

Assignment 9

MCQ:

1. The output of a Mealy machine is determined by

- A. Current input
- B. Current state
- C. Both A and B
- D. None of the above.

Solution: Option C. Both A and B

Explanation: Definition of a mealy machine.

2. Which of the following are true about state charts?

- A. Hierarchy is not inherent in state charts.
- B. Representation of concurrency is present.
- C. Both A and B.
- D. None of the above

Solution: Option B. Representation of concurrency is present.

Explanation: Hierarchy is inherent in state charts, hence, option a is false.

3. "When I build a finite automaton, I ensure that it describes all the transitions by their source, target state, and trigger events."

- A. True
- B. False
- C. Cannot be said

Solution: Option A. True

Explanation: This is a necessary condition for preparing a finite automaton to solve a problem.

4. When there is only one level of nesting the deep and shallow history states are

- A. Semantically not equivalent
- B. Similar
- C. Semantically equivalent
- D. None of the above

Solution: Option C. Semantically equivalent

Explanation: Fact

5. Does a nested concurrent state machine have a history state?

- A. Yes
- B. No
- C. Cannot be determined

Solution: No.

Explanation: A nested concurrent state machine has concurrent substates only.

6. "History state is a pseudo-state that allows the state machine to re-enter the last substate that was active before entering the composite state."

- A. True
- B. False

Solution: Option A. True

Explanation: This is the definition of a history state in UML.

7. Which are False regarding concurrent regions in UML?

- A. Concurrent state diagrams specify finite automata that can be parallelly executed.
- B. The concurrent composite states have no state diagrams.
- C. Both A and B are false.
- D. Both A and B are true.

Solution: Option B. The concurrent composite states have no state diagrams.

Explanation: The concurrent composite states have state diagrams separated by dashed lines.

8. Which of the following are used to model user interface rate?

- A. Petri nets
- B. Dialog maps
- C. Both A and B
- D. None of the above

Solution: Option B. Dialog maps

Explanation: Dialog maps are used to model UI in UML.

9. Which of the following are timing constraints in Program State machines in UML?

- A. Execution time constraints
- B. Data rate constraint
- C. Inter event timing constraint
- D. All of the above

Solution: Option D. All of the above

Explanation: Timing constraints are non-functional constraints that need to be kept in mind while designing Program State Machines.

10. A moore machine has a ____ tuple definition.

- A. 5
- B. 6
- C. 7
- D. 4

Solution: Option B. 6

Explanation: Moore machine is defined as a tuple consisting of

- A finite set of states
- A start state which belongs to set of states
- Input alphabet
- Output alphabet
- Transition function mapping a state and the input alphabet to the next state
- Output function mapping each state to the output alphabet.

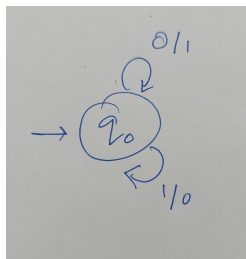
Short-Answer type(Alphanumeric answers only):

11. The given input for a Moore machine is the string “11010110”. Find the output length.

Solution: 9

Explanation: $|\text{output}| = |\text{input}| + 1$ for Moore machines since the initial state is initialized with a value. Therefore $|\text{output}| = 8 + 1 = 9$.

12. Consider the following Mealy machine:



Find the output to the following input string : “110110001”

Solution: 001001110

Explanation: The Mealy machine returns the 1's complement as the output. Therefore, 1's complement of 110110001 = 001001110.