

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