Web Design Principles

UNIT - 1

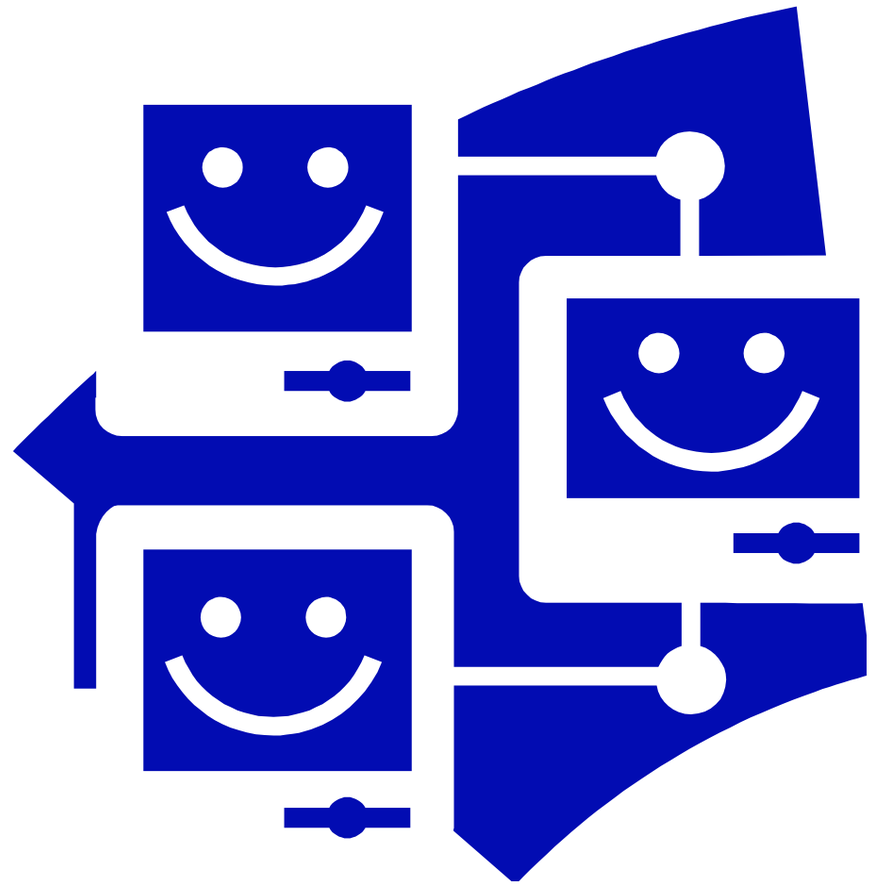
Brief History of Internet

What is the Internet?

- Plain and simple:
  - ✓ A worldwide system of interconnected networks and computers.

What is a Network?

- A computer network is an interconnection of a group of computers.



The Internet was an Accident!

- The Internet was a result of an unsuccessful military and academic research program!

Why is it called the Internet?

- Short for "internetworking."

What is the Internet?

- It is the largest network in the world that connects hundreds of thousands of individual networks all over the world.
- The popular term for the Internet is the "information highway".
- Rather than moving through geographical space, it moves your ideas and information through cyberspace – the space of electronic movement of ideas and information.

What is the Internet?

- No one owns it
- It has no formal management organization.
  As it was originally developed by the Department of defence, this lack of centralization made it less vulnerable to wartime or terrorist attacks.
- To access the Internet, an existing network need to pay a small registration fee and agree to certain standards based on the TCP/IP (Transmission Control Protocol/Internet Protocol)

Brief History of the Internet

- 1968 - DARPA (Defense Advanced Research Projects Agency) contracts with BBN (Bolt, Beranek & Newman) to create ARPAnet
- 1970 - First five nodes:
  - ✓ UCLA
  - ✓ Stanford
  - ✓ UC Santa Barbara
  - ✓ U of Utah, and
  - ✓ BBN
- 1974 - TCP specification by Vint Cerf
- 1984 – On January 1, the Internet with its 1000 hosts converts all together using TCP/IP for its messaging

A Brief Summary of the Evolution of the Internet

Memex Conceived 1945

A Mathematical Theory of Communication 1948

Silicon Chip 1958

First Vast Computer Network Envisioned 1962

Packet Switching Invented 1964

Hypertext Invented 1965

ARPANET 1969

TCP/IP Created 1972

Internet Named and Goes TCP/IP 1984

WWW Created 1989

Mosaic Created 1993

Age of eCommerce Begins 1995

1945

1995

Internet Growth Trends

- 1977: 111 hosts on Internet
- 1981: 213 hosts
- 1983: 562 hosts
- 1984: 1,000 hosts
- 1986: 5,000 hosts
- 1987: 10,000 hosts
- 1989: 100,000 hosts
- 1992: 1,000,000 hosts
- 2001: 150 – 175 million hosts
- 2002: over 200 million hosts
- By 2010, about 80% of the planet will be on the Internet

The uses of the Internet

- Send e-mail messages.
- Send (upload) or receive (down load) files between computers.
- Participate in discussion groups, such as mailing lists and newsgroups.
- Surfing the web.

What is Web?

- TheWeb(WorldWideWeb)consists of information organized into Web pages containing text and graphic images.
- It contains hyper text links, or highlighted keywords and images that lead to related information.
- A collection of linked Web pages that has a common theme or focus is called a **Web site**.
- The main page that all of the pages on a particular Web site are organized around and link back to is called the site's **home page**.

How to access the Internet?

- Many schools and businesses have direct access to the Internet using special high- speed communication lines and equipment.
- Students and employees can access through the organization's local area networks (LAN) or through their own personal computers.
- Another way to access the Internet is through Internet Service Provider (ISP).

How to access the Internet?

- To access the Internet, an existing network need to pay a small registration fee and agree to certain standards based on the TCP/IP (Transmission Control Protocol/Internet Protocol) reference model.
- Each organization pays for its own networks and its own telephone bills, but those costs usually exist independent of the internet.
- The regional Internet companies route and forward all traffic, and the cost is still only that of a local telephone call.

Internet Service Provider (ISP)

- A commercial organization with permanent connection to the Internet that sells temporary connections to subscribers.
- Examples:
  - ✓ Prodigy, America Online, Microsoft network, AT&T Networks.

How to access the Web?

- Once you have your Internet connection, then you need special software called a browser to access the Web.
- Web browsers are used to connect you to remote computers, open and transfer files, display text and images.
- Web browsers are specialized programs.
  - ✓ Examples of Web browser: Mozilla Firefox, Netscape Navigator (Navigator), Google Chrome, Opera and Internet Explorer.

Client/Server Structure of the Web

- Web is a collection of files that reside on computers, called **Web servers**, that are located all over the world and are connected to each other through the Internet.
- When you use your Internet connection to become part of the Web, your computer becomes a **Web client** in a worldwide client/server network.
- A **Web browser** is the software that you run on your computer to make it work as a web client.

Hypertext Markup Language (HTML)

- The public files on the web servers are ordinary text files, much like the files used by word- processing software.
- To allow Web browser software to read them, the text must be formatted according to a generally accepted standard.
- The standard used on the web is Hypertext markup language (HTML).

Hypertext Markup Language (HTML)

- HTML uses codes, or tags, to tell the Web browser software how to display the text contained in the document.
- For example, a Web browser reading the following line of text:

  ✓ <B> A Review of the Book<I>Wind Instruments of the 18th Century</I></B>

  ✓ Recognizes the <B> and </B> tags as instructions to display the entire line of text in bold and the <I> and </I> tags as instructions to display the text enclosed by those tags in italics.

Addresses on the Web:IP Addressing

- Each computer on the internet does have a unique identification number, called an IP (Internet Protocol) address.
- The IP addressing system currently in use on the Internet uses a four-part number.
- Each part of the address is a number ranging from 0 to 255, and each part is separated from the previous part by period,
  - ✓ For example, 192.29.242.17

IPv4 Addressing

- The combination of the four IP address parts provides 4.2 billion possible addresses (256 x 256 x 256 x 256).
- This number seemed adequate until 1998.
- Members of various Internet task forces are working to develop an alternate addressing system that will accommodate the projected growth.
- However, all of their working solutions require extensive hardware and software changes throughout the Internet.

IPv6 Addressing

- IPv6 is the next generation Internet protocol which will eventually replace the current protocol IPv4.
- With IPv6, there is a total of 18,446,744,073,709,551,616 IP addresses in a single /64 allocation.
- 128-bit address Represented in hexadecimal
- Represented in Hex (every 4 bits)
  - ✓ 3FFE:80F0:0002:0000:0000:0010:0000:0000

IPv6 Addressing

128-bit IPv6 Address

3FFE:085B:1F1F:0000:0000:0000:00A9:1234

8 groups of 16-bit hexadecimal numbers separated by “:”

Leading zeros can be removed

3FFE:85B:1F1F::A9:1234

:: = all zeros in one or more group of 16-bit hexadecimal numbers

Domain Name Addressing

- Most web browsers do not use the IP address to locate Web sites and individual pages.
- They use domain name addressing.
- A **domain name** is a unique name associated with a specific IP address by a program that runs on an Internet host computer.
- This program, which coordinates the IP addresses and domain names for all computers attached to it, is called **DNS (Domain Name System) software**.
- The host computer that runs this software is called a **domain name server.**

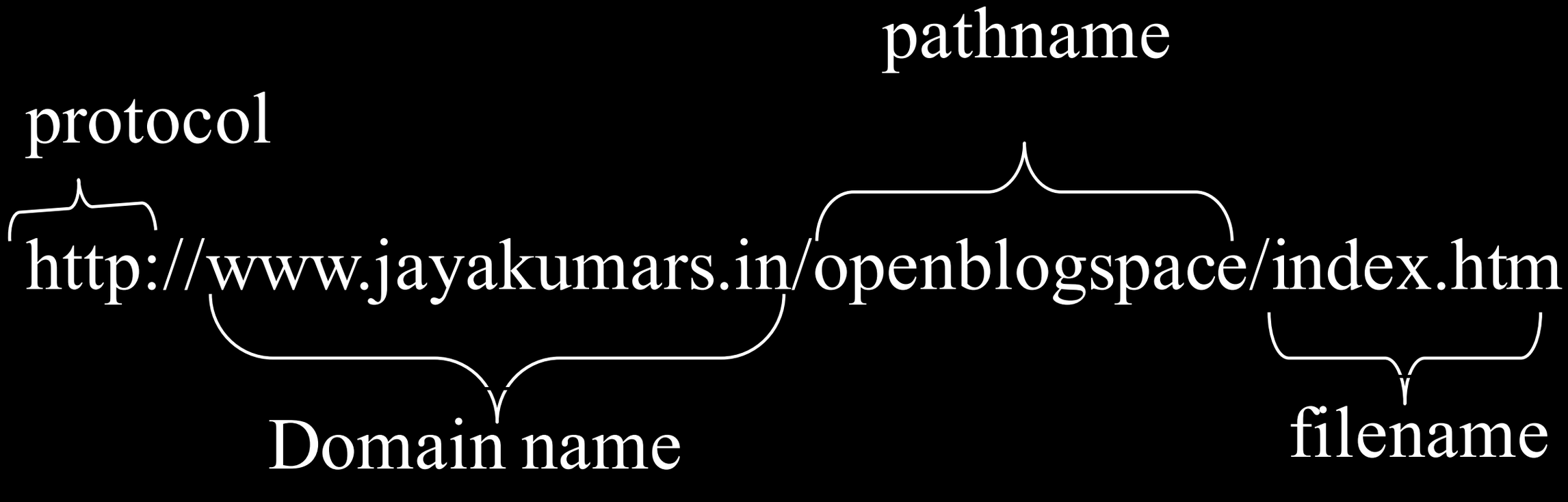
Domain Name Addressing

- Domain names can include any number of parts separated by periods, however most domain names currently in use have only three or four parts.
- Domain names follow hierarchical model that you can follow from top to bottom if you read the name from the right to the left.
- For example, the domain name gsb.uchicago.edu is the computer connected to the Internet at the Graduate School of Business (gsb), which is an academic unit of the University of Chicago (uchicago), which is an educational institution (edu).
- No other computer on the Internet has the same domain name.

Uniform Resource Locators

- The IP address and the domain name each identify a particular computer on the Internet.
- However, they do not indicate where a Web page's HTML document resides on that computer.
- To identify a Web pages exact location, Web browsers rely on Uniform Resource Locator (URL).
- URL is a four-part addressing scheme that tells the Web browser:
- What transfer protocol to use for transporting the file
- The domain name of the computer on which the file resides
- The pathname of the folder or directory on the computer on which the file resides
- The name of the file

Structure of a Uniform Resource Locators



http => Hypertext Transfer Protocol

HTTP

- The transfer protocol is the set of rules that the computers use to move files from one computer to another on the Internet.
- The most common transfer protocol used on the Internet is the Hypertext Transfer Protocol (HTTP).
- Two other protocols that you can use on the Internet are the File Transfer Protocol (FTP) and the Telnet Protocol

How to find information on the Web?

- A number of search tools have been developed and available to you on certain Web sites that provide search services to help you find information.
- Examples:
  - ✓ Jayakumar - www.jayakumars.in
  - ✓ Google - www.google.com

How to find information on the Web?

- You can find information by two basic means.
- Search by Topic and Search by keywords.
- Some search services offer both methods, others only one.
- Yahoo offers both.
- Search by Topic
- You can navigate through topic lists
- Search by keywords
- You can navigate by entering a keyword or phase into a search text box.

Principles of Web Design

Overview

- Characteristics of Web Pages
- Print vs. Web Pages
- Elements of Web Page Design
- Principles of Web Page Content
- Dos and Don’ts
- Website Reader Friendliness Checklist
- Exercise

Characteristics of Web Pages

- Create building blocks of a website, like a page in a book
- Require a browser such as Internet Explorer, Firefox etc to be viewed
- Contain HTML (hyper text markup language) code to define format and functions
- Include text, downloadable files, audio, video and animation in different formats
- Allow non linear navigation to other pages through hyperlinks

Print vs. Web Pages: Similarities

- Writing principles
  - ✓ Customized content for different user groups
  - ✓ Clear, concise, accurate, and relevant content
  - ✓ Simple and easy-to-understand language
- Design elements
  - ✓ Good typography
  - ✓ White space, emphasis, and contrast
  - ✓ Simple, clutter free page design and layout

Print vs. Web Pages:Differences

Features	Print Pages	Web Pages
Content	Uniform for all users	User specific content
Links and labels	Not available	Standard features
Navigation tools	Not available	Standard features
Distribution	Limited / local distribution	Global distribution
Sound and Animation	Not available	Available in different formats
Performance	Does not vary	Internet speed affects performance
Interactivity	Low volume and delayed response times	Instant response through email and message boxes

Elements of Web Page Design

- Emphasis
- Contrast
- Typography
- Color and Graphics
- Navigation
- Visual Balance

Elements of Web Page Design: Emphasis

- Communicates your message effectively
- Highlights placement of most important topics
- Determines information organization on the page
- Common ways to emphasize:
  - ✓ Use of white space to make elements stand apart
  - ✓ Bold, big, italics, different colors, borders, etc.
  - ✓ Effects (drop shadow, glow, texture), shapes, etc

Elements of Web Page Design: Contrast

- Generates visual interest by making page appealing
- Enables easy navigation and directs user to desired part of the page
- Common ways to contrast:
  - Use of white space, reverse text, larger size, italics
  - Borders, different colors, and effects
  - Distinct labels and links

Elements of Web Page Design: Typography

- Refers to the arrangement of text on a page
- Enhances readability and increases user friendliness
- Complements graphics and images to cultivate an image in the reader's mind
- Assists in conveying message you intend to convey (professional, recreational, whimsical, etc.)

Elements of Web Page Design: Typography (cont.)

- Rules to remember
  - ✓ Make content easily readable
  - ✓ Choose between mono-spaced and proportional text spacing and stick to the choice
  - ✓ Maintain a clean look by mixing serif and sans serif fonts
  - ✓ Use fonts no bigger than 14-18 pts or smaller than 12-10 pts for body text
  - ✓ Avoid dancing letters and words

Elements of Web Page Design: Typography (cont.)

- Rules to remember (cont.)
  - Choose fonts that
    - ✓ Fit the character of your site
    - ✓ Are easily readable on a computer screen
    - ✓ Are widely available across many browsers and operating systems
  - Provide alternatives for unsupported fonts on different browsers

Elements of Web Page Design: Typography (cont.)

- Rules to remember (cont.)
  - Use Cascading Style Sheets to define and set characteristics and effects to text
    - ✓ Define formatting of features in a web page such as fonts, color, weight, line spacing, indents, text transformation
    - ✓ Apply styles to a page using cascading styles hierarchy
    - ✓ Generate inconsistent results on different platforms due to lack of uniform browser support

Elements of Web Page Design: Color and Graphics

- Defines character and identity of the web page
- Draws eyes to page elements and enhances readability
- Impacts and influences reader's mind and opinion of the website (flashy or subdued)
- Adds recall value and draws association to ideas or brands (blue and yellow of Ikea.com)

Elements of Web Page Design: Color and Graphics (cont.)

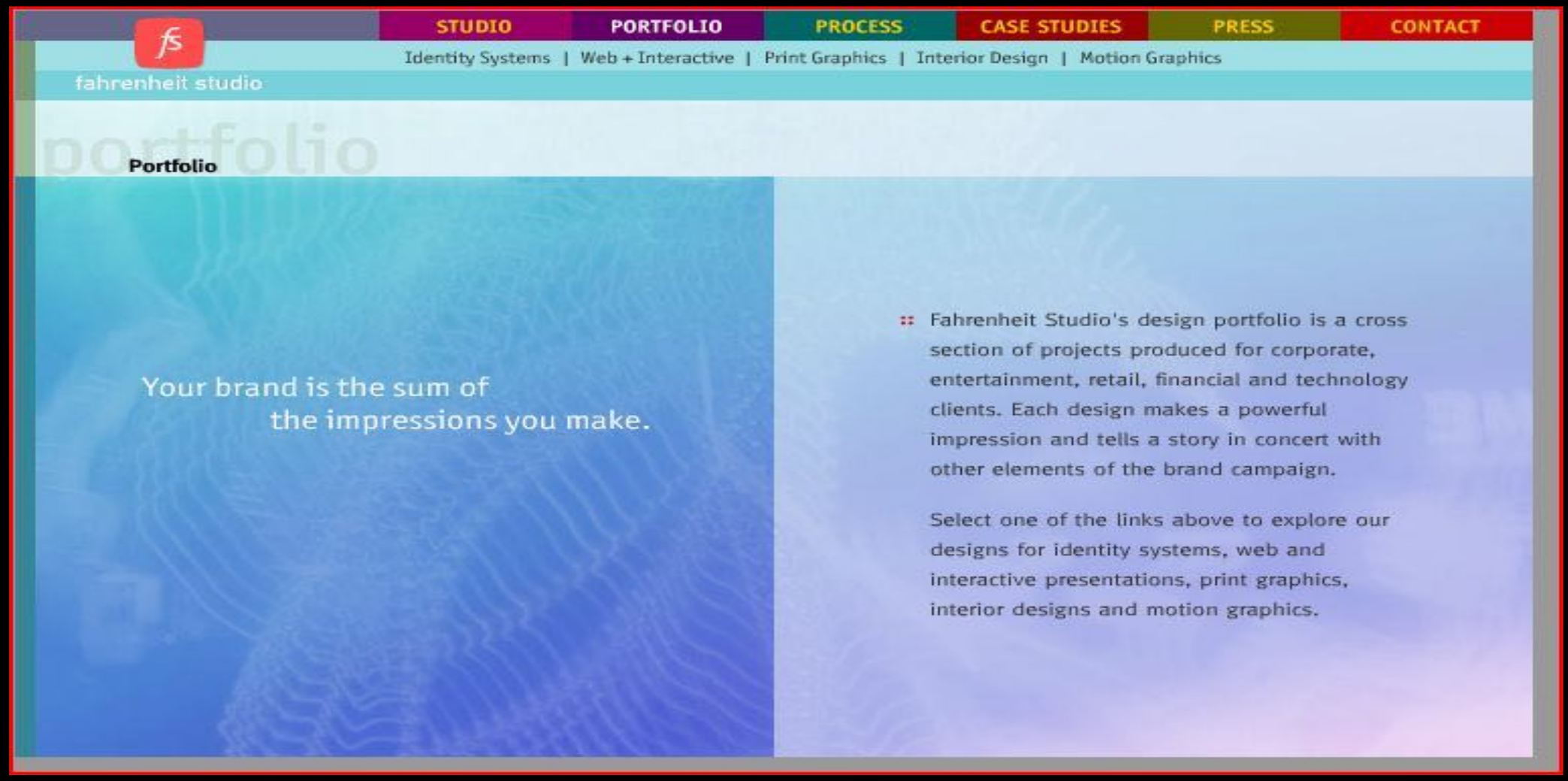
- Color - Rules to remember
  - Understand the color wheel and how to use color schemes
  - Limit mixing complementary colors such as blue and orange, green and red
  - Use black and white when in doubt
  - Test color schemes for readability by visually impaired readers
  - Provide alternate schemes for old computers

Elements of Web Page Design: Color – Example of Color Schemes

- Monochromatic: uses only one color with its different tints and shades. For example, www.abercrombie.com

Elements of Web Page Design:
Color – Example of Color Schemes (cont.)

- Analogous: uses three to five colors next to each other on the color wheel. For example, www.fahrenheit.com.



Elements of Web Page Design:
Color – Example of Color Schemes (cont.)

- Complementary: uses colors opposite to each other on the color wheel to provide stark contrast. For example, www.ezitsolutions.com.

Elements of Web Page Design: Graphics – Rules to Remember

- Graphics: Rules to remember
  - Use the right file format for different images
    - ✓ Graphic Interchange format (GIF) for non-photographic images up to 256 colors
    - ✓ Joint photographic experts group (JPEG) for photographs and images with rich and complex color variations
  - Place buttons and boxes at the top of the page
  - Use small but standard icons for recognizable concepts such as mail, home page, money, etc.

Elements of Web Page Design: Graphics – Rules to Remember (cont.)

- Graphics: Rules to remember (cont.)
  - Provide matching text links for every graphic link to help low bandwidth users
  - Use browser-safe colors for graphics and backgrounds
  - Make animated graphics turn off automatically to minimize distraction
  - Avoid dancing or flashing images

Elements of Web Page Design: Navigation

- Refers to the way a web page is structured for use
- Directs users to desired destination by providing visual clues
- Maintains user focus
- Makes all website features accessible
- Uses various tools depending on nature of content and target users

Elements of Web Page Design: Navigation (cont.)

- Rules to remember
  - Group navigation tools in one place
  - Keep tools vertically or horizontally aligned
  - Present all available features as buttons, bars, tabs, text links to help visual direction
  - Maintain consistent use of tools and terminology
  - Place ‘bread crumb trail’ visual clues to where the user is
  - Provide meaningful and relevant links

Elements of Web Page Design: Navigation

- Rules to remember (cont.)
  - Divide browser window into separate frames or sections to view graphics clearly
  - Create uniform information presentation to provide for different monitor settings
  - Use a site map or an index

Elements of Web Page Design: Visual Balance

- Refers to the combination of visual elements such as lines, images, text, shapes, and color on a page
- Keeps elements evenly distributed without leaning too much on any one in particular
- Common ways to achieve visual balance:
  - ✓ Placing elements based on how eyes scan and follow
  - ✓ Considering alignment, repetition, and proximity of elements
  - ✓ Using text links, navigation tools, graphics such as arrows, pointing fingers, curvy lines, etc.

Principles of Web Page Content

- Clarity
- Brevity
- Informality
- Accuracy
- Relevance
- Consistency
- Compatibility of layout and design

Principles of Web Page Content: Clarity

- Communicate the purpose of the page clearly
- Use simple but appropriate language
- Make content self explanatory
- Keep information well organized and labeled

Principles of Web Page Content: Brevity

- Use short sentence structures and small words
- Write visually scannable text
- Use bold phrases and bullet lists
- Write a blurb or summary of the page

Principles of Web Page Content: Informality

- Maintain an informal and conversational tone
- Make content interesting to explore
- Experiment with design and layout to distinguish page
- Provide forms for reader response and feedback

Principles of Web Page Content: Accuracy

- Check facts and figures before publishing
- Eliminate typos and grammatical errors
- Provide references for source material
- Eliminate misleading links and materials

Principles of Web Page Content: Relevance

- Identify target audience and customize pages to suit their needs
- Place the most relevant information at the top
- Keep information current and well updated
- Provide language options to make content reach a wider audience

Principles of Web Page Content: Consistency

- Use standard terminology and key words
- Use a consistent organization style for topics and headings
- Follow a style guide and use it uniformly

Principles of Web Page Content: Compatibility

- Integrate verbal and visual elements with content
- Provide textual context to graphics and images through callouts, labels, etc.
- Make content appropriate to page length
- Use a matching tone to the chosen visual themes

Do's

- Address the target audience directly
- Customize pages to suit different users
- Communicate with visual elements, such as white space, contrast, layout, etc.
- Provide alternate graphics and multimedia versions for low bandwidth users
- Keep the design user-friendly
- Provide consistent navigation tools

Do's (cont.)

- Provide 'breadcrumb' trails
- Provide links to other relevant sites
- Get consent before publishing outside material
- Test the site early and often to check functions, active links, and relevance
- Ask for user response or feedback
- Update often and publicize the site

Don’ts

- Don’t restrict or limit your audience
- Don’t make users think – make everything obvious and self explanatory
- Don’t abuse the reader’s patience; keep information straight forward
- Don’t make your site hard to navigate
- Don’t use large images/files that slow down browsing speeds

Don’ts (cont.)

- Don’t overuse multimedia and graphics
- Don’t fill pages with too much information
- Don’t use jarring colors and fonts
- Don’t keep inactive links
- Don’t publish outside content without consent

Website Reader Friendliness Checklist

- Does the site convey a clear sense of its intended audience?
- Does it use language in a way familiar to its readers?
- Is it conversational in tone?
- Is load time appropriate to content, even on a slow connection?
- Is there a response form for feedback?

Website Reader Friendliness Checklist (cont.)

- Does the site have a consistent, clearly recognizable "look and feel"?
- Does it make effective use of repeating visual themes to unify the site?
- Are links obvious in their intent and destination?
- Is there a convenient and easy way to maneuver among related pages and different sections ?
- Does the site make effective use of links to tie related items together?

Website Reader Friendliness Checklist (cont.)

- Is page length appropriate to site content?
- Is the site moderate in use of color?
- Does it avoid juxtaposing text and animations?