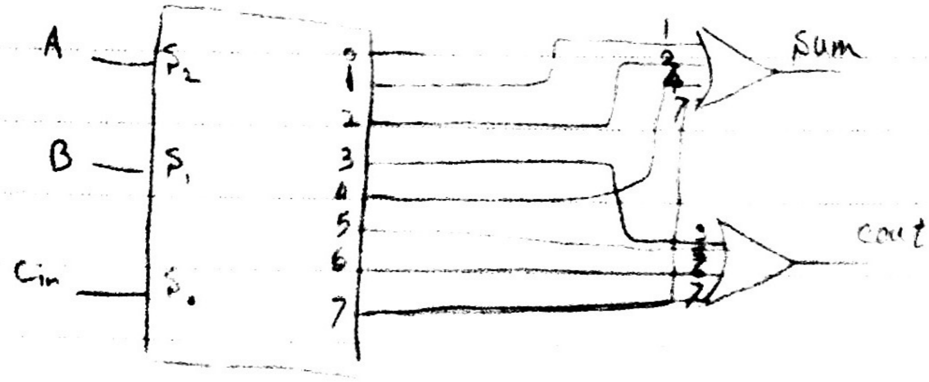
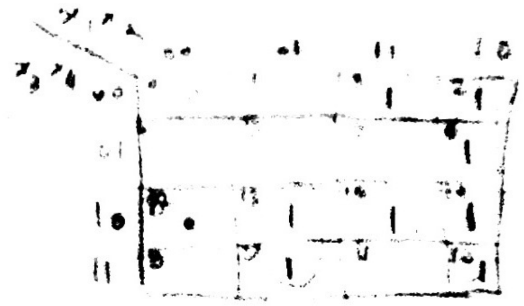
تمرین سری ۵ مدار منطقی - محمدی ۹۲۱۰۲۸۴۶

۱- به وسیله یک 3 به 8 decoder و گیت‌های منطقی یک full adder طراحی کنید.

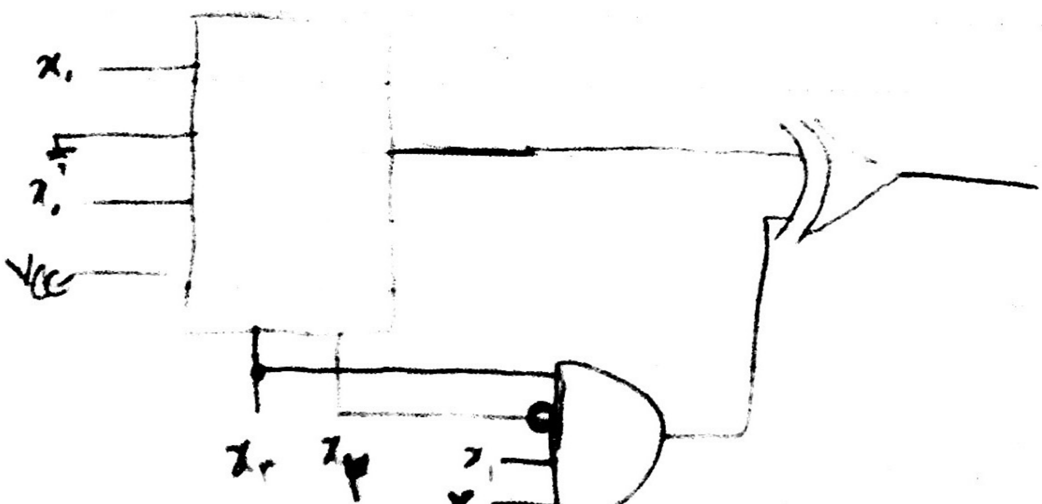
مدار به صورت رو به رو است:



2- تابع $f(x_1, x_2, x_3, x_4) = \Sigma(2,3,6,9,10,13,15) + d(0,12,14)$ را با یک mux 4 به 1 و حداقل تعداد گیت منطقی طراحی کنید.



$$f = x_1\bar{x}_2 + x_2 x_3 \bar{x}_4 + x_1 \bar{x}_3 \bar{x}_4 + \bar{x}_1 x_2 x_3$$



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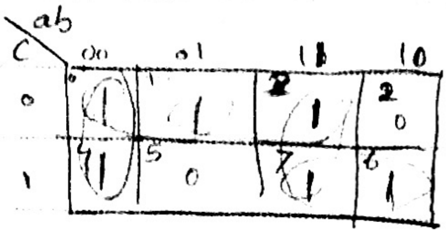
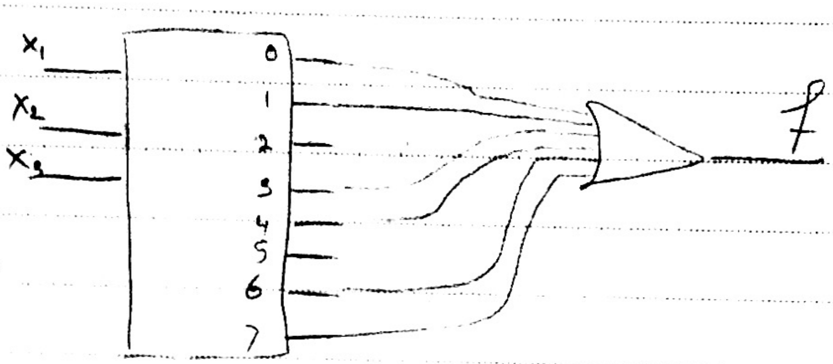
۳ـ تابع $f(x_1, x_2, x_3) = \Sigma(0,1,3,4,6,7)$ را با decoder ۳ به ۸ و گیت های

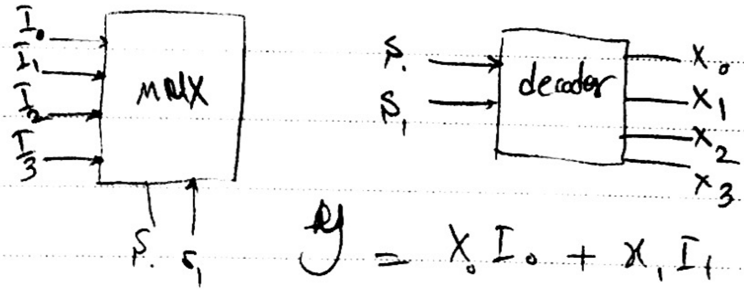
منطق طراحی کنید.



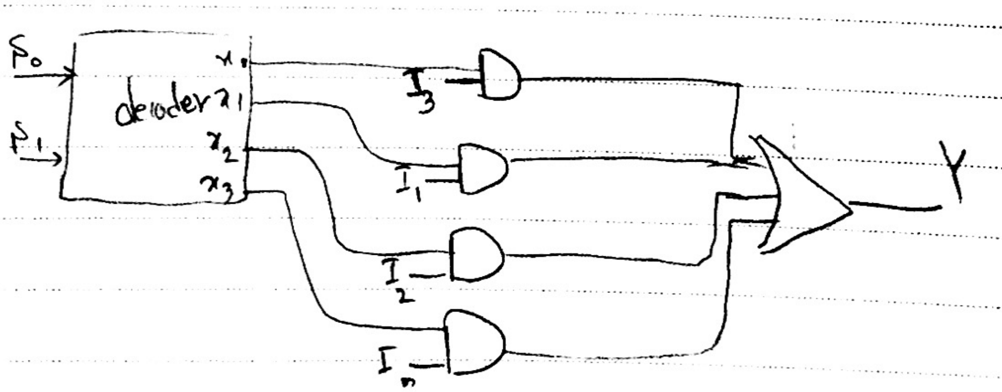
$$f = \bar{a}\bar{b} + \bar{a}\bar{c} + \bar{b}\bar{c} + ac$$



۴ـ



$$y = x_0 I_0 + x_1 I_1 + x_2 I_2 + x_3 I_3$$



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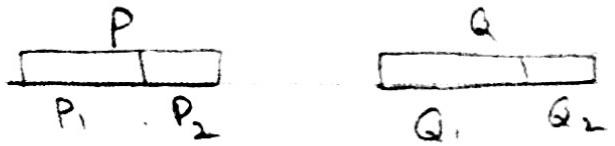


-a

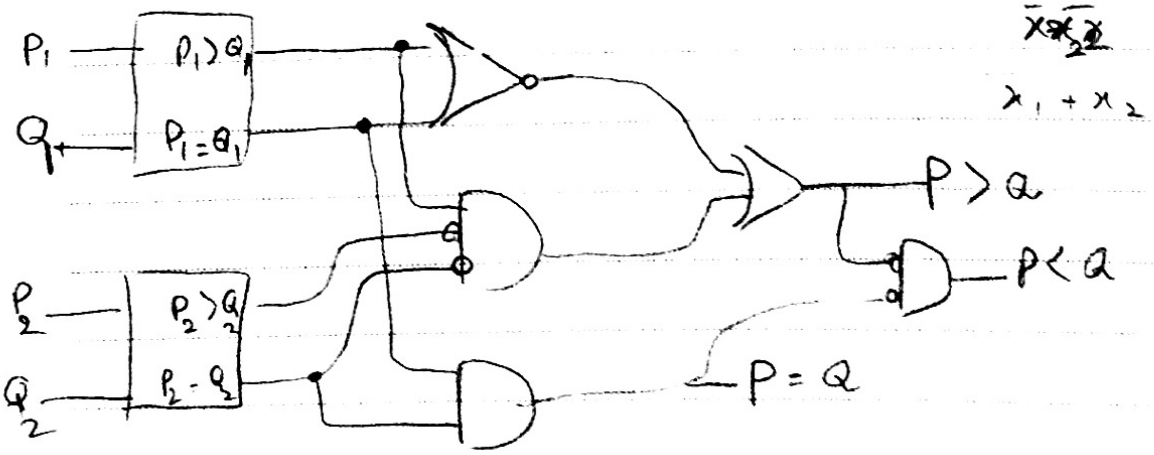
$P_1 > Q_1$ $P_1 = Q_1$ $P_2 > Q_2$ $P_2 = Q_2$ $P > Q$ $P = Q$ $P < Q$

0	0	0	0	0	0	1
0	0	0	1	0	0	1
0	0	1	0	0	0	1
0	1	0	0	0	0	1
0	1	0	1	0	1	0
0	1	1	0	1	0	0
1	0	0	0	1	0	0
1	0	0	1	1	0	0
1	0	1	0	1	0	0

$P<Q = (\overline{P<Q})(\overline{P=Q})$

$P=Q = (P_1 = Q_1)(P_2 = Q_2)$

$P>Q = (\overline{P_1 > Q_1})(\overline{P_1 = Q_1}) + (P_1 = Q_1)(\overline{P_2 > Q_2})(\overline{P_2 = Q_2})$



$\bar{x}\bar{x}_2$

$x_1 + x_2$

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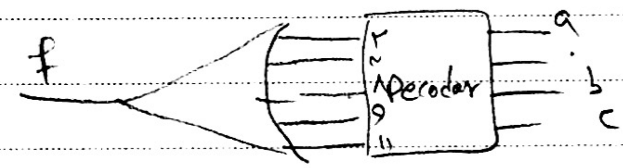
6) 1) a) $f(a,b,c) = \sum m(2,3,8,9,11)$

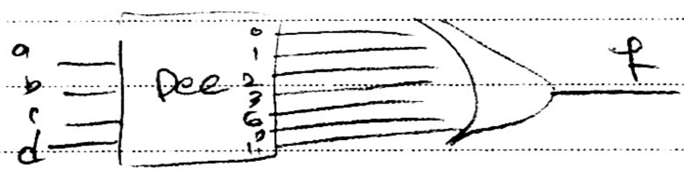
a	0	b	c		f
0	0	1	0	2	1
0	0	1	1	3	1
1	0	0	0	8	1
1	0	0	1	9	1
1	0	1	1	11	1

→ با استفاده از decoder چهار به



۲) a) $f(a,b,c,d) = \sum m(0,1,2,3,6,9,11)$

f		a	b	c	d
1	0	0	0	0	0
1	1	0	0	0	1
1	2	0	0	1	0
1	3	0	0	1	1
1	6	0	1	1	0
1	9	1	0	0	1
1	11	1	0	1	1



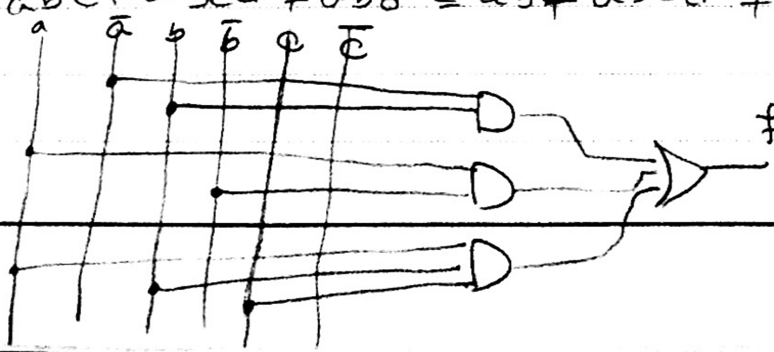
1) b) $f = \bar{a}b\bar{c} + \bar{a}bc + a\bar{b}\bar{c} + a\bar{b}c + abc = abc + a\bar{b} + \bar{a}b$

با استفاده از گیت AND و NOT و OR به راحتی قابل ساخت است

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

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

1) c)



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Year. Month. Date. ( )

2) c)