Questions for self assessment

Module 5--Lecture 1

1. How the temporal logic is different from other classical logic like propositional logic and predicate logic.

2. Express "*P* is true in next state, or the next but one" in temporal logic

3. Consider the fact: *p* is an atomic proposition. Write the temporal formula for "*p* is infinitely often true". Give a model to show that this formula is true in all states.

4. Represent the information in temporal logic, "If *P* holds in a state then eventually in past *Q* holds"

Module 5--Lecture 2

1. Consider $X = \{p, q, r\}$ be a set of atomic propositions. What is the power set of *X*.

2. Show a Kripke structure such that in a particular state *EX (q or r)* holds but *EX(q and r)* does not hold.

3. Show a Kripke structure such that in a particular state *AF (q or r)* holds but *EF(q and r)* does not hold.

4. In the semantics of CTL, we have considered that "future includes the present also". Redefine the semantics of CTL such that future excludes the present.

5. Express the following properties in CTL:
    a. It is possible to get a state where started holds, but ready does not hold.
    b. For any state, if a request (of some resource) occurs, then it will eventually be acknowledged.
    c. A certain process is enabled infinitely often on every computation path.
    d. From any state it is possible to get a restart state.

Module 5--Lecture 3

1. When we say that two CTL formulas are semantically equivalent?

2. Which of the following pairs of CTL formulas are equivalent:
   a) EFp and EGp
   b) $EFp \vee EFq$ and $EF(p \vee q)$
   c) $AFp \vee AFq$ and $AF(p \vee q)$
   d) $AFp \wedge AFq$ and $AF(p \wedge q)$
   e) $EFp \wedge EFq$ and $EF(p \wedge q)$
   f) $AG(p \wedge q)$ and $AGp \wedge AGq$
   g) T and $AGp \rightarrow EGp$
   h) T and $EGp \rightarrow AGP$

3. Show that *"E(Fp U Fq)"* and *"(EF(p U EFq) Ú EF(q U EFP)"* are equivalent.