b. Using the template in Figure 6.9, create a written use-case description for at least one of the use cases in the diagram you created for part a.
c. Exchange your use-case diagram and written use-case description with a classmate. Compare and contrast your work with your classmate's. Focus on areas where your work differs and try to figure out why.

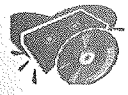
Evergreen Nurseries

Evergreen Nurseries offers a wide range of lawn and garden products to its customers, and conducts wholesale and retail operations. Although the company serves as a wholesaler to nurseries all over the United States, its founder and president has restricted its retail operations to California, the company's home state. The company is situated on 150 acres and wholesales its bulbs, perennials, roses, trees, shrubs, and Evergreen Accessory products. Evergreen Accessory products include a variety of fertilizers, plant foods, pesticides, and gardening supplies.

In the past 5 years, the company has seen phenomenal sales growth. Unfortunately, its information systems have been left behind. Although many of Evergreen Nurseries' processing activities are computerized, these activities require reengineering. You are part of the project team hired by Seymour Davis, the company's president, to renovate its wholesale division. Your project team was hired to renovate the billing, order taking, and inventory control systems.

From requirements determination, you discovered the following: An Evergreen Nurseries customer places a call to the nursery. A sales representative takes the order, verifies the customer's credit standing, determines whether the items are in stock, notifies the customer of the product's status, informs the customer if any special discounts are in effect, and communicates the total payment due. Once an order is entered into the system, the customer's account is updated, product inventory is adjusted, and ordered items are pulled from stock. Ordered items are then packed and shipped to the customer. Once each month, a billing statement is generated and sent to the customer. The customer has 30 days to remit payment in full; otherwise, a 15 percent penalty is applied to the customer's account.

a. Create a use-case diagram for the Evergreen Nurseries' wholesale system. How many use cases should you include? How many actors should there be?
b. Using the template in Figure 6.9, create a written use-case description for at least one of the use cases in the diagram you created for part a.
c. Exchange your use-case diagram and written use-case description with a classmate. Compare and contrast your work with your classmate's. Focus on areas where your work differs and try to figure out why.



CASE: BROADWAY ENTERTAINMENT COMPANY, INC.

Use-Case Modeling for the Web-Based Customer Relationship Management System

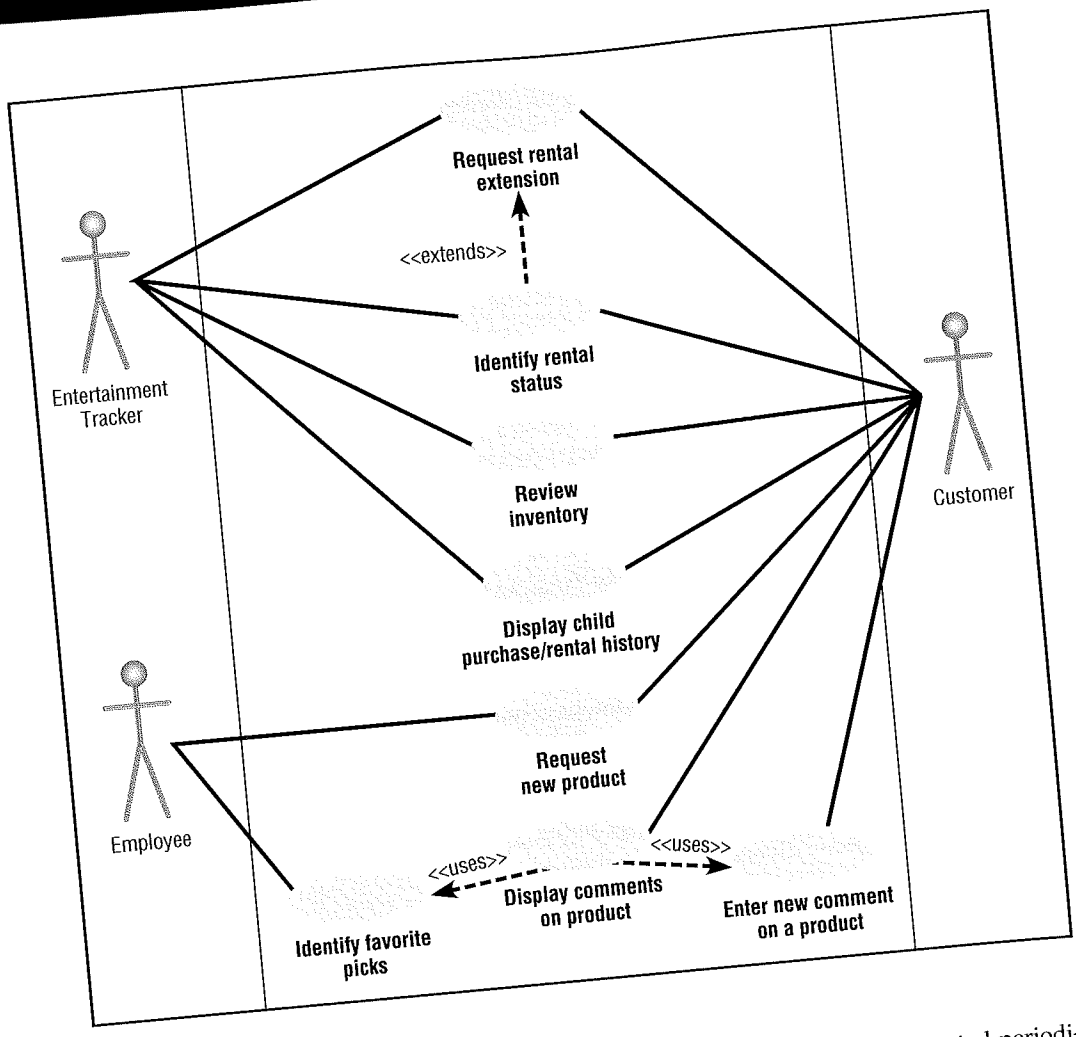
Case Introduction

The BEC student team of Tracey Wesley, John Whitman, Missi Davies, and Aaron Sharp left the first meeting with Carrie Douglass, manager of the BEC store in Centerville, Ohio, eager to begin investigating the requirements for the customer relationship management system. Before they began requirements determination, they structured what they had learned already. Based on the Systems Service Request and the initial meeting with Carrie, the team developed a first draft of a use-case diagram for the system (see BEC Figure 6.1). This use-case diagram, using Microsoft Visio, shows the system in the middle, the actors (Customer, Employee, and the Entertainment Tracker BEC in-store information system) that interact with the system on the outside, and the connections among the actors and use cases. While using Visio, the students were reminded that Visio does not comply with all of the standard Unified Modeling Language (UML) notation. For example, in BEC Figure 6.1, the connection from the "Identify rental status" use case to the "Request rental extension" use case is labeled <<extends>> rather than <<extend>>, and the "Display comments on product" use case shows <<uses>> rather than <<include>> in the connections to the two related use cases.

Not too surprisingly, most of the connections are between the system and customers. The use-case diagram helped the team organize for requirements determination. The data collection part of the analysis phase would be used to verify this overview model of the customer relationship management system and to gather details for each connection, detailed actions for each use case, and a data storage component inside the system.

The team needed one more result before beginning the detailed work of analysis and design—a catchy name for the system it was designing. The BEC Customer Relationship Management System was too long and dull. With the cooperation of Carrie Douglass, team members ran a contest among the other teams in their class to give each member of the team with the best name suggestion (as selected by Carrie) a free movie rental at the Centerville BEC store. Some teams tried to create acronyms using the words and acronyms BEC, Broadway Entertainment Company, and customer relationship management, but most of these were not pronounceable or meaningful. Other teams created phrases that conveyed the Web technology to be used to build the system (e.g., one team suggested VideosByBEC, similar to AutoByTel for automobile sales and information on the Web). However, Carrie

BEC Figure 6.1
BEC Customer Relationship Management System



wanted a name that would convey the personal relationship the system will create with the customer. Thus, one suggested name stood out from the rest. The winner was MyBroadway.

Structuring the High-Level Process Findings from Requirements Determination

The BEC student team used various methods to understand the requirements for MyBroadway. The following sections explain how they approached studying each use case on the use-case diagram and what they discovered from their analysis.

Request Rental Extension

The team studied documentation of the Entertainment Tracker system provided to store employees and the manager. From this documentation, the team understood the data about products and product sales and rentals maintained in store records. This was a necessary step to determine what data the "Request rental extension" use case would need from the customer and Entertainment Tracker. It was clear that MyBroadway would not be the system of record to operate the store; Entertainment Tracker was this official record. For example, the official record of when a rented product was due to be returned would be recorded in the Entertainment Tracker database. Thus, product inventory, sales, and rental data needed by MyBroadway would be extracted periodically from Entertainment Tracker to be stored in MyBroadway for faster access and to keep the two systems as decoupled as possible. Because of the role of Entertainment Tracker, any activity in MyBroadway that changed data in Entertainment Tracker would have to submit a transaction to Entertainment Tracker that Entertainment Tracker understood. The only instance of this the team discovered related to the "Request rental extension" use case. This use case finds the due date in the MyBroadway database and then interacts with Entertainment Tracker to request the extension and to inform the customer whether the extension was accepted. Entertainment Tracker, however, would make the decision, based on its own rules, whether or not to accept the extension. Fortunately, requesting an extension is a transaction in Entertainment Tracker handled from a point-of-sale terminal in the store, so MyBroadway would simply need to simulate this transaction.

Identify Favorite Picks

The team also surveyed employees and customers to understand what would be useful related to the employee "Identify favorite picks" use case. Employees and customers agreed that there are only two broad groups of items for favorite picks: new releases and classics. Each week, a different store employee will select one or two newly released or

classic products in a given product category. For example, each week one employee will select one or two newly released children's videos, another employee will select one or two newly released jazz and new age CDs, and yet another employee will select one or two classic romance DVDs. It is not possible to cover every category of videotape, DVD, and CD each week, but over time most categories will be selected. Selections will be retained for 2 years. Each week, five store employees will make selections each in a different product category. An employee will be given a list of those 10 product categories for which favorite picks have not been made for the longest time. Each employee will be matched with the category with which he or she is most familiar and given a list of those newly released and classic products in that category. A classic product is one that continues to be rented or sold at least 10 years after its initial release. An employee selects one or two products on this list and provides a quality grade for each (A, A–, B, . . . F), a description of its contents relevant to language and sexually explicit references, and a few sentences of personal comments about the product that a parent might want to know. The date of the entry would be recorded with the rest of the data.

Request New Product

The team used interviews with customers, Carrie Douglass, and the assistant store manager as well as observations of people using similar Web-based systems from major online bookstores and other shopping enterprises to determine the nature of the other use cases on the use-case diagram. For "Request new product," MyBroadway will collect all the requests and Carrie will trigger printing a list, in decreasing order of frequency of request, of each requested product. Carrie will then use this report to send a letter to the BEC purchasing department requesting the acquisition of these items. New product requests will be kept for 2 months and then purged.

Enter New Comment on a Product

For the "Enter new comment on a product" use case, MyBroadway will show a parent or child basic information about the product (such as title, publisher, artist, and date released) and then allow him or her to enter an unstructured comment about that product. The length of the comment will not be limited. Each comment will be stored separately, and the same person may comment on the same item many times. The date and time of the comment will be stored with the comment. An issue that required some discussion with Carrie was whether people will have to identify themselves for their comments to be recorded. Carrie was unsure what to do, so the team convened a focus group of a few parents to explore this issue. The team discovered that the parents would not consider a comment valid unless it were attributed, and that the parents thought they and their children would enter a more helpful comment if it were attributed. Carrie, however, saw no need to retain data about customers in MyBroadway, but she wondered how bogus customer names could be identified. Entertainment Tracker maintains data about each customer, including each child with a membership card. Thus, it was decided that customers will have to enter their membership number along with the comment. This number will be sent to Entertainment Tracker for matching with its record of customer numbers after the comment is entered but before it is available to be reported to other customers. Whether the comment is entered by a parent or a child also will be recorded with the comment. If the number does not match a membership number for a BEC customer, the comment will be dropped. When the comment is displayed, the name of the member entering the comment as well as whether that person is a parent or child will be shown.

Review Inventory

The "Review inventory" use case consolidates several similar actions. A customer can ask to see product data by specific title, or to see data for all the products by artist, category (e.g., new age or jazz CD), publisher, release month, or any combination of these factors. In each case, for each product identified by the search criteria, the product title, artist, publisher, release date, media, description, and sale and rental price will be shown.

Display Comments on Products

The "Display comments on products" use case is triggered when a customer enters the name of the product (and possibly searching through a set of products with approximately that name until the exact product is found). Once the exact product the customer is interested in is identified, then all the comments previously entered by customers and favorite picks entered by employees will be available for display. The customer may ask to see only those comments and picks entered since some date they specify and may ask to see comments only by parents, only by children, only by employees (i.e., only favorite picks), or all comments and picks. Comments and picks will be shown in reverse chronology entry order.

Identify Rental Status

For this use case, the customers enter their membership number, and then MyBroadway displays a list of all the product titles and return due dates for all outstanding rented items. Often, customers are engaged in "Identify rental status" before they engage in "Request rental extension," but the team decided to consider these separate use cases.

Display Child Purchase/Rental History

The team discovered that this is arguably the most complex of the use cases on the context diagram. At a high level, this use case needs access to sales and rental history data, including what products have been bought and rented by whom. Customers indicated that a simple history would not be sufficient. They also wanted to see the customer comments and favorite picks ratings for each item. So, the outcome of this use case is a report that shows for a given child the title of each item he or she has bought or rented in the past 6 months, and for each item the rating entered by each employee who has rated that product, and the five most recent parent comments recorded about that item.

Case Summary

Accurately and thoroughly documenting business processes can be tedious and time-consuming, but insightful. The student team working on the analysis and design of MyBroadway quickly discovered how extensive a system Carrie, the store employees, and customers wanted for this customer relationship management system. The team was unsure whether it could do a thorough analysis and design for all the desired features. However, starting with a use-case diagram allowed the team to show the total scope of the system as desired by the project sponsor and system users and yet focus attention on one piece of the system at a time. If only parts of the system could be built during the course project, at least the team would be able to show how those pieces fit into the complete system. The team members also recognized that structuring use cases was only part of the systems analysis. They would also need to identify all the data stored inside MyBroadway and then structure these data into a database specification. Each use case on the use-case diagram would have to be specified in sufficient detail for a programmer to build that functionality into the information system.

The BEC student team made the decision to use automated tools to draw use cases (and other system diagrams) and to record project dictionary data about system objects, such as data objects, activities, and user interfaces. (Because you will use whatever tools your instructor recommends, we do not refer to any specific tools by name in this or subsequent cases.) These automated tools are critical for making it easy to change diagrams, to produce clean documentation about the system requirements, and to make each aspect of the documentation consistent with each other aspect. Drawing the initial diagrams and recording all the dictionary entries is time-consuming. These automated data, however, can be changed by any team member, and team members can prepare new diagrams and dictionary reports at any time with minimal effort.

CASE QUESTIONS

1. Notice in BEC Figure 6.1 how many of the use cases are connected with Entertainment Tracker. Do you agree that this figure shows the nature of the interaction between these use cases and Entertainment Tracker? If not, redraw the use-case diagram to show the proper interaction. Explain why you redrew the diagram as you did. In answering this question, explicitly consider whether there should be an additional use case to extract data from Entertainment Tracker for use in MyBroadway, and then other use cases can use this extract use case.
2. Besides your answer to Question 1, does the use-case diagram in BEC Figure 6.1 represent an accurate and complete overview of the system as described in this case for requirements collected during the analysis phase? If not, what is wrong or missing? If necessary, draw a new use-case diagram in light of what is explained in this case. Why might a use-case diagram initially drawn at the end of project initiation and planning need to be redrawn during the analysis phase?
3. The store manager is not shown as an actor in the use-case diagram in BEC Figure 6.1, except implicitly as an employee who enters favorite picks and sees summaries of requested products. Based on the descriptions in this case, does it make sense that store manager does not appear on the use-case diagram? If not on the use-case diagram, where might the store manager appear or be described? Based on the description in this case, are there any actors missing on the use-case diagram of BEC Figure 6.1?
4. Based on the descriptions of each use case, write templates (as in Figures 6.11, 6.12, and 6.13 in this chapter) for each use case. If this case does not provide all the details you need for each template, propose what analysis activities you would conduct to determine the missing contents of the use case templates.
5. Review your answer to Question 4 for the "Request new product" use case. Was it difficult to write the template for this use case? Did you consider several alternative explanations for this use case? If so, explain the alternatives and why you chose the template you wrote.
6. Look at your answer to Question 4 and focus attention on the "Request rental extension" use case. Modify your template for this use case based on the following explanation. A customer provides his or her customer number or name and a product number or title, and then MyBroadway finds in its records the rental information for this customer's outstanding rental of this product, including the due date. Then the customer may decide that he or she can return the item by the due date, in which case no request for extension is made. If the customer decides to extend the due date, the customer can request a 1-day or 2-day extension, each with a different fee, which will be due when the product is returned. MyBroadway will then send a rental extension request transaction to Entertainment Tracker as if it were a point-of-sale terminal from which the same request was being made. Entertainment Tracker may reject the request if the customer has delinquent fees. Once Entertainment Tracker makes its decision, it returns a code to MyBroadway indicating a yes or the reason for a no to the request. If the decision is no, the customer is given a message to explain rejection. If yes, MyBroadway rental data are updated to reflect the extension, and the user is given a confirmation message.
7. Investigate the capabilities of Microsoft Visio to store and report templates or explanations for use cases on a use-case diagram. Write a report about your findings, and reformulate at least one of your use-case templates from Question 4 into Visio as an example.