Requirements Analysis

Overview

- Unified Modeling Language (UML)
- UML Use case diagram
- Case studies

N. Meng, L. Zhang   2

Unified Modeling Language (UML)

- Definition
  - A visual language for specifying, constructing, and documenting the artifacts of systems
  - Standard diagramming notation for drawing pictures related to software
  - Includes 13 types of diagrams

N. Meng, L. Zhang　　　　3

Two Categories of UML Diagrams

- Structural UML diagrams
  - Class diagram
  - Object diagram

  … …
- Dynamic UML diagrams
  - Use case diagram
  - Sequence diagram

  … …

N. Meng, L. Zhang　　　　4

We will discuss

- Use case diagram (Requirement)
- Class diagram (Requirement & Design)
- Sequence diagram (Requirement & Design)
- Package diagram (Design)

Use case diagram

- Definition
  - A representation of interactions between actors and the system
- It shows relationship between actors, use cases, and the system
  - the scope of the system
  - the external actors
  - how actors use the system
- It is secondary to text documentation

Legends

Actor: an entity that interacts with the system.

Actor: a computer system that interacts with the system under discussion

Use case: usage of a system

Association: relation between an actor and a use case

<<Include>>
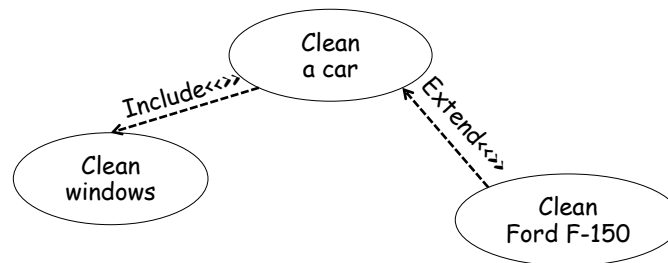**Includes dependency**: a base use case includes a sub use case as component

<<Extend>>
Extends dependency: a use case extends the behavior of a base use case.

N. Meng, L. Zhang   7

What are the relations?

Clean a car

Include<<>>

Clean windows

Extend<<>>

Clean Ford F-150

N. Meng, L. Zhang   8

Case study: POS system

- With a POS system,
  - a cashier can perform the following tasks (with help of the manager if necessary):
    - Process sale
    - Handle return
    - Register product specification
  - For each activity, the system may first authenticate the cashier or manager
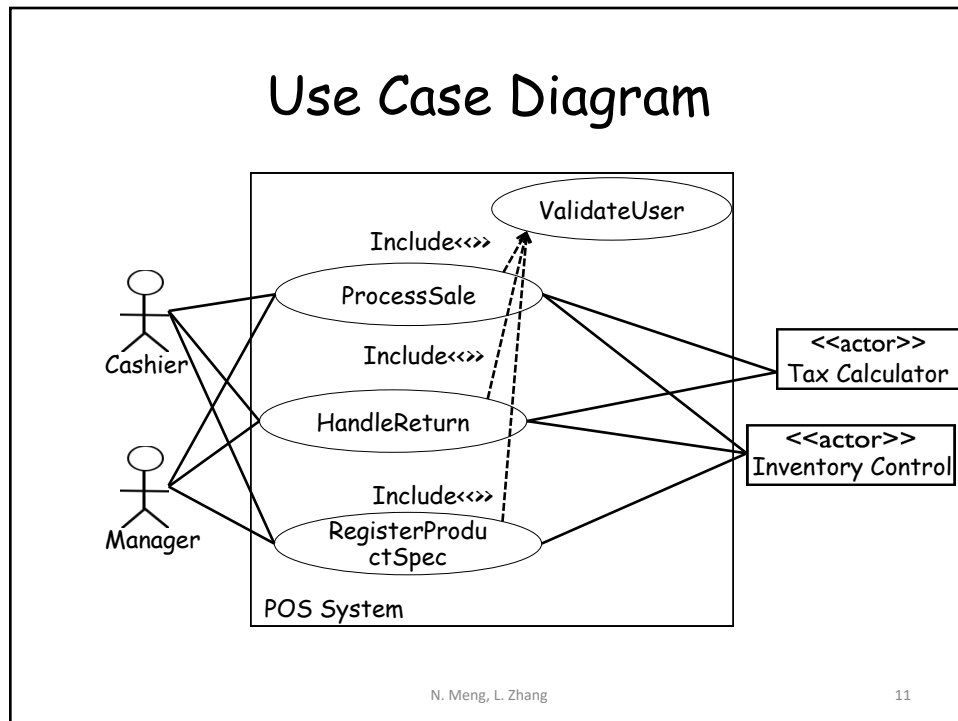- The POS system interfaces to third-party tax calculator and inventory control

Use Case Diagram

- What are the actors?
- What are the use cases in the system?
- What is the relationship between use cases?

Use Case Diagram

POS System actors: ValidateUser, ProcessSale (Include<<>>), HandleReturn (Include<<>>), RegisterProductSpec (Include<<>>); Cashier, Manager; <<actor>> Tax Calculator, <<actor>> Inventory Control

N. Meng, L. Zhang   11

Case study: ATM system

- With an ATM, a customer can perform the following activities:
  - check balance
  - transfer
  - withdraw cash
- For each activity, the system will first authenticate the customer
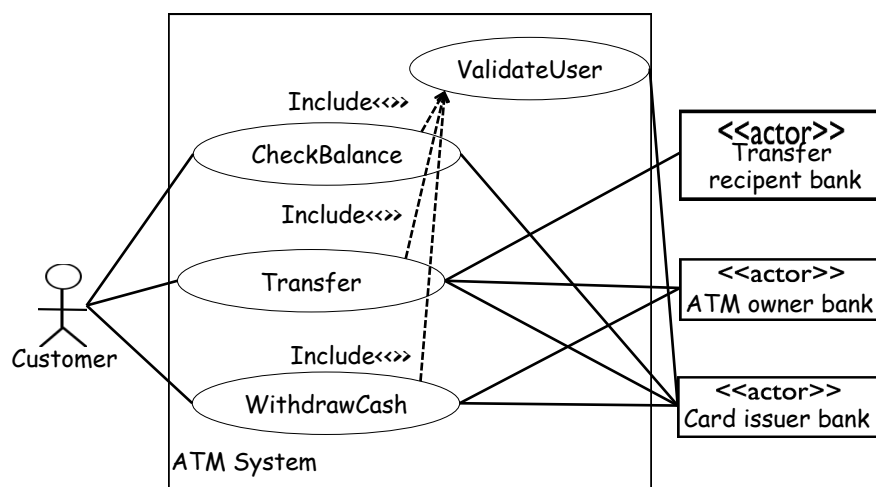- Some fee may apply for withdrawing or transferring

N. Meng, L. Zhang   12

6

Use Case diagram

- What are the actors?
- What are the use cases in the system?
- What is the relationship between use cases?

N. Meng, L. Zhang   13

Use Case diagram

N. Meng, L. Zhang   14