



Modern Systems Analysis and Design

Seventh Edition

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Chapter 7 Appendix A

Object-Oriented Analysis and Design: Use Cases



Learning Objectives

- ✓ Explain use cases and use case diagrams and how they can be used to model system functionality.
- ✓ Present the basic aspects of how to create written use cases.
- ✓ Discuss process modeling with use cases for electronic commerce application.



Use Cases

- A **use case** is a depiction of a system's behavior or functionality under various conditions as the system responds to requests from users.
- An **actor** is an external entity that interacts with the system.

Use Cases (Cont.)

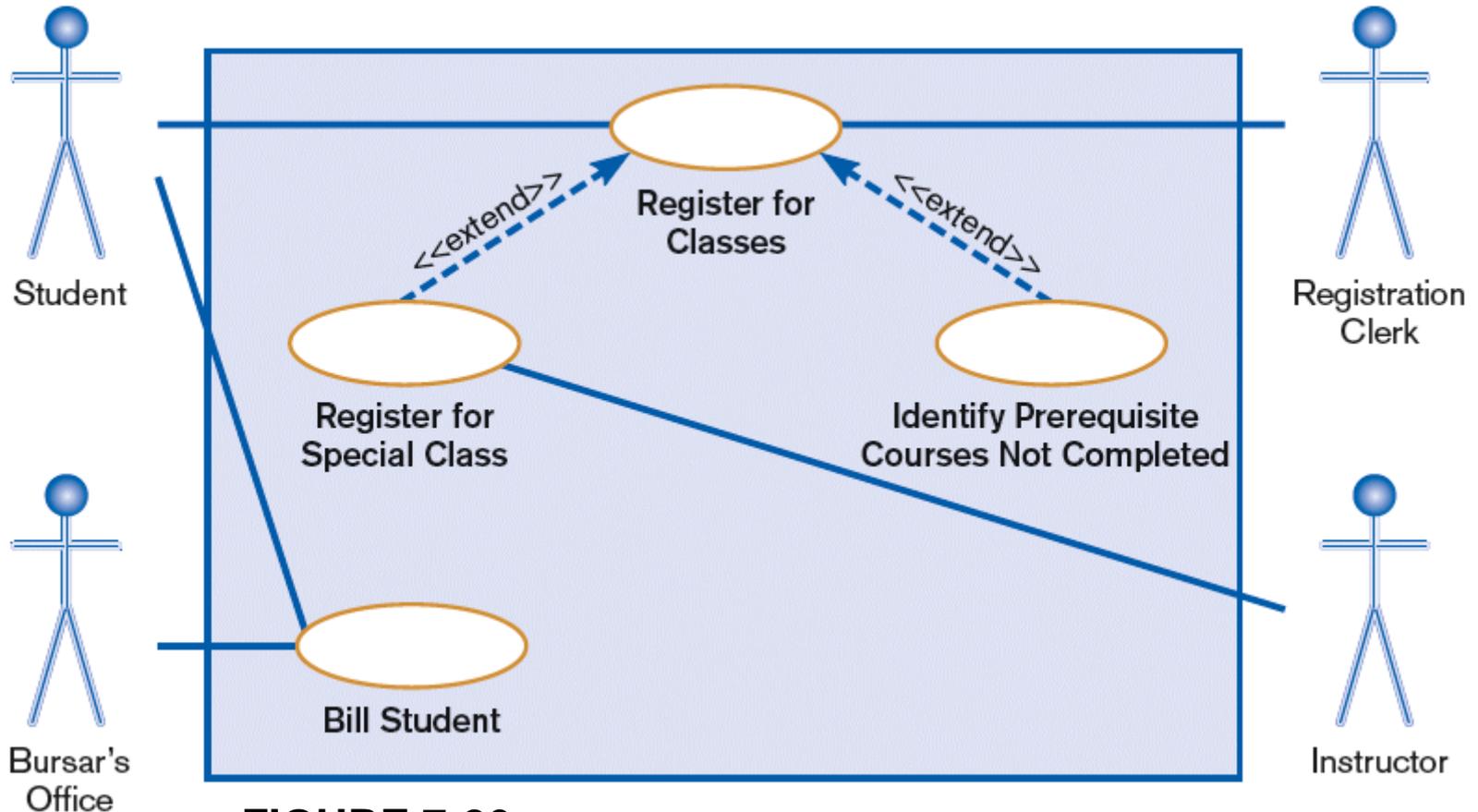


FIGURE 7-26

A use case diagram for a university registration system



Use Cases (Cont.)

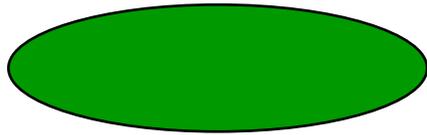
- Most actors represent user roles, but actors can also be external systems.
- An actor is a role, not a specific user; one user may play many roles, and an actor may represent many users.
- A use case model consists of actors and use cases.



Use Cases diagrams

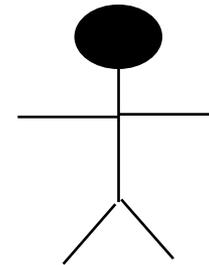
- **Use case diagram:** a picture showing system behavior along with the key actors that interact with the system
- ***Abstract use case*** is when a use case is initiated by another use case.
- A use case represents complete functionality.

Definitions and Symbols



Use Case

Actor



Boundary

Connection



`<<include>>`



Include relationship

Extend relationship



`<<extend>>`



Definitions and Symbols (Cont.)

- **Actor** is a role, not an individual.
 - Involved with the functioning of the system at some basic level
 - Represented by stick figures
- **Use case** represents a single system function.
 - Represented as an eclipse



Definitions and Symbols (Cont.)

- **System boundary** includes all the relevant use cases.
 - A boundary is the dividing line between the system and its environment.
 - Use cases are within the boundary.
 - Actors are outside of the boundary.
 - Represented as a box



Definitions and Symbols (Cont.)

- **Connection** is an association between an actor and a use case.
 - Depicts a usage relationship
 - Connection does not indicate data flow
 - Actors are connected to use cases with lines.
 - Use cases are connected to each other with arrows.



Definitions and Symbols (Cont.)

- *Extend relationship* is an association between two use cases where one adds new behaviors or actions to the other.
 - Extends a use case by adding new behavior or actions
 - Specialized use case extends the general use case.



Definitions and Symbols (Cont.)

- *Include relationship* is an association between two use cases where one use case uses the functionality contained in the other.
 - Indicates a use case that is used (invoked) by another use case
 - Links to general purpose functions, used by many other use cases

Definitions and Symbols (Cont.)

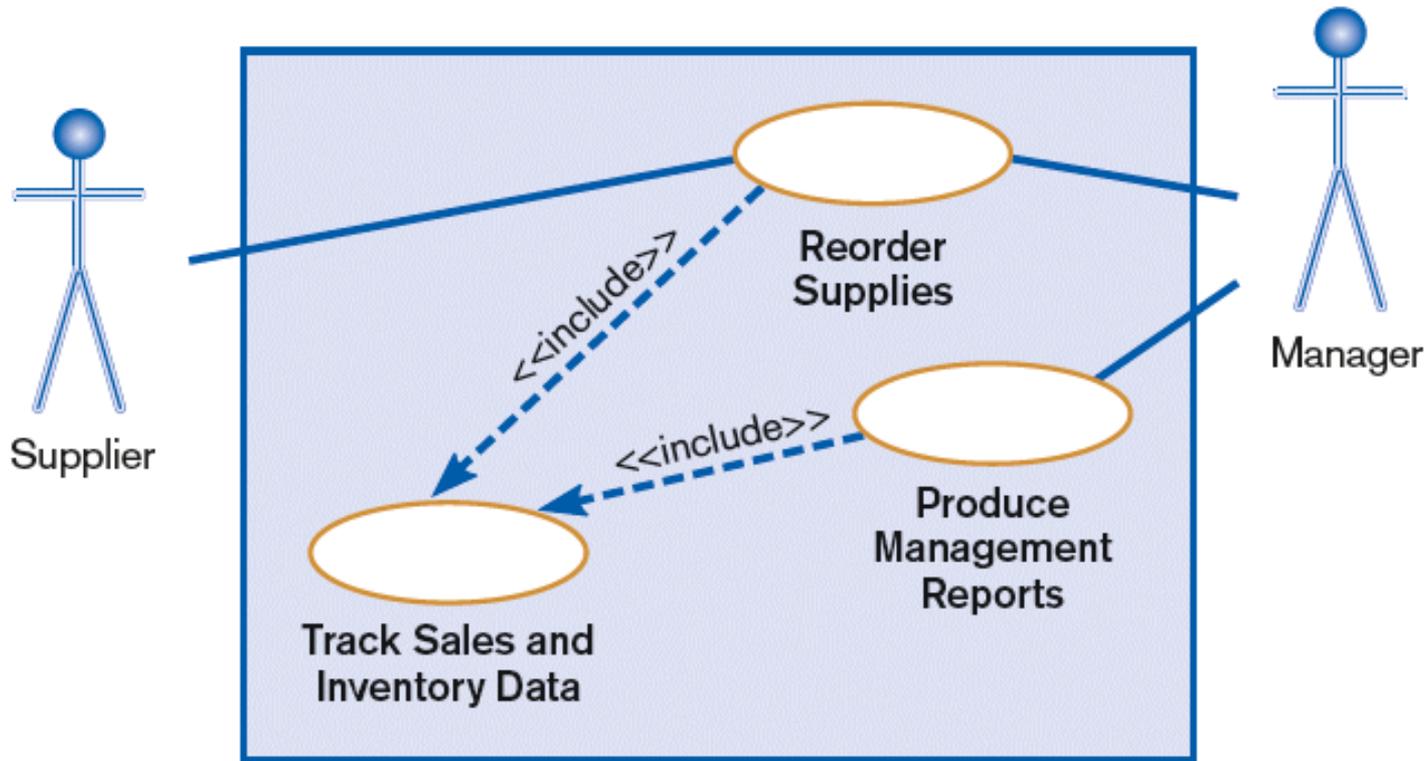


FIGURE 7-27

A use case diagram featuring an include relationship



Written Use Cases

- Document containing detailed specifications for a use case
- Contents can be written as simple text or in a specified format
- Step-by-step description of what must occur in a successful use case

Figure 7-29

A template for writing use cases
(*Source: Cockburn, Alistair, *Writing Effective Use Cases*, 1st ed., © 2001. Reprinted and Electronically reproduced by permission of Pearson Education, Inc. Upper Saddle River, New Jersey.*)

Use Case Title:

Primary Actor:

Level:

Stakeholders:

Precondition:

Minimal Guarantee:

Success Guarantee:

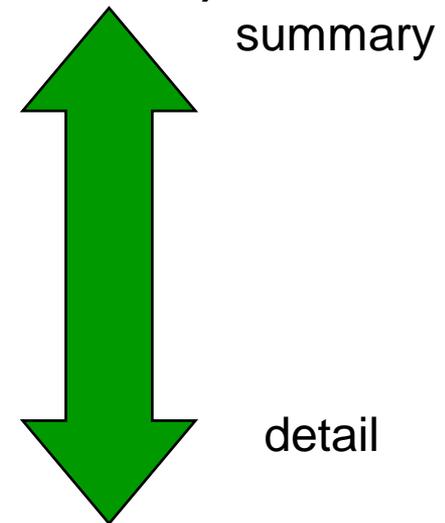
Trigger:

Main Success Scenario:

Extensions:

Level of Use Case

- Refers to degree of detail in the use case description
- Five suggested levels (Cockburn)
 1. White – as seen from clouds
 2. Kite – “birds-eye view”
 3. Blue – sea-level view
 4. Fish – below sea-level
 5. Black – bottom of the sea





Sample Format for Written Use Case

- ***Title*** – descriptive name, matches name in use case diagram
- ***Primary actor*** – usually a user role
- ***Stakeholders*** – any group or individual with an interest in the function of the use case



Sample Format for Written Use Case (Continued)

- ***Precondition*** – conditions that must be satisfied in order to execute the use case
- ***Minimal guarantee*** – outputs that can be expected if the service attempt failed
- ***Success guarantee*** – outputs that can be expected if the service succeeds



Sample Format for Written Use Case (Continued)

- ***Trigger*** – an event or action that initiates the use case
- ***Main success scenario*** – description of sequence of interactions between actor and use case during the use case execution
- ***Extensions*** – detailed description of how errors are handled

Use Case Title: Buying a PVF Product at WebStore

Primary Actor: Customer

Level: Kite (summary)

Stakeholders: Customer, shipping clerk

Precondition: Customer accesses the WebStore website

Minimal Guarantee: Rollback of any uncompleted transaction

Success Guarantees: Order filled

Trigger: Customer accesses WebStore homepage

Main Success Scenario:

1. Customer browses catalog.
2. Customer places order for desired product(s).
3. Shipping clerk fills order.
4. Customer checks status of order.

Extensions:

- 1a. Catalog is not available.
 - 1a1. Customer quits site.
 - 1a2. Customer takes action to gain access to catalog.
- 2a. Order transaction is interrupted.
 - 2a1. Transaction rolled back. Customer starts again.
 - 2a2. Transaction rolled back. Customer quits site.
- 3a. Item is out of stock.
 - 3a1. Shipping clerk notifies customer. Customer waits for stock to be replenished.
 - 3a2. Shipping clerk notifies customer. Customer cancels order.
- 4a. Order status is not available.
 - 4a1. Customer quits site.
 - 4a2. Customer takes action to gain access to order status.

Figure 7-34

Jim Woo's kite level written use case for buying a product at PVF's WebStore (*Source: George, Hoffer, Valacich, Batra, 2006. Object-Oriented Systems Analysis and Design, 2nd ed. Upper Saddle River, NJ: Prentice Hall.*)



Summary

- In Appendix A you learned how to:
 - ✓ Explain use cases and use case diagrams and how they can be used to model system functionality.
 - ✓ Present the basic aspects of how to create written use cases.
 - ✓ Discuss process modeling with use cases for electronic commerce application.



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