Informatics 134: Project in User Interaction Software

Prototyping and Design

Informatics 134: Project in User Interaction Software

This Week

- Continue working on A3/T3
- Next week 5/13, T3 critiques

Today

- Building mixed fidelity prototypes
- SVG keyboard events and QA

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

Prototype vs. System Development

In engineering:

Prototyping <u>is</u> system development -- building the first example of a system by hand

In user interface design:

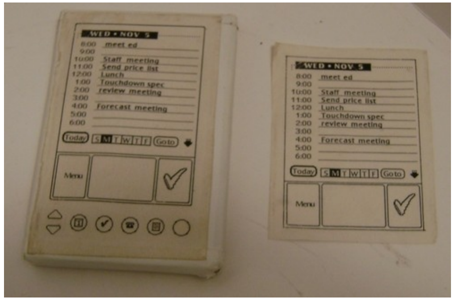
The effort on the *functionality* of the system is minimized for the prototype

- Focus is on the "visible" parts of the system
- Still a range, in terms of <u>fidelity</u> and <u>level of activity</u>, 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



Wooden Palm Pilot, 1995

http://content.time.com/time/subscriber/article/0,33009,987979-1,00.html

https://www.computerhistory.org/collections/catalog/102716262

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

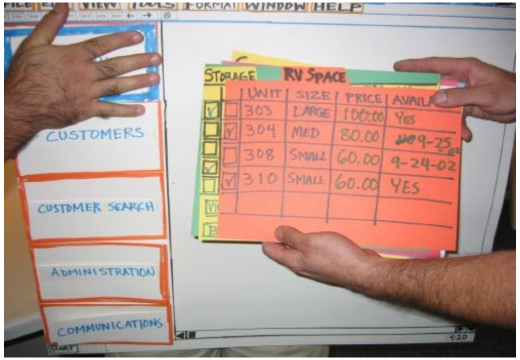
Prototypes **answer questions**, and support designers in **choosing between alternatives**

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



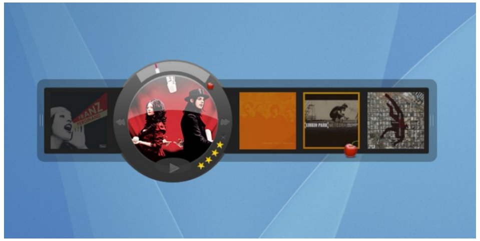
	UNIT	SIZE	PRICE	AVAILA
□	303	LARGE	100.00	YES
☑	304	MED	80.00	9-25
□	308	SMALL	60.00	9-24-02
☑	310	SMALL	60.00	YES

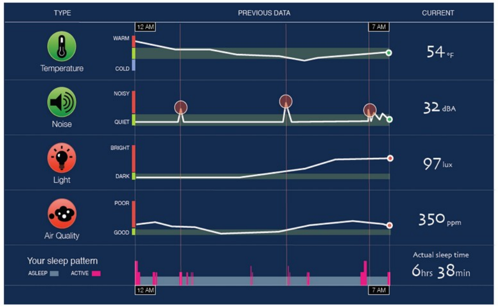
High-Fidelity Prototyping (Hi-Fi)

Prototype looks more like the final system than a low-fidelity version

Common hi-fi prototyping tools:

- **Axure**
- **Figma**
- **InVision**
- **Adobe XD**
- **Others?**





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 in the process

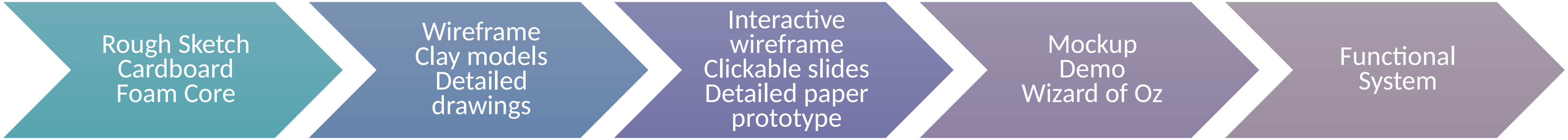
Avoid evolutionary prototypes

- (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

Prototyping Recommendations



Rough Sketch
Cardboard
Foam Core

Wireframe
Clay models
Detailed drawings

Interactive wireframe
Clickable slides
Detailed paper prototype

Mockup
Demo
Wizard of Oz

Functional System

Prototyping can be done at a wide range of fidelities

Assessing Hi-Fidelity

How do we know how high fidelity it is?

(This is a bit of a spectrum and not very clear)

Mostly:

- Visual Design
- *Interaction* - I have thoughts about this...
- Content
- Code - but probably not

Low-fi tools can make high-fi prototypes and high-fi tools can make low-fi prototypes. It's not straightforward.

Choosing the Right Level of Fidelity

What kind of feedback do you want to get?

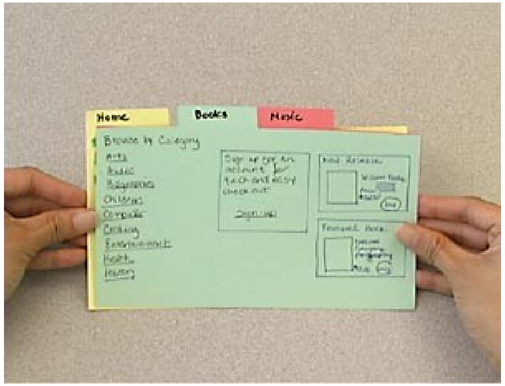
What skills do you have?

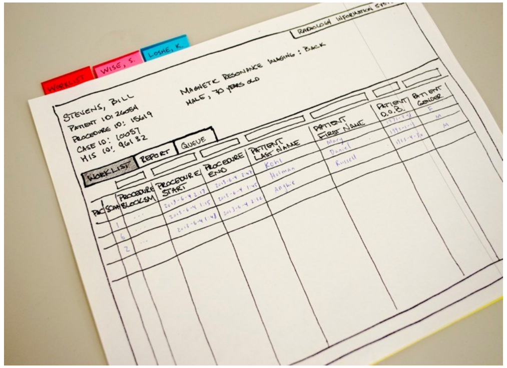
What resources can you use?

How much time do you have?

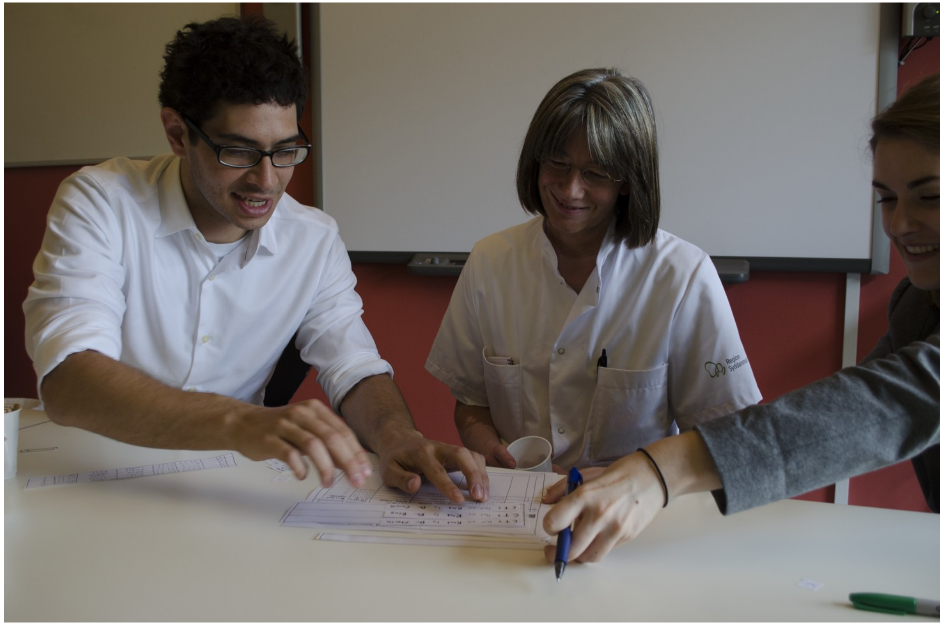
Paper Prototyping

- 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





Paper Prototyping



Experience Prototyping

The key is making the interactions and experience as authentic to the real thing as possible

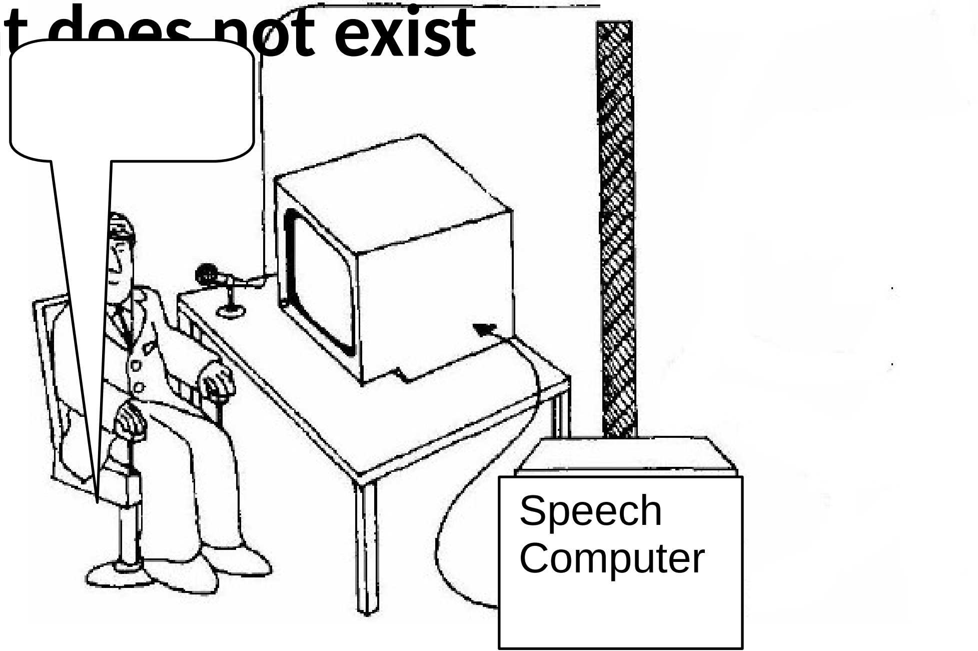
Typically a Hi-fidelity experience

Use Wizard-of-oz to save time and avoid complicated implementation

Wizard of Oz

A method of testing a system that does not exist

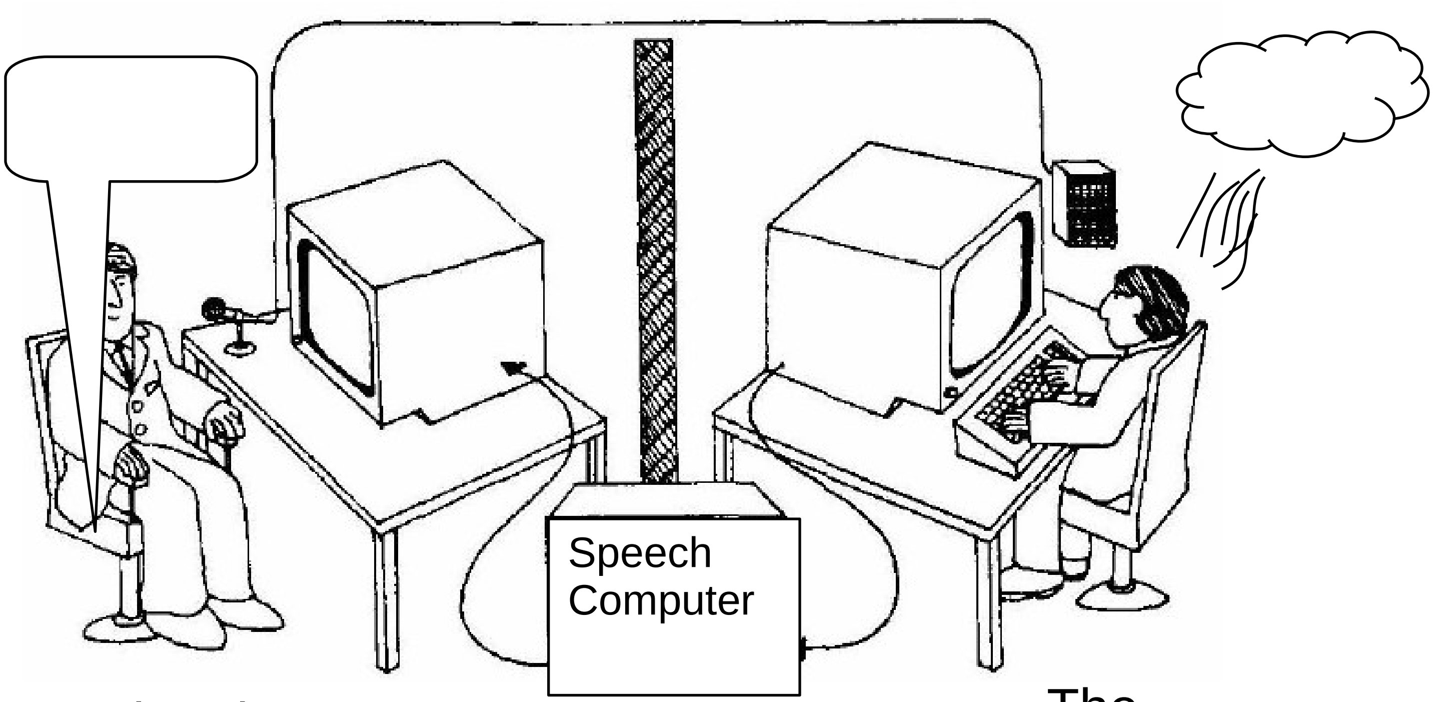
- The listening typewriter, IBM 1984



What the user sees

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

Wizard of Oz



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

Wizard of Oz

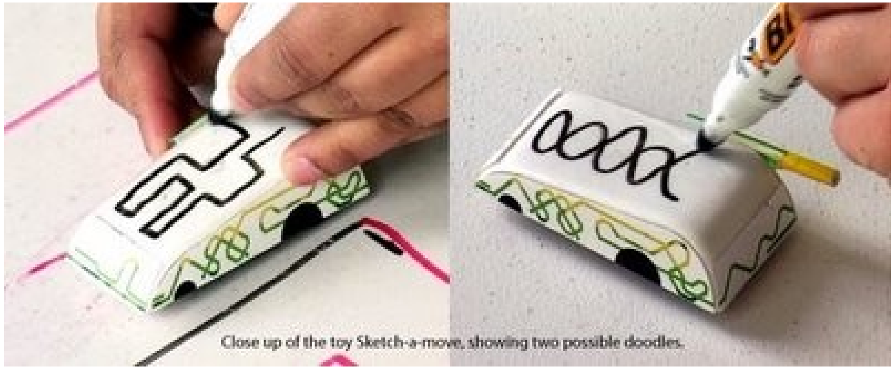
Human 'wizard' simulates system response

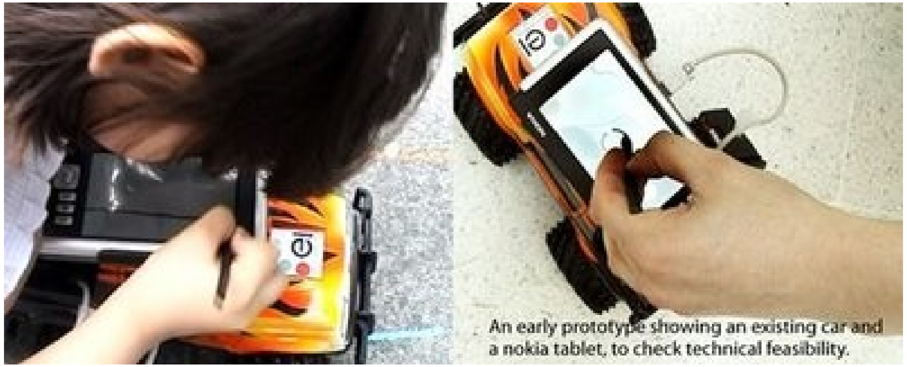
- interprets user input according to an algorithm
- controls computer to simulate appropriate output
- uses real or mock interface
- wizard sometimes visible, sometimes hidden
-

Good for:

- adding simulated and complex vertical functionality
- testing futuristic ideas

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.

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

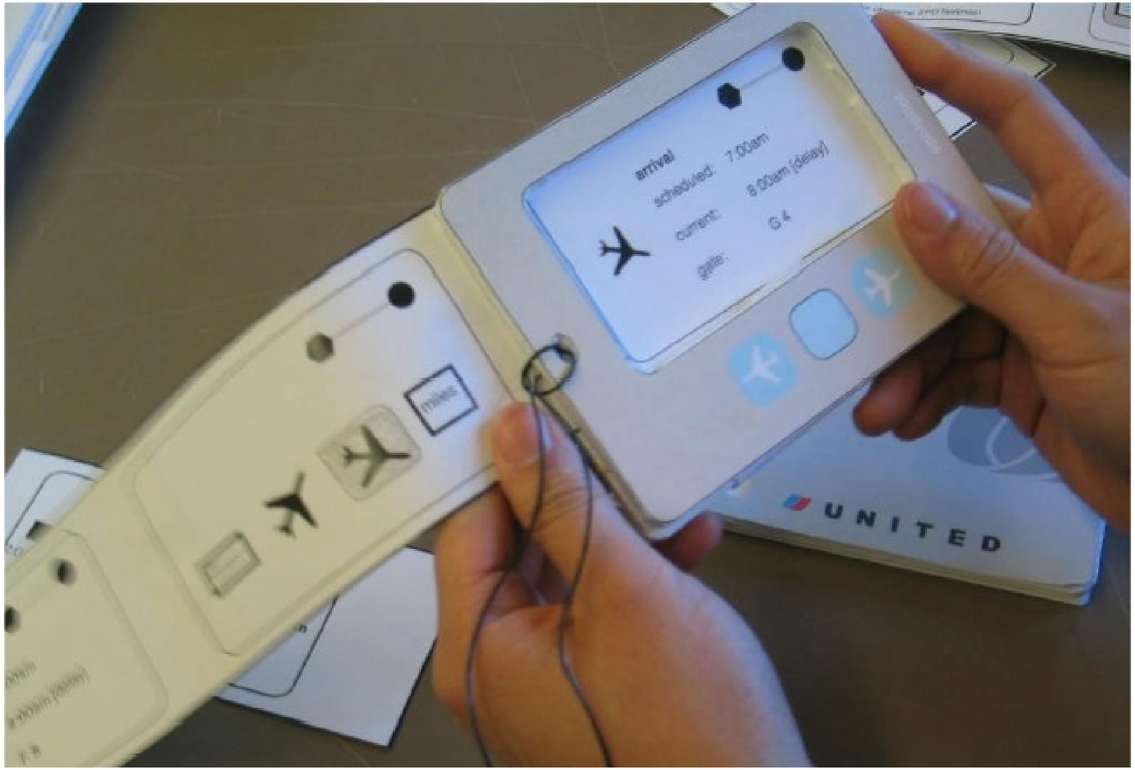
Some more info on WOz

Eye Toy prototype

- Anti-gravity bar
- Ex-A-Sketch - Bjoern Hartman’s experience prototyping tool
- Combines wizard of oz with animation

Experience Prototypes w/ Paper

Spotlight: an interactive foam core and paper sketch/storyboard



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

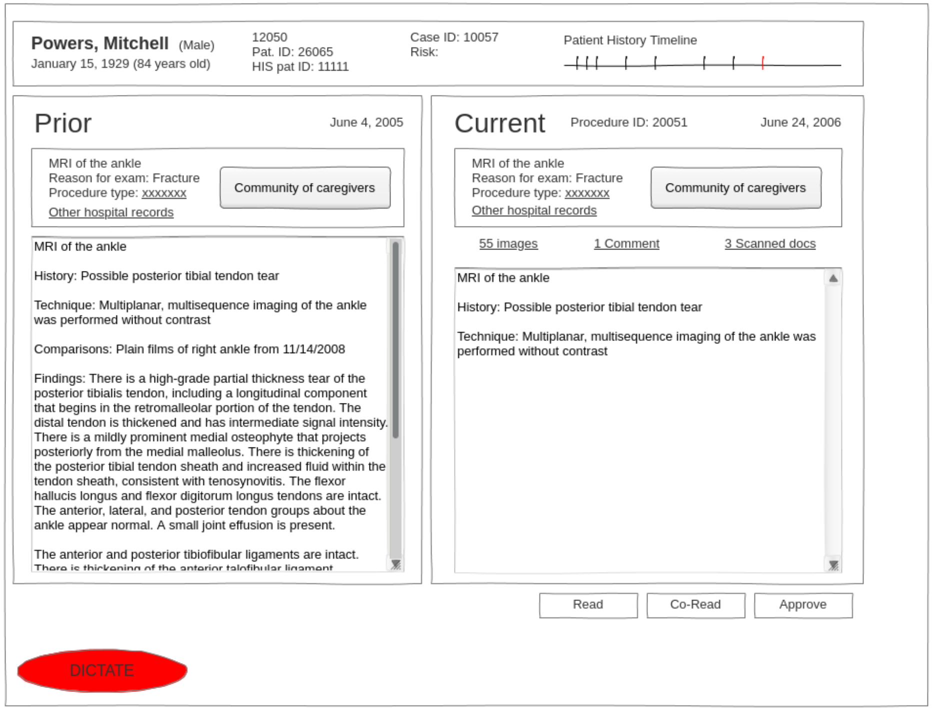
Prototypes vs. Wireframes

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



Powers, Mitchell (Male)
January 15, 1929 (84 years old)

12050
Pat. ID: 26065
HIS pat ID: 11111

Case ID: 10057
Risk:

Prior

June 4, 2005

MRI of the ankle
Reason for exam: Fracture
Procedure type: xxxxxxx
Other hospital records

MRI of the ankle

History: Possible posterior tibial tendon tear

Technique: Multiplanar, multisequence imaging of the ankle was performed without contrast

Comparisons: Plain films of right ankle from 11/14/2008

Findings: There is a high-grade partial thickness tear of the posterior tibialis tendon, including a longitudinal component that begins in the retromalleolar portion of the tendon. The distal tendon is thickened and has intermediate signal intensity. There is a mildly prominent medial osteophyte that projects posteriorly from the medial malleolus. There is thickening of the posterior tibial tendon sheath and increased fluid within the tendon sheath, consistent with tenosynovitis. The flexor hallucis longus and flexor digitorum longus tendons are intact. The anterior, lateral, and posterior tendon groups about the ankle appear normal. A small joint effusion is present.

The anterior and posterior tibiofibular ligaments are intact. There is thickening of the anterior talofibular ligament

Current

Procedure ID: 20051

June 24, 2006

MRI of the ankle
Reason for exam: Fracture
Procedure type: xxxxxxx
Other hospital records

MRI of the ankle

History: Possible posterior tibial tendon tear

Technique: Multiplanar, multisequence imaging of the ankle was performed without contrast

Practical Prototyping Tools

Creating Hi-Fi, semi-functional prototypes with minimal effort

- Simple: Powerpoint, Keynote, Google Slides, Visio, Balsamiq
- UX-Specific: Axure, Mockplus, JustInMind, Indigo Studio
- Adobe: Illustrator, Photoshop, InDesign, XD, InVision
- Mac: Sketch, OmniGraffle, Flinto
- Code: HTML, JavaScript, PHP, Wordpress, various mobile specific tools
- Hardware Prototyping: Arduino, Phidgets
- Web-based: InVision, UXPin, FluidUI, Proto.io
- Mobile: Tapcase, Marvel

PowerPoint/KeyNote/Google Slides

Advantages:

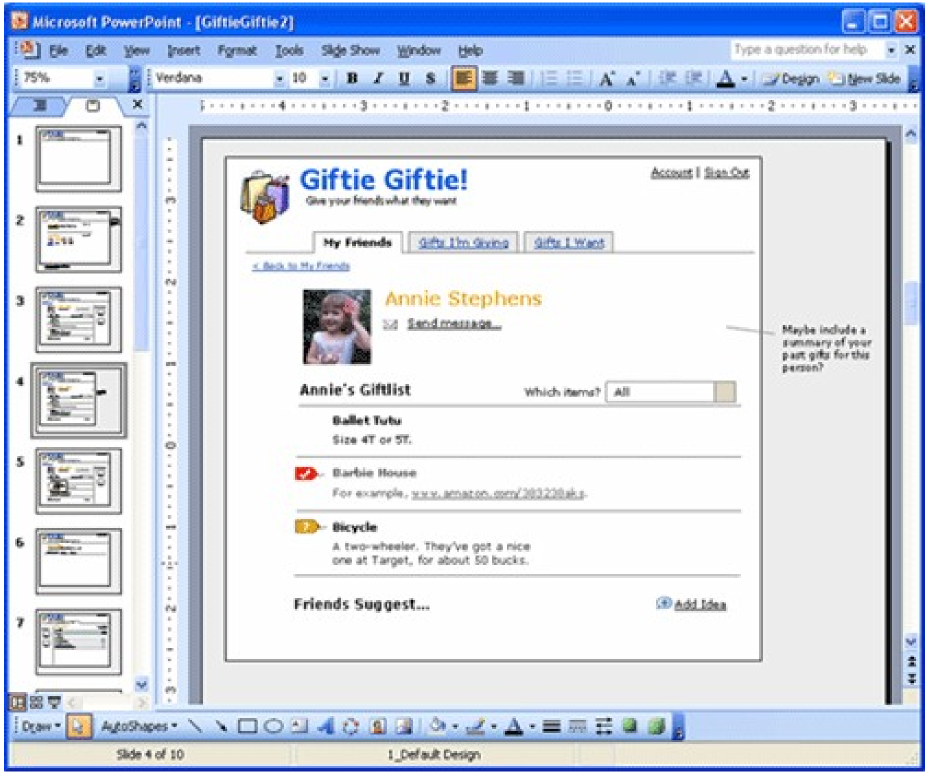
- **Almost everyone has it (well, at least powerpoint)**
- **Ubiquitous format**
- **Fast and easy to use**
- **Can use hyperlinks to simulate interaction**
- **Power mockup – mockup and wireframe toolkit for powerpoint**

- Disadvantages:
- Best used at a computer
  - e.g., difficult to do mobile-based interactions
- Somewhat limited functionality
- Difficult to reuse for final implementation

Example PPT Prototype

Boxes and Arrows (old, but still relevant)

- [Tutorial here]



Giftie Giftie!
Give your friends what they want

Account | Sign Out

My Friends | Gifts I'm Giving | Gifts I Want

< Back to My Friends

Annie Stephens
Send message...

Maybe include a summary of your past gifts for this person?

Annie's Giftlist — Which items? All

Ballet Tutu
Size 4T or 5T.

Barbie House
For example, www.amazon.com/303230aks

Bicycle
A two-wheeler. They've got a nice one at Target, for about 50 bucks.

Friends Suggest... — Add Idea

Axure

A commercially available wireframes maker/prototyping tool

Free license for students (https://www.axure.com/edu)**!**

http://www.axure.com/

- Contains good documentation and tutorials

Advantages

Great for websites

Can transition from wireframe->Prototype->Functional system

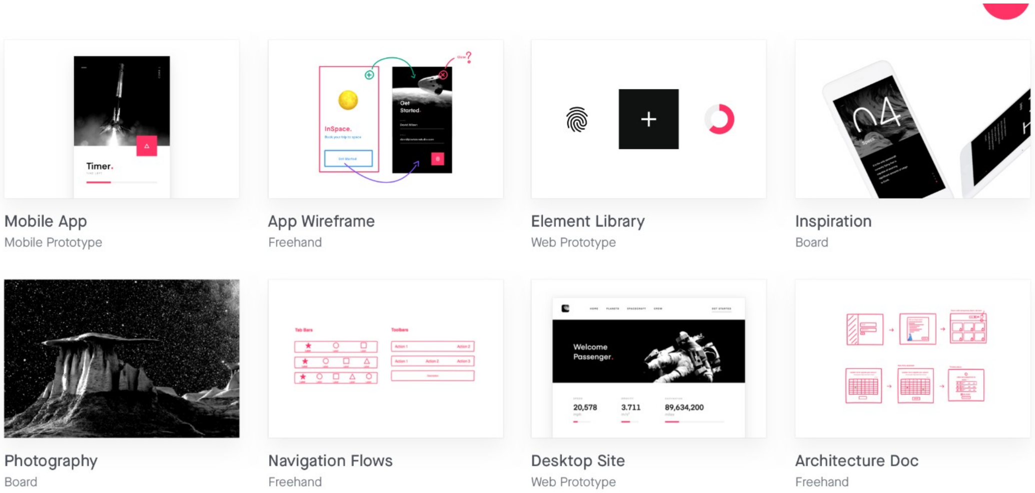
Axure

Demo

InVision

Probably the most popular

- Has really good resources at DesignBetter.Co
- Vector Drawing
- Responsive layouts
- Animation options
- Shared libraries
- Can be exported into materials direct for consumption by developers



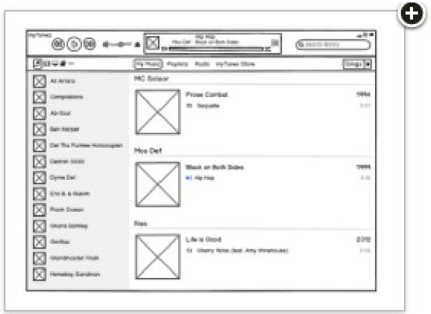
Balsamiq Mockups

Another commercially available prototyping tool

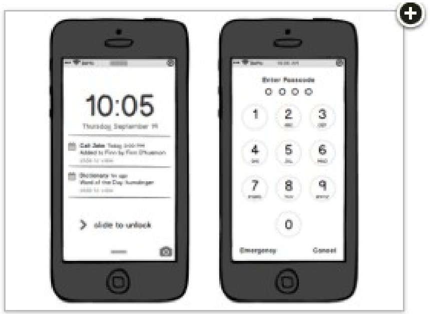
- Free trial 30 day, $90 for single license, or $9 a month
- Advantages Quick and dirty
- Can make lo-fi appearing prototypes
- Can easily move from sketch to wireframe
- Can integrate with Google Drive

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

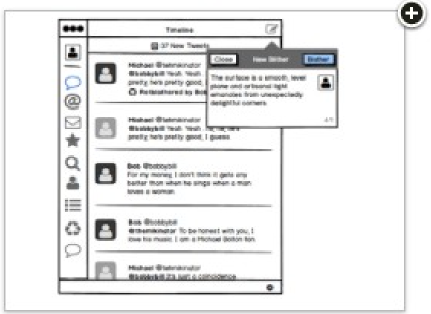
Balsamiq Mockups



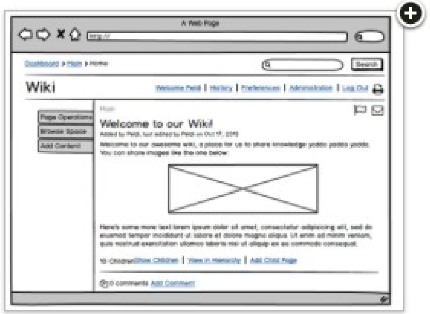
Desktop Apps



Mobile Apps



Desktop Apps



Web Apps

Adobe Products

Advantages

- Can look & feel like real thing
- Powerful, full featured
- Still the coin of the realm in the UXD world

- Disadvantages
  - Can be challenging to get started

Integrated Development Environments

Visual Studio, Eclipse, Apple ID (+Xcode + Swift)

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
- Raspberry Pi

General Tips

There are more tools here than you can learn to use proficiently

Find out what's currently being used in jobs you'd like to do

Take the time to learn one or two prototyping techniques very well

Some more resources

Rob Fitzpatrick talking about “Prototype Everything” –

IDEO visit to Dartmouth

Solving Big Problems with Tiny Prototypes (Joel Sadler)