Sequential Logic Design

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Sequential Circuits and Counters

Introduction to Sequential Circuits:
- Circuits with memory, output depends on past and present inputs.

Latches and Flip-Flops:
- **SR Latch and D Latch**: Basic memory elements.
- **Flip-Flops (FFs)**: RS, JK, D, and T Flip-Flops.
- **Excitation Table of Flip-Flops:** Determines the required inputs for state transitions.

Counters:
- **Asynchronous Counters (Ripple Counter)**: Clock input applied to first FF, others toggle asynchronously.
- **Synchronous Counters:** All FFs triggered simultaneously.
- **Mod Counters:** Counters with a modulus value.

Shift Registers:
- Used for data storage and transfer.
- Types: **SISO (Serial In Serial Out), SIPO (Serial In Parallel Out), PISO (Parallel In Serial Out), PIPO (Parallel In Parallel Out), and Universal Shift Registers**.

Special Counters:
- **Ripple Counter**: Counts asynchronously.
- **Johnson Counter**: Circular shift register with feedback.