Subject:

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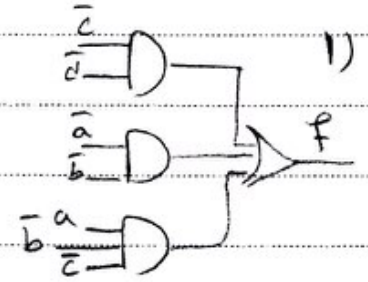
تکلیف سری سوم مدارهای منطقی – HW3

1) a) $f(a,b,c,d) = \Sigma(0,1,2,3,4,8,9,12)$

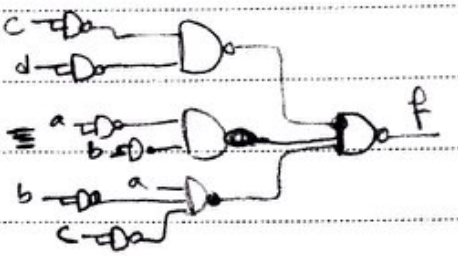
1) only nand gates 2) only nor

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

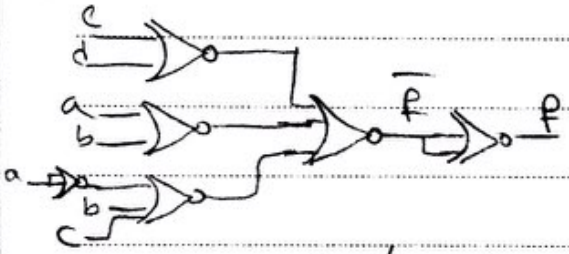
$f = \bar{c}\bar{d} + \bar{a}\bar{b} + a\bar{b}\bar{c}$



1)



۲) $\bar{f} = (c+d)(a+b)(\bar{a}+b+c)$



b) $f = ab'cd' + a'bcd' + ab'c'd + a'bc'd$

$= (ab' + a'b)cd' + (ab' + a'b)c'd$

$= (ab' + a'b)(cd' + c'd') = (a \oplus b).(a \oplus b)$

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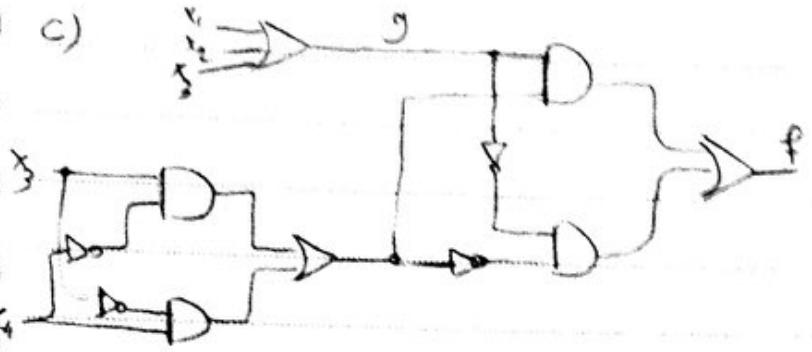
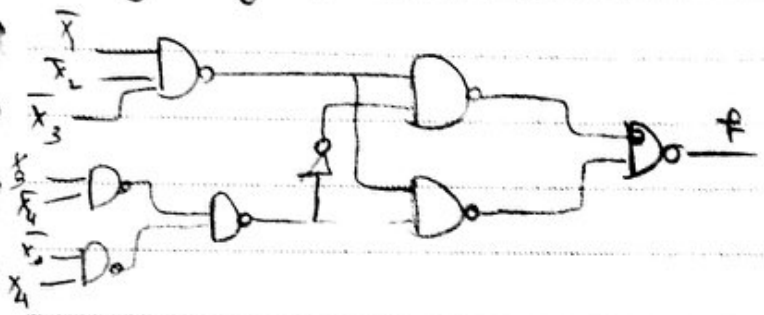
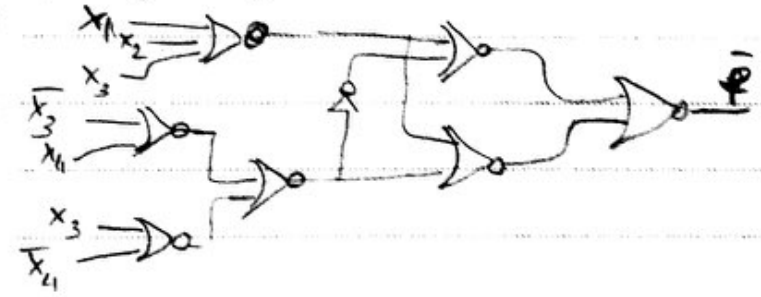
c)



a) only nand gates



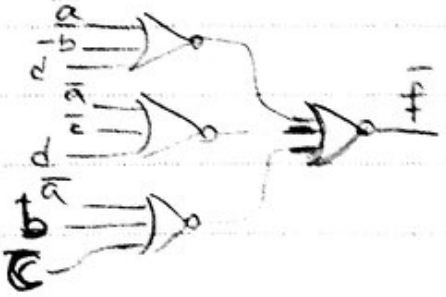
b) only nor gates



2) $f(a,b,c,d) = \Sigma m(1,3,4,5,8,11,12,14,15)$

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

$$\bar{f} = (\bar{a}+\bar{b}+\bar{d})(\bar{a}+\bar{c}+d)(\bar{a}+b+c)$$



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

$$\bar{a}\bar{b}\bar{c}$$

$$ab = \overline{\bar{a}+\bar{b}}$$

$$\overline{\overline{(a+b)}+\bar{c}}$$

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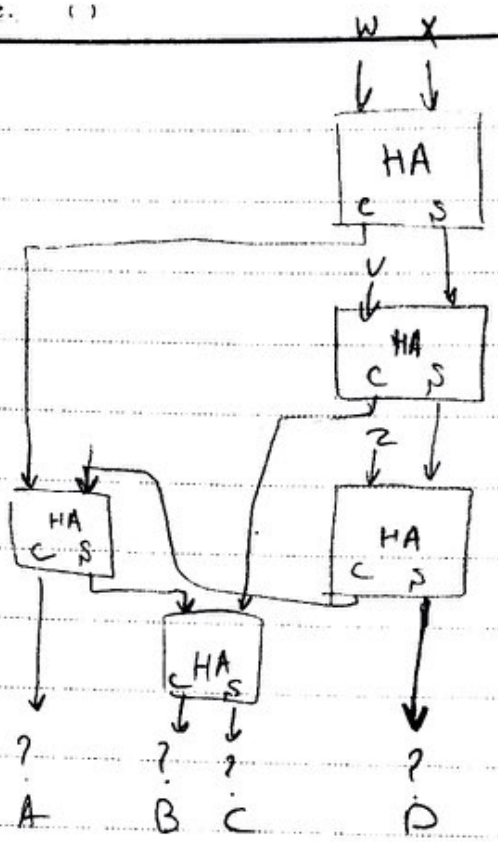
3)



$S = X \oplus W$

$C = XW$

$D = X \oplus W \oplus V \oplus Z$

$C = ((X \oplus W)V) \oplus (XW \oplus Z(X \oplus W \oplus Z))$

$B = ((X \oplus W)V) \cdot (XW \oplus Z(X \oplus W \oplus Z))$

$A = WX \cdot Z(X \oplus W \oplus Z))$

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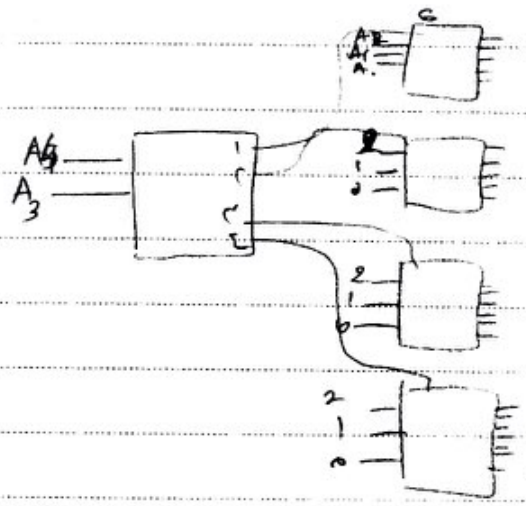
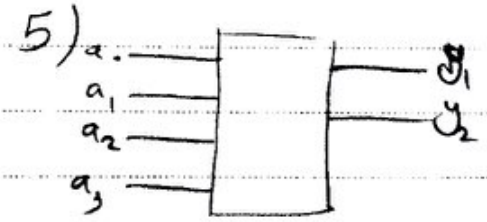
4x decoder 3→8



5)



a_0 a_1 a_2 a_3	y_1 y_2
1 x x x	0 0