User Interface Design

Lecture 5

Work Reengineering and Conceptual Design
Introduction

• bridging the gap
• gathering req. ↔ physical design

• work reengineering
  - user may need to work differently
Work Reengineering

• Work differently if to work effectively

• Goals:
  - Power and efficiency that automation makes possible
  - More effectively support business goals
  - Minimize retraining
Work Reengineering

• **focus on task allocation**
  - user or computer

• who will provide data and knowledge

• maximize the strengths of both

• **UI for ATM**
  - PIN: user
  - Balance: computer
Case study

• Introduction to the Digital Library

• Work Reengineering for the Digital Library

• Task Allocation for the Digital Library
Background

• CP department has academic and research staffs and research students.
• various teaching and research activities
• all maintain personal libraries
• some will be overlapped
Personal Library

- online digital library
- keep track of personal resources of each member
- borrowers can search for items
- items owned by individuals, not library
- owner's decision
Requirements

• search for item(s)
• system need to keep details
  - owner’s contact detail
• regularly updated
  - acquire new resource
  - join/leave department
  - change contact detail (individual member responsibility to keep up to date)
• run on department intranet
Task Scenarios

• Use Scenario: description of the anticipated use of the new UI.

• Task Scenario: represents the present situation.
Task Scenario:
Search and request resource

- Kanya, a lecturer in the department, is looking for a particular CD-ROM containing examples and exercises on OOAD. She knows that Tunwa, another lecturer, mainly teaches OOAD so she knocks on his door. Unfortunately he is not there, so she leaves a note on his door. Later he returns and searches for her, finding her in the coffee bar. He tells Kanya that Tula has the CD-ROM. Unfortunately Tula is on leave, so, Kanya telephones him and he promises to post it to her.
Task Scenario:
View updates and request resource

- Singha has recently returned from six months of study leave and wants to find out what books other members of the department have bought since he left. To do this he telephones everyone in the department and arranges an appointment. He has to do this because everyone is at the university at different times. He then meets everyone individually and checks through their bookcases, asking to borrow books that interest him. He only asks for one book at a time, as he is a slow reader!
Use Scenario:
Search and request resource

• Kanya is looking for a particular CD-ROM containing examples and exercise on OOAD. She accesses the digital library from home and types in the key phrase “Object Oriented Analysis”. The system retrieves one result. Tunwa owns the appropriate CD-ROM. Kanya then sends an e-mail to Tunwa, asking to borrow the CD-ROM.
Use Scenario:
View updates and request resource

- **Singha** has recently returned from study leave and wants to find out what are the latest additions to the digital library. He selects “check updates”, identifies the books he interested in, and sends an e-mail to the owner of the one that interests him most.
Exercise 1 (5 minutes)

• In what respects will the digital library be better than the present arrangements for Kanya and Singha?
• In what respects will it be worse?
• What disadvantages will there be for all the members of staff who are members of the digital library?
Task Allocation

- Sharing the different “essential” tasks between the user and the computer.
- Essential use case:

<table>
<thead>
<tr>
<th>User’s purpose</th>
<th>System responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter search parameters</td>
<td>Show results</td>
</tr>
<tr>
<td>Select a resource</td>
<td>Show the contact details of the owner of the selected resource</td>
</tr>
<tr>
<td>Send an e-mail</td>
<td>Confirm the send</td>
</tr>
</tbody>
</table>
Exercise 2 (5 minutes)

- Draw the essential use case for the “View updates and request resource” use scenario
Conceptual Design

- The process of establishing the underlying organization and structure of a UI

Content diagram - low fidelity prototype that represents the organization and structure of the user interface from the designer’s perspective.
Content Diagram

• Design needs:
  - Derived concrete use cases
  - Identify primary task objects, attributes, actions
  - Identify the containers and the task objects in each one
  - Link containers to screens
  - how navigation flow.
Concrete Use Cases

- Deriving from Essential Use case.

<table>
<thead>
<tr>
<th>User action</th>
<th>System response</th>
</tr>
</thead>
<tbody>
<tr>
<td>The academic enters one or more of the search parameters for the CD-ROM: title, year and platform</td>
<td>The system displays the search results</td>
</tr>
<tr>
<td>The academic selects a search result</td>
<td>The system displays the full details of the CD-ROM and the contact details for its owner, who is a research student</td>
</tr>
<tr>
<td>The academic chooses the e-mail address</td>
<td>The system displays a message area</td>
</tr>
<tr>
<td>The academic writes and sends the e-mail request</td>
<td>The system confirms the sending of the request</td>
</tr>
</tbody>
</table>
Exercise 3 (10 minutes)

• Create a concrete use case for “View updates and request resource”
Conceptual Design

• Deriving Concrete Use Cases from Essential Use Cases

• Identifying Task Objects, Attributes, and Actions
  - Task Objects
  - Attributes
  - Actions
Task Objects, Attributes, Actions

- Task Objects: units of information or data with which the users interact to carry out their tasks.
  - book, CD-ROM, video, journal, academic staff, research staff, research student

- Includes Class objects, i.e. media types, members of the library
Task Objects, Attributes, Actions

• Attributes: task object components
  - Properties and Child Objects
    • Title and author are properties of book
    • Owner of CD-ROM is child object of CD-ROM because Owner has its own properties
Task Objects, Attributes, Actions

- Actions: actions performed on task objects
  - Allocating guests to rooms. (Add)
  - Create, delete, copy, save, edit, etc.
Marking up Concrete Use Cases

<table>
<thead>
<tr>
<th>User action</th>
<th>System response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic enters one or more of the search parameters for the CD-ROM: title, year and platform</td>
<td>The system displays the search results</td>
</tr>
<tr>
<td>The academic selects a search result</td>
<td>The system displays the full details of the CD-ROM and the contact details for its owner, who is a research student</td>
</tr>
<tr>
<td>The academic chooses the e-mail address</td>
<td>The system displays a message area</td>
</tr>
<tr>
<td>The academic writes and sends the e-mail request</td>
<td>The system confirms the sending of the request</td>
</tr>
</tbody>
</table>
Exercise 4 (5 minutes)

• Identify the task object and attributes for the “View updates and request book” discrete use case from exercise 3.
## Prototyping Task Object, Attributes, and Actions

<table>
<thead>
<tr>
<th>Task object</th>
<th>Attributes</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD-ROM</td>
<td>Keywords</td>
<td>View</td>
</tr>
<tr>
<td></td>
<td>Title</td>
<td>Add</td>
</tr>
<tr>
<td></td>
<td>Author</td>
<td>Print</td>
</tr>
<tr>
<td></td>
<td>Platform</td>
<td>Delete</td>
</tr>
<tr>
<td></td>
<td>Owned by (academic, researcher, or research student)</td>
<td>Save</td>
</tr>
</tbody>
</table>

Edit
Exercise 5 (5 minutes)

• Draw an object-attribute-action table for the academic task object. You will need to make some assumptions, as not all necessary information is in the concrete use cases.
Prototyping

Use of “Sticky Notes to prototype task objects, attributes, and actions.
Creating the Content Diagram

- represents the organization and structure of UI
- containers & links
  - container $\rightarrow$ screens, windows, dialog boxes, or message boxes
  - link $\rightarrow$ navigations
the user moves to another container and the new container becomes the focus of the user’s activities.

the work is done in a second container needs the context of the first container and the user will switch back and forth, e.g., word and spell checker.
Content Diagram: Double Link

Edit document
Create, view and change the content of the document

Spellcheck
View spelling errors and suggest corrections
Content Diagram: Main Container

Main
Supports most frequent tasks

Functions
- Search resources
- View current updates
- Contact support team

Links
- Enter search details
- View updates
- Contact

Objects
Constraints

vital task: perform quickly
frequent tasks:
navigational aids:
Other Containers

Enter search criteria
User can specify the search criteria for a resource

Functions
- Enter keywords, title, author
- Check search criteria

Links
- View search results

Objects
Resource
Constraints
Search needs to take less than one second

derived from concrete use cases.
Enter Search Criteria

Search for resource

Keywords: HCI
Title:
Author: Nielsen

Help  Search  Cancel
Exercise 6 (10 minutes)

- create the “View search results” container, identifying the functions, links, and associated task object(s).

- how would you implement the container for an audio output UI, such as a telephone menu system?
Links

- link the containers together
- reflect the navigation flow
- content diagram
- outcome of the conceptual design process

- single link -->
- double link -->>

- label the arrow:
  - conditions of interaction
Content Diagram: Search and request CD-ROM

Main
  Support most frequent tasks
Functions
  - Search resources
  - View current updates
  - Contact support team
Links
  ➢ Enter search details
  ➢ View updates
  ➢ Contact
Objects
Constrains

Enter search criteria
  Support most frequent tasks
Functions
  - Enter keywords, title, author etc.
  + Check search criteria
Links
  ➢ View search results
Objects
  Resource
Constrains
  Search needs to take less than one second
Content Diagram: Search and request CD-ROM

**View search results**
- Displays the search results
- Functions
  - Show search result
  - Select search results
- Links
  - View updates
- Objects
  - Resource
- Constrains
  - Must be able to show at least five results at the same time

**View details**
- Displays full details of one result and full details of owner
- Functions
  - Show details
  - Select email address
- Links
  - Write email message
- Objects
  - Resource, member
- Constrains
Content Diagram: Search and request CD-ROM

Write email message
Allows user to write and send email

Functions
+ Display message area
- Enter message

Links
➢ Email confirmation

Objects
Member

Constrains
Must allow rich text and HTML

Email confirmation
Confirms email has been sent

Functions
+ Display message

Links

Objects
Constrains
Exercise 7 (10 minutes)

• Draw a section of the content diagram for the “View updates and request book”
Summary

• use scenario & use cases for work reengineering

• Creating the Content Diagram
  - essential use cases → concrete use cases
  - task objects, attributes, actions identified from concrete use cases
  - containers and links identified
  - containers → screens
  - links → navigations