USE-CASE MODELING EXAMPLE

The following are the requirements for a web-based system to computerize the management of the sale and rental of videos for a video shop.

- The system must be able to handle both physical and digital videos.
- It must be able to record which videos are sold and rented and by whom.
- For sold videos, the quantity sold should be recorded; for physical video rental, which copy is rented and when it is due back should be recorded.
- The system should keep track of overdue rentals of physical videos and send email notices to customers who have videos overdue.
- There will be a customer membership option for an annual fee, which will entitle a member to discounts (10%) on the sale and rental of videos.
- Members should be able to make reservations for physical video rentals either in person at the shop, by telephone or via the Web.
- A member can reserve at most five physical videos at any one time, but there is no limit on how many physical videos a member or nonmember can rent at any one time.
- As an added feature, the shop would like to allow customers (either members or nonmembers) to input, via the Web, mini-reviews (up to 100 words) and a rating (from 1, lowest, to 10, highest) of videos they have purchased or rented.

USE-CASE MODELING EXAMPLE (cont'd)

- These reviews should be anonymous if the customer so wishes (i.e., customers can specify whether they want their name to be made known when other customers browse the reviews).
- A sales clerk should be able to enter and update the following information about all customers (members or nonmembers): name, address, phone number, age, sex, and email address.
- Members are assigned a membership number by the shop when they become members and a password, which allows them to change their personal information and to buy and rent digital videos via the Web.
- The shop manager should be able to generate various reports on the sale and rental of videos.
- A sales clerk should be able to sell and rent physical videos and process the return of rented physical videos.
- When selling or renting physical videos, a sales clerk must be able to look up customer information and determine whether the customer is a member.
- A sales clerk must be able to enter basic information about a video (i.e., video id, title, leading actor(s), director, producer, genre, synopsis, release year, running time, selling price, and rental price).

USE-CASE MODELING EXAMPLE (cont'd)

From the video sale and rental shop requirements statement:

a) identify all actors and their required functionality.

b) group the functionality into use cases and show the uses cases and their related actors in a use-case context diagram.

USE-CASE MODELING EXAMPLE: ANALYSIS

We first analyze the system's functional requirements and then present the use-case model. For the purposes of producing the use-case model, we are only interested in those functional requirements that provide something of value for some actor.

- The system must be able to handle both physical and digital videos.

  functionality: None. (This is an implementation requirement)

- It must be able to record which videos are sold and rented and by whom.

  functionality: Someone: *buy video*
  Someone: *rent video*

- For sold videos, the quantity sold should be recorded; for physical video rental, which copy is rented and when it is due back should be recorded.

  functionality: Someone: *enter video quantity sold*
  Someone: *enter video copy rented and due date*

USE-CASE MODELING EXAMPLE: ANALYSIS

- The system should keep track of overdue rentals of physical videos and send email notices to customers who have videos overdue.

  functionality: Customer: *receive overdue notice*

- There will be a customer membership option for an annual fee, which will entitle a member to discounts (10%) on the sale and rental of videos.

  functionality: Someone: *enter member information*
  Member: *get discount*

- Members should be able to make reservations for physical video rentals either in person at the shop, by telephone or via the Web.

  functionality: Member: *reserve video*
  Sales clerk: *reserve video*
  (*Note that how the reservation is done is not important from a functionality perspective.)*

USE-CASE MODELING EXAMPLE: ANALYSIS

- A member can reserve at most five physical videos at any one time, but there is no limit on how many physical videos a member or nonmember can rent at any one time.

  functionality: *No new functionality*

- As an added feature, the shop would like to allow customers (either members or nonmembers) to input, via the Web, mini-reviews (up to 100 words) and a rating (from 1, lowest, to 10, highest) of videos they have purchased or rented.

  functionality: Customer: *enter video review*

- These reviews should be anonymous if the customer so wishes (i.e., customers can specify whether they want their name to be made known when other customers browse the reviews).

  functionality: Customer: *browse video reviews*

USE-CASE MODELING EXAMPLE: ANALYSIS

- A sales clerk should be able to enter and update the following information about all customers (members or nonmembers): name, address, phone number, age, sex, and email address.

  functionality: Sales clerk: *enter customer information*

  (Supersedes the requirement regarding someone entering member information.)

  Sales clerk: *update customer information*

- Members are assigned a membership number by the shop when they become members and a password, which allows them to change their personal information and to buy and rent digital videos via the Web.

  functionality: Member: *update personal information*

  Member: *buy video*

  Member: *rent video*

  (Clarifies who can use buy and rent functionality.)

- The shop manager should be able to generate various reports on the sale and rental of videos.

  functionality: Manager: *generate reports*

USE-CASE MODELING EXAMPLE: ANALYSIS

- A sales clerk should be able to sell and rent physical videos and process the return of rented physical videos.

  functionality: Sales clerk: *buy (sell) video*
  Sales clerk: *rent video*
  Sales clerk: *return rented video*
  (Clarifies who can use buy and rent functionality.)

- When selling or renting physical videos, a sales clerk must be able to look up customer information and determine whether the customer is a member.

  functionality: Sales clerk: *lookup customer information*

- A sales clerk must be able to enter basic information about a video (i.e., video id, title, leading actor(s), director, producer, genre, synopsis, release year, running time, selling price, and rental price).

  functionality: Sales clerk: *enter video information*

While there may be other functionality that the system should support, here we will only deal with the functionality identified in the requirements statement in constructing the use-case model.

USE-CASE MODELING EXAMPLE: ANALYSIS

Actors

Customer A customer is a person who uses the services of the video shop. A customer uses the system to buy or rent videos or enter or browse reviews.

Member A member is a customer who has paid a membership fee to the video shop. In addition to what a customer can do, a member can also use the system to reserve videos and to access and change their personal information.

Sales clerk A sales clerk is an employee of the video shop. A sales clerk uses the system to sell and rent videos, reserve videos and enter and update video and customer/member information.

Manager A manager is an employee of the video shop. In addition to what a sales clerk can do, a manager can also generate various reports on sales and rentals of videos.

USE-CASE MODELING EXAMPLE:
FUNCTIONALITY ANALYSIS AND GROUPING

Member or Sales clerk ← ~~Someone~~: *enter video quantity sold*

Sales clerk ← ~~Someone~~: *enter video copy rented and due date*

Customer: *receive overdue notice*

Member: *get discount*

Member: *reserve video*

Sales clerk: *reserve video*

Customer: *enter video review*

Customer: *browse video reviews*

Sales clerk: *enter customer information*

Sales clerk: *update customer information*

Member: *update personal information*

Member: *buy video*

Member: *rent video*

Manager: *generate reports*

Sales clerk: *buy (sell) video*

Sales clerk: *rent video*

Sales clerk: *return rented video*

Sales clerk: *lookup customer information*

Sales clerk: *enter video information*

USE-CASE MODELING EXAMPLE: FUNCTIONALITY ANALYSIS AND GROUPING

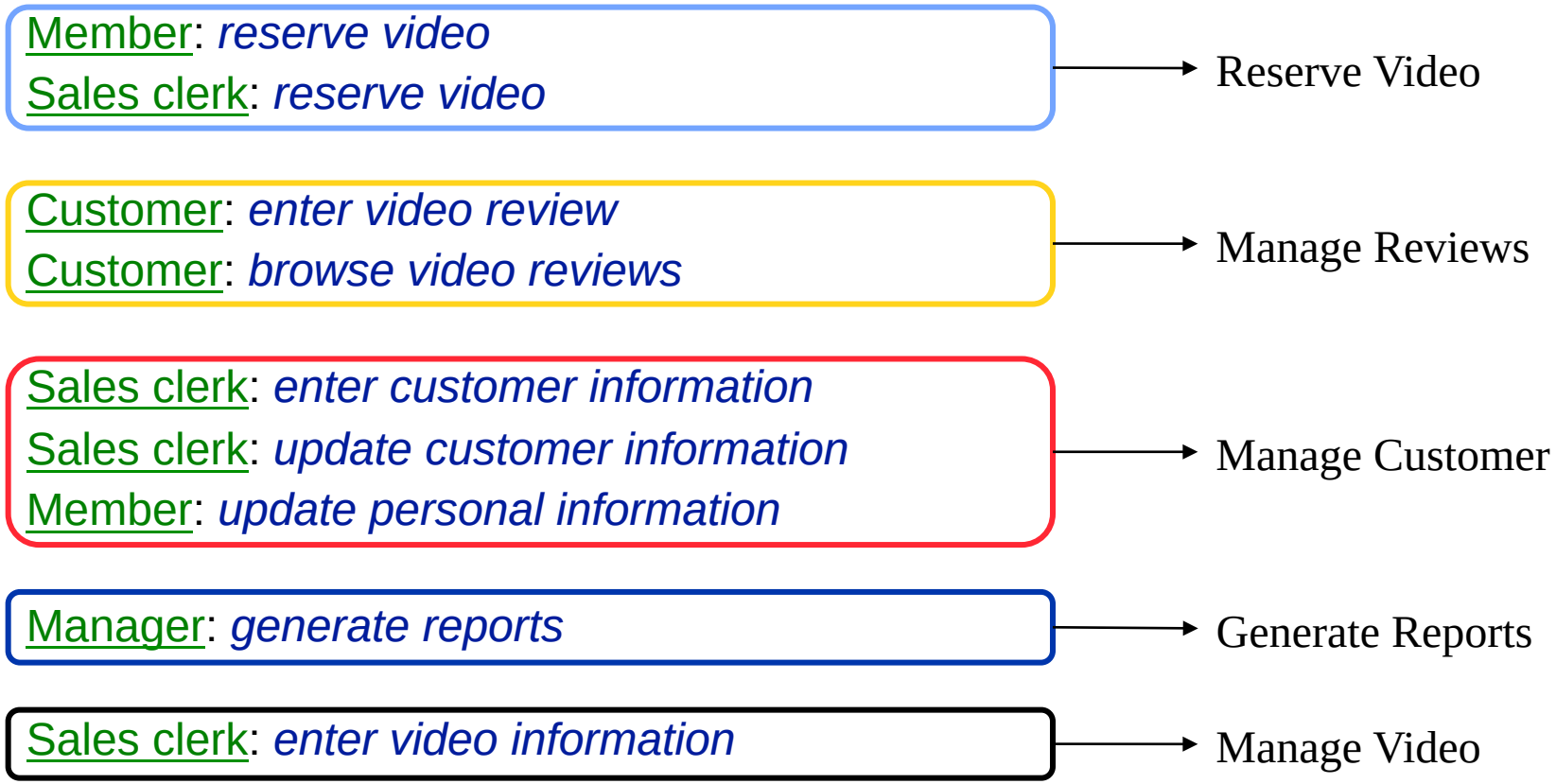
Member: *buy video*
Member: *enter video quantity sold*
Member: *get discount*
Sales clerk: *buy (sell) video*
Sales clerk: *lookup customer information*
Sales clerk: *enter video quantity sold*

→ Buy Video

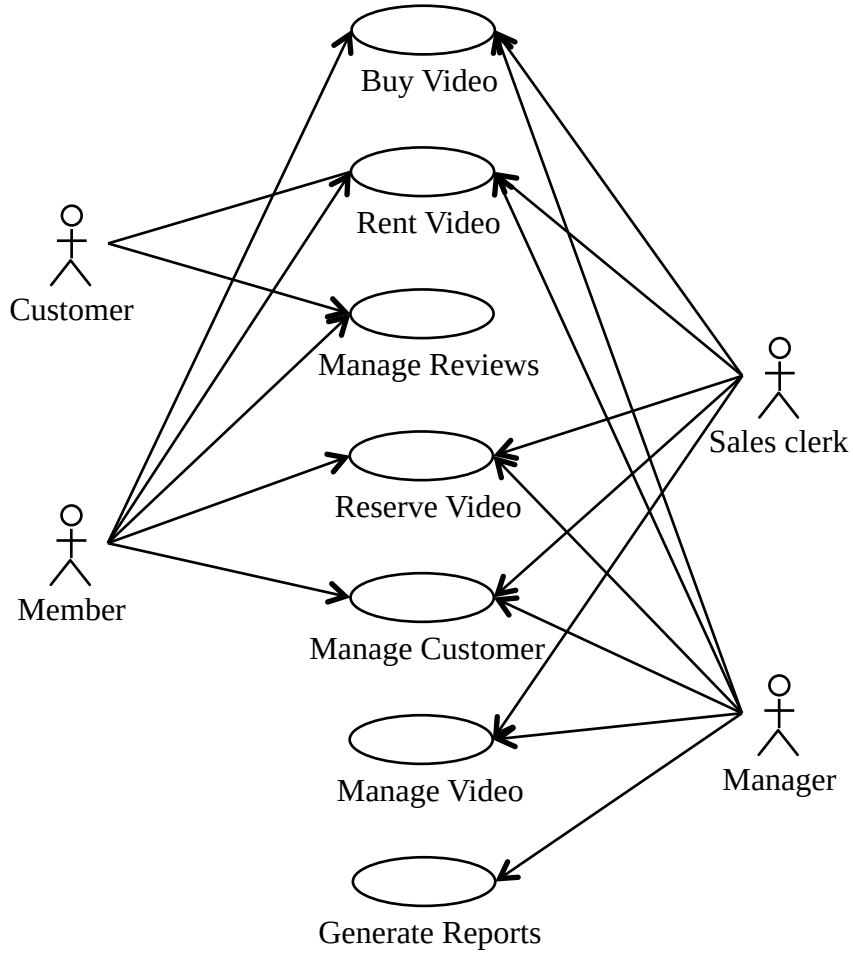
Member: *rent video*
Member: *get discount*
Sales clerk: *rent video*
Sales clerk: *lookup customer information*
Sales clerk: *enter video copy rented and due date*
Sales clerk: *return rented video*
Customer: *receive overdue notice*

→ Rent Video

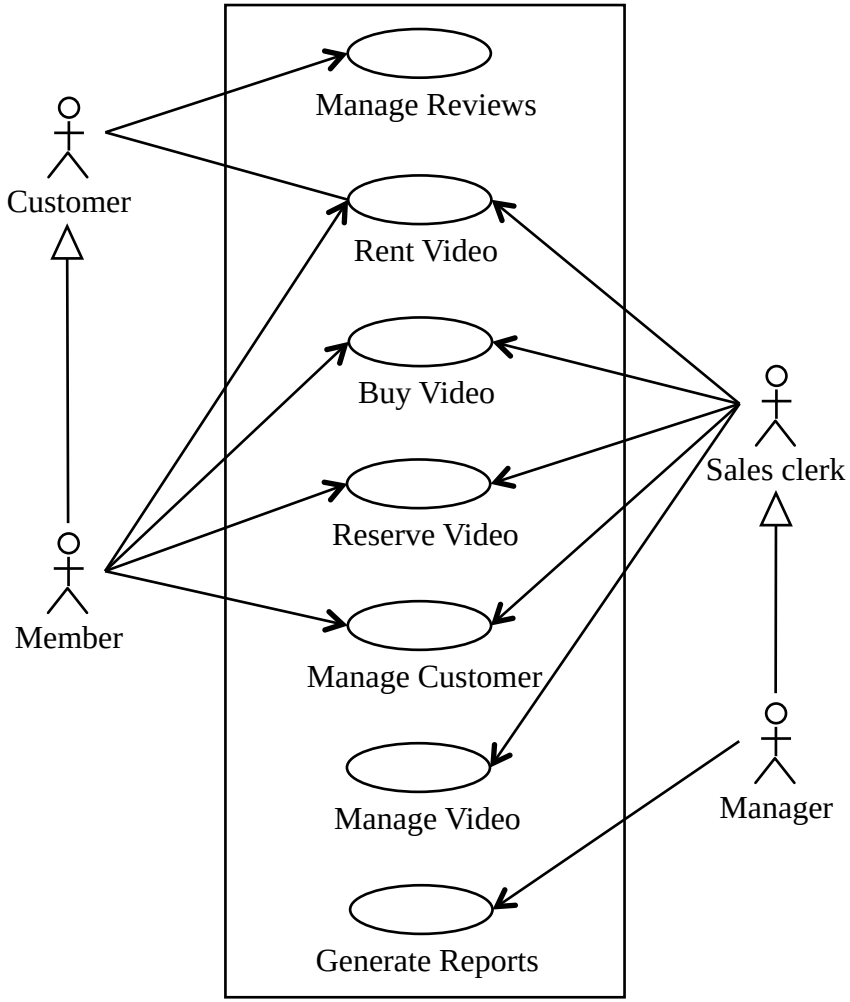
USE-CASE MODELING EXAMPLE: FUNCTIONALITY ANALYSIS AND GROUPING



USE-CASE MODELING EXAMPLE: SOLUTION



USE-CASE MODELING EXAMPLE: REFINED SOLUTION



Video Sale and Rental System

Buy Video allows a member or a sales clerk to select a video and its quantity for purchase and a sales clerk to look up customer/member information .

Rent Video allows a member or a sales clerk to select a video for rental; a sales clerk to look up customer/member information, to record which copy of a physical video has been rented and to return physical rented videos; and the system to keep track of overdue videos and send email notices to customers with overdue videos.

Manage Reviews allows a customer to browse video reviews or to input a review and rating for a selected video and to indicate whether the review is to be anonymous.

Reserve Video allows a member or a sales clerk on behalf of a member to reserve up to five physical videos at a time for rental.

Manage Customer allows a member or a sales clerk to enter or update personal customer/member information.

Manage Video allows a sales clerk to enter video information.

Generate Reports allows a manager to generate various reports on sales and rentals of videos.

USE-CASE MODELING EXAMPLE: COMMON ERRORS

- System/devices/communication methods are not actors.
  (e.g., web, phone, etc. represent how something is done)

  ☞ **Do not represent input/output devices as actors!**

- The client organization is not an actor.
  (e.g., Video Shop)

- Too large or obscure use cases.
  (e.g., Shop For Video, Provide Service To Customer)

- Too small use cases.

  ☞ **Do not represent each operation/function as a use case!**

- Give meaningful names to the use-cases.
  (e.g., names too vague or too long)

USE-CASE MODELING EXAMPLE: COMMON ERRORS

- Do not represent nonfunctional requirements.
  (e.g., 10% discount)
- Login *is not* a functional requirement.
  - It is actually a non-functional (security) requirement that can be represented by an administration use case.
- Incorrect use of use-case generalization.
- A use-case model *is not* a structure chart!
- A use-case model *is not* a domain model!
- A use-case model *is not* a work of art!