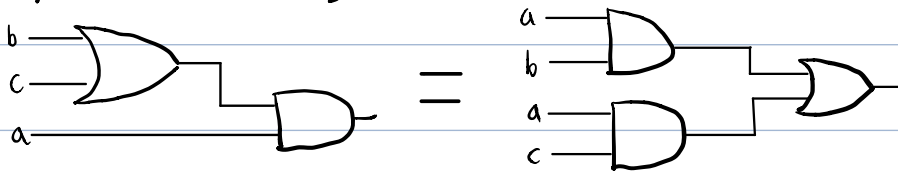


# Chapter 02

page 102:

Problem 3(b)

$$p8a: a(b+c) = ab+ac$$



page 103:

Problem 8(e)

$$x'y'z' + x'yz' + x'yz + xyz \quad (2 \text{ terms, 4 literals})$$

$$= \underline{(x'z')y' + (x'z')y} + \underline{(yz)x' + (yz)x} \quad \dots p1b$$

$$= x'z' + yz \quad \dots p9a, p9a$$

page 104:

Problem 9(b)

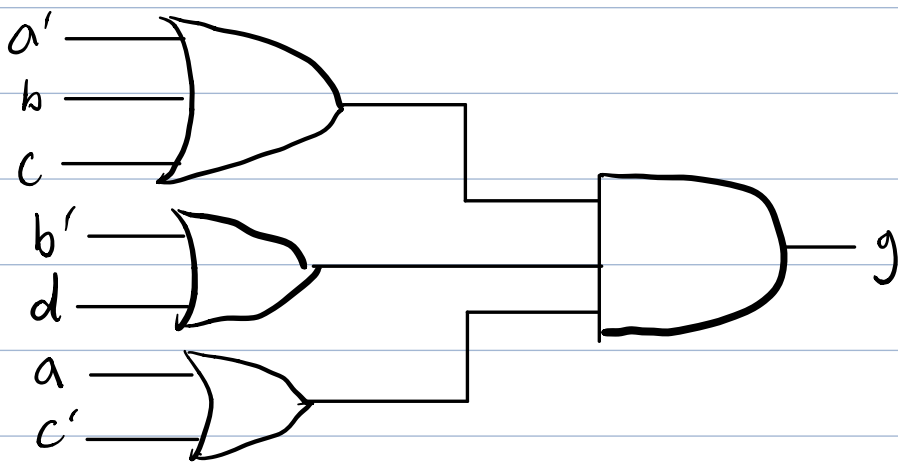
$$(x+y+z)(x+y+z')(x+y'+z)(x+y'+z') \quad (1 \text{ term, 1 literal})$$

$$= \underline{[(x+y)+z][(x+y)+z']} \underline{[(x+y')+z][(x+y')+z']}$$

$$= (x+y)(x+y') \quad \dots p9b, p9b$$

$$= x \quad \dots p9b$$

### Problem 11 (b)



i)  $g = (a' + b + c)(b' + d)(a + c')$

ii)  $g = a'b'c' + bc'd + acd + ab'c$

page 105:

### Problem 13

$$f(x, y, z) = \sum m(1, 3, 6)$$

$$g(x, y, z) = \sum m(0, 2, 4, 6)$$

(d)  $f'(x, y, z) = \sum m(0, 2, 4, 5, 7)$

$$g'(x, y, z) = \sum m(1, 3, 5, 7)$$

(e)  $f(x, y, z) = \prod M(0, 2, 4, 5, 7)$

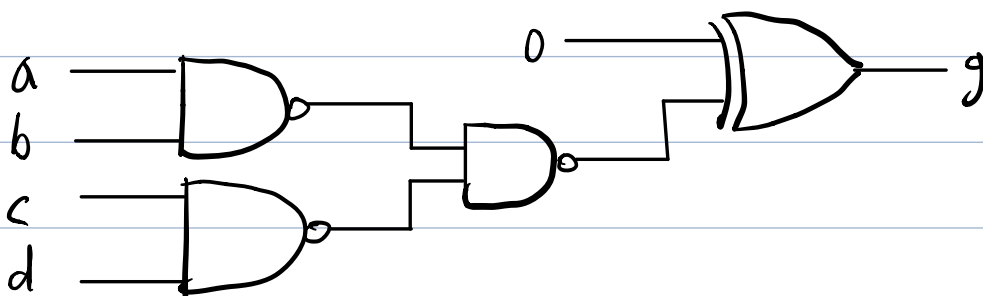
$$= (x + y + z)(x + y' + z)(x' + y + z)(x' + y + z')(x' + y' + z')$$

$$g(x, y, z) = \prod M(1, 3, 5, 7)$$

$$= (x + y + z')(x + y' + z')(x' + y + z')(x' + y' + z')$$

page 106:

### Problem 17 (f)



i)  $g = 0 \oplus ((a \cdot b)' \cdot (c \cdot d)')' = 0 \oplus (ab + cd) = 0 \cdot (ab + cd)' + 1 \cdot (ab + cd)$

ii)  $g = ab + cd$

page 108;

Problem 25 (e)

$$G = B'D'E' + A'B'C'D + ACE + AC'E' + B'CE$$

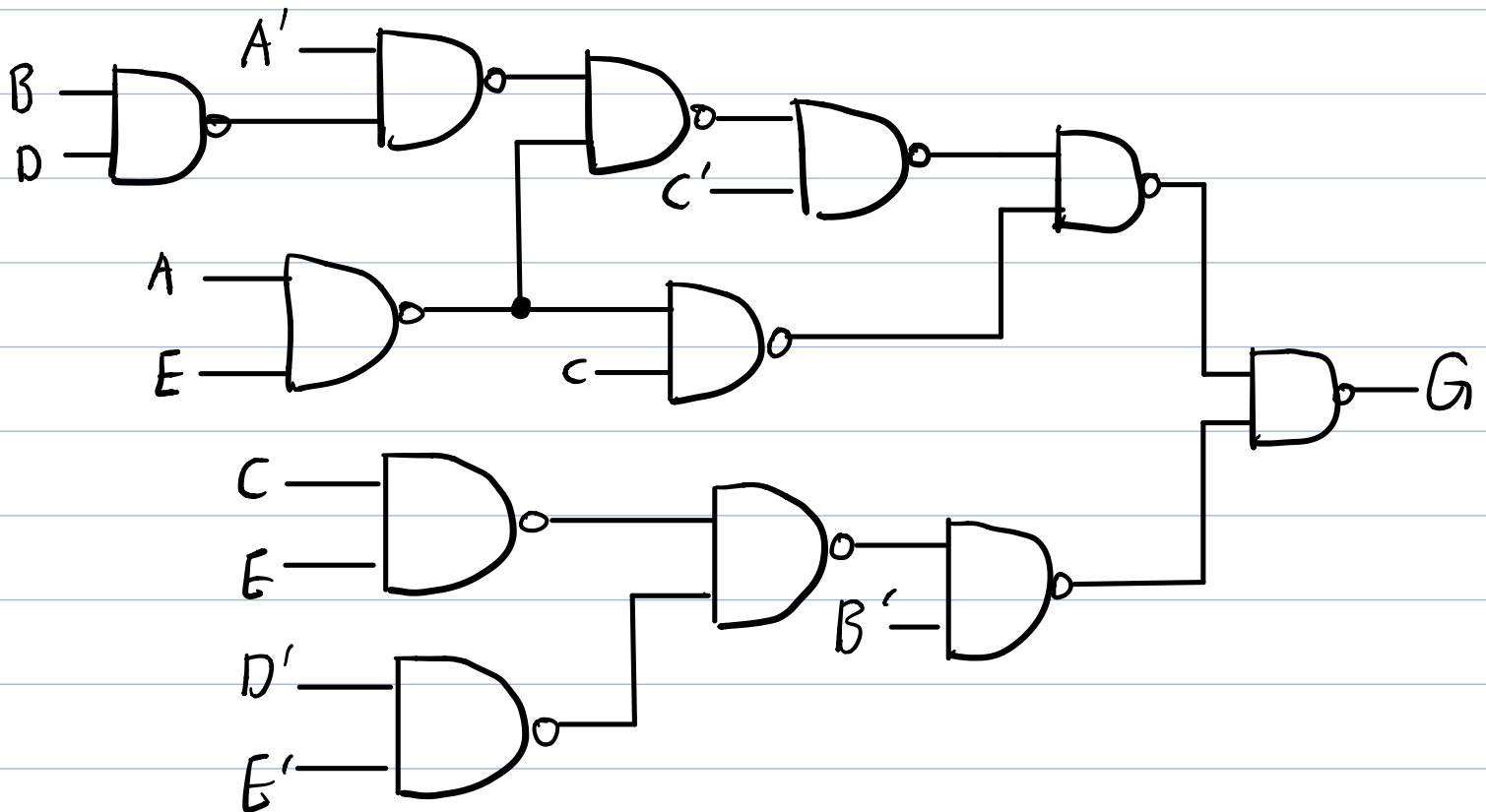
(12 gates, one of which is shared)

$$G = B'D'E' + A'B'C'D + ACE + AC'E' + B'CE$$

$$= B'(D'E' + CE) + C'(A'BD + AE') + ACE$$

$$= B'(D'E' + CE) + [C' + \underline{AE}][\underline{C} + (A' + E')(A + BD)]$$

1 2 3 4 5 6 7 8 9 10 11 12



# chapter 3

page 178:

Problem 4(d)

$$f(a,b,c,d) = \sum m(5,7,9,11,13,14) + \sum d(2,6,10,12,15)$$

ab \ cd	00	01	11	10
00	0	1	3	X <sup>2</sup>
01	4	5	7	X <sup>6</sup>
11	X <sup>12</sup>	13	X <sup>15</sup>	14
10	8	9	11	X <sup>10</sup>

$$f_1 = bd + ad + ab$$

ab \ cd	00	01	11	10
00	0	1	3	X <sup>2</sup>
01	4	5	7	X <sup>6</sup>
11	X <sup>12</sup>	13	X <sup>15</sup>	14
10	8	9	11	X <sup>10</sup>

$$f_1 = bd + ad + cd$$

ab \ cd	00	01	11	10
00	0	1	3	X <sup>2</sup>
01	4	5	7	X <sup>6</sup>
11	X <sup>12</sup>	13	X <sup>15</sup>	14
10	8	9	11	X <sup>10</sup>

$$f_1 = bd + ad + ac$$

ab \ cd	00	01	11	10
00	0	1	3	X <sup>2</sup>
01	4	5	7	X <sup>6</sup>
11	X <sup>12</sup>	13	X <sup>15</sup>	14
10	8	9	11	X <sup>10</sup>

$$f_1 = bd + ad + bc$$

page 179:

Problem 6(d)

$$G(V,W,X,Y,Z) = \sum m(0,1,4,5,8,9,10,15,16,18,19,20,24,26,28,31)$$

V

0

1

WY \ XZ	00	01	11	10
00	0	1	3	2
01	4	5	7	6
11	12	13	15	14
10	8	9	11	10

WY \ XZ	00	01	11	10
00	0	1	3	2
01	4	5	7	6
11	12	13	15	14
10	8	9	11	10

$$G = V'W'Y' + VY'Z' + VWX'Y + V'X'Y' + WX'YZ + WX'Z'$$

Page 180:

# Problem 7(g)

ab \ cd	00	01	11	10
00	1		1	1
01	1		1	1
11		1	1	1
10		1	1	1

$F_1$

ab \ cd	00	01	11	10
00			1	1
01			1	1
11		1	1	1
10	1	1	1	1

$G_1$

ab \ cd	00	01	11	10
00	1		1	1
01	1		1	1
11		1	1	1
10		1	1	1

$H$

ab \ cd	00	01	11	10
00	1		1	1
01	1		1	1
11		1	1	1
10		1	1	1

$F_2$

ab \ cd	00	01	11	10
00			1	1
01			1	1
11		1	1	1
10	1	1	1	1

$G_2$

$$f_1 = ac'd + a'c + a'c'd' + ab'd$$

$$f_2 = ac'd + a'c + a'c'd' + b'cd$$

$$g_1 = ac'd + a'c + ab'd' + bc'd$$

$$g_2 = ac'd + a'c + ab'd' + a'b'd$$

$$h = ac'd + a'c'd' + ab'd' + abd$$

# Test Problem 5

cd \ ab	00	01	11	10
00	0	0	X	0
01	X	1	X	1
11	1	1	0	X
10	0	X	0	0

$$f = a'd + c'd$$

cd \ ab	00	01	11	10
00	0	0	X	0
01	X	1	X	1
11	1	1	0	X
10	0	X	0	0

$$f = a'd + b'd$$

cd \ ab	00	01	11	10
00	0	0	X	0
01	X	1	X	1
11	1	1	0	X
10	0	X	0	0

$$f' = d' + ac$$

$$\begin{aligned} (f')' &= (d' + ac)' \\ &= d \cdot (ac)' \\ &= d \cdot (a' + c') \end{aligned}$$

cd \ ab	00	01	11	10
00	0	0	X	0
01	X	1	X	1
11	1	1	0	X
10	0	X	0	0

$$f' = d' + ab$$

$$\begin{aligned} (f')' &= (d' + ab)' \\ &= d \cdot (ab)' \\ &= d \cdot (a' + b') \end{aligned}$$