Topics

- Usage scenarios
- Conceptual design
- Participatory design
- Detailed screen design
- Customized style guide
- Team exercise on design

Introduction to Design

- Revisiting the usability engineering life cycle
**Design**

- Scenarios bring to light:
  - Interaction objects, properties, relationships
  - Different views
  - Access and operations
- Conceptual design
  - Overview of how system will work
- Screen designs
  - Screen pictures
  - Labels and notes
- Iteration

**Design**

- Approaching interaction design
- Do NOT start with screen designs, widgets
- Do start with tasks, usage scenarios
- Need independent designers
  - Expert users as designers might design for themselves, but not others

**Usage Scenarios**

- Scenarios: stories about people and their work activities
- Work-oriented: focus on the needs and concerns of users
  - What customers and users would rather talk about (than abstract models, specifications)
  - Relate functionality to business process
Usage Scenarios

- Scenarios reveal requirements
  - Scenarios facilitate agreement on requirements
  - Show how tasks will be carried out and how system will provide functionality to enable tasks
- Also called design scenarios
- Where do they come from?
  - Brainstorming
  - Ethnographic field studies
  - Participatory design
  - Reuse of similar designs

Usage Scenarios

- Scenarios highlight work-oriented user goals
- Scenarios make use of the objects of design
- Scenarios are envisioned design solutions!
- Scenarios evoke thought and discussion about design

Usage Scenarios

- Relationship to design specifications
  - Design situations are fluid; written specifications are rigid
  - Scenarios offer a working design representation tied directly to situation of use
  - Scenario-based design is bottom-up (the way people usually think)
    - Needs to be mixed with top-down structuring of task analysis
Usage Scenarios

- Relationship to task analysis:
  - Same general goal
  - Complementary in almost every way

<table>
<thead>
<tr>
<th>Task Analysis</th>
<th>Scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Specific</td>
</tr>
<tr>
<td>Formal</td>
<td>Informal</td>
</tr>
<tr>
<td>Abstract</td>
<td>Concrete</td>
</tr>
<tr>
<td>Completeness is goal</td>
<td>Deliberately incomplete</td>
</tr>
<tr>
<td>Addresses design structure</td>
<td>Addresses design details</td>
</tr>
</tbody>
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Scenarios should capture and make obvious in design:
- Tasks and task threads
  - Common, representative
  - Mission critical
  - Error and recovery situations

Scenarios should drive preparation of representative tasks for usability evaluation

- User roles
- User actions on objects/artifacts
- User planning, thoughts, and reactions to system
- Environmental and work context (e.g., phone ringing)
Usage Scenarios

- Scenarios go hand-in-hand with screen designs
- How many scenarios should we expect?
  - Number of scenarios can be large, if product is large, complex
  - Need different set of scenarios for each user class
  - May need tools to manage and maintain large set of scenarios and correlate with screen designs

Scenario Creation – Example

Example of usage scenario for Calendar:
Sue, a patient with an existing appointment with Dr. Kevorkian for next Tuesday, calls secretary at the physician’s office. Sue is unable to keep her appointment, and needs to reschedule it. The secretary must locate the current appointment, find an open time slot that also is a time the patient is available, and re-enter patient information into the new time slot. While the secretary is doing this, another phone line is ringing and another patient is standing at the desk waiting to schedule a follow-up appointment with Dr. Kevorkian.

Scenario Creation – Example

- Note that scenario is just one instance of task thread
- Note that temporal order of locating current appointment and finding open time slot could be reversed
- Don’t let specificity of scenario force rigid design
Scenario Iteration

- Iteratively refine scenarios and screen designs via design walk-throughs
- Sometimes it takes a large number of iterations to work out a consistent look and feel and to organize the functionality
- Next: as exercise, identify user roles, actions, objects, object attributes, tasks, work context
  - The idea: extract these to drive design

Marking Scenario Components – Example

- Example of usage scenario for Calendar:
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Scenario Creation – Exercise

- Goal: to gain understanding of tasks, user roles, actions, and objects
- Target system: Calendar Management System
- Activities:
  - Select one good representative task for each user class
  - Construct a usage scenario.
  - Make it up as you go!
  - Get detailed and refer to actions and objects.
Scenario Creation – Exercise

- Try to capture deep design issues, such as:
  - Application objects, their properties, and relationships among them
  - How objects will be viewed conceptually (not necessarily details of appearance) in interaction design
  - How user will access those objects
  - Operations to be performed on the objects as a result of user tasks
  - How users will invoke and carry out those operations, including navigation

Conceptual Design

- Conceptual design
  - At last: transition from information gathering to design
  - Early sketch of how it all works
  - Where screen designs emerge
- Develop conceptual model/metaphor
  - A chance to be creative with a “theme” for your interaction design
  - Metaphor is analogy with something existing in real world with similarities that can be leveraged for learning new system

Conceptual Design

- Develop some design details
  - Include navigation, screen layout, visual design
- Uses initial design to encourage critical comments and iteration
  - Start evaluation this early with team, client, and key users
Conceptual Design – Example

- Goal: to create a conceptual design from a scenario
- Target system: Calendar Management System
- Activities:
  - Tease out as much conceptual design information as possible, extrapolating from scenario where useful
  - Identify application objects: appointments

Conceptual Design – Example

- Identify application object properties: Date, time, description, length (?), alarm or not
- Relationships: only one object so far
  - How objects are represented conceptually in user interaction design
    - By month, week, day, hour, time slots
    - Time slots can be empty or contain appointment
    - Implication: these are all "container objects"
- Access methods: how user get at objects

Conceptual Design – Example

- Accessing an existing appointment
  - By viewing, possibly preceded by search or navigation through views
  - Got "search" from needs analysis rather than from scenario
- Invoking and carrying out operations on objects
  - Eventually more of this kind of detail needs to get into the scenarios
    - Menu? Pull-down?
    - Small, fixed number of commands
    - Implication for interaction style: Buttons or icons?
Screen Design – Example

**Goals:**
- To develop together initial screen designs, from conceptual design, scenarios
- To perform an early cognitive-based evaluation of conceptual and screen designs

**Assumptions:**
- Generic desktop platform (not specific to Windows, Mac, etc.)

Screen Design – Example

**Activities**
- Draw pictures of screens, including menus, buttons, icons, application objects
- Label objects with behavior as appropriate
- Do intuitive evaluation of design

**Deliverables:**
- A few representative screen designs

Screen Design – Example

- Conceptual design might lead to something like
- Cognitive/human factors analysis
  - Design does not closely match user’s concept of a calendar
  - Paper calendar not necessarily the criterion. Be creative.
Screen Design – Example

- Can do better with direct manipulation
  - Eliminate explicit view control by selecting view object
  - Add and modify by typing (editing) directly on text of appointment

Screen Design – Example

- Iteration: conceptual design revisited
- Access appointment objects by
  - Selection and navigation on desk top
  - Search on content
- Decisions about container objects
- Several months overlapped; current on top
- In month view select week or day to view

State Diagram

- Design decision: keep at least one instance each of month, week, day on screen
### Screen Design – Example

- Try to show as much appointment information as possible at each level (page preview idea)

| Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Sun  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Mon  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Tue  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Wed  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Thu  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Fri  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Sat  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |

### Iterated Screen Design – Example

- **Day view**
  - No close box, keep on desktop top
  - Scroll up or down to midnight

- **Help**
  - Click here to edit, type

- **Delete/App**
  - May 1999

- **Search Help**
  - April 1999

- **Delete**
  - March 1999

- **Select**
  - February 1999

- **Select**
  - January 1999
Iterated Screen Design – Example

- Search dialogue box

![Iterated Screen Design Example](image)

 Participatory Design

- Active involvement of all roles, especially users, during early design
- People around table with post-its, pencils
- Pros: More accurate information about tasks, work context; lets users influence design decisions; builds rapport/buy-in with users

 Participatory Design

- Cons: Costly; may create antagonism; users not trained designers
- Nevertheless, experiences are usually positive, helped by:
  - Good, experienced leadership
  - Careful selection of users
Participatory Design

- PICTIVE (Plastic Interface for Collaborative Technology Initiatives through Video Exploration)
- Users actually sketch UI design
- Democratic – everyone has same say about things
- Use paper, plastic, tape, sticky notes, etc.
- Video recording of scenario walk-through shown to other users, designers, managers

Participatory Design

- What can we get from talking to users?
  - Some of what users need in tasks
  - Usually very incomplete, unintegrated
  - It’s just an input; you are still the designer
  - Need to extend to design that works for all users over all tasks
  - You are asking users what they do, not what they think is best for them

Custom Style Guide – An integral Part of Design

- Every project needs one!
- Style guide documents visual and other general design decisions that apply in multiple places
- Major force for consistency
- Develop iteratively in parallel with product and maintain throughout UI development process
Custom Style Guide

- Documented internally within an organization
- Must be accepted by team members, not just author(s)
- Very specifically worded
- Support re-use of design decisions, consistency
- Describes specific interaction styles, layouts, formats, wordings, button labels, etc.
- Include sample screen sketches; make it visual

Custom Style Guide

- Details about:
  - Fonts and text usage
  - Color usage, background graphics, other common design elements
  - Icon usage, position, design
  - Widget usage, position, design – dialogue boxes, menus, message windows, toolbars, etc.
  - Formats (e.g., for dates)
  - Consistent use of defaults

Team Exercise – Scenarios and Screen Designs

- Goal: To develop some usage scenarios and an initial design for the screen(s) and interaction objects for your ticket kiosk system
- Assumptions
  - Specialized remote workstation
    - Generic interaction style
    - Hardened against vandalism, etc.
  - Don’t assume much computer, browser knowledge
Team Exercise – Scenarios and Screen Designs

- Keep it simple
  - Tons of functionality doesn’t necessarily help learn the process
- Make it different from Web applications of the same type that you already know

Team Exercise – Scenarios and Screen Designs

- Activities
  - Write one or two usage scenarios for your kiosk
    - Make it up on the fly
    - Do this quickly; you can clean them up as you go
    - Get detailed and refer to user roles, tasks, actions, and objects
  - Start your screen designs with home page
    - Show broad functionality as user tasks
    - Draw pictures of screens, including menus, buttons, nav bars, icons
    - Add text labels to explain things as appropriate

Team Exercise – Scenarios and Screen Designs

- Activities
  - Design one main task thread over a few more pages/screens
  - Don’t go into much breadth for the whole system yet
- Cautions
  - Don’t get too involved in human factors issues yet (e.g., icon appearance or menu placement)
  - Control time spent arguing; learn the process!
  - Keep it simple and cut corners (e.g., from CMS: number of days in a month, what day each month starts on)
Team Exercise – Scenarios and Screen Designs

- **Hints**
  - If team members have different ideas for a feature, consider offering both via “preferences”
  - Use yellow “stickies” to be flexible in design

- **Deliverables**
  - A few representative screen designs on paper; be sure to do home page

- **Schedule:** due by end of class or bring to next class