

# Reading 13

## 15.1 Finite State Machines (FSMs)

- A circuit is combinational if the circuit's output values depend solely on the present combination of input values.
- A circuit is sequential if the circuit's output values depend not only on the present input values, but also on the sequence of past values.
- An FSM is a computational model that can describe sequential behavior.
- A state is the present "situation" of a digital system.

## 15.3 Capturing Behavior with FSMs

- To capture behavior, a designer describes desired behavior in some form.
- A pulse is the changing of a signal from 0 to 1 and back to 0.
- An input that controls whether a behavior occurs is called an enable input.
- Toggle means to change to the opposite situation, such as from 0 to 1 or from 1 to 0.

## 15.5 FSM Issues

- For a given FSM state, exactly one outgoing transition should have a true condition at any given time. No more, No fewer.
- A shorthand in FSM diagrams is if an output is not explicitly assigned in a state, the output is implicitly assigned with 0.
- Additional circuitry may be required to have an initial state be loaded properly for a FSM.