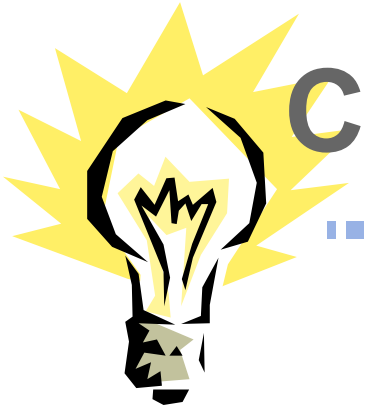
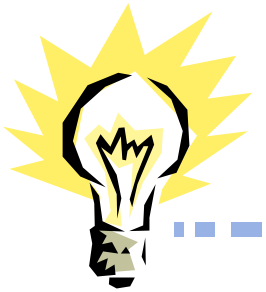


Prototyping 1: Concepts and Software Tools

Sketches, storyboards, mock-ups and scenarios

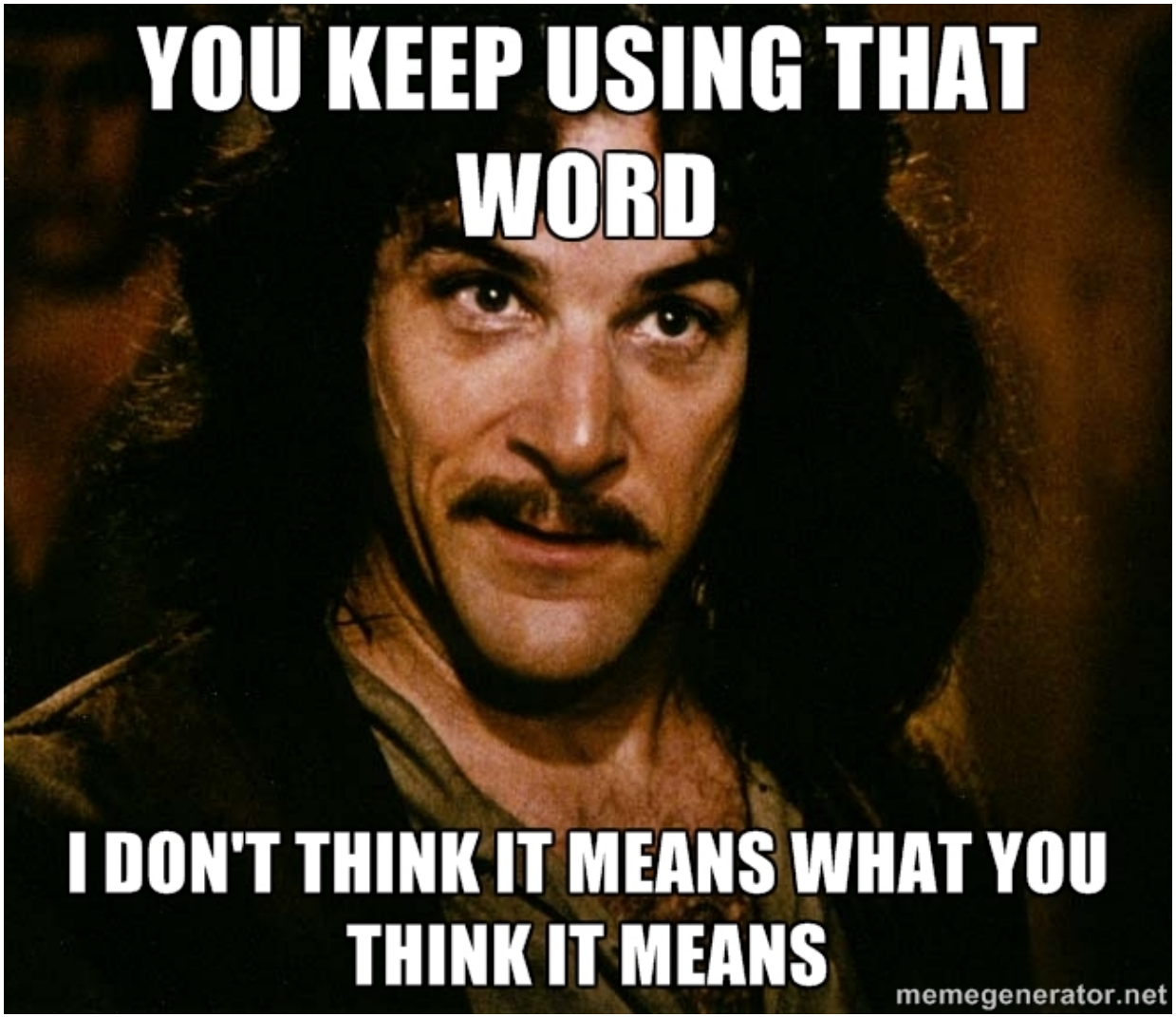
Software tools

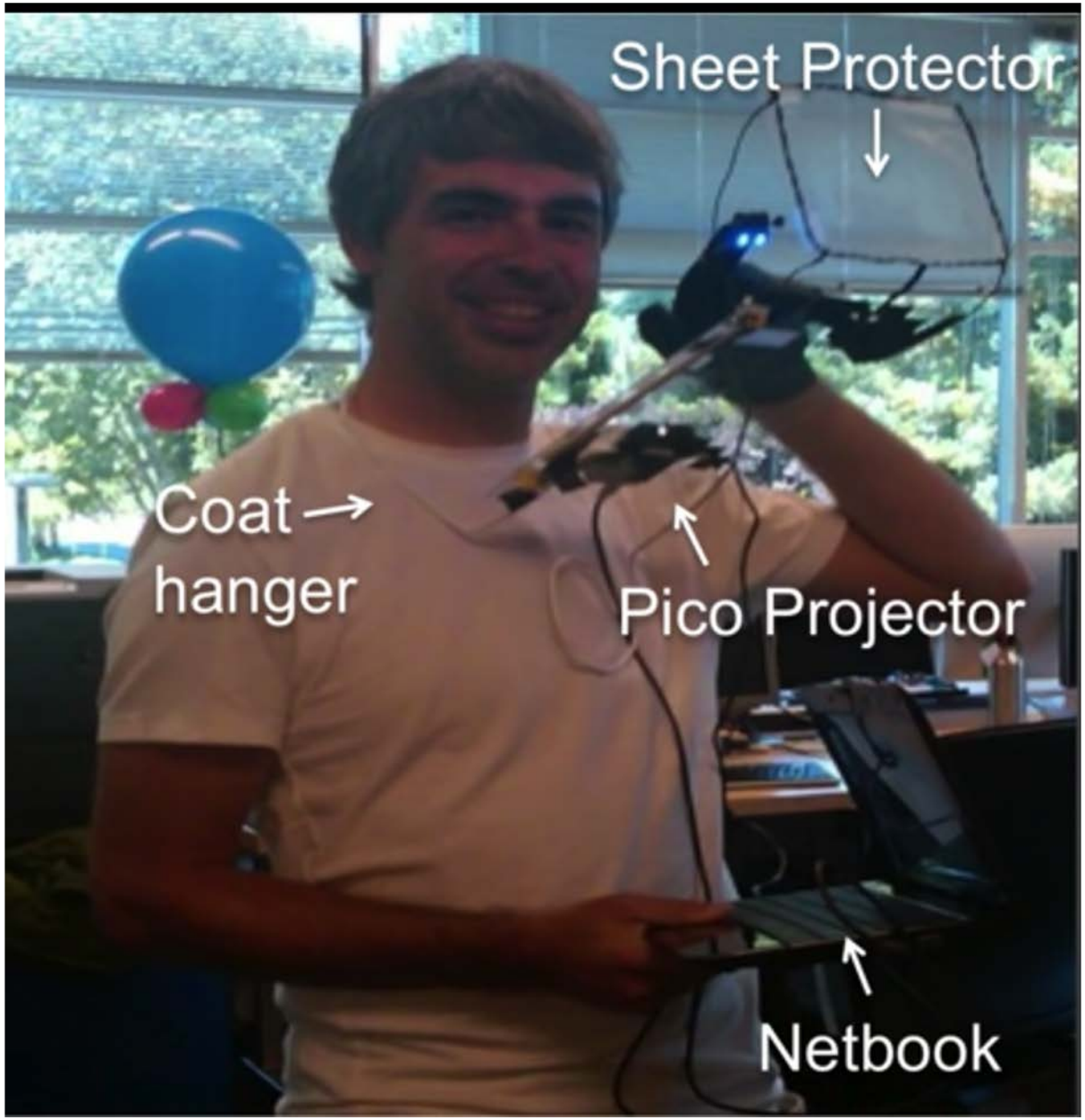


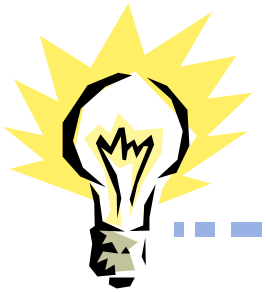
Agenda

- The purpose of prototyping
- Dimensions and terminology
- Non-computer methods
- Computer methods

Why Prototype?

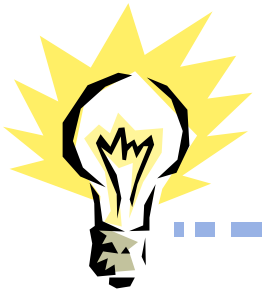



Sheet Protector
Coat hanger
Pico Projector
Netbook



Why Prototype?

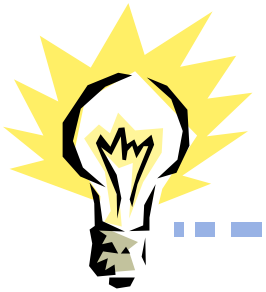
- RESEARCH TOOL
- Better designs
  - More creative
- Find failures quickly
- Faster feedback from users
- Feasibility for high-fi versions



Design Artifacts

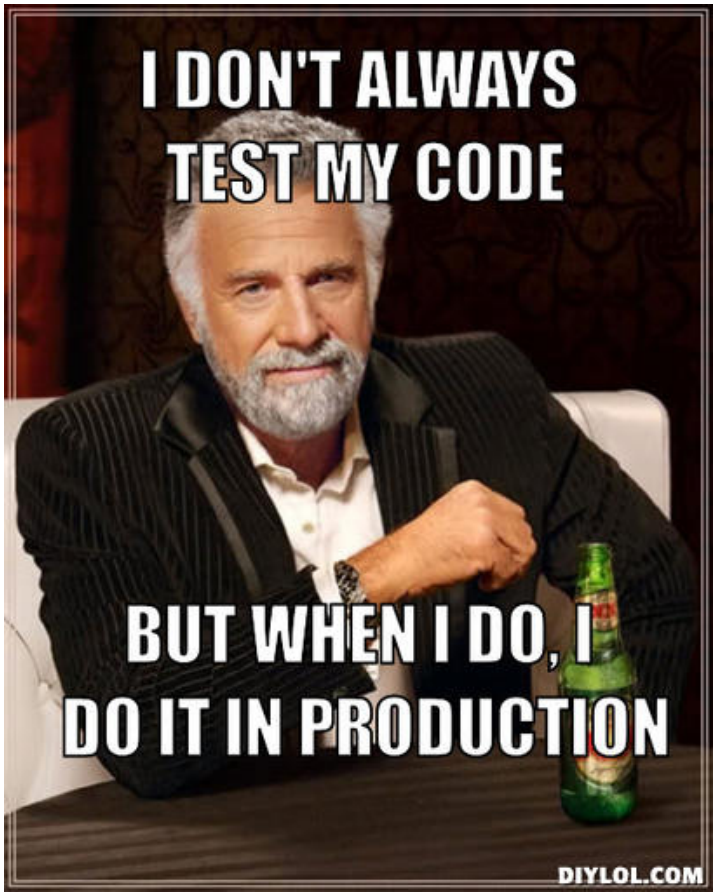
- How do we express early design ideas?
  - No software coding at this stage
- Key notions
  - Make it fast!!!
  - Allow lots of flexibility for radically different designs
  - Make it cheap
  - Promote valuable feedback

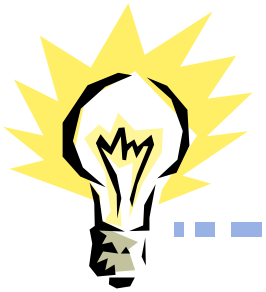
***** Facilitate iterative design and evaluation *****



Dilemma

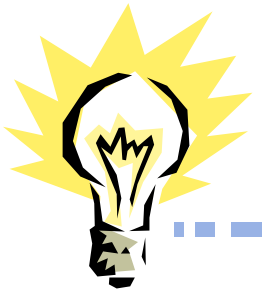
- You can't evaluate design until it's built
- Simulate the design, in low-cost manner





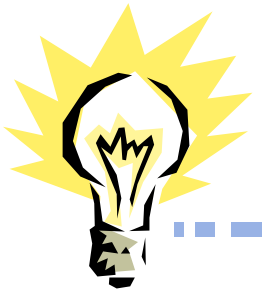
Prototyping Dimensions

- Representation
- Scope
- Executability
- Maturation



Prototyping Dimensions

- 1. Representation
  - How is the design depicted or represented?
  - Can be just textual description or can be visuals and diagrams
- 2. Scope
  - Is it just the interface (mock-up) or does it include some computational component?

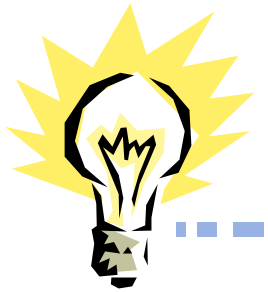


Dimensions (contd)

- 3. Executability
  - Can the prototype be “run”?
  - If coding, there will be periods when it can’t

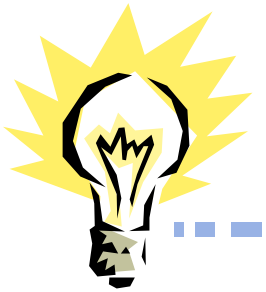
- 4. Maturation
  - What are the stages of the product as it comes along?

    Revolutionary - Throw out old one
    Evolutionary - Keep changing previous design



Terminology (1)

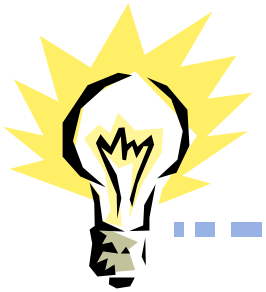
- Early prototyping
  - Used to evaluate function and interface
  - Typically non-computer
- Late prototyping
  - Used to evaluate performance
  - Usually computer-based



Terminology (2)

- Low-fidelity prototype

- High-fidelity prototype



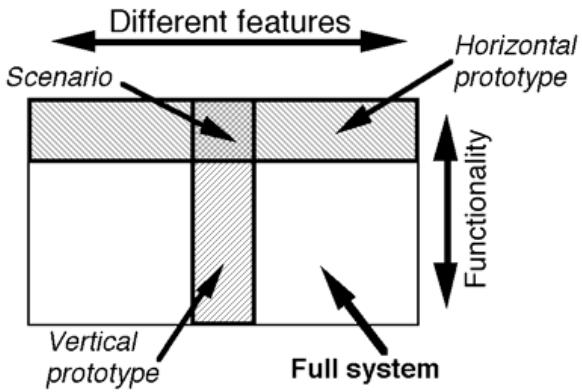
Terminology (3)

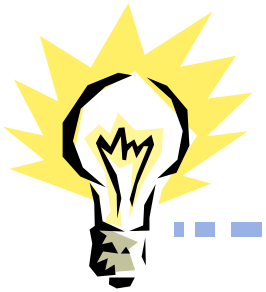
- Horizontal prototype

  Very broad, does or shows much of the interface, but does this in a shallow manner

- Vertical prototype

  Fewer features or aspects of the interface simulated, but done in great detail

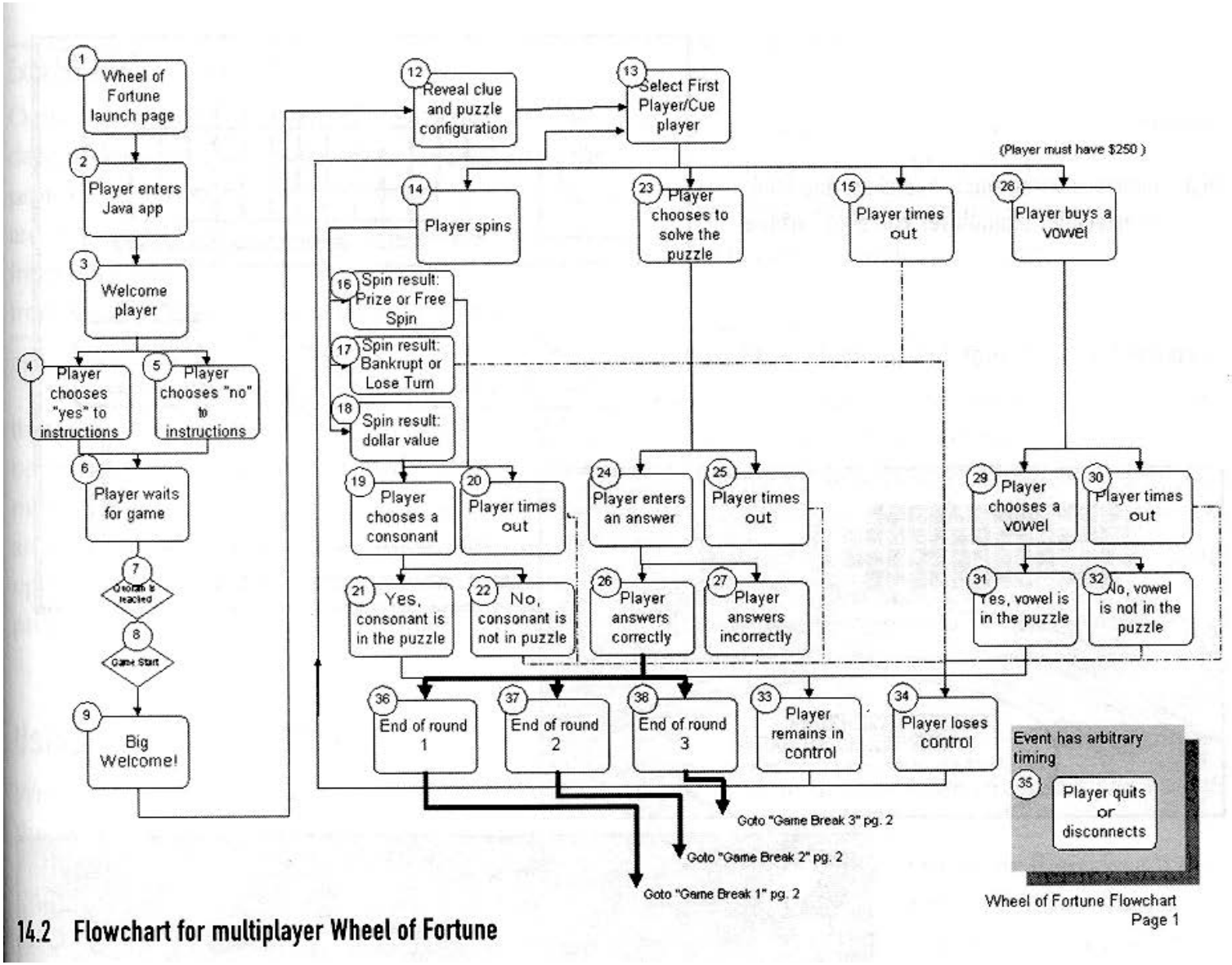




Flow Chart

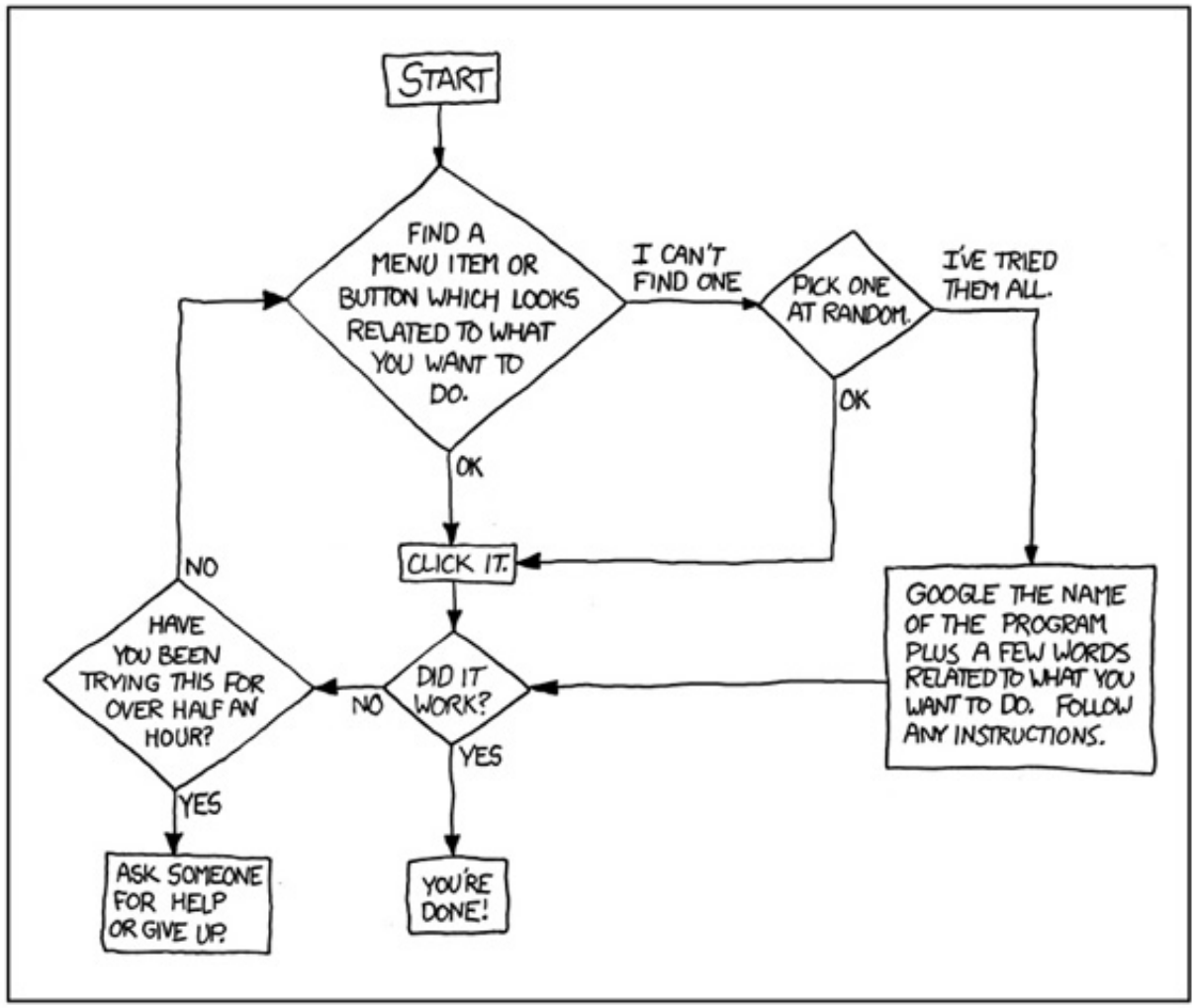
- Functional specification of how the system operates, in a step-by-step flow
  - IF-THENs, branches, loops
  - No visual layout/interface specified
  - More detailed, useful for quick evaluation, but requires more commitment of resources to produce
  - Also more advanced (sometimes means more rigid) than simpler mockups

Flow Chart Example

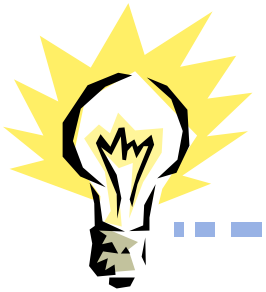


14.2 Flowchart for multiplayer Wheel of Fortune

Or this



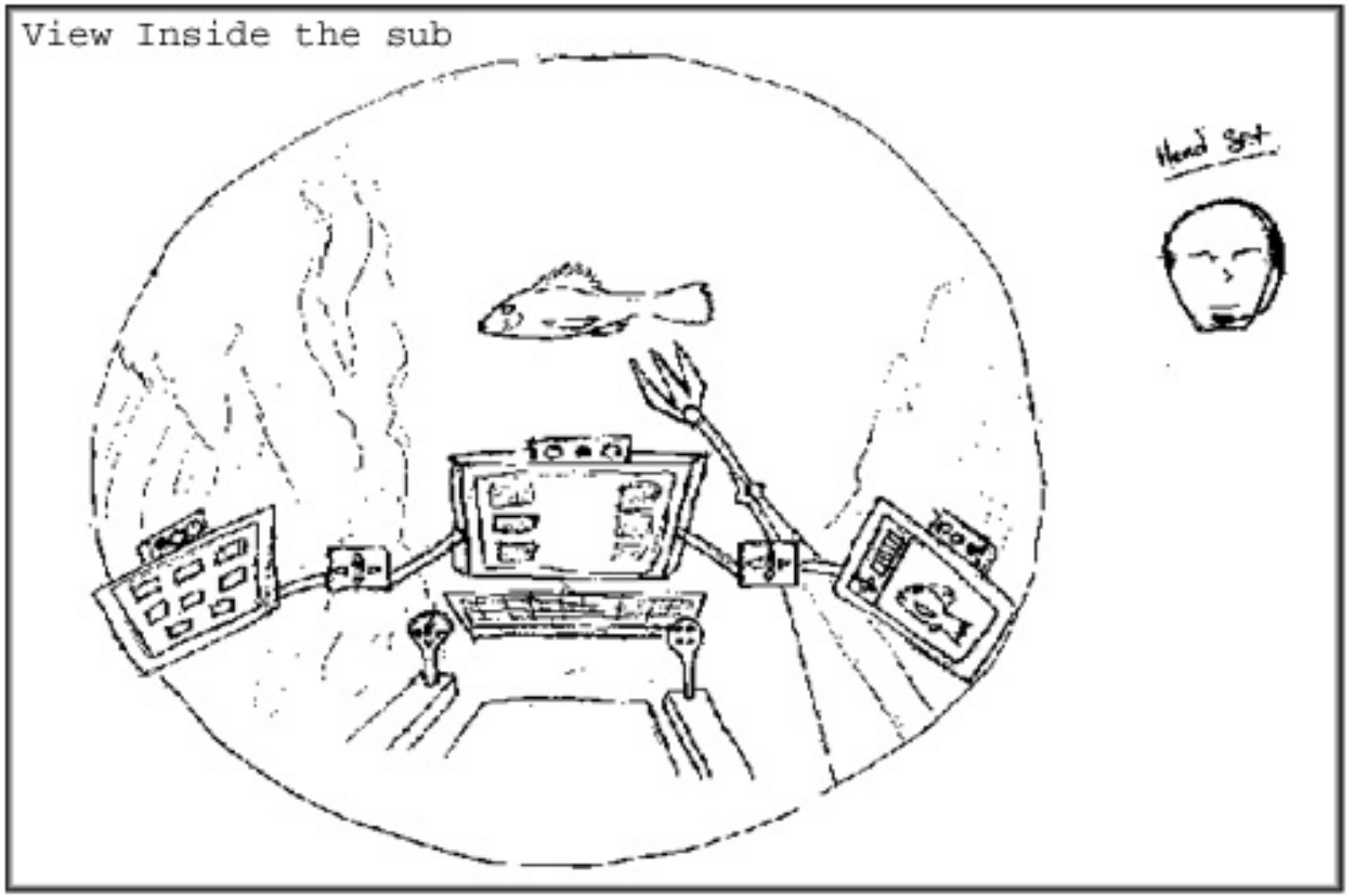
PLEASE PRINT THIS FLOWCHART OUT AND TAPE IT NEAR YOUR SCREEN.
CONGRATULATIONS; YOU'RE NOW THE LOCAL COMPUTER EXPERT!



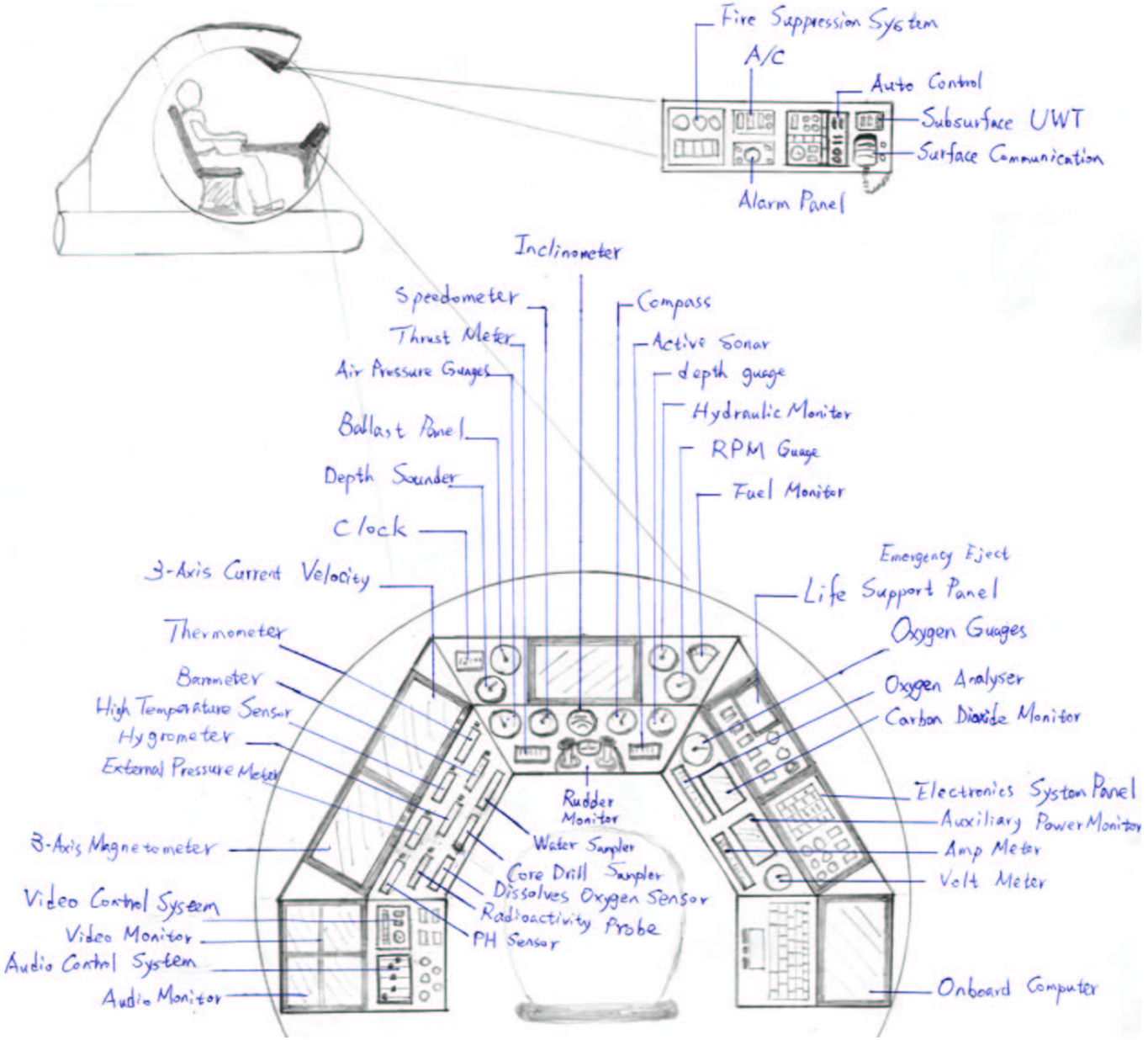
Sketches, Mock-ups

- Paper-based “drawings” of interfaces
  - Good for brainstorming
  - Focuses people on high-level design notions
  - Not so good for illustrating flow and the details
  - Quick and cheap -> helpful feedback

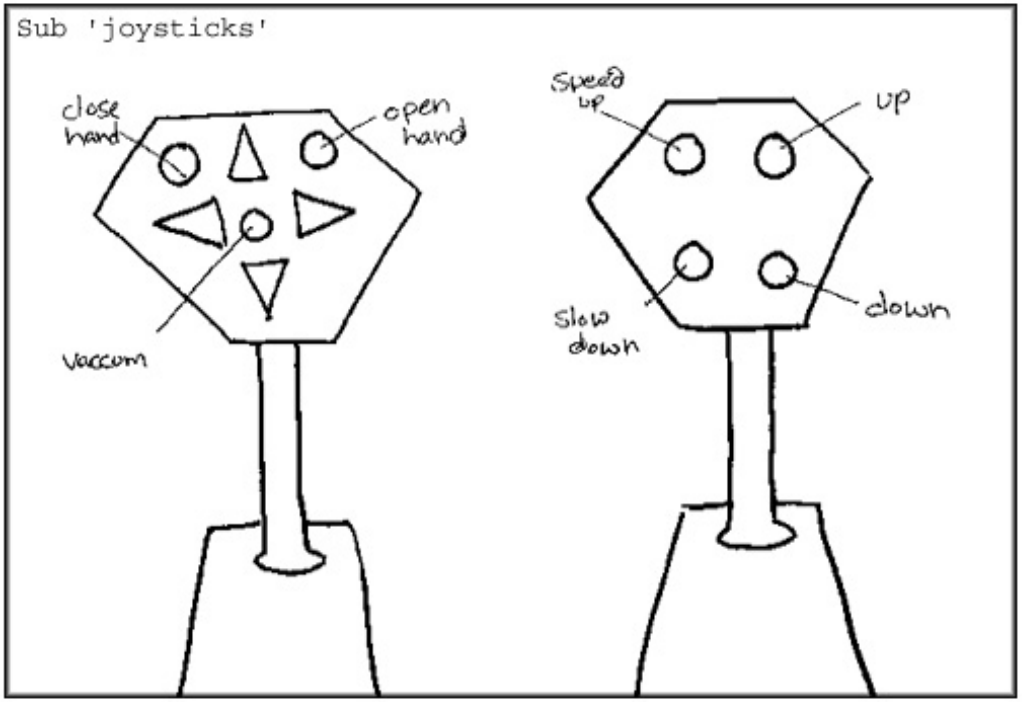
Mockups: Simple sketches…

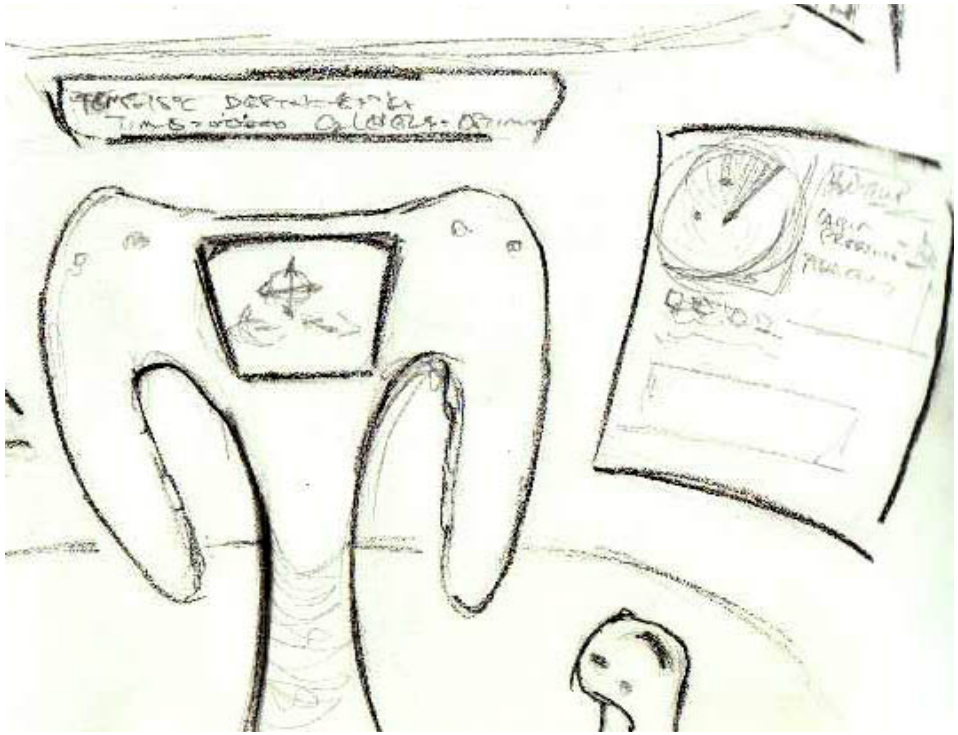


Mockups: Complex details…

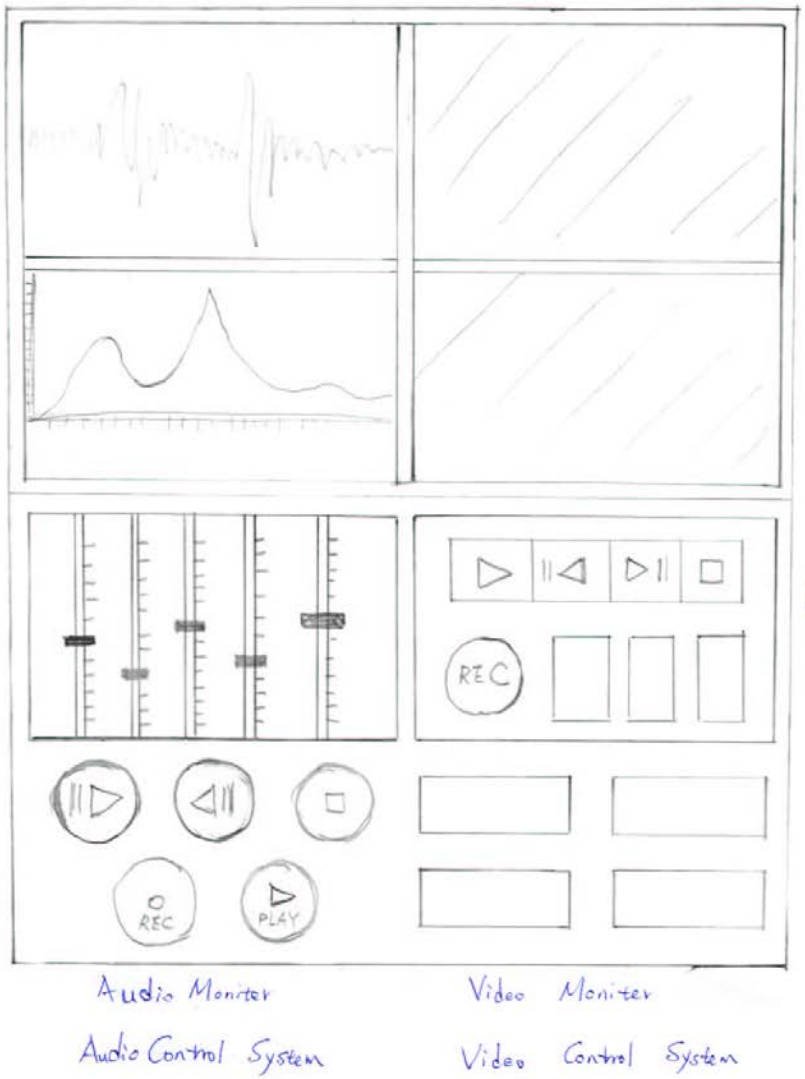


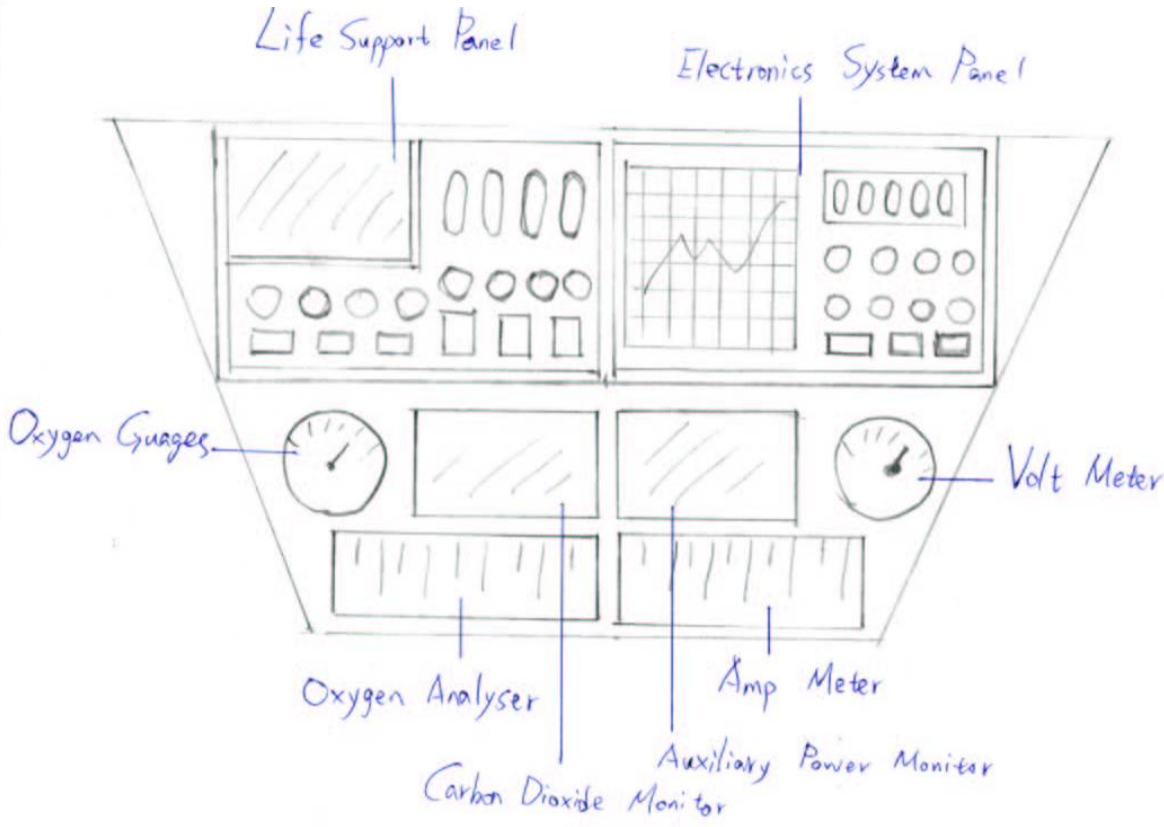
Mockup: Controls…



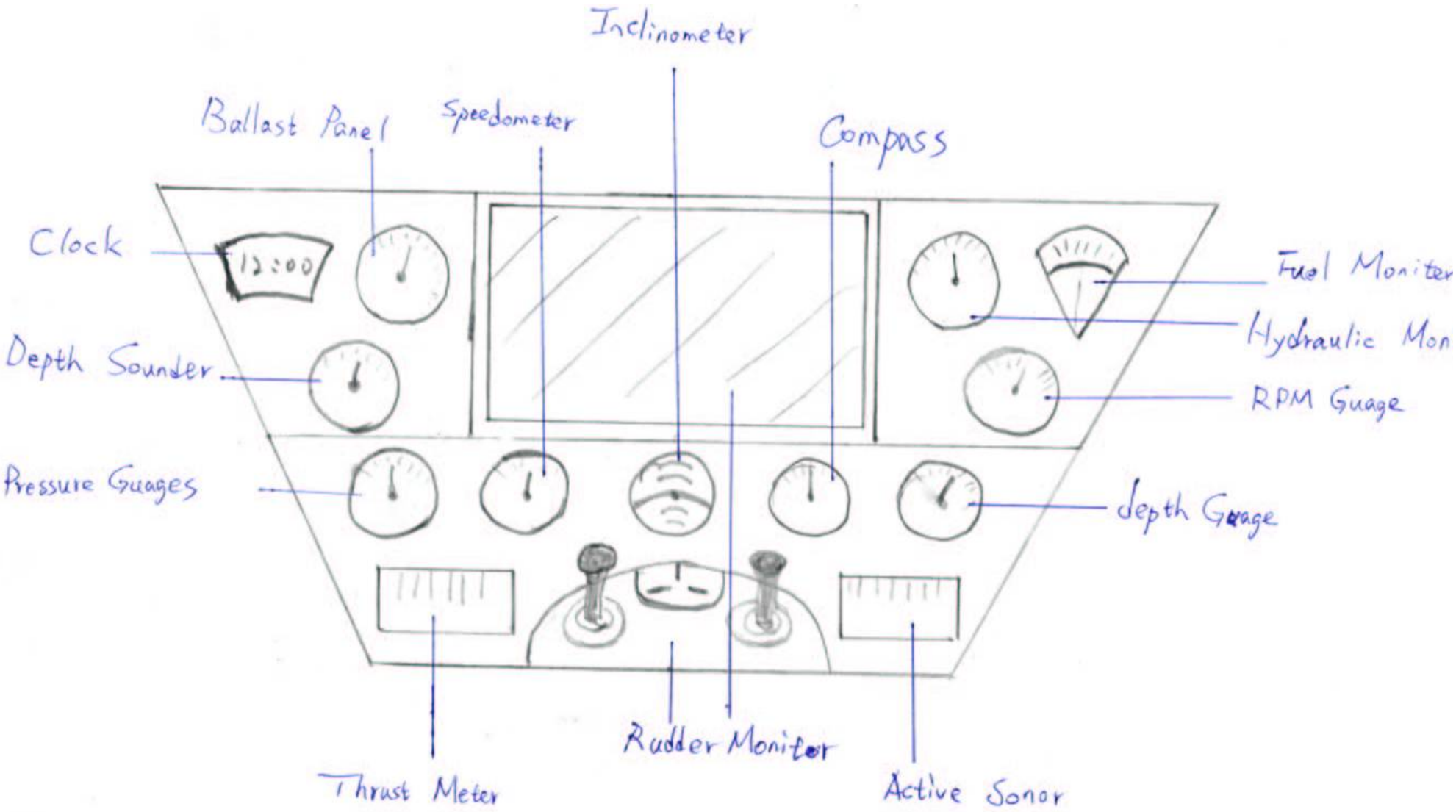


Mockup: Displays…





Mockup: Controls + Displays



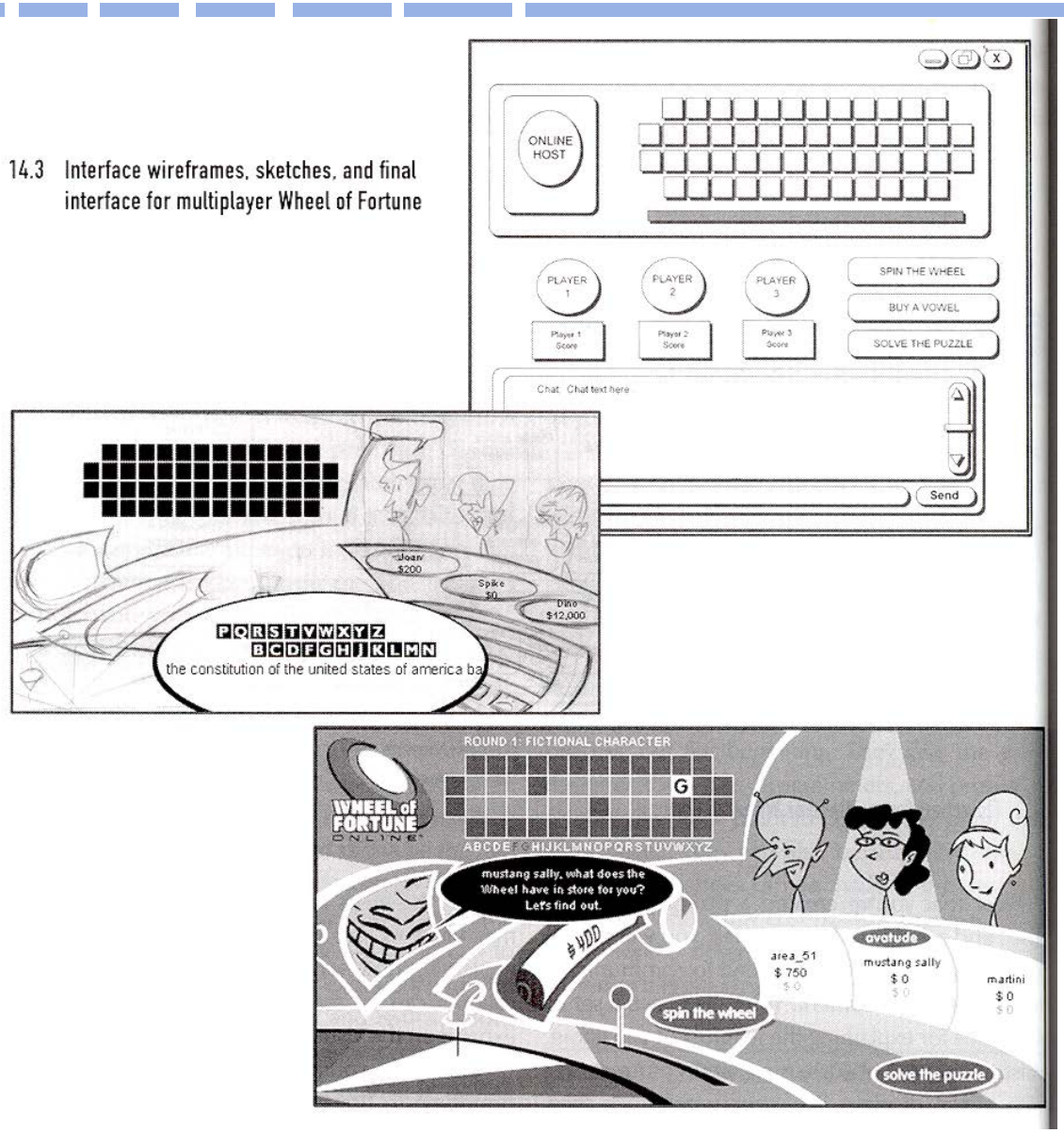
Physical Mockup

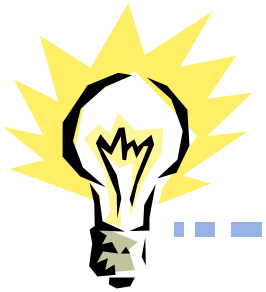
Nintendo Does It

- The Wii U

Wireframe Screen

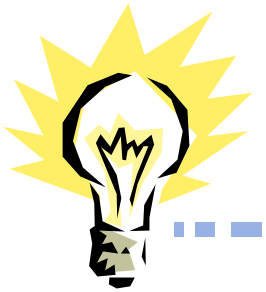
14.3 Interface wireframes, sketches, and final interface for multiplayer Wheel of Fortune





Pros/Cons

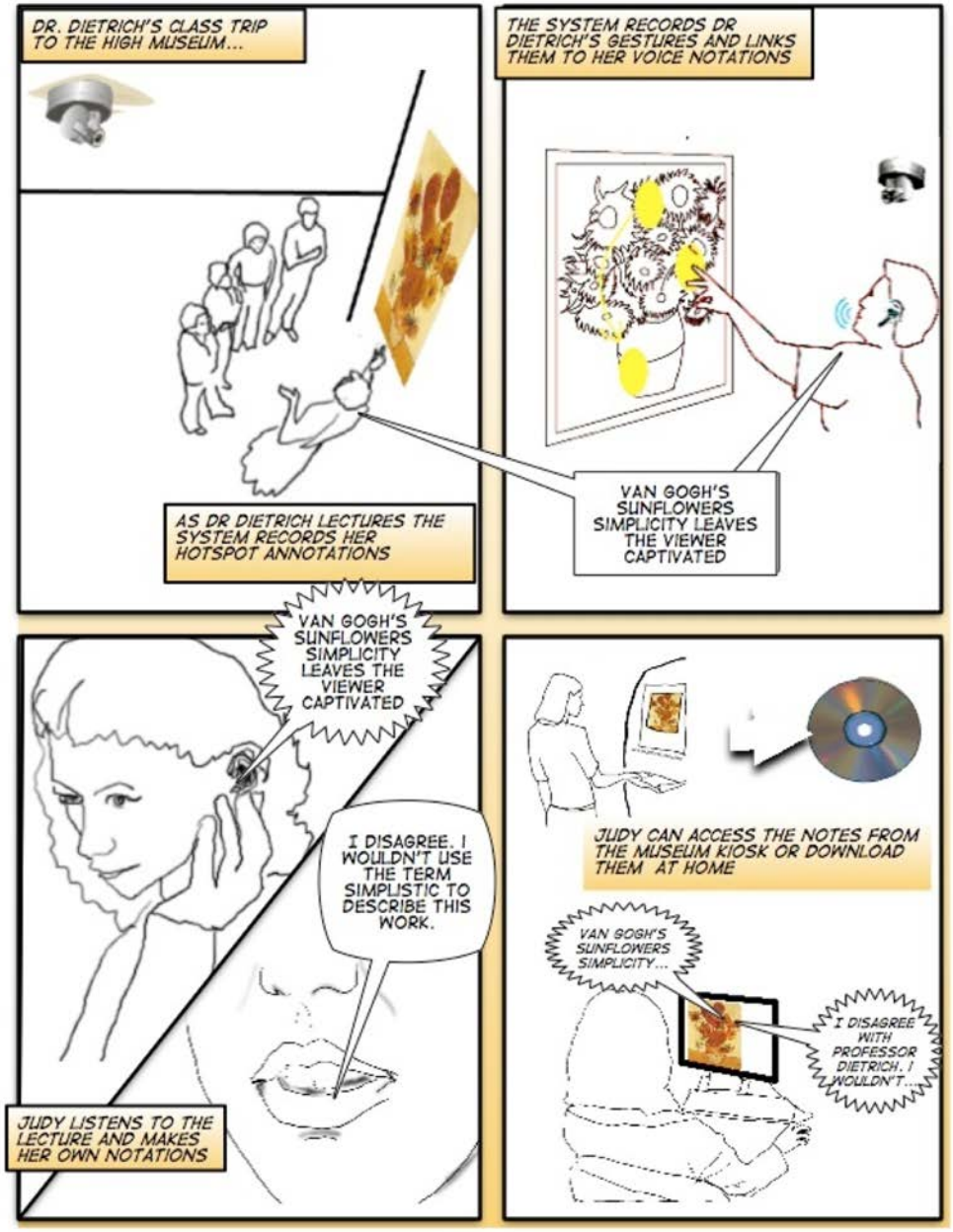
- Pros:
  - Give grounding to feedback
  - Helps users think about it instead of conceptual only
  - Good for brainstorming iteration
- Cons:
  - Users could get stuck on the colors/wording
  - Harder to test new interaction styles

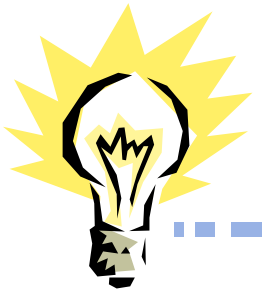


Storyboarding

- Pencil and paper simulation or walkthrough of system look and functionality
  - Use sequence of diagrams/drawings
  - Show key snap shots
  - Quick & easy

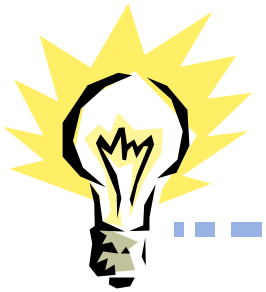
Storyboard


DR. DIETRICH'S CLASS TRIP TO THE HIGH MUSEUM...
AS DR DIETRICH LECTURES THE SYSTEM RECORDS HER HOTSPOT ANNOTATIONS
THE SYSTEM RECORDS DR DIETRICH'S GESTURES AND LINKS THEM TO HER VOICE NOTATIONS
VAN GOGH'S SUNFLOWERS SIMPLICITY LEAVES THE VIEWER CAPTIVATED
VAN GOGH'S SUNFLOWERS SIMPLICITY LEAVES THE VIEWER CAPTIVATED
I DISAGREE. I WOULDN'T USE THE TERM SIMPLISTIC TO DESCRIBE THIS WORK.
JUDY LISTENS TO THE LECTURE AND MAKES HER OWN NOTATIONS
JUDY CAN ACCESS THE NOTES FROM THE MUSEUM KIOSK OR DOWNLOAD THEM AT HOME
VAN GOGH'S SUNFLOWERS SIMPLICITY...
I DISAGREE WITH PROFESSOR DIETRICH. I WOULDN'T...



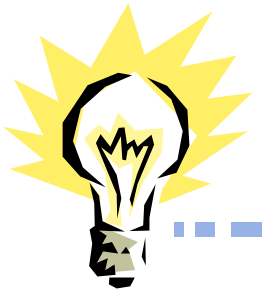
Scenarios

- Hypothetical or fictional situations of use
  - Typically involving some person, event, situation and environment
  - Provide context of operation
  - Often in narrative form, but can also be sketches or even videos



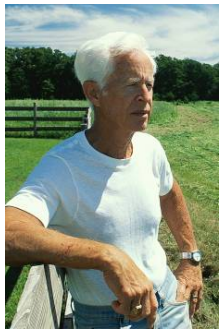
Scenario Utility

- Engaging and interesting
- Allows designer to look at problem from another person's point of view
- Facilitates feedback and opinions
- Can be very futuristic and creative
- Can involve social and interpersonal aspects of the task



Personas

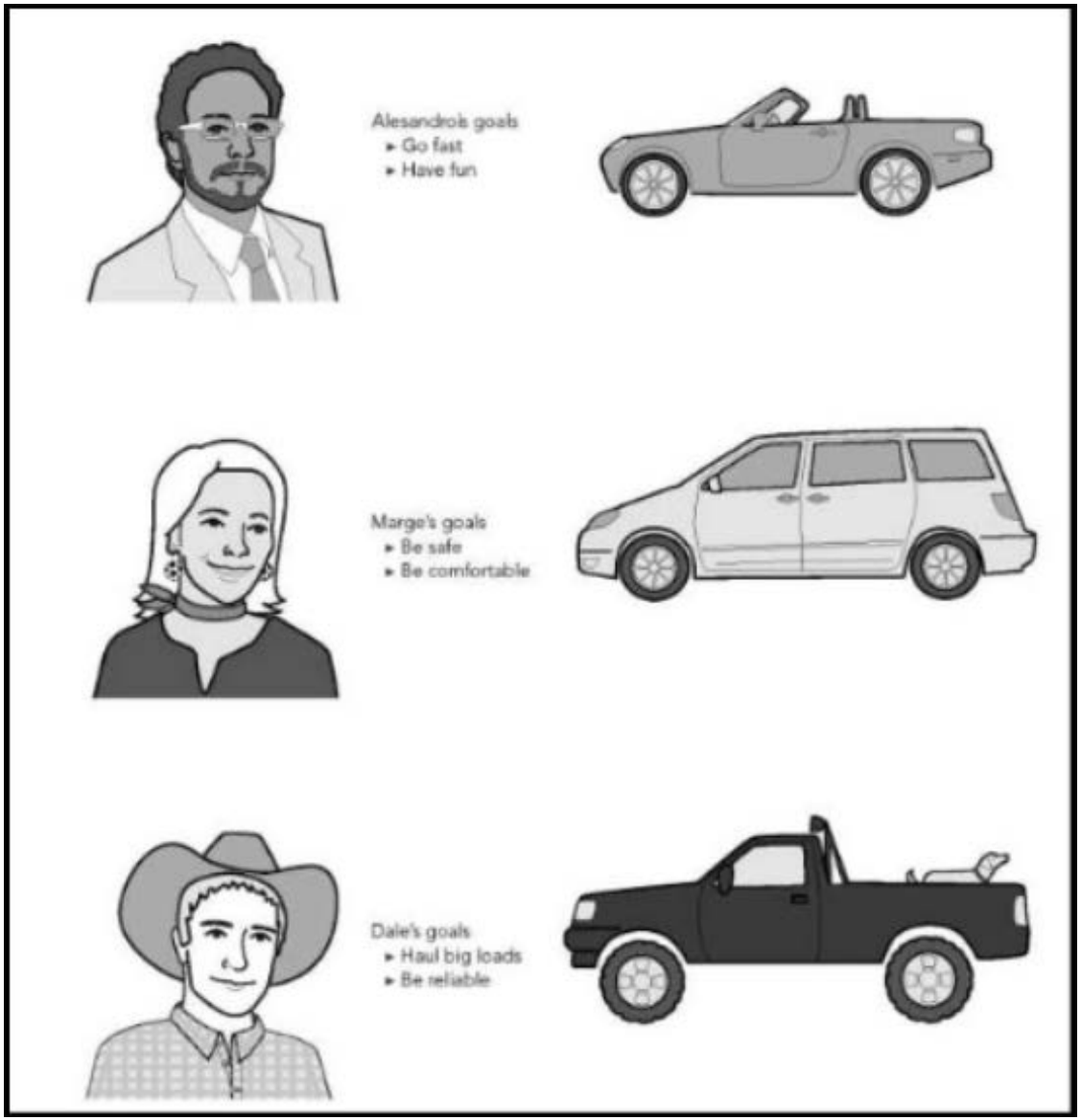
- Prevent designers from designing for themselves or for “average” customers
- Maintain focus on customer needs
- Evolve as survey and focus groups continue
- NOT a replacement for user testing!



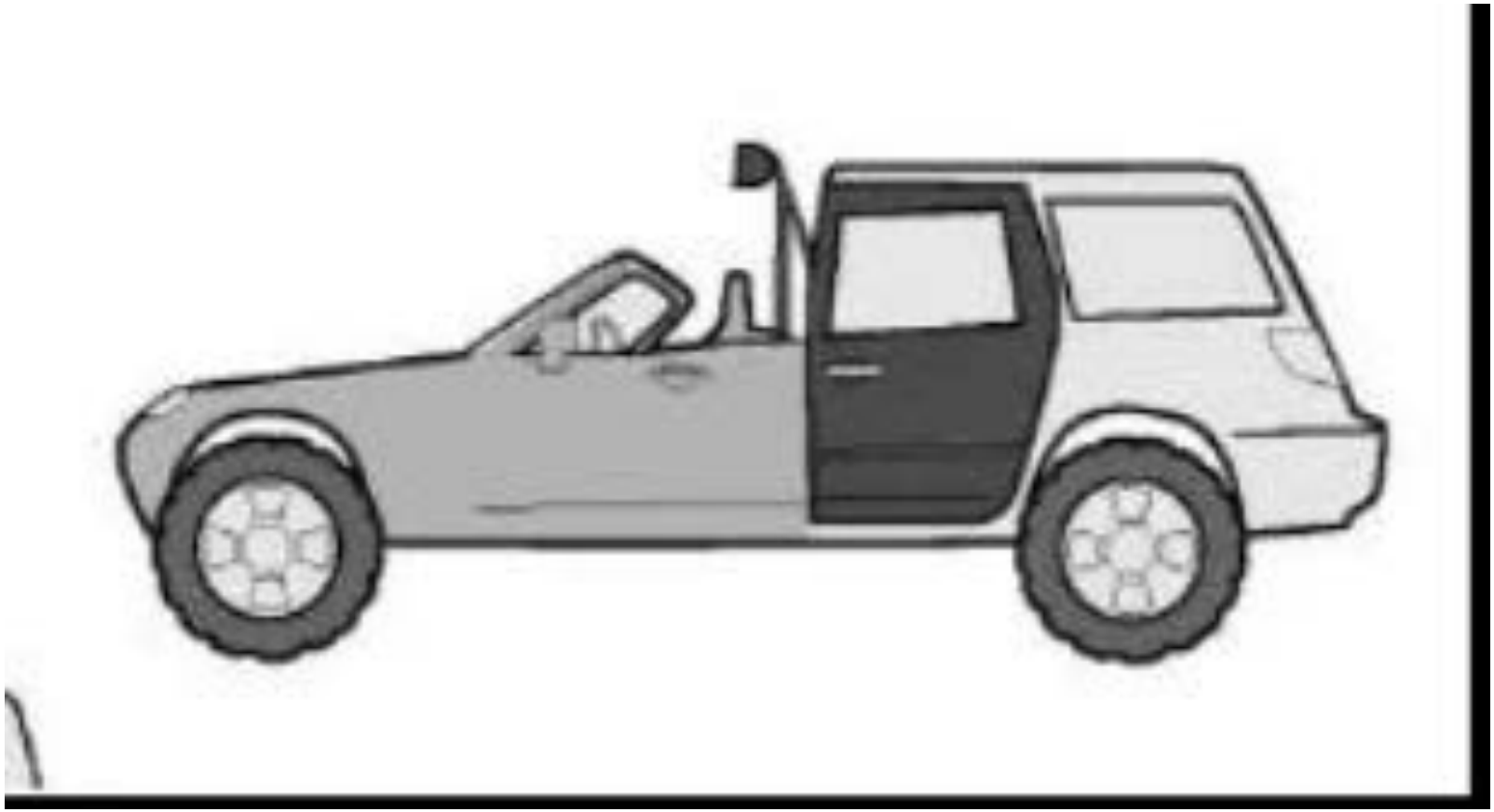




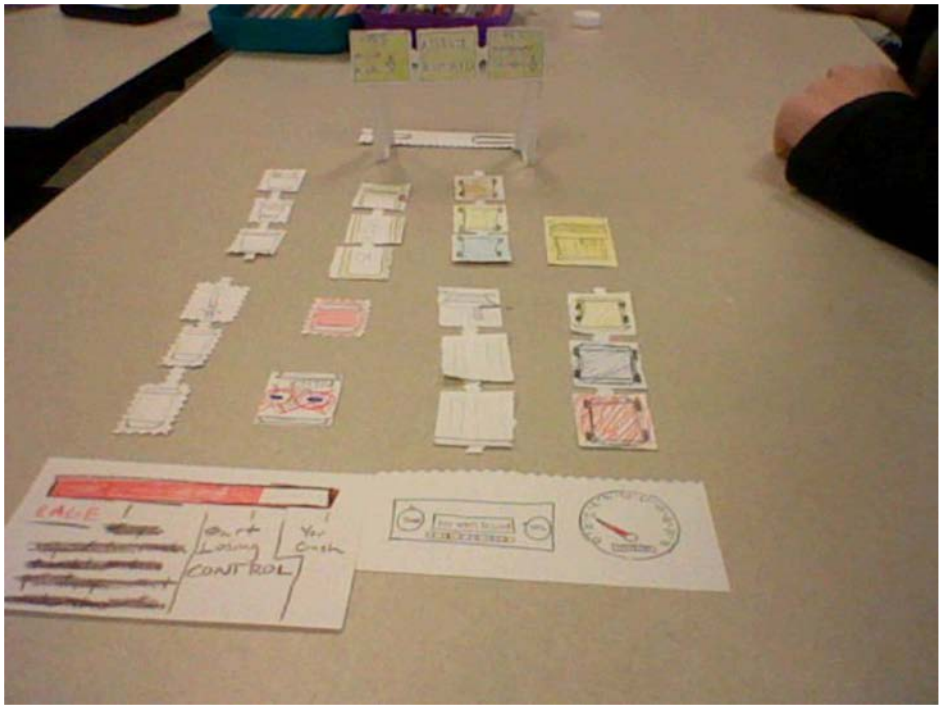
About Face: The Essentials of Interaction Design

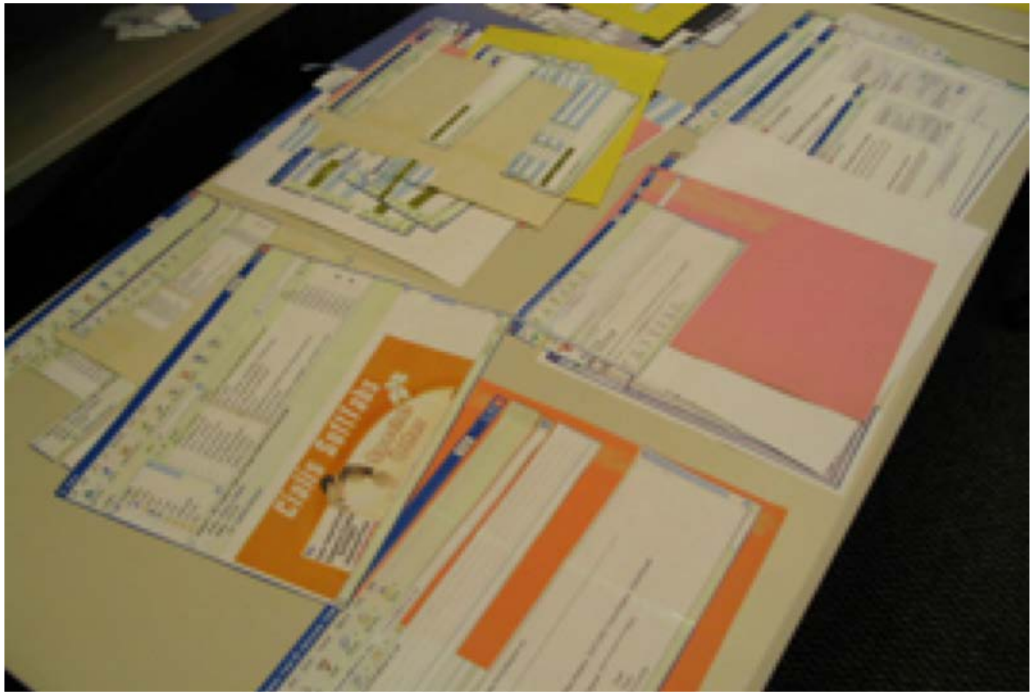


So…this result?



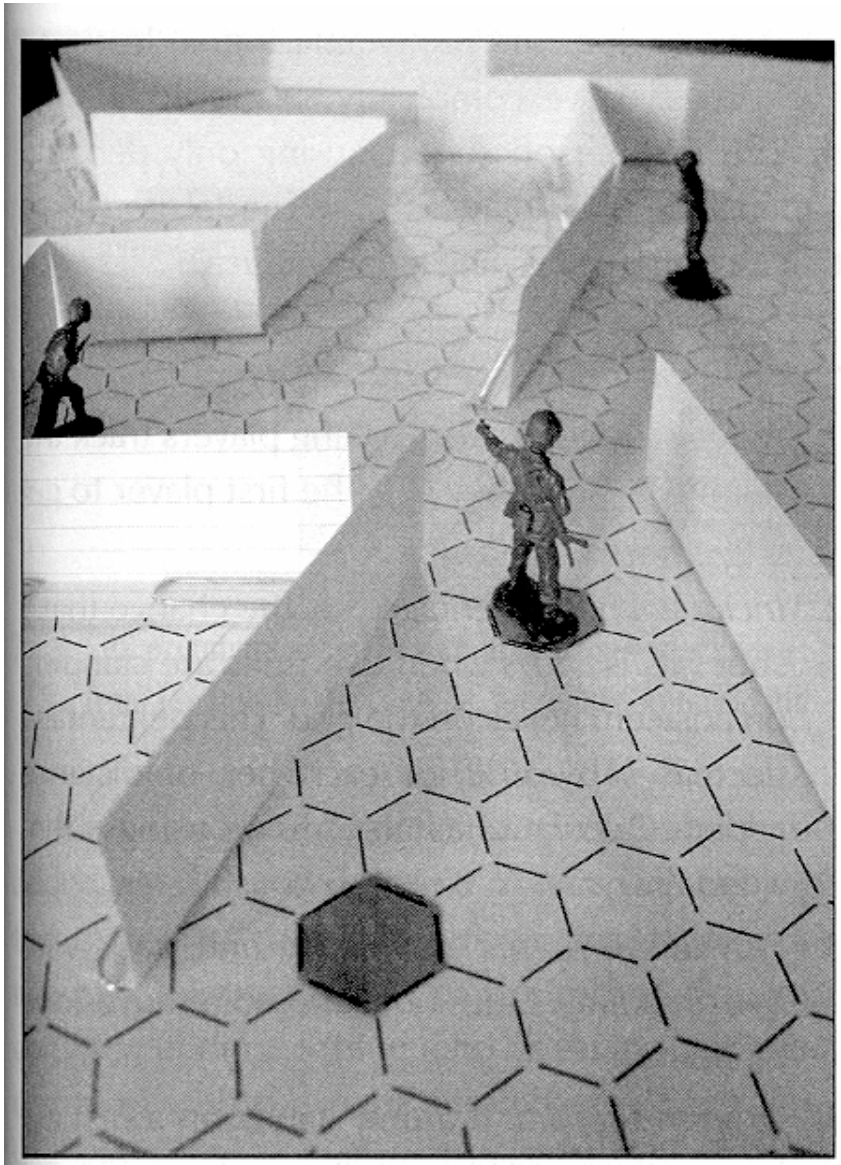
Paper Prototype



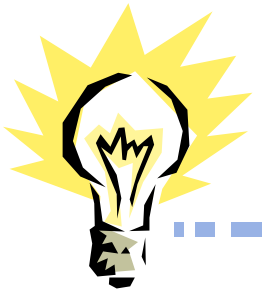


Paper Prototype (game design)

Paper Prototype (game design)



7.5 FPS Prototype example

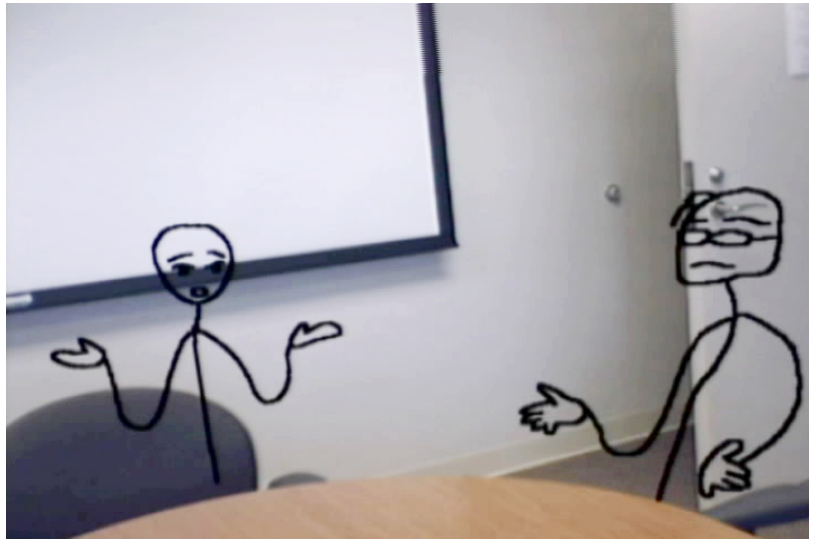


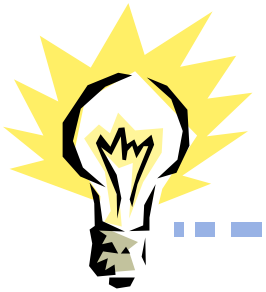
Computer-Supported Methods

- Can support more rapid changes to simple mockups
- Can support more functionality for prototypes
- Can lead to “stale” design, can focus user (or customer) too much on the details of the interface, too early in the design process

Mockup – "Four Angry Men"

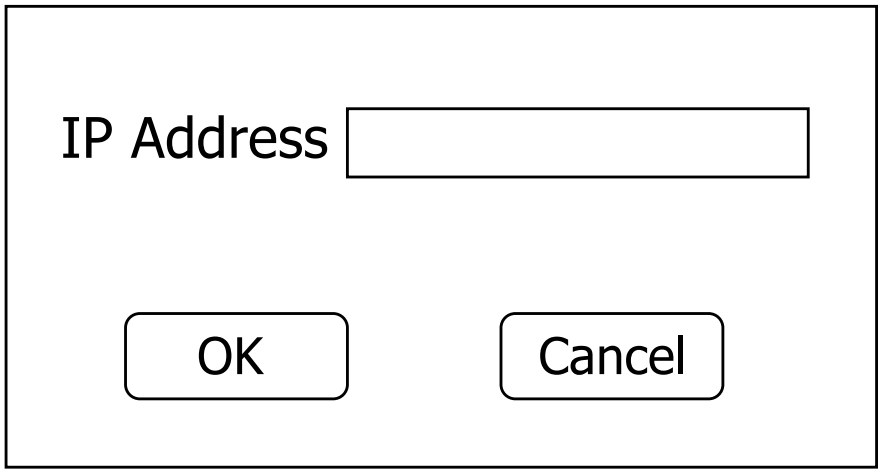
- AR Experience "Four Angry Men"
- 6 months of content development…three times
- 1 year of software development before testing was possible
- Motivated creation of Designers' Augmented Reality Toolkit (DART)





Prototyping Tools

- 1.Draw/Paint programs
  - Draw each screen, good for look



Thin, horizontal prototype

PhotoShop, PowerPoint,...


File Edit Image Enhance Layer Select Filter View Window Help
File Browser Recipes Filters Effects Layer Styles Swatches History Navigator
Feather: 1 px
Anti-aliased
Style: Normal
Width:
Height:
Picture 1.pdf @ 100% (RGB)
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Home
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Applying to UWC
UWC Movement
UWC Colleges
National Committees
UWC Graduates
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Through international education, experience and community service, United World Colleges enable young people to become responsible citizens, politically and environmentally aware, and committed to the ideals of peace and justice, understanding and cooperation, and the implementation of these ideals through action and personal example.
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UWC Graduates
Short Courses
Applying to UWC
How to Apply
Applying Through a National Committee
Scholarships
National Committees
Introduction
Contact Details
UWC Graduates
UWCNet Alumni Home Page
Web Pages
Chat
Discussion Forums
ICQ Network
Email (listserv) lists
Global Directory
UWC.NET Email
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UWC News
UWC Graduates Survey
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UWCers gather around the world on the Second Sunday @ Six
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Company Registered in England and Wales and Limited by Guarantee, No. 908758. Registered
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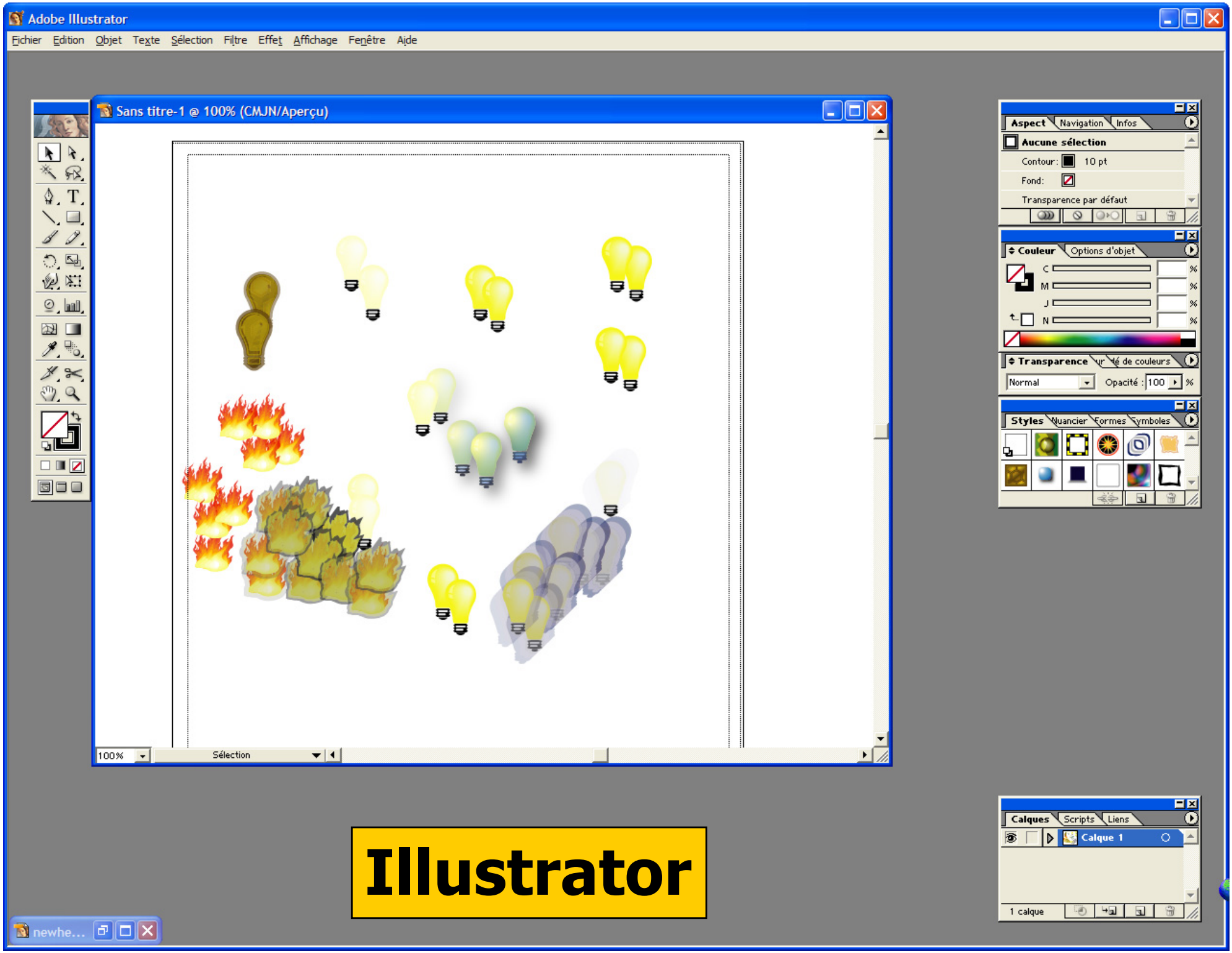
Adobe Illustrator
Fichier Edition Objet Texte Sélection Filtre Effet Affichage Fenêtre Aide
Sans titre-1 @ 100% (CMJN/Aperçu)
100%
Sélection
Aspect
Navigation
Infos
Aucune sélection
Contour:
10 pt
Fond:
Transparence par défaut
Couleur
Options d'objet
C
M
J
N
Transparence
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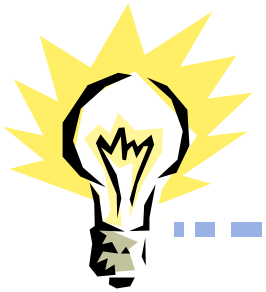
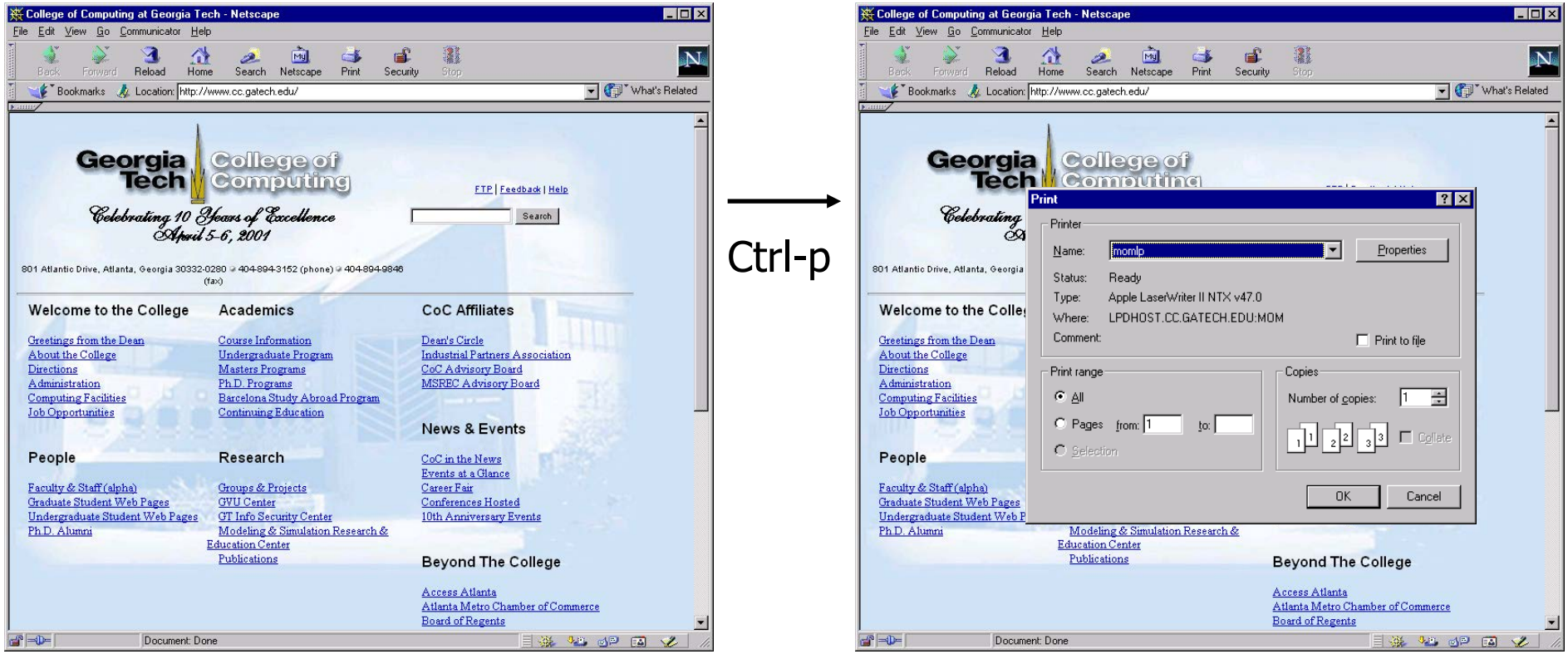
Styles
Nuancier
Formes
Symboles
Calques
Scripts
Liens
Calque 1
1 calque
Illustrator



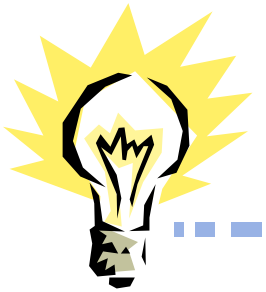
Prototyping Tools

- 2. Scripted simulations/slide shows
  - Put storyboard-like views down with (animated) transitions between them
  - Can give user very specific script to follow
  - Often called *chauffeured prototyping*
  - Examples: PowerPoint, HTML, Javascript

Scripting Example

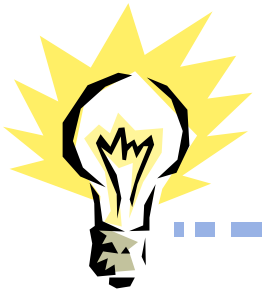


e.g., HTML, Javascript



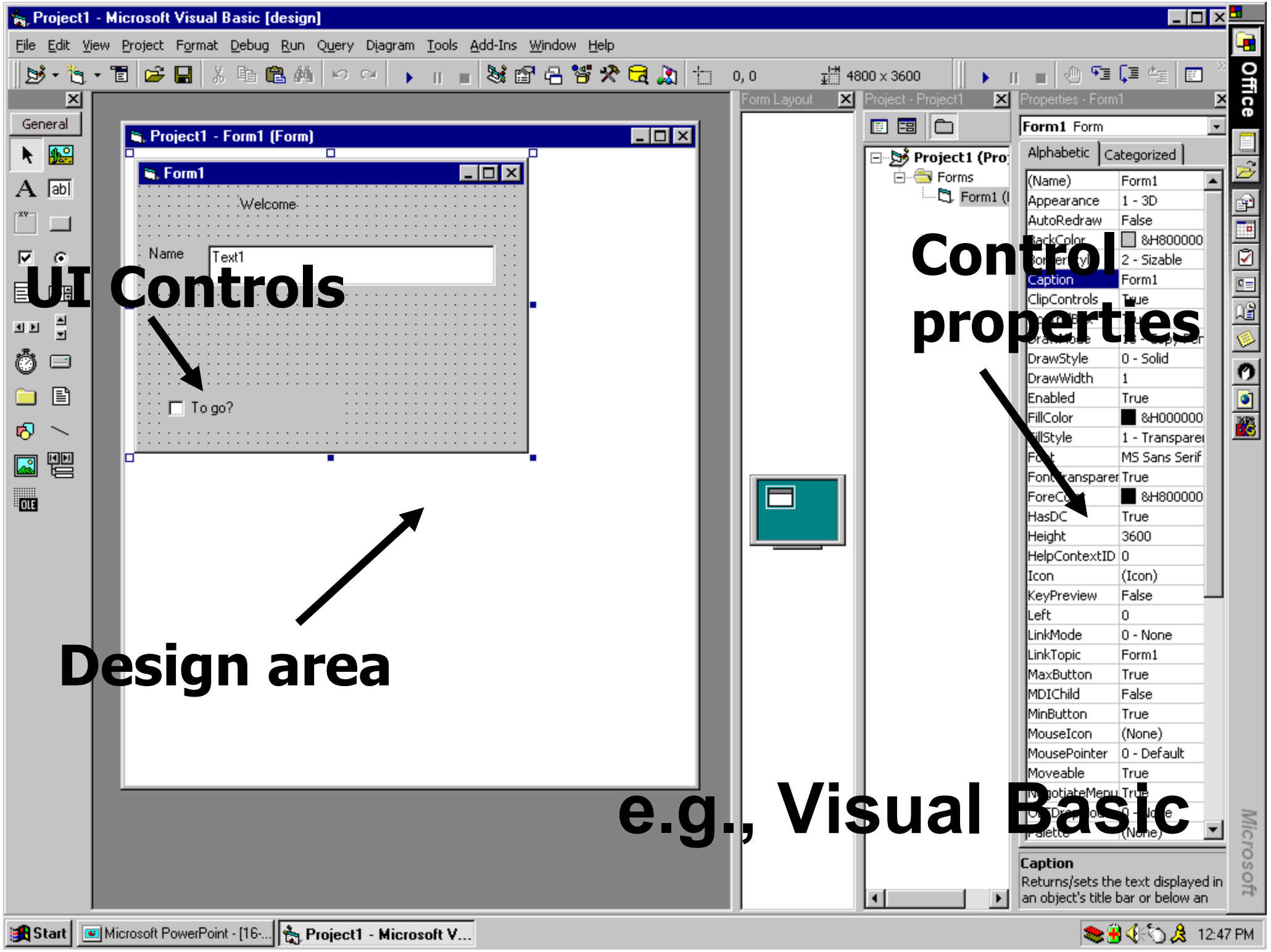
Reflect on these

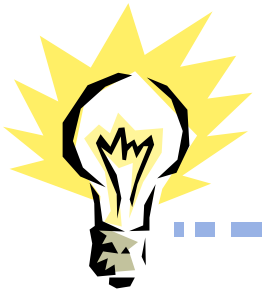
- Do you see any issues with these?
  - Inaccessible



Prototyping Tools

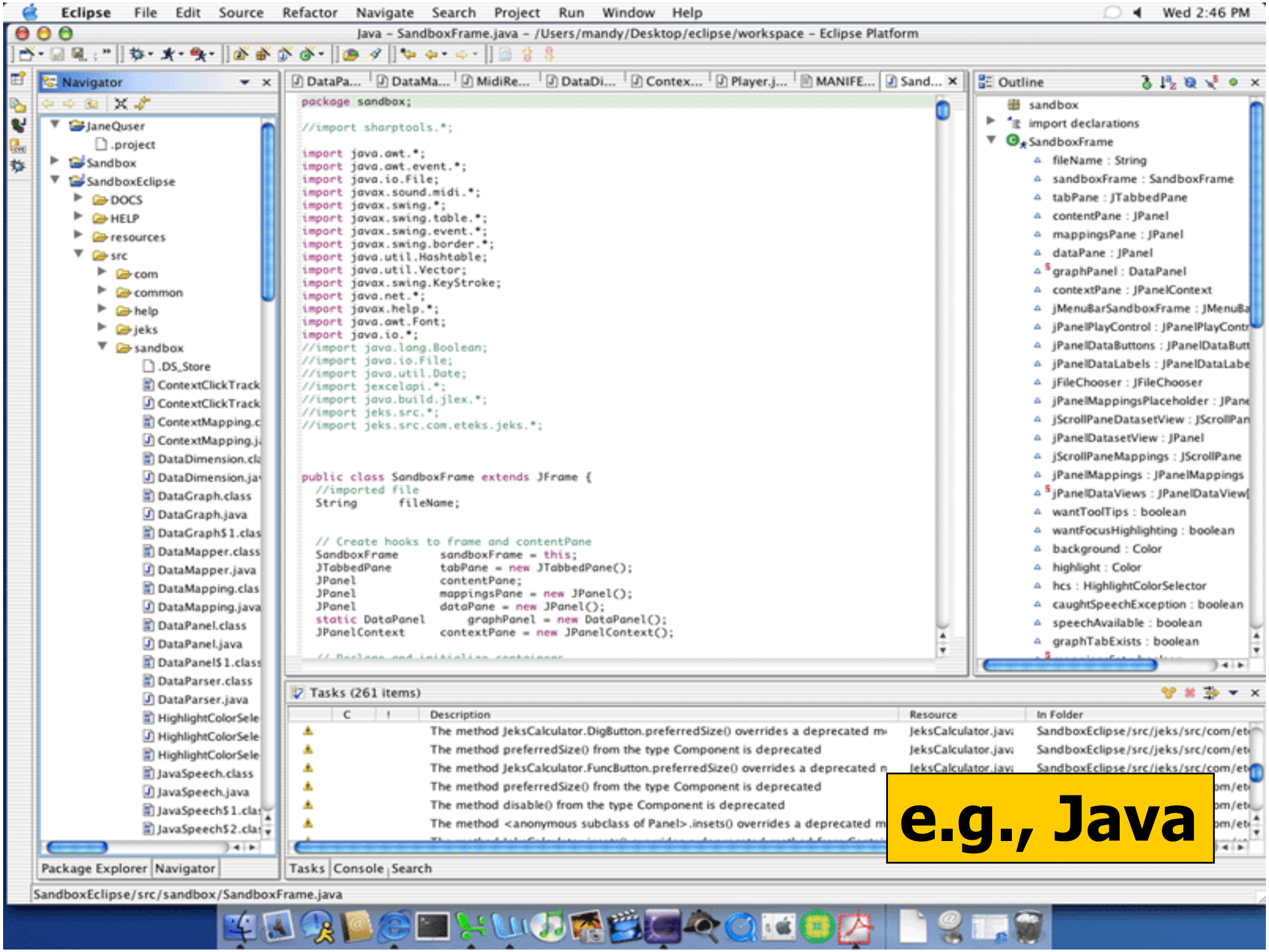
- 3. Interface Builders
  - Tools for laying out windows, controls, etc. of interface
    - Have build and test modes that are good for exhibiting look and feel
    - Generate code to which back-end functionality can be added through programming
  - Examples: Visual Studio (or Visual C++), .NET, Processing, Python


Project1 - Microsoft Visual Basic [design]
File Edit View Project Format Debug Run Query Diagram Tools Add-Ins Window Help
General
Project1 - Form1 (Form)
Form1
Welcome
Name
Text1
To go?
Form Layout
Project - Project1
Project1 (Pro
Forms
Form1 (
Properties - Form1
Form1 Form
Alphabetic
Categorized
(Name) Form1
Appearance 1 - 3D
AutoRedraw False
BackColor &H800000
BorderStyle 2 - Sizable
Caption Form1
ClipControls True
DrawStyle 0 - Solid
DrawWidth 1
Enabled True
FillColor &H000000
FillStyle 1 - Transparer
Font MS Sans Serif
FontTransparent True
ForeColor &H800000
HasDC True
Height 3600
HelpContextID 0
Icon (Icon)
KeyPreview False
Left 0
LinkMode 0 - None
LinkTopic Form1
MaxButton True
MDIChild False
MinButton True
MouseIcon (None)
MousePointer 0 - Default
Moveable True
Caption
Returns/sets the text displayed in an object's title bar or below an
Start
Microsoft PowerPoint - [16-...
Project1 - Microsoft V...
12:47 PM
UI Controls
Control properties
Design area
e.g., Visual Basic



True Programming

- Less useful for rapid prototyping, but can save re-coding time down the road
- More constrained in look and feel
- Constrained to traditional interaction styles and methods
  - Hard to think outside the box…


Eclipse File Edit Source Refactor Navigate Search Project Run Window Help
Wed 2:46 PM
Java – SandboxFrame.java – /Users/mandy/Desktop/eclipse/workspace – Eclipse Platform
Navigator
JaneQuser
.project
Sandbox
SandboxEclipse
DOCS
HELP
resources
src
com
common
help
jeks
sandbox
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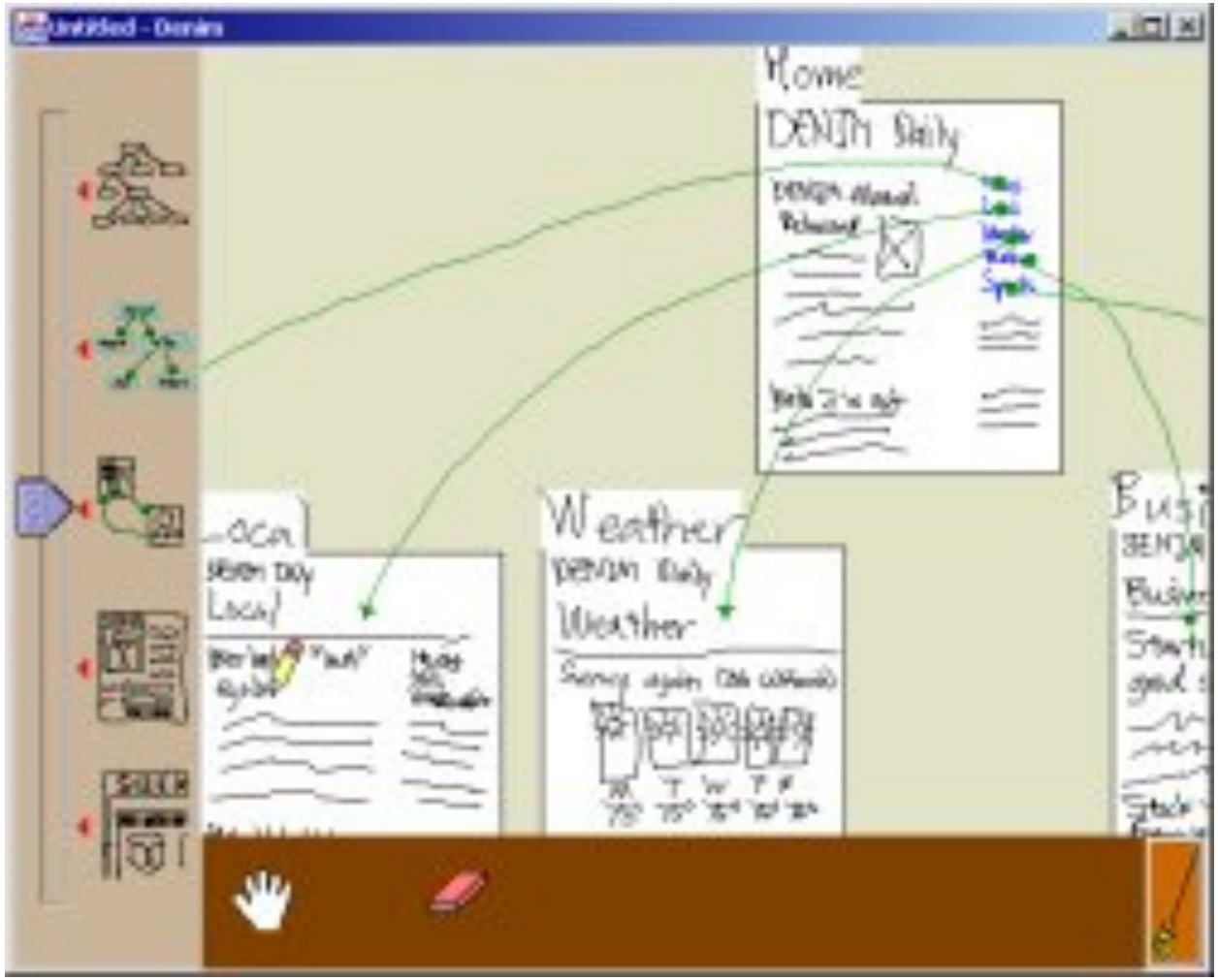
ContextClickTrack
ContextClickTrack
ContextMapping.c
ContextMapping.j
DataDimension.cl
DataDimension.ja
DataGraph.class
DataGraph.java
DataGraph$1.clas
DataMapper.class
DataMapper.java
DataMapping.clas
DataMapping.java
DataPanel.class
DataPanel.java
DataPanel$1.class
DataParser.class
DataParser.java
HighlightColorSele
HighlightColorSele
HighlightColorSele
JavaSpeech.class
JavaSpeech.java
JavaSpeech$1.cla
JavaSpeech$2.cla
Package Explorer
Navigator
DataPa...
DataMa...
MidiRe...
DataDi...
Contex...
Player.j...
MANIFE...
Sand...
package sandbox;
//import sharptools.*;
import java.awt.*;
import java.awt.event.*;
import java.io.File;
import javax.sound.midi.*;
import javax.swing.*;
import javax.swing.table.*;
import javax.swing.event.*;
import javax.swing.border.*;
import java.util.Hashtable;
import java.util.Vector;
import javax.swing.KeyStroke;
import java.net.*;
import javax.help.*;
import java.awt.Font;
import java.io.*;
//import java.lang.Boolean;
//import java.io.File;
//import java.util.Date;
//import jexcelapi.*;
//import java.build.jlex.*;
//import jeks.src.*;
//import jeks.src.com.eteks.jeks.*;
public class SandboxFrame extends JFrame {
//imported file
String fileName;
// Create hooks to frame and contentPane
SandboxFrame sandboxFrame = this;
JTabbedPane tabPane = new JTabbedPane();
JPanel contentPane;
JPanel mappingsPane = new JPanel();
JPanel dataPane = new JPanel();
static DataPanel graphPanel = new DataPanel();
JPanelContext contextPane = new JPanelContext();
Outline
sandbox
import declarations
SandboxFrame
fileName : String
sandboxFrame : SandboxFrame
tabPane : JTabbedPane
contentPane : JPanel
mappingsPane : JPanel
dataPane : JPanel
graphPanel : DataPanel
contextPane : JPanelContext
jMenuBarSandboxFrame : JMenuBa
jPanelPlayControl : JPanelPlayContr
jPanelDataButtons : JPanelDataButt
jPanelDataLabels : JPanelDataLabe
jFileChooser : JFileChooser
jPanelMappingsPlaceholder : JPane
jScrollPaneDatasetView : JScrollPan
jPanelDatasetView : JPanel
jScrollPaneMappings : JScrollPane
jPanelMappings : JPanelMappings
jPanelDataViews : JPanelDataView[
wantToolTips : boolean
wantFocusHighlighting : boolean
background : Color
highlight : Color
hcs : HighlightColorSelector
caughtSpeechException : boolean
speechAvailable : boolean
graphTabExists : boolean
Tasks (261 items)
C
!
Description
Resource
In Folder
The method JeksCalculator.DigButton.preferredSize() overrides a deprecated m
The method preferredSize() from the type Component is deprecated
The method JeksCalculator.FuncButton.preferredSize() overrides a deprecated n
The method preferredSize() from the type Component is deprecated
The method disable() from the type Component is deprecated
The method <anonymous subclass of Panel>.insets() overrides a deprecated m
JeksCalculator.java
SandboxEclipse/src/jeks/src/com/et
Tasks
Console
Search
SandboxEclipse/src/sandbox/SandboxFrame.java
e.g., Java

Other Prototyping Tools

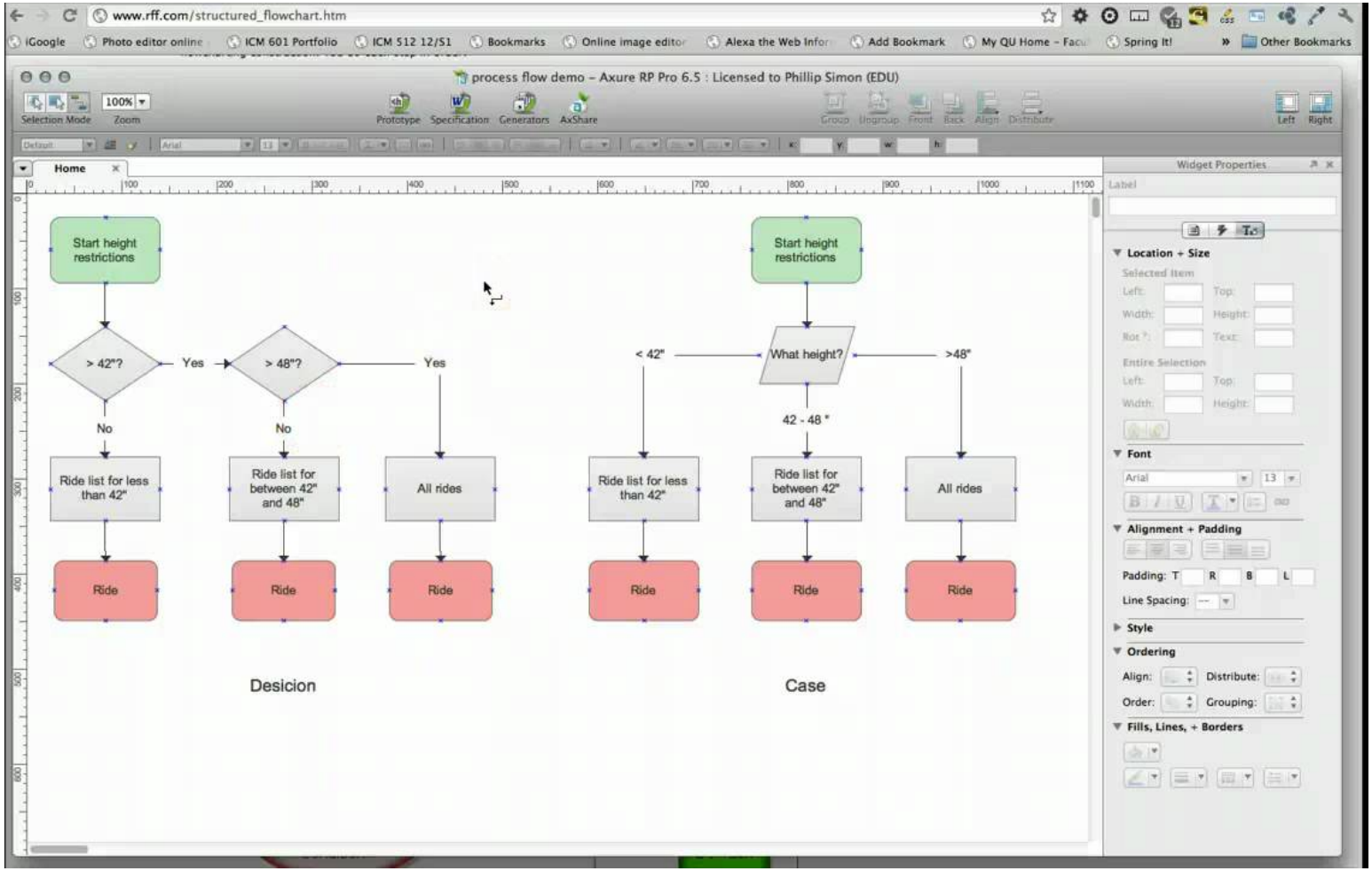
- Denim
- Sketch-based
- Web design



http://dub.washington.edu:2007/denim/

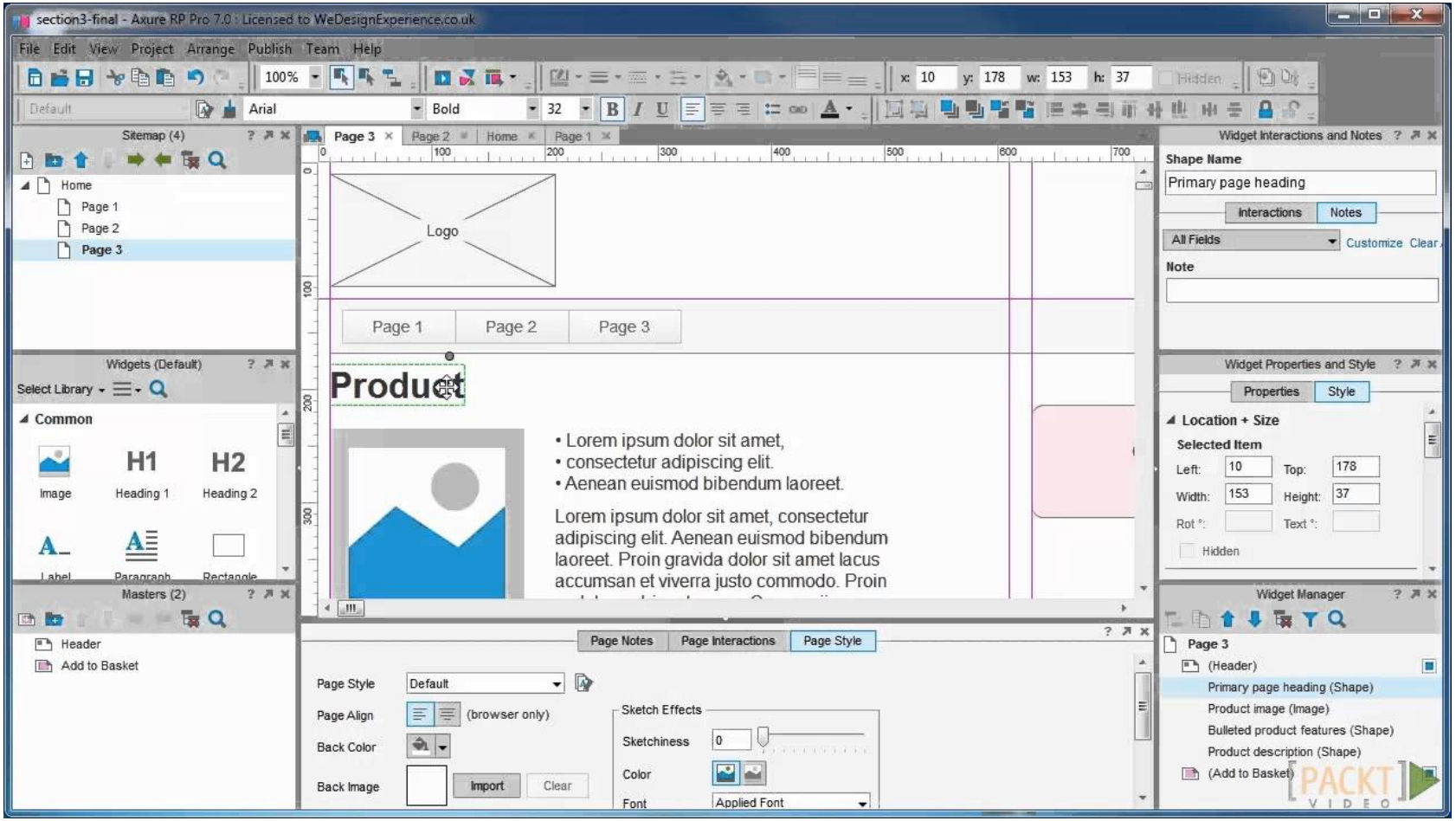
Axure

www.axure.com



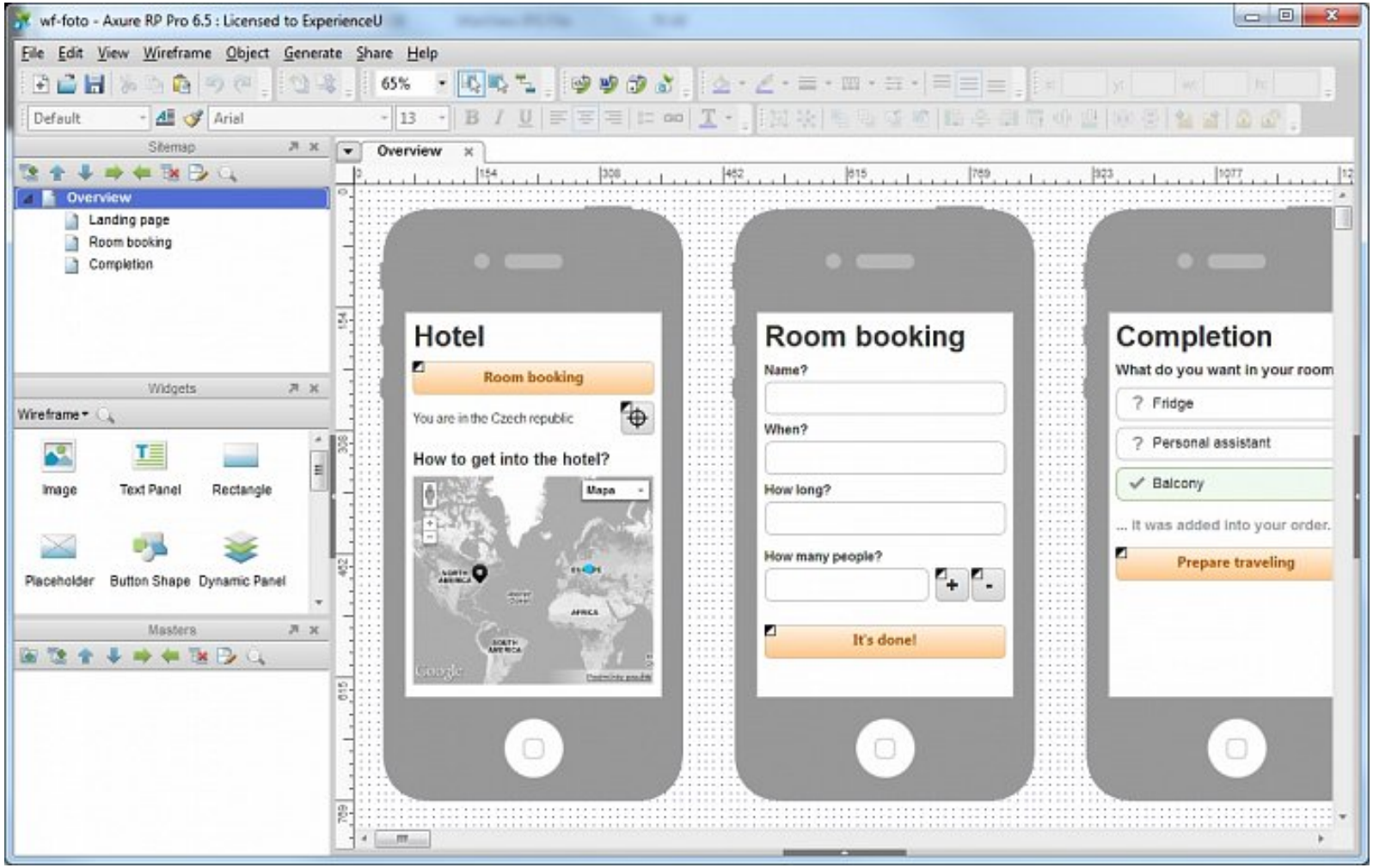
Axure

www.axure.com



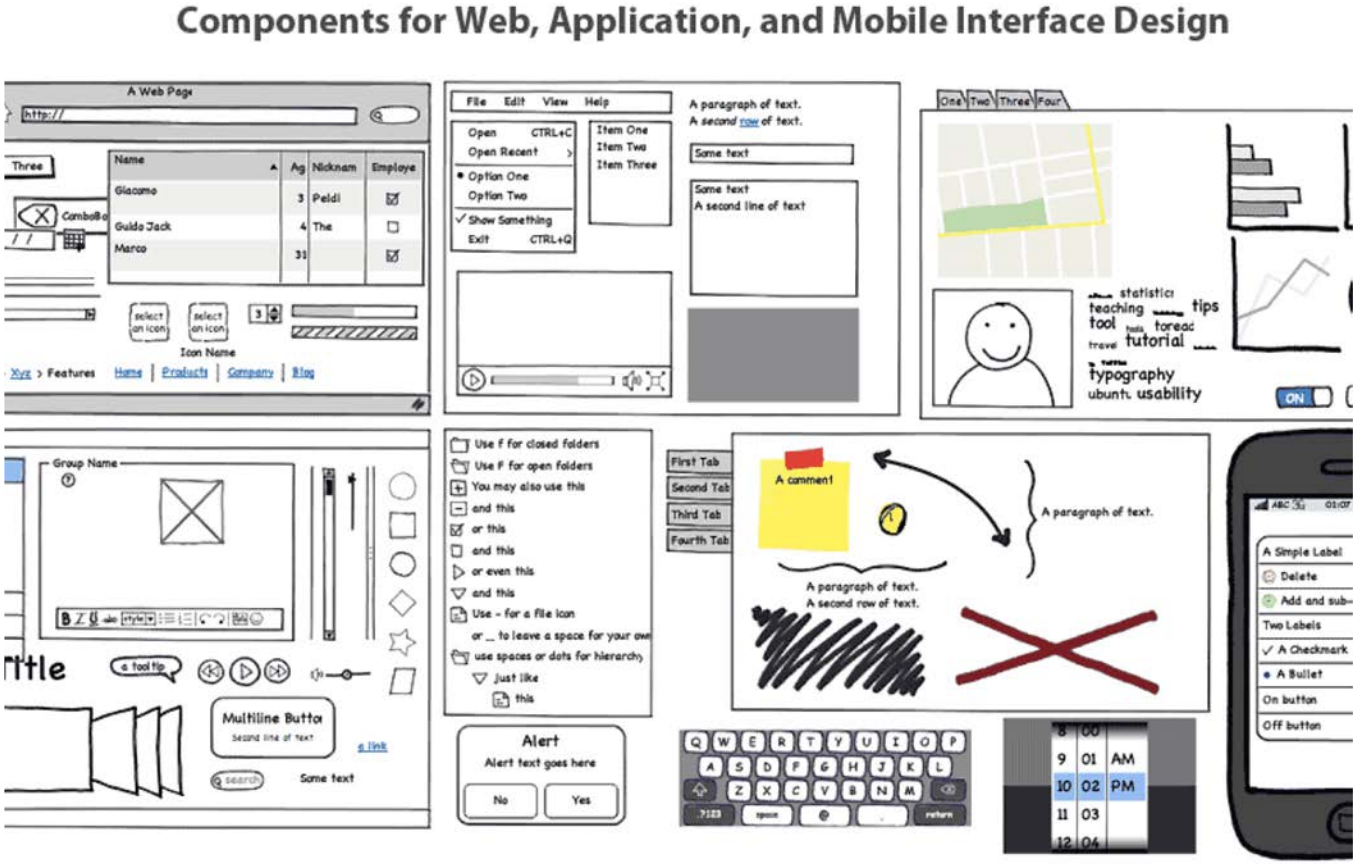
Axure

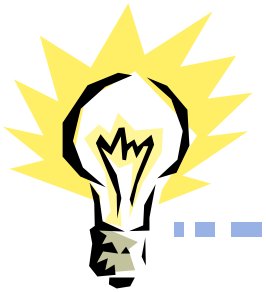
www.axure.com



Balsamiq

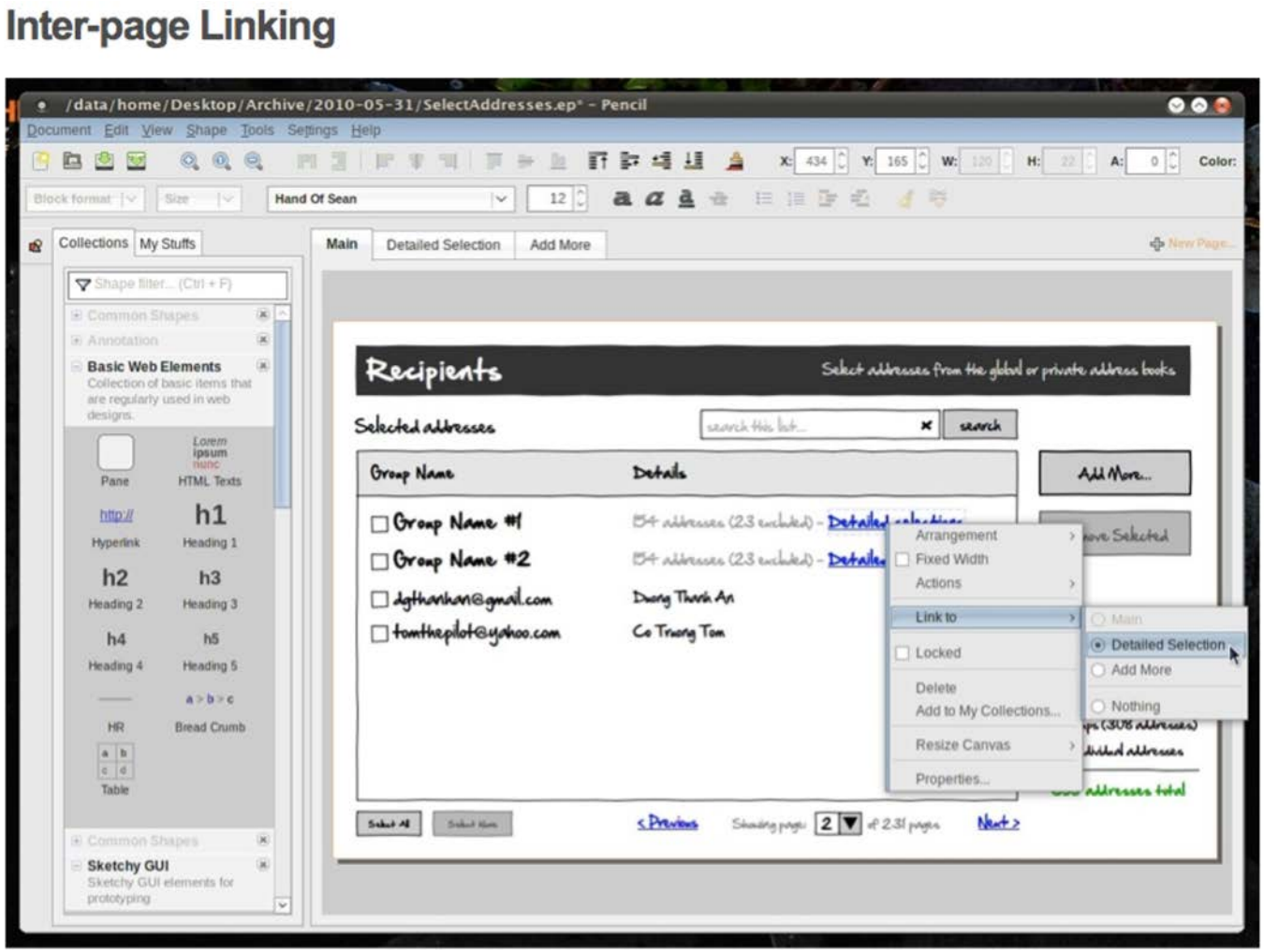
http://www.balsamiq.com





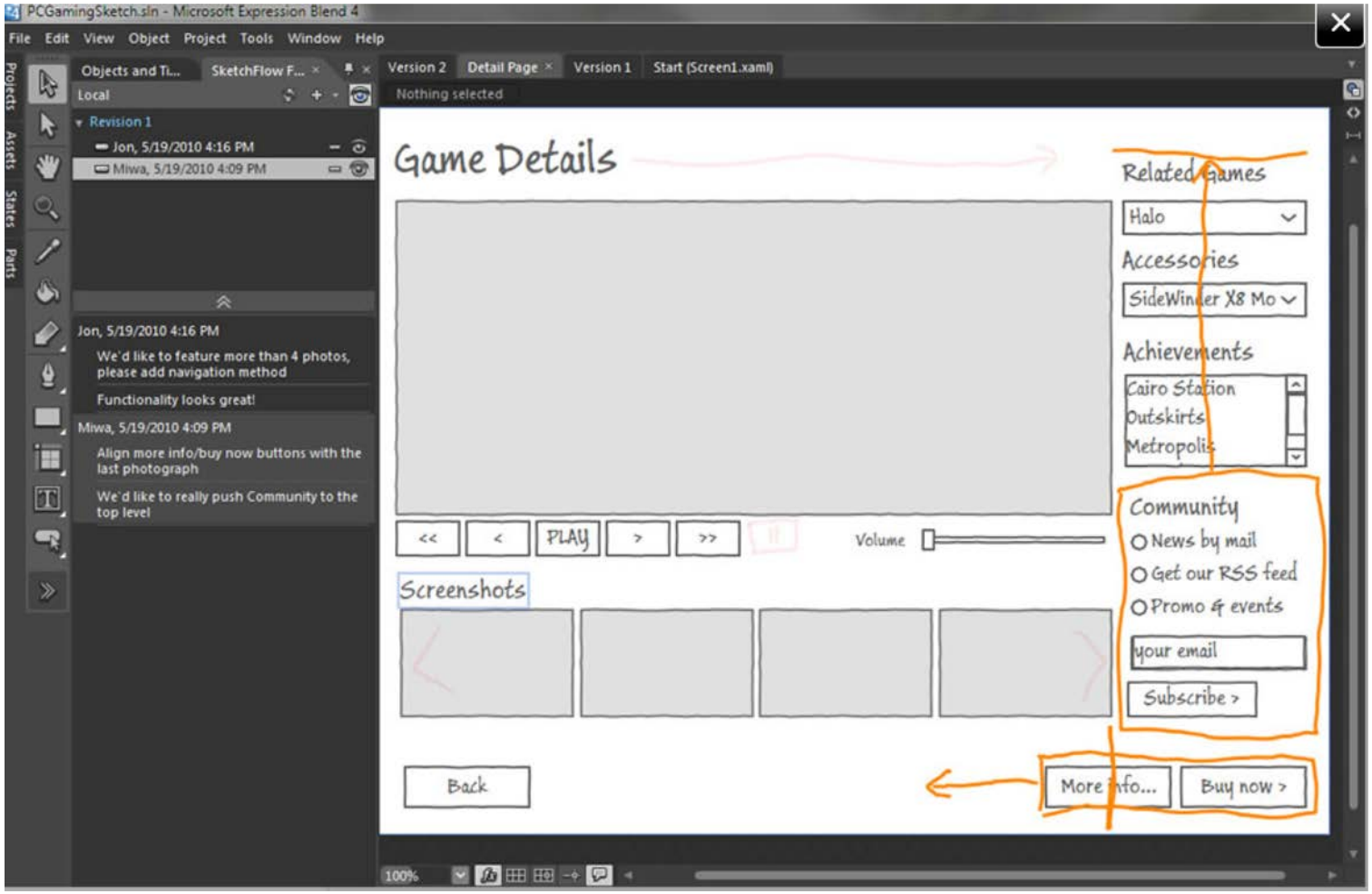
Pencil

- http://pencil.evolus.vn/en-US/Home.aspx
- Similar to Balsamiq
- Open-source
- Works with Firefox or as an app
  - OSX
  - Windows
  - GNU/Linux



Microsoft SketchFlow

- http://www.microsoft.com/Expression/products/SketchFlow_Overview.aspx



quick demo

Centrafuse

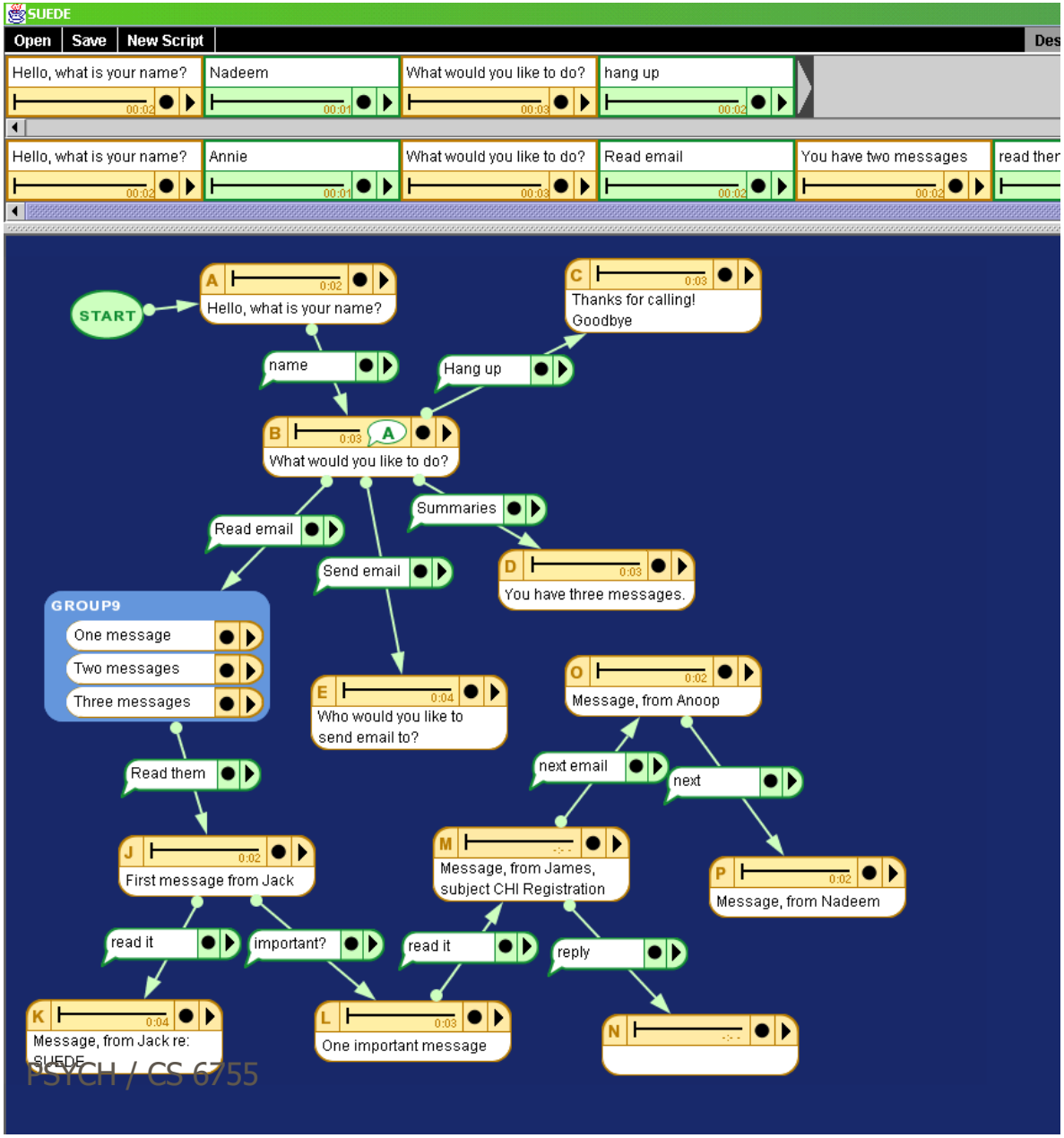

02:06
RADIO
XM
CARTFT.COM
PHONE
DVD
MENU
AC/DC - Rock n Roll Singer
02:07
ENTER


18:53
06.09.08
PARKASSISTENT
VERSION: 0.3.2.0
1,58 m
1,58 m
1,59 m


Getting Started - Playing Media
18:33
00:00 VIDEO
RANDOM
28.8.08
Overal Avg:
0,0 km/h
Total Time:
0:01:07
km/h
0
Driving Avg:
0,0 km/h
Driving Time:
0:00:00
Max Speed:
0 km/h
Elevation: 0 m
N
Stopped Time:
0:01:07
Odometer: 0,0 km
Reset Trip Computer

Audio Interface (Telephony) Builder Tools

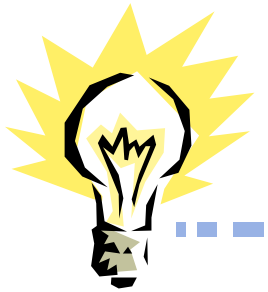
- SUEDE - flow-chart speech interface dialogue
  - Landay et al.
- For wizard-of-Oz studies
- Could be used to drive real system
- http://dub.washington.edu:2007/projects/suede/



Prototyping "Enhancements"

- Wizard of Oz - Person simulates and controls system from "behind the scenes"
  - Use mock interface and interact with users
  - Good for simulating system that would be difficult to build

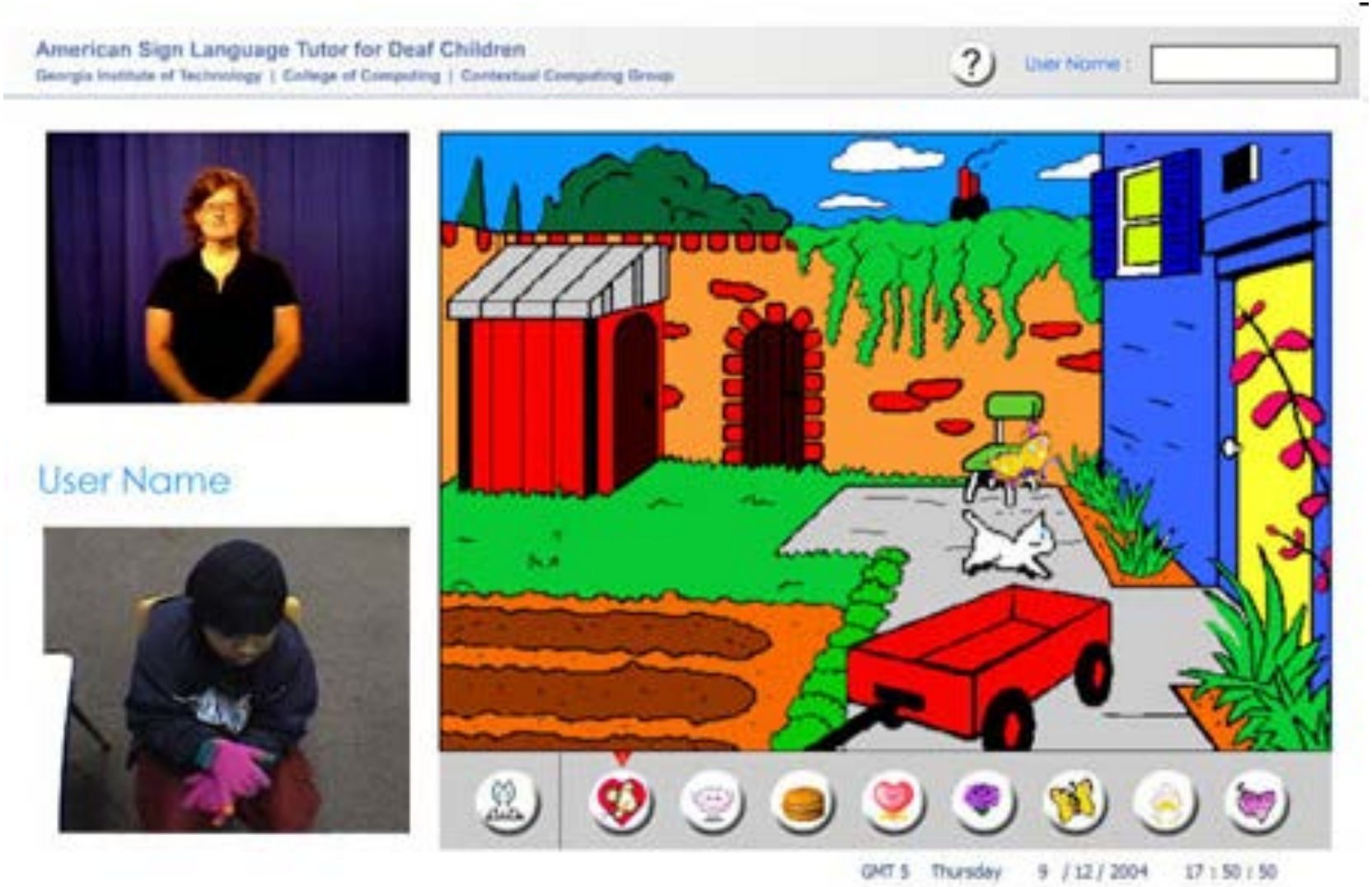
Can be either computer-based or not



Wizard of Oz

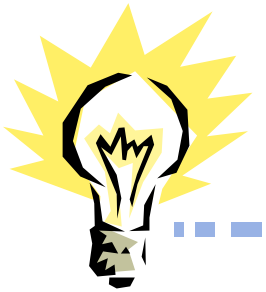
- Method:
  - Behavior should be algorithmic
  - Good for voice recognition systems and non-traditional interfaces
- Advantages:
  - Allows designer to immerse oneself in situation
  - See how people respond, how to specify tasks

Starner's CopyCat – Wizard of Oz



AR Façade – Wizard of Oz

http://www.interactivestory.net/



Review of Prototyping Concepts

Early

Horizontal

Vertical

Vertical

Late

Low-fidelity

Medium-fidelity

High-fidelity

Sketches, mock-ups

Scenarios

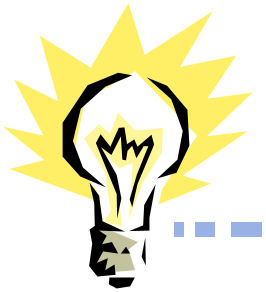
Storyboards

Slide shows

Simulations

System prototypes

Wizard of Oz



Prototyping Summary

- Research research research
- Tradeoffs of simplicity, manageability
- Veracity
- Interactiveness
- Up-front costs vs. down the road costs

- Key: Don't let the prototyping environment drive or constrain your creativity!!