



Prototyping



Laboratory for Ubiquitous Computing and Interaction
Donald Bren School of Information and Computer Sciences | University of California, Irvine

Agenda

- Sketching Critiques
- Lecture: Prototyping overview
- Design Activity
- Discussion: Specific prototyping techniques & examples
- Upcoming



Sketching Critiques – 20 minutes

- Break into groups of 3 people
- Take turns showing and explaining your 3 sketches with each other
- Critics should offer advice and feedback about the idea
 - Strengths, Weaknesses, Originality, Feasibility
 - Sketcher: take notes about what feedback was offered
 - Critic: be critical, but constructive and courteous!
 - Each critic should sign and date the page after the sketches





LECTURE – PROTOTYPING OVERVIEW



Laboratory for Ubiquitous Computing and Interaction
Donald Bren School of Information and Computer Sciences | University of California, Irvine

Sketches vs. Prototypes

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



Sketch vs. Prototype: REMINDER

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



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. PalmPilot)
- 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**



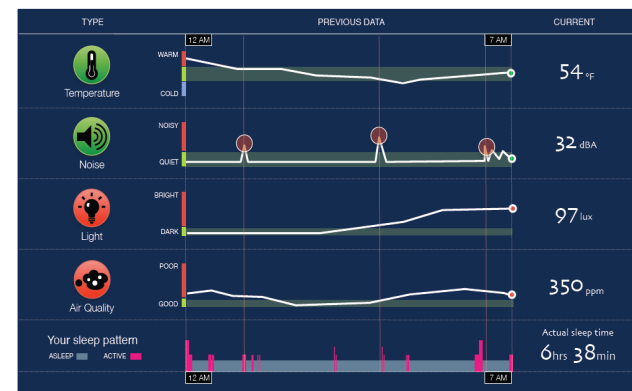
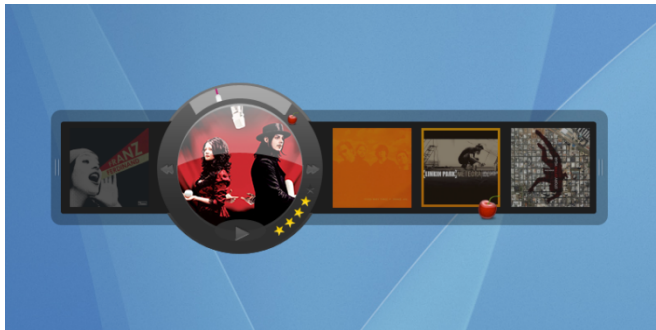
Low-Fidelity Prototyping (Lo-Fi)

- 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:
 - Macromedia Director, Flash, Visual Basic



Hi-Fi vs. Lo-Fi

	Lo – Fi	Hi – Fi
Advantages	<ul style="list-style-type: none">• Fast• Cheap• Easy – kindergarten skills!• Can simulate actual product	<ul style="list-style-type: none">• Better sense of finished product• Can judge aesthetic appeal• More realistic experience• Can evaluate experience
Disadvantages	<ul style="list-style-type: none">• Slow response time• Can't get feedback about aesthetics• User may question design quality	<ul style="list-style-type: none">• 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



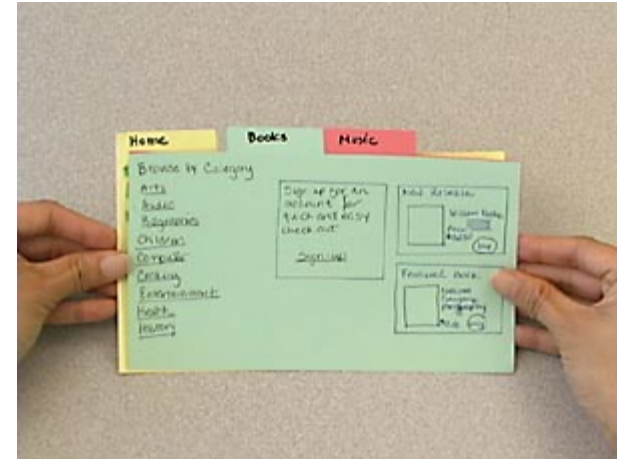
Prototyping Recommendations

- 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 you think of specifics
- Usually good as a first round prototype
- Can still do usability testing, even with paper
- Thoughts on Nielsen video?



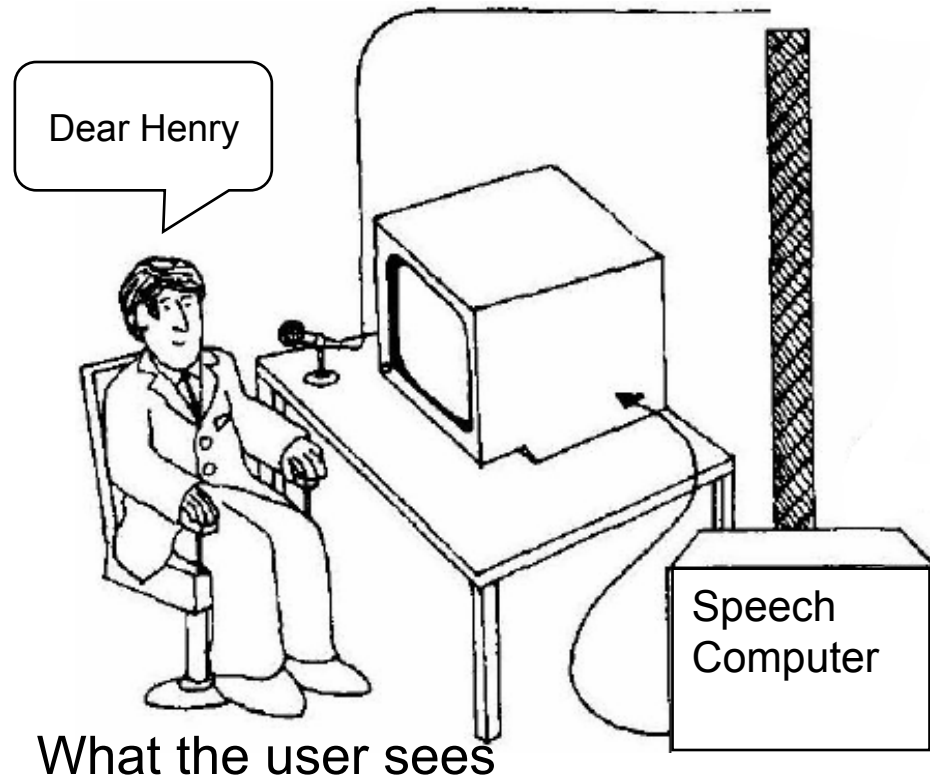
Experience Prototyping

- 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



Wizard of Oz

- A method of testing a system that does not exist
 - the listening typewriter, IBM 1984

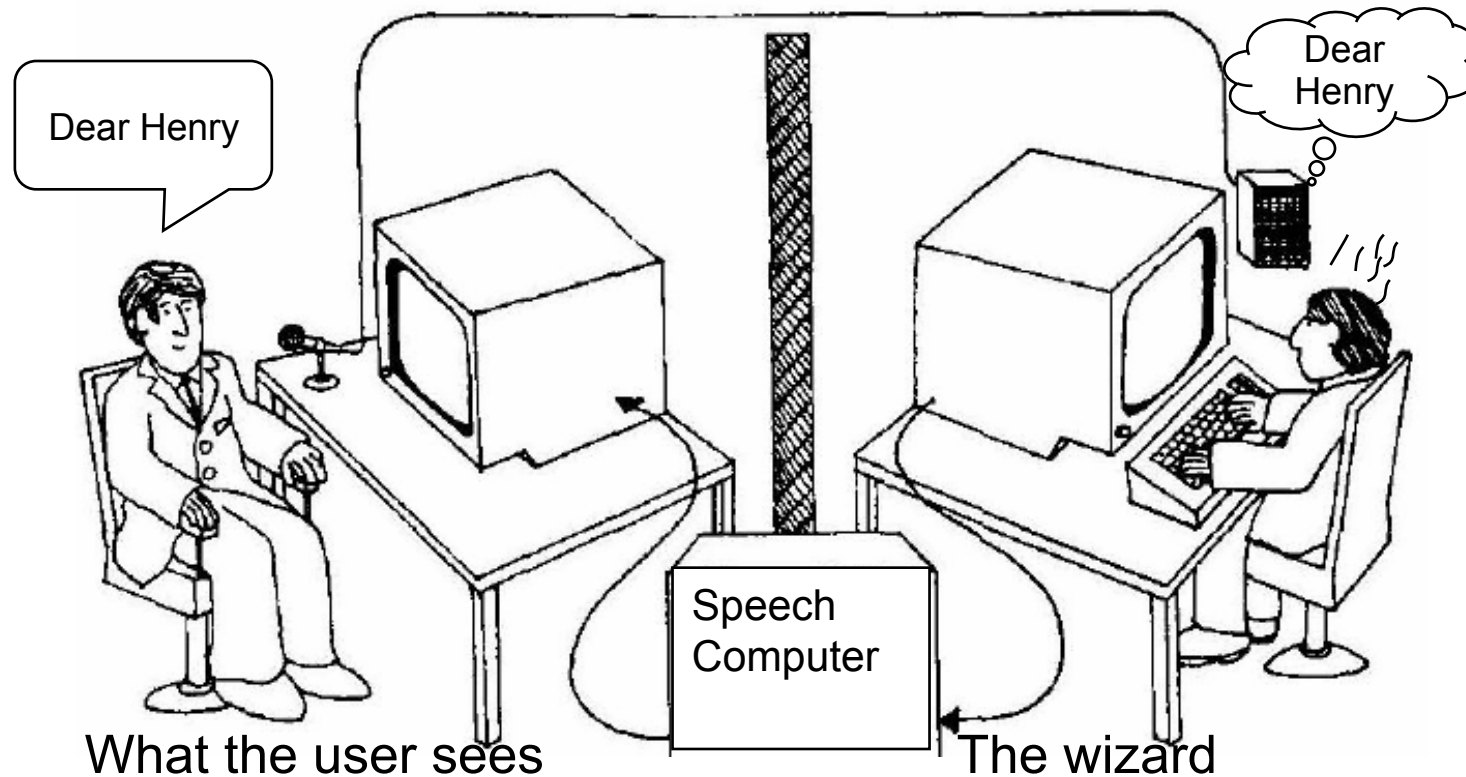


What the user sees



Wizard of Oz

- A method of testing a system that does not exist
 - the listening typewriter, IBM 1984

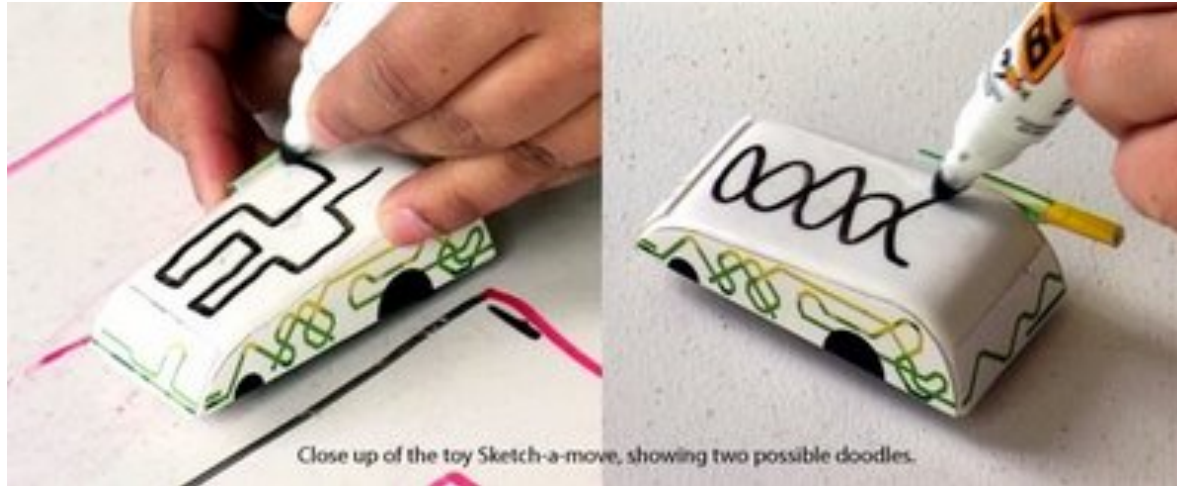


Wizard of Oz

- 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



WoZ Example - Sketch-a-move



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



Laboratory for Ubiquitous Computing and Interaction
Donald Bren School of Information and Computer Sciences | University of California, Irvine

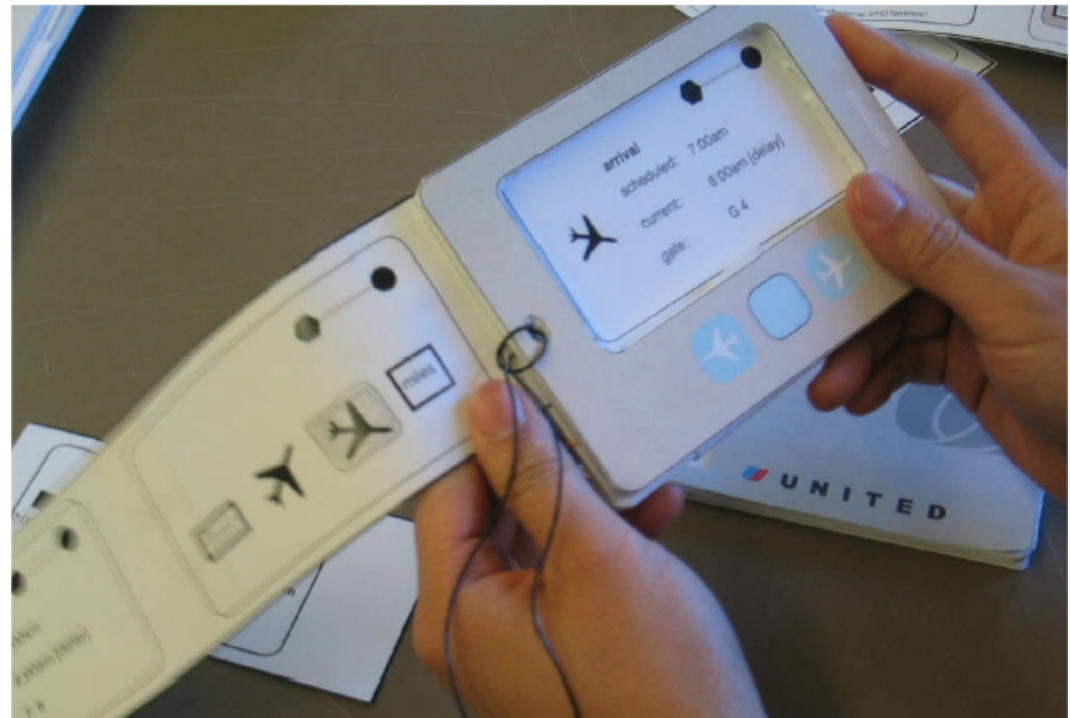
Other WoZ Examples

- 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



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 a lo-fidelity prototype to save time
 - Remove annotations, make it interactive



Example Wireframe



- 1 For Q1 release, music search only
- 2 Related artists determined by user purchasing data mining
- 3 Album art to be approved by legal

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



Design Exercise: Rapid Prototyping

- A vending machine allows you to buy the following drinks:
 - Coffee: drip coffee, latte, or cappuccino
 - Tea: Earl Grey or Orange pekoe
 - Hot chocolate
- Sugar and/or milk may be added to any drink at no extra charge. Drinks come in 3 sizes (12oz, 16oz, and 20oz, for \$2, \$3, and \$3.50 respectively). Payment is by cash or credit card. Change is provided for cash transactions.
- In groups of 3-4, sketch a horizontal paper prototype



A3: Paper Prototyping

- See schedule for due date
- Design a paper prototype for FoodieFinder, a hypothetical system for tracking a user's eating.
- Use techniques described in Nielsen paper prototyping video
- 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>
- <http://courses.washington.edu/info360/examples/powerpoint-prototype-example.ppt>
- Tutorial:
 - <http://www.boxesandarrows.com/view/interactive>



Axure

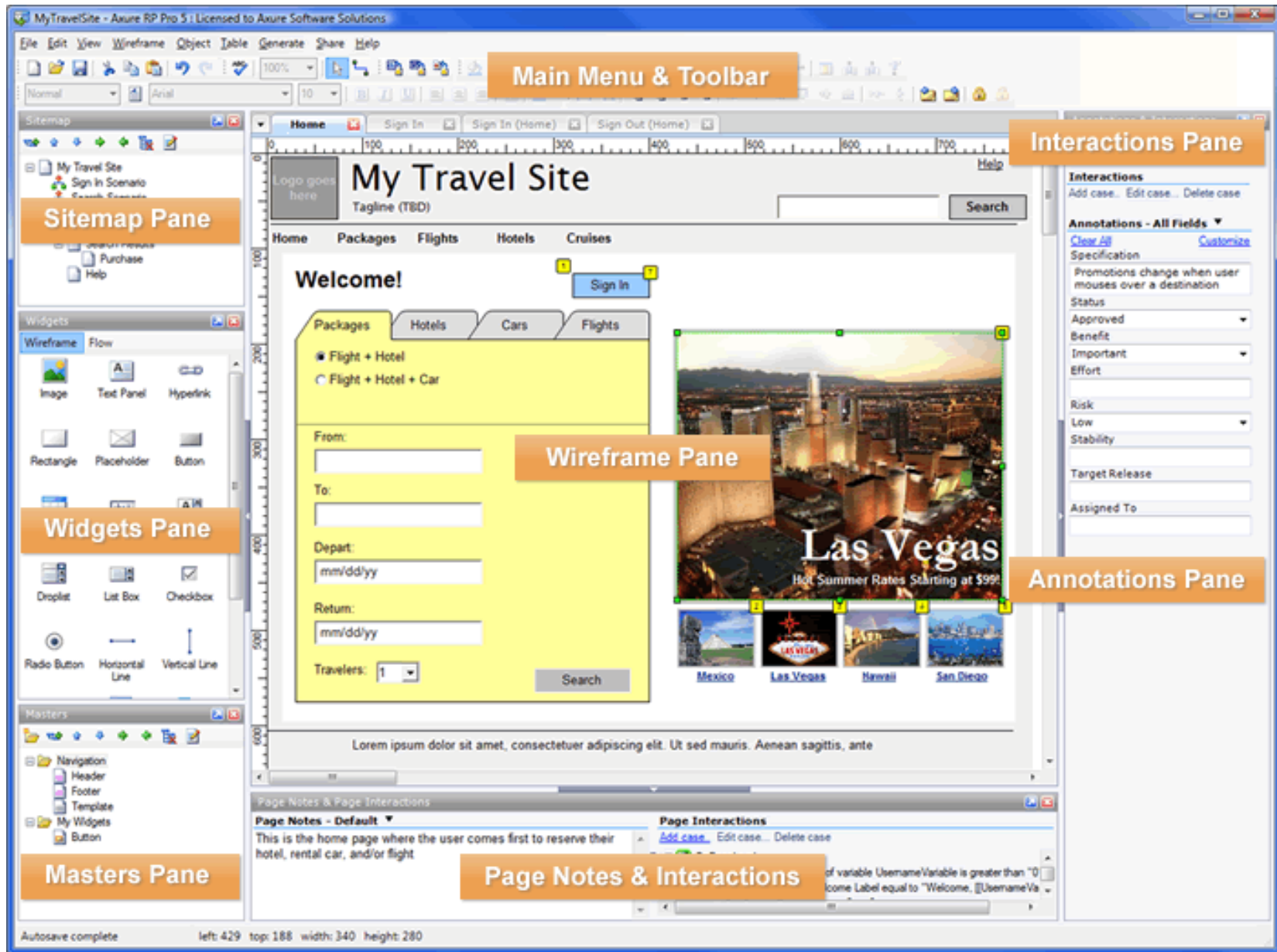
- About

- 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





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



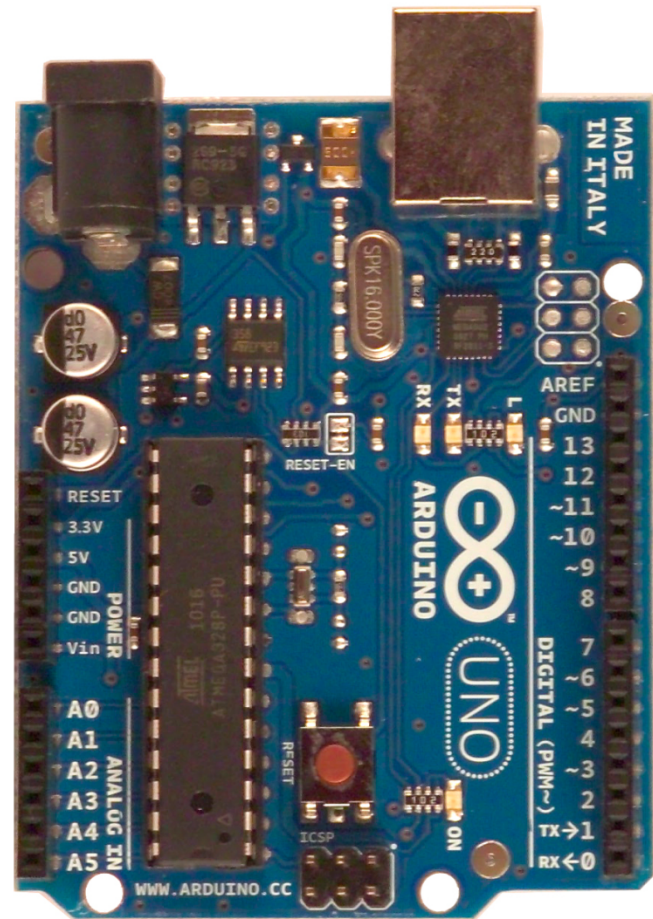
Hardware Prototyping

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



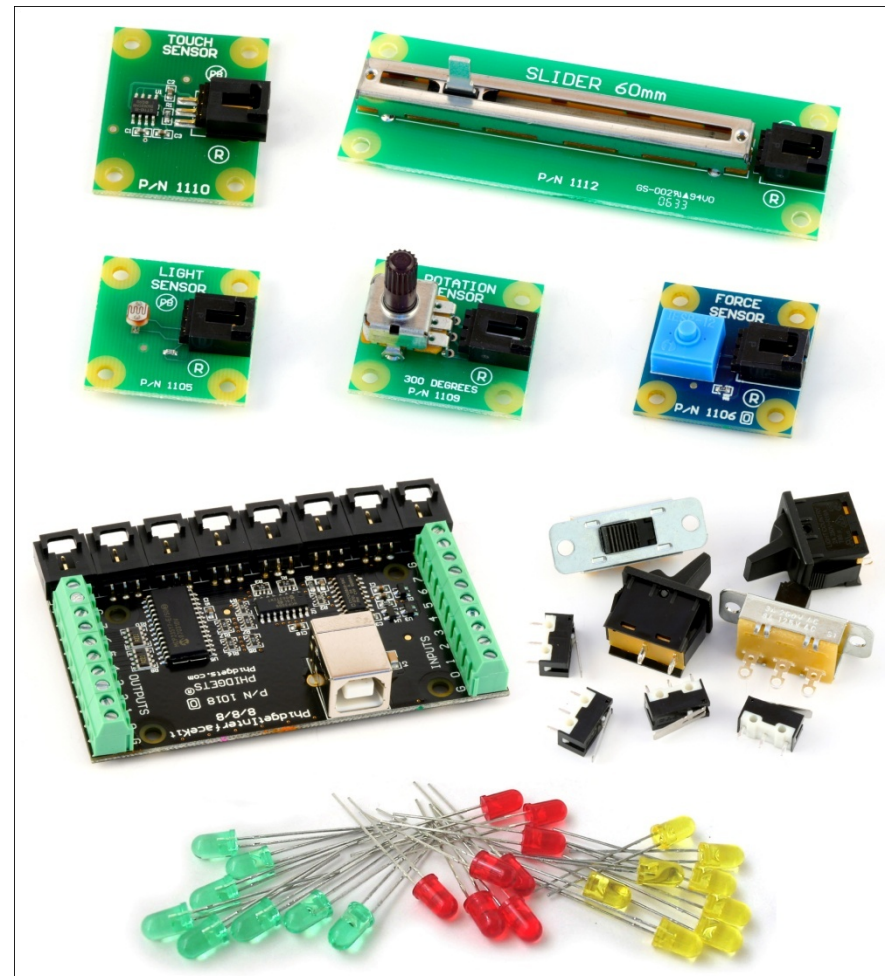
Arduino

- 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 Arduino
 - Uses snap-in and USB
 - Only requires basic knowledge of Java programming
- <http://www.phidgets.com/>



Phidgets Example – Gumball Machine



General Tips

- There are more tools here than you can learn to use proficiently
- Find out what's currently being used by your company or in jobs you'd like to do
- Take the time to learn one or two prototyping techniques very well
 - Perhaps your P3 assignment can be a good start



P3: Prototyping

- Due 12/4
- Create an interactive, hi-fi prototype of your design idea(s) that starts to get at the details of the interaction
 - Method of prototyping is up to you
- Demo of your prototype during class on 12/4
 - plan for 5-10 minutes
- Detailed descriptions of your prototype



Upcoming

- P2 due next Tuesday!!!!
- R7 due Tuesday

- Next Thursday is Thanksgiving, no class 😊

