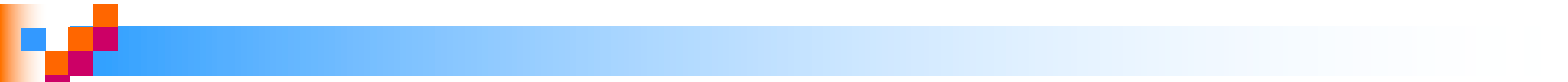# Modern Systems Analysis and Design
Seventh Edition

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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.

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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.)
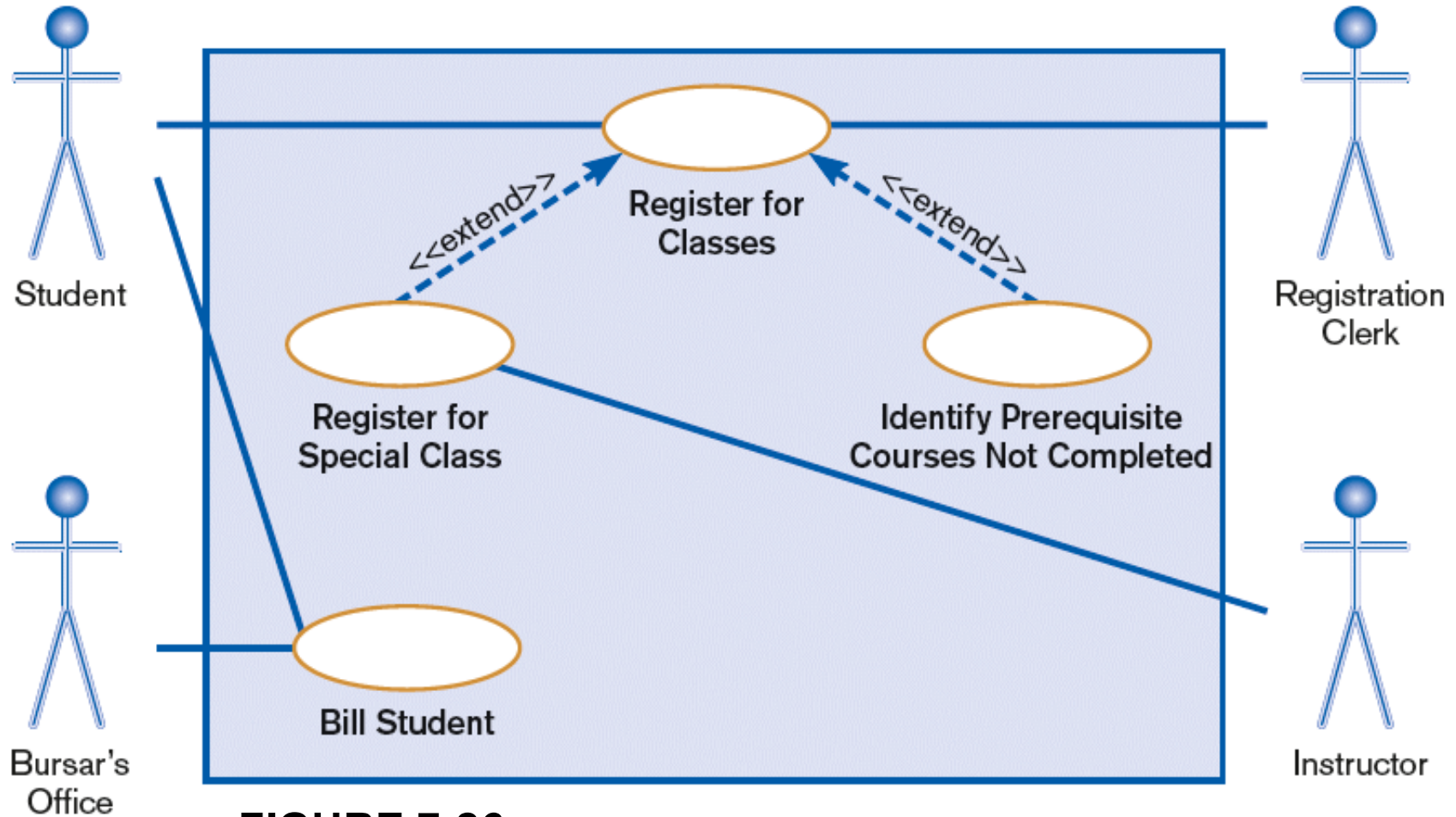
FIGURE 7-26
A use case diagram for a university registration system

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.

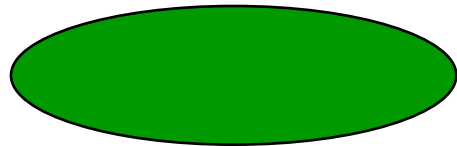- A use case model consists of actors and use cases.

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.

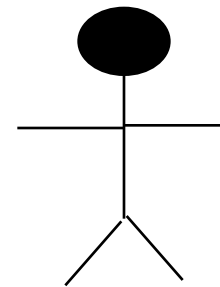- A use case represents complete functionality.

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.)
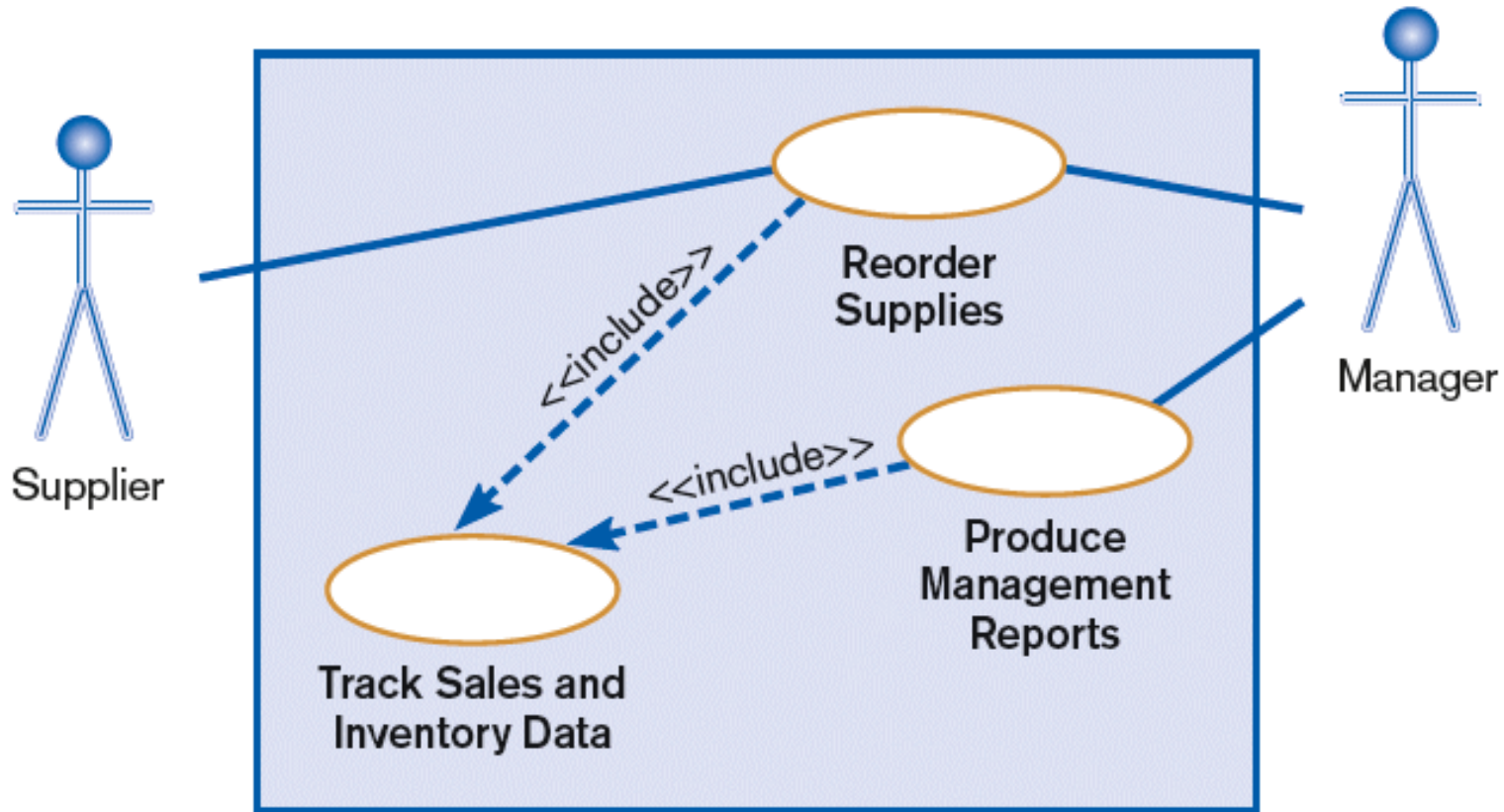
FIGURE 7-27
A use case diagram featuring an include relationship

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
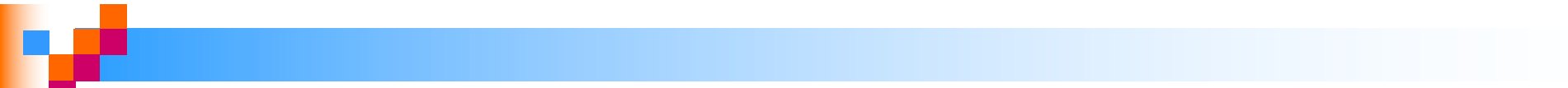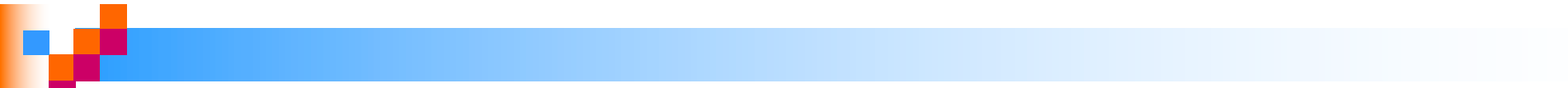 5. Black – bottom of the sea

summary

detail
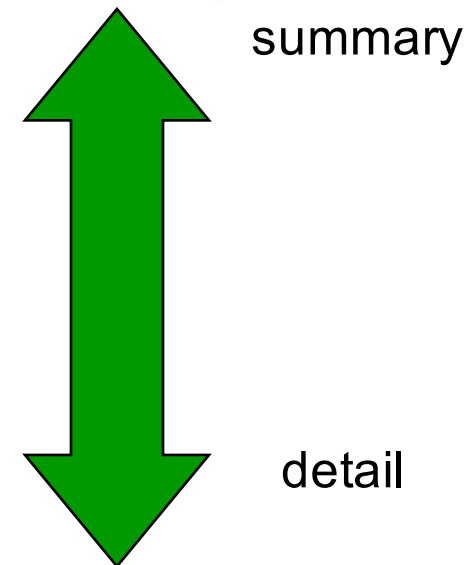
Sample Format for Written Use Case

- ***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

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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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