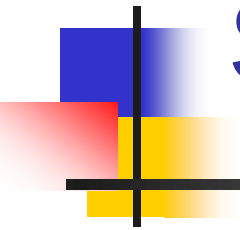
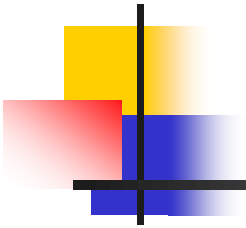


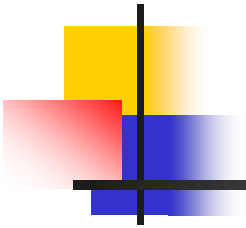
SWE 205 - Introduction to Software Engineering

Lecture 11 - Requirements Engineering Processes



Lecture Objectives

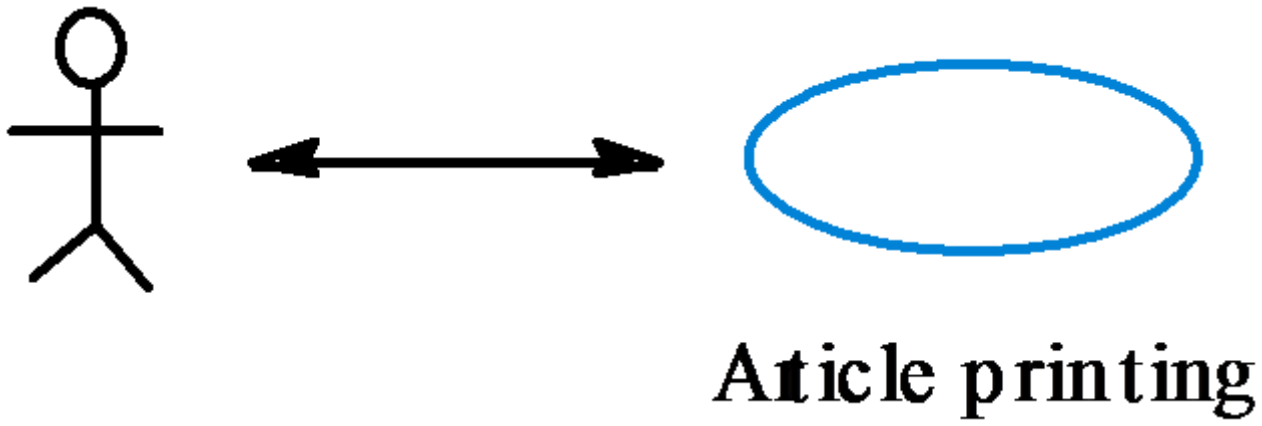
- To describe requirements discovery, validation and the role of requirements reviews
- To discuss the role of requirements management in support of other requirements engineering processes



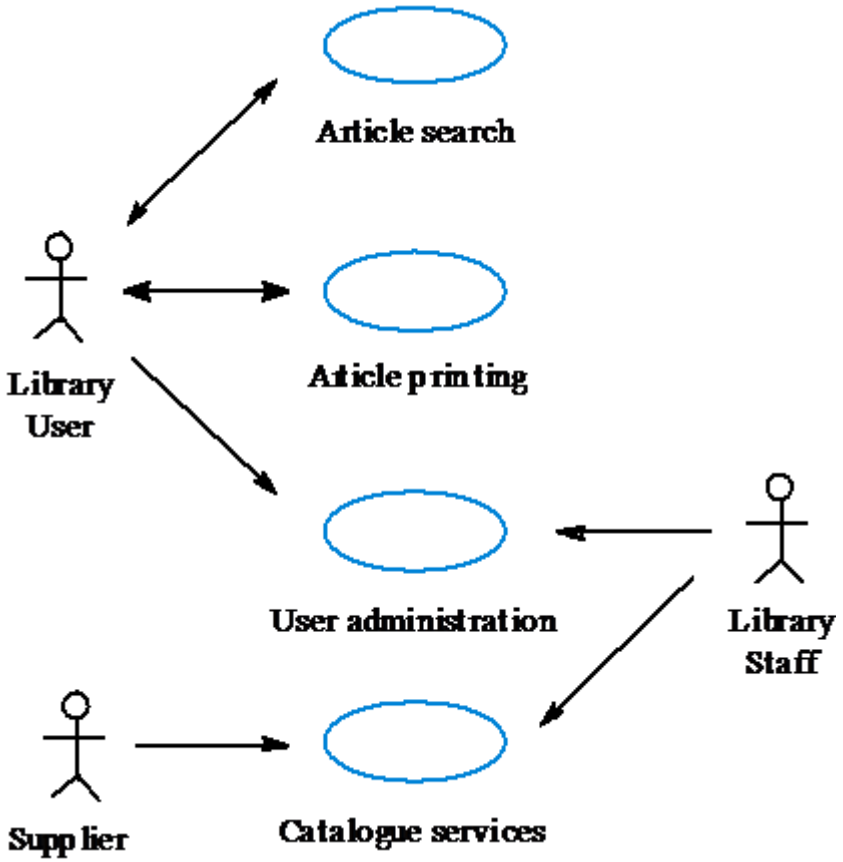
Use cases

- Use-cases are a scenario based technique in the UML which identify the actors in an interaction and which describe the interaction itself.
- A set of use cases should describe all possible interactions with the system.
- Sequence diagrams may be used to add detail to use-cases by showing the sequence of event processing in the system.

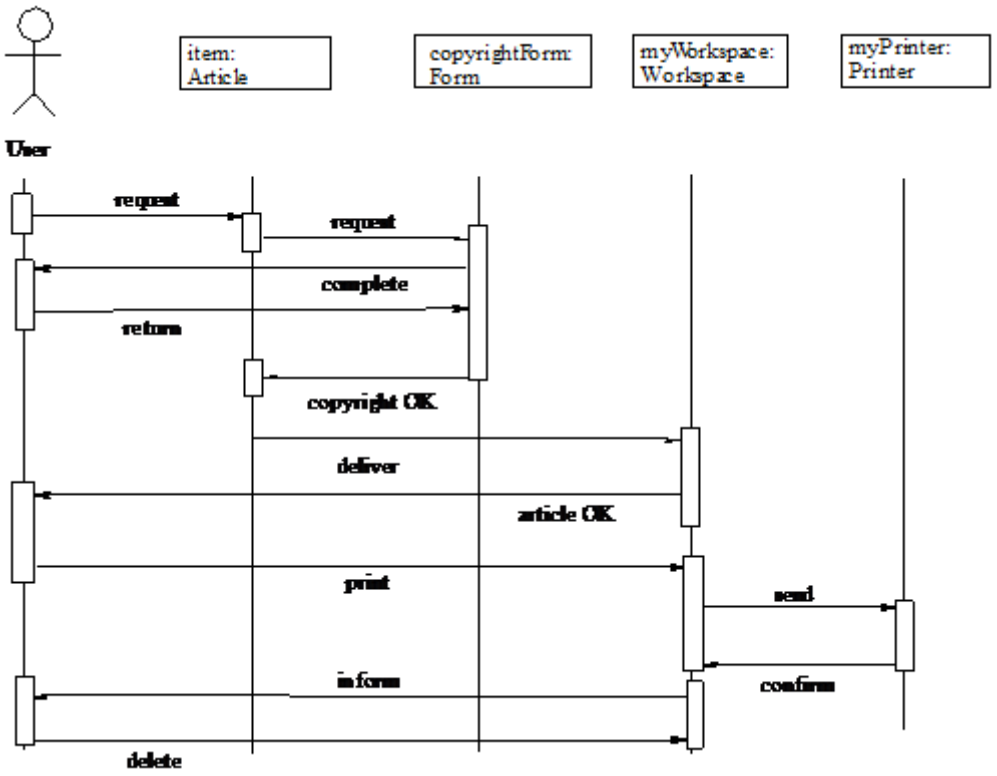
Article printing use-case



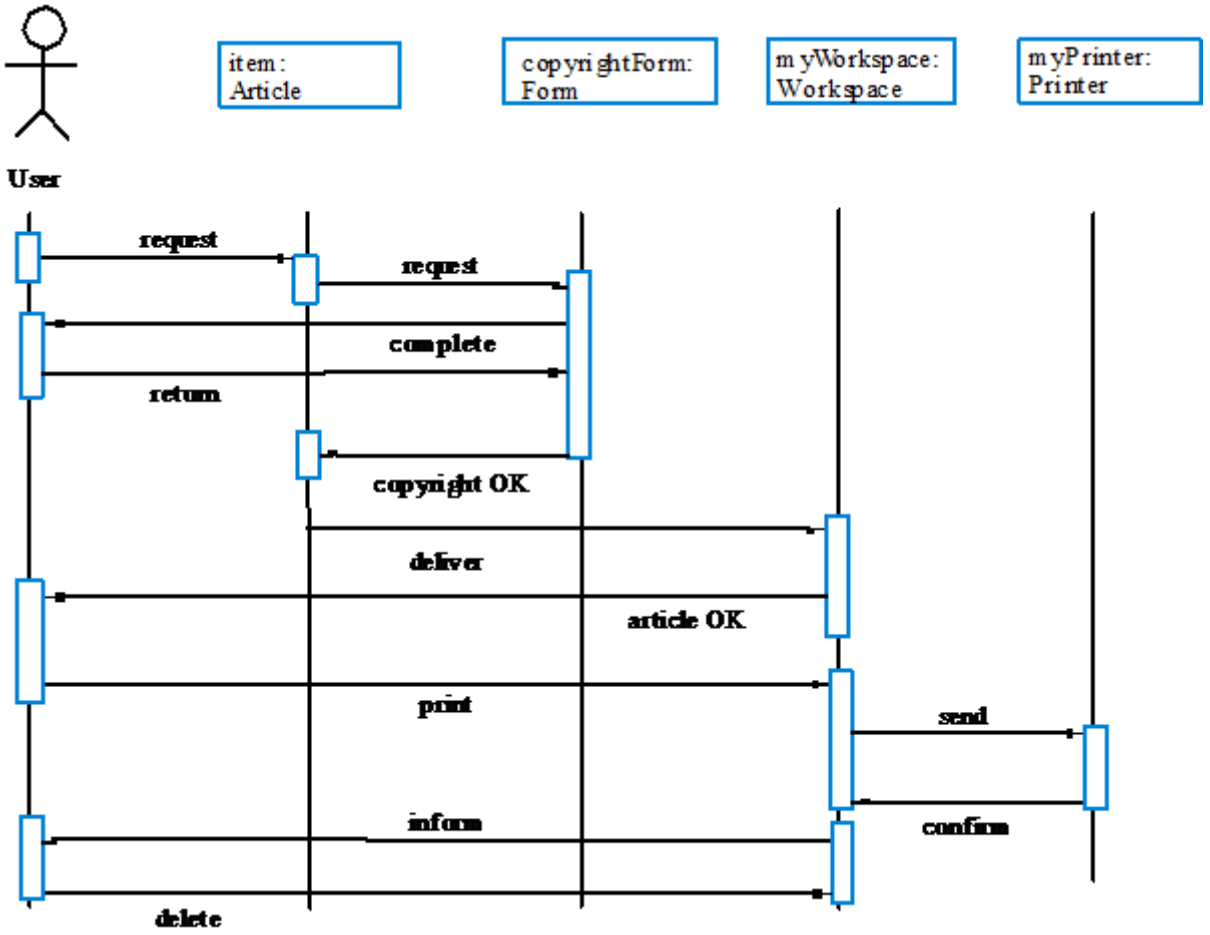
LIBSYS use cases

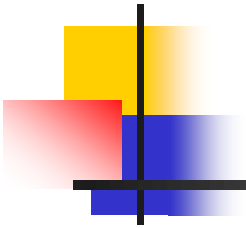


Article printing



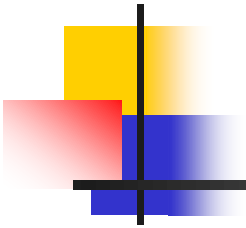
Print article sequence





Requirements validation

- Concerned with demonstrating that the requirements define the system that the customer really wants.
- Requirements error costs are high so validation is very important
  - Fixing a requirements error after delivery may cost up to 100 times the cost of fixing an implementation error.

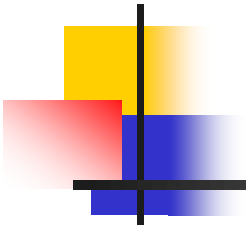


Requirements checking

- Validity Checks
  - Does the system provide the functions which best support the customer's needs?
- Consistency Checks
  - Are there any requirements conflicts?
- Completeness checks
  - Are all functions required by the customer included?
- Realism Checks
  - Can the requirements be implemented given available budget and technology
- Verifiability Checks
  - Can the requirements be checked?

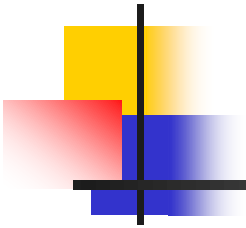
Requirements validation techniques

- Requirements reviews
  - Systematic manual analysis of the requirements.
- Prototyping
  - Using an executable model of the system to check requirements. Covered in Chapter 17.
- Test-case generation
  - Requirements should be testable.
  - If a test is difficult or impossible to design, this usually means that the requirement will be difficult to implement and should be reconsidered.



Requirements reviews

- Regular reviews should be held while the requirements definition is being formulated.
- Both client and contractor staff should be involved in reviews.
- Reviews may be formal (with completed documents) or informal. Good communications between developers, customers and users can resolve problems at an early stage.

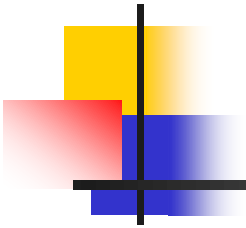


Review checks

- Verifiability. Is the requirement realistically testable?
- Comprehensibility. Is the requirement properly understood?
- Traceability. Is the origin of the requirement clearly stated?
- Adaptability. Can the requirement be changed without a large impact on other requirements?

Requirements management

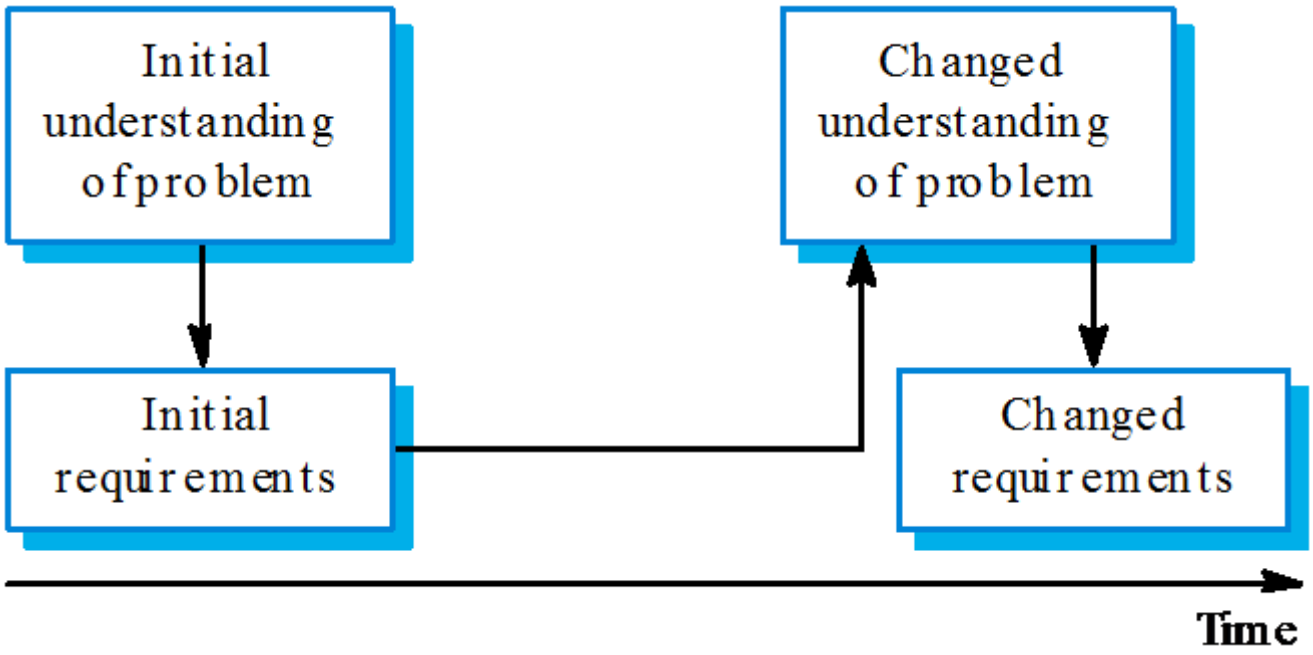
- Requirements management is the process of managing changing requirements during the requirements engineering process and system development.
- Requirements are inevitably incomplete and inconsistent
  - New requirements emerge during the process as business needs change and a better understanding of the system is developed;
  - Different viewpoints have different requirements and these are often contradictory.



Requirements change

- The priority of requirements from different viewpoints changes during the development process.
- System customers may specify requirements from a business perspective that conflict with end-user requirements.
- The business and technical environment of the system changes during its development.

Requirements evolution



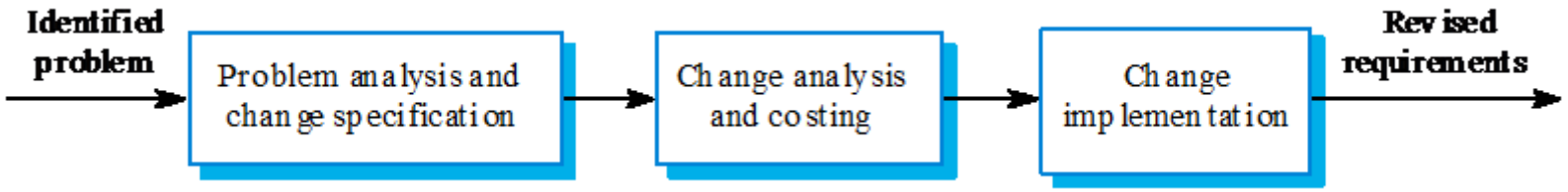
Enduring and volatile requirements

- Enduring requirements. Stable requirements derived from the core activity of the customer organisation. E.g. a hospital will always have doctors, nurses, etc. May be derived from domain models
- Volatile requirements. Requirements which change during development or when the system is in use. In a hospital, requirements derived from health-care policy

Requirements management planning

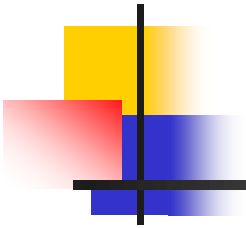
- During the requirements engineering process, you have to plan:
  - Requirements identification
    - How requirements are individually identified;
  - A change management process
    - The process followed when analysing a requirements change;
  - Traceability policies
    - The amount of information about requirements relationships that is maintained;
  - CASE tool support
    - The tool support required to help manage requirements change;

Change management



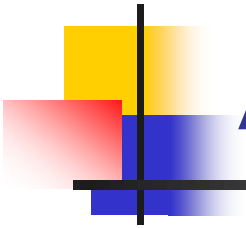
Requirements change management

- Should apply to all proposed changes to the requirements.
- Principal stages
  - Problem analysis.
    - Discuss requirements problem and propose change;
  - Change analysis and costing.
    - Assess effects of change on other requirements;
  - Change implementation.
    - Modify requirements document and other documents to reflect change.



Key Points

- Requirements validation is concerned with checks for validity, consistency, completeness, realism and verifiability.
- Business changes inevitably lead to changing requirements.
- Requirements management includes planning and change management.



Announcements

- Help Session
  - Today Or Tomorrow
  - What time is suitable for everyone?
- Major 1 on Wed November 5, 2008
  - What time is suitable for everyone?