Continuing Education Course #509
State Machines

1. A state machine is used for all of the following purposes except
- a. to describe the behavior of a real world system
- b. to model a random event
- c. to describe the relationship between the inputs and outputs of a system
- d. to ensure the predictability of a control system

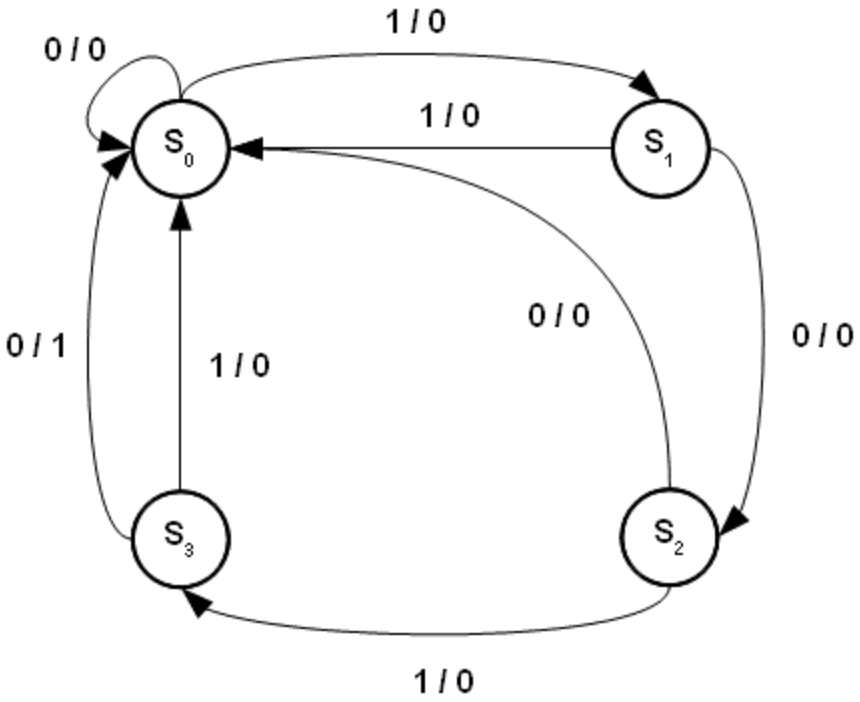
2. A state machine is composed of all of the following except
- a. a set of states
- b. a set of possible input events
- c. a function that maps current state and input to next state
- d. an instruction set

3. A hardware implementation of a state machine containing 19 states will require this many flip-flops
- a. 3
- b. 4
- c. 5
- d. 6

4. Two state machine architectures, Mealy and Moore machines, are differentiated by
- a. their output dependencies
- b. the number of inputs
- c. the number of states
- d. their initial state

5. The architecture whose output depends both on input and current state is
- a. Mealy machine
- b. Moore machine
- c. both Mealy and Moore machines
- d. neither Mealy nor Moore machines

6. The type of state machine that often results in fewer states is
- a. Mealy
- b. Moore
- c. Most
- d. Minus



7.

For the state machine described by the above state diagram, if the current state is S2, an input of 1 would generate a next state of

- a. S0
- b. S1
- c. S2
- d. S3

8. For the state machine described by the above state diagram, if the current state is S3, an input of 1 would generate a next state and output of

- a. next state S0, output 1
- b. next state S2, output 0
- c. next state S0, output 0
- d. next state S1, output 1

9. The state machine described is a

- a. Moore machine
- b. Mealy machine
- c. a Mealy and Moore machine hybrid
- d. neither a Mealy nor Moore machine

10. A state machine may be implemented using

- a. flip-flops and combinational logic
- b. a microprocessor programmed with a software implementation of a state machine
- c. an FPGA loaded with a Verilog implementation of a state machine
- d. all of the above

11. A disadvantage of a hardware implementation of a state machine using flip-flops and discrete logic is

- a. that the implementation requires significant circuit board space
- b. that the design is difficult to modify

○ c. the design is difficult to debug
○ d. all of the above

12. When it comes to execution time, a pure hardware implementation of a state machine is often _____ than a software implementation.
○ a. slower
○ b. faster
○ c. the same

13. The main advantage of a software implementation of a state machine over a hardware implementation is
○ a. the software implementation is always faster than a hardware implementation
○ b. the software implementation requires fewer states than a hardware implementation
○ c. the software implementation is more versatile, i.e., easier to modify than a hardware implementation
○ d. all of the above

14. The component of a state machine, regardless of implementation, that stores the current state of the system is
○ a. the state diagram
○ b. memory
○ c. combinational logic
○ d. a transition

15. A state machine would best be used to describe all of the following except
○ a. a household appliance controller
○ b. a communications protocol that parses symbols as they are received
○ c. a fractal geometry algorithm
○ d. an electronic garage door opener