Questions for self assessment

Module 6--Lecture 1

1. What are the problems with simulation based validation method.

2. Why Formal methods did not get acceptance in industry earlier.

3. What are the advantages of using formal methods for design verification?

4. Why it is difficult to use HOL in verification.

5. Try to find out major instances of system design failures like Pentium Bug.

Module 6--Lecture 2,3,4

1. Prove that model checking algorithm can be done in polynomial time to the size of the Kripke structure and the length of the CTL formula.

2. Consider a microwave oven controller and give the state encoding. What is the Boolean expression for the state transition diagram?

3. Identify some of the specifications of the microwave oven controller and represent them in CTL.

4. Consider the following systems and design a model for them. Also indicate some properties of these systems and represent them in CTL.
    a. Elevator controller
    b. Traffic light controller
    c. Controller for ATM

5. What are the major disadvantages of Model Checking?

Module 6--Lecture 5

1. The basis of model checking algorithm is (i) the graph traversal algorithm and (ii) to find the predecessor states of a given set of states. Indicate the methods to handle these points in symbolic model checking.

2. How do we handle the labeling function in symbolic model checking?

3. What is the relationship between $Pre_{\exists}(X)$ and $Pre_{\forall}(X)$.

4. Show that the following operation returns the OBDD for the set of states which are the predecessor states of a given set of states.

    $exists(x', apply(\bullet, B_{\rightarrow}, B_X'))$