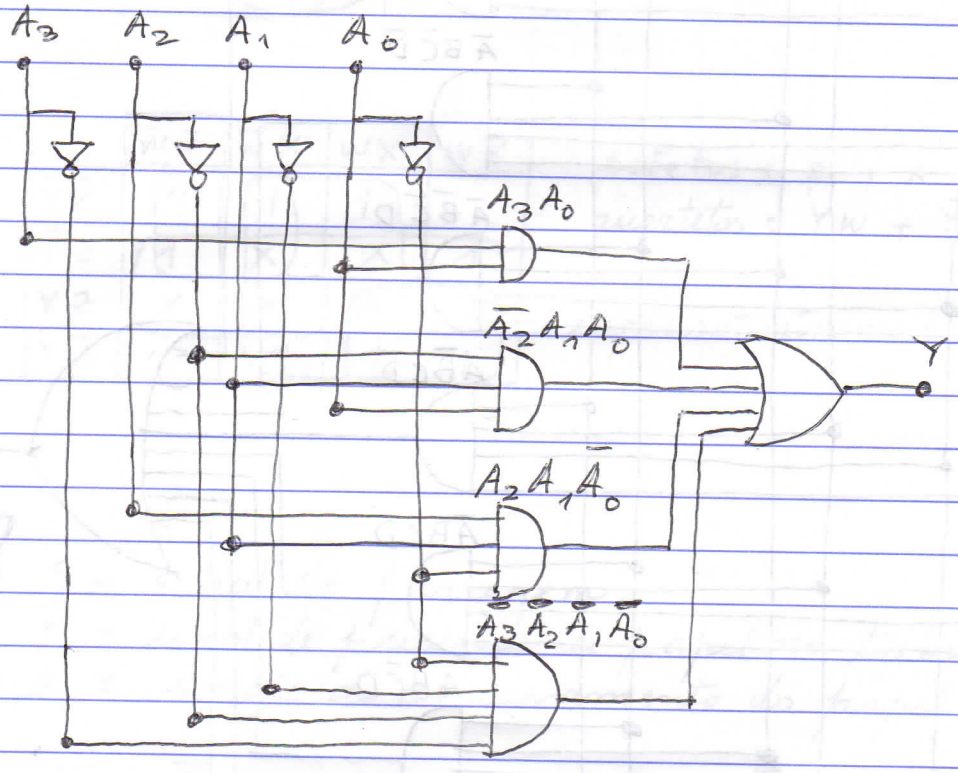

2.

| decimal | $A_3$ | $A_2$ | $A_1$ | $A_0$ | Y | decimal | $A_3$ | $A_2$ | $A_1$ | $A_0$ | $\bar{Y}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 1 | 8 | 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 0 | 9 | 1 | 0 | 0 | 1 | 1 |
| 2 | 0 | 0 | 1 | 0 | 0 | 10 | 1 | 0 | 1 | 0 | X |
| 3 | 0 | 0 | 1 | 1 | 1 | 11 | 1 | 0 | 1 | 1 | X |
| 4 | 0 | 1 | 0 | 0 | 0 | 12 | 1 | 1 | 0 | 0 | X |
| 5 | 0 | 1 | 0 | 1 | 0 | 13 | 1 | 1 | 0 | 1 | X |
| 6 | 0 | 1 | 1 | 0 | 1 | 14 | 1 | 1 | 1 | 0 | X |
| 7 | 0 | 1 | 1 | 1 | 0 | 15 | 1 | 1 | 1 | 1 | X |

| | $\bar{A}_1\bar{A}_0$ | $\bar{A}_1 A_0$ | $A_1 A_0$ | $A_1\bar{A}_0$ |
|---|---|---|---|---|
| $\bar{A}_3\bar{A}_2$ | 1 | | 1 | |
| $\bar{A}_3 A_2$ | | | | 1 |
| $A_3 A_2$ | X | X | X | X |
| $A_3\bar{A}_2$ | | 1 | X | X |

expressão mínima:

$$A_3A_0 + \bar{A}_2A_1A_0 + A_2A_1\bar{A}_0 + \bar{A}_3\bar{A}_2\bar{A}_1\bar{A}_0$$




3.

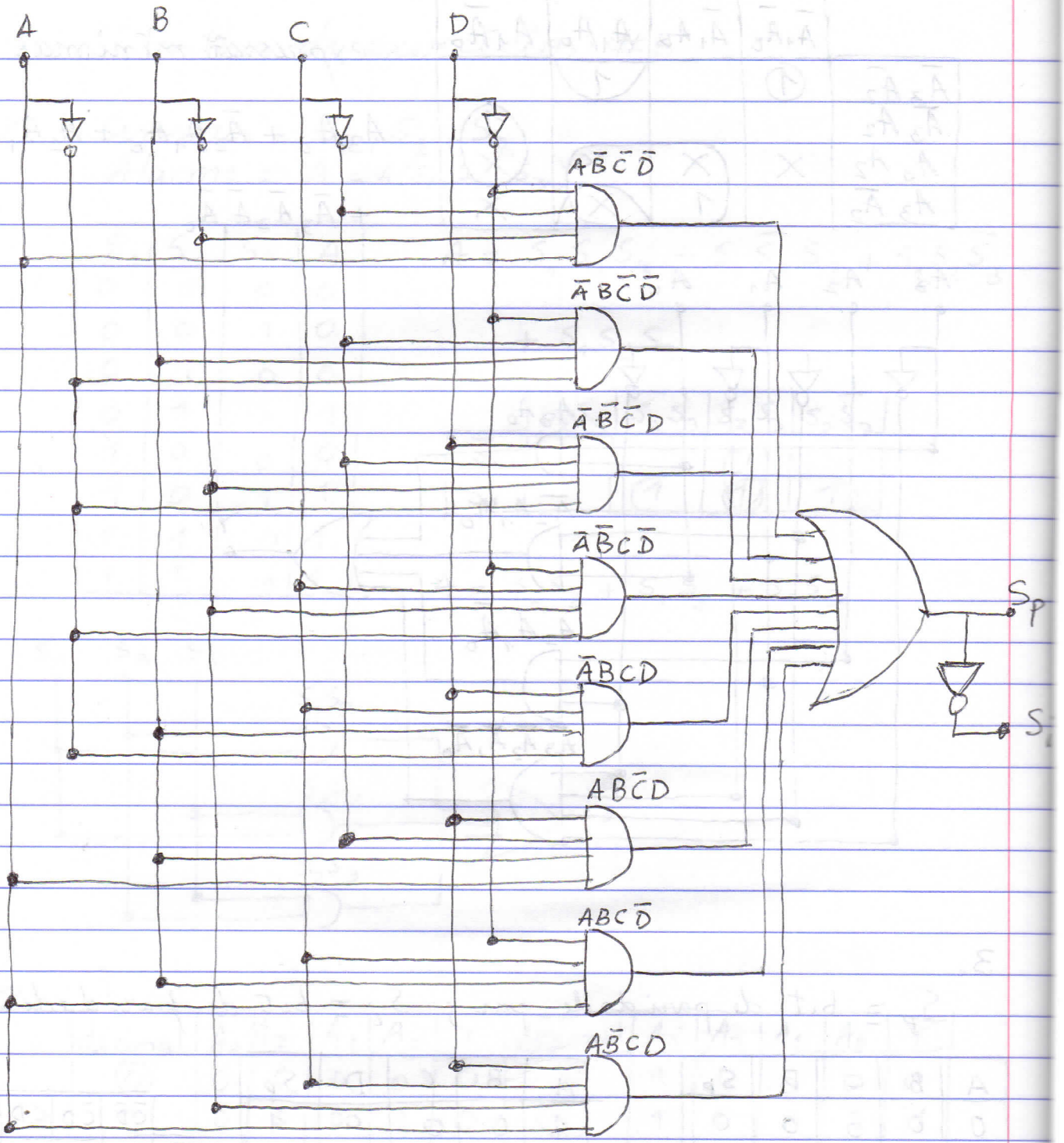
$S_p \equiv$ bit de paridade par ; $S_i \equiv$ bit de paridade ímpar

| A | B | C | D | $S_p$ |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 | 1 |

| A | B | C | D | $S_p$ |
|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 | 0 |

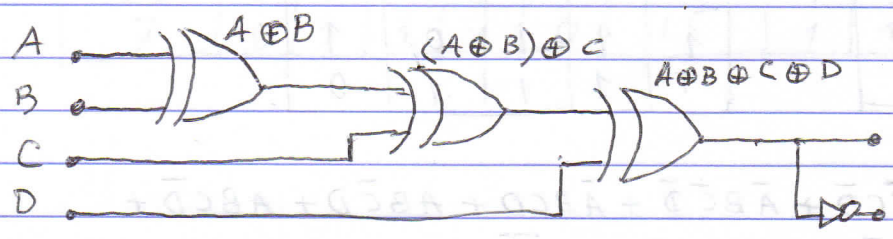
| | $\bar{C}\bar{D}$ | $\bar{C}D$ | $CD$ | $C\bar{D}$ |
|---|---|---|---|---|
| $\bar{A}\bar{B}$ | | 1 | | 1 |
| $\bar{A}B$ | 1 | | 1 | |
| $AB$ | | 1 | | 1 |
| $A\bar{B}$ | 1 | | 1 | |

$$S_p = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}\bar{D} + \bar{A}BCD + AB\bar{C}D + ABC\bar{D} + A\bar{B}\bar{C}\bar{D} + A\bar{B}CD \quad ; \quad S_i = \bar{S}_p = \ldots$$




Alternativa: $S_p = A \oplus B \oplus C \oplus D$ ; $S_i = \overline{S_p}$

(ver exercício 4 da folha 3)



4.

a)

| | $\bar{w}\bar{x}$ | $\bar{w}x$ | $wx$ | $w\bar{x}$ |
|---|---|---|---|---|
| $\bar{y}\bar{z}$ | $\bar{y}$ | | X | |
| $\bar{y}z$ | X | 1 | X | 1 |
| $yz$ | 1 | 1 | X | X |
| $y\bar{z}$ | | 1 | X | X |

octeto: $z$

quarteto: $xy$

expressão mínima: $z + xy$

b)

| | $\bar{w}\bar{x}$ | $\bar{w}x$ | $wx$ | $w\bar{x}$ |
|---|---|---|---|---|
| $\bar{y}\bar{z}$ | 1 | 1 | 1 | |
| $\bar{y}z$ | 1 | X | X | 1 |
| $yz$ | X | X | X | X |
| $y\bar{z}$ | | 1 | 1 | 1 |

octetos: $z + x$

quartetos: $yw + \bar{y}\bar{w}$

expressão mínima: $z + x + wy + \bar{w}\bar{y}$

5.

$S \equiv$ sinal de paragem

$P \equiv$ sinal de presença de papel no tabuleiro

$Q, R \equiv$ sinais de encravamento do papel

$S = \bar{P} + QR$

$S = \bar{\bar{S}} = \overline{\bar{P} + QR} = P \cdot \overline{QR}$