Université de Paris

Génie Logiciel
UML to model requirements

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UML to model requirements

Types of diagrams

- UML defines 13 diagrams in 3 categories which can define a system according to different points of view
- Structure diagrams
  - Class Diagram, Object Diagram, Component Diagram, Composite Structure Diagram, Package Diagram and Deployment Diagram
- Behavior diagrams
  - Use Case Diagram, Activity Diagram and State Machine Diagram
- Interaction diagrams
  - Sequence Diagram, Communication Diagram, Timing Diagram and Interaction Overview Diagram

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Use case diagrams

Use case

- Definition: A *use case* is the specification of a set of actions performed by a system, which **yields an observable result** that is, typically, of value **for one or more actors or other stakeholders of the system**. (OMG UML Superstructure 2.0)

- Definition: an *actor* is the role of an external user when interacting with the system

- External view (point of view of the actors) of the system
- Capture functionnal requirements
- One use case describes the actions and interactions with the system for one functional requirement.
- Support for every other stages of software development

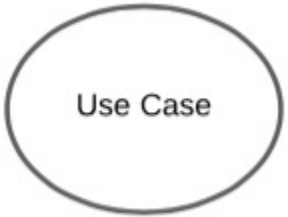
Use case diagrams

The actor

- External to the system
- Interacts directly with the system
- Has a role (in general, indicated by its name)

Use case diagrams

- Definition: A *use case diagram* shows one or more **use cases**, one or more **actors**, and the **relationships** between them

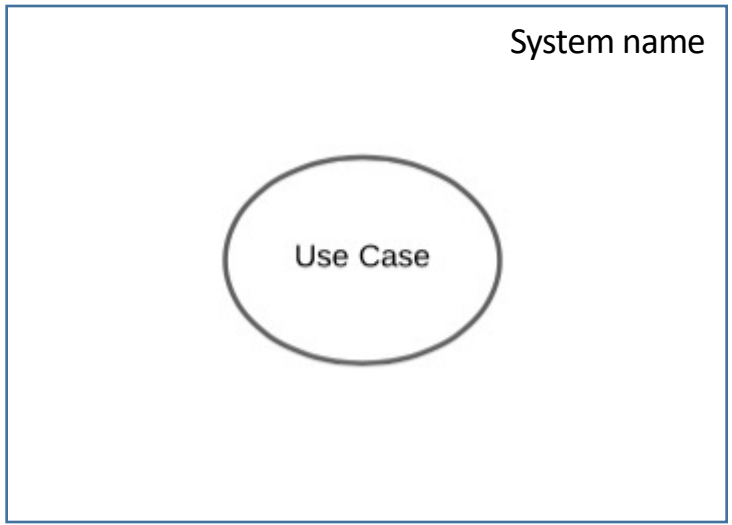


Actors and use cases are linked with an *association link*

Use case diagrams

Elements of use case diagrams

- The use case is named (name must be descriptive!)
- Optionally the system can be represented by a rectangle



Use case diagrams

Elements of use case diagrams

- An actor can be:
  - primary: the one for which the objective of the use case is essential. Most often, will initiate the use case.
  - secondary: the objective is not essential, but is still in interaction with the use case

- Convention: primary actors on the left and secondary actors on the right of the use case(s).
- If the system is drawn, actors are outside

Use case diagrams

Elements of use case diagrams

- An association link between an actor and a use case indicates that the actor can interact with the use case.
- An association can be represented by:
  - a full link
  - an arrow indicating who initiated the interaction

- Therefore: an association between a use case and a secondary actor is an arrow!

Use case diagrams

Elements of use case diagrams

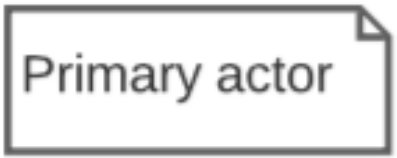
- Associations between an actor and a use case can have a cardinality
- Cardinality on the use case side: how many instances of the use case (scenario) is the actor linked to?
- Cardinality on the actor side: how many instances of the actor are linked to one instance of the use case?

Representation	Cardinality
1	Exactly one time
N	Exactly N times
*	Any number (including 0) of times
0..1	0 or one time
1..*	One or more times
M..N	From M to N times

Use case diagrams

Elements of use case diagrams

- Possible to use notes
- Useful to indicate primary/secondary actors



Use case diagrams

A simple use case diagram