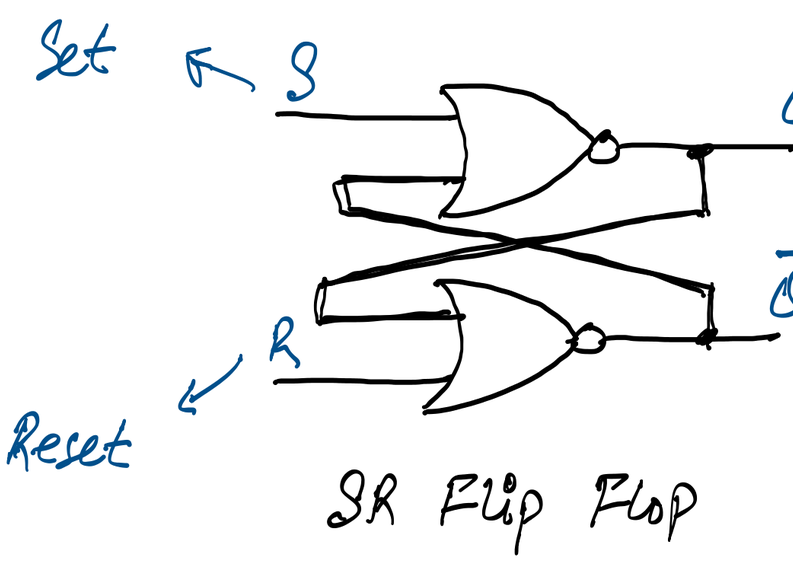
Flip Flop Circuits

Sunday, 5 December 2021 5:11 PM

* Flip flop circuits are used to hold data in computer's memory
* These are sequential circuits. Means their behaviour depends over their output.
* Computer's cache memory (RAM inside microprocessor) is also made up of flip flops.
* Flip flops use either NOR or NAND gates.

NOR Logic:



SR Flip Flop

TRUTH TABLE

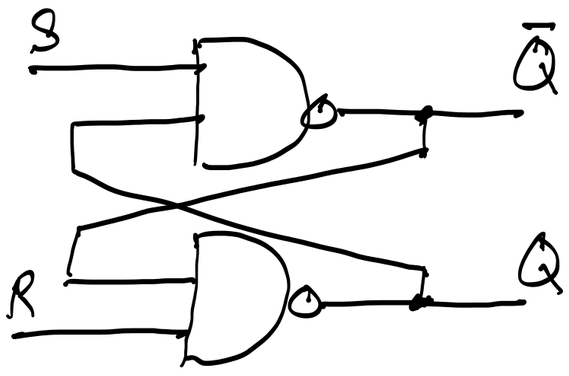
	S	R	Q	$\bar{Q}$	
One change at a time	1	0	1	0	Set
	0	0	1	0	Latch
	0	1	0	1	Reset
	0	0	0	1	Latch
	1	1	0	0	Race/Error.

- Single flipflop represents one bit of storage
- Only one input (S,R) out of two can be changed at a time.
- If there is an error occurs, both Q and Q' becomes same.

Keywords:

Set : Saving 1
Reset : Saving 0
Latch : Hold a bit
Race : An error occured

NAND LOGIC:



SR Flip Flop

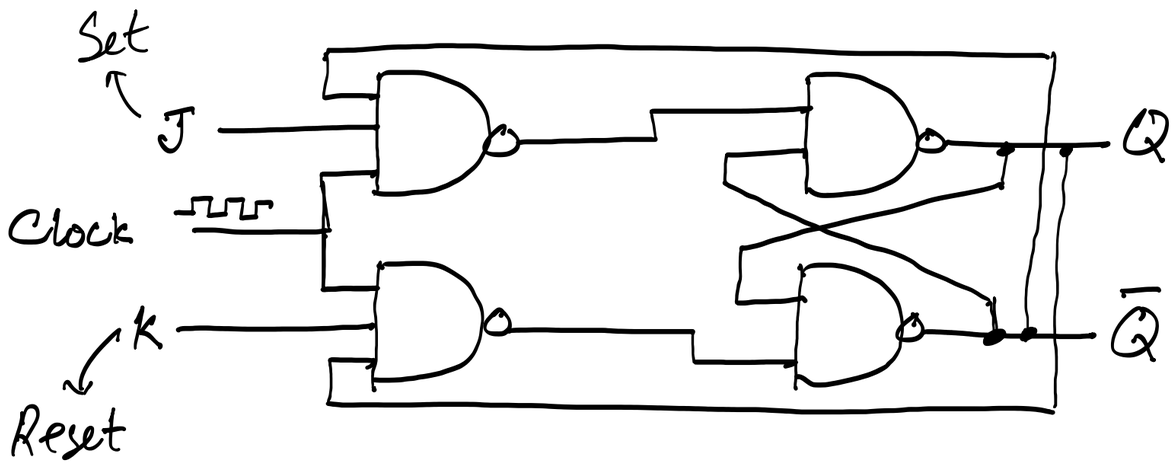
TRUTH TABLE

	S	R	Q	$\bar{Q}$	
One change in input only.	0	1	1	0	Set
	1	1	1	0	Latch
	1	0	0	1	Reset
	1	1	0	1	Latch
	0	0	1	1	Race/Error.

JK Flip Flop

$\bar{J} = S$
$K = R$
Jack Kilby

These are an improvement over SR flip flops as:
- There is no error/race
- No limitation of single input at a time
- It has a toggle/flipping option.



$2^3 = 8$ possibilities

J	k	Clck	Q	$\bar{Q}$	
1	0	↑	1	0	Set
0	1	↑	0	1	Reset
1	1	↑	1	0	Toggle
0	0	↑	1	0	Latch
Anything else			No change.		