Tools for Hi-Fi Prototyping and Web Design

CS 147

November 6, 2006

Macromedia Flash

Interactive Vector Graphics, Line Drawing, and Animation

Basics

- Flash was created as an animation tool, but works quite well for hi-fi prototypes
- Everything follows an animation metaphor
  - A "stage," frames and key frames, motion tweening...
- ActionScript used for programming

Drawing in Flash

- Comes with an extensive set of drawing tools
- Can aggregate drawings into Symbols and Movie Clips
  - These are the bread and butter of interactive elements
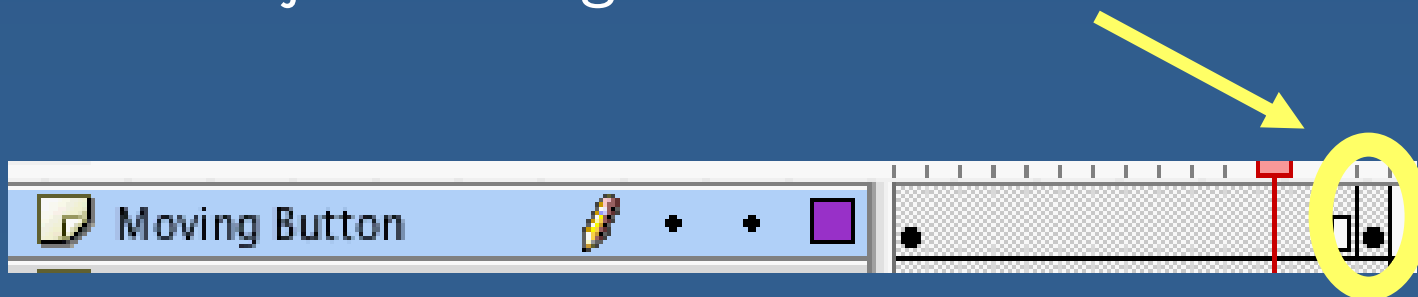- Layers (a la Photoshop)

To Make Something Move

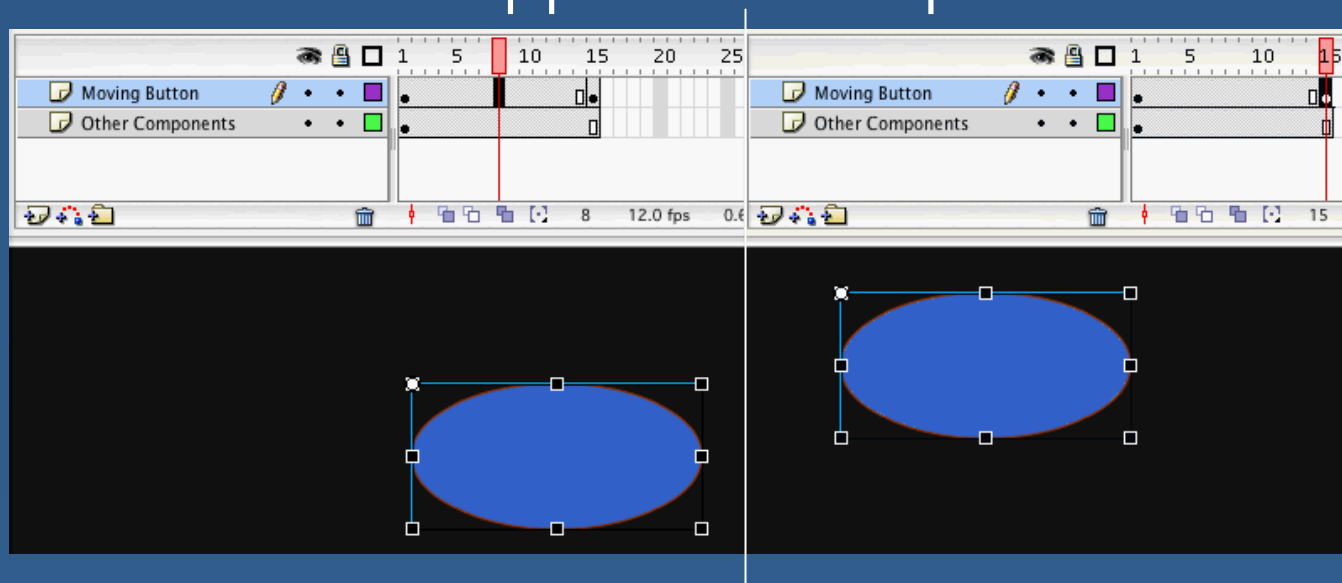- Create a layer for the object

- Add a keyframe at the time when you would like the object to begin and finish its movements

To Make Something Move

- Select each keyframe and move the object to where it should appear at that point
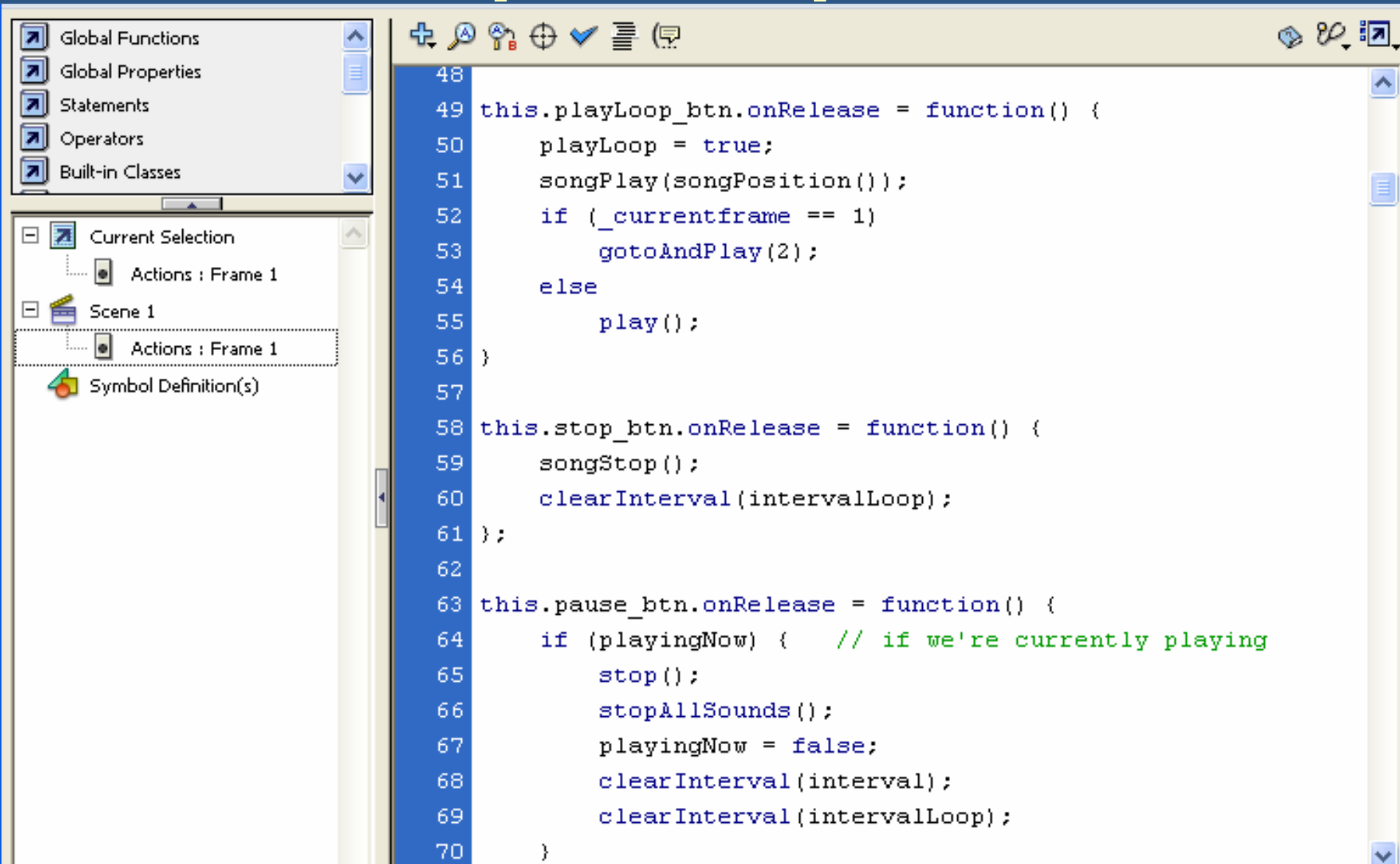

- Tell it to Motion Tween

ActionScript

- Adds interactive functionality to your project
- Variant of Javascript
  - Untyped variables (type 'var')
  - Silent errors – no indication you've screwed up
  - Large library of built-in functions
    - Sounds
    - Movie Clips
    - Animation
    - Math, Geometry, etc.
- Good style: Always put code in a separate "Action" layer, in frame 0

ActionScript Example

```
48
49  this.playLoop_btn.onRelease = function() {
50      playLoop = true;
51      songPlay(songPosition());
52      if (_currentframe == 1)
53          gotoAndPlay(2);
54      else
55          play();
56  }
57
58  this.stop_btn.onRelease = function() {
59      songStop();
60      clearInterval(intervalLoop);
61  };
62
63  this.pause_btn.onRelease = function() {
64      if (playingNow) {    // if we're currently playing
65          stop();
66          stopAllSounds();
67          playingNow = false;
68          clearInterval(interval);
69          clearInterval(intervalLoop);
70      }
```

Global Functions
Global Properties
Statements
Operators
Built-in Classes

Current Selection
    Actions : Frame 1
Scene 1
    Actions : Frame 1
Symbol Definition(s)

Project Examples

- Interactive Academic Planner

- Tone Deaf Revolution

- Chef--

- FEEDBack

- TeamShare

When to Use Flash

- Front-end looks are what you care about
  - Computational needs are somewhat minor
- Your product is an "interactive movie"
  - Potentially involves symbols that move or animate in response to users' actions
  - Contains many screens
- You're looking to craft an interface that would be difficult to create using most typical interface builders like Java Swing

Flash Resources

- Online Tutorials http://www.macromedia.com/support/flash/tutorial_index.html

- Ron & Bjoern's Flash MX Tutorial: http://cs147.stanford.edu/flashmx

Microsoft Visual Basic
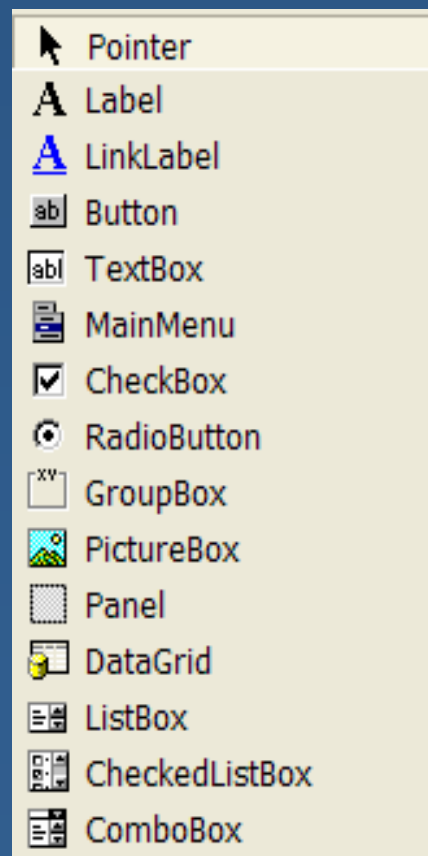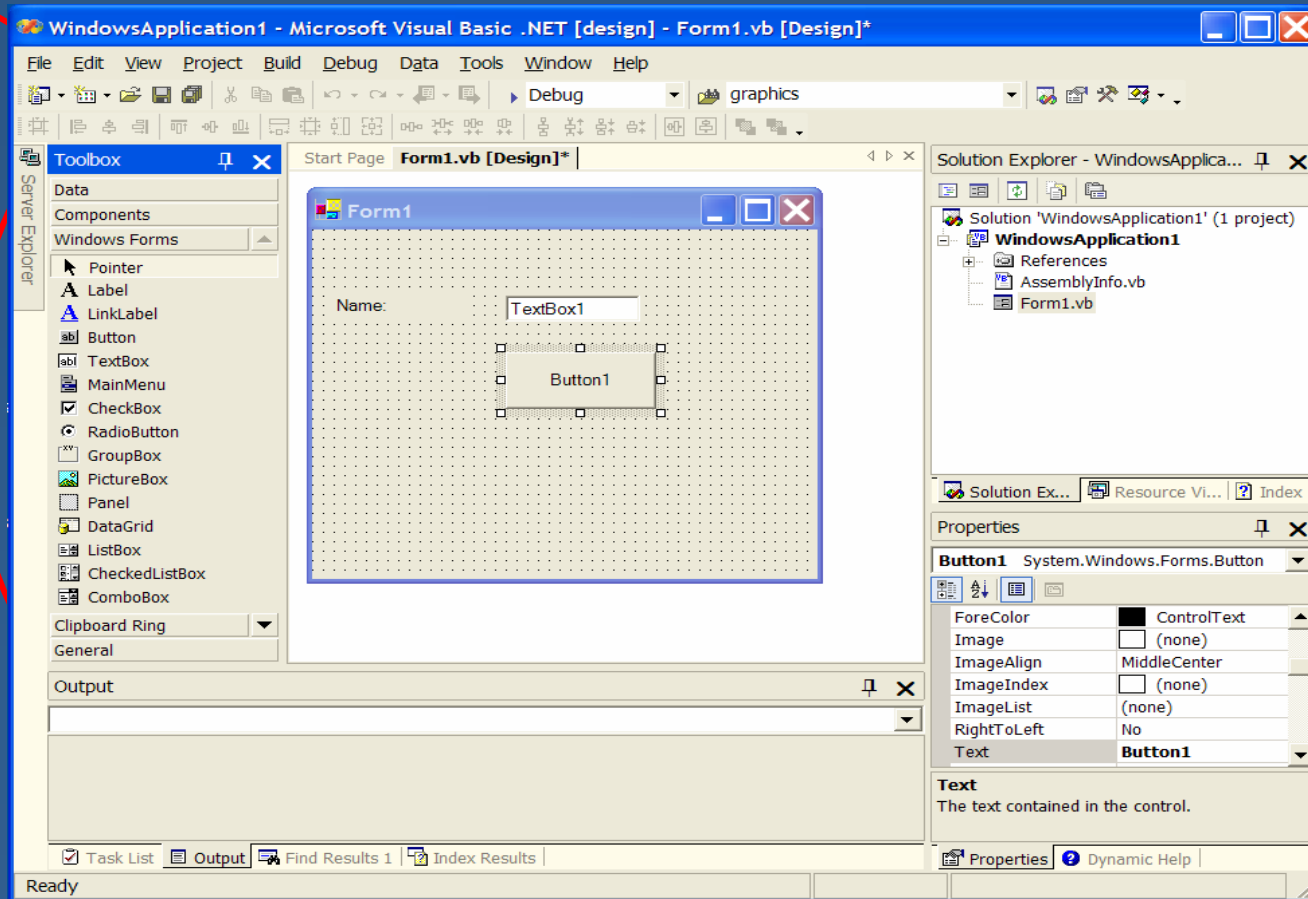
A Graphical Programming Environment and UI Designer

What is Visual Basic?

- Programming environment based on the BASIC language
- One of the first languages to include a visual interface editor that behaves similar to a paint program

Pointer
Label
LinkLabel
Button
TextBox
MainMenu
CheckBox
RadioButton
GroupBox
PictureBox
Panel
DataGrid
ListBox
CheckedListBox
ComboBox

VB Screenshot

VB Basics

- Without worrying about syntax details, VB programmers can add a substantial amount of code by dragging and dropping controls, such as buttons and dialog boxes, and then defining their appearance and behavior

- Event-driven: each object can react to different events, such as a mouse click or key press, with custom event handling code

VB Basics

- Each VB project has two components, form and associated code. The form defines the layout of the widgets, and the code describes how they behave.

- Double-clicking on a widget brings you to the code specifying the behavior of that widget that runs in response to each event that it can trigger.

Pros and Cons

+ A full programming language, better than Flash for tasks involving real computation

+ Large library of built-in interface widgets

+ Easy to get started compared to Java or C++

- Prototype won't run on the web (compiles to a Windows executable)

- Not as easy to do animation and interactive graphics

- Standard widgets mean less flexibility in design: your prototype will look like every other Windows application

Project Examples

- Teacher Organizer
- Physician Order Entry

When to Use VB

- Your application uses fairly standard interface widgets (buttons, sliders, scroll bars, combo boxes)

- Your system requires some back-end computation for which Flash is ill-suited

- You want to build a "real" Windows application that Windows users can download and install

VB Resources

- Online tutorial for beginners: http://www.vbtutor.net/

- Lots of good VB examples with source code: http://pages.cpsc.ucalgary.ca/~saul/vb_examples/

Web Programming

Client and Server
Side Solutions for
Interactive Web
Content

Ways to Make Web Pages Interactive

- Client-side technologies: DHTML using Javascript, DOM

- Server-side technologies: PHP, CGI scripting (Perl/Python), database integration (mySQL), Java servlets, ASP/VBScript

"Plain" HTML

- A simple mark-up language used to create web documents

- HTML is not a programming language; no built-in interactivity

- CSS (Cascading Style Sheets) can be used with HTML to create formatting for Web pages

Dynamic HTML (DHTML)

- A group of technologies used to create interactivity on web pages, such as changes that occur from mouse actions

- The DOM (Document Object Model) interface used in modern browsers allows programs and scripts to dynamically access and update the content, structure and style of documents; results of processing can then be incorporated back into the presented page

Javascript

- A scripting language, originally created by Netscape, that can be embedded into the HTML of a web page to add interactivity

- Simplified, less structured version of Java

- Can interact with HTML, changing page dynamically in response to user input

- Timers, event handlers, form validation, animation, etc.

CGI (Common Gateway Interface) Scripts

- Small programs written in a language like Perl (most common), Python, C or C++

- Allow processing of form input, and connect HTML pages to other programs on the Web server; can be used to dynamically generate web pages in response to input

- For example, a CGI script could allow search data entered on a Web page to be sent to a database for lookup, and generate a response page of search results

- CGI script resides on the server and obtains data from the user via environment variables that the Web server makes available to it

PHP: a Hypertext "Preprocessor"

- A server-side, cross-platform, HTML embedded scripting language

- Lets you create dynamic web pages by embedding code directly into your HTML document

- When the server receives a request for a PHP document, it first runs the PHP code in the document, and then delivers the document to the client

- You can create and edit PHP documents the same way you normally create regular HTML pages

Web Programming Pros and Cons

+ Easy to get lots of users to test your application

+ Initial layout can be done in HTML, which you are probably already familiar with

+ Useful to learn, since more and more programs are becoming web-based

- Web was not initially designed to be interactive, so programming web pages for interactivity can be awkward

- Very limited collection of standard "widgets"

- Difficult to do animation

- There are still problems with compatibility across browsers and operating systems

When to build for the web

- Your proposed system is intended to be run on the web

- You want to test community-based features and need to recruit a large user community

- You want to integrate your system with a database

Web Project Examples

- [iMenu](#)
- [MyStanford](#)
- [BetterBiking](#)
- [WhereToBe](#)
- [MedTrax](#)

Web Programming Resources

- Web page for CS193i: Internet Technologies
  http://www.stanford.edu/class/cs193i/handoutsSum2004/handouts.html

- CGI Programming in Perl:
  http://www.cgi101.com/book/

- CGI Programming in Python:
  http://www.devshed.com/c/a/Python/Writing-CGI-Programs-in-Python

- Javascript tutorial:
  http://www.w3schools.com/js/default.asp

Java and Eclipse

Full-featured
Programming
Language and IDE

Java Swing
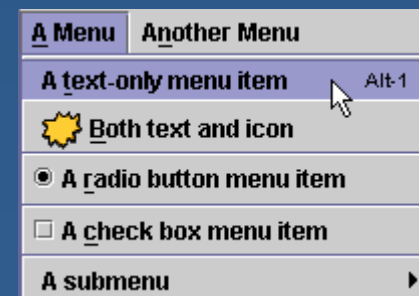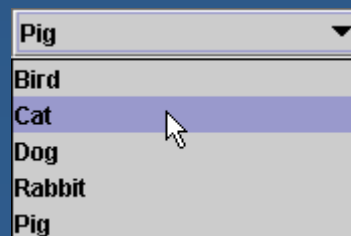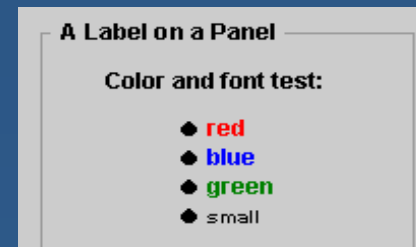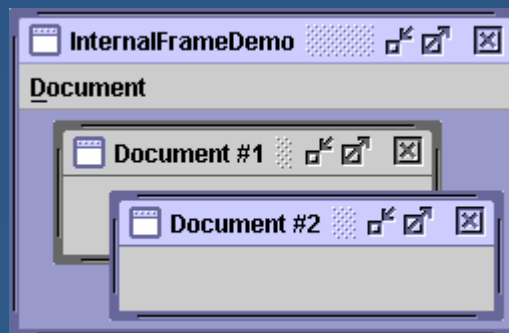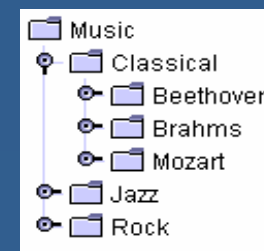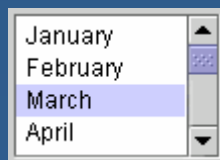
Pros and Cons

+ Your app will use the standard widgets

- Your app will use the standard widgets (hard to make something that doesn't just look like a standard application). Flash might be better in this case.

- Easy to get sucked into coding non-interface things (hooking it up to databases, etc...). We don't want you to do this.

Eclipse

Should have seen this before CS 147. If not...

If you are coding in Java, we highly recommend using Eclipse (http://eclipse.org)

Many useful features

- Ctrl-1 (to suggest fixes for broken code)
- Ctrl-Space (intelligent auto-complete)
- For more productivity tips:
  http://www.javaworld.com/javaworld/jw-08-2005/jw-0829-eclipse.html

Using Swing

Online documentation for UI code:
http://java.sun.com/docs/books/tutorial/uiswing/index.html

Eclipse has a Visual Editor (installed separately) which allows you to drag and drop GUI elements, but we don't think it is that useful.

If you are really interested:

http://www-128.ibm.com/developerworks/library/os-ecvisual/

Eclipse Visual Editor

Again, you have to understand something about writing GUI code even make sense of the visual editor (so we don't recommend it)...
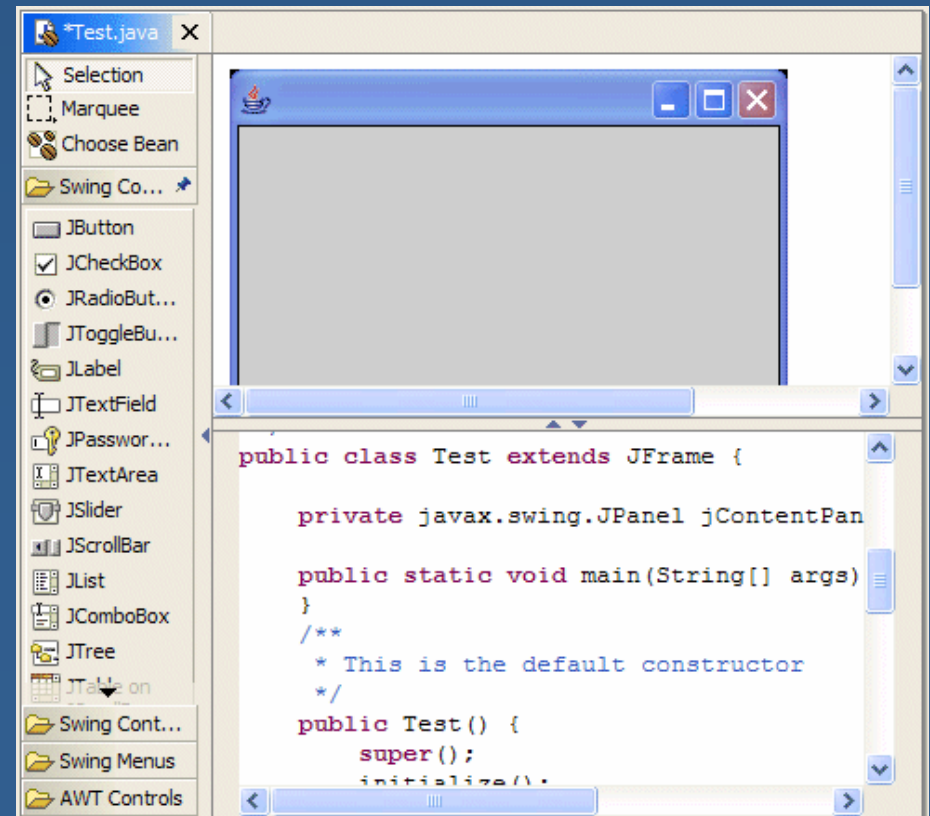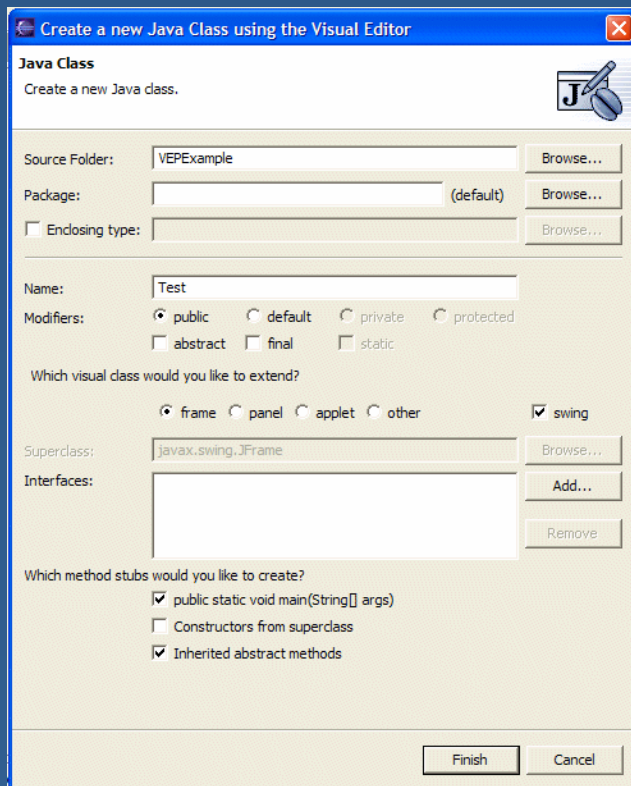
Java Examples

- [N](#)
- [The Familiar: A Magic Deckbuilding Aid](#)
- [DigitalNotes](#)
- [SleepSoft](#)

Mobile Phone Programming

J2ME and BREW

Mobile Programming Pros and Cons

- Pros

    - Realistic look and feel

    - Phone interface built-in to the emulator

    - Familiar programming languages (Java or C++)

- Cons

    - May be too much depth and capabilities

    - Can get bogged down in backend programming

    - New API to learn

J2ME   vs.   Brew

- Java-based
- Download Netbeans or Eclipse; JRE SDK; Netbeans Mobility Pack; and J2ME Wireless Toolkit
- Information: http://java.sun.com/j2me/index.jsp
- Download: http://www.eclipse.org/ or http://www.netbeans.org/

- C/C++ natively
- Supports Java and XML
- Supported on QUALCOMM CDMA
- Information: http://brew.qualcomm.com/
- Download: https://brewx.qualcomm.com/brew/sdk/download.jsp?page=dx/3.1

Netbeans Visual Designer

Screens
- Alert
- Form
- List
- TextBox

Commands
- Back Command
- Cancel Command
- Exit Command
- Help Command
- Item Command
- Ok Command
- Screen Command
- Stop Command

Form Items
- ChoiceGroup
- DateField
- Gauge
- ImageItem
- Spacer
- StringItem
- TextField

Elements
- Choice Element
- List Element
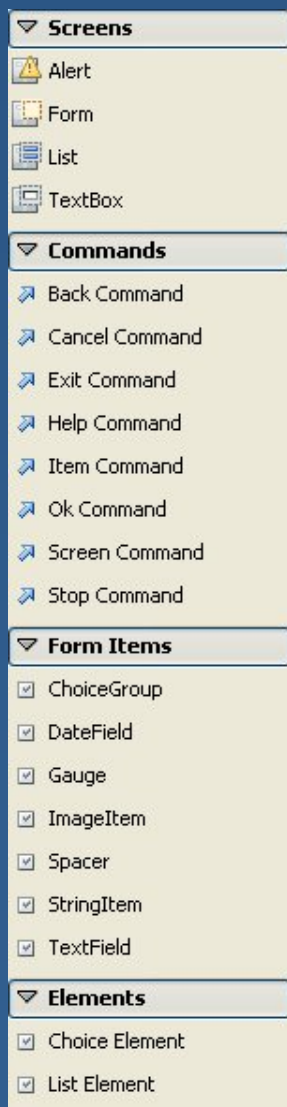
- **Screens**
  - The different types of screens available to use
- **Commands**
  - Correspond to the two "special function" buttons on your phone
  - Can be applied to the entire form
  - Can be applied to individual form items such that the command is only visible when that form item is selected
- **Form Items**
  - The various UI controls available in J2ME
- **Elements**
  - Choice and list elements correspond to the ChoiceGroup form item
  - To make a radio button, you need to insert elements into a ChoiceGroup

Example screen items

- Form title
- String item
- Spacer
- DateField
- ChoiceGroup
- ChoiceElements
- Commands

History of Web Development

Learning Goals

- Be familiar with the kinds of interactive techniques that have been and can be used on the web

- Know the different technologies that are used for web development

- Understand how the basic principles of interaction design are applied in real-world web design

A Brief History of Web Interfaces

- Protocols
  - There is a stack of layers from low level (close to the machine) to higher (closer to user purposes)
- Formats
  - Readability vs. efficiency
  - Open vs. proprietary
- Tools

Arpanet (1968)

- Goals
  - Remote use of computers
  - Robustness in face of computer and communications failures
    - Decentralized architecture
    - End-to-end reliability
- Unexpected major uses
  - Human-to-human communication
  - Commerce

The Internet (1982)

- Formats
  - Domain names (e.g., `hci.stanford.edu`)
  - Email message format
  - ...
- Internet Protocols
  - IP/TCP: Internet Protocol / Transmission Control Protocol
  - FTP: File Transmission Protocol
  - SMTP: Simple Mail Transmission Protocol
  - ...
- Later Research Protocols at a Higher Layer
  - Gopher
  - WAIS: Wide Area Information Server
  - ...

SMTP Protocol Example

```
S: 220 www.example.com ESMTP Postfix
C: HELO mydomain.com
S: 250 Hello mydomain.com
C: MAIL FROM: <sender@mydomain.com>
S: 250 Ok
C: RCPT TO: <friend@example.com>
S: 250 Ok
C: DATA S: 354 End data with <CR><LF>.<CR><LF>
C: Subject: test message
C: From: sender@mydomain.com
C: To: friend@example.com
C:
C: Hello,
C: This is a test.
C: Goodbye.
C: .
S: 250 Ok: queued as 12345
C: QUIT
S: 221 Bye
```

Precursors of the World-Wide Web

- Hypertext in general
  - Proposed by Vannevar Bush in 1945, implemented by Engelbart and others in the 60s
- Hypertext with images and actions
  - Hypercard, 1987
- Internet addressing
  - Domain and mail addresses from Internet Standards
- Markup Languages
  - SGML: Standard Generalized Markup Language (for documents), started in the 1970s
- Stateless protocols
  - Server doesn't need to keep track of multiple clients

Basic Hypertext Web (Berners-Lee, 1991)

- Formats:
  - URL: Uniform Resource Locator (or Universal Resource Locator)
    - How you identify an object anywhere on the web
    - E.g., "`ftp://hci.stanford.edu/documents/slides.gif`"
  - HTML: Hypertext Markup Language
    - How you specify what you want to appear on the page
- Protocols:
  - HTTP: Hypertext Transport Protocol
    - Stateless communication between browser and server
      - Basic model is sending independent "pages"
      - Requests, responses, status codes,...
        - E.g., "`HTTP/1.0 404 Object Not Found`"
- Browsers and Servers

The First Known Web Page
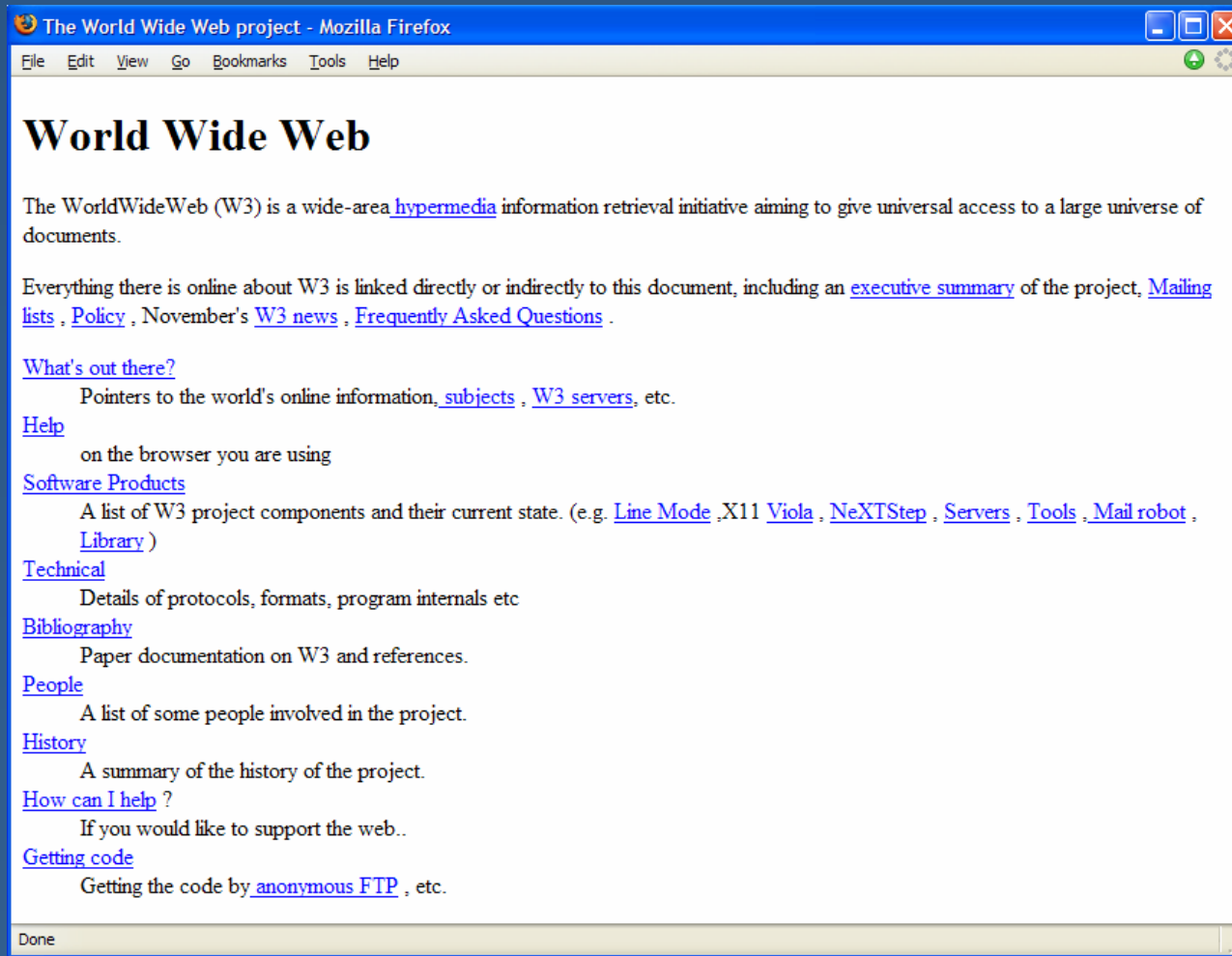
HTML Format

```html
<HTML>
<HEAD>
<TITLE>SGML METADATA FORMAT</TITLE>
<meta HTTP-EQUIV="Content-Type" content="text/html; charset=ISO-8859-1">
<meta name="DC.Description" content="">
<meta name="Keywords" content="">
</HEAD>
<BODY BGCOLOR="#FFFFFF">
<H1><CENTER>ANZLIC Metadata - SGML Format</CENTER>
</H1>
<H2>What is SGML?
</H2>
<P>
<A HREF="http://www.sgmlopen.org">Standard Generalized Markup Language</A>,
also known as SGML, became an International Organisation for Standardisation
(ISO) standard in 1985.  It is used to define the structure of
electronic text files or documents. It is concerned primarily
with structure and not with the content of the document.  <BR>
<P>
It consists of text contained within a series of
fields called elements which are defined by markup tags at the
beginning and end of each field. These tags are contained within
triangular brackets, &lt;&gt;.  The beginning and ending tag contain
the same name however the ending tag name is preceded by a forward
slash, /. <BR>
<P>
SGML is designed primarily for defining the structure
of electronic documents and not for direct viewing by the user.
 But if you did look at an SGML file, what would it look like?
Below is an example of an extract from an SGML document:<BR>
<P>
 &lt;anzmeta&gt;</FONT>
```

53

Lynx Text-based Browser

Main Page | Recent changes | View source | Page history

Printable version | Disclaimers | Current revision
Not logged in
Log in | Help
_____ Go   Search

Main Page

   (Revision as of 01:45, 24 Feb 2004)

   Welcome to Wikipedia, a multilingual, free-content encyclopedia. We
   started in January 2001 and are now working on 213185 articles in the
   English version. To learn how you can edit any article right now,
   visit the Community Main Page or experiment in the sandbox.

      Please let us know what you think about our new Main Page on its
                           discussion page!

Featured article

   Irish Houses of Parliament

   The Irish Houses of Parliament was the world's first purpose-built
   two-chamber parliament house. It served as the seat of both chambers
   of the Irish parliament of the Kingdom of Ireland for most of the
   eighteenth century until that parliament was abolished in the Irish
   Act of Union in 1800.

   Recently featured: Peerage - Electoral College - Rudyard Kipling

                                  More featured articles...

A day in history

   Pope Gregory XIII

   On February 24:
     * 1582 - Pope Gregory XIII announced the Gregorian calendar.
     * 1803 - Marbury v. Madison established judicial review in the U.S.
     * 1917 - The intercepted Zimmermann Telegram was delivered to U.S.
       authorities, complicating World War I.
     * 1999 - Arizona executed German national Karl LaGrand.

   Recent days: February 23 - February 22
(NORMAL LINK) Use right-arrow or <return> to activate.
  Arrow keys: Up and Down to move. Right to follow a link; Left to go back.
 H)elp O)ptions P)rint G)o M)ain screen Q)uit /=search [delete]=history list

Adding Images: Mosaic (1993)

Beyond Read-only (1995)

- Server-side scripting
- Standard form elements
  - Text
  - Checkbox
  - Radio button
  - Pull-down list
- WYSYWIG Web editors
- Browser plug-ins
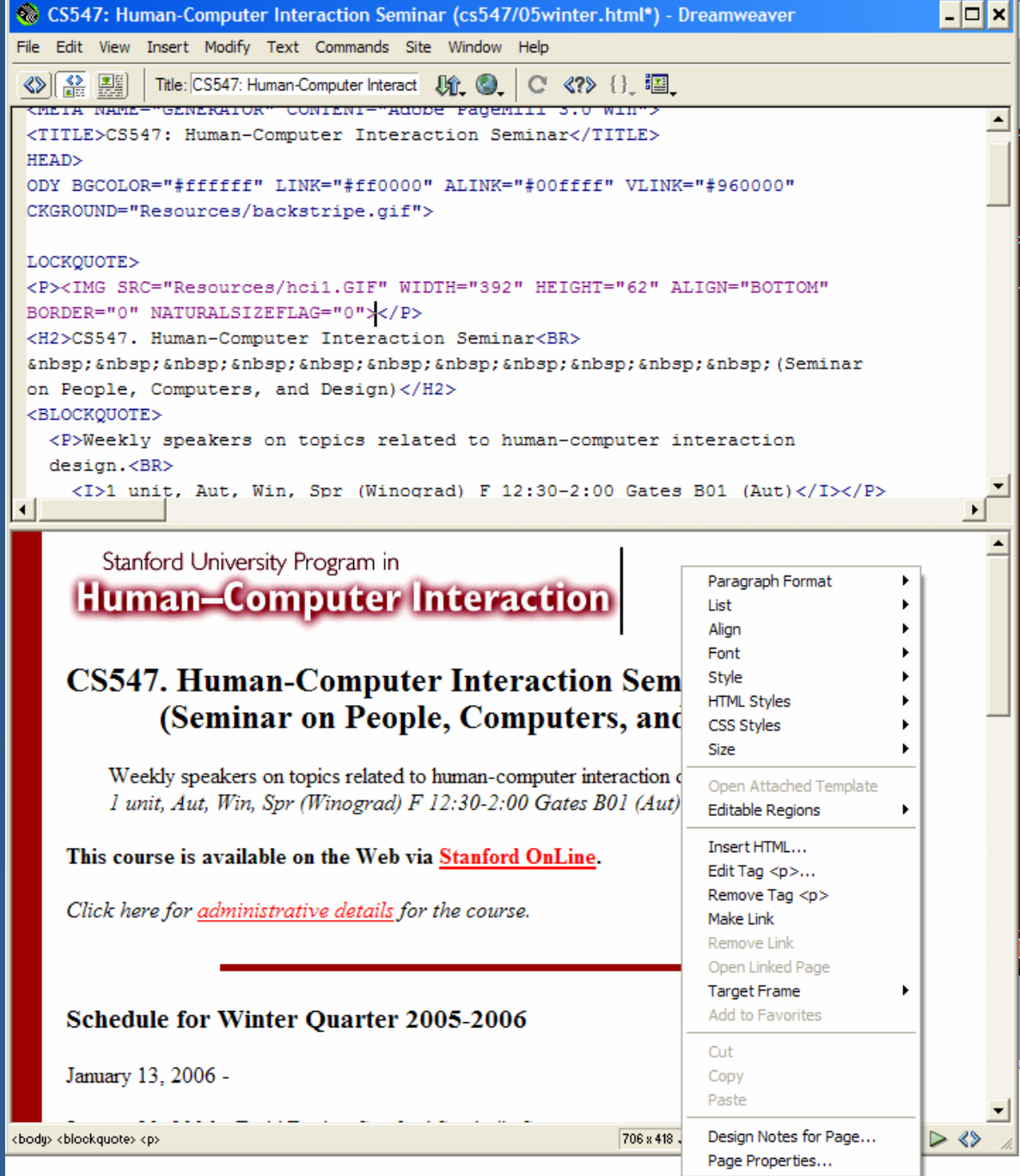
WYSYWIG HTML Editing (Dreamweaver, FrontPage)

Getting Interactive

- Java Applets
  - Run as an independent program, inside the browser
  - Not connected to the rest of the HTML, etc.
- Javascript (not related to the Java language!)
  - Programs that run in your browser between contacts with a server (Client-side scripting)
  - Event/object-driven language (like HyperTalk, 1987, and others)
- DHTML: Dynamic HTML
  - DOM: Document Object Model
    - Uniform way to access and modify elements of the document and display
    - Separation of model from presentation
  - CSS: Cascading Style Sheets: Presentation specification through hierarchy of templates and classes

Getting More Interactive – RIA: Rich Internet Applications

- Director / Flash
  - Proprietary standards and mechanisms for interactive and animated content

- AJAX: Asynchronous Javascript and XML
  - Style of programming that combines advantages of server and client side processing
  - Used to develop

- XML: Extensible Markup Language
  - Standard way to easily handle content formats

- XUL: XML User Interface Language
  - Provides programming control over Firefox browser elements

Issues in Bringing Interactivity to the Web

- Latency - Time to get the next action done
  - Page loading time can be slow and/or unpredictable
  - Bandwidth limitations slow down large transfers
- Directness - Operating on the object
  - e.g., drag and drop
- State management – Keeping context across sessions
  - Cookies and logins
- Compatibility
  - What is usable across browsers and OS platforms?
- Security – Protecting you from bad guys
  - What can a web site do to your browser and the rest of your machine?
    - Sandboxing
  - How can information be protected from interception
    - Secure HTML, HTTP, etc.

Designing for the Web:
An Introduction

Material based on James Landay, Jason Hong, and Scott Klemmer's UC Berkeley continuing education course "User Interface Design, Prototyping, and Evaluation"

Good Website Design Matters

- NY Times, Aug 30 1999, on IBM Web site
  - "Most popular feature was ...search ...because people couldn't figure out how to navigate the site"
  - "The second most popular feature was the help button, because the search technology was so ineffective."
- After redesign:
  - use of the "help" button decreased 84 percent
  - sales increased 400 percent

Web Design Specialties

- Graphic Design (Visual Design)
  - Visual communication of information using elements such as color, images, typography, and layout.
  - Page-oriented
- Information architecture
  - Information design
    - identifying groups of related content and structuring information into a coherent whole.
  - Navigation design
    - the design of methods of finding one's way around the information structure
  - Site oriented

Outline

- Web Design Process, Specialties & Artifacts
- Detailed Design Example
- Web Design Patterns

Web Design Process
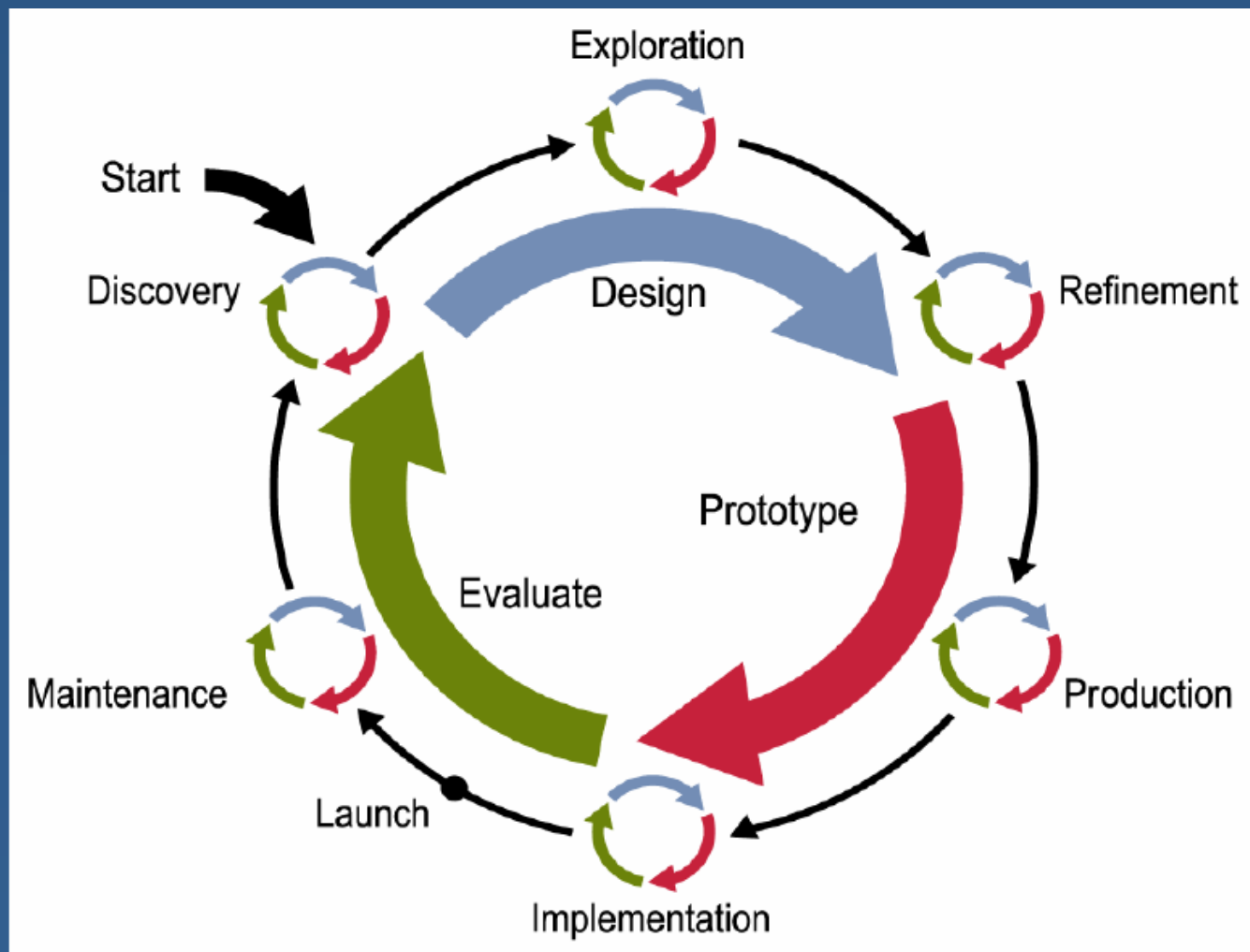
Design Specialties
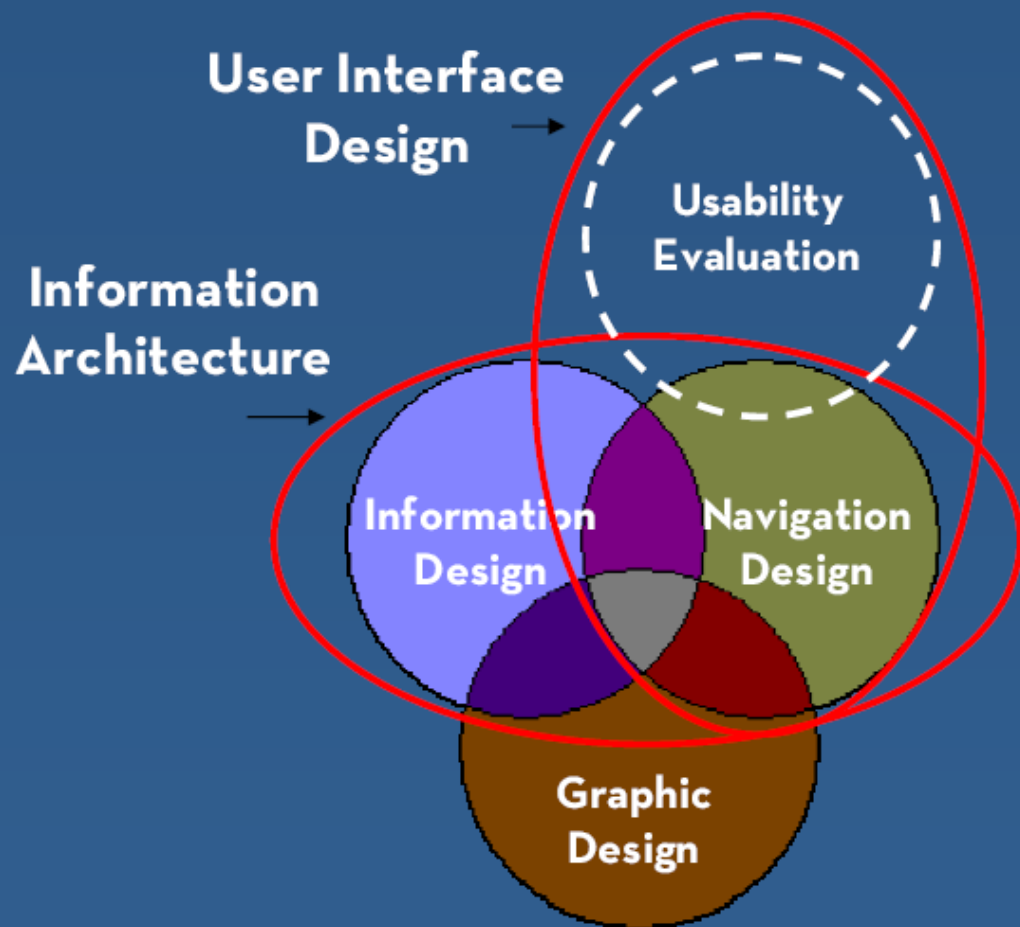
- Information Architecture
  - encompasses information & navigation design
- User Interface Design
  - also includes testing & evaluation

Artifacts of Design Process

- Designers create representations of sites at *multiple levels of detail*

- Web sites are iteratively refined at all levels of detail

Site Maps
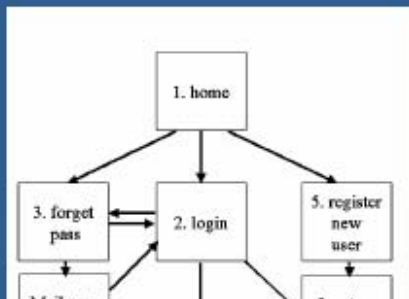
Storyboards

Schematics
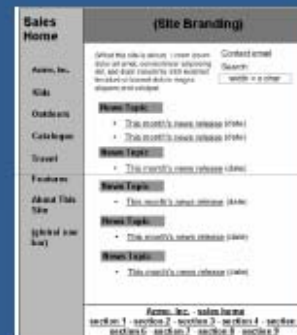
Mock-ups
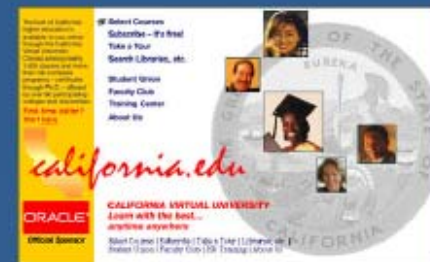
Site Maps

- High-level, coarse-grained view of entire site
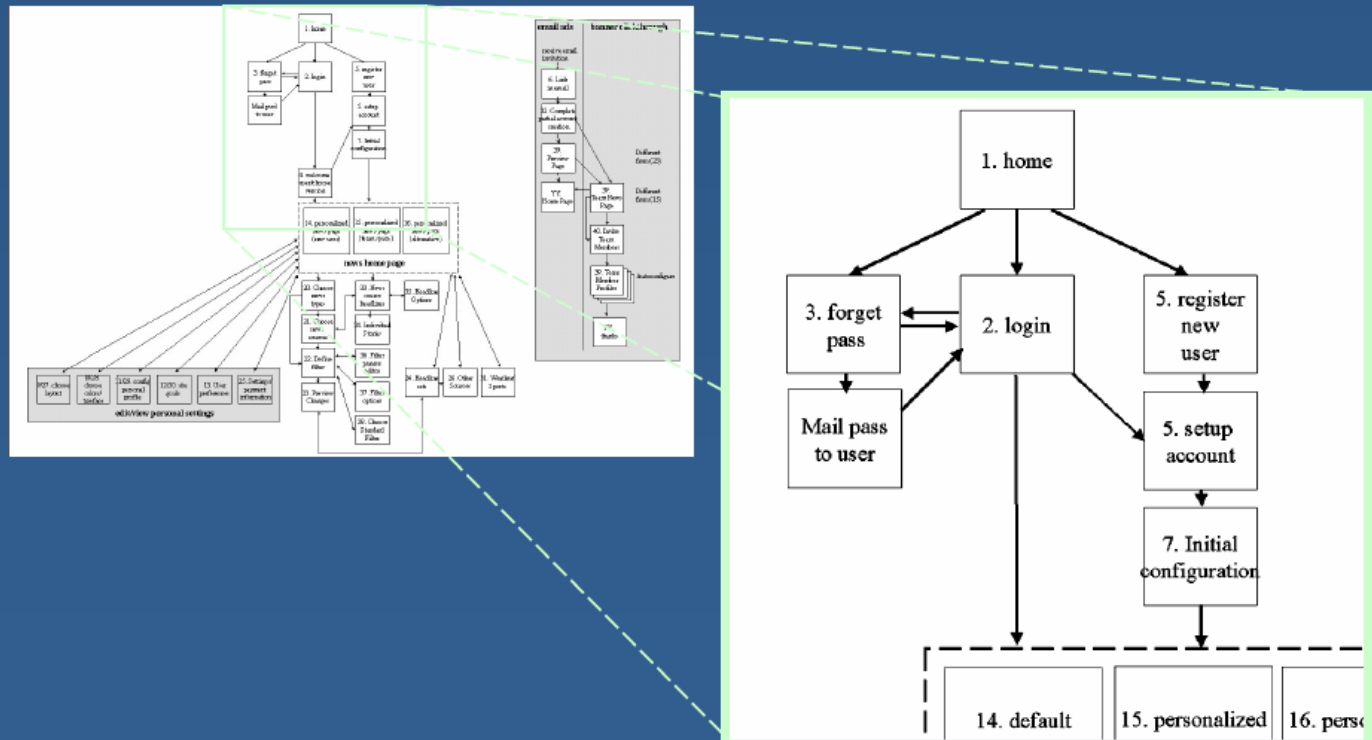
Storyboards

- Interaction sequence, minimal page level details

Schematics

- Page structure with respect to information & navigation

Mock-ups

- High-fidelity, precise representation of page

NEW: Counting Crows: *Hard Candy* $11.88 Save 37%!

my account · cart · help · ebaY home · sign in

| Home | Books | Music | DVDs/Movies | Video Games | Computers & Software | Electronics | Everything Else... |

Gift Certificates | Wish List | Pre-Orders | Sell Your Stuff | New Users

Search: All Categories [ ] go

The Smartest Place to Buy and Sell *Books, Music, Computers, Electronics, DVDs & more...*

New CD Releases!
only **$11.88**

▶ More Hot New Releases!

Welcome
Learn about Buying
Learn about Selling
Register Now!
Announcement Board
Updated Jun 13, 2002

DESKTOP LIQUIDATION CENTER as low as $249!

Categories

Books
Textbooks, Fiction, Biography, Cooking, Business, & more...

Music
Rock, Hip Hop/Rap, Country, Pop, eBay items, & more...

Movies/DVDs
Action, Comedy, Children's, Romance, Animation, & more...

Games
PS2, Xbox, GameCube, Dreamcast, N64, & more...

Music

Red Hot Price for the Chili Peppers' New CD: $11.88!
Evolving after the popularity of *Californication*, the Chili Peppers release a new album featuring the hit song "By the Way".

In-Stock Now!	Our Price	List Price
Weezer, Weezer	$6.99	$18.97
Gutterflower, Goo Goo Dolls	$9.00	$18.98
The Slim Shady LP, Eminem	$2.98	$18.97
Echoes, Pink Floyd	$11.54	$24.97
18, Moby	$10.99	$18.98

Movies

Just Released: *The Royal Tenenbaums* for $18.45
Wes Anderson (*Rushmore*) directs a motley crew of talented actors in this hysterical comedy about the rise and fall of an eccentric family.

In-Stock Now!	Our Price	List Price
Monster's Ball (DVD)	$11.25	$24.99

Advance Orders

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– **examples of SITE BRANDING (E1)**

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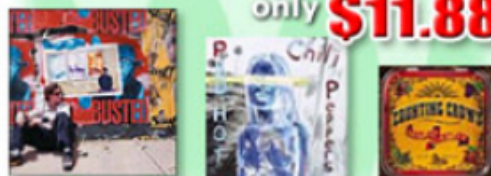
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Our best price: $6.99
List Price: $18.97 (Save: $11.98)

Actual items for sale may vary from this image.

Find out more...
Full product info, Product Reviews

Not ready to buy?
Add to your Wish List, Preorder this item, May we also suggest...

Compare our Prices!

Half.com	$6.99
CDNOW	-- --
AlphaCraze	$ 15.66◀
CDUniverse	$ 15.69

Product Highlights

CD
May 2001

List Price: $18.97
28 minutes
UPC 606949-30452-2
Geffen Records
Catalog 493 045

Standard shipping (USPS Media Mail) for this item is $2.30.

About this album:
▶ Song List
▶ Album Credits
▶ Album Notes
▶ Editorial
▶ Customer Reviews

About the Artist
▶ Other Works

Spread the Word:
▶ Write a Review
▶ Email a Friend

Like New Sorted by **Price**

74 items in stock

Price	Total Price	Seller (Rating)	Seller Comments	
$7.75 **Buy!**	$10.20 Media Mail	custodian46 (149) ⭐	best buy	More info...
$8.00 **Buy!**	$10.45 Media Mail	stargaze13 (3)	Disk, case, and liner all in excellent c more...	More info...
$8.25 **Buy!**	$10.70 Media Mail	dazzyliz (1205) ⭐	SEALED NEW BMG	More info...
$▒ **Buy!**	Media Mail	▒@hotm (35) ⭐	▒ condition	info...

Very Good Sorted by **Price**

Price	Total Price	Seller (Rating)	Seller Comments	
$8.00 **Buy!**	$10.45 Media Mail	lucidsky (14) ⭐		
$8.84 **Buy!**	$11.29 Media Mail	steveeg1 (82) ⭐		
$9.00 **Buy!**	$11.45 Media Mail	saint.timothy (18) ⭐	Great shape...first class ship	More info...

- **The Fold**
  – **Hmm, what's below here?**

2

may we also suggest...

» People who bought **"Weezer (2001)"** also bought:

Weezer (1994) CD, Release Year: 1994
Weezer
Save **$6.97** - Best price: **$5.00**

Pinkerton CD, Release Year: 1996
Weezer
Save **$10.95** - Best price: **$6.00**

Hybrid Theory CD, Release Year: 2000
Linkin Park
Save **$11.68** - Best price: **$6.29**

About this album

Song List
1. Don't Let Go
2. Photograph
3. Hashpipe
4. Island In The Sun
5. Crab
6. Knock-Down Drag-Out
7. Smile
8. Simple Pages
9. Glorious Days
10. O Girlfriend

Album Credits
Ken Allerdyce, Engineer
Ric Ocasek, Producer

- **Impulse buy**
  - **PESONALIZED RECOMMENDATIONS (G3)**
- **About this album**
- **Lots of unused space**
- **Still more info below...**

Album Notes

Weezer: Rivers Cuomo (vocals, guitar); Brian Bell (guitar); Matt Sharp (bass); Patrick Wilson (drums). Recorded at Cello Studios, Los Angeles, California in December 2000.In 1994 Weezer burst onto the music scene, reaching platinum status with their debut, and in the process proving that there was still room in an airbrushed MTV world for unrepentant power pop played by decidedly non-airbrushed guys. Following a brief sojourn into semi-deconstructionism, 1997's PINKERTON, the four men who make up Weezer serve up a third offering, WEEZER 2001, returning to the sound and producer of their successful debut. Nowhere does producer Ric Ocasek define his trademark refined power pop style more than with Weezer. Unlike the immediate, obvious pop hooks of the string of singles on the first album, though, the songs on WEEZER 2001 may take a few listens to settle in. However, once the subtle-yet-undeniable refrains of such tracks as "Crab," "Don't Let Go," and first single "Hash Pipe" make their way into your skull, they're there to stay, as furious, fuzzy, layered guitars compliment Rivers Cuomo's raw, vulnerable vocals. While this disc clocks in at less than a half-hour long, it packs more hooky wallop than many double live albums.

Product Reviews

Editorial Reviews

Spin (01/01/2002)
Ranked #9 in Spin's Albums of the Year 2001 … They are the new Cars…Alternative Press (3/02, p.65)
Ranked #13 in AP's 25 Best Albums of 2001…This is the body pop clean…Magnet (#53, p.89) – a beast…Rolling Stone (6/7/01, p.110) – 4 stars…it's a killer…10 excellent tunes in less than half an hour with zero filler and enough psychosexual contortions to buy leader Rivers Cuomo's shrink another hot tub…Q Magazine (8/01, p.123) – 4 stars…Harks back to the keenly observed power pop of their '94 debut, and there isn't…

Customer Reviews

Rated **4.3** out of 5.0 by 29 raters.

» Read Customer Reviews
» Rate this item

- **Is this product any good?**
  - **Editorial reviews**
  - **Customer reviews**
  - **RECOMMENDATION COMMUNITY (G4)**

half.com

by eBay

③

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Weezer (1994)
(CD, 1994)
Weezer
$5.00
(Save $6.97)

Pinkerton
(CD, 1996)
Weezer
$6.00
(Save $10.95)

All Killer No Filler [ECD]
(CD, 2001)
Sum 41, Sum 41
$4.29
(Save $8.68)

Redeeming a Gift Certificate or Coupon?

Proceed to Checkout ⋯⋯
≡ Speedy Checkout

Shopping Cart

Weezer (2001) Weezer, Weezer (Music)
CD, Release Year: 2001
Seller: naojia@hotmail.com (35)
Condition: Like New • Notes: Perfect condition

Item: $8.30

Media Mail: $2.45

(Change Shipping Method)

Move to WishList • Remove from Cart • Find another one

TOTAL: $10.75

Gift Certificates and Coupons

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[   ] Redeem

Proceed to Checkout ⋯⋯
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③

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(CD, 1994)
Weezer
$5.00
(Save $6.97)

Pinkerton
(CD, 1996)
Weezer
$6.00
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All Killer No Filler [ECD]
(CD, 2001)
Sum 41, Sum 41
$4.29
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Speedy Checkout

Shopping Cart

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Condition: Like New • Notes: Perfect condition

Move to WishList • Remove from Cart • Find another one

Item: $8.30
Media Mail: $2.45
(Change Shipping Method)

TOTAL: $10.75

Gift Certificate

Redeeming your Half.com Gift Certificate or Coupon is easy. Just enter your Claim Code in the box...   Redeem

Proceed to Checkout
Speedy Checkout

• **What site am I at?**

  – **Logo in upper-left**

  – **Colors, layout, font**

  – **examples of SITE BRANDING (E1)**

Home | Books | Music | DVDs/Movies | Video Games | Computers & Software | Electronics | Everything Else...

Gift Certificates | Wish List | Pre-Orders | Sell Your Stuff | New Users

Search: [All Categories ▼] [   ] go

People with similar tastes also enjoyed...

Weezer (1994)
(CD, 1994)
Weezer
$5.00
(Save $6.97)

Pinkerton
(CD, 1996)
Weezer
$6.00
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Condition: Like New • Notes: Perfect condition

Move to WishList • Remove from Cart • Find another one

Gift Certificate

Redeeming your Half.com Gift Certificate or Coupon is easy. Just enter your Claim Code in the box and click "Redeem".

Item: $8.30
Media Mail: $2.45
(Change Shipping Method)

TOTAL: $10.75

[   ] Redeem

Proceed to Checkout ••••
⨯Speedy Checkout

- **Cross-selling**
  - **Possibly a pleasant surprise**
  - **Impulse buy**
  - **CROSS-SELLING & UP-SELLING (G2)**

NEW: Counting Crows: *Hard Candy* $11.88 Save 37%!

my account   cart   help   eBay home   sign in

Home | Books | Music | DVDs/Movies | Video Games | Computers & Software | Electronics | Everything Else...

Gift Certificates | Wish List | Pre-Orders | Sell Your Stuff | New Users

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People with similar tastes also enjoyed...

Weezer (1994)
(CD, 1994)
Weezer
$5.00
(Save $6.97)

Pinkerton
(CD, 1996)
Weezer
$6.00
(Save $10.95)

All Killer No Filler [ECD]
(CD, 2001)
Sum 41, Sum 41
$4.29
(Save $8.68)

Redeeming a Gift Certificate or Coupon?

Proceed to Checkout
Speedy Checkout

Shopping Cart

Weezer (2001) Weezer, Weezer (Music)
CD, Release Year: 2001
Seller: naojia@hotmail.com (35)
Condition: Like New • Notes: Perfect condition

Move to WishList • Remove from Cart • Find another one

Item: $8.30
Media Mail: $2.45
(Change Shipping Method)

TOTAL: $10.75

Gift Certificate

Redeeming your Half.com Gift Certificate or Coupon is easy. Just enter your Claim Code in the...   [Redeem]

Proceed to Checkout
Speedy Checkout

- **What am I going to buy?**
  - **Easy to remove**
  - **Easy to move to wishlist**
- **How much will it cost?**
  - **Shipping costs there, no nasty surprises**
- **SHOPPING CART (F3)**

Home | Books | Music | DVDs/Movies | Video Games | Computers & Software | Electronics | Everything Else...

Gift Certificates | Wish List | Pre-Orders | Sell Your Stuff | New Users

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Checkout

Enter your User ID and Password.

Are you a half.com user having trouble signing in? **Get help now.**

eBay **User ID**
[   ]
You can also use your registered email.

eBay **Password**
[   ]
Forgot your password?
Learn how to protect your account

[Secure Sign In] or **Register Now**

☐ Keep me signed in on this computer unless I sign out. Learn more .

⑦ Having problems signing in? **Get help now**.

For more information about sign in, visit sign in help .

Or sign in to eBay using:

PASSPORT
Sign In ↗

Step 1 – Choose Shipping Address

Ship my order to:

Jason Hong
387 Soda Hall Computer Science UC Berkeley   **Use This Address**
Berkeley, CA 94720

OR

Enter a new shipping address:

Name	
Street address	
City	

If U.S. Military, enter APO/FPO for City.

State   Select State ▼

If U.S. Military, select AE, AP or AA from bottom of list for State.

ZIP code   [   ] [   ]

Country   USA

Save Changes

Checkout

1 **Shipping** ···⟩ 2 Billing ···⟩ 3 Place Order

Secure Shopping

Step 1 – Choose Shipping Address

Ship my order to:

Jason Hong
387 Soda Hall Computer Science UC Berkeley
Berkeley, CA 94720

Use This Address

OR

Enter a new shipping address:

Name

Street address

City

If U.S. Military, enter APO/FPO for City.

State   Select State ▾

If U.S. Military, select AE, AP or AA from bottom of list for State.

ZIP code

Country   USA

Save Changes

- **What site?**
  - **Logo, layout, color, fonts**
- **Where in site?**
  - **Checkout, step 1 of 3**
  - **"Choose shipping address"**
  - **QUICK-FLOW CHECKOUT (F1)**

Step 1 – Choose Shipping Address

Ship my order to:

Jason Hong
387 Soda Hall Computer Science UC Berkeley
Berkeley, CA 94720

Use This Address

OR

Enter a new shipping address:

Name

Street address

City

If U.S. Military, enter APO/FPO for City.

State   Select State ▾

If U.S. Military, select AE, AP or AA from bottom

ZIP code

Country   USA

Save Changes

- **Note what's different**
  - **No tab rows**
  - **No impulse buys**
  - **Only navigation on page takes you to next step**
- **This is a PROCESS FUNNEL (H1)**
  - **Extraneous info and links removed to focus users**

Checkout

Place my order!

Order Summary

Weezer (2001) Weezer, Weezer (Music)
Seller: naojia@hotmail.com (35)
Condition: Like New • Notes: Perfect condition

Item: $8.30
Media Mail: $2.45
Subtotal: $10.75

Total Merchandise: $8.30
Total Shipping: $2.45

TOTAL: $10.75

Ship to

Jason Hong
387 Soda Hall Computer Science UC Berkeley
Berkeley, CA 94720

Edit / Change Shipping Address

Bill to

MasterCard ending with 0155
Expires 11/2003
Zipcode: 94709

Edit / Change Billing

☐ Use this shipping and billing information as my Speedy Checkout settings.

Place my order!

half.com by ebay

6

Place my order!

Order Summary

Weezer (2001) Weezer, Weezer (Music)
Seller: naojia@hotmail.com (35)
Condition: Like New • Notes: Perfect condition

Ship to

Jason Hong
387 Soda Hall Computer Science UC Berkeley
Berkeley, CA 94720

Edit / Change Shipping Address

☐ Use this shipping and billing information as my Speedy Checkout settings.

Place my order!

- **Last step of process**
  - Step 3, "Place Order"
  - "Place my order" button
- **Two HIGH-VISIBILITY ACTION BUTTONS (K5) for fold**
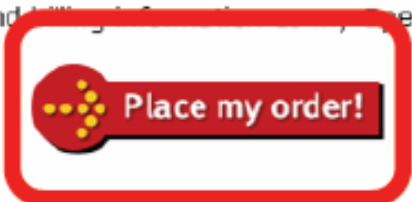
- # No nasty surprises
  - ## – Can see order
  - ## – Total price is same as shopping cart
  - ## – ORDER SUMMARY (F7)

Place my order!

Item: $8.30
Media Mail: $2.45
Subtotal: $10.75

Total Merchandise: $8.30
Total Shipping: $2.45

TOTAL: $10.75

Ship to

Jason Hong
387 Soda Hall Computer Science UC Berkeley
Berkeley, CA 94720

Edit / Change Shipping Address

Bill to

MasterCard ending with 0155
Expires 11/2003
Zipcode: 94709

Edit / Change Billing

☐ Use this shipping and billing information as my Speedy Checkout settings.

Place my order!

Easy to change shipping and billing

Easy to save this info
- **Easier to setup info in context of specific task**
- **Clearer to users why this info is needed**

Checkout

1 Shipping ⋯ 2 Billing ⋯ 3 Place Order

Secure Shopping

Place my order!

Item: $8.30
Media Mail: $2.45
Subtotal: $10.75

Total Merchandise: $8.30
Total Shipping: $2.45

TOTAL: $10.75

...d to

MasterCard ending with 0155
Expires 11/2003
Zipcode: 94700

Jason Hong
387 Soda Hall Computer Science UC Berkeley
Berkeley, CA 94720

Edit / Change Shipping Address

Edit / Change Billing

☐ Use this shipping and billing information as my Speedy Checkout settings.

Place my order!

half.com by ebY

Outline

- Web Design Process, Specialties & Artifacts
- Detailed Design Example
- *Web Design Patterns*

Design = Solutions

- Design is about finding solutions
- Unfortunately, designers often reinvent
  - Hard to know *how* things were done before
  - *Why* things were done a certain way
  - *How* to reuse solutions

Design Patterns

- Design patterns communicate common design problems and solutions
- First used in architecture [Alexander]
- Ex. How to create a beer hall where people socialize?

A Pattern Language

Towns · Buildings · Construction

Christopher Alexander
Sara Ishikawa · Murray Silverstein
with
Max Jacobson · Ingrid Fiksdahl-King
Shlomo Angel

Somewhere in the community at least one big place where a few hundred people can gather, with beer and wine, music, and perhaps a half-dozen activities, so that people are continuously criss-crossing from one to another.

criss-cross paths

activities

open alcoves

Using Design Patterns

- Not too general and not too specific
  - Use a solution "a million times over, without ever doing it the same way twice"

- Design patterns are a <u>shared</u> language
  - for "building and planning towns, neighborhoods, houses, gardens, & rooms."
  - Ex. Beer hall is part of a center for public life...
  - Ex. Beer hall needs spaces for groups to be alone...ALCOVES

A Web of Design Patterns

(8) Mosaic of Subcultures

(31) Promenade

(33) Night Life

(90) Beer Hall

(95) Building Complex

(179) Alcoves

(181) The Fire

Cities & Towns

Local Gatherings

Interiors
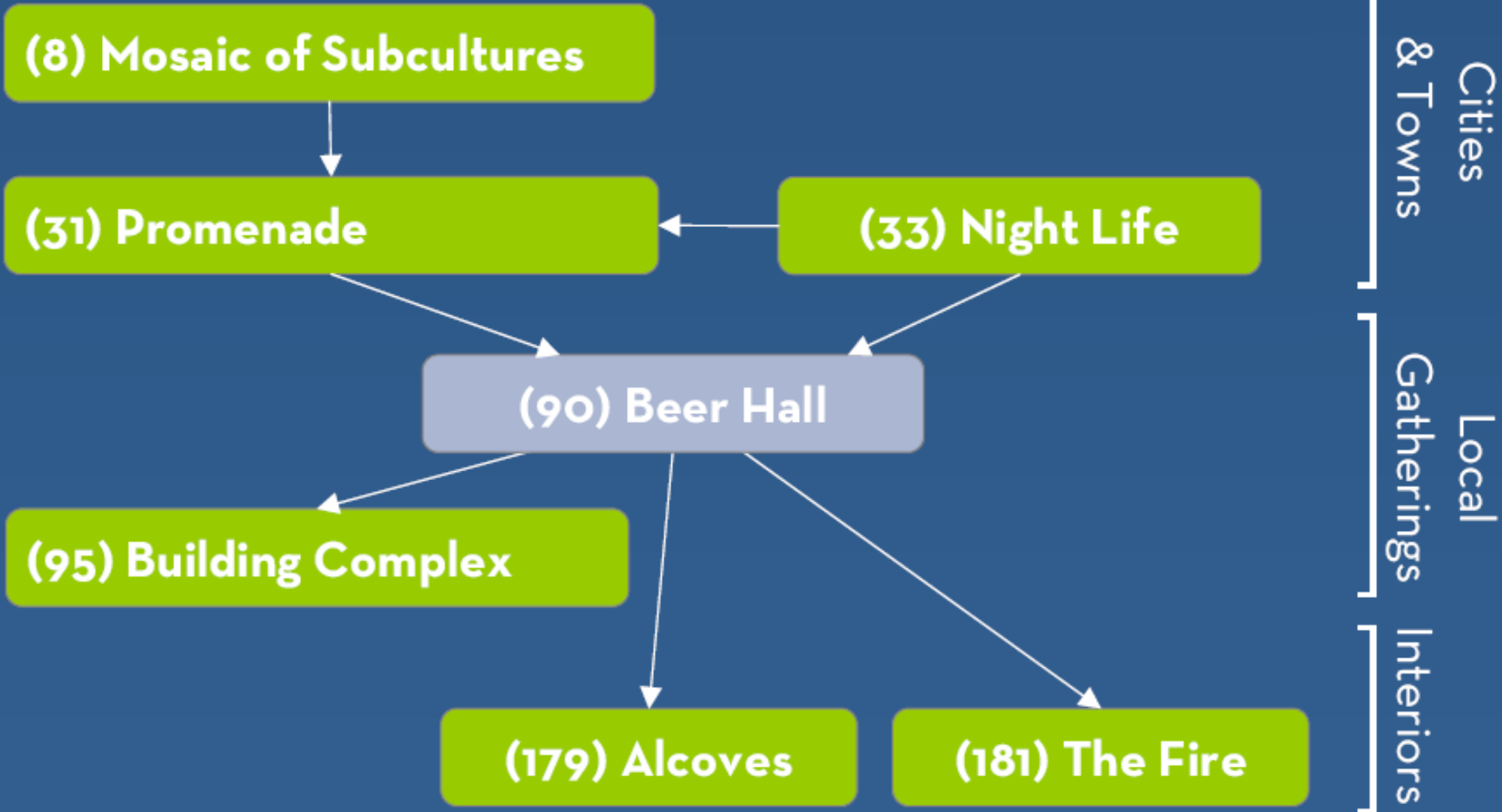
Web Design Patterns

- Now used in Web design
- Communicate design problems & solutions
  - how to create navigation bars for finding relevant content...
  - how to create a shopping cart that supports check out...
  - how to make e-commerce sites where people return & buy...

THE DESIGN OF SITES

PATTERNS, PRINCIPLES, AND PROCESSES FOR CRAFTING A CUSTOMER-CENTERED WEB EXPERIENCE

DOUGLAS K. VAN DUYNE
JAMES A. LANDAY
JASON I. HONG

Foreword by Jakob Nielsen
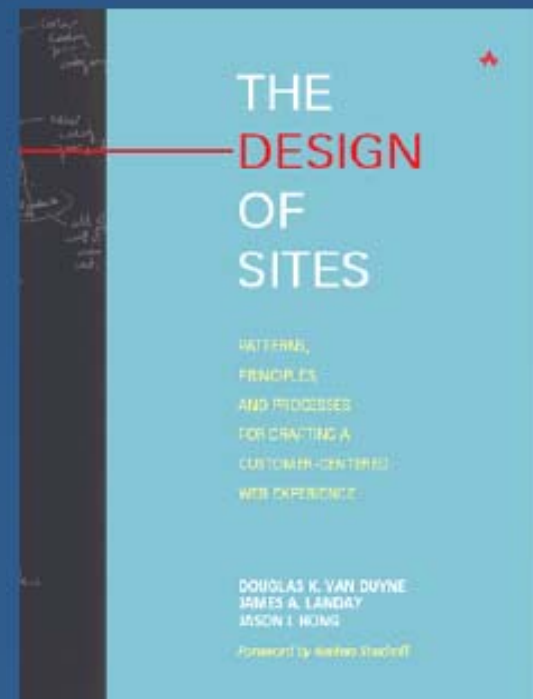
Navigation Bar

- Problem: Customers need a structured, organized way of finding the most important parts of your Web site

Navigation Bar

- Solution Diagram
  - Captures essence of how to solve problem

Patterns Support Creativity

- Patterns come from successful examples
  - sites that are so successful that lots of users are familiar with their paradigms (e.g., Yahoo)
  - interaction techniques/metaphors that work well across many sites (e.g., shopping carts)
- Not too general & not too specific
  - you need to specialize to your needs
- Patterns let you focus on the hard, unique problems to your design situation
  - every real design will have many of these

Process Funnel

- Problem: Need a way to help people complete highly specific stepwise tasks
  - Ex. Create a new account
  - Ex. Fill out survey forms
  - Ex. Check out

Process Funnel

Process Funnel

- **What's different?**
  - No tab rows
  - No impulse buys
  - Only navigation on page takes you to next step

- **What's the same?**
  - Logo, layout, color, fonts

Process Funnel

- Problem: What if users need extra help?

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Featured Dimension 4100

The Dimension 4100 desktop offers you amazing power and flexibility at a price that won't break your budget.

- Intel® Pentium® III processor at 933Mhz
- 40GB[5] Hard Drive
- 128MB SDRAM
- 32MB Nvidia GeForce2 MX 4X AGP Graphics Card

▷ Free Ground (3-5 day) Shipping with purchase of any new Dell Home System. Offer ends 4/23/01.
Click Here for Details.

Dimension 4100	Great Add-Ons For This System	Price

Intel® Pentium® III processor at 933Mhz

$1,199

As low as $36[4] /45 pmts
No payment for 90 days
(Click or scroll for details)[4]

▶ Customize It

E-Value Code
6V771-4100po1

Processor ?	Intel® Pentium® III processor at 933MHz
Keyboard ?	QuietKey® Keyboard

Check any item(s) you wish to add to this system, then click Customize It.

☐ 3 Year On-Site Service — Add $99
- With on-site service, you don't have to leave your home or ship your computer to us should you have a problem.

▷ More Details

☐ Epson Stylus Color 880 Ink Jet Printer — Add $149
- A creative and versatile printer that features super fast print speeds.

▷ More Details

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Dimension 4100

Intel® Pentium® III processor
933Mhz

$1,199

As low as $38[4] /45 pmts
No payment for 90 days
(Click or scroll for details)[4]

▶ Customize It

E-Value Code
6V771-410Lpo1

Processor ? Intel® Pentium® III processor at 933MHz

Keyboard ? QuietKey® Keyboard

Keyboards - Netscape

? DELL LEARN MORE   Close ⊗

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Dell™ Enhanced
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DELL GLOSSARY
Need a definition?
Click on a term.

Keyboard Type	Dell™ QuietKey	Microsoft® Internet Keyboard, Dell Edition	Dell™ Enhanced QuietKey	Dell™ Enhanced Performance
ZOOM! For a closer look.				
Benefits	• Quiet key response • Soft "rubberdome" touch	• 10 Hot Keys for easy access to your internet and e-mail • E-mail Hotkey	• 3 programmable keys • Soft "rubberdome"	• 7 programmable keys • Built-in 2 port USB HUB

speeds.
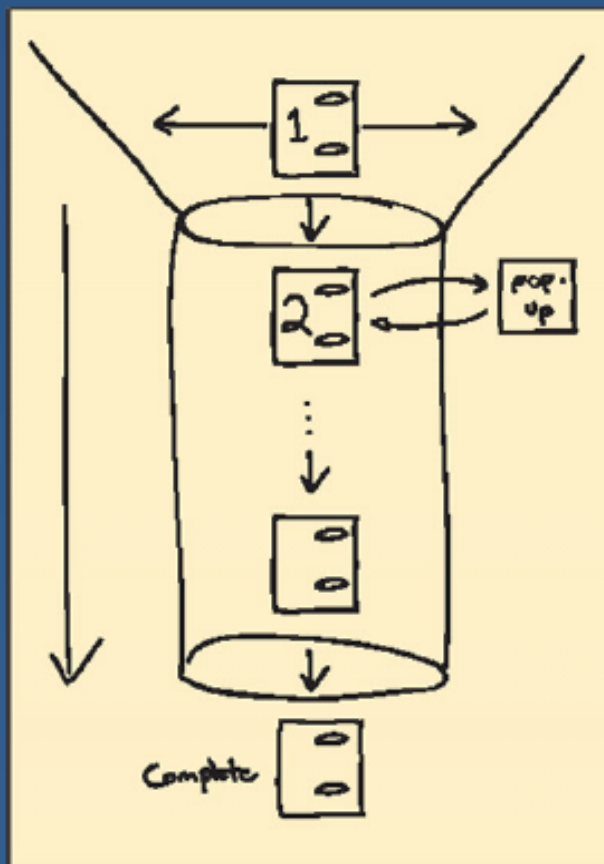
▶ More Details

62

Process Funnel
Solution Diagram

Process Funnel
Related Patterns

(A1) E-Commerce   (A10) Web Apps   (A11) Intranets

(H1) Process Funnel

(K2) Navigation Bars

(K3) Tab Rows

(K4) Action Buttons

(H8) Context-Sensitive Help

(I2) Above the Fold

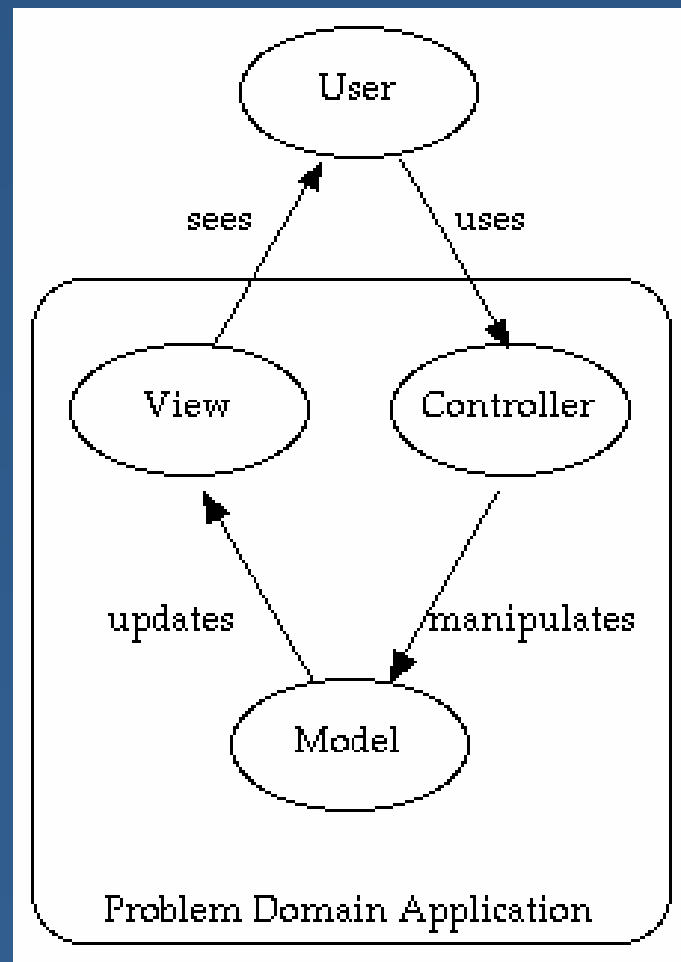(K5) High-Viz Action Buttons

(K12) Preventing Errors

(K13) Meaningful Error Messages
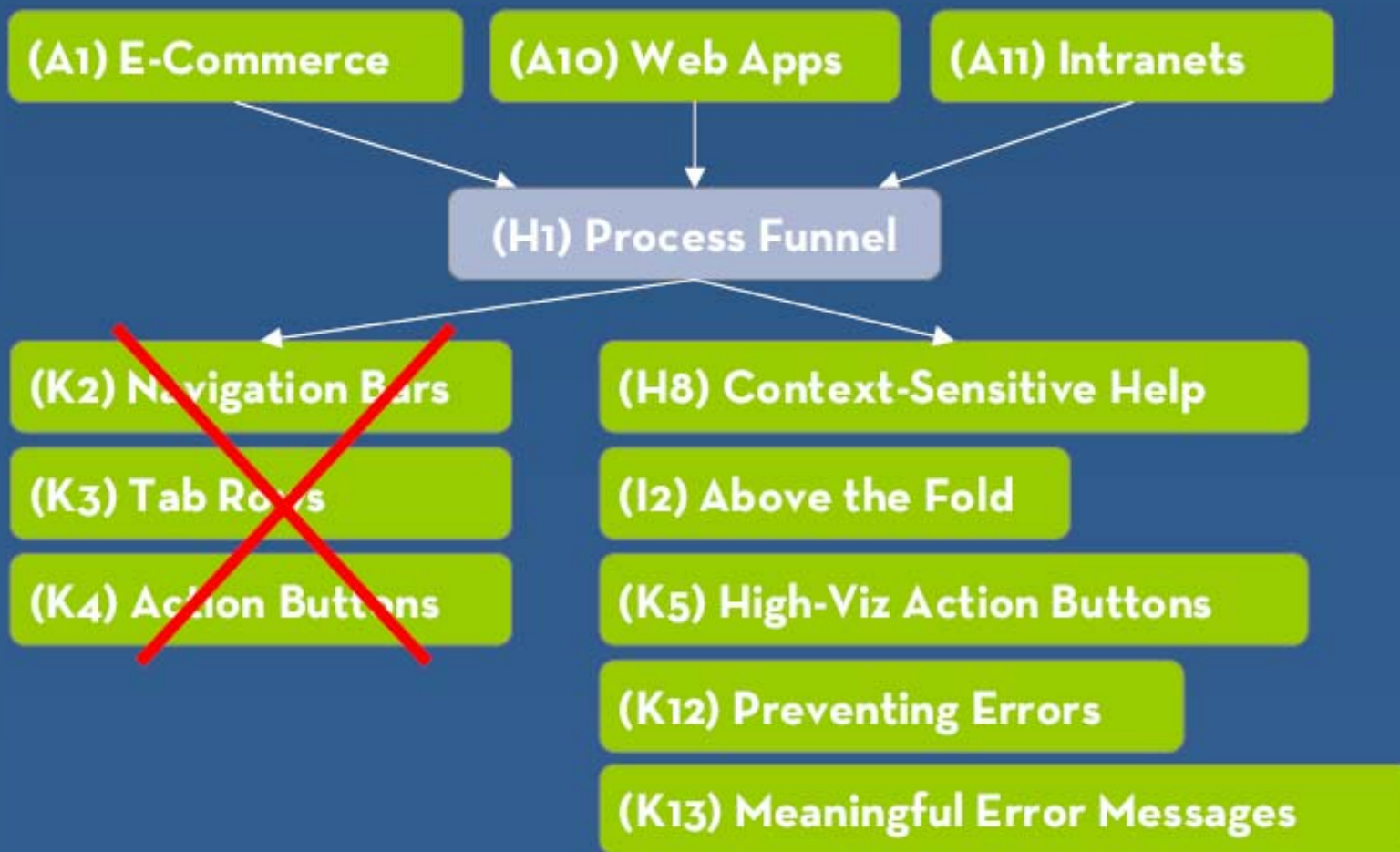
Model-View-Controller (MVC)

- Classic design pattern for application architecture
- Splits application into three main layers:
  - Model
  - View
 - Controller

Model-View-Controller

- **Model**
  - Domain-specific representation of the information on which the application operates
  - Includes raw data and operations on it
  - In web applications, this is often a database
- **View**
  - Renders the model into a form suitable for interaction
  - In web applications, the view is an HTML page
- **Controller**:
  - Processes and responds to events, typically user actions, and may invoke changes on the model and view
  - In web applications, this is often Javascript or an HTTP GET/POST hander

Advantages of MVC

- **Clarity of design:** Easy to understand how to control the model's behavior by looking at the methods in the model

- **Modularity of design:** any of the components can be swapped in and out as the user or programmer desires - even the model! Development of the various components can progress in parallel

- **Multiple views:** the application can display the state of the model in a variety of way, and change views when appropriate

Meaningful Error Messages

- Problem: When customers make mistakes, they need to be informed of the problem and how to recover

- Solution
  - Clear statement of problem
  - Explain how to recover
  - Position near the problem
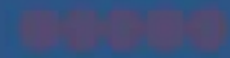
Welcome | Beauty | Jewelry | Toiletries | Accessories | Gifts

We found an error while verifying your shipping address. We've marked the problem in red for you.

Update Address Book of:

Required information is marked in GREEN CAPS.

NICKNAME: `MYSELF`

Please assign a "nickname" for the person you're shipping to.
You may change or delete this information.

FIRST NAME: `DOUGLAS`   **MIDDLE INITIAL:** `   `

LAST NAME: `                      `

ADDRESS: `245 SAN JOSE RD`

`                      `

CITY: `LOS GATOS`

STATE: `California ▾`

ZIP CODE: `95333`

COUNTRY: `Select a country ▾`

SHIPPING METHOD:

◉ **Standard UPS**
(2 business days plus processing time)

○ **Upgrade to UPS Next Business Day**
(1 business day plus processing time, additional charge)

Please select a shipping option. Note: all USA orders are shipped UPS. If you prefer next day service or

○ **U.S. Postal Service**
(Same price as Standard UPS delivery. Use for addresses not served by UPS or if you prefer U.S.

67

Shopping Bag · **Checkout** · **My Account** · **Help**

Welcome | Beauty | Jewelry | Toiletries | Accessories | Gifts

We found an error while verifying your shipping address. We've marked the problem in red for you.

Update Address Book of

Required information is marked in GREEN CAPS.

NICKNAME: MYSELF
Please assign a "nickname" for the person you're sh...
You may change or delete this information.

FIRST NAME: DOUGLAS   MIDDLE INITIAL

LAST NAME:

ADDRESS: 245 SAN JOSE RD

CITY: LOS GATOS

STATE: California

ZIP CODE: 95333

COUNTRY: Select a country

SHIPPING METHOD:
○ Standard UPS (2 business days plus processing time)
○ U.S. Postal Service (Same price as Standard UPS delivery. Use for addresses not served by UPS or if you prefer U.S.
○ Upgrade to UPS Next Business Day (1 business day plus processing, additional

Please select a shipping option. Note: all USA orders are shipped UPS. If you prefer next day service or

- **Clear error message?**
  - two messages at top

- **Explains how to recover?**
  - only implies it is missing required information

- **Positioned near the problem?**
  - error messages far
  - required info differs in green/red → problem for users w/ color deficiency

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DELL

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▷ Limited Warranty

WELCOME TO CHECKOUT

Secure
shopping
guarantee

*- Indicates Required Field

⚠ **Please address the 2 item(s) indicated on this page.**

To continue with checkout, please sign in or create an account. Your account will enable you to retrieve your order status online and benefit from pre-filled forms on your next purchase.

Sign In

Already have an account? Sign in here.

* **Email Address**

johndoe@johndoe.com

* **Password**

Forgot Password?

▶ **Sign In**

OR

Create An Account

Complete these fields to create a new account.

* First Name

John

* Last Name

Doe

* Email Address

johndoe@johndoe.com

* Confirm Email Address

johndoe@johndoe.com

☑ Yes, send me exclusive Dell offers and specials by email. (You can unsubscribe at any time)

🚫 No Password. ....
Password Confirmation ....

* Create Password

Password must be at least four characters in length.

🚫 Password Confirmation ....

* Confirm Password

▶ **Sign In**

DELL

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1-800-761-3355

Purchase Assistance

▷ Security & Privacy
▷ Limited Warranty

WELCOME TO CHECKOUT

Secure shopping guarantee

*- Indicates Required Field

⊘ **Please address the 2 Item(s) Indicated on this page.**

To continue with checkout, please sign in or create an account. Your account will enable you to retrieve your order status online and benefit from pre-filled forms on your next purchase.

Sign In

Already have an account? Sign in here.

* Email Address

johndoe@johndoe.com

* Password

Forgot Password?

OR

Create An Account

Complete these fields to create a new account.

* First Name

John

* Last Name

Doe

* Email Address

johndoe@johndoe.com

* Confirm Email Address

johndoe@johndoe.com

☑ Yes, send me exclusive Dell offers and specials by email. (You can unsubscribe at any time)

❶ No Password. . . . .
Password Confirmation . . . .

* Create Password

Password must be at least four characters in length.

❶ Password Confirmation . . . .

* Confirm Password

▶ Sign In

- **Clear error message**

- **Explains how to recover**

- **Positioned near the problem**

Patterns Offer the Best of Principles, Guidelines, & Templates

- Patterns help you get the details right, without over-constraining your solution

  - unlike principles, patterns not too general, so will apply to your situation

  - unlike guidelines, patterns discuss tradeoffs, show good examples, & tie to other patterns

  - unlike style guides, patterns not too specific, so can still be specialized

  - unlike templates, patterns illustrate flows among different pages

- Patterns can serve as documentation for team-oriented environments

Design Exploration Example

- John given the task of designing a new subsite for showing maps to businesses
  - listings found by typing in address
  - key feature: show nearby businesses
- John comes up with two design sketches
  - Design #1 uses ALPHABETICAL ORGANIZATION (B5)for list of **all** nearby businesses
  - Design #2 uses TASK-BASED ORGANIZATION (B4)for list of **related** nearby businesses

Design #1: Alphabetical Organization
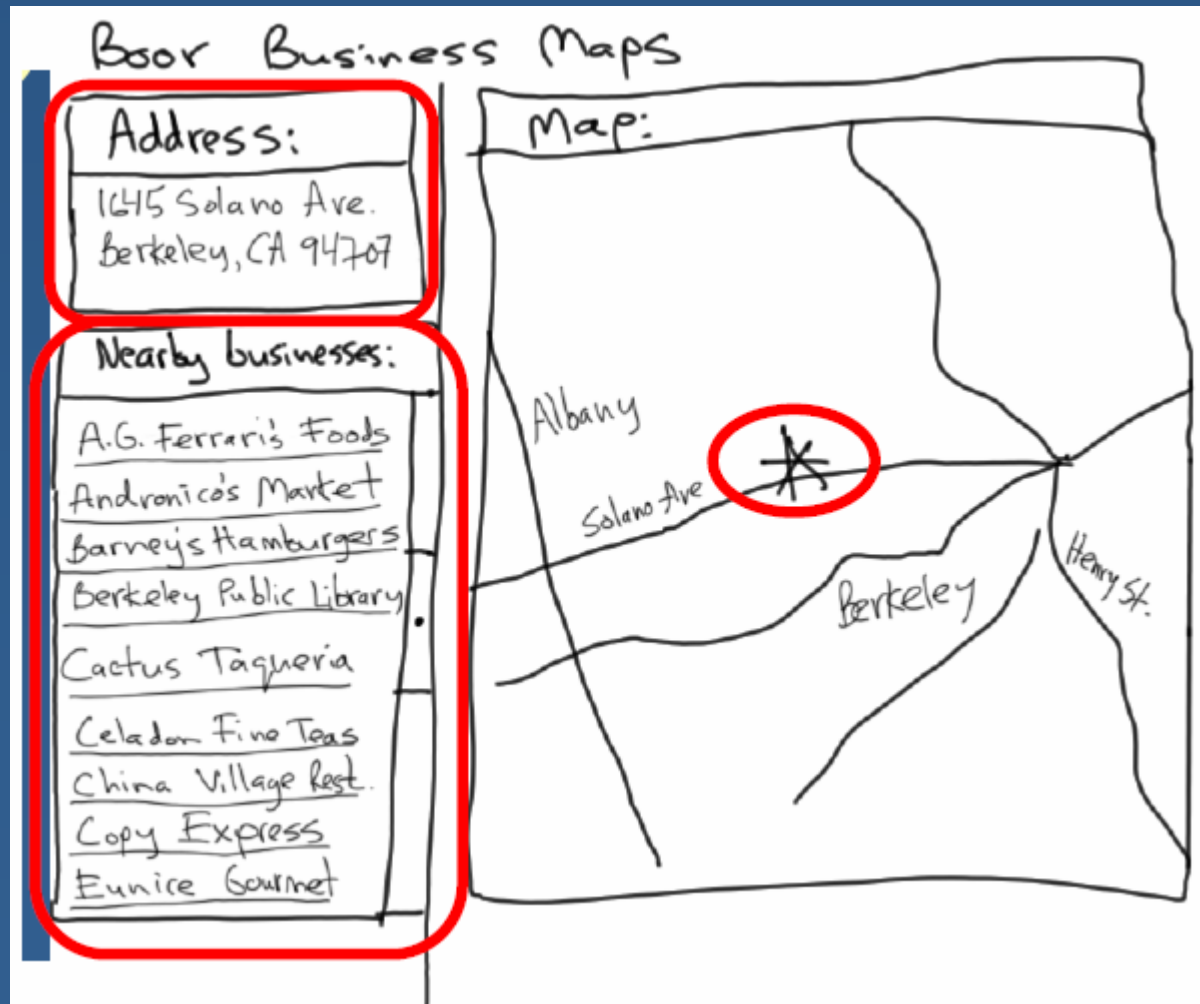
Design #2: Task-Based Organization
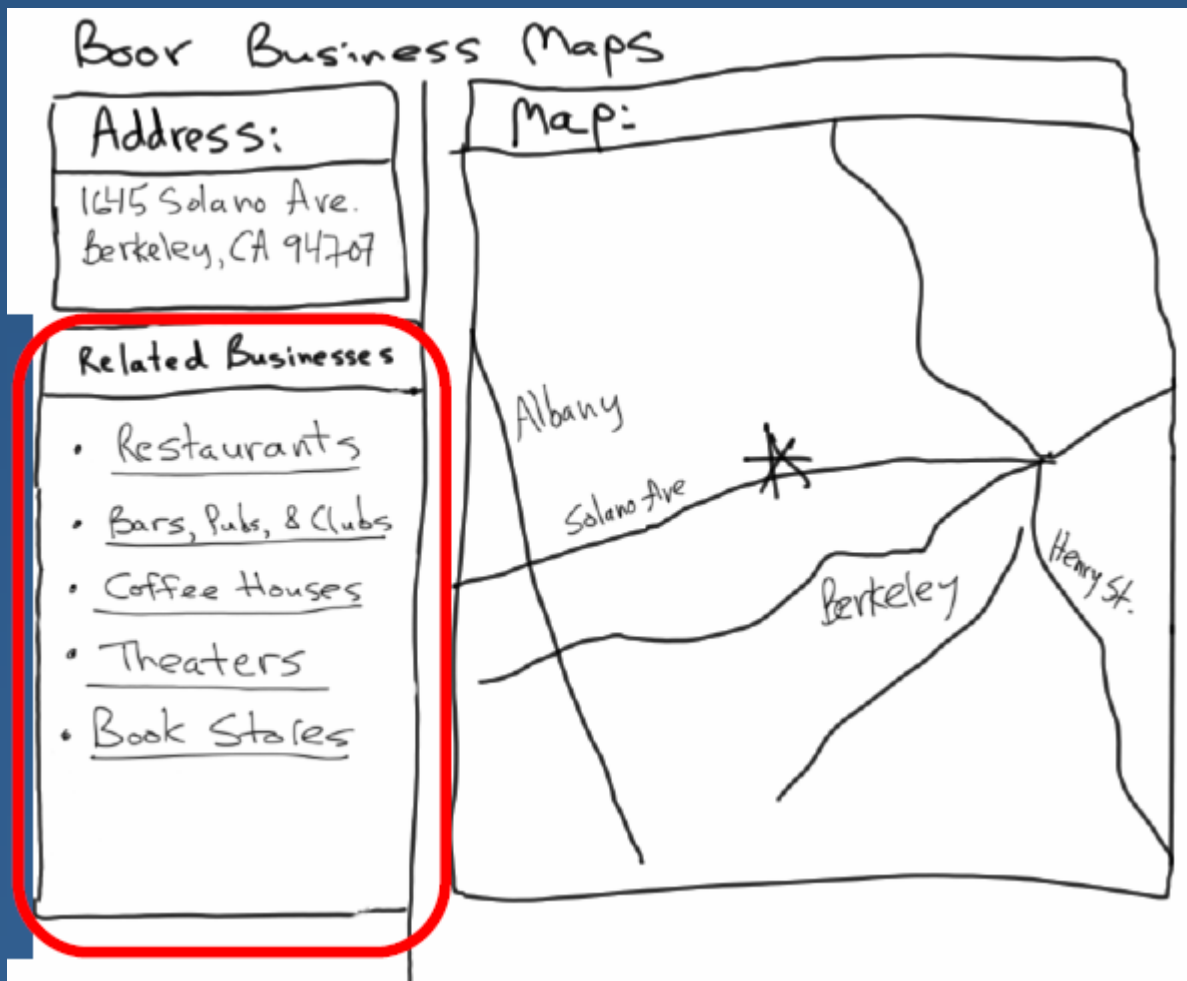
Evaluating Which Design to Choose

- Low-fidelity Usability Test
  - sketches the rest of the key screens on paper
  - brings in 5 participants to his office
  - asks each to carry out 3 tasks while John's colleague Sam "plays computer"
  - John observes how they perform
- Tasks
  - 1) look up 1645 Solano Ave., Berkeley CA
  - 2) look up 1700 California Ave, San Francisco CA & find Tadich Grill
  - 3) look up 2106 N 55th St, Seattle WA & find a Sushi restaurant nearby

Evaluating Which Design to Choose

- Results with Design #1 (Alphabetical)
  - Task 1: look up 1645 Solano Ave
    - no difficulties encountered –warm-up task!
  - Task 2: look up 1700 California & find Tadich Grill
    - several users didn't notice that the list of nearby businesses was scrollable (due to paper affordances?)
    - those that scrolled took awhile to find in list of over 500
  - Task 3: look up 2106 55th St & find nearby Sushi restaurant
    - 3 users only picked restaurants that had "restaurant"in the name & thus couldn't find "Kisaku"

Evaluating Which Design to Choose

- Results with Design #2 (Task-based)
  - Task 1: look up 1645 Solano Ave
    - no difficulties encountered –warm-up task!
  - Task 2: look up 1700 California & find Tadich Grill
    - 1 user took awhile to figure out that Tadich Grill was a restaurant & to click on the "Restaurants"link
    - all others found it in 2 clicks (Restaurants->Tadich Grill)
  - Task 3: look up 2106 55th St & find nearby Sushi restaurant
    - 3 found "Kisaku"in 2 clicks
    - 2 others asked for a listing of Japanese restaurants

Evaluating Which Design to Choose

- General comments

  - 2 users said they often want to email maps to friends who they will be meeting (task-based)

  - 3 users wanted driving directions (task-based)

→TASK-BASED ORGANIZATION (B4) worked better, but still had some minor problems

Design #2 –Revision 2
Adding HIERARCHICAL ORGANIZATION (B3) & LOCATION BREAD CRUMBS (K6)
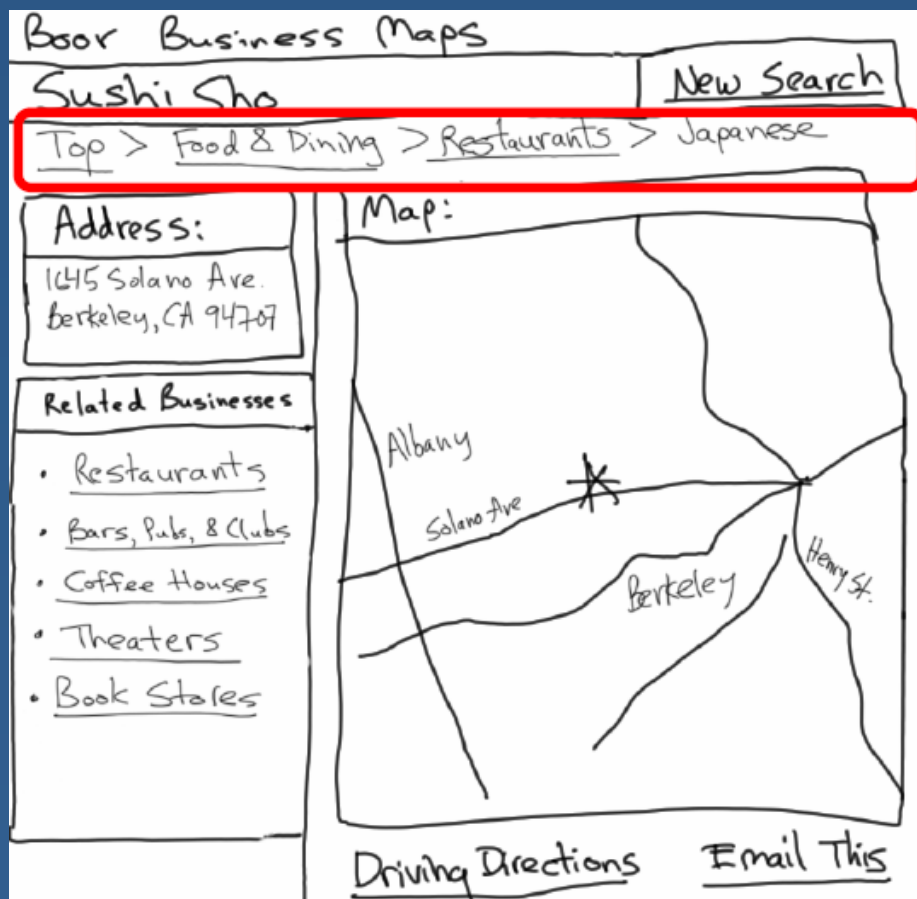
Design #2 – Revision 3
Adding SEARCH ACTION MODULE (J1)

Further Reading

Books on Web Design

- *Community Building on the Web.* Amy Jo Kim. PeachpitPress, 2000.

- *Designing Visual Interfaces: Communication Oriented Techniques.* Kevin Mullet and Darrell Sano. Prentice Hall / SunSoft Press. 1994.

- *Understanding Comics.* Scott McCloud. Kitchen Sink Press, 1994.

- *Designing Web Usability.* Jakob Nielsen. New Riders Publishing, 1999.

Further Reading

Websites on Web Design

- UsableWeb.com, links to other usability sites

- Usability.gov, for building accessible websites

- Web pages that suck, at
  http://www.webpagesthatsuck.com/

- Net tips for designers, at
  http://www.dsiegel.com/tips/

- User Interface Engineering, at http://www.uie.com

- ZDNet Ecommerce Best Practices, at
  http://www.zdnet.com/ecommerce

Further Reading

Websites on Web Design

- New York Times Ecommerce Times, at http://www.nytimes.com/pages-technology/cybertimes/commerce

- Webword.comusability log

- CNetBuilder.com, info on building sites

- ACM's CHI-Web Mailing List http://www.acm.org/sigchi/web/chi-web.html

- Goodexperience.com web log

- Jakob Nielsen useit.com