

## MULTIMEDIA ON THE WEB

**Introduction:** Audio, video, animation, and interactive games are referred to as multimedia. Some multimedia content, called streaming media, are embedded in a web page and begin to play when you access the page. Others require that you download the multimedia file to your computer first. Multimedia files often require that your browser use a plug-in program to play the file, like Quicktime or Flash. Plug-ins are small software programs that extend the capabilities of your browser by enabling it to play audio and video clips or do other functions, such as letting you play interactive games. Plug-ins may be already installed with your web browser. If you don't have the plug-in, you can easily download it from the Internet.

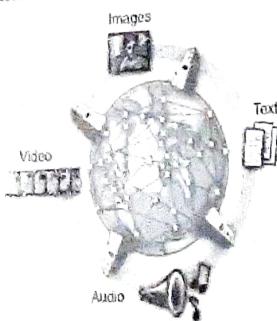


Fig. : Multimedia on the Web

### WWW Web Browsers

There are two types of web browsers, text based browsers (Lynx) and graphical browsers (IE). The first Internet browsers had support for text only (example Lynx browser), and even the text support was limited to a single font in a single color, and little or nothing else. Then came web browsers with support for colors, fonts and text styles, and the support for pictures was added. The support for sounds, animations and videos is handled in different ways by different graphical browsers. Some elements can be handled inline, some requires a plug-in and some requires an ActiveX control.

**Definition:** "A web browser is the software program used to access the World Wide Web. A browser (also known as client software) retrieves data from remote web servers, assembles it, then displays a web page."

The two most popular browsers are Microsoft Internet Explorer (IE) and Mozilla Firefox (FF). Browsers basically work the same way. Once you know one, you can easily use others. Graphics Web browser support all element of multimedia such as text, graphics, sound/audio, video and animation so first of all we are going to explain some popular graphics web browsers.

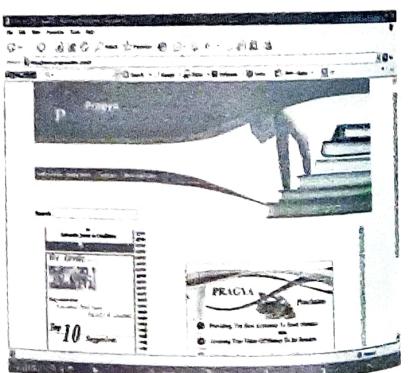
Following is a list of the popular graphics web browsers:

1. Internet Explorer (IE)
2. Mozilla Firefox
3. Netscape Navigator
4. Opera Web browser
5. Apple Safari
6. Google Chrome

### The Internet Explorer Browser

Let us see "What is Internet Explorer Browser?"

**Definition:** "Microsoft Internet Explorer (IE) is one of the most popular Web browser today. IE was introduced in 1995 and passed Netscape in popularity in 1998."



**Internet Explorer 8:** Internet Explorer 8 was released on March 19th 2009. Microsoft claims that their new browser is faster, safer, and has better support for W3C standards. Following are the new features of the Internet Explorer 8:

1. **Accelerators** - quick access to web services. On a restaurant web site, for example, you can click within the page to get maps, news, information about the restaurant, blog about it, or share it on Facebook
2. **Web Slice** - keep up with changes to the sites you care about most
3. **Compatibility View** - for web pages designed for older browsers
4. **Search Suggestions** - get suggested content as you type
5. **New Tab features** - allow you to open accidentally closed tabs, and group related tabs together using color codes
6. **Tab isolation** - prevents a faulty web site from crashing the whole browser. Only the tab with the faulty page will close
7. **InPrivate** - browsing the web without saving any data (like passwords, cookies, browsing history, etc.)
8. **SmartScreen** - protects you against installation of malware, or malicious software which can compromise your data, privacy, and identity, and also damaging your computer and valuable data

**Internet Explorer 7:** Internet Explorer 7.0 was released in November 2006, and became the standard browser in Windows XP with Service Pack 2. Internet Explorer 7 provides tabbed browsing, web search from the toolbar, advanced printing, easy discovery, reading and subscription to RSS feeds.

### Mozilla Firefox Browser

Let us see "What is Firefox browser?"

Firefox is a browser from Mozilla. It was released in 2004 and is one of the most popular browser today.

**Definition:** "Firefox is a popular, free, open-source web browser developed by Mozilla. It is small and fast."

Firefox is based on the Mozilla code, and is one of the most standards-compliant browsers available. Firefox is available for Windows 98, Windows 2000, Windows XP, Windows Vista, Mac OS X, and Linux.

Firefox 3 was released on June 17th 2008.

One feature that was important for Mozilla, was Improved Performance. Firefox 3 lets you view web pages faster, using less of your computer's memory.

New features in Firefox 3 are as follows:

1. **Password Manager** - Remember site passwords without ever seeing a pop-up
2. **One-Click Bookmarking** - Bookmark, search and organize Web sites quick and easy
3. **Improved Performance** - View Web pages faster, using less of your computer's memory
4. **Smart Location Bar** - Find the sites you like in seconds - enter a term for instant matches that make sense
5. **Instant Web Site ID** - Avoid online scams, unsafe transactions and forgeries
6. **Full Zoom** - See any part of a Web page, up close and readable, in seconds
7. **Platform-Native Look & Feel** - Browse with a Firefox that's integrated into your computer's operating system

Some other Firefox 3 features are as follows:

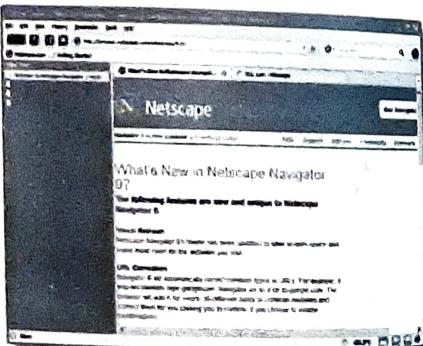
1. **Anti-Malware** - Firefox protects you from viruses, worms, trojan horses and spyware
2. **Anti-Phishing** - Shop and do business safely on the Internet. Firefox gets a fresh update of web forgery sites 48 times in a day
3. **Parental Controls** - Stop unwanted downloads and more
4. **Add-ons** - Firefox looks for a secure connection before installing or updating add-ons
5. **Clear Private Data** - Clear your private data automatically

6. **Automated Update** - Automatic notification of upgrades and security issues
7. **Pop-Up Blocker** - Banish pop-ups (or find a happy medium - choose to view blocked pop-ups or create an "allow" list of trusted sites)
8. **Add-ons Manager** - Find and install add-ons directly in your browser
9. **Browser Look & Feel** - Use themes to dress up your browser as you like it
10. **Download Manager** - An all new download manager, with greater security, and a pause and resume feature
11. **Spell Checking** - A built-in spell checker lets you enter text directly into Web pages, without worrying about typos and misspellings
12. **Session Restore** - Brings back your windows and tabs, restoring text you entered and any in-progress downloads
13. **Smart Keywords** - Search the Web in record time with smart keywords
14. **Search Suggestions** - Start typing in the search bar and it will prompt you with a drop down of filled-in suggestions, plus you can use the search bar as a calculator, converter and more
15. **Integrated Web Search** - Use the web engine of your choice to search by typing directly into the box
16. **Save on Exit** - Now when you open Firefox, your tabs and windows look just like they did when you closed it down
17. **Tabbed Browsing** - Makes it possible to view many web pages in one browser window
18. **Drag & Reorder Tabs** - Simply arrange the order of your tabs by dragging them with your mouse
19. **Universal Customization** - Depending on where you live, you'll see things like BBC headlines tailored to your region
20. **The Language of Firefox** - Firefox speaks your language like no other browser. Over 40 different translations
21. **Improved Text Rendering** - Read your language as it's written. With a new graphics engine, Arabic, Persian, Punjabi and other script languages now render in a remarkably seamless way
22. **Advanced Graphics** - The rendering of text and graphics, including SVG and Canvas, is faster, sharper and more true-to-life than ever before
23. **Online Application Support** - Choose a Web mail client (like Hotmail, Gmail or Yahoo! Mail) to launch when you click on an email address
24. **Support for Advanced Web Technologies**
  - Support is now available for CSS, Acid2, MathML, ECMAScript 4, Animated Portable Network Graphics (APNG) and Microformats, and more
25. **Live Support** - Chat with knowledgeable Firefox community members who troubleshoot via our live chat site

### Netscape Navigator

Let us see "What is Netscape Navigator Browser?"

**Definition:** "*Netscape was the first commercial Internet browser. Netscape was introduced in 1994, but gradually lost its popularity to Internet Explorer. The development of Netscape officially ended in February 2008.*"



Netscape Navigator 9 was released in October. It is based on Mozilla Firefox 2.

New features in Netscape 9 are as follows:

1. **Firefox Features** - full support for all Firefox add-ons and plugins
2. **URL Correction** - automatically correct common typos in URLs
3. **Link Pad** - A sidebar feature allowing you to save URLs without cluttering your bookmarks
4. **Sidebar Mini Browser** - Bookmarks and links can be opened in the sidebar
5. **Resizable Textarea** - Drag the bottom-right corners of text fields in forms to add more typing space
6. **Tab History** - Opening a link in a new tab will give the new tab the same history as the source tab
7. **OPML Support** - import and export your bookmarks in OPML format
8. **Combined Stop/Reload button**

### The Opera Browser

Let us see "What is Opera Browser?"

**Definition:** "*The Opera Web browser is Free, the smallest and fastest Web browser in the world.*"

Opera started out as a research project in Norway's telecom company, Telenor, in 1994, and branched out into an independent development company named Opera Software ASA in 1995. Opera Software ASA has redefined Web browsing for PCs, mobile phones and other networked devices.

Opera's cross-platform Web browser technology is known for its performance, standards compliance and small size, while giving users a faster, safer and more dynamic online experience. The company is listed on the Oslo Stock

Exchange under the ticker symbol OPERA. Opera supports all major Web standards in use, including CSS 2.1, HTML 4.01, XHTML 1.1, HTTP1.1, DOM 2, ECMAScript (JavaScript), PNG, WML 2.0, SVG 1.1 tiny, Unicode, and the Unicode Bidirectional Algorithm.

Opera 9.6 was released in October 2008.

**Opera 9 (for Windows, Mac, Linux, FreeBSD, and Solaris)** Released in June 2006.

**Opera 8.5 (for Windows, Mac, and Linux)** Released in September 2005.

**Opera 8 (for Windows)** Released in April 2005. New features in Opera 9.6 are as follows:

1. **Expanded Opera Link** - Take your favorite search engines and the browser history you enter wherever you go
2. **Optimized Opera M2** - The built-in e-mail client, Opera M2, now includes "low-bandwidth mode" to retrieve mails even faster when bandwidth is limited
3. **Prioritized e-mail** - Opera M2 has two new ways to manage e-mail conversations. Keep an eye on important threads or ignore less important threads
4. **Increased speed** - Improves the quick responsiveness and page loading of Opera 9.5
5. **Previewed feeds** - Look before you feed. Now you can see an RSS feed's content before subscribing to it or even bookmarking it
6. **Improved fluency** - Opera adds support for Indonesian, Ukrainian, Estonian, Hindi, Telugu, and Tamil languages

### Apple Safari Browser

Let us see "What is Apple Safari Browser?"

**Definition:** "*The Safari browser is the default browser for Mac systems. The Safari browser is known for its smooth design.*"

In January 2003, Steve Jobs announced that Apple was developing their own browser, called Safari. At that time (and earlier), Apple computers used Netscape Navigator and Internet Explorer as their default browsers.



The first official "out-of-beta" version was released in June 2003. As of Mac OS X v10.4 (April 2005), Safari have been the default browser for Mac systems. Safari 3 was released in October 2007. Safari 4 was released in June 2009. It is available for Mac and Windows systems.

New features in Safari 4 are as follows:

1. **Top Sites** - Tracks the most recently viewed pages, and notifies of content updates.
2. **Cover Flow** - Display your bookmarks and history as graphical previews, allowing you to flip through them.
3. **Full history search** - All text from every page you visit is stored, you can search for any word or phrase on the site you want to find.
4. **A new UI** - Radical new design for the User Interface.
5. **New Nitro Engine for JavaScript** - Improved stability and speed with the new Nitro Engine. JavaScript renders up to 4.2 times faster than in Safari 3.
6. **Smart search field** - Safari recommends relevant searches using Google Suggest and your earlier searches.
7. **Full page zooming** - By zooming in on the content it is easy to get a closer look at small print. Page layout consistency is kept while zooming.
8. **Stability improvements for HTML 5 media**

### Google Chrome

Let us see" What is Google Chrome?"

**Definition:** "Google Chrome is a free, open-source web browser developed by Google. It was released in 2008."

When Google decided to make a browser, they wanted to completely rethink the browser, as browsing now is very different from browsing simple text web pages. Now we email, shop, pay bills, and run other large application in our browsers.

Google Chrome is running each tab isolated from another, which prevents one tab from crashing another. It is also more secure, and better for the memory; when a tab is closed its memory use is eliminated. Chrome uses a powerful JavaScript engine, V8, which makes large applications perform better. The start page contains your nine most visited web pages, a list of recently visited pages, your favorite search engines and more. Because it is an open source project, new features will be added, and other developers can adopt what they find useful, in their browser.

## BANDWIDTH RELATIONSHIP

Let us see" What is Bandwidth?"

**Definition:** "Bandwidth is the amount of data that can be transmitted in a fixed amount of time from one computer to another in a network or Internet. For digital devices, the bandwidth is usually expressed in bits per second (bps) or bytes per second. For analog devices, the bandwidth is expressed in cycles per second, or Hertz (Hz)."

The bandwidth is particularly important for I/O devices. For example, a fast disk drive can be hampered by a bus with a low bandwidth. This is the main reason that new buses, such as AGP, have been developed for the PC. Bandwidth is most familiar to consumers because of its use by hosting companies or internet service providers. The sense in which bandwidth is used by most web hosting companies, that is, as a measure of total data transferred in a month, is not strictly correct. Some hosts offer so-called unlimited bandwidth plans, which in theory have an unlimited amount of data transfer per month. Bandwidth is also a limiting factor for the technology that connects the computer itself to the modem or device interacting with the direct internet line. Basic Ethernet, for example, has a

bandwidth of 10 Mbit/s, so that using an internet connection faster than that would be largely wasted speed. Fast Ethernet has a bandwidth of 100 Mbit/s, more than fast enough for all consumer uses, while Gigabit Ethernet has a bandwidth of 1 Gbit/s and 10 Gigabit Ethernet is 10 Gbit/s. Wireless technologies are also limited by bandwidth, with Wireless 802.11b featuring a bandwidth of 11 Mbit/s, Wireless-G 802.11g having a 54 Mbit/s cap, and Wireless-N 802.11n a blazing 300 Mbit/s.

The Internet consists of ten millions of computers throughout the world, all connected by cables. Your ISP (Internet Service Provider) is a company that has a very high-speed (and very expensive) connection to the Internet. Your ISP makes its money by renting little "chunks" of that high-speed connection to consumers who don't want to spend thousands of dollars each month for an Internet connection.)

If you've ever wondered why it takes so long to download certain Web pages or other files to your computer, it's all determined by the *bandwidth* of the connection between your computer and your Internet Service Provider. That connection is often referred to as the *last mile*, as shown in Figure.



Figure 2

Now let's say that instead of sticking a skinny pipe onto the pool we put on a big fat pipe, as in Figure 3. I don't think it takes physics major to realize that it's going to take less time to drain the pool in Figure 3 than it is to drain the pool in Figure 2.

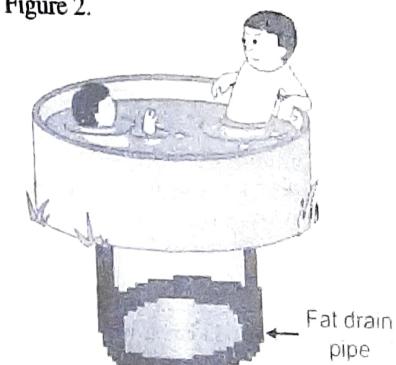
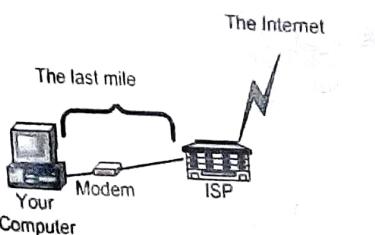


Figure 3



Bandwidth is easy to understand if we use an analogy from everyday life. Imagine that instead of trying to get a Web page or file from your ISP through wires, you're trying to drain a swimming pool. The water in the pool is the Web page or file. If you stick a skinny hose to drain the water from the pool, as in Figure 2, it will take quite a while to drain all the water.

Dial-up Internet accounts, which use a standard telephone line to connect to an ISP, have a very narrow bandwidth (about 50 Kbps or 50,000 bits per second). Thus, things are slow in the sense that it takes a long time to download things.

A *broadband* Internet account can move data at anywhere from 128 Kbps to 2,000 Kbps or more. That's like the fat drain pipe. It takes a lot less time to get a Web page or file from your ISP's computer to your computer using the

broadband account than it does the dial-up account.

## BROADBAND TECHNOLOGIES

Let us see "What are broadband technologies?"

**Definition:** "broadband is a high-speed, high-capacity transmission medium that can carry signals from multiple independent network carriers. This is done on a single coaxial or fiber-optic cable by establishing different bandwidth channels."



Broadband technology can support a wide range of frequencies. It is used to transmit data, voice and video over long distances simultaneously.

### Consider this:

In an office environment, you have a local computer network, an EPABX system, a fax line, separate servers for corporate Internet access, and so on. Broadband is all about combining all of the seemingly disparate services into a single, unified network.

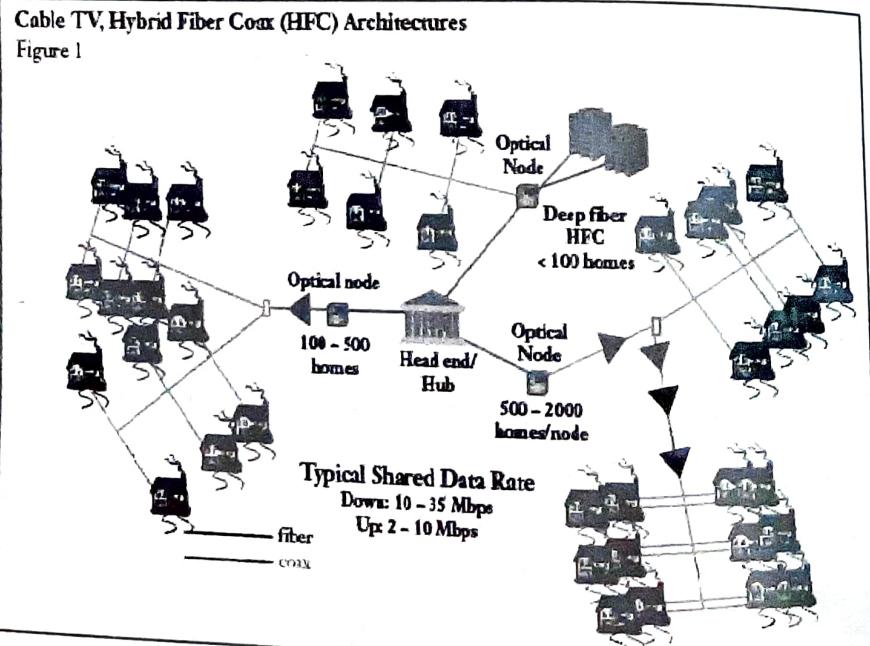
It's not as if broadband is something new; ISDN lines (integrated services digital network) have been around for years, which, at a rudimentary level, managed to combine voice, video and data. But they were frightfully expensive and needed proprietary software to run.

**How does broadband work and what are its applications?**

Broadband networks can potentially open up new vistas of products and services that will be done through a single device at home. Though it sounds too far out, there are already some instances of broadband technology at work. Consider Internet through cable. Expected to be launched by a host of ISPs in India, Internet through cable allows your TV to act as an Internet access device. This allows constant connectivity at speeds which are simply unimaginable.

Cable TV, Hybrid Fiber Coax (HFC) Architectures

Figure 1



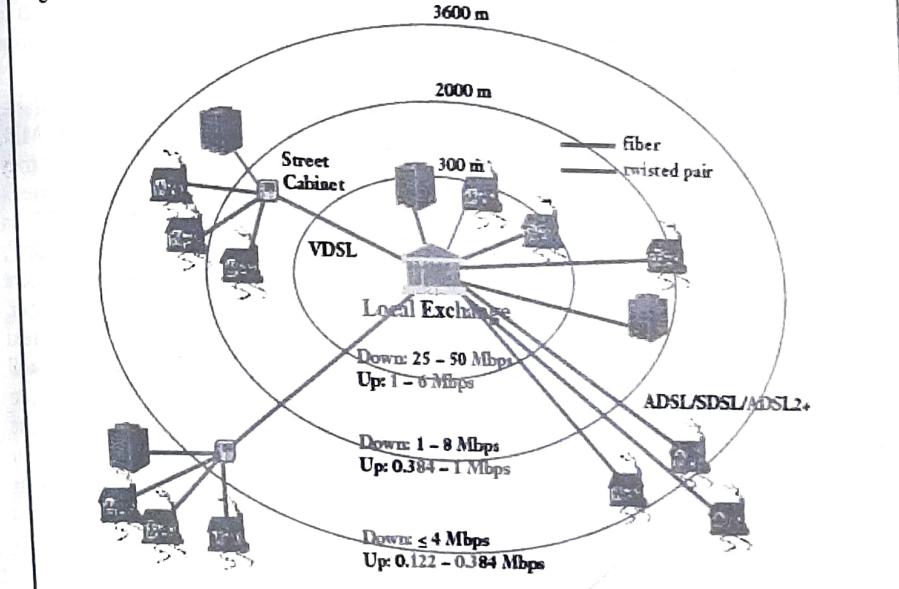
while VoIP calls for setting up specific IP telephony exchanges.

### How long will it take to happen in India?

IT'S already happening. Apart from the soon-to-be launched Internet through cable, there are other broadband technologies such as ATM (asynchronous transfer mode), xDSL (digital subscriber line), ISDN, and WAN (wide area network) technologies which are being rapidly deployed. Of the lot, ATM and WAN technologies are network gizmos, which link up computers over a specified area, largely meant to function as network points, while the other technologies are directly aimed at users.

Network architectures for various forms of xDSL, note the xDSL bandwidth is dependant on distance from the local exchange/central office or the remote street cabinet

Figure 2



WiMAX (Worldwide Interoperability for Microwave Access) is another, relatively new broadband technology making waves in the industry. WiMAX is similar to WiFi but provides data transfer over much larger distances. WiMAX offers speeds up to 70Mbps and can operate up to 50 kilometres away from the source and is currently being planned for a nationwide roll out in Pakistan.

### TEXT IN THE WEB

A multimedia title begins as notes and sketches that form the foundation of your work. As your work progresses, those notes and sketches evolve into the text and graphics that provide the underlying structure and content of your title. Text carries the story line and communicates key ideas, while text formatting conveys the

contents hierarchy and structure. Text can even link ideas by jumping to other topics when you click on it.

**Graphics** establish the design of your title-setting your audiences expectations about where to find different types of information in the same way that a magazine or book design does. Graphical elements, such as buttons and icons, help your audience navigate through a title. Graphics also illustrate your content.

Together text and graphics define the look and feel-the interface-of your title and how your audience interacts with it. And these two effects often provide the main content.

#### Tips: Using text onscreen

**Keep text brief.** Eyes tire more quickly reading onscreen. Furthermore, large blocks of text make your screen look static. If you introduce bullet points, limit them to six bullets per screen and one or two lines of text per bullet.

**Use text for dual purposes.** Define text as a hyperlink that jumps to a related topic or as a popup to a definition for your audience.

**Proofread text carefully.** Typographical errors undermine the credibility of your title, so always allow time to proofread. For the best results, print the text in your title and proofread it both onscreen and in print.

**Choose a readable font.** Sans serif fonts like Arial tend to be easier to read onscreen than serif fonts like Times Roman.

**Use only one or two fonts.** Mixing too many fonts clutters your design, detracting from its impact.

**Use font size and style to convey hierarchy.** Format the size and style of headings and body text differently to communicate structure.

**Avoid unreadable type styles and colors.** Some styles (italics) and colors (blue or green) don't read clearly.

**Choose common fonts or embed fonts in your title.** For fonts to display correctly, the fonts must either be installed on the computer that's running the title or embedded in the title.

## HYPertext Markup Language

Hyper Text Markup Language is the most important aspect in web site development. We write web pages that contain codes written in this particular language. As name implies this is a language like other high level languages, though much easier than those. We shall discuss broadly about different features of html in this chapter in order to get acquainted with writing simple web pages.

### HTML EDITORS

HTML documents are plain-text (also known as ASCII) files that can be created using any text editor (e.g., Emacs or vi on UNIX machines; SimpleText on a Macintosh; Notepad on a Windows machine). You can also use word-processing software if you remember to save your document as "text only with line breaks".

Some WYSIWYG editors are also available (e.g., Claris Home Page or Adobe PageMill, both for Windows and Macintosh). You may wish to try one of them after you learn some of the basics of HTML tagging. WYSIWYG is an acronym for "What You See Is What You Get"; it means that you design your HTML document visually, as if you were using a word processor, instead of writing the markup tags in a plain-text file and imagining what the resulting page will look like. It is useful to know enough HTML to code a document before you determine the usefulness of a WYSIWYG editor, in case you want to add HTML features that your editor doesn't support.

### ELEMENTS OF HTML

An **HTML element** is a fundamental component of the structure of a text document. Some examples of elements are heads, tables, paragraphs, and lists. Elements can contain plain text, other elements, or both.

### TAGS

A web page consists of various types of tags. To denote the various elements in an HTML document, we use **tags**. HTML tags consist of a left angle bracket (<), a tag name, and a right

angle bracket (>). Tags are usually paired (e.g., <Tag> and </Tag>) to start and end the tag instruction. The end tag looks just like the start tag except a slash (/) precedes the text within the brackets.

### ATTRIBUTES

Some elements may include an **attribute**, which is additional information that is included inside the start tag. For example, you can specify the alignment of text (right, left or center) by including the appropriate attribute with the image source HTML code.

- HTML is not case sensitive. <title> is equivalent to <TITLE> or <TITLE>.
- Not all tags are supported by all World Wide Web browsers. If a browser does not support a tag, it will simply ignore it. Any text placed between a pair of unknown tags will still be displayed, however.

### WRITING A HTML DOCUMENT

To write a web document, follow the instructions as follows:

- Load a text editor like Notepad. To open Notepad click Start → Programs → Accessories → NotePad.
- Write codes and save it with a HTML file. HTML files are the files having extensions .htm or .html. (See figure)
- View it in a browser of your choice e.g., Internet Explorer or Netscape Navigator.

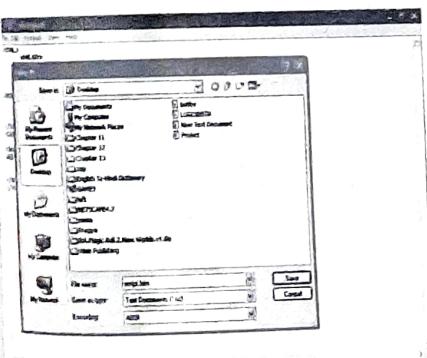


Figure : Saving HTML document

## DOCUMENT LAYOUT

Every HTML document should contain certain standard HTML tags. They are as follows-

- |             |            |
|-------------|------------|
| ■ HTML tag  | ■ Head tag |
| ■ Title tag | ■ Body tag |

**HTML Tag :** The HTML element tells your browser that the file contains HTML-coded information. The file extension html also indicates this an HTML document and must be used. It comes in a pair - <HEAD> and </HEAD>

**Syntax :**

```
<HTML>
.....
.....
</HTML>
```

**HEAD Tag :** The Head element identifies the first part of your HTML-coded document that contains the title. It contains title tag . It also comes with opening and closing tags <HEAD> and </HEAD>

**Syntax :**

```
<HTML>
<HEAD>
.....
.....
</HEAD>
</HTML>
```

**TITLE Tag :** The Title element contains your document title and identifies its content in a global context. The title is typically displayed in the title bar at the top of the browser window, but not inside the window . The title is also what is displayed on someone's hotlist or bookmark list, so choose something descriptive, unique, and relatively short. A title is also used to identify your page for search engines. Generally you should keep your titles to 64 characters or fewer.

**Syntax :**

```
<HTML>
<Head>
<TITLE>
DESCRIBE YOUR TITLE
</TITLE>
</HEAD>
</HTML>
```

After implementing the Title tag as above results as shown in figure.



Figure : Displaying title

If you leave blank between the title tags, some browsers display either UNTITLED or URL.

**BODY Tag :** The second—and largest—part of your HTML document is the body, which contains the content of your document (displayed within the text area of your browser window). The tags explained below are used within the body of your HTML document.

#### Syntax :

```
<HTML>
<HEAD>
<TITLE>
My First Web Page
<TITLE>
</HEAD>
<BODY>
.....
.....
</BODY>
</HTML>
```

#### A SAMPLE HTML DOCUMENT

Each HTML document contains some certain standard HTML tags. It has been illustrated in example 1 that shows what a minimal document contains.

#### Example 1

```
<HTML>
<HEAD>
<TITLE>
A Basic HTML Page
<TITLE>
</HEAD>
<BODY>
I AM LEARNING HOW TO CREATE
A WEB PAGE
</BODY>
</HTML>
```

For implementing the example1, save it with .htm or .html extension and see the result on the browser. The effects should match with one in figure.

Figure : Effects of Example 1 on the browser

#### HEADINGS :

Headings are used to arrange the contents in a systematic way. HTML has six levels of headings, numbered 1 through 6, with 1 being the largest. Headings are typically displayed in larger and/or bolder fonts than normal body text. The first heading in each document should be tagged <H1>.

The syntax of the heading element is:

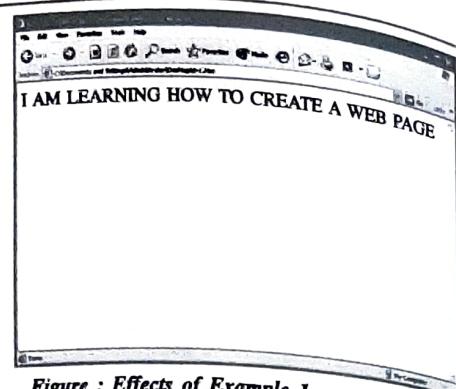
<Hn>Heading/Sub-Heading</Hn>

where n is a number between 1 and 6 specifying the level of the headings. You can see the effects of different headings in example 2.

#### Example 2

```
<HTML>
<HEAD>
<TITLE>
A Web Page Showing Different Level of Head-
ings.
<TITLE>
</HEAD>
<BODY>
<H1> Level One Heading </H1>
<H2> Level Two Heading </H2>
<H3> Level Three Heading </H3>
<H4> Level Four Heading </H4>
<H5> Level Five Heading </H5>
<H6> Level Six Heading </H6>
</BODY>
</HTML>
```

The result should appear like one in figure.



After implementing the Example 3, the browser displays the result like one in figure.

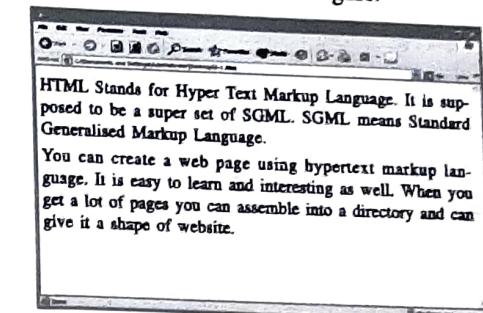


Fig. : Effects of Paragraph Tags on the browser

#### LINE BREAK

This tag is used to change lines with no extra blank spaces. It can be used for short lines of text such as postal addresses. This tag is represented by <BR>. See Example 4.

#### Example 4

```
<HTML>
<HEAD>
<TITLE>
A PAGE WITH BR TAG.
<TITLE>
</HEAD>
<BODY>
<P>
National Informatics Centre <BR>
Chanakya Puri <BR>
New Delhi <BR>
</BODY>
</HTML>
```

The Example 4 results on the browser like this-

National Informatics Centre  
Chanakya Puri  
New Delhi

#### LISTS

HTML supports unnumbered, numbered, and definition lists. You can also nest lists.

#### NUMBERED LIST

Numbered list is also called *ordered list*. It is shortened as OL from which the tag name derives. It is identical to an unnumbered list, except it uses <OL> instead of <UL>. The items are tagged using the same <LI> tag. See Example 5 :

**Example 5**

```
<OL>
<LI> Computer
<LI> Modem
<LI> Internet Connection
<LI> Telephone Line
</OL>
```

After running the Example 5, the browser displays result like this-

1. Computer
2. Modem
3. Internet Connection
4. Telephone Line

**UNNUMBERED LISTS**

Unnumbered list can be referred to as unnumbered list. To make an unnumbered or bulleted list, do the followings-

- ↪ Start with an opening list `<UL>` (for unnumbered list) tag
- ↪ Enter the `<LI>` (List Item) tag followed by the individual item; no closing `</LI>` tag is needed
- ↪ End the entire list with a closing list `</UL>` tag

See Example 6 to understand how it is written.

**Example 6**

```
<UL>
<LI> Computer
<LI> Modem
<LI> Internet Connection
<LI> Telephone Line
</UL>
```

Example 6 results on the browser like this-

- Computer
- Modem
- Internet Connection
- Telephone Line

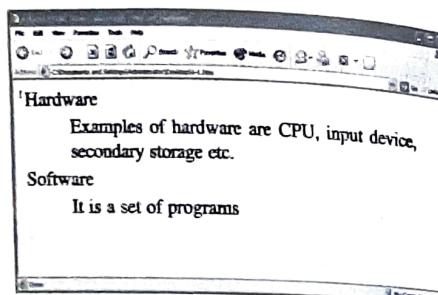
**DEFINITION LISTS**

A definition list (coded as `<DL>`) usually consists of alternating a *definition term* (coded as `<DT>`) and a definition description (coded as `<DD>`). Web browsers generally format the definition on a new line and indent it. (See Example 7)

**Example 7**

```
<HTML>
<HEAD>
<TITLE>
Definition List
</TITLE>
</HEAD>
<BODY>
<DL>
<DT> Hardware
<DD> Examples of hardware are CPU, input device, secondary storage etc.
<DT> Software
<DD> It is a set of programs
</DL>
</BODY>
</HTML>
```

Codes written in Example 7 will affect like one in figure on browser.



*Figure : Effects of Definition List on*

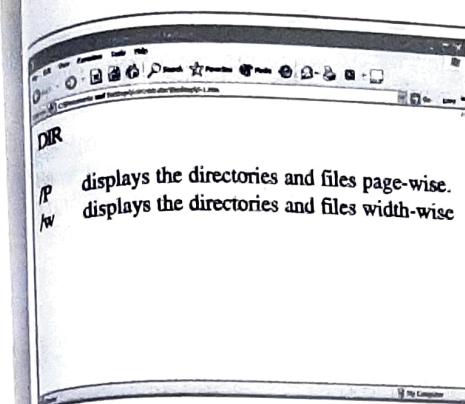
**COMPACT ATTRIBUTE**

The COMPACT attribute can be used routinely in case your definition terms are very short. If, for example, you are showing some computer options, the options may fit on the same line as the start of the definition. See Example 8.

**Example 8**

```
<P> DIR </P>
<DL COMPACT>
<DT> /P
<DD> displays the directories and files page-wise.
<DT> /W
<DD> displays the directories and files width-wise.
</DL>
```

See its output in figure.



*Figure : Effects of Compact attribute*

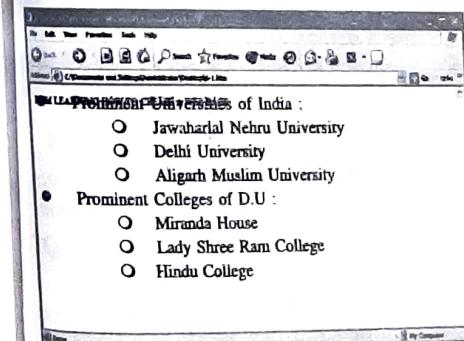
**NESTED LIST**

Lists can be nested. You can also have a number of paragraphs, each containing a nested list, in a single list item. See Example 9.

**Example 9**

```
<UL>
<LI> Prominent Universities of India :
<UL>
<LI> Jawaharlal Nehru University
<LI> Delhi University
<LI> Aligarh Muslim University
</UL>
<LI> Prominent Colleges of D.U. :
<UL>
<LI> Miranda House
<LI> Lady Shree Ram College
<LI> Hindu College
</UL>
</UL>
```

After implementing the codes written in Example 9 will result like one in figure.



*Figure : Effects of Nested List on browser*

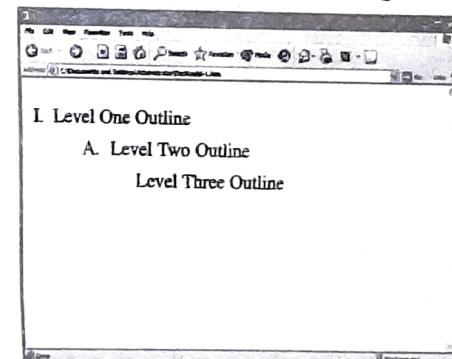
**TYPE ATTRIBUTE**

Type attribute is used with `<OL>` tag. Using this, you can manipulate the way ordered list displays the effects. See Example 10.

**Example 10**

```
<HTML>
<HEAD>
<TITLE>
My first web page
</TITLE>
</HEAD>
<BODY>
<OL TYPE = "I">
<LI> Level One Outline
<OL TYPE = "A">
<LI> Level Two Outline
<OL TYPE = "1">
<LI> Level Three Outline
</OL>
</OL>
</OL>
</BODY>
</HTML>
```

Having Example 10 implemented , you should see the effects something like one in figure.



*Figure : Effects of TYPE attribute on the browser*

**PREFORMATTED TEXT**

The PRE (Preformatted text) tag is used to display a block of “preformatted” text in a monospace, fixed-pitch font. You use the PRE tag to display a block of text “as it is”, including all spaces and hard returns. One of the primary uses of the PRE tag is to display text in a tabular or columnar format in which you want to make sure that the columns remain properly aligned.

**Example 11**

```
<HTML>
<HEAD>
<TITLE>
```

My First Web Page

```
</TITLE>
</HEAD>
<BODY>
```

```
<PRE>
```

Sales Return For First Quarter				
	Jan	Feb	Mar	Total
Ram	\$100	\$200	\$300	\$600
Shyam	50	100	200	350
Gopal	40	60	300	400

```
</PRE>
```

```
</BODY>
```

```
</HTML>
```

When you run the Example 11, the browser will show you the effects that should match with one in figure.

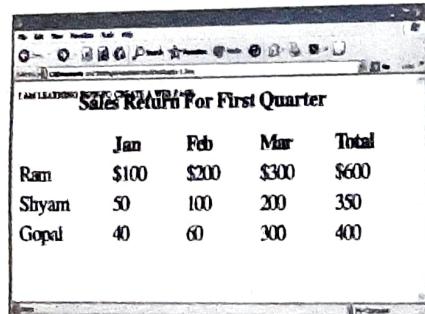


Figure : Effects of <PRE> tag on the browser

**COMMENT TAG**

The comment tag is a stand-alone tag that enables you to include messages for your own or anyone else's future references. A comment always begins with a <!- and ends with a >.

**Example :** <! - Type your comments here ->

**EXTENDED QUOTATION**

Use the <BLOCKQUOTE> tag to include lengthy quotations in a separate block on the screen. Most browsers generally change the margins for the quotation to separate it from surrounding text. See Example 12.

**Example 12**

```
<P> Note : </P>
<BLOCKQUOTE>
<P> This page is meant for no commercial purpose. Therefore, no claims whatsoever can be entertained regarding any information published on it.
<P>
Authority
</BLOCKQUOTE>
```

After implementing the code of Example 12, the result will be like this-

Note :

This page is meant for no commercial purpose. Therefore, no claims whatsoever can be entertained regarding any information published on it.

Authority

**USING LINKS**

The chief power of HTML comes from its ability to link text and/or an image to another document or section of a document. A browser highlights the identified text or image with color and/or underlines to indicate that it is a *hypertext link* (often shortened to *hyperlink* or just *link*). HTML's single hypertext-related tag is <A>, which stands for *anchor*.

Hypertext links can be used to move from one page to the other or to a specific location within the same document or different one. For instance, you can use links to

- display an image
- download a program
- send e-mail
- use a database
- execute a script

Hyperlinks are mainly of three kinds -

**LINKS TO DIFFERENT WEB PAGES**

This type of link is frequently used in web pages. It takes you from one page to the other one.

**LINKS TO SPECIFIC SECTIONS OF CURRENT WEB PAGES**

This type of link helps navigation in the current web page. It takes you from one section to another section of the page. Several pages are

so big that you can not see it at once and browsing may take time. In that situation, it is found very helpful. Clicking the concerned link available in the beginning directly takes you to the specified section.

**LINKS TO SPECIFIC SECTIONS OF DIFFERENT WEB PAGES**

This is very much identical to the above link except it takes you to a specific section in a different web page directly.

**U.R.L.**

The World Wide Web uses Uniform Resource Locators (URLs) to specify the location of files on other servers. A URL includes the type of resource being accessed (e.g., Web, gopher, FTP), the address of the server, and the location of the file. The syntax is:

*scheme://host.domain [:port]/path/ filename*  
where *scheme* is one of

- |               |  |
|---------------|--|
| <b>file</b>   | - a file on your local system            |
| <b>ftp</b>    | - a file on an anonymous FTP server      |
| <b>http</b>   | - a file on a World Wide Web server      |
| <b>gopher</b> | - a file on a Gopher server              |
| <b>WAIS</b>   | - a file on a WAIS server                |
| <b>news</b>   | - a Usenet newsgroup                     |
| <b>telnet</b> | - a connection to a Telnet-based service |

The *port* number can generally be omitted. (That means unless someone tells you otherwise, leave it out.)

**LINK TO DIFFERENT WEB PAGES**

To include an anchor in your document:

- Start the anchor with <A (include a space after the A)
- Specify the document you're linking to by entering the parameter HREF="filename" followed by a closing right angle bracket (>)
- Enter the text that will serve as the hypertext link in the current document
- Enter the ending anchor tag: </A> (no space is needed before the end anchor tag)

Here is a sample hypertext reference in a file called introduction.html:

<A HREF="introduction.html">Introduction</A>

This entry makes the word *Introduction* the hyperlink to the document *Introduction.html*, which is in the same directory as the first document.

You can link to documents in other directories by specifying the *relative path* from the current document to the linked document. For example, a link to a file *introduction.html* located in the subdirectory *Pragya* would be:

<A HREF="pragya/introduction.html">Introduction</A>

These are called *relative links* because you are specifying the path to the linked file relative to the location of the current file.

**LINKS TO SPECIFIC SECTIONS**

Anchors can also be used to move a reader to a *particular section* in a document (either the same or a different document) rather than to the top, which is the default. This type of an anchor is commonly called a *named anchor* because to create the links, you insert HTML names within the document.

You can also link to a specific section in another document. That information is presented first because understanding that helps you understand linking within one document.

**LINKS BETWEEN SECTIONS OF DIFFERENT DOCUMENTS**

Suppose you want to set a link from *pargya* (*pragya.html*) to a specific section in another document (*books.html*).

Enter the HTML coding for a link to a named anchor :

*pragya.html :*

<a href="#IEC">Internet & E-Commerce</a>

Think of the characters after the hash (#) mark as a tab within the *pragya.html* file. This tab tells your browser what should be displayed at the top of the window when the link is activated. In other words, the first line in your browser window should be the *Internet & E-Commerce* heading.

Next, create the **named anchor** (in this example "IEC") in **introduction.html**:

```
<H2><A NAME="IEC">Internet & E-Commerce</A></H2>
```

With both of these elements in place, you can bring a reader directly to the Internet reference in **introduction.html**.

### LINKS TO SPECIFIC SECTIONS WITHIN THE CURRENT DOCUMENT

The technique of Links to specific sections within different documents is very much identical to the technique of links to specific sections within the current document except the filename is omitted.

For example, to link to the IEC anchor from within **pragya**, enter:

```
<A HREF="#IEC">Internet & E-Commerce</A>
```

After this include the **<A NAME=>** tag at the place in your document where you want the link to jump to (**<A NAME="IEC">Internet & E-Commerce</A>**).

Named anchors are particularly useful when you think readers will print an entire or when you have a lot of short information you want to place online in one file.

### MAILTO

You can make it easy for a reader to send electronic mail to a specific person or mail alias by including the **mailto** attribute in a hyperlink. The format is:

```
<A HREF="mailto:emailinfo@host">Name</A>
```

To create a mail window that is already configured to open a mail window for the editor.

### INLINE IMAGES

Most Web browsers can display inline images (that is, images next to text) that are in X Bitmap (XBM), GIF, or JPEG format. Other image formats are also being incorporated into Web browsers [e.g., the Portable Network Graphic (PNG) format]. Each image takes additional time to download and slows down the initial display of a document. Carefully select your images and the number of images in a document.

To include an inline image, enter:

```
<IMG SRC=ImageName>
```

where **ImageName** is the URL of the image file.

### SPECIFYING SIZE OF INLINE IMAGES

You should include two other attributes on **<IMG>** tags to tell your browser the size of the images it is downloading with the text. The **HEIGHT** and **WIDTH** attributes let your browser set aside the appropriate space (in pixels) for the images as it downloads the rest of the file.

For example, to include an image named computer in a file along with the image's dimensions, enter:

```
<IMG SRC=computer.gif HEIGHT=100 WIDTH=65>
```

After running the above command, you can see a big picture shrunk to the size (very small) as specified. (See figure).

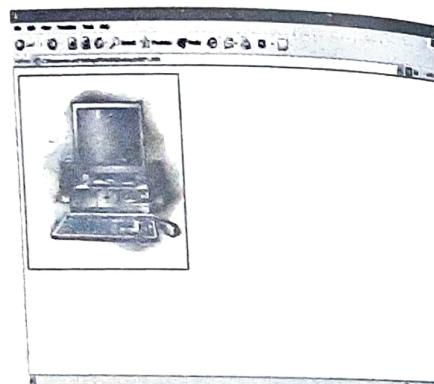


Figure : Image shown in a page

### LINKS TO IMAGES

We can link images with the text in a hypertext link. This link appears in a blue border.

For example:

```
<A HREF="SUB.HTM"> <IMG  
SRC="FLOWERS.GIF"></A>
```

### USING ALT ATTRIBUTE

Sometimes browsers used by your users may not be supporting the graphics available on your web page. In this situation, you must pass an

alternative message to the users that makes the users understand what really the matter is. For example, see the following code

```
<IMG SRC="COMPUTER.GIF"  
ALT="SORRY! YOUR BROWSERS  
ARE NOT SUPPORTING THE  
GRAPHICS">
```

In case you confront the same situations as mentioned above, you should see the result as one in figure.

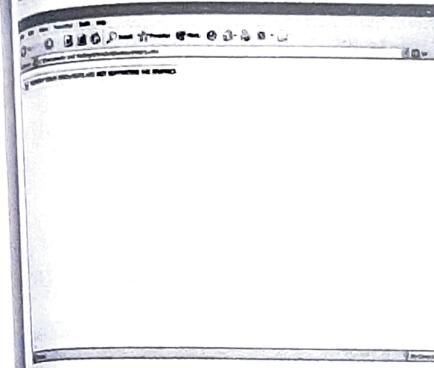


Figure : An alternative message showing when the picture is not getting support from the browser

### HORIZONTAL RULE

The **HR** (Horizontal Ruler) tag is a stand-alone, or empty, document element that allows you to add horizontal rules to your Web pages.

### CHANGE THE HEIGHT OF A HORIZONTAL RULE

To change the height of a horizontal rule, the **SIZE** attribute value in the **HR** tag may be used. The value you set is the rule's height, or thickness, in pixels. The following example is used for creating a horizontal rule that is 10 pixels thick. See Example 13

#### Example 13

```
<P> This is a Normal Rule
```

```
<HR>
```

```
<P> This is a 10 pixel thick horizontal
```

```
<HR SIZE="10">
```

The result will be shown as one in figure.

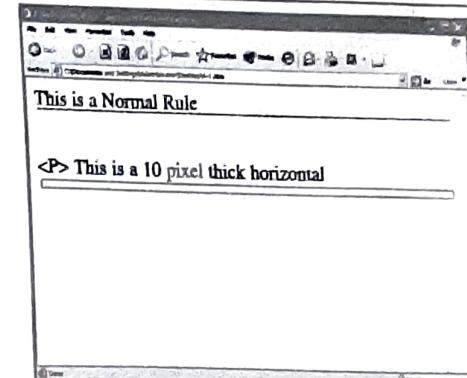


Figure : Horizontal rule on your browser

### REMOVING SHADES FROM THE RULE

The default setting for a rule is "shaded". To set an "unshaded" horizontal rule,

add the **NOSHADe** attribute to the **HR** tag. For instance

```
<P> This is an unshaded, 15-pixel thick horizontal rule:
```

```
<HR SIZE="15" NOSHADe>
```

The produced result may be seen as one in figure.

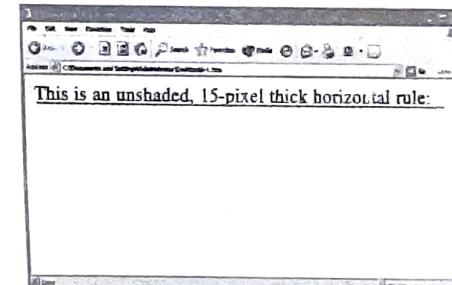


Figure : Horizontal rule with no shade

### CHARACTER FORMATTING

We use some specific formatting attributes to highlight words, phrases or entire sentences in a paragraph or in a page. Some of them are as follows-

```
<B>...</B>
```

This tag is used to set the text bold. For example Computer

```
<U>...</U>
```

This tag is used to set the text underlined. For example Computer

## 356 | Multimedia at RUN

<I>....</I>  
This tag is used to set the text italics. For example Computer

<SUB>....</SUB>  
This tag is used to set the text in a subscript form. For example in O, 2 is in subscript form

<SUP>....</SUP>  
This tag is used to set the text in a superscript form. For example in a<sup>2</sup>, 2 is in superscript form

<STRIKE>....</STRIKE>  
This tag is used to set the text in a strikethrough form. For example Computer  
See the usage of different formatings in Example 14

## Example 14

```
<HTML>
<HEAD>
<TITLE> Character Formatting </TITLE>
</HEAD>
<BODY>
<P> B is used for <B> Bold </B>
<P> I is used for <I> Italics </I>
<P> U is used for <U> Underline </U>
<P> SUB is used for <SUB> Subscript </SUB>
<P> SUP is used for <SUP> Superscript </SUP>
<P> STRIKE is used for <STRIKE>
Strikethrough </STRIKE>
</BODY>
</HTML>
```

After implementing the Example 14, you should see the effects like one in figure.

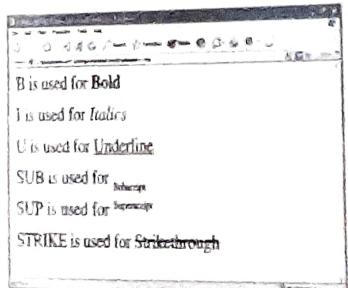


Figure : Effects of character formatting on the browser

## TEXT ALIGNMENT

Paragraph, headings or other texts can be aligned using ALIGN attribute. They can be aligned in three ways-

- Center
- Right
- Left

The syntax for this is as follows-

ALIGN="value"

Where value can be replaced with left, right or center. See Example 15 to look through the codes

## Example 15

```
<HTML>
<HEAD>
<TITLE>
Different Alignments
</TITLE>
</HEAD>
<BODY>
<P ALIGN="CENTER"> I AM IN THE CENTER.
<P ALIGN="LEFT"> I AM LEFT ALIGNED.
<P ALIGN="RIGHT"> I AM RIGHT ALIGNED.
</BODY>
</HTML>
```

See the result of the Example 15 in figure.

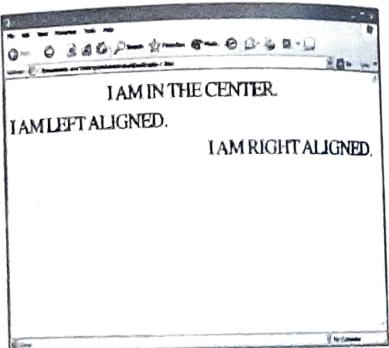


Figure : Text presented in three types of alignment on the browser

## CHANGING FONT SIZE AND COLOURS

You can set or change the size and colours of the font as desired. It can be done using <FONT> tag.

## SPECIFYING FONT SIZE

To specify size of the fonts, Size attribute is used with Font tag. Normally fonts are seven in

size. It can be given a number 1 being the smallest through 7 being the largest. By default the font size is 3. See Example 16.

## Example 16

```
<HTML>
<HEAD>
<TITLE>
My web page
</TITLE>
</HEAD>
<BODY>
<P> FONTSIZE = "1" <FONT SIZE = "1"> FONTSIZE 1 </FONT> <BR>
<P> FONTSIZE = "2" <FONT SIZE = "2"> FONTSIZE 2 </FONT> <BR>
<P> FONTSIZE = "3" <FONT SIZE = "3"> FONTSIZE 3 </FONT> <BR>
<P> FONTSIZE = "4" <FONT SIZE = "4"> FONTSIZE 4 </FONT> <BR>
<P> FONTSIZE = "5" <FONT SIZE = "5"> FONTSIZE 5 </FONT> <BR>
<P> FONTSIZE = "6" <FONT SIZE = "6"> FONTSIZE 6 </FONT> <BR>
<P> FONTSIZE = "7" <FONT SIZE = "7"> FONTSIZE 7 </FONT> <BR>
</BODY>
</HTML>
```

Now, implement the Example 16 on the browser and see the effects in figure.

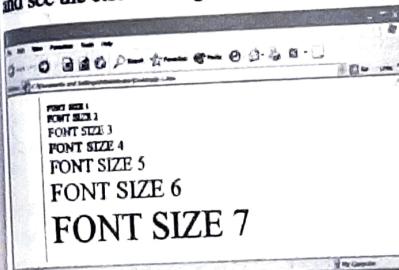


Figure : Different sizes of fonts shown on the browser

## SPECIFYING FONT COLOURS

To change font colour, we use COLOR attribute with the FONT tag. We can set sixteen different colours to make fonts look attractive. They are

- |             |              |
|-------------|--------------|
| (i) Black   | (ii) White   |
| (iii) Aqua  | (iv) Blue    |
| (v) Fuchsia | (vi) Grey    |
| (vii) Green | (viii) Lime  |
| (ix) Maroon | (x) Navy     |
| (xi) Olive  | (xii) Purple |
| (xiii) Red  | (xiv) Silver |
| (xv) Yellow | (xvi) Teal   |

See Example 17 to understand how font colour is set.

## Example 17

```
<P> <FONT SIZE = 7>
<FONT COLOR = "AQUA">
This is aqua.
</FONT>
```

When you will run the Example 17 , you will see the text in aqua colour.

## SETTING THE COLOUR OF BODY BACKGROUND , TEXT AND LINK

You change the color of text, links, visited links, and active links (links that are currently being clicked on) using further attributes of the <BODY> tag.

## Syntax :

```
<BODY BGCOLOR="colorname/code"
TEXT="colorname/code" LINK="colorname/
code">
```

For example:

```
<BODY BGCOLOR="#000000"
TEXT="#FFFFFF" LINK="#9690CC">
```

This creates a window with a black background (BGCOLOR), white text (TEXT), and silvery hyperlinks (LINK).

The six-digit number and letter combinations represent colors by giving their RGB (red, green, blue) value. The six digits are actually three two-digit numbers in sequence, representing the amount of red, green, or blue as a hexadecimal value in the range 00-FF. For example, 000000 is black (no color at all), FF0000 is bright red, 0000FF is bright blue, and FFFFFF is white (fully saturated with all three colors).

You can use the color name also instead of codes that are a bit difficult like

```
<BODY BGCOLOR="BLACK"
TEXT="WHITE" LINK="SILVER">
```

## BACKGROUND GRAPHICS

Newer versions of Web browsers can load an image and use it as a background when displaying a page. Some people like background images and some don't. In general, if you want to include a background, make sure your text can be read easily when displayed on top of the image. Background images can be a texture (linen

finished paper, for example) or an image of an object (a logo possibly). You create the background image as you do any image.

The tag to include a background image is included in the <BODY> statement as an attribute:

#### Syntax :

```
<BODY BACKGROUND="filename">
```

See Example 18 for better comprehension of the codes

#### Example 18

```
<HTML>
<HEAD>
<TITLE>
DEEMED UNIVERSITY
</TITLE>
</HEAD>
<BODY background=format.gif>
</BODY>
</HTML>
```

After the implementation of Example 18, the picture one in figure will display on the browser.



Figure : Image displayed as a background

## Hypermedia

The combination of text, video, graphic images, sound, hyperlinks and other elements in the form typical of Web documents. Essentially, hypermedia is the modern extension of hypertext, the hyperlinked, text-based, text-based documents of the original Internet. Hypermedia attempts to offer a working and learning environ-

ment that parallels human thinking that is, one is which the user can make associations between topics, rather than more sequentially from one to the next, as in an alphabetic list.

## Hypertext

Originally, any textual information on a computer containing jumps to other information. The hypertext jumps are called hyperlinks. On the World Wide Web, hypertext is the primary way to navigate between pages and among Web sites. Hypertext on Web pages has been expanded to include hyperlinks from text, from a picture or a graphic, and from image maps.

## DYNAMIC & EMBEDDED FONT TECHNOLOGY

### Embedded Font Technology

Embedding a font is the technique of bundling a document and the fonts it contains into a file for transmission to another computer. Embedding a font guarantees that a font specified in a transmitted file will be present on the computer which receives the file. Not all fonts can be moved from computer to computer, however, since most fonts are licensed to only one computer at a time. Only TrueType and Open Type fonts can be embedded.

Both Netscape Navigator 4.0+ and Internet Explorer 4.0+ support embedded font technology, enabling them to render your web pages with exactly the fonts you've chosen. Although they are called "embedded fonts," the font information is actually in a separate compressed file linked to the HTML document. When the page is downloaded to the client, so is the necessary font information. Although still in its infancy, this is a great breakthrough for designers who want traditional control over type display.

There are two competing embedded font technologies: TrueDoc (developed by Bitstream and licensed by Netscape), and OpenType (developed by Microsoft and Adobe). TrueDoc's "Dynamic Fonts" can be viewed by Navigator 4.0+ and Internet Explorer 4.0+ on Windows, Mac, and Unix platforms. TrueDoc fonts creation and embedding tools exist for both Win-

dows and Mac as well. The current version of Microsoft's OpenType works only with Internet Explorer 4.0 on the Windows platform.

### 1. TrueDoc Technology ("Dynamic Fonts")

TrueDoc technology was developed by Bitstream in 1994. Netscape partnered with Bitstream in 1996 to include "Dynamic Font" support in the Navigator 4.0 browser. In 1998, Dynamic Fonts became available for Internet Explorer 4.0 via an ActiveX control. TrueDoc is capable of compressing TrueType and Type 1 fonts, and it is compatible with the Windows, Macintosh, and Unix platforms.

**File Format:** Portable Font Resource (.pfr)

**Technology:** TrueDoc uses a method called "direct rendering" which means the font infor-

### Multimedia on the Web | 361

mation is rendered (by a very compact raster-G program) within the browser itself without relying on the operating system. The information for several fonts can be compressed into a single .pfr file.

**Font Embedding Tool:** Eventually, TrueDoc font embedding tools will be built into popular WYSIWYG web-authoring applications. However, as of this writing, the only available tool is HexWeb Typograph 2.0, from HexMac, which works on both Windows and Macintosh. It is available as a standalone product, or as a plugin to BBEdit for the Mac or FrontPage for the PC.

**HTML Code:** Navigator and Internet Explorer require slightly different methods for attaching Dynamic Fonts to an HTML document.

### Netscape Navigator 4.0:

.pfr files are embedded using a <LINK> tag, as follows:

```
<LINK rel="fontdef" src="url/fontname.pfr">
```

The <link> tag goes between the <head> and </head> tags at the top of the document.

### Internet Explorer 4.0:

In addition to the <link> tag, you must add a pointer to an ActiveX control (immediately following the <link> tag). The following example points to an ActiveX control on Bitstream's TrueDoc server. You can point to this control from your page.

```
<SCRIPT LANGUAGE="JavaScript">
if (navigator.appName == "Microsoft Internet Explorer"){
  if (-1 != navigator.appVersion.indexOf ("Windows", 0)){
    document.writeln("<object>");
    document.writeln("classid='clsid:0246ECA8-996F-11D1-
      BE2F-00A0C9037DFE'");
    document.writeln("codebase='http://www.truedoc.com/
      activex/tserver.cab#version=1,0,0,5'");
    document.writeln("id='TDSV' width=0 height=0");
    document.writeln(">");
    document.writeln("</object>");
  }
}
</SCRIPT>
```

## 2. Embedded Open Type (EOT) -

Microsoft's Web Embedding Font Technology (WEFT) is used to generate EOT information. EOTs are best suited for Internet Explorer (IE 4.0 and above). Netscape browsers do not support EOTs.

The dynamic font generated has the extension as .eot. If there is a link to an EOT on a page, then the browser uses these EOTs to display the page with specified fonts. EOTs have specific URL roots so that only specified Web sites can use specific EOTs suitable to them. Once an EOT is prepared it is locked to that URL. The same EOT cannot be reused for some other site.

Any True Type Font can be converted to a Dynamic Font. PFR and EOT can co-exist on a single website. The Browser will sense the dynamic font and accordingly display the content.

### Using Embedded Fonts

Although the two embedded font technologies differ at the detail level, the general process for creating and importing them is essentially the same:

1. Specify the font document by name in your HTML document using the <font face> tag or the font-family property in CSS1.
2. Use a special font-embedding tool to create the downloadable font file(s) for your document (note, you need to have the font installed on your machine). The tool compresses the font shapes into a very small file and adds some security features.
3. Include information in the HTML document that links it to the font file.
4. Upload the HTML documents and the compressed font files to your server. If you are using TrueDoc Dynamic Fonts, you need to configure your server to recognize the new font MIME type.
5. The users' 4.0 browser will display the text in the font you've chosen. The font will be anti-aliased to smooth out the jagged edges.

(Note, at small point sizes, the anti-aliasing can actually make some fonts less legible. Do some testing first.)

### Advantages of embedded fonts

- Following are the advantages of embedded fonts:
1. Content is easy to edit and dynamically update. It can be copied and pasted.
  2. Search engines can spider it.
  3. The browser can enlarge it.
  4. It's fast - this whole font is only 8KB and it's stored in cache.
  5. No need for alt tags.
  6. The advantage of this technology is that the site can be viewed without downloading any fonts.

## GRAPHICS ON THE WEB

Web graphics can be used as part of the web content to add to the visual effect of a web site, or as buttons or maps for navigation.

The following list is a summary of the types of common graphic images that are found on web pages:

1. Navigation buttons - Used to help visitors navigate your web site.
2. Image maps - Also used to help visitors navigate your web site.
3. Logo - Used for your corporate or business identity.
4. Bullet points - Used to draw your visitors' eyes to the main points.
5. Mastheads - Also known as a title graphic. Main function is to let your visitors know which web page they are on.
6. Divider lines or horizontal rules - Commonly used to divide page into areas.
7. Background images - Used to enhance the visual appeal of a web page.
8. Pictures, cartoons, charts - Used to convey information and make your web pages more interesting - 'A picture speaks a thousand words'

## Graphics support in html

HTML support almost all type of graphics. There is no limit in the Web specifications to the graphical formats that can be used on the Web. You just need a MIME type so that the format is labeled correctly for transfer across the Web, and so that a suitable viewer (if one exists) can be located at the other end. In practice, certain formats are more widely understood than others; certain formats are more suited to one type of graphical data than another; so you should make an informed choice about what format to use.

Images on the Web are usually GIF, JPEG or PNG file formats:

**Graphics Interchange Format (GIF):** The original GIF format was designed by CompuServe in 1987, so images in this format are of the type GIF87. When the GIF format was extended in 1989, CompuServe added several new capabilities to the GIF format including transparency, and streaming animation using multiple images in one GIF89a file.

Today the overwhelming majority of images on the Web are in GIF format. Virtually all Web browsers that support graphics support the GIF file format for images. The Gif format Gif has the following features:

- Supports interlaced images- Interlaced GIFs appear first with poor resolution and then improve in resolution until the entire image has arrived, allowing the viewer to sample the picture while waiting for the rest.
- Transparent images-The background of a GIF can be made transparent, so you see the background colour of the browser window you're in.
- GIFs can also be animated.
- GIFs only support 8-bit colour-256 colors).
- Photographs saved as GIFs can also lose their detail and a wide range of values.
- Uses the LZW compression scheme, which reduces file size without loss of image quality.

**Joint Photographic Experts Group (JPEG):** JPEG stands for Joint Photographic Experts Group. JPEG is excellent for most realistic images (photos for example, but not line drawings or logos). JPEG is not good for small, detailed text or images with hard edges. JPEGs main features are:

- Supports 24-bit colour, over 16 million colours.
- It uses a powerful, though nominally "lossy", compression method i.e. the quality deteriorates with the compression.
- Inline JPEG files are not supported by all Web browsers. (Only very old browsers).
- There is no support for interlaced images.
- No support for transparency.
- No support for animation.

**Portable Network Graphics (PNG):** PNG is an extensible file format for the lossless, portable, well-compressed storage of raster images. PNG provides a patent-free replacement for GIF.

- It contains an unregistered compression algorithm
- It supports 24 bit images (millions of colours like JPEGs)
- It's available for all platforms
- It supports interlaced and transparent features
- It supports other interesting features (such as particular transparencies)
- However PNG isn't a standard yet and several browsers don't support it.

The HTML specification does not limit which graphics format you can use. In practice, your choice will be determined by considerations such as:

- The image quality,
- Availability in clients
- The data size.
- Requirements for transparency, streaming, animation or progressive rendering
- Whether the format is an open standard or a commercial one subject to patent fees.
- The format of the existing image

## When to use GIFs or JPEGs- Quick Guide

Use GIF format with graphics that you have created on your computer such as horizontal rules, illustrations, buttons, logos, or animations.

Use JPEG format when the images are scanned pictures or photographs.

### Considerations on Use of images

Some web browser can't show images (in fact they are text based browser, such as Lynx). You should use the ALT tag in order to show an alternative text in place of the image (note: this is a requirement in XHTML). In this case, a text based browser will show the alternative text. The alternative text will explain the image content.

#### Example

<IMG SRC="home.gif" ALT="home page!">

It will show ' home page' in place of the 'home.gif' image.

Images are heavy HTML elements (a text based web page is on average smaller than a simple image).

- ① 1. Don't use background images that make text and graphics hard to see.
- 2. Don't use large graphic files if possible.
- 3. When using large graphics make them available via a thumbnail images.
- 4. Don't overuse animated GIFs, blinking text, image buttons etc.

### SAFE COLOR PALETTES

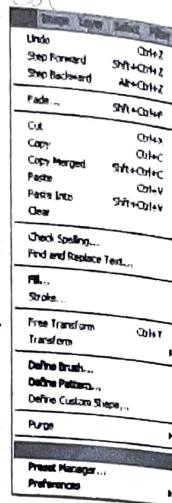
If you display a bitmap onscreen and then immediately display another bitmap, you may notice that the colors in the first image shift and distort onscreen. That distortion is called a palette shift, and it can undermine the overall effect of your title. Fortunately, you can prevent palette shifts, so that your bitmaps always display as you intend.

Palette shifts are an issue when you display 8-bit images on an 8-bit display device because of the way these images and devices store and display colors. Here's a brief look at what happens.

An 8-bit display device can show any color from a selection of more than 16 million, but it can display only 256 of those colors at one time. It maintains the 256 colors it's currently using in a color table, called a system or hardware palette.

Windows claims 20 of those colors to display system items, such as menu bars and the desktop pattern. It allocates the other 236 color entries to active Windows applications.

When you prepare an 8-bit image by drawing, scanning, or capturing it, the software program builds a table of colors, called a *color palette*, that contains the 256 colors the bitmap uses. The color palette determines the color of each pixel in the bitmap.



When you display an 8-bit image on an 8-bit display device, the system palette and the image's color palette have to reconcile their colors. If their colors are similar, only slight adjustments are made. If their colors are different, then the

system palette throws out its current table of colors and replaces it with the color palette from the image.

When you display a succession of bitmaps with different color palettes, that reconciliation process causes unsightly color shifts onscreen. The reason is simple: when the system palette replaces the first bitmap's colors with the second bitmap's colors the first bitmap no longer has the colors it needs to display properly. It can only display the colors available to it.

You can prevent color shifts by creating a common palette of 256 colors that you apply to all of the bitmaps in your title, including video and animation files. A number of programs exist, such as PalEdit and VidEdit, that can help you create a common palette for your title. And some authoring programs, such as Multimedia ToolBook, have a system for handling 8-bit palettes to prevent palette shifts.

- ② Another way to avoid palette shifts is to use transitions between images. If, for example, you fade to black before displaying the next image, Windows can update the palette more easily when the next image displays.

### Predicting palette shifts

The table below can help you evaluate when palette shifts may occur.

DISPLAY DEVICE			
	4-bit (VGA)	8-bit	16-bit/24-bit
BITMAP	No shifts	No shifts	No shifts
BITMAP	No shifts (can dither for better effect)	Shifts	No shifts

### A look at 4-, 16-, and 24-bit color

Both 4-bit images and 4-bit display devices use a 16-color palette. These images and display devices don't experience palette shifts when they share a standard 4-bit (VGA) palette.

A 4-bit display device represents colors as solid or dithered. Dithering involves approximating colors that are unavailable on a system by grouping pixels of the available solid colors. You can

dither an 8-bit image for display on a 4-bit display.

Neither 16-bit nor 24-bit display devices use color palettes because they can display so many colors. An 8-bit image looks great on either display.

- ③ Use 24-bit images sparingly. While they give you high-quality color on a 24-bit display, the files are large and tend to display slowly.

### Using the Color palette in Photoshop

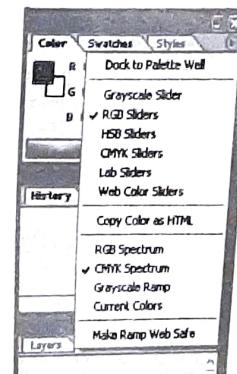
The Color palette displays the color values for the current foreground and background colors. Using the sliders in the Color palette, you can edit the foreground and background colors according to several different color models. You can also choose a foreground or background color from the spectrum of colors displayed in the color ramp at the bottom of the palette.

#### To display the Color palette:

Click on the Window menu → Color, or click the Color palette tab.

#### To change the color model of the color sliders:

Choose a Sliders option from the Color palette menu as figure.



#### To change the spectrum displayed in the color ramp:

Choose an option from the Color palette menu:

- *RGB Spectrum*, *CMYK Spectrum* (Photoshop), or *Grayscale Ramp* to dis-

play the spectrum of the specified color model.

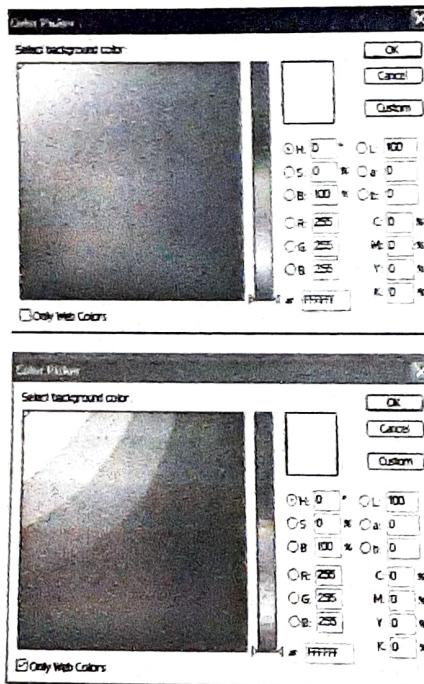
- Current Colors to display the spectrum of colors between the current foreground color and the current background color.
- To display only Web-safe colors, choose Make Ramp Web Safe.

### Using Web-safe colors

The Web-safe colors are the 216 colors used by browsers regardless of the platform. The browser will change all colors in the image to these colors when displaying the color on an 8-bit screen. The 216 colors are a subset of the Mac OS 8-bit color palettes. By working only with these colors, you can be sure that art you prepare for the Web will not dither on a system set to display in 256 colors.

### To identify Web-safe colors in the Adobe Color Picker:

1. Click the Only Web Colors option in the lower left corner of the color picker as figure.

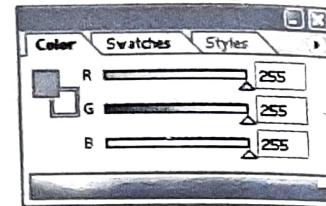


2. And then choose any color in the color picker. Any color you pick with this option selected is Web-safe.

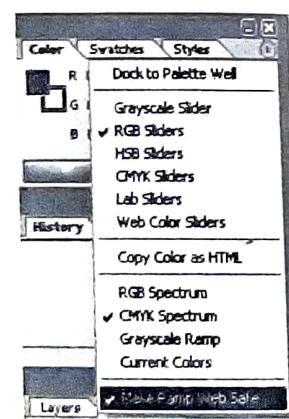
3. Choose a color in the color picker. If you choose a non-Web color, an alert cube appears next to the color rectangle in the color picker. Click the alert cube to select the closest Web color. (If no alert cube appears, the color you chose is Web-safe.)

### To select a Web-safe color using the Color palette:

1. Click the Color palette tab as figure, or choose Window > Color to view the Color palette.



2. Choose an option for selecting a Web-safe color.
3. Choose Make Ramp Web Safe from the Color palette menus figure.



With this option selected, any color you choose in the Color palette is Web-safe.

4. Choose Web Color Sliders from the Color palette menu (Photoshop). By default, Web Color Sliders snap to Web-safe colors (indicated by tick marks) when you drag them.

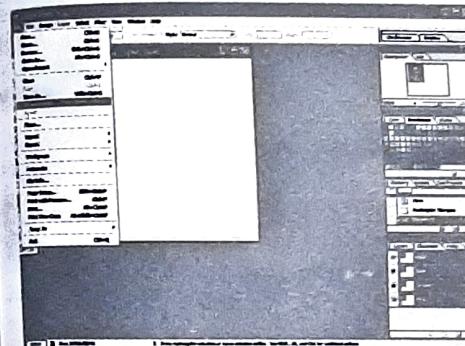
(To override Web-safe color selection, Alt-drag (Windows) the sliders.) If you choose a non-Web color, an alert cube appears above the color ramp on the left side of the Color palette. Click the alert cube to select the closest Web color. (If no alert cube appears, the color you chose is Web-safe.)

### Optimizing images

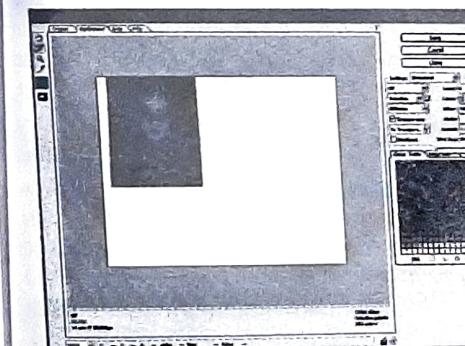
In Photoshop, you use the Save for Web dialog box to select optimization options and preview optimized artwork.

#### Displaying the Save for Web dialog box

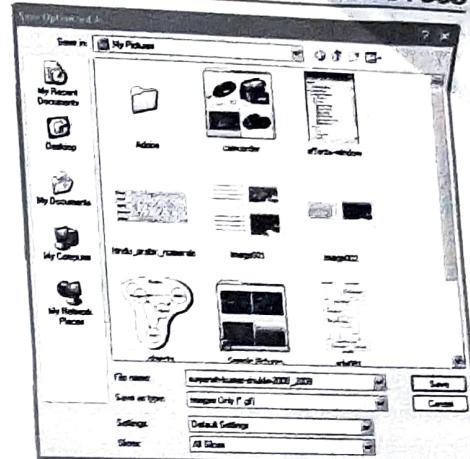
1. Click on the File menu and Choose Save for Web option and click on it as figure.



2. Then Save for Web dialog box appear as figure.



3. Click on the Save button to save your file in *GIF* format for the web.
4. Then Save Optimized As dialog box appear as figure.



5. Type a file name for your file (as suryanshkumar-shukla-2005\_2009) in File name text box.
6. Finally click on the Save button.

### Interlaced v/s Non-Interlaced Modes

An "interlaced" GIF will loads quickly (before all of the GIF is received) but the resolution isn't very good until it is fully loaded. It loads from up to bottom, then top to bottom, etc., until it is fully loaded in the Web browsers.

A "non-interlaced" image won't display on the screen until it is fully loaded in the Web browsers and, then it loads slowly from top to bottom.

Interlaced modes got their bad reputation because they are inferior to their non-interlaced companions at the same vertical scan frequency, VSF. But they are definitely superior at the same horizontal scan rate, and that's where the decisive limits of your monitor/graphics card usually lie.

At a fixed *refresh rate* (or half frame rate, or VSF) the interlaced display will flicker more: a 90Hz interlaced display will be inferior to a 90Hz non-interlaced display. It will, however, need only half the video bandwidth and half the horizontal scan rate. If you compared it to a non-interlaced mode with the same dot clock and the same scan rates, it would be vastly superior: 45Hz non-interlaced is intolerable.

And of course, never use an interlaced mode when your hardware would support a non-interlaced one with similar refresh rate.

If, however, you find that for some resolution you are pushing either monitor or graphics card to their upper limits, and getting dissatisfactorily flickery or outwashed (bandwidth exceeded) display, you might want to try tackling the same resolution using an interlaced mode. Of course this is useless if the VSF of your monitor is already close to its limits.

Design of interlaced modes is easy: do it like a non-interlaced mode. Just two more considerations are necessary: you need an odd total number of vertical lines (the last number in your mode line), and when you specify the "Interlace" flag, the actual vertical frame rate for your monitor doubles. Your monitor needs to support a 90Hz frame rate if the mode you specified looks like a 45Hz mode apart from the "Interlace" flag.

As an example, here is my modeline for 1024x768 interlaced: my Multisync 3D will support up to 90Hz vertical and 38kHz horizontal.

Modeline "1024x768" 45 1024 1048  
1208 1248 768 776 807 Interlace

Both limits are pretty much exhausted with this mode. Specifying the same mode, just without the "Interlace" flag, still is almost at the limit of the monitor's horizontal capacity (and strictly speaking, a bit under the lower limit of vertical scan rate), but produces an intolerably flickery display.

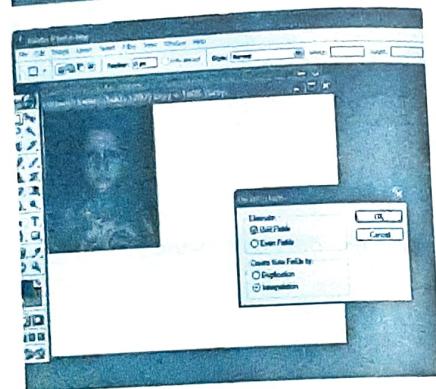
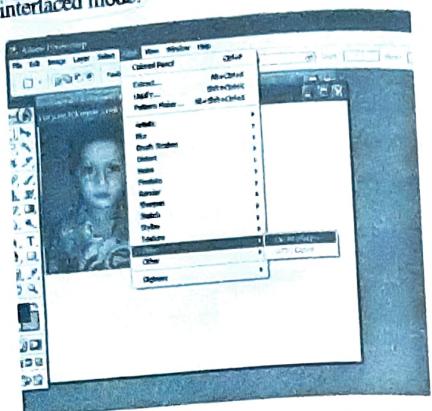
Basic design rules: if you have designed a mode at less than half of your monitor's vertical capacity, make the vertical total of lines odd and add the "Interlace" flag. The display's quality should vastly improve in most cases.

If you have a non-interlaced mode otherwise exhausting your monitor's specs where the vertical scan rate lies about 30% or more under the maximum of your monitor, hand-designing an interlaced mode (probably with somewhat higher resolution) could deliver superior results.

The advantage of a non-interlaced mode is that it is flicker-free. Since all fields (and their

scanlines) get drawn on the same location, there is no interlace flicker. The image is very stable and clear.

The disadvantage of a non-interlaced mode is that the perceived vertical resolution is only a half of what it seemed to be in the respective interlaced mode.



De-Interlacing an Image using Photoshop

## IMAGE MAPS

Any Image can be turned into a clickable link by surrounding it with HTML anchor tags. An Image map however contains multiple links within the same image.

**Definition:** "An image map is a picture in which areas within the picture are links." In other words we can say that "An image map is a single graphic image containing more than one hot spot."

In Web page development, an image map is a graphic image defined so that a user can click on different areas of the image and be linked to different destinations. You make an image map by defining each of the sensitive areas in terms of their x and y coordinates (that is, a certain horizontal distance and a certain vertical distance from the left-hand corner of the image). With each set of coordinates, you specify a Uniform Resource Locator or Web address that will be linked to when the user clicks on that area.

The X and Y coordinates are expressed in pixel either in a separate file called a map file or in the same HTML file that contains the link to the image map. Popular tools like MapEdit provide a graphical interface for creating an image map so that you don't have to figure out the X and Y coordinate numbers yourself.

Originally, the map file had to be sent to the server. Now the creator can place the map information either at the server or at the client (a "client-side map").

Client side image maps have coordinates within the img file while server side image maps have coordinates stored separately on a server. There are various design tools that can be used to make an image and you can usually find some with free downloads or internet-based trials that will enable you to experiment with design features. It's a good idea to try different applications before you set your mind on one if you are not well-versed in graphic design.

Once you have your image and are ready to create an image map, an AREA HREF code is usually used to specify the coordinates of a clickable region. The letters src is an attribute used to specify the source or location of the img file. Commonly used image formats for image maps include gif, jpeg and png formats.

The advantage of using an image map is that it provides an interactive visual element for your website. The disadvantage is that, without an explanation displayed, website visitors that are not familiar with image maps may not know to click on the image for accessibility to further

information, so some designers feel that using text hyperlinks is more effective. Image maps are used widely on many Web sites as a more adventuresome form of main menu.

## Creating an Image Map

There are two types of image maps:

1. **Server side:** Rely on cgi scripts on the server and are more difficult to set up, and are not really used anymore.
2. **Client side:** These are interpreted by the user's browser and are relatively easy to set up and run faster than server side maps. These are the only ones we will consider.

An image map consists of two components:

- **The Image:** This can be any GIF image.
- **The HTML for the links and image sections:** This is usually created by a graphic program but can be done manually with a little trial and error.

Most graphic programs will create image maps such as Macromedia Dreamweaver, Serif Photoplus 6.0 etc.

For this example the starting image is a simple menu image with text for the home page and the contact page. We are going to turn the text on the image into links.

It should be noted that the image isn't changed by the process. It means that any existing image can be used to create an image map. The image map process just uses the image to calculate the co-ordinates of the image hotspots. Here is the image:



The image map toolbar is on the bottom of the left toolbar and has an arrow pointing to the left and drop down selection arrow:



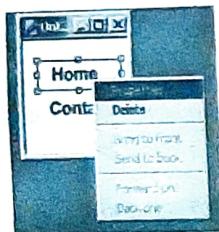
Click the toolbar and select the image map shape (I used a square) Then use it to outline the part of the image that will act as the link (here the text-home)



Then click the image toolbar icon again. This will confirm the selection.

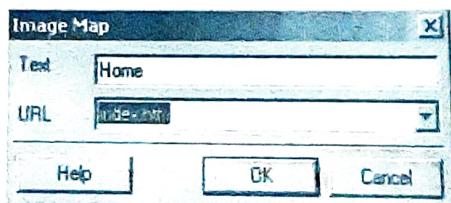


Now click inside the selected area it should have a border around it (see below) then right click and select properties.



A image map text box appears. Enter the text that will be displayed when the visitor hovers over the link and the URL of the link. I have used a relative link in the example below.

If you use the full url with the `http://..` then you may find that it doesn't all fit in the text box. If that happens enter as much as possible and remember to edit the generated html code manually.



Repeat the above process for the contact link. Click ok and it's done. Now Click export the Create html checkbox should be automatically ticked and then give it a name (here menu) and click save.



Two files are created an .gif file (the image) and an HTML file (the image map).

### Image Map HTML

Here is the HTML generated.

```
<IMG BORDER="0" SRC="menu.gif"
ALT="Exported picture"
USEMAP="#PreviewImageMap"
ISMAP="ISMAP">

<MAP NAME="PreviewImageMap">
<AREA SHAPE=RECT HREF="http://www.build-your-website.com/contact"
ALT="contact"
COORDS="12,51,97,73">
<AREA SHAPE=RECT
HREF="index.htm" ALT="Home"
COORDS="13,18,94,45">
</MAP>
```

The 12,51 is 12 pixels horizontal (x) and 51 pixels vertically measure from the top left corner of the image and 97,73 is 97 pixels horizontal (x) and 73 pixels vertically measure from the top left corner of the image marking the upper left and lower right corners of the rectangle.

Finally, if you place the mouse over the text you will see that they are in fact links.

## AUDIO ON THE WEB

### Playing Sounds on the Web

Sounds can be played "inline" or by a "helper", depending on the HTML element you use.

### Inline Sound:

Let us see "What is inline sound?"

**Definition:** "When sound is included in a web page, or as part of a web page, it is called inline sound."

If you plan to use inline sounds in your web applications, be aware that many people find inline sound annoying. Also note that some users might have turned off the inline sound option in their browser.

### Using a Helper (Plug-In)

Now let us see "What is inline sound Plug-In or helper application?"

**Definition:** "A helper application is a program that can be launched by the browser to "help" playing sound. Helper applications are also called Plug-Ins."

Helper applications can be launched using the `<embed>` or the `<object>` tag.

One great advantage of using a helper application is that you can let some (or all) of the player settings be controlled by the user.

Most helper applications allow manually (or programmed) control over the volume settings and play functions like rewind, pause, stop and play.

### Using The `<embed>` Tag

The purpose of the `<embed>` tag is to embed multimedia elements in web page.

The following code fragment displays a MIDI file embedded in a web page.

```
<embed src="beatles.mid" />
```

**Example**

```
<html>
<body>
<h2>Beatles Embedded</h2>
<embed
src="beatles.mid"
width="50%"
height="50%">
</embed>
</body>
</html>
```

⑤ The `<embed>` tag is deprecated. The World Wide Web Consortium (W3C) recommend using the `<object>` tag instead.

### Using The `<object>` Tag

The purpose of the `<object>` tag is to embed multimedia elements in web page.

The following code fragment displays a WAVE file embedded in a web page.

```
<object
classid="clsid:22D6F312-B0F6-11D0-94AB-0080C74C7E95">
<param name="FileName" value="liar.wav" />
</object>
```

**Example**

```
<html>
<body>
```

### Playing The Object

```
<object
height="50%"
width="50%"
classid="clsid:22D6F312-B0F6-11D0-94AB-0080C74C7E95">
<param name="AutoStart" value="1" />
<param name="FileName" value="liar.wav" />
</object>
```

```
</body>
```

```
</html>
```

### Using A Hyperlink

If a web page includes a hyperlink to a media file, most browsers will use a "helper application" to play the file.

The following code fragment displays a link to a MIDI file. If a user clicks on the link, the browser will launch a helper application, like Windows Media Player to play the MIDI file:

```
<a href="beatles.mid">Play the Beatles</a>
```

**Example**

```
<html>
<body>
```

## <h>Linking To Beatles</h2>

```
</p>
<a href="beatles.mid">
Click here to play the Beatles</a>
```

```
</body>
</html>
```

### Audio supported in HTML:

Audio/Sound can be stored in many different formats and almost audio format are supported by maximum Web browsers.

#### The MIDI Format

The MIDI (Musical Instrument Digital Interface) is a format for sending music information between electronic music devices like synthesizers and PC sound cards. The MIDI format was developed in 1982 by the music industry. The MIDI format is very flexible and can be used for everything from very simple to real professional music making.

MIDI files do not contain sampled sound, but a set of digital musical instructions (musical notes) that can be interpreted by your PC's sound card. The downside of MIDI is that it cannot record sounds (only notes). Or, to put it another way: It cannot store songs, only tunes. The MIDI format is supported by many different software systems over a large range of platforms. MIDI files are supported by all the most popular Internet browsers. Sounds stored in the MIDI format have the extension .mid or .midi.

#### The RealAudio Format

The RealAudio format was developed for the Internet by Real Media. The format also supports video. The format allows streaming of audio (on-line music, Internet radio) with low bandwidths. Because of the low bandwidth priority, quality is often reduced. Sounds stored in the RealAudio format have the extension .rm or .ram.

#### The AU Format

The AU format is supported by many different software systems over a large range of

platforms. Sounds stored in the AU format have the extension .au.

#### The AIFF Format

The AIFF (Audio Interchange File Format) was developed by Apple. AIFF files are not cross-platform and the format is not supported by all web browsers. Sounds stored in the AIFF format have the extension .aif or .aiff.

#### The SND Format

The SND (Sound) was developed by Apple. SND files are not cross-platform and the format is not supported by all web browsers. Sounds stored in the SND format have the extension .snd.

#### The WAVE Format

The WAVE (waveform) format is developed by IBM and Microsoft. It is supported by all computers running Windows, and by all the most popular web browsers. Sounds stored in the WAVE format have the extension .wav.

#### The MP3 Format (MPEG)

MP3 files are actually MPEG files. But the MPEG format was originally developed for video by the Moving Pictures Experts Group. We can say that MP3 files are the sound part of the MPEG video format.

MP3 is one of the most popular sound formats for music recording. The MP3 encoding system combines good compression (small files) with high quality. Expect all your future software systems to support it. Sounds stored in the MP3 format have the extension .mp3, or .mpga (for MPG Audio).

#### What Format To Use?

The WAVE format is one of the most popular sound format on the Internet, and it is supported by all popular browsers. If you want recorded sound (music or speech) to be available to all your visitors, you should use the WAVE format. The MP3 format is the new and upcoming format for recorded music. If your website is about recorded music, the MP3 format is the choice of the future.

## VIDEO ON THE WEB

Video files can be linked to HTML documents using the standard link tag around a string of text or a graphic. Videos can be played "inline" or by a "helper", depending on the HTML element you use.

#### Inline Videos

**Definition:** "When a video is included in a web page it is called inline video."

#### Using A Helper (Plug-In)

A helper application is a program that can be launched by the browser to "help" playing a video. Helper applications are also called Plugins.

Helper applications can be launched using the <embed> or the <object> tag.

One great advantage of using a helper application is that you can let some (or all) of the player settings be controlled by the user.

Most helper applications allow manual (or programmed) control over the volume settings and play functions like rewind, pause, stop and play.

#### Using the <embed> Tag

The purpose of the <embed> tag is to embed multimedia elements in web page.

The following code fragment displays an AVI file embedded in a web page: <embed src="video.avi" />

**Note:** The <embed> tag is deprecated. The World Wide Web Consortium (W3C) recommends using the <object> tag instead.

#### Using the <object> Tag

The purpose of the <object> tag is to embed multimedia elements in web page.

The following code fragment displays an AVI file embedded in a web page:

```
<object data="video.avi" type="video/avi" />
```

#### Using A Hyperlink

If a web page includes a hyperlink to a media file, most browsers will use a "helper application" to play the file.

The following code fragment displays a link to an AVI file. If a user clicks on the link, the browser will launch a helper application, like Windows Media Player to play the AVI file:

```
<a href="video.avi">Play a video file</a>
```

## Multimedia Streaming (Streaming Video & Audio)

**Definition:** "Streaming is an enabling technology for providing multimedia data delivery between clients in various multimedia applications on the Internet." In other words we can say that "Streaming is a way of delivering audio and video files across a network or the Internet without downloading an entire file before it plays. When a streamed file finishes playing, it is not stored on your computer."

Web browsing and file transfer are the dominant services provided through the Internet. However, these kinds of service providing information about text, pictures and document exchange are no longer satisfied the demand of clients. With the recent advances in digital technologies, such as high-speed networking, media compression technologies and fast computer processing power, more and more multimedia applications involving digital audio and video are come into practice on the Internet.

When you play a streaming media file, the file is partially downloaded and stored in a buffer before it begins to play; this process is called buffering. As more information in the file is streamed to Windows Media Player or other media player, the Player continues to buffer the information. If traffic on the Internet interrupts the flow of information, buffering may enable the file to play back with fewer breaks or interference. When streaming a file, the Player monitors network conditions and automatically makes adjustments to ensure the best reception and playback. If the information in the buffer runs out, there will be a break in playback. The status bar at the bottom of the Player window alerts you when information is buffering. When you play streaming media content, you can view statistics and information about the quality of the

connection and the playback performance. The information in the Statistics dialog box can help you determine whether you are receiving a high-quality data transmission.

With streaming technology, the client can playback the media content without waiting for the entire media file to arrive. Compared with conventional data communication, delivery of multimedia data has more stringent requirements on network bandwidth, delay and loss. However, the current Internet is inherently a packet-switched network that was not designed to handle isochronous (continuous time-based) traffic such as audio and video. The Internet only provides best-effort services and has no guarantee on the quality of service (QoS) for multimedia data transmission.

Video and audio compression algorithms are first applied to compress the raw audiovisual data to achieve efficiency on storage and transmission. Streaming protocols provide means to the client and the server for services negotiation, data transmission and network addressing. When a request for service is received, the server will decide whether this request will be accepted or not based on the information from the service manager. With the acceptance of the request, resources will be allocated. Media contents retrieved from the storage device are packetized with media information such as timestamp and then delivered to the client. If the server cannot fulfill the request, the client may be blocked or en-queue in the system. The arriving packet at the client is decapsulated into media information and media content. QoS Monitor utilizes these media information to analyze the network condition and feeds back to QoS control in the server for adapting the QoS requirements. On the other hand, the media content is decoded and passed to the application for playback. Audio and video may be transmitted by separated streams. To achieve synchronization among various streams, media synchronization mechanisms are required.

As the large volume of raw multimedia data imposes a stringent bandwidth requirement on

the network, compression is widely employed to achieve transmission efficiency. Since video has larger bandwidth requirement (56 Kbps-15 Mbps) than audio (8 Kbps-128 Kbps) and loss of audio is more annoying to human than video, audio is given higher priority for transmission in a multimedia streaming system. Hence, only video will be used for adaptation in order to meet the QoS requirements.

### **Streaming Protocols**

Streaming protocols provide means to the client and the server for services negotiation, data transmission and network addressing. Protocols relevance to multimedia streaming can be classified into three categories: network-layer protocol, transport protocol and session control protocol.

1. **Network-layer protocol**, being served by IP, provides basic network service such as address resolution and network addressing.
2. **Transport protocols**, such as TCP, UDP and RTP/RTCP, provide end-to-end transport functions for data transmission.
3. Defining the messages and procedures to control the delivery of multimedia data is done by **session control protocol**, e.g. RTSP (Real-Time Streaming Protocol) or SIP (Session Initiation Protocol).

Before the multimedia data can be delivered properly, a session should be established between end-points to negotiate the services based on their capabilities and requirements. Depending on the service requirements, different session protocols can be employed. The Real-Time Streaming Protocol (RTSP) is used for controlling the delivery of data with real-time properties in a streaming system. RTSP also provides VCR-like function to control either a single or several time-synchronized streams of continuous media between the server and the client. While RTSP is suitable for media retrieval system, another protocol, Session Initiation Protocol (SIP), is mainly designed for interactive multimedia application, such as Internet phone and video conferencing. Once the session has

been established and the required services have negotiated successfully, compressed multimedia data is retrieved and packetized in RTP module which defines a way to format the IP packets carrying multimedia data and provides information on the type of data transported, timestamp for multiple streams synchronization, and sequence numbers for packet sequence reordering and loss detection. RTP itself does not guarantee QoS or reliable delivery, so RTCP is designed to work in conjunction with RTP to provide QoS feedback information. The system (QoS control/monitor) utilizes this information to evaluate the network condition and react with suitable actions, says, rate adaptation. The packetized packets are then passed to the UDP/IP layer for transmission over the Internet. The media streams are then processed in the reversed manner before playback in the client.

### **Media Synchronization**

Due to different route and incurred unpredictable delay during transmission, media streams may lose synchronization. Therefore, media synchronization mechanism is needed to maintain the original temporal relationships within one media stream or among various media streams such that the media contents can be presented properly. There are three levels of synchronization, namely, intra-stream, inter-stream and inter-object synchronization.

1. **Intra-stream synchronization** is deployed to maintain the continuity of the stream itself that each received video/audio frame should be played back within its predicted playback time; otherwise, the presentation will be interrupted by pauses or gaps.
2. **Inter-stream synchronization** aims at maintaining the temporal relationship among various media streams, such as audio frame should be played back with its corresponding video frame in the same way as they were originally captured.
3. **Inter-object synchronization** is used to synchronize the media streams with time-independent data such as text and still images.

### **Real videos**

RealVideo is a proprietary video format developed by Real Networks. It was first released in 1997 and as of 2008 is at version 10. RealVideo is supported on many platforms, including Windows, Mac, Linux, Solaris, and several mobile phones.

RealVideo is usually paired with RealAudio and packaged in a Real Media (.rm) container. RealMedia is suitable for use as a streaming media format, that is one which is viewed while it is being sent over the network. Streaming video can be used to watch live television, since it does not require downloading the video in advance.

### **Technology**

The first version of RealVideo was announced in 1997. This was based on the H.263 codec. Though, support for ClearVideo quietly disappeared in the next version of RealVideo. RealVideo codecs are identified by four-character codes. RV10 and RV20 are the H.263-based codecs. RV30 and RV40 are RealNetworks' proprietary formats. RealVideo 10 uses RV40.

RealVideo can be played from a RealMedia file or streamed over the network using the Real Time Streaming Protocol (RTSP), a standard protocol for streaming media developed by the IETF. To make easy real-time streaming, RealVideo (and RealAudio) normally uses constant bit rate encoding, so that the same amount of data is sent over the network each second.

### **MPEG**

MPEG stands for Moving Picture Experts Group. MPEG develops standards for digital video and digital audio compression. It operates under the support of the International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC). The MPEG standards are an developing series, each designed for a different purpose. MPEG standards address audio and video formats used online, in

television broadcasts, and in DVD media.

A number of MPEG standards are in current use, and more are sure to follow. Some well-known standards are explained briefly below.

**MPEG-1:** This first set of standards was developed for audio and video compression. MPEG-1 Layer 3 is a codec within these standards, known simply as MP3, or the popular audio compression format for music.

The video format of MPEG-1 was used to store movies on CDs, known as Video CD, or VCD. Quality is equal to that of a VHS tape, and compatibility playback on CD/DVD players is high. One drawback of MPEG-1 is that it only supports *progressive* footage, versus the inclusion of *interlaced*.

**MPEG-2:** This standard improved on MPEG-1 by including the ability to encode interlaced pictures. It is widely used for digital cable, satellite and over the air digital signals.

**MPEG-3:** The intention was to make this standard compatible with high-definition TV (HDTV), but this became unnecessary when MPEG-2 extensions expanded that standard's ability to encompass HDTV. At that time, MPEG-3 was abandoned.

**MPEG-4:** Borrowing from MPEG-1 and MPEG-2, the MPEG-4 standard extends functionality of audio/video compression by improving format flexibility. MPEG-4 supports 3-D rendered objects, as well as incorporating the copyright protection scheme known as *Digital Rights Management (DRM)*. MPEG-4 can be used for broadcast television, online streaming media, applications such as videophone, and distribution on digital media.

#### SMIL (Synchronized Multimedia Integration Language)

**Definition:** "SMIL is a language for describing interactive audiovisual presentations." In other words we can say that "SMIL (Synchronized Multimedia Integration Language) is a language that allows Web site creators to be able to easily define and synchronize multimedia elements (video, sound, still im-

ages) for Web presentation and interaction."

SMIL stands for *Synchronized Multimedia Integration Language* (pronounced "smile"). It is a new markup language being developed by the World Wide Web Consortium (W3C) that would enable Web developers to divide multimedia content into separate files and streams (audio, video, text, and images), send them to a user's computer individually, and then have them displayed together as if they were a single multimedia stream. The ability to separate out the static text and images should make the multimedia content much smaller so that it doesn't take as long to travel over the Internet.

SMIL is based on the eXtensible Markup Language (XML). Rather than defining the actual formats used to represent multimedia data, it defines the commands that specify whether the various multimedia components should be played together or in sequence. SMIL also lets the "producer" store a media object in multiple versions, each with a different bandwidth so that a lower-bandwidth version of a Web page can be sent to users who need it. SMIL also accommodates multiple language versions of soundtracks.

SMIL statements are simple and can be entered with a text editor similar to those used to create Hypertext Markup Language (HTML) pages. The first public draft of SMIL was released in November, 1997.

#### What Can SMIL Do?

1. SMIL can be used to create Internet or Intranet presentations
2. SMIL can be used to create slide-show presentations
3. SMIL has been described as the Internet answer to PowerPoint
4. SMIL presentations can display multiple file types (text, video, audio...)
5. SMIL presentations can display multiple files at the same time
6. SMIL presentations can display files from multiple web servers
7. SMIL presentations can contain links to other

#### SMIL presentations

8. SMIL presentations can contain control buttons (stop, start, next, ...)
9. SMIL has functions for defining sequences and duration of elements
10. SMIL has functions for defining position and visibility of elements

#### SMIL Files

A SMIL file contains all the information necessary to describe a multimedia presentation. SMIL files are stored with the file extension \*.smil

A SMIL file contains the following:

1. The layout of the presentation
2. The timeline of the presentation
3. The source of the multimedia elements

#### SMIL

#### A Simplified SMIL Example

```
<smil>
<body>
<seq repeatCount="indefinite">


</seq>
</body>
</smil>
```

From the example above you can see that SMIL is an HTML-like language that can be written using a simple text-editor.

The `<smil></smil>` tags defines the SMIL document.

A `<body>` element defines the body of the presentation.

A `<seq>` element defines a sequence to display. The `repeatCount` attribute defines an indefinite loop. Each `<img>` element has a `src` attribute to define the image source and a `dur` attribute to define the duration of the display.

#### VIRTUAL REALITY ON THE WEB

The term Virtual Reality (VR) is used by many different people with many meanings. There are some people to whom VR is a specific collection of technologies, which is a Head Mounted Display, Glove Input Device and Audio. Some other people stretch the term to include conventional

books, movies or pure fantasy and imagination.

**Definition:** "Virtual Reality is a way for humans to visualize, manipulate and interact with computers and extremely complex data."

The visualization part refers to the computer generating visual, auditory or other sensual outputs to the user of a world within the computer. This world may be a CAD model, a scientific simulation, or a view into a database. The user can interact with the world and directly manipulate objects within the world. Some worlds are animated by other processes, perhaps physical simulations, or simple animation scripts. Some people object to the term "Virtual Reality", saying it is an oxymoron. Other terms that have been used are Synthetic Environments, Cyberspace, Artificial Reality, Simulator Technology, etc. VR is the most common and sexiest. It has caught the attention of the media.

The applications are being developed for VR run a wide spectrum, from games to architectural and business planning. Many applications are worlds that are very similar to our own, like CAD or architectural modeling. Some applications provide ways of viewing from an advantageous perspective not possible with the real world, like scientific simulators and telepresence systems, air traffic control systems.

#### Web-Based Virtual Reality via VRML

A potential solution for a standardized virtual model is the most exciting development of VRML, the Virtual Reality Modeling Language, a new addition to the World Wide Web. While HTML, the HyperText Markup Language, is the current standard for authoring home pages, VRML supports the distribution of three-dimensional models over the Internet. These models have all the characteristics of virtual models (as described above). They are based on a polygonal representation and can be animated, can include functionality and dynamic behavior, and can be interactively controlled by the user. In the future, home pages may be replaced by "home spaces" with hyperlinks to other spaces or pages located on any server within the worldwide Internet.

A VRML model is defined in one or more VRML files. A VRML file is a regular text file that describes a virtual model using a standardized syntax. The content of a VRML file is being viewed interactively through the use of a VRML plug-in available for all common Web browsers (like Netscape or Internet Explorer). These plug-ins can be downloaded from various Web sites and are usually available at no cost for different computer platforms.

When accessing a VRML file on the Web (by clicking on a corresponding link), the file is downloaded on the user's computer and the plug-in is activated and displays an initial view of the virtual model on the computer's monitor. The plug-in provides standard navigational tools like walk-trough or fly-over. These tools enable the user to move through the model in an arbitrary way or along a predefined path. Navigation as

well as interactions are usually controlled via the mouse input device.

Using VRML on the World Wide Web provides an excellent tool for sharing virtual models with remote users and for supporting collaborative work and concurrent engineering. It is extremely cost effective since the required infrastructure (networked computers) exists almost everywhere and the viewing software (VRML plug-in) is available to everyone. Today's limitations are dictated by network capabilities (download times for large VRML files describing complex virtual models) and the speed of the user's local computer (responsible for real-time rendering and interactions). The current development trend towards high capacity networks like Internet and more powerful desktop and laptop computers with 3D graphics acceleration will remove these limitations gradually in the near future.

## EXERCISE

1. What are plug-ins ? Explain various plug-ins for web.
2. Write short note on the followings :
 

(i) SMIL	(ii) MIDI
(iii) HTML and Multimedia	(iv) Web based multimedia
(v) AVI files	
3. What do you mean by Web browsers ? Explain features of web browsers ?
4. What is Internet Explorer ? Explain various features of Internet Explorer.
5. What is Firefox ? Write important features of Firefox.
6. What is bandwidth ? Explain with suitable example.
7. What are broadband technology ? How does broadband work and what are its applications?
8. What is HTML ? How do you use text in the web ? Explain with suitable examples.
9. Write short note on the following :
 

(i) Hypertext	(ii) Hypermedia
(iii) Dynamic Font Technology	
10. What is embedded font technology ? What is advantages of embedded fonts.
11. What is color palette ? What do you mean by web-safe colors ? Write all steps to select a web-safe color from color palette in adobe photoshop.
12. Write short note on the followings :
 

(i) Interlaced V/s Non-Interlaced Mode	
(ii) GIF	(iii) JPEG
(iv) PNG	(v) Graphics on the Web
13. What is image map ? How many types of image map use on web ? How do you create image map using image editor ?
14. What is inline sound ? How do you use sound on the web ? Explain.
15. What is inline sound plug-in or helper application ? How do you use sound using <embed> and <object> tag ?
16. What are the various audio file formats that support in HTML ? Explain.
17. What is inline video ? How do you use video on the web ? Explain.
18. What is Real video ? How do you use virtual reality on the web ? Explain.
19. What is SMIL ? What can SMIL do ? How do create a SMIL files ?
20. What is streaming ? What do you mean by streaming protocols ? Explain.
21. Write short note on the following :
 

(i) Streaming Video/Audio	
(ii) Streaming Protocols	
(iii) Streaming Synchronization	