

# Introduction to Use Cases

Requirements to Use Cases

Use Case Basics

Some Use Case Details

In Class Use Cases

Discussion Questions

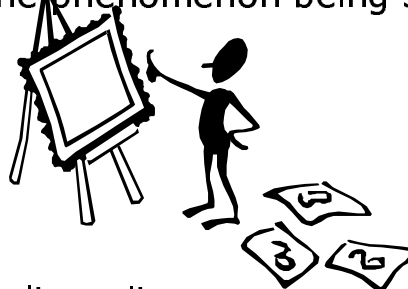
©1998 William N. Robinson

## Questions Answered in This Lecture

- What is the relationship between requirements and use cases?
- What is a Use Case?

## What Is a *Model* ?

- A model is an abstract representation of reality that contains/portrays only important aspects of the phenomenon being studied,



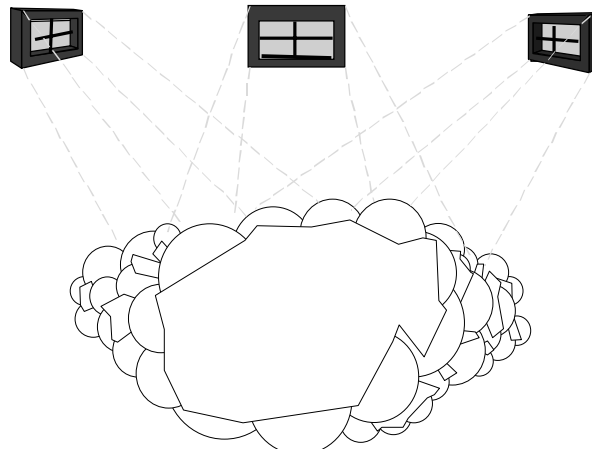
- And by default, omits unnecessary detail and superfluous elements

## Modeling

Requirements

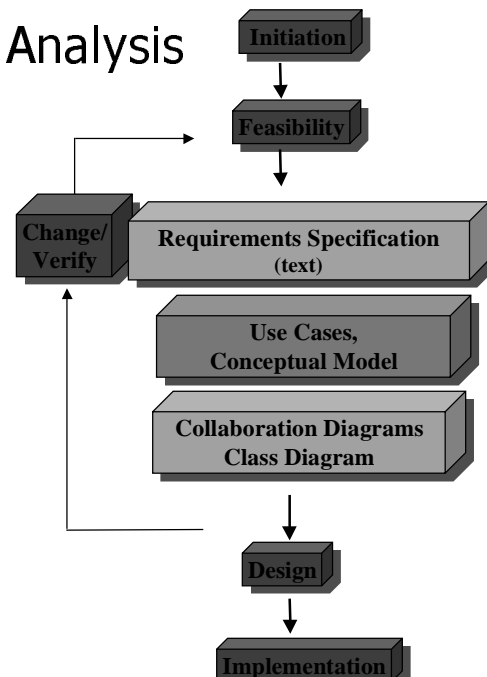
Data

Processes



## Object-Oriented Analysis

- Textual documentation
  - Describes system
    - Rationale
    - Requirements
- Multiple system models
  - Processing depicted in different views
    - Use case diagram (graph)
    - Contracts (text)
  - Data depicted in different views
    - Conceptual model (graph)
    - Class diagram (graph)



## Requirements to Use Cases

- Traceability from Requirements to Behaviors
  - For each (active) requirement, there should be at least one use case that "implements" it
  - For each use case, there should be at least one requirement that it "implements"

## Use Case Diagram

- POST shall compute a running total of sales item for the current transaction
- POST shall provide secure access to its functions
  - *This is a non-functional requirement*
- POST shall allow for the itemized refund of previously purchased items

## Documenting a Use Case *simplified*

- Use Case: Buy Items
- Actors: Customer, Cashier
- Type: Primary
- Purpose: Assist and record a sale
- Description: A customer arrives at a checkout with items to purchase. The Cashier records the purchased items and collects a payment. On completion the customer leaves with the items.
- Typical Course of Events
  - Actor Action                      System Response
    - X does y                      system does z
    - ...

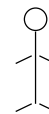
## The Use of Use Cases

- Informal technique for capturing basic functions
  - Adopted, in various forms, by all the major OO methodologies
- Users and Developers have complementary view of Use Cases
  - Users
    - Can read, understand, and critique business-level use cases/scenarios
  - Developer
    - Good for basic structure and interaction of application parts

## Use Case Definition

- Use Case
  - a sequence of transactions in a system whose task is to yield a measurable value to an individual actor of the system
  - a pattern of behavior that the system exhibits
    - Each use case is a sequence of related transactions performed by an actor and the system in a dialogue
- Actor
  - a role that someone or something in the environment can play in relation to the business, everything that interacts with the system, the same someone or something can play different roles. (Jacobson et al 1995)

### Notation



## Use Case Elements

- Transaction
  - an atomic set of activities that is performed either fully or not at all, invoked by a stimulus... , consists of actions, decisions and transmission of stimuli
- A measurable value
  - performance has a visible, quantifiable and/or qualifiable impact on things outside the system, and in particular, the actor who initiated the task

## Documenting Use Cases

- A flow of events document is created for each use cases
  - Written from an actor point of view
- Details what the system must provide to the actor when the use cases is executed
- Typical contents
  - How the use case starts and ends
  - Normal flow of events
  - Alternate flow of events
  - Exceptional flow of events

## Buy Items with Cash: Typical Events

- 1 This use case begins when a Customer arrives at a POST checkout with items to purchase
- 2 The Cashier records the identifier for each item. If there is more than one of the same item, the Cashier can enter the quantity as well
- 3 Determines the item price and adds the item information to the running sales transaction  
The description and price of the current item are presented
- 4 On completion of the item entry, the Cashier indicates to the POST that item entry is complete
- 5 Calculates and presents the sale total
- 6 The Cashier tell the Customer the total
- 7 The Customer gives a cash payment--the "cash tendered" possibly greater than the sale total
- 8 The Cashier records the cash received amount
- 9 Shows the balance due back to the Customer  
Generates a receipt
- 10 The Cashier deposits the cash received and extracts the balance owing. The Cashier gives the balance owing & printed receipt to Customer
- 11 Logs the completed sale
- 12 The Customer leaves

Alternative Courses	Line 2: Invalid identifier entered. Indicate error. Line 7: Customer didn't have enough cash. Cancel sales transaction.
---------------------	----------------------------------------------------------------------------------------------------------------------------

## Use Case Structure

- Dozens
  - Not hundreds
- Contains
  - Brief statement of purpose
  - 1 sunny day event (main course, primary scenario)
  - N rainy day(s) (alternate courses, secondary scenarios)
- Complete "end to end" business process
  - From initiation to completion
  - Initiated at an external interface
  - Common error
    - Use Case for an individual step in a process, rather than a complete end-end process that starts at the interface

## Distribution of Submarine Supplies Requirements



*We are losing business due to our poor order processing and delivery. We mainly serve as a distribution center that consolidates produce and meats for submarine shops. However, we are not meeting our business objectives of profit, quality, responsiveness. Moreover, we are not as efficient as we would like, as our works spend an inordinate amount of time trying to use our current system. Things are a bit chaotic now...*

- Your assignment
  - Consider component systems of business, such as a Distribution Center, a Financial Center, and Franchise Support
    - Do not consider the Point of Sale Terminal
  - Draw a Use Case Diagram
  - Document a Use Case

© 1998 William N. Adkinson

15

### Discussion

## Discussion Questions

- How detailed should a Use Case be?
- How are Use Cases related to each other?
- Are there Use Cases for Design as well as analysis?

© 1998 William N. Adkinson

16