ESCOM - IPN

Fundamentos de Diseño Digital - 2CM2

Minimización Algebraíca

Reporte 2

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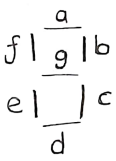
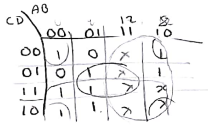
1. Comparador de Magnitud

1.1. Parte Teórica

ABCD	a	b	c	d	e	f	g
0000	1	1	1	1	1	1	0
0001	0	1	1	0	0	0	0
0010	1	1	0	1	1	0	1
0011	1	1	1	1	0	0	1
0100	0	1	1	0	0	1	1
0101	1	0	1	1	0	1	1
0110	1	0	1	1	1	1	1
0111	1	1	1	0	0	0	1
1000	1	1	1	1	1	1	1
1001	1	1	1	1	0	1	1
1010	x	x	x	x	x	x	x
1011	x	x	x	x	x	x	x
1100	x	x	x	x	x	x	x
1101	x	x	x	x	x	x	x
1110	x	x	x	x	x	x	x
1111	x	x	x	x	x	x	x

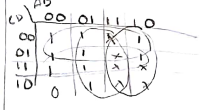


$a = \Sigma(0,2,3,5,7,8,9) + \Phi(10\text{-}15)$



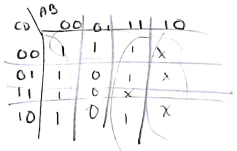
$a = \bar{B}\bar{D} + A + C + BD$

$c = \Sigma(0,1,3,4,5,6,7,8,9) + \Phi(10\text{-}15)$



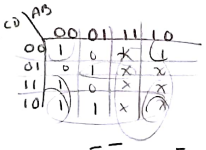
$c = A + B + D + \bar{C}$

$b = \Sigma(0,1,2,3,4,7,8,9) + \Phi(10\text{-}15)$



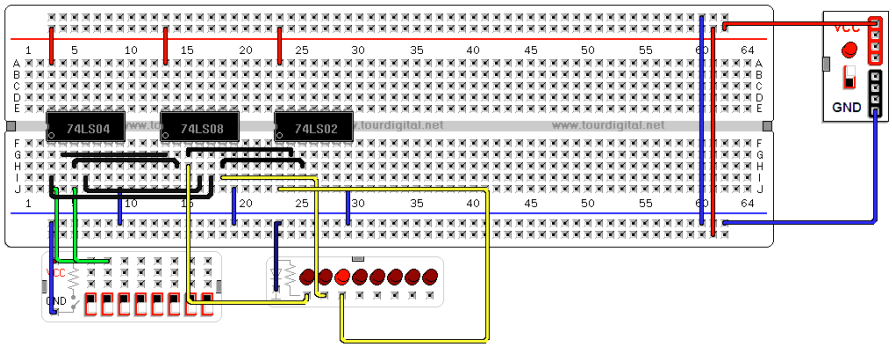
$b = A + \bar{B} + \bar{C}\bar{D}$

$d = \Sigma(0,2,3,5,6,8) + \Phi(10\text{-}15)$



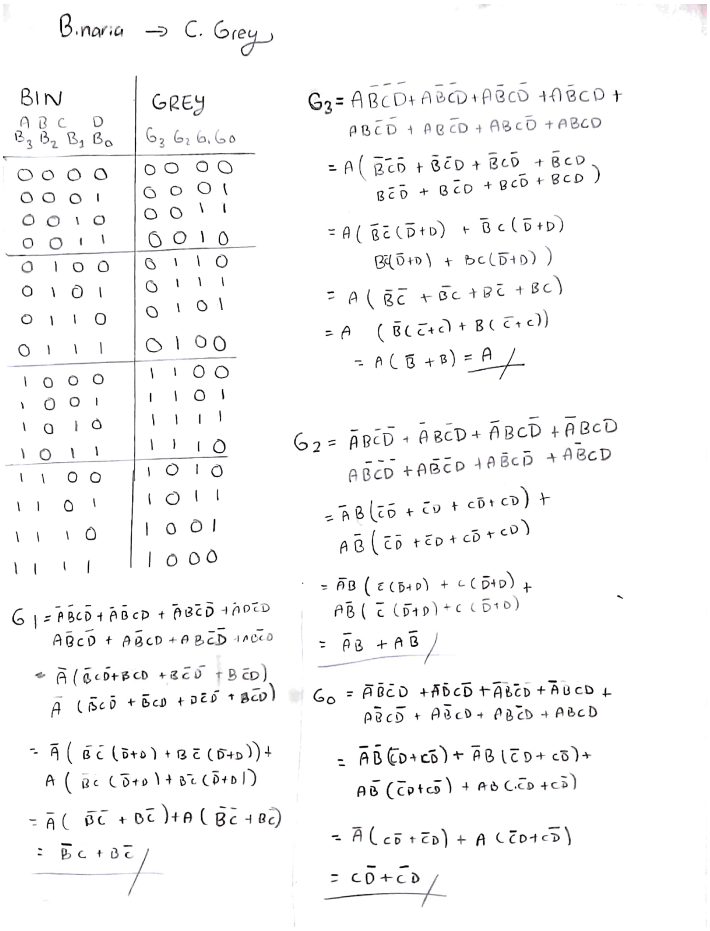
$d = A + \bar{B}\bar{D} + B\bar{C}D + \bar{B}C + C\bar{D}$

1.2. Parte Practica



2. De Código Binario a Código Grey

2.1. Parte Teórica



Binaria → C. Grey

BIN $B_3\ B_2\ B_1\ B_0$	GREY $G_3\ G_2\ G_1\ G_0$
0 0 0 0	0 0 0 0
0 0 0 1	0 0 0 1
0 0 1 0	0 0 1 1
0 0 1 1	0 0 1 0
0 1 0 0	0 1 1 0
0 1 0 1	0 1 1 1
0 1 1 0	0 1 0 1
0 1 1 1	0 1 0 0
1 0 0 0	1 1 0 0
1 0 0 1	1 1 0 1
1 0 1 0	1 1 1 1
1 0 1 1	1 1 1 0
1 1 0 0	1 0 1 0
1 1 0 1	1 0 1 1
1 1 1 0	1 0 0 1
1 1 1 1	1 0 0 0

$G_3 = A\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}D + A\bar{B}C\bar{D} + A\bar{B}CD + AB\bar{C}\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD$

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

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

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

$= A(\bar{B}(\bar{C}+C) + B(\bar{C}+C))$

$= A(\bar{B}+B) = A$

$G_2 = \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + \bar{A}BCD + A\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}D + A\bar{B}C\bar{D} + A\bar{B}CD$

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

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

$= \bar{A}B + A\bar{B}$

$G_1 = \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}CD + \bar{A}B\bar{C}\bar{D} + \bar{A}BC\bar{D} + A\bar{B}\bar{C}D + A\bar{B}CD + AB\bar{C}\bar{D} + ABC\bar{D}$

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

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

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

$= \bar{B}C + B\bar{C}$

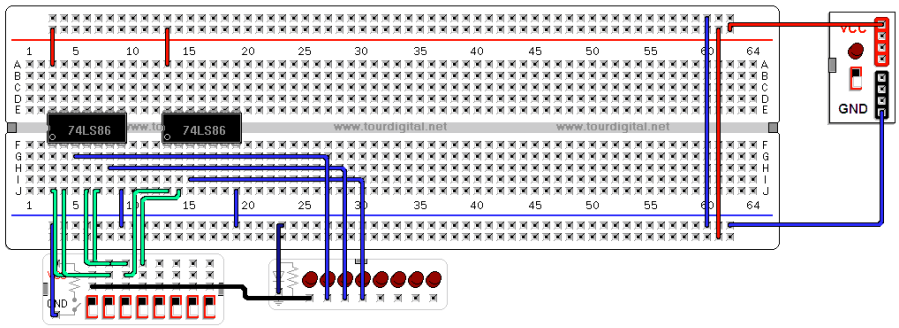
$G_0 = \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + A\bar{B}\bar{C}D + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D}$

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

$= \bar{A}(C\bar{D} + \bar{C}D) + A(\bar{C}D + C\bar{D})$

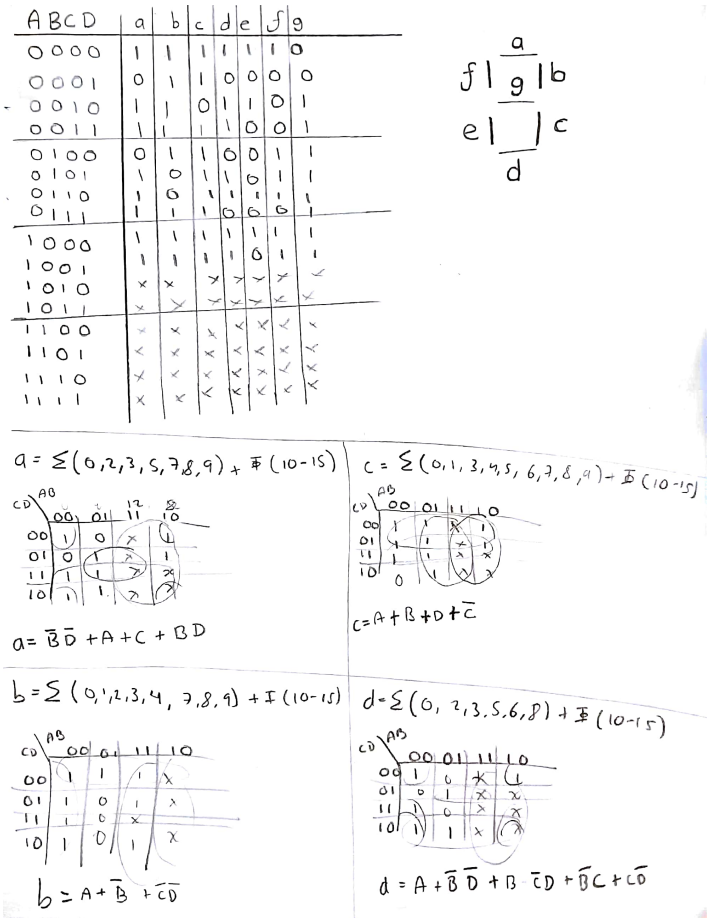
$= C\bar{D} + \bar{C}D$

2.2. Parte Practica



3. De Código BCD a 7 Segmentos

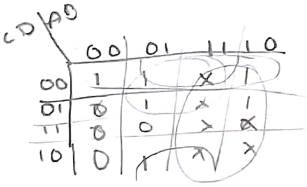
3.1. Parte Teórica



$e = \Sigma(0,2,6,8) + \Phi(10\text{-}15)$

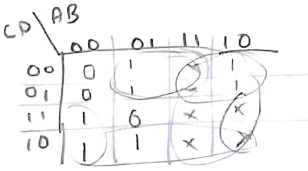
$e = \bar{B}\bar{D} + C\bar{D}$

$f = \Sigma(0,4,5,6,8,9) + \Phi(10\text{-}15)$



$f = \bar{C}\bar{D} + B\bar{C} + A$

$g = (2,3,4,5,6,8,9) + \Phi((10\text{-}15)$



$g = C\bar{D} + \bar{B}C + A + B\bar{C}$

3.2. Parte Practica