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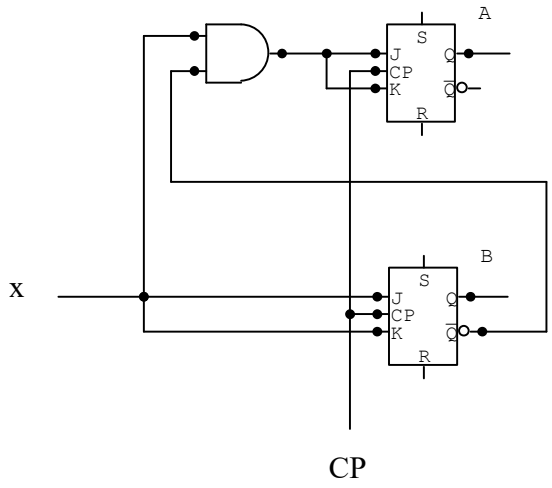
COMPUTER ARCHITECTURE
EXPERIMENT– 3

Implementation of Synchronous Sequential Circuits

Aim: In this experiment, students will be introduced to the concept of sequential circuits and implement a 2-bit Counter.

Experimental Work:

Given the following sequential circuit:



1. Draw the logic diagram of the given sequential circuit in Circuit Maker 6.0.

a) Implement your inputs as logic switches.
Devices → Hotkeys2 → logic switch

b) Implement your circuit using logic gates and JK- Flip Flops (4027).
(You can search devices from *devices → search*)

c) Implement your outputs as logic displays.
Devices → Hotkeys1 → logic display

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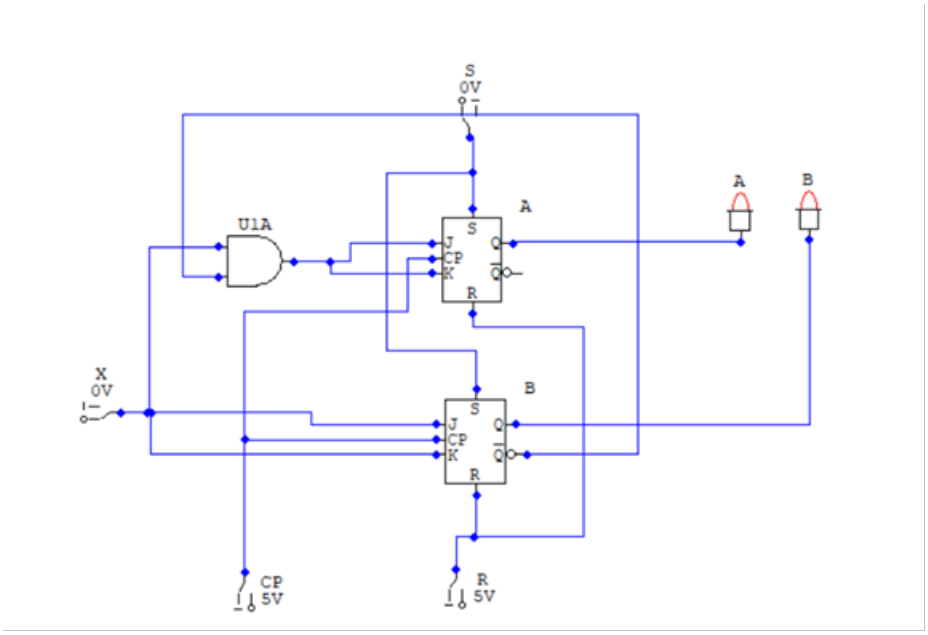

2. Run your circuit and complete the following state table:

Present State			Next State			
A(t)	B(t)	x	A(t+1)	B(t+1)		
0	0	0	0 A(t)	0 B(t)	A(t)	B(t)
0	0	1	1	1	A(t+1)	B(t+1)
0	1	0	0 A(t)	1 B(t)	A(t)	B(t)
0	1	1	0	0	A(t+1)	B(t+1)
1	0	0	1 A(t)	0 B(t)	A(t)	B(t)
1	0	1	0	1	A(t+1)	B(t+1)
1	1	0	1 A(t)	1 B(t)	A(t)	B(t)
1	1	1	1	0	A(t+1)	B(t+1)

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3. Supply your flip-flop input equations:

T_A=AB' T_B=A

Next State Equations:

Q(t+1) = T.Q'+T'Q

A(t+1) = AB'A'+(AB')'A
= AB'A'+(A'+B)A
= AB'A'+A'A+AB
= 0 +AB = AB

B(t+1) = T_bQ'+ T_b'Q
B(t+1) = AB'+ A'B
B(t+1) = A⊕B