

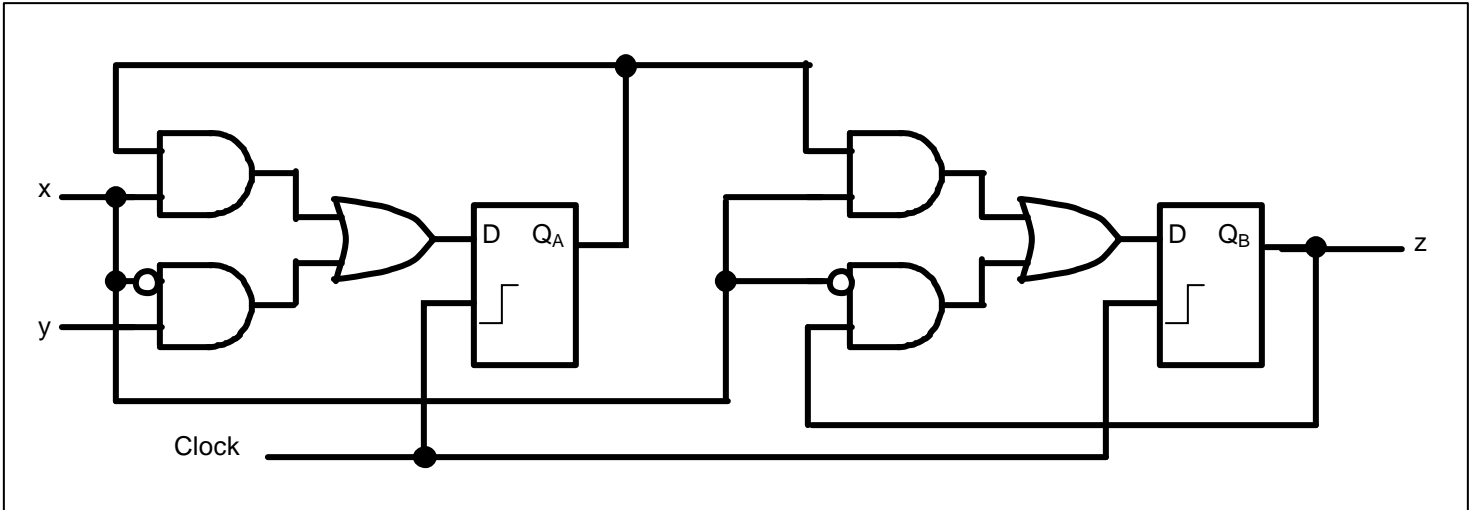
5-6) A sequential circuit with two D flip-flops, A and B, two inputs, x and y, and one output z, is specified by the next state and output equations:

$$A(t+1) = x'y + xA$$

$$B(t+1) = x'B + xA$$

$$z = B$$

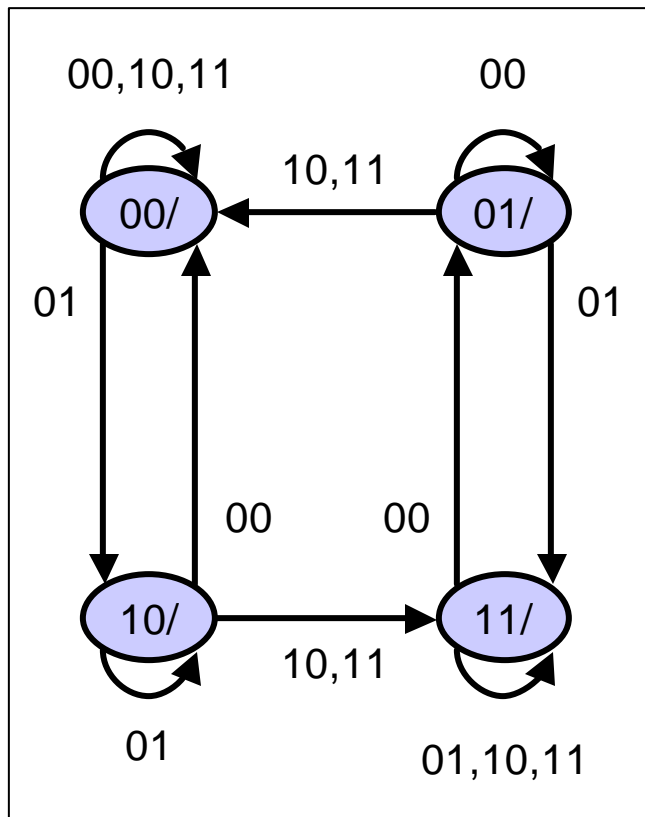
a) Draw the logic diagram of the circuit



b) List the state table for the sequential circuit

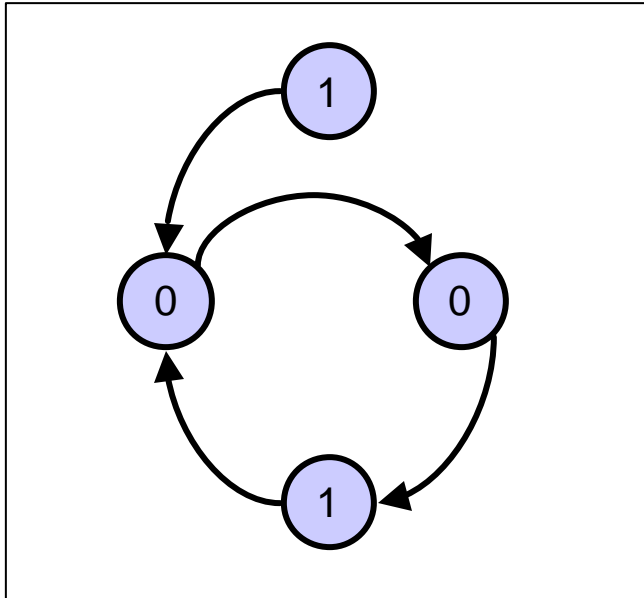
State		Input		Next state		Output
A	B	x	y	A	B	z
0	0	0	0	0	0	0
0	0	0	1	1	0	0
0	0	1	0	0	0	0
0	0	1	1	0	0	0
0	1	0	0	0	1	1
0	1	0	1	1	1	1
0	1	1	0	0	0	1
0	1	1	1	0	0	1
1	0	0	0	0	0	0
1	0	0	1	1	0	0
1	0	1	0	1	1	0
1	0	1	1	1	1	0
1	1	0	0	0	1	1
1	1	0	1	1	1	1
1	1	1	0	1	1	1
1	1	1	1	1	1	1

c) Draw the corresponding state diagram



5-8) Derive the state table and the state diagram of the sequential circuit shown in Fig P5-8. Explain the function the circuit performs.

State		Controls		Next state	
A	B	$T_A=A+B$	$T_B=A'+B$	A	B
0	0	0	1	0	1
0	1	1	1	1	0
1	0	1	0	0	0
1	1	1	1	0	0



This is a divide by 3 circuit

5-9) A sequential circuit has two JK flip-flops A and B and one input x. The circuit is described by the following input equations:

$$J_A = x \quad K_A = B'$$

$$J_B = x \quad K_B = A$$

a) Derive the state equations  $A(t+1)$  and  $B(t+1)$  by substituting the input equations for the J and K variables

$$A(t+1) = xA'(t) + A(t)B(t)$$

$$B(t+1) = A'(t)B(t) + xB'(t)$$

b) Draw the state diagram of the circuit.

