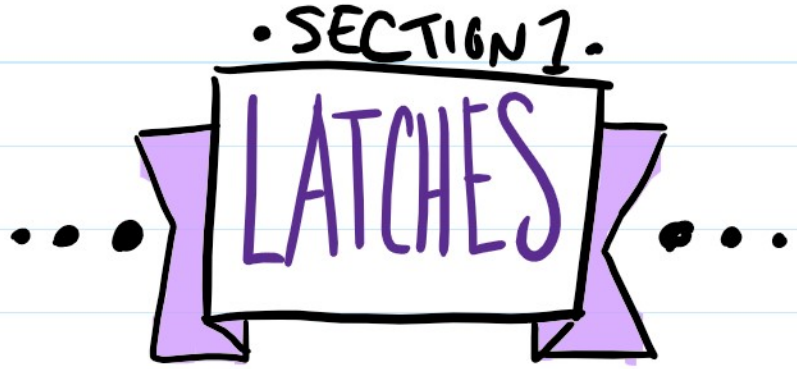
Section 1 - Latches

Wednesday, June 19, 2019 12:20 PM



COMBINATIONAL LOGIC IS BASED UPON THE COMBINATION OF PRESENT INPUTS

SEQUENTIAL LOGIC DEPENDS ON THE SEQUENCE OF INPUTS

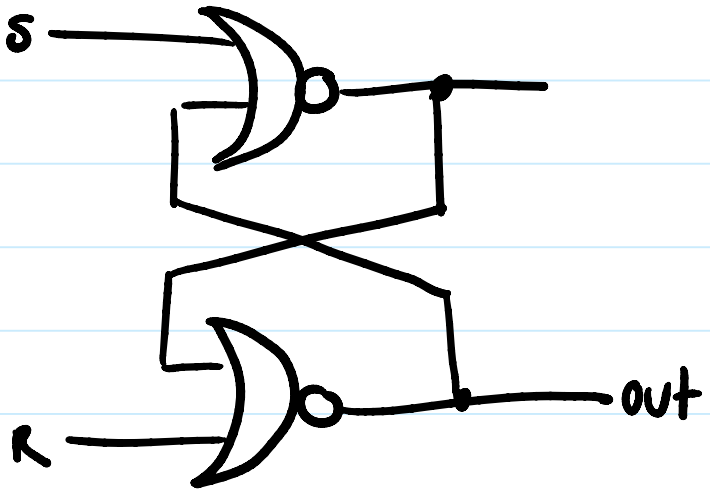
EXAMPLE:

- PRESS ON BUTTON FOR LAMP.
- LAMP TURNS ON
- CIRCUIT STORE 1
- LAMP STAYS ON UNTIL OFF PRESSED
- WHEN OFF IS PRESSED, 0 STORED

LATCH - SIMPLEST CIRCUIT FOR STORING A BIT

SR LATCH - STORES 1 BIT

- S = set
- r = reset



S	r	OUT
0	0	PREVIOUSLY STORE BIT
0	1	0 - RESET
1	0	1 - SET
1	1	UNKNOWN (OSCILLATION)

- SR = 11 CAUSES A PROBLEM
- CAUSES OSCILLATION BETWEEN 1
- DUE TO WIRES & GATE DELAYS ONE COULD DOMINATE - WHICH ONE IS UNKNOWN

D LATCH - STORES ONE BIT
- d: data
- e: enable

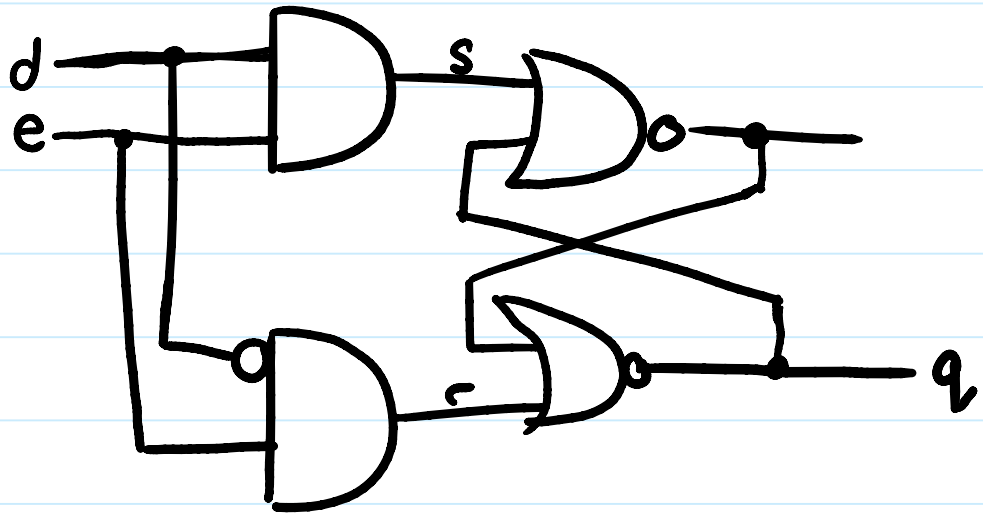
- SR LATCH HAS OSCILLATION PROBLEM.

- D LATCH IMPLEMENTED WITH AN SR LATCH
  - ↳ s = d
  - ↳ r = d'

SR != 00 only 1bit set to or reset

- SR can never equal 11 ↓

- the bit from d(data) can only be enabled if e is 1



e	d	q
0	0	PREVIOUSLY STORED BIT
0	1	PREVIOUSLY STORED BIT
1	0	0 (d is stored)
1	1	1 (d is stored)