UNIFIED MODELING LANGUAGE (UML)

11. USE CASE DIAGRAM

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Content

1. Requirement modeling with use-case
2. Actors
3. Use cases
4. Use case diagrams

Purpose of Requirement

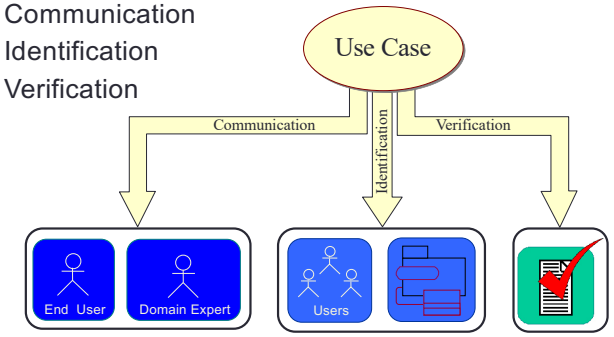
- Establish and maintain agreement with the customers and other stakeholders on what the software should do.
- Give software developers a better understanding of the requirements of the software.
- Delimit the software.
- Provide a basis for planning the technical contents of the iterations.
- Provide a basis for estimating cost and time to develop the software.
- Define a user interface of the software.

What Is Software Behavior?

- Software behavior is how a software acts and reacts.
  - It comprises the actions and activities of a software.
- Software behavior is captured in use cases.
  - Use cases describe the interactions between the software and (parts of) its environment.

Benefits of a Use-Case Model

- Communication
- Identification
- Verification



Major Concepts in Use-Case Modeling

- An actor represents anything that interacts with the software.

Actor

- A use case describes a sequence of events, performed by the software, that yields an observable result of value to a particular actor.

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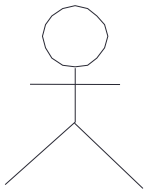
2. Actors

- Actors represent roles a user of the software can play
  - They can represent a human, a machine, or another software
  - They can be a peripheral device or even database
- They can actively interchange information with the software
  - They can be a giver of information
  - They can be a passive recipient of information
- Actors are not part of the software
  - Actors are EXTERNAL



Actor

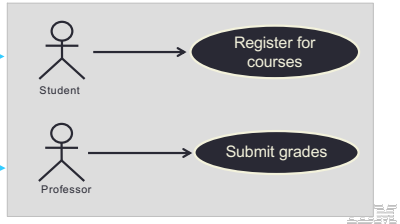
Actors and Roles

Charlie: Is employed as a math professor and is an economics undergraduate.

Jodie: Is a science undergraduate.

Charlie and Jodie both act as a Student.

Charlie also acts as a Professor.



Internet banking system

- The internet banking system, allowing interbank network, communicates with bank customers via a web application. To perform transactions, customers have to log in the software. Customers may change password or view personal information.
- Customers can select any of transaction types: transfer (internal and in interbank network), balance inquiries, transaction history inquiries, electric receipt payment (via EVN software), online saving.
- In the transfer transaction, after receiving enough information from the customer, the software asks the bank consortium to process the request. The bank consortium forwards the request to the appropriate bank. The bank then processes and responses to the bank consortium which in turn notifies the result to the software.
- The bank officers may create new account for a customer, reset password, view transaction history of a customer.

Some guideline to extract actors

- Pay attention to a noun in the problem description, and then extract a subject of action as a Actor.
- Ensure that there are no any excesses and deficiencies between the problem description and Actors extracted.
- Actor names
  - should clearly convey the actor's role
  - good actor names describe their responsibilities

Exercise: Find actors

Internet Banking Software

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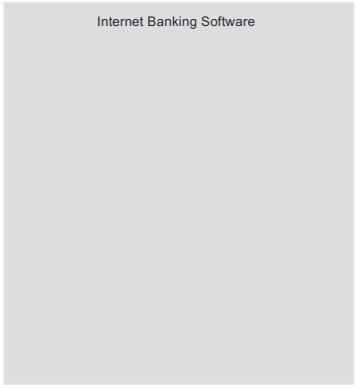
3. Use Cases

- Define a set of use-case instances, where each instance is a sequence of actions a software performs that yields an observable result of value to a particular actor.
  - A use case models a **dialogue** between one or more actors and the software
  - A use case describes the **actions the software takes** to deliver something of value to the actor

Some guidelines to extract use cases

- Pay attention to a verb in the problem description, and then extract a series of Actions as a UC.
- Ensure that there are no any excesses and deficiencies between the problem description and Use cases extracted.
- Check the consistency between Use Cases and related Actors.
- Conduct a survey to learn whether customers, business representatives, analysts, and developers all understand the names and descriptions of the use cases

Exercise: Find use cases



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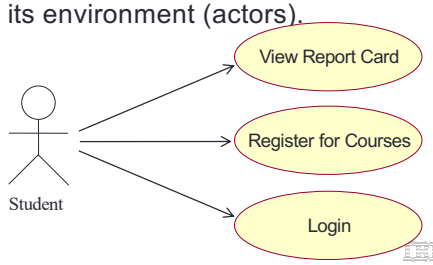
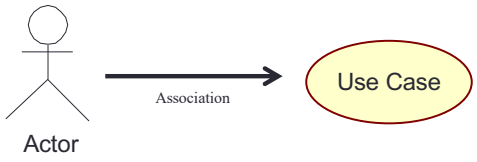
Overview of Use-Case Diagram

- A diagram modeling the dynamic aspects of softwares that describes a software's functional requirements in terms of use cases.
- A model of the software's intended functions (use cases) and its environment (actors).

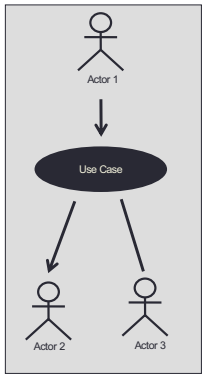


Association between actor and use case

- Establish the actors that interact with related use cases
  - Associations clarify the **communication** between the actor and use case.
  - Association indicate that the actor and the use case instance of the software communicate with one another, each one able to **send and receive messages**.
- The arrow head is optional but it's commonly used to denote the initiator.

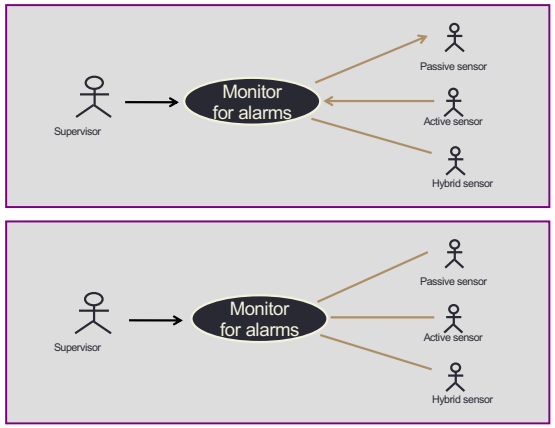


Communicates-Association



- A channel of communication between an actor and a use case.
- A line is used to represent a communicates-association.
  - An arrowhead indicates who initiates each interaction.
  - No arrowhead indicates either end **can** initiate each interaction.

Arrowhead Conventions



Exercise: Draw use case diagram

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Question?