Prototyping Techniques

Learning different techniques for rapid prototype development

Saul Greenberg

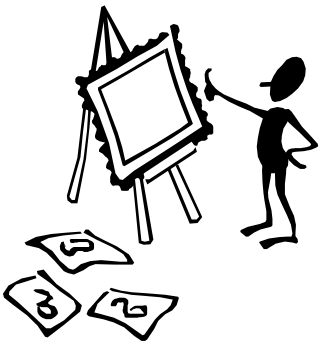
Low Fidelity Prototypes

Paper-based prototypes

- a paper mock-up of the interface look, feel, functionality
- "quick and cheap" to prepare and modify

Purpose

- brainstorm competing representations
- elicit user reactions
- elicit user modifications / suggestions



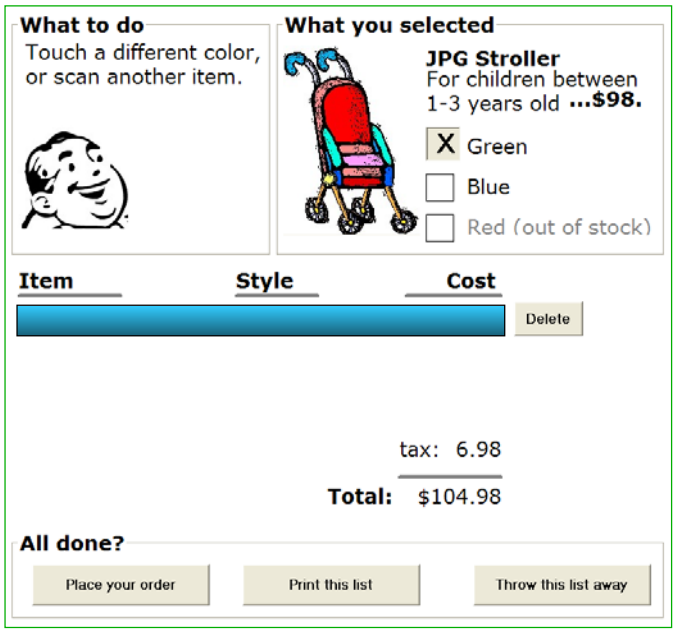
Saul Greenberg

Low Fidelity Prototypes

Sketches

- drawing of the outward appearance of the intended system
- crudity means people concentrate on high level concepts
- but hard to envision a dialog's progression

Saul Greenberg

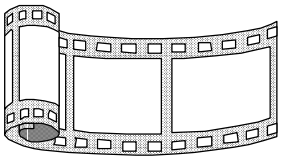


Low Fidelity Prototypes

Storyboarding

- a series of key frames
  - originally from film; used to get the idea of a scene
  - snapshots of the interface at particular points in the interaction

- users can evaluate quickly the direction the interface is heading



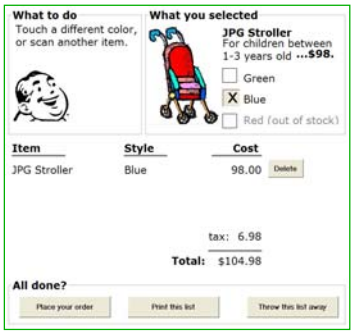
Saul Greenberg

Initial screen

Scan the stroller ->

Change the color ->

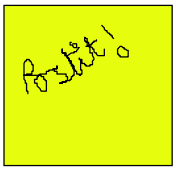
Place the order ->



Low Fidelity Prototypes

Pictive

- "plastic interface for collaborative technology initiatives through video exploration"
- design is multiple layers of sticky notes and plastic overlays
  - different sized stickies represent icons, menus, windows etc.
- interaction demonstrated by manipulating notes
  - contents changed quickly by user/designer with pen and note repositioning
- session is videotaped for later analysis
  - usually end up with mess of paper and plastic!



Saul Greenberg

Low Fidelity Prototypes

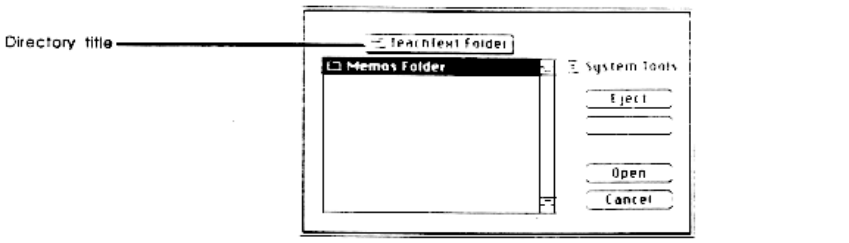
Tutorials and manuals

- write them in advance of the system
- what are they?
  - tutorial for step by step description of an interaction
    an interface "walk-through" with directions
  - manual for reference of key concepts
    in-depth technical description

- if highly visual, then storyboard is set within textual explanations
- does this work?
  - people often read manuals of competing products to check:
    interface
    functionality
    match to task

Saul Greenberg

You see this dialog box:

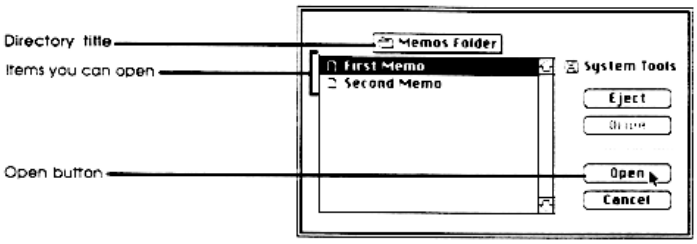


A directory title shows you the name of the folder you're presently working in—in this case, the TeachText Folder. The box beneath it shows you all the other items in the TeachText Folder that you can open with this application—in this case, only the Memos Folder.

From Apple's Tutorial Guide to the Macintosh Finder

Saul Greenberg

■ To open the Memos Folder, click the Open button.



As you open the Memos Folder, you move down through the hierarchy. The directory title changes to remind you where you are in the hierarchy, and the box shows you what's on the new level you just moved to—in this case, the two documents in the Memos Folder. The selected document is the one that will open when you click the Open button. If you want to open the other document, click anywhere on the other document's name to highlight it, and then click the Open button.

From Apple's Tutorial Guide to the Macintosh Finder

Saul Greenberg

Medium Fidelity Prototypes

Prototyping with a computer

- simulate or animate some but not all features of the intended system
  - engaging for end users

Purpose

- provides a sophisticated but limited scenario to the user to try out
- provides a development path (from crude screens to functional system)
- can test more subtle design issues

Danger

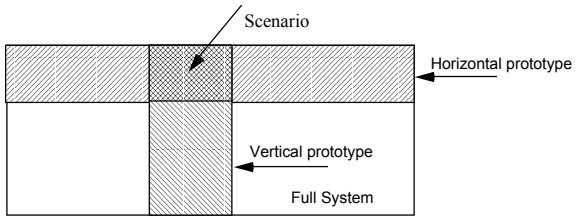
- user's reactions are usually "in the small"
  - blinds people to major representational flaws
- users reluctant to challenge / change the design itself
  - designs are too "pretty", egos…
- management may think its real!

Saul Greenberg

Medium Fidelity Prototypes

Approaches to limiting prototype functionality

- vertical prototypes
  - includes in-depth functionality for only a few selected features
  - common design ideas can be tested in depth
- horizontal prototypes
  - surface layers includes the entire user interface with no underlying functionality
  - a simulation; no real work can be performed
- scenario
  - scripts of particular fixed uses of the system; no deviation allowed



Saul Greenberg

Medium Fidelity Prototypes

Approaches to integrating prototypes and product:

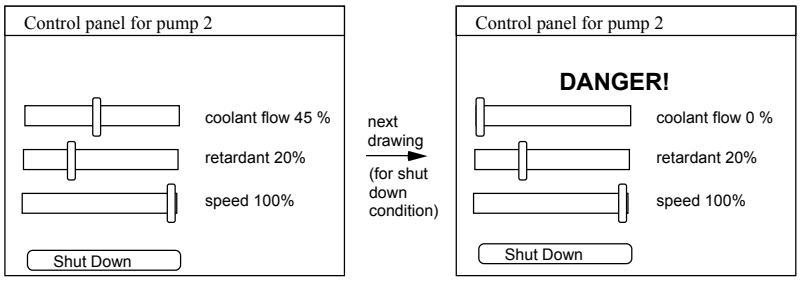
- throw-away
  - prototype only serves to elicit user reaction
  - creating prototype must be rapid, otherwise too expensive
- incremental
  - product built as separate components (modules)
  - each component prototyped and tested, then added to the final system
- evolutionary
  - prototype altered to incorporate design changes
  - eventually becomes the final product

Saul Greenberg

Medium Fidelity Prototypes

Painting/drawing packages

- draw each storyboard scene on computer
  - neater/easier (?) to change on the fly than paper
- a very thin horizontal prototype
- does not capture the interaction "feel"



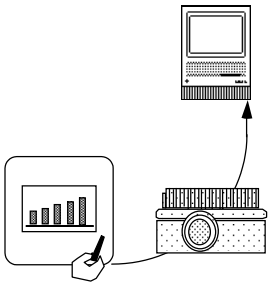
Saul Greenberg

Medium Fidelity Prototypes

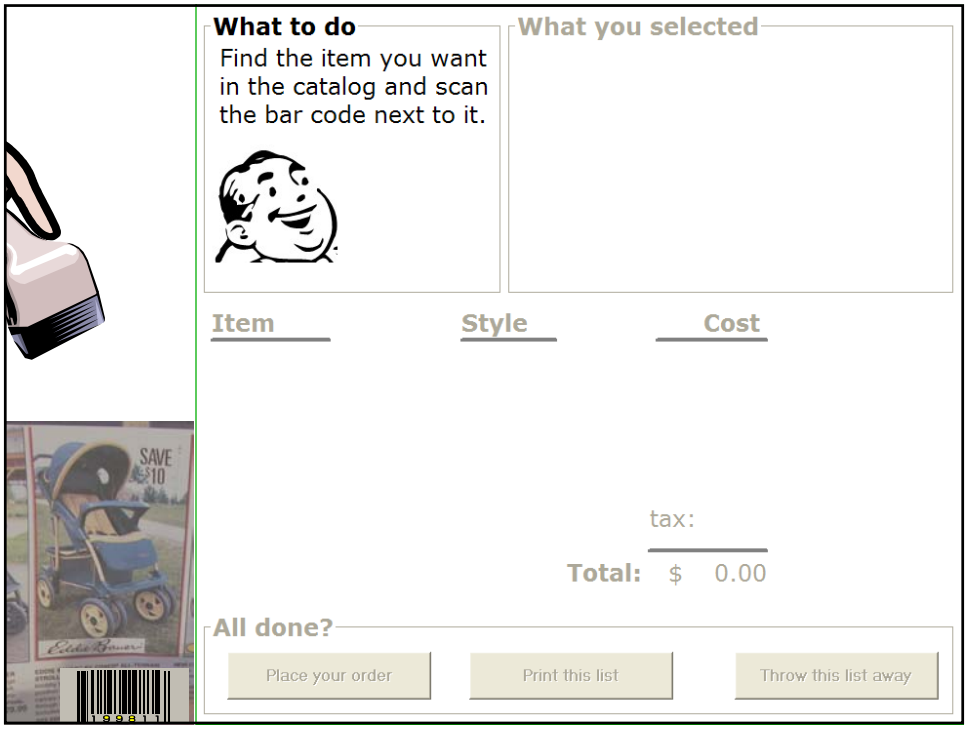
Scripted simulations and slide shows

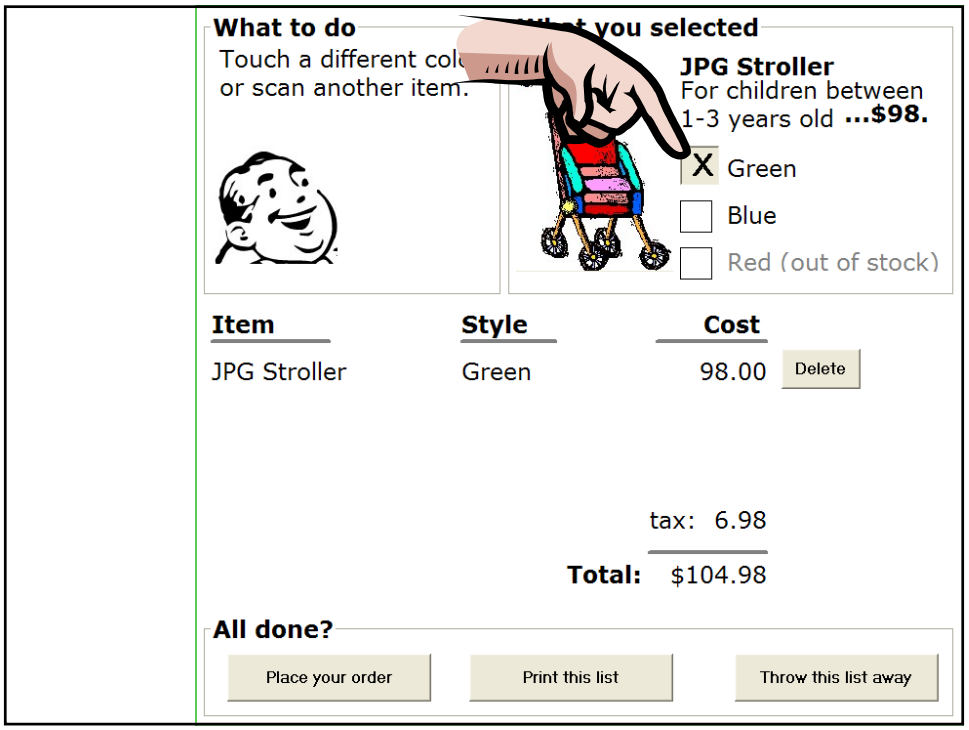
- encode the storyboard on the computer
  - created with media tools
  - scene transition activated by simple user inputs
  - a simple horizontal and vertical prototype

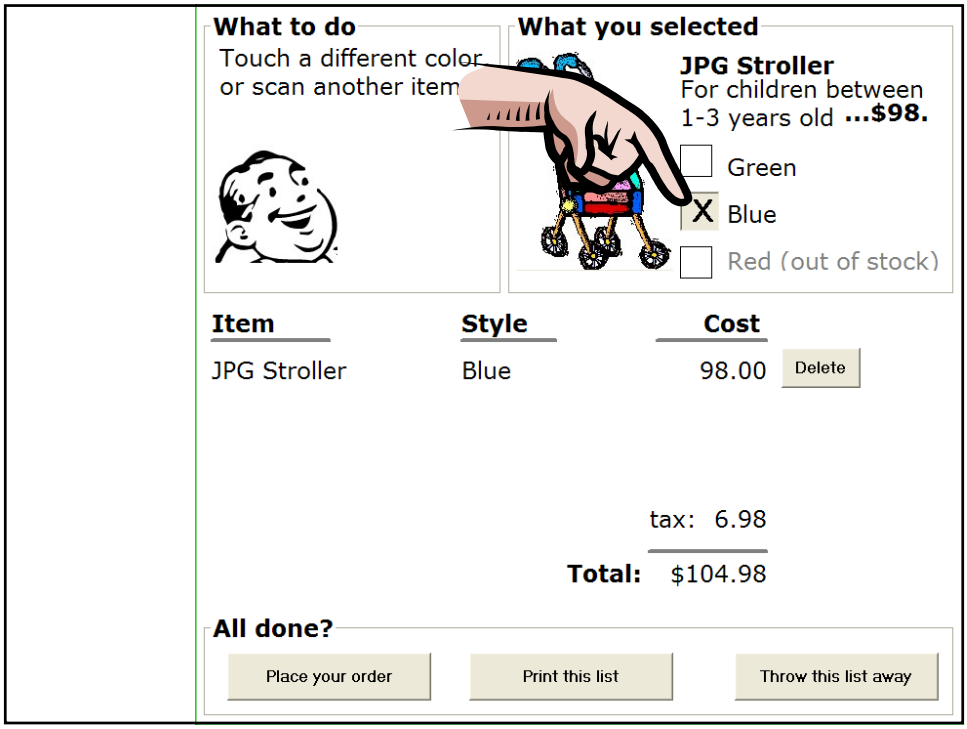
- user given a very tight script/task to follow
  - appears to behave as a real system
  - but script deviations blows the simulation

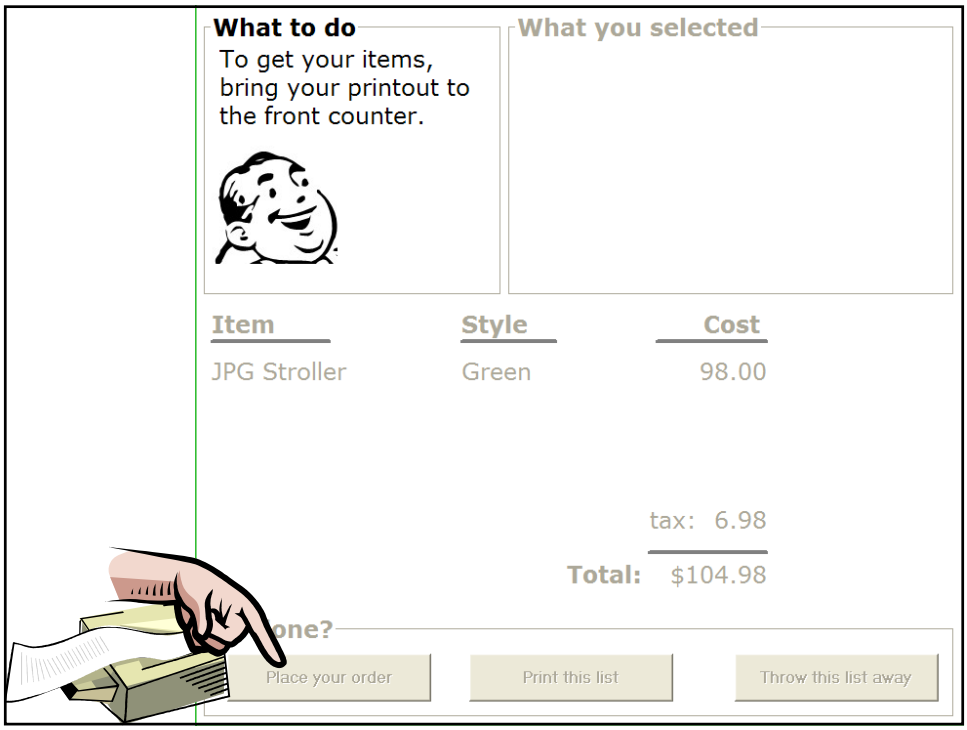


Saul Greenberg


What to do
Find the item you want in the catalog and scan the bar code next to it.
What you selected
Item
Style
Cost
SAVE $10
tax:
Total: $ 0.00
All done?
Place your order
Print this list
Throw this list away


What to do
Touch a different col
or scan another item.
you selected
JPG Stroller
For children between
1-3 years old ...$98.
X Green
Blue
Red (out of stock)
Item
Style
Cost
JPG Stroller
Green
98.00
Delete
tax: 6.98
Total: $104.98
All done?
Place your order
Print this list
Throw this list away

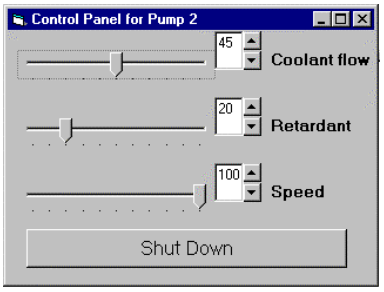

What to do
Touch a different color
or scan another item
What you selected
JPG Stroller
For children between
1-3 years old ...$98.
Green
Blue
Red (out of stock)
Item
Style
Cost
JPG Stroller
Blue
98.00
Delete
tax: 6.98
Total: $104.98
All done?
Place your order
Print this list
Throw this list away


What to do
To get your items,
bring your printout to
the front counter.
What you selected
Item
Style
Cost
JPG Stroller
Green
98.00
tax: 6.98
Total: $104.98
Place your order
Print this list
Throw this list away

Medium Fidelity Prototypes

Interface builders

- tools for letting a designer lay out the common widgets
- construct mode
  - change attributes of objects
- test mode:
  - objects behave as they would under real situations
- excellent for showing look and feel
  - a broader horizontal prototype
  - but constrained to widget library
- vertical functionality added selectively
  - through programming

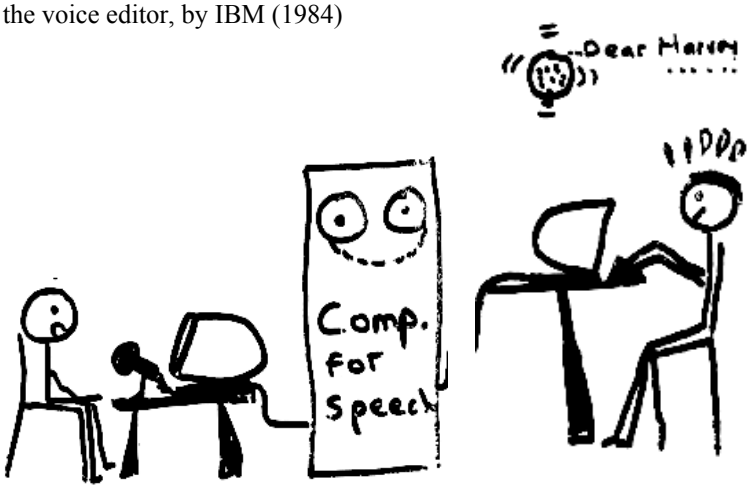


Saul Greenberg

Wizard Of Oz

A method of testing a system that does not exist

- the voice editor, by IBM (1984)



What the user sees

The Wizard

Saul Greenberg

Medium Fidelity Prototypes

Wizard of Oz

- human simulates the system's intelligence and interacts with user
- uses real or mock interface
  - "Pay no attention to the man behind the curtain!"
- user uses computer as expected
- "wizard" (sometimes hidden):
  - interprets subjects input according to an algorithm
  - has computer/screen behave in appropriate manner
- good for:
  - adding simulated and complex vertical functionality
  - testing futuristic ideas

Saul Greenberg

Wizard Of Oz Examples

IBM: an imperfect listening typewriter using continuous speech recognition

- secretary trained to:
  - understand key words as "commands"
  - to type responses on screen as the system would
  - manipulating graphic images through gesture and speech

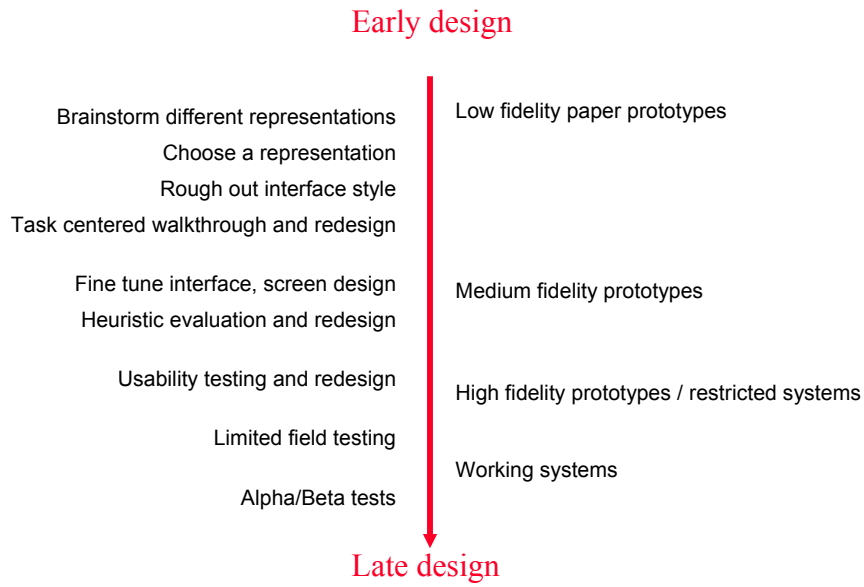
Intelligent Agents / Programming by demonstration

- person trained to mimic "learning agent"
  - user provides examples of task they are trying to do
  - computer learns from them
- shows how people specify their tasks

In both cases, system very hard to implement!

Saul Greenberg

The Prototyping Process



Saul Greenberg

What You Now Know

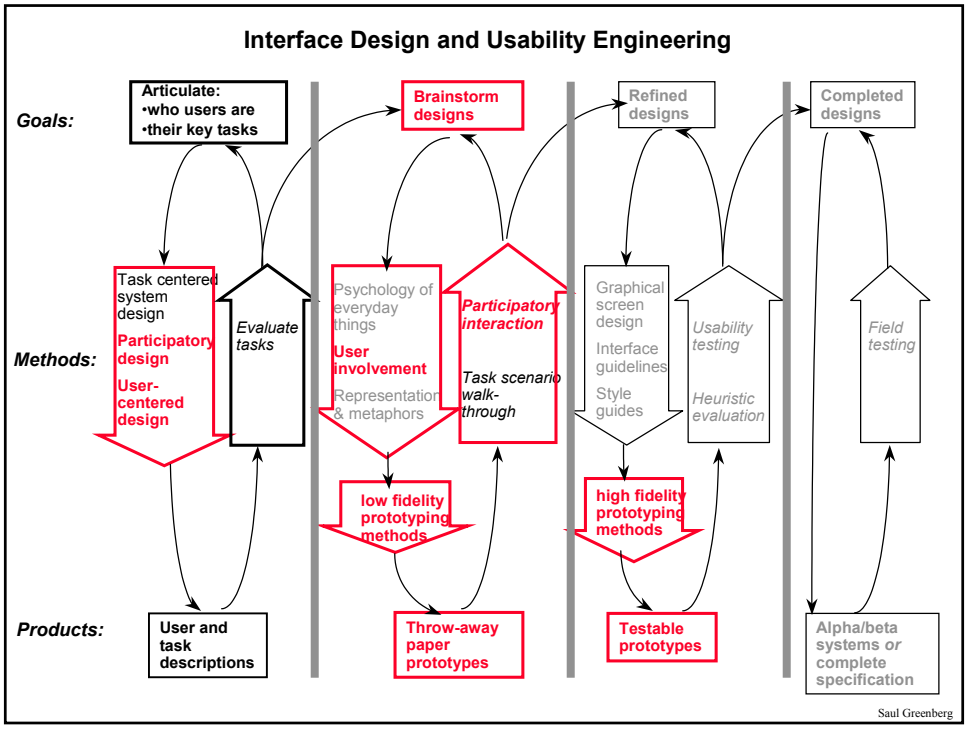
Prototyping

- allows users to react to the design and suggest changes
- low-fidelity prototypes best for brainstorming and choosing representations
- medium-fidelity prototypes best for fine-tuning the design

Prototyping methods

- vertical, horizontal and scenario prototyping
- storyboarding
- Pictive
- scripted simulations
- Wizard of Oz

Saul Greenberg


Interface Design and Usability Engineering
Goals:
Articulate:
•who users are
•their key tasks
Brainstorm designs
Refined designs
Completed designs
Methods:
Task centered system design
Participatory design
User-centered design
Evaluate tasks
Psychology of everyday things
User involvement
Representation & metaphors
Participatory interaction
Task scenario walk-through
Graphical screen design
Interface guidelines
Style guides
Usability testing
Heuristic evaluation
Field testing
low fidelity prototyping methods
high fidelity prototyping methods
Products:
User and task descriptions
Throw-away paper prototypes
Testable prototypes
Alpha/beta systems or complete specification
Saul Greenberg