1º prova de circuitos digitais

Thayse de Jesus Mendes (20150459)

1.1-) 13527 -> base 8 para base 6

$1.8^4 + 3.8^3 + 5.8^2 + 2.8^1 + 7.8^0 \to 1.4096 + 3.512 + 5.64 +$

$2.8 + 7.1 \to 4096 + 1536 + 320 + 16 + 7 \to 5975_{10}$

5975 | 6
(5) 995 | 6
(5) 165 | 6
(3) 27 | 6
(3) (4)

R: 43355_6

1.2-) 234,12 -> base 6 para base 10

$2.6^2 + 3.6^1 + 4.6^0 + 1.6^{-1} + 2.6^{-2} \to 2.36 + 3.6 + 4.1 +$

$1.0,16 + 2.0,02 \to 72 + 18 + 4 + 0,16 + 0,04 \to 94,2_{10}$

R: $94,2_{10}$

1.3-) 1233 -> base 10 para base 2

1233 | 2
(1) 616 | 2
(0) 308 | 2
(0) 154 | 2
(0) 77 | 2
(1) 38 | 2
(0) 19 | 2
(1) 9 | 2
(1) 4 | 2
(0) 2 | 2
(0) (1)

R: 10011010001_2

1.4-) 3FF → base 16 para base 2

$F = 15_{10}$

$3 \cdot 16^2 + 15 \cdot 16^1 + 15 \cdot 16^0 \rightarrow 3 \cdot 256 + 15 \cdot 16 + 15 \cdot 1 \rightarrow$

$768 + 240 + 15 \rightarrow 1023_{10}$

$$
\begin{array}{l}
1023 \,\underline{|2} \\
\quad 1 \quad 511 \,\underline{|2} \\
\quad\quad 1 \quad 255 \,\underline{|2} \\
\quad\quad\quad 1 \quad 127 \,\underline{|2} \\
\quad\quad\quad\quad 1 \quad 63 \,\underline{|2} \\
\quad\quad\quad\quad\quad 1 \quad 31 \,\underline{|2} \\
\quad\quad\quad\quad\quad\quad 1 \quad 15 \,\underline{|2} \\
\quad\quad\quad\quad\quad\quad\quad 1 \quad 7 \,\underline{|2} \\
\quad\quad\quad\quad\quad\quad\quad\quad 1 \quad 3 \,\underline{|2} \\
\quad\quad\quad\quad\quad\quad\quad\quad\quad 1 \quad 1
\end{array}
$$

R: 1111111111_2

2-) $f(A,B,C,D) = (A + B + \bar{C})(\bar{B} + \bar{D})(\bar{A} + C)(B + C) \rightarrow$

$(A\bar{B} + A\bar{D} + B\bar{B} + B\bar{D} + \bar{C}\bar{D}) \cdot (\bar{A} + C) \cdot (B + C) \rightarrow$

$(A\cancel{\bar{B}\bar{A}} + A\bar{D}\bar{A} + B\cancel{\bar{B}\bar{A}} + B\bar{D}A + \bar{C}\bar{D}\bar{A} + A\bar{B}C + A\bar{D}C + B\bar{B}C + B\bar{D}C$

$+ \bar{C}\bar{D}C) \cdot (B + C) \rightarrow$

$\cancel{A\bar{B}\bar{A}B} + \cancel{A}\bar{D}\cancel{\bar{A}}B + \bar{C}\bar{D}\bar{A}B + A\cancel{\bar{B}}C\cancel{B} + A\bar{D}CB + \cancel{B}\cancel{\bar{B}}CB + \cancel{B}\bar{D}C\cancel{B}$

$+ \cancel{\bar{C}}\bar{D}\cancel{C}B + \bar{A}\cancel{\bar{B}}\cancel{B}B + \cancel{\bar{A}}\bar{B}\cancel{A}C + \cancel{A}\bar{D}\cancel{\bar{A}}C + B\cancel{\bar{B}}\bar{A}C + B\bar{D}AC + \cancel{\bar{C}}\bar{D}\bar{A}\cancel{C}$

$+ A\bar{B}CC + A\bar{D}CC + \cancel{B}\cancel{\bar{B}}CC + B\bar{D}CC + \cancel{\bar{C}}\bar{D}\cancel{C}C \rightarrow$

$\bar{D}B + \bar{C}\bar{D}\bar{A}B + AC + A\bar{D}CB + CB + \bar{D}C + \bar{D}B + \bar{A}B + \bar{B}C + \bar{D}C$

$+ \bar{A}C + B\bar{D}AC + \bar{D}\bar{A} + A\bar{B}\cancel{C}C + A\bar{D}\cancel{C}C + \cancel{C}C + B\bar{D}\cancel{C}C + \bar{D}C \rightarrow$

$\bar{D}\cancel{B} + \bar{C}\bar{D}\bar{A}\cancel{B} + \cancel{AC} + A\bar{D}C\cancel{B} + \cancel{CB} + \bar{D}\cancel{C} + \bar{D}\cancel{B} + \bar{A}\cancel{B} + \bar{B}\cancel{C} + \bar{D}C$

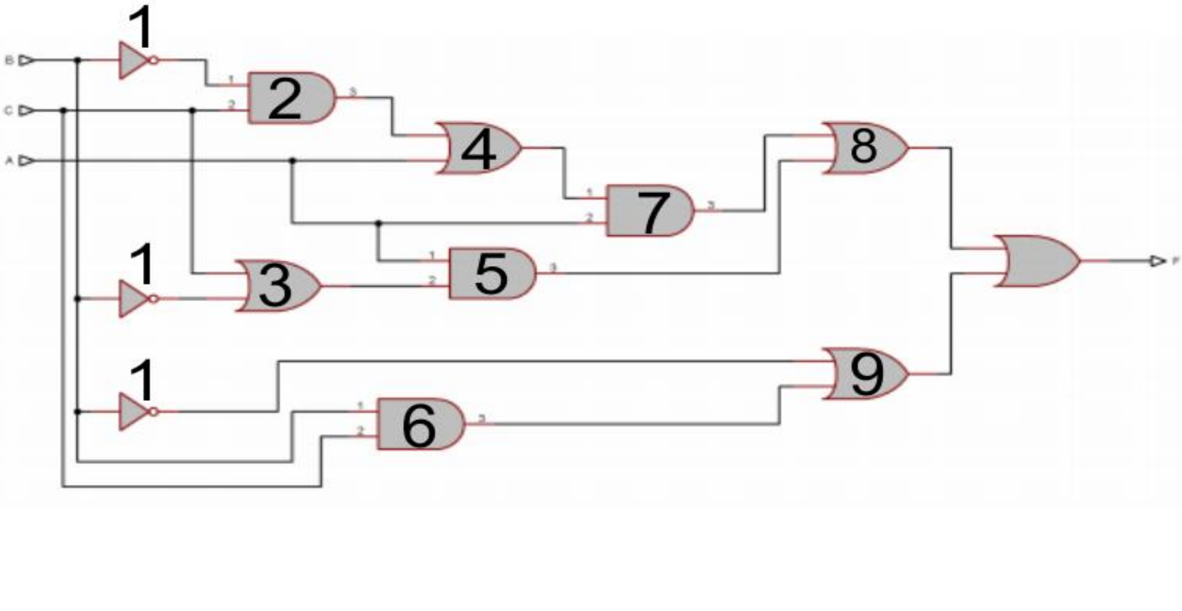
$+ \bar{A}\cancel{C} + B\bar{D}AC + \bar{D}\bar{A} + A\bar{B}\cancel{C} + A\bar{D}\cancel{C} + C + B\bar{D}C + \bar{D}C \rightarrow$

$$B(\cancel{\bar D} + \bar C\bar D\bar A + A\cancel{\bar D}C + C + \cancel{\bar D} + \bar A + \cancel{\bar D A}C + \bar D C) + C.(A + \cancel{\bar B} +$$
$$\bar B + \cancel{\bar D} + \bar A + A\bar B + A\bar D + 1 + \cancel{\bar B}) + \bar D\bar A \to$$
$$B(\bar D + \bar C\bar D\bar A + A\bar D C + C + \bar A + \bar D C) + C.(\cancel{A} + \bar D + \bar B + \cancel{\bar A} + A\bar B + A\bar D$$
$$+ 1) + \bar D\bar A$$
$$B.(\bar D + \bar C\bar D\bar A + A\bar D C + C + \bar A + \bar D C) + C.(\cancel{1} + \bar D + \bar B + A\bar B + A\bar D + \cancel{1})$$
$$+ \bar D\bar A \to$$
$$B\bar D + B\bar C\bar D\bar A + BA\bar D C + BC + B\bar A + B\bar D C + C + C\bar D + C\bar B + A\bar B C +$$
$$A\bar D C + \bar D\bar A \to$$
$$B(\bar D + \bar C\bar D\bar A + A\bar D C + C + \bar A + \bar D\cancel{C}) + C.(\bar D + 1 + \bar B + A\bar B +$$
$$A\bar D) + \bar D\bar A \to$$
$$\cancel{B\bar D} + B\bar C\bar D\bar A + BA\bar D C + \cancel{BC} + B\bar A + \cancel{\bar D} + \cancel{C\bar D} + \cancel{C} + \underset{c}{\cancel{\bar B C}} + A\bar B C + A\bar D C +$$
$$\cancel{\bar D\bar A} \to$$
$$\cancel{\bar D} + B\bar C\bar D A + BA\bar D C + \cancel{C} + B\bar A + \cancel{C\bar D} + \cancel{\bar B C} + A\bar B C + A\bar D C \to$$
$$\bar D + B\bar C\bar D A + BA\bar D C + C + B\bar A + A\bar B C + A\bar D C \to$$
$$\bar D.(B\cancel{\bar C}A + BA\cancel{C} + AC) + C(A\bar B) + B\bar A \to$$
$$\bar D.(\cancel{BA} + \cancel{BA} + AC) + C.(A\bar B) + B\bar A \to$$
$$\cancel{\bar D}.(\cancel{BA} + AC) + C.(A\bar B) + \cancel{B\bar A} \to$$
$$\bar A BC + \bar A B\bar D + AC\bar D$$

$$R: A\bar B C + \bar A B\bar D + AC\bar D$$

3-) $R: \bar B$ (1)
$\bar B C$ (2)
$\bar B + C$ (3)
$\bar B C + A$ (4)
$(\bar B + C)A$ (5)
BC (6)
$(\bar B C + A).A$ (7)
$(\bar B C + A)A + (\bar B + C).A$ (8)
$BC + \bar B$ (9)

$$R: (\bar B C + A)A + (\bar B + C)A + (BC + \bar B)$$



3.2-) $(\bar{B}C + A).A + (\bar{B} + C)A + (BC + \bar{B}) \rightarrow$

$A\bar{B}C + AA + AC + A\bar{B} + BC + \bar{B} \rightarrow$

$A(\bar{B}C + A + C + \bar{B}) + BC + \bar{B} \rightarrow$

$A(\bar{B} + A + C) + BC + \bar{B} \rightarrow$

$\cancel{A\bar{B}} + \cancel{AA} + \cancel{AC} + \cancel{BC} + \bar{B} \rightarrow$

$\bar{B} + A + C$

4-)

DE\ABC	000	001	011	010	110	111	101	100
00								
01	1	1	1	1	1	1	1	1
11								
10	x=1	1	1	x=1	1	x=1		

ABCd = 0 e = 1 $\quad \bar{D}E$

A = 0 BCd = 1 e = 0 $\quad \bar{A}D\bar{E}$

A B = 1 C D = 1 e = 0 $\quad BD\bar{E}$

R: $\bar{D}E + \bar{A}D\bar{E} + BD\bar{E}$

5.1-) $\overline{A\bar{B}C}(D + \bar{D}) + \overline{AB\bar{D}}(C + \bar{C})$

$\overline{A\bar{B}CD} + \overline{A\bar{B}C\bar{D}} + \overline{AB\bar{D}C} + \overline{AB\bar{D}\bar{C}}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

1011 1010 1110 1100

11 10 14 12

R: (10, 11, 12, 14)

5.2-) $\bar{A} + B(\bar{C}+D) + \bar{A}BC$

$\bar{A} + B(\bar{C}+D) + \bar{A}BC$

$\bar{A} + B\bar{C} + BD + \bar{A}BC$

$\bar{A}(1 + BC) + \bar{B}C + BD$

$\bar{C}D \setminus \bar{A}B$	00	01	11	10
00	1	1	1	0
01	1	1	1	0
11	1	1	1	0
11	1	1	1	0
10	1	1	0	0

R: $\Sigma m = (0, 1, 2, 3, 4, 5, 6, 7, 12, 13, 15)$