

CSBB251: Computer Architecture and Organization.

LAB ASSIGNMENT_08: Simulating 3-bit ripple counter using Pspice.

Date Assigned: 29/03/25

Date Submitted :06/03/25

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2025

A 3-bit ripple counter is a digital circuit made up of three flip-flops connected in series. It's used to count pulses in binary, from 000 to 111 (which is 0 to 7 in decimal).

Each bit in the counter represents one flip-flop, and together, they can store $2^3 = 8$ different states.

How It Works

- Clock Input is connected to the first flip-flop (FF0).
- The output of FF0 is connected to the clock input of FF1.
- The output of FF1 is connected to the clock input of FF2.
- All flip-flops are T-type or JK-type configured to toggle on each clock pulse.

Here's what happens on each clock pulse:

1. FF0 toggles with every clock pulse.
2. FF1 toggles whenever FF0's output goes from 1 to 0 (falling edge).
3. FF2 toggles whenever FF1's output goes from 1 to 0.

This cascading behavior gives it the name "ripple" counter, since the toggling effect ripples through the flip-flops.

Clock Pulse	Q2	Q1	Q0	Binary	Decimal
0	0	0	0	000	0
1	0	0	1	001	1
2	0	1	0	010	2
3	0	1	1	011	3
4	1	0	0	100	4
5	1	0	1	101	5
6	1	1	0	110	6
7	1	1	1	111	7
8	0	0	0	000	0 (resets)



