Slide 1

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Prototyping

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Some materials adapted from from MIT
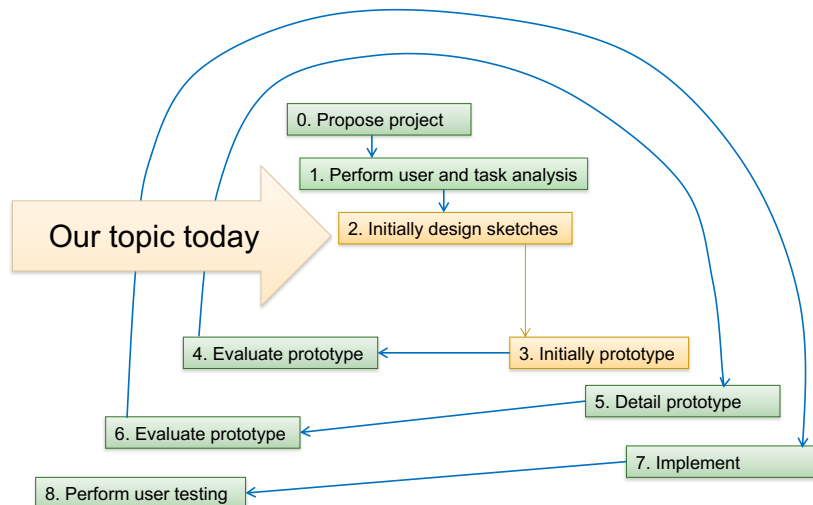CS Course 6.813/6.831

Slide 2

Outline

- Prototype
  - Low- and High-fidelity
  - Dimensions of fidelity
- Paper prototype
- Computer prototype
  - Storyboard
  - Form builder
  - Wizard of Oz

Slide 3

Process for Projects in This Class

Our topic today

0. Propose project
1. Perform user and task analysis
2. Initially design sketches
3. Initially prototype
4. Evaluate prototype
5. Detail prototype
6. Evaluate prototype
7. Implement
8. Perform user testing

Slide 4

Design alternatives

- Why we need to express design ideas early?
  - You can't evaluate design until it's created
  - After software is built, changes to the design are difficult

- We want
  - Make it fast
  - Allow lots of flexibility for radically different alternatives
  - Low cost
  - Promote valuable feedback

What is prototype?

- A prototype is an original type, form, or instance of something serving as a typical example, basis, or standard for other things of the same category

- Examples
  - Screen shots
  - Paper drawings
  - prototype software - referred to as alpha grade, meaning it is the first version to run

Why we need prototypes?

- Experiment with alternative designs
- Provide an early, concrete representation of design ideas
- Provide hands-on experience for all stakeholders (design teams, users, etc.)
- Easier to change or throw away
- Keep the design centered on the user
  - must test and observe ideas with users
- Facilitate iterative design and evaluation
- Reduce the risk of making customers surprise
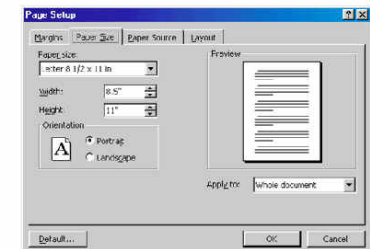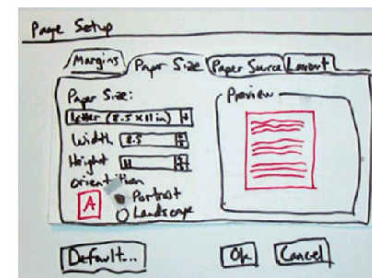 - "I won't believe it until I see it"

Prototype fidelity

- Low-fidelity
  - a set of sketches/storyboards providing a static, non-computerized, non-working mockup of the planned product
  - omits details

- High-fidelity
  - a set of screens that provide a dynamic, computerized, working model of the planed product
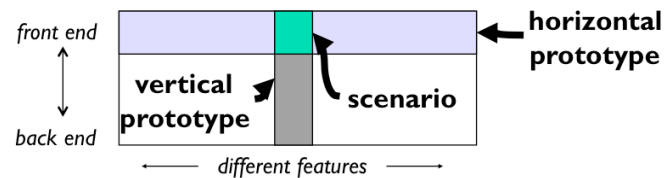 - working software

Prototype fidelity (cont'd)

Dimensions of fidelity

- Horizontal
  - Prototypes cover many features but with little detail
- Vertical
  - Prototypes cover few features but with much in detail
- Diagonal
  - Prototypes cover down to a certain level and vertical

Dimensions of fidelity (cont'd)

- Look
  - Is the appearance and graphic design of the UI
  - Can be sketchy and hand-drawn

- Feel
  - Referring to input methods to interact with the UI
  - Pointing and writing (in paper-mockup) is different from mouse and keyboard

- Can paper prototype have the feel attribute?

Paper prototype - Videos

- "Example Usability Test with a Paper Prototype"
- "Hanmail Paper Prototype"
- "Paper prototype usability test"

- Find these videos on Youtube

Paper prototype

- Using paper mockup to represent the UI
  - Sketches of screen appearance
  - Paper pieces show windows, menus, dialog boxes, toolbars
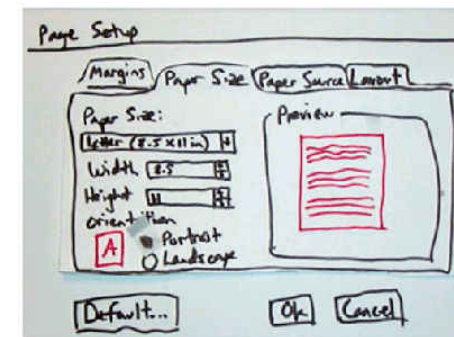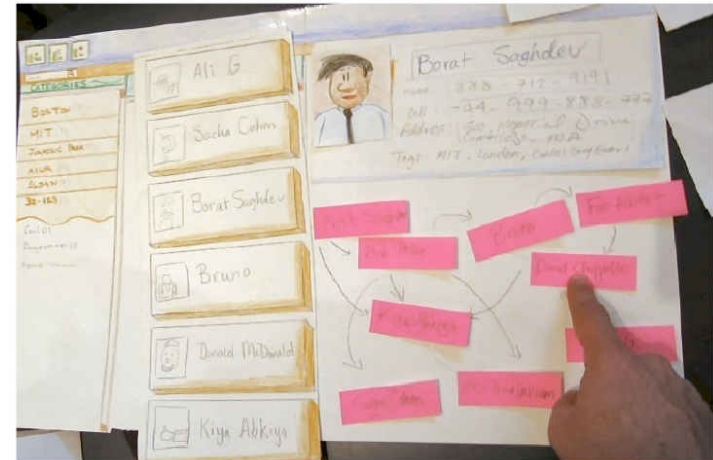
Paper prototype (cont'd)

- Interaction
  - Pointing with a finger = mouse click
  - Writing = typing

- A person simulates the computer's operation
  - Putting down and picking up pieces
  - Writing responses on the mockup (screen)
  - Describing effects that are hard to show on paper

Paper prototype (cont'd)

Paper prototype (cont'd)

- Characteristics
  - Low fidelity in look and feel
  - High fidelity in depth as there is person to simulate the operation

Paper prototype (cont'd)

- Advantages
  - Faster to build
  - Easier to change
  - Cheap
  - Focuses attention on big picture
    - Designers don't waste time on details
    - Attract ideas from customers
  - Non-programmers can help
  - Convenient
    - You can prototype on the bus
    - You can utilize your time efficiently

Tools for paper prototyping

- White poster board
  - Used as background or window frame
- Index cards
- Re-stickable glue
- White correction type
- Photocopier
 - For making copies
- Pens, markers, scissors, type
- Etc.

Exercise

- Work on paper prototypes for your app
  - 1 – 2 main screens
- Take photos of your protoype and share

- Time: 15 minutes

Tips for good paper prototypes

- Make it large
- Make it monochrome (single color)
- Use description where necessary
  - You cannot represent tricky interactions like drag & drop, animation, progress bar
- Keep pieces organized
  - Use folders and envelopes
- Produce multiple alternatives
  - Better to get feedback
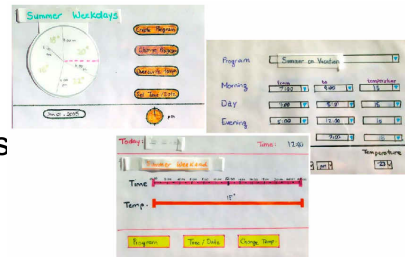
What can paper prototypes help?

- It helps better understanding of
  - conceptual model
    - Do users understand the UI?
  - functionality of the system
    - What features are missing in the UI?
  - navigation and task flow
    - Do users understand the navigation of the UI?
  - terminology
    - Are terms and levels understood?
  - screen content and layout
    - What are there in the UI?

What it does not help?

- Showing "look": color, font, whitespace, etc.
- Demonstrating "feel": efficiency issues
  - Interactions are in low fidelity (not real)
- Measuring response time
- Demonstrating animation and high-level of interaction
  - Actions like drag and drop, drawing, etc.

Computer prototype

- Interactive software simulation
- High-fidelity in look & feel
- Low-fidelity in depth
  - May be no backend, covering horizontally
  - Does not have a human simulating the backend like paper prototype

What can computer prototypes help?

- Everything from paper prototypes, plus
- Better and higher-fidelity **look**
  - Screen layout
  - Colors, fonts, icons, etc.
  - Choices of controls
- Interactive feedback
- Efficient issues
  - Controls are big enough?
  - Whitespace?
  - Distance between controls?

Advantages of computer prototype

- Faster than coding
- No debugging
- Easier to change and throw away
- Separate UI design ideas from what offered by UI toolkit (e.g., Visual Studios, C++ Builder)
  - Your thinking is **not** limited to available widgets
- Non-programmers can do it

Computer prototyping techniques

- Storyboard
  - Sequence of painted screenshots, sometimes connected with links
- Form builder
  - Creating real windows with widgets such as buttons, windows, labels, etc.)
- Wizard of Oz
  - Computer frontend, human backend

Computer prototyping techniques (cont'd)

- Storyboarding tools
  - figma
  - invision
  - Photoshop
  - Balsamiq Mockup
  - Mockingbird
  - Justinmind
  - Axure
  - Pidoco
  - Excel
  - Visio
  - Etc.
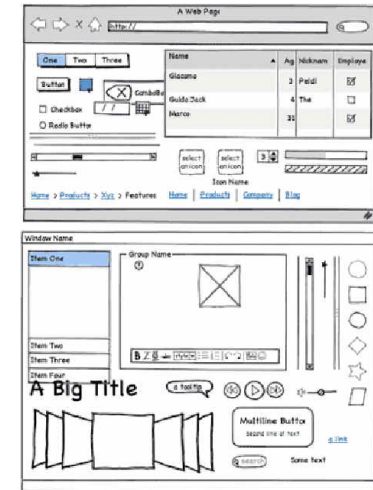
Computer prototyping techniques (cont'd)

- Storyboarding tools
  - Pros
    - You can draw anything
    - Fast
  - Cons
    - No or limited interaction
      - No text entry
      - Widgets aren't active

Computer prototyping techniques (cont'd)

- Form builders
  - FlexBuilder
  - Silverlight
  - Visual Basic
  - C++ Builder
  - Visual C#
  - Qt Designer

Computer prototyping techniques (cont'd)

- Form builders
  - Pros
    - Actual controls → high-fidelity in terms of **look**
    - You can reuse the design for implementation → save effort from doing again
  - Cons
    - Limits thinking to standard and available widgets
    - Content in each widget is not visible

## Computer prototyping techniques (cont'd)

- Wizard of Oz
  - "Wizard of Oz" = "man behind the curtain"
  - Software simulation with human in the loop to help
    - Human "wizard" mimics computational functionalities
      - system response interprets user input
      - controls computer to simulate appropriate output
    - Wizard is not always hidden
  - Example
    - Simulate the speech recognition which is not available (human is needed to recognize speech)

Computer prototyping techniques (cont'd)

- Wizard of Oz
  - Faking the interaction
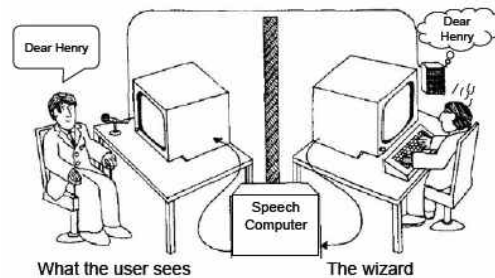
  - Issues
    - Wizard has to be mechanical (pretending to be non-human)
    - Worry about both UIs: for wizard and users

Exercise 2

- Work with your project team
- Discuss with your team mates to select the best paper prototype
- Convert the selected paper protoype into computer prototypes using a software tool

- 25 minutes

- Present 5 minutes each

Summary

- Prototype
  - Low- and High-fidelity
  - Dimensions of fidelity
- Paper prototype
- Computer prototype
  - Storyboard
  - Form builder
  - Wizard of Oz