

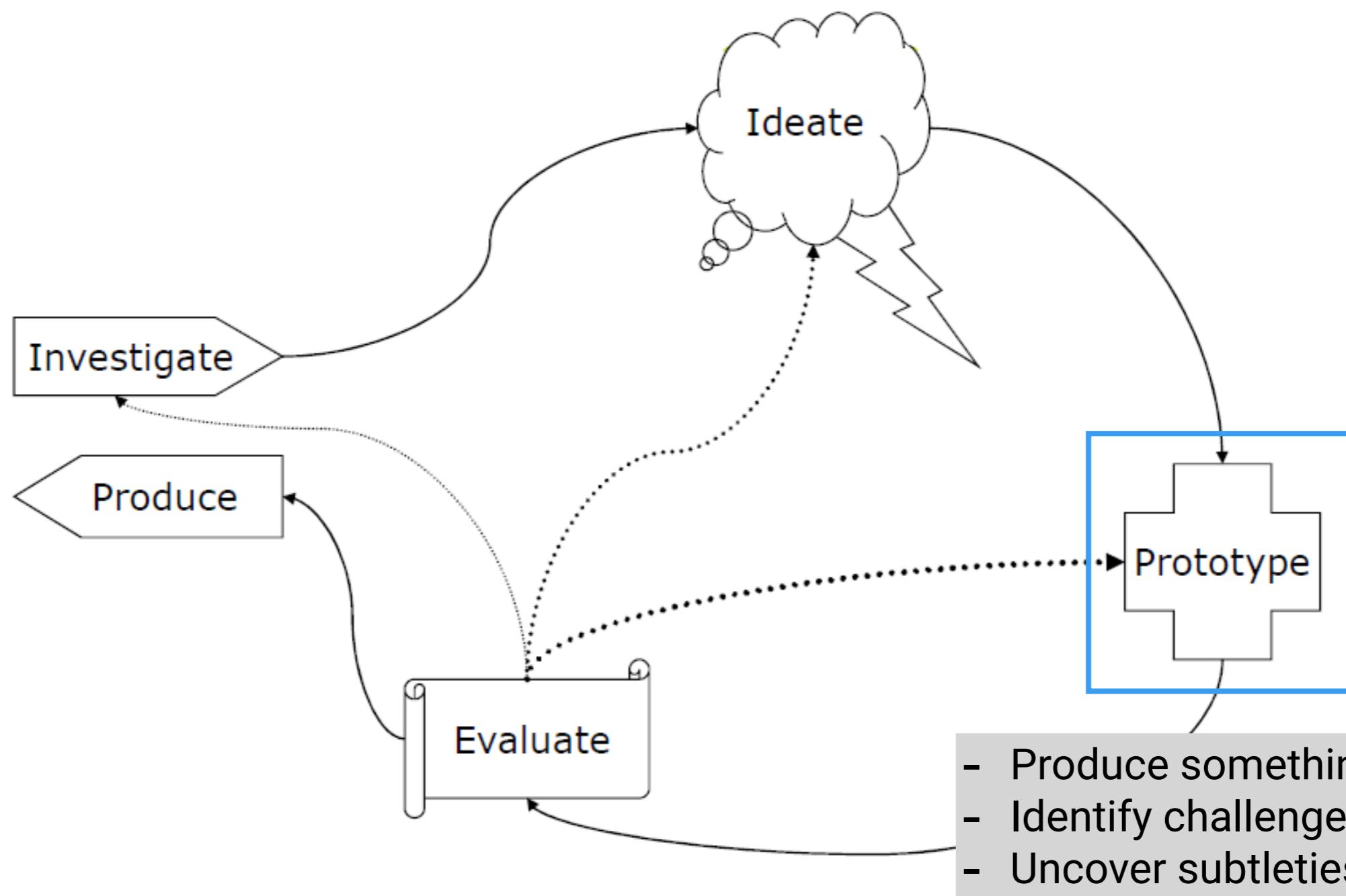
# Human-Computer Interaction

CPSC 481 - Spring 2019

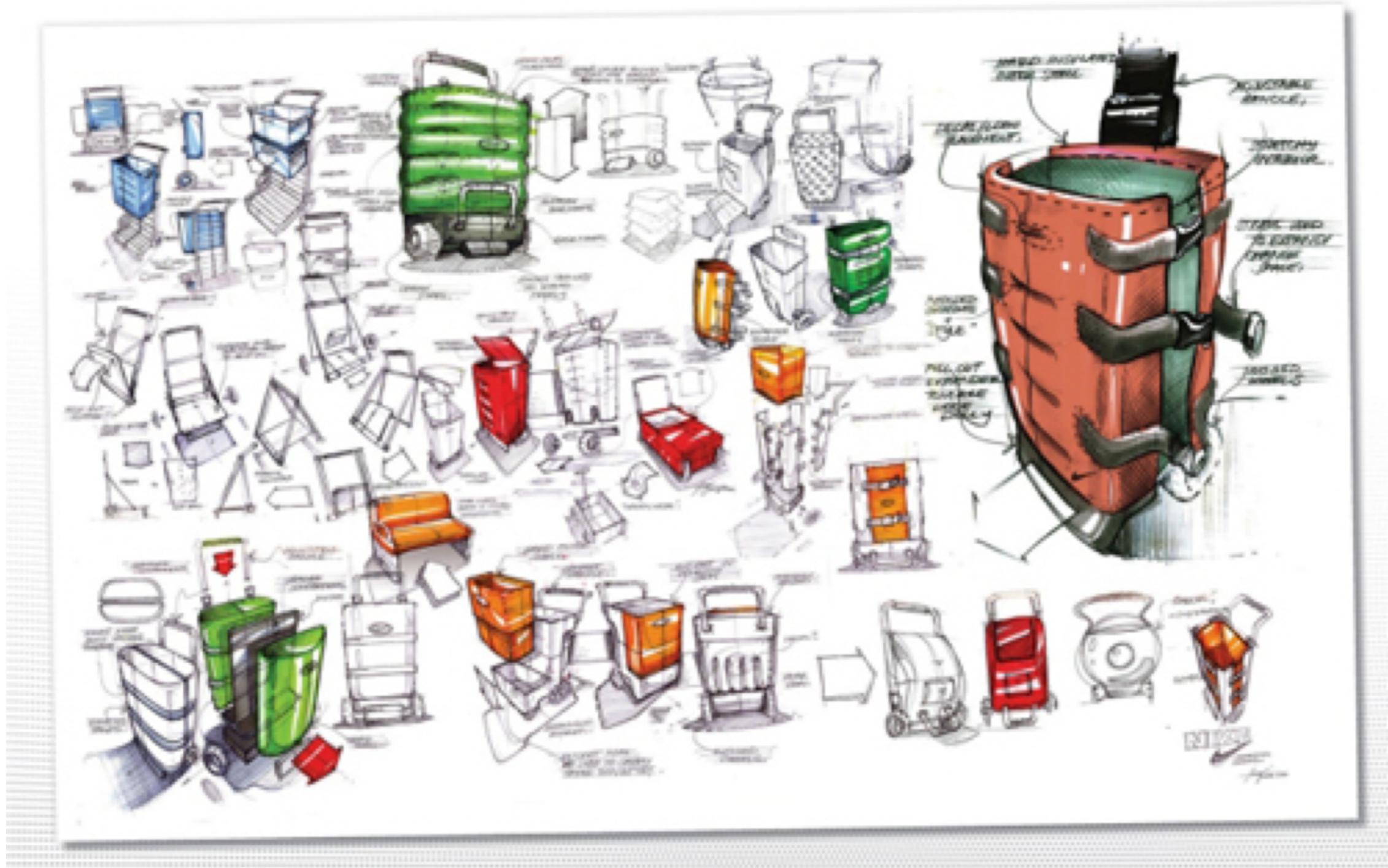
## Prototyping

Adapted from Tony Tang

# User-Centered Design



# How to pick good ideas?



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- Try them out!
  - Prototype multiple, and test them out with your users!

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- Quality metrics:
  - Ease of use
  - Utility vs. superfluous features
  - Effectiveness (task coverage)
  - Efficiency/performance

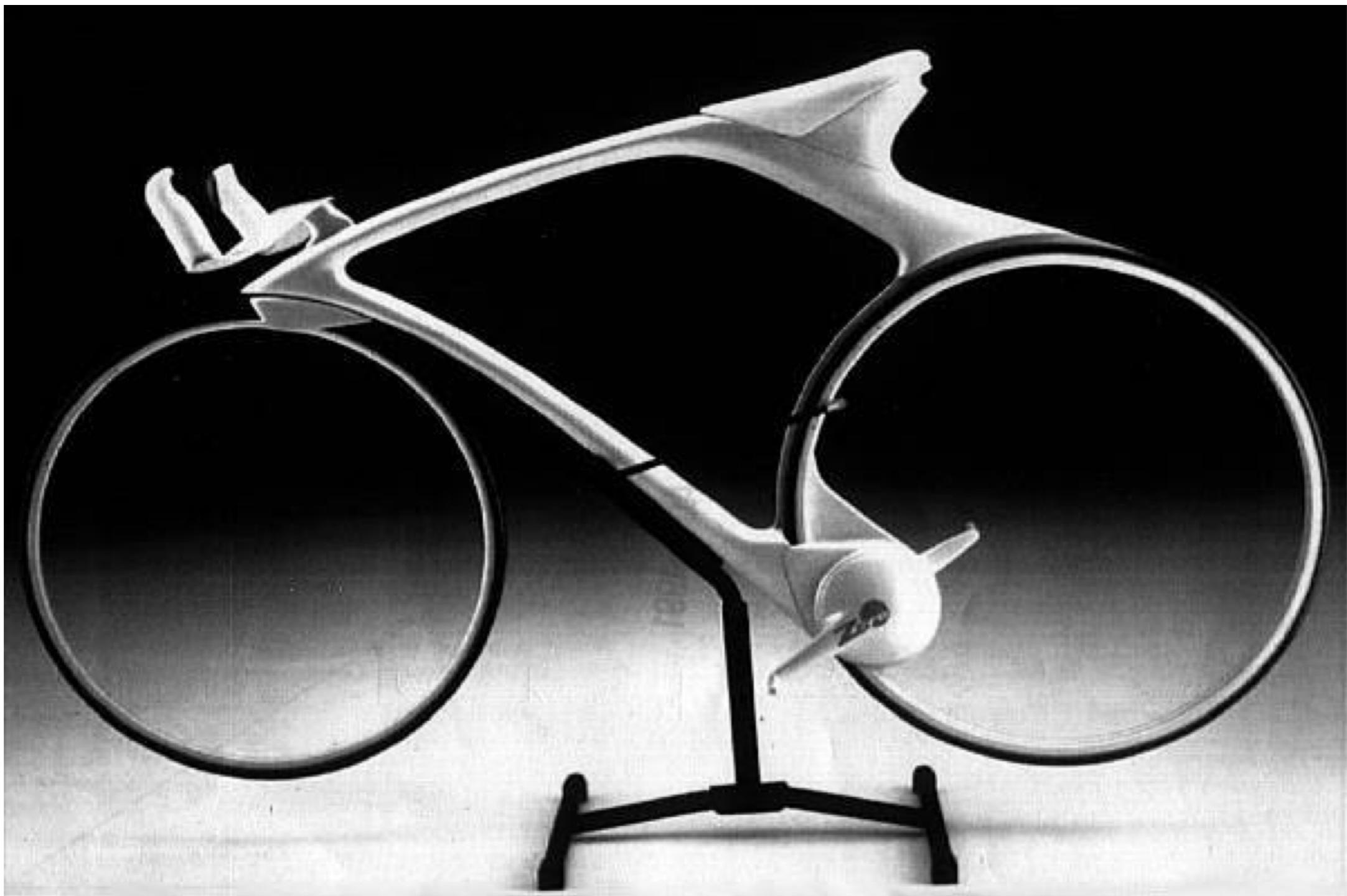
# Why prototype?

# Why prototype?

- Evaluation and user feedback is **central** in good design
  - Stakeholders can see, hold and interact with a prototype (but can't with a stack of documents)
  - Aids communication of an idea, and provides focus for a team
  - You can **test out** your ideas
  - Encourages reflection
  - Answers questions, and helps you make choices between different alternatives
    - On **paper**, it is **too** easy to punt decisions for later

# What is a prototype?

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HowardDigital.com

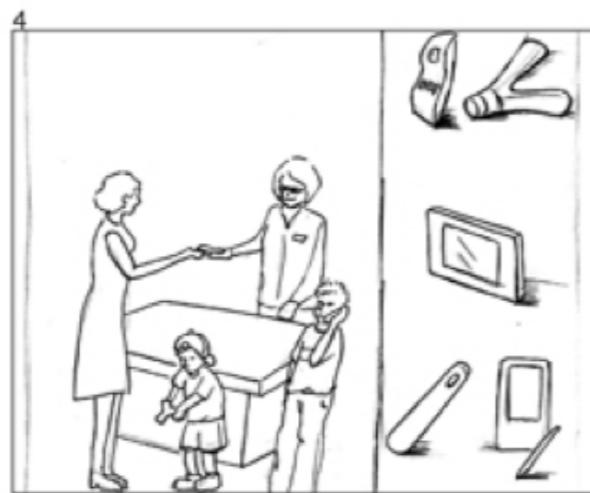
# What is a prototype?



Adam, Bryan and their mother enter the museum and go to the exhibit area, where they decide to use the echoVue guide system



The family moves to the table, where a guide is located. The guide informs the family regarding the narrative aspect of the guide system. The guide explains that they are time travelers, from the future, and have been stranded in the present day due to their time machine malfunctioning. They are required to fix the time-map to restore the time-machine's data bank (etc...)



The family is given instruction regarding the six devices that are available in the museum, which include:  
A collecting device, a listening device, a monitor device, a text device and a divining rod device



The family goes to the mission table where the two boys look at the table. Where the family is told that they are a group of time travelers who come from the future, and who are now stuck in the present day because their time machine has malfunctioned. In order to repair the time machine, they must fix the time-map.



The guide at the table asks the visitors if they can help repair the time-map by first answering a few questions. These questions will ultimately help to understand the visitors age, gender and interests, used to create user models for the adaptive system. This phase provides the members the opportunity to become familiar with the operation of the devices.

Ec(h)Vue Storyboard Scenario I page 1

# What is a prototype?

- A prototype is defined less by form, and more by its function:
  - A prototype expresses and realizes a design concept for the purpose of communication.
- Prototype qualities:
  - Fast
  - Disposable
  - **Focused**
- Role of prototypes:
  - Test / get feedback
  - Communicate
  - Persuade

# Many different kinds of prototypes

- Storyboards
- PowerPoint slideshow
- Video prototype
- Physical model
- Software with limited functionality
- ...

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  - What should it look like?
- Technical aspects
  - Can we actually make this go?

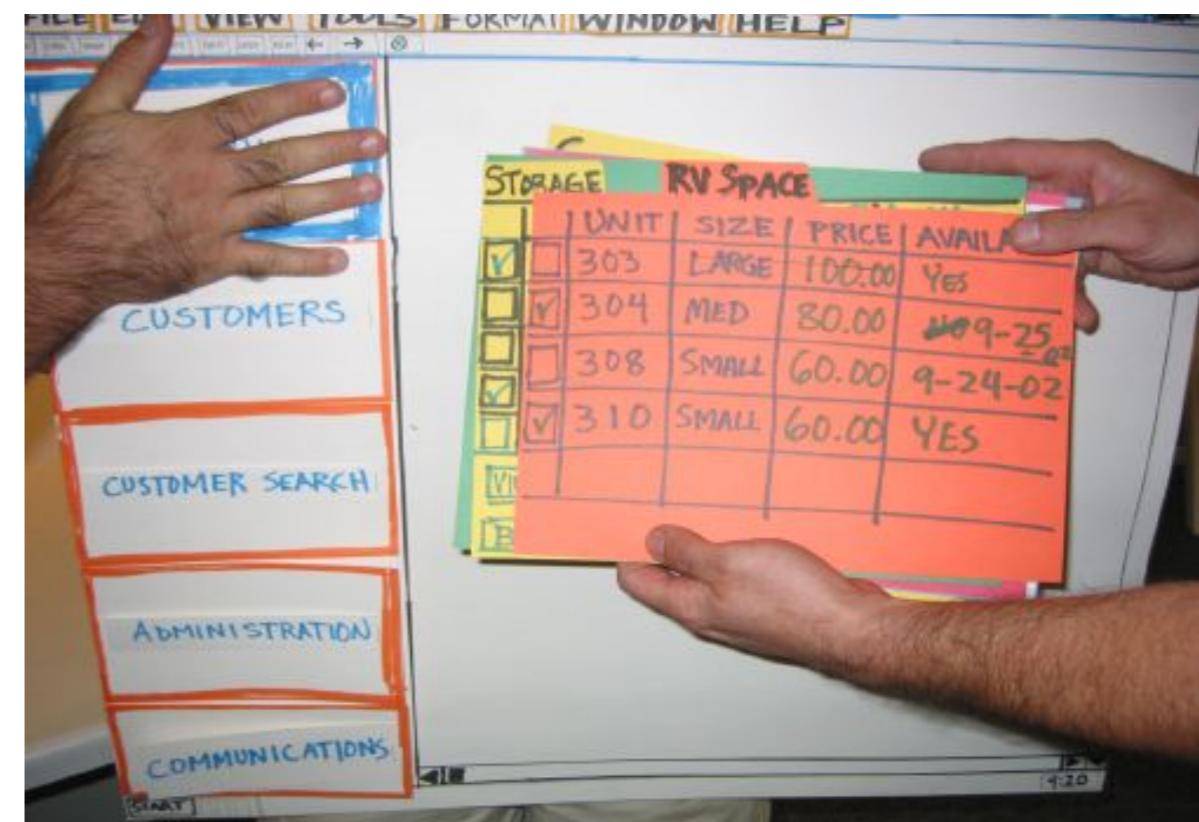
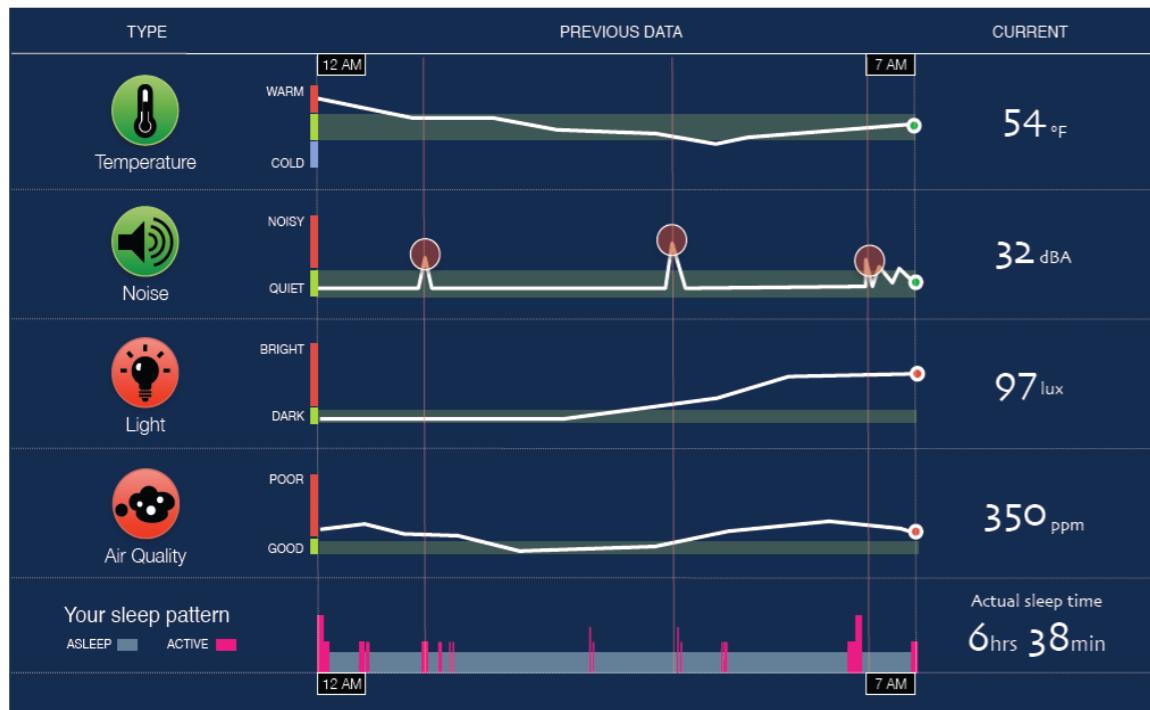
# Which prototyping method to choose?

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- Choose the method that works best for what you are trying to achieve.
- For example:
  - User flow >> storyboard
  - Screen layouts/page flow >> paper prototypes
  - Overall experience >> video prototype
  - Look & Feel >> PowerPoint or PSD
  - Functionality >> software...

# Hi vs. Lo fidelity prototype

- Distinction: is the choice of medium close or far from that of final design? (e.g., high = software; low = paper prototype)\*\*



# Hi vs. Lo “from experts”

	Lo-fi	Hi-fi
<b>Advantages</b>	<ul style="list-style-type: none"><li>- Fast</li><li>- Cheap</li><li>- Easy</li><li>- Can simulate actual product</li><li>- Great way to get feedback from stakeholders</li></ul>	<ul style="list-style-type: none"><li>- Better sense of finished product</li><li>- Can judge aesthetic appeal</li><li>- More realistic experience</li><li>- Can evaluate the experience better</li><li>- More convincing for stakeholders</li></ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"><li>- Slow response time</li><li>- Can't get feedback about aesthetics</li><li>- User may question design quality</li></ul>	<ul style="list-style-type: none"><li>- Users may focus on unnecessary details</li><li>- Takes a lot of time to make</li><li>- Users may lose track of big picture</li></ul>

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- Very effective in persuasion

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- With the right tools, hi-fi prototypes can be done very quickly
- Requires very little client imagination
- Communicates the **form** very well
- Very effective in persuasion
- Typically, can be used to gather usability metrics

# Hi Fidelity Prototypes

- Some design trade-offs you will need to deal with:
  - Technical constraints
  - Commercial feasibility
  - Resources (e.g., developer)



# Prototype “types”

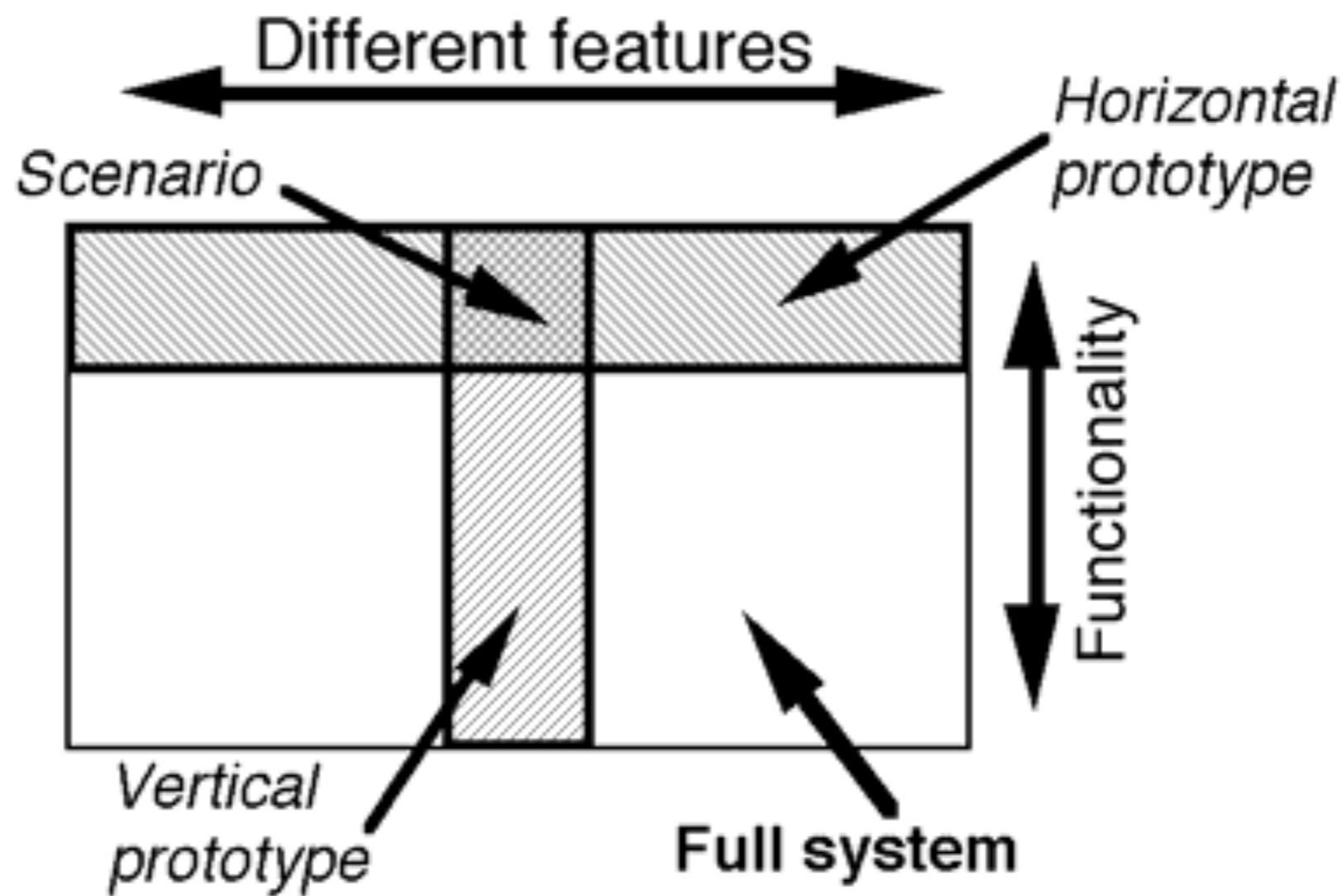
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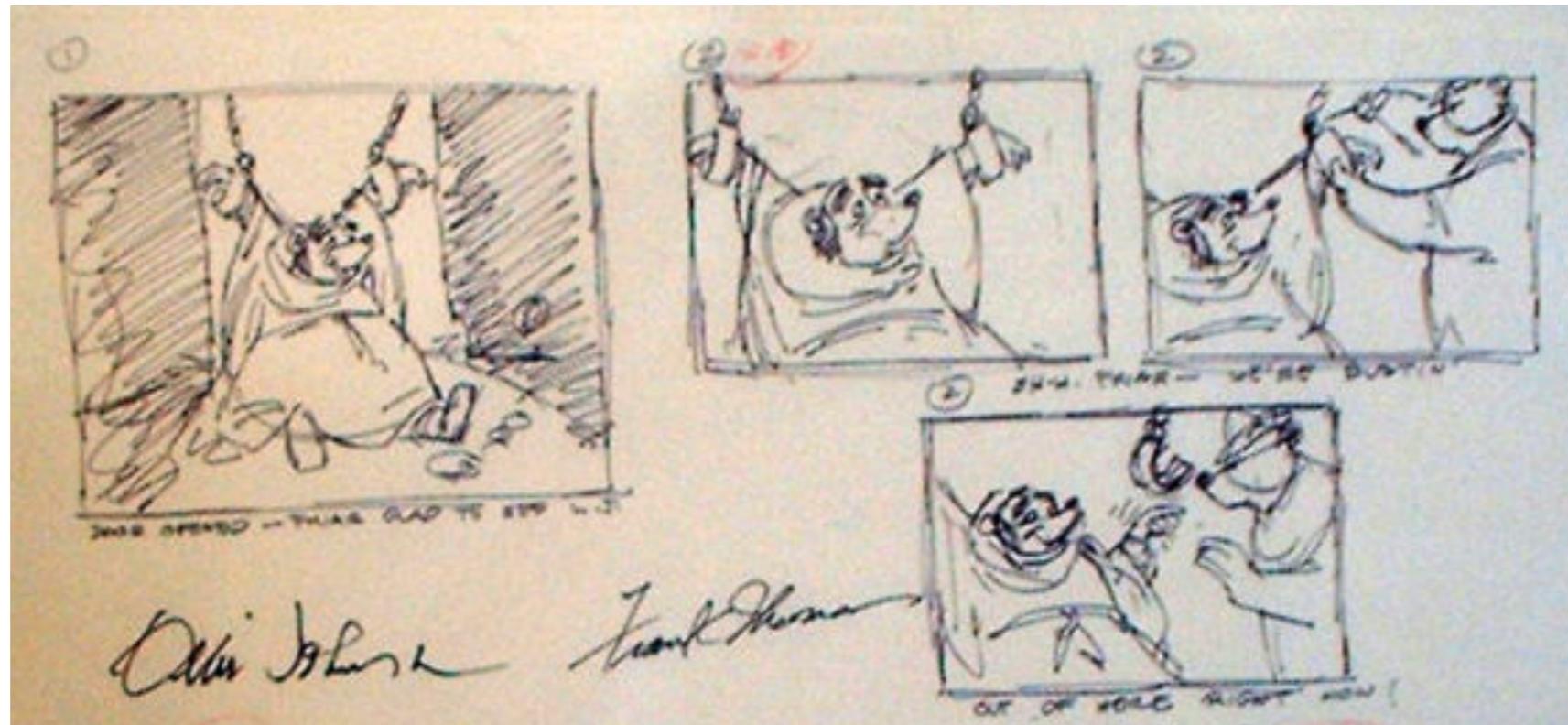
- High vs. Low fidelity
  - Choice of medium is close to or far from that of the final design
- Horizontal vs. Vertical
  - Range of capabilities in the prototype
  - **Horizontal** = wide range of features without full “implementation” of any
  - **Vertical** = select features are “implemented” all the way through

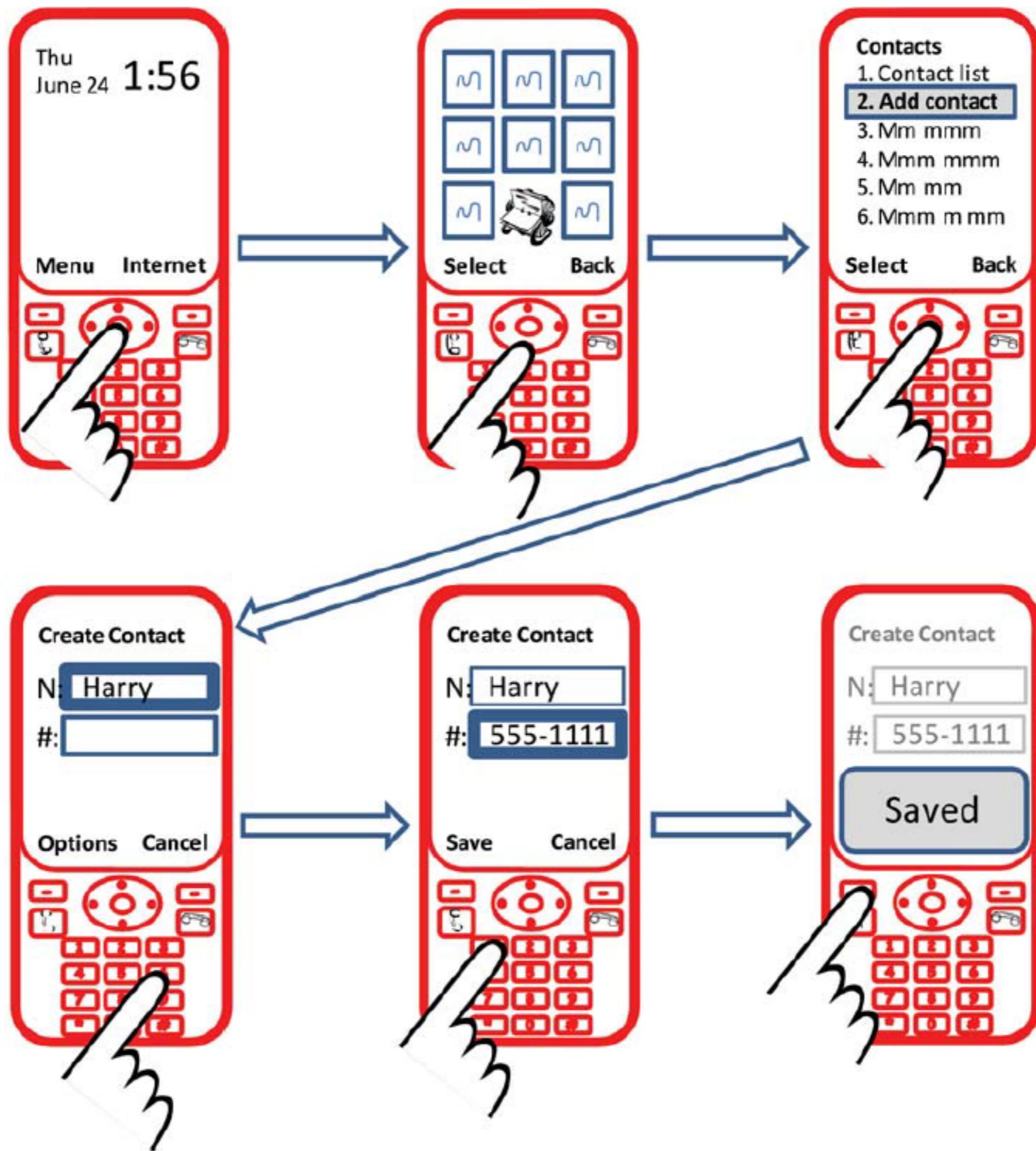
# Vertical vs. Horizontal

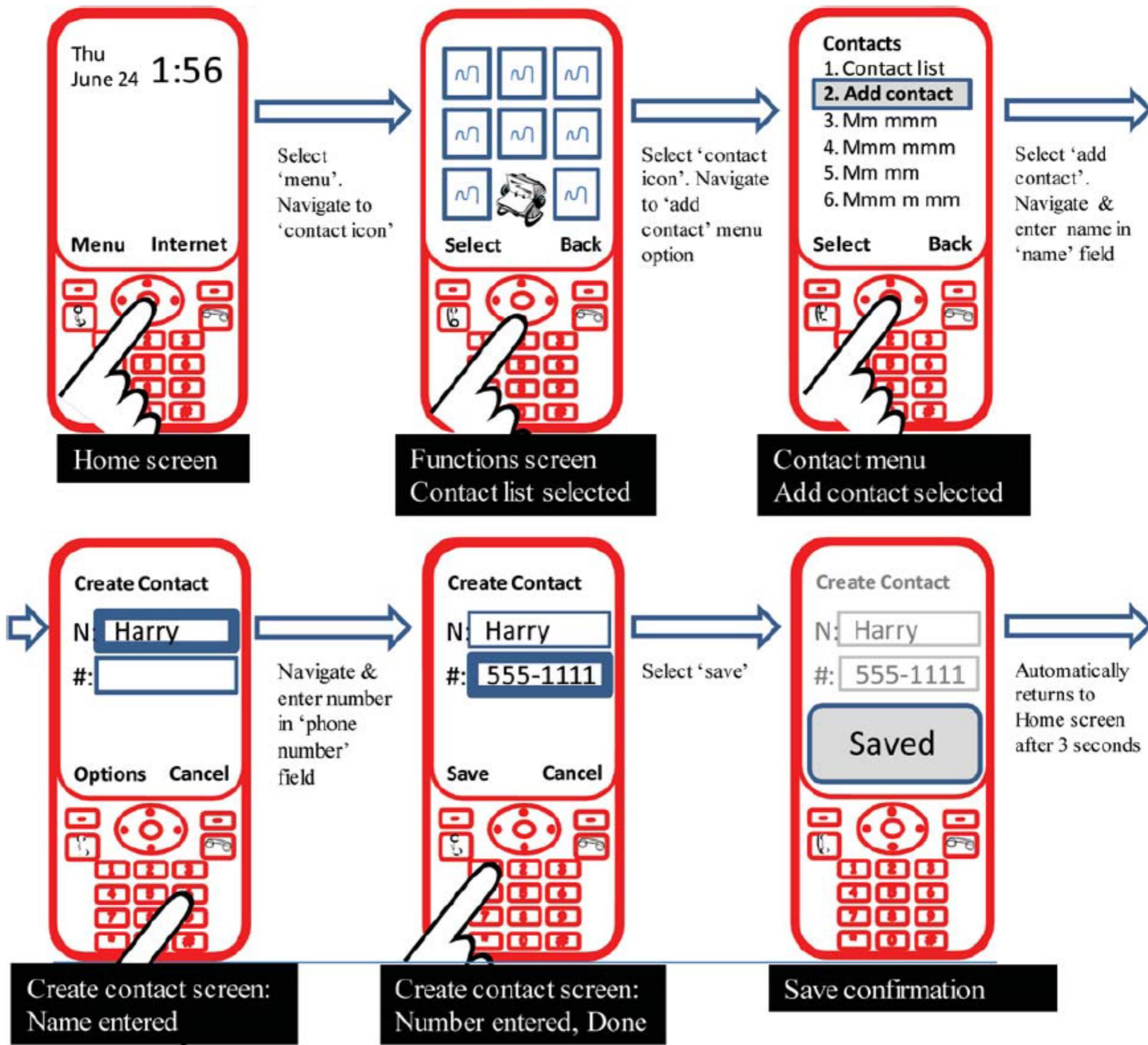


# Prototyping through Storyboards

- “Comic book” approach, a series of keyframes as sketches
  - illustrates a sequence
- Users can evaluate quickly the direction the interface is heading







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- Designing with customers using office supplies
  - Multiple layers of sticky notes and plastic overlays
  - Different sized stickies represent icons, menus, windows...

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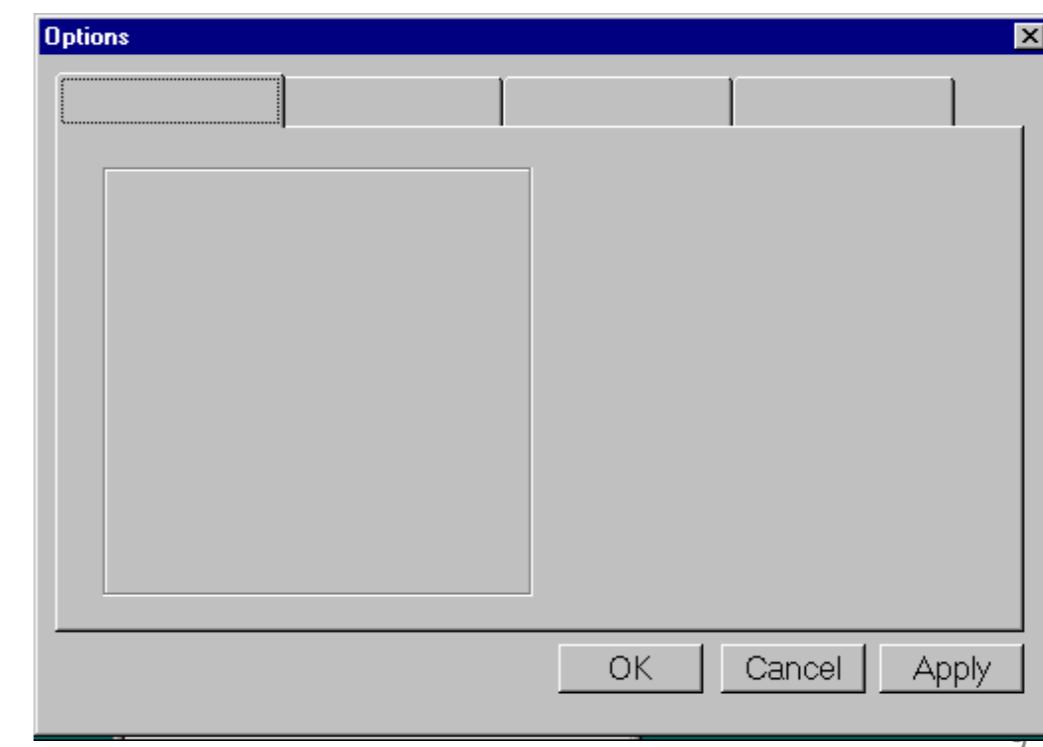
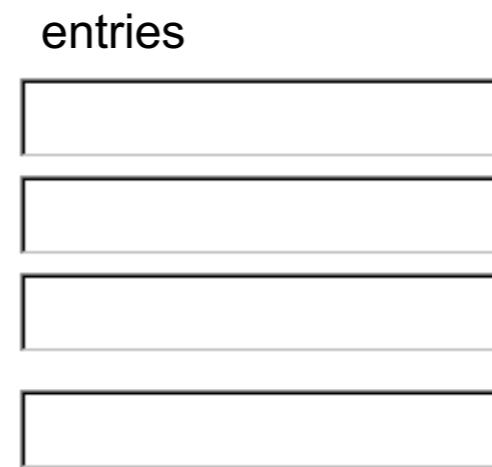
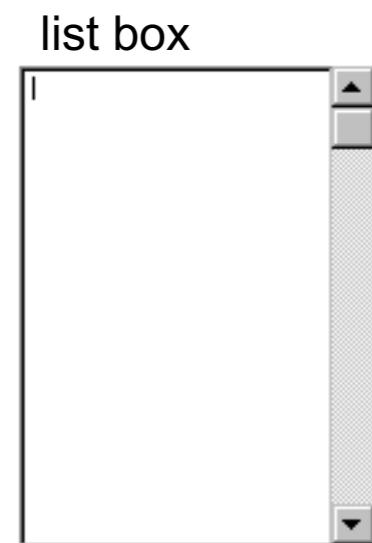
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- Interaction demonstrated by manipulating notes
  - New interfaces built on the fly

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- PICTIVE: Plastic Interface for Collaborative Technology Initiatives through Video Exploration
- Designing with customers using office supplies
  - Multiple layers of sticky notes and plastic overlays
  - Different sized stickies represent icons, menus, windows...
- Interaction demonstrated by manipulating notes
  - New interfaces built on the fly
- Session videotaped for later analysis
  - Usually end up with mess of paper and plastic

# PICTIVE

- Can pre-make paper interface components



# Prototyping with PowerPoint

# Prototyping with PowerPoint

- PowerPoint can also be used to simulate very specific interaction scenarios
- Problem: People give me gifts I don't want
- Solution: Maybe a web-based gift-list social networking site could help

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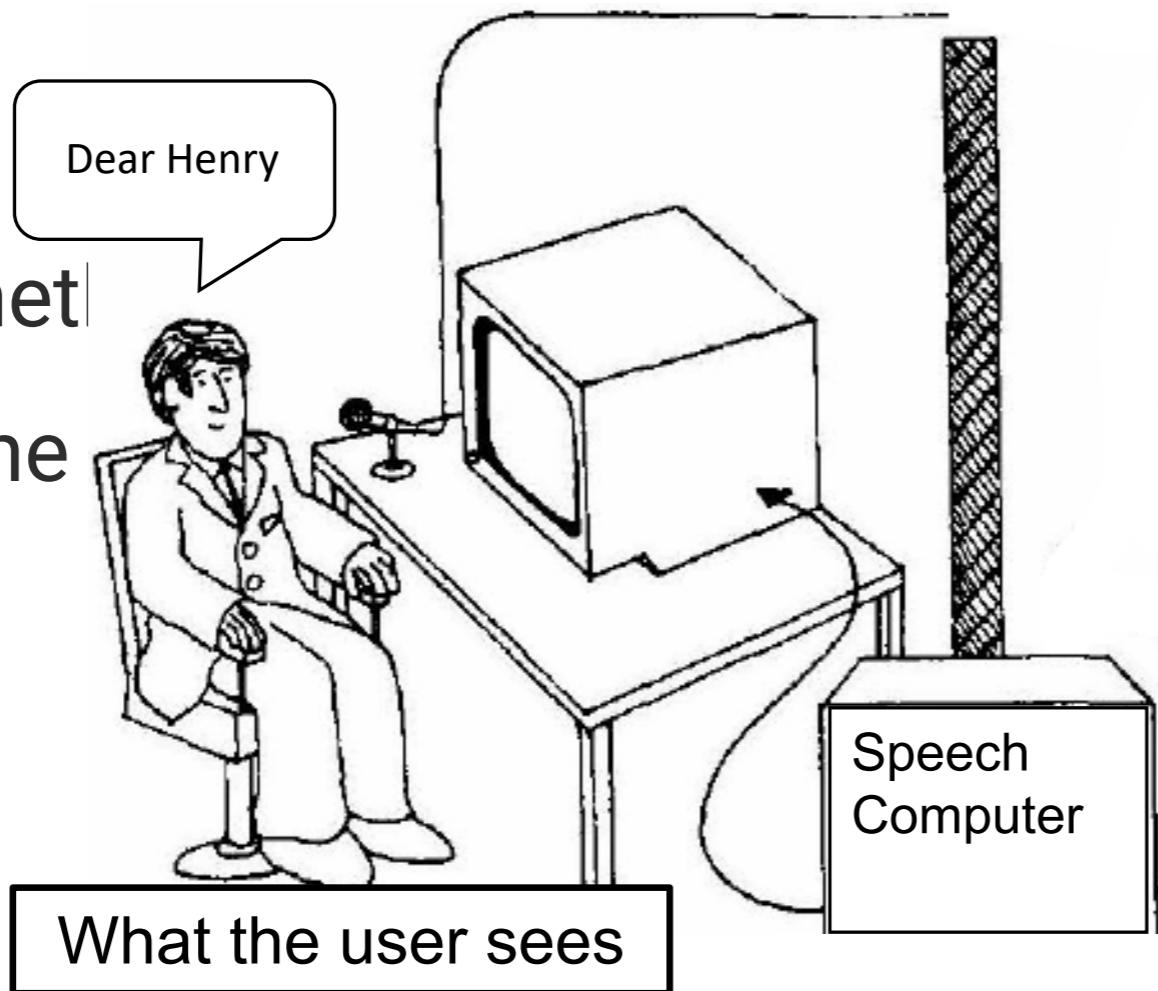
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Make the interaction as authentic as possible

# Prototyping Functionality: Wizard-of-Oz

- **Common problem:** it's difficult to prototype some piece of functionality
- **Need:** test whether it is actually good
- **Solution:** fake it with a person controlling the interface!  
Make the interaction as authentic as possible
- **Key:** user has no idea that the interaction is being faked

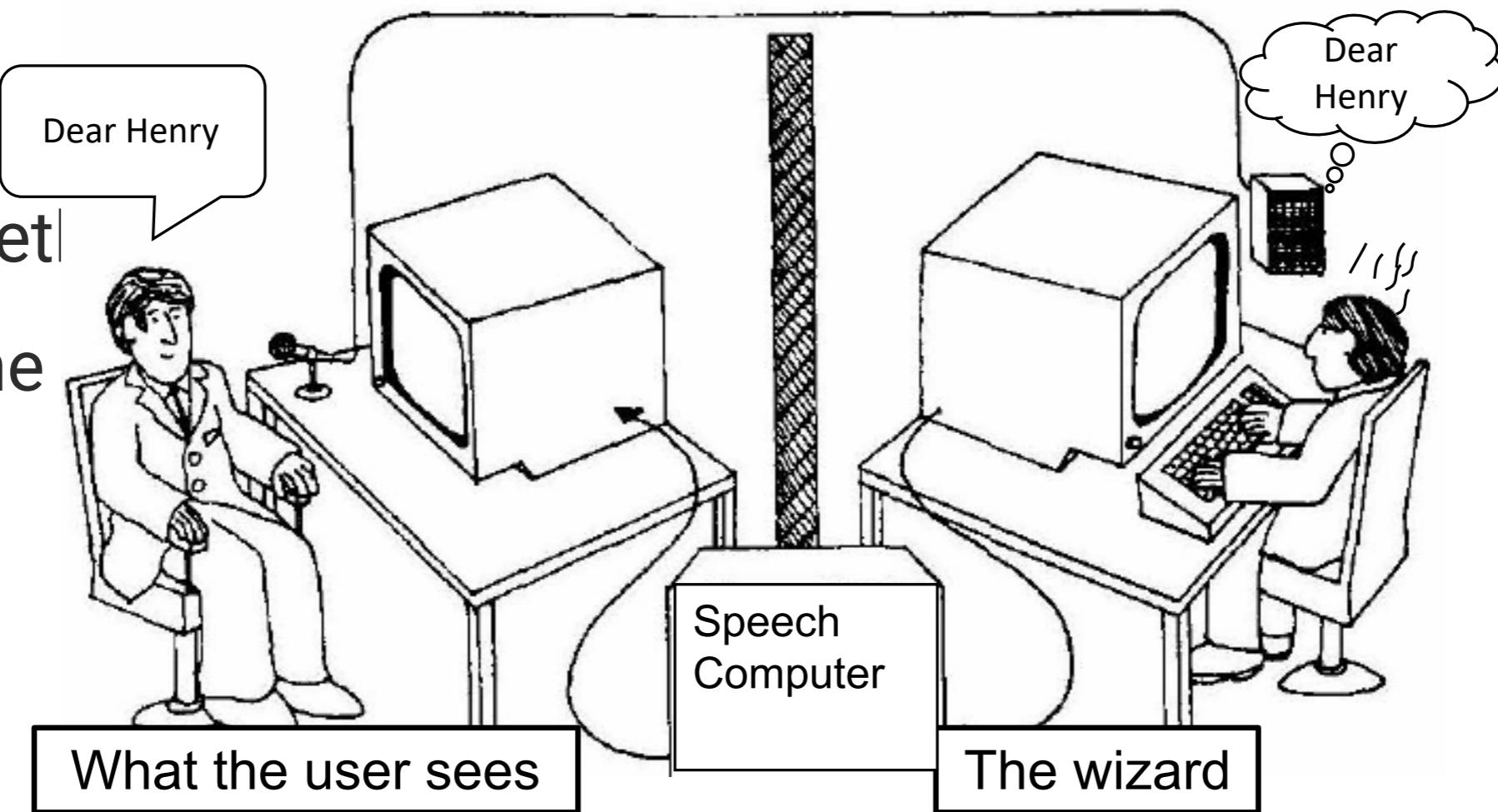
# Wizard of Oz

- A met
- the



# Wizard of Oz

- A metaphor
- the



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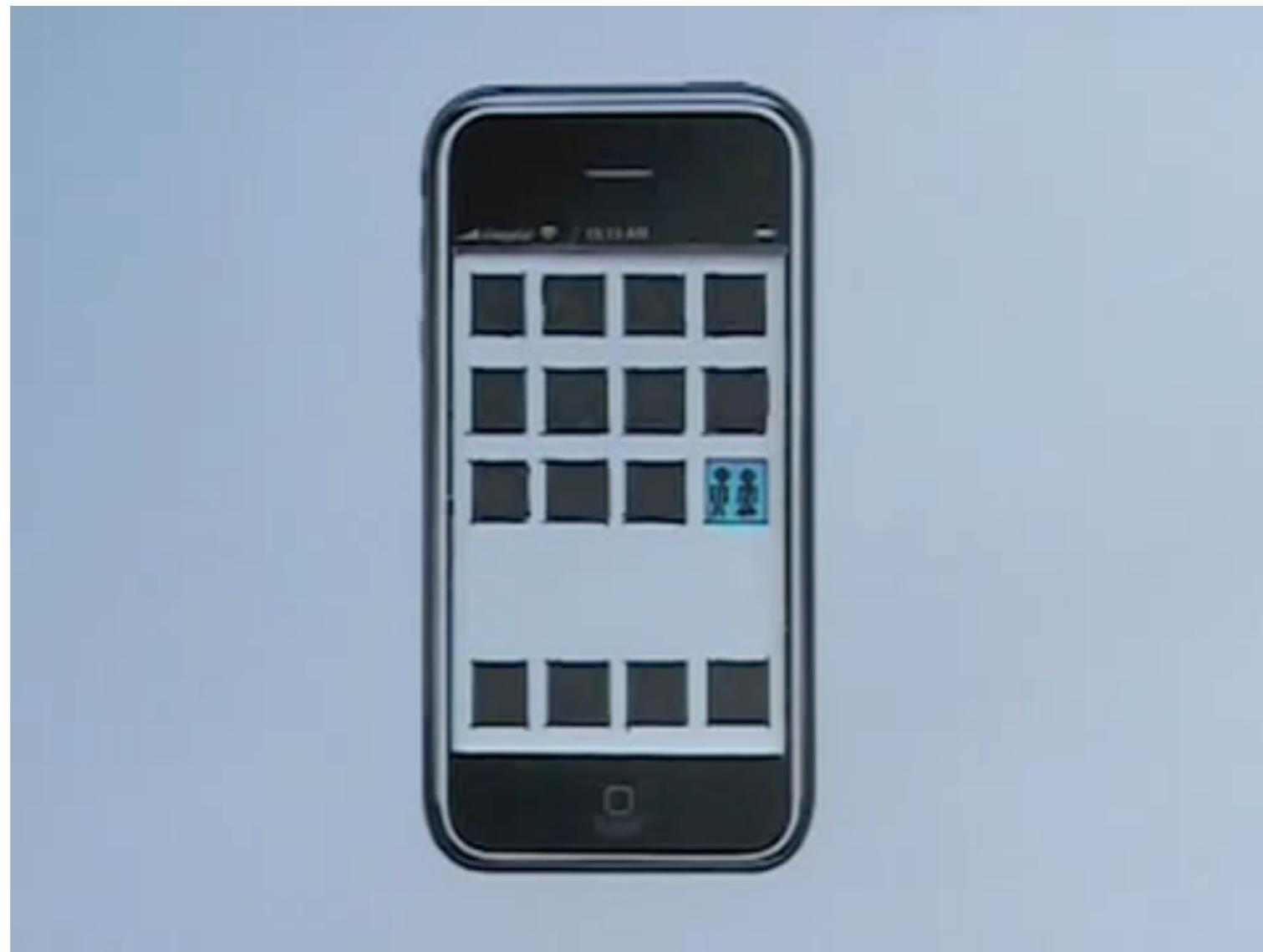
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- A video prototype frees you from that, but constrains you to a limited scenario.

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- Paper prototypes and wizard-of-oz require you to be around to simulate functionality.
- A video prototype frees you from that, but constrains you to a limited scenario.
- You can also simulate this through a stitched together set of images (slow-motion).

# Prototyping Functionality: Video Prototyping



# Prototypes in an Organization

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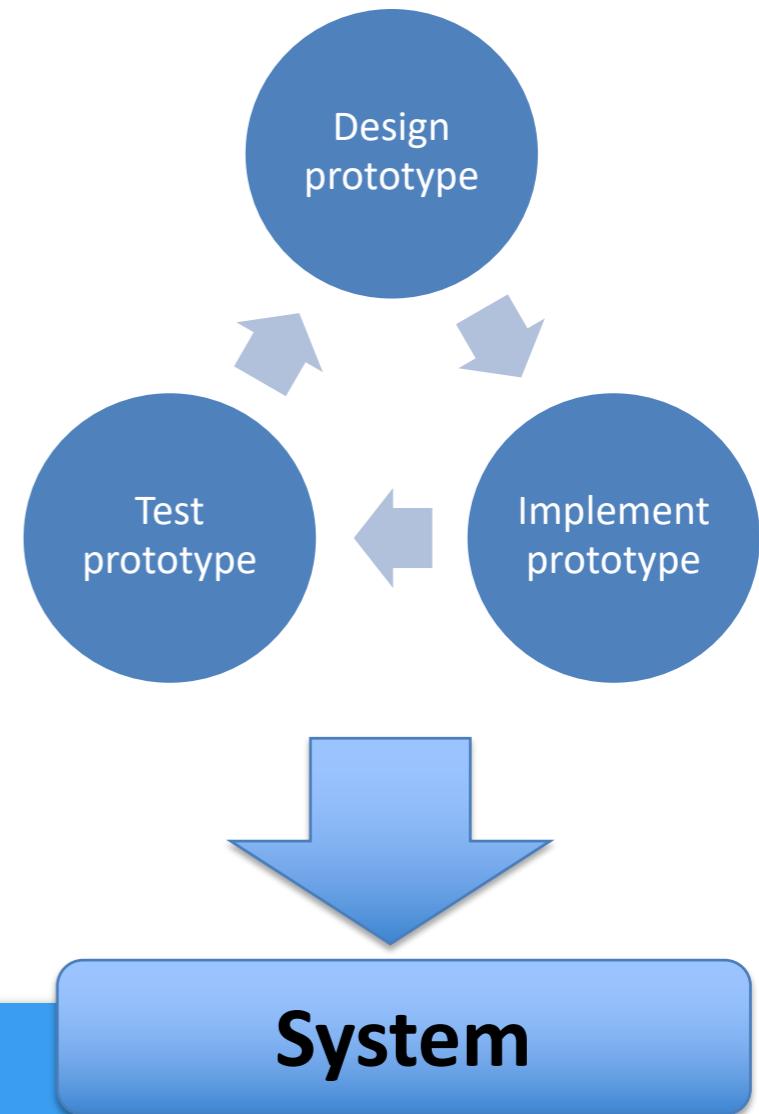
- **Question:** How do we integrate the philosophy of prototyping into an organization?

# Prototypes in an Organization

- **Question:** How do we integrate the philosophy of prototyping into an organization?
- Three methods for managing this integration:
  1. Evolutionary
  2. Modular (incremental)
  3. Throw-away

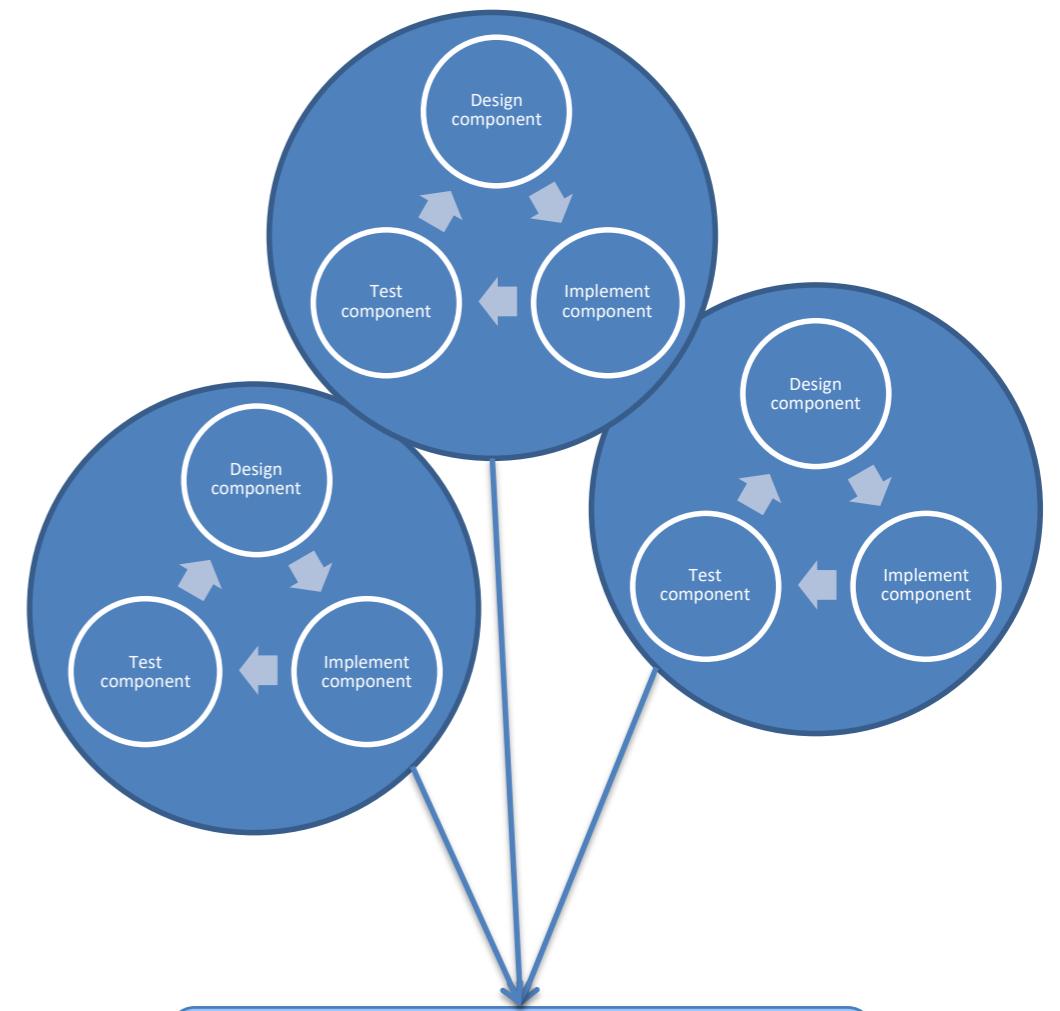
# Evolutionary Approach to Prototype Integration

- Iteratively change the prototype to incorporate changes
- Eventually, the reworked prototype becomes the final system



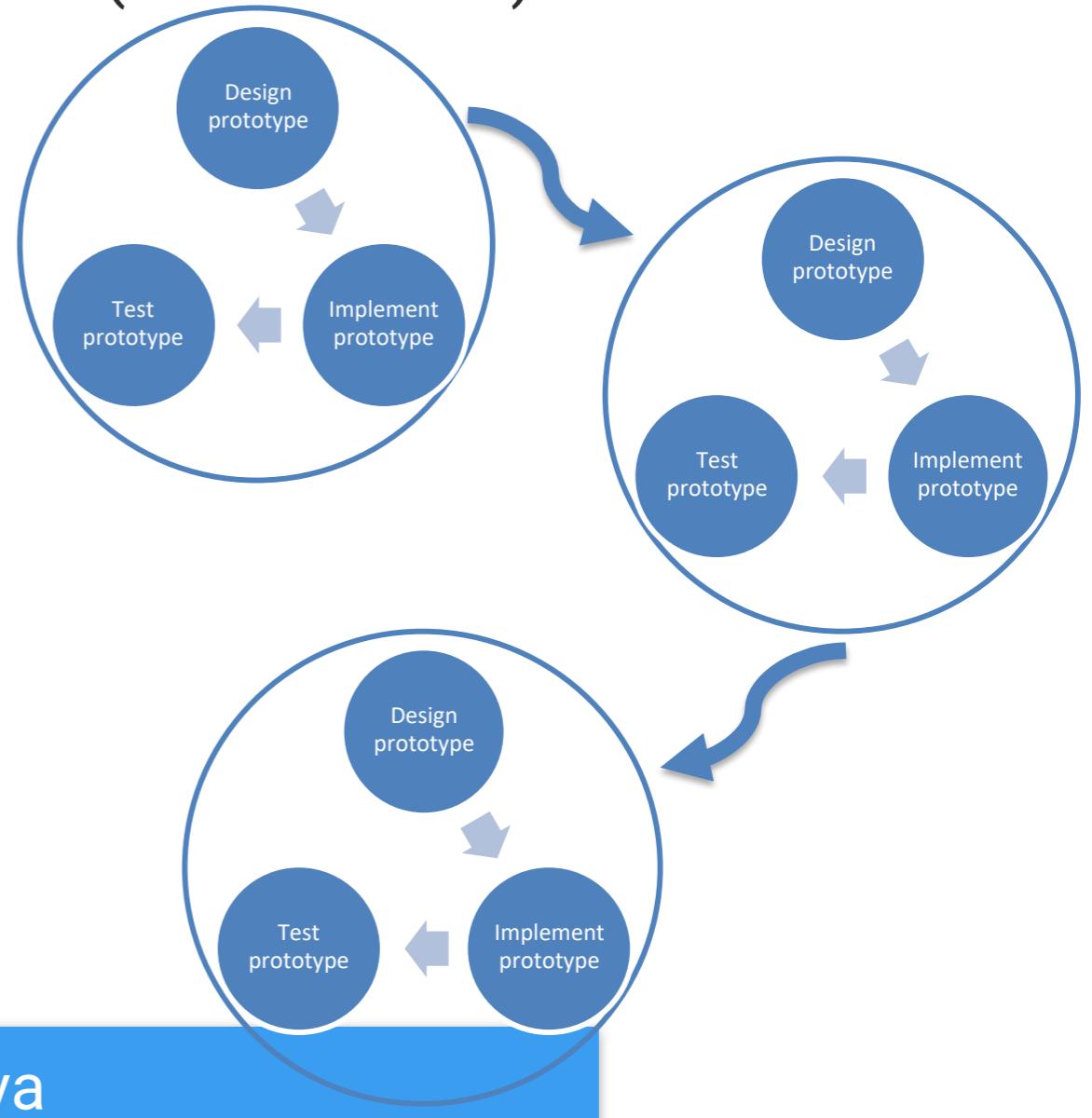
# Modular (Incremental) Approach to Prototype Integration

- Build the system as separate modules/components
- Each module is designed, prototyped and build separately before being combined into a final system



# Throw-away Approach to Prototype Integration

- Prototype is used to get rapid feedback (i.e. to learn lessons)
- Prototype is built, tested, and deployed (or discarded)



# Integrating Prototypes in Organizations

## 1. Evolutionary

- prototype is altered to incorporate design changes
- eventually becomes the final product

## 2. Modular (incremental)

- product is built as separate components (modules)
- each component is prototyped and tested, then added to final system

## 3. Throw-away

- prototype serves to reveal user reach, then discarded
- creating prototype should be rapid, otherwise can be expensive

# Acknowledgements

- Tony Tang
- Lora Oehlberg
- Ehud Sharlin
- Frank Maurer
- Saul Greenberg

# Course information

- Website
  - GitHub Pages <https://silvadasilva.github.io/CPSC481-2019S/>
- Communications
  - Slack <https://cpsc481-2019s.slack.com/>
- Readings and Slides
  - Posted online at the main website