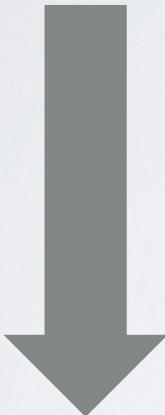


# **User Interface Design & Evaluation**

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Sketching & Prototyping

# Overview



- Scenarios & Use Cases
- Lo-Fi Prototyping
- “Med-Fi” Prototyping
- Hi-Fi Prototyping

# Recap



(Storyboards)

Prototypes

Types of prototype

# Prototyping

- Users often can't say what they want, but as soon as you give them something and they get to use it, know what they don't want and think they know what they want
- Need a bridge between talking to users in the abstract about what they might want and building a full-blown system (with all the expense and effort)
- Prototyping is that bridge - might be a paper-based outline of screens, a video simulation of interaction, 3D cardboard mock-up of a device
- Prototypes can then be shown to potential users as part of an interview or focus group or for initial evaluations

# TODAY'S OBJECTIVES

- Understanding prototypes
- Static representations
  - Storyboards
  - Wireframes

# Where do we start?

So far we have done a lot of the work that we need

- We have personas of who will use
- We have some idea of the concepts and tasks users need to complete
- We have made some choices about interaction style and technology
- We have some contexts of use from our scenarios

Not bad! That's a lot of stuff that we can start prototyping with

# Why build prototypes?

- Very useful when discussing ideas with stakeholders
- Encourages reflection on the design
- Allows you to explore alternative designs without communicating to one idea
- Allows you to make ideas from scenarios more concrete

# WHAT IS A PROTOTYPE?

- Any realisation of a design
  - From early sketches through to basic version of final device
- Provides something concrete to interact with, discuss and evaluate

# Dimensions of Prototyping

There are lots of different dimensions to prototyping

## Fidelity

- Prototypes can be ‘rough-and-ready’ without any code being written or
- Prototypes can be fully working applications

## Evolutionary Fitness

- Prototypes can be something you carry forward in each stage
- Prototypes can be abandoned as soon as they have been used for evaluation purposes

# Types of prototypes

**Low fidelity** prototyping (**low fi**) - not very like end product, very obviously rough and ready

Advantages:

- Cheap, simple, fun to make
- Also cheap, simple, fun to modify
- Clear to stakeholders that they can be criticized
- Designers do not have too much at stake in them

Disadvantages

- Do not allow realistic use

# Lo-fi prototyping: storyboarding

- Storyboard is a technique borrowed from the film Industry
- The form we know now was first used by Walt Disney for animation to explain motion of characters
- Only a newcomer to interactive technology in terms of large scale use – become very popular now because we need a design tool to help with the problem of moving away from the desktop
- As ubiquitous computing (continues) to dominate, it is likely we will see more and more storyboarding in design

# THE PALMPILOT PROTOTYPE



# LOW-FIDELITY PROTOTYPES

- Doesn't look or behave like the final product
  - e.g. different materials, crude graphics, little or no functionality
- Easy to produce
  - quick, cheap, easy to modify
- Used early in the development process for idea exploration

# HIGH-FIDELITY PROTOTYPES

- Look more like the end product
- Implements some of the required functionality
- Still lacks some aspects of the final item
- Breadth vs. depth

# CLASSIFYING PROTOTYPES

- Usually:
  - **High or low fidelity**
- Five dimensions
  - Breadth, depth, look, interaction, data
- Narrative vs testable

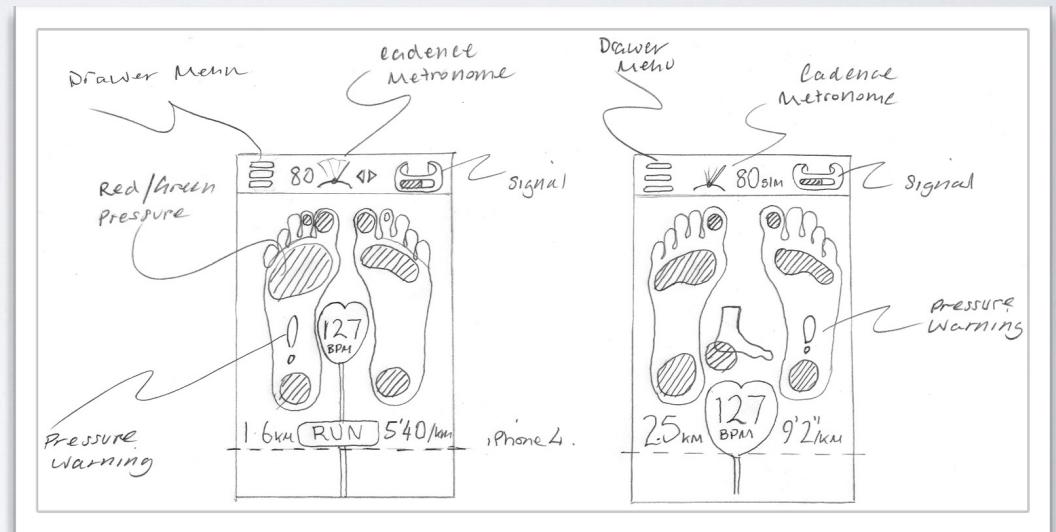
# CHEAPER UCD APPROACH

- Cheap to build
- Easy to change
- Users free to interact

# SKETCHING

- Promotes ideas (ideation)
- Rapid/flexible/cheap
- Unfinished
- Central to design

# SKETCHES

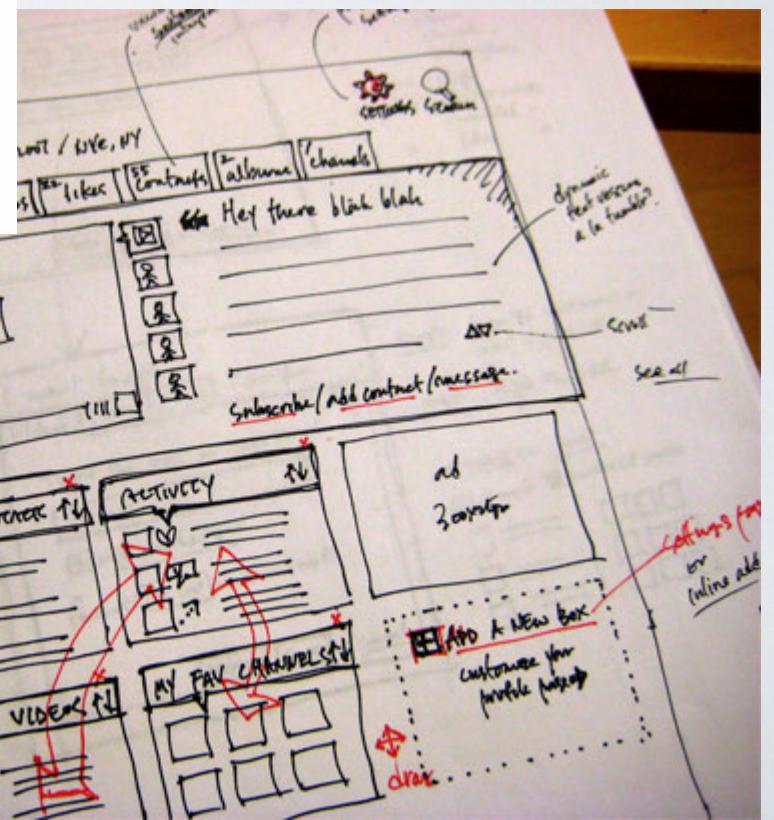




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# SKETCHES

- Promote ideas
- Central to early design
- Rapid, flexible, cheap
- Disposable and unfinished

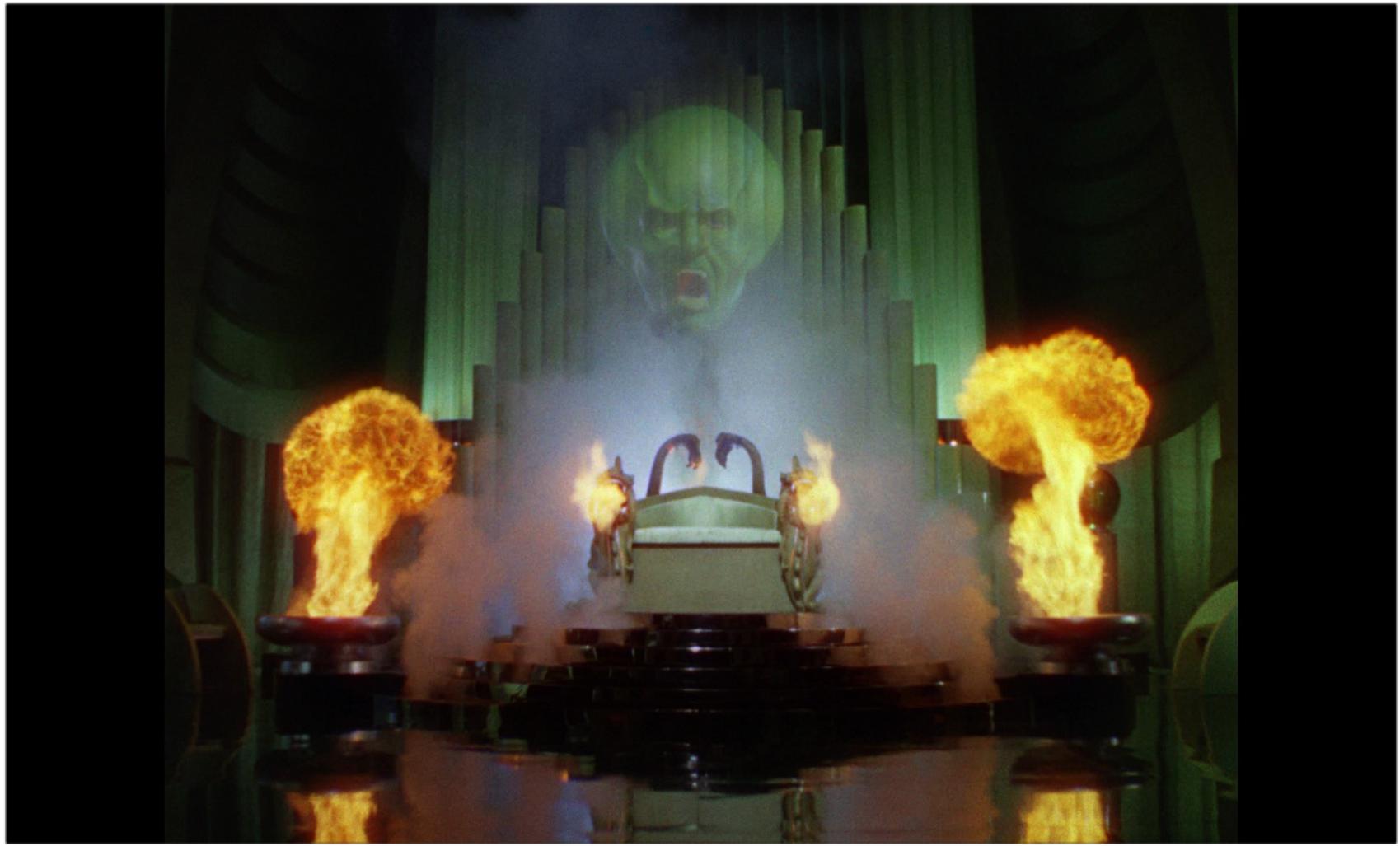
## Lo-fi Prototyping: Interaction Sketching

Virtual Paper – we are beginning to see a lot of software prototype building systems in various virtual media

These allow you to often connect hyperlink style connections between screens to show off sequences of interaction

Almost every major package now has ‘sketchy’ toolkits you can get for them

# WIZARD OF OZ



## Lo-fi prototyping: Wizard of Oz

Originally a term used to describe a system for prototyping speech recognition

In early 1980s researchers realized the speech recognition would soon be possible, but there were no working systems available

So they produced a “fake” system to allow design to start on a voice input system

So like the Wizard in the Wizard of Oz, it appeared to have a powerful voice - a system that understood the utterances of a human and produced appropriate outputs in return

# Wizard of Oz II

But in fact it was actually a human being that was doing the recognition and selecting the appropriate responses

Now used for any system where the processing power is not implemented and a human “fakes” it

In fact, there is no need to deceive the user, works perfectly well if the user knows it is only a WoZ system

# WIZARD OF OZ

- Human takes on some of the role computer will perform in final artefact
- Allows dynamic interaction before implementation has taken place
- Particularly useful when product requires complicated algorithms

# STORYBOARDS

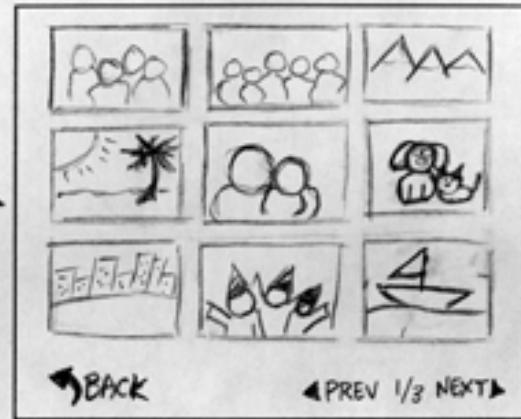
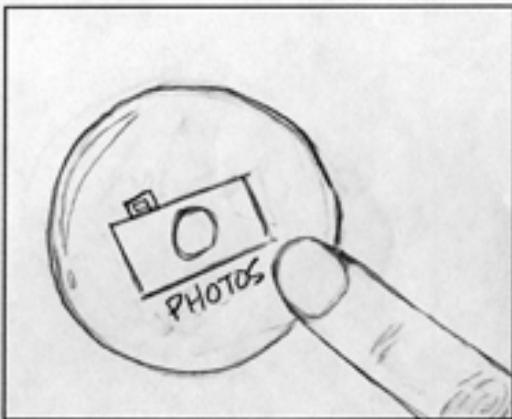
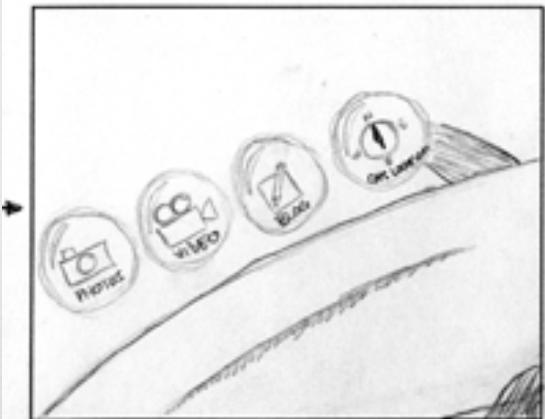
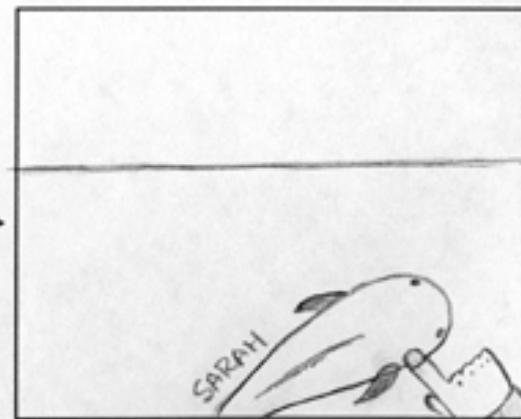
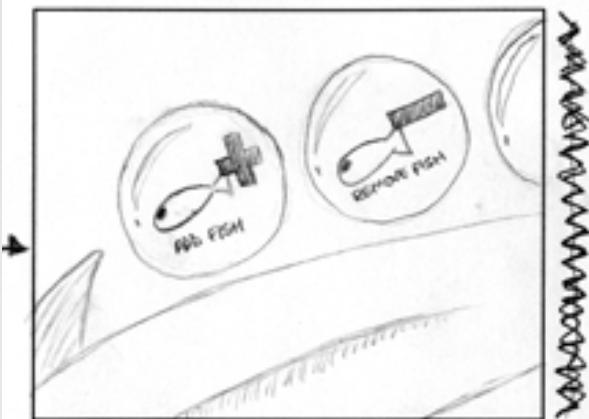
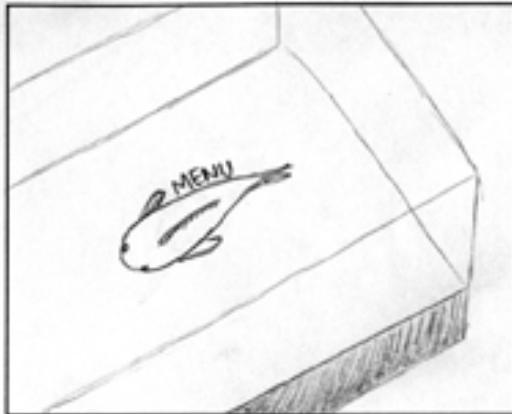
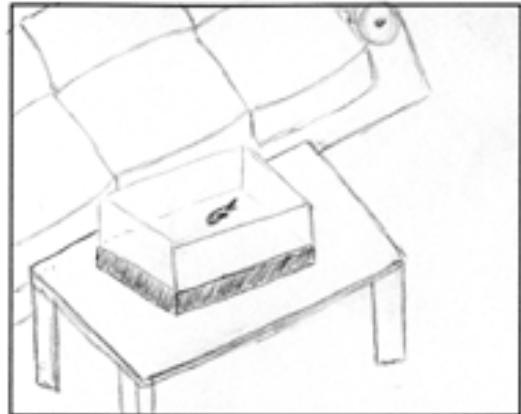
- Typically sketched
- Use photos or video

# TELLING STORIES !

- Illustrate scenarios
- Explore concepts
  - What might work?
  - How might it work?

# What to show in storyboards

- Each panel is a unit of story telling in whatever medium you are working in
- In Interaction Design, we are trying to show frame by frame the user working with an application in context
- These storyboards can then be used to highlight areas where design patterns can be applied or novel designs can be used



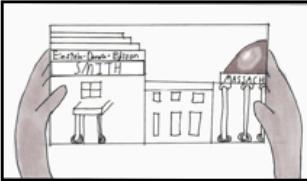
you can make part of MIT  
customized for you!

just enter your name...

and it comes out personalized!



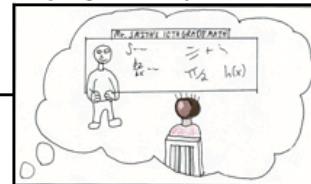
put your name on Killian Court



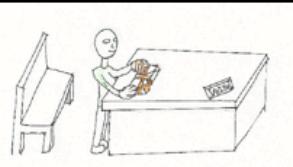
right in the MIT Museum  
gift shop



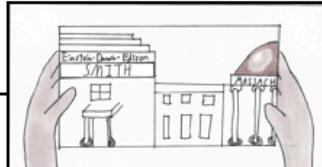
remember people who helped  
you get where you are now



say thank you with a gift



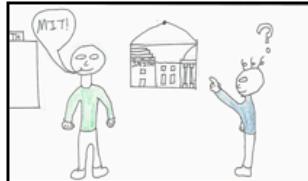
their name will be right on  
Killian Court



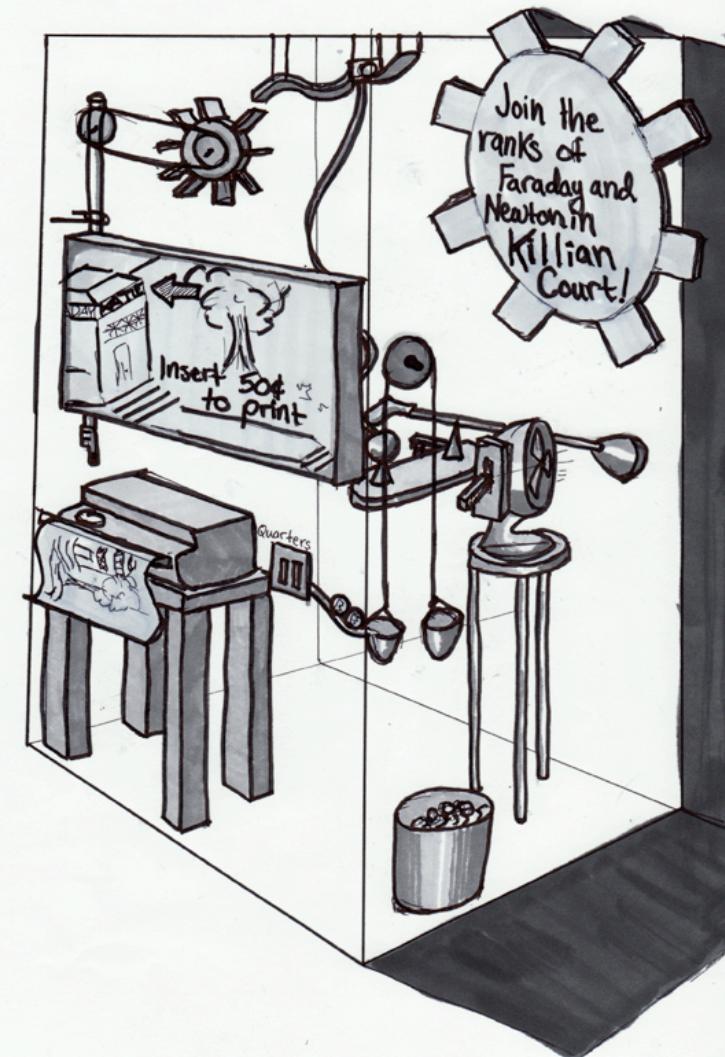
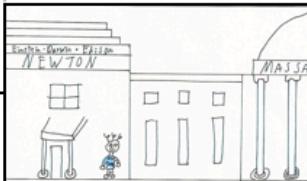
they will be proud to showcase  
your accomplishments



others will see it



... and will be inspired!



# TRY A STORYBOARD

- Context
- Interface
- Both
- Sequence
- More than 1 image

# STORYBOARDS



# STORYBOARDS

- Typically sketched, but can use photos or video
- Illustrate scenarios
  - Helps break down the scenario into possible sequences of steps/screens
- Explore concepts
  - What might work?
  - How might it work?

# Lo-fi Prototyping: Interaction Sketching

- Application sketching is the creation of thumbnails and screen layouts in a very rapid manner
- Produce many designs to explore the design space
- Use all of your personas, scenarios, task models, conceptual designs etc. to inform the designs

# Lo-fi Prototyping: Interaction Sketching

## Good ol' Pen and Paper

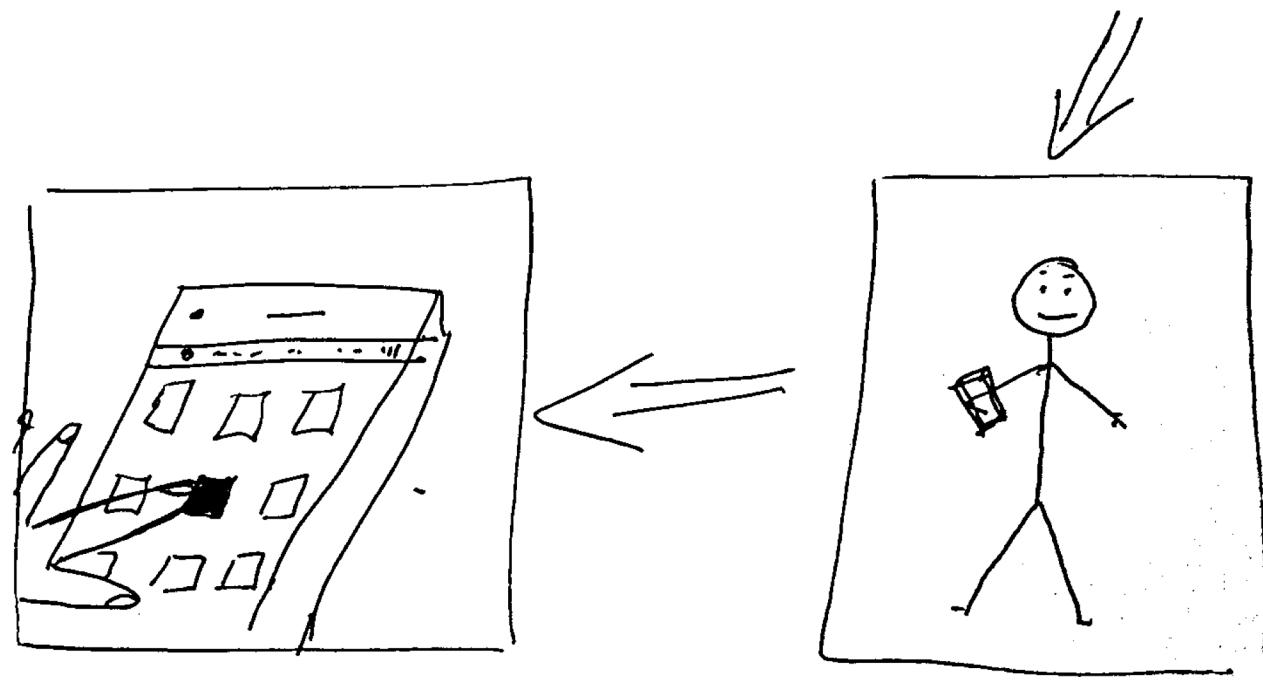
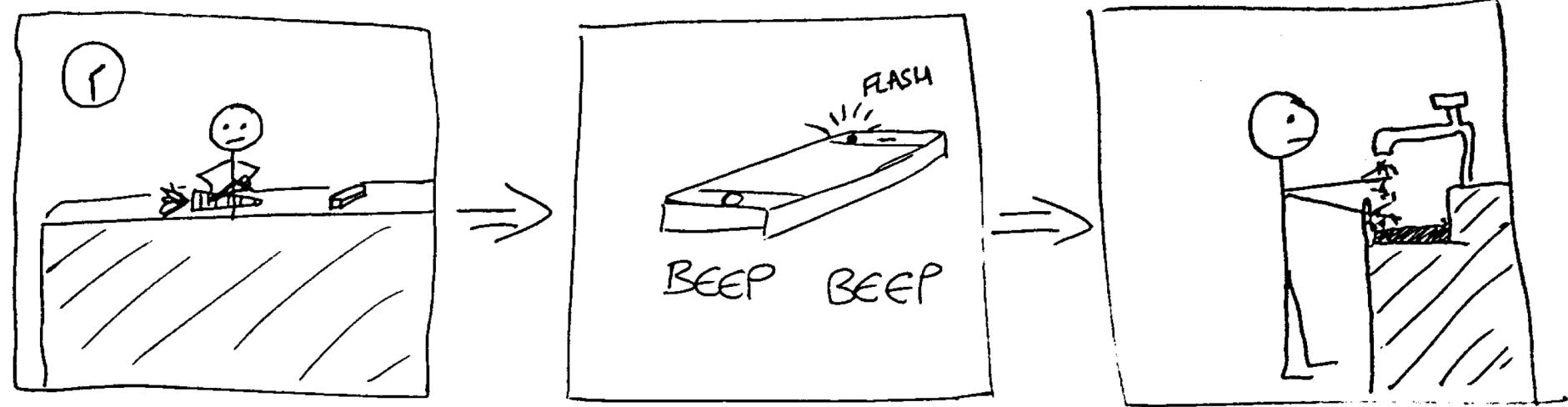
- The most flexible medium (still) for doing design
- There is a lot of power in being able to draw a window on a piece of paper, and then using stick notes to indicate where different information should go

## Nice Case Study from Box UK

- <http://www.boxuk.com/blog/using-sketchboards-to-design-great-user-interfaces>

# STORYBOARD FOR A NEWS APP

It is 2.30pm and Ian is at work, preparing vegetables for the evening dinner shift. His phone alerts him that there is something interesting going on in the financial markets in America. Ian washes his hands, picks up his phone and opens his news App to see what is going on.



# LIVE STORYBOARD

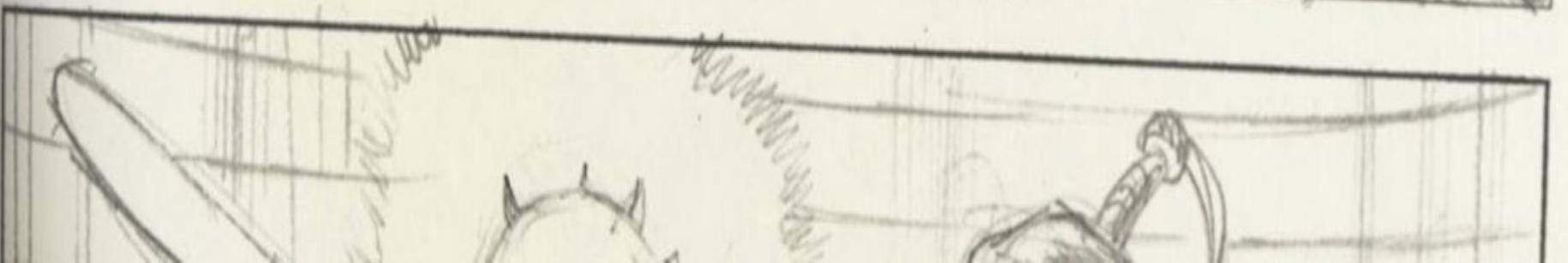
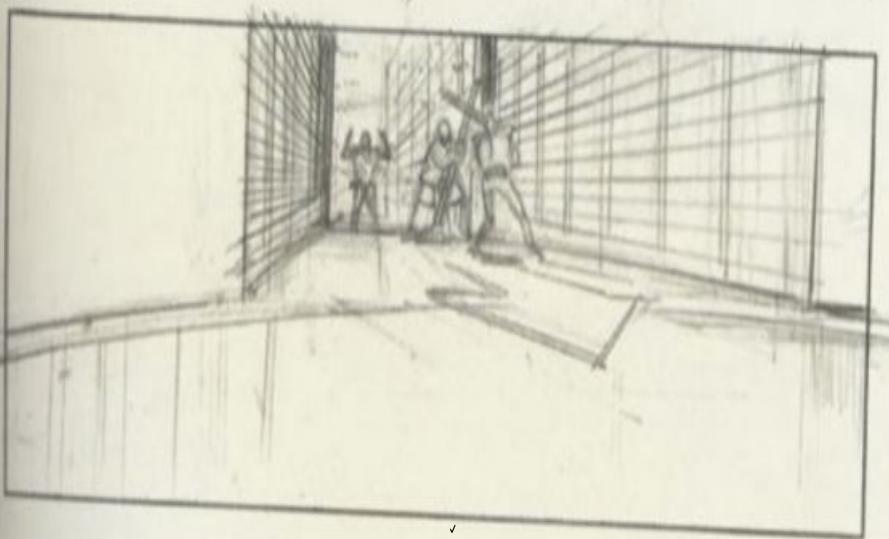
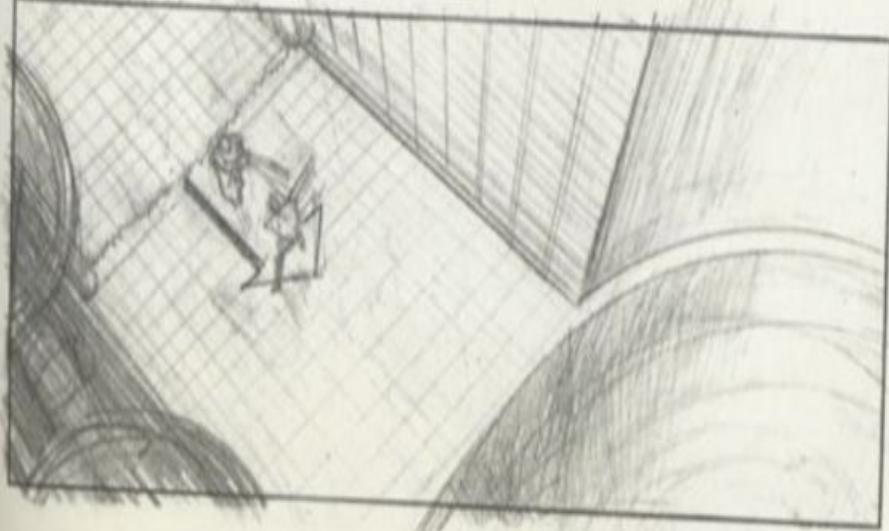
- Scenario
- Play out with people
- Set scene
- Think CSI or Iron Man

# THEATRE & MOVIES!

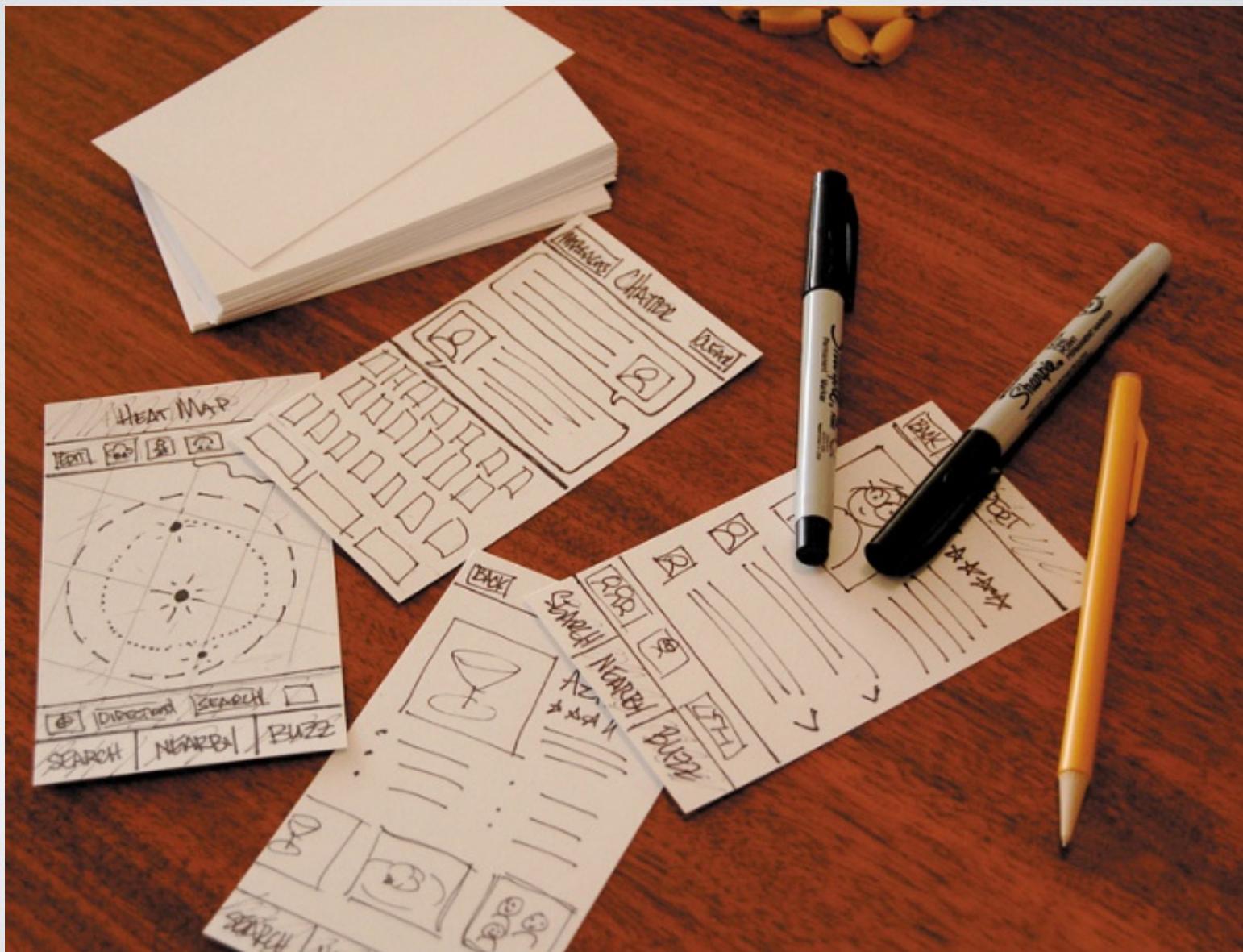
- Actors perform scenario
- Designers talk to actors
- <http://vimeo.com/52490115>
  - 19mins

# GOLDEN PATH

- Depth but no breadth
- Looks real to users
- Provided on path
- Off path – no guarantees



# INDEX CARDS

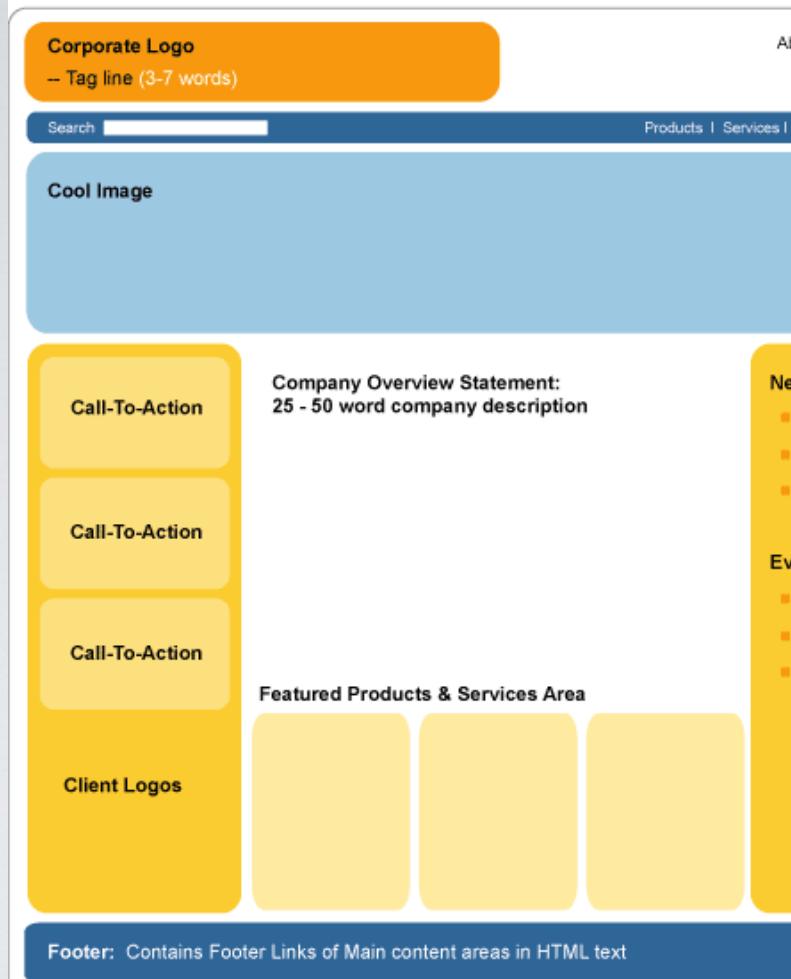


# INDEX CARDS

- Sketches on index cards
- Cards typically show one screen of webpage or app
- Can help to think about
  - Layout of individual screens
  - Flow between screens

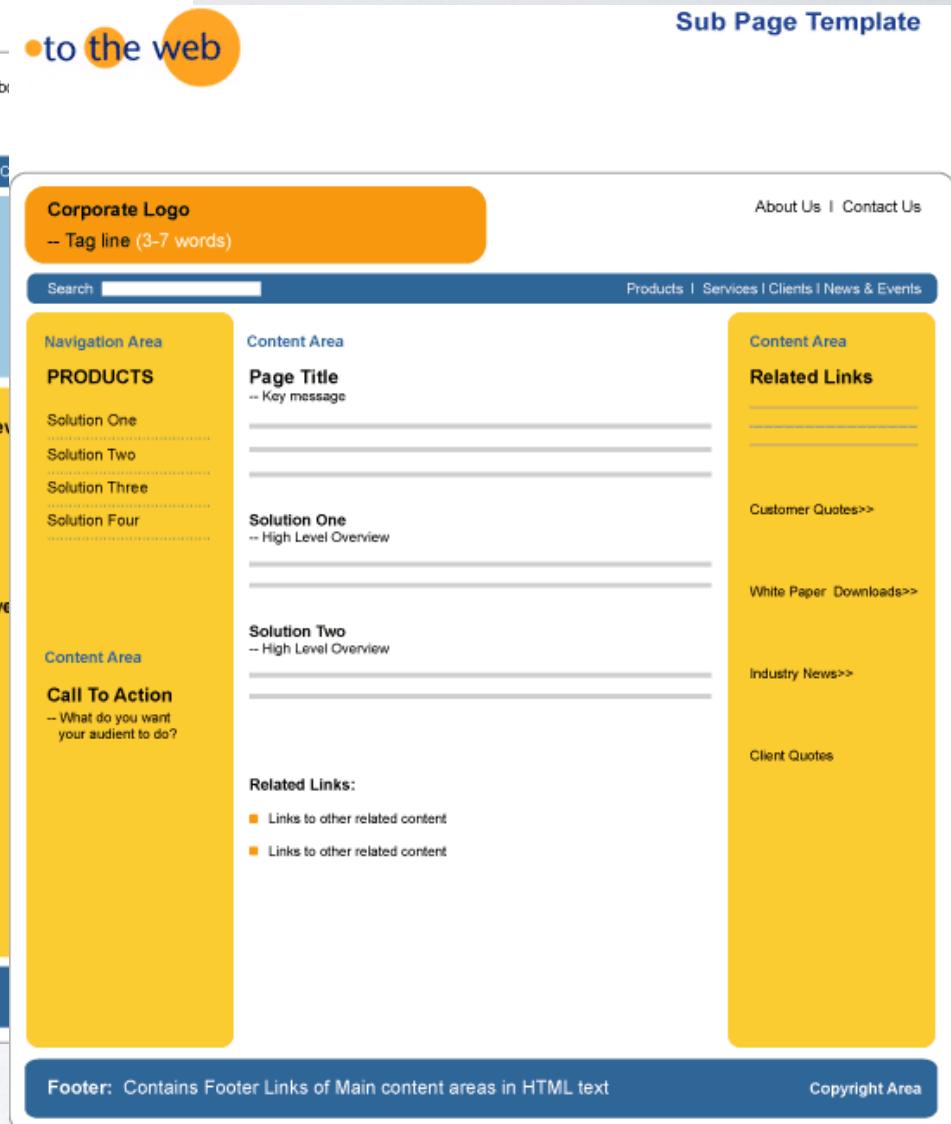
# WIREFRAMES

- Outline interface
- Structure and function
- Low visual design



This diagram illustrates the Home Page Template structure. It features a header with a Corporate Logo and Tag line, a search bar, and navigation links for Products, Services, and Clients. Below the header is a large blue section containing a Cool Image. To the right is a sidebar with sections for News, Events, and a Content Area. The main content area includes a Company Overview Statement, a Featured Products & Services Area with three yellow boxes, and a Footer section.

- Corporate Logo  
-- Tag line (3-7 words)
- Search
- Products | Services | Clients
- Cool Image
- Call-To-Action
- Call-To-Action
- Call-To-Action
- Client Logos
- Company Overview Statement:  
25 - 50 word company description
- News
- Events
- Content Area
- Featured Products & Services Area
- Footer: Contains Footer Links of Main content areas in HTML text



This diagram illustrates the Sub Page Template structure. It follows a similar header and sidebar layout to the Home Page. The main content area is divided into a Navigation Area (listing PRODUCTS, Solution One through Four), a Content Area (with Page Title and key message), and a sidebar with Related Links, Customer Quotes, White Paper Downloads, Industry News, and Client Quotes.

- Corporate Logo  
-- Tag line (3-7 words)
- About Us | Contact Us
- Search
- Products | Services | Clients | News & Events
- Navigation Area
- PRODUCTS
- Solution One
- Solution Two
- Solution Three
- Solution Four
- Content Area
- Page Title  
-- Key message
- Solution One  
-- High Level Overview
- Solution Two  
-- High Level Overview
- Call To Action  
-- What do you want  
your audience to do?
- Related Links:
  - Links to other related content
  - Links to other related content
- Content Area
- Related Links
- Customer Quotes>>
- White Paper Downloads>>
- Industry News>>
- Client Quotes
- Footer: Contains Footer Links of Main content areas in HTML text
- Copyright Area

# WIREFRAME

- Content
- Function
- Navigation
- Annotated
- Holes: clients, developers, graphic design,
- copywriters
- (loads on the web)

# LESSON...

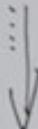
**... it doesn't have to be fancy to be useful**

**Right tool for the right time**

# PAPER PROTOTYPES

- Paper wireframes
- Animated by a person pretending to be the computer
- Fully interactive
- Breadth of prototype?

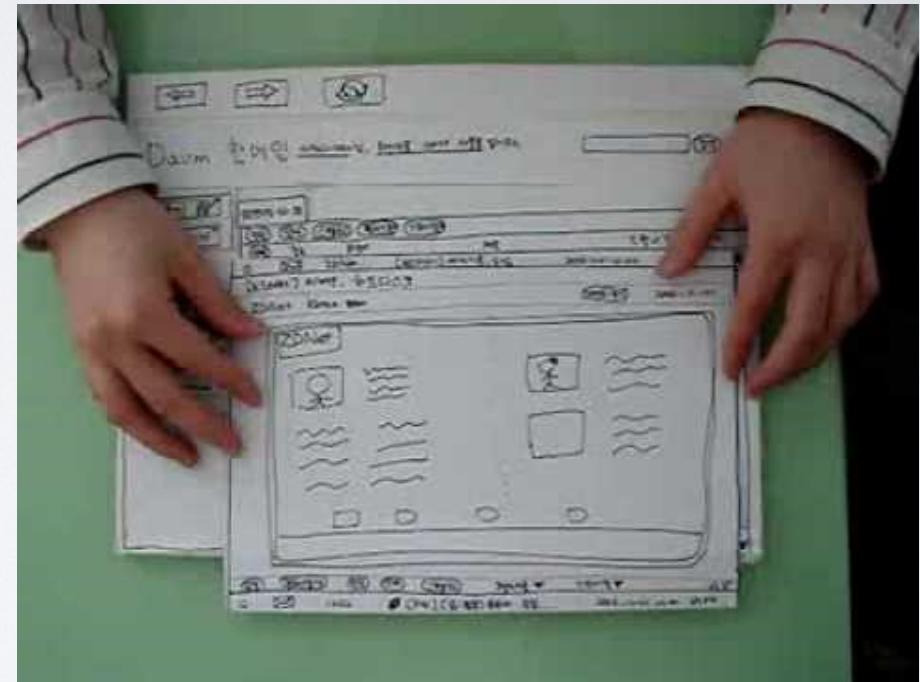
# FEATURED



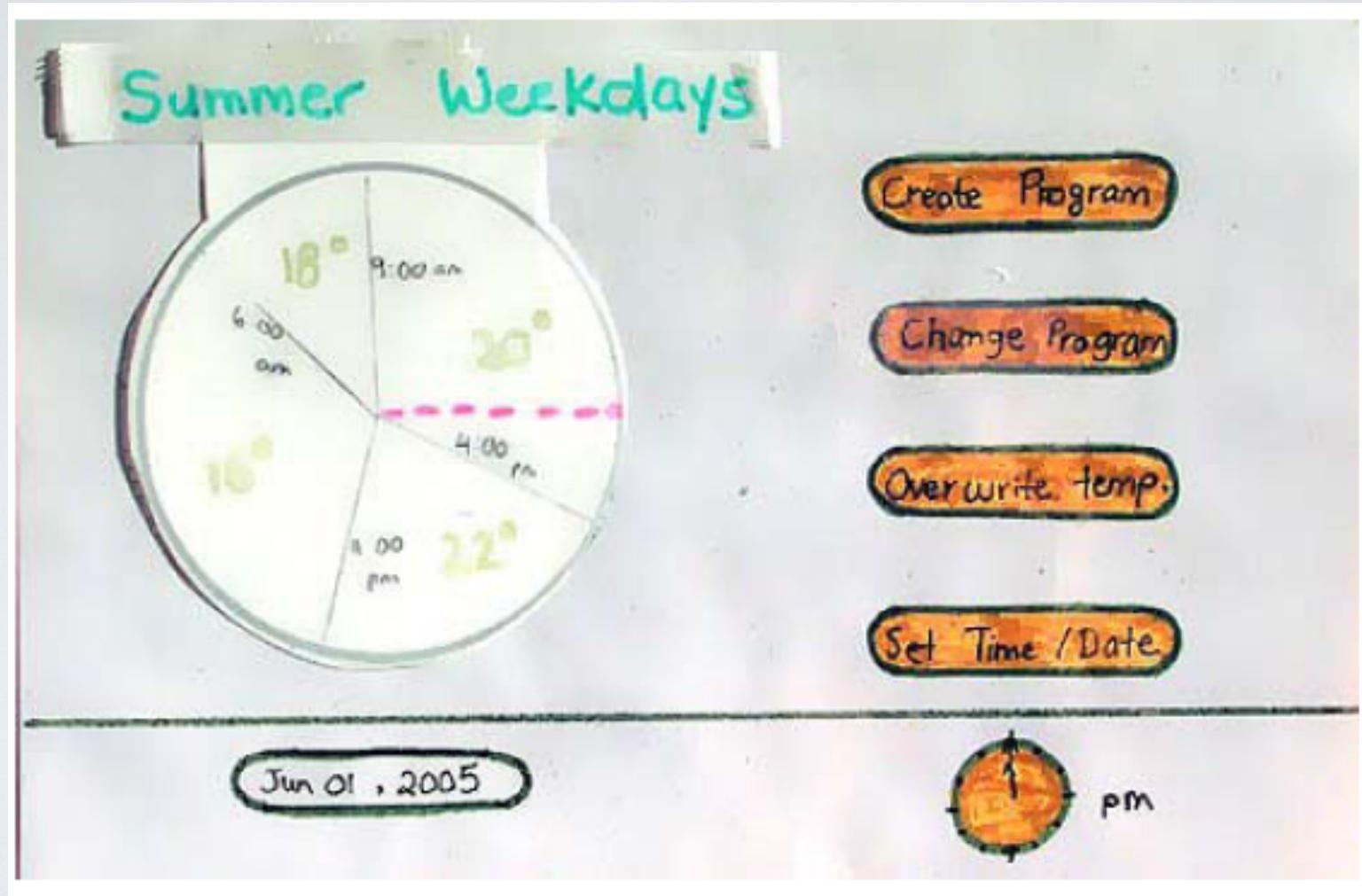
WERBUNG



# PAPER PROTOTYPE EXAMPLES



# TOHIDI ET AL



# OTHER DYNAMIC TECHNIQUES

- PowerPoint
- Implementation using graphical toolkit
- Modify existing product
- Physical toolkits

# High fidelity prototyping

## Advantages:

- You get the real “look and feel”, (some of) the functionality
- Serves as a living specification
- Good for exploration of design features and evaluation
- Good marketing and sales tool"

# High fidelity prototyping

## Disadvantages:

- Is it worth the expense to develop if it might be radically changed?
- Evaluators tend to comment on superficial design features rather than the real design
- Developers can be reluctant to change it
- Can set user expectations too high



atomic

Marvel



pixate

~~FLINTO~~

inVISION

# Compromises in prototyping

Breadth versus depth:

- do you prototype all the functionality (but then you provide little detail about any specific aspect of it) (horizontal prototyping)
- Or just prototype one or more functions, but in a lot of depth (vertical prototyping)"

# **Another dimension of prototyping**

## **Evolutionary prototyping**

- you build the real system, but bit by bit and evaluate as you go

## **Throw away prototyping**

- you build the prototype in one system, evaluate it (perhaps repeatedly with changes), but then throw that code away and build the real system from scratch (sometimes for more efficient processing, security ...)

# Experience prototyping

- Wear a “**Third Age suit**” that simulates the effect of being elderly, try to use technologies
- The suit simulates this with joint restrictors for the hand, wrists, elbows, neck, upper and lower torso, knees and ankles
- **Surgical style gloves** are also provided to mimic the reduction in tactile sensitivity that occurs as a result of changes in the skin and sensory receptors.

# Experience prototyping

- many of the effects of ageing on vision.



It is estimated that the simulation effect on your vision will be that of someone in his or her seventies (reduced acuity; increased glare sensitivity; yellow tint - the reduced sensitivity of the eye to blue light as we age gives a yellow tint to the visual field."



# WHY PROTOTYPING TOOLS?

- Cheap
- Anyone can do it
- Needs redesign
- Hi-fi prototypes become products

# BE IMAGINATIVE

- It just has to look plausible
- Get ideas across
- Get discussion going
- Raise issues

# Conclusions

- Prototypes provide a bridge between you and the users
- The more you commit to coding and functionality the higher loss if something is wrong
- Several different low fidelity prototypes and then move to high fidelity prototypes



# Usability Engineering

**Jakob Nielsen, 1993**

Detailing the methods of usability engineering, this book provides the tools needed to avoid usability surprises and improve product quality. Step-by-step information on which method to use at various stages during the development lifecycle are included, along with detailed information on how to run a usability test and the unique issues relating to international usability. This book emphasizes cost-effective methods that developers can implement immediately, and instructs readers about which methods to use when, throughout the development lifecycle. Also includes strategies to avoid the four most frequently listed reasons for delay in software projects, detailed information on how to run a usability test, and an extensive bibliography allowing readers to find additional information. (Published by Morgan Kaufmann, San Francisco; ISBN 0-12-518406-9 slightly expanded paperback edition. Original hardcover edition published by AP Professional.)

Please buy through the purchase links provided here: Amazon pays me a referral fee that doubles the share of the purchase price that goes to the author, giving me time off from other projects to write new books.

[New Scientist review](#): "It is a book that does not moan about how bad things are but shows us how to change the world and does so admirably."

## Table of Contents

### Preface

- Audience
- Teaching Usability Engineering

# READING

- Interaction Design – Preece, Rogers and Sharp
  - Chapter 11
- The anatomy of prototypes: Prototypes as filters, prototypes as manifestations of design ideas – Lim, Stolterman and Tenenberg
  - <http://dx.doi.org/10.1145/1375761.1375762>
- Getting the right design and the design right – Tohidi, Buxton, Baecker and Sellen
  - <http://dx.doi.org/10.1145/1124772.1124960>