BLG231 Digital Circuits HW2

Yunus Güngör-No:150150701-CRN:11918

1) $f(a, b, c, d) = \sum m(0,2,3,7,8,10,12,13)$
$f(a, b, c, d) + g(a, b, c, d) = \prod M(1,4,6,14)$
$f(a, b, c, d) \cdot g(a, b, c, d) = \sum m(7,13)$

index	a	b	c	d	f	$f+g$	$f \cdot g$	g
0	0	0	0	0	1	1	0	0
1	0	0	0	1	0	0	0	0
2	0	0	1	0	1	1	0	0
3	0	0	1	1	1	1	0	0
4	0	1	0	0	0	0	0	0
5	0	1	0	1	0	1	0	1
6	0	1	1	0	0	0	0	0
7	0	1	1	1	1	1	1	1
8	1	0	0	0	1	1	0	0
9	1	0	0	1	0	1	0	1
10	1	0	1	0	1	1	0	0
11	1	0	1	1	0	1	0	1
12	1	1	0	0	1	1	0	0
13	1	1	0	1	1	1	1	1
14	1	1	1	0	0	0	0	0
15	1	1	1	1	0	1	0	1

i.

$$g(a,b,c,d) = (a+b+c+d)\left(a+b+c+\bar{d}\right)(a+b+\bar{c}+d)\left(a+b+\bar{c}+\bar{d}\right)\left(a+\bar{b}+c+d\right)$$
$$\left(a+\bar{b}+\bar{c}+d\right)(\bar{a}+b+c+d)(\bar{a}+b+\bar{c}+d)\left(\bar{a}+\bar{b}+c+d\right)(a+b+c+d)$$
$$g(a,b,c,d) = \bar{a}b\bar{c}d + \bar{a}bcd + a\bar{b}\bar{c}d + a\bar{b}cd + ab\bar{c}d + abcd$$

ii.

$$g(a,b,c,d) = \bar{a}bd(c+\bar{c}) + a\bar{b}d(\bar{c}+c) + abd(\bar{c}+c) = \bar{a}bd + a\bar{b}d + abd = bd(\bar{a}+a) + a\bar{b}d = bd + a\bar{b}d$$

$$= bd + a\bar{b}d + ad = d\left(b + a\bar{b} + a\right) = d(b+a) = db + ad$$

iii.

$$g(a,b,c,d) = d(b+a) = \overline{(\bar{d} + \overline{(\overline{b+a})})}$$