

User Interface Analysis & Design

Outline

- UI analysis and design
 - Three golden rules
 - UI models : user model, mental model, design model, implementation model
 - UI process : iterative steps - UI interface analysis and modeling, interface design, interface construction, interface validation
- User interface analysis elements :
 - (1) User analysis
 - (2) Task analysis and modeling : Techniques – use case, task elaboration, object elaboration, workflow analysis(swimlane diagram), hierarchical representation.
 - (3) Analysis of display content
 - (4) Analysis of the work environment
- UI design steps
 - User interface object and actions : target object, source object, application object, action

UI Analysis and Design

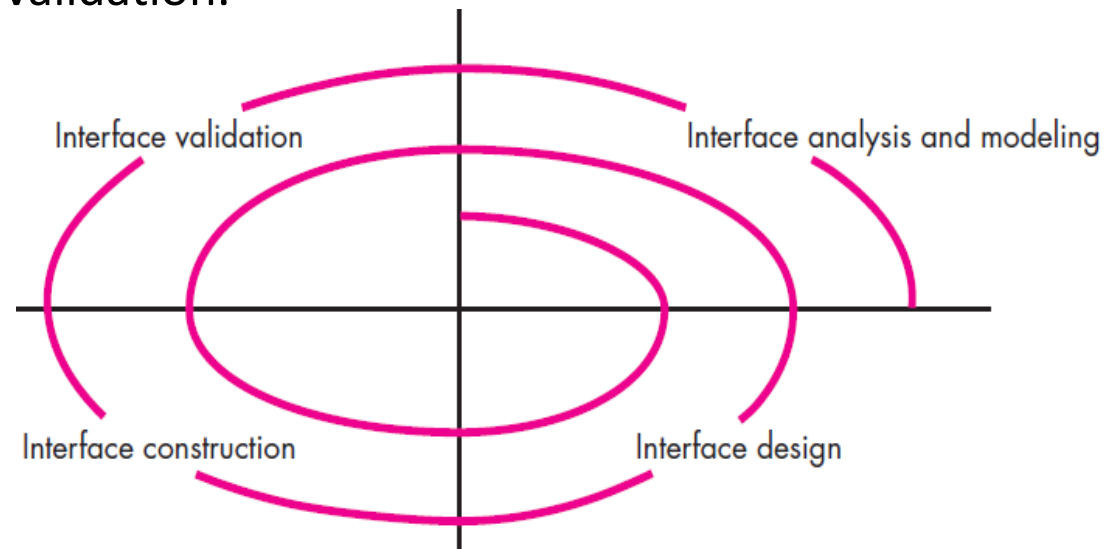
- Three **golden rules** for UI analysis and design :
 - Place the user in control.
 - Reduce the user's memory load.
 - Make the interface consistent.
- The overall process for analyzing and designing a user interface begins with the creation of **different models** of system function.
- Four different models come into play when a user interface is to be analyzed and designed.
 - a user model,
 - design model,
 - mental model
 - implementation model

UI Analysis and Design (Contd..)

- The **user model** establishes the profile of end users of the system. Users can be categorized as: (1) *Novices*, (2) *Knowledgeable, intermittent users*, (3) *Knowledgeable frequent users*.
- The user's **mental model** (*system perception*) is the image of the system that end users carry in their heads.
- The **implementation model** combines the computer based system coupled with all supporting information.
- The **design model** should accommodate the information contained in the user model.
- Most important principle of user interface design: “Know the user, know the tasks.”

UI Analysis and Design

- **Analysis and design process** : The analysis and design process for user interfaces is iterative and can be represented using a spiral model.
- Four distinct framework activities :
 - (1) interface analysis and modeling,
 - (2) interface design,
 - (3) interface construction,
 - (4) interface validation.



UI analysis and Design (contd..)

- **Interface analysis** focuses on the profile of the users who will interact with the system.
 - A more detailed task analysis is conducted.
 - Analysis of the user environment focuses on the physical work environment. Eg. Where will the interface be located physically? Will the user be sitting, standing, or performing other tasks unrelated to the interface?
- **Interface design** defines a set of interface objects and actions (and their screen representations) to perform all defined tasks to meet every usability goal defined for the system.
- **Interface construction** evaluates usage scenarios by creating prototype. As the iterative design process continues, a user interface tool kit may be used to complete the construction of the interface.
- **Interface validation** focuses on
 - User task correctness
 - task variations
 - Cover user requirement
 - Ease of use
 - Easy to learn
 - the users' acceptance

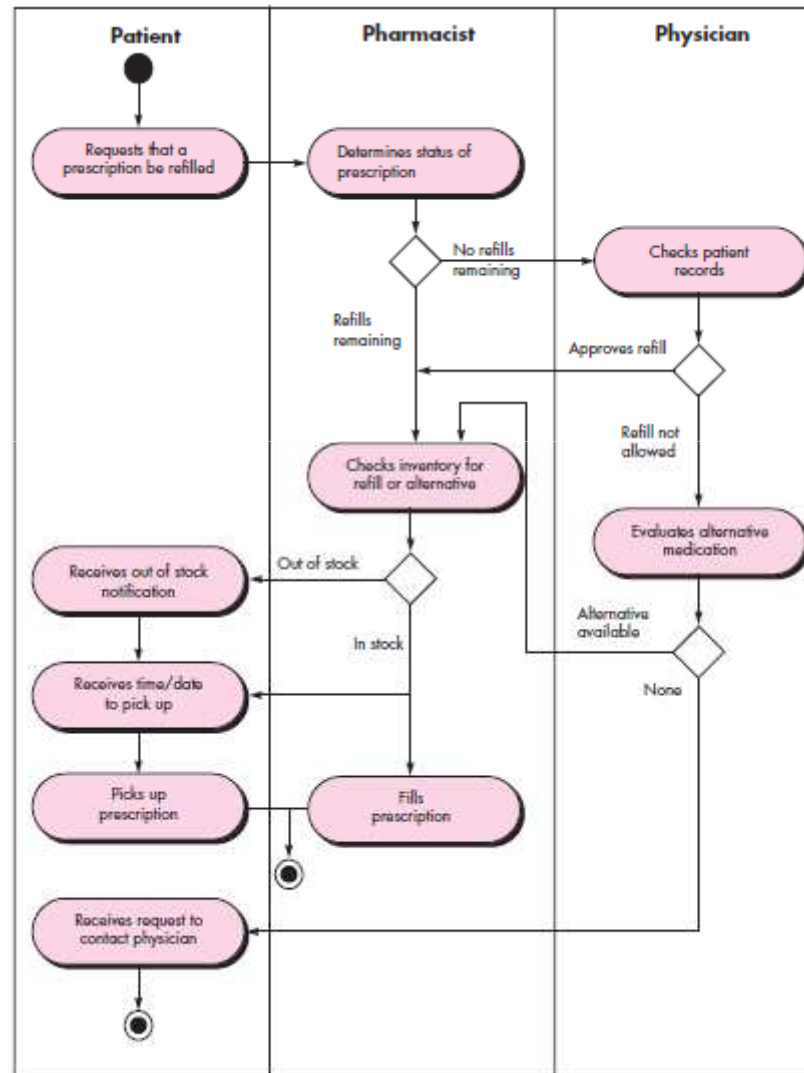
UI Analysis

- **User interface analysis elements** include :
 - (1) User analysis
 - (2) Task analysis and modeling
 - (3) Analysis of display content
 - (4) Analysis of the work environment
- **1. User analysis** : The goal of the user analysis to understand the users and their use. Understanding the users and their use can be accomplished as follows:
 - User Interviews, sales input, marketing input, support input.
 - Question to better understand the user of a system. Eg. Are users trained professionals, technicians, clerical, or manufacturing workers? What level of formal education does the average user have?
- **2. Task Analysis and Modeling** : The goal of task analysis is to answer the following questions:
 - What work will the user perform in specific circumstances? Use case techniques is used.
 - What tasks and subtasks will be performed as the user does the work? Task elaboration is used.
 - What specific problem domain objects will the user manipulate as work is performed? Object elaboration.
 - What is the sequence of work tasks—the workflow? Workflow analysis
 - What is the hierarchy of tasks? Hierarchical representation is used.

UI Analysis (Contd..)

- **(2) Task Analysis and Modeling : Techniques**
- **Use case** - When used as part of task analysis, the use case is developed to show how an end user performs some specific work-related task. From use case, it is possible to extract tasks, objects, and the overall flow of the interaction.
- **Task elaboration** – Elaborate approach assist in understanding the human activities the user interface must accommodate. Can be done in two ways. First approach is to derive a set of tasks that will accommodate the user model, design model, and the system perspective. Second use stepwise elaboration to elaborate the major tasks into subtasks.
- **Object elaboration** – From use case and other information extract the physical objects. These objects can be categorized into classes. Attributes of each class are defined, and provide a list of operations. As the design is elaborated, the details of each operation are defined.
- **Workflow analysis** can be represented effectively with a **UML swimlane diagram** (a variation on the activity diagram).
- **Hierarchical representation** - The hierarchy is derived by a stepwise elaboration of each task identified for the user.

Swimlane diagram(activity diagram)



UI Analysis (Contd..)

- **User interface analysis elements (Contd..)**
- (3) **Analysis of display content** : Display content can range from reports, graphical displays or specialized information. During this interface analysis step, the format is considered.
- (4) **Analysis of the work environment** : The user interface for a computer-based system, but in others, noise may be a factor, a keyboard or mouse may not be an option. The interface designer may consider these factors.

UI Design

- The definition of interface objects and the actions is an important step in interface design. Interface design, is an iterative process.
- Target, source, and application objects are identified.
- A *source object* (e.g., a report icon) is dragged and dropped onto a *target object* (e.g., a printer icon). The implication of this action is to create a hard-copy report.
- An *application object* represents application-specific data that are not directly manipulated as part of screen interaction.
- When all important objects and actions have been defined (for one design iteration), screen layout is performed.
- **Screen layout** is an interactive process in which graphical design and placement of icons, definition of descriptive screen text, specification and titling for windows, and definition of major and minor menu items are conducted.