**Sequential Circuit: Small Design Introduction**

* All small and large sequential circuits are made of flip-flops and set of CC’s – Combinational circuits.
* Contrary to CC’s, a sequential circuit design has states and transitions from a current state to next state.
* A sequential circuit design problem is typically modeled as a finite state diagram (FSD).
* FSD consist of circles as states and arcs (arrows) as transitions, which specifies the behavior of sequential circuit.
* An FSD is systematically converted into circuit called a finite state machine. (FSM)
* Finite state machine designs are categorized into Mealy, Moore or hybrid machines.
* Mealy is a FSM whose output values are determined by its ***current state and current input***. Contrast to a Moore machine, whose output values are determined **solely by** its current inputs.
* Finite state diagram (FSD) describes the behavior of system
* A register is used as a storage module to save the output of a CC.
* FSM’s are categorized into Mealy, Moore or hybrid machines.

**Sequential Circuit: Small Design Introduction – Moore Vs Mealy**

Moore Machines

* Output depends only upon present state
* If input changes, output does not change
* More number of states are required
* There is more hardware requirement
* They react slower to inputs ( One clock cycle later)
* Synchronous output and state generation
* Output is placed on states
* Easy to design

Mealy Machine

* Output depends on present state as well as present input
* If input changes, output also changes
* Less number of states are required
* There is less hardware requirement
* They react faster to inputs
* Asynchronous output generation
* Output is placed on transitions
* It is difficult to design