Ideation & Prototypes

Informatics 132

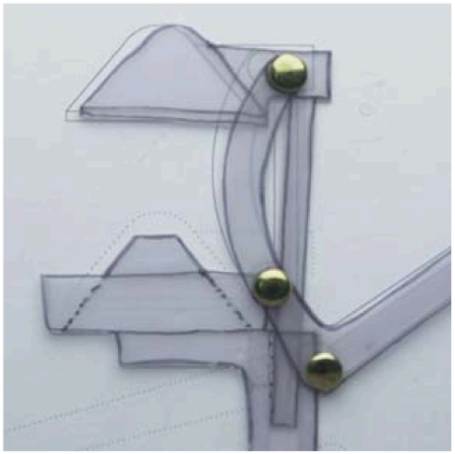
5/13/2012

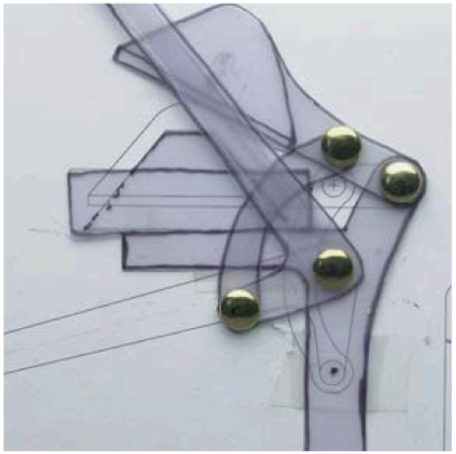
Prototyping

The use of simplified and incomplete models of a design to explore ideas, elaborate requirements, refine specifications, and test functionality.

There are three types of prototypes:

- **Conceptual**
- **Throwaway**
- **Evolutionary**





TODAY

- Ideation and Prototypes Lecture

UPCOMING

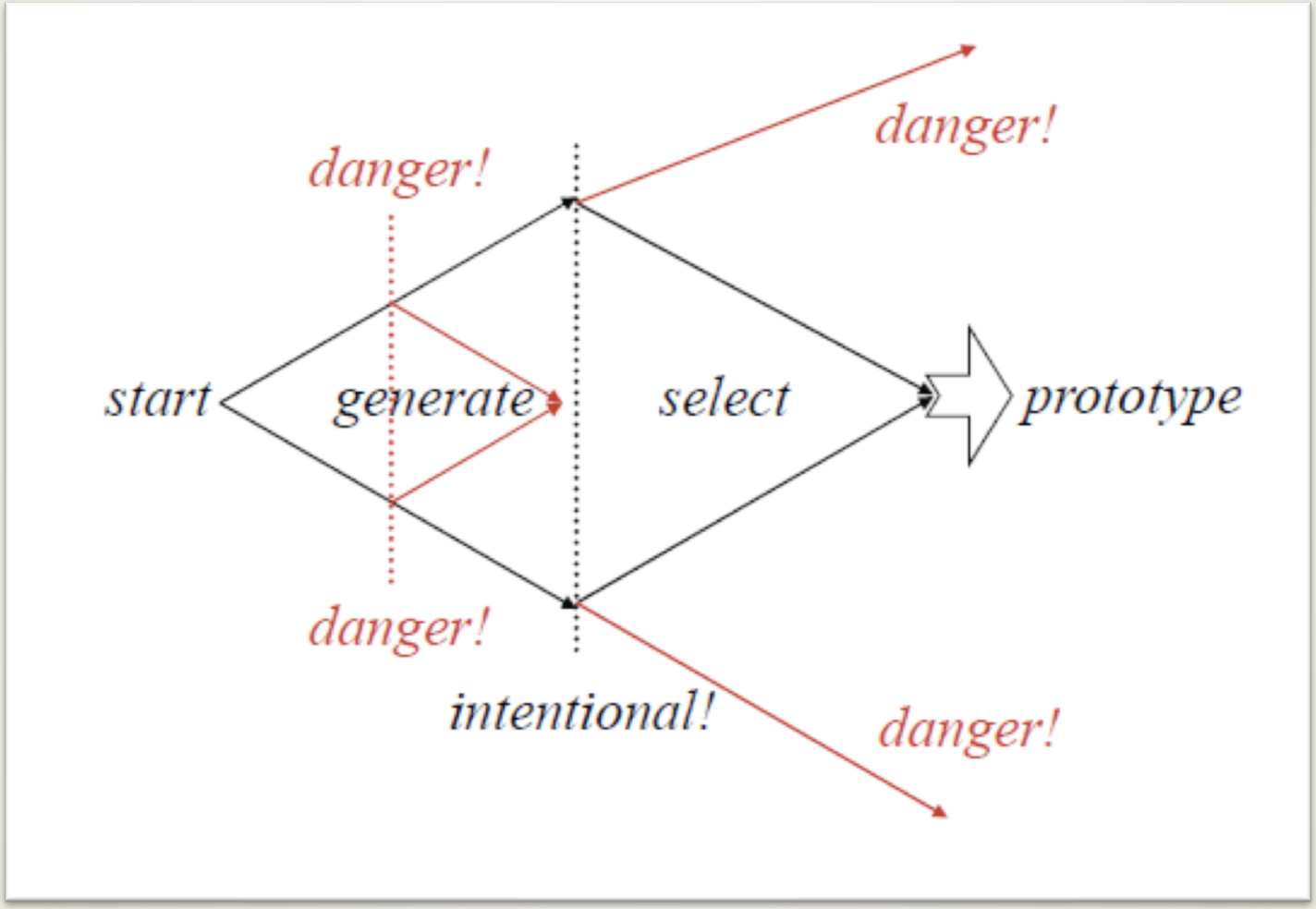
- Tonight: Group project time (Conduct your ideation session, or develop your prototyping plan)
- Wednesday:
  Group project time
- Friday:
  S6: *Interpersonal Communication*

Ideation

Ideation

- How to come up with lots of ideas?
- How to come up with the big ideas?
- How to refine those ideas?
- How to organize those ideas?

Idea Oscillation



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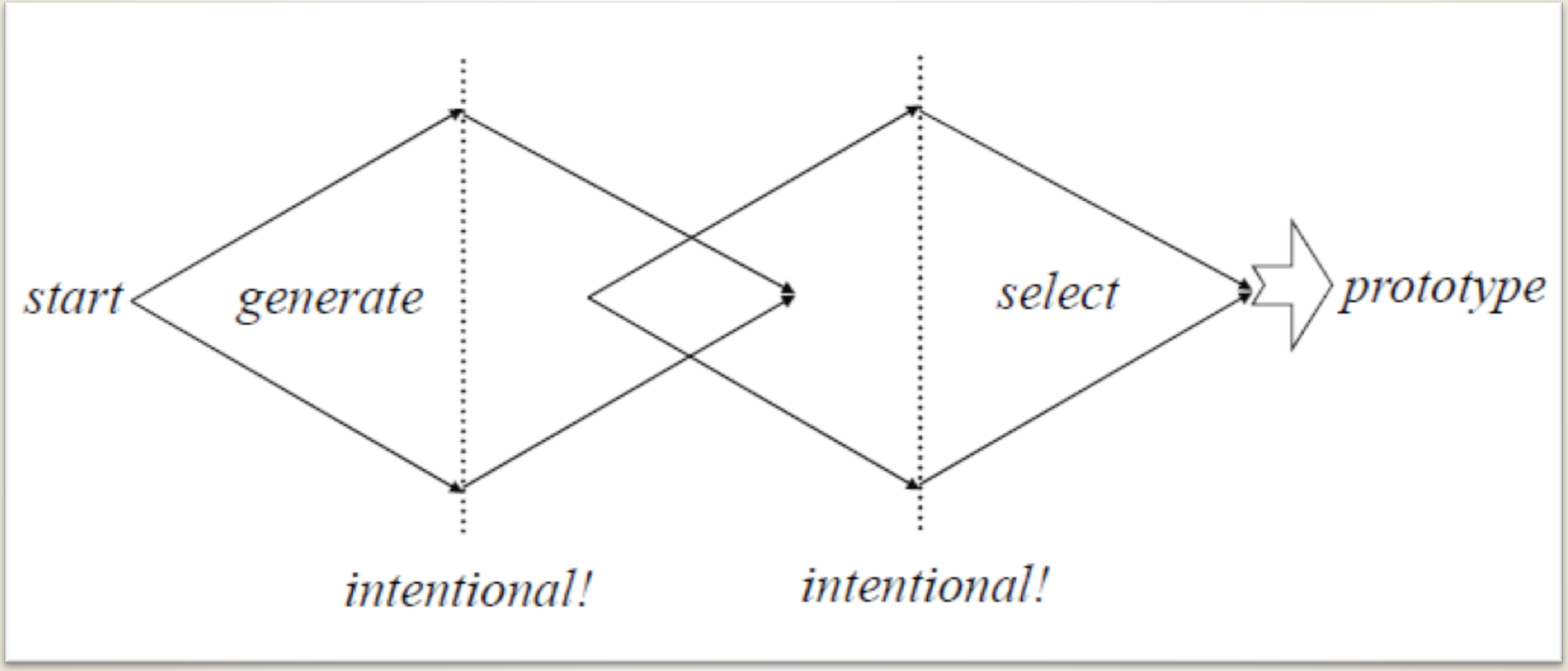


How to inspire creativity?

- Immerse yourself in the world for which you're designing
- Generate ideas constantly
  - Keep a book, you never know when you're going to be inspired
- Sketch your vague ideas to think through them more clearly

How to inspire creativity?

- Explain your ideas to others regularly
  - Feedback from others can inspire new ideas
  - But make sure you don't get stifled by it
- Take an outsider's perspective on something you know
- Take an insider's perspective on something you don't know
- Take risks!
  - Early in the design process, it won't hurt

Think of the Children

- Children are creative because they don't know the rules, and thus break them all the time
- Children don't know the consequences, and thus are more likely to take risks

Other Ideas

- Take things from one domain and try them in another
- Talk with other creative people
- Leave your comfort zone
- Be passionate about the topic
- Consider posting sketches around your workspace for inspiration and feedback
- Read science fiction

Possible Futures

- Look to current trends and extrapolate future possibilities. The trends can be human, or technology, or both. Think sci-fi!

- Some current trends
  - Distributed, social, data-centric, community-driven, bottomup, sensors, networks, ambient, invisible, mobile, reconfigurable, fashion, adaptive, “natural”…

Roles to Adopt

- The Explorer
  – gathers information and research
- The Artist
  – generates new ideas in the early phases
- The Judge
  – evaluates and filters the generated ideas
- The Warrior
  – champions one idea and sets the course forward

Brainstorming

- Working in groups is essential to design
- Brainstorming can be fun and fruitful
- Keep the results of your user research handy during the process
  - E.g., scenarios, profiles of potential users, lists of design requirements

IDEO's Rules for Brainstorming

1. Be visual
2. Defer judgment
3. Encourage wild ideas
4. Build on the ideas of others
5. Go for quantity
6. One conversation at a time
7. Stay focused on the topic

7 Brainstorming "Dos"
(Tischler, Fast Company, 2001)

1. Sharpen the focus
2. Write playful rules
3. Number your ideas
4. Build and jump
5. Make the space remember
6. Stretch your mental muscles
7. Get physical

6 Brainstorming “Don'ts”
(Tischler, Fast Company, 2001)

1. Let the boss speak first
2. Give everybody a turn
3. Ask the experts only
4. Go off-site
5. No silly stuff
6. Write down everything

Nominal Group Technique

A powerful alternative to traditional brainstorming

- State an open-ended question (" What are some ways we could tackle our design problem?").
- Have each person spend several minutes in silence individually brainstorming all the possible ideas and jot these ideas down.
- Collect the ideas by sharing them round-robin fashion (one response per person each time), while all are recorded in key term, on a flipchart. No criticism is allowed, but clarification in response to questions is encouraged.
- Have each person evaluate the ideas and individually and anonymously vote for the best ones
- Share votes within the group and tabulate

Pros and Cons of NGT

Advantages

- Voting is anonymous
- There are opportunities for equal participation of group members
- Distractions inherent in other group methods are minimized

Disadvantages

- Opinions may not converge in the voting process
- Cross-fertilization of ideas may be constrained
- The process may appear to be too mechanical

Filtering: How to do it?

- Talk about the strengths of the idea
- Talk about the weaknesses
- Discuss the feasibility of it
  - Is it buildable?
- Discuss the originality of it
  - What new task does this accomplish?
  - Or what is out there that the idea is better than?
- Sort into piles of good, okay, and off-the-table

P2 – Ideation & Sketching

- As a team, conduct a brainstorming session where you generate at least 6 ideas per person (e.g., 24 total ideas for a 4 person team)
- As a team, filter down the ideas by discussing their strengths and weaknesses and pick the best three
  - Resketch these 3 ideas more neatly and provide written justification for why they're the best

Prototyping

Sketching Definition

- A process that enables you to think through ideas and convey design ideas to others very early in the design phase

Why is sketching useful?

- Early ideation
- Think through ideas
- Force you to visualize how things come together
- Communicate ideas to others to inspire new designs
- Active brainstorming

Sketches vs. Prototypes

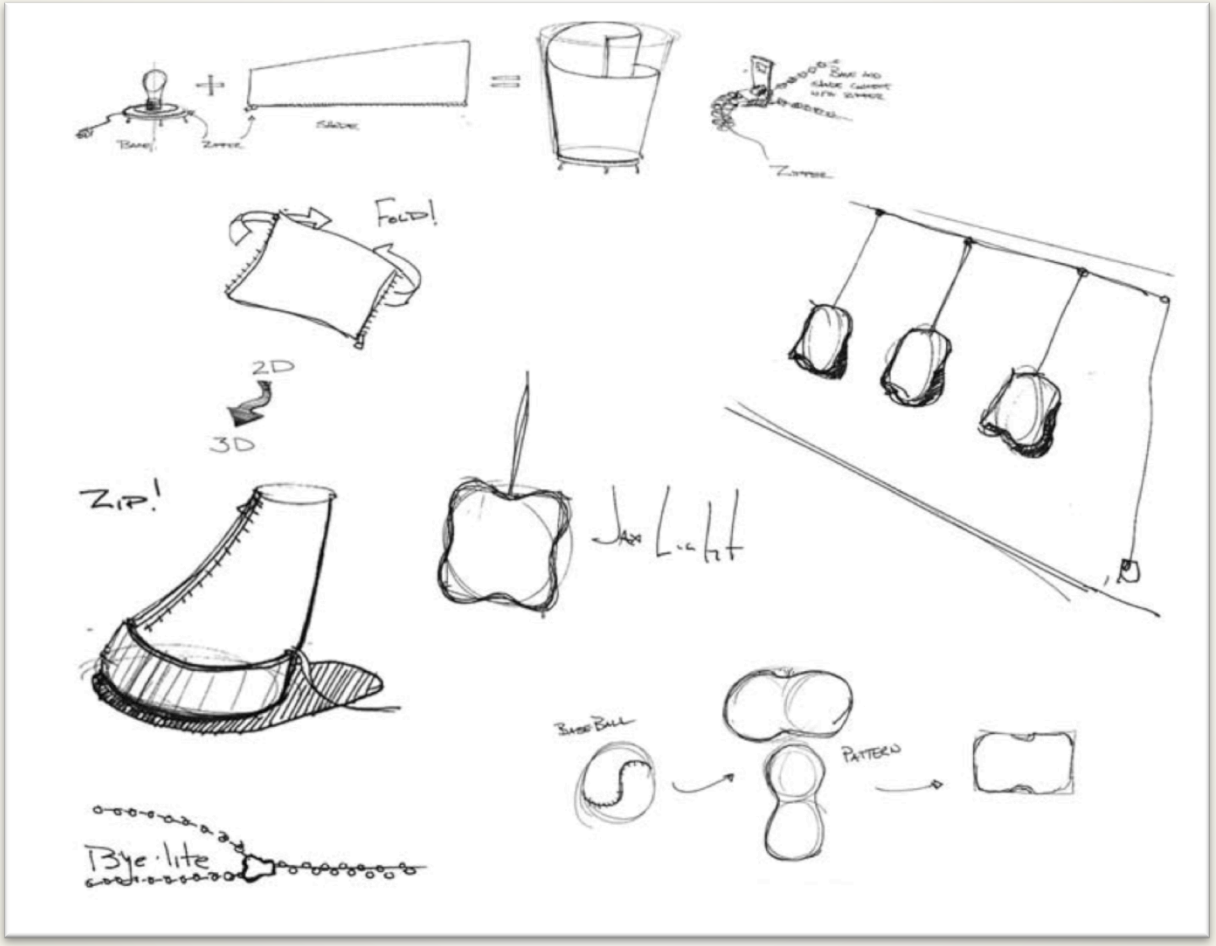
- Sketches are about exploring ideas
- Prototypes are about testing ideas

Sketch vs. Prototype

Sketch	Prototype
Invite	Attend
Suggest	Describe
Explore	Refine
Question	Answer
Propose	Test
Provoke	Resolve
Tentative, non committal	Specific Depiction

The primary differences are in the intent

Is this a sketch? Why or why not?



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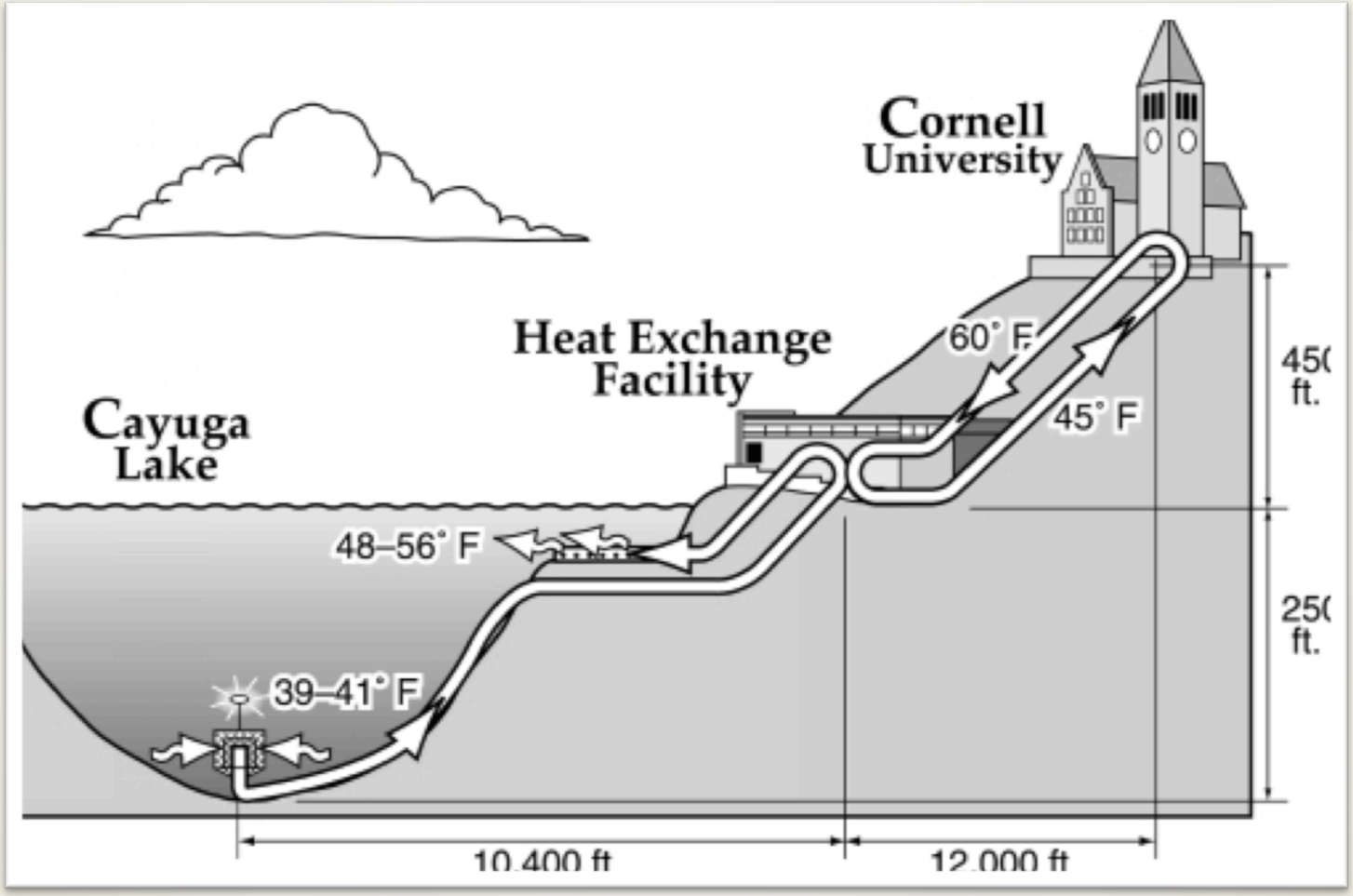

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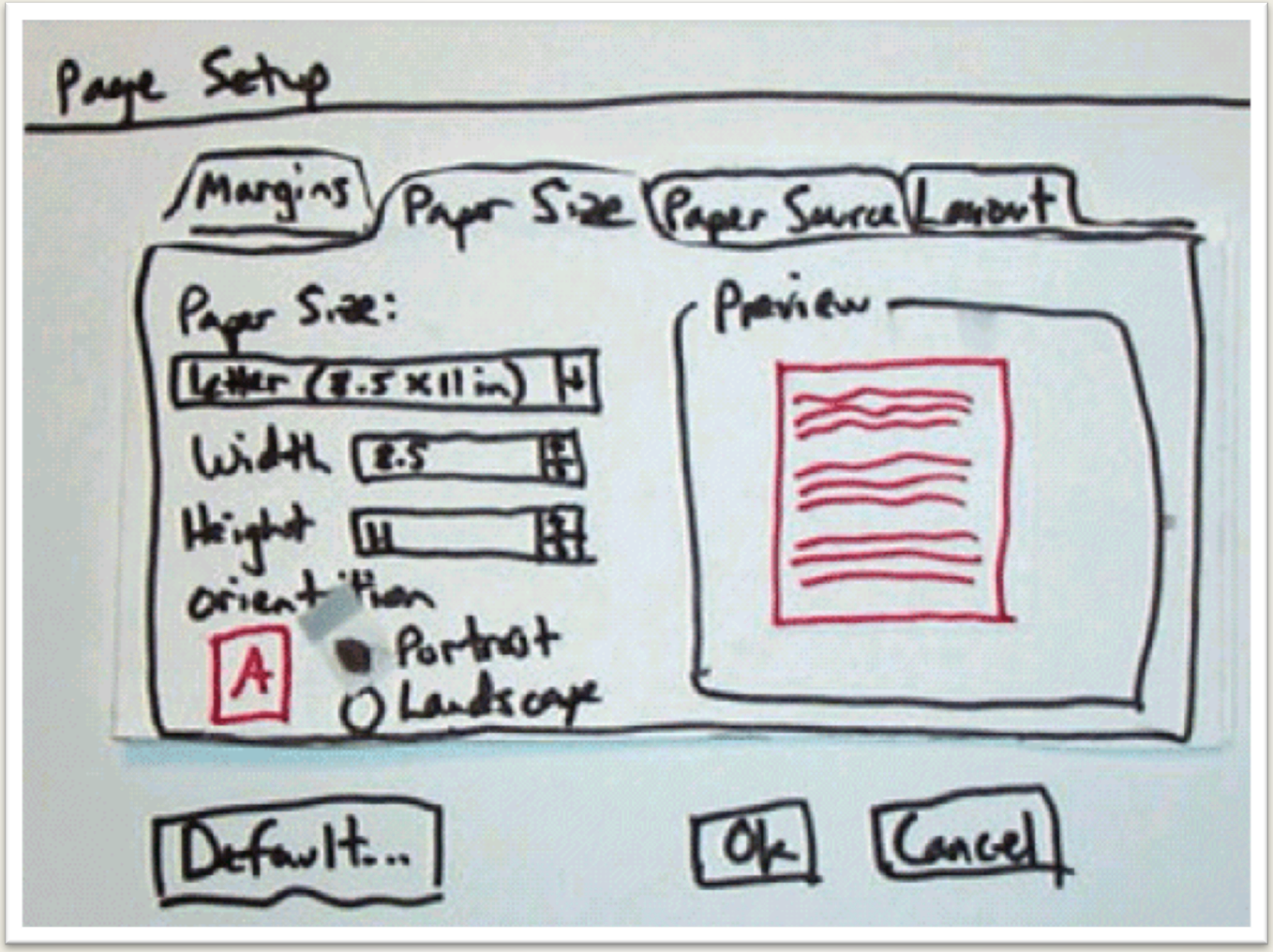


Prototype vs. System Development

- In engineering, prototyping is system development: building the first example of a system by hand
- In user interface design, the effort on the functionality of the system is minimized for the prototype
  - Focus on the "visible" parts of the system
  - Still a range, in terms of fidelity and level of activity, in relation to the final product

What is a prototype?

In designing interactive systems, it can be:

- a series of screen designs (e.g., from Photoshop)
- a storyboard, i.e. a cartoon-like series of scenes
- a PowerPoint slide show or HTML pages
- a video simulating the use of a system
- a lump of wood (e.g. Mobile Device)
- a cardboard mock-up
- a piece of software with limited functionality written in the target language or in another language

Why prototype?

- Evaluation and feedback are central to interaction design
- Users can see, hold, interact with a prototype more easily than a document or a drawing
- You can test out ideas for yourself
- It encourages reflection: important aspect of design
- Prototypes answer questions, and support designers in choosing between alternatives

Low-Fidelity Prototyping (Lo-Fi)

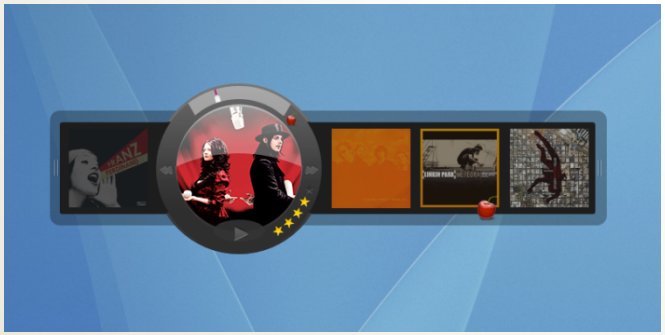
Very far from the final product (e.g. paper, cardboard)

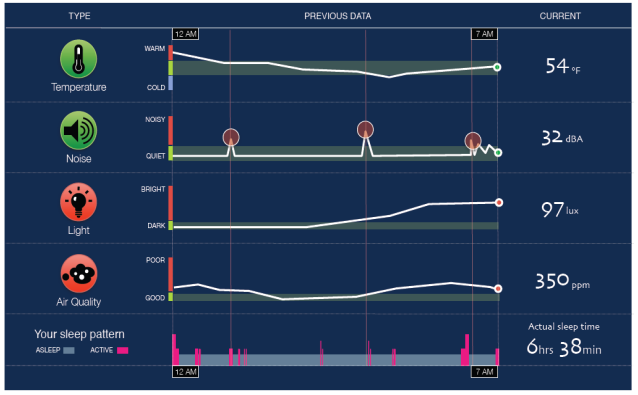
Examples: sketches of screens, task sequences, etc.

- ‘Post-it’ notes
- Storyboards
- Scenarios

High-Fidelity Prototyping (Hi-Fi)

- Prototype looks more like the final system than a low-fidelity version
- Common hi-fi prototyping tools:
  - Adobe Flash, Axure, JavaScript widgets





Hi-Fi vs. Lo-Fi

	Lo-Fi	Hi-Fi
Advantages	• Fast • Cheap • Easy – kindergarten skills! • Can simulate actual product	• Better sense of finished product • Can judge aesthetic appeal • More realistic experience • Can evaluate experience
Disadvantages	• Slow response time • Can't get feedback about aesthetics • User may question design quality	• Users may focus on unnecessary details • Takes a lot of time to make • Users may lose track of big picture

Horizontal vs. Vertical

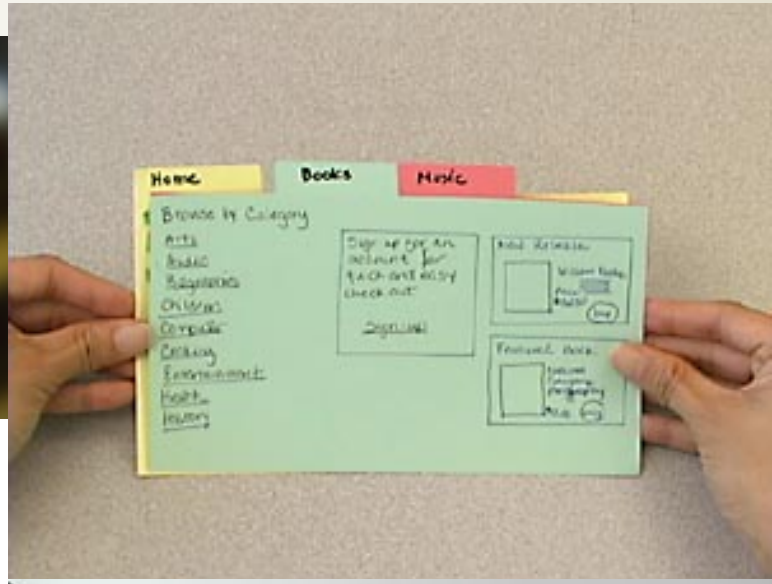
- "Deep" or "vertical" prototyping
  - provide a lot of detail for only a few functions
- "Broad" or "horizontal" prototyping
  - provide a wide range of functions, but with little detail

Prototyping Recommendations

- Start early
- Avoid evolutionary prototypes
  - Temptation is too great to stick with bad ideas
- Start with idealistic (rather than realistic) prototypes
- Level of polish should reflect maturity of the prototype

Paper Prototyping

- Easy and fast to do
- Helps to think of specifics
- Usually good as a first round prototype
- Can still do usability testing, even with paper



Experience Prototyping

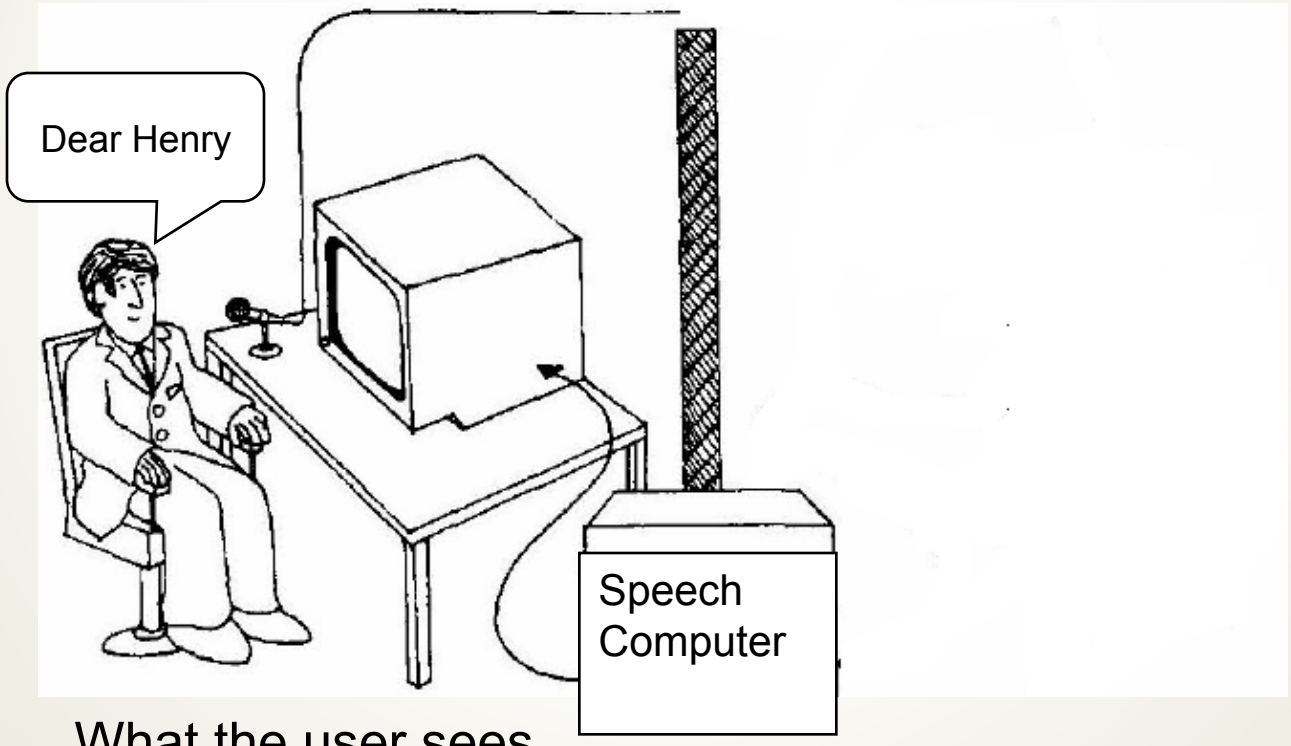
- The key is making the interactions and experience as authentic to the real thing as possible
- Typically a Hi-fidelity experience
- Use Wizard-of-oz to save time and avoid complicated implementation

From Gould, Conti & Hovanvecz, Comm ACM 26(4) 1983.

Wizard of Oz

A method of testing a system that does not exist

→ the listening typewriter, IBM 1984



What the user sees

From Gould, Conti & Hovanvecz, Comm ACM 26(4) 1983.

Wizard of Oz

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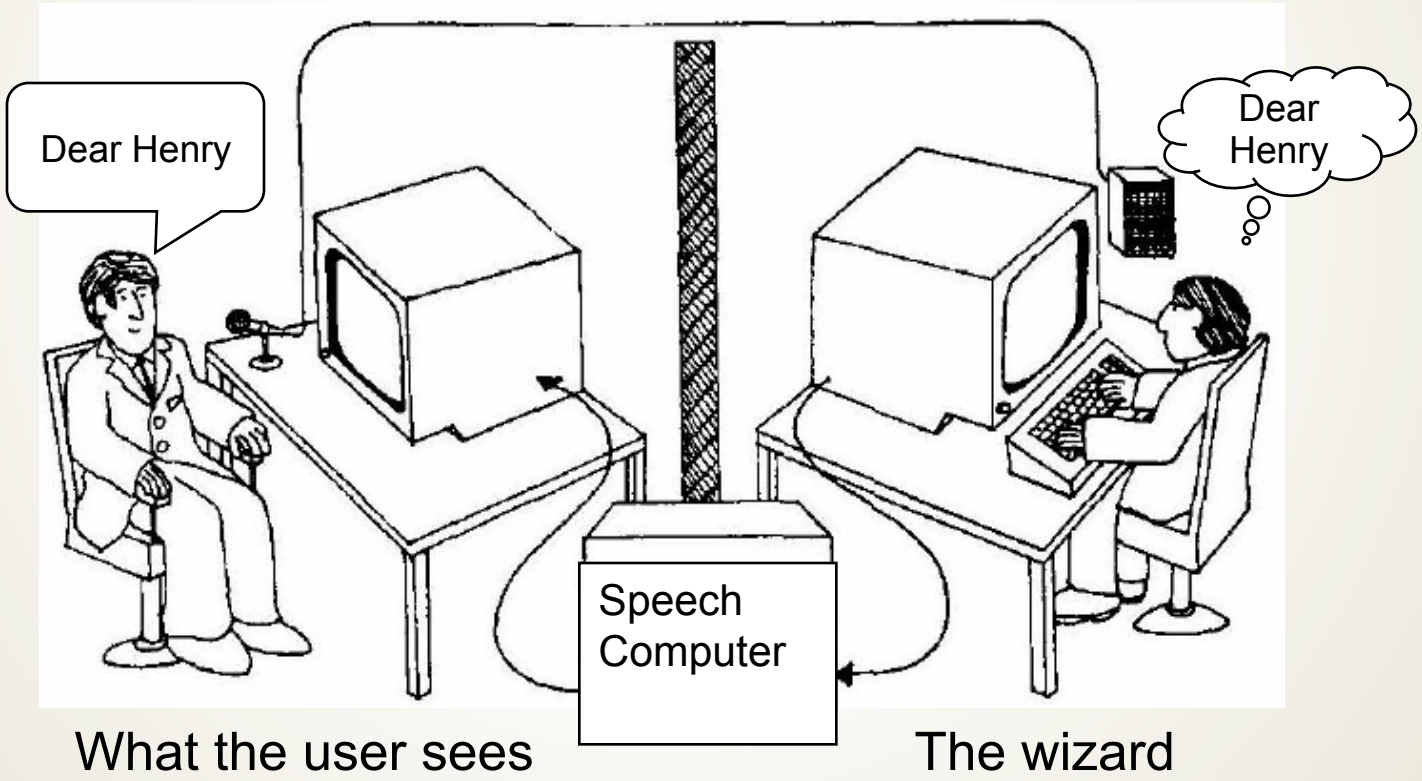


Wizard of Oz

Human ‘wizard’ simulates system response

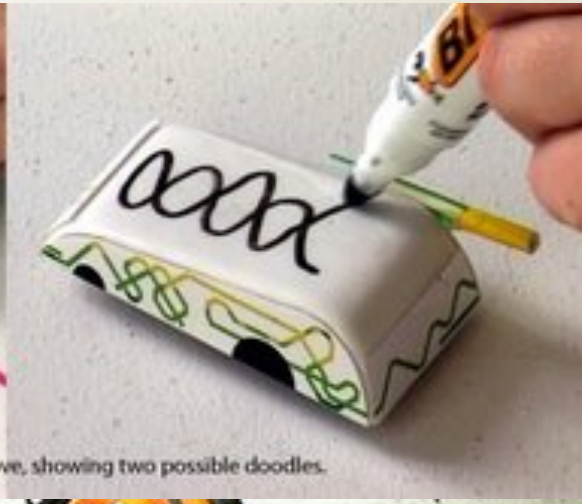
- interprets user input according to an algorithm
- controls computer to simulate appropriate output
- uses real or mock interface
- wizard sometimes visible, sometimes hidden
  - “pay no attention to the man behind the curtain!”

Good for:

- adding simulated and complex vertical functionality
- testing futuristic ideas

http://www.youtube.com/watch?v=O-XNwam3LOs

WoZ Example: Sketch-a-move



Close up of the toy Sketch-a-move, showing two possible doodles.

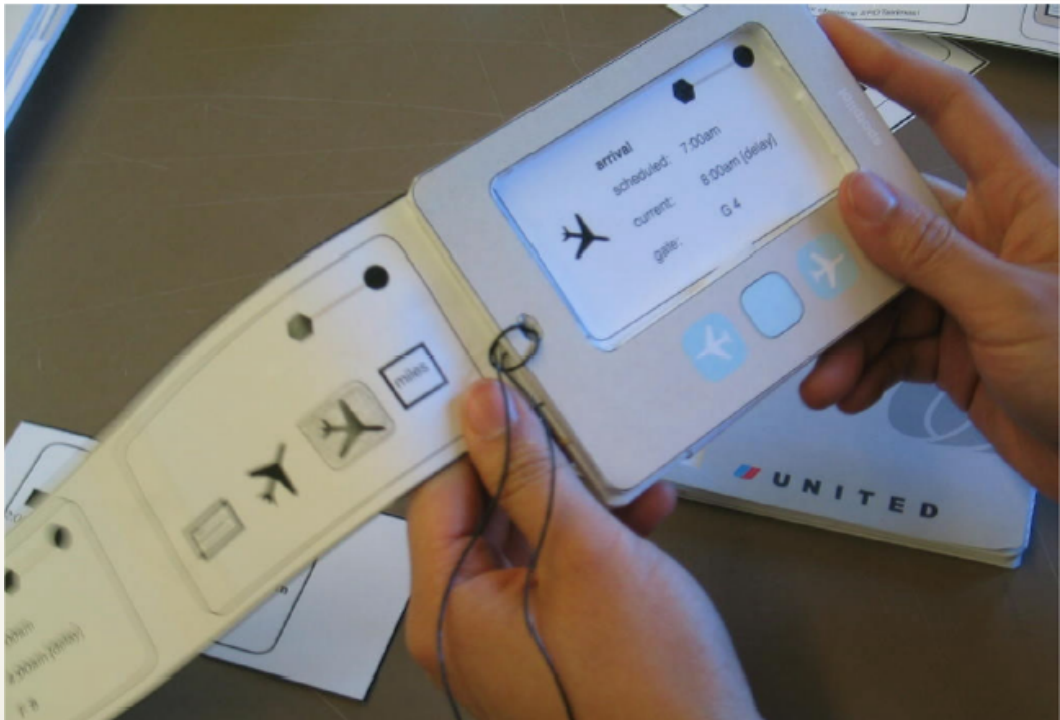
An early prototype showing an existing car and a nokia tablet, to check technical feasibility.

Other WoZ Examples

- Eye Toy prototype:
  - http://www.youtube.com/watch?v=IZUQqssE7Jk
- Anti-gravity bar:
  - http://www.youtube.com/watch?v=DL9cAcQ-gKQ&feature=related
- Virtual Peers for Autism
  - http://www.articulab.justinecassell.com/projects/samautism/index.html

Experience Prototypes w/ Paper

Spotlight: an interactive foam core and paper sketch/storyboard



Credit: Sue-Tze Tan,
Dept Industrial Design,
University of Washington

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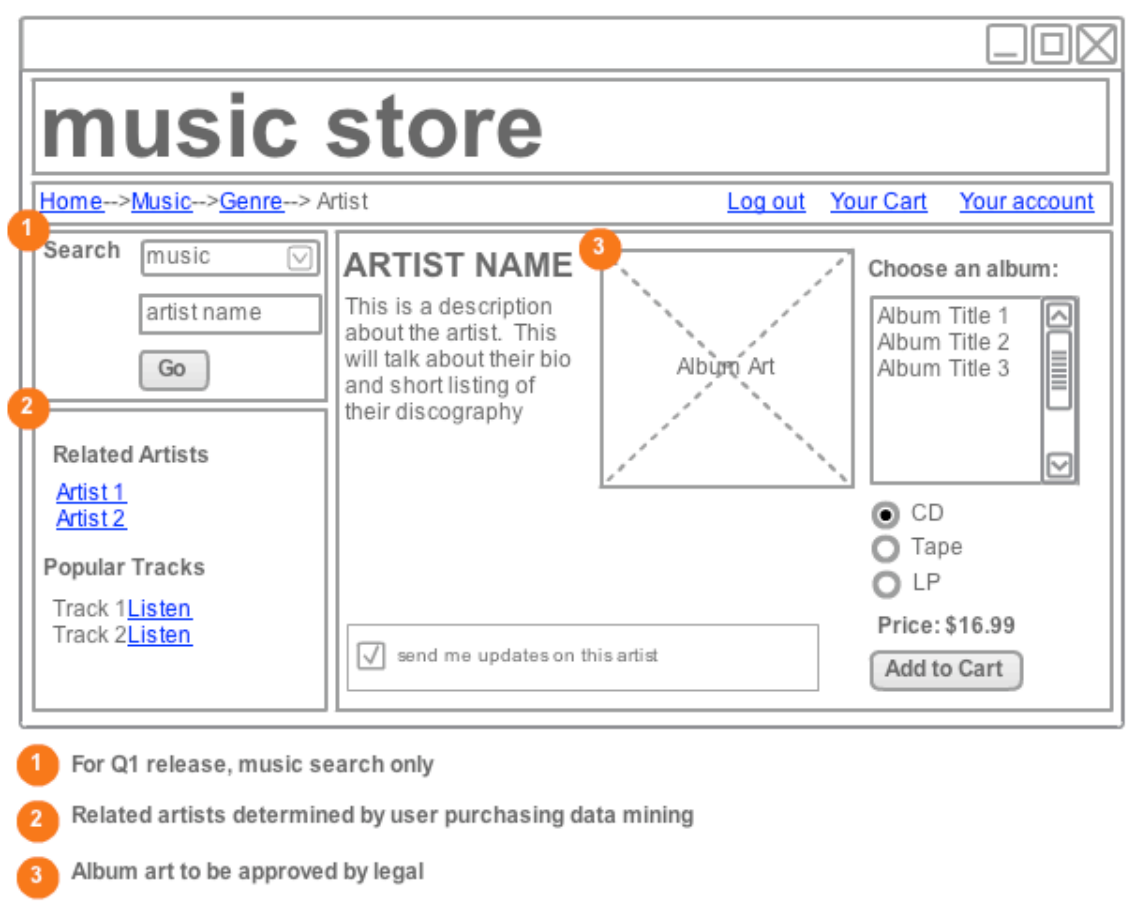
Prototypes vs. Wireframes

- Prototypes are usually intended to be shown to the end user
- Wireframes are usually more of a design document to go from design to actual system
  - Usually contain annotations specific to the design team and are not intended for end-user consumption
- Wireframes can be used as lo-fidelity prototypes to save time
  - Remove annotations, make it interactive

Example Wireframe



http://www.smashingmagazine.com/2009/09/01/35-excellent-wireframing-resources/

A3: Paper Prototyping

- Design a paper prototype for FoodieFinder, a hypothetical system for tracking a user's eating.
- Also provide a list of tasks that could be performed in a usability test

Practical Prototyping Tools

- Creating Hi-Fi, semi-functional prototypes with minimal effort
  - PowerPoint Prototyping
  - UX-Specific Tools
    - Axure, Balsamiq
  - Photoshop + HTML/Dreamweaver
  - Visual Studio
  - OmniGraffle
  - Hardware Prototyping (Arduino, Phidgets)

PowerPoint

- Advantages:
  - Almost everyone has it
    - Ubiquitous format
  - Fast and easy to use
  - Can use hyperlinks to simulate interaction
- Disadvantages:
  - Must be used at a computer
    - e.g., difficult to do mobile-based interactions
  - Somewhat limited functionality
  - Cannot be reused for final implementation

Example Prototypes

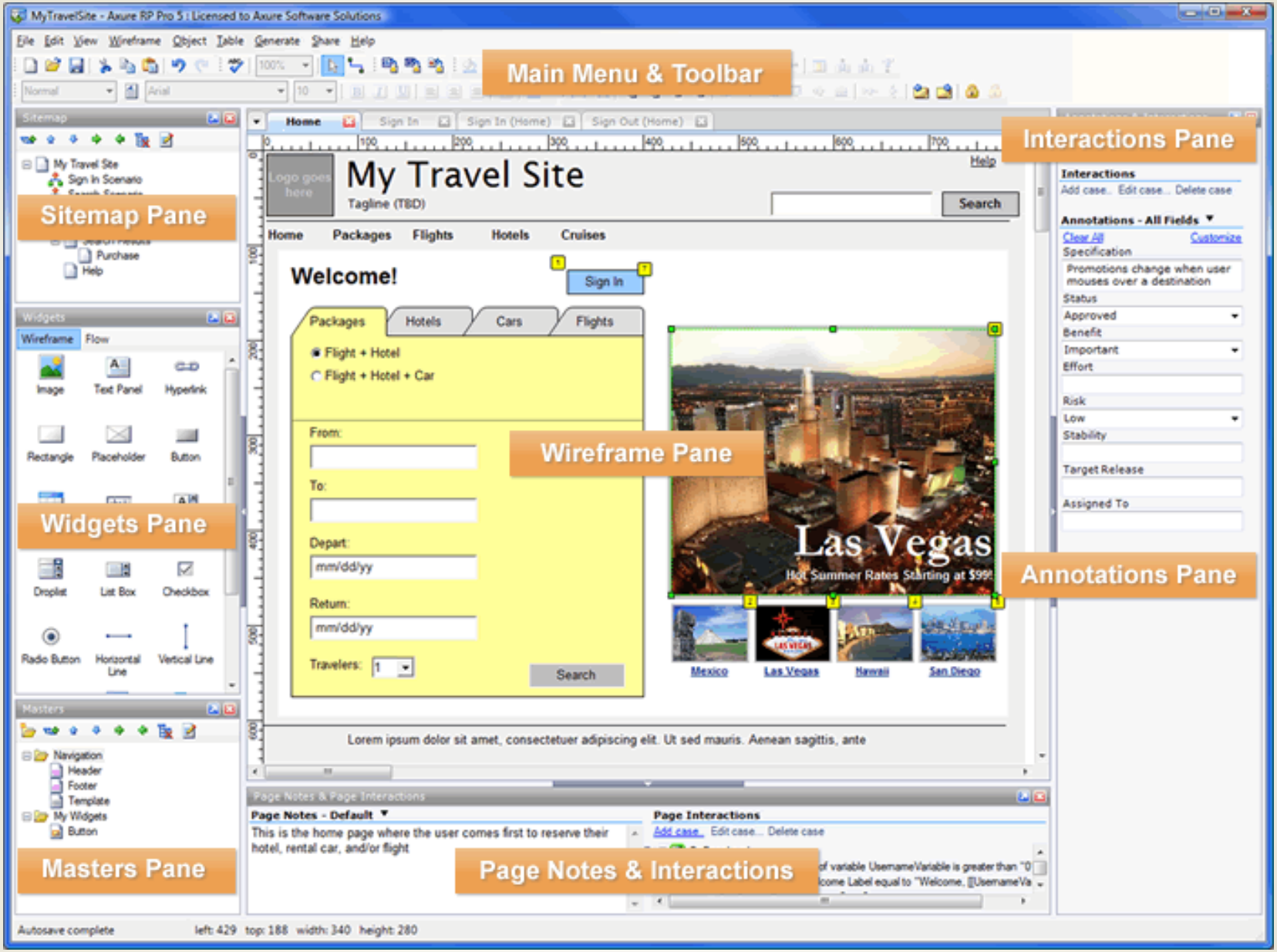
- http://www.boxesandarrows.com/files/banda/interactive/SamplePrototype.ppt

  – Tutorial:

    - http://www.boxesandarrows.com/view/interactive

Axure

- About
  - A commercially available wireframes maker/prototyping tool
  - Free license for students!
  - http://www.axure.com/
    - Contains good documentation and tutorials
- Advantages
  - Great for websites
  - Can transition from wireframe->Prototype->Functional system


Main Menu & Toolbar
Interactions Pane
Sitemap Pane
Wireframe Pane
Widgets Pane
Annotations Pane
Masters Pane
Page Notes & Interactions
My Travel Site
Welcome!
Las Vegas

Balsamiq Mockups

- Another commercially available prototyping tool
  - Free trial, or $79 to buy
- Advantages
  - Quick and dirty
  - Can make lo-fi appearing prototypes

  - http://www.balsamiq.com/products/mockups

Photoshop

- Advantages
  - Can look & feel like real thing
- Disadvantages
  - Needs use of HTML for real interactions

Photoshop Tools

- Download iPhone template:
  - http://www.teehanlax.com/blog/?p=1628
- Android Template:
  - http://chrisbrummel.com/google-android-gui-psd
- More free PS widgets:
  - http://www.greepit.com/2009/03/25-free-psd-resources-for-designers/
- To do screen shots (saves to clipboard)
  - Windows: alt+print screen button
  - Mac: Command-Control-Shift-3 (or 4 if you want to select only part of the screen)

Visual Studio, Eclipse + Android

- Advantages:
  - Fast to put together interfaces
  - Can evolve into a fully functional prototype

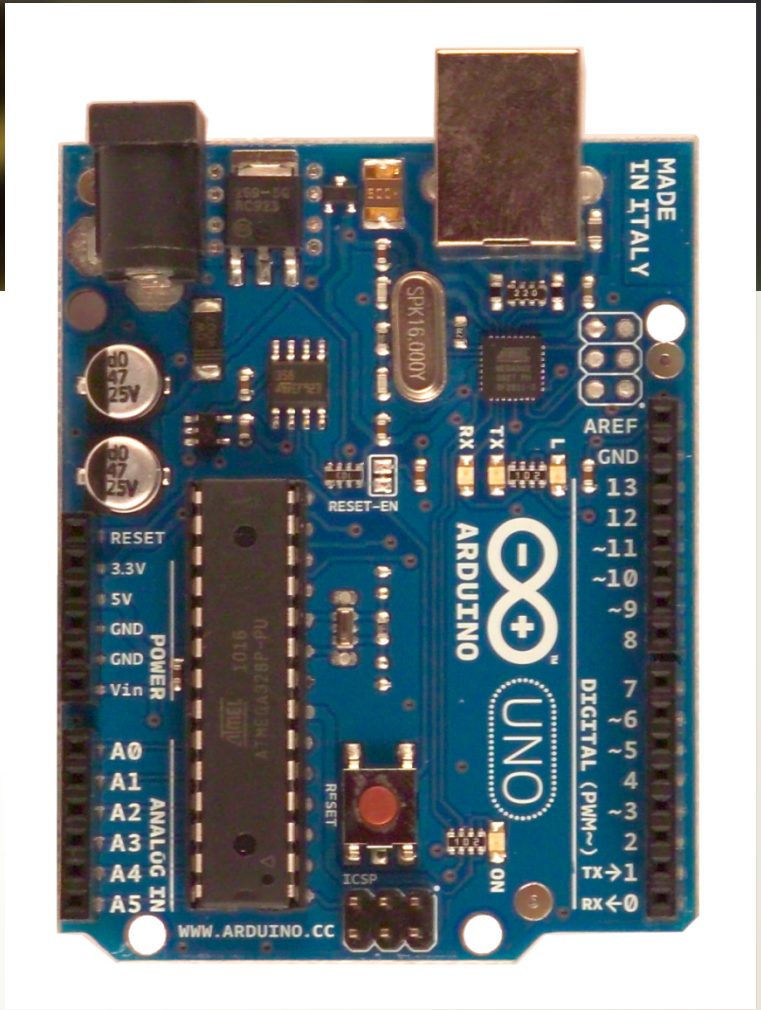
- Disadvantages:
  - Requires programming knowledge to start creating interactivity

Hardware Prototyping

- Great for making devices “off the screen”
  - Arduino
  - Phidgets

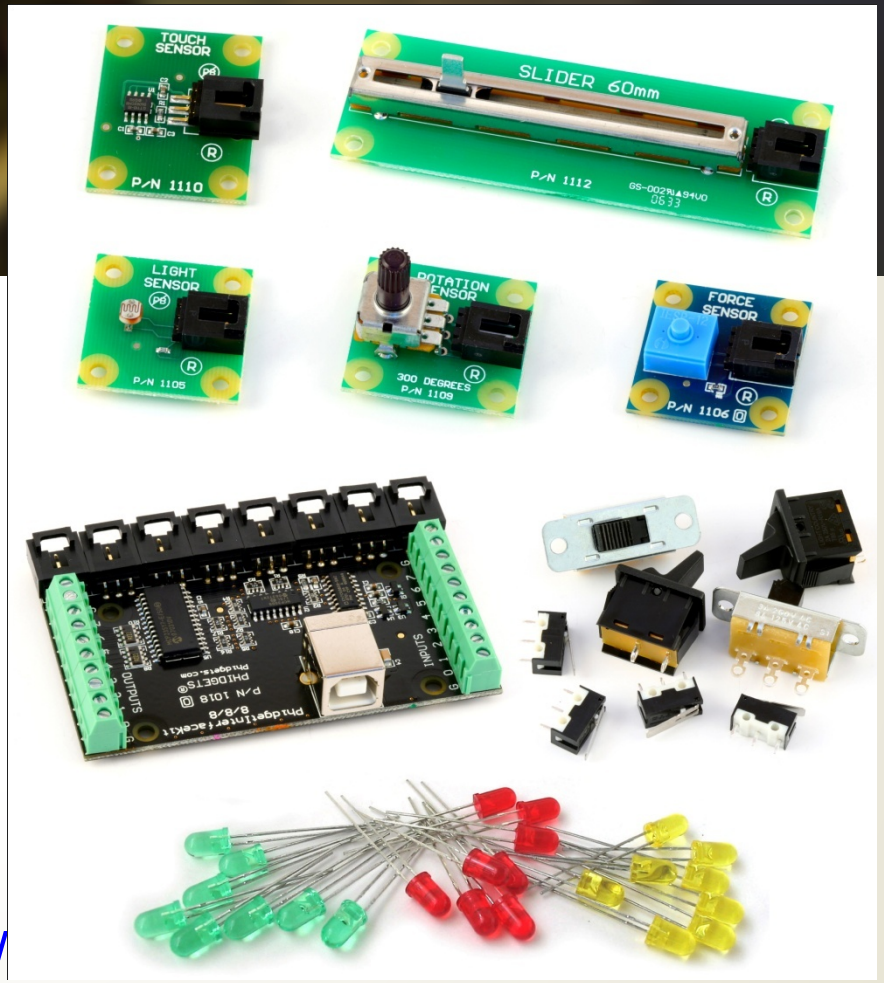
Arduino

- Prototyping tool for physical devices
- Allows you to interface with hardware and for physical devices to communicate with your computer
- http://www.arduino.cc/



Phidgets

- "Physical Widgets"
  - Sliders, buttons, sensors, lights, RFID, motors, etc.
- Easier than Ardunio
  - Uses snap-in and USB
  - Only requires basic knowledge of Java programming
- http://www.phidgets.com/



Phidgets Example: Gumball Machine