Prototyping

Creation of concrete but partial implementations of a system design to explore usability issues
Goals of Prototyping

Prototyping enables evaluation, happens throughout

- Exploring requirements
  - Market analysis, participatory design, envisionment
- Choosing among alternatives
  - Risky or critical features, go/no-go decisions
- Empirical usability testing
  - As early as possible, try out ideas with target users
- Evolutionary development
  - May deliberately choose a malleable software platform, building software in incremental, iterative fashion

Do scenarios as used in SBD serve as prototypes?

Boehm’s Spiral
Model
Some Key Tradeoffs

- Quality vs premature commitment
- Special-purpose systems vs scheduling and resource management
- Realism (e.g. timing, content) vs early availability or throw-away efforts
- Constant iteration vs radical change and/or re-factoring of a design
- Dynamic (highly malleable) platforms vs organized, well-structured code base

Prototyping in UE

<table>
<thead>
<tr>
<th>Approach</th>
<th>Description</th>
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<tbody>
<tr>
<td>Storyboard</td>
<td>Sketches or screenshots illustrating key points in a usage narrative</td>
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<tr>
<td>Paper, cardboard mock-up</td>
<td>Fabricated devices with simulated controls or display elements</td>
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<tr>
<td>Wizard of Oz</td>
<td>Workstation connected to invisible human assistant who simulates input, output, or processing functionality not yet available</td>
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<tr>
<td>Video prototype</td>
<td>Video recording of persons enacting one or more envisioned tasks</td>
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<tr>
<td>Computer animation</td>
<td>Screen transitions that illustrate a series of input and output events</td>
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<tr>
<td>Scenario machine</td>
<td>Interactive system implementing a specific scenario's event stream</td>
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<tr>
<td>Rapid prototype</td>
<td>Interactive system created with special-purpose prototyping tools</td>
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“Off-the-Shelf” Prototyping

• Jump-start the design and iteration process
  – Recruit existing tools and devices
  – Integrate into approximation of a “system”
• Example as used in virtual school project
  – Telephone for audio conferencing
  – Netmeeting for video conferencing, chat
  – Web pages for project questions and answers
  – Email for interaction with mentors
• Can be very useful in requirements exploration
  and in activity-oriented feasibility studies

Prototyping Tools

• Presentation tools
  – Paper sketches/printouts
  – Powerpoint
• Scripting languages
  – Tcl/Tk
• Visual languages
  – Visual Basic
  – SILK/Denim

frame $d
button $d.b -text OK
button $d.c -text Cancel
pack $d.b $d.c -side left
Prototyping with Powerpoint

• Create general look-and-feel of interface with essential functionality

Fidelity in Prototyping

• Fidelity refers to the level of detail
• High fidelity
  - prototypes look like the final product
• Low fidelity
  - artists renditions with many details missing
Why Use Low-fi Prototypes?

- Traditional methods take too long
  - Sketches -> prototype -> evaluate -> iterate
- Can simulate the prototype
  - Sketches -> evaluate -> iterate
  - Sketches act as prototypes
    - Designer “plays computer”
    - Other design team members observe & record
- Kindergarten implementation skills
  - Allows non-programmers to participate

Hi-fi Prototypes Warp

- Perceptions of the tester/reviewer?
  - Formal representation indicates “finished” nature
    - Comments on color, fonts, and alignment
- Time?
  - Encourage precision
    - Specifying details takes more time
- Creativity?
  - Lose track of the big picture