1. Which of the following best describes the characterizing equation of a sequential system?

A) An equation that defines the relationship between input and output variables
B) An equation that specifies the state transitions based on input and current state
C) An equation that describes the timing characteristics of the system
D) An equation that governs the power consumption of the system

Answer: B) An equation that specifies the state transitions based on input and current state.
Explanation: The characterizing equation of a sequential system typically describes how the output and next state are determined by the current state and input.

2. What defines a synchronous sequential machine?

A) It has no clock signal
B) It operates without any memory elements
C) Its state transitions are controlled by a clock signal
D) It relies solely on combinational logic

Answer: C) Its state transitions are controlled by a clock signal.
Explanation: Synchronous sequential machines synchronize their state transitions to a clock signal, ensuring orderly and predictable behavior.

3. How are state diagrams and state tables typically derived from a verbal description of a sequential system?

A) By analyzing the power consumption
B) By minimizing the number of states
C) By examining the timing characteristics

D) By identifying the states and state transitions

Answer: D) By identifying the states and state transitions.
Explanation: State diagrams and state tables are derived by identifying the different states of the system and the transitions between them based on verbal descriptions.

4. In which type of sequential machine does the output depend on both the current state and input?

A) Mealy machine
B) Moore machine
C) Johnson counter
D) Asynchronous machine

Answer: A) Mealy machine.
Explanation: In a Mealy machine, the output is a function of both the current state and input, unlike in a Moore machine where it depends only on the current state.

5. What distinguishes a Mealy model from a Moore model in terms of state table representation?

A) Mealy model has additional columns for inputs
B) Moore model has additional columns for outputs
C) Both models have the same state table representation
D) Moore model has additional rows for states

Answer: A) Mealy model has additional columns for inputs.
Explanation: In a Mealy model state table, there are additional columns for inputs, as the

outputs depend on both the current state and input.

6. How is the state table of a sequential machine minimized?

A) By maximizing the number of states
B) By increasing the number of inputs
C) By combining equivalent states
D) By introducing additional memory elements

Answer: C) By combining equivalent states.
Explanation: Minimizing the state table involves identifying and combining equivalent states to reduce the complexity of the machine.

7. Which type of sequential machine allows for asynchronous state transitions?

A) Mealy machine
B) Moore machine
C) Synchronous machine
D) Asynchronous machine

Answer: D) Asynchronous machine.
Explanation: Asynchronous machines do not rely on a clock signal for state transitions, allowing for more flexible timing behavior.

8. What is the purpose of minimizing the state table of a completely specified sequential machine?

A) To increase power consumption

B) To decrease the number of inputs
C) To reduce the number of states
D) To introduce more complexity

Answer: C) To reduce the number of states.
Explanation: Minimizing the state table helps reduce the complexity of the machine by decreasing the number of states required to represent its behavior.

9. Which type of machine's output depends only on the current state, not on the inputs?

A) Mealy machine
B) Moore machine
C) Synchronous machine
D) Asynchronous machine

Answer: B) Moore machine.
Explanation: In a Moore machine, the output depends solely on the current state, regardless of the inputs.

10. What aspect of a sequential system is described by its state diagram?

A) Input-output relationship
B) Timing characteristics
C) State transitions
D) Power consumption

Answer: C) State transitions.
Explanation: State diagrams visually represent the different states of a system and the

transitions between them, aiding in understanding its behavior.

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