Lecture 8 Behavioral Models

Interaction diagrams:

1. Sequence diagram
2. Communication diagram

State machine

1. Sequence Diagram
   • Illustrates the classes that participate in a use case
   • Shows the messages that pass between classes over time for one use case
   • Can be a generic sequence diagram, but more frequently one is drawn for a single scenario within the use case

Elements:
   An actor
   An object
   A lifeline
   An execution occurrence / Focus of control
   A message, return message
   Object destruction

Example:

1. Object creation and destruction
2. Simple iteration

Scenario for making a phone call:
- Caller lifts receiver
- Dial tone begins
- Caller dials digits one at a time
- Switch makes routing
- Ringing tone on caller’s receiver begins
  o Phone rings on callee’s receiver begins
  o Callee lifts receiver
- Switch makes connection between caller and callee
  o Switch connects caller
  o Switch connects callee
Message with duration

Communication diagram / Collaboration

Emphasize the flow of messages among objects, rather than timing and ordering of messages

Elements
  Actor
  Object
  Association / link – communication paths
  Message – sequence number and direction
State Machine / Statechart

State – an abstraction of the attribute values and links of an object.

Characteristics:

A state occupies an interval of time
A state is often associated with an abstraction of attribute values of an entity satisfying some condition(s)
An entity changes its state not only as a direct consequence of current input, but as a result of some past history of its inputs

State machine

- A dynamic model showing changes of state of a single class over time in response to events along with its responses and actions
- Typically not used for all classes, but just to help simplify the design of algorithms for methods of complex classes

Elements

- Initial state
- Final state
- State
- Transition

Examples