

# Modelling Web Applications



# Outline

## Modelling Web Applications

Introduction

Content Modelling

Hypertext modelling

Presentation Modelling

- 1 Introduction
- 2 Content Modelling
- 3 Hypertext modelling
- 4 Presentation Modelling

- A systematic approach and a specification of the Web application is required for the development of complex Web application development
- Traditional software application modelling covers 3 dimensions:
- Levels, Aspects and Phases
- Levels specify "what" and "how" of a system in terms of application logic level and user interface level modelling
- Structure in terms of objects and behaviour in terms of functions and processes define another dimension
- The three phases of development analysis, design and implementation cover the third dimension

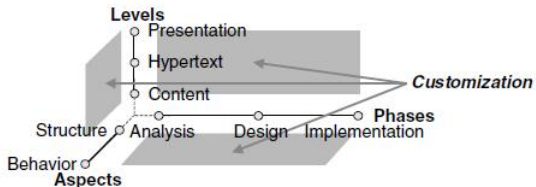


Figure: Modelling requirements for Web applications

- Overall functionality of the Web application can be represented as use cases
- Use «navigation» stereotype to present hypertext/navigational requirements
- All Web applications have at least 1 human actor which interacts with the system

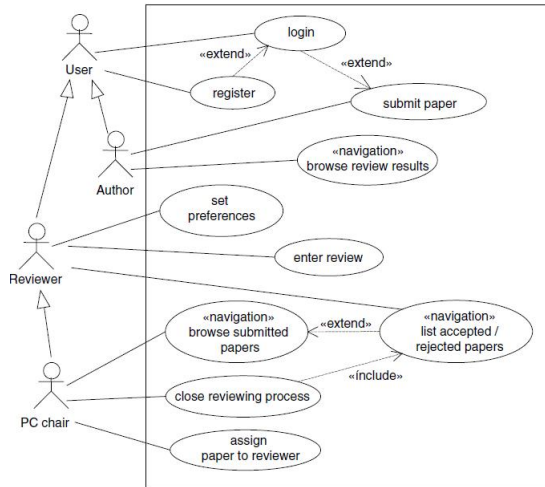


Figure: Use case diagram of a paper reviewing system



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# Modelling requirements-III

## Modelling Web Applications

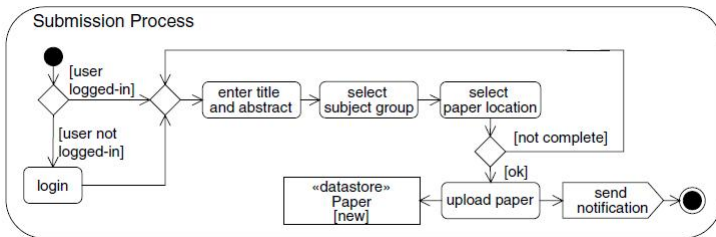
### Introduction

### Content Modelling

### Hypertext modelling

### Presentation Modelling

Figure: Activity diagram of the submission process



- Content modelling can be modelled from a pure data modelling perspective
- Complex Web applications may also require modelling of behavioural aspects of content
- This can be achieved by problem domain modelling consisting of static and dynamic aspects
- Class diagrams can be used to model the structural aspect of content
- State and interaction diagrams are suitable to model the behavioural aspect



Figure: Class diagram for the reviewing system

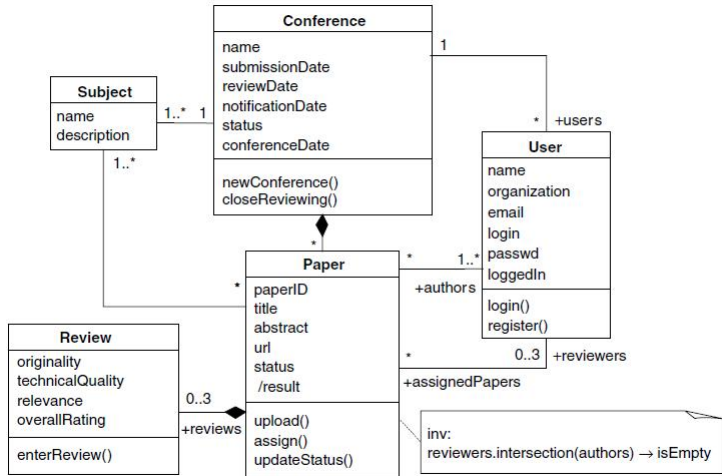
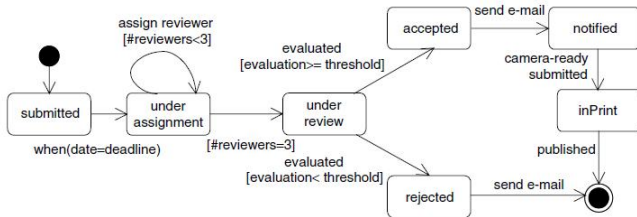


Figure: State-machine diagram for the states of a paper



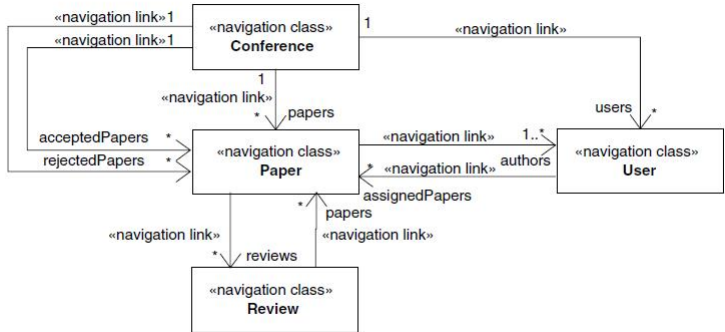
- Navigational options are required to provide suitable navigational structure
- Navigational modelling specifies the available navigational paths through the content
- Hypertext modelling provides:
  - Hypertext structure model**  
Which classes of the content model can be visited by navigation
  - Access model**  
Defines the access elements

- Hypertext modelling is based on the concepts of nodes (i.e., pages or documents) and navigation between these nodes
- Content model forms the basis of the hypertext modelling which contain the classes and objects that need to be made available as nodes
- Hypertext structure model is specified as a view on the content model.
- Various hypertext structural models can be developed defining alternative hypertext views.

## Example

personalised hypertext views can be obtained by developing hypertext structural models based on user rights of different users.

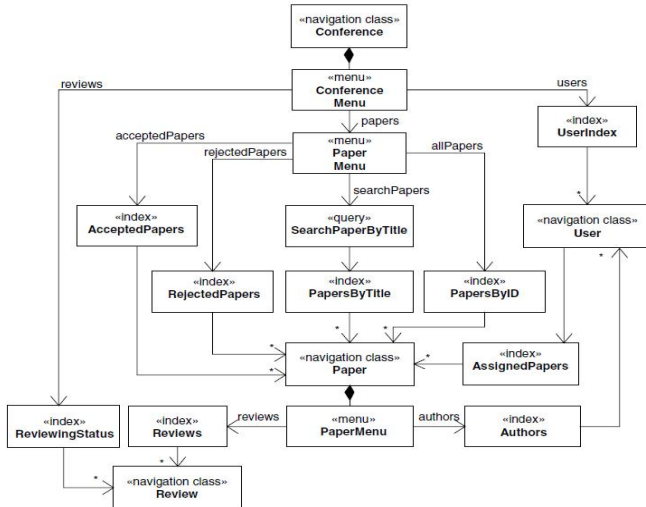
Figure: Hypertext structure model of the reviewing system



- Hypertext structure model is not enough to define how a particular node can be reached by navigation.
- User requires navigation and orientation aids
- *Access structures* refine the hypertext structure model to provide these aids.
- Access structures define various navigational structures.
- Examples are *index, guided tour, menu, home and landmark*.

- An **index** is an access structure which allows users to select a single object (i.e. one object of the content) out of a homogeneous list of objects.
- A **menu** allows users to access heterogeneous nodes, or further menus (i.e. submenus).
- A **guided tour** allows users to sequentially walk through a number of nodes.
- A **query** allows users to search for nodes.
- **home** points to the home page of a Web application
- **landmark** points to a node that can be reached from within all nodes.

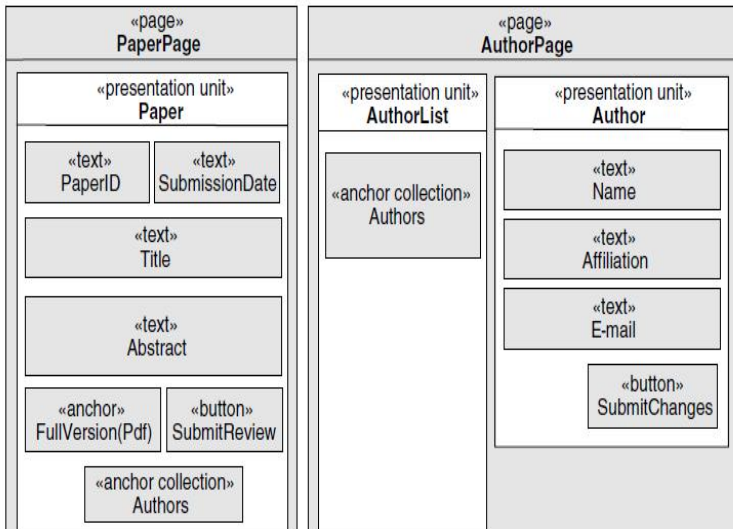
Figure: Access model related to the hypertext model





- It deals with the user interface and look and feel of the Web application.
- *Presentation page* is a visualisation unit presented as a page.
- *Presentation unit* groups related user interface elements i.e., headers, footers, side bars, content area etc.
- *Presentation element* represents a node's set of information i.e., text, images, buttons etc.
- Nested UML class diagram representation known as “composition” may be used for this purpose
- Use UML stereotypes «page» for presentation page, «presentation unit» for presentation unit.
- Use appropriate stereotypes to present presentation elements i.e., «button» for button and «anchor» for a hyperlink.

Figure: Presentation pages of the reviewing system



- 1 Chapter 3 of Web Engineering book
- 2 Special focus on Customisation modelling
- 3 See also relationships of each modelling aspect with each other in the relevant sections of the book