

Object Oriented Analysis & Design

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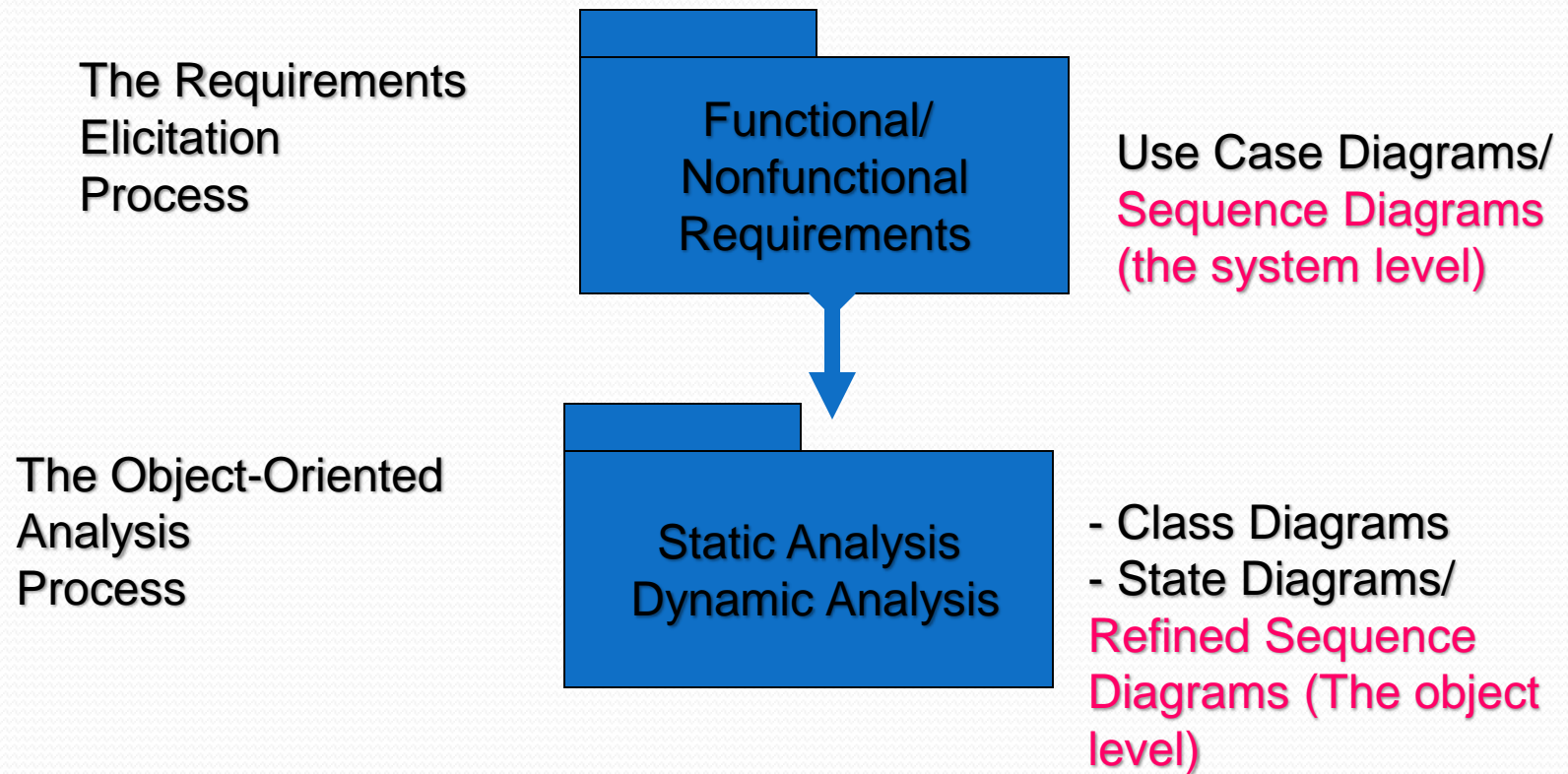
Sequence Diagrams

The Requirements Model, and
The Dynamic Analysis Model

Outline

- The Requirements Model and the Analysis model
- Importance of Sequence Diagrams
- Rules of sequence diagrams
- Use Cases and Sequence Diagrams
- The System Sequence Diagrams
- The Vending Machine Example
- Other Examples

The Requirements Model and the Analysis Model

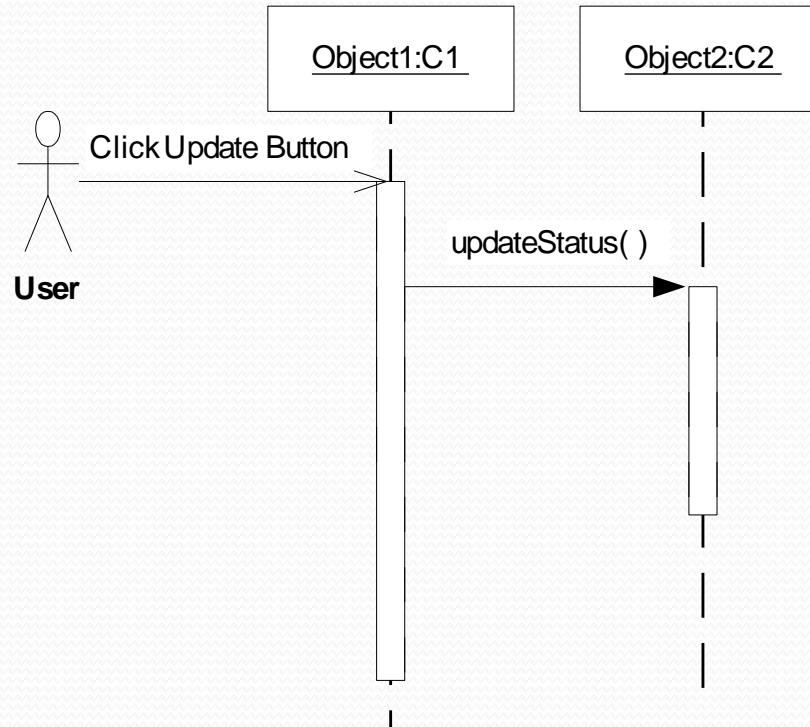


Importance of Sequence Diagrams

- Depict object interactions in a given scenario identified for a given Use Case
- Specify the messages passed between objects using horizontal arrows including messages to/from external actors
- Time increases from Top to bottom

Rules of Sequence Diagrams

- Sequence Initiation

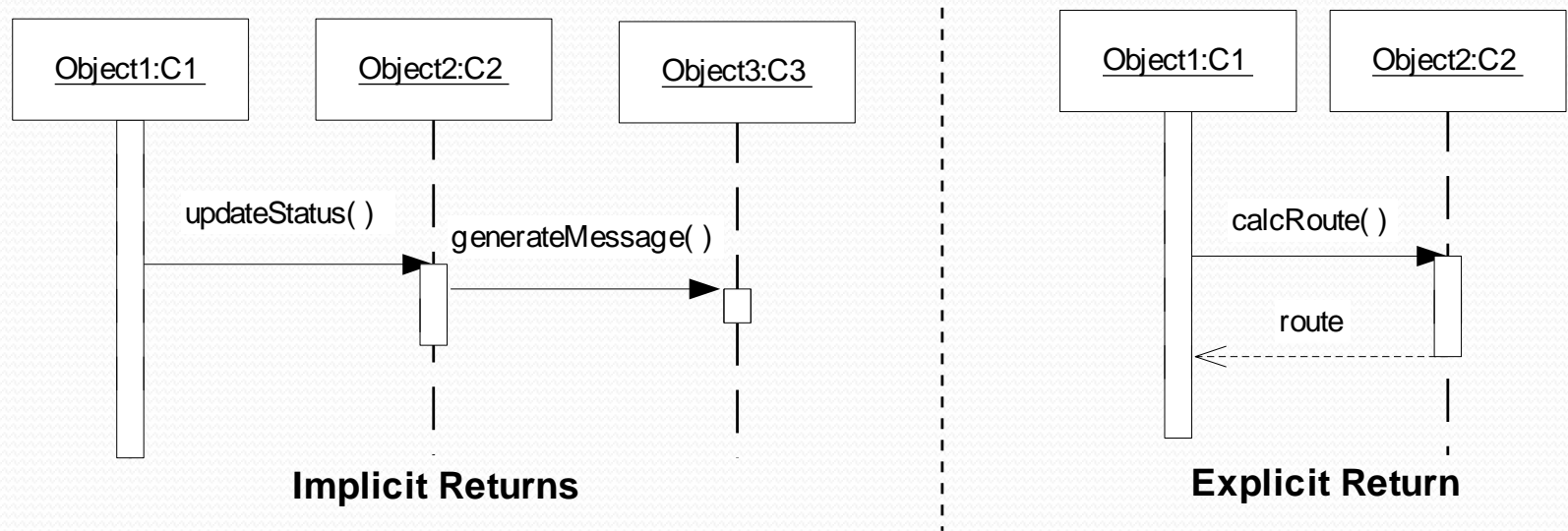


Rules of Sequence Diagrams

- Identify objects needed to support use case, determine sequence of internal events following the external initiating event
- Diagrams that are not initiated with an external actor represent only a partial sequence
- Partial sequence diagrams should clearly identify the actor initiated sequence diagrams from which they are launched

Rules of Sequence Diagrams

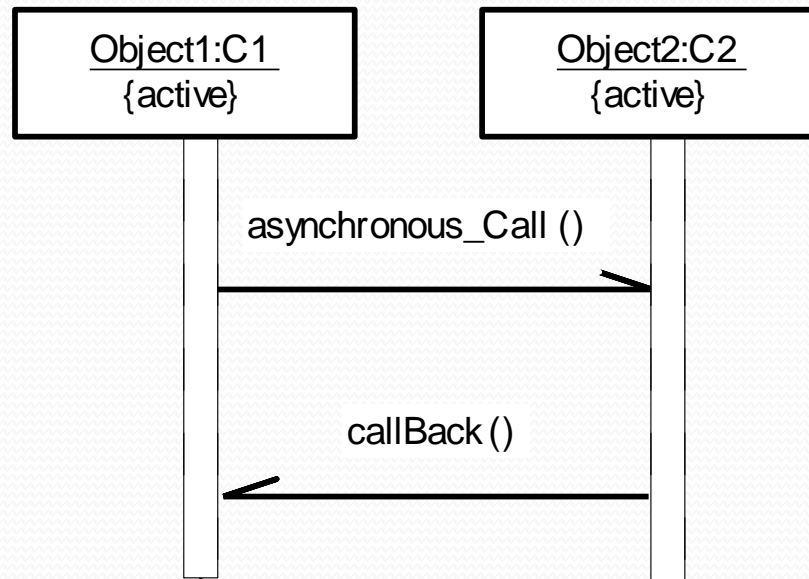
- Messages specified on interactions can be synchronous or asynchronous



Synchronous call

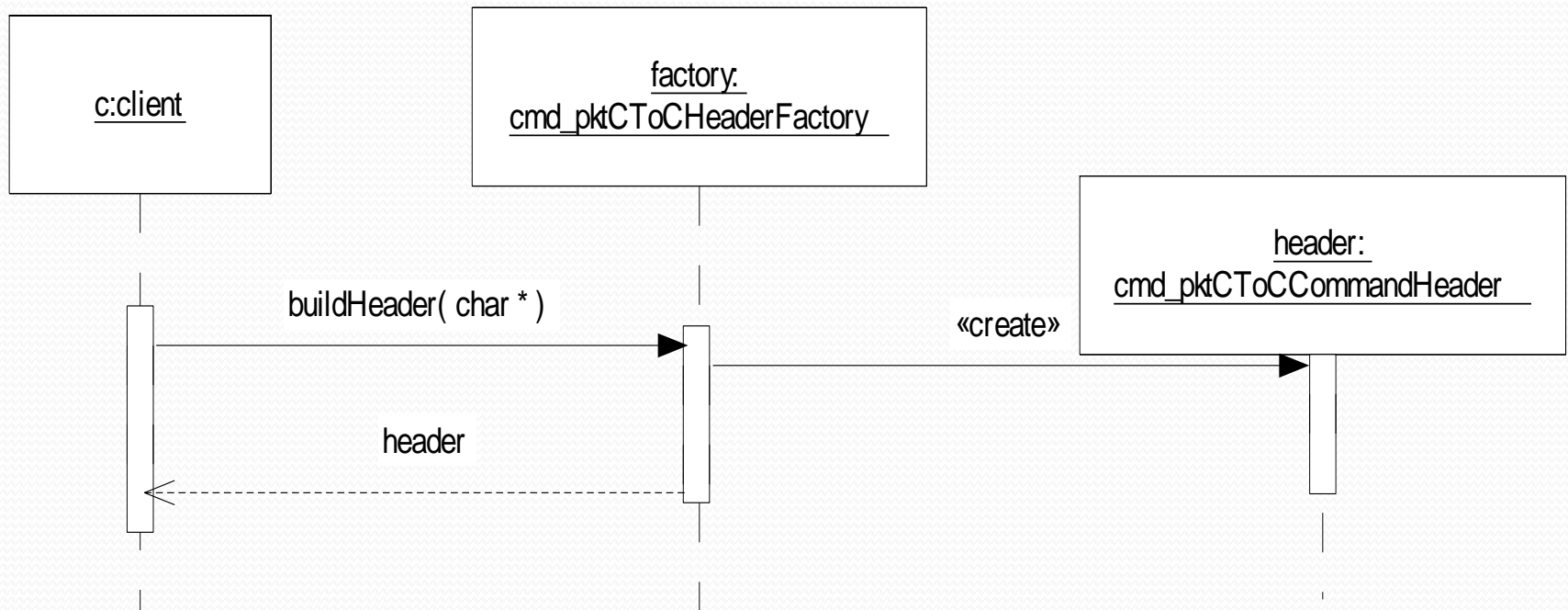
Rules of Sequence Diagrams

Asynchronous call



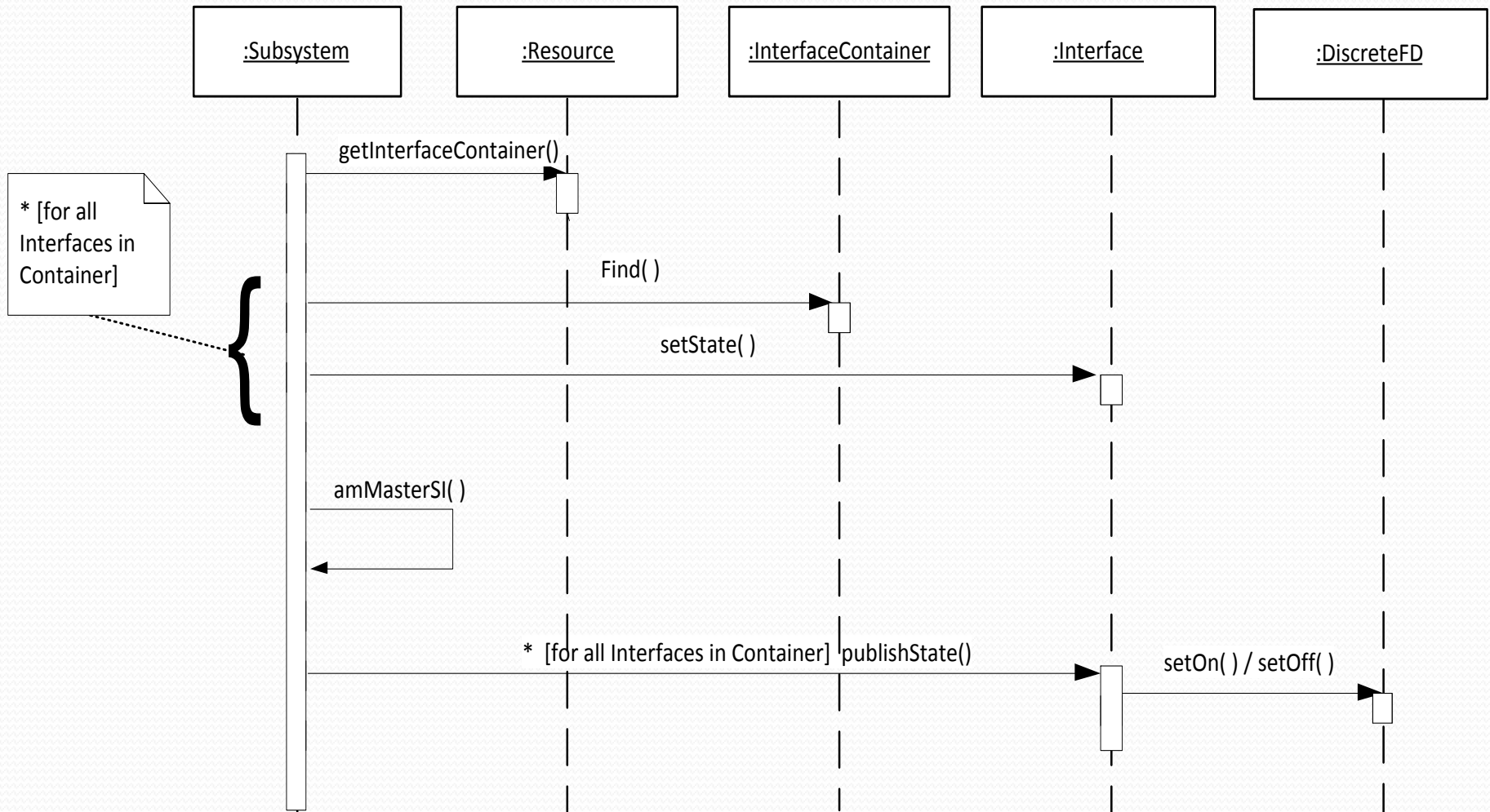
Rules of Sequence Diagrams

- Display operation names on call arrows

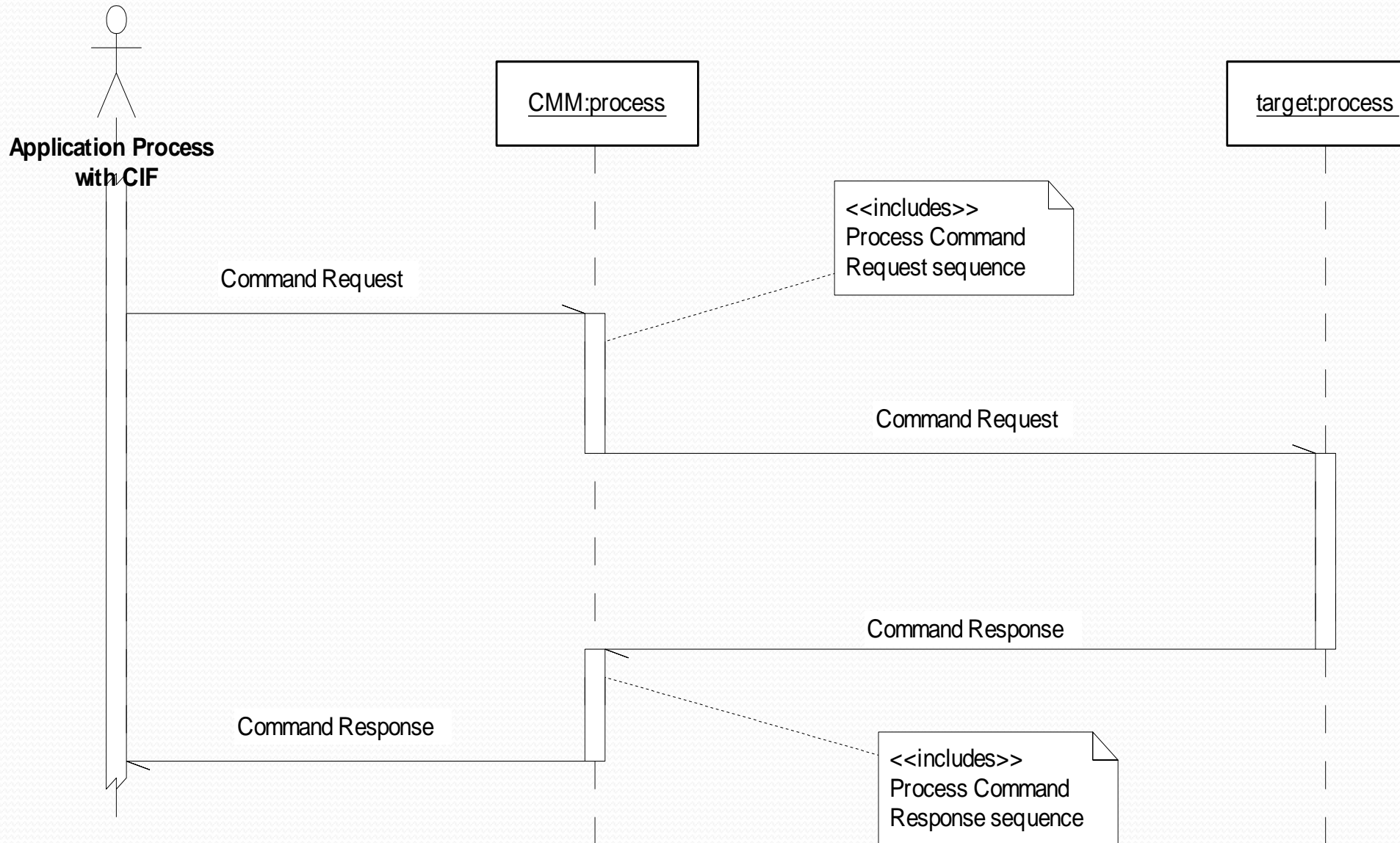


Rules of Sequence Diagrams

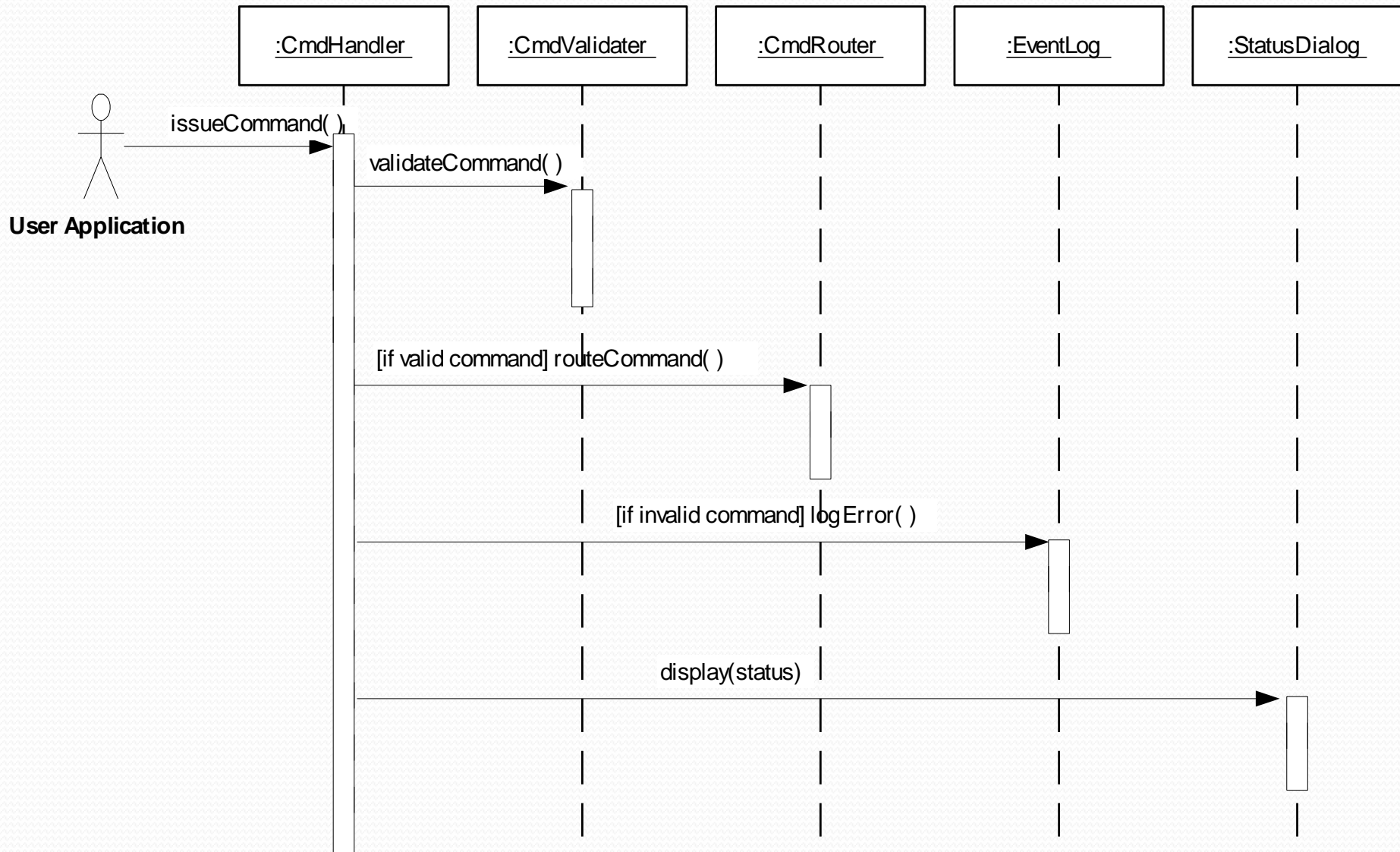
Compound and Simple Iteration



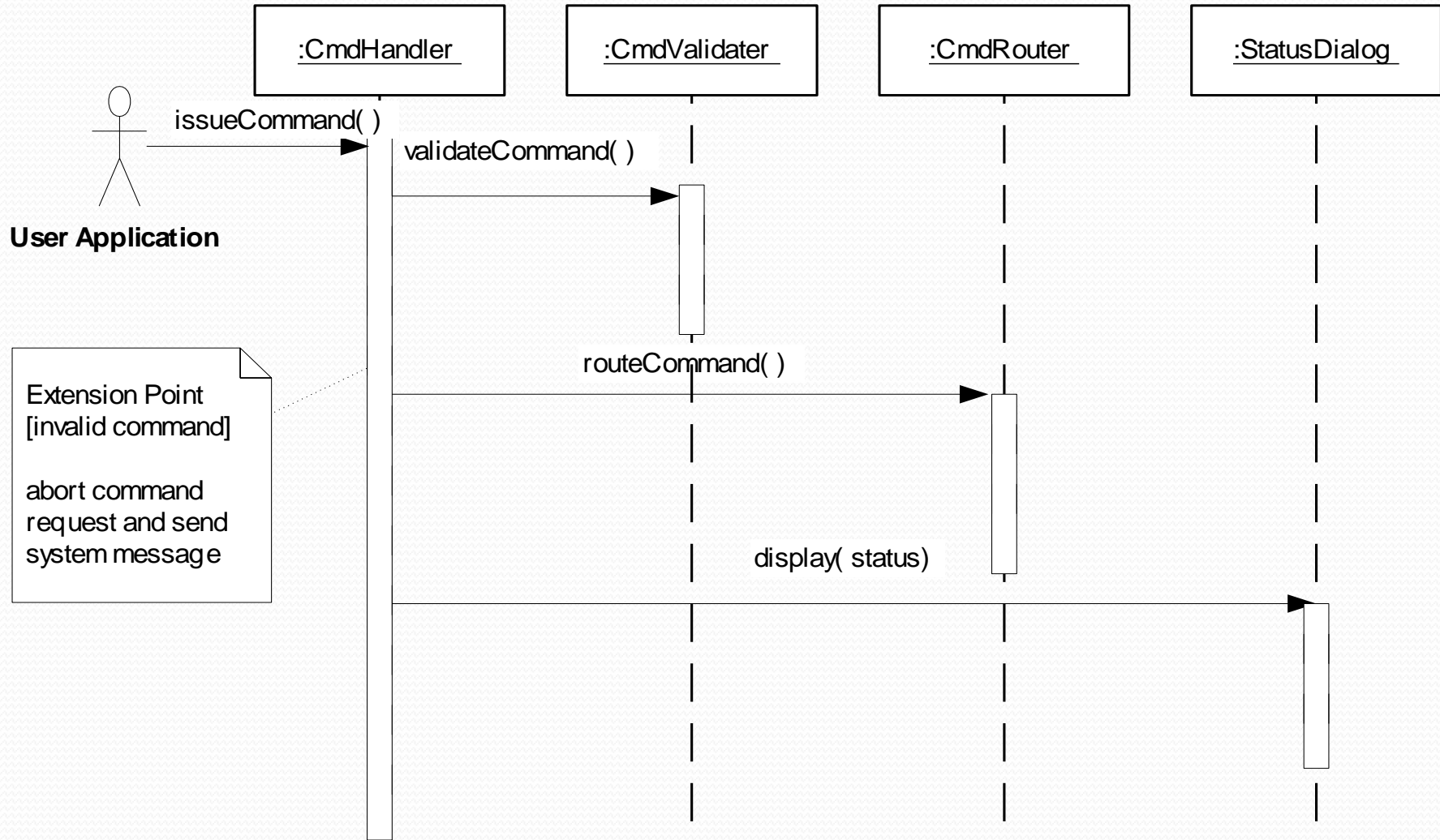
'included' sequence diagrams



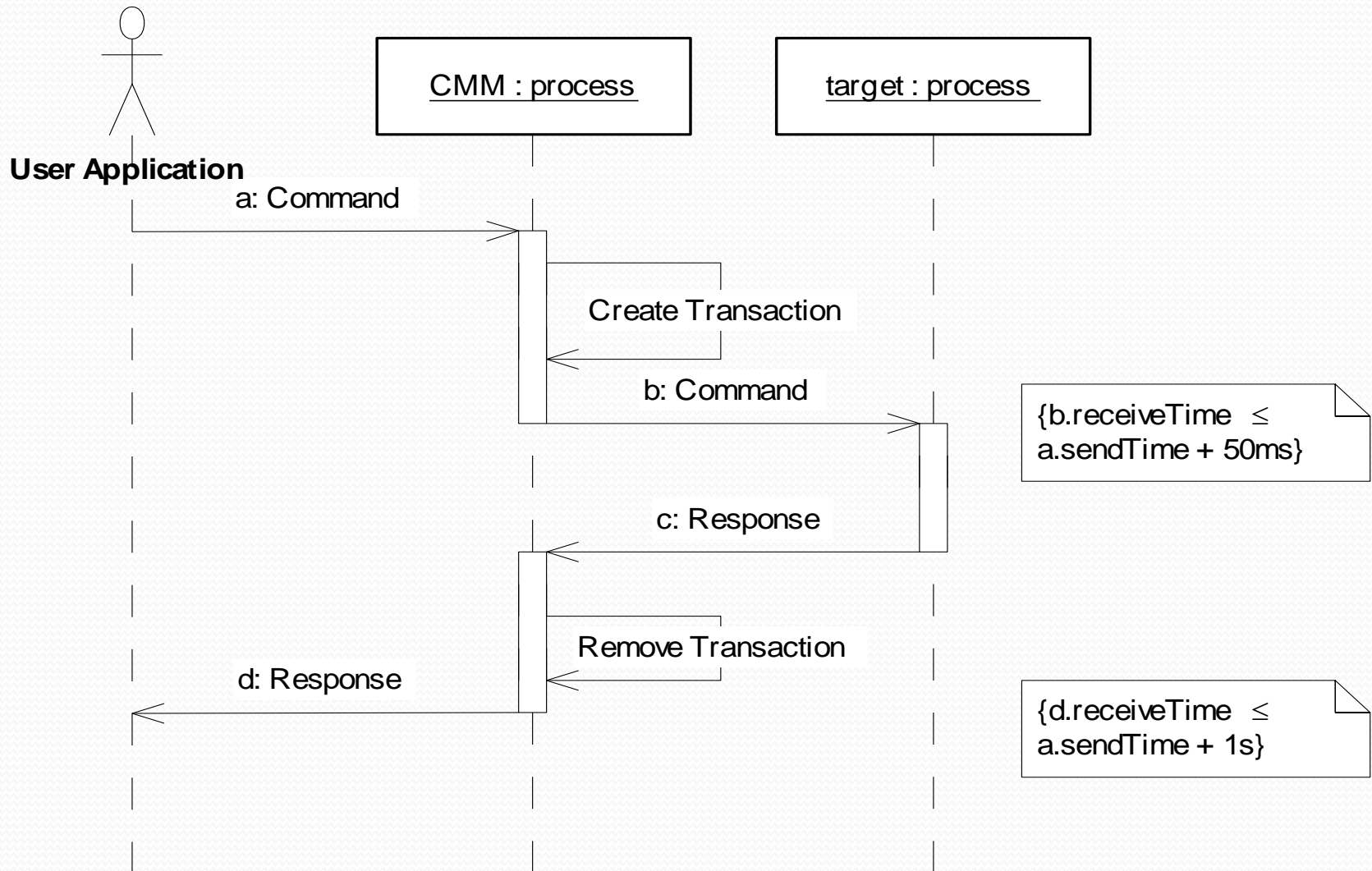
Showing alternate behavior in a sequence diagram



Showing Extension Point



Specifying Timing Requirements



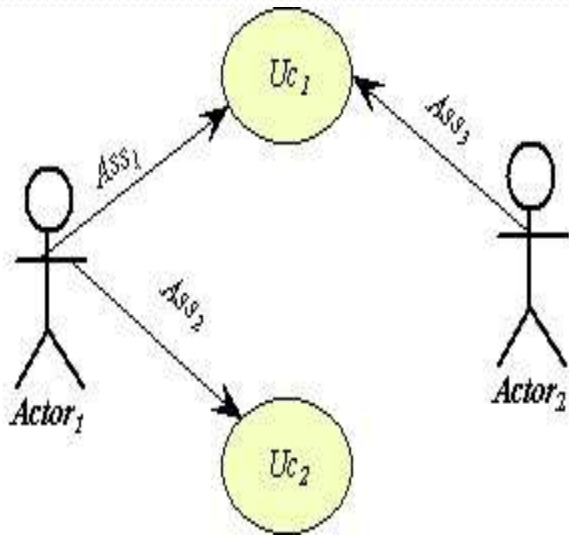
Requirements Elicitation Process

Refining Use Cases using System Sequence Diagrams

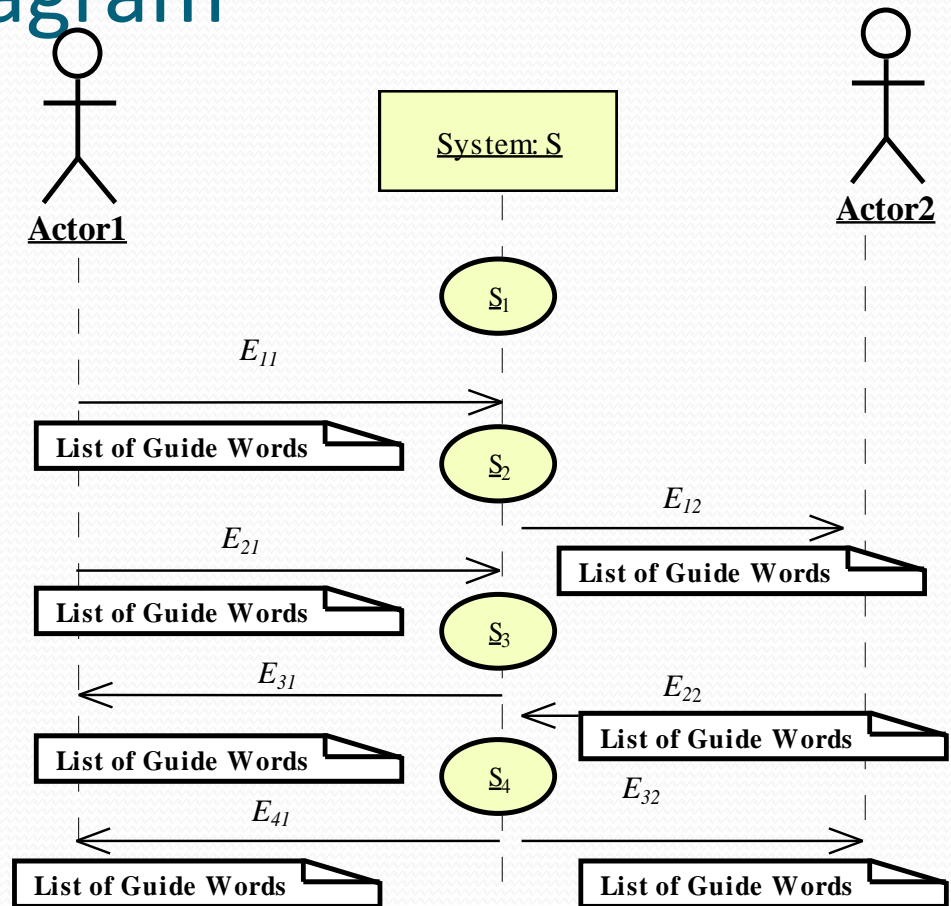
- System sequence diagrams establish the dynamic behavior in terms of key scenarios of the system for each use case
- The system sequence diagram models a scenario of the system interactions with the environment for a given use case
- Input/output events are clearly identified in each sequence diagram,
- The State of the system before and after each event are also depicted
- Different diagrams model scenarios with the normal flow of events and the abnormal flow of events

Sequence Diagrams and Use Cases

System Sequence Diagram

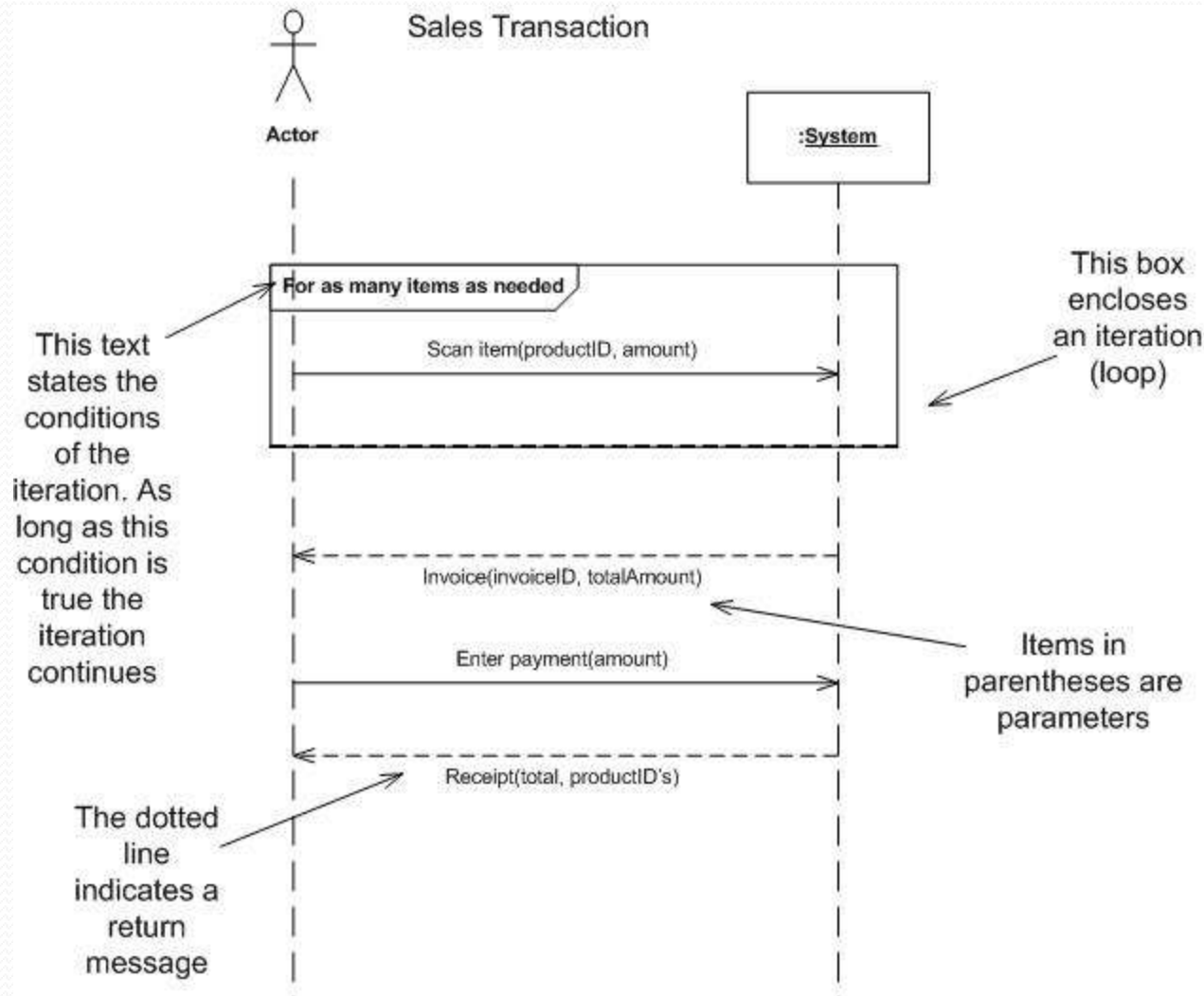


The use case diagram Of system S

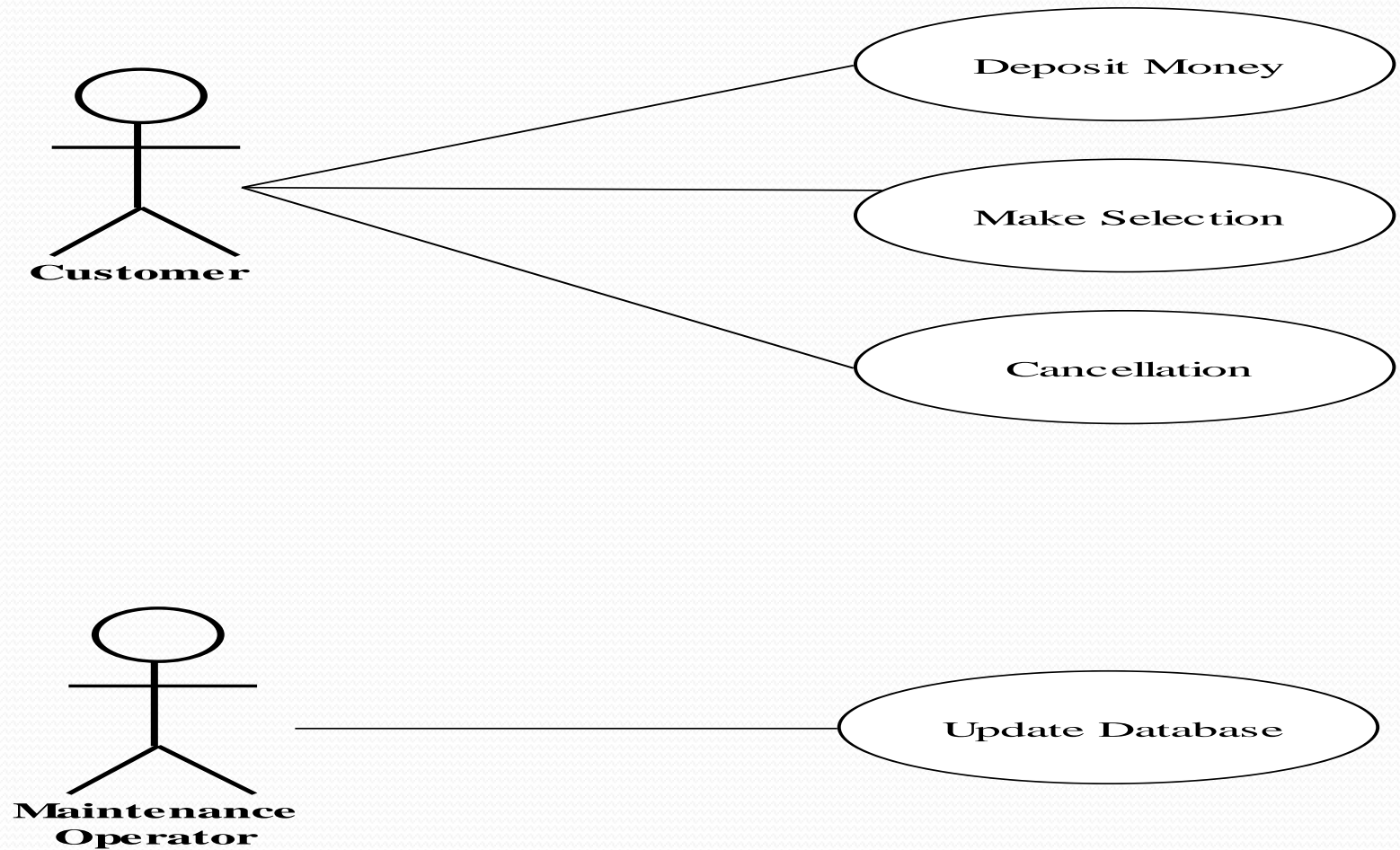


The sequence diagram of use case UC1 for system S

System Sequence Diagram

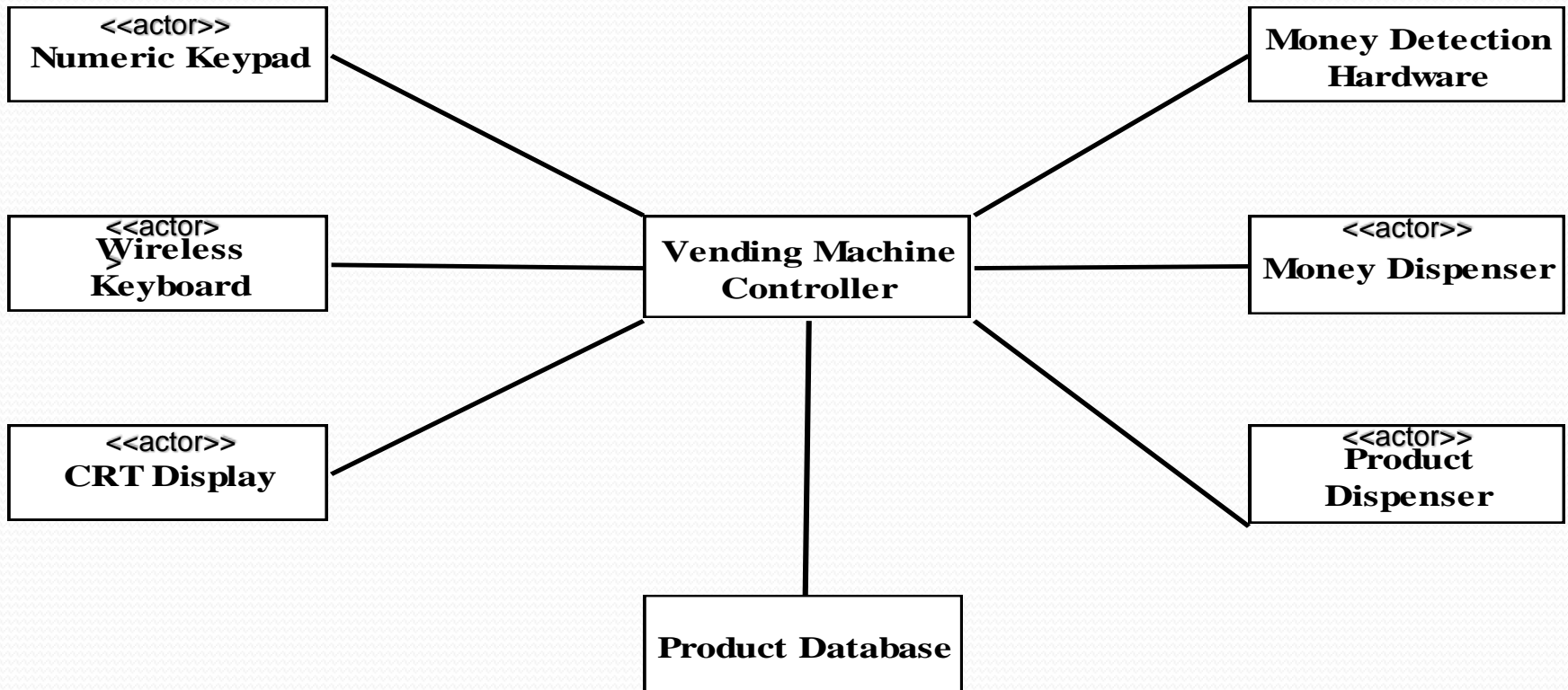


Example: Use Case Diagram of the Vending Machine



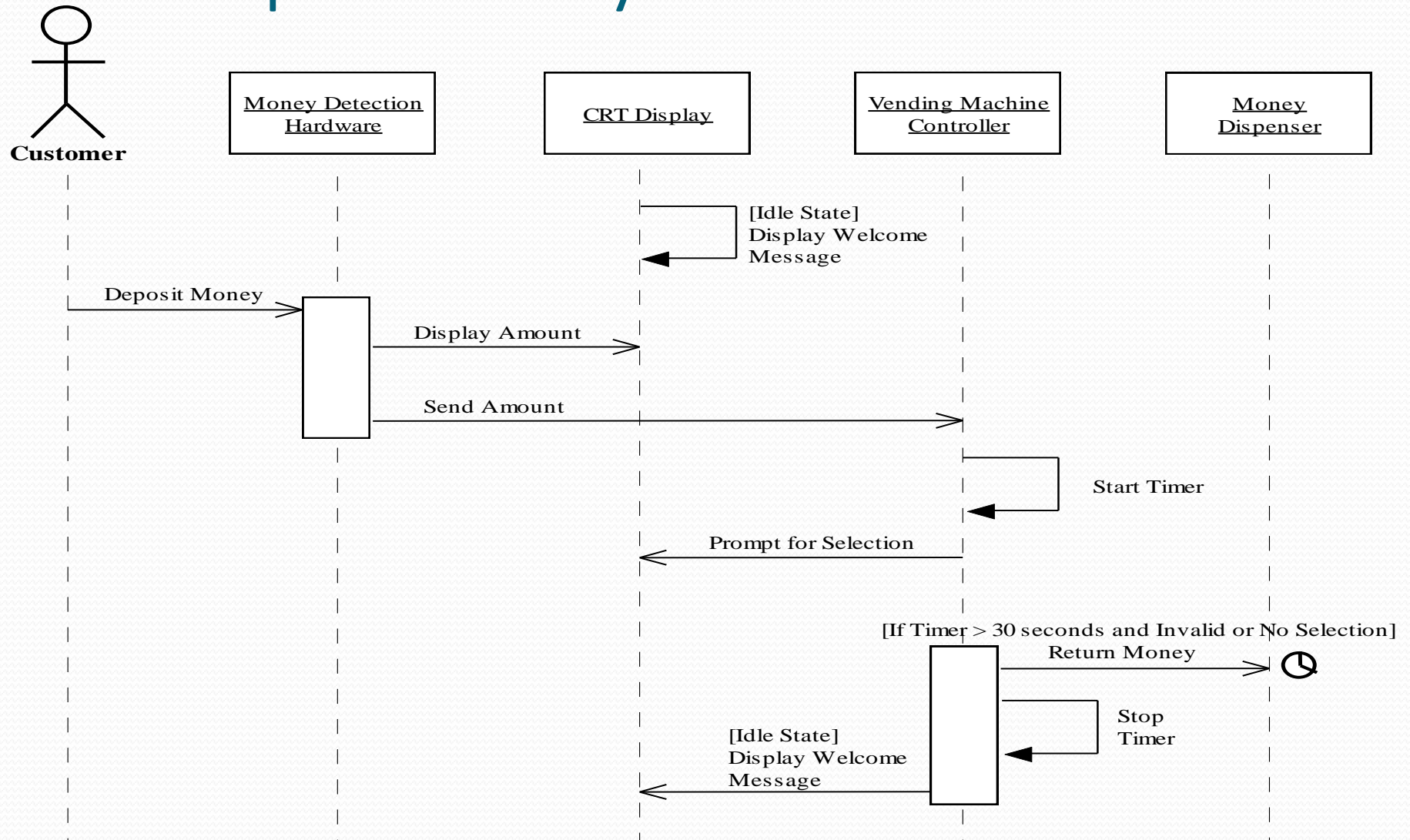
Requirements Elicitation Process

Step 6. Identify Initial Analysis Objects- The Initial Object-Model

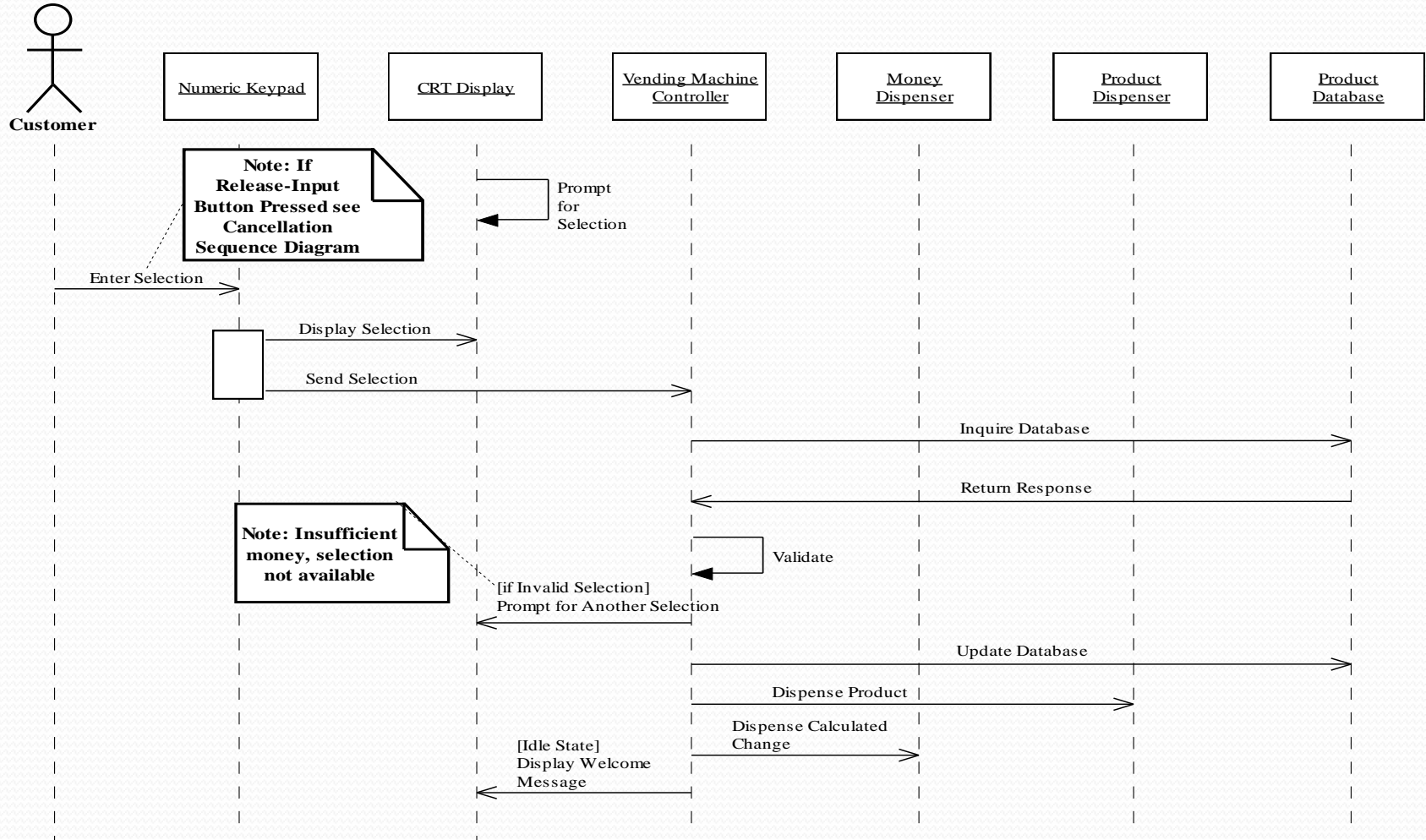


Designate the Actor objects with the **<<actor>>** stereotype above the object label

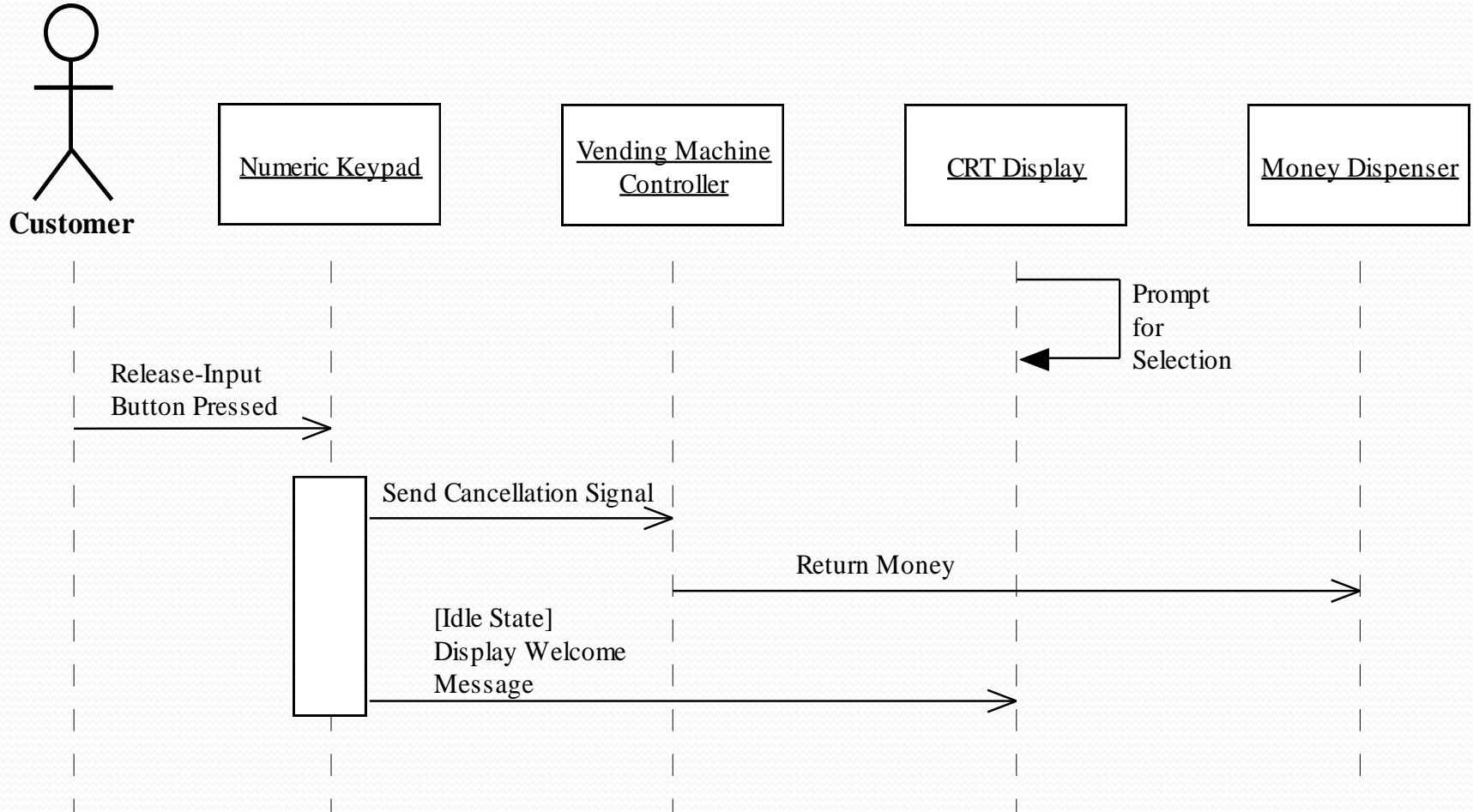
System Sequence Diagram for Deposit Money Use Case



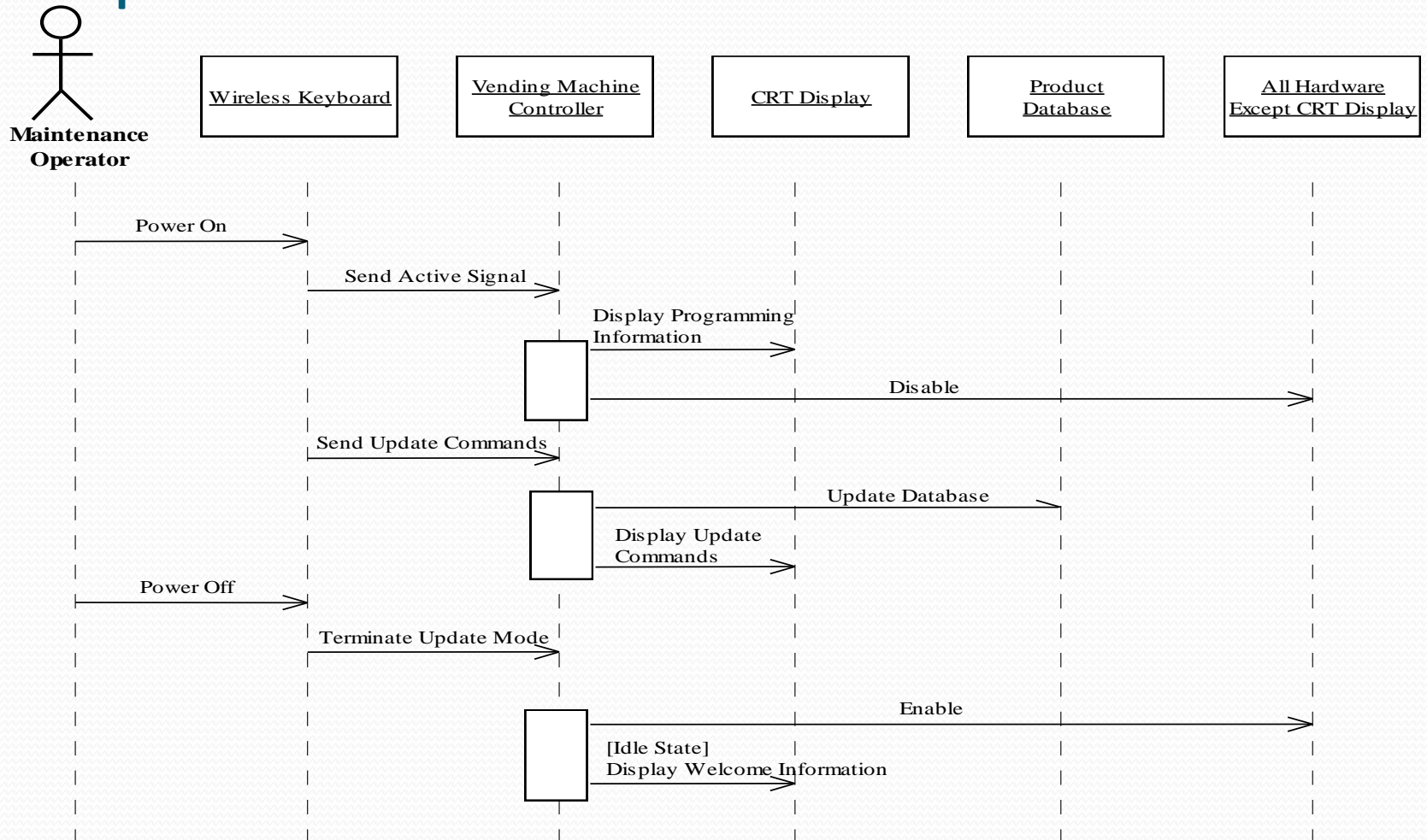
System Sequence Diagram for Make Selection Use Case



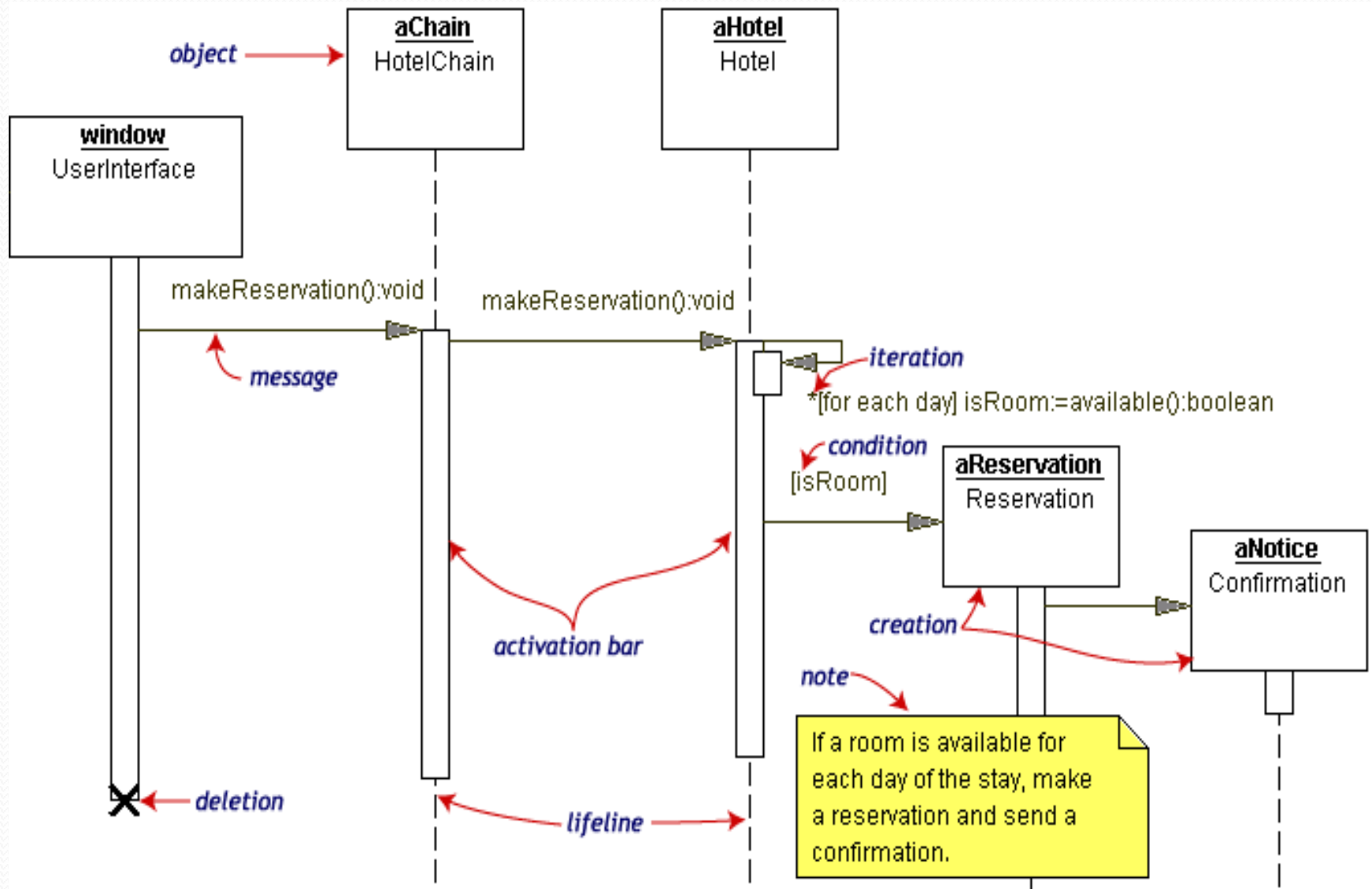
System Sequence Diagram for Cancellation Use Case



System Sequence Diagram for Update Database Use Case

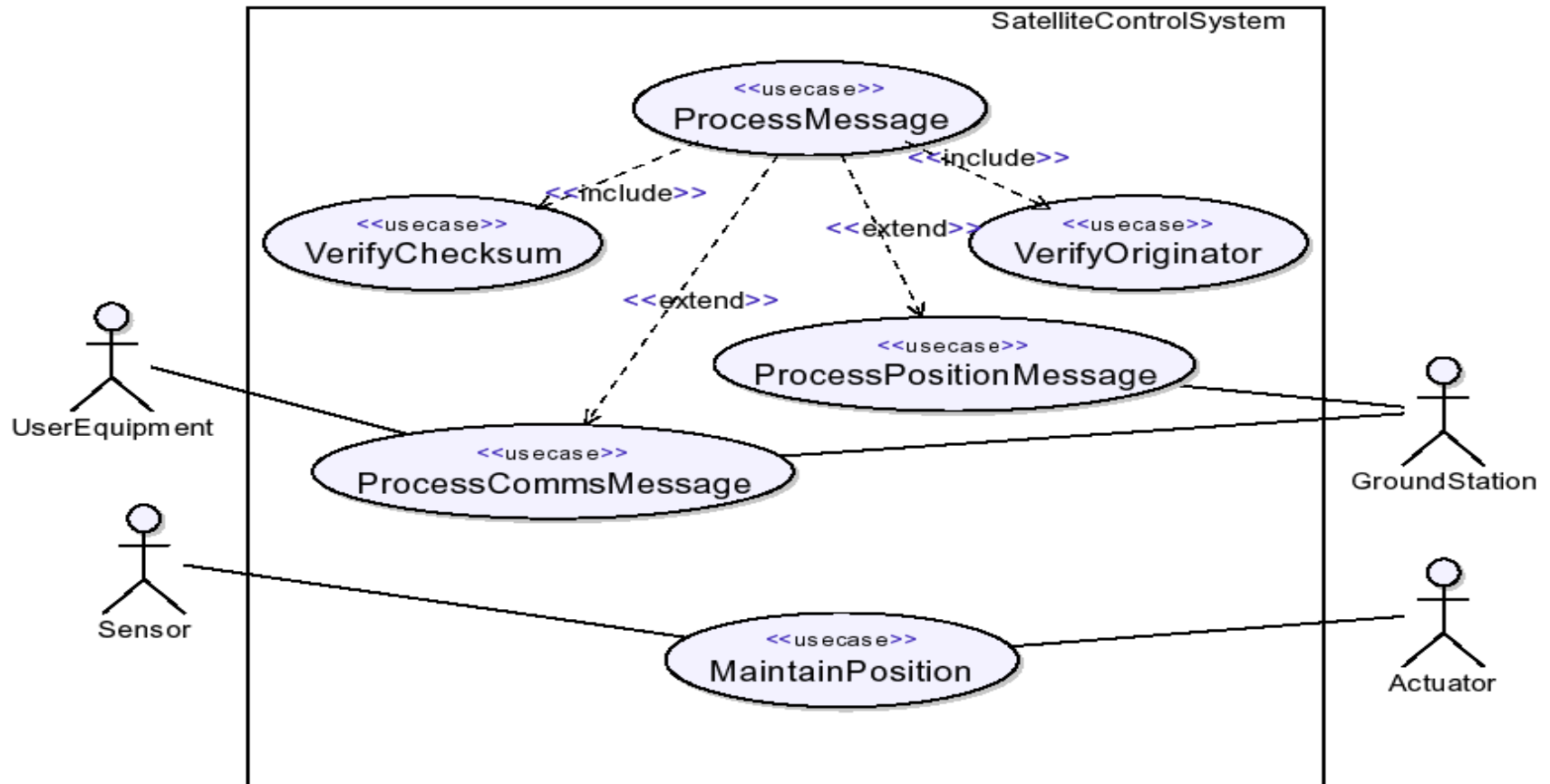


Other Examples of Sequence Diagrams



A Simple Example of Using UML2

- EXAMPLE: SATELLITE CONTROL SYSTEM



A Simple Example Using UML2

- SATELLITE CONTROL - Architectural behavior

