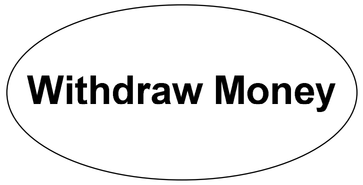
Use Cases

(Cas d’utilisation)

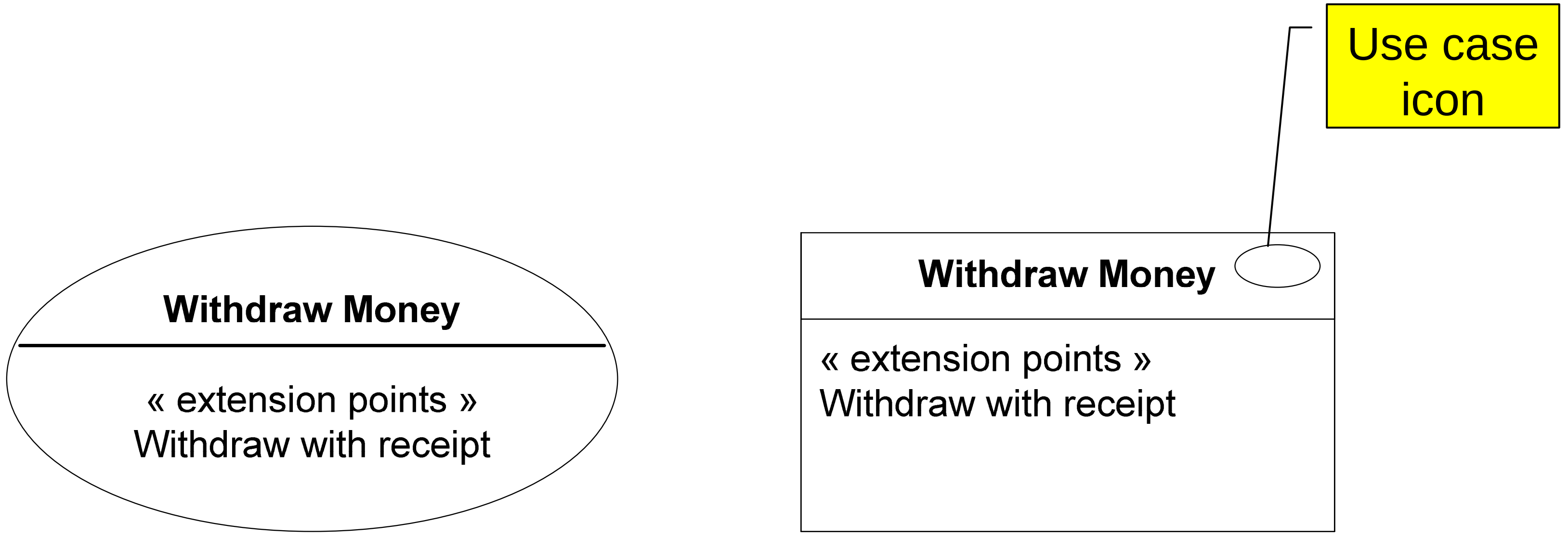
Introduction

- Use cases are a way to capture system functionality and requirements.
- An interesting system is not isolated: it interacts with human or automated actors that use that systems for some purpose.
- Those actors expect that system to behave in predictable ways.
- A use case specifies the behavior of a system or a part of a system.
- Should not be too general nor too specific.

Use case notations



Simple use case



Use case with a compartment showing extension points

Use case in classifier notation

Instantiation of a Use Case

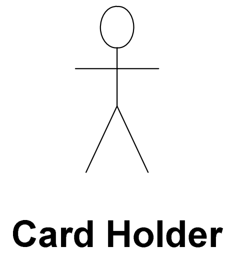
- Use case = model element defined in the two previous slides.
- Instantiation of a use case = full documentation of the use case

  Use the way that best captures the use case’s functionality:

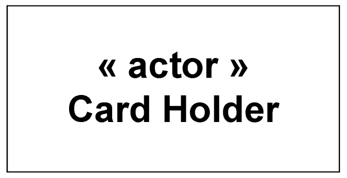
  - Text document
  - State machine
  - Activity diagram
  - Interaction diagram
  - …

Actor

- A use case must be initiated by someone or something outside the scope of the use case.
- This party is call an actor.
- Doesn't need to be human (e.g., a sensor, a clock…)
- A use case can also provide an actor with results (human receiver, actuators, displays…)



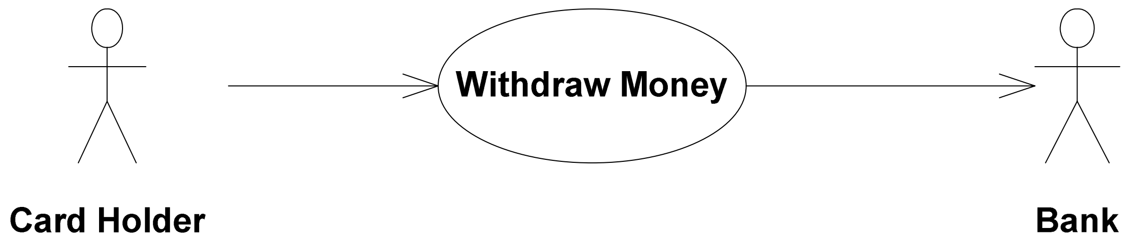
Stick figure representation



Classifier representation

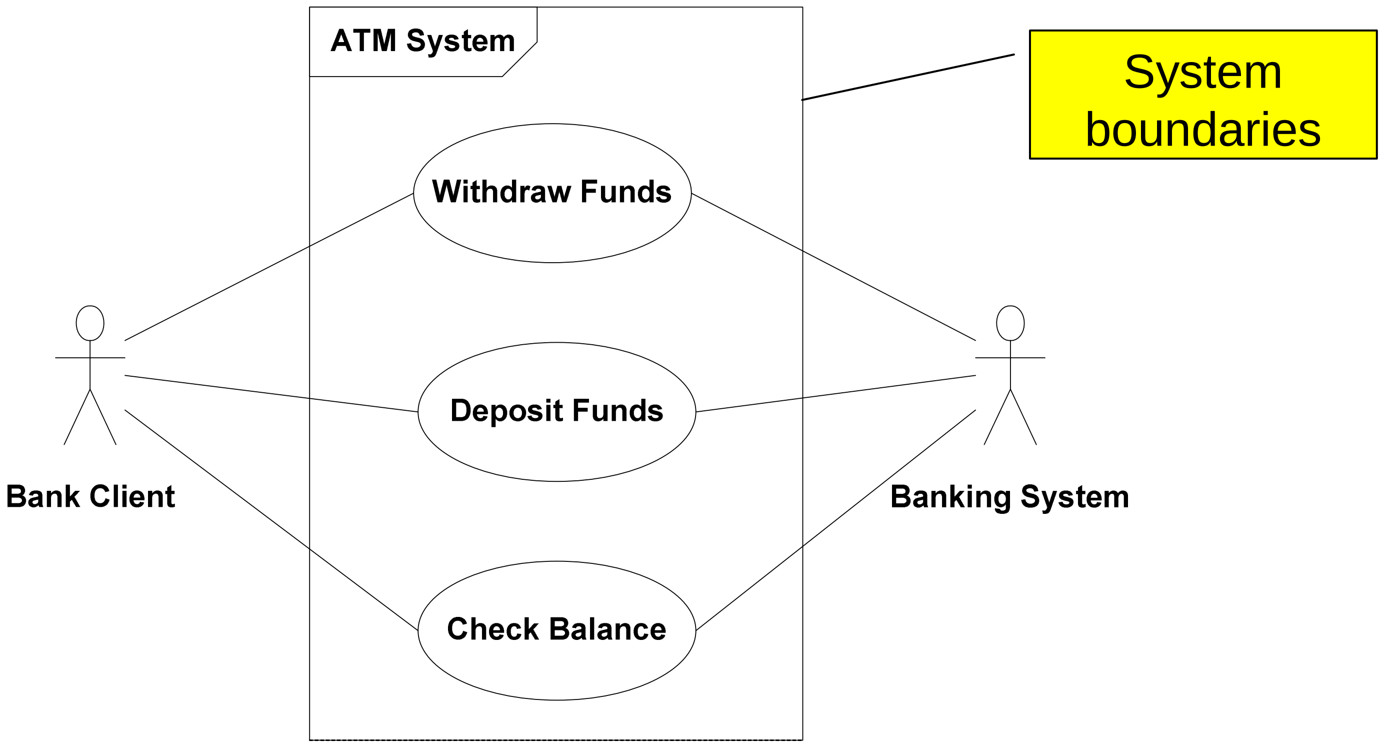
Actor/Use case Association

- An actor is associated with one or more use cases.
- A relationship actor/use case indicates the actor initiates the use case, the use case provides the actor with results, or both.
- Usually initiating actors on the left, receiving actors on the right. You can depart from this notation. Use arrows on associations.
- Note that the arrows do not necessarily restrict the direction of information flow.



System boundaries

- By definition, use cases capture the functionality of a particular subject.
- Anything not realized by the subject is considered outside the system boundaries and should be modeled as an actor.

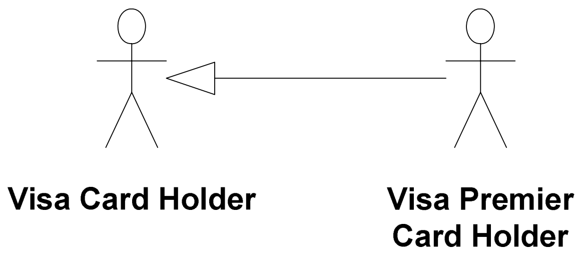


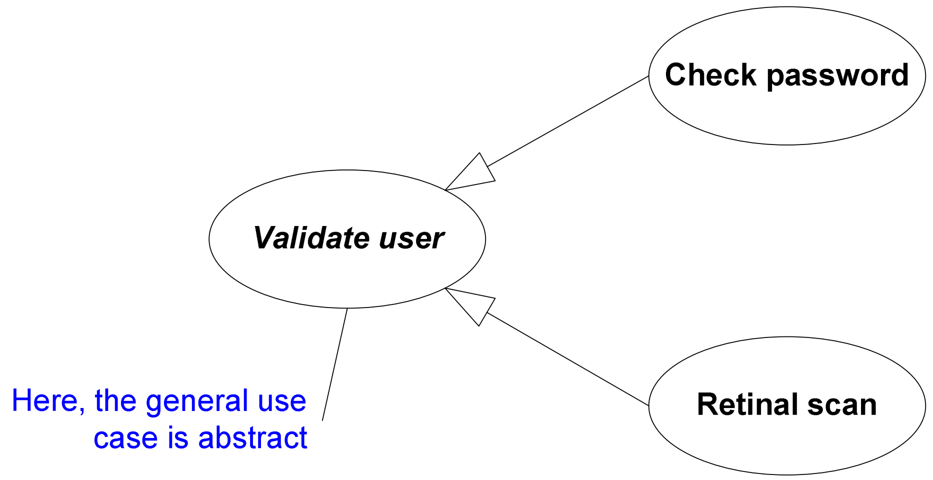
Using Actors to identify functionality

- Actors don’t need to have a one-to-one mapping to physical entities; in fact, they don’t need to be physical entities at all.
- UML allows for actors to represent roles of potential users of a system.
- For example, the actor “Head of Department” and the actor “Professor” can be the same person.
- Different roles may unveil new use cases.

Advanced Use Case Modeling (1)

- Actors and Use case generalization

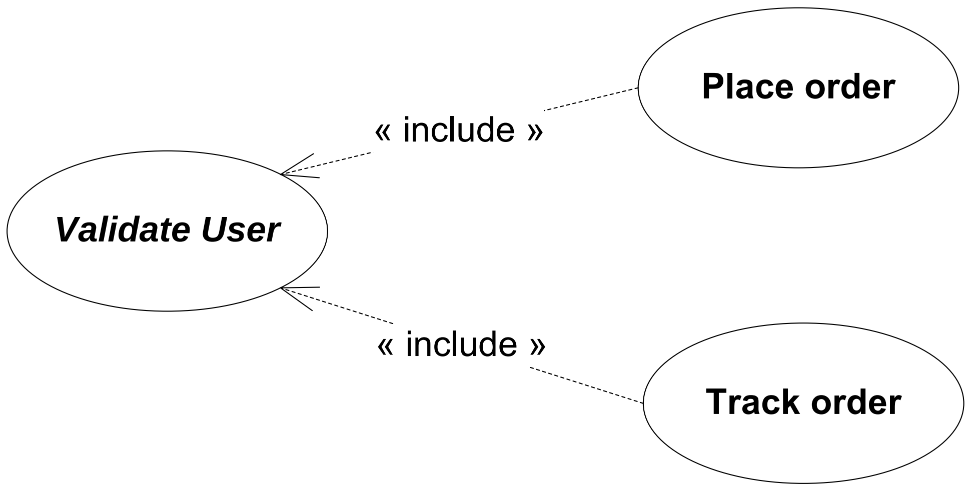




- Use case inclusion (see below)
- Use case extension

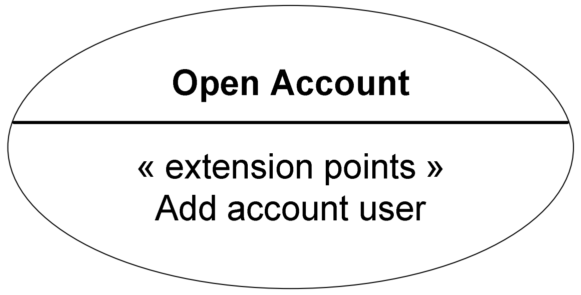
Advanced Use Case Modeling (2)

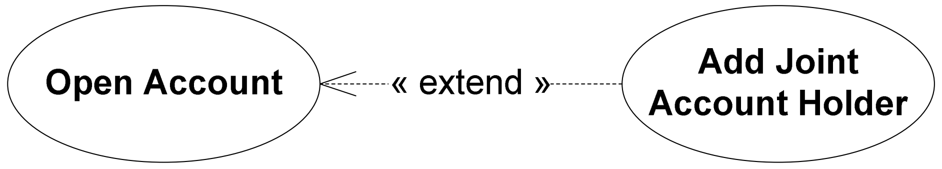
- Use case inclusion
- Factor out common functionality from several use cases by creating a shared, included use case.
- An include relationship defines that a use case contains the behavior defined in another use case.
- The including use case is typically not complete on its own.



Advanced Use Case Modeling (3)

- Use case extension
- UML provides the ability to plug in additional functionality to a base use case if specified conditions are met.
- Clearly, a base use case should be a complete use case on its own. The extension use case is optional.
- The extended use case must have clearly defined extensions points.

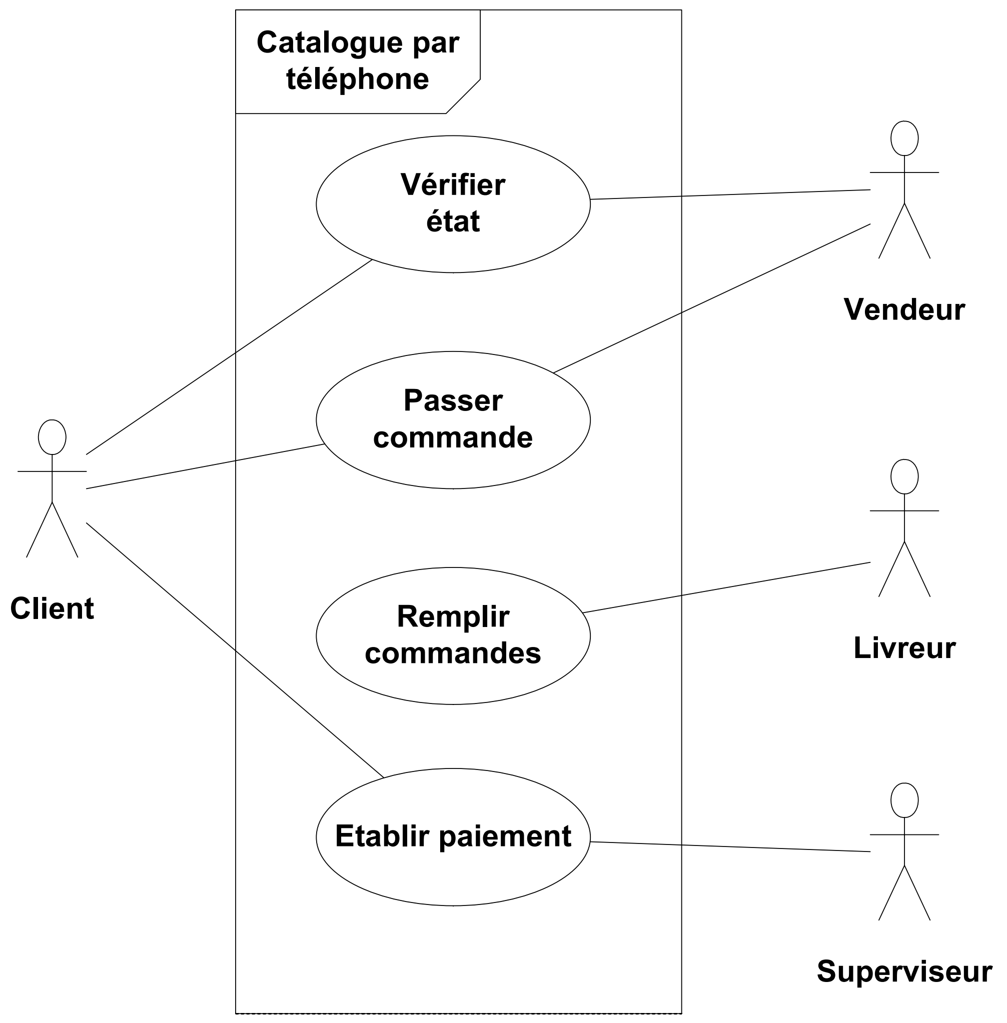




Use Case Description Format

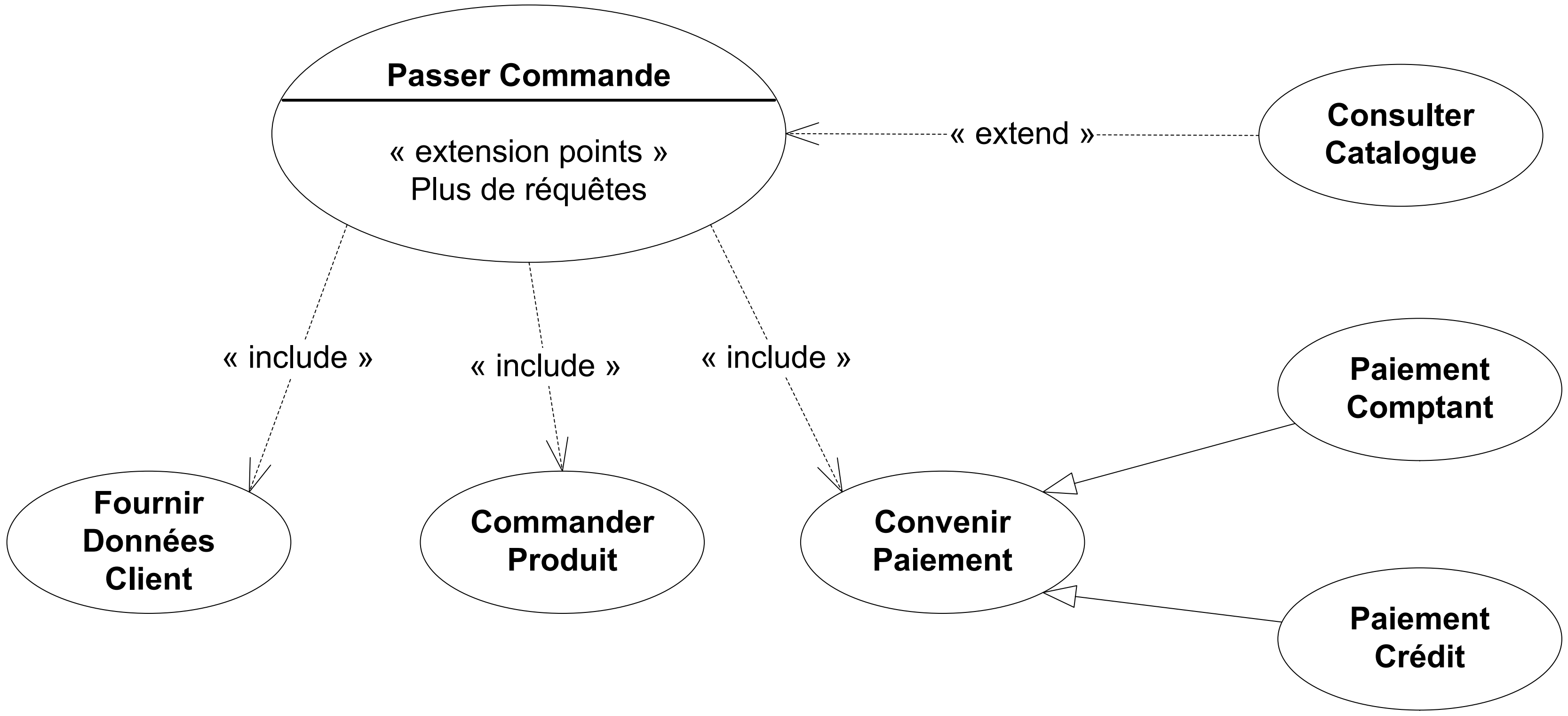
- Name
- Purpose
  - May be written informally (“The purpose of the capability is to…”)
- Description
  - May be written semi-formally (“The system shall…”)
  - May be informal
  - May be a hyperlink off to a separate document
- Preconditions
  - What is true *prior* to the execution of the capability?
- Postconditions
  - What does the system guarantee to be true *after* the execution of the use case?
- Constraints
  - Additional QoS requirements or other rules for the use case

Example



Catalogue par téléphone
Vérifier état
Passer commande
Remplir commandes
Etablir paiement
Client
Vendeur
Livreur
Superviseur

Example


Passer Commande
« extension points »
Plus de réquêtes
« extend »
Consulter Catalogue
« include »
« include »
« include »
Fournir Données Client
Commander Produit
Convenir Paiement
Paiement Comptant
Paiement Crédit