

COMP 3111

SOFTWARE ENGINEERING

LECTURE 8

SYSTEM REQUIREMENTS CAPTURE

USE-CASE MODELING EXERCISE

EXERCISE: MOVIE SHOP USE-CASE MODEL

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

- The system must be able to handle both physical and digital movies.
- It must be able to record which movies are sold and rented and by whom.
- For sold movies, the quantity sold should be recorded; for physical movie rental, which copy is rented and when it is due back should be recorded.
- The system should keep track of overdue rentals of physical movies and send email notices to customers who have movies 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 movies.
- Members should be able to make reservations for physical movie rentals either in person at the shop, by telephone or via the Web.
- A member can reserve at most five physical movies at any one time, but there is no limit on how many physical movies 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 movies they have purchased or rented.

EXERCISE: MOVIE SHOP USE-CASE MODEL (CONTD)

- 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 movies via the Web.
- The shop manager should be able to generate various reports on the sale and rental of movies.
- A sales clerk should be able to sell and rent physical movies and process the return of rented physical movies.
- When selling or renting physical movies, 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 movie (i.e., movie id, title, leading actor(s), director, producer, genre, synopsis, release year, running time, selling price, and rental price).

EXERCISE: MOVIE SHOP USE-CASE MODEL (CONTD)

From the movie sales and rental shop requirements statement:

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

EXERCISE:

MOVIE SHOP USE-CASE MODEL 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 movies.

functionality: *None. This is an implementation requirement.*

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

functionality: Someone: *buy movie*

Someone: *rent movie*

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

functionality: Someone: *enter movie quantity sold*

Someone: *enter movie copy rented and due date*

EXERCISE:

MOVIE SHOP USE-CASE MODEL ANALYSIS

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

functionality: Customer: *receive overdue notice*

Note that how the notice is received (i.e., by email) is not important from a functionality perspective.

- 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 movies.

functionality: Someone: *enter member information*

Member: *get discount*

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

functionality: Member: *reserve movie*

Sales clerk: *reserve movie*

Note that how the reservation is done is not important from a functionality perspective.

EXERCISE:

MOVIE SHOP USE-CASE MODEL ANALYSIS

- A member can reserve at most five physical movies at any one time, but there is no limit on how many physical movies 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 movies they have purchased or rented.

functionality: Customer: *enter movie 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 movie reviews*

EXERCISE:

MOVIE SHOP USE-CASE MODEL 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 movies via the Web.

functionality: Member: *update personal information*

Member: *buy movie*

Member: *rent movie*

Clarifies who can use buy and rent functionality.

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

functionality: Manager: *generate reports*

EXERCISE:

MOVIE SHOP USE-CASE MODEL ANALYSIS

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

functionality: Sales clerk: *buy (sell) movie*

Sales clerk: *rent movie*

Sales clerk: *return rented movie*

Clarifies who can use buy and rent functionality.

- When selling or renting physical movies, 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 movie (i.e., movie id, title, leading actor(s), director, producer, genre, synopsis, release year, running time, selling price, and rental price).

functionality: Sales clerk: *enter movie 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.

EXERCISE:

MOVIE SHOP USE-CASE MODEL ANALYSIS

Actors

- Customer** A customer is someone who uses the system to enter and browse reviews and who receives overdue notices from the system.
- Member** A member is someone who has paid a membership fee to the shop. In addition to what a customer can do, a member can also use the system to buy or rent movies, to reserve movies and to access and change their personal information.
- Sales clerk** A sales clerk is a shop employee who uses the system to sell and rent movies, to reserve movies, to process the return of rented movies and to enter and update movie and customer/member information.
- Manager** A manager is a shop employee. In addition to what a sales clerk can do, a manager can also generate various reports on sales and rentals of movies.

EXERCISE: MOVIE SHOP USE-CASE MODEL

FUNCTIONALITY ANALYSIS AND GROUPING

Member or Sales clerk ← ~~Someone~~: enter movie quantity sold
Sales clerk ← ~~Someone~~: enter movie copy rented and due date
Customer: receive overdue notice
Member: get discount
Member: reserve movie
Sales clerk: reserve movie
Customer: enter movie review
Customer: browse movie reviews
Sales clerk: enter customer information
Sales clerk: update customer information
Member: update personal information
Member: buy movie
Member: rent movie
Manager: generate reports
Sales clerk: buy (sell) movie
Sales clerk: rent movie
Sales clerk: return rented movie
Sales clerk: lookup customer information
Sales clerk: enter movie information

Should customer
be an actor for
buy/rent movie?

No! Why?

Customers do not interact
directly with the system to
buy/rent a movie.

EXERCISE: MOVIE SHOP USE-CASE MODEL

FUNCTIONALITY ANALYSIS AND GROUPING

Member: *buy movie*

Member: *enter movie quantity sold*

Member: *get discount*

Sales clerk: *buy (sell) movie*

Sales clerk: *lookup customer information*

Sales clerk: *enter movie quantity sold*

Buy Movie

Member: *rent movie*

Member: *get discount*

Sales clerk: *rent movie*

Sales clerk: *lookup customer information*

Sales clerk: *enter movie copy rented and due date*

Sales clerk: *return rented movie*

Customer: *receive overdue notice*

Rent Movie

EXERCISE: MOVIE SHOP USE-CASE MODEL

FUNCTIONALITY ANALYSIS AND GROUPING

Member: *reserve movie*

Sales clerk: *reserve movie*

Reserve Movie

Customer: *enter movie review*

Customer: *browse movie reviews*

Manage Reviews

Sales clerk: *enter customer information*

Sales clerk: *update customer information*

Member: *update personal information*

Manage Customer

Manager: *generate reports*

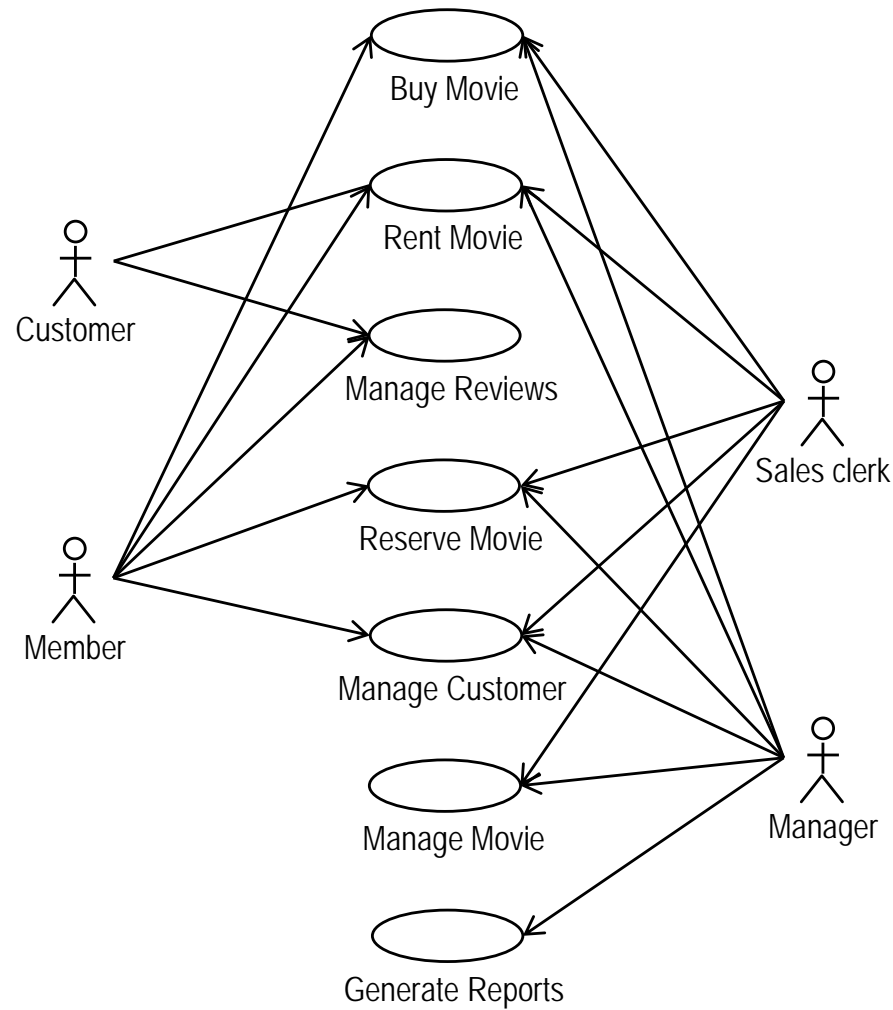
Generate Reports

Sales clerk: *enter movie information*

Manage Movie

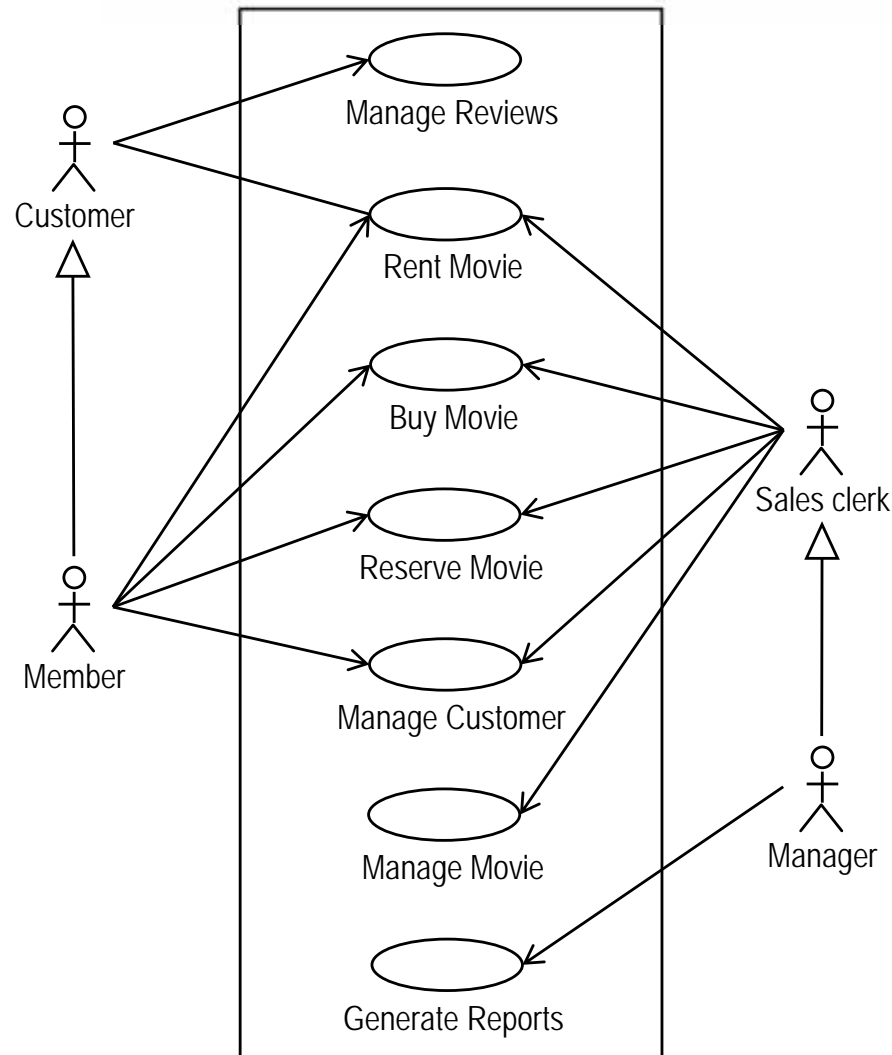
EXERCISE:

MOVIE SHOP INITIAL USE-CASE DIAGRAM



EXERCISE:

MOVIE SHOP REFINED USE-CASE DIAGRAM



Movie Sales and Rental System

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

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

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

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

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

Manage Movie allows a sales clerk to enter movie information.

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

EXERCISE: MOVIE SHOP USE-CASE MODEL 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., Movie Shop)

- Too large or obscure use cases.
(e.g., Shop For Movie, 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)

EXERCISE: MOVIE SHOP USE-CASE MODEL

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!