Assignment 7

Class-SE IV
Batch-F4

ROLL NO-21430
D.OS - 9/12/2020.

TITLE- flipflop

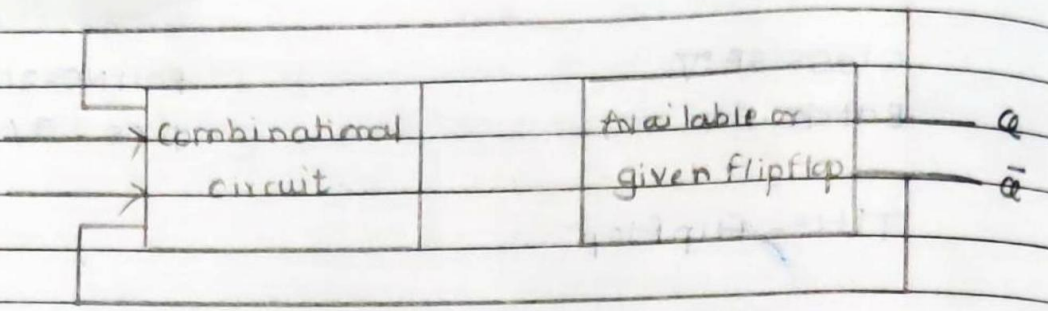
Objective - Conversion of flipflop

Apparatus- Digital trainer kit, IC 7476, IC 7474, IC 7408, IC 7432, IC 7404, Patch cords, +5 v power supply

Theory-:

1. A flipflop is an electronic device which is having two stable states and a feedback path which is used to store 1 bit of information by using the clock signal as input. Laches are also used to do the same task expect that they do not use clock signal.
2. There are four types of flipflop SR, D, JK and T flipflop.
3. Generally, Jk flip-flops and D flip flops are the most widely used flipflops. And so their availability in the form of integrated circuits
4. common conversions are SR → JK, SR → D. SR - T, JK → SR, JK - D, JK - T, D → SR, D → JK, D → T

General model used to convert one type of flipflop to other -:



Derived flipflop

* SR to JK flip flop Conversion :-

Here we are required to convert the SR to JK ff. so first we design a combinational circuit with J and K as its inputs and we connect output to the input of our available flipflop i.e. an SR flip flop so its output is same as that of JK flipflop

* Conversion Table-

FF Inputs		Present state	Next state	Outputs	
J	K	Q_n	Q_{n+1}	S	R
0	0	0	0	0	x
0	1	0	0	0	x
1	0	0	1	1	0
1	1	0	1	1	0
0	1	1	0	0	1
1	1	1	0	0	1
0	0	1	1	x	0
1	0	1	1	x	0

* K-Map Simplification :-

i. for S :-

J \ Q_n	00	01	11	10
0	0	x	0	0
1	1	x	0	1

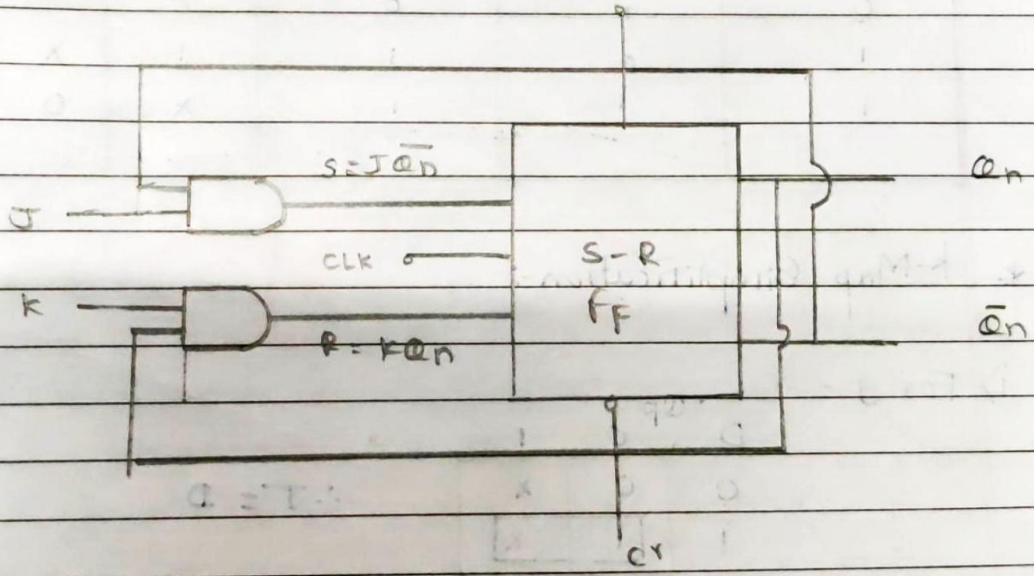
$\therefore S = J\bar{Q}_n$

ii) for R -

J \ Q_n	00	01	11	10
0	x	0	1	x
1	0	0	1	0

$\therefore R = KQ_n$

* Logic Diagram -1



8. JK flipflop to D flip flop Conversion:-
The design of the combinational circuit should be in such a way that D is the input and J & K are its output. The outputs of the combinatio circuit J and K are connected as inputs to th flipflop. Q_p is the present state output of flipflop and $\bar{Q}_p$ is its complementary and q_{p+1} is the next state

* Conversion Table:-

Inputs	Present	Next (Q_{p+1})	Outputs	
D	(Q_p) State	State	J	K
0	0	0	0	X
0	1	0	X	1
1	0	1	1	X
1	1	1	X	0

* K-Map Simplification:-

i) For J.

D \ Q_p	0	1
0	0	X
1	1	X

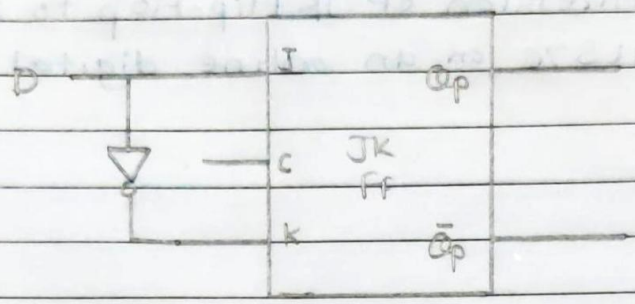
$\therefore J = D$

ii) For K.

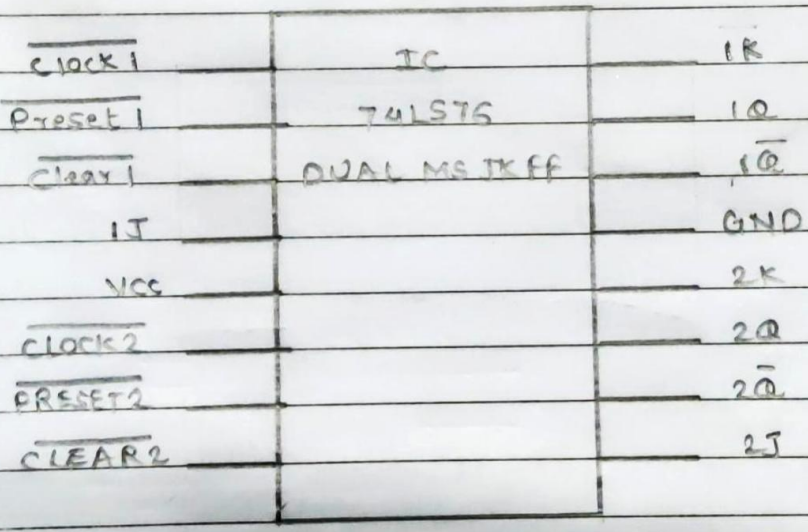
D \ Q_p	0	1
0	X	1
1	X	0

$K = \bar{D}$

* Logic Diagram:-



* PIN DIAGRAM -)



* Logic Gates/MSI Devices required for Implementation:-

NO.	TiHe	Name of IC	Number of FF's required	IC's required
1.	Flip-flop Conversion	IC 74LS76 IC74LS04	1 -	1 1

* Conclusion:-

We successfully designed and implemented circuit for conversion of JK flip-flop to D flip flop using IC-7415 76 on an online digital trainer kit.

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Main

Decoders & Plexers

Sequential Elements

Memory Elements

Test Bench

Misc

PROPERTIES

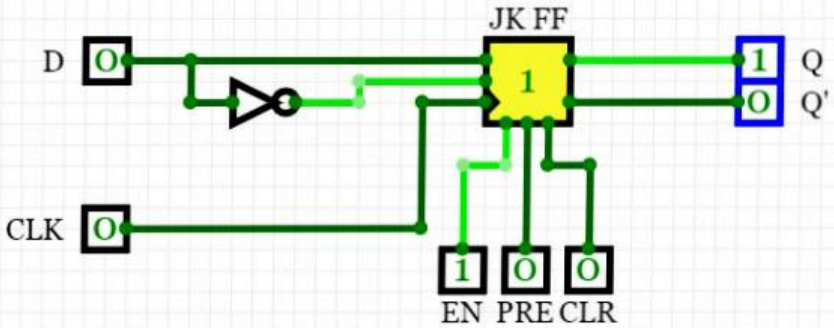
JKFLIPFLOP

Delay: 100

Label: JK FF

Label Direction: UP

Help



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Main

Decoders & Plexers

Sequential Elements

Memory Elements

Test Bench

Misc

PROPERTIES

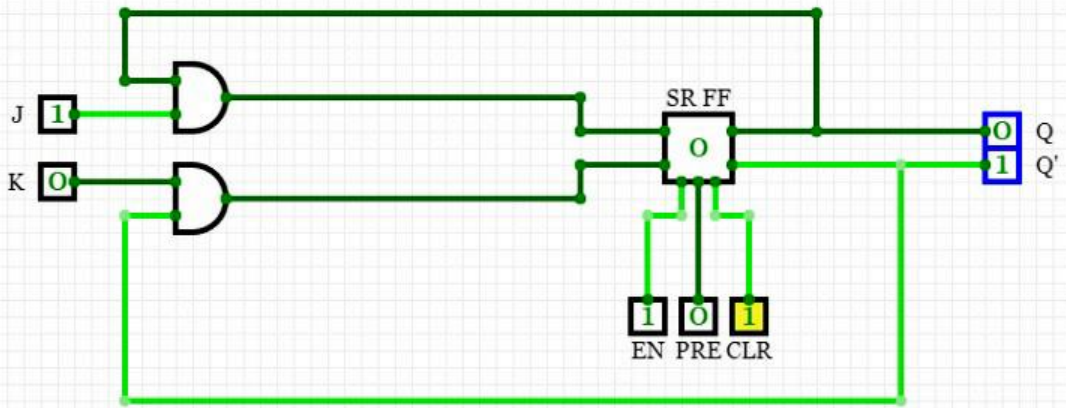
INPUT

BitWidth: 1

Delay: 0

Label: CLR

Label Direction: DOWN



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