Chapter 12

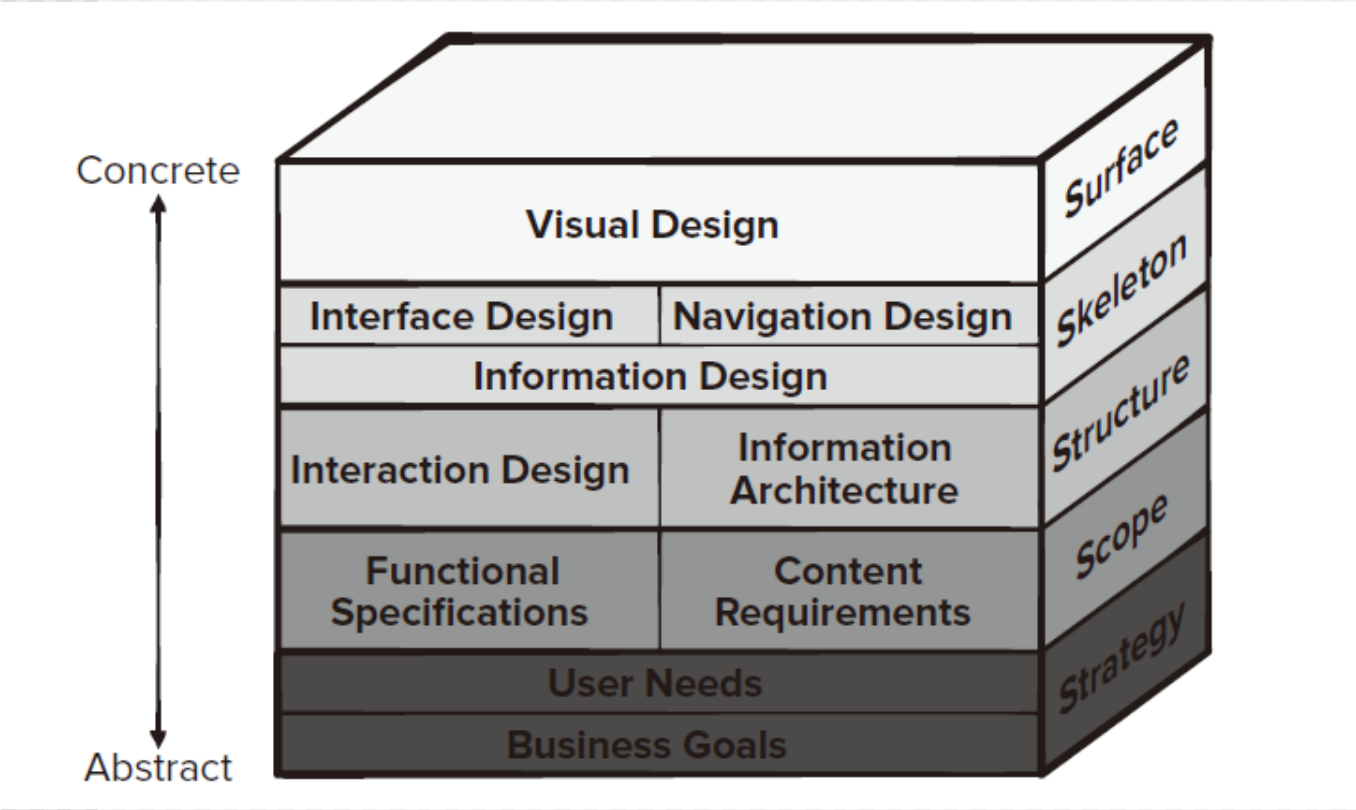
- **User Experience Design**

Slide Set to accompany

Software Engineering: A Practitioner's Approach, 8/e

by Roger S. Pressman and Bruce R. Maxim

User Experience Design Elements



Golden Rules

- Place the user in control.
- Reduce the user's memory load.
- Make the interface consistent.

Place the User in Control

- Define interaction modes in a way that does not force a user into unnecessary or undesired actions.
- Provide for flexible interaction.
- Allow user interaction to be interruptible and undoable.
- Streamline interaction as skill levels advance and allow the interaction to be customized.
- Hide technical internals from the casual user.
- Design for direct interaction with objects that appear on the screen.

Reduce the User's Memory Load

- Reduce demand on short-term memory.
- Establish meaningful defaults.
- Define shortcuts that are intuitive.
- The visual layout of the interface should be based on a real world metaphor.
- Disclose information in a progressive fashion.

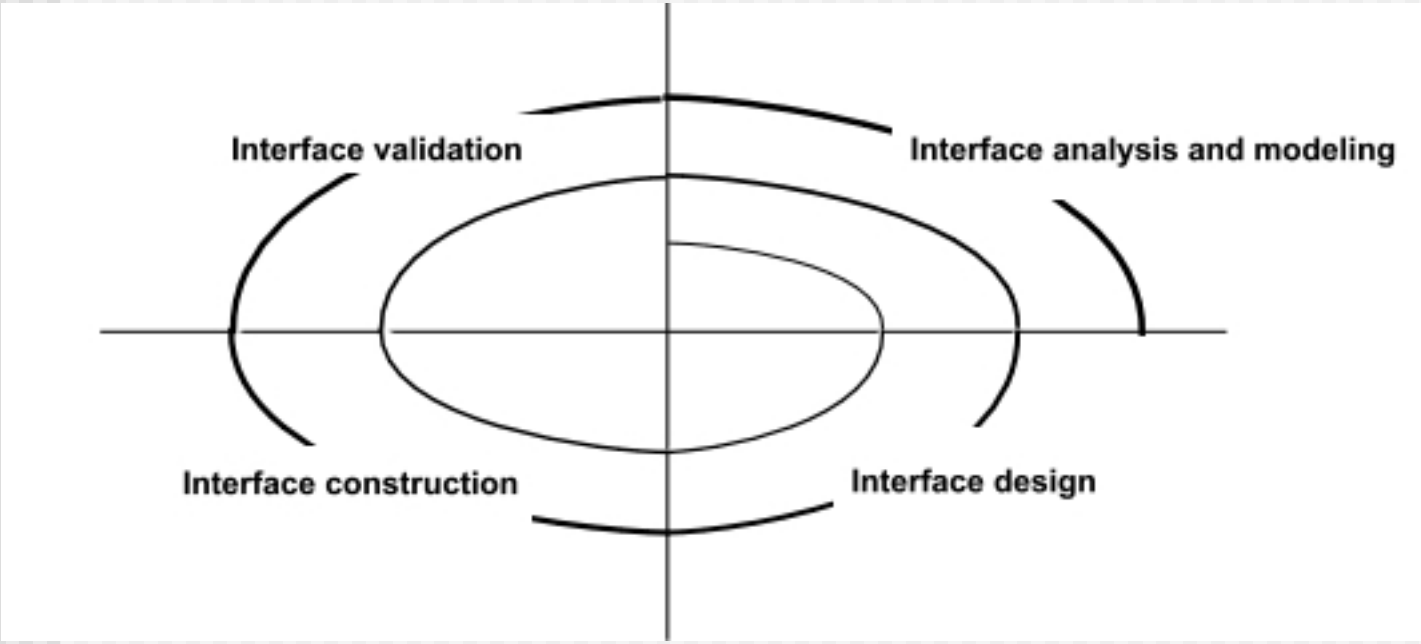
Make the Interface Consistent

- Allow the user to put the current task into a meaningful context.
- Maintain consistency across a family of applications.
- If past interactive models have created user expectations, do not make changes unless there is a compelling reason to do.

User Interface Design Models

- User model — a profile of all end users of the system.
- Design model — a design realization of the user model.
- Mental model (system perception) — the user's mental image of what the interface is.
- Implementation model — the interface "look and feel" coupled with supporting information that describe interface syntax and semantics.

User Interface Design Process



Interface Analysis

- Interface analysis means understanding
  - the people (end-users) who will interact with the system through the interface;
  - the tasks that end-users must perform to do their work,
  - the content that is presented as part of the interface
  - the environment in which these tasks will be conducted.

User Analysis

- Are users trained professionals, technician, clerical, or manufacturing workers?
- What level of formal education does the average user have?
- Are the users capable of learning from written materials or have they expressed a desire for classroom training?
- Are users expert typists or keyboard phobic?
- What is the age range of the user community?
- Will the users be represented predominately by one gender?
- How are users compensated for the work they perform?
- Do users work normal office hours or do they work until the job is done?
- Is the software to be an integral part of the work users do or will it be used only occasionally?
- What is the primary spoken language among users?
- What are the consequences if a user makes a mistake using the system?
- Are users experts in the subject matter that is addressed by the system?
- Do users want to know about the technology the sits behind the interface?

Task Analysis and Modeling

- Answers the following questions …
  - What work will the user perform in specific circumstances?
  - What tasks and subtasks will be performed as the user does the work?
  - What specific problem domain objects will the user manipulate as work is performed?
  - What is the sequence of work tasks—the workflow?
  - What is the hierarchy of tasks?
- Use-cases define basic interaction
- Task elaboration refines interactive tasks
- Object elaboration identifies interface objects (classes)
- Workflow analysis defines how a work process is completed when several people (and roles) are involved

Analysis of Display Content

- Are different types of data assigned to consistent geographic locations on the screen (e.g., photos always appear in the upper right hand corner)?
- Can the user customize the screen location for content?
- Is proper on-screen identification assigned to all content?
- If a large report is to be presented, how should it be partitioned for ease of understanding?
- Will mechanisms be available for moving directly to summary information for large collections of data.
- Will graphical output be scaled to fit within the bounds of the display device that is used?
- How will color to be used to enhance understanding?
- How will error messages and warning be presented to the user?

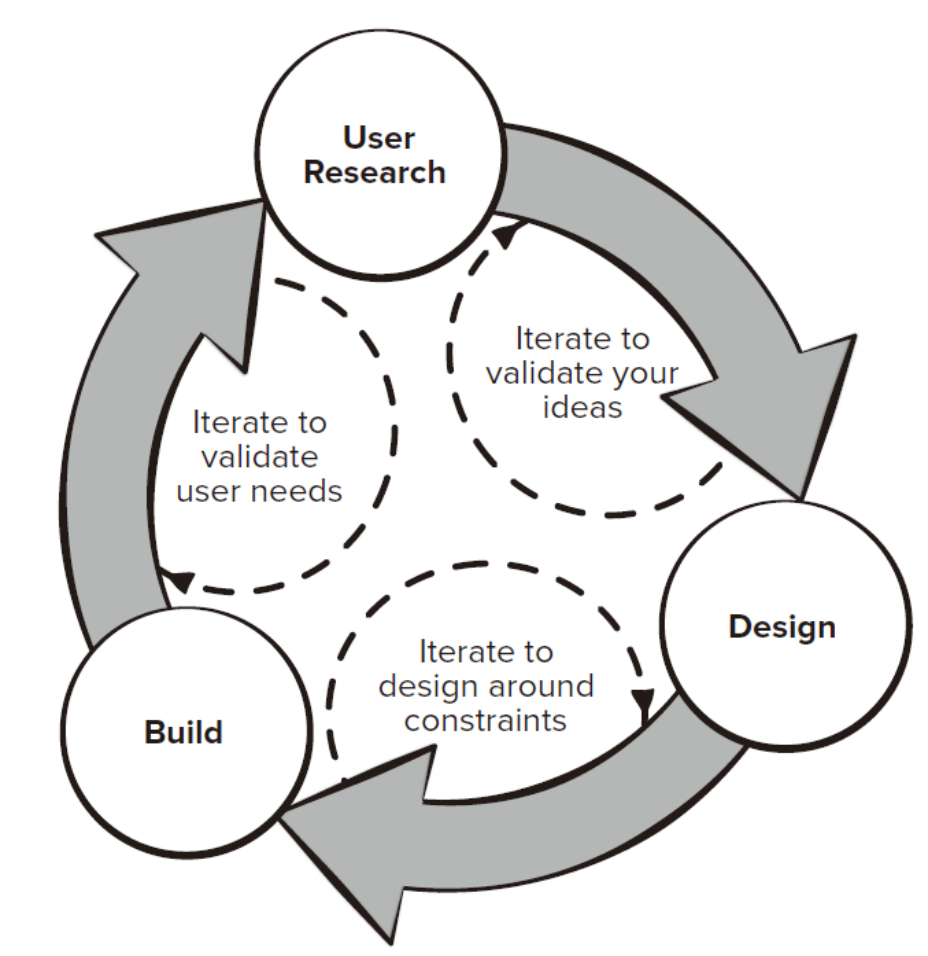
Interface Design Steps

- Using information developed during interface analysis, define interface objects and actions (operations).
- Define events (user actions) that will cause the state of the user interface to change. Model this behavior.
- Depict each interface state as it will actually look to the end-user.
- Indicate how the user interprets the state of the system from information provided through the interface.

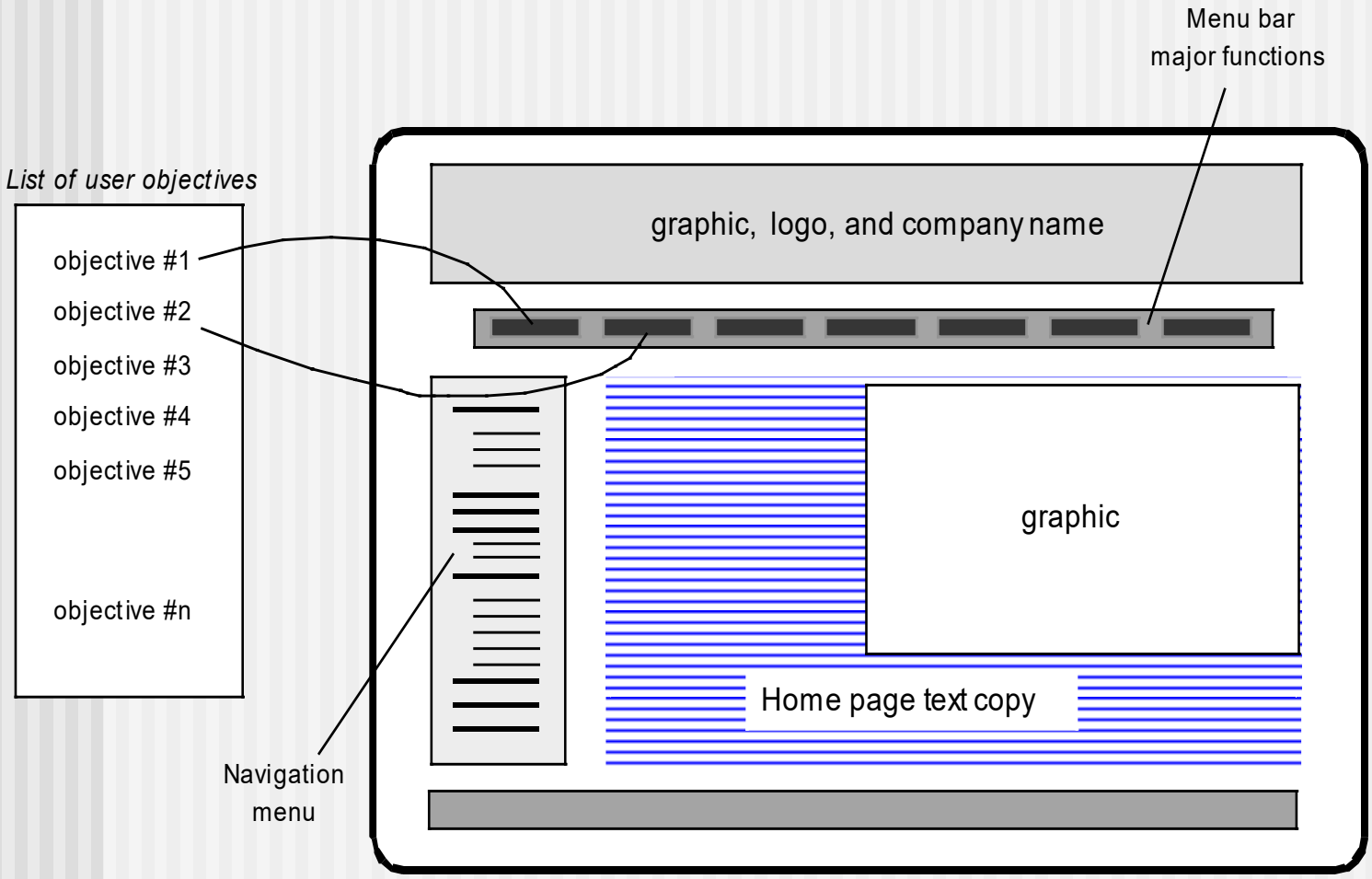
Design Issues

- Response time
- Help facilities
- Error handling
- Menu and command labeling
- Application accessibility
- Internationalization

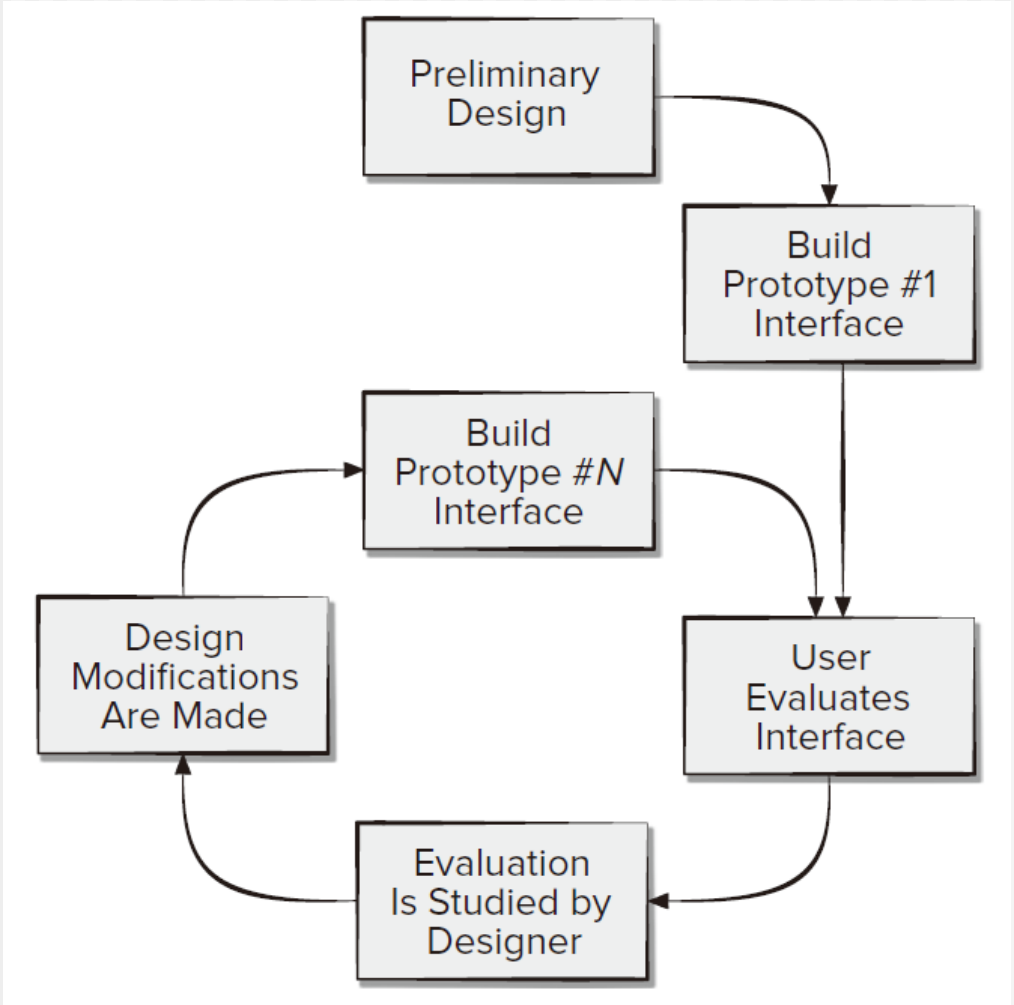
User Experience Design



User Interface Design



Design Evaluation



Usability & Accessibility

- *Where am I?* The interface should
  - provide an indication of the Web or Mobie App that has been accessed
  - inform the user of her location in the content hierarchy.
- *What can I do now?* The interface should always help the user understand his current options
  - what functions are available?
  - what links are live?
  - what content is relevant?
- *Where have I been, where am I going?* The interface must facilitate navigation.
  - Provide a “map” (implemented in a way that is easy to understand) of where the user has been and what paths may be taken to move elsewhere within the Web or Mobile App.

Chapter 13

- **Design for Mobility**

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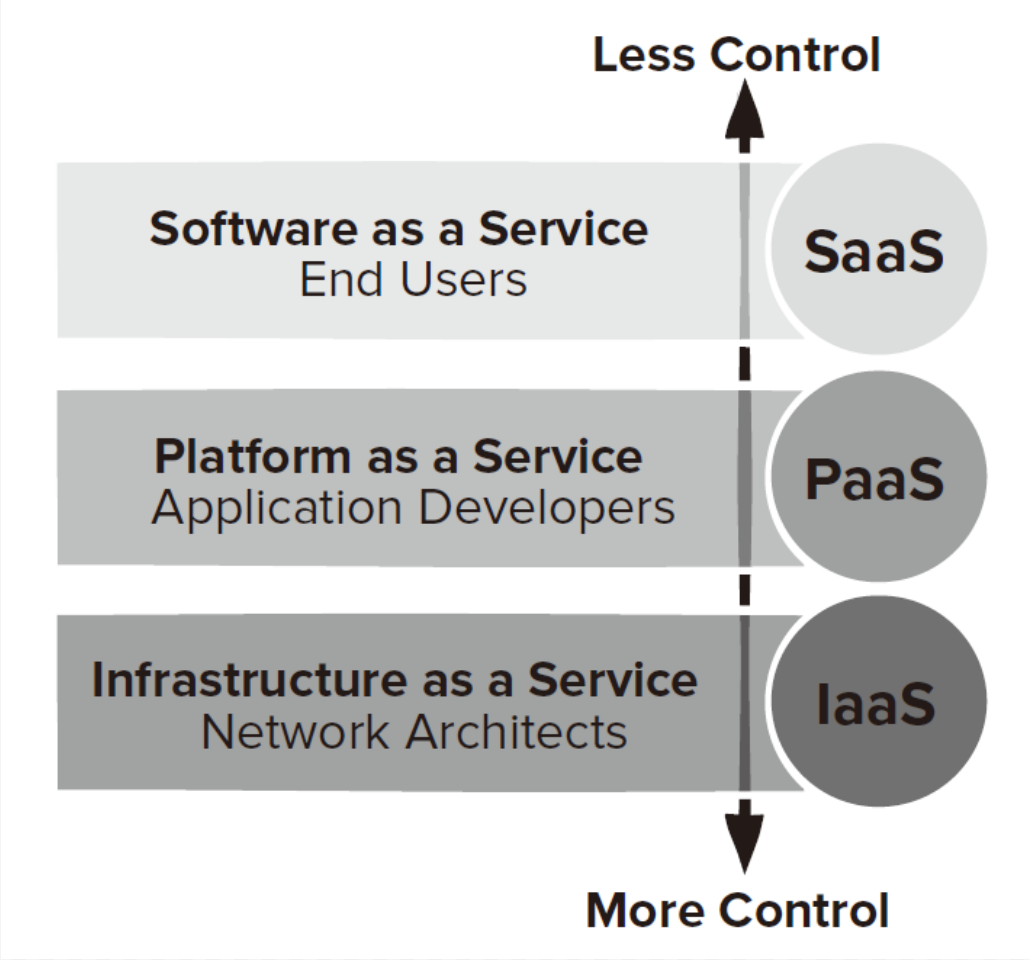
Design for Mobility

"There are essentially two basic approaches to design: the artistic ideal of expressing yourself and the engineering ideal of solving a problem for a customer."

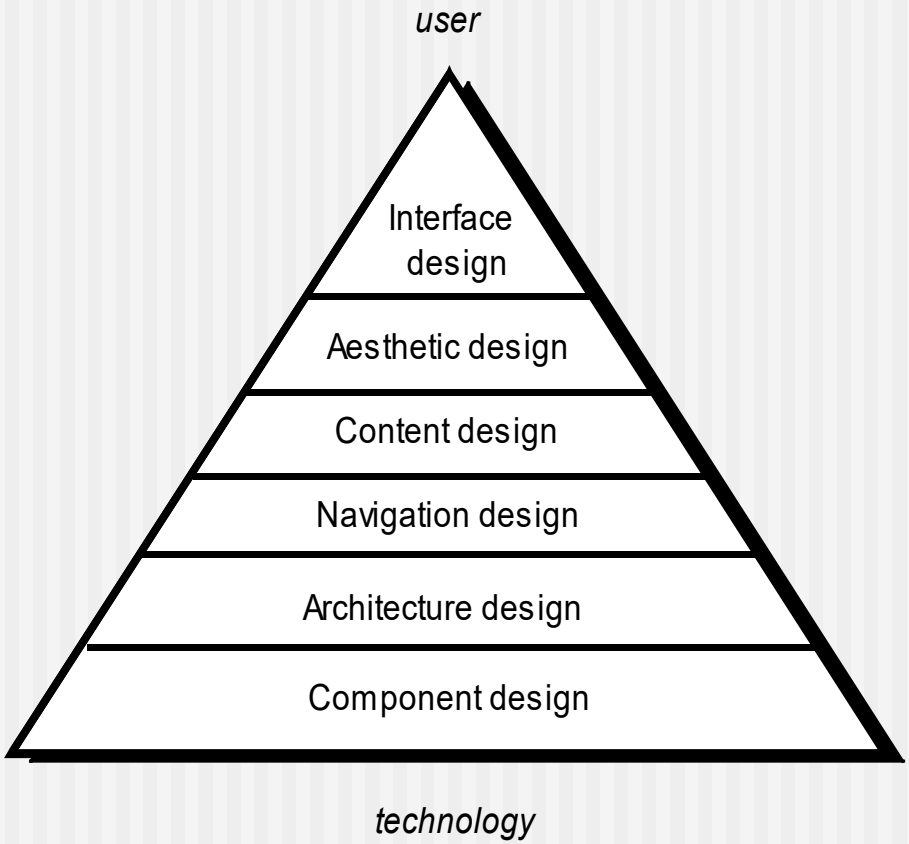
Jakob Nielsen

- *When should we emphasize WebApp design?*
  - when content and function are complex
  - when the size of the WebApp encompasses hundreds of content objects, functions, and analysis classes
  - when the success of the WebApp will have a direct impact on the success of the business

Mobile Architecture



WebE Design Pyramid



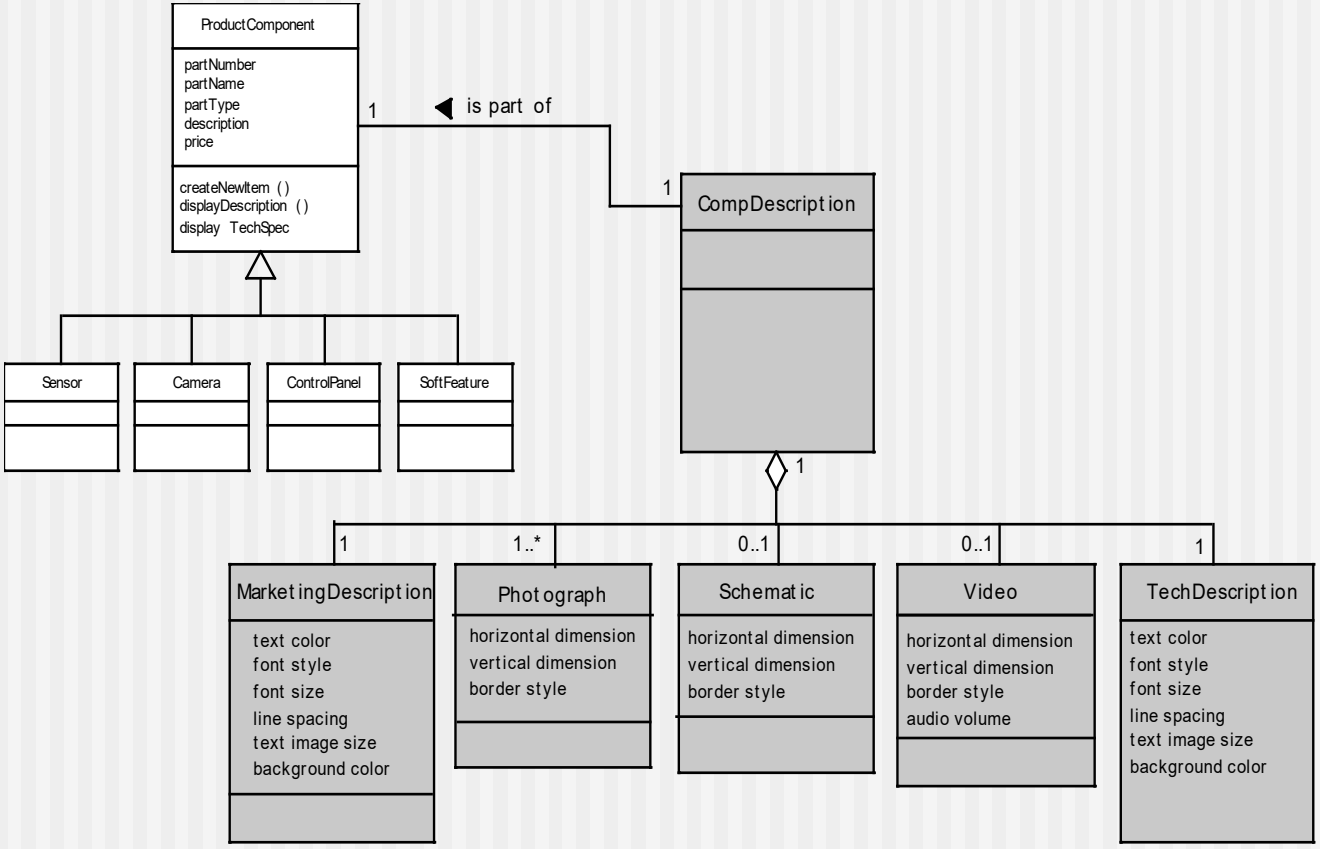
Aesthetic Design

- Don’t be afraid of white space.
- Emphasize content.
- Organize layout elements from top-left to bottom right.
- Group navigation, content, and function geographically within the page.
- Don’t extend your real estate with the scrolling bar.
- Consider resolution and browser window size when designing layout.

Content Design

- Develops a design representation for content objects
  - For Web/Mobile Apps, a content object is more closely aligned with a data object for conventional software
- A content object has attributes that include content-specific information and implementation-specific attributes that are specified as part of design.

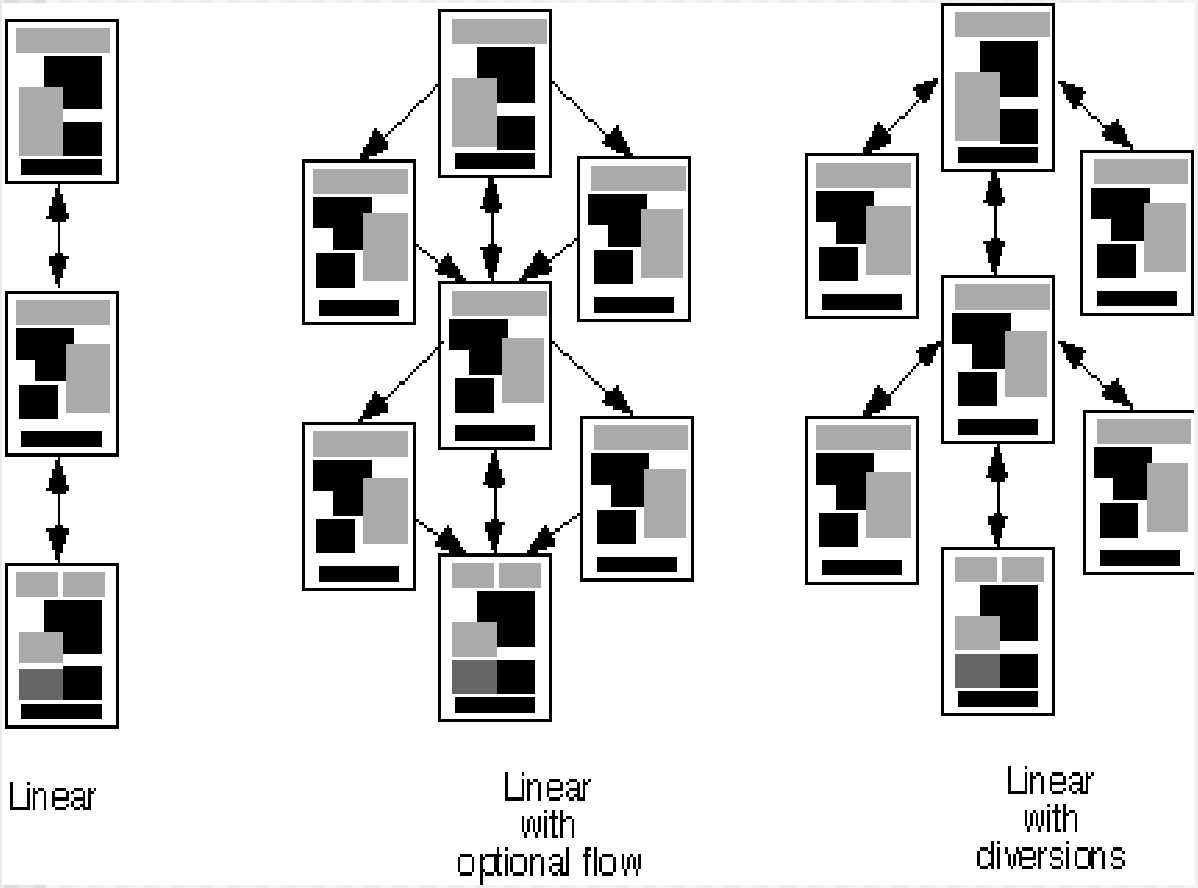
Design of Content Objects



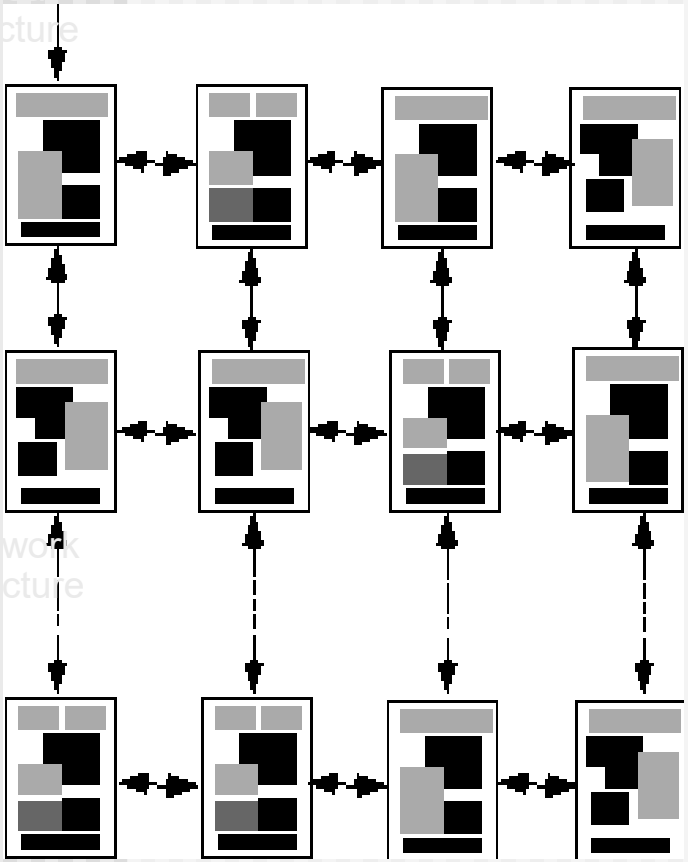
Architecture Design

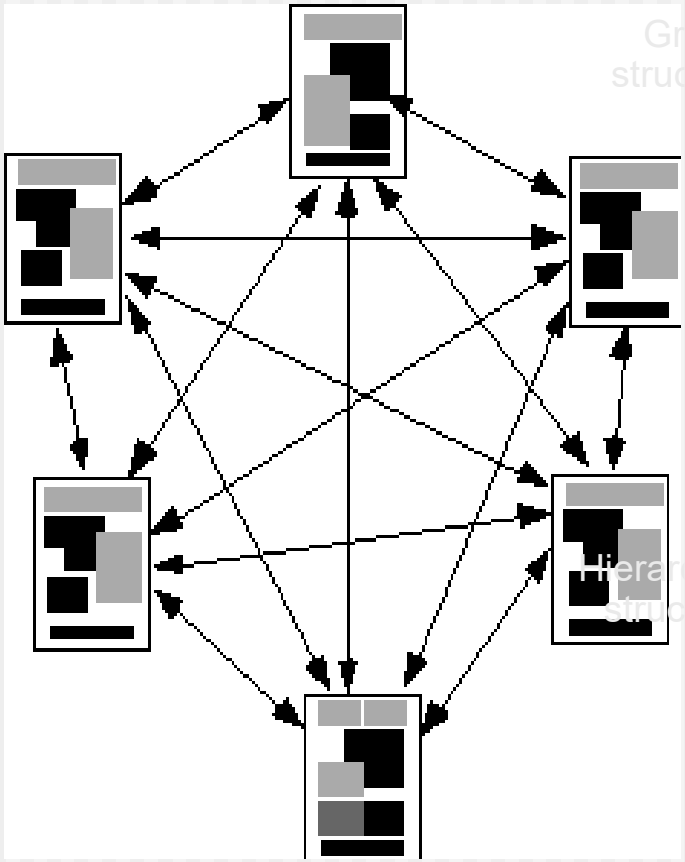
- *Content architecture* focuses on the manner in which content objects (or composite objects such as Web pages) are structured for presentation and navigation.
  - The term information architecture is also used to connote structures that lead to better organization, labeling, navigation, and searching of content objects.
- *WebApp architecture* addresses the manner in which the application is structured to manage user interaction, handle internal processing tasks, effect navigation, and present content.
- Architecture design is conducted in parallel with interface design, aesthetic design and content design.

Content Architecture

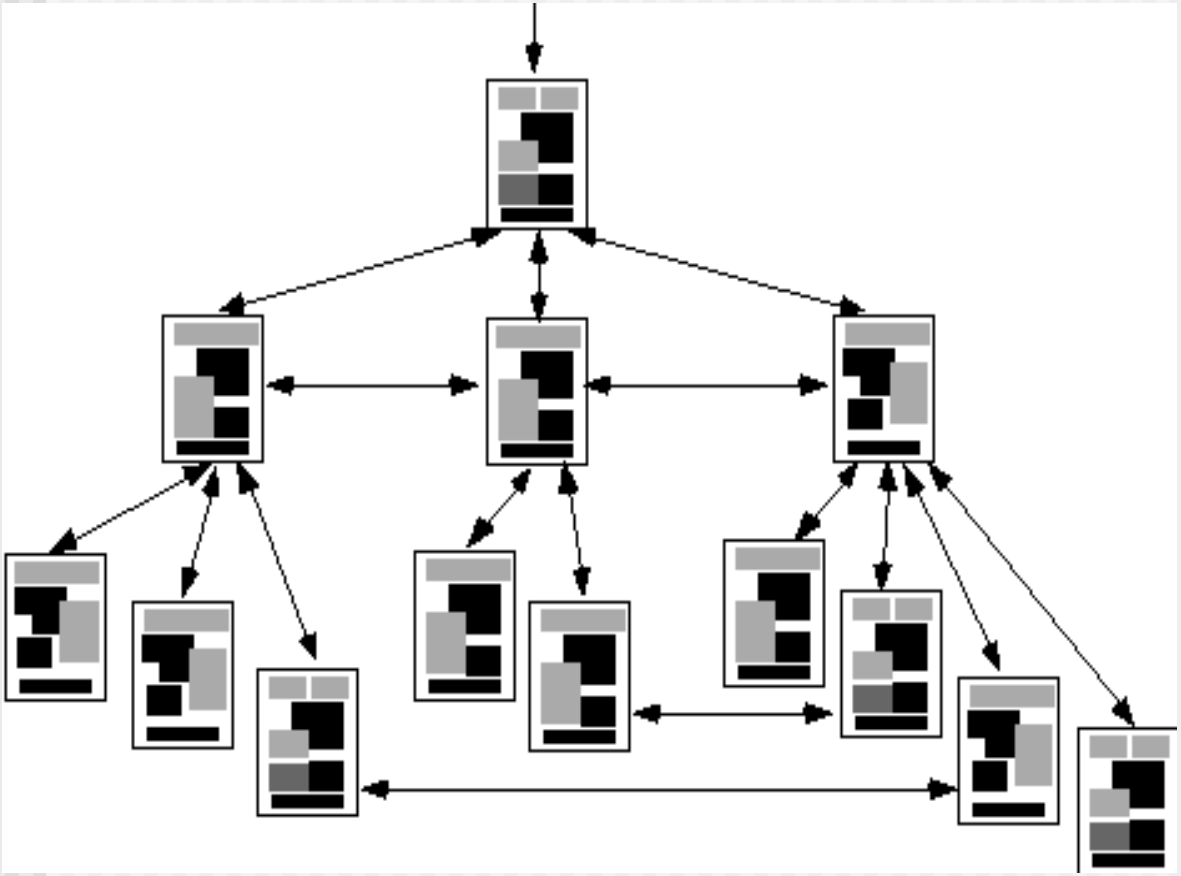


Content Architecture





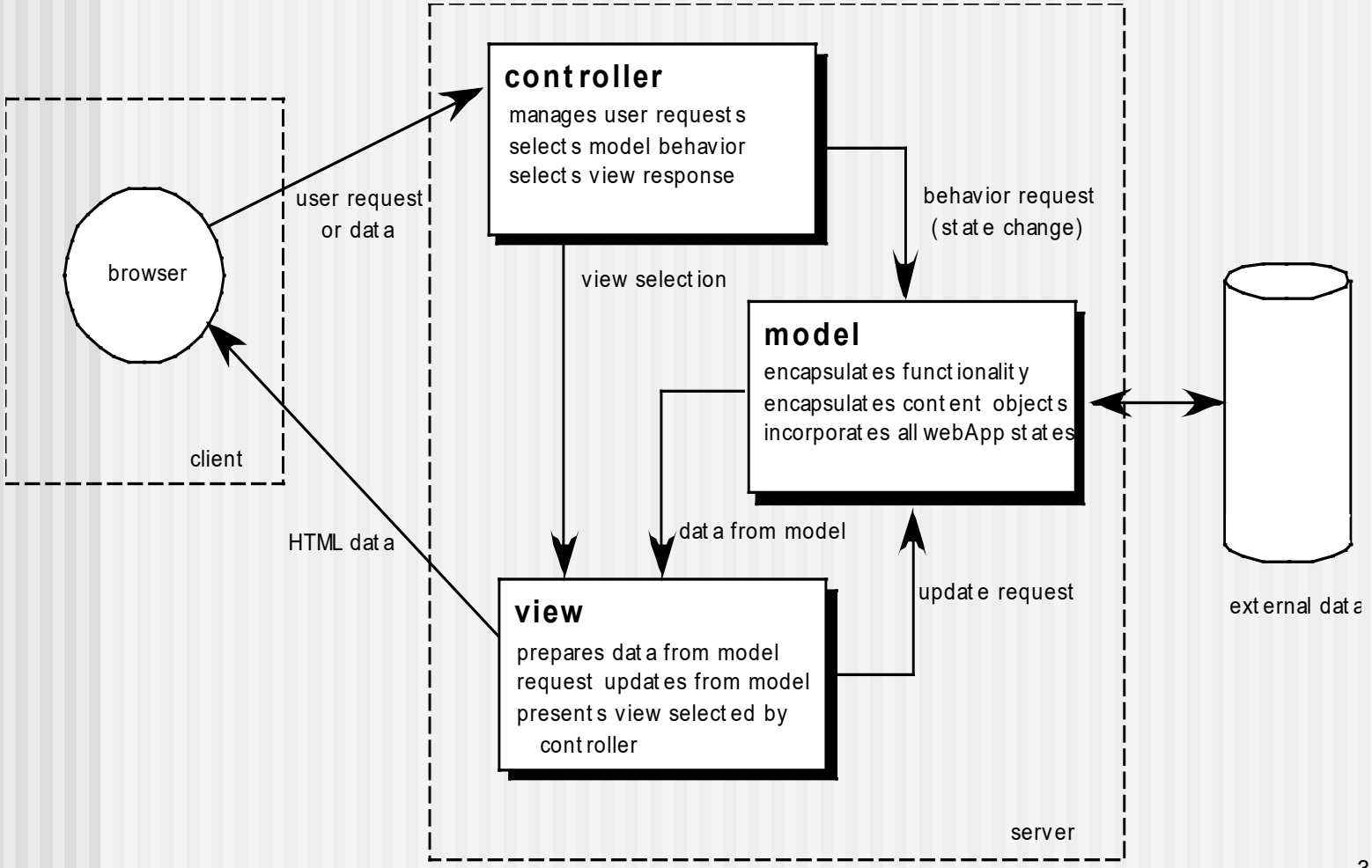
Content Architecture



MVC Architecture

- The *model* contains all application specific content and processing logic, including
  - all content objects
  - access to external data/information sources,
  - all processing functionality that are application specific
- The *view* contains all interface specific functions and enables
  - the presentation of content and processing logic
  - access to external data/information sources,
  - all processing functionality required by the end-user.
- The *controller* manages access to the model and the view and coordinates the flow of data between them.

MVC Architecture

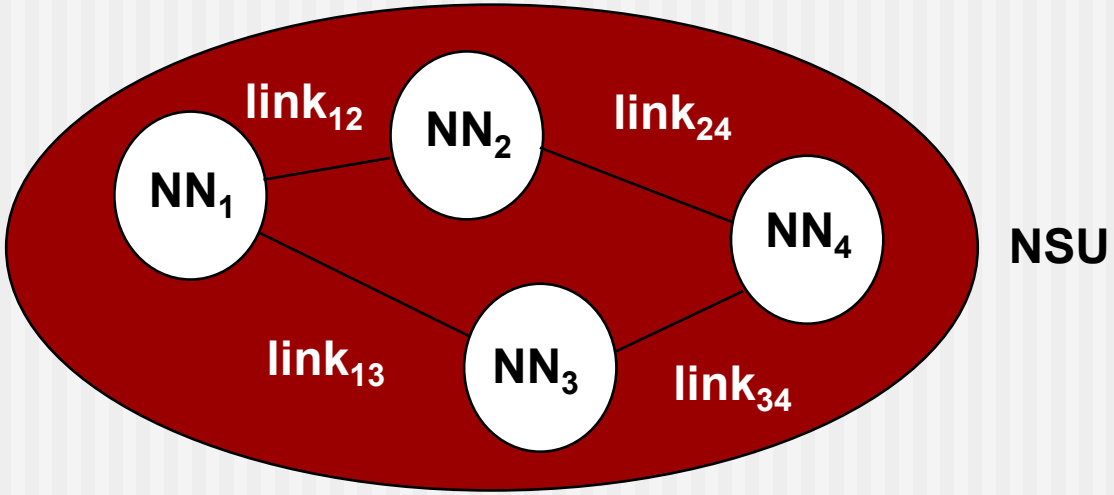


Navigation Design

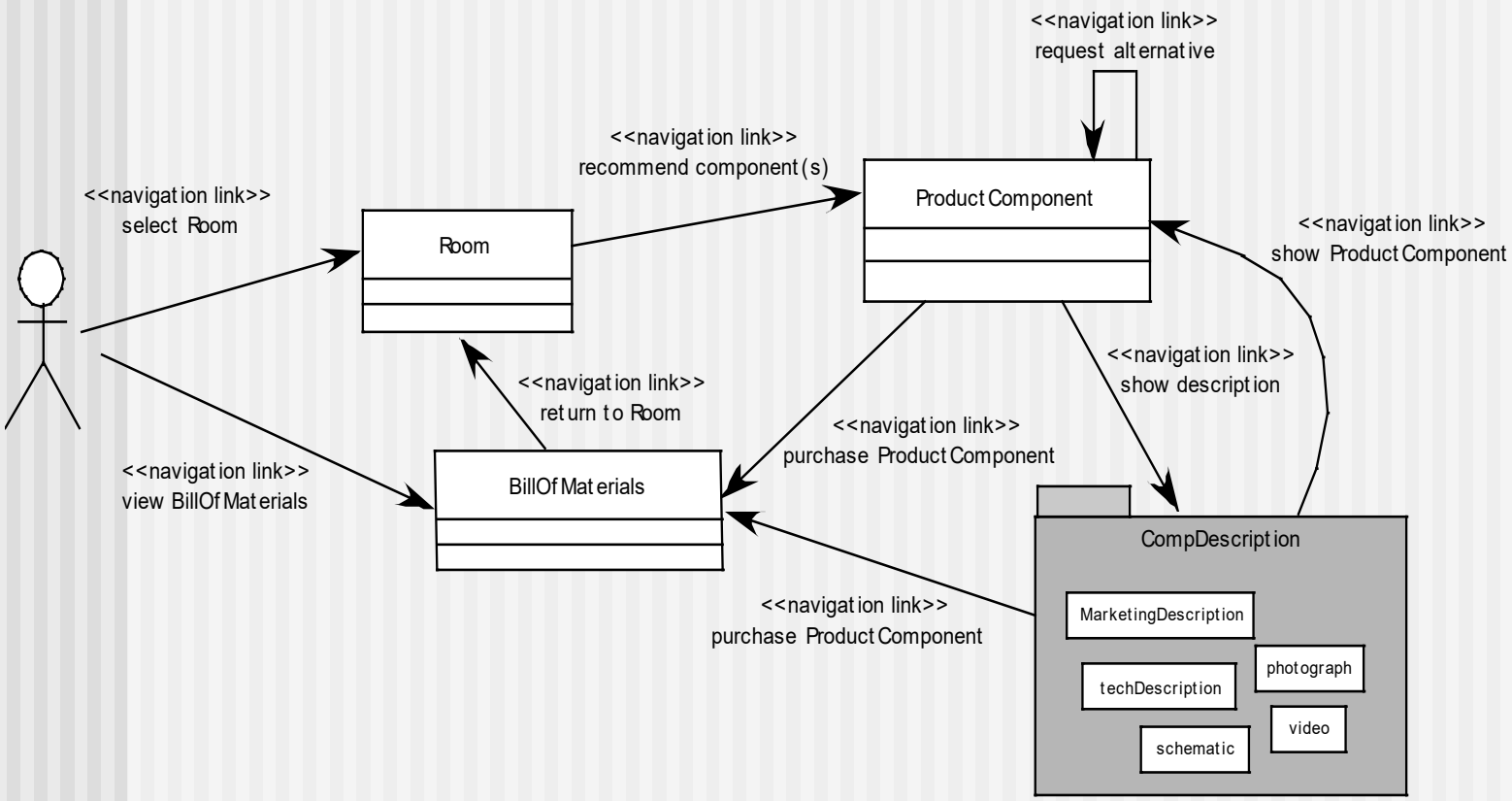
- Begins with a consideration of the user hierarchy and related use-cases
  - Each actor may use the WebApp somewhat differently and therefore have different navigation requirements
- As each user interacts with the WebApp, she encounters a series of *navigation semantic units* (NSUs)
  - NSU—"a set of information and related navigation structures that collaborate in the fulfillment of a subset of related user requirements"

Navigation Semantic Units

- Navigation semantic unit
  - Ways of navigation (WoN)—represents the best navigation way or path for users with certain profiles to achieve their desired goal or sub-goal. Composed of …
    - Navigation nodes (NN) connected by Navigation links



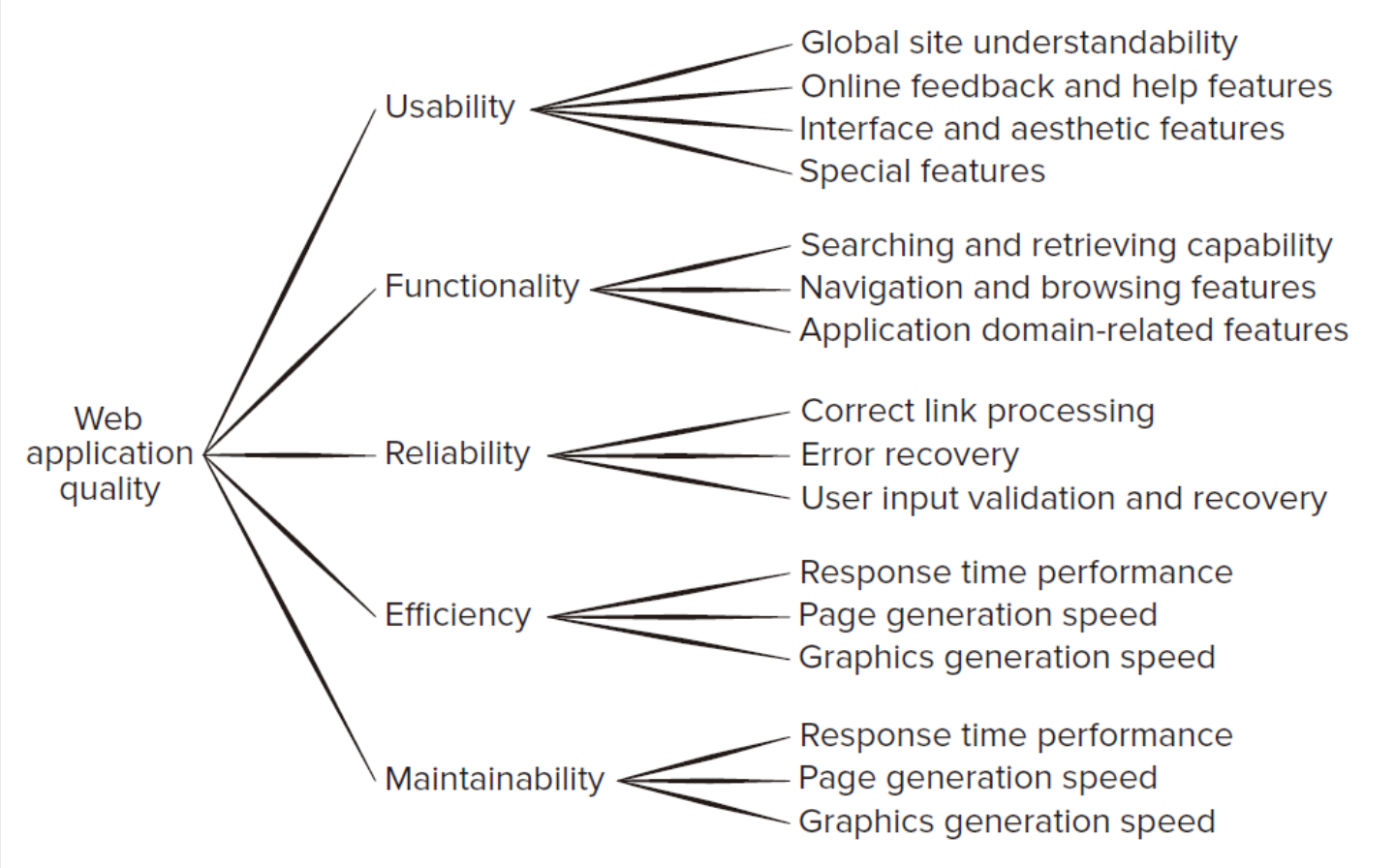
Example: Creating an NSU



Component-Level Design

- WebApp components implement the following functionality
  - perform localized processing to generate content and navigation capability in a dynamic fashion.
  - provide computation or data processing capability that are appropriate for the WebApp's business domain.
  - provide sophisticated database query and access
  - establish data interfaces with external corporate systems.

Mobility & Design Quality



Mobility & Design Quality

- Security
  - Rebuff external attacks
  - Exclude unauthorized access
  - Ensure the privacy of users/customers
- Availability
  - the measure of the percentage of time that a WebApp is available for use
- Scalability
  - **Can** the WebApp and the systems with which it is interfaced handle significant variation in user or transaction volume
- Time to Market
- Quality of content

Assignment

- Review for the exam

  《Software Engineering》(9th Edition)

  Chapter 1 to Chapter 12