

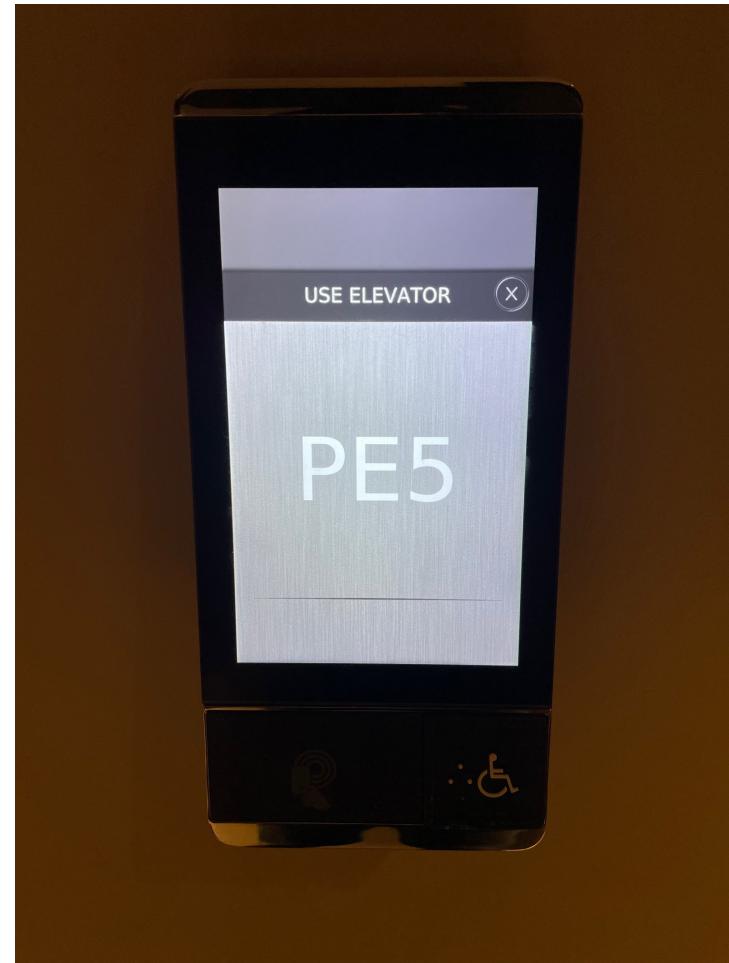
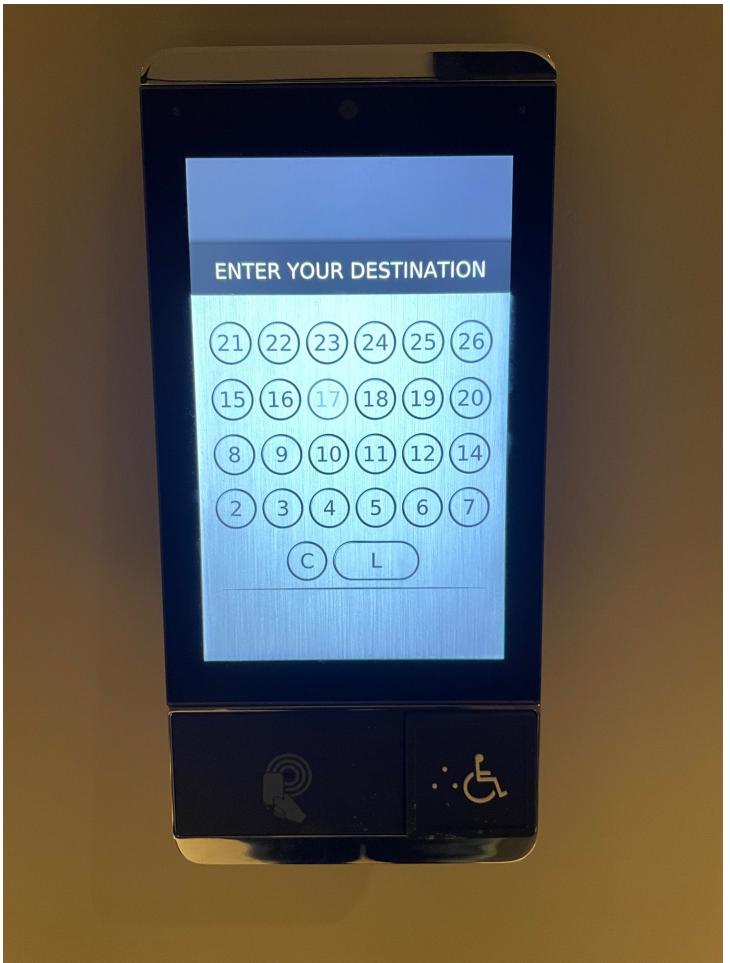
Intro to Prototyping and Low-Fi Prototypes

Human Computer Interaction

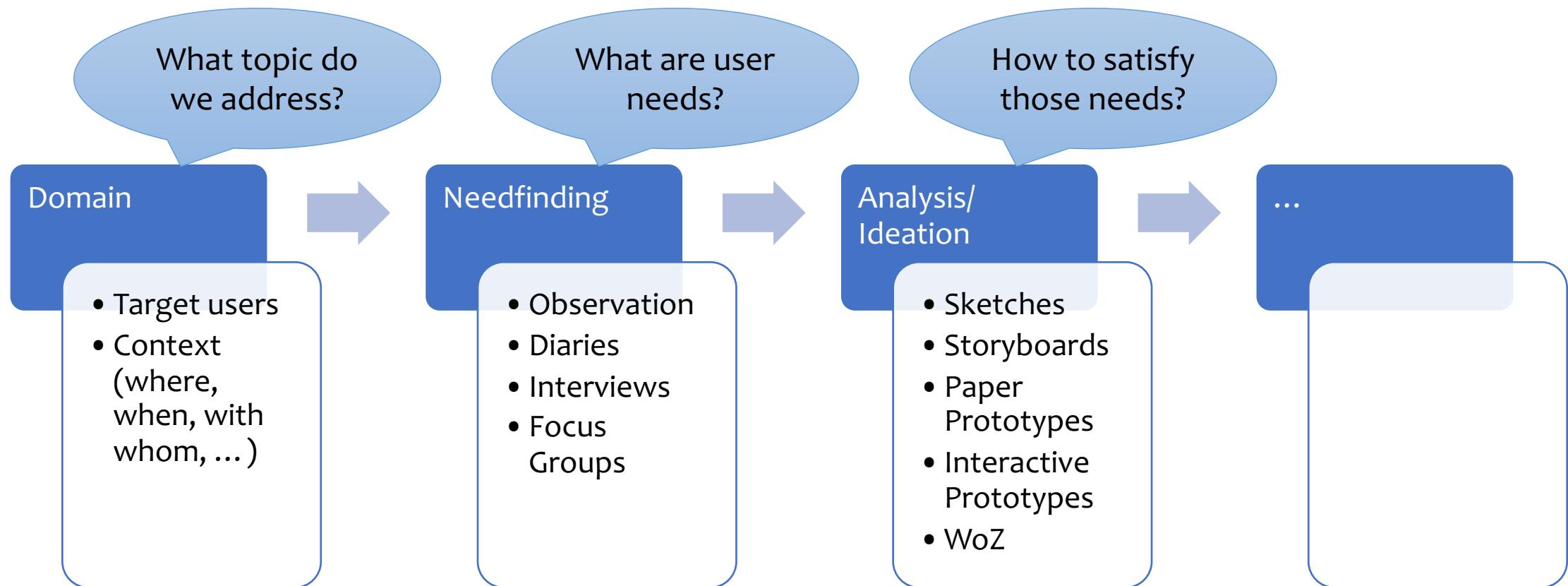
Luigi De Russis

Academic Year 2023/2024

Hall of Fame or Shame?



Process Recap



The Goal

- **Envisionment:** making ideas visible
 - Generating new ideas
 - Evaluating new ideas (within the design group)
 - Testing new ideas (with users)
- Different tools and techniques, according to
 - The stage of design (early, ..., advanced, final)
 - The intended audience (designers, test users, clients, management, ...)
- **Error to avoid:** focusing on the user interface before focusing on the task that the user has to accomplish

The Method

- Techniques to **explore** different design **alternatives**
- Explore
 - Flows of action
 - Devices and their roles
 - Interfaces
- Alternatives
 - More than one possible design
 - Impossible to get it right the first time
 - Find the best possible solution

Techniques

- Sketches (see “Storyboards”)
- Maps
- Prototypes:
 - Low Fidelity (paper)
 - Video
 - Medium Fidelity
 - High Fidelity

“If a picture is worth a thousand words, a prototype is worth a thousand meetings” — IDEO

Maps

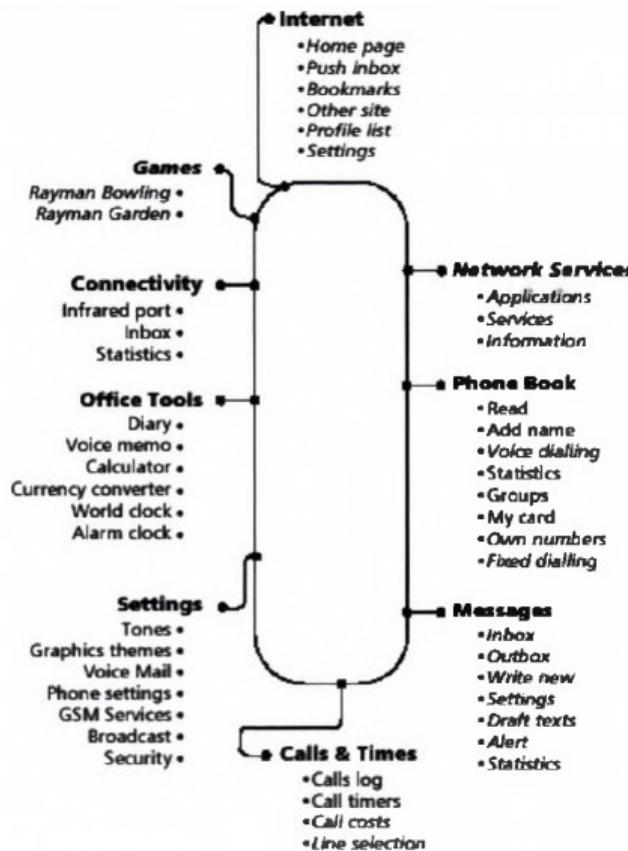
Visual overviews of navigation paths

Navigation Map

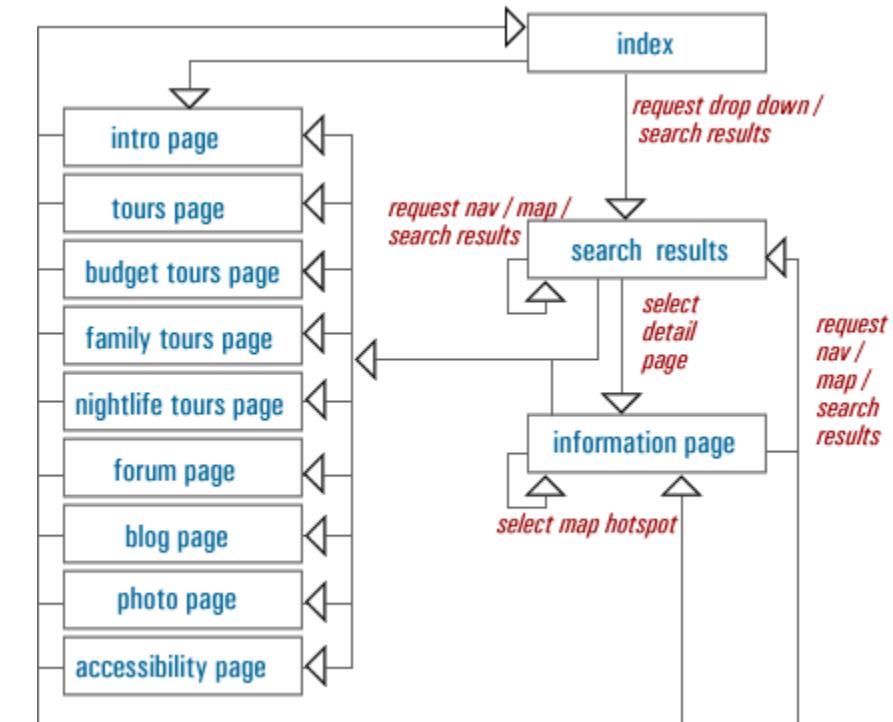
- A high-level view for the major structure of the interface
- Focus on how people move throughout the application
- Does not show the pages, only their organization and hierarchical relationship
- Related to the “information architecture” of the application

Map Examples

Old-style mobile phone menus



Website ‘sitemap’

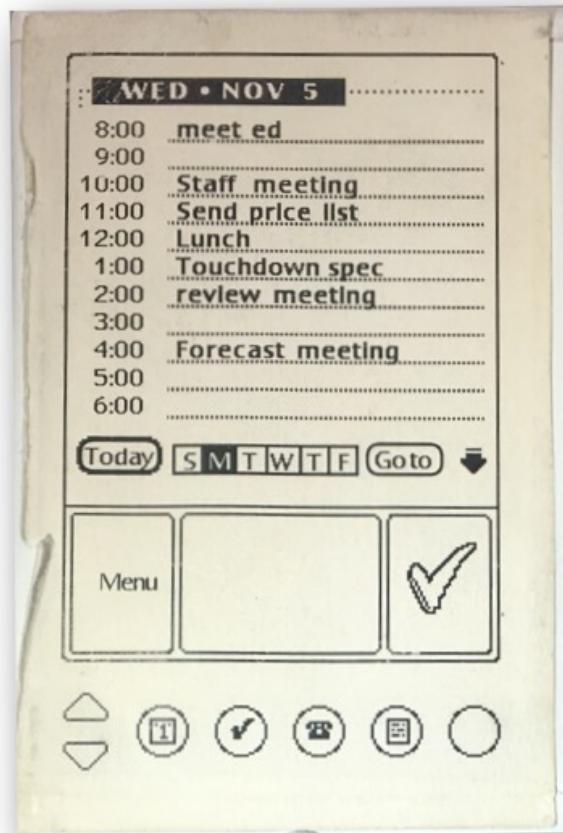


Prototypes

Tangible approximations, at various levels, of system behavior and appearance, to cheaply and quickly evaluate and explore design decisions

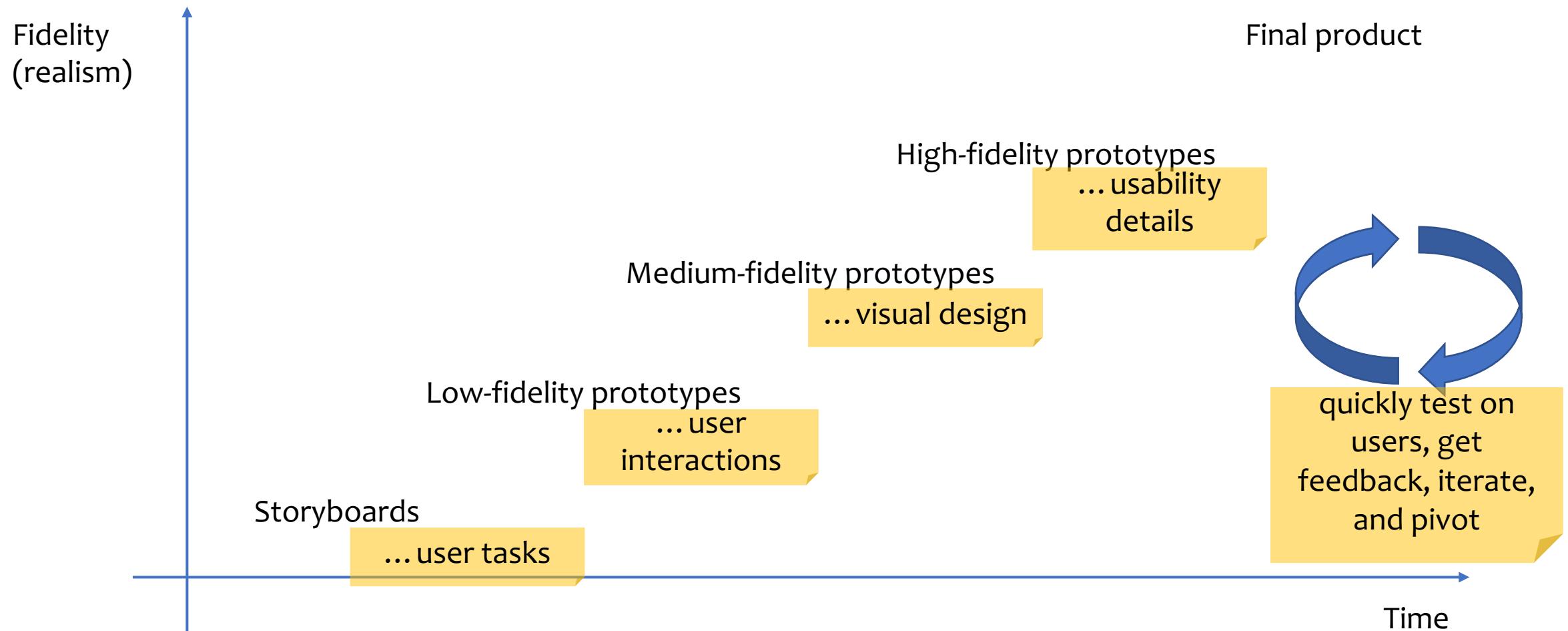
Prototypes

- «A prototype is a concrete but partial representation or implementation of a system design»
- «An easily modified and extensible model (representation, simulation or demonstration) of a planned software system, likely including its interface and input/output functionality»
- One of the most powerful tools for design exploration, visualization, and testing
- They let us ‘see’ and ‘feel’ interactivity (simulated or real)



source: <https://albertosavoia.medium.com/the-palm-pilot-story-1a3424d2ffe4>

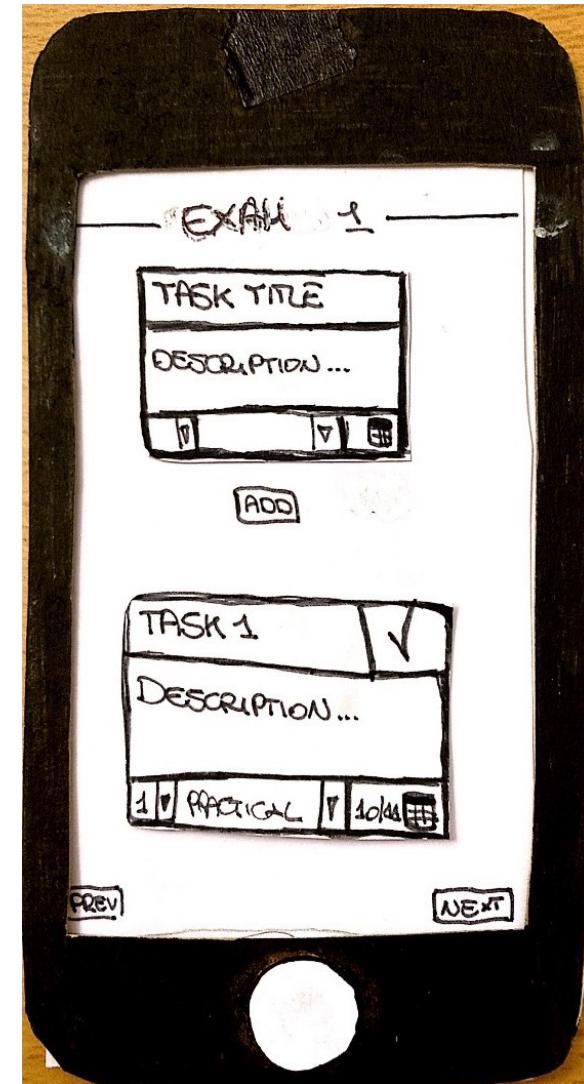
Prototypes Facilitate Conversations About...



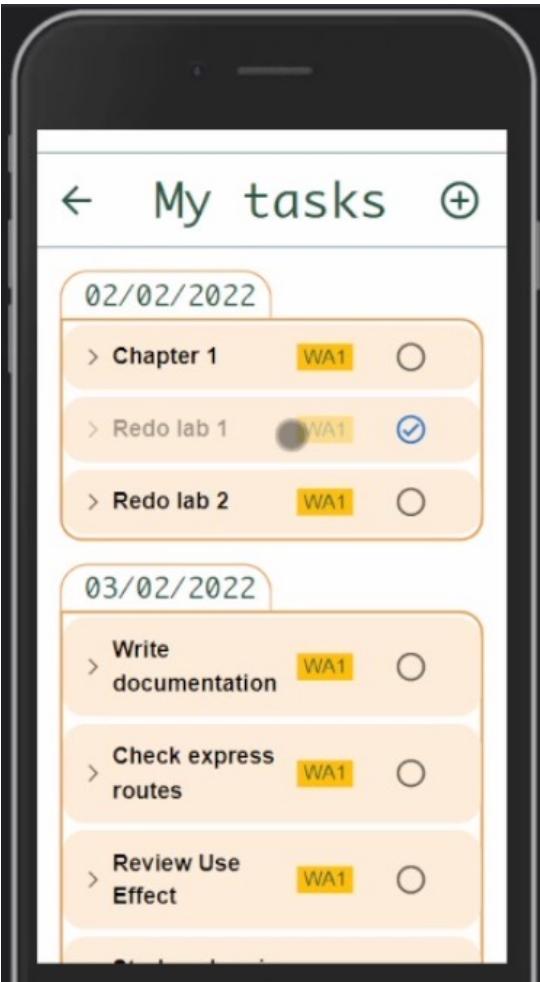
Low to High Fidelity Prototypes

Low-fi

- Lays out the *main* information, interactions, and design choices
- With many missing details



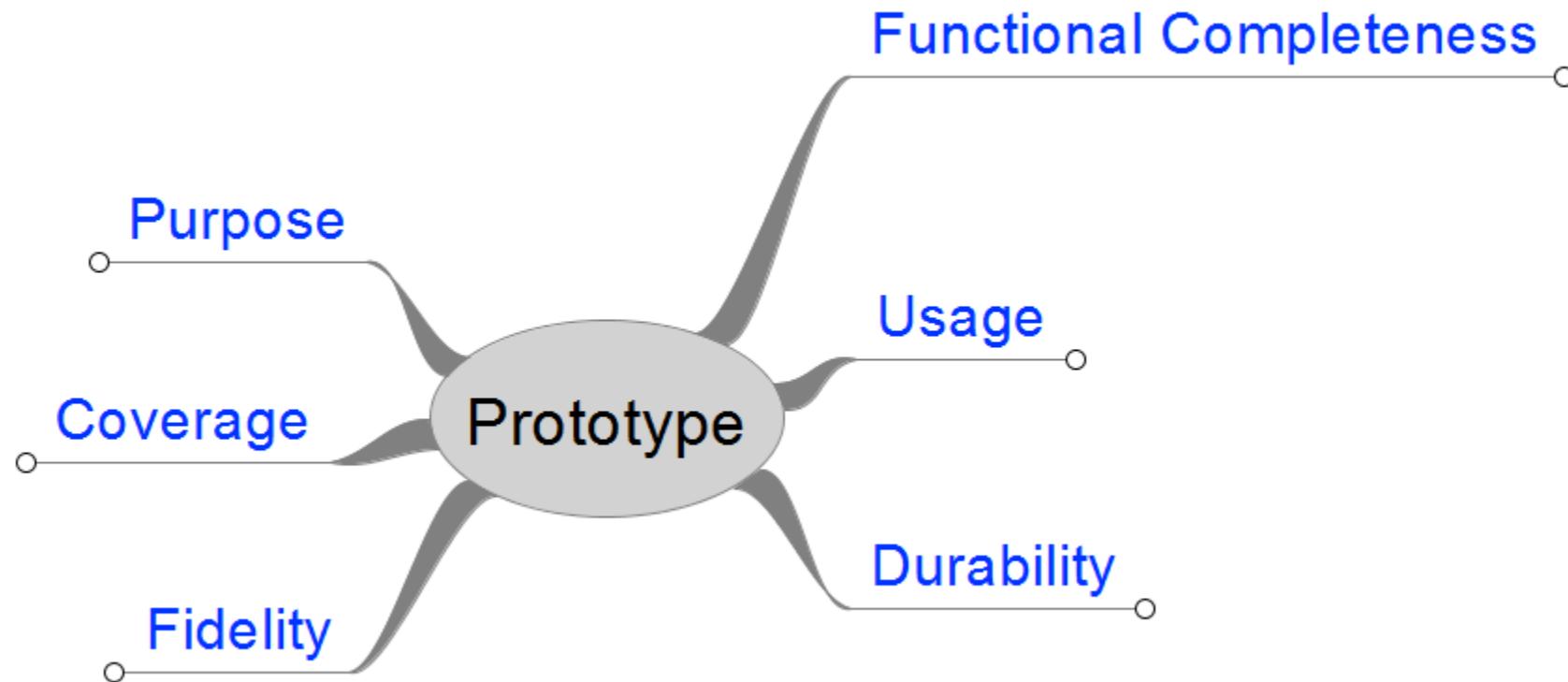
Low to High Fidelity Prototypes



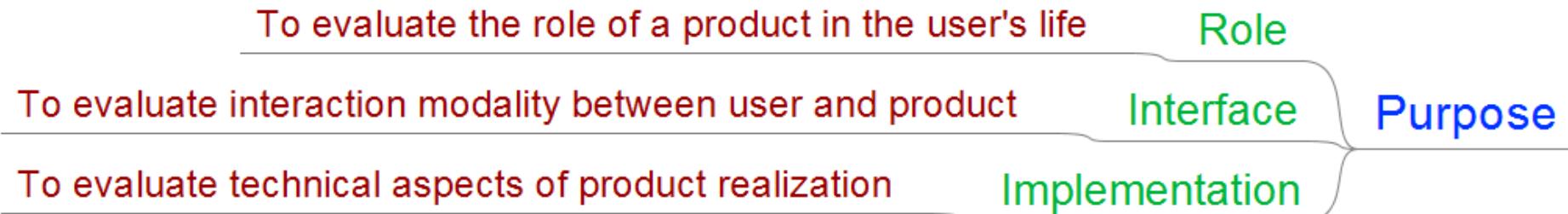
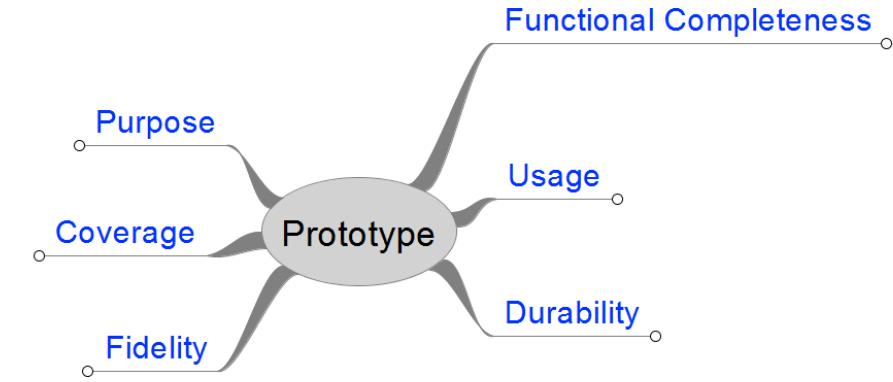
Hi-fi

- It looks like the final product

Characteristics of Prototypes



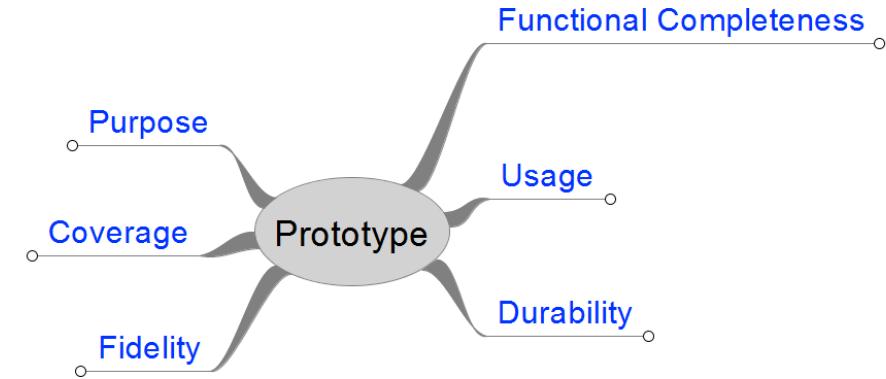
Characteristics of Prototypes



Possible Purposes For a Prototype

- Expert analysis
- Check with design rules and guidelines
- Involve users in a controlled experiment
- Involve users “in the wild”
- ...

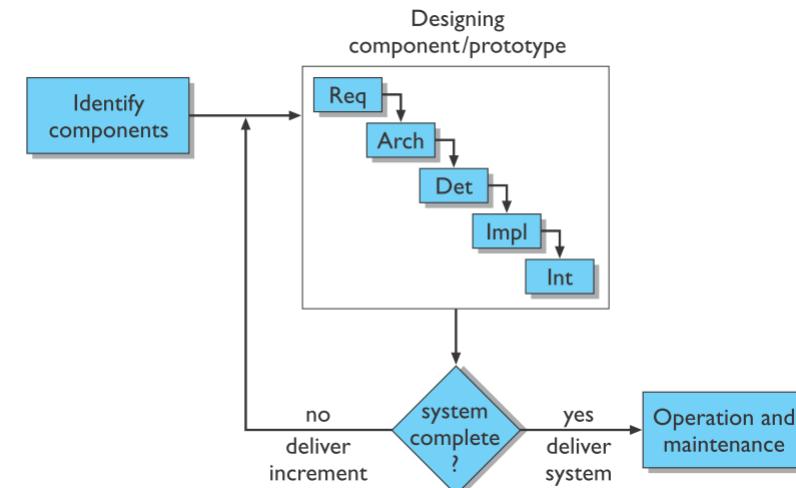
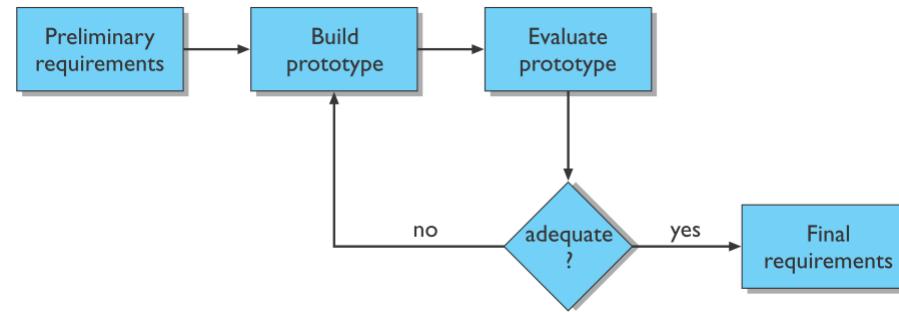
Characteristics of Prototypes



Durability	Exploratory	A throw-away prototype used to clarify project goals, to identify requirements, to examine alternative designs, or to investigate a large and complex system
	Experimental	A prototype used to validate system specifications
	Operational	An iterative prototype that is progressively refined until it becomes the final system

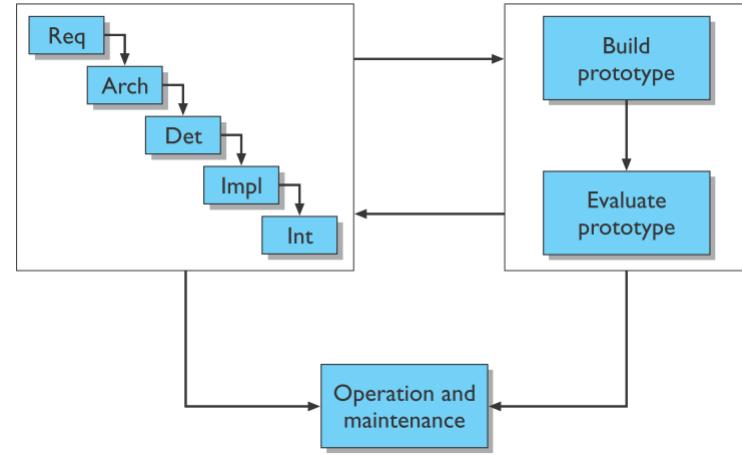
Durability (1)

- **Throw-away prototype:** used to assess some qualities of the system (gain knowledge), then discarded
- **Incremental prototype:** the system is developed as incremental modules, each of them released in a separate step



Durability (2)

- **Evolutionary prototype:** the prototype *becomes* the product; each product iteration builds upon the previous one



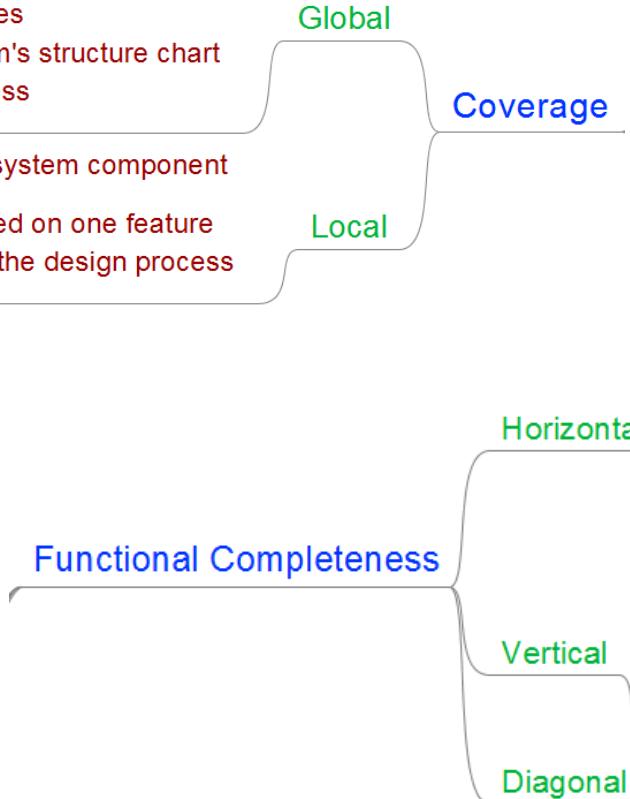
Characteristics of Prototypes

A prototype of the entire system

- an expanded horizontal prototype
- models a greater number of features
- covers multiple levels of the system's structure chart
- useful throughout the design process

A prototype of a single usability-critical system component

- a vertical prototype that is focused on one feature
- useful at some specific stage of the design process



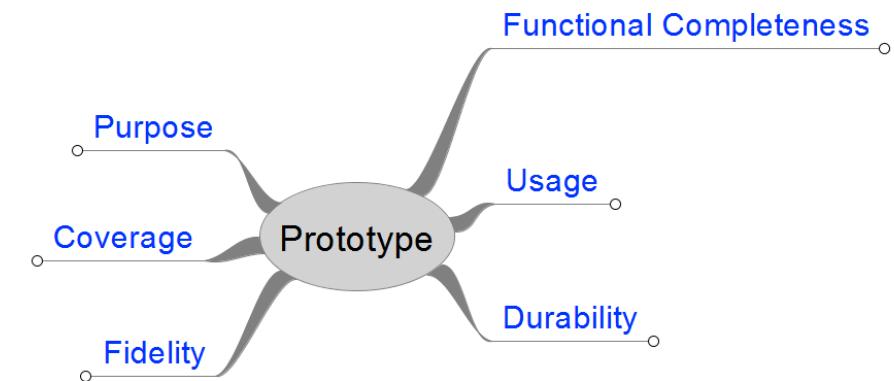
A prototype that models many features but with little detail

- a horizontal slice of a system's structure chart from the top down to a specific depth
- most useful in the early stages of design
- purpose is to test the overall interaction metaphor, so includes common functions that the user is expected to perform frequently

A prototype that models few features but with much detail

- a vertical slice of a system's structure chart from top to bottom
- most useful in the later stages of design
- purpose is to test details of the design

A prototype that is horizontal down to a particular level, then vertical below that point



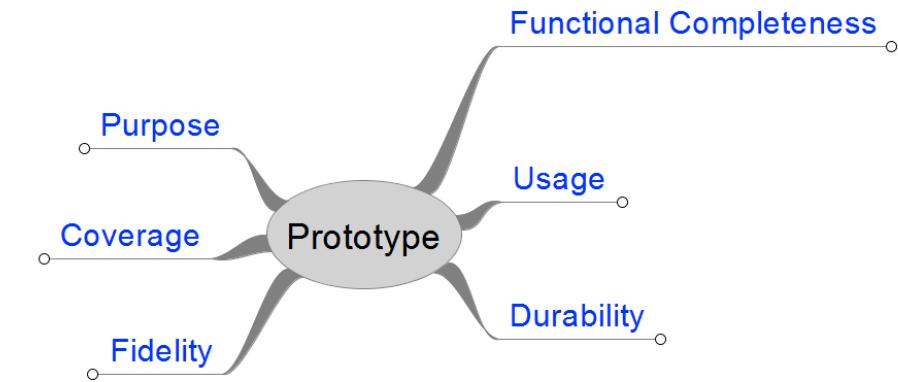
Characteristics of Prototypes

A set of drawings (e.g., storyboard) that provide a static, non-computerized, non-working mock-up of user interface for the planned system

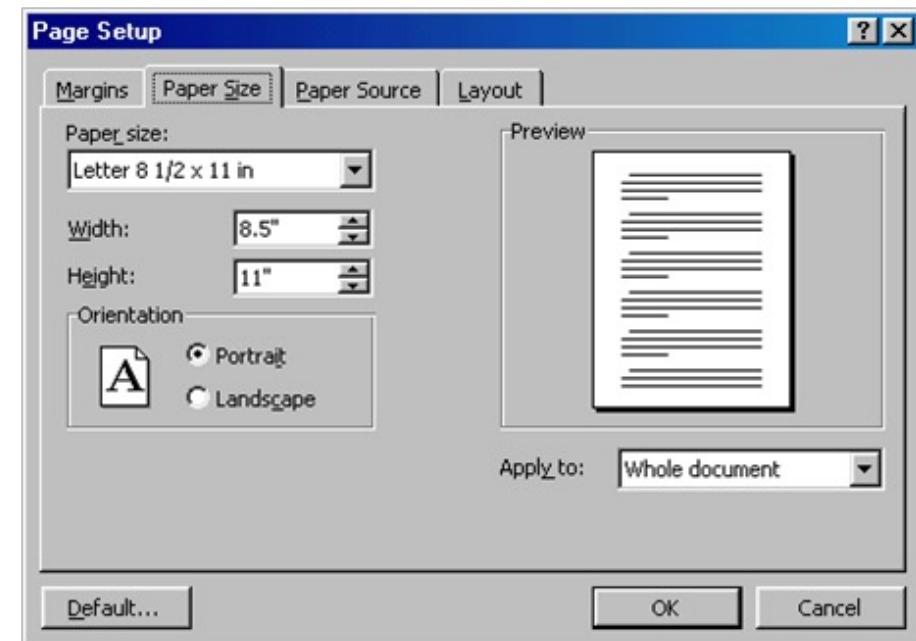
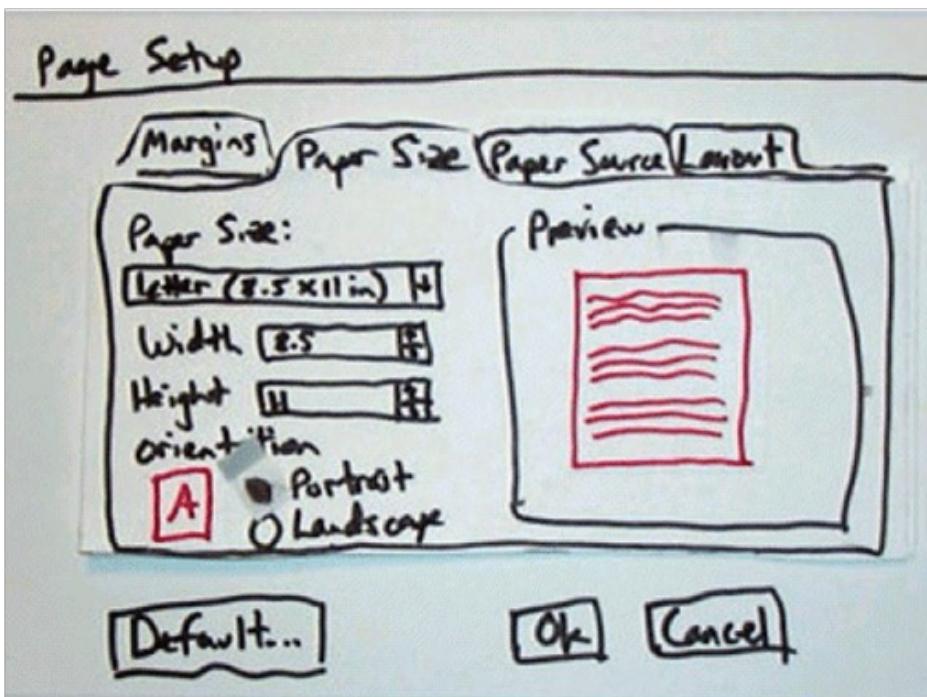
A set of screens that provide a dynamic, computerized, working model of the planned system

Low
High
Fidelity

Static	Static representation of the product (storyboards, diagrams, ...)
Dynamic	Dynamic (but not interactive) representation of the product (e.g., video)
Interactive	Allows users to test the usage of the system, even if in an approximate and simplified way



Fidelity: Different Information Is Conveyed



Low Fidelity Prototypes

How to start using an application, months before implementing it

Paper Prototypes

- A hand-drawn mock-up of the user interface (usually) on multiple sheets of paper of varying sizes



Key Features for Paper Prototypes

- Interactive paper mockup
 - Sketches of screen appearance
 - Paper pieces show windows, menus, dialog boxes
- Interaction is natural
 - Pointing with a finger = mouse click
 - Writing = typing
- A person simulates the computer's operation
 - Putting down & picking up pieces
 - Writing responses on the “screen”
 - Describing effects that are hard to show on paper
- Low fidelity in look & feel
- High fidelity in depth (person simulates the backend)

<http://web.mit.edu/6.813/www/sp18/classes/11-prototyping/>

Materials

- Paper, Transparent paper
- Pens, Markers
- Post-It notes
- Glues, scotch tape, scissors
- Photocopies
- UI Stencils
- Reusable UI components
- Printouts of screenshots

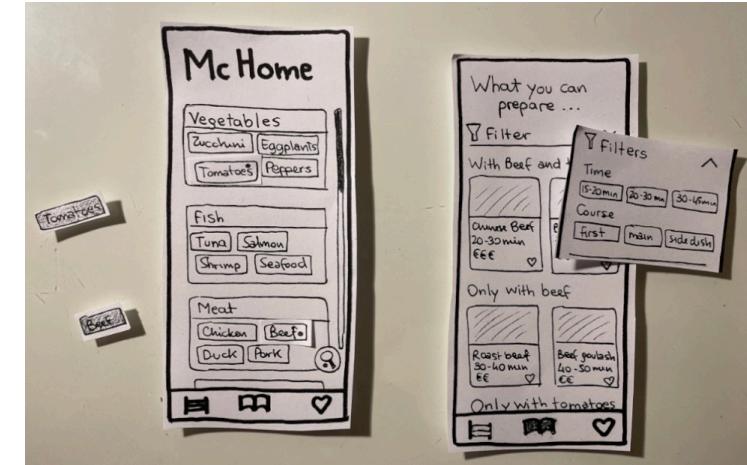
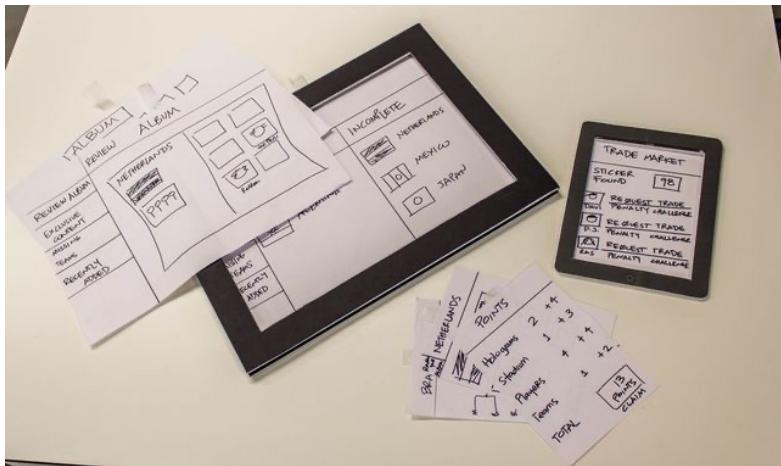


Why Paper Prototyping?

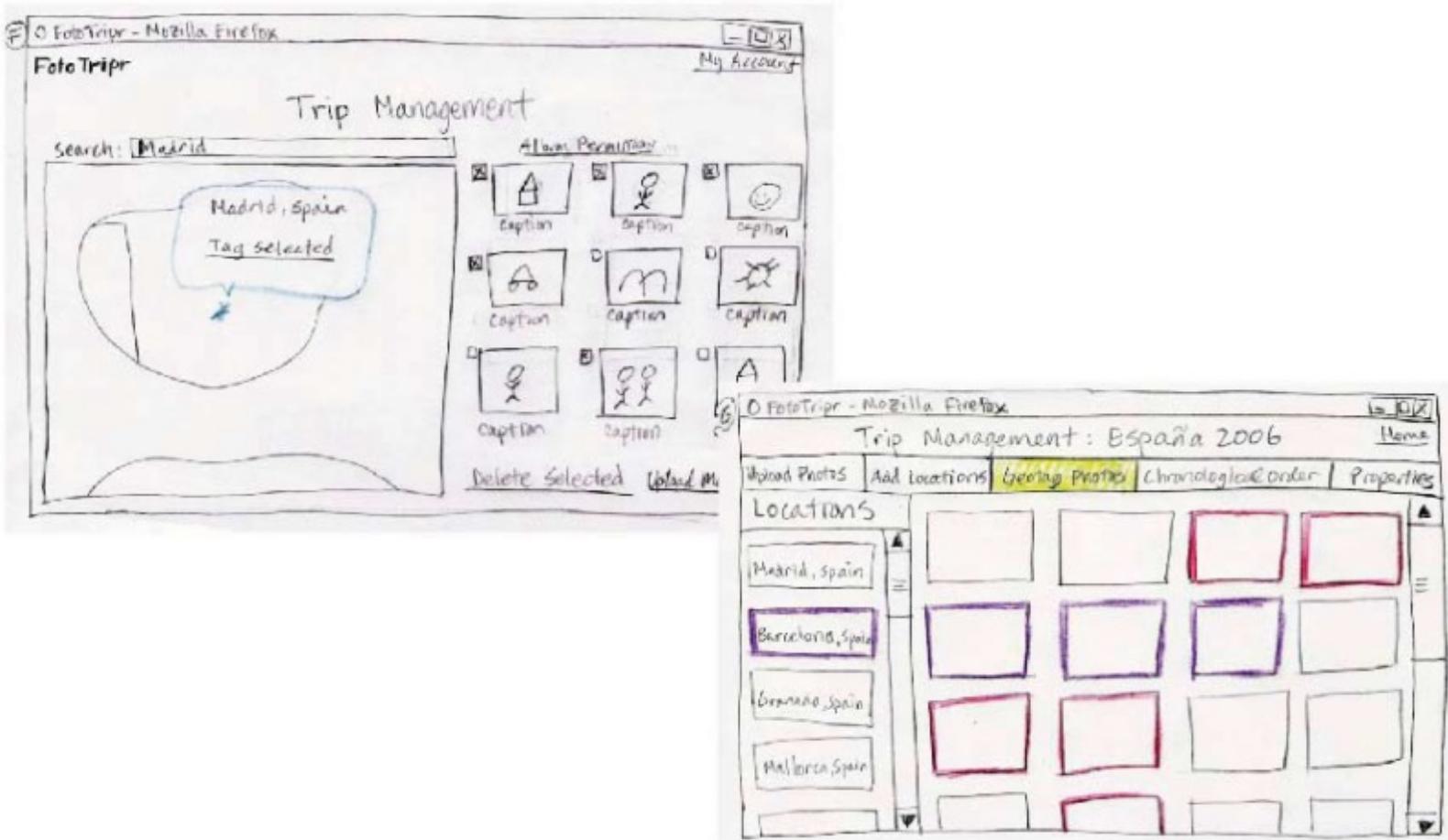
- Faster to build
 - Sketching is faster than programming
- Easier to change
 - Easy to make changes between user tests, or even **during** a user test
 - No code investment - everything will be thrown away (except the design)
- Focuses attention on big picture
 - Designer doesn't waste time on details
 - Customer makes more creative suggestions, not nitpicking
- Non-programmers can help
 - Only kindergarten skills are required

<http://web.mit.edu/6.813/www/sp18/classes/11-prototyping/>

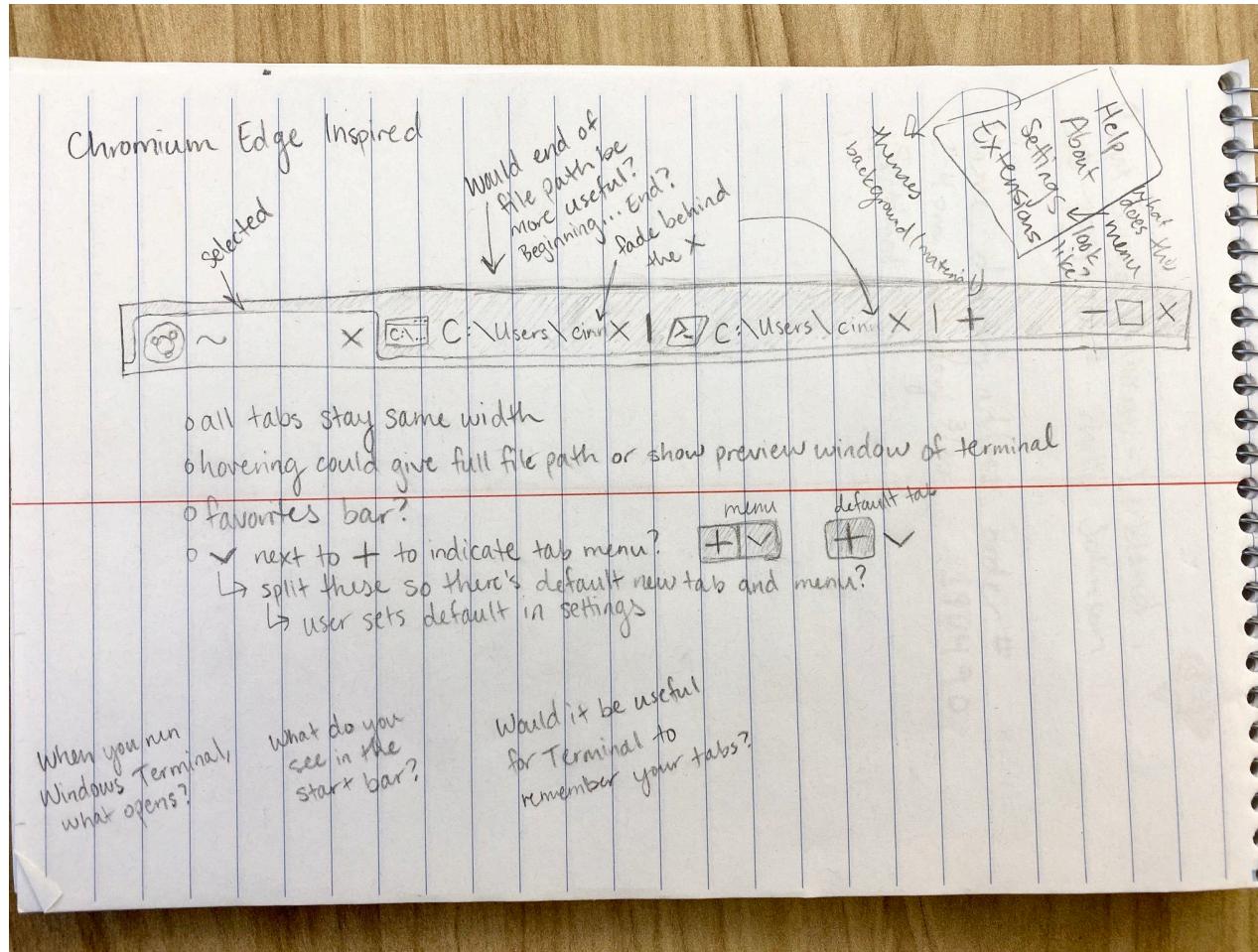
Paper Prototypes: Examples



Other Examples

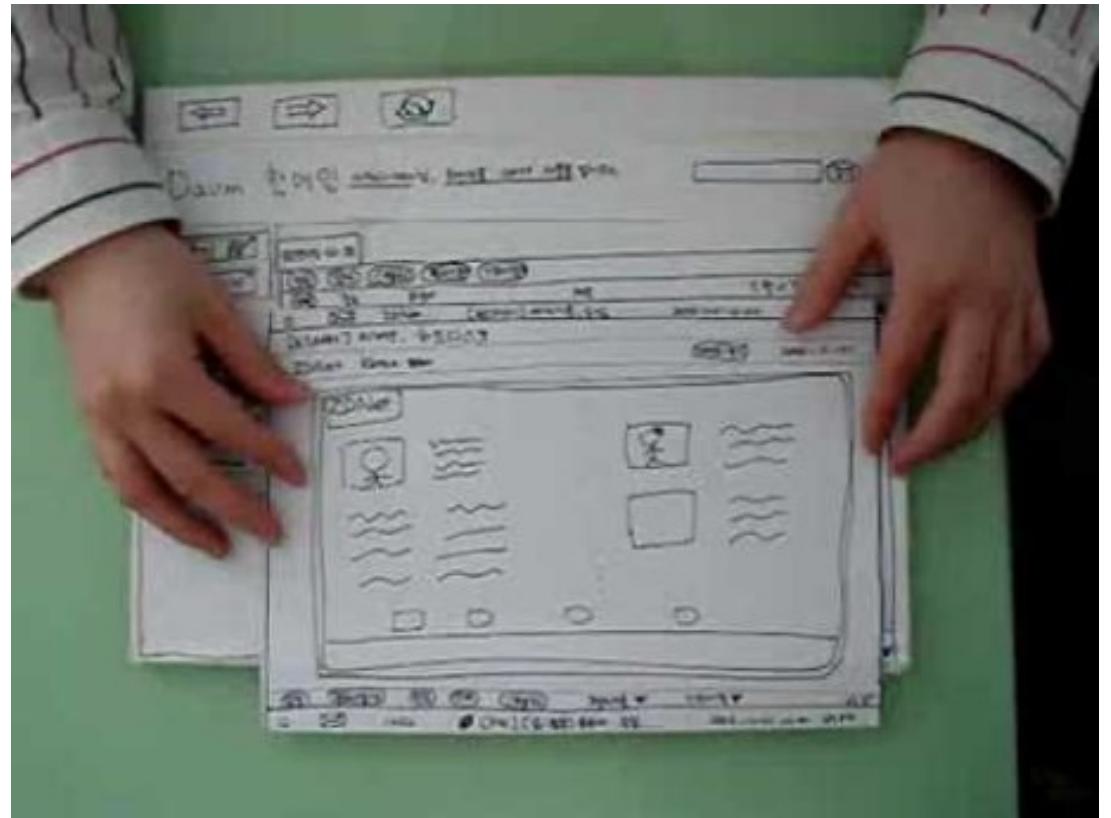


First Ever Mockup of the Windows Terminal Tab Bar



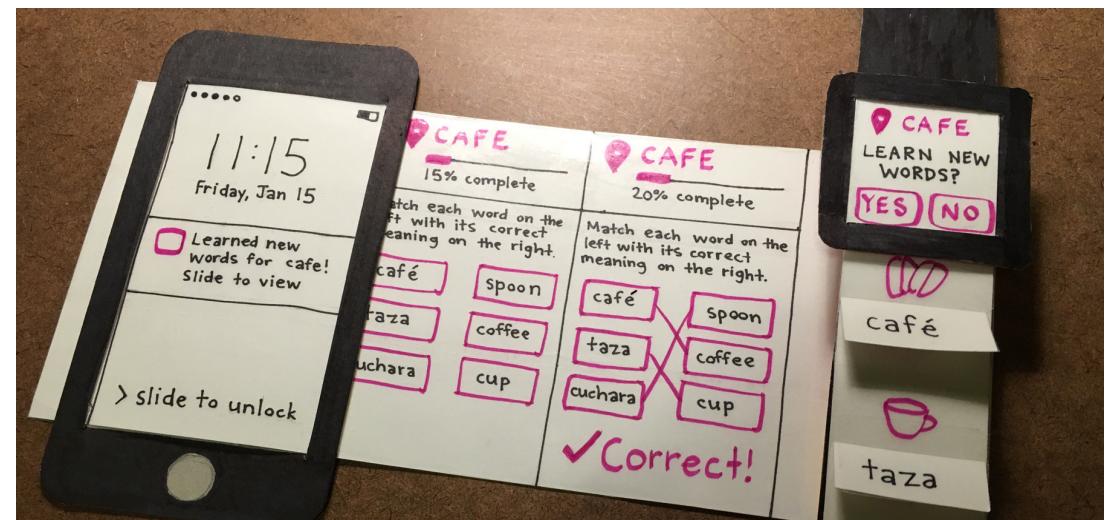
[https://twitter.com/cinnamon_msft/
status/1190015862201176065?s=20](https://twitter.com/cinnamon_msft/status/1190015862201176065?s=20)

Creating Flows With Paper Prototypes



<https://youtu.be/GrV2SZuRPvo>

“Dynamic” Screens



How to Test a Paper Prototype

- The Design Team should cover these roles
 - ‘Computer’ actor
 - Simulates prototype
 - Does not give any feedback that the computer would not
 - Facilitator
 - Presents interface and tasks to the user
 - Encourages user to “**think aloud**” by asking questions
 - Keeps user test from getting off track
 - Observer
 - Keeps mouth shut
 - Takes copious notes

Learnable Lessons From Paper Prototypes

Can Learn

- Conceptual model
 - Do users understand it?
- Functionality
 - Does it do what's needed? Missing features?
- Navigation & task flow
 - Can users find their way around?
 - Are information preconditions met?
- Terminology
 - Do users understand labels?
- Screen contents
 - What needs to go on the screen?

Cannot Learn

- Look: color, font, whitespace, etc
- Feel: efficiency issues
- Response time
- Are small changes noticed?
 - Even the tiniest change to a paper prototype is clearly visible to user
- Exploration vs. deliberation
 - Users are more deliberate with a paper prototype; they don't explore or thrash as much

References and Acknowledgments

- Google, Begin Today With Rapid prototyping,
https://www.youtube.com/playlist?list=PL9KVldeJ2K8NDpsiYpcbB_qifd3y5CYZ
- MIT, http://web.mit.edu/6.813/www/sp18/classes/11-prototyping/#reading_11_prototyping
- Scott Klemmer, Storyboards, Paper Prototypes, and Mockups,
<https://youtu.be/z4glsttyxw8>
- Thanks to Fulvio Corno, past teacher of the course, for his work on some of these slides



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