IX. Use Cases

The Unified Modeling Language
Actors and Use Cases
How to Find Them

The Unified Modeling Language (UML)

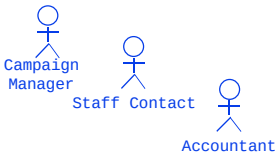
- Booch and Rumbaugh started working towards a unified modelling language (UML) in 1994 under the auspices of Rational Inc. They were later joined by Jacobson.
- UML only offers a notation, not a methodology for modeling (as various OOA techniques do).
- Combines Jacobson's use cases with Booch and Rumbaugh concepts for object modeling, along with statecharts.
- UML has been adopted by the Object Management Group {OMG) as an (object) modelling standard. OMG UML 1.0 is the first version of this new modelling standard.

Where Do We Start? Use Cases

- Use cases describe how the system-to-be (or any artifact under design, for that matter!) from a user's perspective.
- They answer the question: How will the artifact be used, once it is built?
- Used to show the ***functions*** to be supported.
- Developed by Ivar Jacobson and friends [Jacobson92].

Actors

- An actor is anything that needs to exchange information with the artifact
- An actor could be a person, or another external, system.
- Actors define ***roles*** that users can play while using the artifact.

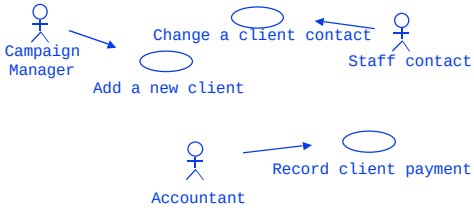


Use Cases

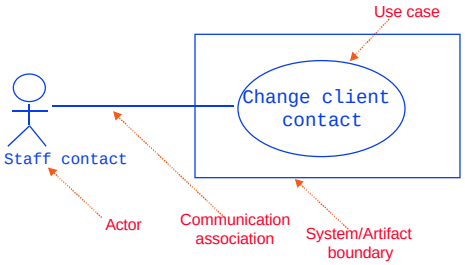
- A ***use case*** is a function the new system needs to support.
- Each use case is a sequence of steps performed by an actor and the system through a dialogue.
- To find use case, examine each actor and her needs.

Use Case Diagrams

- Use case diagrams are created to capture the relationships between actors and use cases



Notation for Use Cases



Agate is an Advertising Company

…which puts together advertising campaigns for client companies. Here is the breakdown of their staff:

Direction
1 Campaign
1 Creative
1 Admin
1 Finance

Admin
1 Office mgr
3 Direction asst
4 Manager clerks
2 Receptionists
2 Clerks/typists

Campaigns Mgt
2 Campaign managers
3 Campaign marketers
1 Editor in Chief
1 Creative Manager

Edition
1 Filing clerk
2 Editors
4 Copy writers

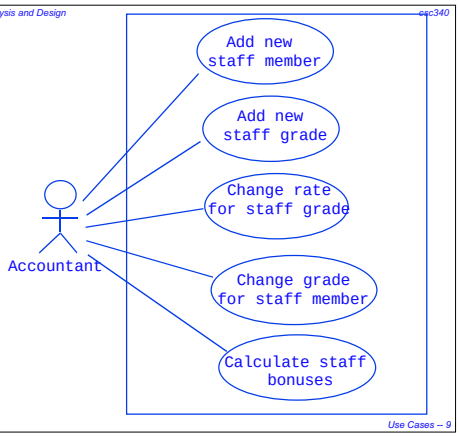
Graphics
6 Graphic designers
2 Photographers

IT
1 IT manager
1 Network administrator
1 System admin
1 Analyst

Accounts Edition
1 Accountant manager
1 Credit controller
2 Accounts clerks
2 Purchasing assistants

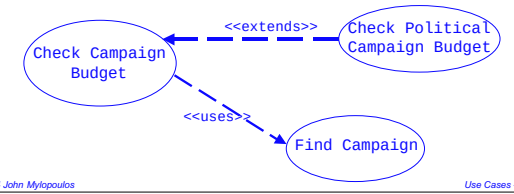
Documentation
1 Media librarian
1 Resource libr
1 Knowledge worker
1 Computer tech

Agate Case Study



<<extends>> and <<uses>>

- <<extends>> used to model a part of a use case that the user may see as optional system behavior; also models a separate sub-case which is executed conditionally.
- <<uses>> adds behavior to a base case (like a procedure call).



Finding Actors

- Actors can be identified by answering the following:
  - ✓Who will be a primary user of the artifact?
  - ✓Who will be supported?
  - ✓Who will maintain, administrate the artifact?
  - ✓What hardware does the system need?
  - ✓Which other systems does it interact with?
  - ✓Who or what has an interest in the results that the artifact produces ?
- Tip: don't consider only the users who directly use the artifact, but also others who need services from the artifact!

Finding Use Cases

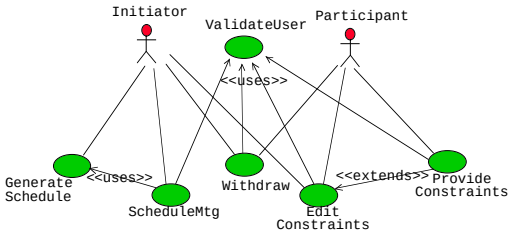
For each actor, ask the following questions:

- Which functions does the actor require from the artifact? What does the actor need to do?
- Does the actor need to read, create, destroy, modify, or store some kinds of information in the artifact?
- Does the actor have to be notified about events in the artifact? Or, does the actor need to notify the artifact about something? What do those events require in terms of artifact functionality?
- Could the actor's daily work be simplified or made more efficient through new functions provided by the artifact?

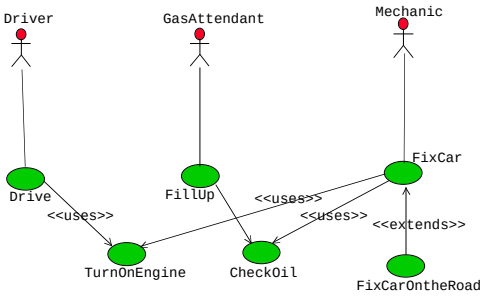
Documenting Use Cases

- For each use case, prepare a "flow of events" document, written from an actor's point of view.
- The document details what the system must provide to the actor when the use case is executed.
- Typical contents
  - ✓How the use case starts and ends;
  - ✓Normal flow of events;
  - ✓Alternate flow of events;
  - ✓Exceptional flow of events;

Use Cases for a Meeting Scheduling System



Use Cases for a Car



Additional Readings

- [Booch99] Booch, G. et al. *The Unified Modeling Language User Guide*, Chapters 2, 16, 17. Addison-Wesley, 1999.
- [Jacobson92] Jacobson, I. et all. *Object-Oriented Software Engineering: A Use-Case Driven Approach*, Addison-Wesley, 1992.
- [Schneider98] Schneider, G. et al. *Applying Use Cases*, Addison-Wesley, 1998.