

IE4717 Web Application Design

Web Application Design Principles

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A PDF file is available for printing purpose.

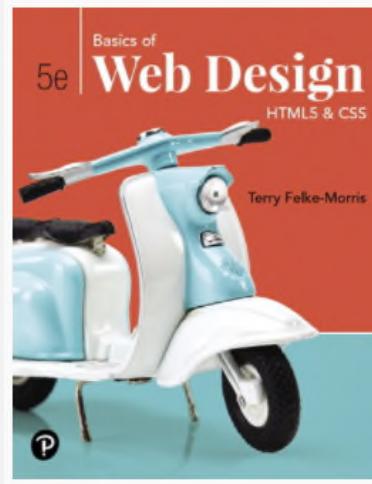
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- The teaching slides on HTML5 and CSS3 are mostly adopted from the slides provided by the author and publisher of the following textbook:

**Basics of Web Design:
HTML5 & CSS,
5th edition**

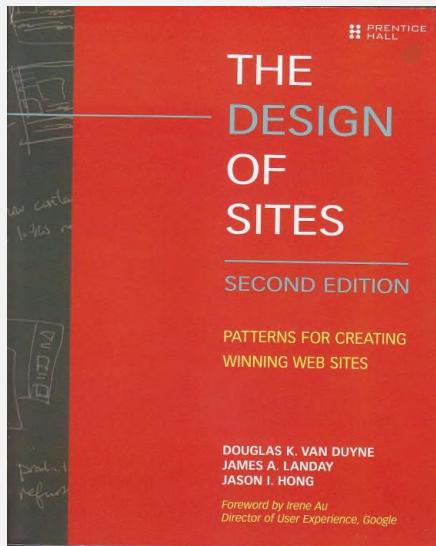
Author : Terry Felke-Morris
Publisher : Pearson
ISBN-13 : 9780135225486



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Design of web application

- It is more than just web-programming.
- Recommended text:



- Title: The Design of Sites
- Authors: Douglas K. Van Duyne;
James A. Landay;
Jason I. Hong
- ISBN: 978-0-13-134555-3
- Publisher: Prentice Hall PTR

- Emphasis : **Customer-centered** web design.
- Some slides are based on the chapters in this book

Applying Customer-Centered Design

- Principles
 - high-level concepts that guide the entire design process and help you stay focused.
 - must acquire a deep understanding of your customers' needs.
 - design your Web site iteratively, moving from rough cuts to refined prototypes, before creating the production Web site.
- Design is about making informed **trade-offs** between competing constraints.
- Based on customer's needs, analyze
 - **Application Requirements**
 - **Functional Requirements**

Choose the right combination of colors

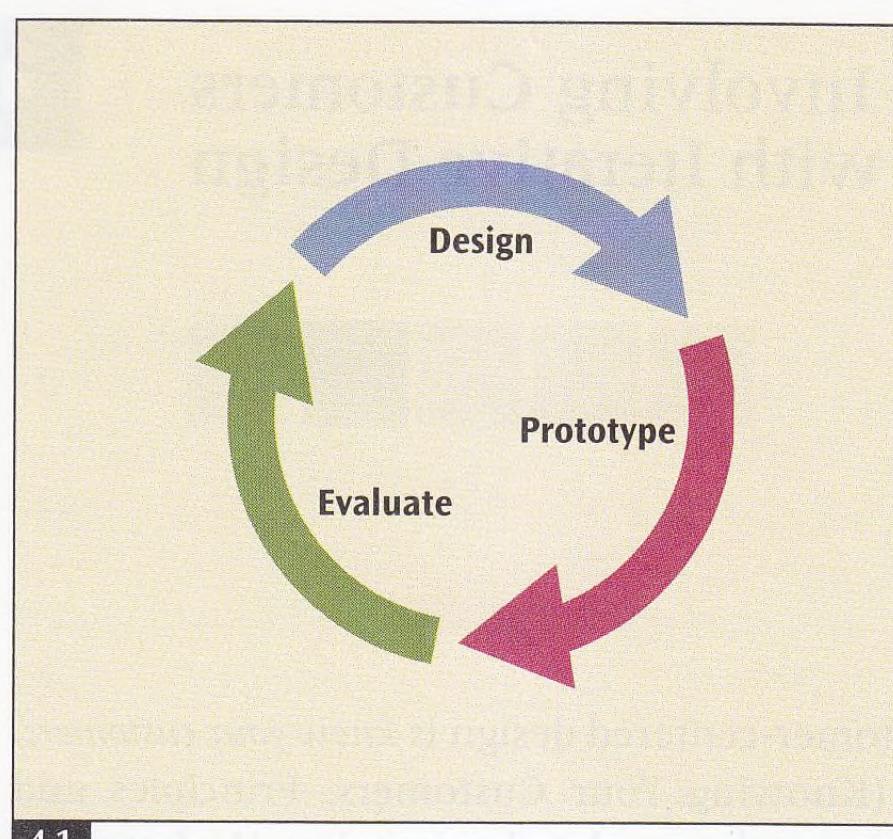
The screenshot shows a web page with a purple header bar containing links for Shopping Bag, Checkout, My Account, and Help. Below the header is a yellow navigation bar with links for Welcome, Beauty, Jewelry, Toiletries, Accessories, and Gifts. A red error message box displays the text: "We found an error while verifying your shipping address. We've marked the problem in red for you." The main content area has a purple header "Update Address Book of:" followed by a green note: "Required information is marked in GREEN CAPS." The form fields are as follows:

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:	<input type="checkbox"/>
LAST NAME:	<input type="text"/>		
ADDRESS:	245 SAN JOSE RD <input type="text"/>		
CITY:	LOS GATOS		
STATE:	California <input type="button" value="▼"/>		
ZIP CODE:	95333		
COUNTRY:	Select a country <input type="button" value="▼"/>		
SHIPPING METHOD:	<input checked="" type="radio"/> Standard UPS (2 business days plus processing time)		
	<input type="radio"/> Upgrade to UPS Next Business Day (1 business day plus processing time, additional charge)		
	<input type="radio"/> U.S. Postal Service (Same price as Standard UPS delivery. Use for addresses not served by UPS or if you prefer U.S. Post. 5-7 days plus)		

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

3.2

The Iterative Design Process

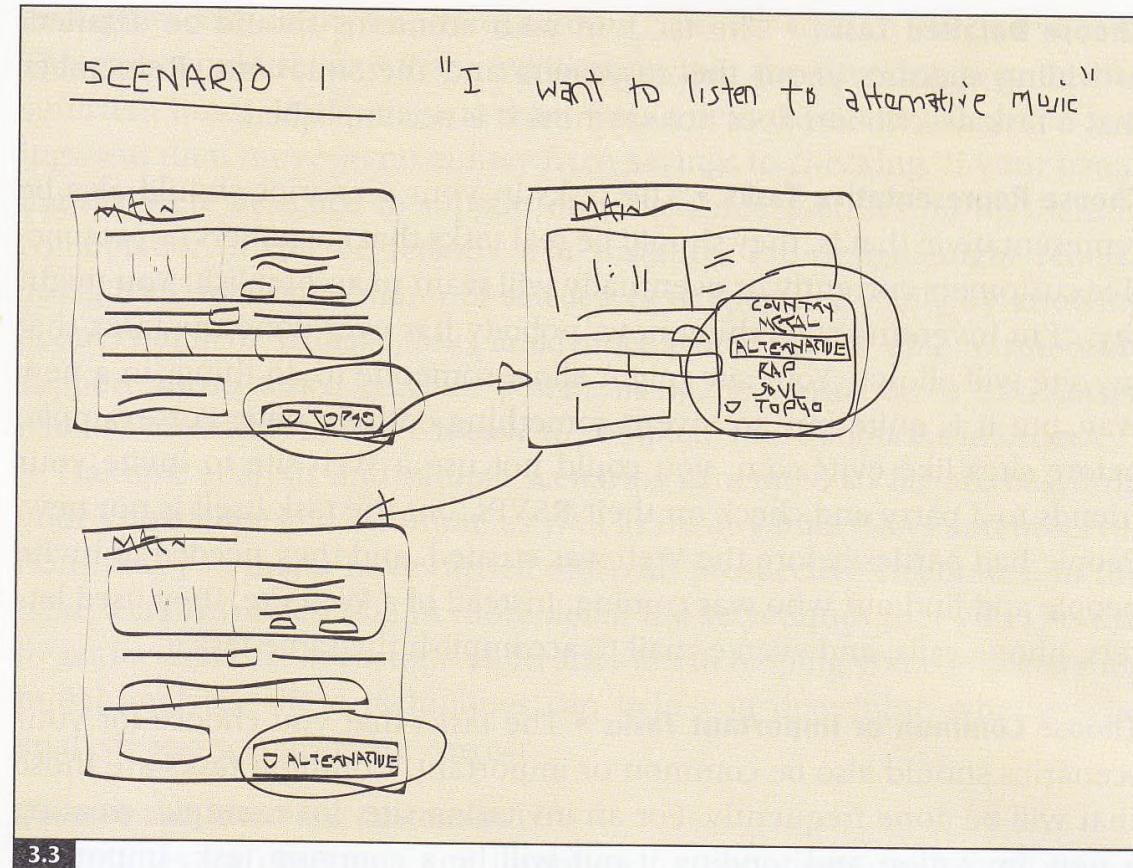


Detect problems while they're still inexpensive and easy to fix, building site with the features that your customers need, in a way that your customers can use.

How to start: Build Scenarios

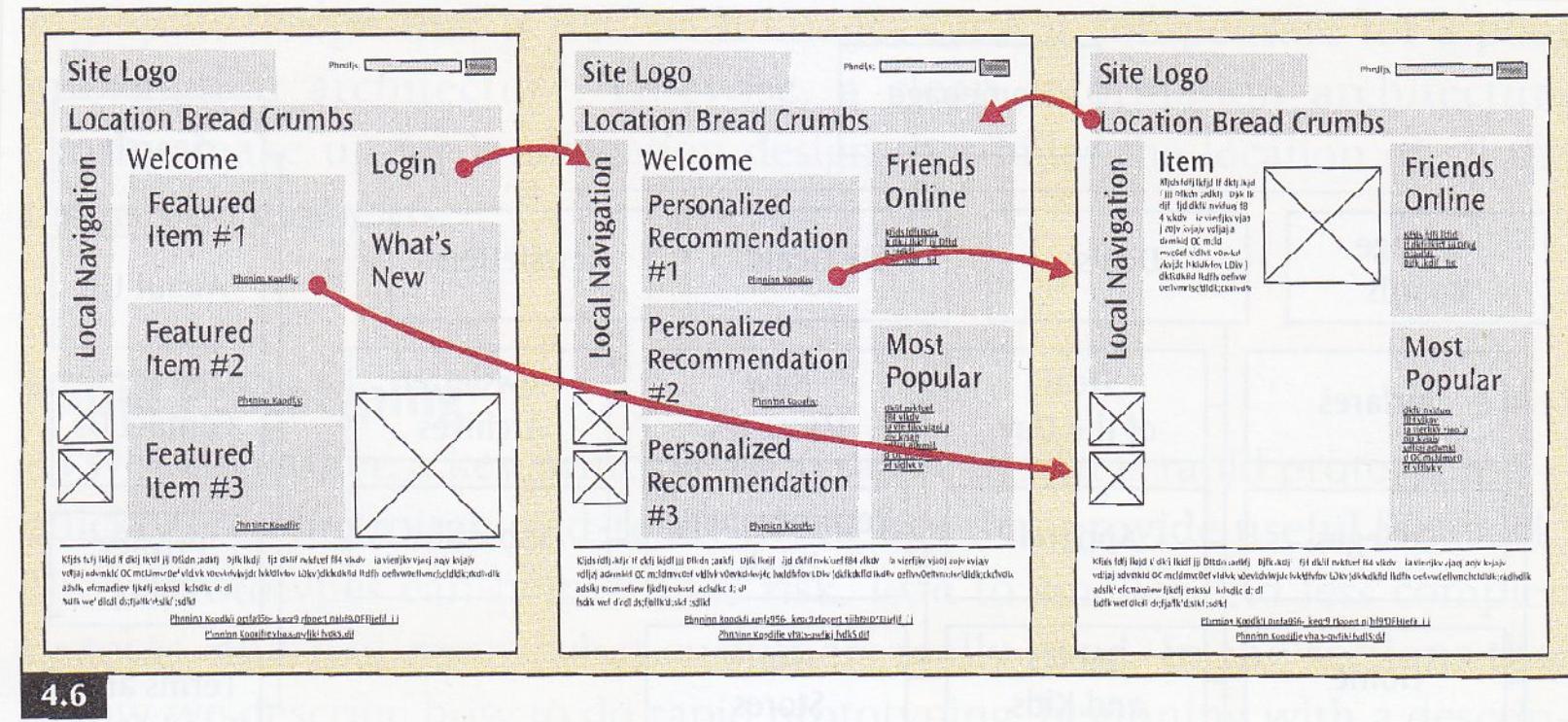
- Create **scenarios** illustrating why people would use your Web site.
- Use photographs or sketched **storyboards**.
- **Storyboard** is a **sequence of Web pages** that you create to give a rough idea of how someone might accomplish a given task.

Storyboard



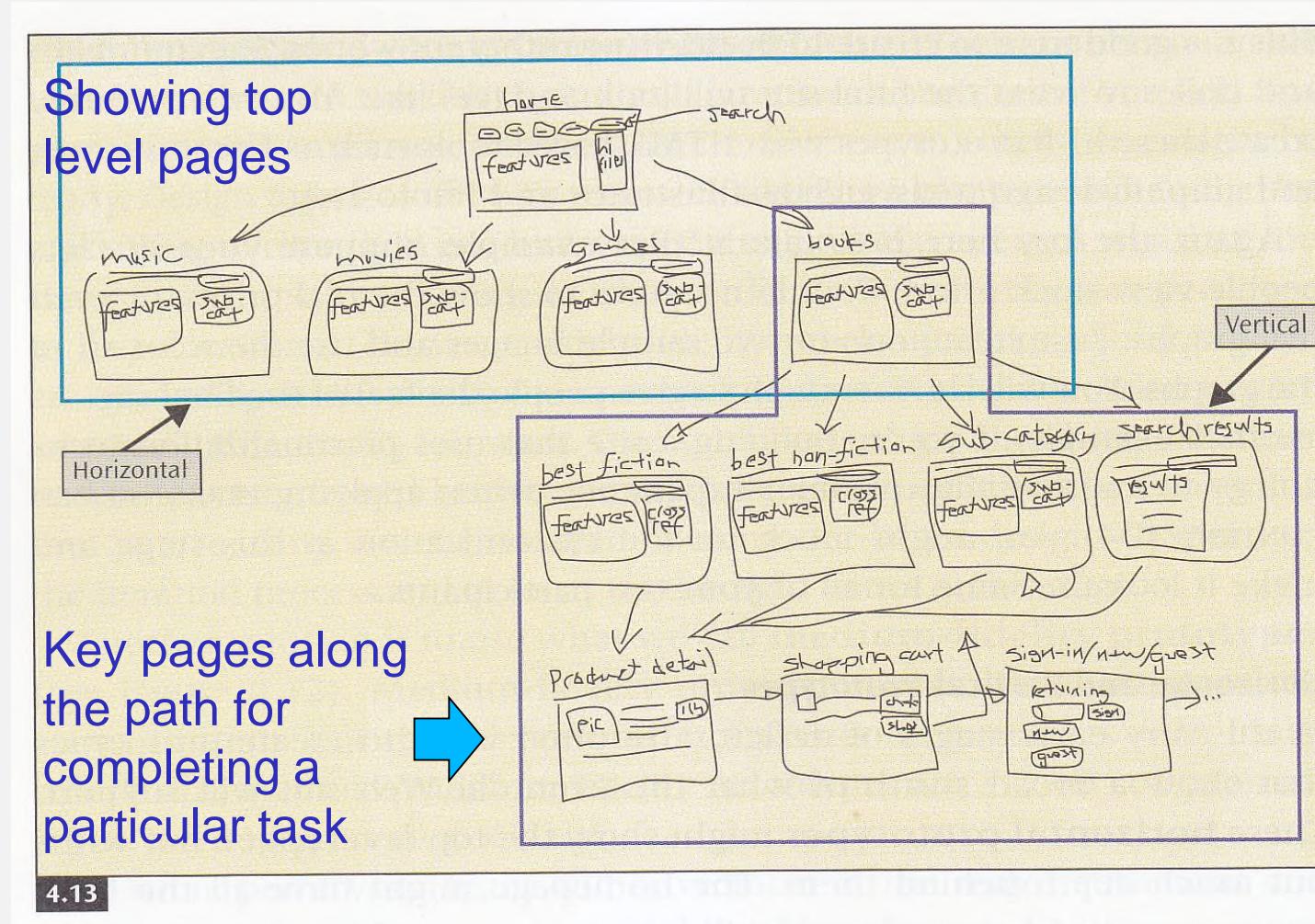
This sketcher storyboard shows how a customer would accomplish one task using the design of a music site targeted at mobile device users.

Rapid Prototyping – Storyboard



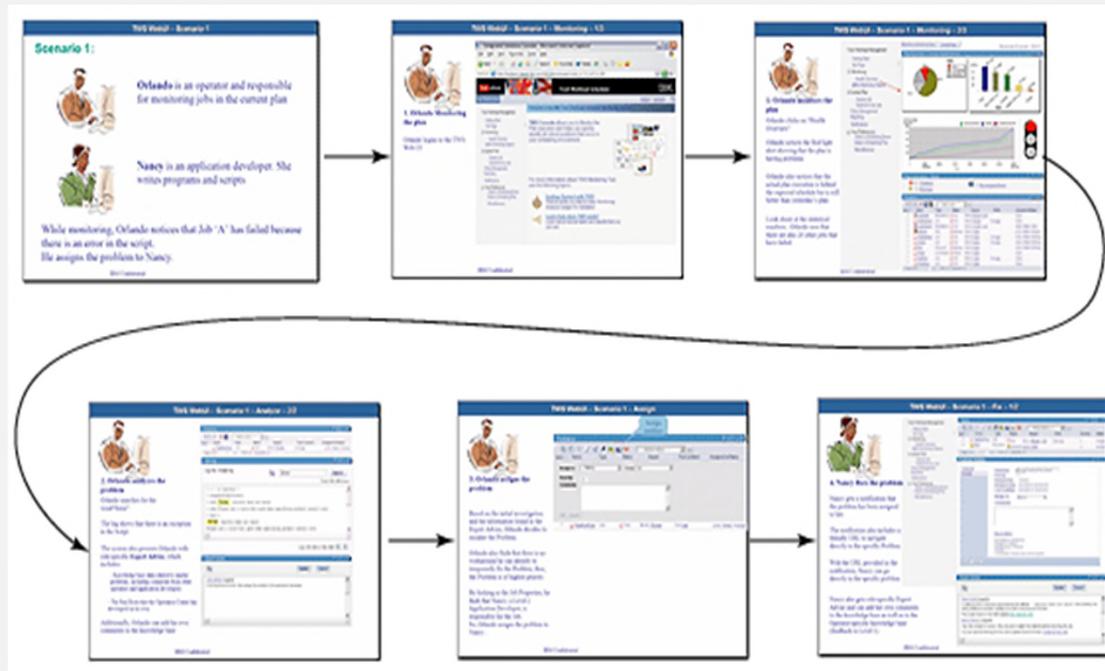
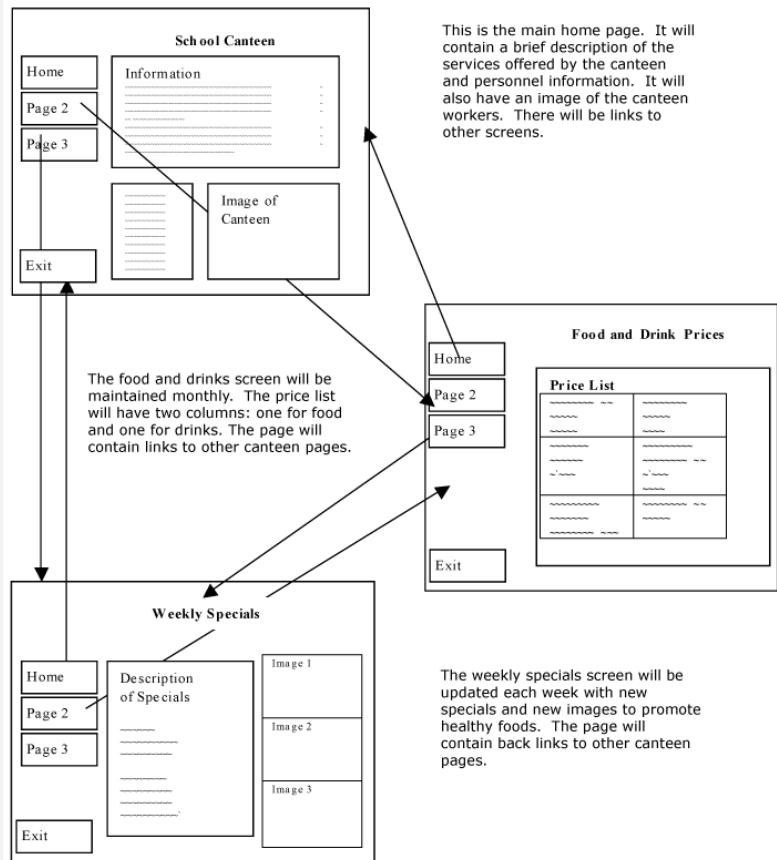
Storyboards show the steps that a customer would take to accomplish a task. This storyboard shows how a customer interacts with a site that lets groups of friends find, recommend, and share things with each other.

Horizontal and Vertical Prototypes



4.13

Sample Storyboards



Sample Storyboards

3.2.2

Scenario 2 Book ticket via Buy Tickets

XXX CINEMA

MOVIES **BUY TICKETS** **PROMOTIONS** **LOCATE US** **MY BOOKINGS** **REGISTER / LOGIN**

SLIDESHOW

NOW SHOWING COMING SOON PROMOTIONS

Copyright © 2000 Nanyang Technological University. P/N#0000

Click on "Movies" at the navigation bar to access page

XXX CINEMA

MOVIES **BUY TICKETS** **PROMOTIONS** **LOCATE US** **MY BOOKINGS** **REGISTER / LOGIN**

BUY TICKETS

Cinema Theatre 1	TODAY	TUE	WED	THU	FRI	SAT	SUN
TITLE XXXX RATING: (GRATUITOUS)	10:10 12:50 15:00 17:30 19:50 22:00						
TITLE XXXX RATING: (GRATUITOUS)	09:50 11:10 14:50 16:40 18:20 21:20						
Cinema Theatre 2	TODAY	TUE	WED	THU	FRI	SAT	SUN
TITLE XXXX RATING: (GRATUITOUS)	10:10 12:00 15:00 17:30 19:50 22:00						

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Displays showing times and movies by theatre.
User click on the desired movie and showing time in their desired theatre.

BOOK CINEMA

MOVIES **BUY TICKETS** **PROMOTIONS** **LOCATE US** **MY BOOKINGS** **REGISTER / LOGIN**

CURRENT BOOKINGS | **BOOKING HISTORY**

CONFIRM

Contact Information

Name:
Email:

Credit Card Information

Name:
Credit Card Number:
Expiry:

CONFIRM

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For non-registered member, it will request them to input their details before confirmation.

User click on "Confirm" and an email acknowledgement will be sent to them upon successful booking of their tickets.

BOOK TICKET

MOVIE TITLE: XXXX
DATE: XXX-XXXX-XXXX
LOCATION: CINEMA THEATRE 1

SELECT SEATS

SEATING PLAN

CANCEL **ADD BOOKING**

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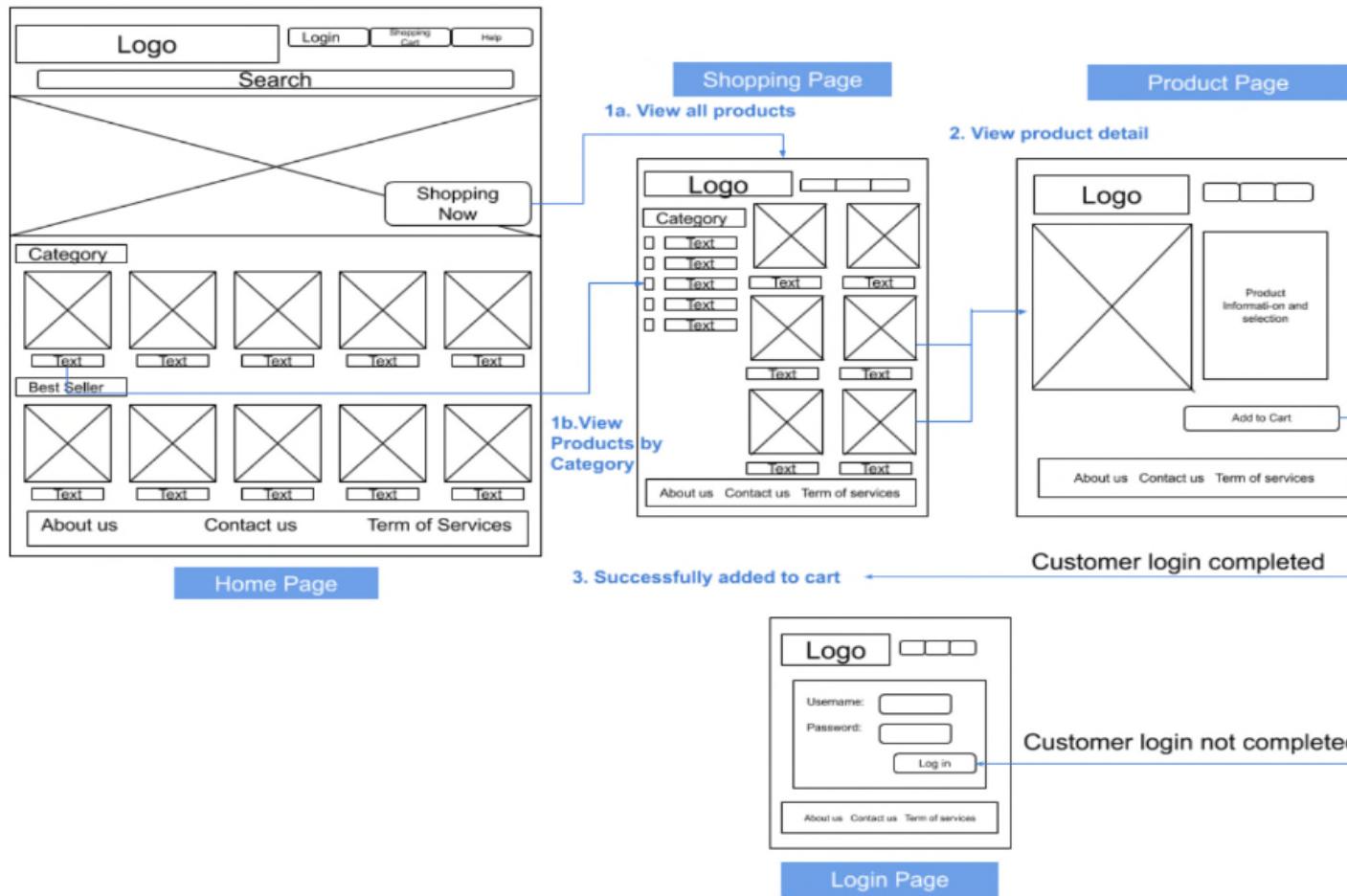
User select their seats in the theatre for booking and click on "Add Booking".

Upon clicking, user will have the booking added for confirmation.
It will prompt user if they would like to make more bookings for other movies or proceed to confirm bookings.

If they chosen not to add more bookings, they will be redirected to "My Bookings" page for ticket confirmation

Sample Storyboards

Scenario 3: Customers add product(s) into Shopping Cart



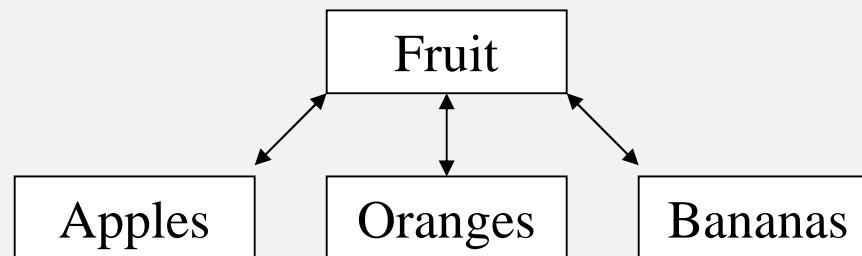
Card Sorting

- It helps to determine the best **Site Map structure**.
- Example

suppose your site starts with the following content:

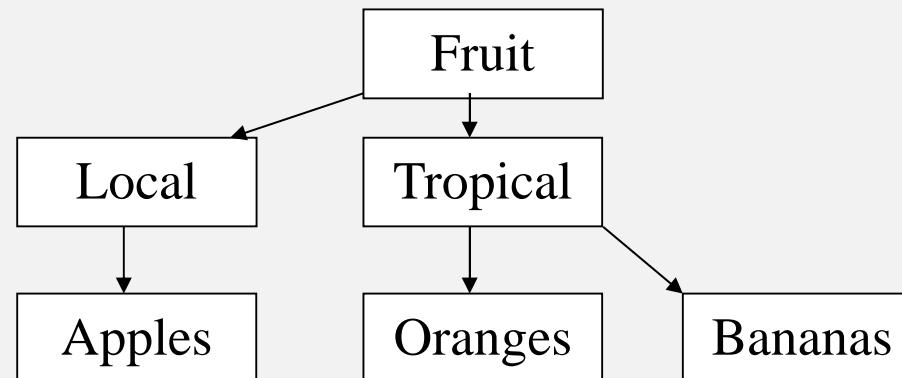


- for a grocery site:

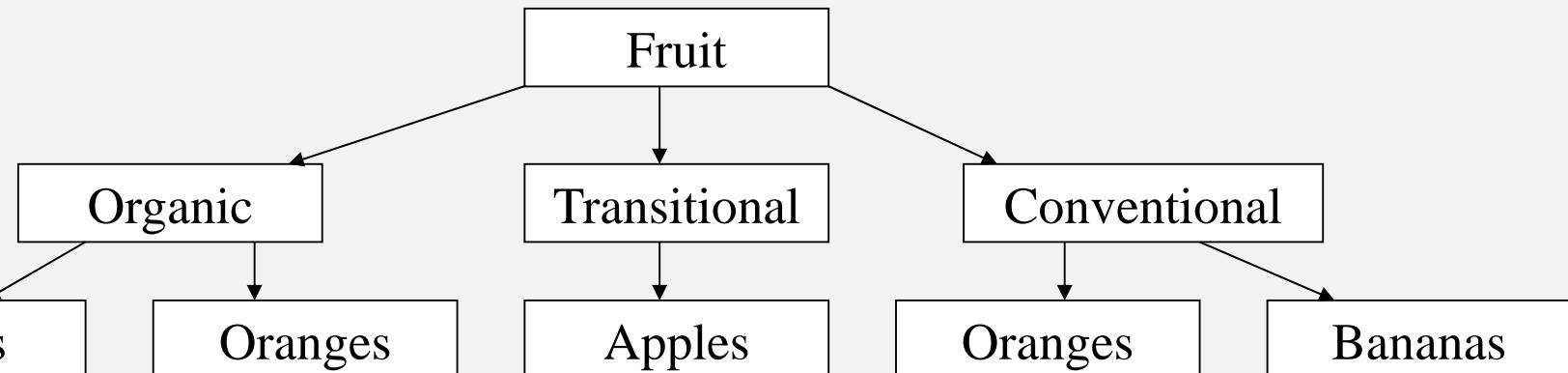


Card Sorting

- If customers were particularly concerned about freshly picked, locally grown fruit,



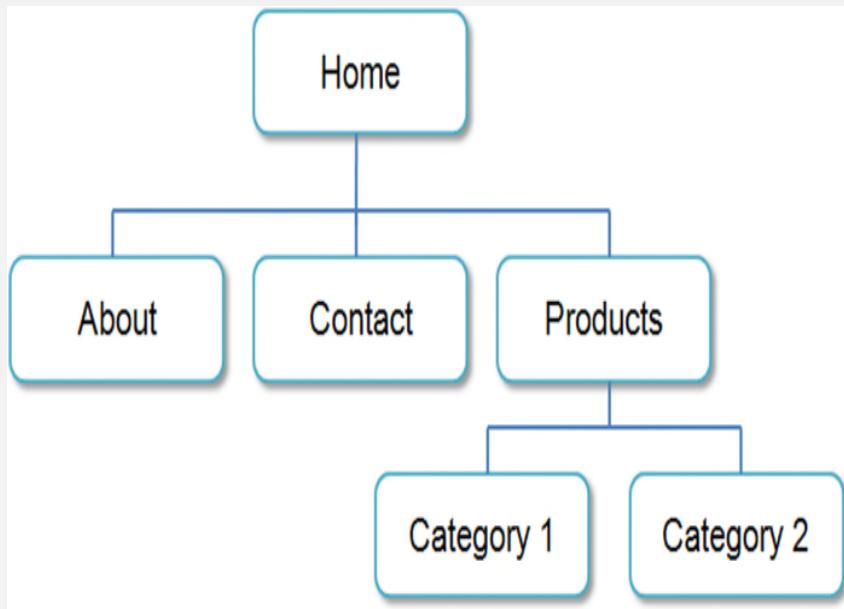
- If customers were concerned about pesticide use,



Website Organization

- Hierarchical
- Linear
- Random

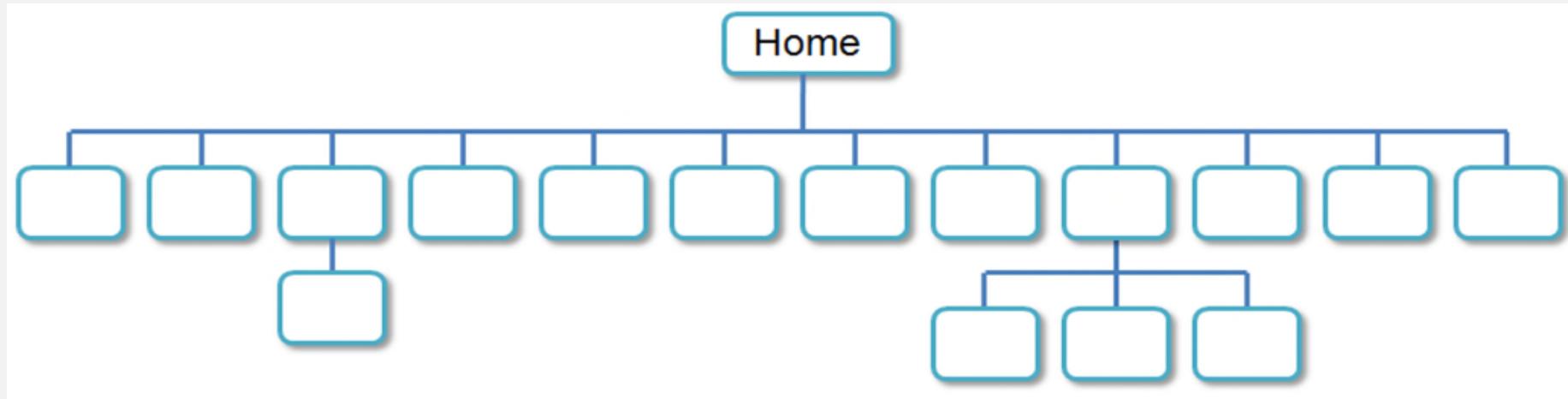
Hierarchical Organization



- A clearly defined **home page**
- Navigation links to major site sections
- Often used for **commercial and corporate** websites

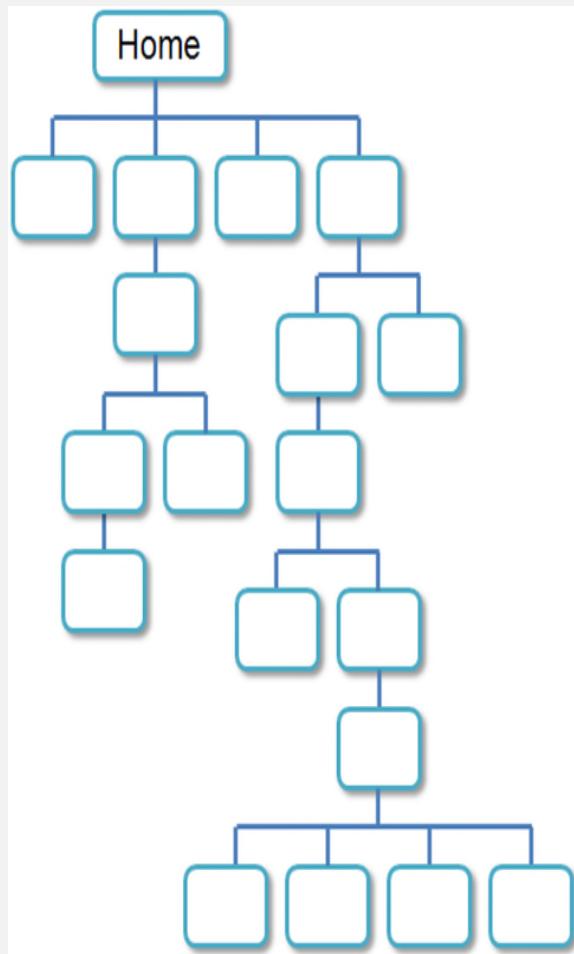
Site Map

Hierarchical: Too Shallow



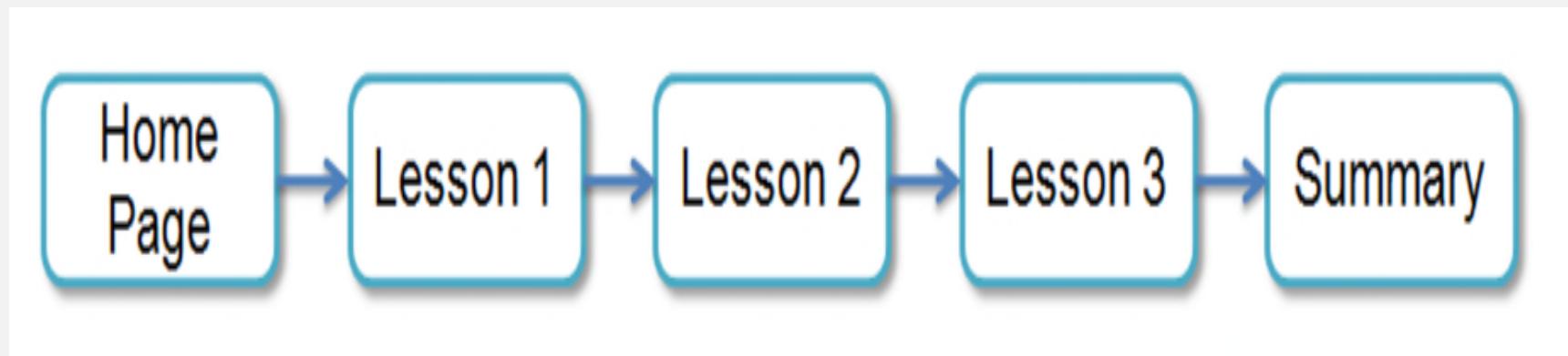
- Be careful that the organization is **not too shallow**.
- **Too many immediate choices** → a confusing and less usable website.
- Group, or “chunk”, related areas

Hierarchical: Too Deep



- Be careful that the organization is not too deep.
 - This results in **many “clicks”** needed to drill down to the needed page.
 - User Interface **“Three Click Rule”**
 - A web page visitor should be able to get from any page on your site to any other page on your site with a **maximum of three hyperlinks**.

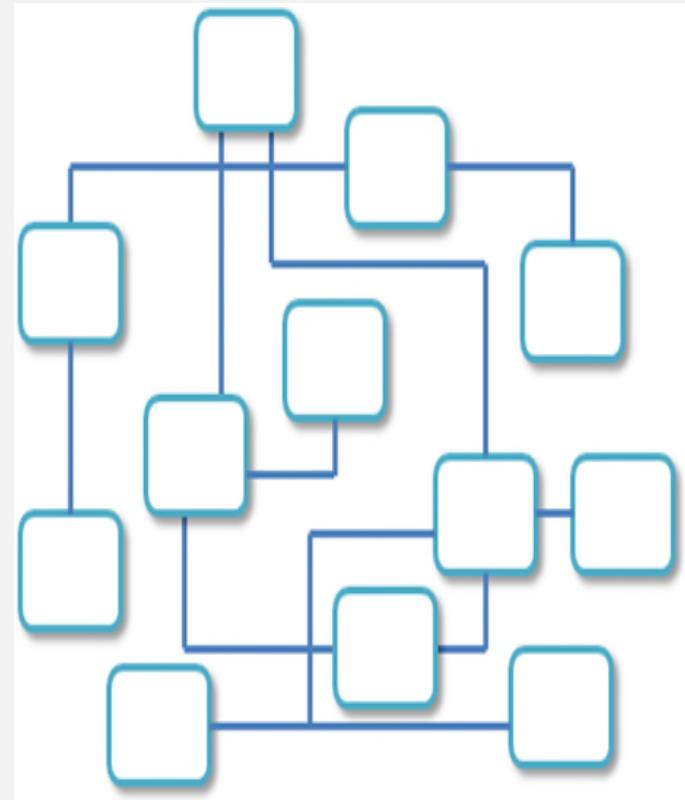
Linear Organization



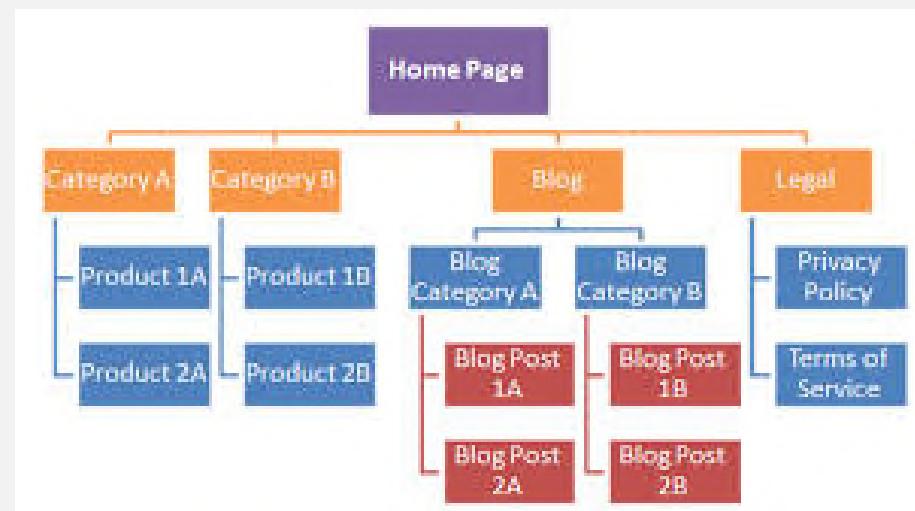
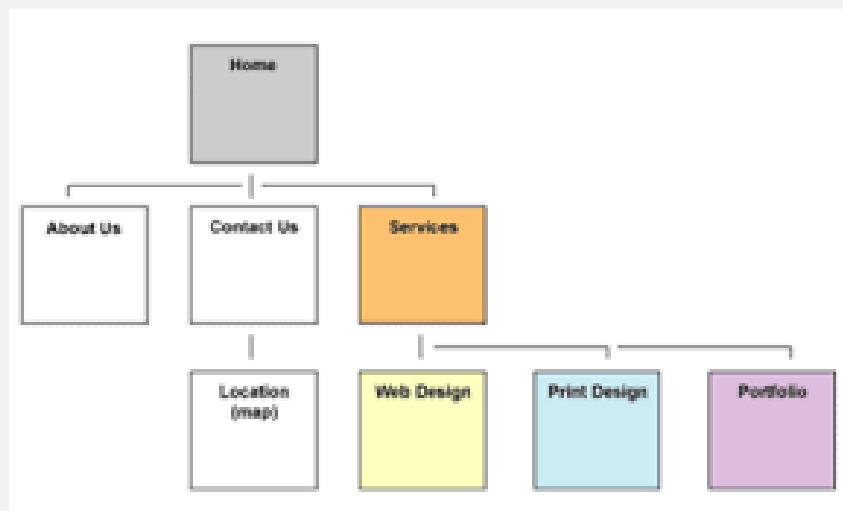
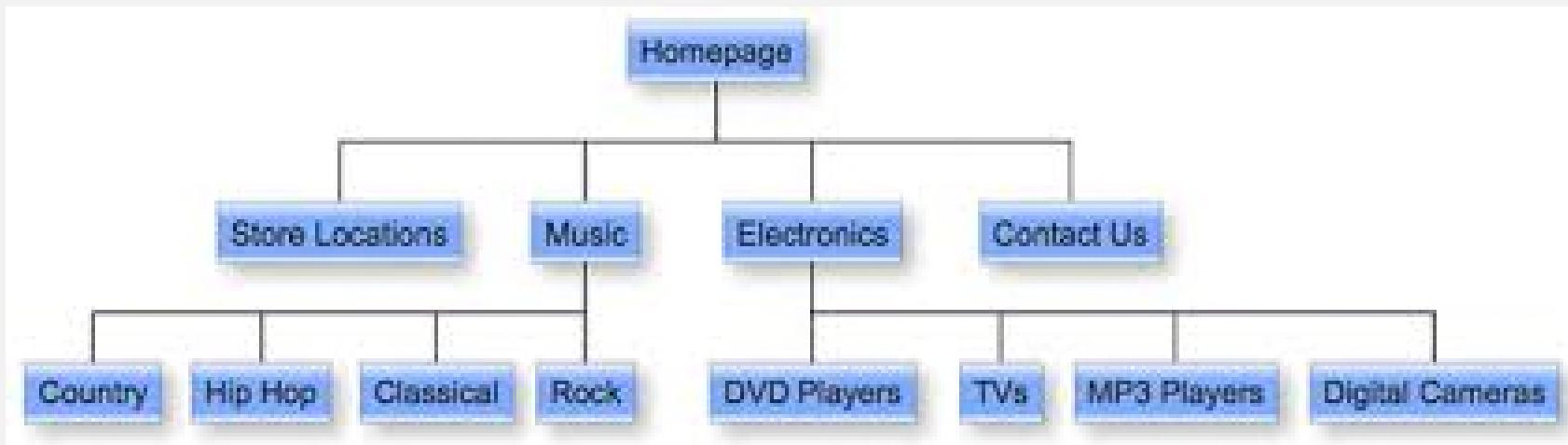
- A series of pages that provide a **tutorial, tour, or presentation.**
- **Sequential viewing**

Random Organization

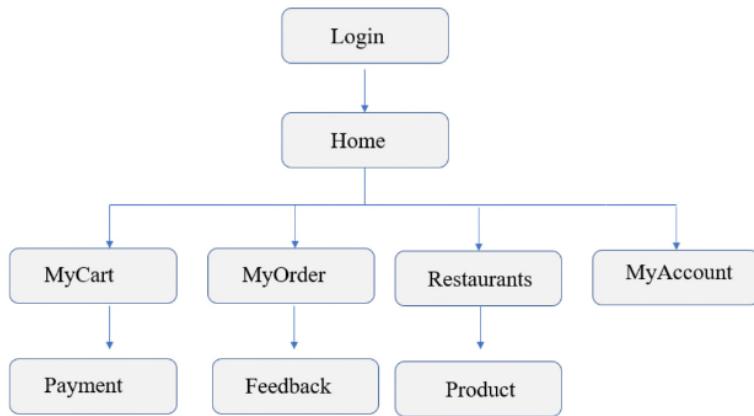
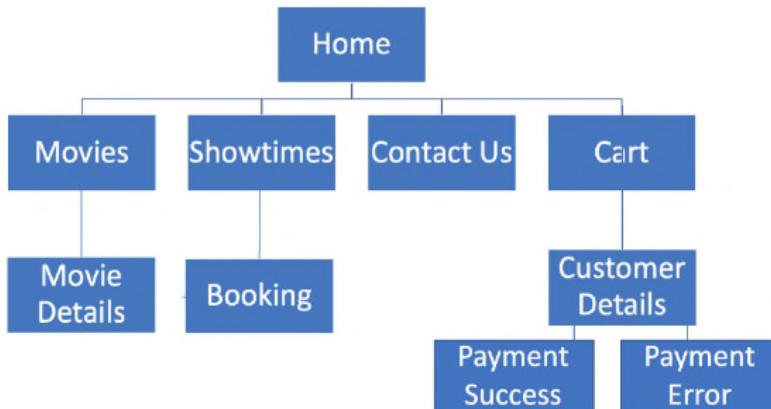
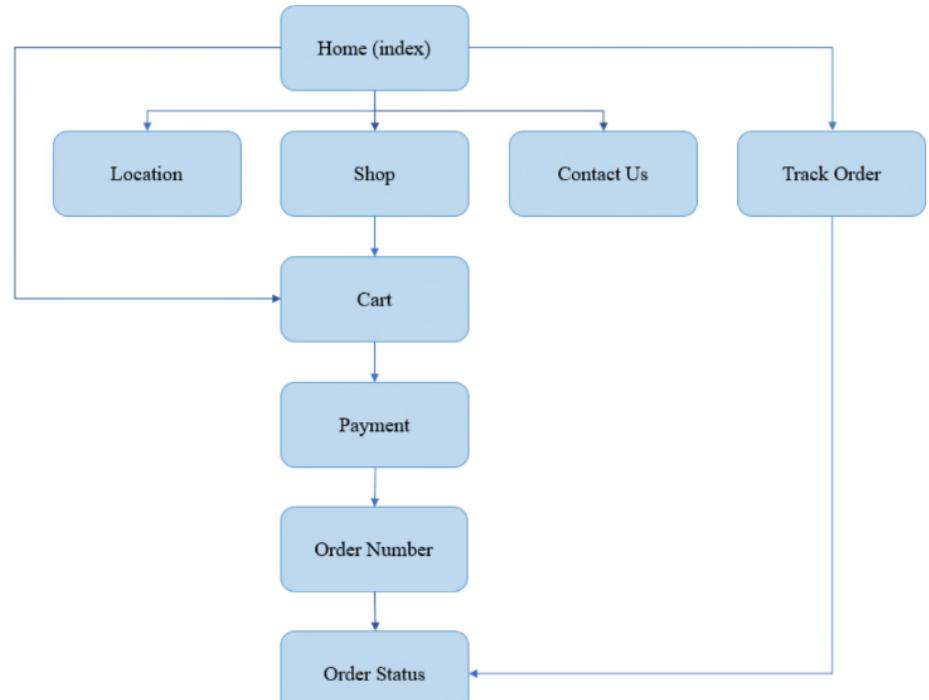
- Sometimes called “Web” Organization
- Usually there is no clear path through the site
- May be used with artistic or concept sites
- Not typically used for commercial sites



Sample Site Maps



Sample Site Maps

Site MapSite Map

Visual Design Principles

➤ Repetition

- Repeat visual elements throughout design

➤ Contrast

- Add visual excitement and draw attention

➤ Proximity

- Group related items

➤ Alignment

- Align elements to create visual unity



Writing for the Web

- Avoid long blocks of text
- Use bullet points
- Use headings and subheadings
- Use short paragraphs
- Use common fonts:
 - Arial, Helvetica, Verdana, Times New Roman
- Use appropriate text size:
 - medium, 1em, 100%
- Use appropriate line length
 - Between 50-75 characters is recommended
- Use strong contrast between text & background
- Use columns instead of wide areas of horizontal text

More Text Design Considerations

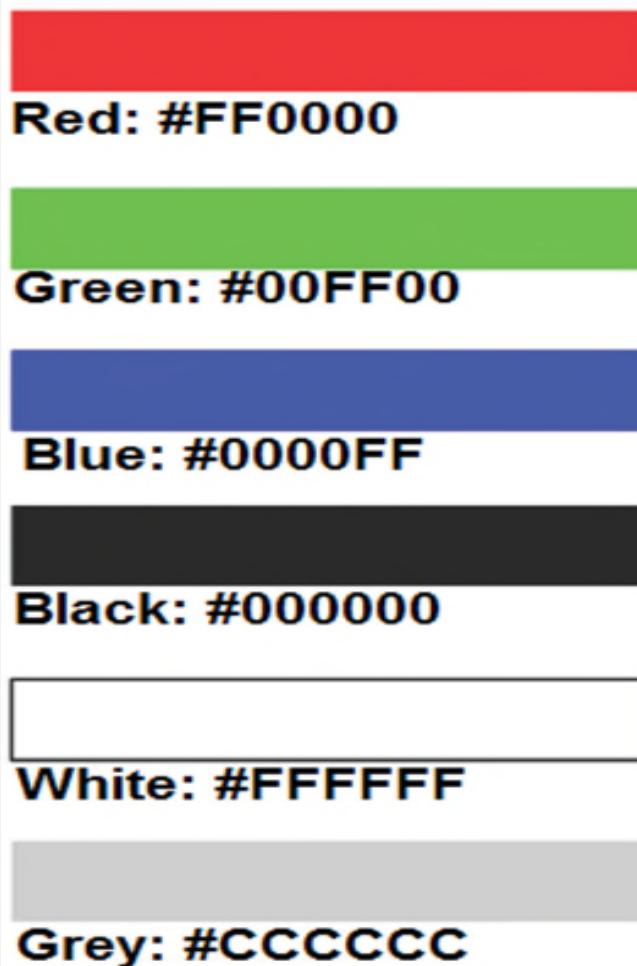
- Carefully choose text in hyperlinks
 - Avoid “**click here**”
 - Hyperlink key words or phrases (eg. Book Ticket)
 - Do not hyperlink entire sentences
- Chek yur spellin (Check your spelling !!)

Using Color on Web Pages

- Computer monitors display color as intensities of red, green, and blue light
- RGB Color
- The values of red, green, and blue vary from 0 to 255.
- Hexadecimal numbers (base 16) represent these color values.

#FFFFFF	#FFFFCC	#FFFF99	#FFFF66	#FFFF33	#FFFF00
#FFCCFF	#FFCCCC	#FFCC99	#FFCC66	#FFCC33	#FFCC00
#FF99FF	#FF99CC	#FF9999	#FF9966	#FF9933	#FF9900

Hexadecimal Color Values



- # indicates a hexadecimal value
- Hex value pairs range from 00 to FF
- Three hex value pairs describe an RGB color

Web Color Palette

#FFFFFF	#FFFFCC	#FFFF99	#FFFF66	#FFFF33	#FFFF00
#FFCCFF	#FFCCCC	#FFCC99	#FFCC66	#FFCC33	#FFCC00
#FF99FF	#FF99CC	#FF9999	#FF9966	#FF9933	#FF9900
#FF66FF	#FF66CC	#FF6699	#FF6666	#FF6633	#FF6600
#FF33FF	#FF33CC	#FF3399	#FF3366	#FF3333	#FF3300
#FF00FF	#FF00CC	#FF0099	#FF0066	#FF0033	#FF0000

- A collection of 216 colors
- Display the most similar on the Mac and PC platforms
- Hex values:
00, 33, 66, 99, CC, FF
- Color Chart : <http://webdevbasics.net/color>
- Color Picker : http://www.w3schools.com/colors/colors_picker.asp

Making Color Choices

- Color Theory:
 - the study of color and its use in design

- Color Wheel
 - Primary Colors
 - Secondary Colors
 - Tertiary Colors



Color Schemes Based on The Color Wheel (1)

- Monochromatic – shades, tints, or tones of the same color

<http://meyerweb.com/eric/tools/color-blend>



- Analogous – a main color and two colors adjacent to it on the color wheel



- Complementary – two colors that are opposite each other on the color wheel



Color Schemes Based on The Color Wheel (2)

- Split Complementary – a main color, the color opposite it on the color wheel (the complement) and two colors adjacent to the complement



- Triadic- three colors that are equidistant on the color wheel



- Tetradic – two complementary color pairs



Making Color Choices

- **How to choose a color scheme?**

- ▶ **Monochromatic**

- ▶ <http://meyerweb.com/eric/tools/color-blend>
 - ▶ <http://www.0to255.com>

- ▶ **Choose from a photograph or other image**

- ▶ <http://www.colr.org>

- ▶ **Begin with a favorite color**

- Use one of the sites below to choose other colors**

- ▶ <http://paletton.com>
 - ▶ <http://www.colorsontheweb.com/Color-Tools/Color-Wizard>

Use of Color

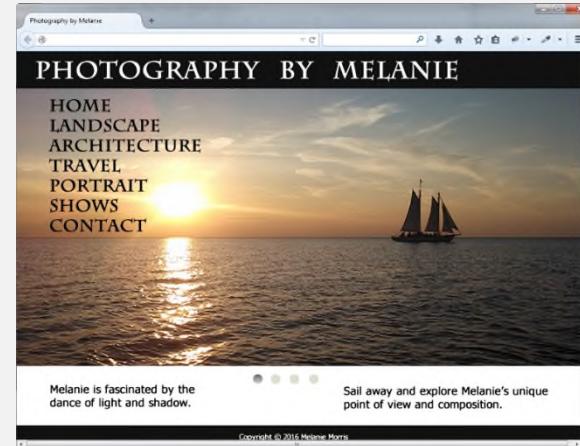


Appealing to Kids & Preteen

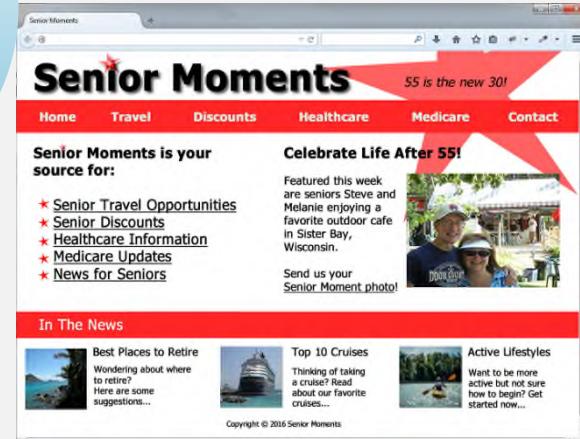


Appealing to Young Adults

Use
of
Color



Appealing to Everyone



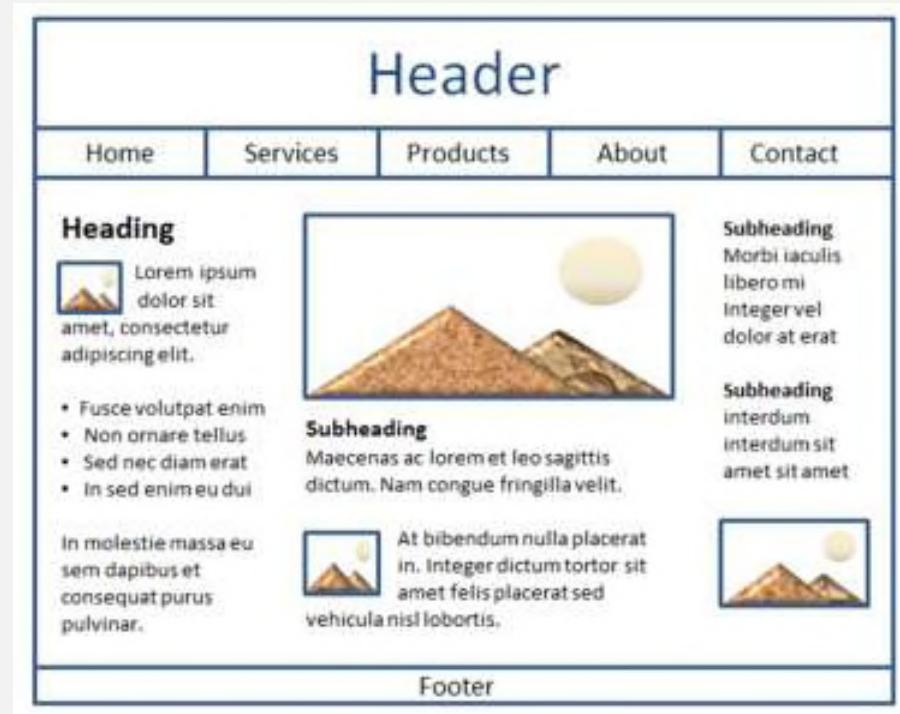
Appealing to Older Adults

Navigation Design

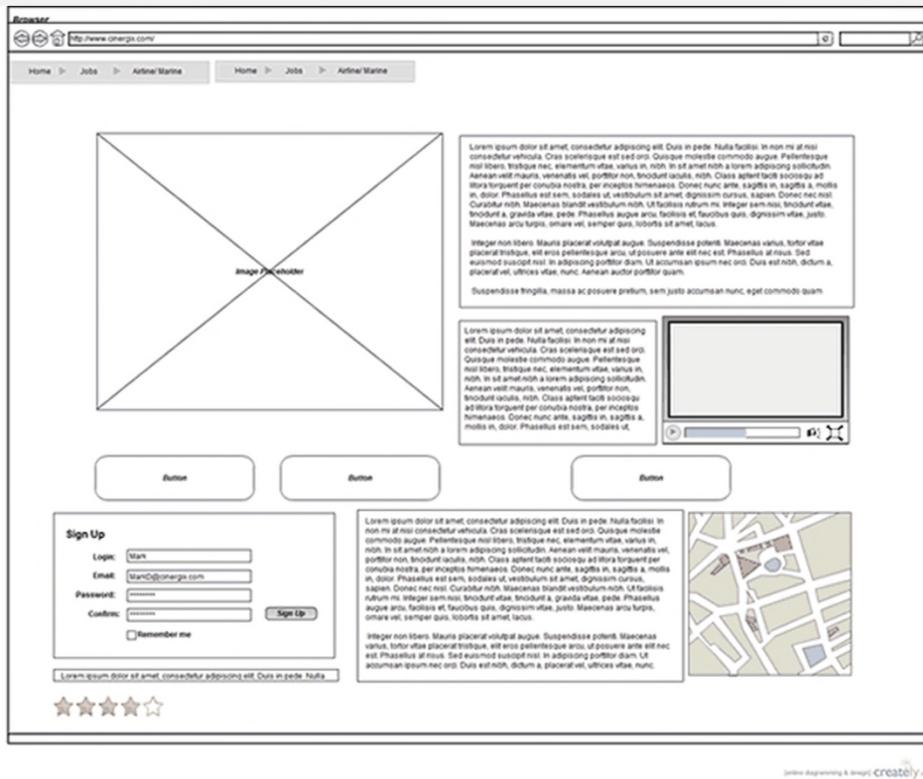
- Make your site easy to navigate
 - Provide clearly labeled navigation in the **same location on each page**
 - Most common – across **top or down, left side**
- Consider:
 - Navigation Bars
 - Breadcrumb Navigation
 - Using Graphics for Navigation
 - Dynamic Navigation
 - Site Map Links
 - Site Search Feature

Wireframe

- A **sketch** of blueprint of a web page
- Shows the **structure** of the basic page elements, including:
 - Logo
 - Navigation
 - Content
 - Footer



Sample Wireframes



music store

Home --> Music --> Genre --> Artist

[Log out](#) [Your Cart](#) [Your account](#)

ARTIST NAME

This is a description about the artist. This will talk about their bio and short listing of their discography

Choose an album:

- Album Title 1
- Album Title 2
- Album Title 3

CD **Tape** **LP**

Price: \$16.99

Add to Cart

1 For Q1 release, music search only

2 Related artists determined by user purchasing data mining

3 Album art to be approved by legal

Search

artist name

Related Artists

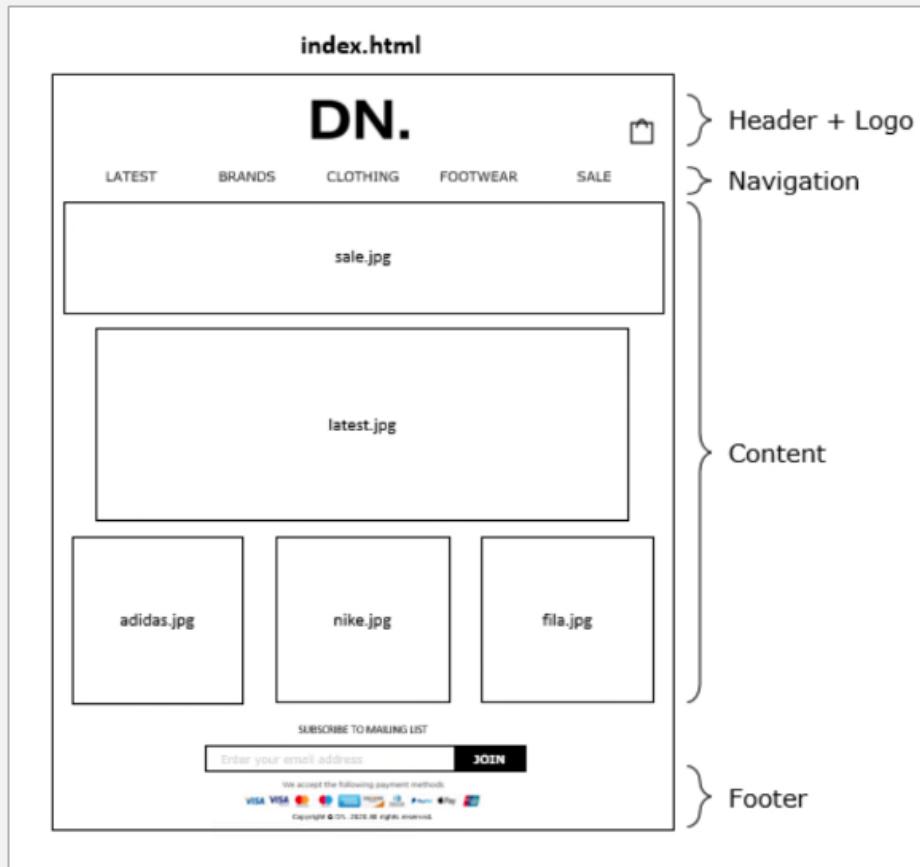
[Artist 1](#) [Artist 2](#)

Popular Tracks

Track 1 [Listen](#) Track 2 [Listen](#)

send me updates on this artist

Sample Wireframes



The wireframe for the movie booking application includes:

- Header:** LOGO, Movies, Check Booking, Book Tickets.
- Background:** A placeholder for a movie poster.
- Movie Title:** Movie Title, Short description of movie, Short description of movie, Short description of movie, Short description of movie, Short description of movie.
- Buttons:** Book Ticket.
- Section:** Now Showing, featuring two movie entries.
- Movie Entry:** Movie Title (e.g., PG), Genre1 | Genre2, Short Movie Description, View More, Book Ticket, Movie Poster.
- Footer:** Footer information, Copyright notice, and links to Movies, Check Bookings, and Book Ticket.

Sample Wireframes

3.3.6 Category Page

Laptop

	Product Name 1 4.0 ★★★★☆ Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.....	\$250 <input type="button" value="Add to cart"/> <input type="button" value="Add to wishlist"/>
	Product Name 2 4.0 ★★★★☆ Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.....	\$250 <input type="button" value="Add to cart"/> <input type="button" value="Add to wishlist"/>
	Product Name 3 4.0 ★★★★☆ Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.....	\$250 <input type="button" value="Add to cart"/> <input type="button" value="Add to wishlist"/>

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Email: IT@gmail.com
Phone: +65 83017281

Followed us on social media

Copyright © 2020 All Rights Reserved

Site Logo

Stalls | Feedback | Login | Cart

Stall Menu

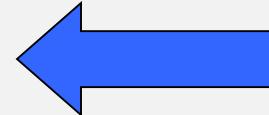
	Food Item #1 Description <input type="button" value="Add to Cart"/>		Food Item #2 Description <input type="button" value="Add to Cart"/>
--	---	--	---

Stall Page

Web Page Design Page Layout (1)

- Place the most important information "above the fold"
- Use adequate "white" or blank space
- Use an interesting page layout

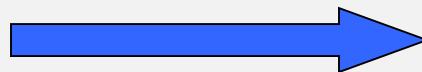
Header				
Home	Services	Products	About	Contact
Heading Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam laoreet mi sed sapien tristique et cursus lorem venenatis. Curabitur fermentum purus ut odio sodales consectetur interdum purus dictum. Donec ac purus a lectus rutrum auctor quis sed justo. In sed enim eu dui posuere lobortis id eget diam.				
Subheading Maecenas ac lorem et leo sagittis dictum. Nam congue fringilla velit, at bibendum nulla placerat in. Integer dictum tortor sit amet felis placerat sed vehicula nisi lobortis. <ul style="list-style-type: none">• Fusce volutpat enim ut felis tincidunt.• Non ornare tellus commodo.• Sed nec diam erat. Morbi iaculis libero mi. Integer vel dolor at erat interdum interdum sit amet sit amet ligula. In molestie massa eu sem dapibus et consequat purus pulvinar.				
Footer				



This is usable, but **a little boring**. See the next slide for improvements in page layout.

Web Page Design Page Layout (2)

Better



Columns make the page more interesting and it's easier to read this way.

Header				
Home	Services	Products	About	Contact
	Subheading Maecenas ac lorem et leo sagittis dictum. Nam congue fringilla velit, at bibendum nulla placerat in. Integer dictum tortor sit amet felis placerat sed vehicula nisl lobortis. Heading Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam laoreet mi sed sapien tristique et cursus lorem venenatis. <ul style="list-style-type: none">• Fusce volutpat enim ut felis tincidunt.• Non ornare tellus commodo.• Sed nec diam erat.	Subheading Morbi iaculis libero mi. Integer vel dolor at erat interdum interdum sit amet sit amet ligula.	Subheading In molestie massa eu sem dapibus et consequat purus pulvinar.	Subheading Donec ac purus a lectus rutrum auctor quis sed justo.
Footer				

Web Page Design Page Layout (3)

Best

Columns of **different widths**, interspersed with **graphics and headings** create the most interesting, easy to read page.

Header				
Home	Services	Products	About	Contact
Heading  Lorem ipsum dolor sit amet, consectetur adipiscing elit.	 Subheading Maecenas ac lorem et leo sagittis dictum. Nam congue fringilla velit.	Subheading Morbi iaculis libero mi Integer vel dolor at erat	Subheading interdum interdum sit amet sit amet	 Subheading At bibendum nulla placerat in. Integer dictum tortor sit amet felis placerat sed vehicula nisl lobortis.
In molestie massa eu sem dapibus et consequat purus pulvinar.				
Footer				

Header	
Home	
Services	
Products	
About	
Contact	
 Heading Lorem ipsum dolor sit amet, consectetur adipiscing elit. et ipsum dolor sit amet, consectetur adipiscing elit.	 Subheading Morbi iaculis libero mi Integer vel dolor at erat
 Subheading interdum etu interdum sit amet sit amet	 Subheading Fusce volutpat enim
	Subheading Non ornare tellus
	Subheading Sed nec diam erat
	Subheading In sed enim eu dui
Footer	

Page Layout Design Techniques

Fixed Layout

- AKA rigid or “ice” design
- Fixed-width often at left margin



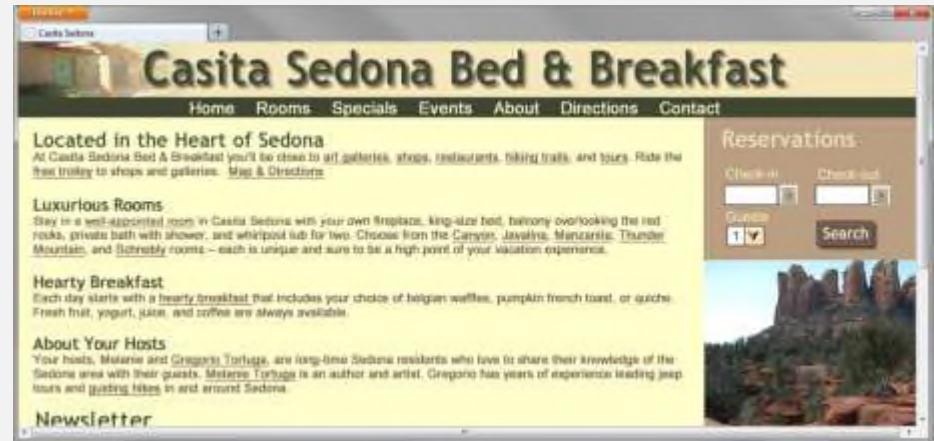
- More appealing if fixed with **content centered**



Page Layout Design Techniques

Fluid Layout

- AKA “liquid” design
- Expands to fill the browser at all resolutions.



Adaptation:

- Page content typically **centered**, with a **percentage width** (such as 80%)
- Set **Minimum width**

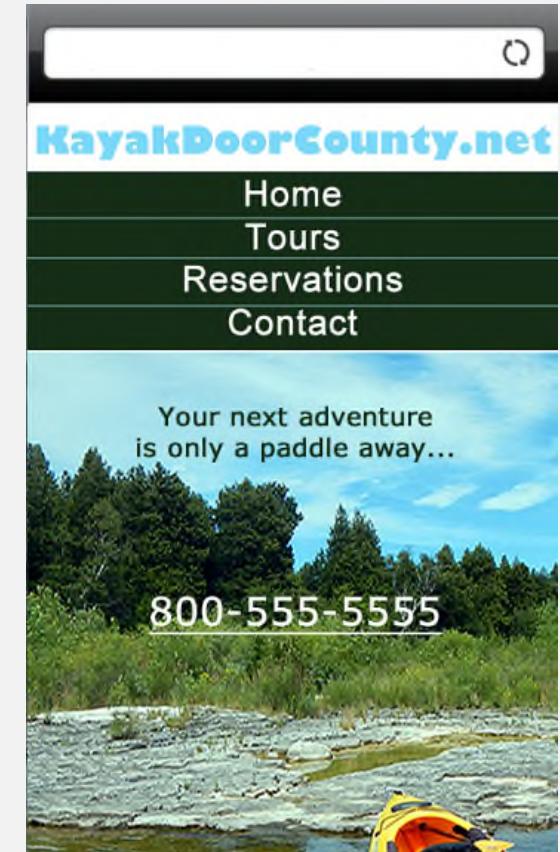


Responsive Web Design

- Ethan Marcotte, noted web developer
<http://alistapart.com/article/responsive-web-design>
- Progressively enhancing a web page for different viewing contexts (such as smartphones and tablets) through the use of coding techniques, including **flexible layouts** and **media queries**.
- Coding techniques to configure **responsive web page** layouts that display differently on desktop browsers and mobile devices will be needed

Mobile Design Quick Checklist

- Small screen size
- Bandwidth issues
- Single-column layout
- Maximize contrast
- Optimize images for mobile display
- Descriptive alternate text for images
- Avoid display of non-essential content



Web Design - Best Practices Checklist

<http://terrymorris.net/bestpractices>

- Page Layout
- Browser Compatibility
- Navigation
- Color and Graphics
- Multimedia
- Content Presentation
- Functionality
- Accessibility

Final Words on design

- Avoid Computer-Based Tools in the Early Design Stages
- Designer who work out conceptual ideas **on paper** tend to iterate more and explore the design space **more broadly**. Using computer-based tools tend to take only one idea and work it out in detail.
- When should you move to computer-base tools?
 - when you absolutely must save designs and email them to others.