Information Systems Analysis & Design (M8748)

Tutorial 11 Answer

1. Define event, state and transition.
   Event—occurrence that is relevant to an object or application.
   State—the state of an object is determined by the value of some of its attributes and the presence or absences of links with other objects.
   Transition—the movement from one state to another, triggered by an event.

2. What is the effect of a guard condition?
   A guard condition is evaluated when a particular event occurs and only if the condition is true does the associated transition fire.

3. Why should all the guard conditions from a state be mutually exclusive?
   All the guard conditions from a state should be mutually exclusive so that for each set of circumstances there is only one valid transition from a state. If they are not mutually exclusive more than one transition may be valid and the behavior of the statechart is indeterminate.

4. What does it mean to say that an object can be in concurrent states?
   An object can be in concurrent states if it has a complex composite state with concurrent substates.

5. How do nested states differ from concurrent states?
   Nested states are substates of a composite state and describe the life cycle of an object in detail. Nested states need not be concurrent but may be. Concurrent nested states are substates that an object may occupy at the same time.

6. What is the difference between an action and an activity?
   An action is considered to be instantaneous (its duration is actually determined by the processing environment) while an activity persists for the duration of a state, for example (its duration is dependent upon the occurrence of events that may cause a state change).

7. What UML modeling element has its behavior partly described by a statechart?
   A statechart describes the possible dynamic behavior and associated state changes of a class. Please note that statecharts can also be used to model the dynamic behavior of other classifiers eg. sub-systems and use cases.

8. What are the indications that a statechart has not been drawn to model state changes?

   Typical indications that a statechart is not modelling state changes include:

   - Most transitions fired by state completion.
   - Many messages sent to 'self' reflecting code reuse.
   - States do not capture state dependent behavior associated with the class.

9. Against which other UML diagrams should a statechart be cross-checked?

   A statechart should be cross-checked with relevant class diagrams to ensure that the class specifications are consistent, with interaction sequence diagrams and collaboration diagrams that involve this class (and hence its statechart), with any nested statecharts and also with any linked activity diagrams (e.g. parent activity diagram).

10. What cross-checks should be carried out??

    The consistency checks should include class names, location of operations and signature of operations.