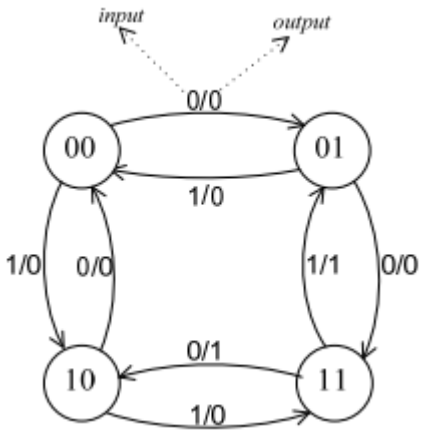
Review Questions 5

Algorithmic State Machines

1 – Given the state diagram below, generate the state table and design a sequential circuit using D flip fops.



Yanıt 1

Şimdiki durum		girdi	Sonraki durum		çıktı
A	B	x	A	B	y
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	1	1	0
0	1	1	0	0	0
1	0	0	0	0	0
1	0	1	1	1	0
1	1	0	1	0	1
1	1	1	0	1	0

Çıktı sadece bir durumda 1 oluyor → Y= ABx'

Flip flop girdileri D_A = A(t+1) D_B = B(t+1)

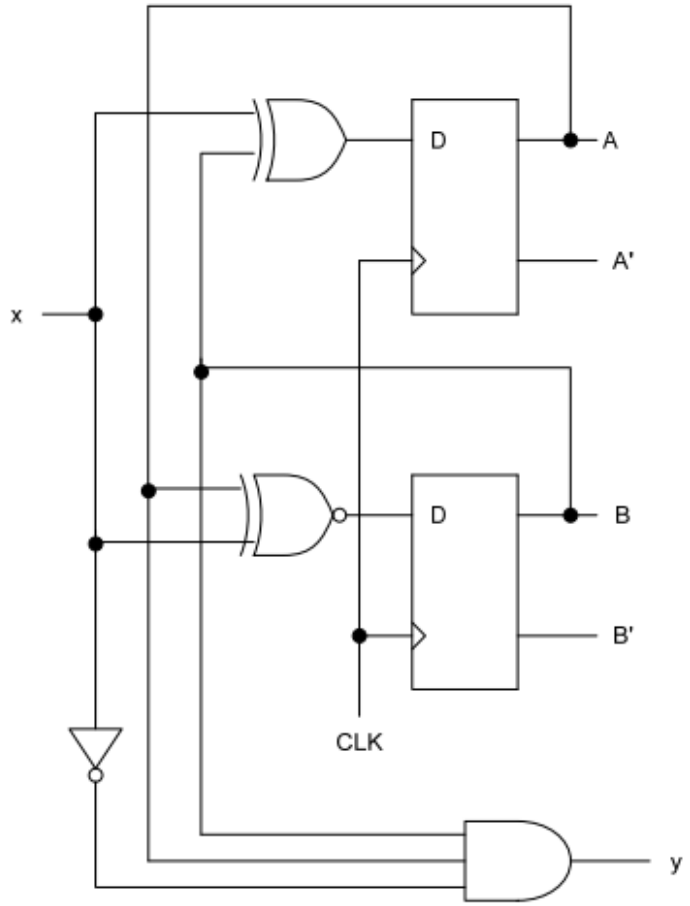
D_A ve D_B için Karnaugh Map kullanıyoruz.

A \ Bx	00	01	11	10
0		1		1
1		1		1

$D_A = B'x + Bx' = B \oplus x$

A \ Bx	00	01	11	10
0	1			1
1		1	1	

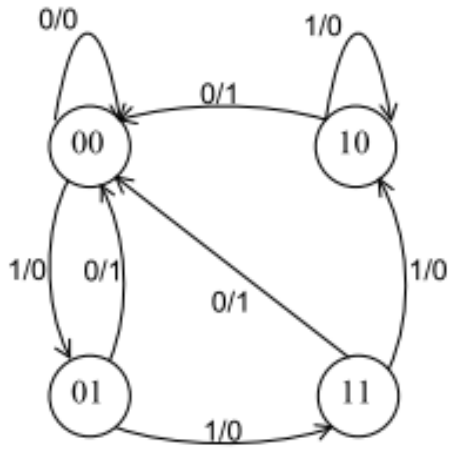
$D_B = Ax + A'x' = (A \oplus x)'$



2 – Given the state diagram below,

a) Starting from state 00 determine state transitions and output sequence that will be generated when an input sequence of 01011011011110 is applied.

b) Design a sequential circuit using D flip fops.



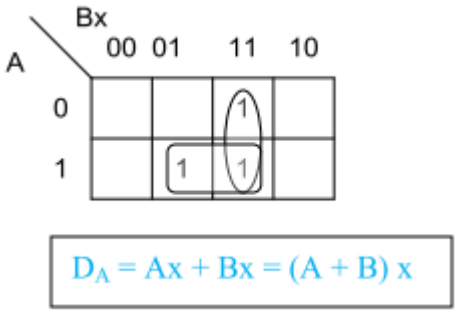
Yanıt 2

a)

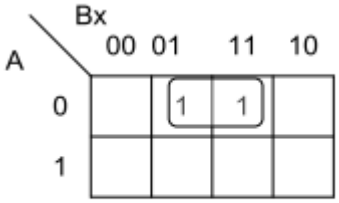
Durum	*00*	*00*	*01*	*00*	*01*	*11*	*00*	*01*	*11*	*00*	*01*	*11*	*10*	*10*	*00*
Girdi	*0*	*1*	*0*	*1*	*1*	*0*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*0*	
Çıktı	*0*	*0*	*1*	*0*	*0*	*1*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*1*	

b)

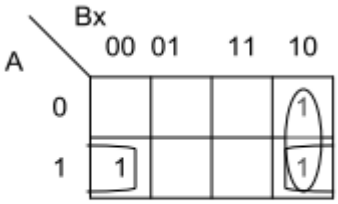
Şimdiki durum		girdi	Sonraki durum		çıktı
A	B	x	A	B	y
0	0	0	0	0	0
0	0	1	0	1	0
0	1	0	0	0	1
0	1	1	1	1	0
1	0	0	0	0	1
1	0	1	1	0	0
1	1	0	0	0	1
1	1	1	1	0	0



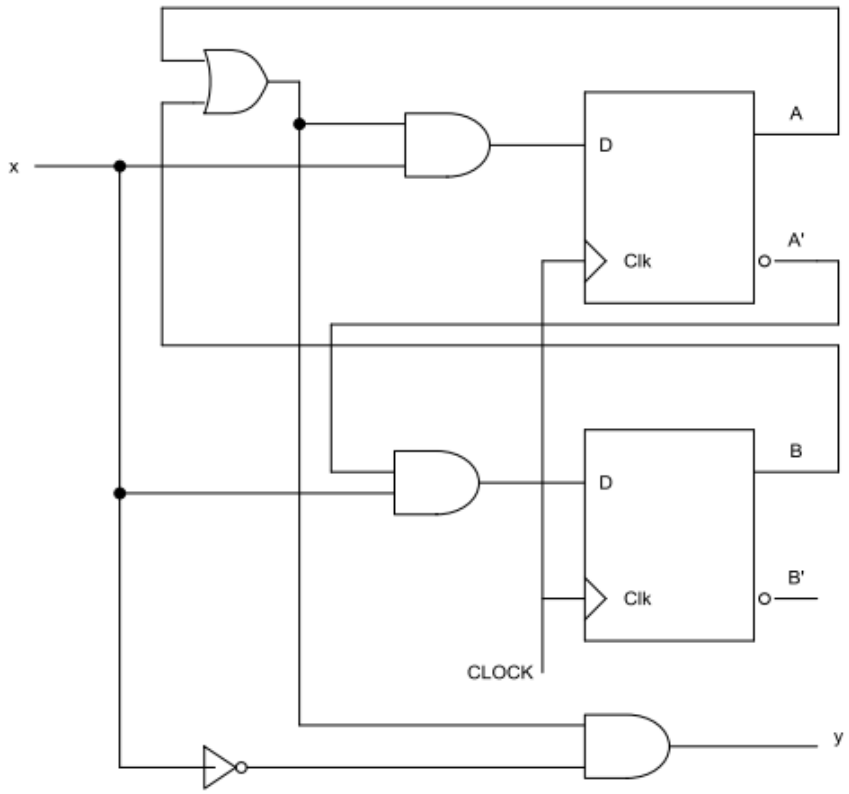
$D_A = Ax + Bx = (A + B)\,x$



$D_B = A'x$



$y = Bx' + Ax' = (A + B)x'$



3 - Create a state diagram for a sequence detector that outputs a 1 when it detects the final bit in the serial data stream 1101

Yanıt 3