دانشگاه تهران

دانشکده ریاضی، آمار و علوم کامپیوتر

پاسخنامه تمرین سری پنجم **مهلت تحویل: جمعه۲ اردیبهشت**

سوال ۱.

الف)

$$A_7A_6A_5A_4A_3A_2A_1A_0 \times B_7B_6B_5B_4B_3B_2B_2B_1 = S_{15}S_{14}S_{13}S_{12}S_{11}S_{10}\ldots S_2S_1S_0$$

16 inputs : 2^{16}

16 outputs : 16

2^{16} 16-bit words $\rightarrow 2^{16} \times 16$

ب)

$$A_7A_6A_5A_4A_3A_2A_1A_0 + B_7B_6B_5B_4B_3B_2B_2B_1 = CS_7S_6S_5S_4S_3S_2S_1S_0$$

(c=0 for adder)

16+1 inputs : 2^{16+1}

9 outputs : 9

2^{17} 9-bit words $\rightarrow 2^{17} \times 9$

$$A_7A_6A_5A_4A_3A_2A_1A_0 - B_7B_6B_5B_4B_3B_2B_2B_1 = CS_7S_6S_5S_4S_3S_2S_1S_0$$

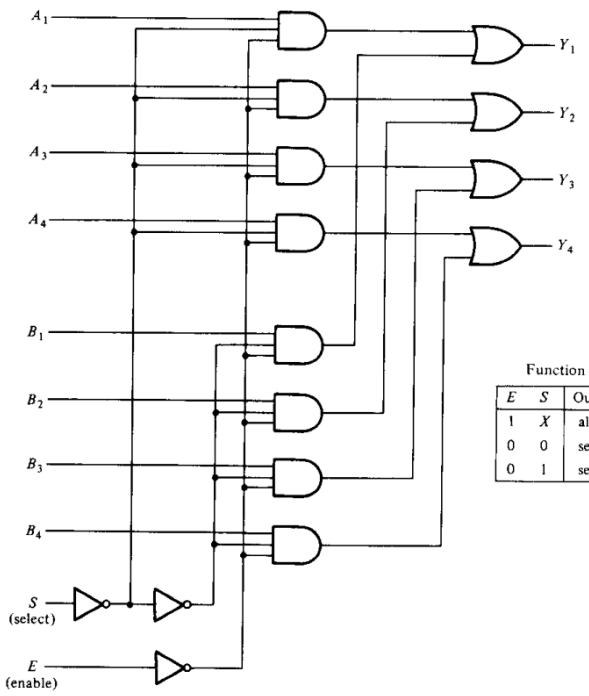
(c=0 for adder)

16+1 inputs : 2^{17}

9 outputs : 9

2^{17} 9-bit words $\rightarrow 2^{17} \times 9$

ج)



Function table

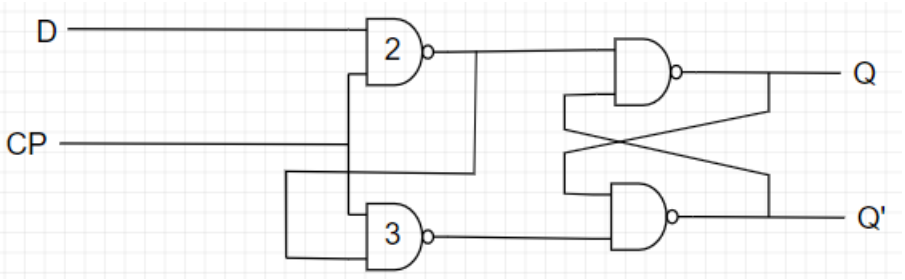
E	S	Output Y
1	X	all 0's
0	0	select A
0	1	select B

$2^{10} \times 4$

سوال ۲.

x	y	z	F_0	F_1	F_2	F_3
0	0	0	0	1	0	0
0	0	1	1	1	0	1
0	1	0	1	0	1	1
0	1	1	0	0	0	1
1	0	0	1	0	0	0
1	0	1	0	1	0	1
1	1	0	1	0	1	0
1	1	1	0	1	0	1

سوال ۳.

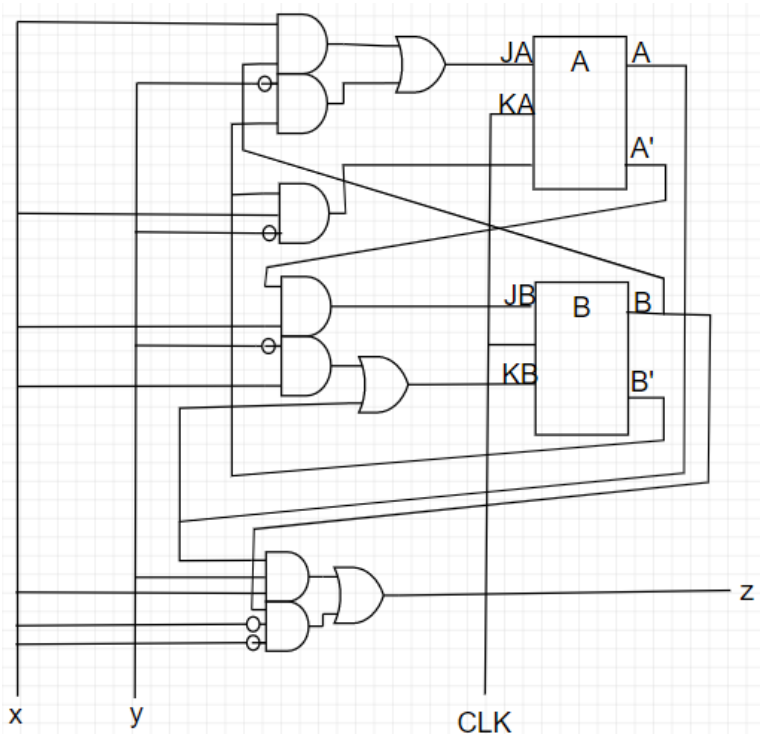


c	D	Q	Q’
0	x	No change	No change
1	0	0	1
1	1	1	0

با توجه به این که جدول بالا با جدول فلیپ فلاپ D که در درس گفته شده یکی است مدار بالا مانند این مدار کار میکند.

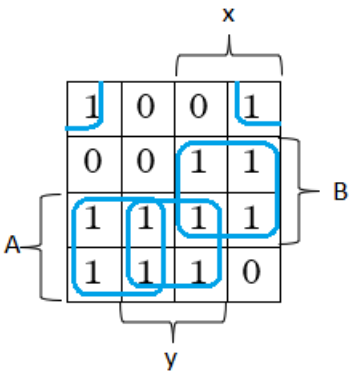
سوال ۴.

الف)

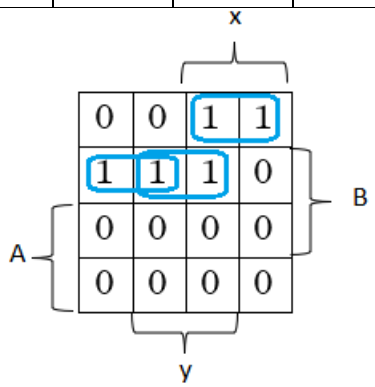


ب)

Present state				next state						
A	B	x	y	A	B	z	JA	KA	JA	JB
0	0	0	0	1	0	0	1	0	0	0
0	0	0	1	0	0	0	0	0	0	0
0	0	1	0	1	1	0	1	1	1	1
0	0	1	1	0	1	0	0	0	1	0
0	1	0	0	0	1	1	0	0	0	0
0	1	0	1	0	1	0	0	0	0	0
0	1	1	0	1	0	0	1	0	1	0
0	1	1	1	1	1	0	1	0	1	0
1	0	0	0	1	0	0	1	0	0	1
1	0	0	1	1	0	0	0	0	0	1
1	0	1	0	0	0	0	1	1	0	1
1	0	1	1	1	0	0	0	0	0	1
1	1	0	0	1	0	1	0	0	0	1
1	1	0	1	1	0	0	0	0	0	1
1	1	1	0	1	0	0	1	0	0	1
1	1	1	1	1	0	1	1	0	0	1



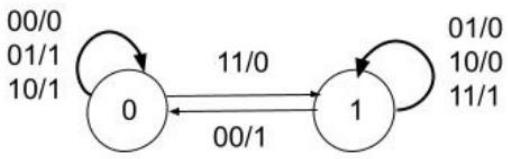
A(t+1)=Ax'+Bx+Ay+A'B'y'



B(t+1)=A'B'x+A'B(x'+y)

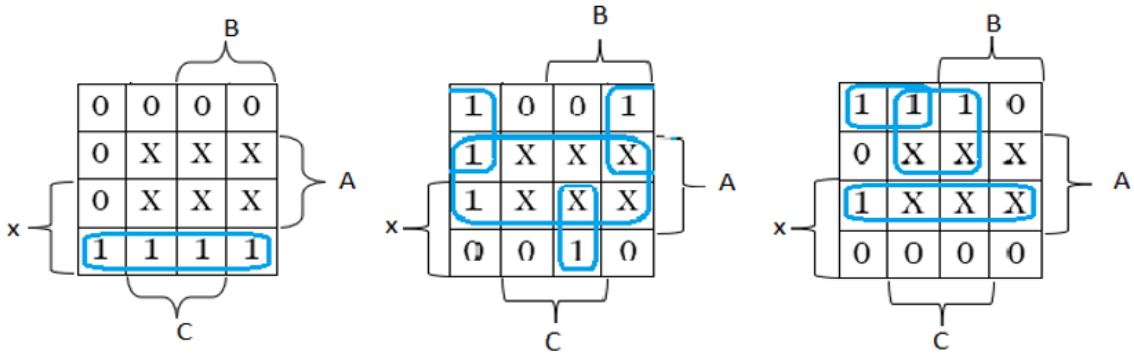
سوال ۵.

Current Q	x	y	Next Q	C	S
0	0	0	0	0	0
0	0	1	0	0	1
0	1	0	0	0	1
0	1	1	1	1	0
1	0	0	0	0	1
1	0	1	1	1	0
1	1	0	1	1	0
1	1	1	1	1	1

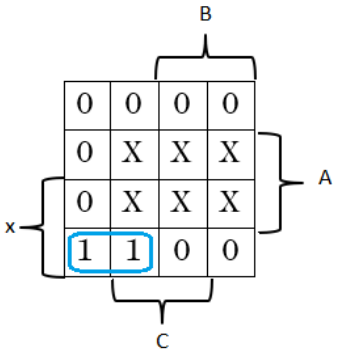


سوال ۶.

	Present state			next state			
x	A	B	C	A	B	C	y
0	0	0	0	0	1	1	0
0	0	0	1	0	0	1	0
0	0	1	0	0	1	0	0
0	0	1	1	0	0	1	0
0	1	0	0	0	1	0	0
0	1	0	1	X	X	X	X
0	1	1	0	X	X	X	X
0	1	1	1	X	X	X	X
1	0	0	0	1	1	1	1
1	0	0	1	1	1	1	1
1	0	1	0	0	0	1	1
1	0	1	1	0	0	0	1
1	1	0	0	0	0	0	0
1	1	0	1	X	X	X	X
1	1	1	0	X	X	X	X
1	1	1	1	X	X	X	X



$y=xA'$, $B(t+1)=A(t)+xB(t)C(t)+x'c'(t)$, $C(t+1)=xA(t)+x'c(t)+x'A'(t)B'(t)$



$A(t+1)=x\,A'(t)b'(t))$