

**Problem 1** *K-maps*

$$*F(A, B, C, D) = \Sigma m(0, 2, 3, 5, 6, 7, 8, 10, 11, 14, 15)$$

AB \ CD	00	01	11	10
00	1	0	1	1
01	0	1	1	1
11	0	0	1	1
10	1	0	1	1

Figure 1:  $F = C + \overline{B}.\overline{D} + \overline{A}.B.D$

$$*F(A, B, C, D) = \Sigma m(1, 2, 3, 6, 7, 11)$$

AB \ CD	00	01	11	10
00	0	1	1	1
01	0	0	1	1
11	0	0	0	0
10	0	0	1	0

Figure 2:  $F = \overline{A}.C + \overline{A}.\overline{B}.D + \overline{B}.C.D$

$$*F(A, B, C, D) = \Sigma m(2, 3, 5, 7, 10, 11, 13, 14, 15)$$

CD \ AB	00	01	11	10
00	0	0	1	1
01	0	1	1	0
11	0	1	1	1
10	0	0	1	1

Figure 5:  $F = B.D + A.C + \bar{B}.C$

$$*F(A, B, C, D, E) = \Sigma m(2, 5, 7, 8, 10, 13, 15, 17, 19, 21, 23, 24, 29, 31)$$

A = 0					A = 1				
DE \ BC	00	01	11	10	DE \ BC	00	01	11	10
00	0	0	0	1	00	0	1	1	0
01	0	1	1	0	01	0	1	1	0
11	0	1	1	0	11	0	1	1	0
10	1	0	0	1	10	1	0	0	0

Figure 6:  $F = C.E + A.\bar{B}.E + B.\bar{C}.\bar{D}.\bar{E} + \bar{A}.\bar{C}.D.\bar{E}$

$$*F(A, B, C, D, E) = \Sigma m(0, 4, 18, 19, 22, 23, 25, 29)$$

		A = 0			
		DE			
BC		00	01	11	10
00		1	0	0	0
01		1	0	0	0
11		0	0	0	0
10		0	0	0	0

		A = 1			
		DE			
BC		00	01	11	10
00		0	0	1	1
01		0	0	1	1
11		0	1	0	0
10		0	1	0	0

Figure 7:  $F = \overline{A} \cdot \overline{B} \cdot \overline{D} \cdot \overline{E} + A \cdot B \cdot \overline{D} \cdot E + A \cdot \overline{B} \cdot D$

**Problem 2** CK-map + Don't cares)

$$*F(A, B, C, D) = \Sigma m(1, 3, 5, 7, 9) + \Sigma d(6, 8, 12, 13)$$

		CD			
		00	01	11	10
AB					
00		0	1	1	0
01		0	1	1	d
11		d	d	0	0
10		d	1	0	0

Figure 8:  $F = \overline{A} \cdot D + A \cdot \overline{C}$

$$*F(A, B, C, D) = \Sigma m(0, 2, 8, 9, 10, 15) + \Sigma d(1, 3, 6, 7)$$

	CD			
AB	00	01	11	10
00	1	d	d	1
01	0	0	d	d
11	0	0	1	0
10	1	1	0	1

Figure 9:  $F = \overline{B}.\overline{C} + \overline{B}.\overline{D} + B.C.D$

**Problem 6**

List1

0	0	0	0	0
2	0	0	1	0
4	0	1	0	0
8	1	0	0	0
5	0	1	0	1
9	1	0	0	1
7	0	1	1	1
15	1	1	1	1

List2

0,2	0	0	X	0
0,4	0	x	0	0
0,8	x	0	0	0
4,5	0	1	0	X
8,9	1	0	0	X
5,7	0	1	X	1
7,15	x	1	1	1

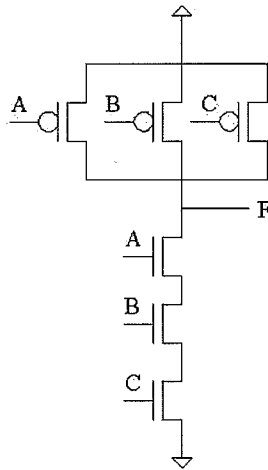
ECE/CS 3700  
Solutions to HW 2

**Problem 6**

a)

Pull-up Network:  $F=A'+B'+C'$

Pull-down Network:  $F'=ABC$



b)

Pull-up Network:  $F=(A'+B')(C'+D')$

Pull-down Network:  $F'=AB+CD$

