HCI 2025

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Intro to Prototyping and Low-Fi Prototypes

Human Computer Interaction

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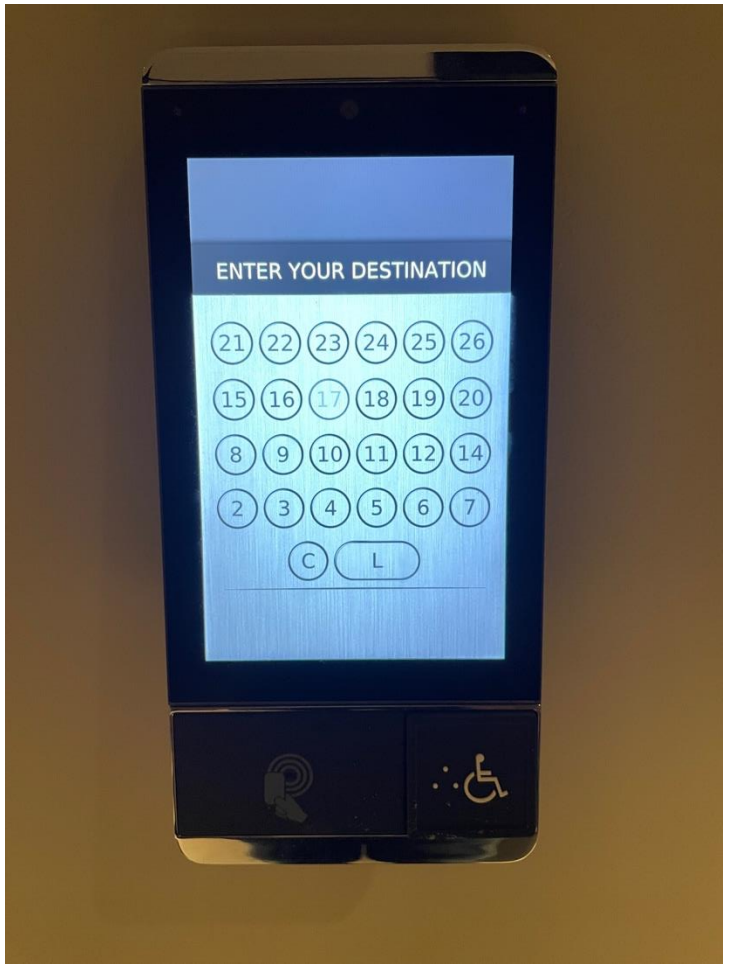
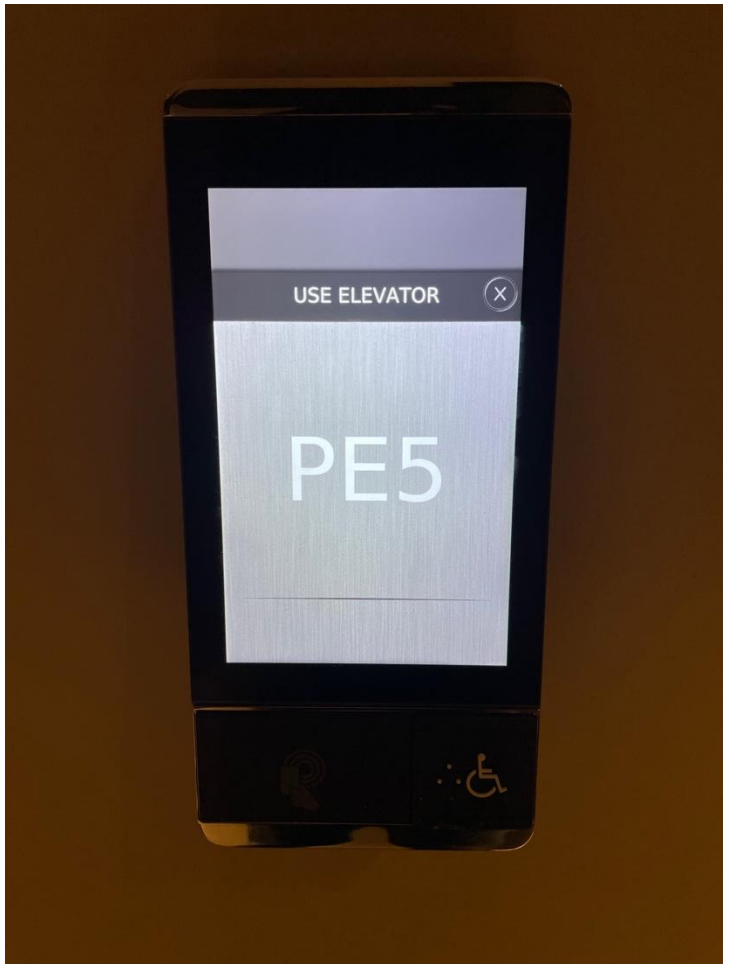
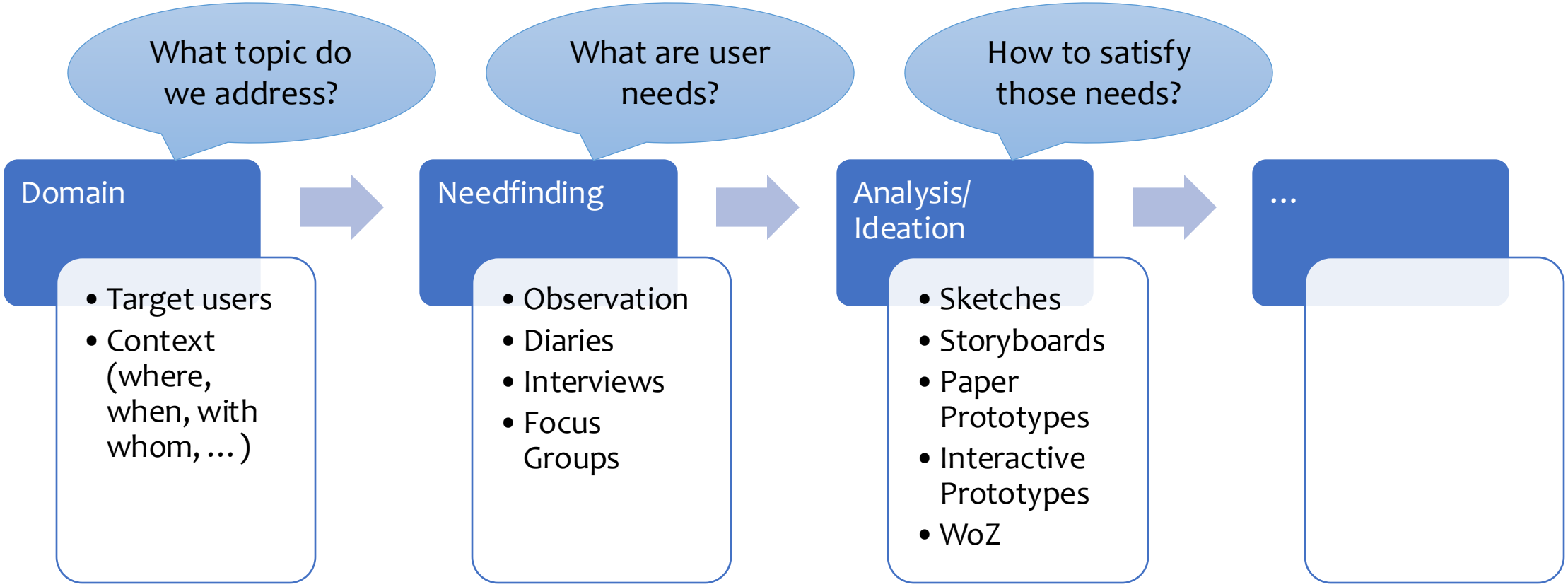
Academic Year 2025/2026

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

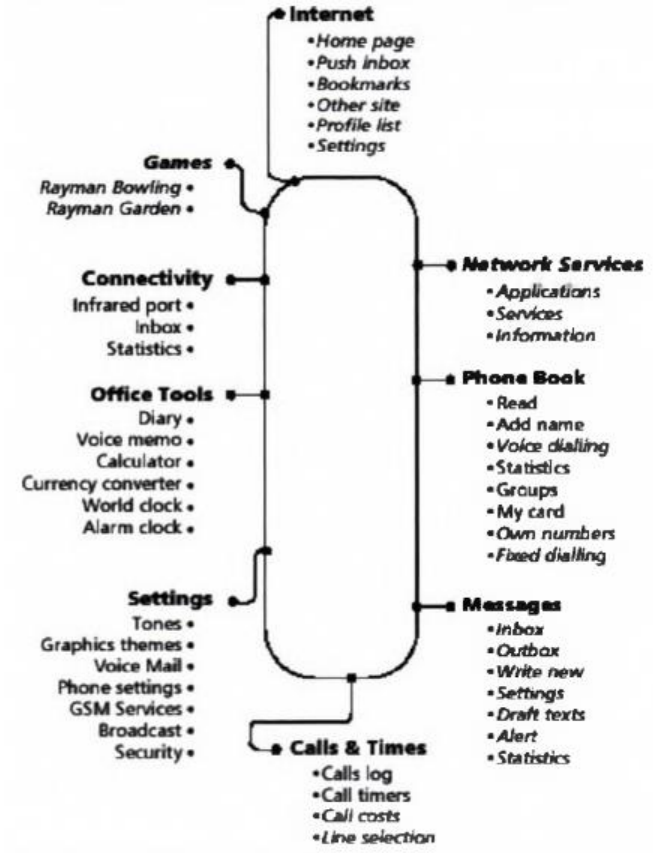
Visual overviews of navigation paths

Navigation Map

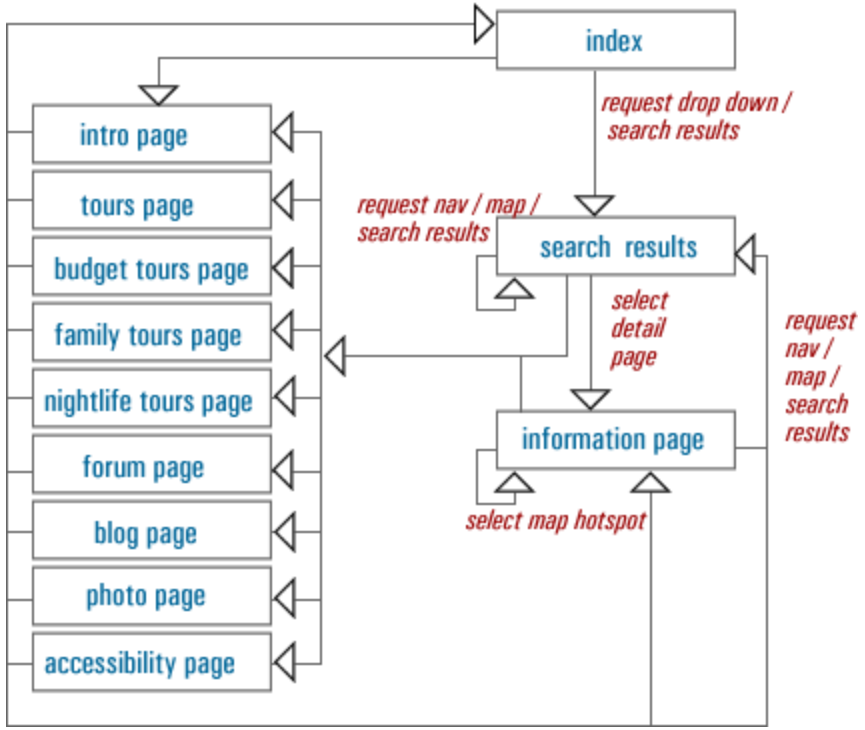
- A high-level view for the major structure of the interface
- Focus on how people move throughout the application
- Does not show the pages, only their organization and hierarchical relationship
- Related to the “information architecture” of the application

Map Examples

Old-style mobile phone menus



Website 'sitemap'

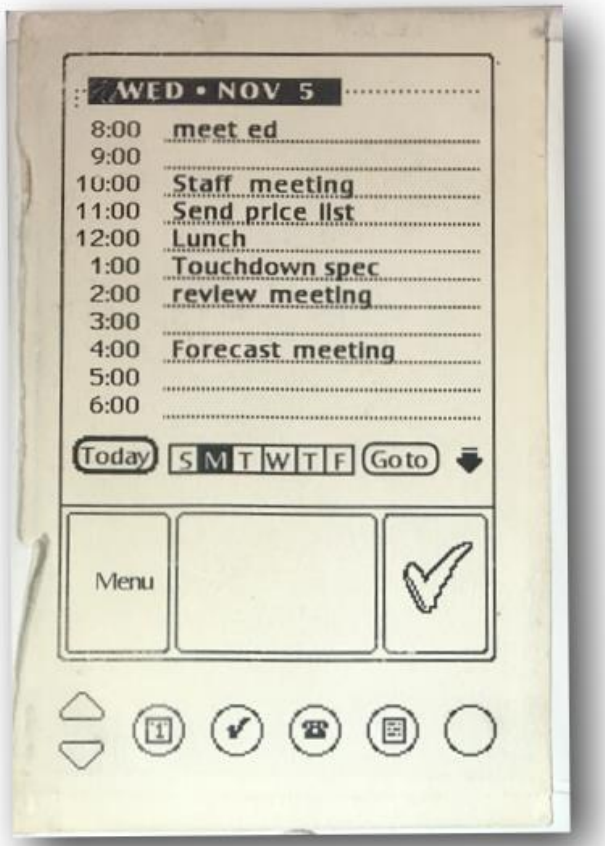


Prototypes

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

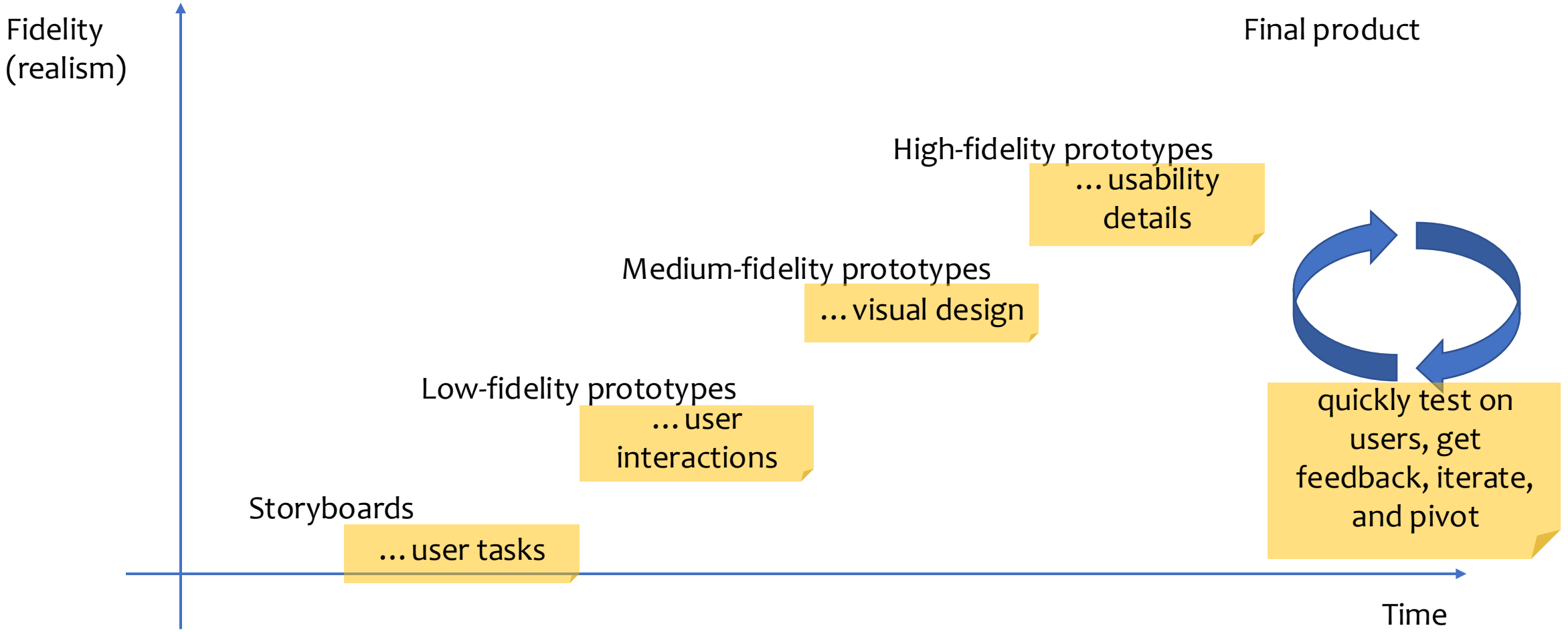
Prototypes

- «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

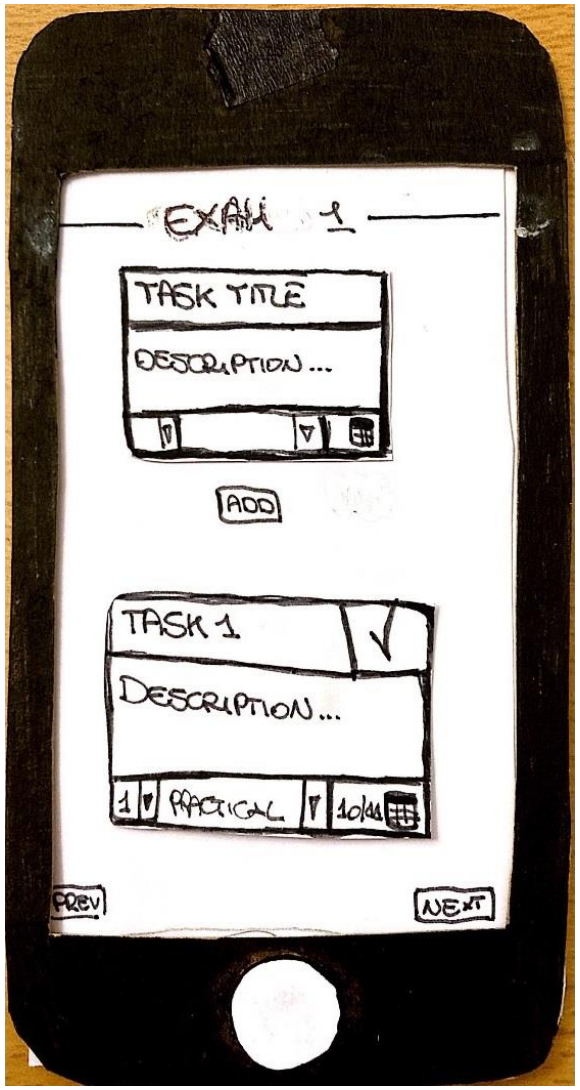
Prototypes Facilitate Conversations About…



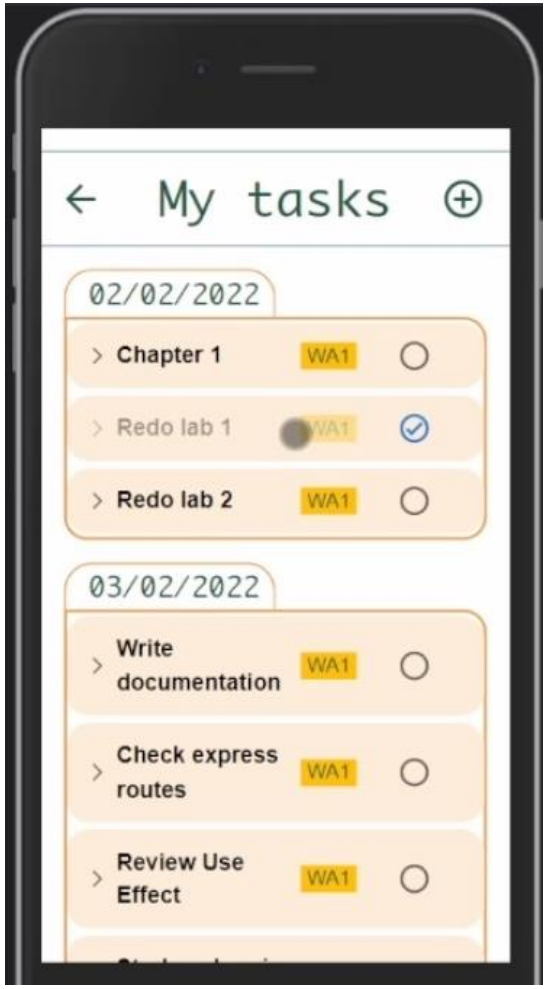
Low to High Fidelity Prototypes

Low-fi

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



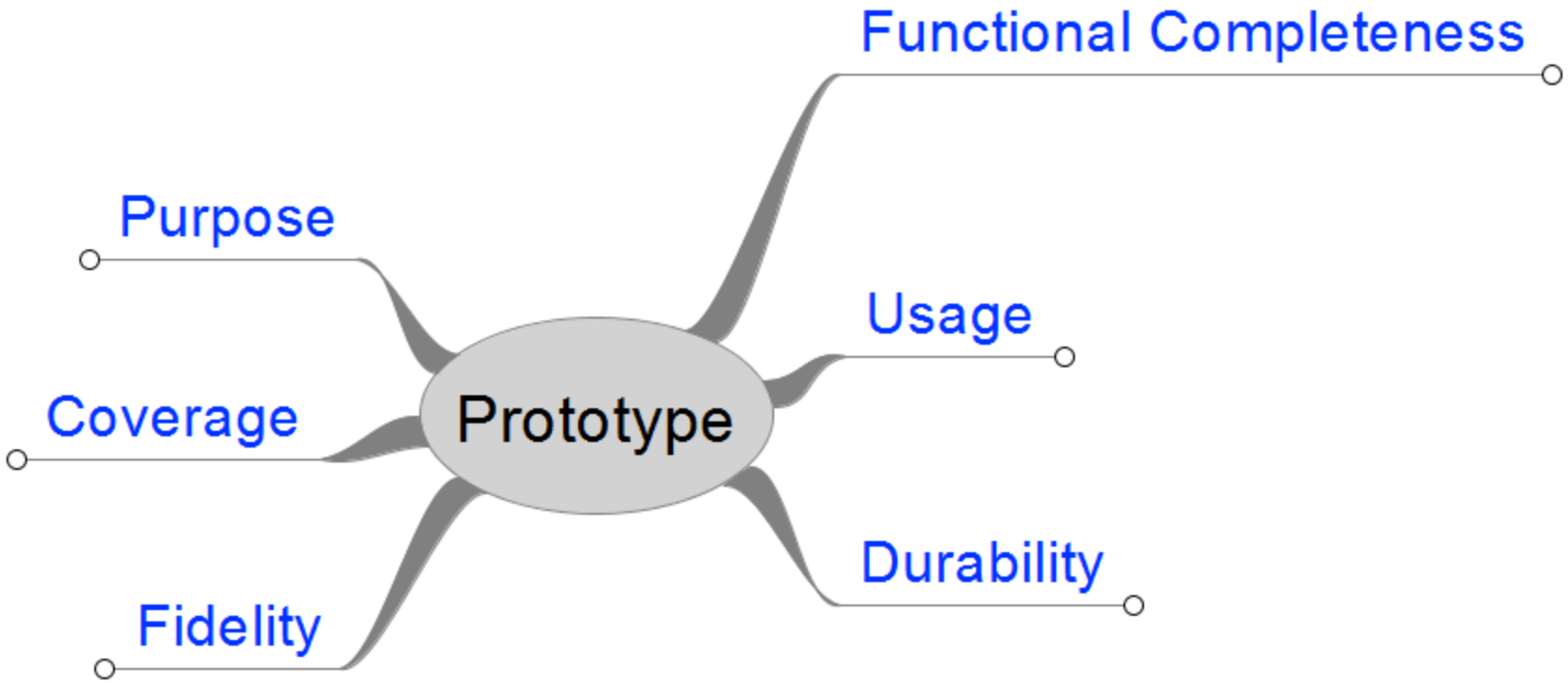
Low to High Fidelity Prototypes



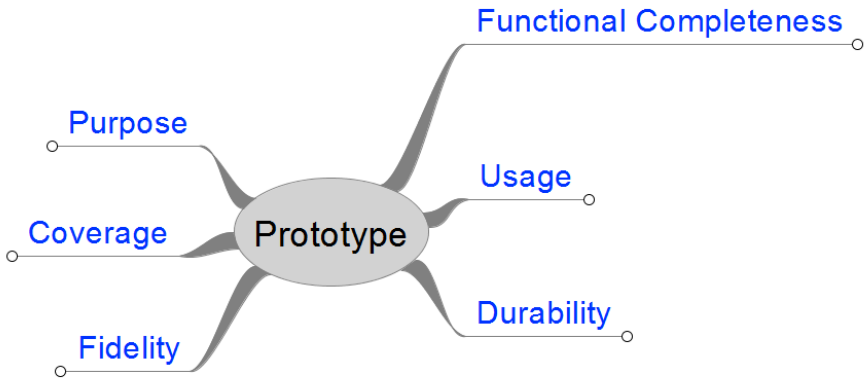
Hi-fi

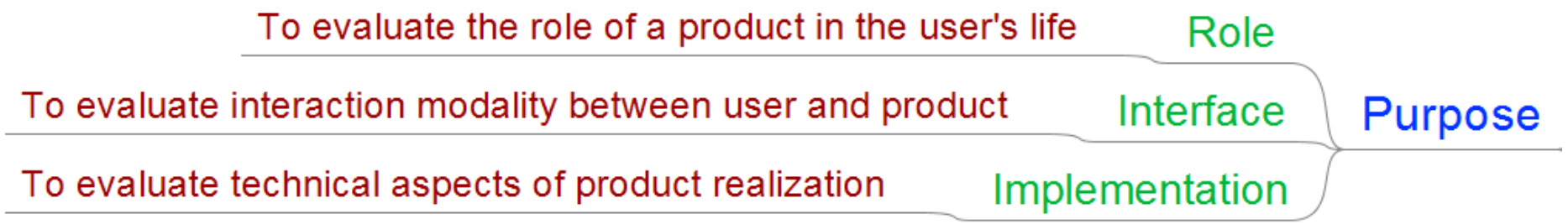
- It *looks like* the final product

Characteristics of Prototypes



Characteristics of Prototypes

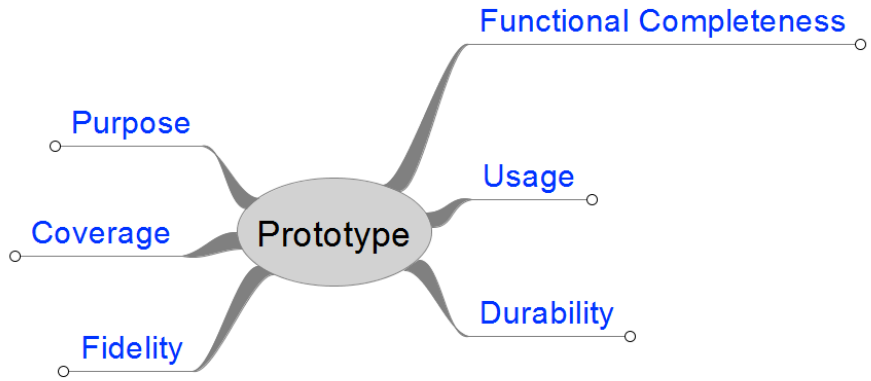


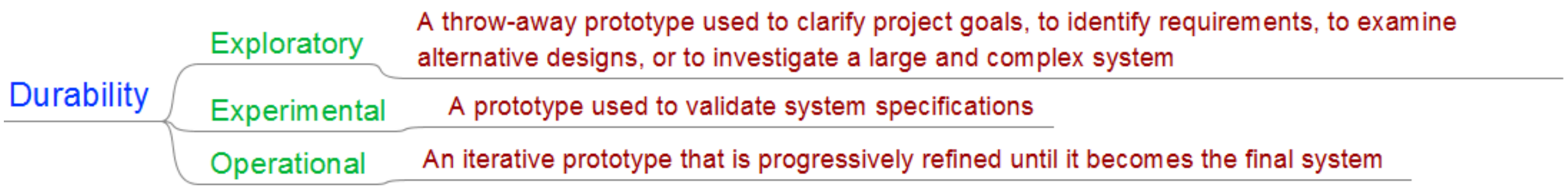


Possible Purposes For a Prototype

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

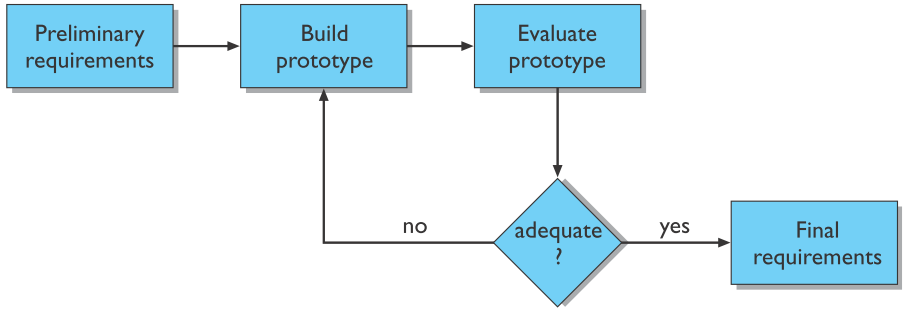
Characteristics of Prototypes



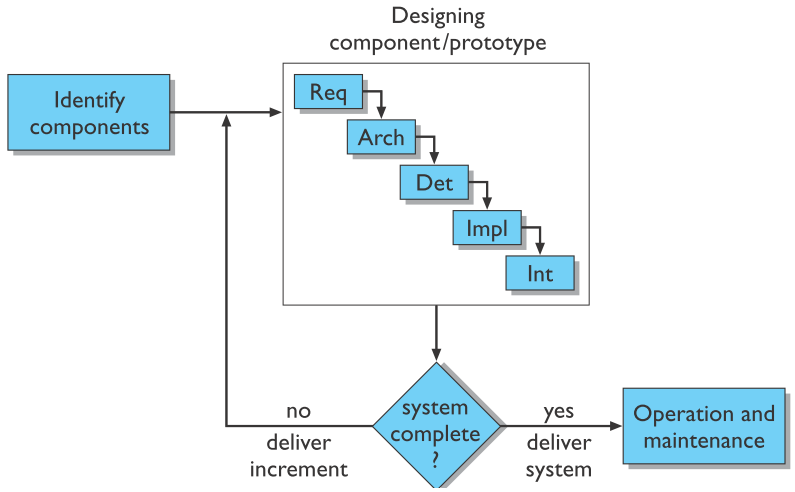


Durability (1)

- **Throw-away prototype:** used to assess some qualities of the system (gain knowledge), then discarded

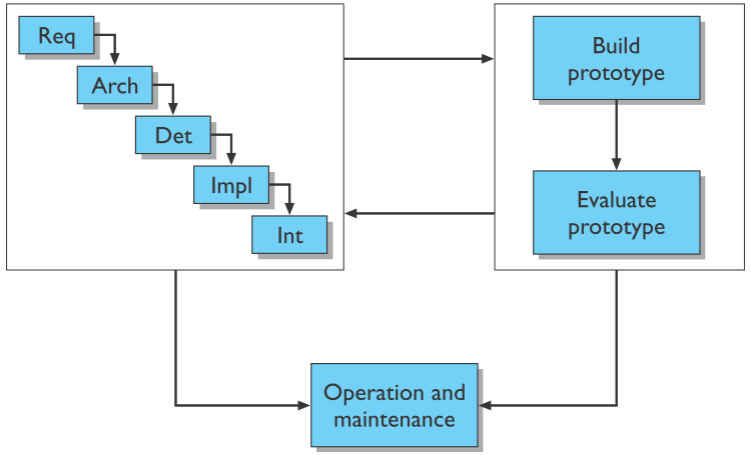


- **Incremental prototype:** the system is developed as incremental modules, each of them released in a separate step

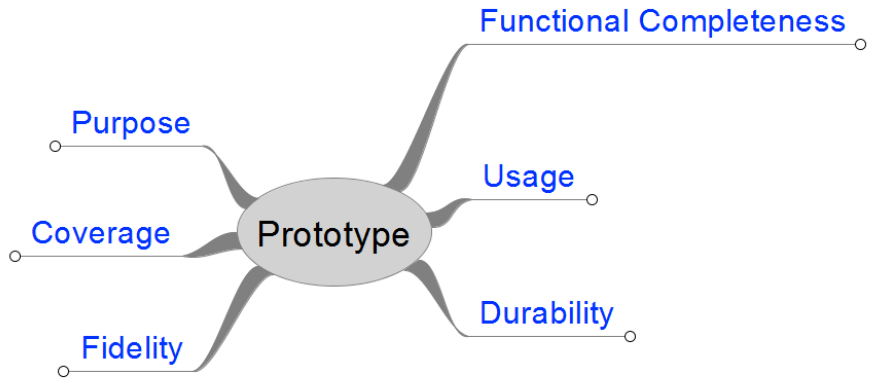


Durability (2)

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



Characteristics of Prototypes



Coverage

Global

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

Local

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

Functional Completeness

Horizontal

A prototype that models many features but with little detail

- a horizontal slice of a system's structure chart from thetop 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

Vertical

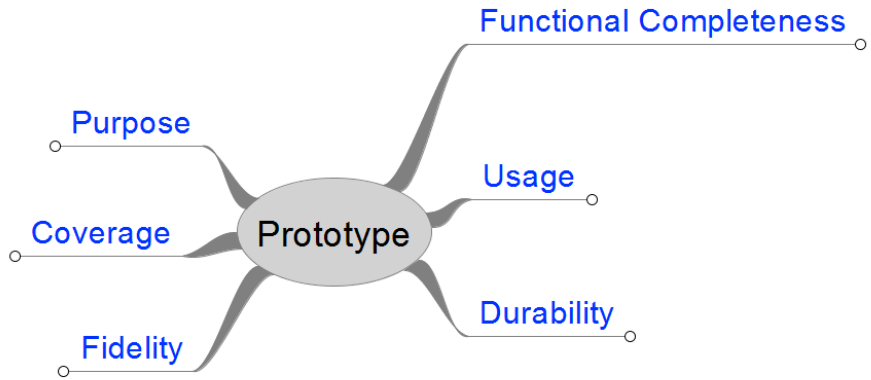
A prototype that models few features but with much detail

- 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

Diagonal

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

Characteristics of Prototypes



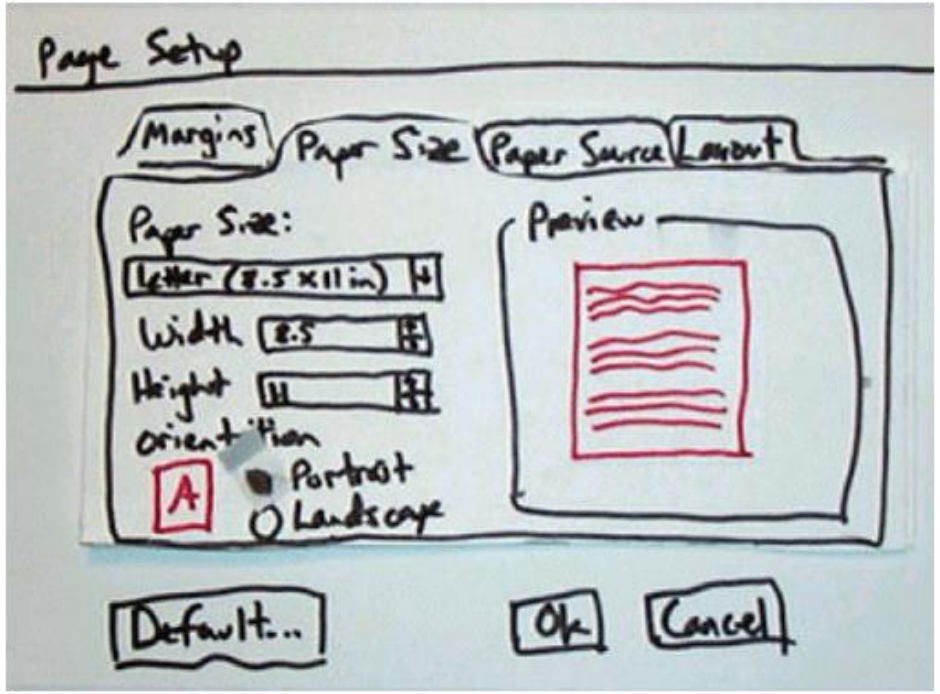
Fidelity

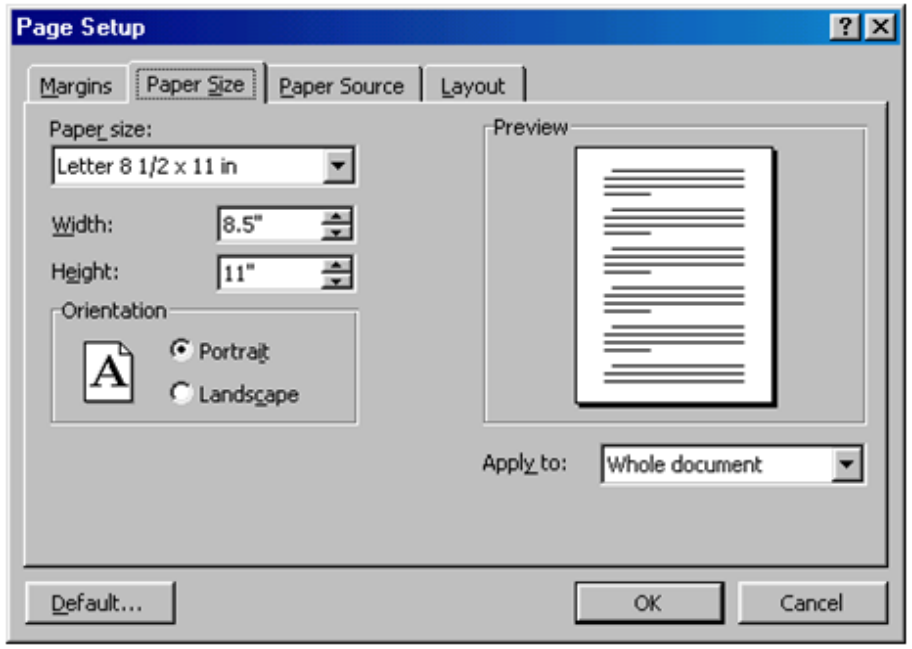
- **Low**: A set of drawings (e.g., storyboard) that provide a static, non-computerized, non-working mock-up of user interface for the planned system
- **High**: A set of screens that provide a dynamic, computerized, working model of the planned system

Usage

- **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



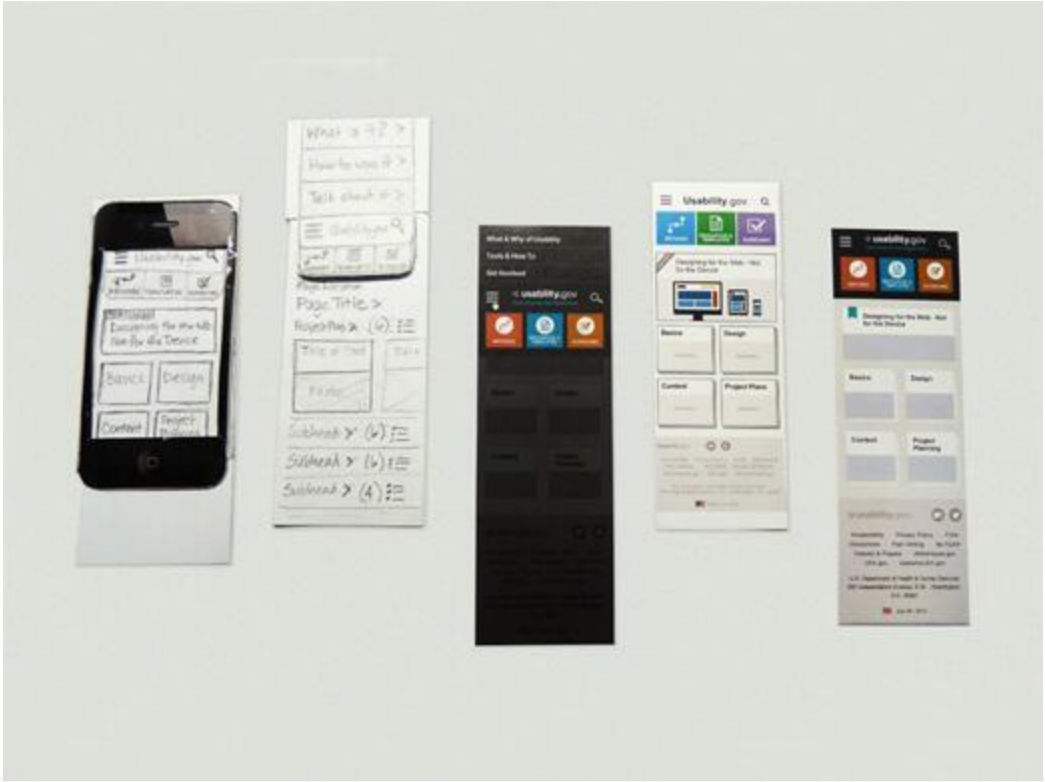


Low Fidelity Prototypes

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

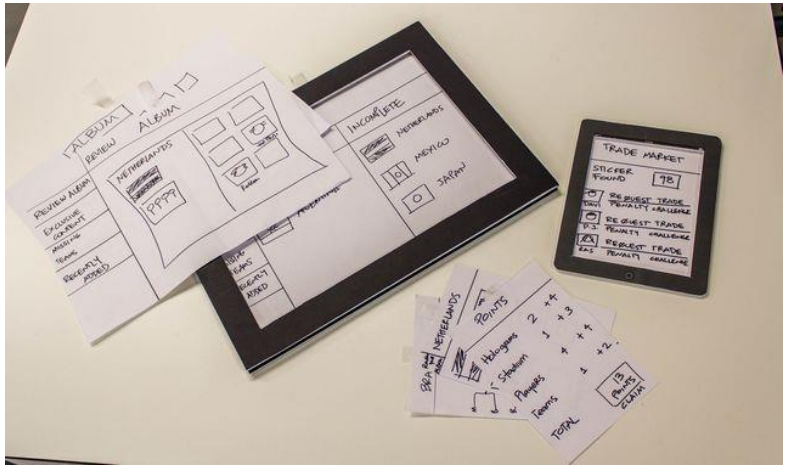
- Paper, Transparent paper
- Pens, Markers
- Post-It notes
- Glues, scotch tape, scissors
- Photocopies
- UI Stencils
- Reusable UI components
- Printouts of screenshots

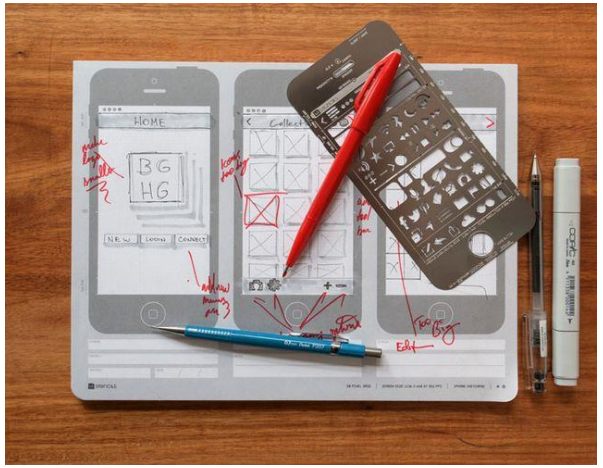
Why Paper Prototyping?

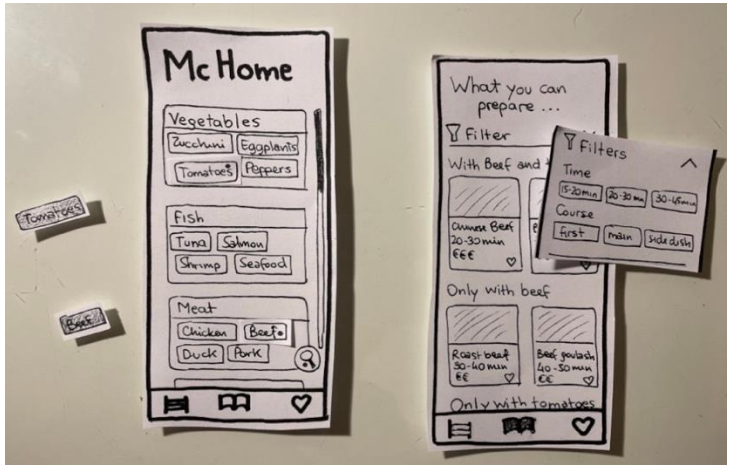
- Faster to build
  - Sketching is faster than programming
- Easier to change
  - Easy to make changes between user tests, or even **during** a user test
  - No code investment - everything will be thrown away (except the design)
- Focuses attention on big picture
  - Designer doesn't waste time on details
  - 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/

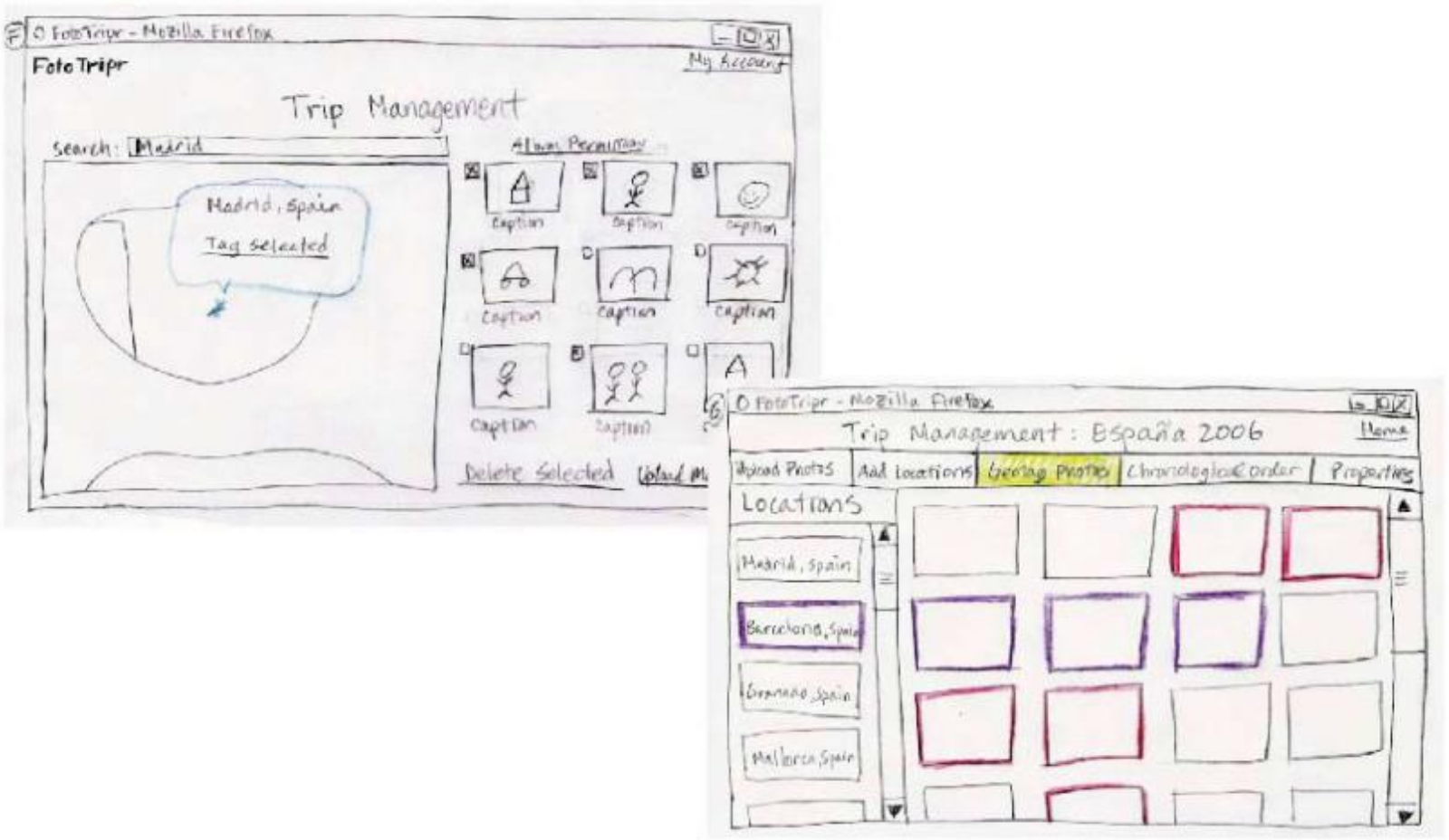
Paper Prototypes: Examples



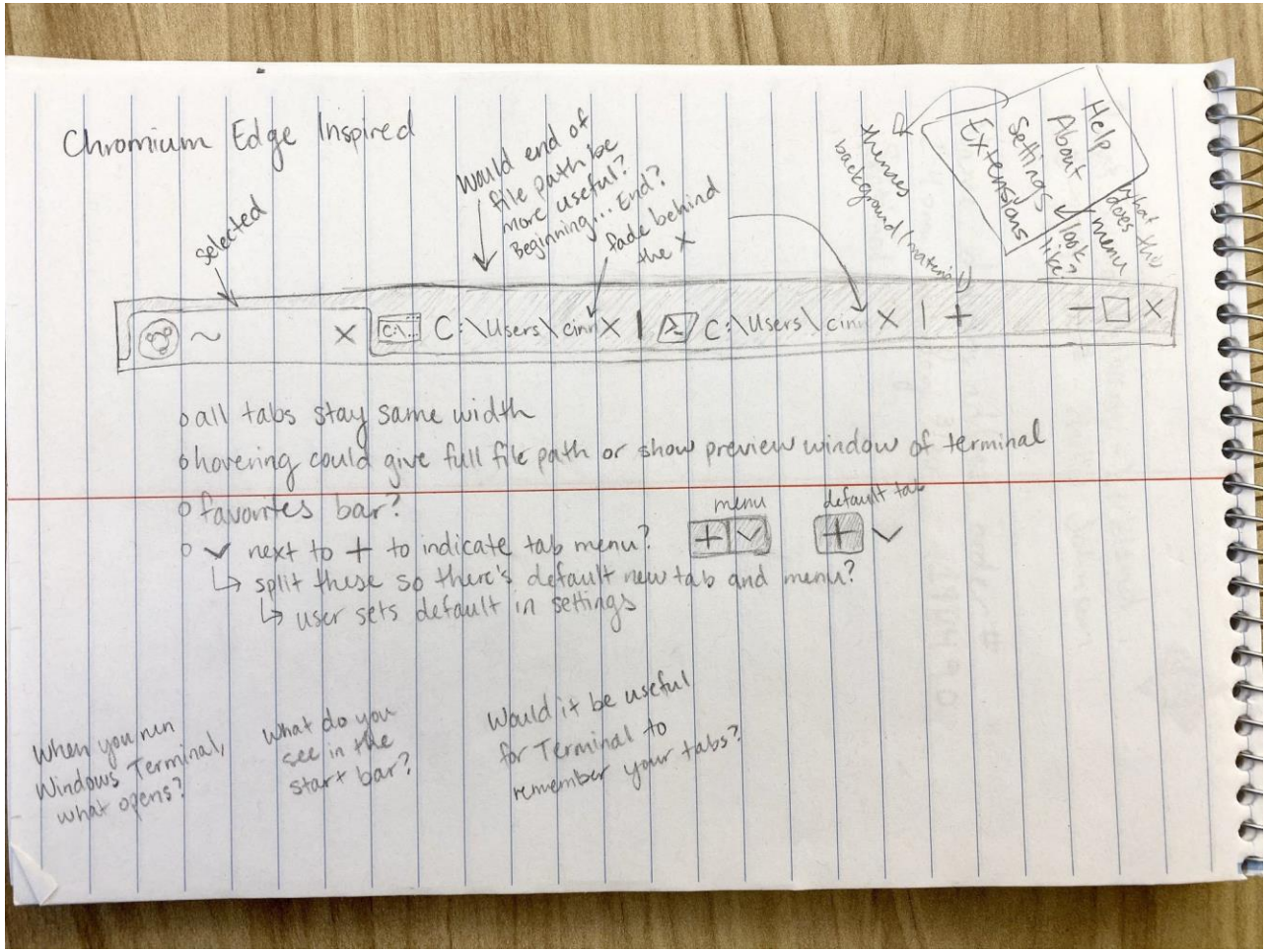




Other Examples

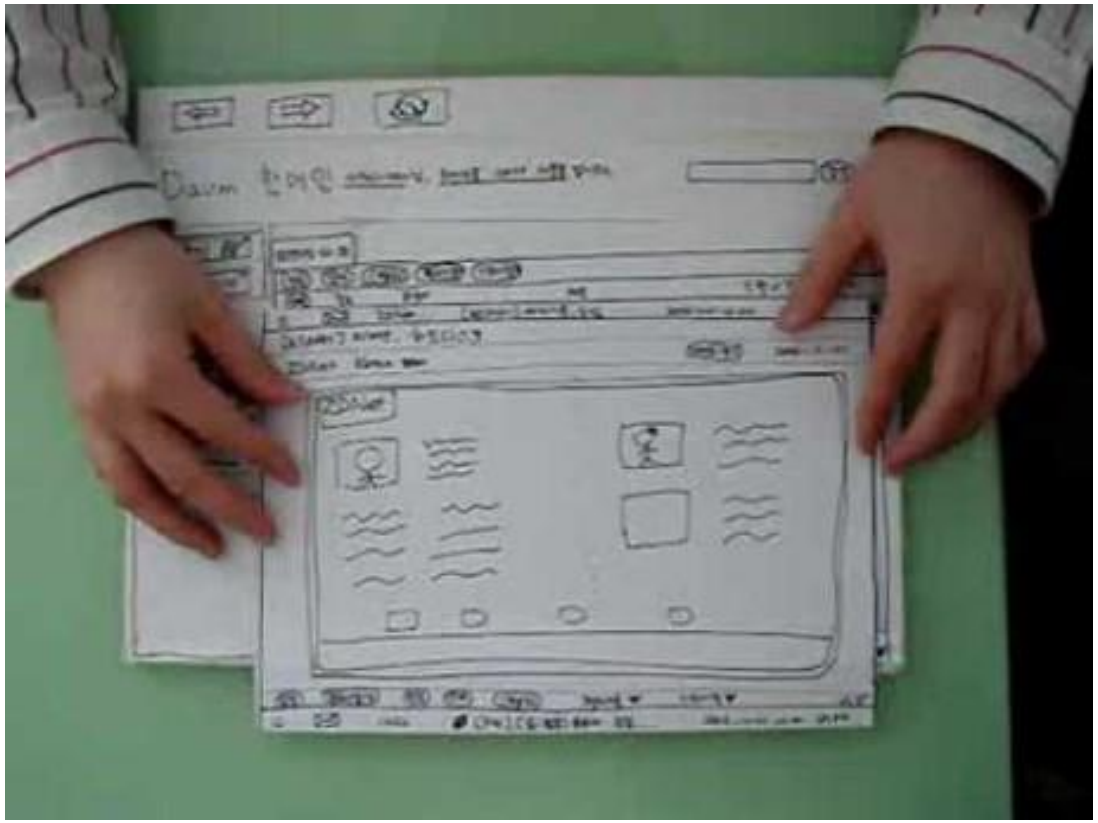


First Ever Mockup of the Windows Terminal Tab Bar



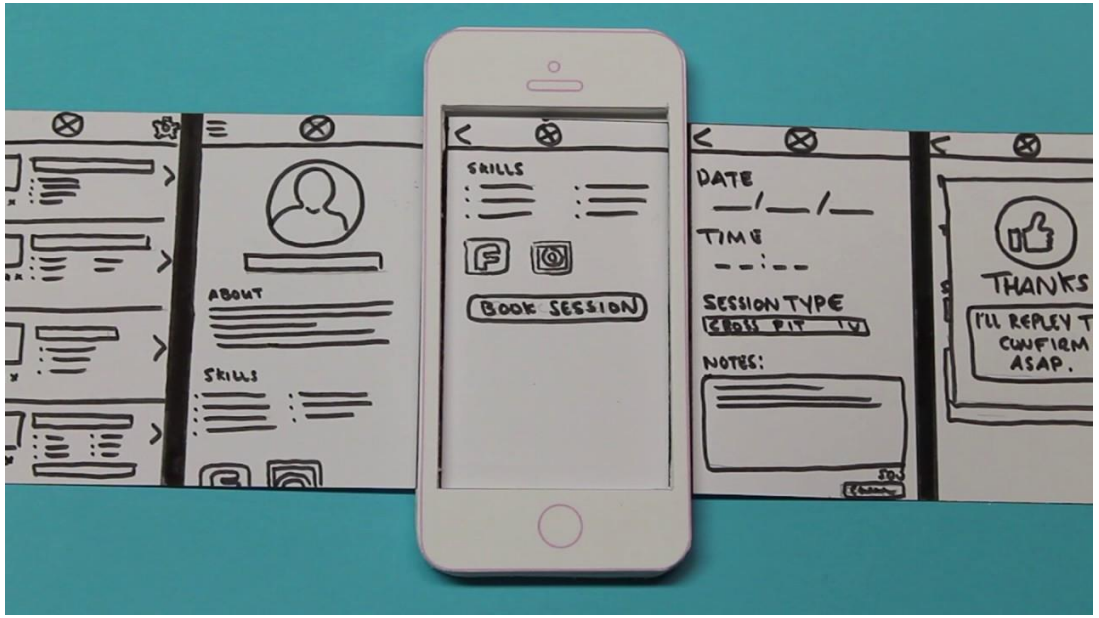
https://twitter.com/cinnamon_msft/status/1190015862201176065?s=20

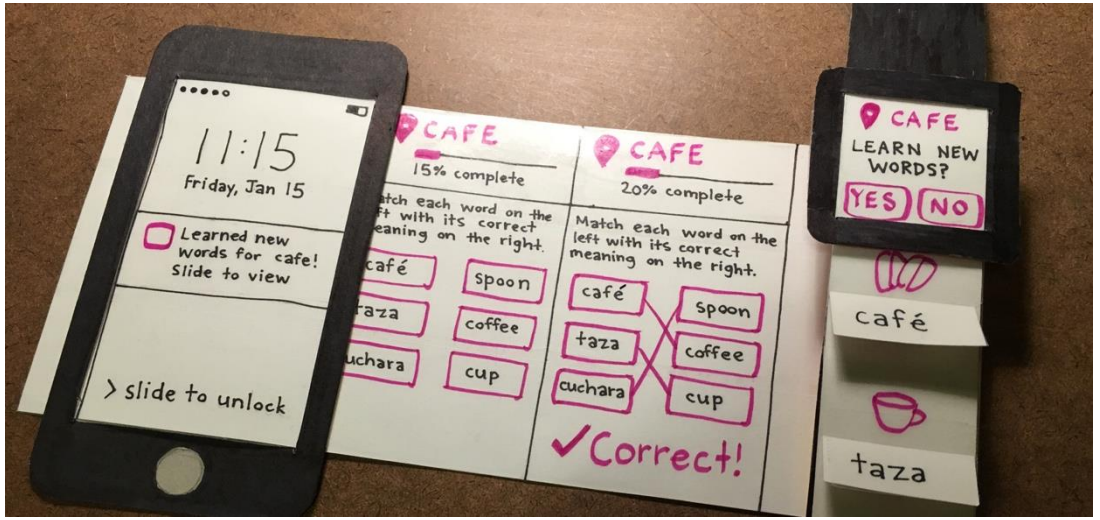
Creating Flows With Paper Prototypes



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=PL9KVIdeJ2K8NDpsiyYpcbB_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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