R N S INSTITUTE OF TECHNOLOGY

CHANNASANDRA, BANGALORE - 98

PROGRAMMING THE WEB

NOTES FOR 7TH SEMESTER INFORMATION SCIENCE

SUBJECT CODE: 06CS73

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TEXT BOOK: PROGRAMMING THE WORLD WIDE WEB – Robert W Sebesta, 4th Edition, Pearson Education, 2008

Notes have been circulated on self risk. Nobody can be held responsible if anything is wrong or is improper information or insufficient information provided in it. Please add the XHTML document structure in the beginning of all programs. All the programs are properly working & are executed.

CONTENTS:

Contains more programs with outputs for each which is not in text book..!!!

UNIT 1
FUNDAMENTALS OF WEB, XHTML – 1

A BRIEF INTRODUCTION ABOUT THE INTERNET

Origins:

- **1960s**
  - U.S. Department of Defence (DoD) became interested in developing a new large-scale computer network
  - The purposes of this network were communications, program sharing, and remote computer access for researchers working on defence-related contracts.
  - The DoD's Advanced Research Projects Agency (ARPA) funded the construction of the first such network. Hence it was named as ARPAnet.
  - The primary early use of ARPAnet was simple text-based communications through e-mail.

- **late 1970s and early 1980s**
  - BITNET, which is an acronym for ***B**ecause **I**t's **T**ime **NET**work*, began at the City University of New York. It was built initially to provide electronic mail and file transfers.
  - CSNET is an acronym for ***C**omputer **S**cience **NET**work*. Its initial purpose was to provide electronic mail.

- **1990s**
  - NSFnet which was created in 1986 replaced ARPAnet by 1990.
  - It was sponsored by the National Science Foundation (NSF).
  - By 1992 NSFnet, connected more than 1 million computers around the world.
  - In 1995, a small part of NSFnet returned to being a research network. The rest became known as the ***Internet.***

What Is the Internet?

- The Internet is a huge collection of computers connected in a communications network.
- The Transmission Control Protocol/Internet Protocol (TCP/IP) became the standard for computer network connections in 1982.
- Rather than connecting every computer on the Internet directly to every other computer on the Internet, normally the individual computers in an organization are connected to each other in a local network. One node on this local network is physically connected to the Internet.
- So, the Internet is actually a ***network of networks***, rather than a network of computers.
- Obviously, all devices connected to the Internet must be uniquely identifiable.

Internet Protocol Addresses

- The Internet Protocol (IP) address of a machine connected to the Internet is a unique 32-bit number.
- IP addresses usually are written (and thought of) as four 8-bit numbers, separated by periods.
- The four parts are separately used by Internet-routing computers to decide where a message must go next to get to its destination.
- Although people nearly always type domain names into their browsers, the IP works just as well.
- For example, the IP for United Airlines (`www.ual.com`) is `209.87.113.93`. So, if a browser is pointed at `http://209.87.113.93`, it will be connected to the United Airlines Web site.

Domain Names

The IP addresses are numbers. Hence, it would be difficult for the users to remember IP address. To solve this problem, text based names were introduced. These are technically known as ***domain name system (DNS).***

These names begin with the names of the host machine, followed by progressively larger enclosing collection of machines, called ***domains.*** There may be two, three or more domain names.
DNS is of the form **hostname.domainName.domainName** . Example: **rnsit.ac.in**
The steps for conversion from DNS to IP:

- The DNS has to be converted to IP address before destination is reached.
- This conversion is needed because computer understands only numbers.
- The conversion is done with the help of *name server*.
- As soon as domain name is provided, it will be sent across the internet to contact name servers.
- This name server is responsible for converting domain name to IP
- If one of the *name servers* is not able to convert DNS to IP, it contacts other name server.
- This process continues until IP address is generated.
- Once the IP address is generated, the host can be accessed.
- The hostname and all domain names form what is known as FULLY QUALIFIED DOMAIN NAME.

This is as shown below:

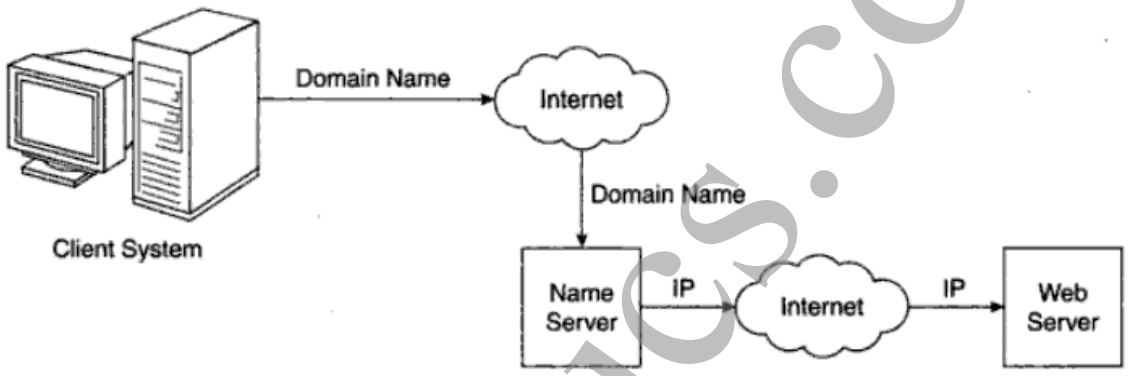


Figure 1.1 Domain name conversion

The World Wide Web

Origins

- Tim Berners Lee and his group proposed a new protocol for the Internet whose intention was to allow scientists around the world to use the Internet to exchange documents describing their work.
- The proposed new system was designed to allow a user anywhere on the Internet to search for and retrieve documents from the databases on any number of different document-serving computers.
- The system used *hypertext*, which is text with embedded links to text in other documents to allow non-sequential browsing of textual material.
- The units of web are referred as pages, documents and resources.
- Web is merely a vast collection of documents, some of which are connected by links.
- These documents can be accessed by web browsers and are provided by web servers.

Web or Internet?

It is important to understand that the Internet and the Web is not the same thing.

- ✓ The **Internet** is a collection of computers and other devices connected by equipment that allows them to communicate with each other.
- ✓ The **Web** is a collection of software and protocols that has been installed on most, if not all, of the computers on the Internet.

WEB BROWSERS

- Documents provided by servers on the Web are requested by **browsers**, which are programs running on client machines.

- They are called browsers because they allow the user to browse the resources available on servers.
- Mosaic was the first browser with a graphical user interface.
- A browser is a client on the Web because it initiates the communication with a server, which waits for a request from the client before doing anything.
- In the simplest case, a browser requests a static document from a server.
- The server locates the document among its servable documents and sends it to the browser, which displays it for the user.
- Sometimes a browser directly requests the execution of a program stored on the server. The output of the program is then returned to the browser.
- Examples: Internet Explorer, Mozilla Firefox, Netscape Navigator, Google Chrome, Opera etc.,

WEB SERVERS

Web servers are programs that provide documents to requesting browsers. Example: Apache

Web server operations:

- All the communications between a web client and a web server use the HTTP
- When a web server begins execution, it informs the OS under which it is running & it runs as a background process
- A web client or browser, opens a network connection to a web server, sends information requests and possibly data to the server, receives information from the server and closes the connection.
- The primary task of web server is to monitor a communication port on host machine, accept HTTP commands through that port and perform the operations specified by the commands.
- When the URL is received, it is translated into either a filename or a program name.

General characteristics of web server:

- The file structure of a web server has two separate directories
- The root of one of these is called **document root** which stores web documents
- The root of the other directory is called the **server root** which stores server and its support softwares
- The files stored directly in the document root are those available to clients through top level URLs
- The secondary areas from which documents can be served are called **virtual document trees.**
- Many servers can support more than one site on a computer, potentially reducing the cost of each site and making their maintenance more convenient. Such secondary hosts are called **virtual hosts.**
- Some servers can serve documents that are in the document root of other machines on the web; in this case they are called as **proxy servers**

Apache

- Apache is the most widely used Web server.
- The primary reasons are as follows: Apache is an excellent server because it is both fast and reliable.
- Furthermore, it is open-source software, which means that it is free and is managed by a large team of volunteers, a process that efficiently and effectively maintains the system.
- Finally, it is one of the best available servers for Unix-based systems, which are the most popular for Web servers.
- Apache is capable of providing a long list of services beyond the basic process of serving documents to clients.
- When Apache begins execution, it reads its configuration information from a file and sets its parameters to operate accordingly.

IIS

- Microsoft IIS server is supplied as part of Windows—and because it is a reasonably good server—most Windows-based Web servers use IIS.
- With IIS, server behaviour is modified by changes made through a window-based management program, named the IIS snap-in, which controls both IIS and `ftp`.

- This program allows the site manager to set parameters for the server.
- Under Windows XP and Vista, the IIS snap-in is accessed by going to *Control Panel, Administrative Tools, and IIS Admin.*

UNIFORM RESOURCE LOCATORS

- Uniform Resource Locators (URLs) are used to identify different kinds of resources on Internet.
- If the web browser wants some document from web server, just giving domain name is not sufficient because domain name can only be used for locating the server.
- It does not have information about which document client needs. Therefore, URL should be provided.
- The general format of URL is: **scheme: object-address**
- Example: **http: www.vtu.ac.in/results.php**
- The scheme indicates protocols being used. (http, ftp, telnet...)
- In case of http, the full form of the object address of a URL is as follows: **//fully-qualified-domain-name/path-to-document**
- URLs can never have embedded spaces
- It cannot use special characters like semicolons, ampersands and colons
- The path to the document for http protocol is a sequence of directory names and a filename, all separated by whatever special character the OS uses. (forward or backward slashes)
- The path in a URL can differ from a path to a file because a URL need not include all directories on the path
- A path that includes all directories along the way is called a **complete path.**
- Example: http://www.rnsit.ac.in/index.html
- In most cases, the path to the document is relative to some base path that is specified in the configuration files of the server. Such paths are called **partial paths.**
- Example: http://www.rnsit.ac.in/

MULTIPURPOSE INTERNET MAIL EXTENSIONS

- MIME stands for **Multipurpose Internet Mail Extension.**
- The server system apart from sending the requested document, it will also send MIME information.
- The MIME information is used by web browser for rendering the document properly.
- The format of MIME is: **type/subtype**
- Example: text/html , text/doc , image/jpeg , video/mpeg
- When the type is either text or image, the browser renders the document without any problem
- However, if the type is video or audio, it cannot render the document
- It has to take the help of other software like media player, win amp etc.,
- These softwares are called as **helper applications or plugins**
- These non-textual information are known as **HYPER MEDIA**
- Experimental document types are used when user wants to create a customized information & make it available in the internet
- The format of experimental document type is: **type/x-subtype**
- Example: database/x-xbase , video/x-msvideo
- Along with creating customized information, the user should also create helper applications.
- This helper application will be used for rendering the document by browser.
- The list of MIME specifications is stored in configuration file of web server.

THE HYPERTEXT TRANSFER PROTOCOL

Request Phase:

The general form of an HTTP request is as follows:

1. HTTP method Domain part of the URL HTTP version
2. Header fields
3. Blank line
4. Message body

The following is an example of the first line of an HTTP request:

```
GET /storefront.html HTTP/1.1
```

Table 1.1 HTTP request methods

Method	Description
GET	Returns the contents of the specified document
HEAD	Returns the header information for the specified document
POST	Executes the specified document, using the enclosed data
PUT	Replaces the specified document with the enclosed data
DELETE	Deletes the specified document

The format of a header field is the field name followed by a colon and the value of the field. There are four categories of header fields:

1. ***General***: For general information, such as the date
2. ***Request***: Included in request headers
3. ***Response***: For response headers
4. ***Entity***: Used in both request and response headers

A wildcard character, the asterisk (*), can be used to specify that part of a MIME type can be anything.

```
Accept: text/plain
Accept: text/html
```

Can be written as

```
Accept: text/*
```

The `Host:` *host name* request field gives the name of the host. The `Host` field is required for HTTP 1.1. The `If-Modified-Since:` *date* request field specifies that the requested file should be sent only if it has been modified since the given date. If the request has a body, the length of that body must be given with a `Content-length` field. The header of a request must be followed by a blank line, which is used to separate the header from the body of the request.

The Response Phase:

The general form of an HTTP response is as follows:

1. Status line
2. Response header fields
3. Blank line
4. Response body

The status line includes the HTTP version used, a three-digit status code for the response, and a short textual explanation of the status code. For example, most responses begin with the following:

```
HTTP/1.1 200 OK
```

The status codes begin with `1`, `2`, `3`, `4`, or `5`. The general meanings of the five categories specified by these first digits are shown in Table 1.2.

Table 1.2 First digits of HTTP status codes

First Digit	Category
1	Informational
2	Success
3	Redirection
4	Client error
5	Server error

One of the more common status codes is one user never want to see: `404 Not Found`, which means the requested file could not be found.

SECURITY

Security is one of the major concerns in the Internet. The server system can be accessed easily with basic hardware support, internet connection & web browser. The client can retrieve very important information from the server. Similarly, the server system can introduce virus on the client system. These viruses can destroy the hardware and software in client.

While programming the web, following requirements should be considered:

- **Privacy:** it means message should be readable only to communicating parties and not to intruder.
- **Integrity:** it means message should not be modified during transmission.
- **Authentication:** it means communicating parties must be able to know each other's identity
- **Non-repudiation:** it means that it should be possible to prove that message was sent and received properly

Security can be provided using cryptographic algorithm. Ex: private key, public key

Protection against viruses and worms is provided by antivirus software, which must be updated frequently so that it can detect and protect against the continuous stream of new viruses and worms.

THE WEB PROGRAMMER'S TOOLBOX

Web programmers use several languages to create the documents that servers can provide to browsers.

- The most basic of these is **XHTML**, the standard mark-up language for describing how Web documents should be presented by browsers. Tools that can be used without specific knowledge of XHTML are available to create XHTML documents.
- A **plug-in** is a program that can be integrated with a word processor to make it possible to use the word processor to create XHTML. A **filter** converts a document written in some other format to XHTML.
- **XML** is a meta-mark-up language that provides a standard way to define new mark-up languages.
- **JavaScript** is a client-side scripting language that can be embedded in XHTML to describe simple computations. JavaScript code is interpreted by the browser on the client machine; it provides access to the elements of an XHTML document, as well as the ability to change those elements dynamically.
- **Flash** is a framework for building animation into XHTML documents. A browser must have a Flash player plug-in to be able to display the movies created with the Flash framework.
- **Ajax** is an approach to building Web applications in which partial document requests are handled asynchronously. Ajax can significantly increase the speed of user interactions, so it is most useful for building systems that have frequent interactions.
- **PHP** is the server-side equivalent of JavaScript. It is an interpreted language whose code is embedded in XHTML documents. PHP is used primarily for form processing and database access from browsers.
- **Servlets** are server-side Java programs that are used for form processing, database access, or building dynamic documents. JSP documents, which are translated into servlets, are an alternative approach to building these applications. JSF is a development framework for specifying forms and their processing in JSP documents.
- **ASP.NET** is a Web development framework. The code used in ASP.NET documents, which is executed on the server, can be written in any .NET programming language.
- **Ruby** is a relatively recent object-oriented scripting language that is introduced here primarily because of its use in Rails, a Web applications framework.
- **Rails** provides a significant part of the code required to build Web applications that access databases, allowing the developer to spend his or her time on the specifics of the application without the drudgery of dealing with all of the housekeeping details.

ORIGINS AND EVOLUTION OF HTML AND XHTML

HTML → Hyper Text Mark-up Language
XHTML → eXtensible Hyper Text Mark-up Language

HTML	XHTML
HTML is much easier to write	XHTML requires a level of discipline many of us naturally resist
huge number of HTML documents available on the Web, browsers will continue to support HTML as far as one can see into the future.	some older browsers have problems with some parts of XHTML.
HTML has few syntactic rules, and HTML processors (e.g., browsers) do not enforce the rules it does have. Therefore, HTML authors have a high degree of freedom to use their own syntactic preferences to create documents. Because of this freedom, HTML documents lack consistency, both in low-level syntax and in overall structure.	XHTML has strict syntactic rules that impose a consistent structure on all XHTML documents. Another significant reason for using XHTML is that when you create an XHTML document, its syntactic correctness can be checked, either by an XML browser or by a validation tool
Used for displaying the data	Used for describing the data

BASIC SYNTAX

- The fundamental syntactic units of HTML are called ***tags***.
- In general, tags are used to specify categories of content.
- The syntax of a tag is the tag's name surrounded by *angle brackets* (< and >).
- Tag names must be written in all lowercase letters.
- Most tags appear in pairs: an *opening tag and a closing tag*.
- The name of a closing tag is the name of its corresponding opening tag with a slash attached to the beginning. For example, if the tag's name is `p`, the corresponding closing tag is named `/p`.
- Whatever appears between a tag and its closing tag is the ***content*** of the tag. Not all tags can have content.
- The opening tag and its closing tag together specify a container for the content they enclose.
- The container and its content together are called an ***element***.
- Example: **`<p> This is RNSIT Web Programming Notes. </p>`**
- The paragraph tag, `<p>`, marks the beginning of the content; the `</p>` tag marks the end of the content of the paragraph element.
- Attributes, which are used to specify alternative meanings of a tag, can appear between an opening tag's name and its right angle bracket.
- They are specified in keyword form, which means that the attribute's name is followed by an equal's sign and the attribute's value.
- Attribute names, like tag names, are written in lowercase letters.
- Attribute values must be delimited by double quotes.
- Comments in programs increase the readability of those programs. Comments in XHTML have the same purpose. They can appear in XHTML in the following form:

```
<!-- anything except two adjacent dashes -->
```

- Browsers ignore XHTML comments—they are for people only. Comments can be spread over as many lines as are needed. For example, you could have the following comment:

```
<!-- CopyRights.html
This notes is prepared by Divya K of Information Science Department
RNSIT, Bangalore -->
```

Standard XHTML Document Structure

- Every XHTML document must begin with an xml declaration element that simply identifies the document as being one based on XML. This element includes an attribute that specifies the version number 1.0.
- The xml declaration usually includes a second attribute, encoding, which specifies the encoding used for the document [utf-8].
- Following is the xml declaration element, which should be the first line of every XHTML document:

<?xml version = "1.0" encoding = "utf-8"?>

- Note that this declaration must begin in the first character position of the document file.
- The xml declaration element is followed immediately by an SGML DOCTYPE command, which specifies the particular SGML document-type definition (DTD) with which the document complies, among other things.
- The following command states that the document in which it is included complies with the XHTML 1.0 Strict standard:

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml11/DTD/xhtml1-strict.dtd">

- An XHTML document must include the four tags <html>, <head>, <title>, and <body>.
- The <html> tag identifies the root element of the document. So, XHTML documents always have an <html> tag immediately following the DOCTYPE command, and they always end with the closing html tag, </html>.
- The html element includes an attribute, xmlns, that specifies the XHTML namespace, as shown in the following element:

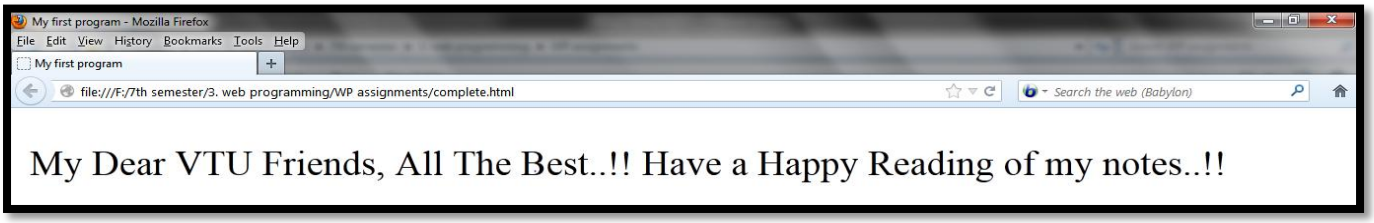
<html xmlns = "http://www.w3.org/1999/xhtml">

- Although the xmlns attribute's value looks like a URL, it does not specify a document. It is just a name that happens to have the form of a URL.
- An XHTML document consists of two parts, named the *head* and the *body*.
- The <head> element contains the head part of the document, which provides information about the document and does not provide the content of the document.
- The body of a document provides the content of the document.
- The content of the title element is displayed by the browser at the top of its display window, usually in the browser window's title bar.

BASIC TEXT MARKUP

We will have a look at a complete XHTML document:

```
<?xml version = "1.0" encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml11/DTD/xhtml1-strict.dtd">
<!-- complete.html
A document which must be followed throughout the notes
-->
<html xmlns = "http://www.w3.org/1999/xhtml">
 <head>
   <title> My first program </title>
 </head>
 <body>
  <p>
   My Dear VTU Friends, All The Best..!! Have a Happy Reading of my notes..!!
  </p>
 </body>
</html>
```



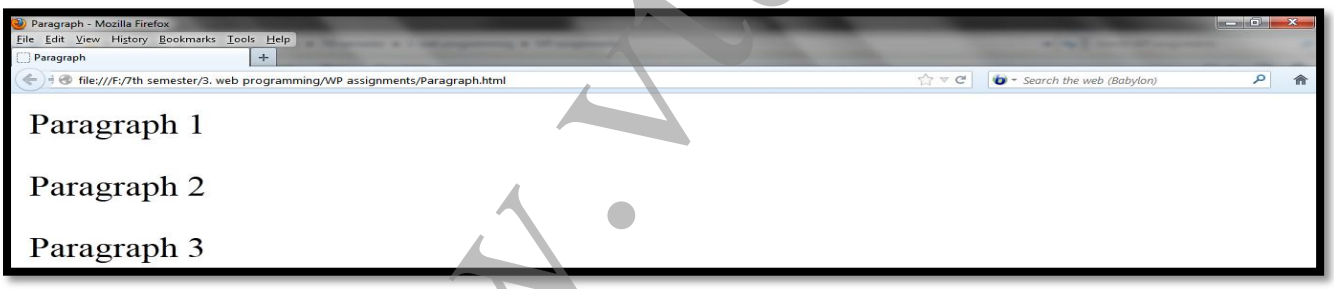
PLEASE NOTE: From here onwards programming in XHTML will begin. Please add the following compulsory document structure to all programs in the first 4 lines and skip the simple <html> tag of first line because I have begun the coding part directly .

```
<?xml version = "1.0" encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml11/DTD/xhtml1-strict.dtd">
<html xmlns = "http://www.w3.org/1999/xhtml">
```

Paragraphs:

It begins with and ends with . Multiple paragraphs may appear in a single document.

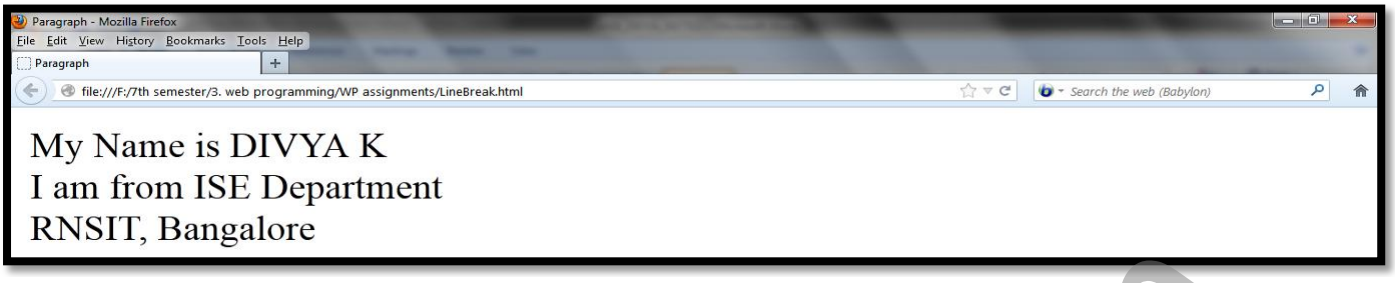
```
<html>
<head>
   <title> Paragraph </title>
 </head>
 <body>
  <p> Paragraph 1 </p>
  <p> Paragraph 2 </p>
  <p> Paragraph 3 </p>
 </body>
</html>
```



Line Breaks:

The break tag is specified as
. The slash indicates that the tag is both an opening and closing tag.

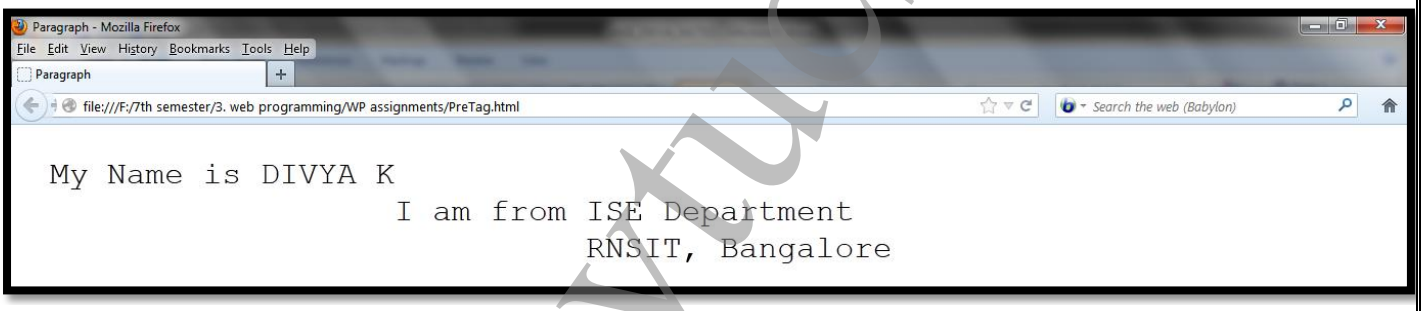
```
<html>
<head>
   <title> br tag </title>
 </head>
 <body>
  <p>
     My Name is DIVYA K <br/>
      I am from ISE Department<br/>
       RNSIT, Bangalore
   </p>
   </body>
</html>
```



Preserving White Space

Sometimes it is desirable to preserve the white space in text—that is, to prevent the browser from eliminating multiple spaces and ignoring embedded line breaks. This can be specified with the **<pre>** tag.

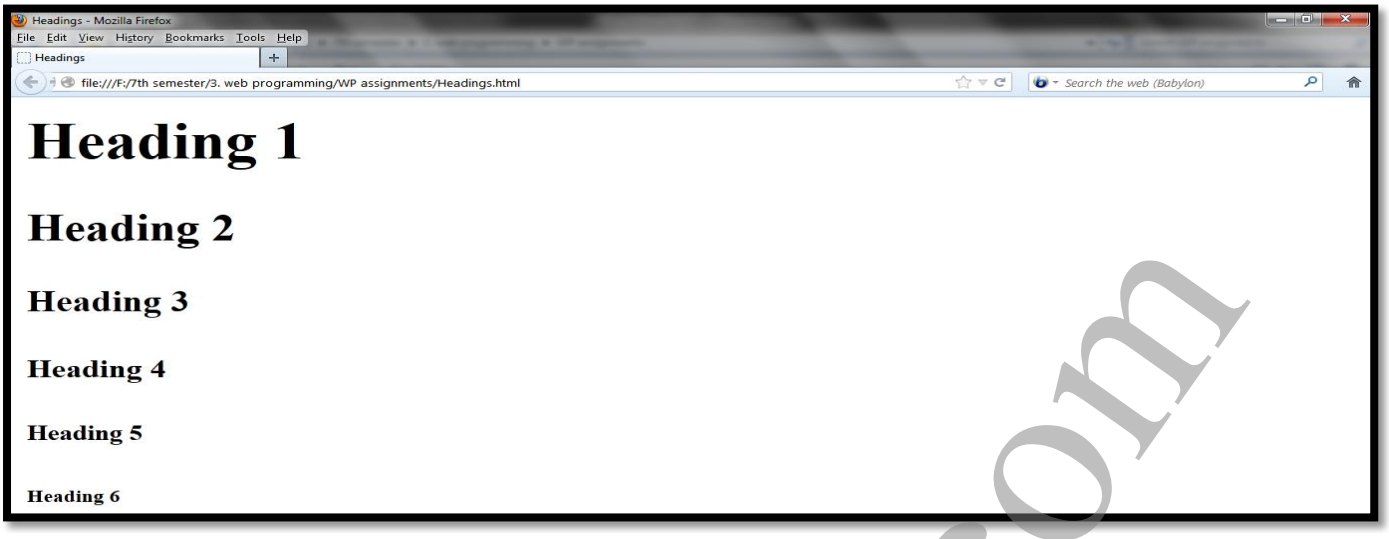
```
<html>
<head>
   <title> Pre Tag </title>
 </head>
 <body>
  <p><pre> My Name is DIVYA K
                   I am from ISE Department
                            RNSIT, Bangalore
   </pre></p>
   </body>
</html>
```



Headings:

In XHTML, there are six levels of headings, specified by the tags <h1>, <h2>, <h3>, <h4>, <h5>, and <h6>, where <h1> specifies the highest-level heading. Headings are usually displayed in a boldface font whose default size depends on the number in the heading tag. On most browsers, <h1>, <h2>, and <h3> use font sizes that are larger than that of the default size of text, <h4> uses the default size, and <h5> and <h6> use smaller sizes. The heading tags always break the current line, so their content always appears on a new line. Browsers usually insert some vertical space before and after all headings.

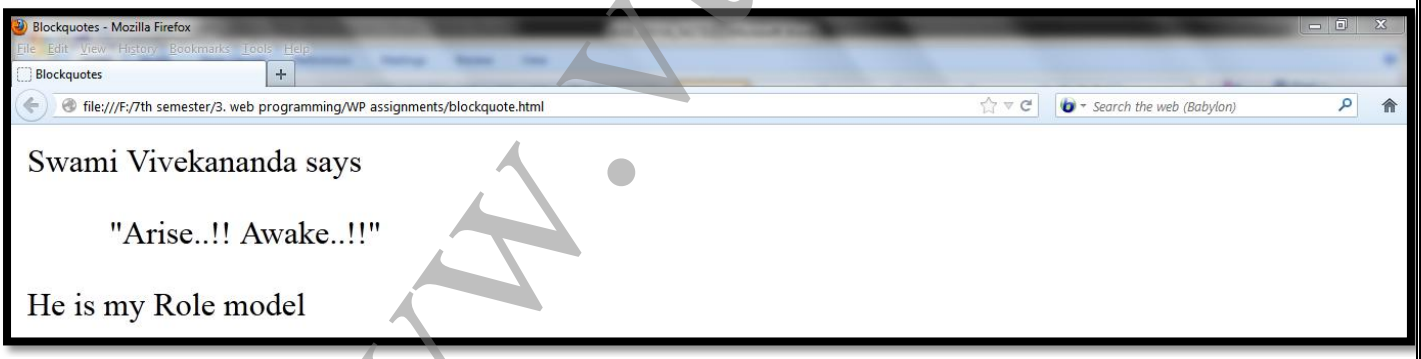
```
<html>
<head>
   <title> Headings </title>
 </head>
 <body>
  <h1> Heading 1 </h1>
  <h2> Heading 2 </h2>
  <h3> Heading 3 </h3>
  <h4> Heading 4 </h4>
  <h5> Heading 5 </h5>
  <h6> Heading 6 </h6>
 </body>
</html>
```



Block Quotations:

The <blockquote> tag is used to make the contents look different from the surrounding text.

```
<html>
<head> <title> Blockquotes </title>
</head>
<body>
 <p> Swami Vivekananda says </p>
  <blockquote>
   <p> "Arise..!! Awake..!!" </p>
  </blockquote>
 <p> He is my Role model </p>
</body>
</html>
```

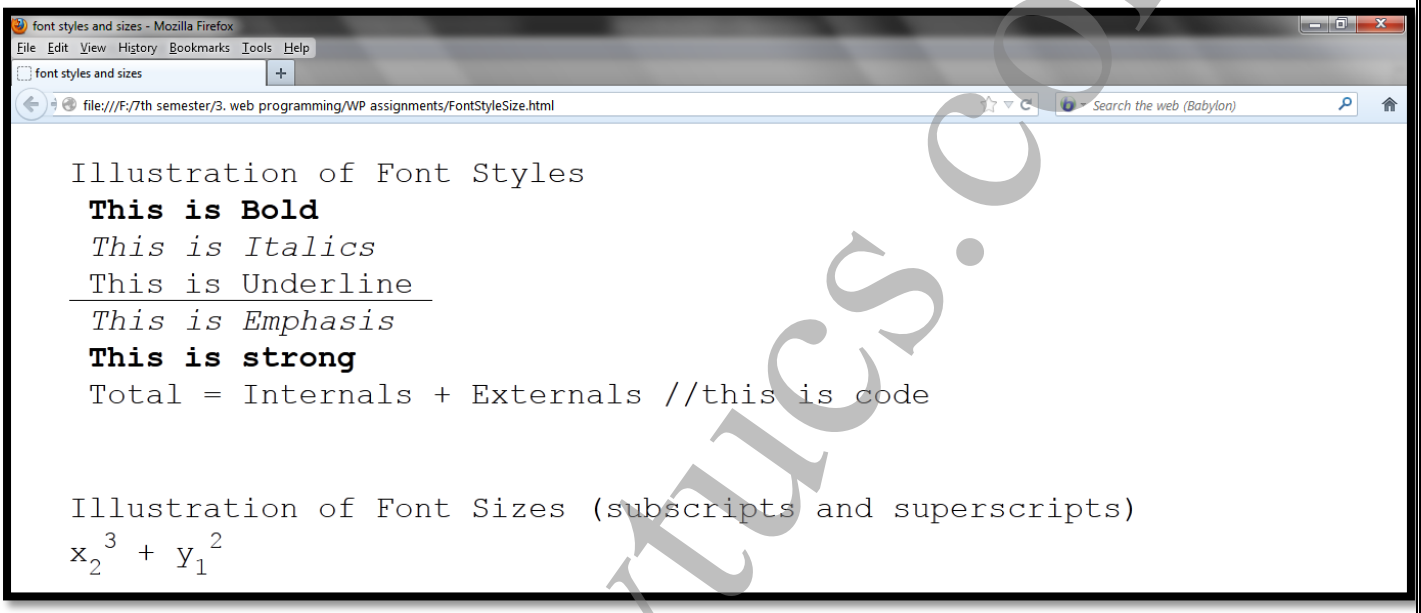


Font Styles and Sizes:

- <b>, <i> and <u> specifies bold, italics and underline respectively.
- The emphasis tag, `<em>`, specifies that its textual content is special and should be displayed in some way that indicates this distinctiveness. Most browsers use italics for such content.
- The strong tag, `<strong>` is like the emphasis tag, but more so. Browsers often set the content of strong elements in bold.
- The code tag, `<code>`, is used to specify a monospace font, usually for program code.

```
<html>
<head> <title> font styles and sizes </title>
</head>
<body>
 <p><pre>
  Illustration of Font Styles
```

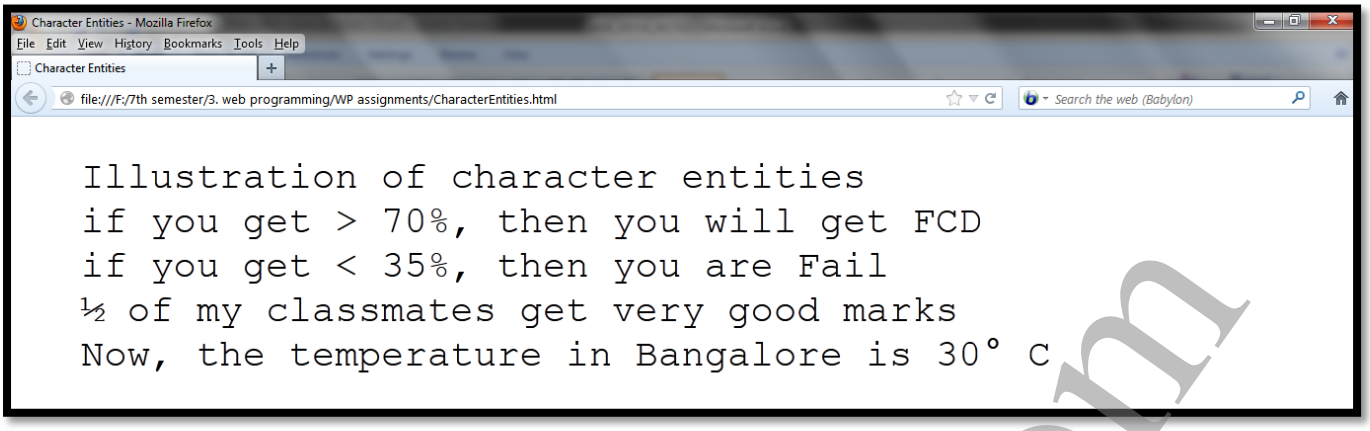
```
  <b> This is Bold </b>
  <i> This is Italics </i>
  <u> This is Underline </u>
  <em> This is Emphasis </em>
  <strong> This is strong </strong>
  <code> Total = Internals + Externals //this is code</code>
 </pre></p>
 <p><pre>
  Illustration of Font Sizes (subscripts and superscripts)
  x<sub>2</sub><sup>3</sup> + y<sub>1</sub><sup>2</sup>
 </pre></p>
</body>
</html>
```



Character Entities:

XHTML provides a collection of special characters that are sometimes needed in a document but cannot be typed as themselves. In some cases, these characters are used in XHTML in some special way—for example, >, <, and &. In other cases, the characters do not appear on keyboards, such as the small raised circle that represents "degrees" in a reference to temperature. These special characters are defined as entities, which are codes for the characters. An entity in a document is replaced by its associated character by the browser.

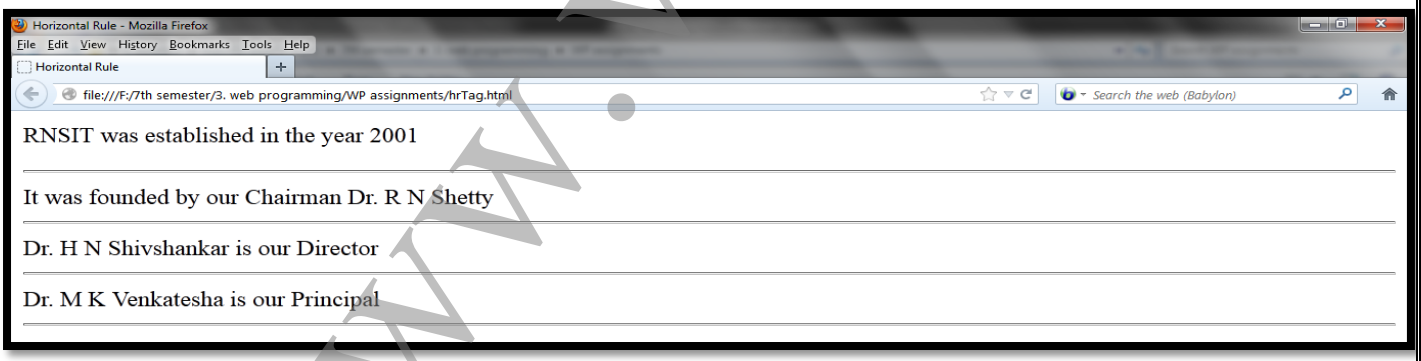
```
<html>
<head> <title> Character Entities </title>
</head>
<body>
 <p><pre>
  Illustration of character entities
  if you get &gt 70%, then you will get FCD
  if you get &lt 35%, then you are Fail
  &frac12 of my classmates get very good marks
  Now, the temperature in Bangalore is 30&deg C
 </pre></p>
</body>
</html>
```



Horizontal Rules:

The parts of a document can be separated from each other, making the document easier to read, by placing horizontal lines between them. Such lines are called horizontal rules. The block tag that creates them is <hr />. The <hr /> tag causes a line break (ending the current line) and places a line across the screen.
Note again the slash in the <hr /> tag, indicating that this tag has no content and no closing tag.

```
<html>
 <head>
   <title> Horizontal Rule </title>
 </head>
 <body>
  <p>
    RNSIT was established in the year 2001 <hr/>
    It was founded by our Chairman Dr. R N Shetty <hr/>
    Dr. H N Shivshankar is our Director <hr/>
    Dr. M K Venkatesha is our Principal <hr/>
  </p>
 </body>
</html>
```



The meta Element:

The `meta` element is used to provide additional information about a document. The meta tag has no content; rather, all of the information provided is specified with attributes. The two attributes that are used to provide information are `name` and `content`. The user makes up a name as the value of the `name` attribute and specifies information through the `content` attribute. One commonly chosen name is `keywords`; the value of the `content` attribute associated with the keywords are those which the author of a document believes characterizes his or her document. An example is

```
<meta name = "Title" content = "Programming the Web" />
<meta name = "Author" content = "Divya K" />
```

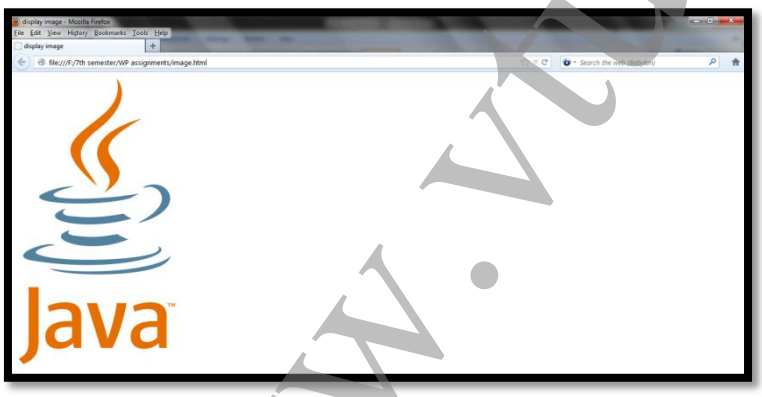
Web search engines use the information provided with the `meta` element to categorize Web documents in their indices.

UNIT 2
XHTML - 2

IMAGES

- Image can be displayed on the web page using **<img>** tag.
- When the <img> tag is used, it should also be mentioned which image needs to be displayed. This is done using **src** attribute.
- Attribute means extra information given to the browser
- Whenever <img> tag is used, alt attribute is also used.
- Alt stands for alert.
- Some very old browsers would not be having the capacity to display the images.
- In this case, whatever is the message given to alt attribute, that would be displayed.
- Another use of alt is → when image display option has been disabled by user. The option is normally disabled when the size of the image is huge and takes time for downloading.

```
<html>
  <head>
    <title>display image</title>
  </head>
  <body>
    <img src="java.png" alt="cannot display"/>
  </body>
</html>
```



NOTE:

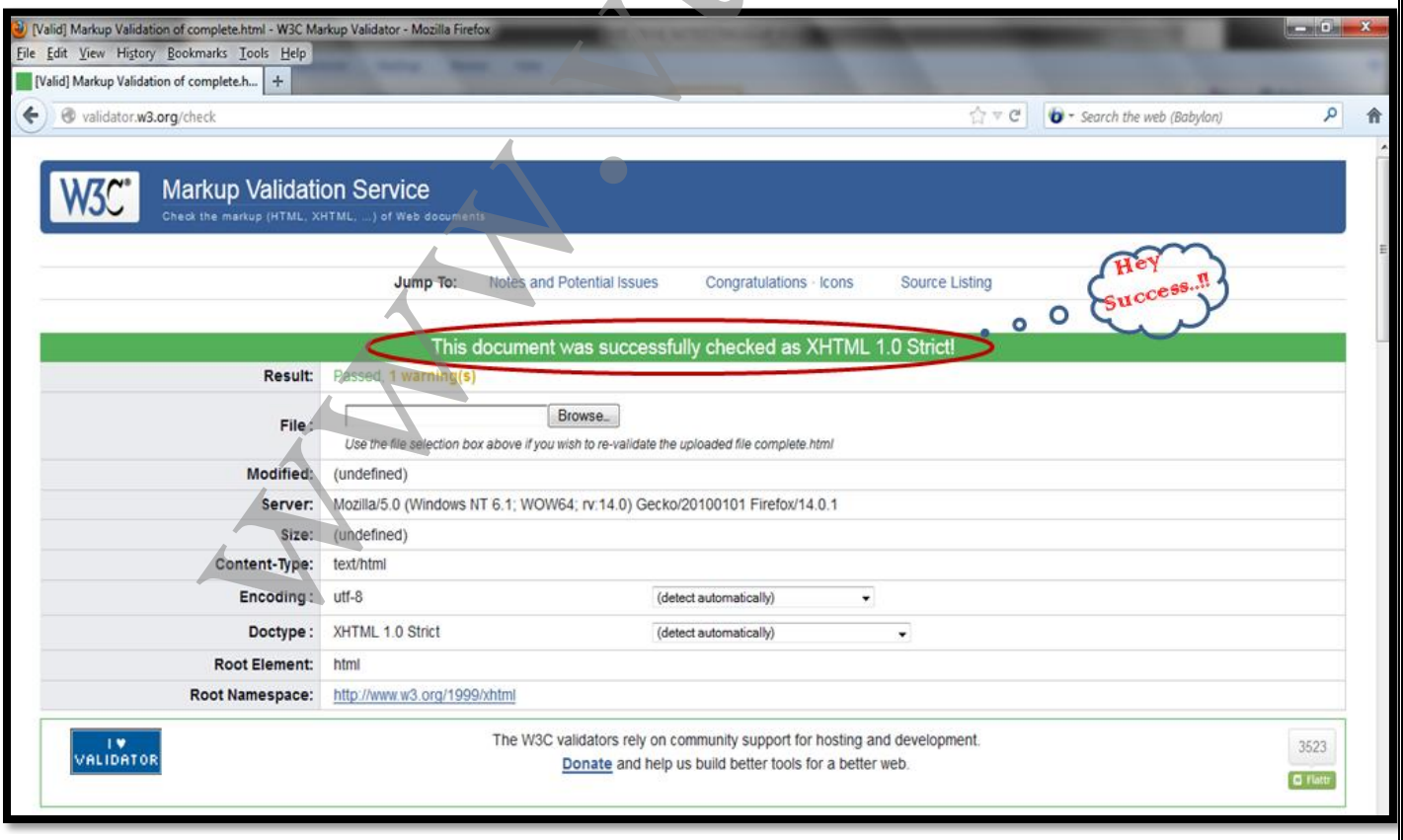
- JPEG → Joint Photographic Experts Group
- GIF → Graphic Interchange Format
- PNG → Portable Network Graphics

XHTML Document Validation:

The W3C provides a convenient Web-based way to validate XHTML documents against its standards.
Step 1: The URL of the service is http://validator.w3.org/file-upload.html. Copy & paste this link.
Step 2: You will be driven to "**Validate by File Upload**" option automatically.
Step 3: Browse for a XHTML program file in your computer. (example: *F:/complete.html*)
Step 4: Click on "**More Options**" and select your criteria like *show source*
Step 5: After all the settings, click on "**Check**" button

Now you will be navigated to another page which shows success or failure.
In our example, the file *complete.html* is a valid XHTML file. So the output shows success..!!

Output:



HYPERTEXT LINKS

Links:

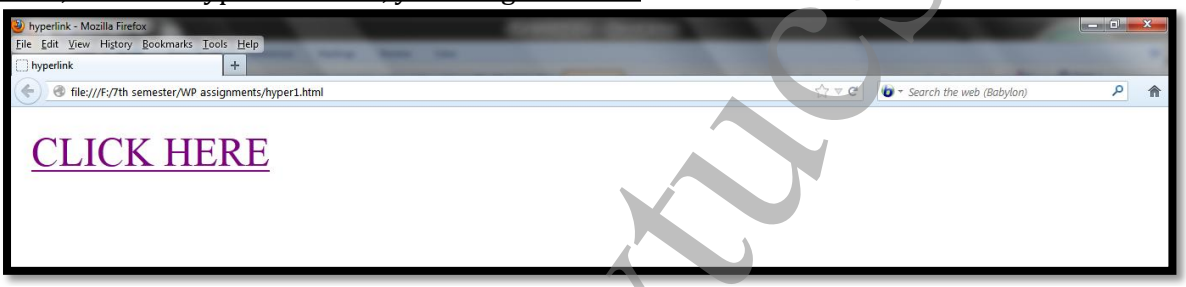
- Hyperlinks are the mechanism which allows the navigation from one page to another.
- The term "hyper" means beyond and "link" means connection
- Whichever text helps in navigation is called hypertext
- Hyperlinks cam be created using **<a>** (anchor tag)
- The attribute that should be used for <a> is **href**

Program: *hyper.html*

```
<html>
 <head>
  <title> hyperlink </title>
 </head>
 <a href  = "link.html"> CLICK HERE </a>
</html>
```

Program: *link.html*

```
<html>
 <body> This is Web Programming </body>
</html>
```



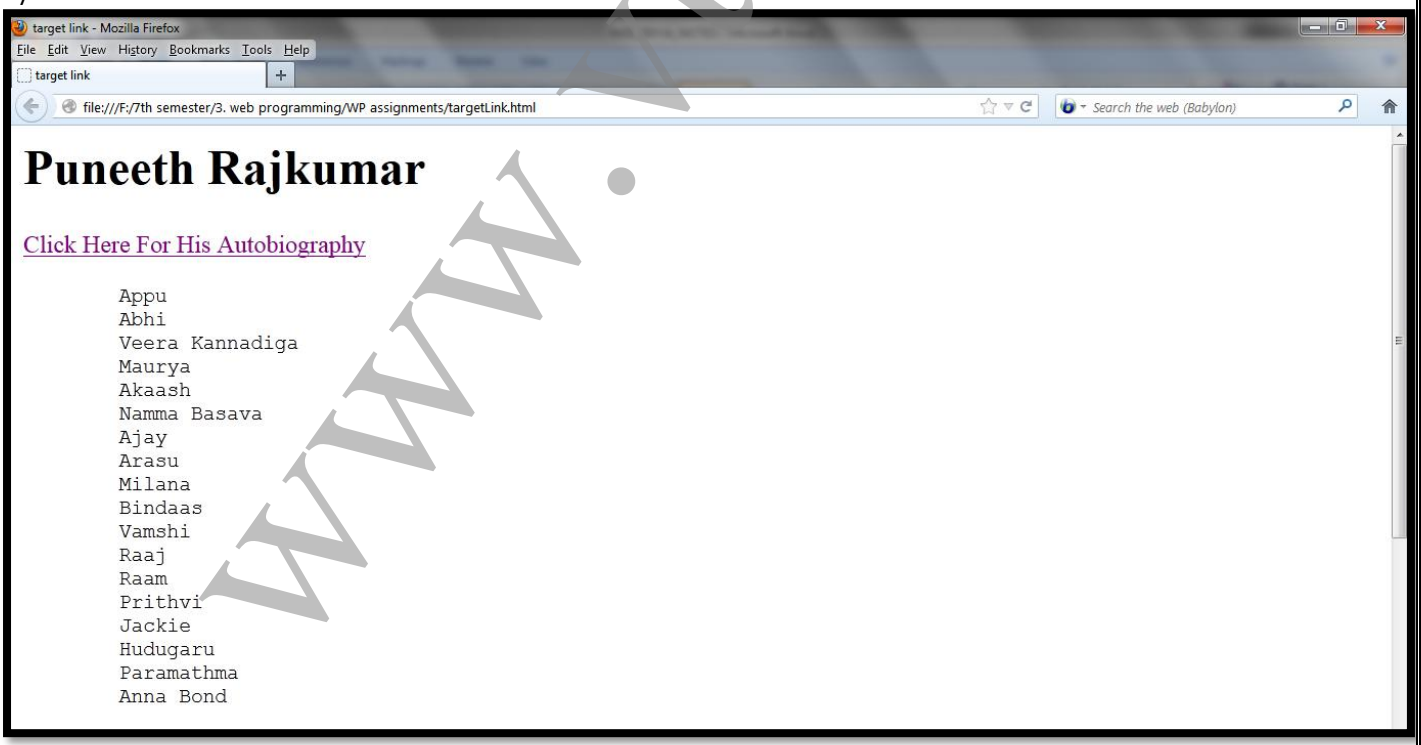
After clicking on the above text, we can navigate to another page "link.html" as shown below

Targets within Documents:

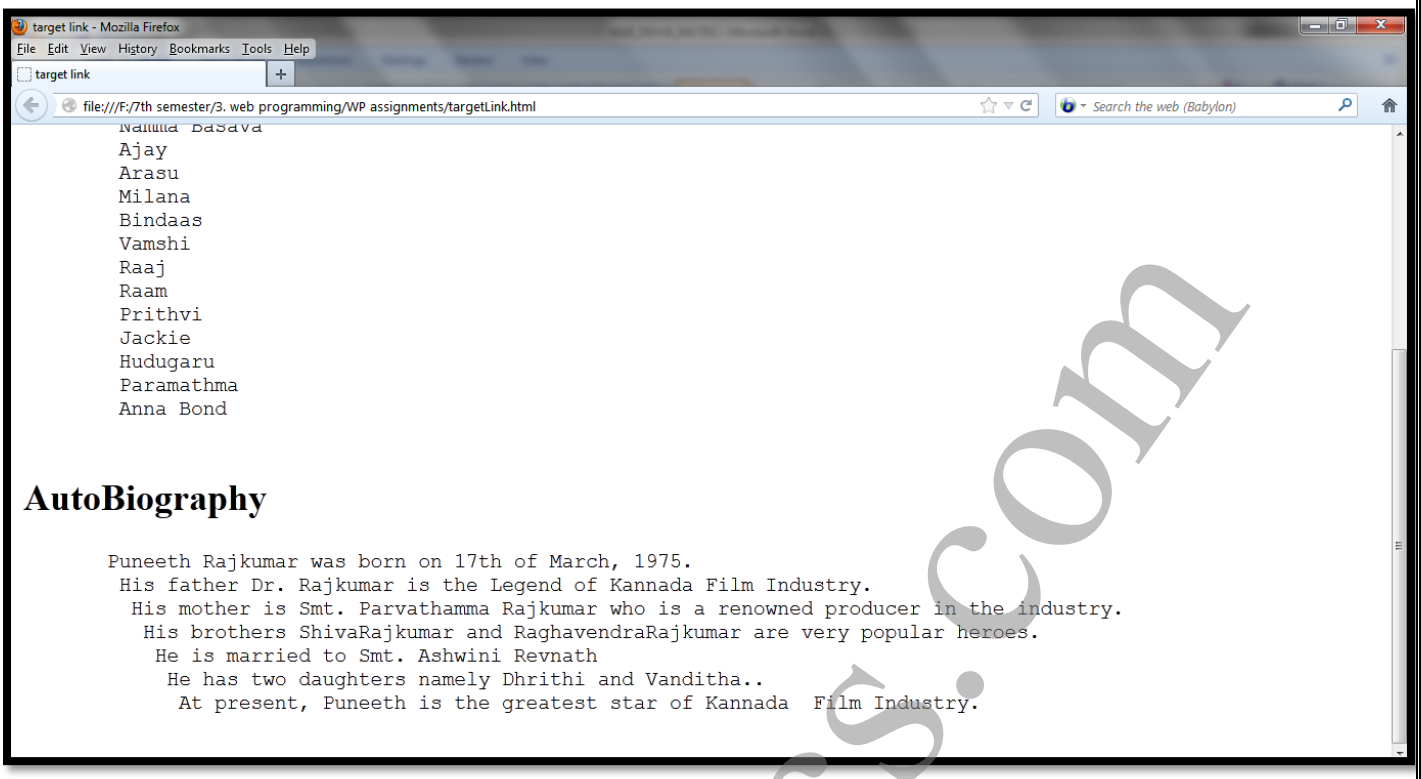
If the target of a link is not at the beginning of a document, it must be some element within the document, in which case there must be some means of specifying it. The target element can include an id attribute, which can then be used to identify it in an href attribute. (observe the scroll bar in the outputs given)

```
<html>
 <head>
  <title> target link</title>
 </head>
 <body>
  <h1> Puneeth Rajkumar </h1>
  <a href = "#bottom"> Click Here For His Autobiography </a>
  <p><pre>
        Appu
        Abhi
```

```
        Veera Kannadiga
        Maurya
        Akaash
        Namma Basava
        Ajay
        Arasu
        Milana
        Bindaas
        Vamshi
        Raaj
        Raam
        Prithvi
        Jackie
        Hudugaru
        Paramathma
        Anna Bond
  </pre></p>
  <h2> AutoBiography </h2>
  <p id = "bottom"> <pre>
     Puneeth Rajkumar was born on 17th of March, 1975.
      His father Dr. Rajkumar is the Legend of Kannada Film Industry.
       His mother is Smt. Parvathamma Rajkumar who is a renowned producer in the industry.
        His brothers ShivaRajkumar and RaghavendraRajkumar are very popular heroes.
         He is married to Smt. Ashwini Revnath
          He has two daughters namely Dhrithi and Vanditha..
           At present, Puneeth is the greatest star of Kannada  Film Industry.
  </pre></p>
 </body>
</html>
```



Actually, here we are not creating two separate files, but we are specifying a target within the same document itself. If you click on the above link, you will be redirected to the bottom of the page which contains Autobiography of Puneeth Rajkumar. This is useful for lengthy documents like e-newspaper, e-magazine etc.,

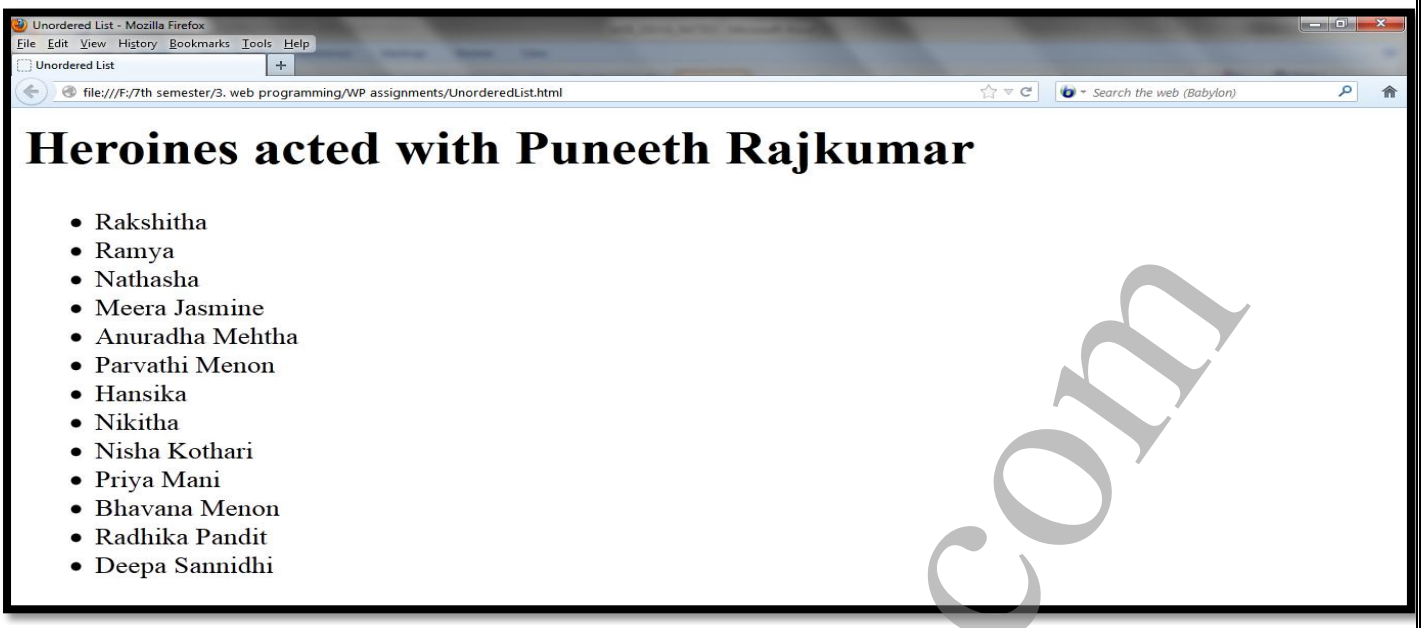


LISTS

Unordered Lists:

The <ul> tag, which is a block tag, creates an unordered list. Each item in a list is specified with an <li> tag (li is an acronym for *l*ist *i*tem). Any tags can appear in a list item, including nested lists. When displayed, each list item is implicitly preceded by a bullet.

```
<html>
 <head>
  <title> Unordered List </title>
 </head>
 <body>
  <h1> Heroines acted with Puneeth Rajkumar </h1>
   <ul>
        <li>Rakshitha</li>
        <li>Ramya</li>
        <li>Nathasha</li>
        <li>Meera Jasmine</li>
        <li>Anuradha Mehtha</li>
        <li>Parvathi Menon</li>
        <li>Hansika</li>
        <li>Nikitha</li>
        <li>Nisha Kothari</li>
        <li>Priya Mani</li>
        <li>Bhavana Menon</li>
        <li>Radhika Pandit</li>
        <li>Deepa Sannidhi</li>
   </ul>
 </body>
</html>
```

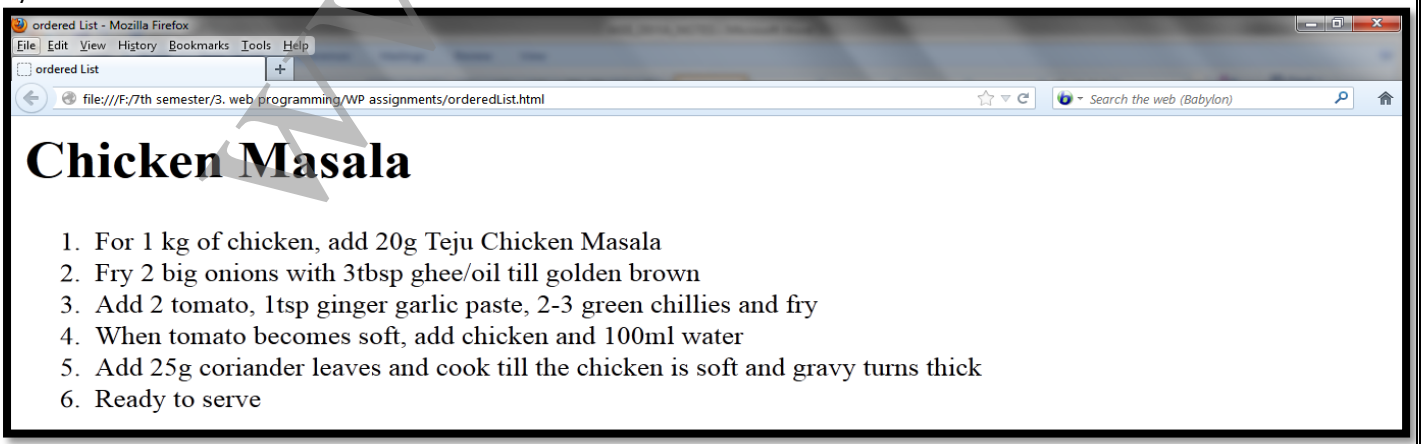


Ordered Lists:

Ordered lists are lists in which the order of items is important. This orderedness of a list is shown in the display of the list by the implicit attachment of a sequential value to the beginning of each item. The default sequential values are Arabic numerals, beginning with 1.

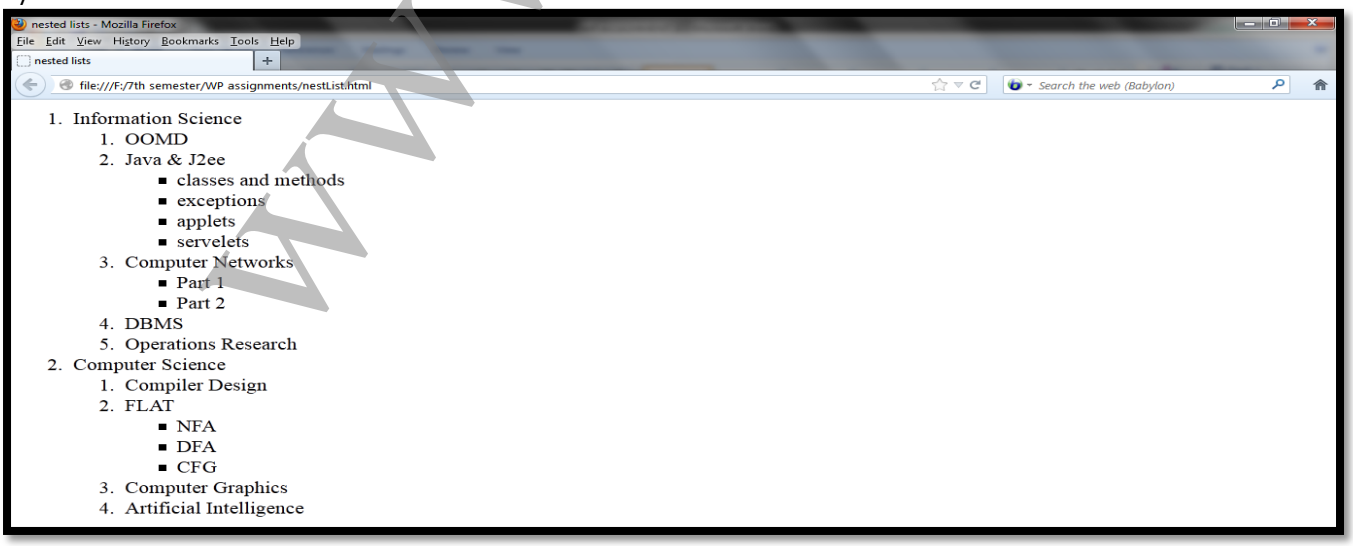
An ordered list is created within the block tag <ol>. The items are specified and displayed just as are those in unordered lists, except that the items in an ordered list are preceded by sequential values instead of bullets.

```
<html>
 <head>
  <title> ordered List </title>
 </head>
 <body>
  <h1>Chicken Masala</h1>
   <ol>
        <li>For 1 kg of chicken,  add 20g Teju Chicken Masala</li>
        <li>Fry 2 big onions with 3tbsp ghee/oil till golden brown</li>
        <li>Add 2 tomato, 1tsp ginger garlic paste, 2-3 green chillies and fry</li>
        <li>When tomato becomes soft, add chicken and 100ml water</li>
        <li>Add 25g coriander leaves and cook till the chicken is soft and gravy turns thick</li>
        <li>Ready to serve</li>
 </ol>
 </body>
</html>
```



Nested Lists:

```
<html>
 <head>
  <title> nested lists </title>
 </head>
 <ol>
  <li> Information Science </li>
   <ol>
        <li>OOMD</li>
        <li>Java & J2ee</li>
        <ul>
          <li>classes and methods</li>
          <li>exceptions</li>
          <li>applets</li>
          <li>servelets</li>
        </ul>
        <li>Computer Networks</li>
        <ul>
          <li>Part 1</li>
          <li>Part 2</li>
        </ul>
        <li>DBMS</li>
        <li>Operations Research</li>
   </ol>
   <li> Computer Science</li>
    <ol>
        <li>Compiler Design</li>
        <li>FLAT</li>
        <ul>
          <li>NFA</li>
          <li>DFA</li>
          <li>CFG</li>
        </ul>
        <li>Computer Graphics</li>
        <li>Artificial Intelligence</li>
    </ol>
  </ol>
</html>
```



Definition Lists:

As the name implies, definition lists are used to specify lists of terms and their definitions, as in glossaries. A definition list is given as the content of a <dl> tag, which is a block tag. Each term to be defined in the definition list is given as the content of a <dt> tag. The definitions themselves are specified as the content of <dd> tags. The defined terms of a definition list are usually displayed in the left margin; the definitions are usually shown indented on the line or lines following the term.

```
<html>
 <head>
  <title> Definition List </title>
 </head>
 <body>
  <h1> South Indian Film Heroes </h1>
   <dl>
        <dt> Puneeth Rajkumar </dt>
        <dd>Top in Kannada Film Industry</dd>
        <dt> Mahesh Babu </dt>
        <dd>Top in Telugu Film Industry</dd>
        <dt> Suriya </dt>
        <dd>Top in Tamil Film Industry</dd>
  </dl>
 </body>
</html>
```

TABLES

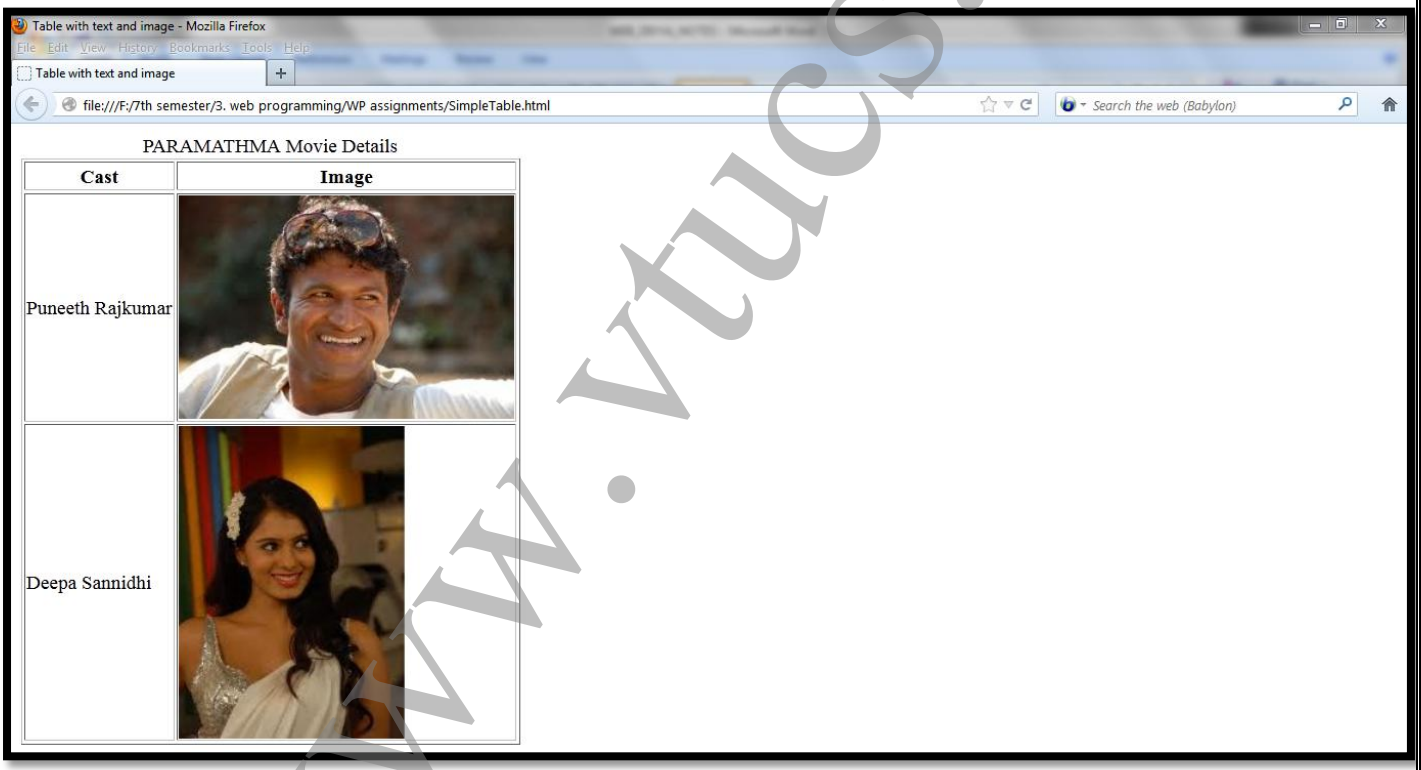
A table is a matrix of cells. The cells in the top row often contain column labels, those in the leftmost column often contain row labels, and most of the rest of the cells contain the data of the table. The content of a cell can be almost any document element, including text, a heading, a horizontal rule, an image, and a nested table.

Basic Table Tags:

- A table is specified as the content of the block tag **<table>.**
- There are two kinds of lines in tables: the line around the outside of the whole table is called the *border*; the lines that separate the cells from each other are called *rules*.
- It can be obtained using **border** attribute. The possible values are "border" or any number.
- The table heading can be created using **<caption>** tag.
- The table row can be created using **<tr>** tag.
- The column can be created either by using **<th>** tag (stands for table header which is suitable for headings) or **<td>** tag (stands for table data which is suitable for other data).

```
<html>
 <head>
  <title> Table with text and image </title>
```

```
 </head>
 <body>
   <table border = "border">
    <caption>PARAMATHMA Movie Details </caption>
      <tr>
           <th> Cast</th>
           <th> Image </th>
       </tr>
      <tr>
          <td> Puneeth Rajkumar </td>
          <td> <img src = "puneeth.jpg" alt = "cant display"/></td>
      </tr>
      <tr>
          <td> Deepa Sannidhi</td>
          <td> <img src = "deepa.jpg" alt = "cant display"/></td>
      </tr>
     </table>
  </body>
</html>
```



The rowspan and colspan Attributes:

Multiple-level labels can be specified with the rowspan and colspan attributes.

```
<html>
 <head>
   <title>row-span and column-span</title>
 </head>
 <body>
   <p> Illustration of Row span</p>
   <table border="border">
     <tr>
```

```
    <th rowspan="2"> RNSIT </th>
    <th>ISE</th>
   </tr>
   <tr>
    <th>CSE</th>
   </tr>
  </table>
  <p> Illustration of Column span</p>
  <table border="border">
   <tr>
    <th colspan="2"> RNSIT </th>
   </tr>
   <tr>
    <th>ISE</th>
    <th>CSE</th>
   </tr>
  </table>
 </body>
</html>
```

The align and valign Attributes:

The placement of the content within a table cell can be specified with the align and valign attributes in the <tr>, <th>, and <td> tags.

The align attribute has the possible values left, right, and center, with the obvious meanings for horizontal placement of the content within a cell. The default alignment for th cells is center; for td cells, it is left.

The valign attribute of the <th> and <td> tags has the possible values top and bottom. The default vertical alignment for both headings and data is center.

```
<html>
 <head>
  <title> Align and valign </title>
 </head>
 <body>
  <p>Table having entries with different alignments</p>
   <table border="border">
    <tr align = "center">
     <th> </th>
     <th> Puneeth Rajkumar </th>
     <th> Darshan Thoogudeep</th>
     <th> Kichcha Sudeep </th>
```

```
    </tr>
    <tr>
      <th> Ramya </th>
      <td align = "left"> Akaash </td>
      <td align = "center"> Datta </td>
      <td align = "right"> Ranga </td>
    </tr>
    <tr>
      <th> <br/>Rakshitha <br/><br/><br/></th>
       <td> Appu </td>
       <td valign = "top"> Kalasipalya </td>
       <td valign = "bottom"> Kaashi from village </td>
     </tr>
    </table>
 </body>
</html>
```

The cellpadding and cellspacing Attributes:

Cellspacing is the distance between cells.
Cellpadding is the distance between the edges of the cell to its content.

```
<html>
 <head>
  <title> cell spacing and cell padding </title>
 </head>
 <body>
  <h3>Table with space = 10, pad = 50</h3>
  <table border = "7" cellspacing = "10" cellpadding = "50">
    <tr>
      <td> Divya </td>
      <td>Chethan </td>
    </tr>
  </table>
  <h3>Table with space = 50, pad = 10</h3>
   <table border = "7" cellspacing = "50" cellpadding = "10">
    <tr>
      <td> Divya </td>
      <td>Chethan </td>
    </tr>
 </table>
 </body>
</html>
```

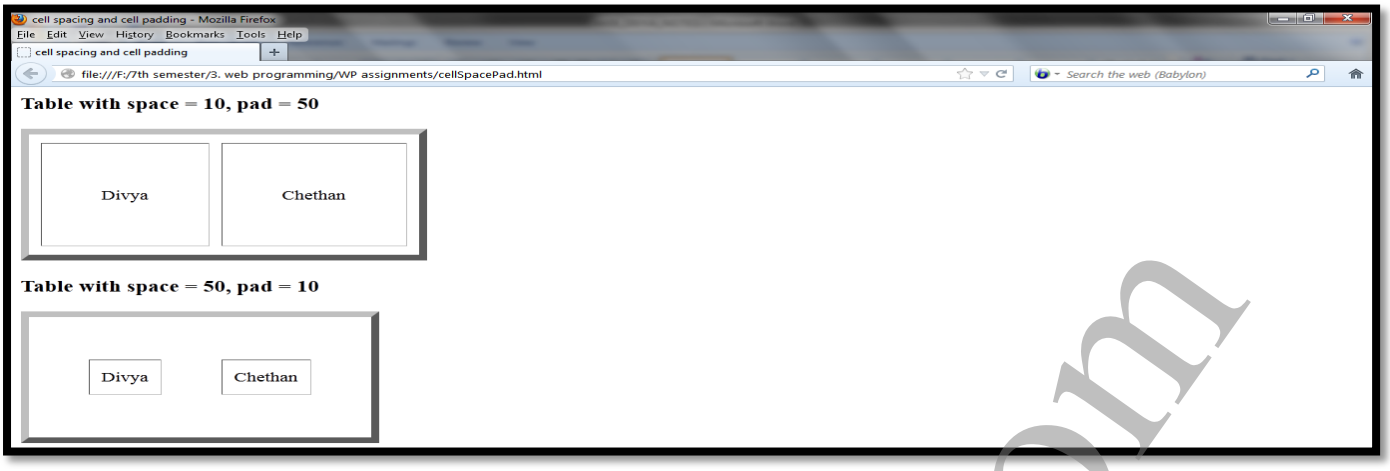


Table Sections:

Tables naturally occur in two and sometimes three parts: header, body, and footer. (Not all tables have a natural footer.) These three parts can be respectively denoted in XHTML with the thead, tbody, and tfoot elements. The header includes the column labels, regardless of the number of levels in those labels. The body includes the data of the table, including the row labels. The footer, when it appears, sometimes has the column labels repeated after the body. In some tables, the footer contains totals for the columns of data above. A table can have multiple body sections, in which case the browser may delimit them with horizontal lines that are thicker than the rule lines within a body section.

FORMS

The most common way for a user to communicate information from a Web browser to the server is through a form. XHTML provides tags to generate the commonly used objects on a screen form. These objects are called *controls* or *widgets*. There are controls for single-line and multiple-line text collection, checkboxes, radio buttons, and menus, among others. All control tags are inline tags.

The <form> Tag:

All of the controls of a form appear in the content of a <form> tag. A block tag, <form>, can have several different attributes, only one of which, action, is required. The action attribute specifies the URL of the application on the Web server that is to be called when the user clicks the *Submit* button. Our examples of form elements will not have corresponding application programs, so the value of their action attributes will be the empty string ("").

The <input> Tag:

Many of the commonly used controls are specified with the inline tag <input>, including those for text, passwords, checkboxes, radio buttons, and the action buttons *Reset*, *Submit*, and *plain*.

- **Text Box**

✓ It is a type of input which takes the text.
✓ Any type of input can be created using <input>
✓ The *type* attribute indicates what type of input is needed for the text box, the value should be given as text.
✓ For any type of input, a name has to be provided which is done using *name* attribute.
✓ The size of the text can be controlled using *size* attribute.
✓ Every browser has a limit on the number of characters it can collect. If this limit is exceeded, the extra characters are chopped off. To prevent this chopping, *maxlength* attribute can be used. When maxlength is used, users can enter only those many characters that is given as a value to the attribute.

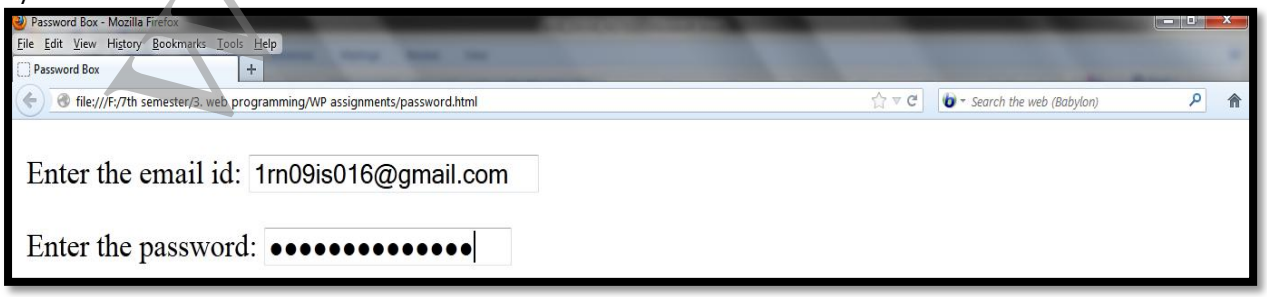
```
<html>
  <head>
```

```
 <title>Text Box</title>
</head>
<body>
 <form action = " ">
  <p>
   <label>Enter your Name:
    <input type = "text" name = "myname" size = "20" maxlength = "20" />
   </label>
  </p>
 </form>
</body>
</html>
```

❖ Password Box

- ✓ If the contents of a text box should not be displayed when they are entered by the user, a password control can be used.
- ✓ In this case, regardless of what characters are typed into the password control, only bullets or asterisks are displayed by the browser.

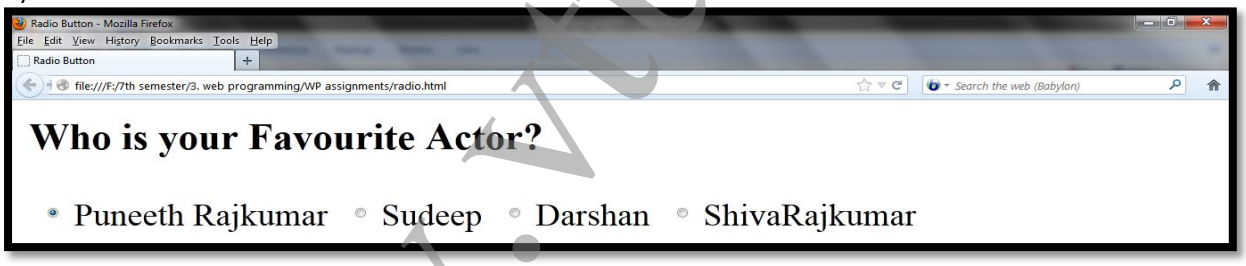
```
<html>
 <head>
  <title>Password Box</title>
 </head>
 <body>
  <form action = " ">
   <p>
    <label>Enter the email id:
     <input type = "text" name = "myname" size = "24" maxlength = "25" />
    </label>
   </p>
   <p>
    <label>Enter the password:
     <input type = "password" name = "mypass" size = "20" maxlength = "20" />
    </label>
   </p>
  </form>
 </body>
</html>
```



❖ Radio Button

- ✓ Radio buttons are special type of buttons which allows the user to select only individual option
- ✓ Radio buttons are created using the input tag with the *type* attribute having the value **radio.**
- ✓ When radio buttons are created, values must be provided with the help of *value* attribute.
- ✓ All the radio buttons which are created would have same name. This is because the radio buttons are group elements.
- ✓ If one of the radio buttons has to be selected as soon as the web page is loaded, checked attribute should be used. The value also would be checked.

```
<html>
 <head>
  <title>Radio Button</title>
 </head>
 <body>
 <h3>Who is your Favourite Actor?</h3>
  <form action = " ">
   <p>
    <label><input type="radio" name="act" value="one"/>Puneeth Rajkumar</label>

    <label><input type="radio" name="act" value="two"/>Sudeep</label>

    <label><input type="radio" name="act" value="three"/>Darshan</label>

    <label><input type="radio" name="act" value="four"/>ShivaRajkumar</label>
   </p>
  </form>
 </body>
</html>
```

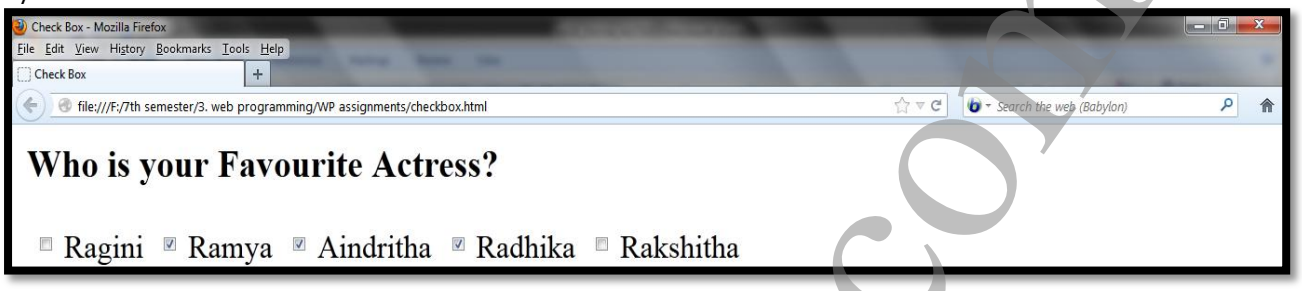


❖ Check Box

- ✓ Check box is a type of input using which multiple options can be selected.
- ✓ Check box can also be created using the <input> tag with the *type* having the value “checkbox”.
- ✓ During the creation of check box, the value should be provided using the *value* attribute.
- ✓ All the checkbox which are created would have the same name because they are group elements.
- ✓ If one of the check box have to be selected as soon as the page is loaded, checked attribute should be used with the value checked.

```
<html>
 <head>
  <title>Check Box</title>
 </head>
 <body>
 <h3>Who is your Favourite Actress?</h3>
  <form action = " ">
   <p>
    <label><input type="checkbox" name="act" value="one"/>Ragini</label>

    <label><input type="checkbox" name="act" value="two"/>Ramya</label>
```

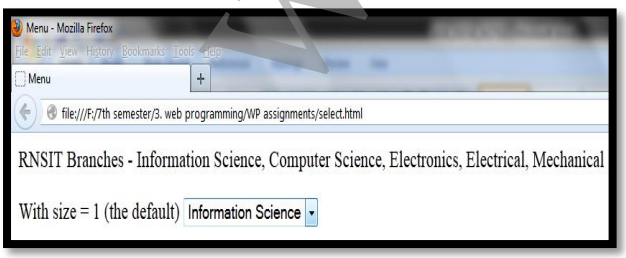
```
    <label><input type="checkbox" name="act" value="three"/>Aindritha</label>

    <label><input type="checkbox" name="act" value="four"/>Radhika</label>

    <label><input type="checkbox" name="act" value="four"/>Rakshitha</label>
   </p>
  </form>
 </body>
</html>
```

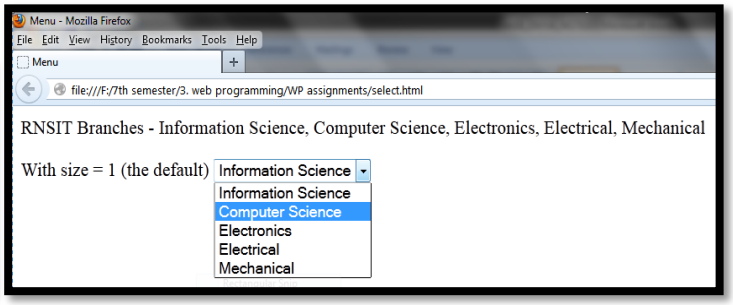


The <select> Tag:

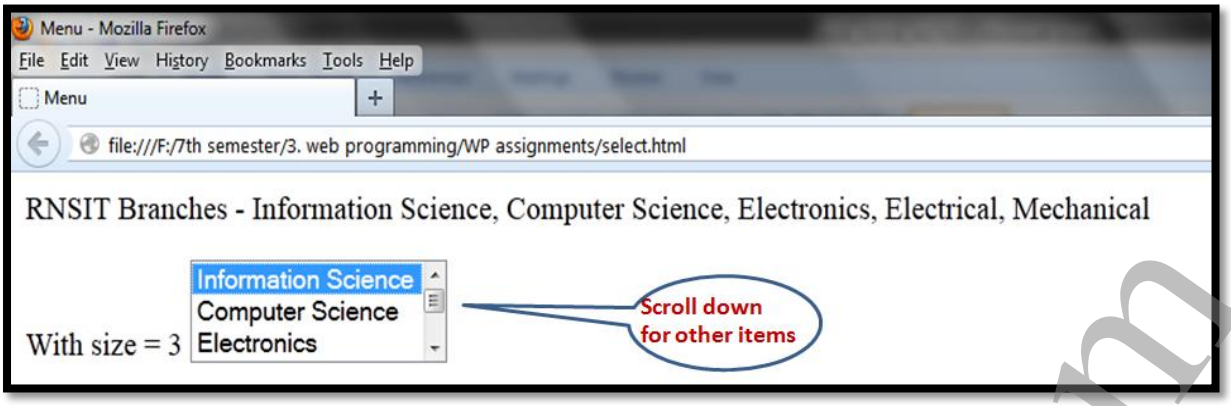
- Menu items is another type of input that can be created on the page.
- To create the menu item, <select> tag is used.
- To insert the item in the menu, <option> tag is used.

```
<html
<head> <title> Menu </title>
</head>
<body>
<p>
RNSIT Branches - Information Science, Computer Science, Electronics, Electrical, Mechanical
</p>
<form action = "">
<p>
With size = 1 (the default)
<select name = "branches">
<option> Information Science </option>
<option> Computer Science </option>
<option> Electronics </option>
<option> Electrical </option>
<option> Mechanical </option>
</select>
</p>
</form>
</body>
</html>
```





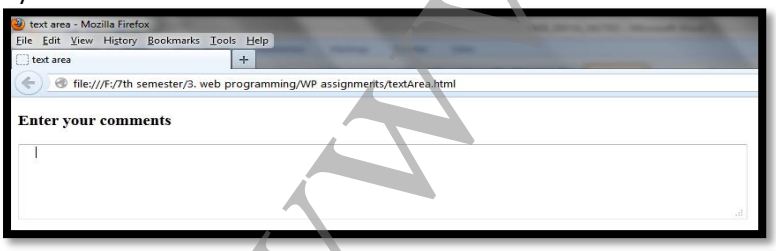
If you give <select name = "branches" size = “3”>, then you will get a scroll bar instead of drop down menu. It is as shown in the output given below:

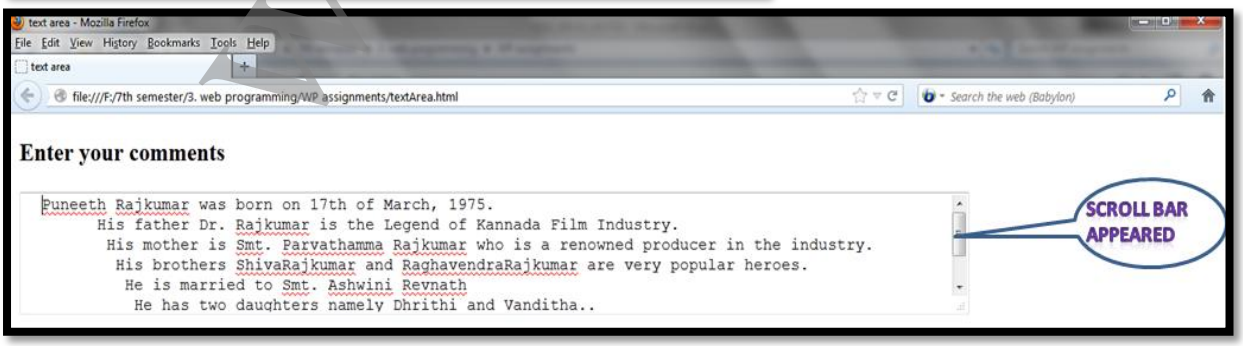


The <textarea> Tag:

- Text area is a type of input using which multiple statements can be entered.
- Text area is created using <textarea> tag.
- Text area should have the name.
- During the creation of text area, it should be mentioned how many sentences can be entered. This is done using *rows* attribute.
- Similarly, it should also be mentioned how many characters can be entered in a line. This is done using *cols* attribute.
- If the value given to rows is exceeded i.e. if users enter sentences more than specified, the *scroll bar* automatically appears.

```
<html>
 <head>
  <title> text area </title>
 </head>
 <body>
 <form action=" ">
   <h3> Enter your comments</h3>
   <p>
    <textarea name="feedback" rows="5" cols="100">
    </textarea>
   </p>
 </form>
 </body>
</html>
```

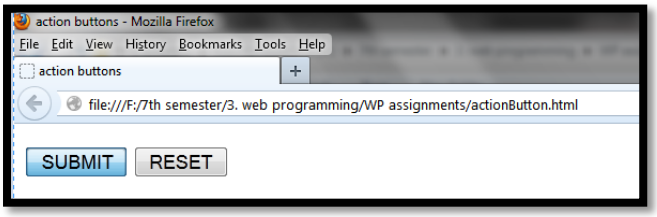




The Action Buttons:

The *Reset* button clears all of the controls in the form to their initial states. The *Submit* button has two actions: First, the form data is encoded and sent to the server; second, the server is requested to execute the server-resident program specified in the action attribute of the <form> tag. The purpose of such a server-resident program is to process the form data and return some response to the user. Every form requires a *Submit* button. The *Submit* and *Reset* buttons are created with the <input> tag.

```
<html>
 <head>
  <title> action buttons </title>
 </head>
 <body>
 <form action=" ">
  <p>
     <input type="SUBMIT" value="SUBMIT"/>
     <input type="RESET"   value="RESET"/>
   </p>
 </form>
 </body>
</html>
```



NOTE: A *plain* button has the type button. *Plain* buttons are used to choose an action.

Example of a Complete Form:

```
<html>
 <head>
  <title> CompleteForm</title>
 </head>
 <body>
  <h1>Registration Form</h1>
  <form action=" ">
   <p>
     <label>Enter your email id:
       <input type = "text" name = "myname" size = "24" maxlength = "25" />
     </label>
    </p>
    <p>
     <label>Enter the password:
       <input type = "password" name = "mypass" size = "20" maxlength = "20" />
     </label>
   </p>
  <p>Sex</p>
  <p>
   <label><input type="radio" name="act" value="one"/>Male</label>
     <label><input type="radio" name="act" value="two"/>Female</label>
    </p>
   <p>Which of the following Accounts do you have?</p>
  <p>
   <label><input type="checkbox" name="act" value="one"/>Gmail</label>
```

```
    <label><input type="checkbox" name="act" value="two"/>Facebook</label>
    <label><input type="checkbox" name="act" value="three"/>Twitter</label>
    <label><input type="checkbox" name="act" value="four"/>Google+</label>
   </p>
  <p> Any Suggestions?</p>
   <p>
    <textarea name="feedback" rows="5" cols="100">
    </textarea>
   </p>
   <p>Click on Submit if you want to register</p>
   <p>
     <input type="SUBMIT" value="SUBMIT"/>
     <input type="RESET"   value="RESET"/>
   </p>
    </form>
  </body>
</html>
```

FRAMES

The browser window can be used to display more than one document at a time. The window can be divided into rectangular areas, each of which is a *frame.* Each frame is capable of displaying its own document.

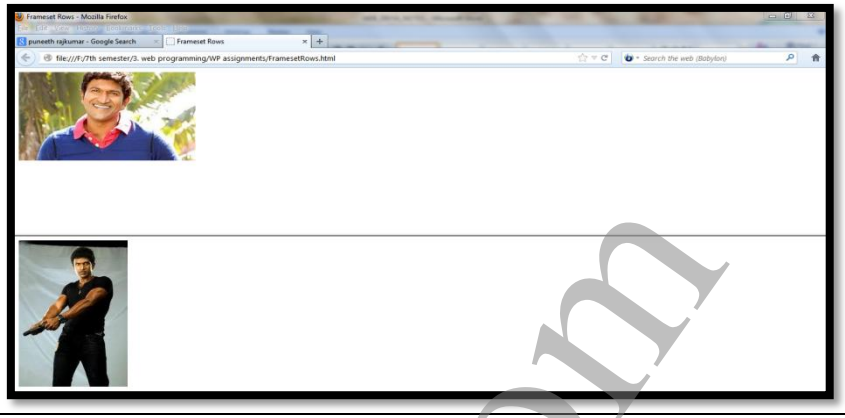
Framesets:

- The number of frames and their layout in the browser window are specified with the <frameset> tag.
- A frameset element takes the place of the body element in a document. A document has either a body or a frameset but cannot have both.
- The <frameset> tag must have either a *rows* or a *cols* attribute. (or both)
- To create horizontal frames, *rows* attribute is used.
- To create vertical frames, *cols* attribute is used.
- The values for these attributes can be numbers, percentages and asterisks.

- Two or more values are separated by commas & given in quoted string.

To Demonstrate Horizontal Frames using *rows* Attribute

```
<html>
 <head>
  <title>Frameset Rows</title>
 </head>
  <frameset rows = "*,*">
   <frame src = "FrameRow1.html"/>
   <frame src = "FrameRow2.html"/>
  </frameset>
</html>
```



To Demonstrate Vertical Frames using *cols* Attribute

```
<html>
 <head>
  <title>Frameset Cols</title>
 </head>
  <frameset cols = "25%,25%,25%,25%">
   <frame src = "FrameCol1.html"/>
   <frame src = "FrameCol2.html"/>
   <frame src = "FrameCol3.html"/>
   <frame src = "FrameCol4.html"/>
  </frameset>
</html>
```

Note: Here, the programs FrameRow1.html, FrameRow2.html, FrameCol1.html, FrameCol2.html, FrameCol3.html, FrameCol4.html are programs to display images. They must be coded separately.

```
<html>
 <head>
  <title>frame row 1</title>
 </head>
 <body>
  <img src="pr1.jpg" alt="cannot display"/>
 </body>
</html>
```

```
<html>
 <head>
  <title>frame row 2</title>
 </head>
 <body>
  <img src="pr2.jpg" alt="cannot display"/>
 </body>
</html>
```

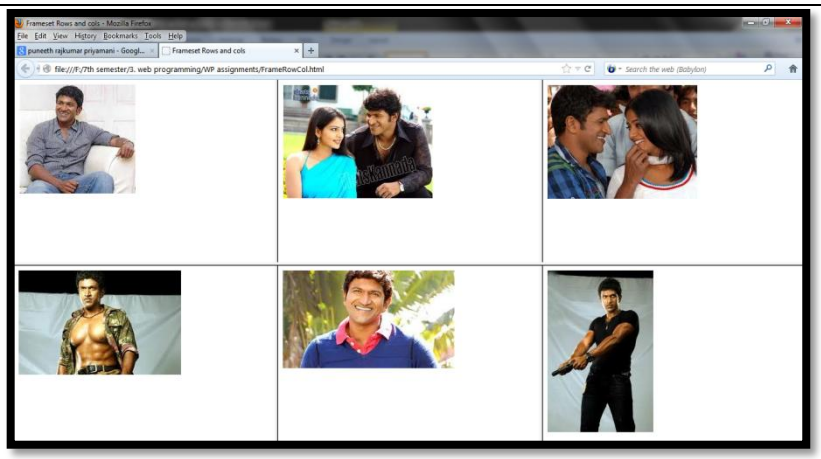
```
<html>
 <head>
  <title>frame col 1</title>
 </head>
 <body>
  <img src="pr3.jpg" alt="cannot display"/>
 </body>
</html>
```

```
<html>
 <head>
  <title>frame col 2</title>
 </head>
 <body>
  <img src="pr4.jpg" alt="cannot display"/>
 </body>
</html>
```

```
<html>
 <head>
  <title>frame col 3</title>
 </head>
 <body>
  <img src="pr5.jpg" alt="cannot display"/>
 </body>
</html>
```

```
<html>
 <head>
  <title>frame col 4</title>
 </head>
 <body>
  <img src="pr6.jpg" alt="cannot display"/>
 </body>
</html>
```

```
<html>
 <head>
  <title>Frameset Rows and cols</title>
 </head>
  <frameset rows = "50,50"  cols = "*,*,*">
   <frame src = "FrameCol1.html"/>
   <frame src = "FrameCol2.html"/>
   <frame src = "FrameCol3.html"/>
   <frame src = "FrameCol4.html"/>
   <frame src = "FrameRow1.html"/>
   <frame src = "FrameRow2.html"/>
</frameset>
</html>
```



Create two frames vertically on the browser window: the first frame should occupy 20% and the next frame should occupy 80%. In the first frame, display a document which consists of hyperlinks. When the hyperlinks are clicked, Image should be displayed on the second frame.

Frames.html

```
<html>
 <head>
  <title>Frames</title>
 </head>
 <frameset  cols = "20%,80%">
   <frame src = "FrameTarget.html"/>
   <frame name = "description"/>
 </frameset>
</html>
```

PRImage.html

```
<html>
  <head>
    <title>PRImage</title>
  </head>
  <body>
    <img src="PR.jpg" alt="cannot display"/>
  </body>
</html>
```

FrameTarget.html

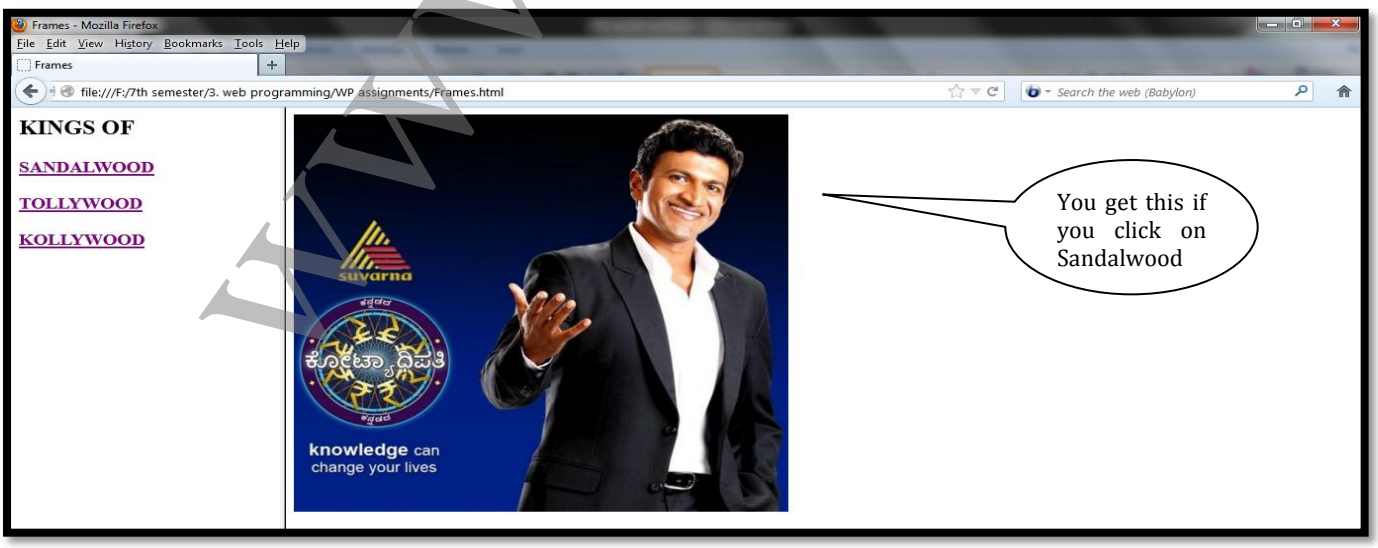
```
<html>
 <head>
  <title>Frames Target</title>
 </head>
 <body>
  <h2>KINGS OF</h2>
   <h3>
    <a href="PRImage.html" target = "description">
     SANDALWOOD</a>
    </h3>
   <h3>
  <a href="MBImage.html" target = "description">
    TOLLYWOOD</a>
  </h3>
   <h3>
  <a href="SImage.html" target = "description">
    KOLLYWOOD</a>
  </h3>
 </body>
</html>
```

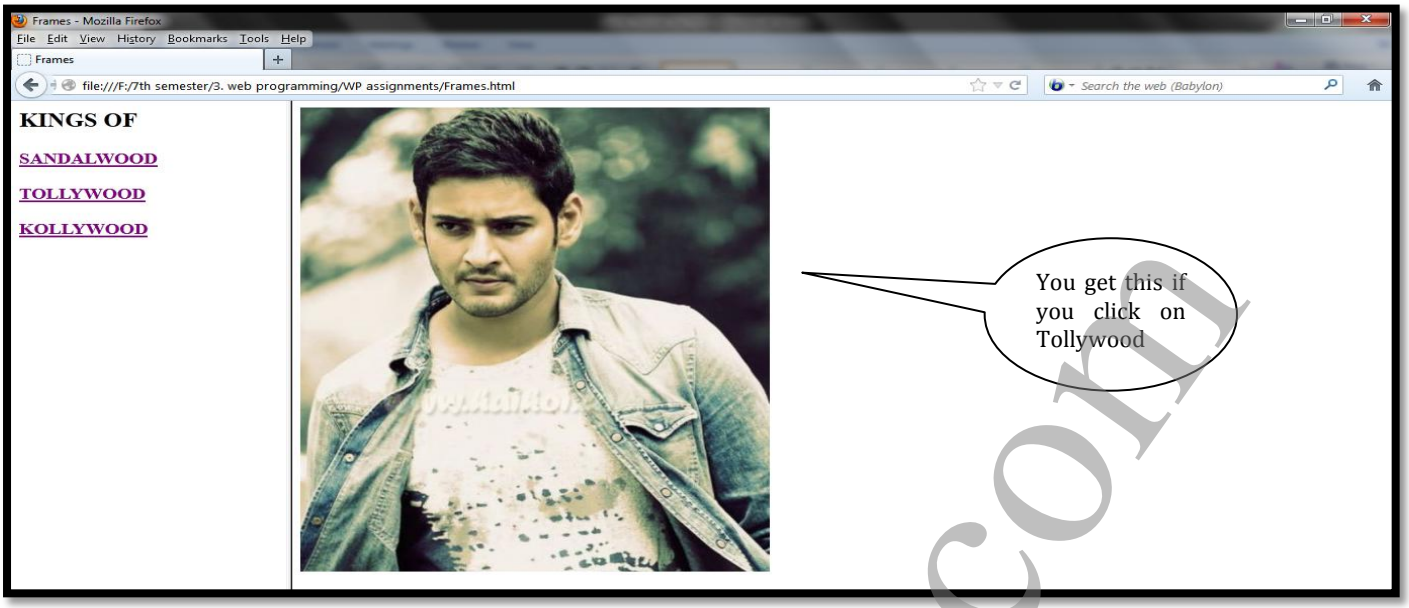
MBImage.html

```
<html>
  <head>
    <title>MBImage</title>
  </head>
  <body>
    <img src="MB.jpg" alt="cannot display"/>
  </body>
</html>
```

SImage.html

```
<html>
  <head>
    <title>SImage</title>
  </head>
  <body>
    <img src="S.jpg" alt="cannot display"/>
  </body>
</html>
```





SYNTACTIC DIFFERENCES BETWEEN HTML AND XHTML

PARAMETERS	HTML	XHTML
Case Sensitivity	Tags and attributes names are case insensitive	Tags and attributes names must be in lowercase
Closing tags	Closing tags may be omitted	All elements must have closing tag
Quoted attribute values	Special characters are quoted. Numeric values are rarely quoted.	All attribute values must be quoted including numbers
Explicit attribute values	Some attribute values are implicit. For example: <table border>. A default value for border is assumed	All attribute values must be explicitly stated
id and *name* attributes	Both *id* and *name* attributes are encouraged	Use of *id* is encouraged and use of *name* is discouraged
Element nesting	Rules against improper nesting of elements (for example: a form element cannot contain another form element) are not enforced.	All nesting rules are strictly enforced

UNIT 3
CASCADING STYLE SHEETS

INTRODUCTION

XHTML style sheets are called *cascading* style sheets because they can be defined at three different levels to specify the style of a document. Lower level style sheets can override higher level style sheets, so the style of the content of a tag is determined, in effect, through a cascade of style-sheet applications.

LEVELS OF STYLE SHEETS

- The three levels of style sheets, in order from lowest level to highest level, are inline, document level, and external.
- **Inline style sheets** apply to the content of a single XHTML element.
- **Document-level style sheets** apply to the whole body of a document.
- **External style sheets** can apply to the bodies of any number of documents.
- Inline style sheets have precedence over document style sheets, which have precedence over external style sheets.
- Inline style specifications appear within the opening tag and apply only to the content of that tag.
- Document-level style specifications appear in the document head section and apply to the entire body of the document.
- External style sheets stored separately and are referenced in all documents that use them.
- External style sheets are written as text files with the MIME type `text/css`.
- They can be stored on any computer on the Web. The browser fetches external style sheets just as it fetches documents.
- The `<link>` tag is used to specify external style sheets. Within `<link>`, the `rel` attribute is used to specify the relationship of the linked-to document to the document in which the link appears. The `href` attribute of `<link>` is used to specify the URL of the style sheet document.

EXAMPLE WHICH USES EXTERNAL STYLE SHEET

```
<html>
 <head>
 <title>Sample CSS</title>
 <link rel = "stylesheet" type = "text/css"
   href = "Style1.css" />
 </head>
 <h1>Puneeth Rajkumar</h1>
</html>
```

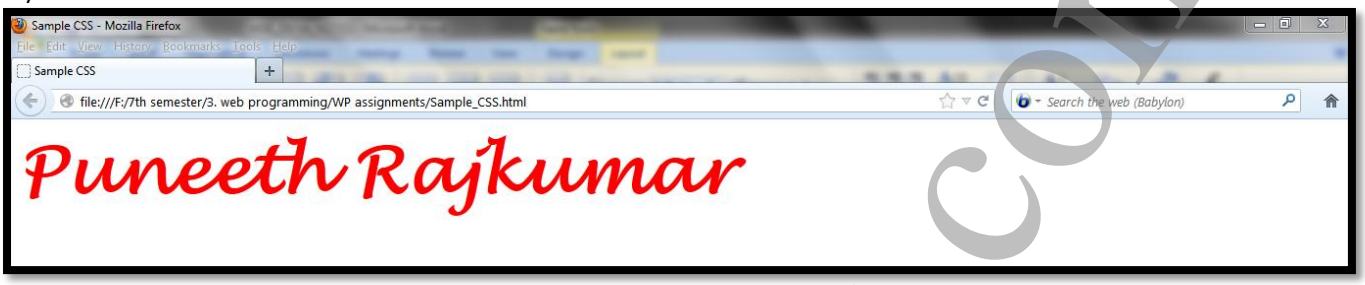
Style1.css

```
h1
{
        font-family: 'Lucida Handwriting';
        font-size: 50pt;
        color: Red;
}
```

EXAMPLE WHICH USES DOCUMENT LEVEL STYLE SHEET

```
<html>
 <head>
 <title>Sample CSS</title>
```

```
<style type = "text/css">
  h1
   {
        font-family: 'Lucida Handwriting';
        font-size: 50pt;
        color: Red;
    }
 </style>
 </head>
 <h1>Puneeth Rajkumar</h1>
</html>
```



EXAMPLE WHICH USES INLINE STYLE SHEET

```
<html>
 <head>
 <title>Sample CSS</title>
  </head>
   <h1  style  ="font-family: 'Lucida Handwriting'; font-size: 50pt; color: Red;">
     Puneeth Rajkumar  </h1>
</html>
```

STYLE SPECIFICATION FORMATS

Inline Style Specification:

*Style = "Property1 : Value1; Property2 : Value2; Property3 : Value3; ..... Property_**n** : Value_**n**;"*

Document Style Specification:

<style type = "text/css">
Rule list
</style>

Each style rule in a rule list has two parts: a selector, which indicates the tag or tags affected by the rule, and a list of property–value pairs. The list has the same form as the quoted list for inline style sheets, except that it is delimited by braces rather than double quotes. So, the form of a style rule is as follows:

Selector { *Property1 : Value1; Property2 : Value2; Property3 : Value3; ..... Property_**n** : Value_**n**;* }
[For examples on all three levels of style sheets along with specifications, Please refer the previous examples]

SELECTOR FORMS

Simple Selector Forms:

In case of simple selector, a tag is used. If the properties of the tag are changed, then it reflects at all the places when used in the program. The selector can be any tag. If the new properties for a tag are not mentioned within the rule list, then the browser uses default behaviour of a tag.

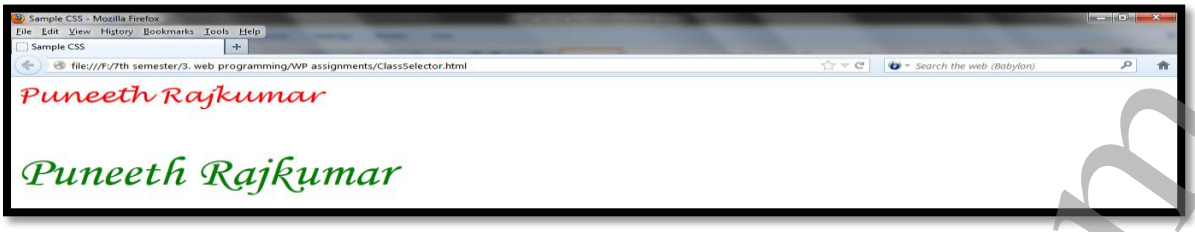
```
<html>
 <head>
 <title>Sample CSS</title>
 <style type = "text/css">
  p
  {
        font-family: 'Lucida Handwriting';
        font-size: 50pt;
        color: Red;
  }
 </style>
 </head>
  <body>
    <p>Puneeth Rajkumar</p>
    <p>Mahesh Babu</p>
    <p>Suriya</p>
  </body>
</html>
```

Class Selectors:

In class selector, it is possible to give different properties for different elements

```
<html>
 <head>
 <title>Sample CSS</title>
 <style type = "text/css">
  p.one
  {
        font-family: 'Lucida Handwriting';
        font-size: 25pt;
        color: Red;
  }
   p.two
  {
        font-family: 'Monotype Corsiva';
        font-size: 50pt;
        color: green;
  }
 </style>
 </head>
```

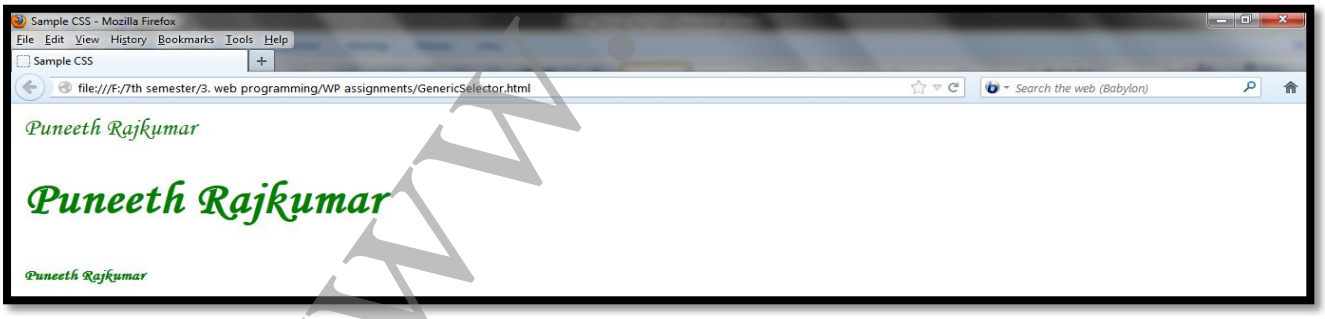
```
 <body>
    <p class = "one">Puneeth Rajkumar</p>
    <p class = "two">Puneeth Rajkumar</p>
 </body>
</html>
```



Generic Selectors:

In case of generic selector, when the class is created, it would not be associated to any particular tag. In other words, it is generic in nature.

```
<html>
 <head>
 <title>Sample CSS</title>
 <style type = "text/css">
   .one
 {
        font-family: 'Monotype Corsiva';
        color: green;
 }
 </style>
 </head>
 <body>
    <p class = "one">Puneeth Rajkumar</p>
    <h1 class = "one">Puneeth Rajkumar</h1>
    <h6 class = "one">Puneeth Rajkumar</h6>
 </body>
</html>
```

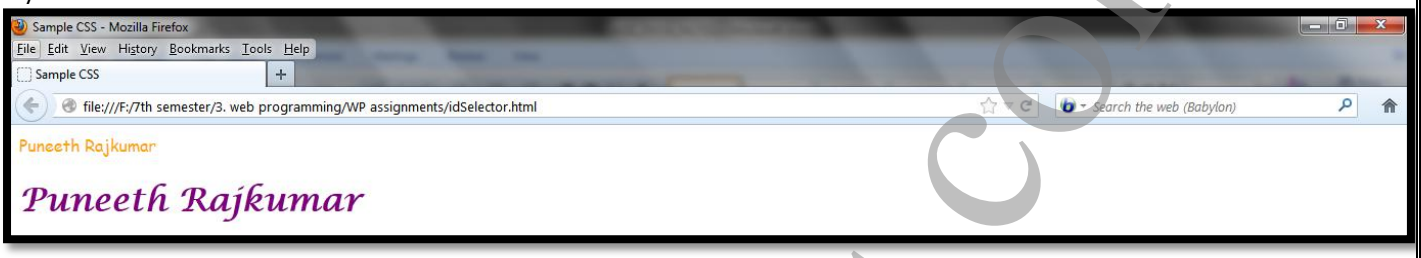


id Selectors:

An `id` selector allows the application of a style to one specific element.

```
<html>
 <head>
 <title>Sample CSS</title>
 <style type = "text/css">
   #one
 {
        font-family: 'lucida calligraphy';
        color: purple;
 }
```

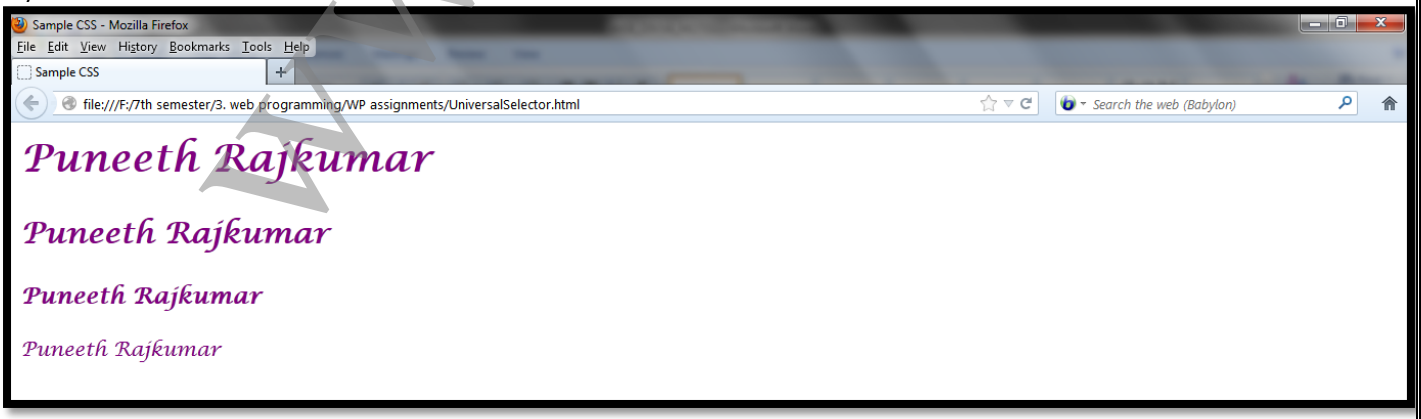
```
  #two
 {
        font-family: 'comic sans ms';
        color: orange;
  }
 </style>
</head>
 <body>
   <p id = "two">Puneeth Rajkumar</p>
   <h1 id = "one">Puneeth Rajkumar</h1>
     </body>
</html>
```



Universal Selectors:

The universal selector, denoted by an asterisk (*), applies its style to all elements in a document.

```
<html>
 <head>
 <title>Sample CSS</title>
 <style type = "text/css">
   *
 {
        font-family: 'lucida calligraphy';
        color: purple;
  }
   </style>
 </head>
 <body>
        <h1>Puneeth Rajkumar</h1>
        <h2>Puneeth Rajkumar</h2>
        <h3>Puneeth Rajkumar</h3>
        <p>Puneeth Rajkumar</p>
   </body>
</html>
```

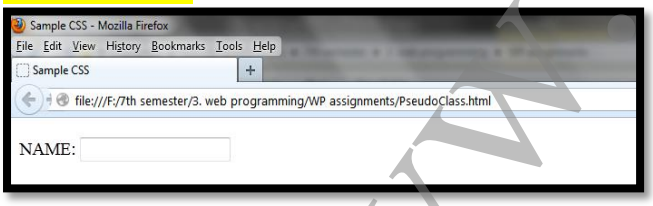


Pseudo Classes:

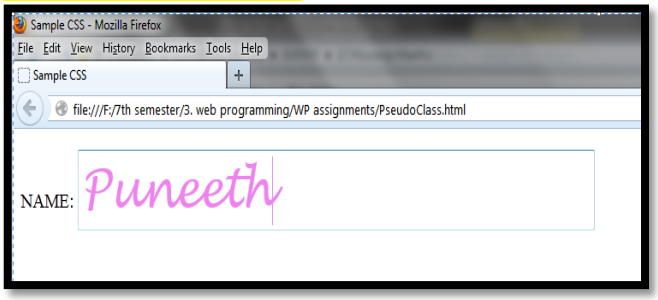
Pseudo class selectors are used if the properties are to be changed dynamically. For example: when mouse movement happens, in other words, hover happens or focus happens.

```
<html>
 <head>
 <title>Sample CSS</title>
 <style type = "text/css">
  input:focus
 {
        font-family: 'lucida calligraphy';
        color: purple;
          font-size:100;
 }
 input:hover
 {
        font-family: 'lucida handwriting';
        color: violet;
         font-size:40;
 }
  </style>
</head>
 <body>
     <form action = " ">
       <p>
        <label>
          NAME:
           <input type = "text" />
        </label>
       </p>
     </form>
  </body>
</html>
```

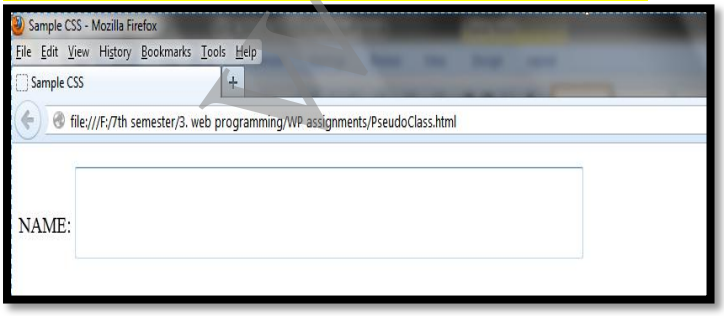
STEP 1: Initial



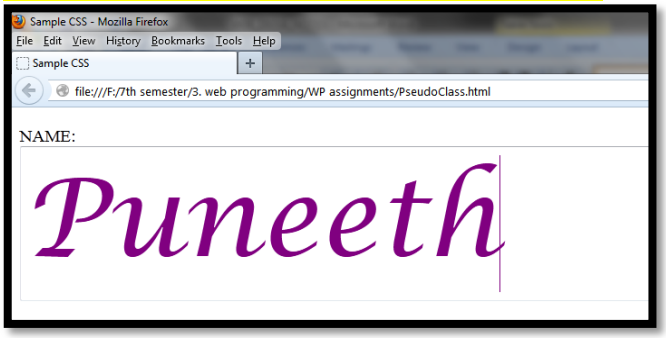
STEP 3: Enter the data



STEP 2:After placing mouse pointer on text area



STEP 4: After taking away the mouse pointer



PROPERTY VALUE FORMS

CSS includes 60 different properties in seven categories: fonts, lists, alignment of text, margins, colours, backgrounds, and borders. Property values can appear in a variety of forms.

- Keyword property values are used when there are only a few possible values and they are predefined.
- A number value can be either an integer or a sequence of digits with a decimal point and can be preceded by a sign (+ or −).
- Length values are specified as number values that are followed immediately by a two-character abbreviation of a unit name. The possible unit names are px, for pixels; in, for inches; cm, for centimeters; mm, for millimeters; pt, for points.
- Percentage values are used to provide a measure that is relative to the previously used measure for a property value. Percentage values are numbers that are followed immediately by a percent sign (%).Percentage values can be signed. If preceded by a plus sign, the percentage is added to the previous value; if negative, the percentage is subtracted.
- There can be no space between `url` and the left parenthesis.
- Color property values can be specified as color names, as six-digit hexadecimal numbers, or in RGB form. RGB form is just the word `rgb` followed by a parenthesized list of three numbers that specify the levels of red, green, and blue, respectively. The RGB values can be given either as decimal numbers between 0 and 255 or as percentages. Hexadecimal numbers must be preceded with pound signs (#), as in `#43AF00`.

FONT PROPERTIES

Font Families:

The `font-family` property is used to specify a list of font names. The browser uses the first font in the list that it supports. For example, the property:

```
font-family: Arial, Helvetica, Futura
```

tells the browser to use Arial if it supports that font. If not, it will use Helvetica if it supports it. If the browser supports neither Arial nor Helvetica, it will use Futura if it can. If the browser does not support any of the specified fonts, it will use an alternative of its choosing.

If a font name has more than one word, the whole name should be delimited by single quotes, as in the following example:

```
font-family: 'Times New Roman'
```

Font Sizes:

The `font-size` property does what its name implies. For example, the following property specification sets the font size for text to 10 points:

```
font-size: 10pt
```

Many relative `font-size` values are defined, including `xx-small`, `x-small`, `small`, `medium`, `large`, `x-large`, and `xx-large`. In addition, `smaller` or `larger` can be specified. Furthermore, the value can be a percentage relative to the current font size.

Font Variants:

The default value of the `font-variant` property is `normal`, which specifies the usual character font. This property can be set to `small-caps` to specify small capital characters. These characters are all uppercase, but the letters that are normally uppercase are somewhat larger than those that are normally lowercase.

Font Styles:

The `font-style` property is most commonly used to specify italic, as in

```
font-style: italic
```

Font Weights:

The `font-weight` property is used to specify the degree of boldness, as in

font-weight: bold

Besides `bold`, the values `normal`, `bolder`, and `lighter` can be specified. Specific numbers also can be given in multiples of `100` from `100` to `900`, where `400` is the same as `normal` and `700` is the same as `bold`.

Font Shorthands:

If more than one font property must be specified, the values can be stated in a list as the value of the `font` property. The order in which the property values are given in a `font` value list is important. The order must be as follows: The font names must be last, the font size must be second to last, and the font style, font variant, and font weight, when they are included, can be in any order but must precede the font size and font names.

font: bold 14pt 'Times New Roman'

```
<html>
 <head>
 <title>Font Properties</title>
 <style type = "text/css">
  p.one
  {
        font-family: 'lucida calligraphy';
        font-weight:bold;
        font-size:75pt;
        color: purple;
  }
 h1.two
  {
        font-family: 'cambria';
        color: violet;
        font-style:italics;
  }
  p.three
  {
        font: small-caps italic bold 50pt 'times new roman'
  }
   </style>
 </head>
 <body>
      <p class = "one">Puneeth Rajkumar</p>
      <h1 class = "two">Puneeth Rajkumar</h1>
      <p class = "three">Puneeth Rajkumar</p>
  </body>
</html>
```

Text Decoration:

The `text-decoration` property is used to specify some special features of text. The available values are `line-through`, `overline`, `underline`, and `none`, which is the default.

```
<html>
 <head>
 <title>Text Decoration</title>
 <style type = "text/css">
  h1.one
 {text-decoration: line-through;}
 h1.two
 {text-decoration: overline;}
  h1.three
 {text-decoration: underline;}
   </style>
 </head>
  <body>
       <h1 class = "one">Puneeth Rajkumar</h1> <p>[This is line-through]</p><br/>
       <h1 class = "two">Puneeth Rajkumar</h1> <p>[This is overline]</p><br/>
       <h1 class = "three">Puneeth Rajkumar</h1><p>[This is underline]</p><br/>
   </body>
</html>
```

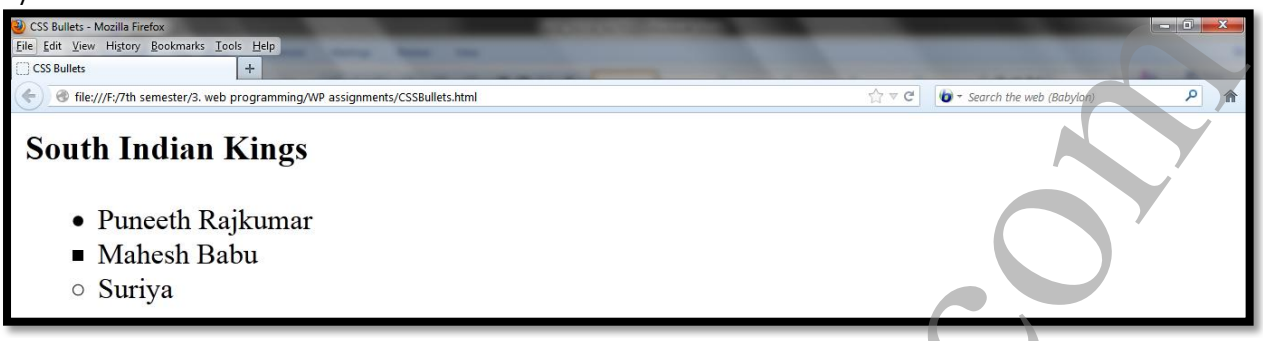
LIST PROPERTIES

Two presentation details of lists can be specified in XHTML documents: the shape of the bullets that precede the items in an unordered list and the sequencing values that precede the items in an ordered list. The `list-style-type` property is used to specify both of these.

The **`list-style-type`** property of an unordered list can be set to `disc`, `circle`, `square`, or `none`.

```
<html>
 <head>
 <title>CSS Bullets</title>
 <style type = "text/css">
   li.one {list-style-type:disc}
   li.two{list-style-type:square}
   li.three{list-style-type:circle}
   </style>
 </head>
  <body>
   <h3>South Indian Kings</h3>
```

```
    <ul>
        <li class = "one"> Puneeth Rajkumar</li>
        <li class = "two"> Mahesh Babu</li>
        <li class = "three"> Suriya</li>
    </ul>
  </body>
</html>
```



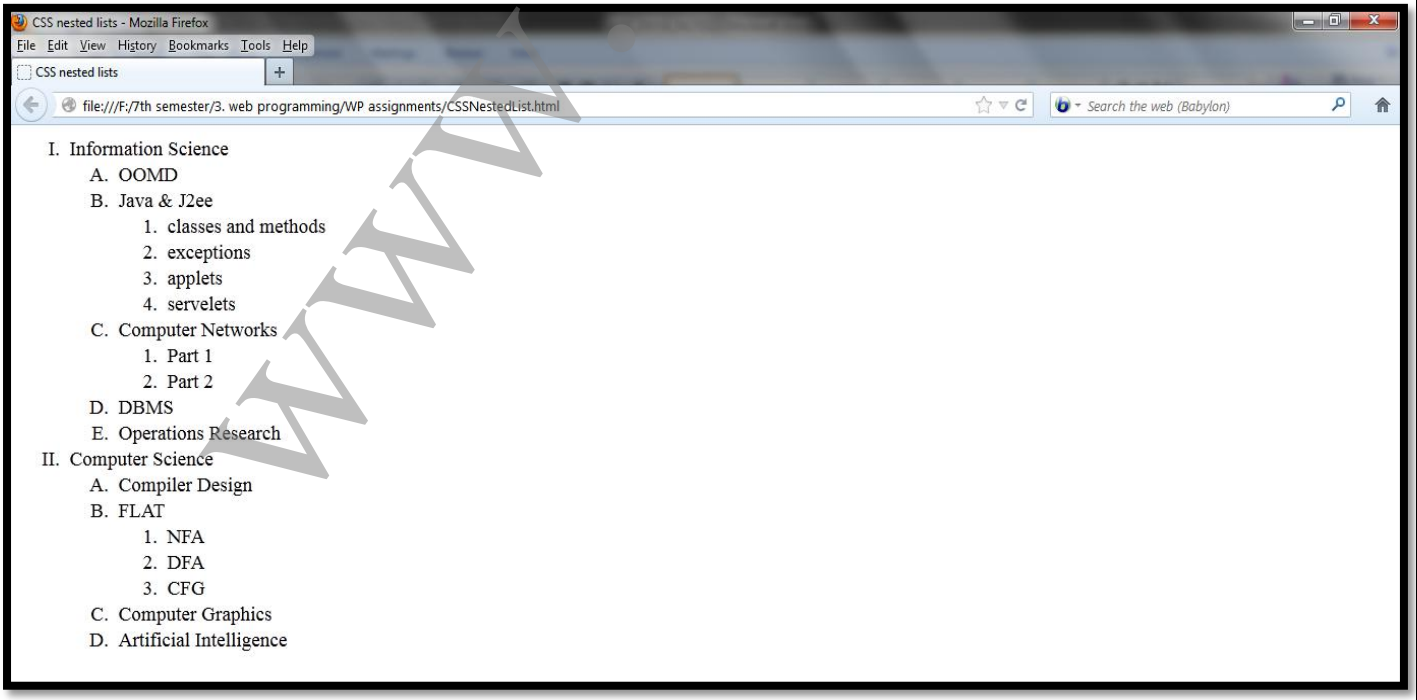
Bullets in unordered lists are not limited to discs, squares, and circles. Any image can be used in a list item bullet. Such a bullet is specified with the `list-style-image` property, whose value is specified with the `url` form.

```
<html>
 <head>
 <title>CSS Bullets-Image</title>
 <style type = "text/css">
  li.image {list-style-image: url(bullet.png); font-size:25pt;}
 </style>
 </head>
 <body>
  <h1>South Indian Kings</h1>
   <ul>
        <li class = "image"> Puneeth Rajkumar</li>
        <li class = "image"> Mahesh Babu</li>
        <li class = "image"> Suriya</li>
    </ul>
 </body>
</html>
```

The following example illustrates the use of different sequence value types in nested lists:

```
<html>
 <head>
  <title> CSS nested lists </title>
   <style type = "text/css">
        ol {list-style-type:upper-roman;}
        ol ol {list-style-type:upper-alpha;}
        ol ol ol {list-style-type:decimal;}
   </style>
 </head>
```

```
<ol>
 <li> Information Science </li>
  <ol>
       <li>OOMD</li>
       <li>Java & J2ee</li>
       <ol>
         <li>classes and methods</li>
         <li>exceptions</li>
         <li>applets</li>
         <li>servelets</li>
       </ol>
       <li>Computer Networks</li>
       <ol>
         <li>Part 1</li>
         <li>Part 2</li>
       </ol>
       <li>DBMS</li>
       <li>Operations Research</li>
  </ol>
  <li> Computer Science</li>
   <ol>
       <li>Compiler Design</li>
       <li>FLAT</li>
       <ol>
         <li>NFA</li>
         <li>DFA</li>
         <li>CFG</li>
       </ol>
       <li>Computer Graphics</li>
       <li>Artificial Intelligence</li>
   </ol>
 </ol>
</html>
```



COLOR

Color Groups:

Three levels of collections of colours might be used by an XHTML document. The smallest useful set of colours includes only those that have standard names and are guaranteed to be correctly displayable by all browsers on all color monitors. This collection of 17 colours is called the *named colours.*

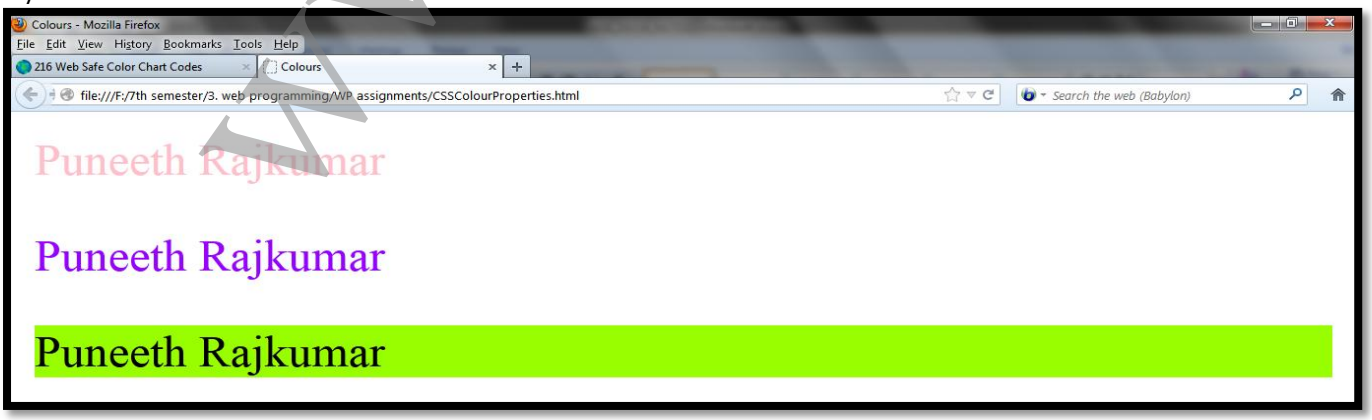
Name	Hexadecimal Code	Name	Hexadecimal Code
aqua	00FFFF	olive	808000
black	000000	orange	FFA500
blue	0000FF	purple	800080
fuchsia	FF00FF	red	FF0000
gray	808080	silver	C0C0C0
green	008000	teal	008080
lime	00FF00	white	FFFFFF
maroon	800000	yellow	FFFF00
navy	000080		

Larger set of colors, called the Web palette, consists of 216 colors. The colors of the Web palette can be viewed at **http://www.web-source.net/216_color_chart.htm**

Color Properties:

The `color` property is used to specify the foreground color of XHTML elements.

```
<html>
 <head>
 <title>Colours</title>
 <style type = "text/css">
  p.one
 {color: pink; }
  p.two
 {color: # 9900FF; }
  p.three
 {background-color:#99FF00;}
  </style>
 </head>
 <body>
      <p class = "one">Puneeth Rajkumar</p>
      <p class = "two">Puneeth Rajkumar</p>
      <p class = "three">Puneeth Rajkumar</p>
  </body>
</html>
```



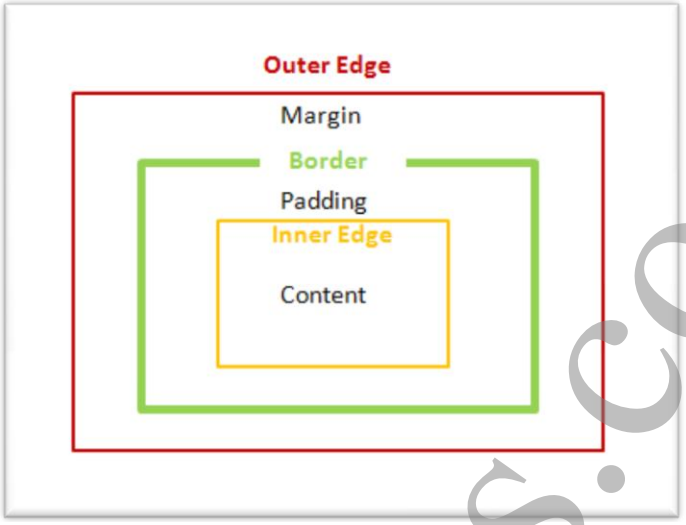
ALIGNMENT OF TEXT

- The `text-indent` property can be used to indent the first line of a paragraph. This property takes either a length or a percentage value. The text-align property, for which the possible keyword values are left, center, right, and justify, is used to arrange text horizontally.
- The `float` property is used to specify that text should flow around some element, often an image or a table. The possible values for `float` are `left`, `right`, and `none`, which is the default.

```
<html>
 <head>
 <title>Text Alignment</title>
 <style type = "text/css">
  h1.one
 {text-align: center}
  p.two
 {text-indent: 0.5in; text-align: justify;}
 img{float:right}
  </style>
 </head>
 <body>
    <h1 class = "one">Kannadada Kotyadhipathi</h1>
     <p>
        <img src = "kk.jpg" alt="error"/>
     </p>
        <p class = "two">Kannadada Kotyadhipathi is a Kannada primetime quiz show hosted by the power star of Kannada cinema Mr. Puneet Rajkumar. This is the biggest game show ever on Kannada Television. This show will be aired on Suvarna TV. This show gives the common man an opportunity to win Rs 1 crore. Kannadada Kotyadipathi is a Kannada primetime quiz and human drama show hosted by matinee idol Puneeth Rajkumar on Suvarna TV. Contestants participate in a game that allows them to win up to Rs. 1 crore. Short-listed contestants play a 'Fastest Finger First' round to make it to the main game. From there on, they play rounds with increasing levels of difficulty, and winning higher amounts of money, culminating in the Rs. 1 crore prize. Contestants can stop at any time having viewed the next question. Or they can avail of a 'Lifeline' and play on. Welcome to the world of high stakes chills and thrills! Welcome to the world of the crorepati!</p>
 </body>
</html>
```

THE BOX MODEL

- On a given web page or a document, all the elements can have borders.
- The borders have various styles, color and width.
- The amount of space between the content of the element and its border is known as *padding.*
- The space between border and adjacent element is known as *margin.*



Borders:

Border-style

It can be dotted, dashed, double

- Border-top-style
- Border-bottom-style
- Border-left-style
- Border-right-style

Border-width

It can be thin, medium, thick or any length value

- Border-top-width
- Border-bottom-width
- Border-left-width
- Border-right-width

Border-color

- Border-top-color
- Border-bottom-color
- Border-left-color
- Border-right-color

```
<html>
 <head>
  <title> Table with border effects </title>
   <style type = "text/css">
    table
     {
        border-width:thick;
        border-top-color:red;
        border-left-color:orange;
        border-bottom-color:violet;
        border-right-color:green;
        border-top-style:dashed;
```

```
        border-bottom-style:double;
        border-right-style:dotted;
      }
    </style>
  </head>
  <body>
    <table border = "border">
     <caption>PARAMATHMA </caption>
       <tr>
         <td> Puneeth Rajkumar </td>
         <td> <img src = "puneeth.jpg" alt = "cant display"/></td>
       </tr>
     </table>
   </body>
</html>
```

Margins and Padding:

The margin properties are named `margin`, which applies to all four sides of an element: `margin-left`, `margin-right`, `margin-top`, and `margin-bottom`. The padding properties are named `padding`, which applies to all four sides: `padding-left`, `padding-right`, `padding-top`, and `padding-bottom`.

```
<html>
 <head>
  <title> Margins and Padding </title>
   <style type = "text/css">
    p.one
    {
        margin:0.1in;
        padding:0.5in;
        background-color:#FF33FF;
        border-style:dotted;
    }
    p.two
     {
        margin:0.5in;
        padding:0.1in;
        background-color:#00FF33;
        border-style:dashed;
     }
    p.three
     {
```

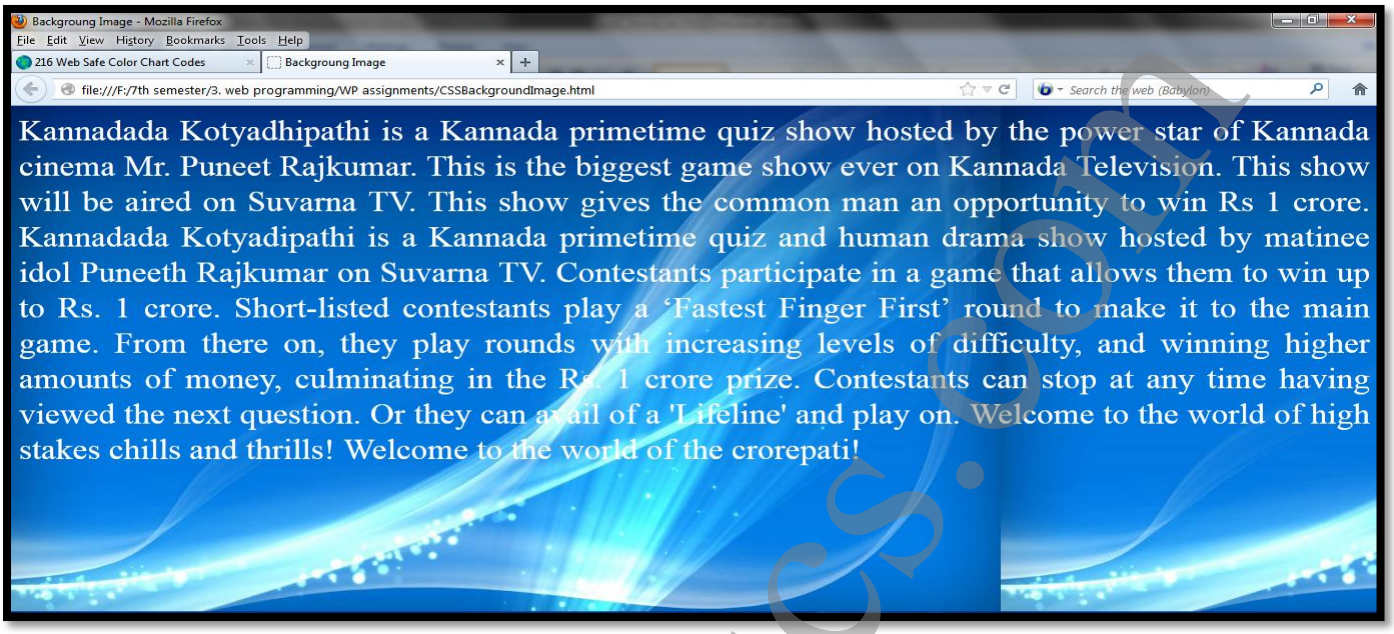
```
            margin:0.3in;
            background-color:#FFFF00;
        }
        p.four
        {
            padding:0.3in;
            background-color:#FF9900;
        }
      </style>
    </head>
    <body>
      <p class = "one"> Puneeth Rajkumar is the Power Star of Sandalwood<br/>
        [margin=0.1in, padding=0.5in]</p>
       <p class = "two"> Puneeth Rajkumar is the Power Star of Sandalwood<br/>
        [margin=0.5in, padding=0.1in]</p>
        <p class = "three"> Puneeth Rajkumar is the Power Star of Sandalwood<br/>
        [margin=0.3in, no padding, no border]</p>
       <p class = "four"> Puneeth Rajkumar is the Power Star of Sandalwood<br/>
        [no margin, padding=0.3in, no border]</p>
    </body>
</html>
```

BACKGROUND IMAGES

The `background-image` property is used to place an image in the background of an element.

```
<html>
 <head>
 <title>Background Image</title>
 <style type = "text/css">
  body {background-image:url(bg3.jpg);}
   p
  {text-align: justify; color:white;font-size:25pt;}
  </style>
 </head>
  <body>
    <p >Kannadada Kotyadhipathi is a Kannada primetime quiz show hosted by the power star of Kannada cinema Mr. Puneet Rajkumar. This is the biggest game show ever on Kannada Television. This show will be aired on Suvarna TV. This show gives the common man an opportunity to win Rs 1 crore. Kannadada Kotyadipathi is a Kannada primetime quiz and human drama show hosted by matinee idol Puneeth Rajkumar on Suvarna TV. Contestants participate in a game that allows them to win up to Rs. 1 crore. Short-listed
```

contestants play a 'Fastest Finger First' round to make it to the main game. From there on, they play rounds with increasing levels of difficulty, and winning higher amounts of money, culminating in the Rs. 1 crore prize. Contestants can stop at any time having viewed the next question. Or they can avail of a 'Lifeline' and play on. Welcome to the world of high stakes chills and thrills! Welcome to the world of the crorepati!</p>
</body>
</html>



In the example, notice that the background image is replicated as necessary to fill the area of the element. This replication is called *tiling*. Tiling can be controlled with the `background-repeat` property, which can take the value `repeat` (the default), `no-repeat`, `repeat-x`, or `repeat-y`. The `no-repeat` value specifies that just one copy of the image is to be displayed. The `repeat-x` value means that the image is to be repeated horizontally; `repeat-y` means that the image is to be repeated vertically. In addition, the position of a non-repeated background image can be specified with the `background-position` property, which can take a large number of different values. The keyword values are `top`, `center`, `bottom`, `left`, and `right`, all of which can be used in many different combinations.

THE AND TAGS

In many situations, we want to apply special font properties to less than a whole paragraph of text. The `<span>` tag is designed for just this purpose.

```
<html>
 <head> <title>span</title>
 <style type = "text/css">
  .spanviolet {font-size:25pt;font-family:'lucida calligraphy';color:violet;}
   </style>
 </head>
  <body>
    <p >Kannadada Kotyadhipathi is a Kannada primetime quiz show hosted by <span class = "spanviolet">
Puneeth Rajkumar </span>, the power star of Kannada cinema  </p>
  </body>
 </html>
```

It is more convenient, however, to be able to apply a style to a section of a document rather than to each paragraph. This can be done with the `<div>` tag. As with `<span>`, there is no implied layout for the content of the `<div>` tag, so its primary use is to specify presentation details for a section or division of a document.

```
<html>
 <head>
 <title>div</title>
 <style type = "text/css">
  .one
    {font-size:20pt;font-family:'lucida calligraphy';color:violet;}
   .two
    {font-size:25pt;font-family:'comic sans ms';color:green;}
   </style>
 </head>
  <body>
    <div class = "one">
         <p>Paragragh 1 under division 1</p>
         <p>Paragragh 2 under division 1</p>
         <p>Paragragh 3 under division 1</p>
    </div>
     <div class = "two">
         <p>Paragragh 1 under division 2</p>
         <p>Paragragh 2 under division 2</p>
         <p>Paragragh 3 under division 2</p>
    </div>
  </body>
</html>
```

CONFLICT RESOLUTION

- Sometimes on a web page, there can be two different values for the same property on the same element leading to conflict.
- h3 {color: blue;}
  body h3 {color: red;}
- The browser has to resolve this conflict.
- There can be one or more type of conflict: i.e. when style sheets at 2 or more levels specify different value for same property on some element.
- This conflict is resolved by providing priority to the different levels of style sheets.
- The inline level gets the highest priority over the document level.

- The document level gets the higher priority over the external level
- But the browser must be able to resolve the conflict in the first example using same technique.
- There can be several different origins of the specification of property values.
- One of the value may come from a style sheet created by the author or it can be specified by the user using the options provided by the browser.
- The property values with different origin have different precedence.
- The precedence can also be set for a property by marking it as important.
- p.special {font-style: italic !important; font-size: 14}
- This means that font-style:italic is important [this is known as weight of specification]
- The process of conflict resolution is a multi-stage sorting process.
- The first step is to gather information about levels of style sheet.
- Next, all the origins and weights are sorted. The following rules are considered:
    1. Important declarations with user origin
    2. Important declarations with author origin
    3. Normal declarations with author origin
    4. Normal declarations with user origin
    5. Any declarations with browser (or other user agent) origin
- If there are other conflicts even after sorting, the next step is sorting by specificity. Rules are:
    1. id selectors
    2. Class and pseudo class selectors
    3. Contextual selectors (more element type names means that they are more specific)
    4. Universal selectors
- If there still conflicts, they are resolved by giving precedence to most recently seen specification.

UNIT 4
JAVASCRIPT

OVERVIEW OF JAVASCRIPT

ORIGINS

- JavaScript, which was developed by Netscape, was originally named Mocha but soon was renamed LiveScript.
- In late 1995 LiveScript became a joint venture of Netscape and Sun Microsystems, and its name again was changed, this time to JavaScript.
- A language standard for JavaScript was developed in the late 1990s by the European Computer Manufacturers Association (ECMA) as ECMA-262.
- The official name of the standard language is ECMAScript.
- JavaScript can be divided into three parts: the core, client side, and server side.
- The ***core*** is the heart of the language, including its operators, expressions, statements, and subprograms.
- ***Client-side*** JavaScript is a collection of objects that support the control of a browser and interactions with users.
- ***Server-side*** JavaScript is a collection of objects that make the language useful on a Web server.

JAVASCRIPT AND JAVA

JAVA	JAVASCRIPT
Java is programming language	JavaScript is a scripting language
It is strongly typed language	It is dynamically typed language
Types are known at compile time	Compile time type checking is impossible
Objects in java are static	JavaScript objects are dynamic
Collection of data members and methods is fixed at compile time	The number of data members and methods of an object can change during execution
Object oriented programming language	Object based language

USES OF JAVASCRIPT

- The JavaScript was initially introduced to provide programming capability at both the server and client ends of web connection
- JavaScript therefore is implemented at 2 ends:
  - Client end
  - Server end
- The client side JavaScript is embedded in XHTML documents and is interpreted by the browser
- It also provides some means of computation, which serves as an alternative for some tasks done at the server side
- Interactions with users through form elements, such as buttons and menus, can be conveniently described in JavaScript. Because button clicks and mouse movements are easily detected with JavaScript, they can be used to trigger computations and provide feedback to the user.
- For example, when a user moves the mouse cursor from a text box, JavaScript can detect that movement and check the appropriateness of the text box's value (which presumably was just filled by the user).
- Even without forms, user interactions are both possible and simple to program in JavaScript. These interactions, which take place in dialog windows, include getting input from the user and allowing the

user to make choices through buttons. It is also easy to generate new content in the browser display dynamically.

- ♥ This transfer of task ensures that the server is not overloaded and performs only required task
- ♥ But client side JavaScript cannot replace serves side JavaScript; because server side software supports file operations, database access, security, networking etc
- ♥ JavaScript is also used as an alternative to java applets.
- ♥ Programming in JavaScript is much simpler than compared to java
- ♥ JavaScript support DOM [Document Object Model] which enables JavaScript to access and modify CSS properties and content of any element of a displayed XHTML document

EVENT-DRIVEN COMPUTATION OF JAVASCRIPT

- In JavaScript, the actions are often executed in response to actions of the users of documents like mouse clicks and form submissions.
- This form of computation supports user interactions through the XHTML form elements on the client display
- One of the common uses of JavaScript is to check the values provided in forms by users to determine whether the values are sensible.
- The program or script on the server that processes the form data must check for invalid input data.
- When invalid data is found, the server must transmit that information back to the browser.
- Since this process is time consuming, we can perform input checks at the client side itself which saves both server time and internet time.
- However, validity checking is done on the server side because client side validity checking can be subverted by an unscrupulous user.

BROWSERS AND XHTML/JAVASCRIPT DOCUMENTS

- ★ If an XHTML document does not include embedded scripts, the browser reads the lines of the document and renders its window according to the tags, attributes, and content it finds.
- ★ When a JavaScript script is encountered in the document, the browser uses its JavaScript interpreter to "execute" the script.
- ★ Output from the script becomes the next markup to be rendered.
- ★ When the end of the script is reached, the browser goes back to reading the XHTML document and displaying its content.
- ★ There are two different ways to embed JavaScript in an XHTML document: implicitly and explicitly.
- ★ In explicit embedding, the JavaScript code physically resides in the XHTML document.
- ★ The JavaScript can be placed in its own file, separate from the XHTML document. This approach, called implicit embedding, has the advantage of hiding the script from the browser user.
- ★ When JavaScript scripts are explicitly embedded, they can appear in either part of an XHTML document—the head or the body—depending on the purpose of the script.

OBJECT ORIENTATION AND JAVASCRIPT

- JavaScript is an object-based language
- It supports prototype-based inheritance
- Without class-based inheritance, JavaScript cannot support polymorphism.
- A polymorphic variable can reference related methods of objects of different classes within the same class hierarchy

JAVASCRIPT OBJECTS

- In JavaScript, objects are collections of properties, which correspond to the members of classes in Java and C++.
- Each property is either a data property or a function or method property.
- Data properties appear in two categories: primitive values and references to other objects.

- JavaScript uses non-object types for some of its simplest types; these non-object types are called *primitives.*
- Primitives are used because they often can be implemented directly in hardware, resulting in faster operations on their values.
- All objects in a JavaScript program are indirectly accessed through variables.
- All primitive values in JavaScript are accessed directly—these are like the scalar types in Java and C++. These are often called *value types.*
- The properties of an object are referenced by attaching the name of the property to the variable that references the object.
- A JavaScript object appears, both internally and externally, as a list of property–value pairs.
- The properties are names; the values are data values or functions.
- All functions are objects and are referenced through variables.
- The collection of properties of a JavaScript object is dynamic: Properties can be added or deleted at any time.

GENERAL SYNTACTIC CHARACTERISTICS

- Scripts can appear directly as the content of a **<script>** tag.
- The type attribute of <script> must be set to "**text/javascript**".
- The JavaScript script can be indirectly embedded in an XHTML document with the src attribute of a <script> tag, whose value is the name of a file that contains the script—for example,

```
<script type = "text/javascript" src = "tst_number.js" >
</script>
```

- Notice that the script element requires the closing tag, even though it has no content when the src attribute is included.
- In JavaScript, identifiers, or names, must begin with a letter, an underscore (_), or a dollar sign ($). Subsequent characters may be letters, underscores, dollar signs, or digits. There is no length limitation for identifiers.
- JavaScript has 25 reserved words

break	delete	function	return	typeof
case	do	if	switch	var
catch	else	in	this	void
continue	finally	instanceof	throw	while
default	for	new	try	with

- In addition, JavaScript has a large collection of predefined words, including `alert`, `open`, `java`, and `self`.
- JavaScript has two forms of comments, both of which are used in other languages. First, whenever two adjacent slashes (//) appear on a line, the rest of the line is considered a comment. Second, /* may be used to introduce a comment, and */ to terminate it, in both single- and multiple-line comments.
- The XHTML comment used to hide JavaScript uses the normal beginning syntax, <!--.
- The following XHTML comment form hides the enclosed script from browsers that do not have JavaScript interpreters, but makes it visible to browsers that do support JavaScript:

```
<!--
-- JavaScript script --
// -->
```

- The use of semicolons in JavaScript is unusual. The JavaScript interpreter tries to make semicolons unnecessary, but it does not always work.
- When the end of a line coincides with what could be the end of a statement, the interpreter effectively inserts a semicolon there. But this can lead to problems. For example,

```
return
x;
```

- The interpreter will insert a semicolon after return, making x an invalid orphan.
- The safest way to organize JavaScript statements is to put each on its own line whenever possible and terminate each statement with a semicolon. If a statement does not fit on a line, be careful to break the statement at a place that will ensure that the first line does not have the form of a complete statement.

```
<?xml version = "1.0" encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- hello.html
     A trivial hello world example of XHTML/JavaScript
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title> Hello world </title>
  </head>
  <body>
    <script type = "text/javascript">
      <!--
      document.write("Hello, fellow Web programmers!");
      // -->
    </script>
  </body>
</html>
```

PRIMITIVES, OPERATIONS, AND EXPRESSIONS

PRIMITIVE TYPES

- JavaScript has five primitive types: Number, String, Boolean, Undefined, and Null.
- Each primitive value has one of these types.
- JavaScript includes predefined objects that are closely related to the Number, String, and Boolean types, named **`Number`**, **`String`**, and **`Boolean`**, respectively.
- These objects are called wrapper objects.
- Each contains a property that stores a value of the corresponding primitive type.
- The purpose of the wrapper objects is to provide properties and methods that are convenient for use with values of the primitive types.
- The difference between primitives and objects is shown in the following example.

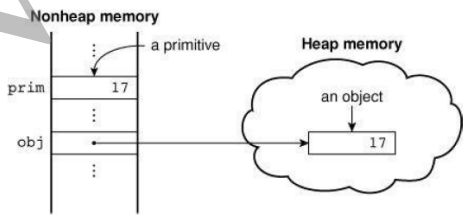


Figure 4.1 Primitives and objects

NUMERIC AND STRING LITERALS

- All numeric literals are values of type Number. The Number type values are represented internally in double-precision floating-point form.
- Integer literals are strings of digits.
- Floating-point literals can have decimal points, exponents, or both.
- Exponents are specified with an uppercase or lowercase e and a possibly signed integer literal.
- The following are valid numeric literals:

72	7.2	.72	72.	7E2	7e2	.7e2	7.e2	7.2E-2

- Integer literals can be written in hexadecimal form by preceding their first digit with either 0x or 0X.
- A string literal is a sequence of zero or more characters delimited by either single quotes (') or double quotes (").
- String literals can include characters specified with escape sequences, such as \n and \t. If you want an actual single-quote character in a string literal that is delimited by single quotes, the embedded single quote must be preceded by a backslash:

```
'You\'re the most lovely person I\'ve ever met'
```

- A double quote can be embedded in a double-quoted string literal by preceding it with a backslash. An actual backslash character in any string literal must be itself back-slashed, as in the following example:

```
"D:\\bookfiles"
```

- There is no difference between single-quoted and double-quoted literal strings.
- The null string (a string with no characters) can be denoted with either "or ".

OTHER PRIMITIVE TYPES

- The only value of type Null is the reserved word `null`, which indicates no value.
- The only value of type Undefined is `undefined`.
- The only values of type Boolean are `true` and `false`.

DECLARING VARIABLES

A variable can be declared either by assigning it a value, in which case the interpreter implicitly declares it to be a variable, or by listing it in a declaration statement that begins with the reserved word `var`. Initial values can be included in a `var` declaration, as with some of the variables in the following declaration:

```
var counter,
    index,
    pi = 3.14159265,
    quarterback = "Elway",
    stop_flag = true;
```

A variable that has been declared but not assigned a value, has the value `undefined`.

NUMERIC OPERATORS

- JavaScript has the typical collection of numeric operators: the binary operators `+` for addition, `-` for subtraction, `*` for multiplication, `/` for division, and `%` for modulus.
- The unary operators are plus (+), negate (−), decrement (−−), and increment (++). The increment and decrement operators can be either prefix or postfix.
- For example, if the variable `a` has the value `7`, the value of the following expression is `24`:

```
(++a) * 3
```

- But the value of the following expression is `21`:

```
(a++) * 3
```

- In both cases, `a` is set to `8`.
- All numeric operations are done in double-precision floating point.
- The precedence rules of a language specify which operator is evaluated first when two operators with different precedence are adjacent in an expression.
- The associativity rules of a language specify which operator is evaluated first when two operators with the same precedence are adjacent in an expression.

Operator	Associativity
++, --, unary -, unary +	Right (though it is irrelevant)
*, /, %	Left
Binary +, binary -	Left

THE Math OBJECT

The `Math` object provides a collection of properties of `Number` objects and methods that operate on `Number` objects. The `Math` object has methods for the trigonometric functions, such as `sin` (for sine) and `cos` (for cosine), as well as for other commonly used mathematical operations.

Among these are `floor`, to truncate a number; `round`, to round a number; and `max`, to return the largest of two given numbers.

THE NUMBER OBJECT

The Number object includes a collection of useful properties that have constant values. Table 4.3 lists the properties of Number. These properties are referenced through Number.

Property	Meaning
MAX_VALUE	Largest representable number
MIN_VALUE	Smallest representable number
NaN	Not a number
POSITIVE_INFINITY	Special value to represent infinity
NEGATIVE_INFINITY	Special value to represent negative infinity
PI	The value of π

Any arithmetic operation that results in an error (e.g., division by zero) or that produces a value that cannot be represented as a double-precision floating-point number, such as a number that is too large (an overflow), returns the value "not a number," which is displayed as NaN. If NaN is compared for equality against any number, the comparison fails. The Number object has a method, toString, which it inherits from Object but overrides. The toString method converts the number through which it is called to a string. Example:

```
var price = 427,
str_price;
...
str_price = price.toString();
```

THE STRING CATENATION OPERATOR

JavaScript strings are not stored or treated as arrays of characters; rather, they are unit scalar values. String catenation is specified with the operator denoted by a plus sign (+). For example, if the value of first is "Divya", the value of the following expression is "Divya Gowda":

```
first + " Gowda"
```

IMPLICIT TYPE CONVERSIONS

The JavaScript interpreter performs several different implicit type conversions. Such conversions are called ***coercions***. If either operand of a `+` operator is a string, the operator is interpreted as a string catenation operator. If the other operand is not a string, it is coerced to a string.

Example1: **"August " + 1977 → "August 1997"**

Example2: **7 * "3" → 21** & will not be evaluated as string

EXPLICIT TYPE CONVERSIONS

Strings that contain numbers can be converted to numbers with the `String` constructor, as in the following code:

```
var str_value = String(value);
```

This conversion could also be done with the `toString` method, which has the advantage that it can be given a parameter to specify the base of the resulting number.

```
var num = 6;
var str_value = num.toString();              //the result is "6"
var str_value_binary = num.toString(2);      //the result is "110"
```

A number also can be converted to a string by catenating it with the empty string. Also,

```
var number = Number(aString);
```

The number in the string cannot be followed by any character except a space. JavaScript has two predefined string functions that do not have this problem.

- The `parseInt` function searches its string parameter for an integer literal. If one is found at the beginning of the string, it is converted to a number and returned. If the string does not begin with a valid integer literal, `NaN` is returned.
- The `parseFloat` function is similar to `parseInt`, but it searches for a floating-point literal, which could have a decimal point, an exponent, or both. In both `parseInt` and `parseFloat`, the numeric literal could be followed by any nondigit character without causing any problem

String PROPERTIES AND METHODS

The `String` object includes one property, `length`, and a large collection of methods. The number of characters in a string is stored in the `length` property as follows:

```
var str = "George";
var len = str.length;        //now, len=6
```

Method	Parameters	Result
charAt	A number	Returns the character in the String object that is at the specified position
indexOf	One-character string	Returns the position in the String object of the parameter
substring	Two numbers	Returns the substring of the String object from the first parameter position to the second
toLowerCase	None	Converts any uppercase letters in the string to lowercase
toUpperCase	None	Converts any lowercase letters in the string to uppercase

Table 4.4 `String` methods

Consider, **`var str = "George";`**

Now,
```
str.charAt(2) is 'o'
str.indexOf('r') is 3
str.substring(2, 4) is 'org'
str.toLowerCase() is 'george'
```

THE typeof OPERATOR

- The `typeof` operator returns the type of its single operand.
- `typeof` produces `"number"`, `"string"`, or `"boolean"` if the operand is of primitive type Number, String, or Boolean, respectively.
- If the operand is an object or `null`, `typeof` produces `"object"`.
- If the operand is a variable that has not been assigned a value, `typeof` produces `"undefined"`, reflecting the fact that variables themselves are not typed.
- Notice that the `typeof` operator always returns a string.
- The operand for `typeof` can be placed in parentheses, making it appear to be a function.
- Therefore, `typeof x` and `typeof(x)` are equivalent.

ASSIGNMENT STATEMENTS

There is a simple assignment operator, denoted by =, and a host of compound assignment operators, such as += and /=. For example, the statement **a += 7;** means the same as **a = a + 7;**

THE Date OBJECT

A `Date` object is created with the `new` operator and the `Date` constructor, which has several forms.

```
var today = new Date();
```

The date and time properties of a `Date` object are in two forms: local and Coordinated Universal Time (UTC, which was formerly named Greenwich Mean Time).

Table 4.5 shows the methods, along with the descriptions, that retrieve information from a `Date` object.

Method	Returns
toLocaleString	A string of the Date information
getDate	The day of the month
getMonth	The month of the year, as a number in the range from 0 to 11
getDay	The day of the week, as a number in the range from 0 to 6
getFullYear	The year
getTime	The number of milliseconds since January 1, 1970
getHours	The number of the hour, as a number in the range from 0 to 23
getMinutes	The number of the minute, as a number in the range from 0 to 59
getSeconds	The number of the second, as a number in the range from 0 to 59
getMilliseconds	The number of the millisecond, as a number in the range from 0 to 999

SCREEN OUTPUT AND KEYBOARD INPUT

- JavaScript models the XHTML document with the `Document` object.
- The window in which the browser displays an XHTML document is modelled with the `Window` object.
- The `Window` object includes two properties, `document` and `window`.
- The `document` property refers to the `Document` object.
- The `window` property is self-referential; it refers to the `Window` object.
- `write` is used to create XHTML code, the only useful punctuation in its parameter is in the form of XHTML tags. Therefore, the parameter of `write` often includes `<br />`.
- The `writeln` method implicitly adds `"\n"` to its parameter, but since browsers ignore line breaks when displaying XHTML, it has no effect on the output.
- The parameter of `write` can include any XHTML tags and content.
- The `write` method actually can take any number of parameters.
- Multiple parameters are concatenated and placed in the output.
- Example: **`document.write("The result is: ", result, "<br />");`**

- There are 3 types of pop-up boxes:
  - Alert
  - Confirm
  - Prompt
- The `alert` method opens a dialog window and displays its parameter in that window. It also displays an OK button.
- The string parameter of `alert` is not XHTML code; it is plain text. Therefore, the string parameter of `alert` may include `\n` but never should include `<br />`.

```
alert("The sum is:" + sum + "\n");
```

- The `confirm` method opens a dialog window in which the method displays its string parameter, along with two buttons: OK and Cancel.
- `confirm` returns a Boolean value that indicates the user's button input: `true` for OK and `false` for Cancel. This method is often used to offer the user the choice of continuing some process.

```
var question = confirm("Do you want to continue this download?");
```

- After the user presses one of the buttons in the `confirm` dialog window, the script can test the variable, `question`, and react accordingly.

- The `prompt` method creates a dialog window that contains a text box used to collect a string of input from the user, which `prompt` returns as its value.

Create an XHTML and JavaScript to compute the real roots of a given quadratic equation

```
<?xml version = "1.0"  encoding = "utf-8" ?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- roots.html
     A document for roots.js
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title> roots.html </title>
  </head>
  <body>
    <script type = "text/javascript"  src = "roots.js" >
    </script>
  </body>
</html>
```

```
// roots.js
//   Compute the real roots of a given quadratic
//   equation. If the roots are imaginary, this script
//   displays NaN, because that is what results from
//   taking the square root of a negative number

// Get the coefficients of the equation from the user
var a = prompt("What is the value of 'a'? \n", "");
var b = prompt("What is the value of 'b'? \n", "");
var c = prompt("What is the value of 'c'? \n", "");

// Compute the square root and denominator of the result
var root_part = Math.sqrt(b * b - 4.0 * a * c);
var denom = 2.0 * a;

// Compute and display the two roots
var root1 = (-b + root_part) / denom;
var root2 = (-b - root_part) / denom;
document.write("The first root is: ", root1, "<br />");
document.write("The second root is: ", root2, "<br />");
```

CONTROL STATEMENTS

A compound statement in JavaScript is a sequence of statements delimited by braces.
A control construct is a control statement together with the statement or compound statement whose execution it controls.

CONTROL EXPRESSIONS

The result of evaluating a control expression is one of the Boolean values `true` and `false`. If the value of a control expression is a string, it is interpreted as `true` unless it is either the empty string (`""`) or a zero string (`"0"`). If the value is a number, it is `true` unless it is zero (`0`). A relational expression has two operands and one relational operator. Table 4.6 lists the relational operators.

Operation	Operator
Is equal to	==
Is not equal to	!=
Is less than	<
Is greater than	>
Is less than or equal to	<=
Is greater than or equal to	>=
Is strictly equal to	===
Is strictly not equal to	!==

JavaScript has operators for the AND, OR, and NOT Boolean operations. These are `&&` (AND), `||` (OR), and `!` (NOT). Both `&&` and `||` are short-circuit operators.

Operators	Associativity
++, --, unary -	Right
*, /, %	Left
+, -	Left
>, <, >= ,<=	Left
==, !=	Left
===, !==	Left
&&	Left
||	Left
=, +=, -=, *=, /=, &&=, ||=, %=	Right

Table 4.7 Operator precedence and associativity
Highest-precedence operators are listed first.

SELECTION STATEMENTS

The selection statements (`if-then` and `if-then-else`) of JavaScript are similar to those of the common programming languages. Either single statements or compound statements can be selected—for example,

```
if (a > b)
    document.write("a is greater than b <br />");
else {
    a = b;
    document.write("a was not greater than b <br />",
                   "Now they are equal <br />");
}
```

THE switch STATEMENT

JavaScript has a `switch` statement that is similar to that of Java. In any `case` segment, the statement(s) can be either a sequence of statements or a compound statement. The `break` statement transfers control out of the compound statement in which it appears.

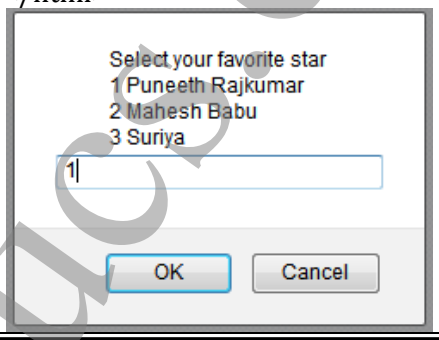
The control expression of a `switch` statement could evaluate to a number, a string, or a Boolean value. Case labels also can be numbers, strings, or Booleans, and different case values can be of different types.

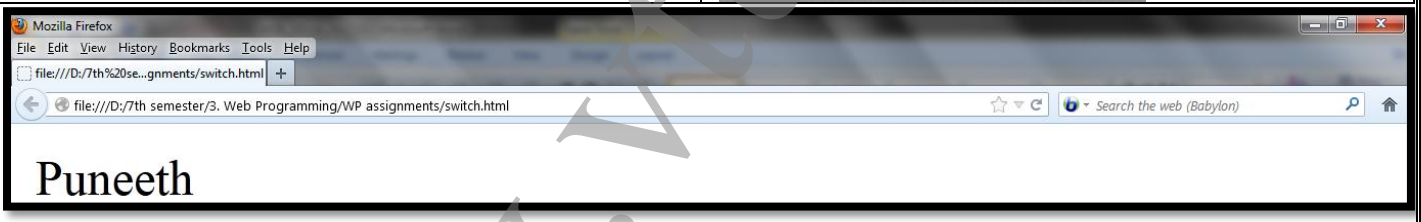
```
switch (expression) {
      case value_1:
            // statement(s)
      case value_2:
            // statement(s)
      ...
      [default:
            // statement(s)]
}
```

Example:

```
//switch.js
var choice = prompt("Select your favorite star \n" +
                    "1 Puneeth Rajkumar \n" +
                    "2 Mahesh Babu \n" +
                    "3 Suriya \n");

switch(choice)
{
        case "1": document.write("Puneeth");
                  break;
        case "2": document.write("Mahesh Babu");
                  break;
        case "3": document.write("Suriya");
                  break;
        default:  document.write("invalid choice");
}
```

```
//switch.html
<html>
<body>
<script type = "text/javascript" src = "switch.js">
</script>
</body>
</html>
```





Assignment: switch statement for table border size selection – it is similar but refer text book

LOOP STATEMENTS

The general form of the `while` statement is as follows:

```
while (control expression)
   statement or compound statement
```

The general form of the `for` statement is as follows:

```
for (initial expression; control expression; increment expression)
   statement or compound statement
```

The following example illustrates the `Date` object and a simple `for` loop:

```
// date.js
//    Illustrates the use of the Date object by
//    displaying the parts of a current date and
//    using two Date objects to time a calculation

// Get the current date
var today = new Date();
```

```
// Fetch the various parts of the date
var dateString = today.toLocaleString();
var day = today.getDay();
var month = today.getMonth();
var year = today.getFullYear();
var timeMilliseconds = today.getTime();
var hour = today.getHours();
var minute = today.getMinutes();
var second = today.getSeconds();
var millisecond = today.getMilliseconds();
```

```
// Display the parts
document.write(
  "Date: " + dateString + "<br />",
  "Day: " + day + "<br />",
  "Month: " + month + "<br />",
  "Year: " + year + "<br />",
  "Time in milliseconds: " + timeMilliseconds + "<br />",
  "Hour: " + hour + "<br />",
  "Minute: " + minute + "<br />",
  "Second: " + second + "<br />",
  "Millisecond: " + millisecond + "<br />");
```

```
// Time a loop
var dum1 = 1.00149265, product = 1;
var start = new Date();

for (var count = 0; count < 10000; count++)
  product = product + 1.000002 * dum1 / 1.00001;

var end = new Date();
var diff = end.getTime() - start.getTime();
document.write("<br />The loop took " + diff +
               " milliseconds <br />");
```

OUTPUT:

Date: Tuesday, August 11, 2009 1:54:01 PM
Day: 2
Month: 7
Year: 2009
Time in milliseconds: 1250020441561
Hour: 13
Minute: 54
Second: 1
Millisecond: 561

The loop took 9 milliseconds

JavaScript has a `do-while` statement, whose form is as follows:

```
do statement or compound statement
while (control expression)
```

JavaScript includes one more loop statement, the `for-in` statement, which is most often used with objects.

```
for (identifier in object)
   statement or compound statement
```

OBJECT CREATION AND MODIFICATION

- Objects are often created with a `new` expression, which must include a call to a constructor method. The constructor that is called in the `new` expression creates the properties that characterize the new object.
- In JavaScript, however, the `new` operator creates a blank object—that is, one with no properties.
- The following statement creates an object that has no properties:
  ```
  var my_object = new Object();
  ```
- In this case, the constructor called is that of `Object`, which endows the new object with no properties, although it does have access to some inherited methods.
- The variable `my_object` references the new object. Calls to constructors must include parentheses, even if there are no parameters.
- The properties of an object can be accessed with dot notation, in which the first word is the object name and the second is the property name. Because properties are not variables, they are never declared.
- The number of members of a class in a typical object-oriented language is fixed at compile time. The number of properties in a JavaScript object is dynamic.
- At any time during interpretation, properties can be added to or deleted from an object. A property for an object is created by assigning a value to that property's name. Consider the following example:
  ```
  var my_car = {make: "Ford", model: "Contour SVT"};
  ```
- Properties can be accessed in two ways.
  ```
  var prop1 = my_car.make;
  var prop2 = my_car["make"];
  ```
  the variables `prop1` and `prop2` both have the value "`Ford`".
- A property can be deleted with `delete`, as in the following example:
  ```
  delete my_car.model;
  ```
- JavaScript has a loop statement, `for-in`, that is perfect for listing the properties of an object.
  ```
  for (var prop in my_car)
    document.write("Name: ", prop, "; Value: ",
                   my_car[prop], "<br />");
  ```

ARRAYS

Array OBJECT CREATION

The usual way to create any object is with the `new` operator and a call to a constructor. In the case of arrays, the constructor is named `Array`:

```
var my_list = new Array(1, 2, "three", "four");
var your_list = new Array(100);
```

The second way to create an `Array` object is with a literal array value, which is a list of values enclosed in brackets:

```
var my_list_2 = [1, 2, "three", "four"];
```

CHARACTERISTICS OF Array OBJECTS

The lowest index of every JavaScript array is zero. Access to the elements of an array is specified with numeric subscript expressions placed in brackets. The length of an array is the highest subscript to which a value has been assigned, plus 1.

For example, if `my_list` is an array with four elements and the following statement is executed, the new length of `my_list` will be 48.

```
my_list[47] = 2222;
```

The length of an array is both read and write accessible through the `length` property, which is created for every array object by the `Array` constructor. For example,

```
my_list.length = 1002;
```

An array is lengthened by setting its `length` property to a larger value, shortened by setting its `length` property to a smaller value.

The next example, `insert_names.js`, illustrates JavaScript arrays. This script has an array of names, which are in alphabetical order. It uses `prompt` to get new names, one at a time, and inserts them into the existing array. Notice that each new name causes the array to grow by one element.

```
// The original list of names
var name_list = new Array("Al", "Betty", "Kasper",
                          "Michael", "Roberto", "Zimbo");
var new_name, index, last;

// Loop to get a new name and insert it
while (new_name =
       prompt("Please type a new name", "")) {
  last = name_list.length - 1;

// Loop to find the place for the new name
  while (last >= 0 && name_list[last] > new_name) {
    name_list[last + 1] = name_list[last];
    last--;
  }

// Insert the new name into its spot in the array
  name_list[last + 1] = new_name;

// Display the new array
  document.write("<p><b>The new name list is:</b> ",
                 "<br />");
  for (index = 0; index < name_list.length; index++)
    document.write(name_list[index], "<br />");
  document.write("</p>");
} //** end of the outer while loop
```

Array METHODS

Array objects have a collection of useful methods, most of which are described in this section.

- The **join** method converts all of the elements of an array to strings and catenates them into a single string. If no parameter is provided to join, the values in the new string are separated by commas. If a string parameter is provided, it is used as the element separator. Consider the following example:

```
var names = new Array["Mary", "Murray", "Murphy", "Max"];
...
var name_string = names.join(" : ");
```

The value of `name_string` is now "Mary : Murray : Murphy : Max".

- The **reverse** method reverses the order of the elements of the Array object through which it is called.
- The **sort** method coerces the elements of the array to become strings if they are not already strings and sorts them alphabetically
- The **concat** method catenates its actual parameters to the end of the Array object on which it is called.

```
var names = new Array["Mary", "Murray", "Murphy", "Max"];
...
var new_names = names.concat("Moo", "Meow");
```

The new_names array now has length 6, with the elements of names, along with "Moo" and "Meow", as its fifth and sixth elements.

- The **slice** method does for arrays what the substring method does for strings, returning the part of the Array object specified by its parameters, which are used as subscripts. The array returned has the elements of the Array object through which it is called, from the first parameter up to, but not including, the second parameter.

```
var list = [2, 4, 6, 8, 10];
...
var list2 = list.slice(1, 3);
```

The value of list2 is now [4, 6]. If slice is given just one parameter, the array that is returned has all of the elements of the object, starting with the specified index.

- When the **toString** method is called through an Array object, each of the elements of the object is converted (if necessary) to a string. These strings are catenated, separated by commas. So, for Array objects, the toString method behaves much like join.
- The **push, pop, unshift,** and **shift** methods of Array allow the easy implementation of stacks and queues in arrays. The pop and push methods respectively remove and add an element to the high end of an array, as in the following code:

```
var list = ["Dasher", "Dancer", "Donner", "Blitzen"];
var deer = list.pop();     // deer is "Blitzen"
list.push("Blitzen");
  // This puts "Blitzen" back on list
```

The shift and unshift methods respectively remove and add an element to the beginning of an array.

```
var deer = list.shift(); // deer is now "Dasher"
list.unshift("Dasher"); // This puts "Dasher" back on list
```

```
// nested_arrays.js
//   An example illustrating an array of arrays

// Create an array object with three arrays as its elements
var nested_array = [[2, 4, 6], [1, 3, 5], [10, 20, 30]
                   ];

// Display the elements of nested_list
for (var row = 0; row <= 2; row++) {
  document.write("Row ", row, ":  ");

  for (var col = 0; col <=2; col++)
    document.write(nested_array[row][col], " ");

  document.write("<br />");
}
```

OUTPUT:

```
Row 0: 2 4 6
Row 1: 1 3 5
Row 2: 10 20 30
```

FUNCTIONS

FUNDAMENTALS

- A function definition consists of the function's header and a compound statement that describes the actions of the function. This compound statement is called the body of the function.
- A function header consists of the reserved word `function`, the function's name, and a parenthesized list of parameters if there are any.
- A `return` statement returns control from the function in which it appears to the function's caller. A function body may include one or more `return` statements. If there are no `return` statements in a function or if the specific `return` that is executed does not include an expression, the value returned is `undefined`.
- JavaScript functions are objects, so variables that reference them can be treated as are other object references—they can be passed as parameters, be assigned to other variables, and be the elements of an array. The following example is illustrative:

```
function fun() { document.write(
                 "This surely is fun! <br/>");}

ref_fun = fun;   // Now, ref_fun refers to the fun object
fun();           // A call to fun
ref_fun();       // Also a call to fun
```

- Because JavaScript functions are objects, their references can be properties in other objects, in which case they act as methods.

LOCAL VARIABLES

- The scope of a variable is the range of statements over which it is visible.
- When JavaScript is embedded in an XHTML document, the scope of a variable is the range of lines of the document over which the variable is visible.
- Variables that are implicitly declared have global scope—that is, they are visible in the entire XHTML document.
- It is usually best for variables that are used only within a function to have local scope, meaning that they are visible and can be used only within the body of the function. Any variable explicitly declared with `var` in the body of a function has local scope.
- If a variable that is defined both as a local variable and as a global variable appears in a function, the local variable has precedence, effectively hiding the global variable with the same name. This is the advantage of local variables.

PARAMETERS

- The parameter values that appear in a call to a function are called actual parameters.
- The parameter names that appear in the header of a function definition, which correspond to the actual parameters in calls to the function, are called formal parameters.
- JavaScript uses the pass-by-value parameter-passing method.
- When a function is called, the values of the actual parameters specified in the call are, in effect, copied into their corresponding formal parameters, which behave exactly like local variables.
- Because of JavaScript's dynamic typing, there is no type checking of parameters. The called function itself can check the types of parameters with the `typeof` operator.
- The number of parameters in a function call is not checked against the number of formal parameters in the called function.
- In the function, excess actual parameters that are passed are ignored; excess formal parameters are set to `undefined`.
- All parameters are communicated through a property array, `arguments`, that, like other array objects, has a property named `length`.
- By accessing `arguments.length`, a function can determine the number of actual parameters that were passed.

- The following example illustrates a variable number of function parameters:

```
// params.js
//   The params function and a test driver for it.
//   This example illustrates a variable number of
//   function parameters

// Function params
// Parameters: A variable number of parameters
// Returns: nothing
// Displays its parameters
function params(a, b) {
  document.write("Function params was passed ",
      arguments.length, " parameter(s) <br />");
  document.write("Parameter values are: <br />");

  for (var arg = 0; arg < arguments.length; arg++)
    document.write(arguments[arg], "<br />");

  document.write("<br />");
}

// A test driver for function params
params("Mozart");
params("Mozart", "Beethoven");
params("Mozart", "Beethoven", "Tchaikowsky");
```

Output:

```
Function params was passed 1 parameter(s)
Parameter values are:
Mozart

Function params was passed 2 parameter(s)
Parameter values are:
Mozart
Beethoven

Function params was passed 3 parameter(s)
Parameter values are:
Mozart
Beethoven
Tchaikowsky
```

There is no elegant way in JavaScript to pass a primitive value by reference. One inelegant way is to put the value in an array and pass the array, as in the following script:

```
// Function by10
//    Parameter: a number, passed as the first element
//               of an array
//  Returns: nothing
//  Effect: multiplies the parameter by 10
function by10(a) {
    a[0] *= 10;
}
...
var x;
var listx = new Array(1);
...
listx[0] = x;
by10(listx);
x = listx[0];
```

THE sort METHOD, REVISITED

- If you need to sort something other than strings, or if you want an array to be sorted in some order other than alphabetically as strings, the comparison operation must be supplied to the `sort` method by the caller. Such a comparison operation is passed as a parameter to `sort`.
- The comparison function must return a negative number if the two elements being compared are in the desired order, zero if they are equal, and a number greater than zero if they must be interchanged.
- For example, if you want to use the `sort` method to sort the array of numbers `num_list` into descending order, you could do so with the following code:

```
// Function num_order
// Parameter: Two numbers
// Returns: If the first parameter belongs before the
//           second in descending order, a negative number
//         If the two parameters are equal, 0
//         If the two parameters must be
//           interchanged, a positive number
function num_order(a, b) {return b - a;}
// Sort the array of numbers, list, into
// ascending order
  num_list.sort(num_order);
```

AN EXAMPLE

```
// medians.js
//   A function and a function tester
//   Illustrates array operations

// Function median
//   Parameter: An array of numbers
//   Result: The median of the array
//   Return value: none
function median(list) {
  list.sort(function (a, b) {return a - b;});
  var list_len = list.length;

// Use the modulus operator to determine whether
//   the array's length is odd or even
// Use Math.floor to truncate numbers
// Use Math.round to round numbers
  if ((list_len % 2) == 1)
    return list[Math.floor(list_len / 2)];
  else
    return Math.round((list[list_len / 2 - 1] +
                       list[list_len / 2]) / 2);
}  // end of function median
var my_list_1 = [8, 3, 9, 1, 4, 7];
var my_list_2 = [10, -2, 0, 5, 3, 1, 7];
var med = median(my_list_1);
document.write("Median of [", my_list_1, "] is: ",
               med, "<br />");
med = median(my_list_2);
document.write("Median of [", my_list_2, "] is: ",
               med, "<br />");
```

Output:

```
Median of [1,3,4,7,8,9] is: 6
Median of [-2,0,1,3,5,7,10] is: 3
```

CONSTRUCTORS

- JavaScript constructors are special methods that create and initialize the properties of newly created objects.
- Every `new` expression must include a call to a constructor whose name is the same as that of the object being created.
- Constructors are actually called by the `new` operator, which immediately precedes them in the `new` expression.
- Obviously, a constructor must be able to reference the object on which it is to operate. JavaScript has a predefined reference variable for this purpose, named `this`.
- When the constructor is called, `this` is a reference to the newly created object. The `this` variable is used to construct and initialize the properties of the object.
- For example, the constructor

```
function car(new_make, new_model, new_year) {
    this.make = new_make;
    this.model = new_model;
    this.year = new_year;
}
```

could be used as in the following statement:

```
my_car = new car("Ford", "Contour SVT", "2000");
```

- For example, suppose you wanted a method for `car` objects that listed the property values. A function that could serve as such a method could be written as follows:

```
function display_car() {
    document.write("Car make: ", this.make, "<br/>");
    document.write("Car model: ", this.model, "<br/>");
    document.write("Car year: ", this.year, "<br/>");
}
```

- The following line must then be added to the `car` constructor:

```
this.display = display_car;
```

- Now the call `my_car.display()` will produce the following output

```
Car make: Ford
Car model: Contour SVT
Car year: 2000
```

PATTERN MATCHING BY USING REGULAR EXPRESSIONS

- JavaScript has powerful pattern-matching capabilities based on regular expressions.
- There are two approaches to pattern matching in JavaScript: one that is based on the `RegExp` object and one that is based on methods of the `String` object.
- The simplest pattern-matching method is `search`, which takes a pattern as a parameter.
- The `search` method returns the position in the `String` object (through which it is called) at which the pattern matched.
- If there is no match, `search` returns `-1`.
- Most characters are normal, which means that, in a pattern, they match themselves.
- The position of the first character in the string is 0.
- As an example, the following statements

```
var str = "Rabbits are furry";
var position = str.search(/bits/);
if (position >= 0)
    document.write("'bits' appears in position", position,
                   "<br />");
else
    document.write("'bits' does not appear in str <br />");
```

produce the following output:

```
'bits' appears in position 3
```

CHARACTER AND CHARACTER-CLASS PATTERNS

- Metacharacters are characters that have special meanings in some contexts in patterns.
- The following are the pattern metacharacters:
  \ | ( ) [ ] { } ^ $ * + ? .
- Metacharacters can themselves be matched by being immediately preceded by a backslash.
- A period matches any character except newline.
- Example: **/snow./** matches "snowy", "snowe", and "snowd"
- Example: **/3\.4/** matches 3.4. *but* **/3.4/** would match `3.4` and `374`, among others.
- Example: **[abc]** matches 'a' , 'b' & 'c'
- Example: **[a-h]** matches any lowercase letter from 'a' to 'h'
- Example: **[^aeiou]** matches any lowercase letter except 'a', 'e', 'i', 'o' & 'u'

Name	Equivalent Pattern	Matches
\d	[0-9]	A digit
\D	[^0-9]	Not a digit
\w	[A-Za-z_0-9]	A word character (alphanumeric)
\W	[^A-Za-z_0-9]	Not a word character
\s	[\r\t\n\f]	A white-space character
\S	[^ \r\t\n\f]	Not a white-space character

ANCHORS

- A pattern is tied to a string position with an anchor. A pattern can be specified to match only at the beginning of the string by preceding it with a circumflex (^) anchor.
- For example, the following pattern matches "`pearls are pretty`" but does not match "`My pearls are pretty`":
  /^pearl/
- A pattern can be specified to match at the end of a string only by following the pattern with a dollar sign anchor. For example, the following pattern matches "`I like gold`" but does not match "`golden`":
  /gold$/
- Anchor characters are like boundary-named patterns: They do not match specific characters in the string; rather, they match positions before, between, or after characters.

PATTERN MODIFIERS

- The modifiers are specified as letters just after the right delimiter of the pattern.
- The `i` modifier makes the letters in the pattern match either uppercase or lowercase letters in the string.
- For example, the pattern `/Apple/i` matches '`APPLE`', '`apple`', '`APPle`', and any other combination of uppercase and lowercase spellings of the word "apple."
- The `x` modifier allows white space to appear in the pattern.

```
/\d+          # The street number
\s            # The space before the street name
[A-Z][a-z]+   # The street name
/x
```

is equivalent to

```
/\d+\s[A-Z][a-z]+/
```

OTHER PATTERN-MATCHING METHODS OF String

- The `replace` method is used to replace substrings of the `String` object that match the given pattern.
- The `replace` method takes two parameters: the pattern and the replacement string.
- The `g` modifier can be attached to the pattern if the replacement is to be global in the string, in which case the replacement is done for every match in the string.
- The matched substrings of the string are made available through the predefined variables `$1`, `$2`, and so on. For example, consider the following statements:
  var str = "Fred, Freddie, and Frederica were siblings";
  str.replace(/Fre/g, "Boy");
- In this example, str is set to "Boyd, Boyddie, and Boyderica were siblings", and $1, $2, and $3 are all set to "Fre".
- The match method is the most general of the String pattern-matching methods.
- The match method takes a single parameter: a pattern. It returns an array of the results of the pattern-matching operation.
- If the pattern has the g modifier, the returned array has all of the substrings of the string that matched.
- If the pattern does not include the g modifier, the returned array has the match as its first element, and the remainder of the array has the matches of parenthesized parts of the pattern if there are any:

```
var str =
  "Having 4 apples is better than having 3 oranges";
var matches = str.match(/\d/g);
```

  In this example, `matches` is set to `[4, 3]`.
- The `split` method of `String` splits its object string into substrings on the basis of a given string or pattern. The substrings are returned in an array. For example, consider the following code:
  var str = "grapes:apples:oranges";
  var fruit = str.split(":");
  In this example, fruit is set to [grapes, apples, oranges].

ANOTHER EXAMPLE

```
// forms_check.js
//   A function tst_phone_num is defined and tested.
//
//   This function checks the validity of phone
//   number input from a form

// Function tst_phone_num
//   Parameter: A string
//   Result: Returns true if the parameter has the form of a valid
//           seven-digit phone number (3 digits, a dash, 4 digits)
function tst_phone_num(num) {

// Use a simple pattern to check the number of digits and the dash
  var ok = num.search(/^\d{3}-\d{4}$/);

  if (ok == 0)
    return true;
  else
    return false;

}  // end of function tst_phone_num
```

```
// A script to test tst_phone_num
var tst = tst_phone_num("444-5432");
if (tst)
  document.write("444-5432 is a valid phone number <br />");
else
  document.write("Error in tst_phone_num <br />");
tst = tst_phone_num("444-r432");
if (tst)
  document.write("Program error <br />");
else
  document.write(
            "444-r432 is not a valid phone number <br />");

tst = tst_phone_num("44-1234");
if (tst)
  document.write("Program error <br />");
else
  document.write("44-1234 is not a valid phone number <br /");
```

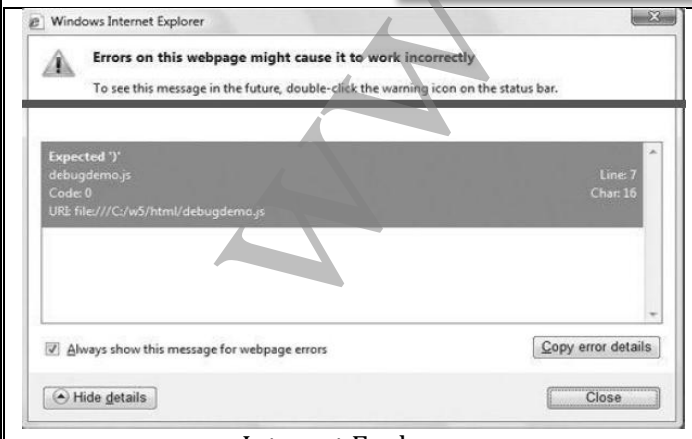
OUTPUT:

```
444-5432 is a valid phone number
444-r432 is not a valid phone number
44-1234 is not a valid phone number
```

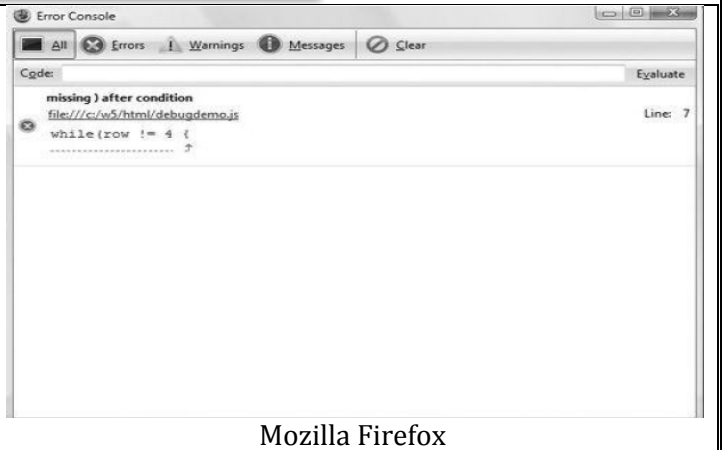
ERRORS IN SCRIPTS

The JavaScript interpreter is capable of detecting various errors in scripts. Debugging a script is a bit different from debugging a program in a more typical programming language, mostly because errors that are detected by the JavaScript interpreter are found while the browser is attempting to display a document. In some cases, a script error causes the browser not to display the document and does not produce an error message. Without a diagnostic message, you must simply examine the code to find the problem.

```
// debugdemo.js
//   An example to illustrate debugging help

var row;
row = 0;
while(row != 4 {
  document.write("row is ", row, "<br />");
  row++;
}
```



Internet Explorer



Mozilla Firefox

UNIT 5
DOCUMENT OBJECT MODEL

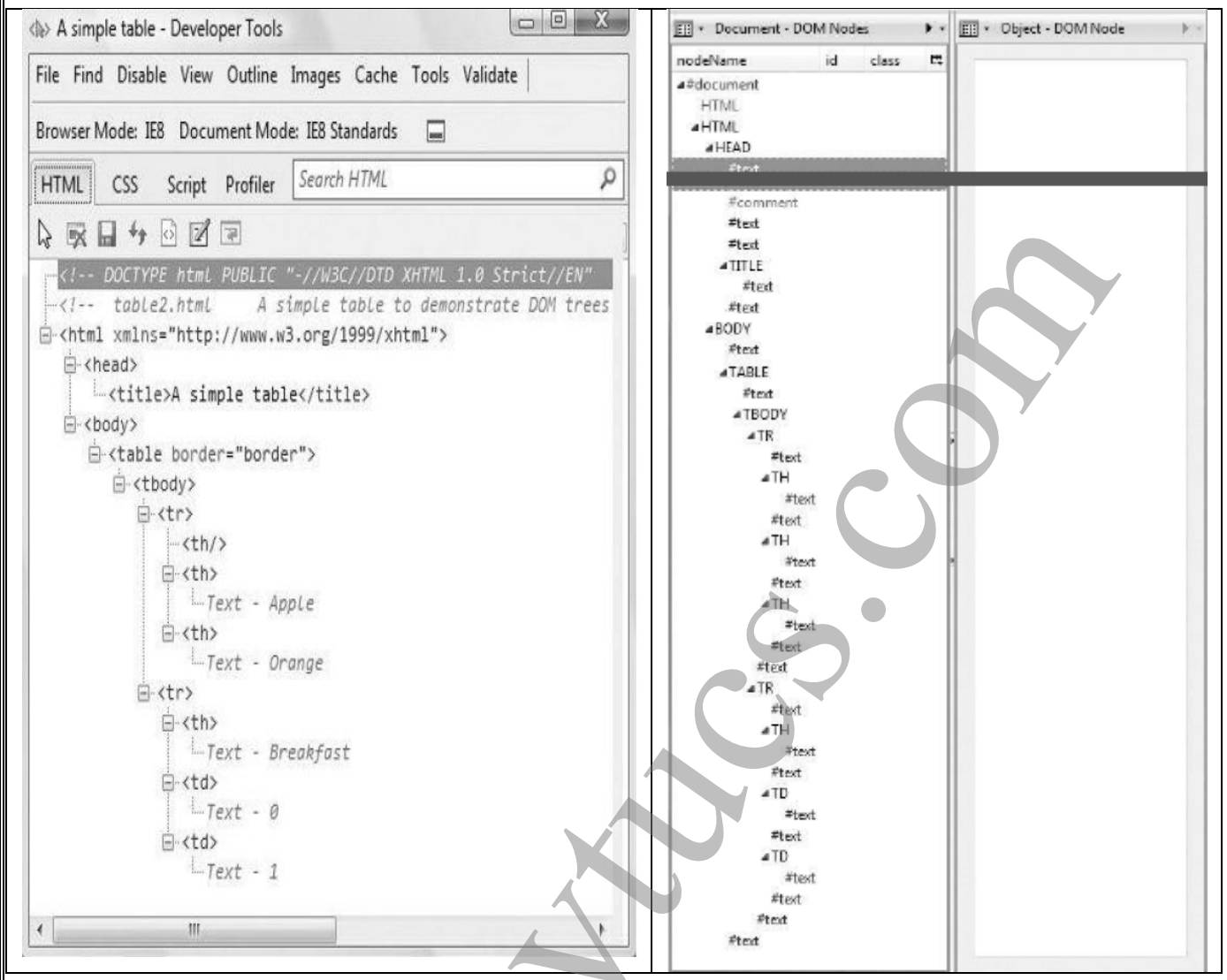
THE JAVASCRIPT EXECUTION ENVIRONMENT

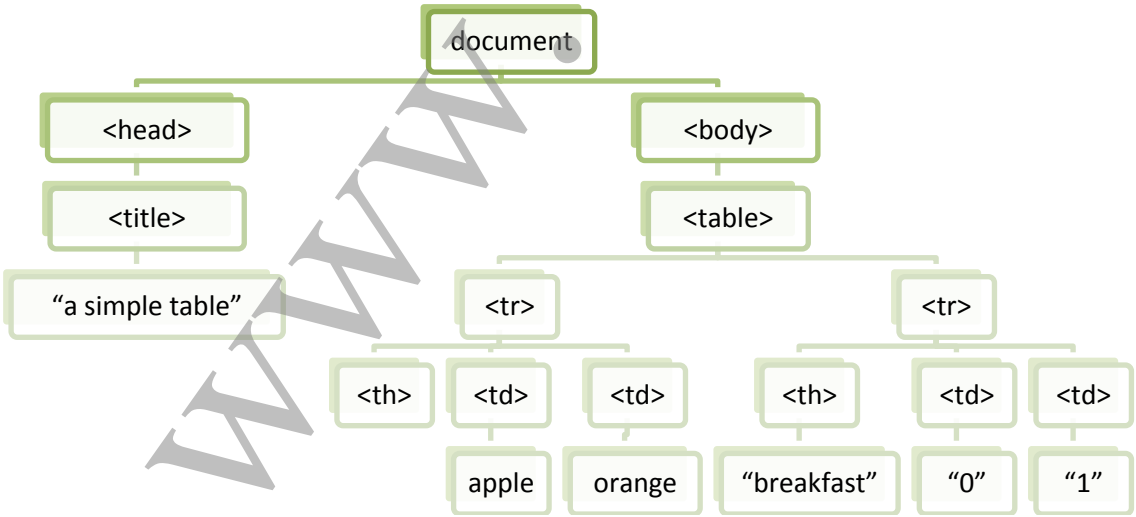
- A browser displays an XHTML document in a window on the screen of the client.
- The JavaScript `Window` object represents the window that displays the document.
- The properties of the `Window` object are visible to all JavaScript scripts that appear either implicitly or explicitly in the window's XHTML document, so they include all of the global variables.
- Every `Window` object has a property named `document`, which is a reference to the `Document` object that the window displays.
- Every `Document` object has a `forms` array, each element of which represents a form in the document.
- Each `forms` array element has an `elements` array as a property, which contains the objects that represent the XHTML form elements, such as buttons and menus.
- `Document` objects also have property arrays for anchors, links, images, and applets.

THE DOCUMENT OBJECT MODEL

- The original motivation for the standard DOM was to provide a specification that would allow Java programs and JavaScript scripts that deal with XHTML documents to be portable among various browsers.
- The DOM is an application programming interface (API) that defines an interface between XHTML documents and application programs.
- It is an abstract model because it must apply to a variety of application programming languages.
- Each language that interfaces with the DOM must define a binding to that interface.
- The actual DOM specification consists of a collection of interfaces, including one for each document tree node type.
- They define the objects, methods, and properties that are associated with their respective node types.
- With the DOM, users can write code in programming languages to create documents, move around in their structures, and change, add, or delete elements and their content.
- Documents in the DOM have a treelike structure, but there can be more than one tree in a document.
- Because the DOM is an abstract interface, it does not dictate that documents be implemented as trees or collections of trees.

```
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head> <title> A simple table </title>
  </head>
  <body>
    <table border = "border">
      <tr>
        <th> </th>
        <th> Apple </th>
        <th> Orange </th>
      </tr>
      <tr>
        <th> Breakfast </th>
        <td> 0 </td>
        <td> 1 </td>
      </tr>
    </table>
  </body>
</html>
```





- A language that is designed to support the DOM must have a binding to the DOM constructs.
- In the JavaScript binding to the DOM, the elements of a document are objects, with both data and operations.
- The data are called properties, and the operations are, naturally, called methods.
- Example: **`<input type = “text” name = “address”>`**

ELEMENT ACCESS IN JAVASCRIPT

The elements of an XHTML document have corresponding objects that are visible to an embedded JavaScript script. There are several ways the object associated with an XHTML form element can be addressed in JavaScript. The original (DOM 0) way is to use the `forms` and `elements` arrays of the `Document` object, which is referenced through the `document` property of the Window object.

Example:

```
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head> <title> Access to form elements </title>
  </head>
  <body>
    <form action = "">
      <input type = "button"  name = "turnItOn" />
    </form>
  </body>
</html>
```

The DOM address of the button in this example, using the `forms` and `elements` arrays, is as follows:

```
var dom = document.forms[0].elements[0];
```

The problem with this approach to element addressing is that the DOM address is defined by address elements that could change—namely, the `forms` and `elements` arrays.

Another Approach:

```
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head> <title> Access to form elements </title>
  </head>
  <body>
    <form name = "myForm"  action = "">
      <input type = "button"  name = "turnItOn" />
    </form>
  </body>
</html>
```

Using the `name` attributes, the button's DOM address is as follows:

```
var dom = document.myForm.turnItOn;
```

One drawback of this approach is that the XHTML 1.1 standard does not allow the `name` attribute in the form element, even though the attribute is now valid for form elements. This is a validation problem, but it causes no difficulty for browsers. Hence, alternatively we use,

```
var dom = document.getElementById("turnItOn");
```

Buttons in a group of checkboxes often share the same name. The buttons in a radio button group always have the same name. In these cases, the names of the individual buttons obviously cannot be used in their DOM addresses. To access the arrays, the DOM address of the form object must first be obtained, as shown:

```
<form id = "vehicleGroup">
  <input type = "checkbox"  name = "vehicles"
         value = "car" />  Car
  <input type = "checkbox"  name = "vehicles"
         value = "truck" />  Truck
  <input type = "checkbox"  name = "vehicles"
         value = "bike" />  Bike
</form>
```

The `checked` property of a checkbox object is set to `true` if the button is checked. For the preceding sample checkbox group, the following code would count the number of checkboxes that were checked:

```
var numChecked = 0;
var dom = document.getElementById("vehicleGroup");
for (index = 0; index < dom.vehicles.length; index++)
  if (dom.vehicles[index].checked)
    numChecked++;
```

Radio buttons can be addressed and handled exactly as are the checkboxes in the foregoing code.

EVENTS AND EVENT HANDLING

BASIC CONCEPTS OF EVENT HANDLING

- One important use of JavaScript for Web programming is to detect certain activities of the browser and the browser user and provide computation when those activities occur. These computations are specified with a special form of programming called event-driven programming.
- In conventional (non-event-driven) programming, the code itself specifies the order in which it is executed, although the order is usually affected by the program's input data.
- In event-driven programming, parts of the program are executed at completely unpredictable times, often triggered by user interactions with the program that is executing.
- An event is a notification that something specific has occurred, either with the browser, such as the completion of the loading of a document, or because of a browser user action, such as a mouse click on a form button.
- An event handler is a script that is implicitly executed in response to the appearance of an event. Event handlers enable a Web document to be responsive to browser and user activities.
- One of the most common uses of event handlers is to check for simple errors and omissions in user input to the elements of a form, either when they are changed or when the form is submitted.
- This kind of checking saves the time of sending incorrect form data to the server.
- Because events are JavaScript objects, their names are case sensitive. The names of all event objects have only lowercase letters.
- Events are created by activities associated with specific XHTML elements.
- The process of connecting an event handler to an event is called registration.
- There are two distinct approaches to event handler registration, one that assigns tag attributes and one that assigns handler addresses to object properties.

EVENTS, ATTRIBUTES, AND TAGS

Event	Tag Attribute
blur	onblur
change	onchange
click	onclick
dblclick	ondblclick
focus	onfocus
keydown	onkeydown
keypress	onkeypress
keyup	onkeyup
load	onload
mousedown	onmousedown
mousemove	onmousemove
mouseout	onmouseout
mouseover	onmouseover
mouseup	onmouseup
reset	onreset
select	onselect
submit	onsubmit
unload	onunload

In many cases, the same attribute can appear in several different tags. The circumstances under which an event is created are related to a tag and an attribute, and they can be different for the same attribute when it appears in different tags.

Attribute	Tag	Description
onblur	<a>	The link loses the input focus
	<button>	The button loses the input focus
	<input>	The input element loses the input focus
	<textarea>	The text area loses the input focus
	<select>	The selection element loses the input focus
onchange	<input>	The input element is changed and loses the input focus
	<textarea>	The text area is changed and loses the input focus
	<select>	The selection element is changed and loses the input focus
onclick	<a>	The user clicks on the link
	<input>	The input element is clicked
ondblclick	Most elements	The user double-clicks the left mouse button
onfocus	<a>	The link acquires the input focus
	<input>	The input element receives the input focus
	<textarea>	A text area receives the input focus
	<select>	A selection element receives the input focus
onkeydown	<body>, form elements	A key is pressed down
onkeypress	<body>, form elements	A key is pressed down and released
onkeyup	<body>, form elements	A key is released
onload	<body>	The document is finished loading
onmousedown	Most elements	The user clicks the left mouse button
onmousemove	Most elements	The user moves the mouse cursor within the element
onmouseout	Most elements	The mouse cursor is moved away from being over the element
onmouseover	Most elements	The mouse cursor is moved over the element
onmouseup	Most elements	The left mouse button is unclicked
onreset	<form>	The reset button is clicked
onselect	<input>	Any text in the content of the element is selected
	<textarea>	Any text in the content of the element is selected
onsubmit	<form>	The *Submit* button is pressed
onunload	<body>	The user exits the document

As mentioned previously, there are two ways to register an event handler in the DOM 0 event model. One of these is by assigning the event handler script to an event tag attribute, as in the following example:

```
<input type = "button" id = "myButton"
       onclick = "alert('You clicked my button!');" />
```

In many cases, the handler consists of more than a single statement. In these cases, often a function is used and the literal string value of the attribute is the call to the function. Consider the example of a button element:

```
<input type = "button" id = "myButton"
       onclick = "myButtonHandler();" />
```

An event handler function could also be registered by assigning its name to the associated event property on the button object, as in the following example:

```
document.getElementById("myButton").onclick =
                                    myButtonHandler;
```

HANDLING EVENTS FROM BODY ELEMENTS

The events most often created by body elements are `load` and `unload`. As our first example of event handling, we consider the simple case of producing an alert message when the body of the document has been loaded. In this case, we use the `onload` attribute of `<body>` to specify the event handler:

```
<?xml version = "1.0"  encoding = "utf-8" ?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- load.html
     A document for load.js
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title> load.html </title>
    <script type = "text/javascript"  src = "load.js" >
    </script>
  </head>
  <body onload="load_greeting();">
    <p />
  </body>
</html>
```

```
// load.js
//   An example to illustrate the load event

// The onload event handler
function load_greeting () {
  alert("You are visiting the home page of \n" +
        "Pete's Pickled Peppers \n" + "WELCOME!!!");
}
```

Output:

The `unload` event is probably more useful than the `load` event. It is used to do some cleanup before a document is unloaded, as when the browser user goes on to some new document. For example, if the document opened a second browser window, that window could be closed by an `unload` event handler.

HANDLING EVENTS FROM BUTTON ELEMENTS

Buttons in a Web document provide an effective way to collect simple input from the browser user. Example:

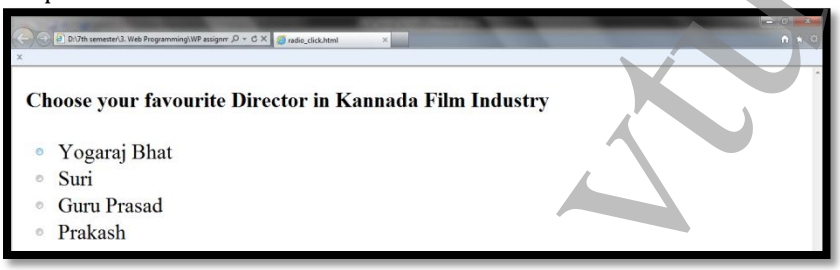
```
//radio_click.html
<html>
 <head>
  <title> radio_click.html</title>
  <script type = "text/javascript" src = "radio_click.js">
  </script>
 </head>
 <body>
   <h4> Choose your favourite Director in Kannada  Film Industry</h4>
    <form id = "myForm" action = " ">
```

```
   <p>
        <label><input type = "radio" name = "dButton" value = "1" onclick = "dChoice(1)"/> Yogaraj Bhat</label><br/>
        <label><input type = "radio" name = "dButton" value = "2" onclick = "dChoice(2)"/> Suri</label><br/>
        <label><input type = "radio" name = "dButton" value = "3" onclick = "dChoice(3)"/> Guru Prasad</label><br/>
        <label><input type = "radio" name = "dButton" value = "4" onclick = "dChoice(4)"/> Prakash</label>
   </p>
  </form>
 </body>
</html>
```

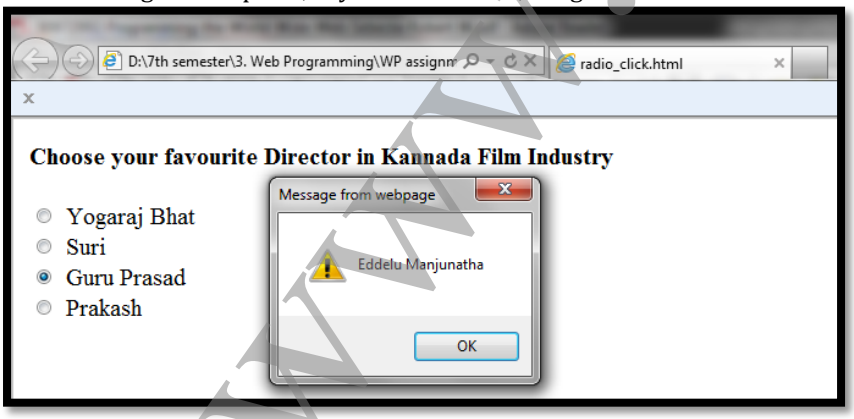
//radio_click.js

```
function dChoice(ch)
{
        switch(ch)
        {
                case 1: alert("Mungaaru Male");
                        break;
                case 2: alert("Duniya");
                        break;
                case 3: alert("Eddelu Manjunatha");
                        break;
                case 4: alert("Milana");
                        break;
                default: alert("Ooops..Invalid choice :O");
                        break;
        }
}
```

Output:



After clicking on an option, say "Guru Prasad", we get



The next example, `radio_click2.html`, whose purpose is the same as that of `radio_click.html`, registers the event handler by assigning the name of the handler to the event properties of the radio button objects.

The following example uses three files—one for the XHTML, one for the script for the event handlers, and one for the script to register the handlers:

//radio_click2.html

```
<html>
 <head>
```

```
 <title> radio_click2.html</title>
 <script type = "text/javascript" src = "radio_click2.js">
 </script>
</head>
<body>
  <h4> Choose your favourite Director in Kannada  Film Industry</h4>
   <form id = "myForm" action = " ">
    <p>
<label><input type = "radio" name = "dButton" value = "1" id = "1"/> Yogaraj Bhat</label><br/>
<label><input type = "radio" name = "dButton" value = "2" id = "2"/> Suri</label><br/>
<label><input type = "radio" name = "dButton" value = "3" id = "3"/> Guru Prasad</label><br/>
<label><input type = "radio" name = "dButton" value = "4" id = "4"/> Prakash</label>
   </p>
  </form>
 <script type = "text/javascript" src = "radio_click2r.js">
 </script>
</body>
</html>
```

//radio_click2.js

```
function dChoice(ch)
{
	var dom = document.getElementById("myForm");

	for(var index = 0; index < dom.dButton.length; index++)
	{
		if(dom.dButton[index].checked)
		{
			ch = dom.dButton[index].value;
			break;
		}
	}
	switch(ch)
	{
		case 1: alert("Mungaaru Male");
			break;
		case 2: alert("Duniya");
			break;
		case 3: alert("Eddelu Manjunatha");
			break;
		case 4: alert("Milana");
			break;
		default: alert("Ooops..Invalid choice :O");
			break;
	}
}
```

//radio_click2r.js

```
var dom = document.getElementById("myForm");
dom.getElementById("1").onclick = dChoice;
dom.getElementById("2").onclick = dChoice;
dom.getElementById("3").onclick = dChoice;
dom.getElementById("4").onclick = dChoice;
```

There are two advantages to registering handlers as properties over registering them in XHTML attributes.

- First, it is good to keep XHTML and Java-Script separated in the document. This allows a kind of modularization of XHTML documents, resulting in a cleaner design that will be easier to maintain.
- Second, having the handler function registered as the value of a property allows for the possibility of changing the function during use.

HANDLING EVENTS FROM TEXT BOX AND PASSWORD ELEMENTS

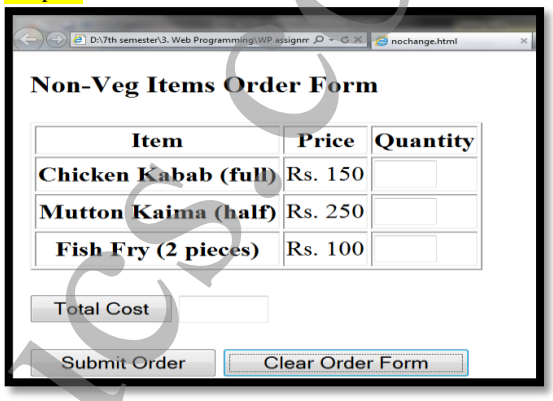
Text boxes and passwords can create four different events: `blur`, `focus`, `change`, and `select`.

THE FOCUS EVENT

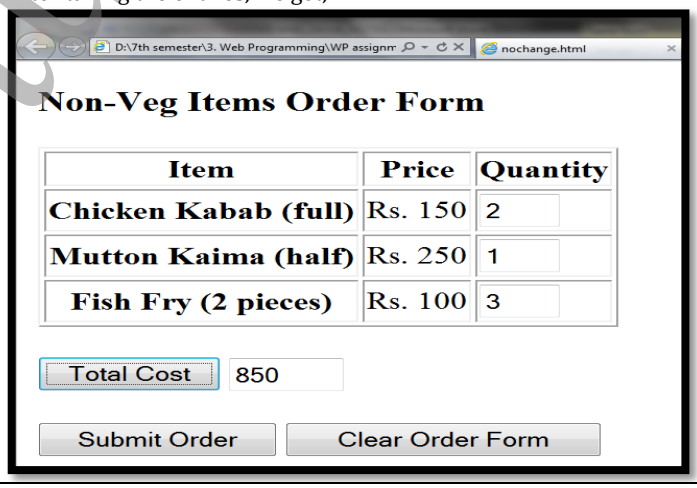
```
// nochange.html
<html>
 <head><title>nochange.html</title>
  <script type = "text/javascript" src = "nochange.js">
  </script>
 </head>
 <body>
  <form action = " ">
   <h3> Non-Veg Items Order Form</h3>
   <table border="border">
<tr>
<th>Item</th>
<th>Price</th>
<th>Quantity</th>
</tr>
<tr>
<th>Chicken Kabab (full)</th>
<td>Rs. 150</td>
<td><input type = "text" id = "chicken" size = "2"/></td>
</tr>
<tr>
<th>Mutton Kaima (half)</th>
<td>Rs. 250</td>
<td><input type = "text" id = "mutton" size = "2"/></td>
</tr>
<tr>
<th>Fish Fry (2 pieces)</th>
<td>Rs. 100</td>
<td><input type = "text" id = "fish" size = "2"/></td>
</tr>
</table>
<p>
<input type = "button" value = "Total Cost" onclick = "computeCost();"/>
<input type = "text" size = "5" id = "cost" onfocus = "this.blur();"/>
</p>
<p>
<input type = "submit" value = "Submit Order"/>
<input type = "reset" value = "Clear Order Form"/>
</p>
</form>
</body>
</html>
```

```
//nochange.js
function computeCost()
{
var chicken = document.getElementById("chicken").value;
var mutton = document.getElementById("mutton").value;
var fish = document.getElementById("fish").value;

document.getElementById("cost").value = totalCost = chicken*150
+ mutton*250 + fish*100;
}
```

Output:



After taking the entries, we get,



VALIDATING FORM INPUT

- One of the common uses of JavaScript is to check the values provided in forms by users to determine whether the values are sensible.
- When a user fills in a form input element incorrectly and a JavaScript event handler function detects the error, the function should produce an `alert` message indicating the error to the user and informing the user of the correct format for the input.
- The form in the next example includes the two password input elements, along with Reset and Submit buttons.
- The JavaScript function that checks the passwords is called either when the Submit button is pressed, using the `onsubmit` event to trigger the call, or when the second text box loses focus, using the `blur` event.
- The function performs two different tests.

- First, it determines whether the user typed the initial password (in the first input box) by testing the value of the element against the empty string. If no password has been typed into the first field, the function calls `alert` to produce an error message and returns `false`.
- The second test determines whether the two typed passwords are the same. If they are different, once again the function calls `alert` to generate an error message and returns `false`.

- If they are the same, it returns `true`.

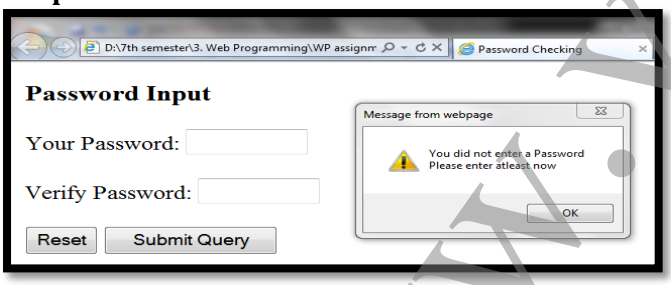
//pswd_chk.html

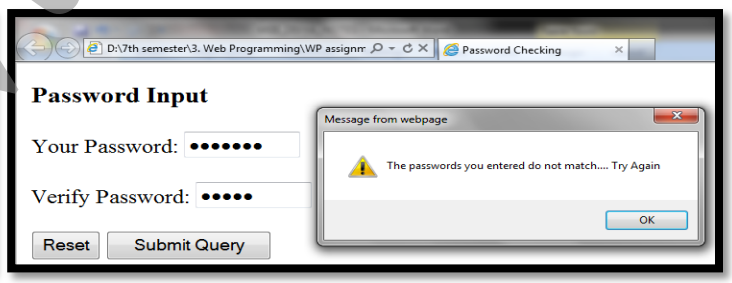
```
<html>
<head>
<title>Password Checking</title>
<script type = "text/javascript" src = "pswd_chk.js">
 </script>
 </head>
 <body>
<h3>Password Input</h3>
<form id="myForm" action=" ">
<p>
<label>Your Password: <input type="password" id="initial" size="10"/></label><br/><br/>
<label>Verify Password: <input type="password" id="final" size="10"/></label><br/><br/>
<input type="reset" name="Reset"/>
<input type="submit" name="Submit"/>
</p>
</form>
<script type = "text/javascript" src = "pswd_chkr.js">
 </script>
</body>
</html>
```

//pswd_chk.js

```
function chkPass( )
{
var init=document.getElementById("initial");
var fin=document.getElementById("final");
if(init.value=="")
{
alert("You did not enter a Password\n" + "Please enter atleast now");
init.focus( );
return false;
}

if(init.value!=fin.value)
{
alert("The passwords you entered do not match.... Try Again");
init.focus( );
init.select( );
return false;
}
Else return true;
}
```

Output:





We now consider an example that checks the validity of the form values for a name and phone number obtained from text boxes. The pattern for matching names [LastName, FirstName, MiddleName] is as follows:

`/^[A-Z][a-z]+, ?[A-Z][a-z]+, ?[A-Z]\.?$/`

The pattern for phone numbers is as follows:

`/^d{3}-\d{8}$/`

The following is the XHTML document, `validator.html`, that displays the text boxes for a customer's name and phone number:

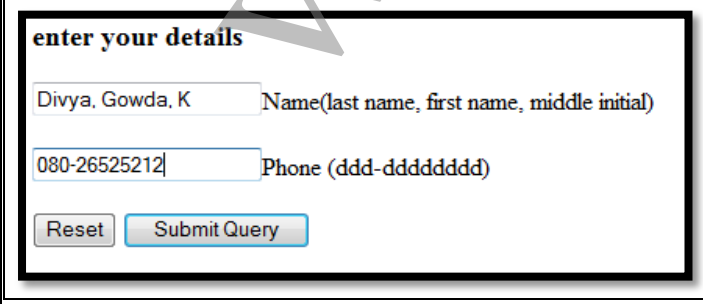
//validator.html

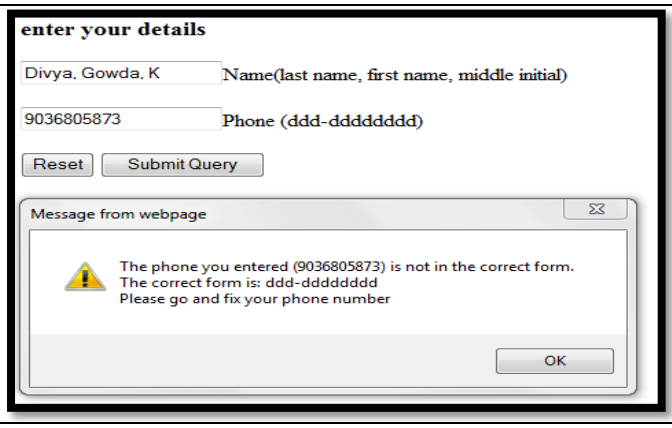
```
<html>
<head>
<title>Name and Phone check</title>
<script type = "text/javascript" src = "validator.js">
</script>
</head>
<body>
<h3>enter your details</h3>
```

```
<form action="">
<p>
<label><input type="text" id="custName"/>Name(last name, first name, middle initial)</label><br/><br>
<label><input type="text" id="custPhone"/>Phone (ddd-ddddddddd)</label><br/><br>
<input type="reset" id="reset"/>
<input type="submit" id="submit"/>
</p>
</form>
<script type = "text/javascript">
document.getElementById("custName").onchange=chkName;
document.getElementById("custPhone").onchange=chkPhone;
</script>
</body>
</html>
```

```
//validator.js
function chkName()
{
        var myName = document.getElementById("custName");
        var pos = myName.value.search(/^[A-Z][a-z]+, ?[A-Z][a-z]+, ?[A-Z]\.?$/);
        if(pos != 0)
        {
                alert("The  name you entered (" + myName.value + ") is not in the correct form.\n" +
                      "The correct form is: " + "last-name, first-name, middle-initial \n" +
                          "Please go and fix your name");
                myName.focus();
                myName.select();
                return false;
        }
        else return true;
}
function chkPhone()
{
        var myPhone = document.getElementById("custPhone");
        var pos = myPhone.value.search(/^\d{3}-\d{8}$/);
        if(pos != 0)
        {
                alert("The phone you entered (" + myPhone.value + ") is not in the correct form.\n" +
                      "The correct form is: " + "ddd-ddddddddd \n" +
                          "Please go and fix your phone number");
                myPhone.focus();
                myPhone.select();
                return false;
        }
        else return true;
}
```

OUTPUT:





THE DOM 2 EVENT MODEL

The DOM 2 model is a modularized interface. One of the DOM 2 modules is `Events`, which includes several sub-modules. The ones most commonly used are `HTMLEvents` and `MouseEvents`. The interfaces and events defined by these modules are as follows:

Module	Event Interface	Event Types
HTMLEvents	Event	abort, blur, change, error, focus, load, reset, resize, scroll, select, submit, unload
MouseEvents	MouseEvent	click, mousedown, mousemove, mouseout, mouseover, mouseup

EVENT PROPAGATION:

- A browser which understands DOM, on receiving the XHTML document from the server, creates a tree known as document tree.
- The tree constructed consists of elements of the document except the HTML
- The root of the document tree is document object itself
- The other elements will form the node of the tree
- In case of DOM2, the node which generates an event is known as target node
- Once the event is generated, it starts the propagation from root node
- During the propagation, if there are any event handlers on any node and if it is enabled then event handler is executed
- The event further propagates and reaches the target node.
- When the event handler reaches the target node, the event handler gets executed
- After this execution, the event is again re-propagated in backward direction
- During this propagation, if there are any event handlers which are enabled, will be executed.
- The propagation of the even from the root node towards the leaf node or the target node is known as **capturing phase.**
- The execution of the event handler on the target node is known as **execution phase.**
- This phase is similar to event handling mechanism in DOM – 0
- The propagation of the event from the leaf or from the target node is known as **bubbling phase**
- All events cannot be bubbled for ex: load and unload event
- If user wants to stop the propagation of an event, then stop propagation has to be executed.

EVENT REGISTRATION:

- In case of DOM2, the events get registered using an API known as **addEventListener**
- The first arg is the eventName. Ex: click, change, blur, focus
- The second arg is the event handler function that has to be executed when there is an event
- The third arg is a Boolean argument that can either take a true or false value
- If the value is true, it means event handler is enabled in capturing phase
- If the event value if off (false), then event handler is enabled at target node
- The addEventListener method will return event object to eventhandler function. The event object can be accessed using the keyword "Event"
- The address of the node that generated event will be stored in **current target**, which is property of **event object**

AN EXAMPLE OF THE DOM 2 EVENT MODEL

The next example is a revision of the `validator.html` document and `validator.js` script from previous example, which used the DOM 0 event model. Because this version uses the DOM 2 event model, it does not work with IE8.

```
//validator2.html
<html>
<head>
<title>Illustrate form input validation with DOM 2</title>
```

```
<script type = "text/javascript" src = "validator2.js">
</script>
</head>
<body>
<h3>enter your details</h3>
<form action="">
<p>
<label><input type="text" id="custName"/>Name(last name, first name, middle initial)</label><br/><br>
<label><input type="text" id="custPhone"/>Phone (ddd-ddddddddd)</label><br/><br>
<input type="reset" />
<input type="submit" id="submitButton"/>
</p>
</form>
<script type = "text/javascript" src = "validator2r.js"/>
</body>
</html>
```

```
//validator2.js
function chkName(event)
{
var myName = event.currentTarget;
var pos = myName.value.search(/^[A-Z][a-z]+, ?[A-Z][a-z]+, ?[A-Z]\.?$/);
if(pos != 0)
{
alert("The  name you entered (" + myName.value + ") is not in the correct form.\n" +
      "The correct form is: " + "last-name, first-name, middle-initial \n" +
          "Please go and fix your name");
myName.focus();
myName.select();
}
}
function chkPhone(event)
{
var myPhone = event.currentTarget;
var pos = myPhone.value.search(/^\d{3}-\d{8}$/);
if(pos != 0)
{
alert("The phone you entered (" + myPhone.value + ") is not in the correct form.\n" +
      "The correct form is: " + "ddd-ddddddddd \n" +
          "Please go and fix your phone number");
myPhone.focus();
myPhone.select();
}
}
```

```
//validator2r.js
var c = document.getElementById("custName");
var p = document.getElementById("custPhone");
c.addEventListener("change",chkName,false);
p.addEventListener("change",chkPhone,false);
```

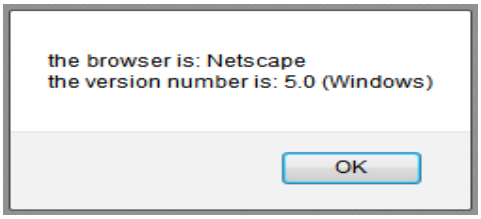
THE navigator OBJECT

The navigator object indicates which browser is being used to view the XHTML document. The browser's name is stored in the appName property of the object. The version of the browser is stored in the appVersion property of the object. These properties allow the script to determine which browser is being used and to use

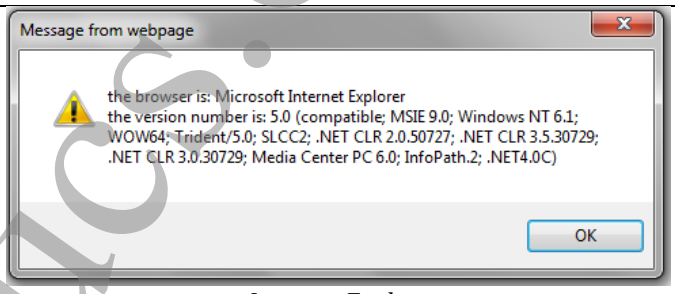
processes appropriate to that browser. The following example illustrates the use of navigator, in this case just to display the browser name and version number:

```
//navigate.html file
<html>
<head>
<title>Navigator</title>
<script type = "text/javascript" src = "navigate.js">
</script>
</head>
<body onload = "navProperties()">
</body>
</html>
//navigate.js file
function navProperties()
{
alert("the browser is: " + navigator.appName + "\n" +
"the version number is: " + navigator.appVersion + "\n");
}
```

OUTPUT:



Mozilla Firefox



Internet Explorer

DOM TREE TRAVERSAL AND MODIFICATION

DOM TREE TRAVERSAL

The `parentNode` property has the DOM address of the parent node of the node through which it is referenced. The `childNodes` property is an array of the child nodes of the node through which it is referenced. The `previousSibling` property has the DOM address of the previous sibling node of the node through which it is referenced. The `nextSibling` property has the DOM address of the next sibling node of the node through which it is referenced. The `firstChild` and `lastChild` properties have the DOM addresses of the first and last child nodes, respectively, of the node through which they are referenced. The `nodeType` property has the type of the node through which it is referenced.

DOM TREE MODIFICATION

A number of methods allow JavaScript code to modify an existing DOM tree structure. The `insertBefore(newChild, refChild)` method places the `newChild` node before the `refChild` node. The `replaceChild(newChild, oldChild)` method replaces the `oldChild` node with the `newChild` node. The `removeChild(oldChild)` method removes the specified node from the DOM structure. The `appendChild(newChild)` method adds the given node to the end of the list of siblings of the node through which it is called.

UNIT 6
DYNAMIC DOCUMENTS WITH JAVASCRIPT

INTRODUCTION

- Informally, a dynamic XHTML document is an XHTML document that, in some way, can be changed while it is being displayed by a browser.
- Dynamic XHTML is not a new markup language.
- It is a collection of technologies that allows dynamic changes to documents defined with XHTML.
- Specifically, a dynamic XHTML document is an XHTML document whose tag attributes, tag contents, or element style properties can be changed by user interaction or the occurrence of a browser event after the document has been, and is still being, displayed.
- Such changes can be made with an embedded script that accesses the elements of the document as objects in the associated DOM structure.

POSITIONING ELEMENTS

- Cascading Style Sheet – Positioning (CSS-P) is completely supported by IE8 and FX3.
- It provides the means not only to position any element anywhere in the display of a document, but also to move an element to a new position in the display dynamically, using JavaScript to change the positioning style properties of the element.
- These style properties, which are appropriately named `left` and `top`, dictate the distance from the left and top of some reference point to where the element is to appear.
- Another style property, `position`, interacts with `left` and `top` to provide a higher level of control of placement and movement of elements.
- The `position` property has three possible values: `absolute`, `relative`, and `static`.

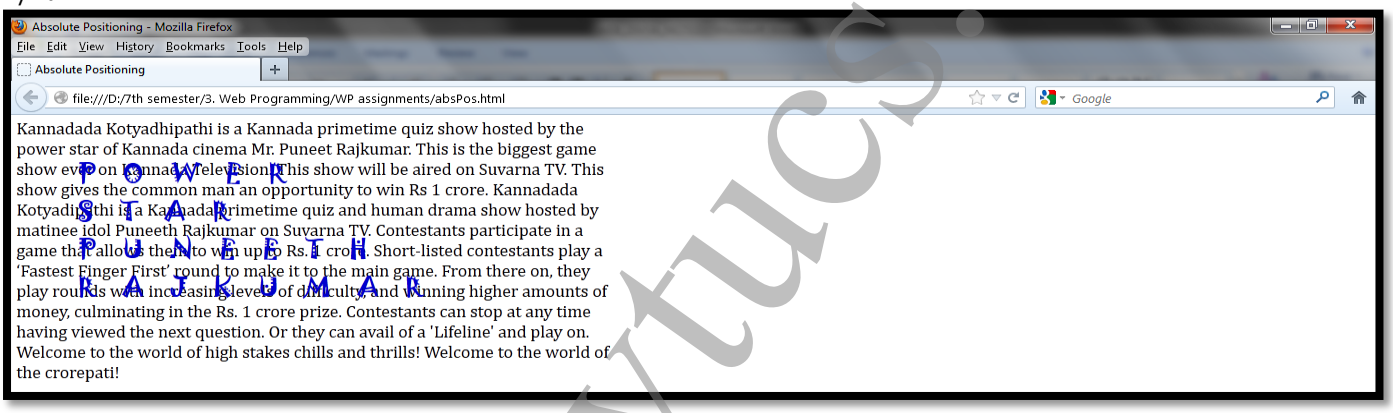
ABSOLUTE POSITIONING

- The `absolute` value is specified for `position` when the element is to be placed at a specific place in the document display without regard to the positions of other elements.
- One use of absolute positioning is to superimpose special text over a paragraph of ordinary text to create an effect similar to a watermark on paper.
- A larger italicized font, in a light-gray color and with space between the letters, could be used for the special text, allowing both the ordinary text and the special text to be legible.

//absPos.html

```
<html>
<title>Absolute Positioning</title>
<style type = "text/css">
.regtext
{
font-family: Cambria;
font-size:20pt;
width: 900px;
}
.abstext
{
position:absolute;
top:25px;
left:100px;
font-family: jokerman;
font-size:30pt;
```

```
width: 500px;
color:#0000cd;
letter-spacing: 1em;
}
</style>
</head>
<body>
<p class="regtext">
Kannadada Kotyadhipathi is a Kannada primetime quiz show hosted by the power star of Kannada cinema Mr. Puneet Rajkumar. This is the biggest game show ever on Kannada Television. This show will be aired on Suvarna TV. This show gives the common man an opportunity to win Rs 1 crore. Kannadada Kotyadipathi is a Kannada primetime quiz and human drama show hosted by matinee idol Puneeth Rajkumar on Suvarna TV. Contestants participate in a game that allows them to win up to Rs. 1 crore. Short-listed contestants play a 'Fastest Finger First' round to make it to the main game. From there on, they play rounds with increasing levels of difficulty, and winning higher amounts of money, culminating in the Rs. 1 crore prize. Contestants can stop at any time having viewed the next question. Or they can avail of a 'Lifeline' and play on. Welcome to the world of high stakes chills and thrills! Welcome to the world of the crorepati!
</p>
<p class="abstext">
POWER STAR PUNEETH RAJKUMAR
</p>
</body>
</html>
```

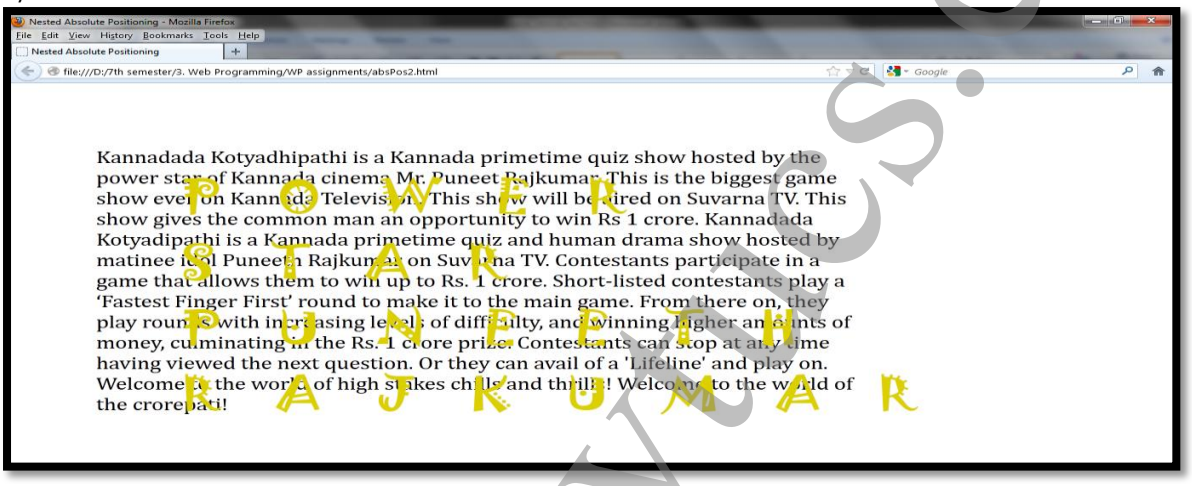


To illustrate the placement of nested elements, the document `absPos.html` is modified to place the regular text 100 pixels from the top and 100 pixels from the left. The special text is nested inside the regular text by using `<div>` and `<span>` tags. The modified document, which is named `absPos2.html`, is as follows:

```
//absPos.html
<html>
<title>Nested Absolute Positioning</title>
<style type = "text/css">
.regtext
{
font-family: Cambria;
font-size: 20pt;
width: 900px;
position:absolute;
top: 100px;
left: 100px;
}
.abstext
{
position:absolute;
top:25px;
left:100px;
font-family: jokerman;
font-size:50pt;
width: 500px;
color:#ddd000;
```

```
letter-spacing: 1em;
}
</style>
</head>
<body>
<div class="regtext">
```
Kannadada Kotyadhipathi is a Kannada primetime quiz show hosted by the power star of Kannada cinema Mr. Puneet Rajkumar. This is the biggest game show ever on Kannada Television. This show will be aired on Suvarna TV. This show gives the common man an opportunity to win Rs 1 crore. Kannadada Kotyadipathi is a Kannada primetime quiz and human drama show hosted by matinee idol Puneeth Rajkumar on Suvarna TV. Contestants participate in a game that allows them to win up to Rs. 1 crore. Short-listed contestants play a 'Fastest Finger First' round to make it to the main game. From there on, they play rounds with increasing levels of difficulty, and winning higher amounts of money, culminating in the Rs. 1 crore prize. Contestants can stop at any time having viewed the next question. Or they can avail of a 'Lifeline' and play on. Welcome to the world of high stakes chills and thrills! Welcome to the world of the crorepati!

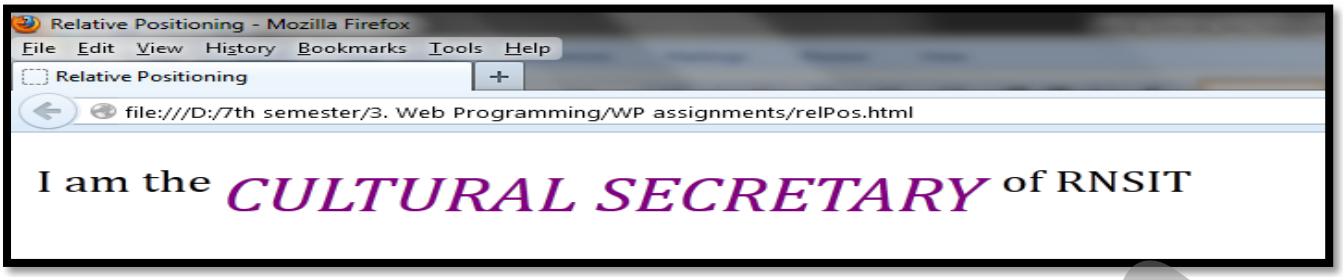
```
<span class = "abstext">
POWER STAR PUNEETH RAJKUMAR
</span>
</div>
</body>
</html>
```



RELATIVE POSITIONING

- ★ An element that has the `position` property set to `relative`, but does not specify `top` and `left` property values, is placed in the document as if the `position` attribute were not set at all.
- ★ However, such an element can be moved later.
- ★ If the `top` and `left` properties are given values, they displace the element by the specified amount from the position where it would have been placed.
- ★ In both the case of an absolutely positioned element inside another element and the case of a relatively positioned element, negative values of `top` and `left` displace the element upward and to the left, respectively.
- ★ Relative positioning can be used for a variety of special effects in placing elements.

```
//relPos.html
<html>
<head><title>Relative Positioning</title></head>
<body>
<p> I am the
<span style = "position: relative; top:10px; font-family: Cambria; font-size:25px; font-style: italic; color: purple;">
CULTURAL SECRETARY
</span>
of RNSIT </p>
</body>
</html>
```



STATIC POSITIONING

The default value for the `position` property is `static`. A statically positioned element is placed in the document as if it had the `position` value of `relative` but no values for `top` or `left` were given. The difference is that a statically positioned element cannot have its `top` or `left` properties initially set or changed later. Therefore, a statically placed element cannot be displaced from its normal position and cannot be moved from that position later.

MOVING ELEMENTS

Moving an element is simple:

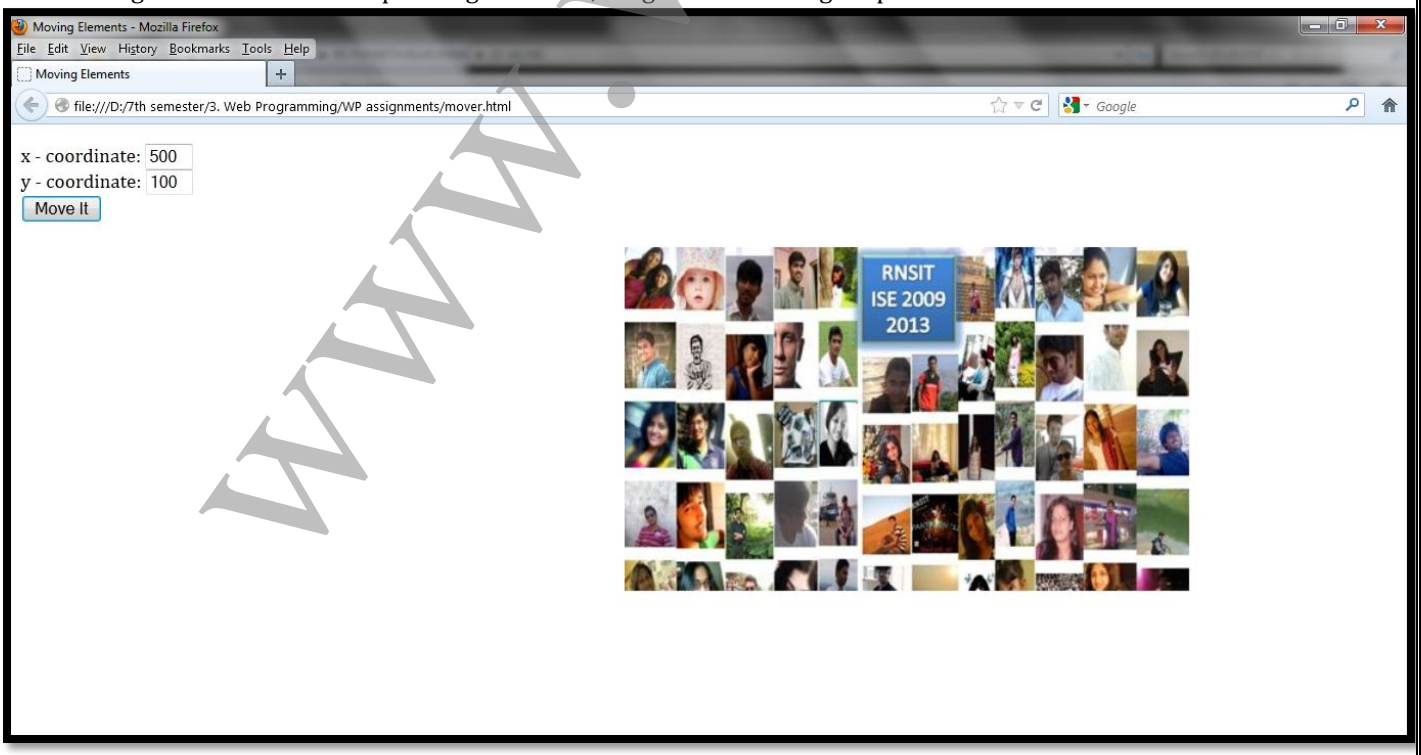
- ★ Changing the `top` or `left` property values causes the element to move on the display.
- ★ If its `position` is set to `absolute`, the element moves to the new values of `top` and `left`; if its `position` is set to `relative`, it moves from its original position by distances given by the new values of `top` and `left`.
- ★ In the next example, an image is absolutely positioned in the display.
- ★ The document includes two text boxes, labeled `x coordinate` and `y coordinate`, respectively.
- ★ The user can enter new values for the `left` and `top` properties of the image in these boxes.
- ★ When the button labeled Move It is pressed, the values of the `left` and `top` properties of the image are changed to the given values, and the element is moved to its new position.
- ★ A JavaScript function, stored in a separate file, is used to change the values of `left` and `top` in this example.

//mover.html

```
<html>
<head><title>Moving Elements</title>
<script type = "text/javascript" src = "mover.js">
</script>
</head>
<body>
<form action="">
<p>
<label>
x - coordinate: <input type = "text" id = "leftCoord" size = "3" />
</label>
<br/>
<label>
y - coordinate: <input type = "text" id = "topCoord" size = "3" />
</label>
<br/>
<input type="button" value="Move It" onclick = "moveIt('rnsit', document.getElementById('topCoord').value, document.getElementById

('leftCoord').value)" />
</p>
</form>
<div id = "rnsit" style = "position:absolute;top:115px;left:0;">
<img src = "CLASS PHOTO.jpg" alt = "RNSIT ISE 2009 - 2013" />
```

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

//mover.js
function moveIt(movee, newTop, newLeft)
{
        dom = document.getElementById(movee).style;
        dom.top=newTop + "px";
        dom.left=newLeft + "px";
}
```

After setting the coordinates and pressing "Move It", we get the following output:



ELEMENT VISIBILITY

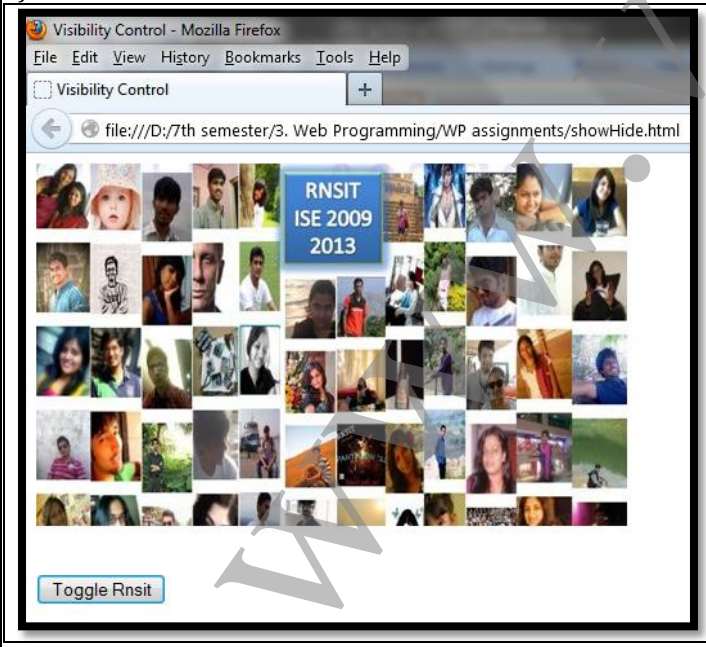
- ★ Document elements can be specified to be visible or hidden with the value of their `visibility` property.
- ★ The two possible values for `visibility` are, quite naturally, `visible` and `hidden`.
- ★ The appearance or disappearance of an element can be controlled by the user through a widget.

//showHide.html

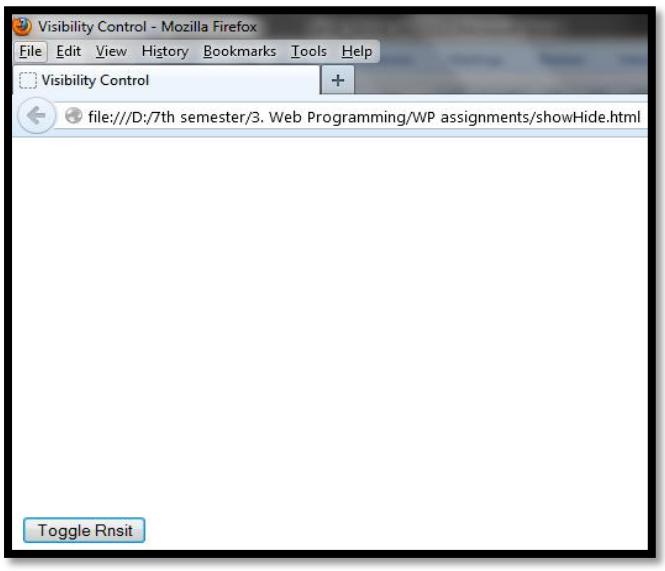
```
<html>
<head>
<title>Visibility Control</title>
<script type="text/javascript" src="showHide.js">
</script>
</head>
<body>
<form action="">
<div id="rnsit" style="position:relative; visibility: visible;">
<img src = "CLASS PHOTO.jpg" alt = "RNSIT ISE 2009-2013" />
</div>
<p><br><input type="button" value="Toggle Rnsit" onclick = "flipImag()" /></p>
</form>
</body>
</html>
```

//showHide.js

```
function flipImag()
{
        dom=document.getElementById("rnsit").style;
        if(dom.visibility == "visible")
                dom.visibility = "hidden";
        else
                dom.visibility = "visible";
}
```



After clicking on Toggle Rnsit button, we get,



CHANGING COLORS AND FONTS

The background and foreground colors of the document display can be dynamically changed, as can the font properties of the text.

CHANGING COLORS

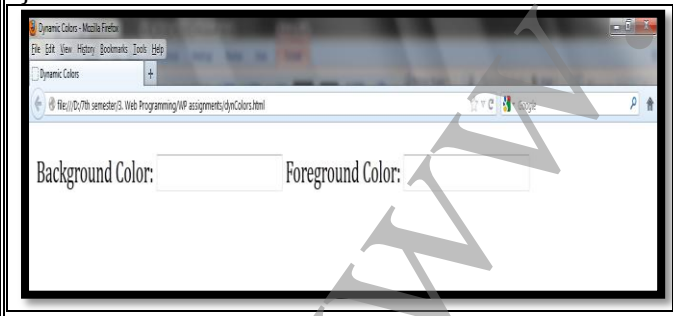
- ★ Dynamic changes to colors are relatively simple.
- ★ In the next example, the user is presented with two text boxes into which color specifications can be typed—one for the document background color and one for the foreground color.
- ★ The colors can be specified in any of the three ways that color properties can be given in CSS.
- ★ A JavaScript function that is called whenever one of the text boxes is changed makes the change in the document's appropriate color property: `back-groundColor` or `color`.
- ★ The first of the two parameters to the function specifies whether the new color is for the background or foreground; the second specifies the new color.
- ★ The new color is the `value` property of the text box that was changed by the user.

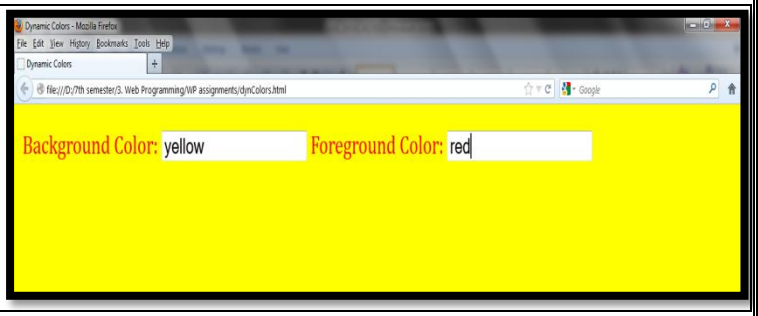
//dynColor.html

```
<html>
<head>
<title>Dynamic Colors</title>
<script type="text/javascript" src = "dynColors.js">
</script>
</head>
<body>
<form action="">
<p>
<label>Background Color: <input type="text" name="bg" size = "20" onchange="setColor('bg', this.value)" /></label>
<label>Foreground  Color: <input type="text" name="fg"  size = "20" onchange="setColor('fg', this.value)" /> </label>
<br></p>
</form>
</body>
</html>
```

//dynColor.js

```
function setColor(where, newColor)
{
        if(where == "bg")
                document.body.style.backgroundColor = newColor;
        else
                document.body.style.color = newColor;
}
```





CHANGING FONTS

- ★ Web users are accustomed to having links in documents change color when the cursor is placed over them.
- ★ Use of the `mouseover` event to trigger a JavaScript event handler allows us to change any property of any element in a document, including text, when the mouse cursor is placed over it.
- ★ Thus, the font style and font size, as well as the color and background color of text, can be changed when the cursor is placed over the text.
- ★ The text can be changed back to its original form when an event handler is triggered with the `mouseout` event.

//dynLink.html

```
<html>
```

```
<head><title>Changing Fonts</title>
<style type = "text/css">
.regtext
{
font: cambria;
font-size:16pt;
}
</style>
</head>
<body>
<p class="regtext">
The batch of
<a style = "color:purple;"
onmouseover="this.style.color='red'; this.style.font='italic 20pt Jokerman';"
onmouseout ="this.style.color='blue'; this.style.font='bold 17pt Times';" >
RNSIT ISE 2009-2013
</a>
always Rocks..!!!
</p>
</body>
</html>
```

INITIALLY

MOUSEOVER

MOUSEOUT

DYNAMIC CONTENT

- ★ We now develop an example that illustrates one use of dynamic content.
- ★ Assistance to a browser user filling out a form can be provided with an associated text area, often called a help box.
- ★ The content of the help box can change, depending on the placement of the mouse cursor.
- ★ When the cursor is placed over a particular input field, the help box can display advice on how the field is to be filled in.

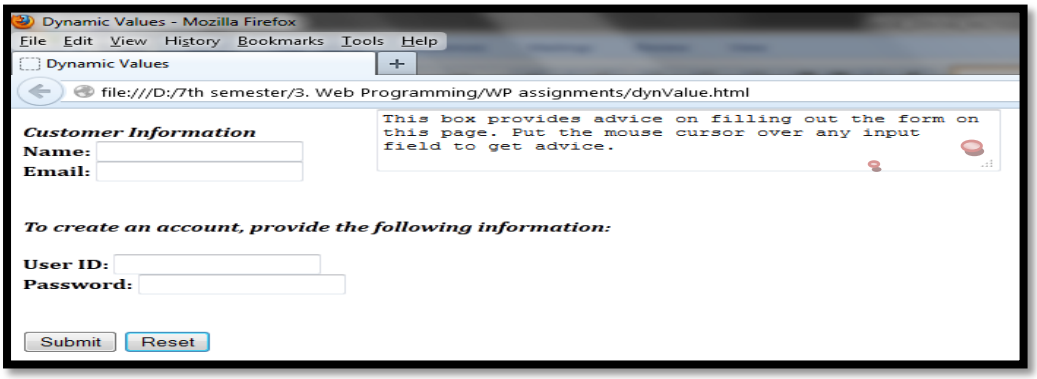
- ★ When the cursor is moved away from an input field, the help box content can be changed to simply indicate that assistance is available.
- ★ In the next example, an array of messages that can be displayed in the help box is defined in JavaScript.
- ★ When the mouse cursor is placed over an input field, the `mouseover` event is used to call a handler function that changes the help box content to the appropriate value
- ★ The appropriate value is specified with a parameter sent to the handler function.
- ★ The `mouseout` event is used to trigger the change of the content of the help box back to the "standard" value.

//dynValue.html

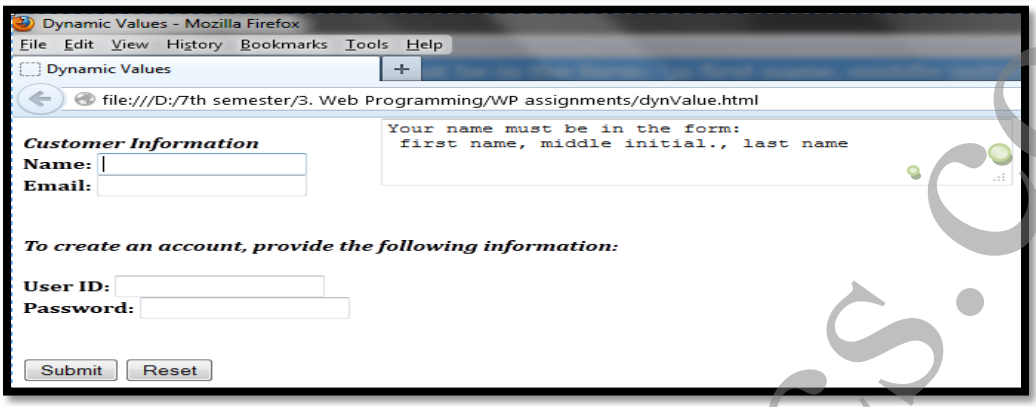
```
<html>
<head>
<title>Dynamic Values</title>
<script type = "text/javascript" src = "dynValue.js">
</script>
</head>
<body>
<form action="">
<p style = "font-weight: bold">
<span style = "font-style: italic">
Customer Information
</span>
<br>
<label>Name:
<input type="text" onmouseover="messages(0)" onmouseout="messages(4)" />
</label>
<br>
<label>Email:
<input type="text" onmouseover="messages(1)" onmouseout="messages(4)" />
</label>
<br><br><br>
<span style = "font-style:italic">
To create an account, provide the following information:
</span>
<br><br>
<label>User ID:
<input type="text" onmouseover="messages(2)" onmouseout="messages(4)" />
</label>
<br>
<label>Password:
<input type="text" onmouseover="messages(3)" onmouseout="messages(4)" />
</label>
<br>
<textarea id="adviceBox" rows="3" cols="50" style="position:absolute; left:250px; top:0px">
This box provides advice on filling out the form on this page. Put the mouse cursor over any input field to get advice.
</textarea>
<br><br>
<input type="submit" value="Submit" />
<input type="reset" value="Reset" />
</p>
</form>
</body>
</html>
```

//dynValue.js

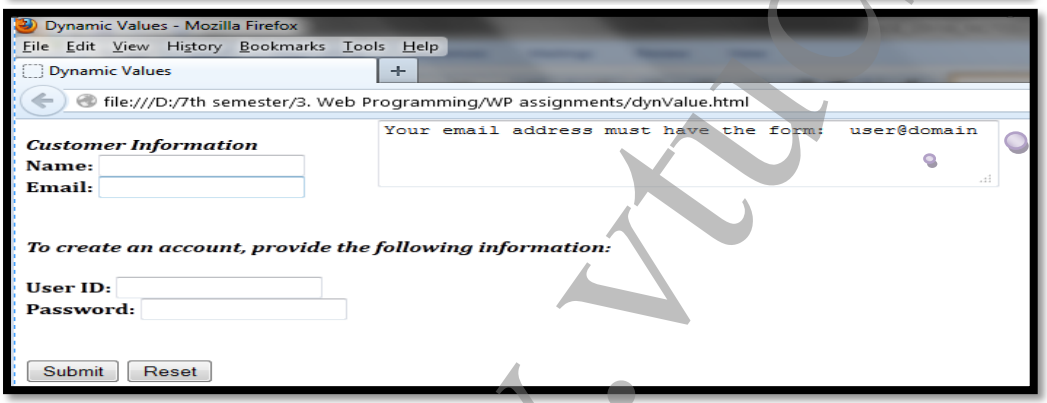
```
var helpers = ["Your name must be in the form: \n first name, middle initial., last name",
        "Your email address must have the form: \ user@domain",
        "Your user ID must have at least six characters and it must include one digit",
        "This box provides advice on filling out the form on this page. Put the mouse cursor over any input field to get advice"]

function messages(adviceNumber)
{
        document.getElementById("adviceBox").value=helpers[adviceNumber];
}
```



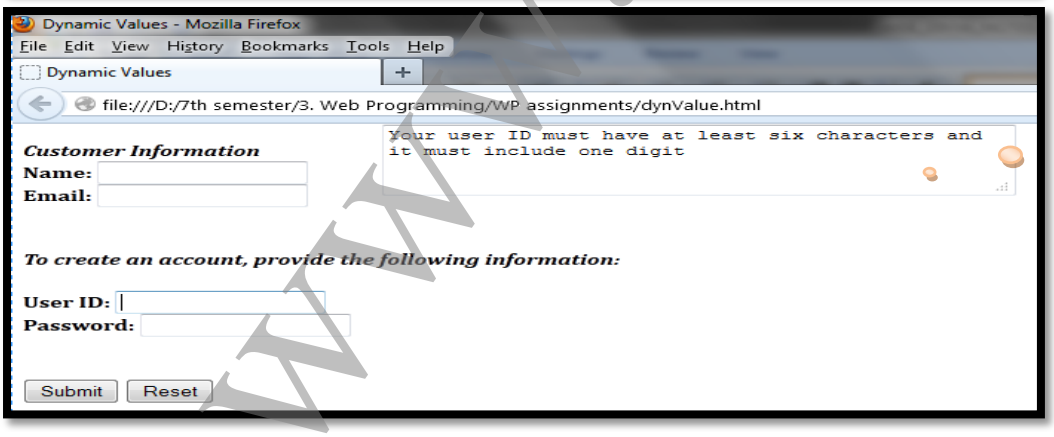
Initially



Cursor on Name



Cursor on Email



Cursor on User ID

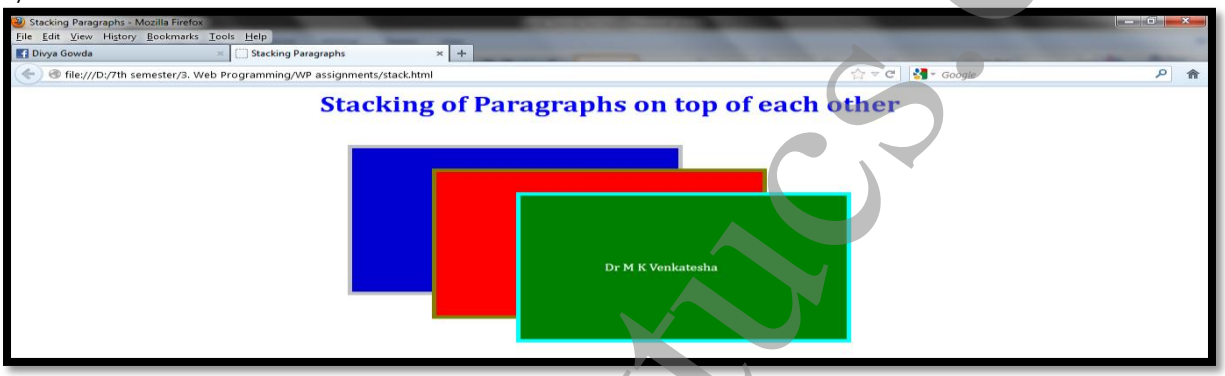
STACKING ELEMENTS

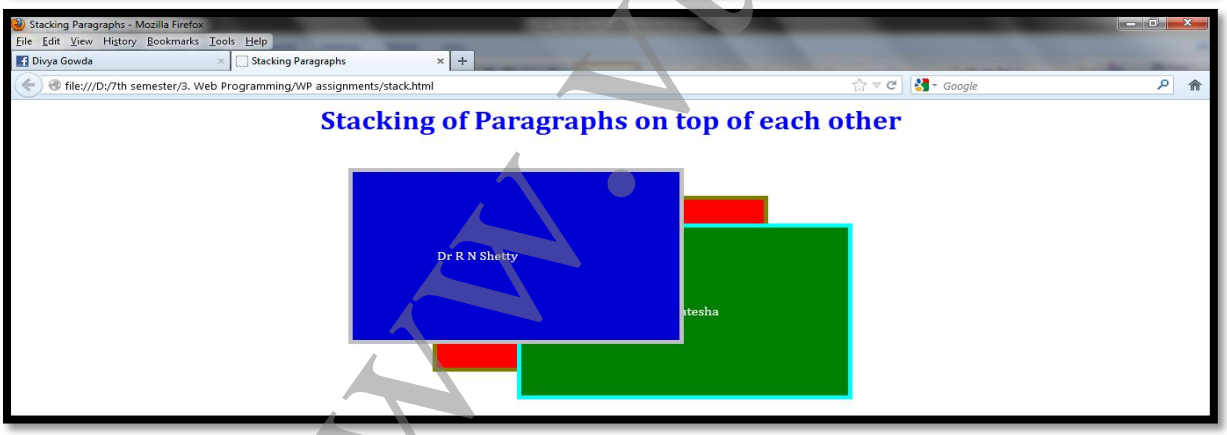
★ The `top` and `left` properties allow the placement of an element anywhere in the two dimensions of the display of a document.

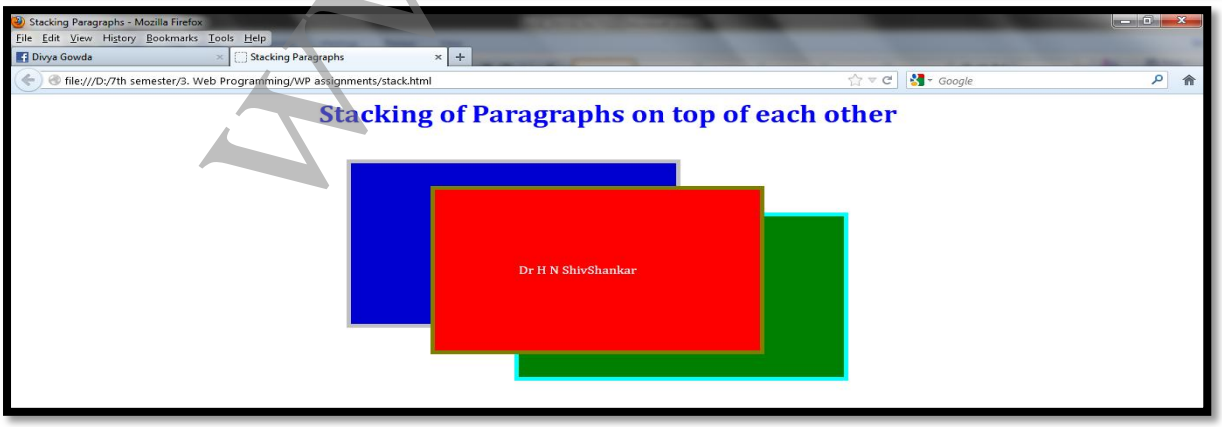
- ★ Although the display is restricted to two physical dimensions, the effect of a third dimension is possible through the simple concept of stacked elements, such as that used to stack windows in graphical user interfaces.
- ★ Although multiple elements can occupy the same space in the document, one is considered to be on top and is displayed.
- ★ The top element hides the parts of the lower elements on which it is superimposed.
- ★ The placement of elements in this third dimension is controlled by the `z-index` attribute of the element.
- ★ An element whose `z-index` is greater than that of an element in the same space will be displayed over the other element, effectively hiding the element with the smaller `z-index` value.
- ★ The JavaScript style property associated with the `z-index` attribute is `zIndex`.

```
//stack.html
<html >
<head><title>Stacking Paragraphs</title>
<style type="text/css">
        .para1
    {
                        border: solid thick #C0C0C0;
                        padding: 1in;
                        width:180px;
                        background-color:#0000D0;
                        color:white;
                        position:absolute;
                        top:70px;
                        left:4in;
                        z-index:1;
    }
        .para2
    {
                        border: solid thick #808000;
                        padding: 1in;
                        width:180px;
                        background-color:red;
                        color:white;
                        position:absolute;
                        top:105px;
                        left:5in;
                        z-index:2;
    }
         .para3
    {
                        border: solid thick #00ffff;
                        padding: 1in;
                        width:180px;
                        background-color:green;
                        color:white;
                        position:absolute;
                        top:140px;
                        left:6in;
                        z-index:3;
    }
        .display
         {
                        font-size:25pt;
                        color:blue;
                        text-align:center;
          }
p:hover{background-color:rgb(250,200,150);font-size:25px;color:white;};
</style>
<script type="text/javascript">
                        var stack1="stack1";
                        function move(curStack)
                                {
```

```
                                var oldStack=document.getElementById(stack1).style;
                                oldStack.zIndex="0";
                                var newStack=document.getElementById(curStack).style;
                                newStack.zIndex="10";
                                stack1=document.getElementById(curStack).id;
                        }
        </script>
  </head>
  <body>
    <h2 class="display">Stacking of Paragraphs on top of each other</h2>
     <p class="para1" id="stack1"  onmouseover="move('stack1')">
        Dr R N Shetty
     </p>
     <p class="para2" id="stack2" onmouseover="move('stack2')">
        Dr H N ShivShankar
     </p>
     <p class="para3" id="stack3" onmouseover="move('stack3')">
        Dr M K Venkatesha
     </p>
  </body>
</html>
```





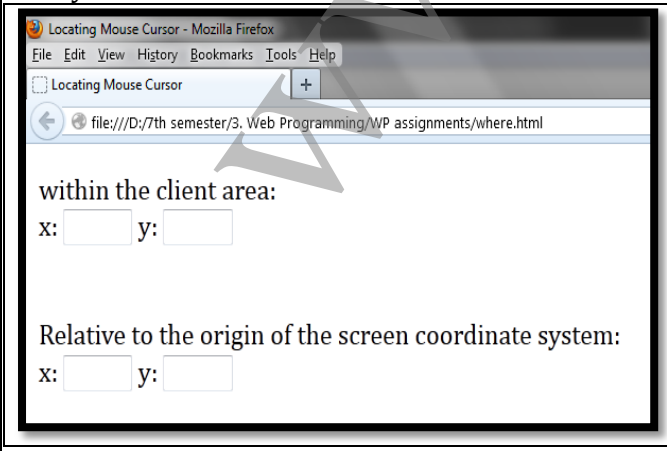


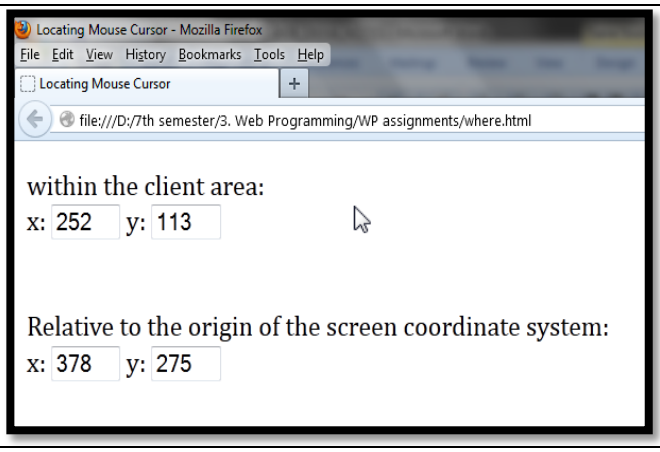
LOCATING THE MOUSE CURSOR

- ★ A mouse-click event is an implementation of the `Mouse-Event` interface, which defines two pairs of properties that provide geometric coordinates of the position of the element in the display that created the event.
- ★ One of these pairs, `clientX` and `clientY`, gives the coordinates of the element relative to the upper-left corner of the browser display window, in pixels.
- ★ The other pair, `screenX` and `screenY`, also gives coordinates of the element, but relative to the client computer's screen.
- ★ In the next example, `where.html`, two pairs of text boxes are used to display these four properties every time the mouse button is clicked.
- ★ The handler is triggered by the `onclick` attribute of the body element.
- ★ The call to the handler in this example sends `event`, which is a reference to the event object just created in the element, as a parameter.

```
//where.html
<html>
<head>
<title>Locating Mouse Cursor</title>
<script type="text/javascript">
function findIt(evt)
{
        document.getElementById("xcoor1").value = evt.clientX;
        document.getElementById("ycoor1").value = evt.clientY;
        document.getElementById("xcoor2").value = evt.screenX;
        document.getElementById("ycoor2").value = evt.screenY;
}
</script>
</head>
<body onclick="findIt(event)">
<form action="">
<p>
within the client area:<br>
x: <input type="text" id="xcoor1" size="4"/>
y: <input type="text" id="ycoor1" size="4"/>
<br><br><br>
Relative to the origin of the screen coordinate system:<br>
x: <input type="text" id="xcoor2" size="4"/>
y: <input type="text" id="ycoor2" size="4"/>
</p>
</form>
</body>
</html>
```

NOTE: We are not entering any values, instead click somewhere on the screen, you will automatically get the x and y co-ordinate values in the text boxes.



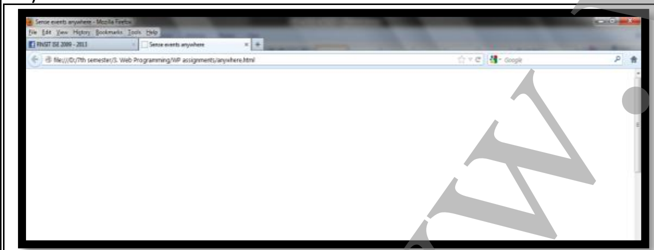


REACTING TO A MOUSE CLICK

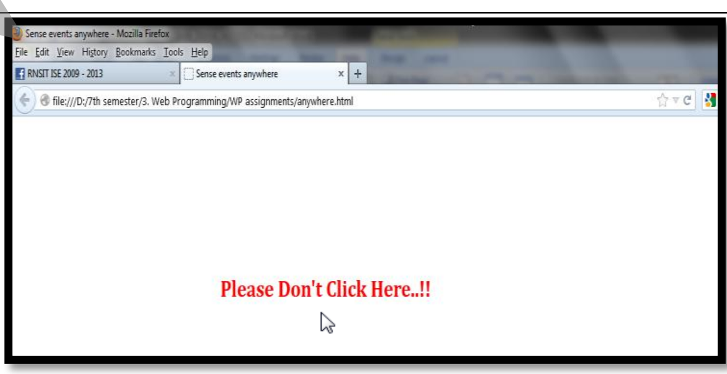
The next example is another one related to reacting to mouse clicks. In this case, the `mousedown` and `mouseup` events are used, respectively, to show and hide the message "Please don't click here!" on the display under the mouse cursor whenever the mouse button is clicked, regardless of where the cursor is at the time. The offsets (`-130` for `left` and `-25` for `top`) modify the actual cursor position so that the message is approximately centered over it.

//anywhere.html

```
<html>
<head>
<title>Sense events anywhere</title>
<script type="text/javascript">
function displayIt(evt)
{
	var dom=document.getElementById("message");
	dom.style.left=(evt.clientX - 130) + "px";
	dom.style.top=(evt.clientY - 25 ) + "px";
	dom.style.visibility="visible";
}
function hideIt()
{
	document.getElementById("message").style.visibility="hidden";
}
</script>
</head>
<body onmousedown="displayIt(event);"  onmouseup="hideIt();">
<p>
<span id="message"
style = "color:red; visibility:hidden; position:relative; font-size:20pt; font-weight:bold;">
Please Don't Click Here..!!
</span>
<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>
<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>
<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br
</p>
</body>
</html>
```



Initially, the web page will be blank. You can click anywhere on the page and the mouse click is sensed which in-turn displays a message as shown in the next snapshot.

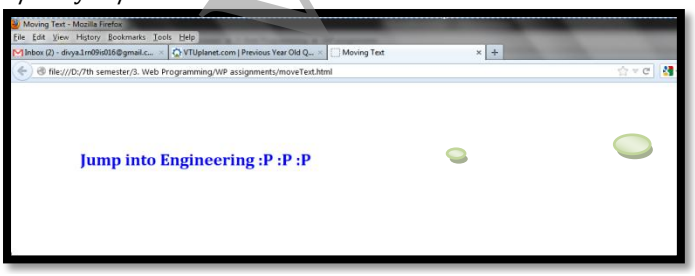


SLOW MOVEMENT OF ELEMENTS

★ The only way to move an element slowly is to move it by small amounts many times, with the moves separated by small amounts of time.
★ JavaScript has two `Window` methods that are capable of this task: `setTimeout` and `setInterval`.
★ The `setTimeout` method takes two parameters: a string of JavaScript code to be executed and a number of milliseconds of delay before executing the given code.
★ The `setInterval` method has two forms. One form takes two parameters, exactly as does `setTimeout`.
★ It executes the given code repeatedly, using the second parameter as the interval, in milliseconds, between executions.

- ★ The second form of `setInterval` takes a variable number of parameters.
- ★ The first parameter is the name of a function to be called, the second is the interval in milliseconds between the calls to the function, and the remaining parameters are used as actual parameters to the function being called.
- ★ The initial position of the text is set in the span element that specifies the text.
- ★ The `onload` attribute of the body element is used to call a function, `initText`, to initialize the x- and y-coordinates of the initial position to the `left` and `top` properties of the element and call the mover function.
- ★ The mover function, named `moveText`, takes the current coordinates of the text as parameters, moves them one pixel toward the final position, and then, using `setTimeout`, calls itself with the new coordinates.

```
//moveText.html
<html>
<head>
<title>Moving Text</title>
<script type="text/javascript">
var dom, x, y, finalx=500, finaly=500;
function initText()
{
        dom = document.getElementById('theText').style;
        var x=dom.left;
        var y=dom.top;
        x=x.match(/\d+/);
        y=y.match(/\d+/);
        moveText(x,y);
}
function moveText(x,y)
{
        if(x!=finalx)
                if(x>finalx)        x--;
                else if(x<finalx)  x++;
        if(y!=finaly)
                if(y>finaly)        y--;
                else if(y<finaly)  y++;
        if((x!=finalx)||(y!=finaly))
        {
                dom.left=x + "px";
                dom.top=y + "px";
                setTimeout("moveText(" + x + "," + y + ")", 1);
        }
}
</script>
<body onload = "initText()">
<p>
<span id = 'theText'
style = "position:absolute; left:100px; top:100px; font:bold 20pt cambria; color:blue;">
Jump into Engineering :P :P :P
</span></p>
</body></html>
```



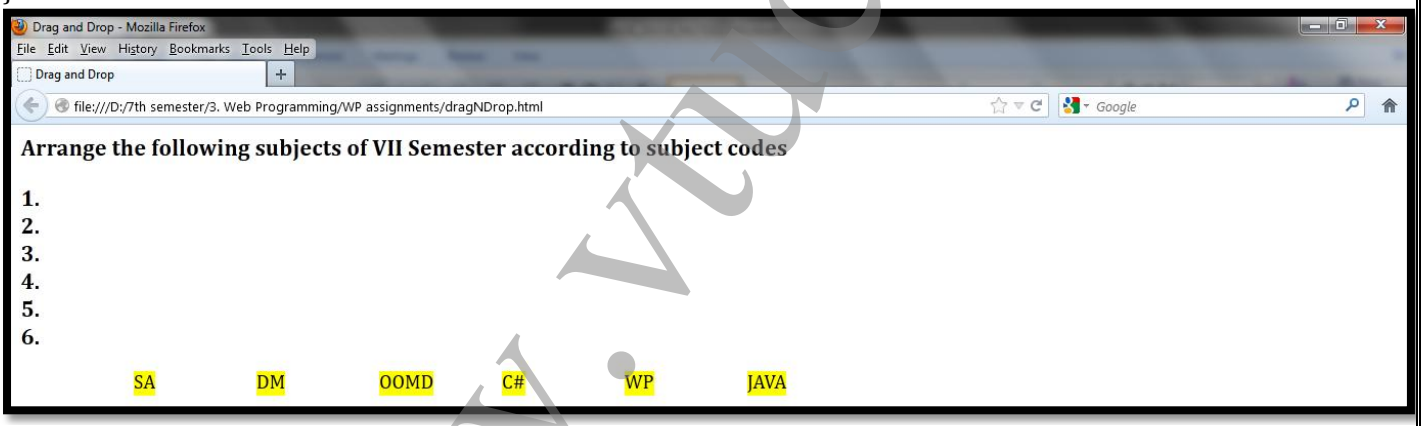
Execute & check once. It will slide from top to bottom & do not directly jump from top.

DRAGGING AND DROPPING ELEMENTS

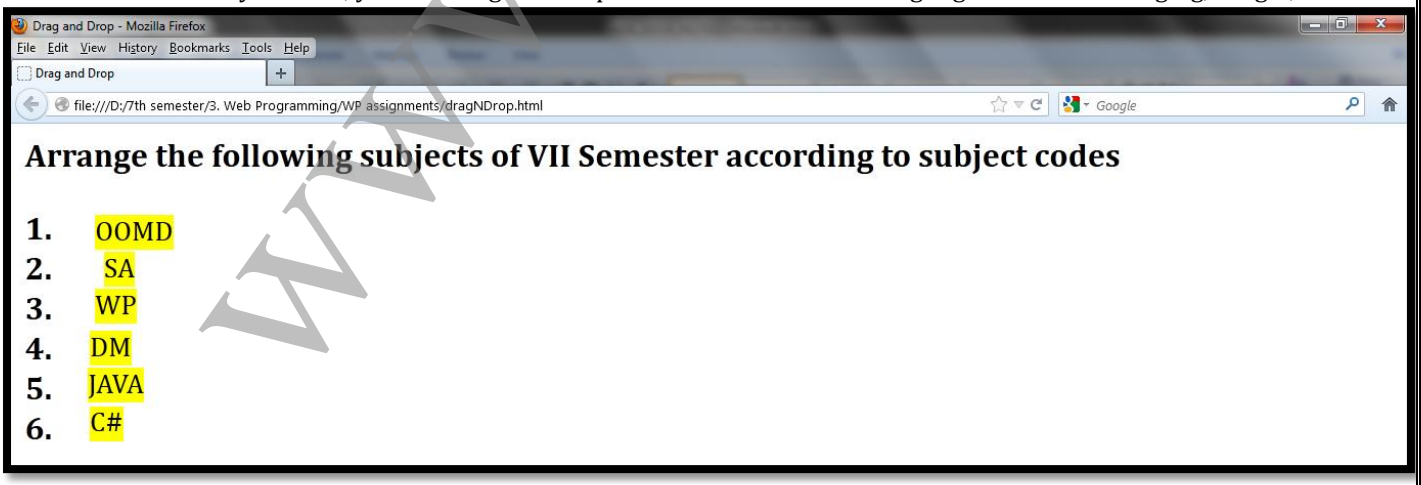
- ★ The `mouseup`, `mousedown`, and `mousemove` events can be used to implement drag and drop.
- ★ To illustrate drag and drop, an XHTML document and a JavaScript file that creates a magnetic poetry system is developed, showing two static lines of a poem and allowing the user to create the last two lines from a collection of movable words.
- ★ The DOM 0 model is used for the call to the handler for the `mousedown` event.
- ★ The rest of the process is designed with the DOM 2 model.
- ★ The `mousedown` event handler, `grabber`, takes the `Event` object as its parameter.
- ★ It gets the element to be moved from the `currentTarget` property of the `Event` object and puts it in a global variable so that it is available to the other handlers.
- ★ Then it determines the coordinates of the current position of the element to be moved and computes the difference between each of them and the corresponding coordinates of the position of the mouse cursor.
- ★ The `grabber` handler also registers the event handlers for `mousemove` and `mouseup`.
- ★ These two handlers are named `mover` and `dropper`, respectively.
- ★ The `dropper` handler disconnects mouse movements from the element-moving process by unregistering the handlers `mover` and `dropper`.

```
//dragNDrop.html
<html>
<head><title>Drag and Drop</title>
<script type = "text/javascript" src="dragNDrop.js">
</script>
</head>
<body>
<h3>Arrange the following subjects of VII Semester according to subject codes</h3>
<h3>1.<br>2.<br>3.<br>4.<br>5.<br>6.<br></h3>
<p>
<span style = "position: absolute; top:200px; left:100px; background-color:yellow;"
        onmousedown="grabber(event);"> SA </span>
<span style = "position: absolute; top:200px; left:200px; background-color:yellow;"
        onmousedown="grabber(event);">DM </span>
<span style = "position: absolute; top:200px; left:300px; background-color:yellow;"
        onmousedown="grabber(event);">OOMD </span>
<span style = "position: absolute; top:200px; left:400px; background-color:yellow;"
        onmousedown="grabber(event);"> C# </span>
<span style = "position: absolute; top:200px; left:500px; background-color:yellow;"
        onmousedown="grabber(event);"> WP </span>
<span style = "position: absolute; top:200px; left:600px; background-color:yellow;"
        onmousedown="grabber(event);"> JAVA </span>
</p>
</body>
</html>
```

```
//dragNDrop.js
var diffx, diffy, theElement;
function grabber(event)
{
	theElement=event.currentTarget;
	var posX=parseInt(theElement.style.left);
	var posY=parseInt(theElement.style.top);
	diffx=event.clientX - posX;
	diffy=event.clientY - posY;
	document.addEventListener("mousemove",mover,true);
	document.addEventListener("mouseup",dropper,true);
	event.stopPropagation();
	event.preventDefault();
}
function mover(event)
{
	theElement.style.left=(event.clientX - diffx) + "px";
	theElement.style.top=(event.clientY - diffy) + "px";
	event.stopPropagation();
}
function dropper(event)
{
	document.removeEventListener("mouseup", dropper, true);
	document.removeEventListener("mousemove", mover, true);
	event.stopPropagation();
}
```



Execute and check if you want, you can drag and drop the elements which are highlighted. After arranging, we get,



UNIT 7
INTRODUCTION TO XML

SYNTAX OF XML

- ★ XML imposes two distinct levels of syntax:
  - There is a general low level syntax that is appreciable on all XML documents
  - The other syntactic level is specified by DTD (Document Type Definition) or XML schemas.
- ★ The DTDs and XML schemas specify a set of tag and attribute that can appear in a particular document or collection of documents.
- ★ They also specify the order of occurrence in the document.
- ★ The XML documents consists of data elements which form the statements of XML document.
- ★ The XML document might also consists of markup declaration, which act as instructions to the XML parser
- ★ All XML documents begin with an XML declaration. This declaration identifies that the document is a XML document and also specifies version number of XML standard.
- ★ It also specifies encoding standard.
  <?xml version = "1.0" encoding = "utf-8"?>
- ★ Comments in XML is similar to HTML
- ★ XML names are used to name elements and attributes.
- ★ XML names are case-sensitive.
- ★ There is no limitation on the length of the names.
- ★ All XML document contains a single root element whose opening tag appears on first line of the code
- ★ All other tags must be nested inside the root element
- ★ As in case of XHTML, XML tags can also have attributes
- ★ The values for the attributes must be in single or double quotation

Example:

1.
```
<?xml version = "1.0" encoding = "utf-8"?>
<student>
        <name>Santhosh B S</name>
        <usn>1RN10CS090</usn>
</student>
```
2. Tags with attributes
   The above code can be also written as
```
<student name = "Santhosh B S" usn = "1RN10CS090">
</student>
```

XML DOCUMENT STRUCTURE

- ♥ An XML document often consists of 2 files:
  - One of the document – that specifies its tag set
  - The other specifies the structural syntactic role and one that contains a style sheet to describe how content of the document is to be printed
- ♥ The structural roles are given as either a DTD or an XML schema
- ♥ An XML document consists of logically related collection of information known as entities
- ♥ The *document entity* is the physical file that represent the document itself
- ♥ The document is normally divided into multiple entities.
- ♥ One of the advantage dividing document into multiple entities is managing the document becomes simple
- ♥ If the same data appears in more than one place, defining it as an entity allows number of references to a single copy of the data

- Many documents include information that cannot be represented as text. Ex: images
- Such information units are stored as binary data
- These binary data must be a separate unit to be able to include in XML document
- These entities are called as *Binary entities*
- When an XML processor encounters the name of a non-binary entity in a document, it replaces the name with value it references
- Binary entities can be handled only by browsers
- XML processor or parsers can only deal with text
- Entity names can be of any length. They must begin with a letter, dash or a colon
- A reference to an entity is its name with a prepended ampersand and an appended semicolon
- Example: if **`stud_name`** is the name of entity, **`&stud_name;`** is a reference to it
- One of the use of entities is to allow characters used as markup delimiters to appears as themselves
- The entity references are normally placed in CDATA section
- Syntax: **<! [CDATA[** *content* **]] >**
- For example, instead of

```
The last word of the line is &gt;&gt;&gt; here &lt;&lt;&lt;.
```

the following could be used:

```
<![CDATA[The last word of the line is >>> here <<<]]>
```

DOCUMENT TYPE DEFINITIONS

- A DTD is a set of structural rules called declarations which specify a set of elements that can appear in the document. It also specifies how and where these elements appear
- DTD also specify entity definitions
- DTD is more useful when the same tag set definition is used by collection of documents
- A DTD can be embedded in XML document whose syntax rules it describes
- In this case, a DTD is called as *internal DTD* or a separate file can be created which can be linked to XML file. In this case the DTD is called as *External DTD*
- An external DTD can be used with more than one XML file
- Syntactically, a DTD is a sequence of declarations. Each declaration has the form of markup declaration
- Example: `<!keyword...>`
- Four possible keywords can be used in a declaration:
  - `ELEMENT`, used to define tags;
  - `ATTLIST`, used to define tag attributes;
  - `ENTITY`, used to define entities; and
  - `NOTATION`, used to define data type notations.

DECLARING ELEMENTS

- DTD follows rules of context-free grammar for element declaration
- A DTD describes the syntactic structure of a particular set of documents
- Each element declaration in a DTD specifies the structure of one category of elements
- An element is a node in such a tree either a leaf node or an internal node
- If element is leaf node, its syntactic description is its character pattern
- If the element is internal node, its syntactic description is a list of its child element
- The form of an element declaration for elements that contain elements is as follows:

```
<!ELEMENT element_name (list of names of child elements)>
```

- For example, consider the following declaration:

```
<!ELEMENT memo (from, to, date, re, body)>
```

- This element declaration would describe the document tree structure shown in Figure 7.1.

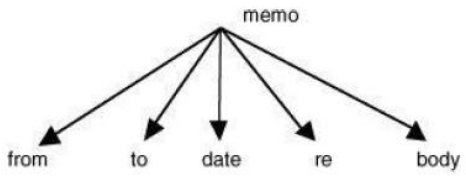


Figure 7.1 An example of the document tree structure for an element definition

- In many cases, it is necessary to specify the number of times that a child element may appear. This can be done in a DTD declaration by adding a modifier to the child element specification. These modifiers, described in Table 7.1, are borrowed from regular expressions.
- Any child element specification can be followed by one of the modifiers.

Modifier	Meaning
+	One or more occurrences
*	Zero or more occurrences
?	Zero or one occurrence

- Consider the following DTD declaration:
  <!ELEMENT person (parent+, age, spouse?, sibling*)>
- In this example, a person element is specified to have the following child elements: one or more parent elements, one age element, possibly a spouse element, and zero or more sibling elements.
- The leaf nodes of a DTD specify the data types of the content of their parent nodes, which are elements.
- In most cases, the content of an element is type PCDATA, for parsable character data. Parsable character data is a string of any printable characters except "less than" (<), "greater than" (>), and the ampersand (&).
- Two other content types can be specified: EMPTY and ANY.
- The EMPTY type specifies that the element has no content; it is used for elements similar to the XHTML img element.
- The ANY type is used when the element may contain literally any content.
- The form of a leaf element declaration is as follows:
  <!ELEMENT *element_name* (#PCDATA)>

DECLARING ATTRIBUTES

The attributes of an element are declared separately from the element declaration in a DTD. An attribute declaration must include the name of the element to which the attribute belongs, the attribute's name, its type, and a default option. The general form of an attribute declaration is as follows:

<!ATTLIST *element_name attribute_name attribute type default_option*>

If more than one attribute is declared for a given element, the declarations can be combined, as in the following element:

```
<!ATTLIST element_name
          attribute name_1  attribute type  default_option_1
          attribute_name_2  attribute_type  default_option_2
          ...
          attribute_name_n  attribute_type  default_option_n
>
```

The default option in an attribute declaration can specify either an actual value or a requirement for the value of the attribute in the XML document.

Table 7.2 Possible default options for attributes

Option	Meaning
A value	The quoted value, which is used if none is specified in an element
#FIXED value	The quoted value, which every element will have and which cannot be changed
#REQUIRED	No default value is given; every instance of the element must specify a value
#IMPLIED	No default value is given (the browser chooses the default value); the value may or may not be specified in an element

For example, suppose the DTD included the following attribute specifications:

```
<!ATTLIST airplane places CDATA "4">
<!ATTLIST airplane engine_type CDATA #REQUIRED>
<!ATTLIST airplane price CDATA #IMPLIED>
<!ATTLIST airplane manufacturer CDATA #FIXED "Cessna">
```

Then the following XML element would be valid for this DTD:

```
<airplane places = "10" engine_type = "jet"> </airplane>
```

DECLARING ENTITIES

- Entities can be defined so that they can be referenced anywhere in the content of an XML document, in which case they are called general entities. The predefined entities are all general entities.
- Entities can also be defined so that they can be referenced only in DTDs, in which case they are called parameter entities.
- The form of an entity declaration is

  <!ENTITY [%] *entity_name* "*entity_value*">
- When the optional percent sign (%) is present in an entity declaration, it specifies that the entity is a parameter entity rather than a general entity.
- Example: `<!ENTITY sbs "Santhosh B Suresh">`
- When an entity is longer than a few words, its text is defined outside the DTD. In such cases, the entity is called an external text entity. The form of the declaration of an external text entity is

  <!ENTITY *entity_name* SYSTEM "*file_location*">

A Sample DTD

```
<?xml version = "1.0" encoding = "utf-8"?>

<!-- planes.dtd - a document type definition for
                  the planes.xml document, which specifies
                  a list of used airplanes for sale  -->

<!ELEMENT planes_for_sale (ad+)>
<!ELEMENT ad (year, make, model, color, description,
              price?, seller, location)>
<!ELEMENT year (#PCDATA)>
<!ELEMENT make (#PCDATA)>
<!ELEMENT model (#PCDATA)>
<!ELEMENT color (#PCDATA)>
<!ELEMENT description (#PCDATA)>
<!ELEMENT price (#PCDATA)>
<!ELEMENT seller (#PCDATA)>
<!ELEMENT location (city, state)>
<!ELEMENT city (#PCDATA)>
<!ELEMENT state (#PCDATA)>

<!ATTLIST seller phone CDATA #REQUIRED>
<!ATTLIST seller email CDATA #IMPLIED>

<!ENTITY c "Cessna">
<!ENTITY p "Piper">
<!ENTITY b "Beechcraft">
```

- Some XML parsers check documents that have DTDs in order to ensure that the documents conform to the structure specified in the DTDs. These parsers are called validating parsers.
- If an XML document specifies a DTD and is parsed by a validating XML parser, and the parser determines that the document conforms to the DTD, the document is called valid.
- Handwritten XML documents often are not well formed, which means that they do not follow XML's syntactic rules.
- Any errors they contain are detected by all XML parsers, which must report them.
- XML parsers are not allowed to either repair or ignore errors.
- Validating XML parsers detect and report all inconsistencies in documents relative to their DTDs.

INTERNAL AND EXTERNAL DTDs

Internal DTD Example:

```
<?xml version = "1.0" encoding = "utf-8"?>
      <!DOCTYPE planes [
          <!-- The DTD for planes -->
      ]>
<!-- The planes XML document -->
```

External DTD Example: [assuming that the DTD is stored in the file named *planes.dtd*]

```
<!DOCTYPE planes_for_sale SYSTEM "planes.dtd">
```

//sampleDTD.xml

```
<?xml version = "1.0" encoding = "utf-8"?>
<!DOCTYPE vtu_stud_info SYSTEM "vtu.dtd">
<VTU>
<students>
        <USN> 1RN10CS090 </USN>
        <name> Santhosh B S</name>
        <college> RNSIT </college>
        <branch> CSE </branch>
        <year> 2010 </year>
        <email> santhosh.b.suresh@gmail.com </email>
</students>
<students>
        <USN> 1RN0IS016 </USN>
         <name> Divya K </name>
        <college> RNSIT </college>
        <branch> ISE </branch>
        <year> 2009 </year>
        <email> divya@gmail.com </email>
</students>
</VTU>
```

NAMESPACES

- One problem with using different markup vocabularies in the same document is that collisions between names that are defined in two or more of those tag sets could result.
- An example of this situation is having a <table> tag for a category of furniture and a <table> tag from XHTML for information tables.
- Clearly, software systems that process XML documents must be capable of unambiguously recognizing the element names in those documents.
- To deal with this problem, the W3C has developed a standard for XML namespaces (at http://www.w3.org/TR/REC-xml-names).
- An XML namespace is a collection of element and attribute names used in XML documents. The name of a namespace usually has the form of a uniform resource identifier (URI).
- A namespace for the elements and attributes of the hierarchy rooted at a particular element is declared as the value of the attribute xmlns.

- The form of a namespace declaration for an element is

  <*element_name* xmlns[:*prefix*] = URI>

- The square brackets indicate that what is within them is optional. The prefix, if included, is the name that must be attached to the names in the declared namespace.
- If the prefix is not included, the namespace is the default for the document.
- A prefix is used for two reasons. First, most URIs are too long to be typed on every occurrence of every name from the namespace. Second, a URI includes characters that are invalid in XML.
- Note that the element for which a namespace is declared is usually the root of a document.
- For ex: all XHTML documents in this notes declare the xmlns namespace on the root element, html:

  <html xmlns = "http://www.w3.org/1999/xhtml">

- This declaration defines the default namespace for XHTML documents, which is http://www.w3.org/1999/xhtml.
- The next example declares two namespaces. The first is declared to be the default namespace; the second defines the prefix, `cap`:

```
<states>
  xmlns = "http://www.states-info.org/states"
  xmlns:cap = "http://www.states-info.org/state-capitals"
  <state>
    <name> South Dakota </name>
    <population> 754844 </population>
    <capital>
      <cap:name> Pierre </cap:name>
      <cap:population> 12429 </cap:population>
    </capital>
  </state>
  <!-- More states -->
</states>
```

XML SCHEMAS

XML schemas is similar to DTD i.e. schemas are used to define the structure of the document
DTDs had several disadvantages:

- The syntax of the DTD was un-related to XML, therefore they cannot be analysed with an XML processor
- It was very difficult for the programmers to deal with 2 different types of syntaxes
- DTDs does not support the datatype of content of the tag. All of them are specified as text

Hence, schemas were introduced

SCHEMA FUNDAMENTALS

- Schemas can be considered as a class in object oriented programming
- A XML document that conforms to the standard or to the structure of the schema is similar to an object
- The XML schemas have 2 primary purposes.
  - They are used to specify the structure of its instance of XML document, including which elements and attributes may appear in instance document. It also specifies where and how often the elements may appear
  - The schema specifies the datatype of every element and attributes of XML
- The XML schemas are ***namespace-centric***

DEFINING A SCHEMA

Schemas themselves are written with the use of a collection of tags, or a vocabulary, from a namespace that is, in effect, a schema of schemas. The name of this namespace is http://www.w3.org/2001/XMLSchema.

- Every schema has `schema` as its root element. This namespace specification appears as follows:

  xmlns:xsd = "http://www.w3.org/2001/XMLSchema"

- The name of the namespace defined by a schema must be specified with the `targetNamespace` attribute of the `schema` element.

targetNamespace = "http://cs.uccs.edu/planeSchema"

- If the elements and attributes that are not defined directly in the schema element are to be included in the target namespace, schema's `elementFormDefault` must be set to `qualified`, as follows:

elementFormDefault = "qualified"

- The default namespace, which is the source of the unprefixed names in the schema, is given with another `xmlns` specification, but this time without the prefix:

xmlns = "http://cs.uccs.edu/planeSchema"

Example in 2 alternate methods of defining a schema

```
<xsd:schema
<!-- The namespace for the schema itself (prefix is xsd) -->
  xmlns:xsd = http://www.w3.org/2001/XMLSchema
<!-- The namespace where elements defined here will be placed -->
  targetNamespace = http://cs.uccs.edu/planeSchema
<!-- The default namespace for this document (no prefix) -->
  xmlns = http://cs.uccs.edu/planeSchema
<!-- We want to put non-top-level elements in the target namespace -->
  elementFormDefault = "qualified">
```

```
<schema
  xmlns = "http://www.w3.org/2001/XMLSchema"
  targetNamespace = "http://cs.uccs.edu/planeSchema"
  xmlns:plane = "http://cs.uccs.edu/planeSchema"
  elementFormDefault = "qualified">
```

The above is an alternative to the preceding opening tag would be to make the XMLSchema names the default so that they do not need to be prefixed in the schema. Then the names in the target namespace would need to be prefixed.

DEFINING A SCHEMA INSTANCE

- An instance document normally defines its default namespace to be the one defined in its schema. For example, if the root element is planes, we could have

```
<planes
xmlns = "http://cs.uccs.edu/planeSchema"
... >
```

- The second attribute specification in the root element of an instance document is for the schemaLocation attribute. This attribute is used to name the standard namespace for instances, which includes the name XMLSchema-instance.

xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"

- Third, the instance document must specify the filename of the schema in which the default namespace is defined. This is accomplished with the schemaLocation attribute, which takes two values: the namespace of the schema and the filename of the schema.

```
xsi:schemaLocation = "http://cs.uccs.edu/planeSchema
                      planes.xsd"
```

- Combining everything, we get,

```
<planes
   xmlns = "http://cs.uccs.edu/planeSchema"
   xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
   xsi:schemaLocation = "http://cs.uccs.edu/planeSchema
                         planes.xsd">
```

AN OVERVIEW OF DATA TYPES

There are two categories of user-defined schema data types: simple and complex.

- A simple data type is a data type whose content is restricted to strings. A simple type cannot have attributes or include nested elements.
- A complex type can have attributes and include other data types as child elements.

Data declarations in an XML schema can be either local or global.

- ★ A local declaration is a declaration that appears inside an element that is a child of the `schema` element.
- ★ A global declaration is a declaration that appears as a child of the `schema` element. Global elements are visible in the whole schema in which they are declared.

SIMPLE TYPES

- Elements are defined in an XML schema with the element tag.

```
<xsd:element name = "engine" type = "xsd:string" />
```

- An instance of the schema in which the engine element is defined could have the following element:

```
<engine> inline six cylinder fuel injected </engine>
```

- An element can be given a default value with the default attribute:

```
<xsd:element name = "engine"   type = "xsd:string"
             default = "fuel injected V-6"  />
```

- Constant values are given with the fixed attribute, as in the following example:

```
<xsd:element name = "plane"   type = "xsd:string"
             fixed = "single wing"  />
```

- A simple user-defined data type is described in a simpleType element with the use of facets.
- Facets must be specified in the content of a restriction element, which gives the base type name.
- The facets themselves are given in elements named for the facets: the value attribute specifies the value of the facet.

```
<xsd:simpleType name = "firstName">
  <xsd:restriction base = "xsd:string">
    <xsd:maxLength value = "10" />
  </xsd:restriction>
</xsd:simpleType>
```

COMPLEX TYPES

Complex types are defined with the `complexType` tag. The elements that are the content of an element-only element must be contained in an ordered group, an unordered group, a choice, or a named group. The `sequence` element is used to contain an ordered group of elements. Example:

```
<xsd:complexType name = "sports_car">
  <xsd:sequence>
    <xsd:element name = "make"  type = "xsd:string" />
    <xsd:element name = "model"  type = "xsd:string" />
    <xsd:element name = "engine"  type = "xsd:string" />
    <xsd:element name = "year"  type = "xsd:decimal" />
  </xsd:sequence>
</xsd:complexType>
```

A complex type whose elements are an unordered group is defined in an `all` element. Elements in `all` and `sequence` groups can include the `minOccurs` and `maxOccurs` attributes to specify the numbers of occurrences. Example:

```
<?xml version = "1.0" encoding = "utf-8"?>
```

```
<xsd:schema
  xmlns:xsd = "http://www.w3.org/2001/XMLSchema"
  targetNamespace = "http://cs.uccs.edu/planeSchema"
  xmlns = "http://cs.uccs.edu/planeSchema"
  elementFormDefault = "qualified">

  <xsd:element name = "planes">
    <xsd:complexType>
      <xsd:all>
        <xsd:element name = "make"
                     type = "xsd:string"
                     minOccurs = "1"
                     maxOccurs = "unbounded" />
      </xsd:all>
    </xsd:complexType>
  </xsd:element>
</xsd:schema>
```

An XML instance that conforms to the `planes.xsd` schema is as follows:

```
<?xml version = "1.0" encoding = "utf-8"?>

<!-- planes1.xml
     A simple XML document for illustrating a schema
     The schema is in planes.xsd
     -->
<planes
  xmlns = "http://cs.uccs.edu/planeSchema"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://cs.uccs.edu/planeSchema
                        planes.xsd">
    <make> Cessna </make>
    <make> Piper </make>
    <make> Beechcraft </make>
</planes>
```

For example, the `year` element could be defined as follows:

```
<xsd:element name = "year">
  <xsd:simpleType>
    <xsd:restriction base = "xsd:decimal">
      <xsd:minInclusive value = "1900" />
      <xsd:maxInclusive value = "2007" />
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
```

With the `year` element defined globally, the `sports_car` element can be defined with a reference to the `year` with the `ref` attribute:

```
<xsd:complexType name = "sports_car">
  <xsd:sequence>
    <xsd:element name = "make"  type = "xsd:string" />
    <xsd:element name = "model"  type = "xsd:string" />
    <xsd:element name = "engine"  type = "xsd:string" />
    <xsd:element ref = "year" />
  </xsd:sequence>
</xsd:complexType>
```

VALIDATING INSTANCES OF SCHEMAS

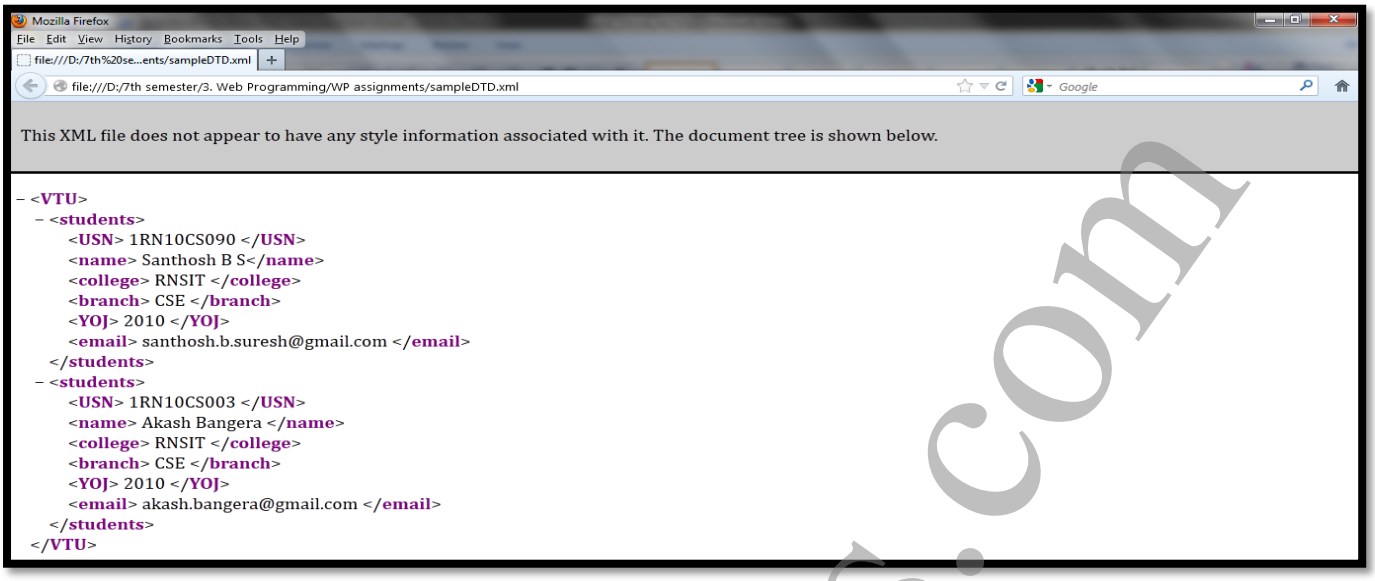
XSV is an abbreviation for ***XML Schema Validator***. If the schema and the instance document are available on the Web, `xsv` can be used online, like the XHTML validation tool at the W3C Web site. This tool can also be downloaded and run on any computer. The Web site for `xsv` is http://www.w3.org/XML/Schema#XSV.

The output of `xsv` is an XML document. When the tool is run from the command line, the output document appears on the screen with no formatting, so it is a bit difficult to read. The following is the output of `xsv` run on `planes.xml`:

```
<?XML version='1.0' encoding='utf-8'?>
<xsv docElt='{http://cs.uccs.edu/planeSchema}planes'
     instanceAssessed='true'
     instanceErrors = '0'
     rootType='[Anonymous]'
     schemaErrors='0'
     schemaLocs='http://cs.uccs.edu/planeSchema -> planes.xsd'
     target='file:/c:/wbook2/xml/planes.xml'
     validation='strict'
     version='XSV 1.197/1.101 of 2001/07/07 12:10:19'
     xmlns='http://www.w3.org/2000/05/xsv' >

  <importAttempt URI='file:/c:wbook2/xml/planes.xsd'
                 namespace='http://cs.uccs.edu/planeSchema'
                 outcome='success' />
</xsv>
```

DISPLAYING RAW XML DOCUMENTS

If an XML document is displayed without a style sheet that defines presentation styles for the document's tags, the displayed document will not have formatted content.



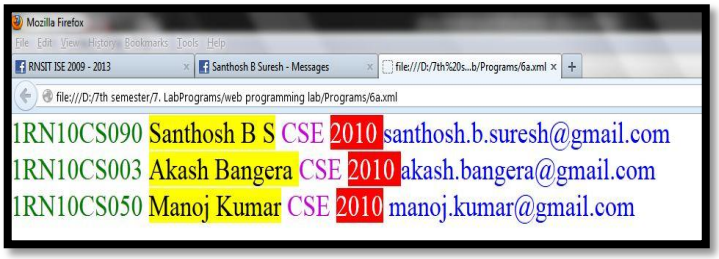
DISPLAYING XML DOCUMENTS WITH CSS

//6a.xml

```
<?xml version = "1.0" encoding = "utf-8"?>

<?xml-stylesheet type = "text/css" href = "6a.css"?>
<VTU>
<students>
        <USN> 1RN10CS090 </USN>
        <name> Santhosh B S</name>
        <college> RNSIT </college>
        <branch> CSE </branch>
        <YOJ> 2010 </YOJ>
        <email> santhosh.b.suresh@gmail.com </email>
</students>
<students>
        <USN> 1RN10CS003 </USN>
         <name> Akash Bangera </name>
        <college> RNSIT </college>
        <branch> CSE </branch>
        <YOJ> 2010 </YOJ>
        <email> akash.bangera@gmail.com </email>
</students>
<students>
        <USN> 1RN10CS050 </USN>
        <name> Manoj Kumar</name>
        <college> RNSIT </college>
        <branch>CSE </branch>
        <YOJ> 2010</YOJ>
        <email> manoj.kumar@gmail.com </email>
</students>
</VTU>
```

//6a.css

```
students
{ clear: both; float : left;}
USN
{color: green; }
name
{background: yellow;}
college
{ display: none;}
branch
{color : #cd00dc; text-align: right;}
YOJ
{background : red; color : white;}
email
{ color: blue;}
```



XSLT STYLE SHEETS

- ★ The eXtensible Stylesheet Language (XSL) is a family of recommendations for defining the presentation and transformations of XML documents.
- ★ It consists of three related standards:
  - XSL Transformations (XSLT),
  - XML Path Language (XPath), and

- XSL Formatting Objects (XSL-FO).

★ XSLT style sheets are used to transform XML documents into different forms or formats, perhaps using different DTDs.
★ One common use for XSLT is to transform XML documents into XHTML documents, primarily for display. In the transformation of an XML document, the content of elements can be moved, modified, sorted, and converted to attribute values, among other things.
★ XSLT style sheets are XML documents, so they can be validated against DTDs.
★ They can even be transformed with the use of other XSLT style sheets.
★ The XSLT standard is given at http://www.w3.org/TR/xslt.
★ XPath is a language for expressions, which are often used to identify parts of XML documents, such as specific elements that are in specific positions in the document or elements that have particular attribute values.
★ XPath is also used for XML document querying languages, such as XQL, and to build new XML document structures with XPointer. The XPath standard is given at http://www.w3.org/TR/xpath.

OVERVIEW OF XSLT

♥ XSLT is actually a simple functional-style programming language.
♥ Included in XSLT are functions, parameters, names to which values can be bound, selection constructs, and conditional expressions for multiple selection.
♥ XSLT processors take both an XML document and an XSLT document as input. T
♥ he XSLT document is the program to be executed; the XML document is the input data to the program.
♥ Parts of the XML document are selected, possibly modified, and merged with parts of the XSLT document to form a new document, which is sometimes called an XSL document.
♥ The transformation process used by an XSLT processor is shown in Figure 7.5.

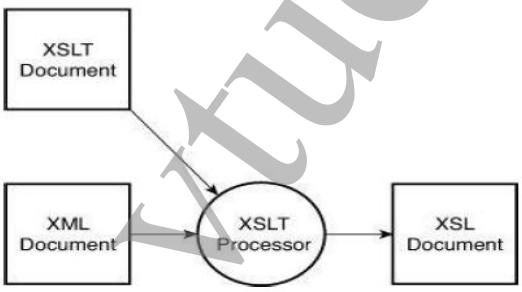


Figure 7.5 XSLT processing

♥ An XSLT document consists primarily of one or more templates.
♥ Each template describes a function that is executed whenever the XSLT processor finds a match to the template's pattern.
♥ One XSLT model of processing XML data is called the template-driven model, which works well when the data consists of multiple instances of highly regular data collections, as with files containing records.
♥ XSLT can also deal with irregular and recursive data, using template fragments in what is called the data-driven model.
♥ A single XSLT style sheet can include the mechanisms for both the template- and data-driven models.

XSL TRANSFORMATIONS FOR PRESENTATION

Consider a sample program:

//6b.xml

```
<?xml version="1.0" encoding="utf-8"?>
<?xml-stylesheet type="text/xsl" href="6b.xsl"?>

<vtu>
<student>
        <name>Santhosh B S</name>
```

```
        <usn>1RN10CS090</usn>
        <collegeName>RNSIT</collegeName>
        <branch>CSE</branch>
        <year>2010</year>
        <email> santhosh.b.suresh@gmail.com </email>
</student>
<student>
         <name>Akash Bangera</name>
        <usn>1RN10CS003</usn>
        <collegeName>RNSIT</collegeName>
        <branch>CSE</branch>
        <year>2010</year>
        <email>akash.bangera@gmail.com</email>
</student>
<student>
        <name>Manoj Kumar</name>
        <usn>1RN10CS050</usn>
        <collegeName>RNSIT</collegeName>
        <branch>CSE</branch>
        <year>2010</year>
        <email>manoj.kumar@gmail.com</email>
</student>
</vtu>
```

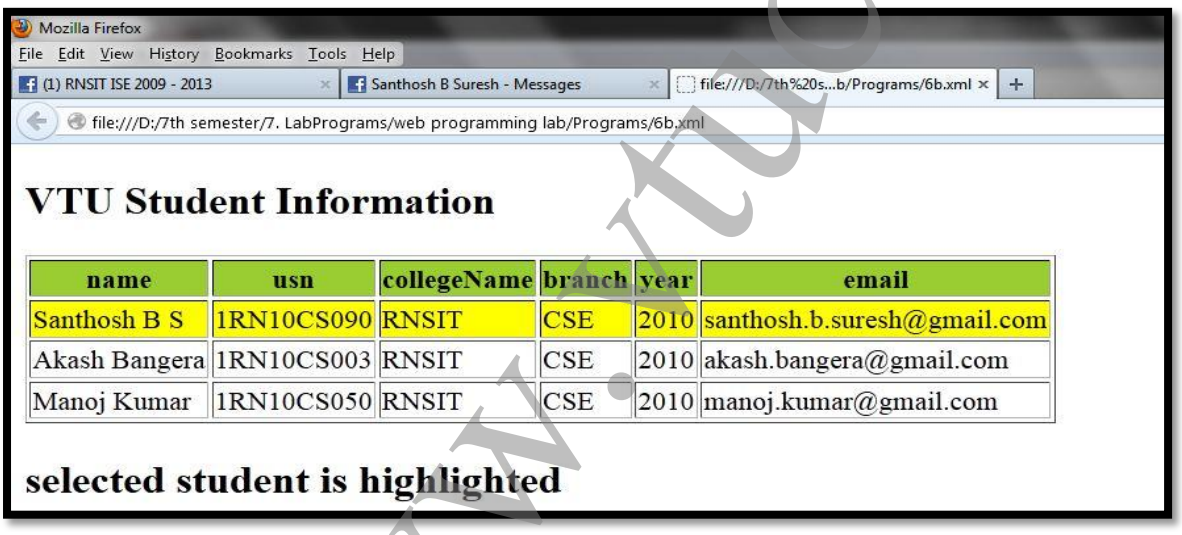
An XML document that is to be used as data to an XSLT style sheet must include a processing instruction to inform the XSLT processor that the style sheet is to be used. The form of this instruction is as follows:

```
<?xml-stylesheet type = "text/xsl" href =
                                    "XSL_stylesheet_name" ?>
```

//6b.xsl

```
<?xml version="1.0" encoding="utf-8"?>
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
<xsl:template match="/">
 <html>
 <body>
 <h2>VTU Student Information</h2>
  <table border="1">
   <tr bgcolor="#99cd32">
    <th>name</th>
    <th>usn</th>
    <th>collegeName</th>
    <th>branch</th>
    <th>year</th>
    <th>email</th>
     </tr>

   <xsl:for-each select="vtu/student">
   <xsl:choose>
    <xsl:when test="name = 'Santhosh B S'">
    <tr bgcolor="yellow">
    <td><xsl:value-of select="name"/></td>
    <td><xsl:value-of select="usn"/></td>
    <td><xsl:value-of select="collegeName"/></td>
    <td><xsl:value-of select="branch"/></td>
```

```
    <td><xsl:value-of select="year"/></td>
    <td><xsl:value-of select="email"/></td>
    </tr>
    </xsl:when>
    <xsl:otherwise>
     <tr >
    <td><xsl:value-of select="name"/></td>
    <td><xsl:value-of select="usn"/></td>
    <td><xsl:value-of select="collegeName"/></td>
    <td><xsl:value-of select="branch"/></td>
    <td><xsl:value-of select="year"/></td>
    <td><xsl:value-of select="email"/></td>
   </tr>
    </xsl:otherwise>
   </xsl:choose>
   </xsl:for-each>
  </table>
<h2>selected student is highlighted</h2>
 </body>
 </html>
</xsl:template>
</xsl:stylesheet>
```



An XSLT style sheet is an XML document whose root element is the special-purpose element `stylesheet`. The `stylesheet` tag defines namespaces as its attributes and encloses the collection of elements that defines its transformations. It also identifies the document as an XSLT document.

<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

In many XSLT documents, a template is included to match the root node of the XML document.

<xsl:template match="/">

In many cases, the content of an element of the XML document is to be copied to the output document. This is done with the `value-of` element, which uses a `select` attribute to specify the element of the XML document whose contents are to be copied.

<xsl:value-of select="name"/>

The `select` attribute can specify any node of the XML document. This is an advantage of XSLT formatting over CSS, in which the order of data as stored is the only possible order of display.

XML PROCESSORS

The XML processor takes the XML document and DTD and processes the information so that it may then be used by applications requesting the information. The processor is a software module that reads the XML document to find out the structure and content of the XML document. The structure and content can be derived by the processor because XML documents contain self-explanatory data.

THE PURPOSES OF XML PROCESSORS

- ★ First, the processor must check the basic syntax of the document for well-formedness.
- ★ Second, the processor must replace all references to entities in an XML document with their definitions.
- ★ Third, attributes in DTDs and elements in XML schemas can specify that their values in an XML document have default values, which must be copied into the XML document during processing.
- ★ Fourth, when a DTD or an XML schema is specified and the processor includes a validating parser, the structure of the XML document must be checked to ensure that it is legitimate.

THE SAX APPROACH

- The Simple API for XML (SAX) approach to processing is called event processing.
- The processor scans the XML document from beginning to end.
- Every time a syntactic structure of the document is recognized, the processor signals an event to the application by calling an event handler for the particular structure that was found.
- The syntactic structures of interest naturally include opening tags, attributes, text, and closing tags.
- The interfaces that describe the event handlers form the SAX API.

THE DOM APPROACH

- The Document Object Model (DOM) is an application programming interface (API) for HTML and XML documents.
- It defines the logical structure of documents and the way a document is accessed and manipulated
- Properties of DOM
  - Programmers can build documents, navigate their structure, and add, modify, or delete elements and content.
  - Provides a standard programming interface that can be used in a wide variety of environments and applications.
  - structural isomorphism.
- The DOM representation of an XML document has several advantages over the sequential listing provided by SAX parsers.
- First, it has an obvious advantage if any part of the document must be accessed more than once by the application.
- Second, if the application must perform any rearrangement of the elements of the document, that can most easily be done if the whole document is accessible at the same time.
- Third, accesses to random parts of the document are possible.
- Finally, because the parser sees the whole document before any processing takes place, this approach avoids any processing of a document that is later found to be invalid.

WEB SERVICES

A Web service is a method that resides and is executed on a Web server, but that can be called from any computer on the Web. The standard technologies to support Web services are WSDL, UDDI, SOAP, and XML.
WSDL - It is used to describe the specific operations provided by the Web service, as well as the protocols for the messages the Web service can send and receive.
UDDI - also provides ways to query a Web services registry to determine what specific services are available.
SOAP - was originally an acronym for Standard Object Access Protocol, designed to describe data objects.
XML - provides a standard way for a group of users to define the structure of their data documents, using a subject-specific mark-up language.

SYLLABUS

UNIT 1

FUNDAMENTALS OF WEB, XHTML – 1:
Internet, WWW, Web Browsers, and Web Servers; URLs; MIME; HTTP; Security; The Web Programmers Toolbox. XHTML: Origins and evolution of HTML and XHTML; Basic syntax; Standard XHTML document structure; Basic text markup.

UNIT 2

XHTML – 2:
Images; Hypertext Links; Lists; Tables; Forms; Frames; Syntactic differences between HTML and XHTML.

UNIT 3

CSS:
Introduction; Levels of style sheets; Style specification formats; Selector forms; Property value forms; Font properties; List properties; Color; Alignment of text; The Box model; Background images; The and tags; Conflict resolution.

UNIT 4

JAVASCRIPT:
Overview of Javascript; Object orientation and Javascript; General syntactic characteristics; Primitives, operations, and expressions; Screen output and keyboard input; Control statements; Object creation and modification; Arrays; Functions; Constructor; Pattern matching using regular expressions; Errors in scripts; Examples.

UNIT 5

JAVASCRIPT AND HTML DOCUMENTS:
The Javascript execution environment; The Document Object Model; Element access in Javascript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model; The navigator object; DOM tree traversal and modification.

UNIT - 6

DYNAMIC DOCUMENTS WITH JAVASCRIPT:
Introduction to dynamic documents; Positioning elements; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click; Slow movement of elements; Dragging and dropping elements.

UNIT - 7

XML:
Introduction; Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS; XSLT style sheets; XML processors; Web services.

UNIT - 8

PERL, CGI PROGRAMMING:
Origins and uses of Perl; Scalars and their operations; Assignment statements and simple input and output; Control statements; Fundamentals of arrays; Hashes; References; Functions; Pattern matching; File input and output; Examples. The Common Gateway Interface; CGI linkage; Query string format; CGI.pm module; A survey example; Cookies.

R N S INSTITUTE OF TECHNOLOGY

CHANNASANDRA, BANGALORE - 98

PROGRAMMING THE WEB

7TH SEMESTER INFORMATION SCIENCE

SUBJECT CODE: 06CS73

PREVIOUS VTU QUESTION PAPERS

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UNIT 1 - VTU QUESTION BANK

No	QUESTIONS	YEAR	MARKS
1.	Explain the tasks of DNS name server	Dec 09	5
2.	Explain response phase of http	Dec 09	5
3.	Give syntax and an example for each of the following tags. 1.<pre> 2.<a> 3.<img> 4.<sub> 5.<p>	Dec 09	10
4.	Explain at least two uses of the following. 1. Perl 2.php 3.java script 4.xml 5.MIME type specification.	June 10	10
5.	Explain with an example the following tags 1.select 2.frames 3.colspan 4.radio button 5.style class selector	June 10	10
6.	How does domain name conversion happen on web? Describe the concept with a figure by taking a suitable example.	Dec10	6
7.	Give and explain response and request phases of hyper text transfer protocol.	Dec10	8
8.	What is the purpose of MIME type specification in request or response transaction between browser and server?	Dec10	3
9.	Give and explain syntax of following tags 1.<blockquote> 2.meta	Dec10	3
10.	Explain the concept of domain name conversion with figure and suitable example.	June 12	5
11.	Explain request phase of http	June 12	5
12.	Give syntax and an example for each of the following tags. 1.<pre> 2.<p> 3.<sup> 4.<sub> 5.<blackquote>	June 12	10
13.	Explain HTTP.	June 11	5
14.	Explain web server operations and general server characteristics.	June 11	5
15.	Explain two web programmers tool used in web programming.	June 11	10
16	Describe a fully qualified domain name and explain how fully qualified domain names are translated into IP	Dec 11	6
17	What is HTTP? Explain its phases in detail	Dec 11	10
18	Explain the following tags with examples: <img> and <a>	Dec 11	4

UNIT 2 - VTU QUESTION BANK

No	QUESTIONS	YEAR	MARKS
1	Write an XHTML document to describe an ordered list of your five favourite movies. Each element of the list must have a nested list of atleast two actors in your favourite movies.	Dec 09	5
2	With examples, explain a style class selector.	Dec 09	5
3	Write an XHTML document that has six short paragraphs of text. Define three different paragraph styles p1, p2 and p3. The p1 style must use left and right margins of 20 pixels, a background colour of yellow, and a foreground color of blue . The p2 style must use font size of 18 points, font name 'Arial' and a font style in italic form. The p3 style must use a text indent of 1 centimeter , a background color of green, and a foreground color of white. The 1st and the 4th paragraph must use p1, the 2nd and 5th must use p2 and the 3rd and 6th must use p3.	Dec 09	10
4	Explain the following with respect to table creation in XHTML documents: Align and valign attributes tr, th and td attributes Rowspan and Colspan attributes Cell padding and Cell spacing attributes	June 10	10
5	Create XHTML document to describe a table with the following contents: The columns of the table must have the headings pine, maple, Oak and fir. The rown must have the labels average height, average width, typical lifespan, and leaf type. Fill the data cells with some values.	June 10	10
6	Create , test and validate a XHTML document that has a form with Three text boxes to collect user name and address. Tables with the headings product name , price and quantity and the values are 100—watts light bulb, $2.39 , 4 200—watts light bulb, $4.29 , 8 100—watts long life light bulbs, $3.95 , 4 200—watts long life light bulbs, $7.49 , 8 A collection of 4 radio buttons that are labeled as Visa Master card Discover Check A submit and a reset button	Dec 10	10
7	Explain the syntactic differences between HTML and XHTML	Dec 10	5
8	Create XHTML document that has two frames. The left frame displays contents.html and the right frame displays cars.html where the second frame is a target of link from the first frame. [Note: contents.html is a list of links to the cars description.]	Dec 10	5
9	What tag and attribute are used to describe a link? Discuss about it.	June 11	4

10	Explain all controls that are created with the <input> tag with examples, which are used for text collection.	**June 11**	**8**
11	Explain the XHTML tags used for lists in documents.	**June 11**	**8**
12	Write an XHTML document to describe an ordered list of four states. Each element of the list must have an unordered list of atleast two cities in the state.	**June 12**	**5**
13	Explain the syntactic differences between HTML and XHTML.	**June 12**	**5**
14	Explain the following , with respect to table creation in XHTML documents. <table> tr, th and td attributes rowspan and colspan attributes align and valign attributes cell padding and cell spacing	**June 12**	**10**
15	Bring out the differences between HTML and XHTML	**Dec 11**	**6**
16	Write an XHTML program to create a link within a document	**Dec 11**	**4**
17	Create XHTML document that defines a table with 5 rows and 5 columns. The first row should contain country name, gold, silver, bronze (all three indicating the type of medals) and total in each column respectively. Fill in the information details in the table with appropriate values. After filling the details, set red color to the background for the first row, blue for the second, yellow for the third, purple for the fourth and green for the fifth row. Use of align and valign attributes for this table has to be made at the appropriate places	**Dec 11**	**10**

UNIT 3 - VTU QUESTION BANK

No	QUESTIONS	YEAR	MARKS
1.	With examples describe all input and output operations in java script	Dec 09	10
2.	Give examples for different ways an array object can be created in java script and also write XHTML document and java script code to sort N given values using a sorting techniques	Dec 09	10
3.	Explain the following CSS tags with example, class selectors, pseudo classes, background images, text decoration, alignment of text .	June 10	10
4.	Create an XHTML document that includes atleast 2 images and enough text to preceed the images flow around them and continue after the last image(use CSS tags)	June 10	10
5.	What are selector forms? Explain with example different types of selector forms with syntax	Dec 10	6
6.	How many levels of style sheet are there? Explain their usage with syntax and example	Dec 10	6
7.	Write document level style sheet to illustrate the text decoration	Dec 10	4
8.	Write the conflict resolution in cascading style sheets	Dec 10	4
9.	What is the purpose of external level style sheet? Compare it with other 2 levels. Write the format of external level style sheet	Jun 11	4
10.	Explain all selector forms	June 11	6
11.	Explain and tags	June 11	5
12.	Write a note on conflict resolution	June 11	5
13.	Explain all selector forms	June 12	5
14.	Explain the usage of different levels of style sheets with syntax and explain	June 12	5
15.	Explain the following with example, pseudo classes, background images, text decoration, alignment of text, and tags.	June 12	10
16	List out the variety of selector forms available in CSS and explain in detail	Dec 11	8
17	Explain the different levels of style sheets available in CSS	Dec 11	4
18	Explain the box model (margin and padding property) with respect to CSS	Dec 11	8

UNIT 4 - VTU QUESTION BANK

No	QUESTIONS	YEAR	MARKS
1.	Describe functions in java script. Write XHTML document and java script function to compute and print factorial of a number.	Dec 09	10
2.	Write XHTML document and java script code to implement the following: i) To count the number of names in the given array that end in either "ie" or "y". ii) To print the position in the string of the leftmost vowel.	Dec 09	10
3.	Describe briefly three major uses of java script on the client side	June 10	6
4.	Describe briefly the basic process of event driven computation.	June 10	4
5.	Write a function in java script to check whether the given string has the form string1, string2 letters where both the string must be all lowercase letters except the first letter and "letter "must be upper case. If the string is of the given format the function should return true or false otherwise.	June 10	10
6.	Explain with examples, the screen output and keyboard input methods.	Dec10	5
7.	Write a javascript to accept three numbers using the prompt method. Find and display the largest of three using alert method. Use predefined function Math.max.	Dec10	5
8.	Write a javascript that contains a function named tst_phone_num, which tests the phone number of the format ddd-dddd-ddddddd <091-8256-1234567>and display whether the given number is valid or not using alert.	Dec 10	5
9.	Write a note on character and character classes.	Dec 10	5
10.	Explain the screen output and keyboard input methods, with examples	June 12	8
11.	Explain the java script array methods, with examples	June 12	7
12.	Write an XHTML document and Javascript function to compute and print reverse of a given number	June 12	5
13.	Describe three major differences between java and javascript.	June 11	3
14.	Explain java script array methods with examples.	June 11	7
15.	Explain screen output and keyboard input.	June 11	10
16	Explain different primitive types in javascript	Dec 11	5
17	Explain the concept of object creation and modification in javascript	Dec 11	5
18	Develop and demonstrate the use of javascript, a XHTML document that illustrates the USN (the valid format is: A digit from 1 To 4 followed by two upper-case characters followed by two digits Followed by two upper-case characters followed by three digits; no Embedded spaces allowed) of the user. Event handler must be Included for the form element that collects this information to validate the input. Messages in the alert windows must be produced when errors are detected.	Dec 11	10

UNIT 5 - VTU QUESTION BANK

No	QUESTIONS	YEAR	MARKS
1	With an example, explain on focus event in java script.	Dec 09	5
2	Describe the approach to addressing XHTML elements using forms and elements	Dec 09	5
3	Write an XHTML document which displays a form containing text elements to input register number, sub-code, marks in three tests and a button element. Also write java script code to computer average of two better tests on click of button and print average marks using alert.	Dec 09	10
4	What are the two ways in which an event handler can be associated with an event generated by a specific XHTML element in the DOM2 event model?	June 10	6
5	Describe the approach to addressing XHTML elements using forms and elements	June 10	6
6	Write XHTML file and java script, scripts to sort a set of number in either ascending order or descending order. The sorting order is input from the user which is either “ascending” or “descending”. The sorted numbers should be displayed with proper headings.	June 10	8
7	What are the different approaches to addressing XHTML elements? Describe with examples	Dec 10	6
8	Explain the three phases of event processing in the DOM2 event model.	Dec 10	6
9	Write a java script to compare two passwords.	Dec 10	8
10	Discuss the different approaches of XHTML element access in javascript.	June 11	6
11	Explain, with an example, handling events from body elements using onload attribute.	June 11	4
12	Explain event handler connection for DOM2 event model.	June 11	10
13	What are the different approaches to addressing XHTML elements? Describe with examples.	June 12	6
14	Explain with an example, focus event in javascript	June 12	6
15	Write a java script to compare two passwords	June 12	8
16	Write XHTML and javascript, script which has 6 buttons, labelled 6 different subjects. The event handler for these buttons must produce message starting the chosen favourite subject. The event handler must be implemented as a function, whose name must be assigned to the onclick attribute of the radio button element. The chosen subject must be sent to the event handler as a parameter. Use a click event to trigger a call to alert, which should display a brief description of the selected subject	Dec 11	10
17	Write the XHTML and javascript, script that checks passwords, that includes two passwords as input elements, along with reset and submit buttons. Implement the below mentioned functions to check: i) Both entered passwords are same ii) Both entered passwords are different iii) If no password is typed in either of the password fields Use on submit event to trigger a call to display an alert box if the error occurs	Dec 11	7
18	Explain all parameters of addEventListener method	Dec 11	3

UNIT 6 - VTU QUESTION BANK

No	QUESTIONS	YEAR	MARKS
1	With examples, explain absolute and relative positioning of elements in java script	Dec 09	10
2	Write an XHTML document that contains three short paragraphs of text, stacked on top of each other, with only enough of each showing, so that mouse cursor can always be placed over some part of them. Write java script code so that when cursor is placed over the exposed part of any paragraph, it should rise to the top to become completely visible.	Dec 09	10
3	Explain the following, with an example each: i) Absolute positioning ii) Dynamic content iii) Element visibility iv) Stacking elements.	June 10	12
4	Write an XHTML document to display an image and three buttons. The buttons should be labeled simply 1, 2 and 3. When pressed, each button should change the content of the image to that of a different image.	June 10	8
5	Explain the different types of positioning, with examples.	Dec 10	6
6	Write a java script that illustrates the dynamic stacking of images.	Dec 10	6
7	Write a java script which displays the message 'hello, how are you?' when the mouse button is pressed no matter where it is on the screen.	Dec 10	6
8	What exactly is stored in the screen X and screen Y properties after a mouse click?	Dec 10	2
9	Describe all the differences between the three possible values of the position property.	June 11	7
10	Explain element visibility	June 11	3
11	With an example of XHTML document with java script, explain dynamic content	June 11	10
12	With examples, explain the absolute and relative positioning of elements in javascript	June 12	8
13	Write javascript that illustrates dynamic stacking of images.	June 12	8
14	Explain the element visibility, with examples.	June 12	4
15	Explain the different types of positioning, with examples.	Dec 11	10
16	Write XHTML and javascript, script that illustrate the DOM2 event model which allows the user to drag and drop words to complete a paragragh (create atleast 10 words). Use both DOM0 and DOM2 event model concept	Dec 11	10

UNIT 7 - VTU QUESTION BANK

No	QUESTIONS	YEAR	MARKS
1	What are the two primary tasks of a validating XML parser?	Dec 09	4
2	How does an XSLT processor use an XSLT style sheet with an XML document?	Dec 09	6
3	With examples, explain string functions in PERL.	Dec 09	10
4	Explain the three types that can be used to describe data in an element declaration, with an example for each.	June 10	6
5	What are the four possible parts of an attribute declaration in a DTD?	June 10	4
6	Describe briefly an XML name space.	June 10	4
7	Briefly explain the purposes of XML processor	June 10	6
8	What is the document type definition (DTD)? Describe the approach to declare elements, entities and attributes.	Dec 10	8
9	Create an XML document that lists advertisement for selling used cars.	Dec 10	6
10	With a neat diagram, explain the transformation process by an XSLT processor.	Dec 10	6
11	What is the purpose of DTD? What are four possible keywords in DTD declaration? Write their format.	June 11	5
12	What is the purpose of character data section? Explain with an example.	June 11	5
13	Explain the two categories of user defined XML schema data types.	June 11	4
14	Mention the advantages of XML schema over DTDs.	June 11	6
15	What is document type definition (DTD)? Describe the approach to declare element entities and attributes.	June 12	10
16	Explain briefly an XML namespace	June 12	4
17	Explain the purposes of XML processor	June 12	6
18	What is DTD? Explain how to create elements, attributes and entities in DTD	Dec 11	10
19	Explain the concept of XSLT processing	Dec 11	4
20	With an example, explain how an XSLT processor uses an XSLT style sheet with an XML document?	Dec 11	6

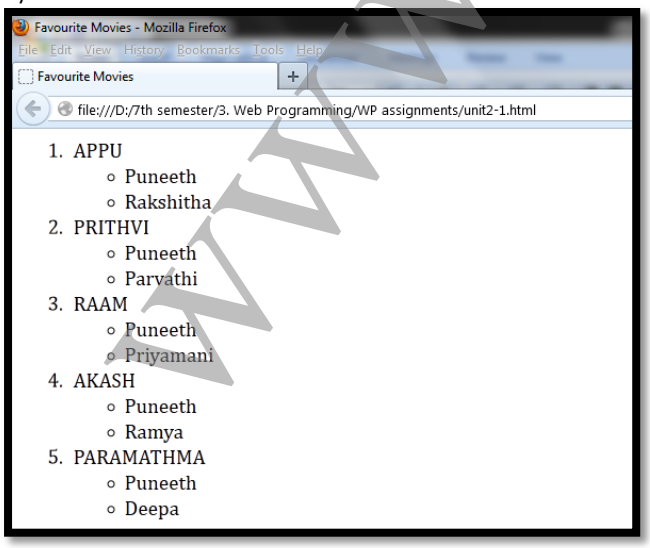
UNIT 1 – VTU PAPER SOLUTIONS

1. Refer page 3
2. Refer page 6
3. Refer page
    a. <pre> → 11
    b. <a> → 17
    c. <img> → 15
    d. <sub> → 13
    e. <p> → 10
4. Refer page 7
5. Refer page
    a. Select → 29
    b. Frames → 32
    c. Colspan → 23
    d. Radio button → 28
    e. Style class selector → 38
6. Refer page 2 and 3
7. Refer page 5 and 6
8. Refer page 5
9. Refer page 12 for <blockquote> and page 14 for <meta>
10. Already mentioned
11. Refer page 5
12. Already mentioned
13. Already mentioned
14. Refer page 4
15. Refer page 7
    i. **Plug-ins and Filters →**
    Plug-ins are programs that can be integrated together with a word processor. Plug-ins add new capabilities to the word processor, such as toolbar buttons and menu elements that provide convenient ways to insert XHTML into the document being created or edited. The plug-in makes the word processor appears to be an XHTML editor that provides WYSIWYG XHTML document development. The end result of this process is an XHTML document. The plug-in also makes available all the tools that are inherent in the word processor during XHTML document creation, such as a spell-checker and a thesaurus.
    A second kind of converter is a filter, which converts an existing document in some form, such as LaTeX or Microsoft Word, to XHTML. Filters are never part of the editor or word processor that created the document—an advantage because the filter can then be platform independent. For example, a Word-Perfect user working on a Macintosh computer can use a filter running on a UNIX platform to provide documents that can be later converted to XHTML. The disadvantage of filters is that creating XHTML documents with a filter is a two-step process: First you create the document, and then you use a filter to convert it to XHTML.
    ii. Javascript →
    JavaScript is a client-side scripting language whose primary uses in Web programming are to validate form data and to create dynamic XHTML documents. JavaScript "programs" are usually embedded in XHTML documents, which are downloaded from a Web server when they are requested by browsers. The JavaScript code in an XHTML document is interpreted by an interpreter embedded in the browser on the client. One of the most important applications of JavaScript is to dynamically create and modify documents. JavaScript defines an object hierarchy that matches a hierarchical model of an XHTML document. Elements of an XHTML document are accessed through these objects, providing the basis for dynamic documents.
16. DNS - Already mentioned
17. Already mentioned
18. Already mentioned

UNIT 2 – VTU PAPER SOLUTIONS

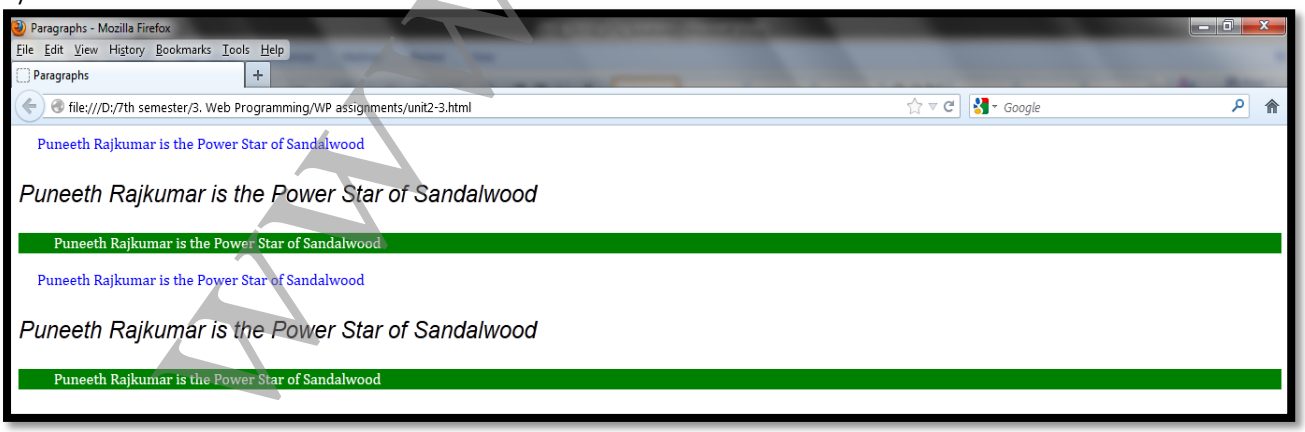
1. //unit2-1.html

```
<html>
<head>
<title>Favourite Movies</title>
</head>
<body>
<ol>
<li>APPU</li>
        <ul>
        <li>Puneeth</li>
        <li>Rakshitha</li>
        </ul>
<li>PRITHVI</li>
        <ul>
        <li>Puneeth</li>
        <li>Parvathi</li>
        </ul>
<li>RAAM</li>
        <ul>
        <li>Puneeth</li>
        <li>Priyamani</li>
        </ul>
<li>AKASH</li>
        <ul>
        <li>Puneeth</li>
        <li>Ramya</li>
        </ul>
<li>PARAMATHMA</li>
        <ul>
        <li>Puneeth</li>
        <li>Deepa</li>
        </ul>
</ol>
</body>
</html>
```



2. Refer page 38
3. //unit2-3.html

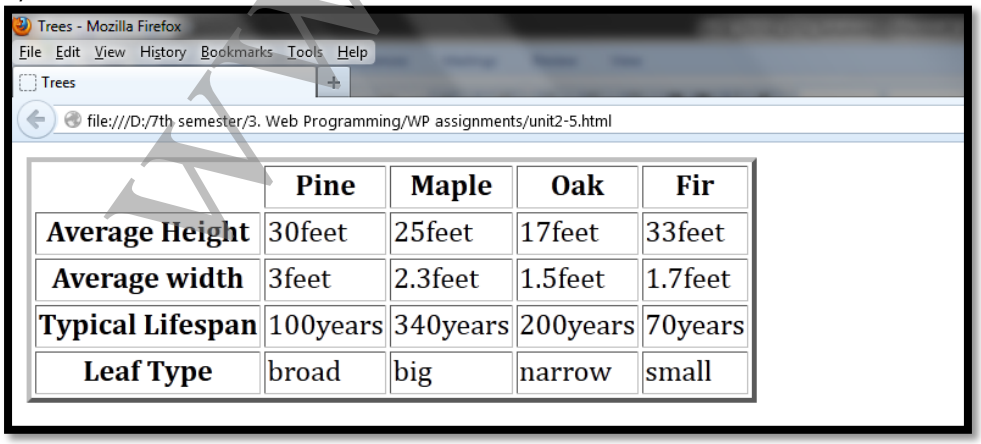
```
<html>
 <head>
  <title> Paragraphs </title>
   <style type = "text/css">
    p.one
     {
      margin-left:20px;
      margin-right:20px
      background-color:yellow;
      color:blue;
     }
     p.two
      {
      font: italic 18pt Arial;
      }
      p.three
       {
      text-indent: 1cm;
      background-color:green;
      color: white;
       }

      </style>
    </head>
    <body>
     <p class = "one"> Puneeth Rajkumar is the Power Star of Sandalwood<br/>
      </p>
      <p class = "two"> Puneeth Rajkumar is the Power Star of Sandalwood<br/>
      </p>
       <p class = "three"> Puneeth Rajkumar is the Power Star of Sandalwood<br/>
      </p>
       <p class = "one"> Puneeth Rajkumar is the Power Star of Sandalwood<br/>
     </p>
      <p class = "two"> Puneeth Rajkumar is the Power Star of Sandalwood<br/>
      </p>
       <p class = "three"> Puneeth Rajkumar is the Power Star of Sandalwood<br/>
      </p>
    </body>
</html>
```



4. Refer page
   a. Align & valign → 24
   b. tr, th, td → 22
   c. rowspan & colspan → 23
   d. cell spacing & padding → 25

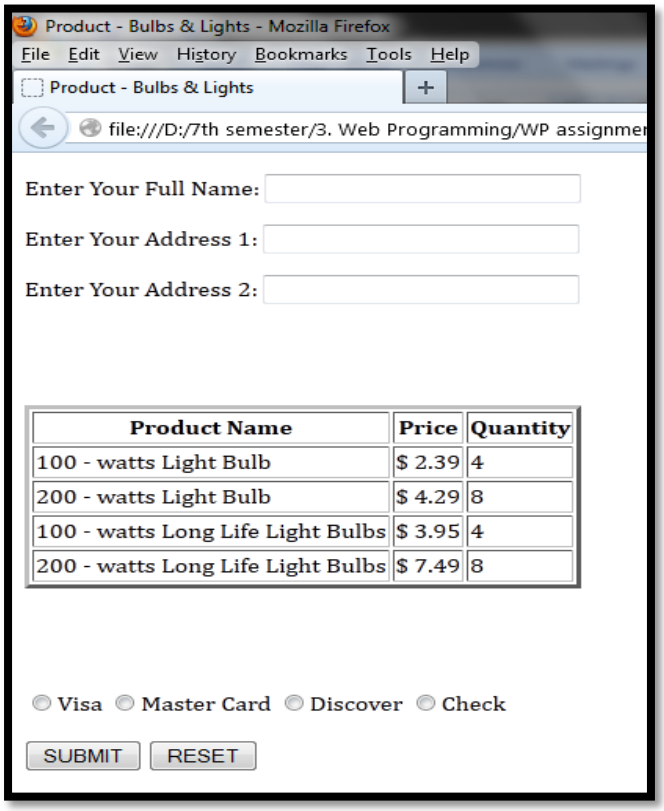
5. //unit2-5.html

```
<html>
<head>
<title>Trees</title>
</head>
<body>
<table border = "3">
<tr>
        <th></th>
        <th>Pine</th>
        <th>Maple</th>
        <th>Oak</th>
        <th>Fir</th>
</tr>
<tr>
        <th>Average Height</th>
        <td>30feet</td>
        <td>25feet</td>
        <td>17feet</td>
        <td>33feet</td>
</tr>
<tr>
        <th>Average width</th>
        <td>3feet</td>
        <td>2.3feet</td>
        <td>1.5feet</td>
        <td>1.7feet</td>
</tr>
<tr>
        <th>Typical Lifespan</th>
        <td>100years</td>
        <td>340years</td>
        <td>200years</td>
        <td>70years</td>
</tr>
<tr>
        <th>Leaf Type</th>
        <td>broad</td>
        <td>big</td>
        <td>narrow</td>
        <td>small</td>
</tr>
</table>
</body>
</html>
```



6. //unit2-6.html

```
<html>
<head>
<title>Product - Bulbs & Lights</title>
</head>
<body>
<form action="">
<p><label>Enter Your Full Name: <input type="text" size="30"/></label></p>
<p><label>Enter Your Address 1: <input type="text" size="30"/></label></p>
<p><label>Enter Your Address 2: <input type="text" size="30"/></label></p>
</form>
<br><br><br>
<table border = "3">
<tr>
        <th>Product Name</th>
        <th>Price</th>
        <th>Quantity</th>
</tr>
<tr>
        <td>100 - watts Light Bulb</td>
        <td>$ 2.39</td>
        <td>4</td>
</tr>
<tr>
        <td>200 - watts Light Bulb</td>
        <td>$ 4.29</td>
        <td>8</td>
</tr>
<tr>
        <td>100 - watts Long Life Light Bulbs</td>
        <td>$ 3.95</td>
        <td>4</td>
</tr>
<tr>
        <td>200 - watts Long Life Light Bulbs</td>
        <td>$ 7.49</td>
        <td>8</td>
</tr>
</table>
<br><br><br>
<form action = " ">
   <p>
    <label><input type="radio" name="card" value="one"/>Visa</label>

    <label><input type="radio" name="card" value="two"/>Master Card</label>

    <label><input type="radio" name="card" value="three"/>Discover</label>

    <label><input type="radio" name="card" value="four"/>Check</label>
  </p>
 <p>
     <input type="SUBMIT" value="SUBMIT"/>
     <input type="RESET"   value="RESET"/>
  </p>
 </form>
</body>
</html>
```



7. Refer page 35
8. //unit2-8.html

```
<html>
 <head>
  <title>Frames</title>
 </head>
  <frameset  cols = "30%,70%">
    <frame src = "unit2-8contents.html"/>
   <frame src = "unit2-8cars.html"/>
    <frame name = "description"/>
  </frameset>
</html>
```

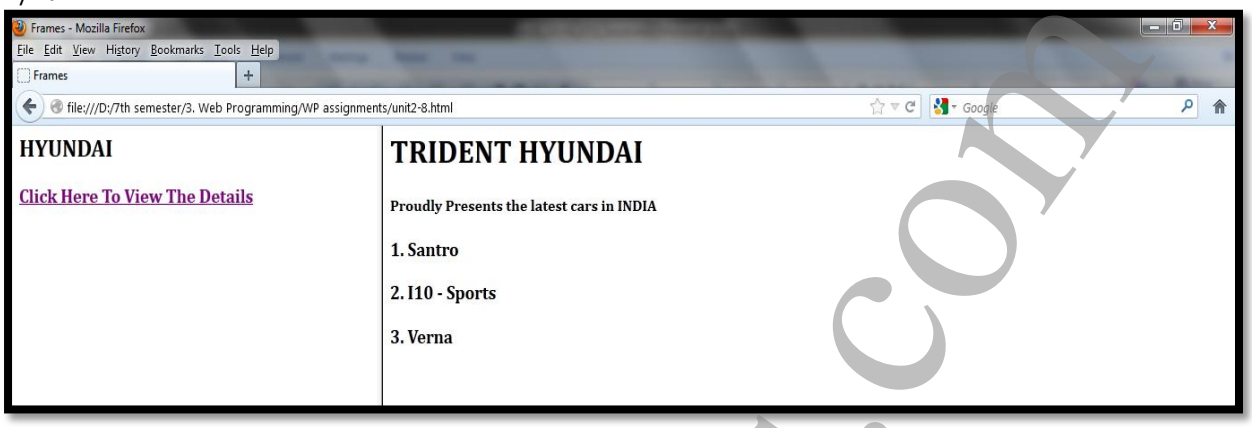
//unit2-8contents.html

```
<html>
 <head>
  <title>contents.html</title>
 </head>
  <body>
  <h2>HYUNDAI</h2>
   <h3>
    <a href="unit2-8cars.html" target = "description">
      Click Here To View The Details</a>
    </h3>
  </body>
</html>
```

//unit2-8cars.html

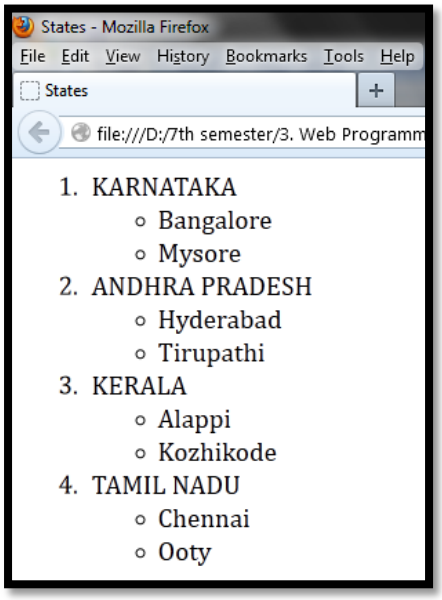
```
<html>
  <head>
    <title>cars.html</title>
  </head>
```

```
 <body>
  <h1>TRIDENT HYUNDAI</h1>
   <h4>Proudly Presents the latest cars in INDIA</h4>
   <h3>1. Santro</h3>
   <h3>2. I10 - Sports</h3>
   <h3>3. Verna</h3>
 </body>
</html>
```



9. Refer page 17
10. Refer page 26, 27,28
11. Refer page 19,20,21
12. //unit2-12.html

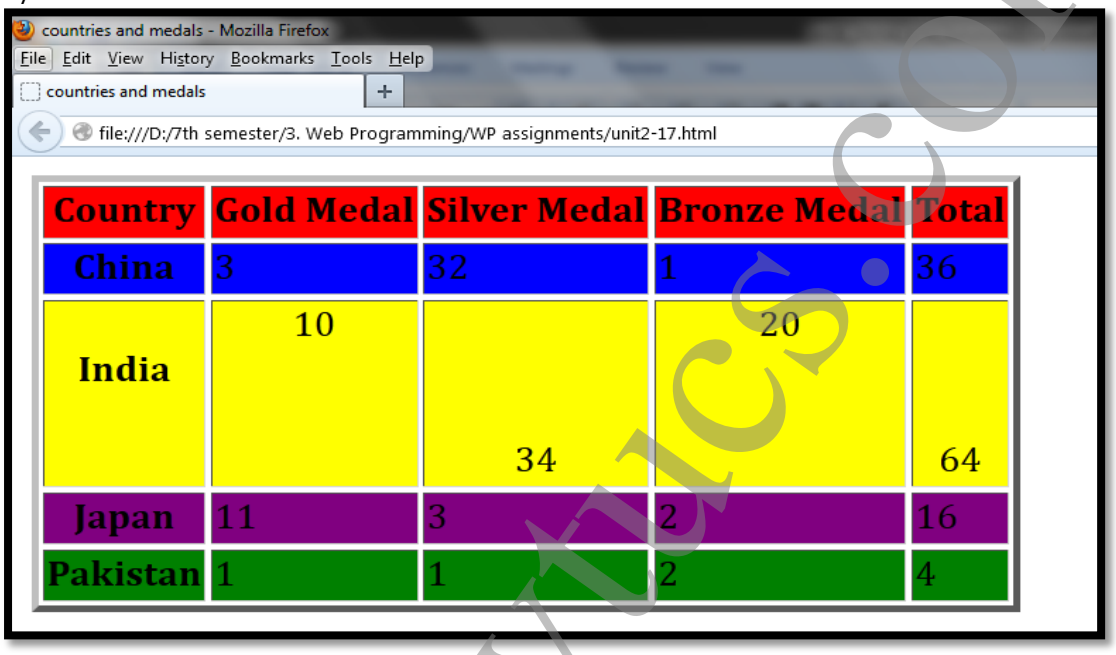
```
<html>
<head>
<title>States</title>
</head>
<body>
<ol>
<li>KARNATAKA</li>
        <ul>
        <li>Bangalore</li>
        <li>Mysore</li>
        </ul>
<li>ANDHRA PRADESH</li>
        <ul>
        <li>Hyderabad</li>
        <li>Tirupathi</li>
        </ul>
<li>KERALA</li>
        <ul>
        <li>Alappi</li>
        <li>Kozhikode</li>
        </ul>
<li>TAMIL NADU</li>
        <ul>
        <li>Chennai</li>
        <li>Ooty</li>
        </ul>
</ol>
</body>
</html>
```



13. Already Mentioned
14. Already Mentioned
15. Already Mentioned
16. Refer page 17,18 (Targets within a document)
17. //unit2-17.html

```
<html>
<head>
<title>countries and medals</title>
</head>
<body>
<table border = "3">
<tr style="background-color:red;">
        <th>Country</th>
        <th>Gold Medal</th>
        <th>Silver Medal</th>
        <th>Bronze Medal</th>
        <th>Total</th>
</tr>
<tr style="background-color:blue;">
        <th>China</th>
        <td>3</td>
        <td>32</td>
        <td>1</td>
        <td>36</td>
</tr>
<tr style="background-color:yellow;" align="center">
        <th><br/>India<br><br><br></th>
        <td valign="top">10</td>
        <td valign="bottom">34</td>
        <td valign="top">20</td>
        <td valign="bottom">64</td>
</tr>
<tr style="background-color:purple;">
        <th>Japan</th>
        <td>11</td>
        <td>3</td>
        <td>2</td>
```

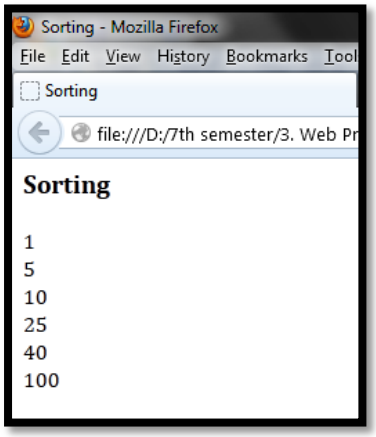
```
        <td>16</td>
</tr>
<tr style="background-color:green;">
        <th>Pakistan</th>
        <td>1</td>
        <td>1</td>
        <td>2</td>
        <td>4</td>
</tr>
</table>
</body>
</html>
```



UNIT 3 – VTU PAPER SOLUTIONS

1. Refer page 62
2. Refer page 67 for array object creation

```
//unit3-2.html
<html>
<head><title>Sorting</title>
<script type = "text/javascript" src = "unit3-2.js">
</script>
</head>
</html>

// unit3-2.js
var points = [40, 100, 1, 5, 25, 10];
document.write("<h3>Sorting </h3> " );
points.sort(function(a,b){return a-b});
for (i=0;i<points.length;i++)
{
        document.write(points[i] + "<br >");
}
```



3. Refer page
   a. Class selectors → 38
   b. Pseudo classes → 41
   c. Background images → 51 & 52
   d. Text decoration → 44
   e. Alignment of text → 48
4.

```
//unit3-4.html
<html>
 <head>
 <title>Text Alignment</title>
 <style type = "text/css">
  h1.one
 {text-align: center}
  p.two
 {text-indent: 0.5in; text-align: justify;}
 img{float:left}
    </style>
 </head>
 <body>
```

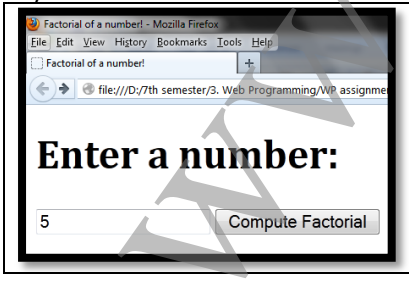
```
<h1 class = "one">Kannadada Kotyadhipathi</h1>
<p>
   <img src = "kk2.jpg" alt="error"/>
</p>
   <p class = "two">Kannadada Kotyadhipathi is a Kannada primetime quiz show hosted by the power star of Kannada cinema Mr. Puneet Rajkumar. This is the biggest game show ever on Kannada Television. This show will be aired on Suvarna TV. This show gives the common man an opportunity to win Rs 1 crore. Kannadada Kotyadipathi is a Kannada primetime quiz and human drama show hosted by matinee idol Puneeth Rajkumar on Suvarna TV. Contestants participate in a game that allows them to win up to Rs. 1 crore. </p>
   <p>
         <img src = "kk3.jpg" alt="error"/>
</p>
   <p>  Short-listed contestants play a 'Fastest Finger First' round to make it to the main game. From there on, they play rounds with increasing levels of difficulty, and winning higher amounts of money, culminating in the Rs. 1 crore prize. Contestants can stop at any time having viewed the next question. Or they can avail of a 'Lifeline' and play on. Welcome to the world of high stakes chills and thrills! Welcome to the world of the crorepati!</p>
</body>
</html>
```

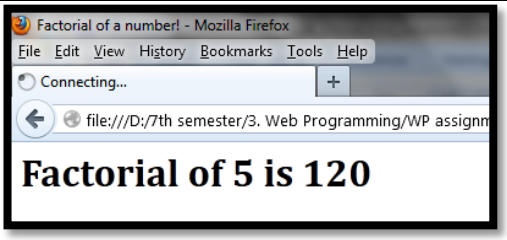
5. Refer page 38, 39, 40, 41 but condense the contents for 6 marks
6. Refer page 36 and 37
7. Refer page 44
8. Refer page 53 and 54
9. Refer page 36 and 37
10. Already Mentioned
11. Refer page 52 and 53
12. Already Mentioned
13. Already Mentioned
14. Already Mentioned
15. Already Mentioned
16. Already Mentioned
17. Already Mentioned
18. Refer page 49 and 50. Write about box model and margins & padding property

UNIT 4 – VTU PAPER SOLUTIONS

1. Refer page 70 for functions

```
//unit4-1.html
<html>
<head>
<title>Factorial of a number!</title>
<script type="text/javascript">
function displayFactorial(elem)
        {
                var n = elem.value;
                var fact =1;
                  if(n==0)
                  {
                          fact =1;
                  }
                  else
                  {
                          while(n>0)
                          {
                                  fact = fact *n;
                                  n=n-1;
                          }
                        document.write("<h1>Factorial of " + elem.value + " is " + fact + "</h1>");
                  }
        }
</script>
</head>
<body>
<form>
<h1>Enter a number: </h1>
<input type='text' id='numbers'/>
<input type='button' onclick="displayFactorial(document.getElementById('numbers'))"
value='Compute Factorial' />
</form>
</body>
</html>
```

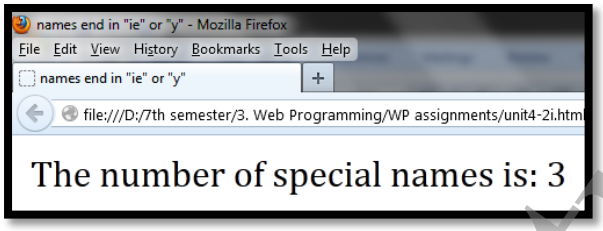




2. //unit4-2i.html

```
<html>
<head>
<title>names end in "ie" or "y" </title>
<script type = "text/javascript">
function e_names(names) {
```

```
  var len, index, count = 0;
  len = names.length;
  for (index = 0; index < len; index++)
 {
    position1 = names[index].search(/ie$/);
    position2 = names[index].search(/y$/);
    if (position1 + position2 > -2)
      count++;
  }
  return count;
}
</script>
</head>
<body>
<script type = "text/javascript">
var new_names = new Array ("freddie", "santhosh", "akash", "chamelie", "jyothy");
result = e_names(new_names);
document.write("The number of special names is: " + result + "<br/>");
</script>
</body>
</html>
```



//3a.html

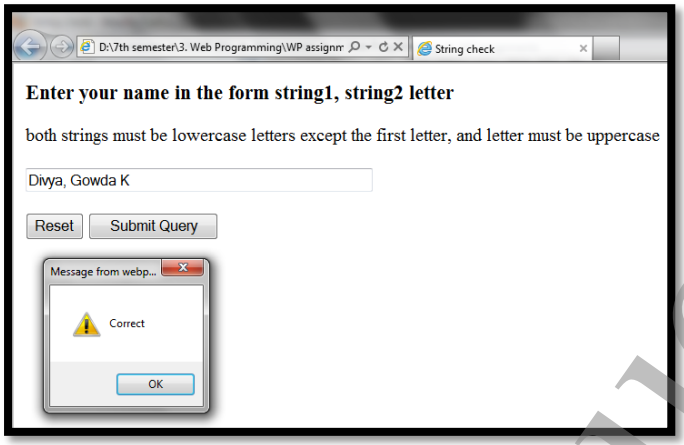
```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN"
  "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">

<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en">
<head>
<title>Lab Program 3a </title>
<script type='text/javascript'>
function isVowel(elem)
{
        var vowels = "aeiouAEIOU";
        var str = elem.value
        var chr = ""
        var nIndx = -1;
        var pos = 0;
        //Counting all the vowels except y.
        for (; pos < str.length; pos++)
        {
                chr = str.charAt(pos);
                 if (vowels.indexOf(chr) != -1)
                {
                        nIndx = vowels.indexOf(chr);break;
                }
        }
```

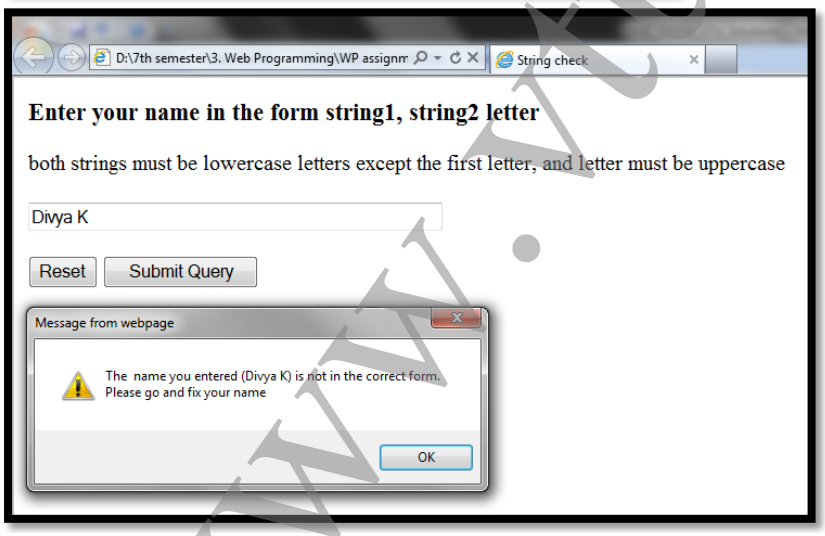
```
        if(nIndx >=0)
        {
                document.write("<h1>The index of the first vowel is  " + pos + " <br> and character
                is="+chr+"</h1>");
        }
        else
                document.write("<h1>There were no vowels.</h1>");
}
</script>
</head>
<body>
<form>
PLEASE ENTER THE STRING:
<input type='text' id='numbers'/>
<input type='button' onclick="isVowel(document.getElementById('numbers'))"
value='Check Field' />
</form>
</body>
</html>
```

3. Refer page 55
4. Refer page 56
5. //unit4-5.html

```
<html>
<head>
<title>String check</title>
<script type = "text/javascript" >
function chkName()
{
        var myName = document.getElementById("custName");
        var pos = myName.value.search(/^[A-Z][a-z]+, ?[A-Z][a-z]+ ?[A-Z]\.?$/);
        if(pos != 0)
        {
                alert("The  name you entered (" + myName.value + ") is not in the correct form.\n" +
                        "Please go and fix your name");
                myName.focus();
                myName.select();
                return false;
        }
        else
        {
                alert("Correct");
                return true;
        }
}
</script>
</head>
<body>
```

```
<h3>Enter your name in the form string1, string2 letter</h3>
<p>both strings must be lowercase letters except the first letter, and letter must be uppercase</p>
<form action="">
<p>
<label><input type="text" id="custName" size="50"/></label><br/><br>
<input type="reset" id="reset"/>
<input type="submit" id="submit"/>
</p>
</form>
<script type = "text/javascript">
document.getElementById("custName").onchange=chkName;
</script>
</body>
</html>
```

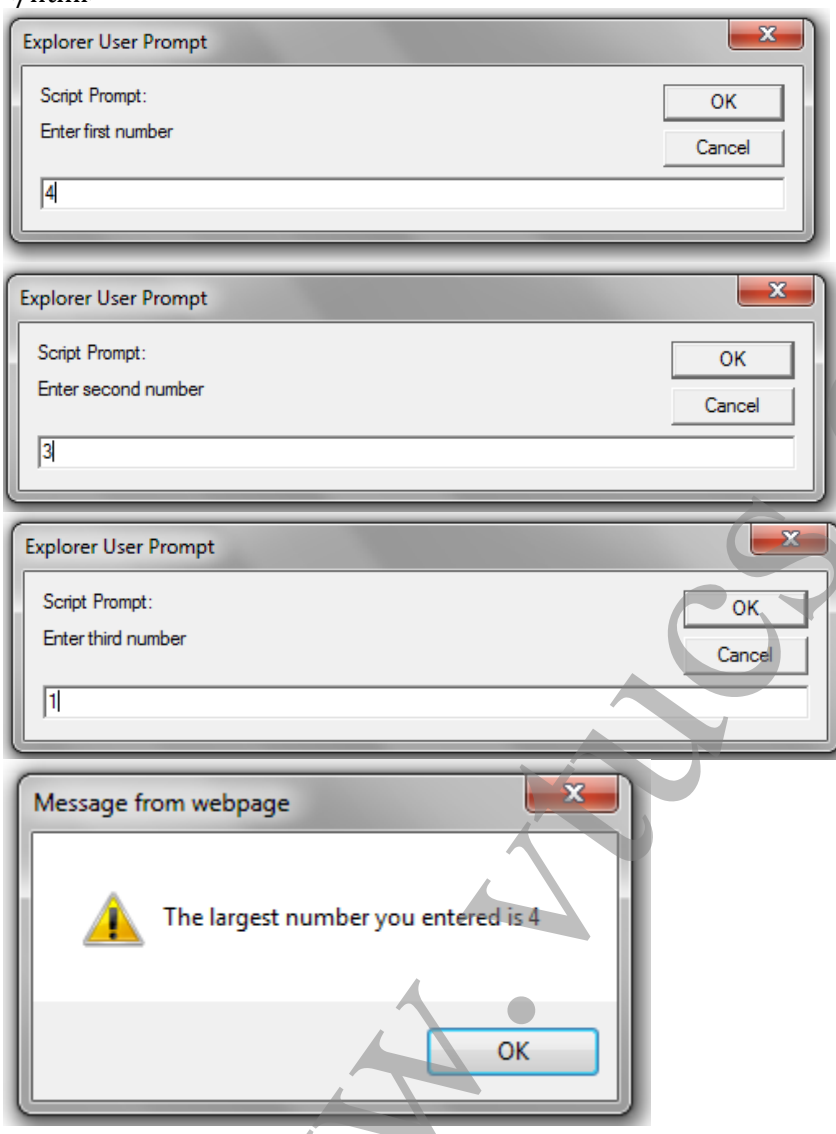




6. Refer page 62
7. //unit4-7.html

```
<html>
<head><title>Highest of 3</title>
<script type = "text/javascript" >
var num1 = prompt("Enter first number");
num1=parseInt(num1);
var num2 = prompt("Enter second number");
num2=parseInt(num2);
var num3 = prompt("Enter third number");
num3=parseInt(num3);
```

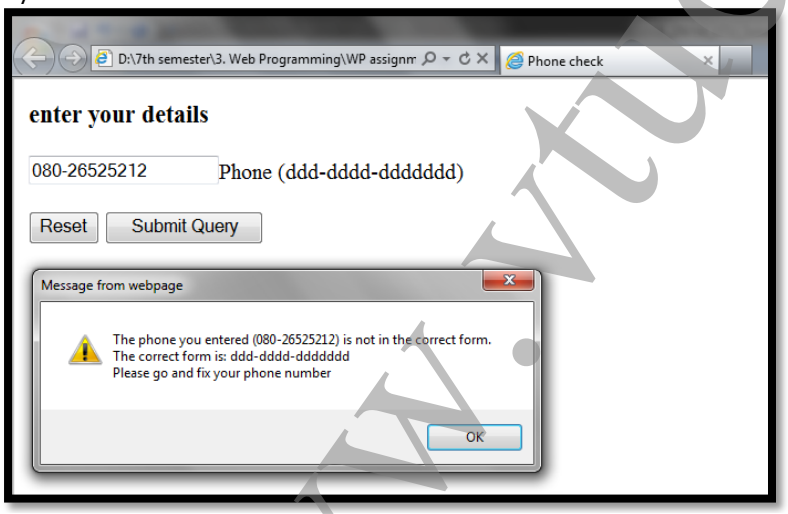
```
var high = Math.max(num1, num2, num3);
alert("The largest number you entered is " + high);
</script>
</head>
</html>
```

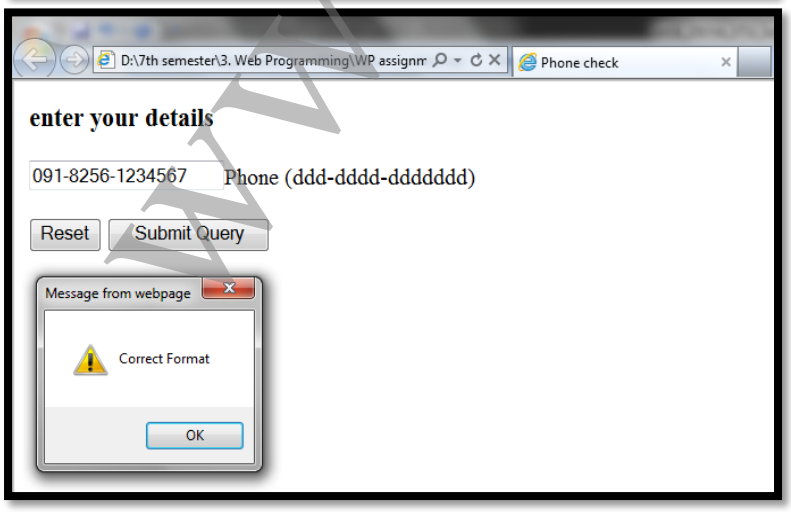


8. //unit4-8.html

```
<html>
<head>
<title>Phone check</title>
<script type = "text/javascript" >
function chkPhone()
{
        var myPhone = document.getElementById("custPhone");
        var pos = myPhone.value.search(/^\d{3}-\d{4}-\d{7}$/);
        if(pos != 0)
        {
                alert("The phone you entered (" + myPhone.value + ") is not in the correct form.\n" +
                      "The correct form is: " + "ddd-dddd-ddddddd \n" +
                         "Please go and fix your phone number");
                myPhone.focus();
                myPhone.select();
```

```
                return false;
        }
        else
        {
                alert("Correct Format");
                return true;
        }
}
</script>
</head>
<body>
<h3>enter your details</h3>
<form action="">
<p>
<label><input type="text" id="custPhone"/>Phone (ddd-dddd-ddddddd)</label><br/><br>
<input type="reset" id="reset"/>
<input type="submit" id="submit"/>
</p>
</form>
<script type = "text/javascript">
document.getElementById("custPhone").onchange=chkPhone;
</script>
</body>
</html>
```

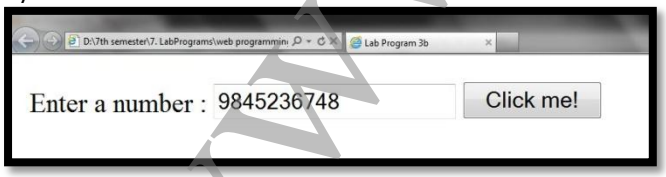


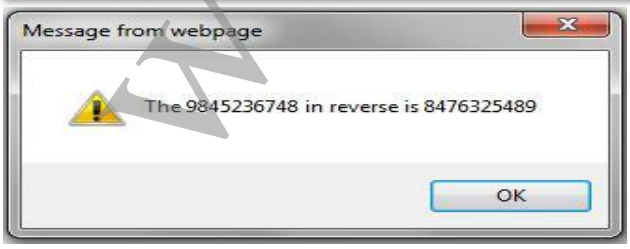


9. Refer page 74
10. Already Mentioned
11. Refer page 68 and 69
12. Lab program

//3b.html

```
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title>Lab Program 3b</title>
<script type="text/javascript">
function disp(num)
{
        var alphaExp = /^[0-9]+$/;
        if(!num.value.match(alphaExp))
        {
                alert("Input should be positive numeric");
                return false;
        }

        var rn=0, n= Number(num.value);

        while(n!=0)
        {
                r = n%10;
                n = Math.floor(n/10);
                rn = rn*10 + r;
        }
        alert("The " + num.value + " in reverse is " + rn);
}
</script>
</head>
<body>
<form>
Enter a number :
<input type=text id='number'/>
<input type="button" onclick="disp(document.getElementById('number'))" value="Click me!" />
</form>
</body>
</html>
```



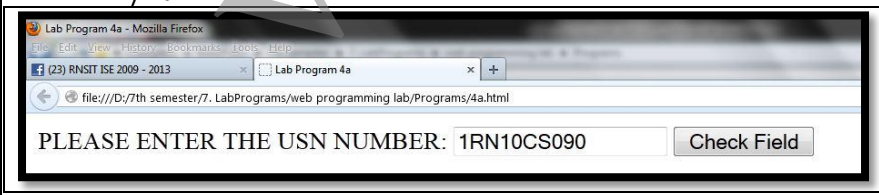


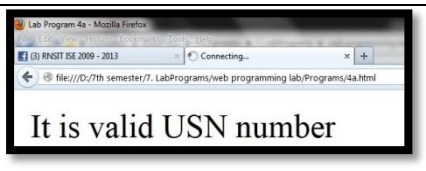
13. Refer page 55
14. Already Mentioned
15. Already Mentioned

16. Refer page 58 and 59
17. Refer page 67
18. Lab program

//4a.html

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN"
  "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">

<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en">
<head>
<title>Lab Program 4a</title>
<script type='text/javascript'>

function isNumeric(elem)
{
var numericExpression = /[0-4][A-Z][A-Z][0-9][0-9][A-Z][A-Z][0-9][0-9][0-9]/;
 var str = elem.value
if(str.length > 10)
{
        alert('please enter a valid usn number');
        elem.focus();
        return false;
 }
if(elem.value.match(numericExpression))
{
        document.write("It is valid USN number");
        return true;
}
else
 {
        alert('please enter valid usn number');
        elem.focus();
         return false;
}
}
</script>
</head>
<body>
<form>
PLEASE ENTER THE USN NUMBER:
<input type='text' id='numbers'/>
<input type='button' onclick="isNumeric(document.getElementById('numbers'))"
value='Check Field' />
</form>
</body>
</html>
```





UNIT 5 – VTU PAPER SOLUTIONS

1. Refer page 85
2. Refer page 79
3. //TEST.HTML

```
<html>
 <head><title>AVERAGE</title>
  <script type = "text/javascript" src = "TEST.JS">
  </script>
 </head>
 <body>
  <form id = "myForm" action = " ">
   <h3> ENTER YOUR DETAILS</h3>
   <table border="border">
<tr>
<th>USN</th>
<td><input type = "text" id = "USN" size = "10"/></td>
</tr>
<tr>
<th>WEB SUB-CODE</th>
<td><input type = "text" id = "SUB-CODE" size = "7"/></td>
</tr>
<tr>
<th>TEST 1 MARKS</th>
<td><input type = "text" id = "T1" size = "2"/></td>
</tr>
<tr>
<th>TEST 2 MARKS</th>
<td><input type = "text" id = "T2" size = "2"/></td>
</tr>
<tr>
<th>TEST 3 MARKS</th>
<td><input type = "text" id = "T3" size = "2"/></td>
</tr>
</table>
<p>
<input type = "submit" value = "AVERAGE_MARKS" />
</p>
</form>
<script type = "text/javascript" src = "TESTR.JS">
  </script>
</body>
</html>
```

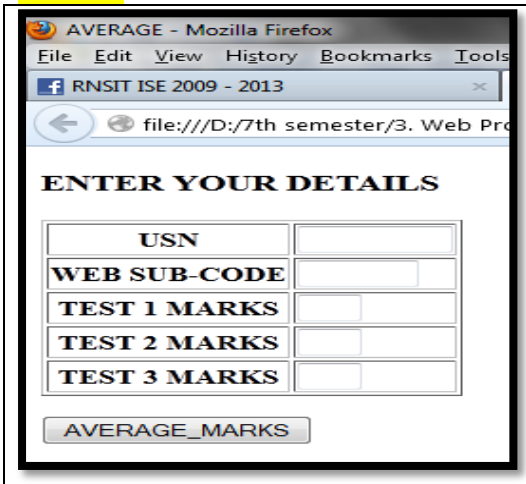
```
//TEST.JS
function compute()
{
var T1 = document.getElementById("T1").value;
var T2 = document.getElementById("T2").value;
var T3 = document.getElementById("T3").value;
var value = 0;

if ( (T1&&T2) > T3)
{ value = (T1*1 + T2*1)/4;
alert(value);
}
```

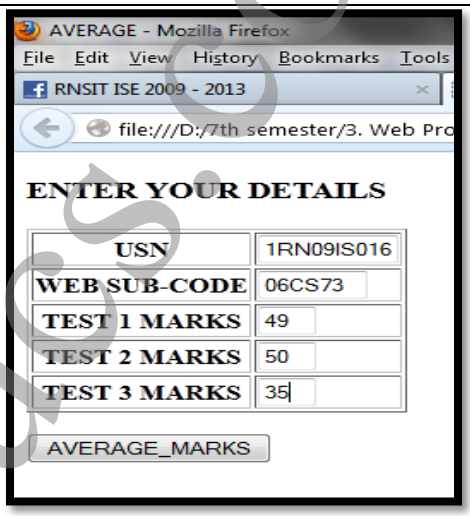
```
if( (T2&&T3) > T1)
{value = (T2*1 + T3*1)/4;
alert(value);
}

if( (T3&&T1) > T2)
{value = (T3*1 + T1*1)/4;
alert(value);
}

}
```

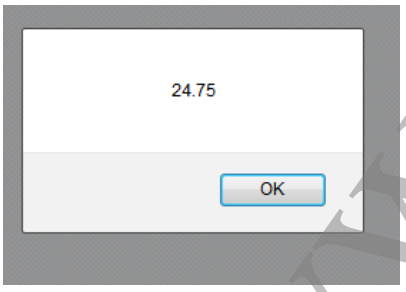
//TESTR.JS

```
document.getElementById("myForm").onsubmit = compute;
```

OUTPUT:







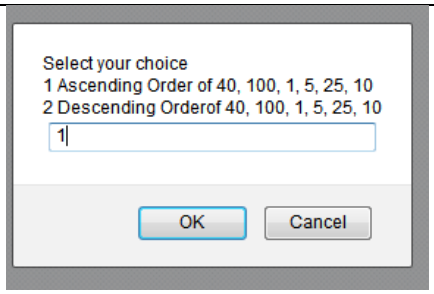
4. Refer page 80 and 81
5. Refer page 79
6. //sort_num.html

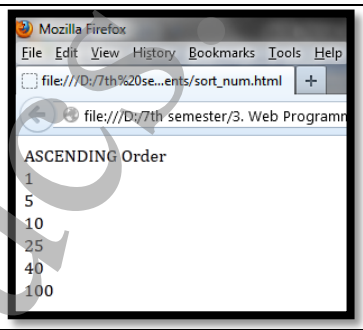
```
<html>
<body>
<script type = "text/javascript" src = "sort_num.js">
</script>
</body>
</html>
```

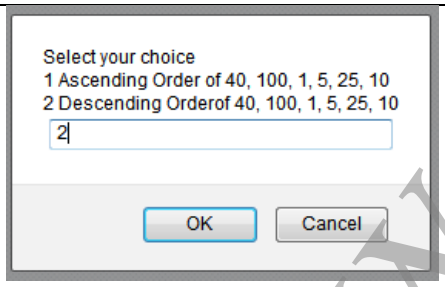
//sort_num.js

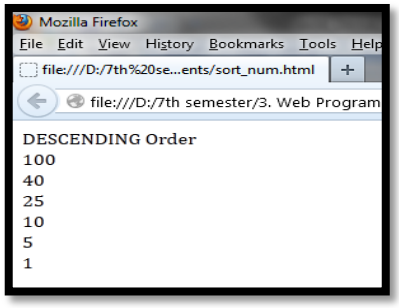
```
var choice = prompt("Select your choice \n" +
                    "1 Ascending Order of 40, 100, 1, 5, 25, 10\n" +
                    "2 Descending Orderof 40, 100, 1, 5, 25, 10\n" );
```

```
var points = [40,100,1,5,25,10];
var i=0;
switch(choice)
{
        case "1": document.write("ASCENDING Order <br>" );
                points.sort(function(a,b){return a-b});
                break;

        case "2": document.write("DESCENDING Order <br> " );
                points.sort(function(a,b){return b-a});
                break;
        default:  document.write("invalid choice");
}

for (i=0;i<points.length;i++)
{
        document.write(points[i] + "<br >");
}
```





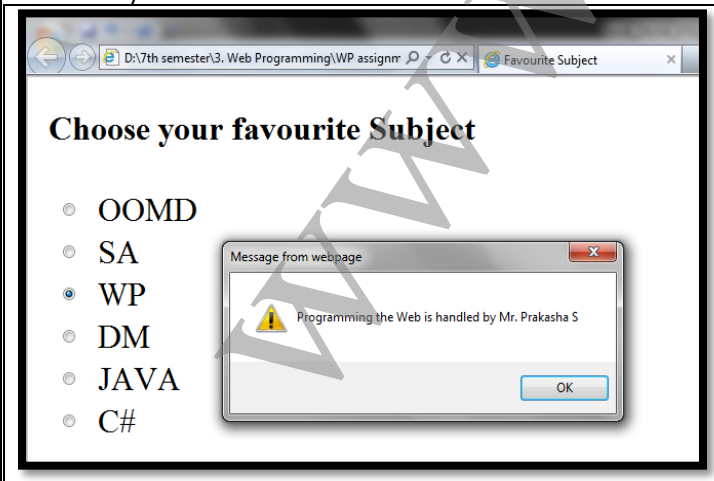


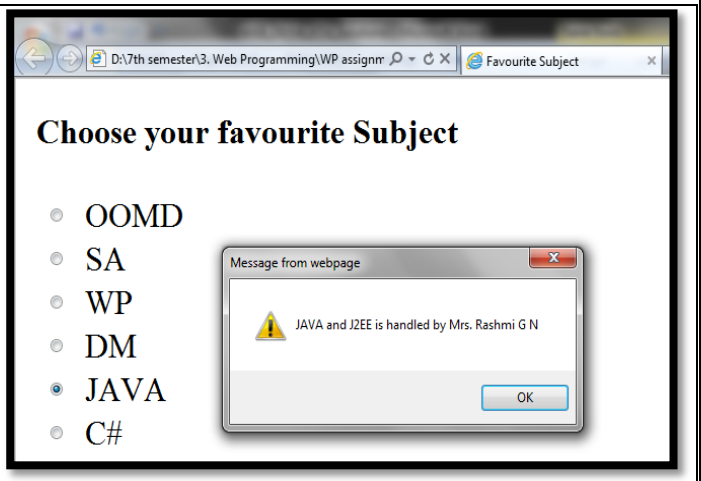


7. Already Mentioned
8. Refer page 88
9. Refer page 86
10. Already Mentioned
11. Refer page 82
12. Already Mentioned
13. Already Mentioned
14. Already Mentioned
15. Already Mentioned
16. //unit5-16.html

```
<html>
<head>
<title> Favourite Subject</title>
<script type = "text/javascript" >
function dChoice(ch)
```

```
{
switch(ch)
{
case 1: alert("Object Oriented Modeling and Design is handled by Mrs. Y Mamatha Rao");
        break;
case 2: alert("Software Architecture is handled  by Mr. RaviKumar S G");
        break;
case 3: alert("Programming the Web is handled by Mr. Prakasha S");
        break;
case 4: alert("Data Mining is handled by Mrs. Sudha V");
        break;
case 5: alert("JAVA and J2EE is handled by Mrs. Rashmi G N");
        break;
case 6: alert("C# and .Net is handled by Mrs. Niharika Kumar");
        break;
default: alert("Ooops..Invalid choice :O");
        break;
}
}
</script>
</head>
<body>
<h4> Choose your favourite Subject</h4>
<form id = "myForm" action = " ">
<p>
<label><input type = "radio" name = "dButton" value = "1" onclick = "dChoice(1)"/>
OOMD</label><br/>
<label><input type = "radio" name = "dButton" value = "2" onclick = "dChoice(2)"/> SA</label><br/>
<label><input type = "radio" name = "dButton" value = "3" onclick = "dChoice(3)"/> WP</label><br/>
<label><input type = "radio" name = "dButton" value = "4" onclick = "dChoice(4)"/> DM</label><br/>
<label><input type = "radio" name = "dButton" value = "5" onclick = "dChoice(5)"/> JAVA</label><br/>
<label><input type = "radio" name = "dButton" value = "6" onclick = "dChoice(6)"/> C#</label>
</p>
</form>
</body>
</html>
```





17. Refer page 86
18. Refer page 88

UNIT 6 – VTU PAPER SOLUTIONS

1. Refer page 91, 92 and 93
2. Refer page 101 and 102
3. Refer page
   a. 91
   b. 98
   c. 96
   d. 100
4. //unit6-4.html

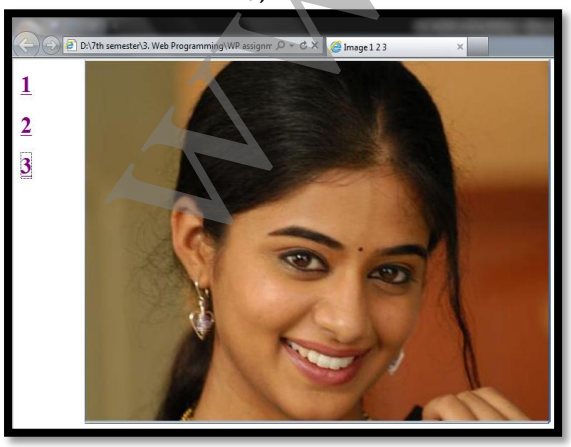
```
<html >
 <head>
  <title> Image 1 2 3 </title>
  <style type = "text/css" >
   .act {position: absolute; top: 0; left: 100; z-index: 0;" />
  </style>
  <script type = "text/javascript"  src="unit6-4.js">
var top = "Ramya";

function toTop(newTop)
{
 domTop = document.getElementById(top).style;
 domNew = document.getElementById(newTop).style;
 domTop.zIndex = "0";
 domNew.zIndex = "10";
 top = newTop;
}
  </script>
 </head>
 <body>
  <p>
  <a href = "JAVASCRIPT:toTop('Ramya')">
  <h1>1 </h1>
  </a>
  </p><p>
  <a href = "JAVASCRIPT:toTop('radhika-pandit')">
  <h1>2</h1>
  </a>
  </p><p>
  <a href = "JAVASCRIPT:toTop('Priyamani')">
  <h1>3</h1>
  </a>
  </p><p>
  <img class = "act"  id = "Ramya"  src = "Ramya.jpg"
     alt = "(Picture of a Ramya)" />
  <img class = "act"  id = "radhika-pandit"  src = "radhika-pandit.jpg"
     alt = "(Picture of a radhika-pandit)" />
  <img class = "act"  id = "Priyamani"  src = "Priyamani.jpg"
     alt = "(Picture of a Priyamani)" />
  </p><p></p>
 </body>
</html>
```

```
//unit6-4.js
var top = "Ramya";

function toTop(newTop)
{
 domTop = document.getElementById(top).style;
 domNew = document.getElementById(newTop).style;
 domTop.zIndex = "0";
 domNew.zIndex = "10";
 top = newTop;
}
```

BY CLICKING ON “1”, WE GET

BY CLICKING ON “2”, WE GET

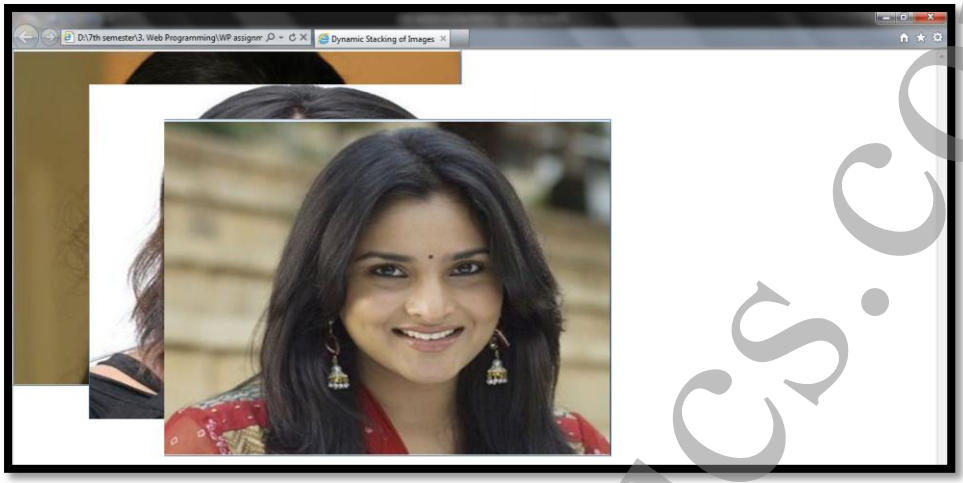
BY CLICKING ON “3”, WE GET

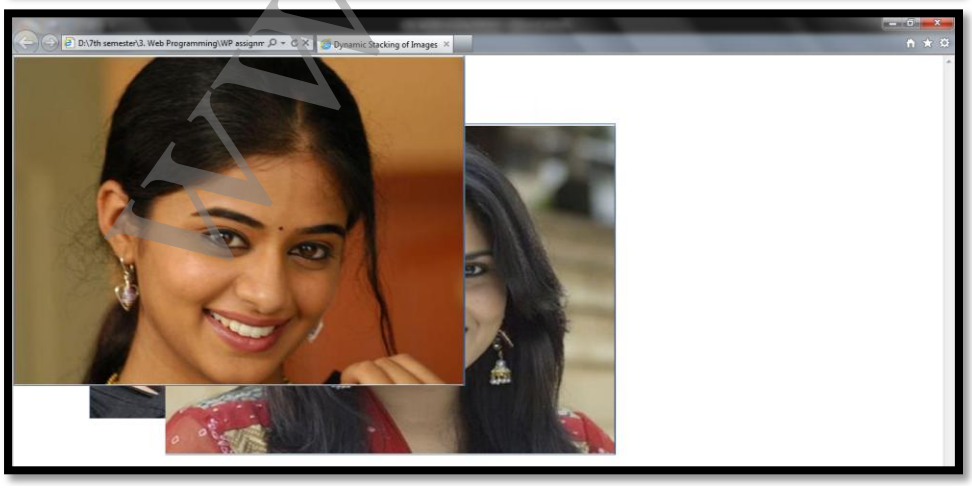


5. Already mentioned
6. //stacking.html

```
<html>
<head>
<title>Dynamic Stacking of Images</title>

<style type = "text/css">
.image1
{
position:absolute;
top: 0;
left: 0;
z-index:1;
}
.image2
{
position:absolute;
top:50px;
left: 110px;
z-index:2;
}
.image3
{
position:absolute;
top: 100px;
left: 220px;
z-index:3;
}
</style>
<script type="text/javascript">
var top = "p";
function toTop(newTop)
{
var oldTop=document.getElementById(top).style;
oldTop.zIndex="0";
var newNew=document.getElementById(newTop).style;
newNew.zIndex="10";
top=document.getElementById(newTop).id;
}
</script>
</head>
<body>
<p class="image1" id="p" onmouseover="toTop('p')">
<img  src="Priyamani.jpg"  alt="error"/ >
</p>
<p class="image2" id="rp"  onmouseover="toTop('rp')">
<img src="radhika-pandit.jpg" alt="error"   / >
</p>
<p class="image3" id="r" onmouseover="toTop('r')" >
<img  src="Ramya.jpg" alt="error"  / >
</p>
</body>
</html>
```

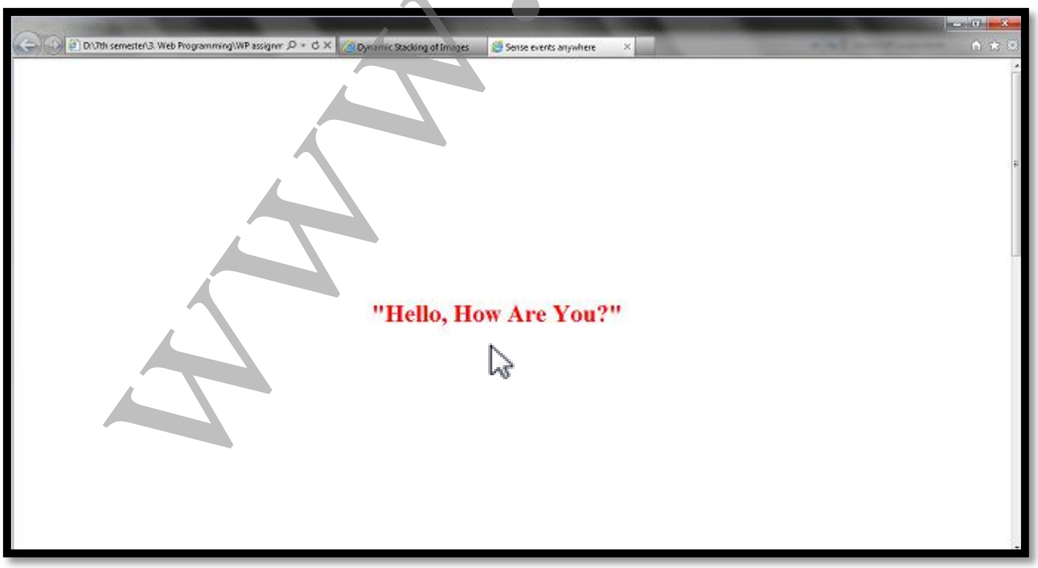
```
//stacking.js
var top = "r";
function toTop(newTop)
{
var domTop=document.getElementById(top).style;
domTop.zIndex="0";
var domNew=document.getElementById(newTop).style;
domNew.zIndex="10";
top=document.getElementById(newTop).id;
}
```





7. //unit6-7.html

```
<html>
<head>
<title>Sense events anywhere</title>
<script type="text/javascript">
function displayIt(evt)
{
var dom=document.getElementById("message");
dom.style.left=(evt.clientX - 130) + "px";
dom.style.top=(evt.clientY - 25 ) + "px";
dom.style.visibility="visible";
}
function hideIt()
{
document.getElementById("message").style.visibility="hidden";
}
</script>
</head>
<body onmousedown="displayIt(event);"  onmouseup="hideIt();">
<p>
<span id="message"
style = "color:red; visibility:hidden; position:relative; font-size:25pt; font-weight:bold;">
"Hello, How Are You?"
</span>
<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><
br><br><br><br><br><br><br><br>
<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><
br><br><br><br><br><br><br><br>
<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><
br><br><br><br><br><br><br><br>
</p>
</body>
</html>
```



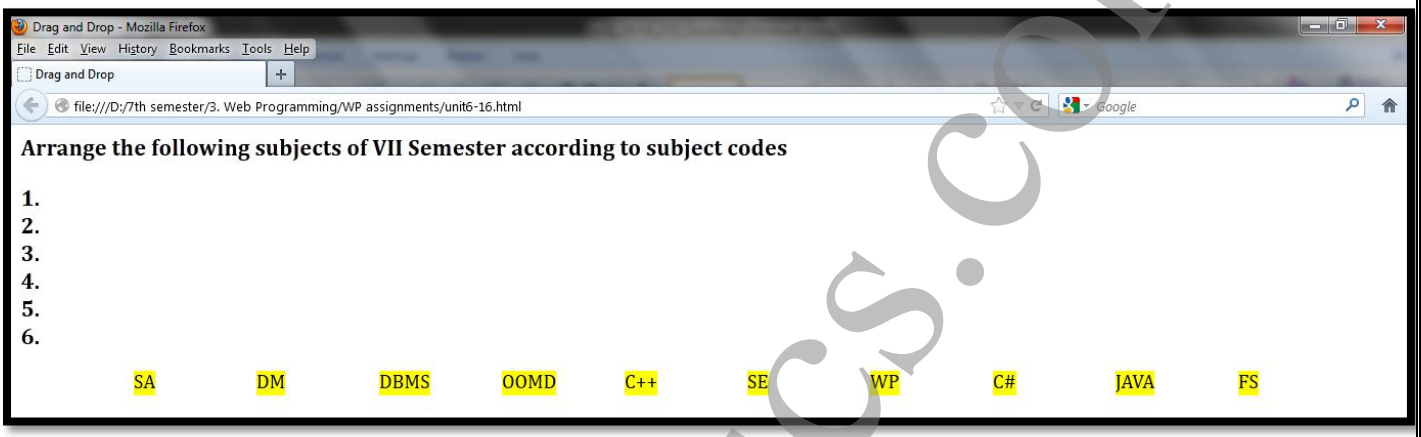
8. Refer page 103
9. Already mentioned about Position Property
10. Already mentioned

11. Already mentioned
12. Already mentioned
13. Already mentioned
14. Already mentioned
15. Already mentioned
16. //unit6-16.html

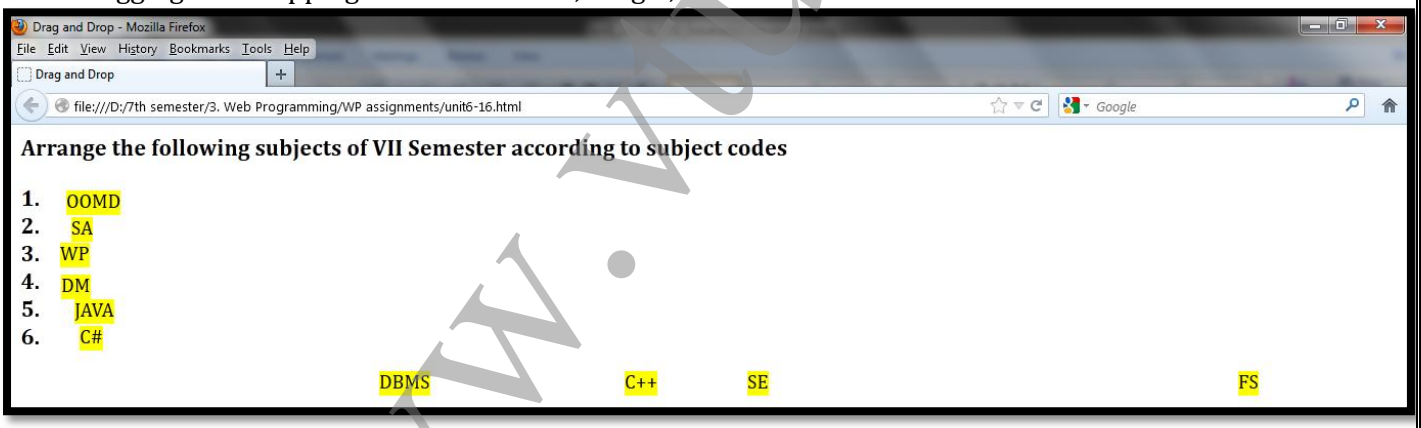
```
<html>
<head><title>Drag and Drop</title>
<script type = "text/javascript" >
var diffx, diffy, theElement;
function grabber(event)
{
theElement=event.currentTarget;
var posX=parseInt(theElement.style.left);
var posY=parseInt(theElement.style.top);
diffx=event.clientX - posX;
diffy=event.clientY - posY;
document.addEventListener("mousemove",mover,true);
document.addEventListener("mouseup",dropper,true);
event.stopPropagation();
event.preventDefault();
}
function mover(event)
{
theElement.style.left=(event.clientX - diffx) + "px";
theElement.style.top=(event.clientY - diffy) + "px";
event.stopPropagation();
}
function dropper(event)
{
document.removeEventListener("mouseup", dropper, true);
document.removeEventListener("mousemove", mover, true);
event.stopPropagation();
}
</script>
</head>
<body>
<h3>Arrange the following subjects of VII Semester according to subject codes</h3>
<h3>1.<br>2.<br>3.<br>4.<br>5.<br>6.<br></h3>
<p>
<span style = "position: absolute; top:200px; left:100px; background-color:yellow;"
        onmousedown="grabber(event);"> SA </span>
<span style = "position: absolute; top:200px; left:200px; background-color:yellow;"
        onmousedown="grabber(event);">DM </span>
<span style = "position: absolute; top:200px; left:300px; background-color:yellow;"
        onmousedown="grabber(event);"> DBMS </span>
<span style = "position: absolute; top:200px; left:400px; background-color:yellow;"
        onmousedown="grabber(event);">OOMD </span>
<span style = "position: absolute; top:200px; left:500px; background-color:yellow;"
        onmousedown="grabber(event);"> C++ </span>
<span style = "position: absolute; top:200px; left:600px; background-color:yellow;"
        onmousedown="grabber(event);"> SE </span>
<span style = "position: absolute; top:200px; left:700px; background-color:yellow;"
```

```
        onmousedown="grabber(event);"> WP </span>
<span style = "position: absolute; top:200px; left:800px; background-color:yellow;"
        onmousedown="grabber(event);"> C# </span>
<span style = "position: absolute; top:200px; left:900px; background-color:yellow;"
        onmousedown="grabber(event);"> JAVA </span>
<span style = "position: absolute; top:200px; left:1000px; background-color:yellow;"
        onmousedown="grabber(event);"> FS </span>
</p>
</body>
</html>
```

INITIALLY



After dragging and dropping certain elements, we get,



UNIT 7 – VTU PAPER SOLUTIONS

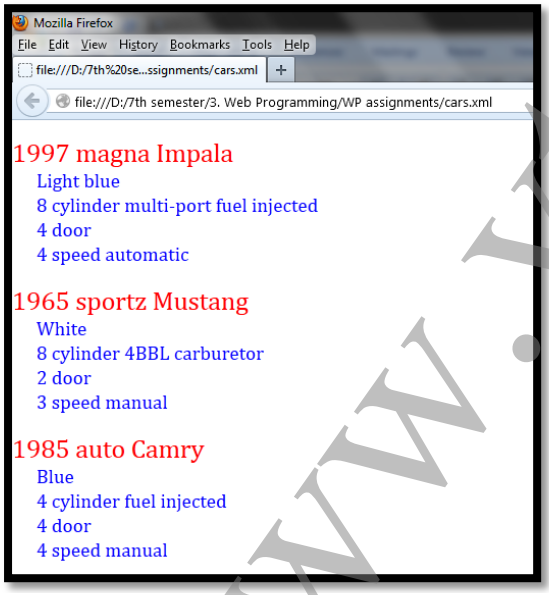
1. Refer page 112
2. Refer page 118 and 119
3. Refer UNIT 8 From Text Book
4. Refer page 110 PCDATA, EMPTY and ANY
5. Refer page 110
6. Refer page 112 and 113
7. Refer page 121
8. Refer page 109 onwards
9. //cars.xml

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE car_catalog SYSTEM "cars.dtd">
<?xml-stylesheet type = "text/css" href = "cars.css"?>
        <car_catalog>
            <car>
              <year> 1997 </year>
              <make> magna </make>
              <model> Impala </model>
              <color> Light blue </color>
              <engine>
             <number_of_cylinders> 8 cylinder
             </number_of_cylinders>
             <fuel_system> multi-port fuel injected </fuel_system>
           </engine>
           <number_of_doors> 4 door </number_of_doors>
           <transmission_type> 4 speed automatic
           </transmission_type>
           <accessories radio = "yes"  air_conditioning = "yes"
                    power_windows = "yes"
                    power_steering = "yes"
                    power_brakes = "yes" />
            </car>
            <car>
              <year> 1965 </year>
              <make> sportz </make>
              <model> Mustang </model>
              <color> White </color>
              <engine>
             <number_of_cylinders> 8 cylinder
             </number_of_cylinders>
             <fuel_system> 4BBL carburetor </fuel_system>
           </engine>
           <number_of_doors> 2 door </number_of_doors>
           <transmission_type> 3 speed manual </transmission_type>
           <accessories radio = "yes"  air_conditioning = "no"
                    power_windows = "no"  power_steering = "yes"
                    power_brakes = "yes" />
            </car>
            <car>
              <year> 1985 </year>
              <make> auto </make>
```

```
        <model> Camry </model>
        <color> Blue </color>
        <engine>
      <number_of_cylinders> 4 cylinder
      </number_of_cylinders>
      <fuel_system> fuel injected </fuel_system>
    </engine>
     <number_of_doors> 4 door </number_of_doors>
     <transmission_type> 4 speed manual </transmission_type>
     <accessories radio = "yes"  air_conditioning = "yes"
            power_windows = "no"  power_steering = "yes"
            power_brakes = "yes" />
      </car>
     </car_catalog>
```

//cars.js

```
car {display: block; margin-top: 15px; color: blue;}
year, make, model {color: red; font-size: 16pt;}
color {display: block; margin-left: 20px; font-size: 12pt;}
engine {display: block; margin-left: 20px;}
 number_of_cylinders {font-size: 12pt;}
 fuel_system {font-size: 12pt;}
number_of_doors {display: block; margin-left: 20px; font-size: 12pt;}
transmission_type {display: block; margin-left: 20px; font-size:12pt;}
```



10. Refer page 118
11. Already Mentioned
12. Refer page 109
13. Refer page 114
14. Refer page 113
15. Already Mentioned
16. Already Mentioned
17. Already Mentioned
18. Already Mentioned
19. Already Mentioned
20. Already Mentioned

SOLUTIONS TO
SELECTED
TEXT BOOK EXERCISES
REFERENCE: ROBERT W SEBESTA

Exercise 2.1

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Exercise 2.1 </title>
</head>
<body>
<h2> Ruper B. Baggins </h2>
<p>
1321 Causeway Circle <br />
Middle, Earth <br />
rbaggins@miderth.net<br />
</p>
<hr />
<h3> Bush Watcher </h3>
<p>
<em> Forest Keepers, Limited </em> <br />
14 Cranberry Way <br />
Middle, Earth <br />
<strong> (no web site yet) </strong>
</p>
</body>
</html>
```

Exercise 2.3

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Exercise 2.3 </title>
</head>
<body>
<h2> Ruper B. Baggins </h2>
<p>
1321 Causeway Circle <br />
Middle, Earth <br />
rbaggins@miderth.net<br /><br />
<a href = "e2_31.html"> Mr. Baggins' Background </a>
</p>
<hr />
<h3> Bush Watcher </h3>
<p>
```

```
<em> Forest Keepers, Limited </em> <br />
14 Cranberry Way <br />
Middle, Earth <br />
<strong> (no web site yet) </strong>
</p>
</body>
</html>
```

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e2_31.html
     This is part of the solution to Exercise 2.3
     (The second document for the background info)
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Exercise 2.3 (background) </title>
</head>
<body>
<p>
Although we share the same family name, I am not in any way
related to the famous (or is it infamous) adventurer, Bilbo.
I have a lovely wife, Elvira, and two grown children, Max
and Miriam. Max has chosen to follow me in my profession,
which is described below. Miriam is a beekeeper for the town
bookkeeper, who keeps bees as a second job.
</p>
<p>
I am employed by Forest Keepers, Limited. My job, as I understand
it, is to keep an eye on the 4 acres of wild cranberries that
grow in the swamp at the edge of the village forest. I am required
to file a daily report, in triplicate, on the condition of the
cranberry bushes. To accomplish my task, I walk by and inspect
every cranberry bush in the swamp every workday. My employer provides
me with wading boots for my job. I pick up the boots at the office
every weekday morning and turn them back in, after a thorough
cleaning, after each workday.
</p>
</body>
</html>
```

Exercise 2.4

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e2_4.html
     A solution to Exercise 2.4 - an unordered list
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Unordered List </title>
</head>
<body>
<h3> Grocery List </h3>
<ul>
```

```
    <li> milk - 2%, 2 gallons </li>
    <li> bread - butter top wheat </li>
    <li> cheddar cheese - sharp, 1 lb. </li>
    <li> soup - vegetable beef, 3 cans </li>
    <li> hamburger - 80% fat free, 2 lbs. </li>
    <li> orange juice - not from concentrate, 1/2 gallon </li>
    <li> eggs - large, 1 dozen </li>
</ul>
</body>
</html>
```

Exercise 2.8

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e2_8.html
     A solution to Exercise 2.8 - a nested, ordered list
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> An Ordered List </title>
</head>
<body>
<h3> My Uncles, Aunts, and Cousins </h3>
<ol>
   <li> Violet Vinelli (my mother) </li>
   <li> Frederick Vinelli
      <ol>
         <li> Mary Vinelli </li>
         <li> Betty Ann Boop </li>
         <li> Bob Vinelli </li>
         <li> Roger Vinelli </li>
      </ol>
   </li>
   <li> Maxine Robinson
      <ol>
         <li> John Robinson </li>
         <li> Patty Robinson </li>
         <li> Lucille Robinson </li>
      </ol>
   </li>
   <li> Thomas Vinelli
      <ol>
         <li> Albert Vinelli </li>
         <li> Alison MacKinsey </li>
         <li> Alton Vinelli </li>
      </ol>
   </li>
</ol>

<ol>
   <li> Albert Alphonso (my father) </li>
   <li> Herbert Alphonso
      <ol>
         <li> Louise Alphonso </li>
         <li> Pam Alphonso </li>
         <li> Fred Alphonso </li>
      </ol>
```

```
   </li>
   <li> Ann Marie Predicate
      <ol>
         <li> George Predicate </li>
         <li> Michael Predicate </li>
         <li> Darcie Predicate </li>
      </ol>
   </li>
   <li> Ferdinand Alphonso
      <ol>
         <li> Noah Alphonso </li>
         <li> Leah Alphonso </li>
         <li> Jo Alphonso </li>
      </ol>
   </li>
</ol>
</body>
</html>
```

Exercise 2.9

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e2_9.html
     A solution to Exercise 2.9 - a simple table
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> A simple table </title>
</head>
<body>
<table border = "border">
<caption> Trees </caption>
    <tr>
        <th> </th>
        <th> Pine </th>
        <th> Maple </th>
        <th> Oak </th>
        <th> Fir </th>
    </tr>
    <tr>
        <th> Average Height (feet) </th>
        <td> 55 </td>
        <td> 50 </td>
        <td> 50 </td>
        <td> 65 </td>
    </tr>
    <tr>
        <th> Average Width (inches) </th>
        <td> 18 </td>
        <td> 26 </td>
        <td> 24 </td>
        <td> 28 </td>
    </tr>
    <tr>
        <th> Typical Lifespan (years) </th>
        <td> 150 </td>
        <td> 230 </td>
```

```
        <td> 310 </td>
        <td> 135 </td>
    </tr>
    <tr>
        <th> Leaf Type </th>
        <td> Long needles </td>
        <td> Broadleaf </td>
        <td> Split leaf </td>
        <td> Short needles </td>
    </tr>
</table>
</body>
</html>
```

Exercise 2.10

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e2_10.html
     A solution to Exercise 2.10 - a simple table
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> A simple table </title>
</head>
<body>
<table border = "border">
<caption> Tree Characteristics </caption>
    <tr>
        <td rowspan = "2" colspan = "2"> </td>
        <th colspan = "4"> Tree </th>
    </tr>
    <tr>
        <th> Pine </th>
        <th> Maple </th>
        <th> Oak </th>
        <th> Fir </th>
    </tr>
    <tr>
        <th rowspan = "4"> Characteristic </th>
        <th> Average Height (feet) </th>
        <td> 55 </td>
        <td> 50 </td>
        <td> 50 </td>
        <td> 65 </td>
    </tr>
    <tr>
        <th> Average Width (inches) </th>
        <td> 18 </td>
        <td> 26 </td>
        <td> 24 </td>
        <td> 28 </td>
    </tr>
    <tr>
        <th> Typical Lifespan (years) </th>
        <td> 150 </td>
        <td> 230 </td>
        <td> 310 </td>
```

```
        <td> 135 </td>
    </tr>
    <tr>
        <th> Leaf Type </th>
        <td> Long needles </td>
        <td> Broadleaf </td>
        <td> Split leaf </td>
        <td> Short needles </td>
    </tr>
</table>
</body>
</html>
```

Exercise 3.1

```
/* Book Layout Style Sheet */
h1 {font: bold  24pt  Helvetica 'Times New Roman'}
h2 {font: bold  20pt  Helvetica 'Times New Roman'}
h3 {font: bold  16pt  Helvetica 'Times New Roman'}
p {font: 12pt  'Times New Roman'}
```

Exercise 3.2

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e3_2.html
     A solution to Exercise 3.2 - a styled table
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> A Styled Table </title>
<style type = "text/css">
   <!--
    td.win {font-size: 16pt; color: red;}
    td.lose {font-size: 14pt; color: blue;}
    -->
</style>
</head>
<body>
<table border = "border">
<caption style = "font-size: 18pt"> Football Scores </caption>
    <tr>
        <th> Team </th>
        <th> Score </th>
    </tr>
    <tr>
        <th style = "font-family: 'Century Gothic';
                     font-style: italic;
                     color: gold;"> Colorado </th>
        <td class = "win"> 30 </td>
    </tr>
    <tr>
        <th style = "font-family: 'Century Gothic';
                     font-style: italic;
                     color: red;"> Nebraska </th>
        <td class = "lose"> 29 </td>
```

```
    </tr>
    <tr>
        <th style = "font-family: 'Century Gothic';
                     font-style: italic;
                     color: grey;"> Iowa State </th>
        <td class = "win"> 17 </td>
    </tr>
    <tr>
        <th style = "font-family: 'Century Gothic';
                     font-style: italic;
                     color: blue;"> Kansas </th>
        <td class = "lose"> 10 </td>
    </tr>
    <tr>
        <th style = "font-family: 'Century Gothic';
                     font-style: italic;
                     color: purple;"> Kansas State </th>
        <td class = "win"> 48 </td>
    </tr>
    <tr>
        <th style = "font-family: 'Century Gothic';
                     font-style: italic;
                     color: green;"> Missouri </th>
        <td class = "lose"> 13 </td>
    </tr>
</table>
</body>
</html>
```

Exercise 3.4

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e3_4.html
     A solution for Exercise 3.4 - floating a text element
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head> <title> Floating a text element </title>
</head>
<body>
<p style = "float: left; width: 1.5in; margin-right: 10px;
           margin-bottom: 10px;" >
My airplane soars like an eagle and handles like
a hummingbird.
</p>

<p>
The 210 is the flagship
single-engine Cessna aircraft. Although the 210 began as a
four-place aircraft, it soon acquired a third row of seats,
stretching it to a six-place plane. The 210 is classified
as a high-performance airplane, which means its landing
gear is retractable and its engine has more than 200
horsepower. In its first model year, which was 1960,
the 210 was powered by a 260-horsepower fuel-injected
six-cylinder engine that displaced 471 cubic inches.
The 210 is the fastest single-engine airplane ever
built by Cessna.
```

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

Exercise 3.6

```
<?xml version = "1.0"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">


<!-- e36.html
     A solution to Exercise 3.6
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head> <title> Exercise 3.6 </title>
    <style type = "text/css">
      ol {list-style-type: upper-roman;}
      ol ol {list-style-type: upper-alpha;}
      ol ol ol {list-style-type: decimal;}
      li.pink {color: pink}
      li.blue {color: blue}
      li.red {color: red}
    </style>
  </head>
  <body>
    <ol>
      <li class = "pink"> Compact Cars
        <ol>
          <li> Two door
            <ol>
              <li> Hyundai Accent </li>
              <li> Chevrolet Cobalt </li>
              <li> Honda Civic </li>
            </ol>
          </li>
          <li> Four door
            <ol>
              <li> Hyundai Accent </li>
              <li> Chevrolet Cobalt </li>
              <li> Honda Civic </li>
            </ol>
          </li>
        </ol>
      </li>
      <li class = "blue"> Midsize Cars
        <ol>
          <li> Two door
            <ol>
              <li> Honda Accord </li>
              <li> Hyundai Genesis </li>
              <li> Nissan Altima </li>
            </ol>
          </li>
          <li> Four door
            <ol>
              <li> Honda Accord </li>
              <li> Dodge Avenger </li>
              <li> Ford Fusion  </li>
            </ol>
```

```
          </li>
        </ol>
      </li>
     <li class = "red"> Sports Cars
        <ol>
          <li> Coupe
            <ol>
              <li> Jaguar XK </li>
              <li> Ford Mustang </li>
              <li> Nissan Z  </li>
            </ol>
          </li>
          <li> Convertible
            <ol>
              <li> Mazda Miata </li>
              <li> Ford Mustang </li>
              <li> Lotus Elise </li>
            </ol>
          </li>
        </ol>
      </li>
    </ol>
  </body>
</html>
```

Exercise 3.12

```
<?xml version = "1.0" encoding = "utf-8" ?>
<!DOCTYPE html PUBLIC "-//w3c//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e312.html
     A solution to Exercise 3.12
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head> <title> Exercise 3.12 </title>
    <style type = "text/css">
      dt {font-family: Courier; font-size: 12pt;}
      dd {font-family: 'Times New Roman'; font-size: 14pt;
          font-style: italic;}
    </style>
  </head>
  <body>
    <h3> Single-Engine Cessna Airplanes </h3>
    <dl>
      <dt> 152 </dt>
      <dd> Two-place trainer </dd>
      <dt> 172 </dt>
      <dd> Smaller four-place airplane </dd>
      <dt> 182 </dt>
      <dd> Larger four-place airplane </dd>
      <dt> 210 </dt>
      <dd> Six-place airplane - high performance </dd>
    </dl>
  </body>
</html>
```

Exercise 4.1

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e4_1.html - A solution to Exercise 4.1
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Exercise 4.1 </title>
</head>

<body>
<script type = "text/javascript">
<!--
var number, square, cube;

document.write("Number, Square, Cube <br /><br />");

for (number = 5; number < 16; number++)  {
    square = number * number;
    cube = number * square;
    document.write(number + ",  " + square + ",  " + cube + "<br />");
}
// -->
</script>
</body>
</html>
```

Exercise 4.2

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e4_2.html - A solution to Exercise 4.2
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Exercise 4.2 </title>
</head>

<body>
<script type = "text/javascript">
<!--
var first = 1, second = 1, next, count;

document.write("First 20 Fibonacci Numbers <br/><br/>");
document.write("1 - 1 <br/> 2 - 1 <br/>");

for (count = 3; count <= 20; count++)  {
   next = first + second;
   document.write(count + " - " + next + "<br/>");
   first = second;
   second = next;
}
// -->
</script>
```

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

Exercise 4.4

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e4_4.html - A solution to Exercise 4.4
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Exercise 4.4 </title>
</head>

<body>
<script type = "text/javascript">
<!--
var first = 1, second = 1, next, count;

number = prompt("How many Fibonacci numbers do you want? (3-50)", "");

if (number >= 3 && number <= 50) {
   document.write("First " + number + " Fibonacci Numbers <br /><br />");
   document.write("1 - 1 <br/> 2 - 1 <br />");

      for (count = 3; count <= number; count++)  {
         next = first + second;
         document.write(count + " - " + next + "<br />");
         first = second;
         second = next;
      }
   }
else
   document.write("Error - number not in the range 3-50");
// -->
</script>
</body>
</html>
```

Exercise 4.6

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e4_6.html - A solution to Exercise 4.6
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Exercise 4.6 </title>
</head>

<body>
<script type = "text/javascript">
<!--
var first = 1, second = 1, next, count;
```

```
str = prompt("Please input your sentence", "");

var words = str.split(" ");

words = words.sort();

words_len = words.length;

for (count = 0; count < words_len; count++)
   document.write(words[count] + "<br/>");
// -->
</script>
</body>
</html>
```

Exercise 4.7

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e4_7.html - A solution to Exercise 4.7
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Exercise 4.7 </title>
<script type = "text/javascript">
<!--
// A function to compare strings for reverse alphabetic order

function dec_order(a, b) {
   if (a > b)
      return -1;
   else if (a < b)
      return 1;
   else return 0;
}
// -->
</script>
</head>

<body>
<script type = "text/javascript">
<!--
var order, str, words, word_len, count;

// Get the input

str = prompt("Please input your sentence", "");
order = prompt("What order? (ascending or descending)", "");

// If the order is recognized, issue an error message

if (order != "descending" && order != "ascending")
   document.write("Error - order is incorrectly specified <br/>");

// Otherwise, do the sort, depending on the requested order

else {
```

```
   var words = str.split(" ");

   if (order == "ascending")
      words = words.sort();
   else
      words = words.sort(dec_order);

// Write out the results

   words_len = words.length;

   for (count = 0; count < words_len; count++)
      document.write(words[count] + "<br/>");

}
// -->
</script>
</body>
</html>
```

Exercise 4.9

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e4_9.html - A solution to Exercise 4.9
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Exercise 4.9 </title>
<script type = "text/javascript">
<!--
// Function e_names
// Parameter: an array of strings
// Returns: the number of given strings that end
//          in either "ie" or "y"

function e_names(names) {
   var len, index, count = 0;
   len = names.length;

// Loop to use pattern matching to produce the count

   for (index = 0; index < len; index++) {
      position1 = names[index].search(/ie$/);
      position2 = names[index].search(/y$/);
      if (position1 + position2 > -2)
         count++;
   }
   return count;
}
// -->
</script>
</head>

<body>
<script type = "text/javascript">
<!--
// Function e_names tester
```

```
var new_names = new Array ("freddie", "bob", "mieke", "yahoo2", "georgey");
result = e_names(new_names);
document.write("The number of special names is: " + result + "<br/>");
// -->
</script>
</body>
</html>
```

Exercise 4.14

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e4_14.html - A solution to Exercise 4.14
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Exercise 4.14 </title>
<script type = "text/javascript">
<!--
var result;

// Function reverser
// Parameter: a number
// Returns: the number with its digits in reverse order
// Note: Math.floor must be used to get the integer part
//       of the division operations

function reverser(num) {
   var digit, position = 0;

// If the number has just one digit, that's it

   if (num < 10)
      return num;

// Get the first digit

   result = num % 10;
   num = Math.floor(num / 10);

// Loop to produce the result for the rest

   do {
      digit = num % 10;
      result = 10 * result + digit;
      num = Math.floor(num / 10);
   } while (num >= 1);

   return result;
}
// -->
</script>
</head>

<body>
<script type = "text/javascript">
<!--
```

```
// Function reverser tester

var num1 = 2468, num2 = 7;
result = reverser(num1);
document.write("The reverse of 2468 is: " + result + "<br />");
result = reverser(num2);
document.write("The reverse of 7 is: " + result + "<br />");
// -->
</script>
</body>
</html>
```

Exercise 5.1

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e51.hmtl
     A solution to Exercise 5.1 - events with radio buttons
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title> Exercise 5.1 </title>
    <script type = "text/javascript"  src = "e51.js" >
    </script>
  </head>
  <body>
    <h4> Choose your favorite color </h4>
    <form>
      <label> <input type = "radio"  name = "colorButton"
                     value = "red"
                     onClick = "colorChoice('red')" />
        Red </label>
      <br />
      <label>  <input type = "radio"  name = "colorButton"
                      value = "blue"
                      onClick = "colorChoice('blue')" />
        Blue </label>
      <br />
      <label> <input type = "radio"  name = "colorButton"
                     value = "green"
                     onClick = "colorChoice('green')" />
         Green </label>
      <br />
      <label> <input type = "radio"  name = "colorButton"
                     value = "yellow"
                     onClick = "colorChoice('yellow')" />
         Yellow </label>
      <br />
      <label> <input type = "radio"  name = "colorButton"
                     value = "orange"
                     onClick = "colorChoice('orange')" />
         Orange </label>
    </form>
  </body>
</html>
// e51.js - The JavaScript solution for Exercise 5.1
//
// The event handler function to produce an alert message
```

```
//  about the chosen color

function colorChoice (color) {

    switch (color) {
        case "red":
          alert("Your favorite color is red");
            break;
        case "blue":
          alert("Your favorite color is blue");
            break;
        case "green":
          alert("Your favorite color is green");
            break;
        case "yellow":
          alert("Your favorite color is yellow");
            break;
        case "orange":
          alert("Your favorite color is orange");
            break;
        default:
            alert("Error in JavaScript function colorChoice");
            break;
    }
}
```

Exercise 5.2

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e5_2.hmtl
     A solution to Exercise 5.2 - events with radio buttons
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title> Exercise 5.2 </title>
    <script type = "text/javascript"  src = "e521.js" >
    </script>
  </head>
  <body>
    <h4> Choose your favorite color </h4>

    <form id = "colorsForm">
      <p>
      <label> <input type = "radio"  name = "colorButton"
                     value = "red" /> Red
      </label>
      </p> <p>
      <label> <input type = "radio"  name = "colorButton"
                     value = "blue" /> Blue
      </label>
      </p><p>
      <label> <input type = "radio"  name = "colorButton"
                     value = "green" /> Green
      </label>
      </p><p>
      <label> <input type = "radio"  name = "colorButton"
                     value = "yellow" /> Yellow
```

```
      </label>
      </p><p>
      <label> <input type = "radio"  name = "colorButton"
                    value = "orange" /> Orange
      </label>
      </p>
    </form>
    <script type = "text/javascript"  src = "e522.js" >
    </script>
  </body>
</html>


// e521.js - JavaScript for the solution to Exercise 5.2
//
// The event handler function to produce an alert message
//  about the chosen color

function colorChoice () {
    var color;

// Put the DOM address of the elements array in a local variable

    var radioElement = document.getElementById("colorsForm").elements;

// Determine which button was pressed

    for (var index = 0; index < radioElement.length; index++) {

        if (radioElement[index].checked) {
            color = radioElement[index].value;
            break;
        }

    }

// Produce an alert message about the chosen color

    switch (color) {
        case "red":
          alert("Your favorite color is red");
            break;
        case "blue":
          alert("Your favorite color is blue");
            break;
        case "green":
          alert("Your favorite color is green");
            break;
        case "yellow":
          alert("Your favorite color is yellow");
            break;
        case "orange":
          alert("Your favorite color is orange");
            break;
        default:
            alert("Error in JavaScript function colorChoice");
            break;
    }
}


// e522.js - Handler registration for the solution to
```

```
//          Exercise 5.2

var dom = document.getElementById("colorsForm");
dom.elements[0].onclick = colorChoice;
dom.elements[1].onclick = colorChoice;
dom.elements[2].onclick = colorChoice;
dom.elements[3].onclick = colorChoice;
dom.elements[4].onclick = colorChoice;
```

Exercise 5.4

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e54.html
     A solution to Exercise 5.4
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title> Exercise 5.4 </title>
    <script type = "text/javascript"  src = "e54.js" >
    </script>
  </head>
  <body>
    <h3> Order Form </h3>
    <form name = "orderForm" onSubmit = "finish()">
      <p>
      <label> <input type = "text"  name = "apples"
                     size = "3"
                     onChange = "appleHandler()" />
        Apples
      </label>
      </p><p>
      <label> <input type = "text"  name = "oranges"
                     size = "3"
                     onChange = "orangeHandler()" />
        Oranges
      </label>
      </p><p>
      <label> <input type = "text"  name = "bananas"
                     size = "3"
                     onChange = "bananaHandler()" />
        Bananas
      </label>
      </p><p>
      <input type = "reset"  name = "reset" />
      <input type = "submit"  name = "submit" />
      </p>
    </form>
  </body>
</html>


// e54.js - The JavaScript file for the solution
//          to Exercise 5.4

var total = 0;

// The event handler functions for the text boxes
```

```
function appleHandler() {
    var number = document.orderForm.apples.value;
    total = total + number * 0.59;
}

function orangeHandler() {
    var number = document.orderForm.oranges.value;
    total = total + number * 0.49;
}

function bananaHandler() {
    var number = document.orderForm.bananas.value;
    total = total + number * 0.39;
}

// The event handler function to produce the total cost message
//  when "submit" is clicked

function finish() {
    total = total * 1.05;
    alert("Thank you for your order \n" +
          "Your total cost is: $" + total + "\n");
}
```

Exercise 5.5

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e55.html
     The XHTML part of a solution to Exercise 5.5
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title> Exercise 5.5 </title>
    <script type = "text/javascript"  src = "e551.js">
    </script>
  </head>

  <body>
    <h3> Order Form </h3>
    <form name = "" onSubmit = "finish()">
      <p>
      <label> <input type = "text"  id = "apples"  size = "3" />
        Apples
      </label>
      </p><p>
      <label> <input type = "text"  id = "oranges"  size = "3" />
        Oranges
      </label>
      </p><p>
      <label> <input type = "text"  id = "bananas"  size = "3" />
        Bananas
      </label>
      </p><p>
      <input type = "reset"  name = "reset" />
      <input type = "submit"  name = "submit" />
      </p>
```

```
    </form>
    <script type = "text/javascript"  src = "e552.js">
    </script>
  </body>
</html>


// e551.js -- The JavaScript part of the solution
//            to Exercise 5.5

var total = 0;

// The event handler functions for the text boxes

function appleHandler() {
    var myApple = document.getElementById("apples");
    var number = myApple.value;
    if (number < 0 || number > 99) {
        alert("Error - the quantity you entered in not valid" +
              "\n [It is not in the range of 0 - 99] \n" +
              "Please enter a valid quantity");
        myApple.focus();
        myApple.select();
        return false;
    }
    else {
        total = total + number * 0.59;
        return true;
    }
}

function orangeHandler() {
    var myOrange = document.getElementById("oranges");
    var number = myOrange.value;
    if (number < 0 || number > 99) {
        alert("Error - the quantity you entered in not valid" +
              "\n [It is not in the range of 0 - 99] \n" +
              "Please enter a valid quantity");
        myOrange.focus();
        myOrange.select();
        return false;
    }
    else {
        total = total + number * 0.39;
        return true;
    }
}

function bananaHandler() {
    var myBanana = document.getElementById("bananas");
    var number = myBanana.value;
    if (number < 0 || number > 99) {
        alert("Error - the quantity you entered in not valid" +
              "\n [It is not in the range of 0 - 99] \n" +
              "Please enter a valid quantity");
        myBanana.focus();
        myBanana.select();
        return false;
    }
    else {
        total = total + number * 0.49;
        return true;
```

```
    }
}

// The event handler function to produce the total cost message
//  when "submit" is clicked

function finish() {
    total = total * 1.05;
    alert("Thank you for your order \n" +
          "Your total cost is: $" + total + "\n");
}


// e552.js - The JavaScript code to register the
//           handlers

document.getElementById("apples").onchange = appleHandler;
document.getElementById("oranges").onchange = orangeHandler;
document.getElementById("bananas").onchange = bananaHandler;
```

Exercise 5.6

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e56.html
     A solution to Exercise 5.6
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title> Exercise 5.6 </title>
    <script type = "text/javascript"  src = "e561.js" >
    </script>
  </head>
  <body>
    <h3> Order Form </h3>
    <form name = "orderForm" onSubmit = "finish()">
      <p>
      <label> <input type = "text"  id = "apples"
                     size = "3" /> Apples
      </label>
      </p><p>
      <label> <input type = "text"  id = "oranges"
                     size = "3" /> Oranges
      </label>
      </p><p>
      <label> <input type = "text"  id = "bananas"
                     size = "3" /> Bananas
      </label>
      </p><p>
      <input type = "reset"  name = "reset" />
      <input type = "submit"  name = "submit" />
      </p>
    </form>
    <script type = "text/javascript"  src = "e562.js" >
    </script>
  </body>
</html>
```

```
// e561.js - Event handlers for the solution to
//           Exercise 5.6

var total = 0;

// The event handler functions for the text boxes

function appleHandler() {
    var dom = document.getElementById("apples");
    var number = dom.value;
    if (number < dom.min || number > dom.max) {
        alert("Error - the quantity you entered in not valid" +
              "\n [It is not in the range of " + dom.min +
              " to " + dom.max + "] \n" +
              "Please enter a valid quantity");
        dom.focus();
        dom.select();
        return false;
    }
    else {
        total = total + number * 0.59;
        return true;
    }
}

function orangeHandler() {
    var dom = document.getElementById("oranges");
    var number = dom.value;
    if (number < dom.min || number > dom.max) {
        alert("Error - the quantity you entered in not valid" +
              "\n [It is not in the range of " + dom.min +
              " to " + dom.max + "] \n" +
              "Please enter a valid quantity");
        dom.focus();
        dom.select();
        return false;
    }
    else {
        total = total + number * 0.39;
        return true;
    }
}

function bananaHandler() {
    var dom = document.getElementById("bananas");
    var number = dom.value;
    if (number < dom.min || number > dom.max) {
        alert("Error - the quantity you entered in not valid" +
              "\n [It is not in the range of " + dom.min +
              " to " + dom.max + "] \n" +
              "Please enter a valid quantity");
        dom.focus();
        dom.select();
        return false;
    }
    else {
        total = total + number * 0.49;
        return true;
    }
}
```

```
// The event handler function to produce the total cost message
//  when "submit" is clicked

function finish() {
    total = total * 1.05;
    alert("Thank you for your order \n" +
          "Your total cost is: $" + total + "\n");
}


// e562.js - The body part of the JavaScript for the
//           solution to Exercise 5.6

// Get DOM addresses of the text boxes

var appleDom = document.getElementById("apples");
var orangeDom = document.getElementById("oranges");
var bananaDom = document.getElementById("bananas");

// Set the onchange properties for the event handlers

appleDom.onchange = appleHandler;
orangeDom.onchange = orangeHandler;
bananaDom.onchange = bananaHandler;

// Add properties for minimum and maximum values for the text boxes

appleDom.max = 99;
appleDom.min = 0;
orangeDom.max = 99;
orangeDom.min = 0;
bananaDom.max = 99;
bananaDom.min = 0;
```

Exercise 6.1

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<!-- e6_1.html
     A solution to Exercise 6.1
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
<title> Exercise 6.1 </title>

<style type = "text/css">

/* A style for the paragraph of text */

   .regtext {position: absolute; top: 100px; left: 100px;
             font-family: Times; font-size: 14pt; width: 330px}

/* A style for the image */

   .img {background-image: url(c172.gif); position: absolute;
         left: 190px; top: 180px; width: 100px}

</style>
```

```
</head>
<body>

   <p class = "img">
      <br/><br/><br/><br/><br/>
   </p>

   <p class = "regtext">
      I was born on July 4th,
      1976, in Huckabee, Alaska.
      I have three brothers and
      a sister, all older than I.
      My sister, Mary, is 26 years old.
      She lives in Kalkan, Montana.
      My oldest brother, Ron, is 32
      years old. He lives in Huckabee.
      My youngest brother, Max, is
      28 years old. He lives in Pinkee,
      Wyoming. My middle brother, Fred,
      is 30 years old. He lives in
      Kinkyhollow, Nebraska.
      My parents, who are both still
      living, still live in Huckabee.

   </p>

</body>
</html>
```

Exercise 6.2

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<!-- e62.html
     The XHTML part of a solution to Exercise 6.2
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title> Exercise 6.2 </title>

    <style type = "text/css">

/* A style for the paragraph of text */

      .regtext {position: absolute; top: 150px; left: 100px;
                font-family: Times; font-size: 14pt; width: 330px}

/* A style for the image */

      .img {background-image: url(c172.gif); position: absolute;
            left: 100px; top: 150px; width: 100px}

    </style>
    <script type = "text/javascript"  src = "e62.js" >
    </script>
  </head>
  <body>

    <h2> Background Image Position Control Buttons </h2>
```

```
    <p>
    <form name = "moveControl">
      <label> <input type = "radio"  name = "choser"
                     checked = "checked"
                     onclick = "moveIt('picture', 150, 100)" />
         Northwest
      </label>
      <p/><p>
      <label> <input type = "radio"  name = "choser"
                     onclick = "moveIt('picture', 150, 300)" />
         Northeast
      </label>
      </p><p>
      <label> <input type = "radio"  name = "choser"
                     onclick = "moveIt('picture', 300, 300)" />
         Southeast
      </label>
      <p/><p>
      <label> <input type = "radio"  name = "choser"
                     onclick = "moveIt('picture', 300, 100)" />
         Southwest
      </label>
      </p>
    </form>

    <p class = "img"  id = "picture">
      <br/><br/><br/><br/><br/>
    </p>

    <p class = "regtext">
      I was born on July 4th,
      1976, in Huckabee, Alaska.
      I have three brothers and
      a sister, all older than I.
      My sister, Mary, is 26 years old.
      She lives in Kalkan, Montana.
      My oldest brother, Ron, is 32
      years old. He lives in Huckabee.
      My youngest brother, Max, is
      28 years old. He lives in Pinkee,
      Wyoming. My middle brother, Fred,
      is 30 years old. He lives in
      Kinkyhollow, Nebraska.
      My parents, who are both still
      living, still live in Huckabee.
    </p>
  </body>
</html>


// e62.js - The JavaScript file for the solution to
//          Exercise 6.2

/* A function to move an element */

   function moveIt(movee, newTop, newLeft) {

     dom = document.getElementById(movee).style;

/* Change the top and left properties to perform the move */

     dom.top = newTop + "px";
```

```
    dom.left = newLeft + "px";
  }
```

Exercise 6.3

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e63.html
     The XHTML part of a solution to Exercise 6.3
      -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title> Exercise 6.3 </title>

    <style type = "text/css">

/* A style for the paragraph of text */

    .regtext {position: absolute; top: 200px; left: 100px;
              font-family: Times; font-size: 14pt; width: 330px}

    </style>

    <script type = "text/javascript"  src = "e63.js" >
    </script>
  </head>

  <body>

    <h2> Background Image Visibility Control Buttons </h2>

    <form name = "visibilityControl">
      <p>
      <label> <input type = "checkbox"  name = "choser"
                     onclick = "flipImage('northwest')" />
        Northwest
      </label>
      <p/><p>
      <label> <input type = "checkbox"  name = "choser"
                     onclick = "flipImage('northeast')" />
        Northeast
      </label>
      </p><p>
      <label> <input type = "checkbox"  name = "choser"
                     onclick = "flipImage('southeast')" />
        Southeast
      </label>
      </p><p>
      <label> <input type = "checkbox"  name = "choser"
                     onclick = "flipImage('southwest')" />
        Southwest
      </label>
      </p>
    </form>

    <p id = "northwest"  style = "background-image: url(c172.gif);
       visibility: hidden;  position: absolute;
       left: 100px;  top: 200px;  width: 100px">
```

```
      <br/><br/><br/><br/><br/>
    </p>

    <p id = "northeast"  style = "background-image: url(c172.gif);
       visibility: hidden;  position: absolute;
       left: 300px;  top: 200px;  width: 100px">
       <br/><br/><br/><br/><br/>
    </p>

    <p id = "southeast"  style = "background-image: url(c172.gif);
       visibility: hidden;  position: absolute;
       left: 300px;  top: 350px;  width: 100px">
       <br/><br/><br/><br/><br/>
    </p>

    <p id = "southwest"  style = "background-image: url(c172.gif);
       visibility: hidden;  position: absolute;
       left: 100px;  top: 350px;  width: 100px">
       <br/><br/><br/><br/><br/>
    </p>


    <p class = "regtext">
       I was born on July 4th,
       1976, in Huckabee, Alaska.
       I have three brothers and
       a sister, all older than I.
       My sister, Mary, is 26 years old.
       She lives in Kalkan, Montana.
       My oldest brother, Ron, is 32
       years old. He lives in Huckabee.
       My youngest brother, Max, is
       28 years old. He lives in Pinkee,
       Wyoming. My middle brother, Fred,
       is 30 years old. He lives in
       Kinkyhollow, Nebraska.
       My parents, who are both still
       living, still live in Huckabee.

    </p>

  </body>
</html>


// e63.js - The JavaScript part of a solution to
//          Exercise 6.3

/* A function to change the visibility of an element */

   function flipImage(img) {

     dom = document.getElementById(img).style;

/* Change the visibility property */

     if (dom.visibility == "visible" || dom.visibility == "show")
         dom.visibility = "hidden";
     else
         dom.visibility = "visible";
   }
```

Exercise 6.5

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- e65.html
     A solution to Exercise 6.5
     -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title> Exercise 6.5 </title>
    <style type = "text/css" >
      .planes {position: absolute; top: 100; left: 0; z-index: 0;" />
    </style>
    <script type = "text/javascript"  src = "e65.js" >
    </script>
  </head>
  <body>
    <p>
    <a href = "JAVASCRIPT:toTop('C172')">
    1
    </a>
    </p><p>
    <a href = "JAVASCRIPT:toTop('cix')">
    2
    </a>
    </p><p>
    <a href = "JAVASCRIPT:toTop('C182')">
    3
    </a>
    </p><p>
    <img class = "planes"  id = "C172"  src = "c172.gif"
         alt = "(Picture of a C172)" />
    <img class = "planes"  id = "cix"  src = "cix.gif"
         alt = "(Picture of a Citation airplane)" />
    <img class = "planes"  id = "C182"  src = "c182.gif"
         alt = "(Picture of a C182)" />
    </p><p></p>
  </body>
</html>


// e65.js - The JavaScript part of a solution to
//          Exercise 6.5

var top = "C172";

function toTop(newTop) {

// Get DOM addresses for the new top and the old top elements
  domTop = document.getElementById(top).style;
  domNew = document.getElementById(newTop).style;


// Set the zIndex properties of the two elements
  domTop.zIndex = "0";
  domNew.zIndex = "10";
  top = newTop;
}
```

Exercise 7.1

```
<?xml version = "1.0"  encoding = "utf-8"?>

<!-- cars.dtd - a document type definition for
                    the cars.xml document
       A solution to Exercise 7.1
       -->

<!ELEMENT car_catalog (car+)>
<!ELEMENT car (make, model, year, color, engine,
                number_of_doors, transmission_type, accessories)>
<!ELEMENT make (#PCDATA)>
<!ELEMENT model (#PCDATA)>
<!ELEMENT year (#PCDATA)>
<!ELEMENT color (#PCDATA)>
<!ELEMENT engine (number_of_cylinders, fuel_system)>
<!ELEMENT number_of_doors (#PCDATA)>
<!ELEMENT transmission_type (#PCDATA)>
<!ELEMENT accessories (#PCDATA)>

<!ATTLIST accessories radio CDATA #REQUIRED>
<!ATTLIST accessories air_conditioning CDATA #REQUIRED>
<!ATTLIST accessories power_windows CDATA #REQUIRED>
<!ATTLIST accessories power_steering CDATA #REQUIRED>
<!ATTLIST accessories power_brakes CDATA #REQUIRED>

<!ENTITY c "Chevrolet">
<!ENTITY f "Ford">
<!ENTITY d "Dodge">
<!ENTITY h "Honda">
<!ENTITY n "Nisson">
<!ENTITY t "Toyota">
```

Exercise 7.2

```
<?xml version = "1.0"  encoding = "utf-8"?>

<!-- cars.xml - A solution to Exercise 7.2
     -->

<!DOCTYPE car_catalog SYSTEM "cars.dtd">
<?xml-stylesheet type = "text/css" href = "cars.css"?>
        <car_catalog>
         <car>
            <year> 1997 </year>
            <make> &c; </make>
            <model> Impala </model>
            <color> Light blue </color>
            <engine>
                <number_of_cylinders> 8 cylinder
                </number_of_cylinders>
                <fuel_system> multi-port fuel injected </fuel_system>
              </engine>
              <number_of_doors> 4 door </number_of_doors>
              <transmission_type> 4 speed automatic
              </transmission_type>
              <accessories radio = "yes"  air_conditioning = "yes"
                           power_windows = "yes"
```

```
                        power_steering = "yes"
                        power_brakes = "yes" />
        </car>
        <car>
           <year> 1965 </year>
           <make> &f; </make>
           <model> Mustang </model>
           <color> White </color>
           <engine>
                <number_of_cylinders> 8 cylinder
                </number_of_cylinders>
                <fuel_system> 4BBL carburetor </fuel_system>
           </engine>
           <number_of_doors> 2 door </number_of_doors>
           <transmission_type> 3 speed manual </transmission_type>
           <accessories radio = "yes"  air_conditioning = "no"
                        power_windows = "no"  power_steering = "yes"
                        power_brakes = "yes" />
        </car>
        <car>
           <year> 1985 </year>
           <make> &t; </make>
           <model> Camry </model>
           <color> Blue </color>
           <engine>
                <number_of_cylinders> 4 cylinder
                </number_of_cylinders>
                <fuel_system> fuel injected </fuel_system>
           </engine>
             <number_of_doors> 4 door </number_of_doors>
             <transmission_type> 4 speed manual </transmission_type>
             <accessories radio = "yes"  air_conditioning = "yes"
                        power_windows = "no"  power_steering = "yes"
                        power_brakes = "yes" />
        </car>
      </car_catalog>
```

Exercise 7.4

```
<!-- cars.css - a style sheet for the cars.xml document
     A solution to Exercise 8.4
     -->

car {display: block; margin-top: 15px; color: blue;}
year, make, model {color: red; font-size: 16pt;}
color {display: block; margin-left: 20px; font-size: 12pt;}
engine {display: block; margin-left: 20px;}
  number_of_cylinders {font-size: 12pt;}
  fuel_system {font-size: 12pt;}
number_of_doors {display: block; margin-left: 20px; font-size: 12pt;}
transmission_type {display: block; margin-left: 20px; font-size: 12pt;}
```

Exercise 7.5

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!-- xslcar.xsl
     A solution to Exercise 7.5
     -->
```

```
<xsl:stylesheet xmlns:xsl = "http://www.w3.org/TR/WD-xsl"
                xmlns = "http://www.w3.org/TR/REC-html40">

   <xsl:template match = "/">
      <h2> Car Description </h2>
      <span style = "font-style: italic"> Year: </span>
      <xsl:value-of select = "car_catalog/car/year" /> <br />
      <span style = "font-style: italic"> Make: </span>
      <xsl:value-of select = "car_catalog/car/make" /> <br />
      <span style = "font-style: italic"> Model: </span>
      <xsl:value-of select = "car_catalog/car/model" /> <br />
      <span style = "font-style: italic"> Color: </span>
      <xsl:value-of select = "car_catalog/car/color" /> <br />
      <span style = "font-style: italic"> Cylinders: </span>
      <xsl:value-of select =
          "car_catalog/car/engine/number_of_cylinders" /> <br />
      <span style = "font-style: italic"> Fuel system: </span>
      <xsl:value-of select = "car_catalog/car/engine/fuel_system" />
          <br />
      <span style = "font-style: italic"> Doors: </span>
      <xsl:value-of select = "car_catalog/car/number_of_doors" />
          <br />
  </xsl:template>
</xsl:stylesheet>
```

Exercise 7.6

```
<?xml version = "1.0"  encoding = "utf-8"?>
<!-- xslcars.xsl
     A solution to Exercise 7.6
     -->
<xsl:stylesheet xmlns:xsl = "http://www.w3.org/TR/WD-xsl"
                xmlns = "http://www.w3.org/TR/REC-html40">

   <xsl:template match = "/">
      <h2> Car Description </h2>

      <xsl:for-each select = "car_catalog/car">
         <span style = "font-style: italic"> Year: </span>
         <xsl:value-of select = "year" /> <br />
         <span style = "font-style: italic"> Make: </span>
         <xsl:value-of select = "make" /> <br />
         <span style = "font-style: italic"> Model: </span>
         <xsl:value-of select = "model" /> <br />
         <span style = "font-style: italic"> Color: </span>
         <xsl:value-of select = "color" /> <br />
         <span style = "font-style: italic"> Cylinders: </span>
         <xsl:value-of select = "engine/number_of_cylinders" />
           <br />
         <span style = "font-style: italic"> Fuel system: </span>
         <xsl:value-of select = "engine/fuel_system" /> <br />
         <span style = "font-style: italic"> Doors: </span>
         <xsl:value-of select = "number_of_doors" />
         <br /><br />
      </xsl:for-each>
   </xsl:template>
</xsl:stylesheet>
```

ALL THE BEST...!!!