



SWEN30006

Software Design and Modelling

Use Cases

Textbook: Larman Chapter 6 & 30

*"The indispensable first step to getting the things you want out of life:
decide what you want."*

— Ben Stein





Learning Objectives

On completion of this topic, you should be able to:

- Recognise and interpret use cases in their different forms and use case diagrams
- Relate use cases with *include* and *extend* associations, in both text and diagram formats
- Apply tests to identify suitable use cases

Use Cases

- Use cases are widely used to discover and record requirements
- Use cases are ***text stories*** of some actor using a system to meet goals
- Use cases ***emphasize*** the user goals and perspective: “Who is using the system, what are their typical scenarios of use, and what are their goals?”

Checkout use case for POS: A customer arrives at a checkout with items to purchase. The cashier uses the POS system to record each purchased item. The system presents a running total and line-item details. The customer enters payment information, which the system validates and records. The system updates inventory. The customer receives a receipt from the system and then leaves with the items.

The Orthopaedic Workstation (OWS) system: The surgeon inspects and annotates an OWS x-ray; judgement is made regarding the femur neck resection lines and location of replacement components. Decisions are also made by the surgeon regarding type and size of replacement components, and the accessories needed for the operation. An operation plan is prepared to reflect decisions made during Pre-Operative Planning. Orders for the components and accessories are generated. A Fad may also be prepared and some details of the Pre-Operative Plan are added to Patient Details.



Definitions

- ***SuD:*** System-under-Discussion
- ***Actor:*** something with behaviour, such as a person, computer system or organisation (e.g. a cashier).
- ***Scenario (or use case instance):*** a specific sequence of actions and interactions between actors and the SuD.
- ***Use case:*** a collection of related success and failure scenarios that describe an actor using the SuD to support a goal.



Example: Handle Returns (casual)

A main success scenario for Handle Returns use case for POS

A customer arrives at a checkout with items to return. The cashier uses the POS system to record each returned item ...

Alternative scenarios

If the customer paid by credit, and the reimbursement transaction to their credit account is rejected, inform the customer and pay them with cash.

If the system detects failure to communicate with the external accounting system, ...

Which of the following use cases are NOT properly described?

"A customer searches a product in an online shopping website. Then the website displays a list of products"

✓ 0%

"A customer clicks the new account button to register an account in the system."

✓ 0%

"A customer checkouts the cart, which sends an JSON object from the client machine to the server. Then, the server store the purchase records in the database"

✓ 0%

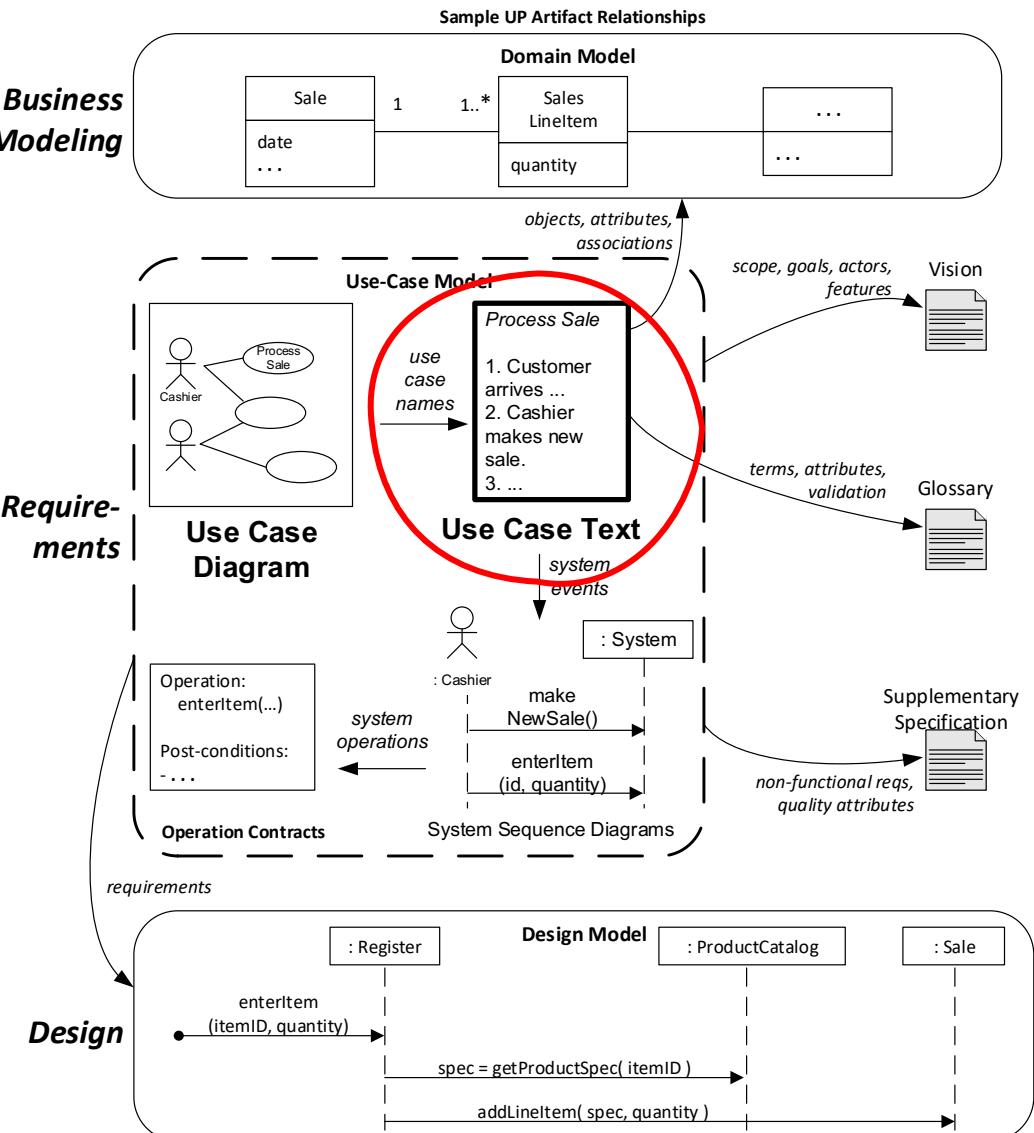
"A user enters its login and password, then the system checks whether the password is correct. If it is, the system presents the user profile"

Three kinds of actors

- ***Primary actor*** has user goals fulfilled through using services of the SuD (e.g. the cashier).
 - User goals drive the use case
- ***Supporting actor*** provides a service (e.g. information) to the SuD to clarify external interfaces and protocols (e.g. an automated payment authorization service)
 - Usually be a computer system but could be an organization or person.
- ***Offstage actor*** has an interest in the behaviour of the use case, but is not primary or supporting (e.g. a government tax agency).
 - Ensure all interests identified/satisfied

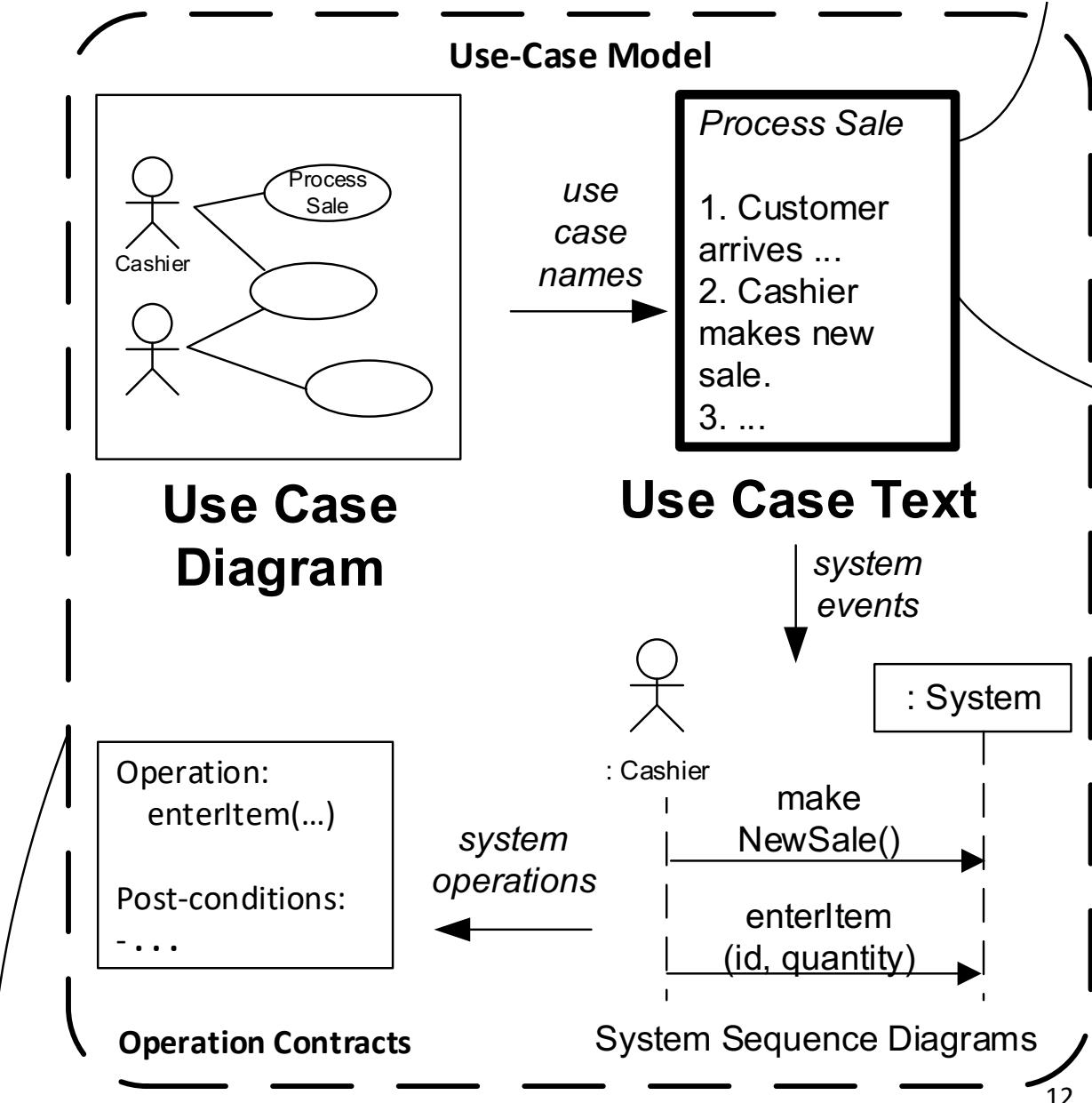
Use Case Influence in Unified Process (UP)

- The use cases influence many aspects of a software development project
 - Design
 - Implementation
 - Project Management
- Use cases are key source of information of OO analysis and testing
- Use cases should be strongly driven by the goals of the project



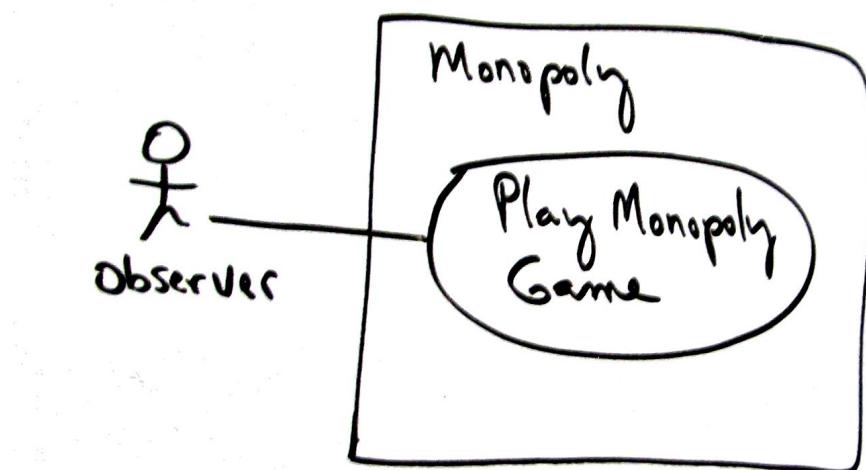
Use-Case Model

- Use-Case Model: A model of the system's functionality and environment
 - *Primarily* includes the set of all written use cases
 - *Optionally* includes a UML use case diagram

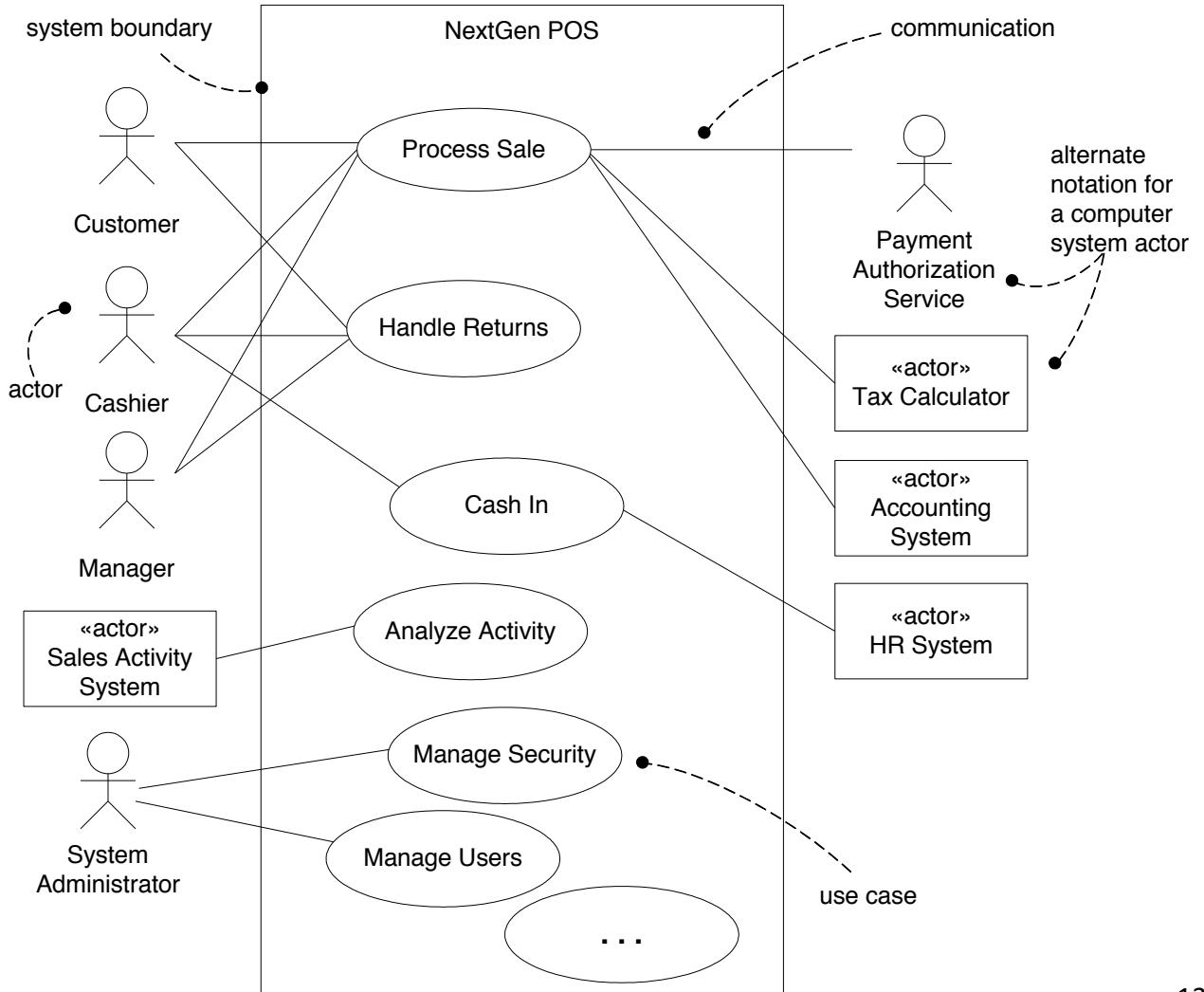


UML use-case diagram

- A UML use case diagrams gives a context diagram of a system and its environment
 - Showing the names of use cases, actors and their relationships



A UML use case diagram for
Monopoly Simulation System



A UML use case diagram for POS

- When poll is active, respond at **PollEv.com/unimelbse**
- Text **UNIMELBSE** to **+61 427 541 357** once to join

Which of the following use cases are considered as useful?

Negotiate a Supplier Contract

Handle Returns

Log In

Move Piece on Game Board



Finding Useful Use Cases

*“What is a useful level to **express** use cases for application requirements analysis?”*

- Boss Test
 - If your boss asks: “What have you been doing all day?” and you reply: “Logging in!”, will your boss be happy?
 - Is “Log In” use case useful?
- Elementary Business Process (EBP) Test
 - A task performed by one person in one place at one time, in response to a business event, which *adds measurable business value* and leaves the data in a consistent state
 - Does a use case like “*delete a line item*” reflect EBPs? What about “*Handle Returns*”?
- Size Test
 - Is a task very seldom a single action/step; typically many steps; fully dressed often require 3–10 pages of text



Example: Applying Tests

- **Negotiate a Supplier Contract**
 - Much broader and longer than an EBP. Could be modeled as a *business* use case, rather than a system use case.
- **Handle Returns**
 - OK with the boss. Seems like an EBP. Size is good.
- **Log In**
 - Boss will not be happy if this is all you do all day!
- **Move Piece on Game Board**
 - Single step—fails the size test.

Summary & Remarks

- ***Use Cases*** are text descriptions of an *actor* using the system to achieve a goal.
- ***Use Case Diagrams*** provide a context of use cases and show some relationships between use cases and actors
- Use Cases should cover both success and failure scenarios.
- Use cases can be at different levels of detail.
 - Use the tests to identify the useful use cases



Lecture Identification

Lecturer: Patanamon Thongtanunam

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These slides include materials from:

Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development, Third Edition, by Craig Larman, Pearson Education Inc., 2005.

