Web Server

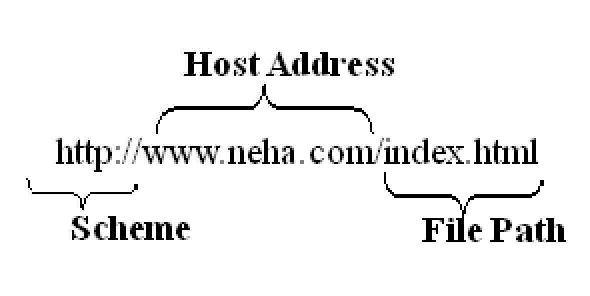
- Every Website sits on a computer known as Web Server.

URL (**U**niform **R**esource **L**ocator):

- Web Pages are preserved in a Web Server.
- Website can be extracted using a browser using Domain Name or I.P. Address.
- Domain Names are far easier to remember than IP Addresses.

- Address of a Web Page is called **URL**.
  Example: http://www.google.com
- google.com is called domain name

- URL contains three parts: The scheme, host address and file path as shown below:



The Scheme identifies the type of URL you are linking to and therefore how the resource should be retrieved. For example, most Web pages use something called the Hypertext Transfor Protocol (HTTP) to pass information to you, which is why most Web pages start with http://.

- A browser receives a domain name, and the request goes to one of many special computers on the Internet known as **domain name server (DNS)** (name servers). These servers keep tables of machine names and their IP addresses. So, domain name is converted it into 12 digit IP (Internet Protocal) address.
- IP address made up of four numbers between 0 and 258 separated by periods - for example, 192.168.0.123
- When you connect to the Internet using an ISP you will be allocated an IP address, and you will often be allocated a new IP address each time you connect.

HTML5 Reference Book

(from Tutorial Point) 169 pages

- **HTML5** is the ***latest*** and ***most enhanced version*** of **HTML**.

Execute the following program:

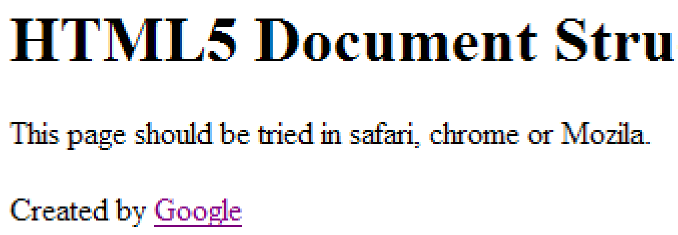
```
<!DOCTYPE html>
<html>
        <head>
                <meta charset="utf-8">
                <title>Neha Computers</title>
        </head>
        <body>
                <header role="banner">
                    <h1>HTML5 Document Structure Example</h1>
                    <p>This page should be tried in safari, chrome or Mozila.</p>
                </header>
                <footer>
                        <p>Created by <a href="http://www.google.co.in/">Google</a></p>
                </footer>
        </body>
</html>
```

Note1: The **doctype declaration** ***should*** be the very first thing in an HTML document, before the tag. ***The doctype declaration is not an HTML tag***; it is an ***instruction to the web browser*** about ***what version of the markup language the page is written in***. The doctype declaration refers to a **Document Type Definition** (**DTD**).

Note2: The **charset** ***attribute*** is **new** in **HTML5**, and **replaces** the need for: ***<meta http-equiv="Content-Type" content="text/html;*** **charset=UTF-8"**> ***Specifying the character-set using the http-equiv attribute is still allowed***, but t**he new way requires less code**.

Note3: The **header role="banner"** makes sense as it takes a ***special role***.

OUTPUT:



HTML5 Document Structure Example

This page should be tried in safari, chrome or Mozila.

Created by Google

HTML5 - Overview
Chatpter - 1

- **HTML5** is the ***next major revision*** of the **HTML** standard superseding **HTML 4.01**, **XHTML 1.0**, and **XHTML 1.1**.
- **HTML5** is a ***standard*** for **structuring** and **presenting** content on the **World Wide Web**.
- **HTML5** is a cooperation between the **World Wide Web Consortium (W3C)** and the **Web Hypertext Application Technology Working Group** (**WHATWG**).
- The **new standard** ***incorporates features*** like **video playback** and **drag-and-drop** that have been ***previously dependent on third-party browser plug-ins*** such as **Adobe Flash**, **Microsoft Silverlight**, and **Google Gears**.

Browser Support

- The ***latest versions*** of **Apple Safari**, **Google Chrome**, **Mozilla Firefox**, and **Opera** all ***support*** many **HTML5** ***features*** and **Internet Explorer 9.0** will also have ***support*** for some **HTML5** ***functionality***.
- The **mobile web browsers** that come ***pre-installed*** on **iPhones**, **iPads**, and **Android phones** all have ***excellent support*** for **HTML5**.

New Features of HTML5

- **HTML5** ***introduces*** a number of new **elements** and **attributes** that can help you in ***building*** **modern websites**.
- Here is a set of some of the most important features introduced in **HTML5** is given below:
- **New Semantic Elements:** These are like **<header>**, **<footer>**, and **<section>**.

Note: A **semantic element** clearly describes its meaning to both the **browser** and the **developer**. **Examples** of **semantic elements**: **<form>**, **<table>**, and **<article>** **-** Clearly defines its content. **Examples** of **non-semantic elements**: **<div>** and **<span>** **-** Tells nothing about its content.

- **Forms 2.0:** ***Improvements*** to **HTML** web forms where **new attributes** have been introduced for **<input> tag**.
- **Persistent Local Storage:** To ***achieve without resorting to third-party plugins***.

Note: Local Storage is designed to be a dependable, **persistent store of data on a client**. With local storage, web applications can store data locally within the user's browser. Before **HTML5**, application data had to be stored in **cookies**, ***included in every server request***. Local storage is more secure, and large amounts of data can be stored locally, without affecting website performance.

- **WebSocket :** A ***next-generation bidirectional communication technology*** for **web applications**.

Note: **WebSocket** is a computer communications protocol, providing full-duplex communication channels over a single TCP connection. WebSocket is designed to be implemented in **web browsers** and **web servers**, but it can be used by any **client** or **server application**. The **WebSocket Protocol** is an independent **TCP-based protocol**.

- **Server-Sent Events: HTML5** introduces ***events*** which flow from **web server** to the **web browsers** and they are called **Server-Sent Events** (**SSE**).

Note: **Server-sent events** (**SSE**) is a technology where a ***browser receives automatic updates*** from a **server** via HTTP connection. The Server-Sent Events EventSource API is standardized as part of **HTML5** by the **W3C**.

- **Canvas:** This ***supports*** a **two-dimensional drawing surface** that **you can program** with **JavaScript**.
- **Audio & Video:** You can ***embed*** **audio** or **video** on your ***webpages*** without ***resorting to third-party plugins***.
- **Geolocation:** Now ***visitors*** can choose to share their ***physical location*** with your ***web application***.

Note: The process or technique of identifying the **geographical location of a person** or **device** by means of ***digital information processed via the Internet***.

- **Microdata:** This lets you ***create your own vocabularies*** beyond **HTML5** and extend your web pages with ***custom semantics***.

Note: **Microdata** is data on the characteristics of units of a population, such as **individuals**, **households**, or establishments, collected by a **census**, **survey**, or **experiment**.

- **Drag and drop:** ***Drag and drop the items from one location to another location on the same webpage***.

Note: In computer graphical user interfaces, **drag and drop** is a pointing device gesture in which the user selects a virtual object by "grabbing" it and dragging it to a different location or onto another virtual object.

Backward Compatibility

- **HTML5** is designed, as much as possible, to be ***backward compatible with existing web browsers***.

HTML5 - Syntax
Chapter 2

- The **HTML5** language has a "**custom**" **HTML** ***syntax*** that is ***compatible*** with **HTML4** and **XHTML1** documents published on the Web, but is ***not compatible*** with the more difficult **SGML** features of **HTML4**.
- **HTML5** ***does not have the same syntax rules*** as **XHTML** where ***we needed lower case tag names***, ***quoting our attributes***, an ***attribute had to have a value*** and to ***close all empty elements***.
- **HTML5** comes with a ***lot of flexibility*** and it ***supports*** the ***following features***:

- **Uppercase tag names**
- **Quotes are optional for attributes**
- **Attribute values are optional**
- **Closing empty elements are optional**

The DOCTYPE

- **DOCTYPEs** in ***older versions*** of **HTML4** were ***longer*** because the **HTML4** language was

SGML based and therefore required a reference to a **DTD**.

- **HTML5** authors would use ***simple syntax*** to specify ***DOCTYPE*** as follows:

<!DOCTYPE html>

Note: ***The above syntax is case-insensitive.***

Character Encoding

- **HTML5** authors can use ***simple syntax to specify Character Encoding*** as follows:

<meta charset="UTF-8">

Note: ***The above syntax is case-insensitive***.

The <script> tag

- It's ***common practice to add*** a ***type attribute*** with a value of "**text/javascript**" to script elements as follows:

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

- **HTML5** removes ***extra information required*** and you can use simply following syntax:

<script src="scriptfile.js"></script>

The <link> tag

- So far you were writing **<link>** as follows:

<link rel="stylesheet" type="text/css" href="stylefile.css">

- **HTML5** ***removes extra information required*** and you can simply use the following syntax:

<link rel="stylesheet" href="stylefile.css">

HTML5 Elements

- **HTML5** ***elements*** are marked up using ***start tags*** and ***end tags***. Tags are delimited using angle brackets with the tag name in between.
- The difference between ***start tags*** and ***end tags*** is that the latter includes a ***slash before the tag name***.
- Following is the example of an **HTML5** element:
  <p>...</p>
- **HTML5 tag names** are **case insensitive** and may be written in all ***uppercase*** or ***mixed case***, although the most common convention is to stick with ***lowercase***.

- Most of the elements contain some content like <p>...</p> contains a **paragraph**. Some elements, however, are ***forbidden*** from containing any content at all and these are known as **void elements**. For example, **br**, **hr**, **link**, **meta**, etc.

HTML5 Attributes
Chapter 3

- **Elements** may contain **attributes** that are used to ***set various properties of an element***.
- Some **attributes** are ***defined globally*** and can be used ***on any element***, while others are defined for ***specific elements only***. All attributes have a **name** and a **value** and look like as shown below in the example.

Following is the example of an **HTML5** ***attribute*** which illustrates how to mark up a **div** ***element*** with an attribute named class using a value of "**example**":

```
<div class="example">...</div>
```

Note: **Attributes** may only be specified **within start tags** and must ***never be used in end tags***.

HTML5 ***attributes*** are ***case insensitive*** and may be written in all uppercase or mixed case, although the most common convention is to stick with ***lowercase***.

Here is a complete list of **HTML5 Attributes**.

HTML5 Document:

- The following tags have been introduced for ***better structure***.

- **section**: This **tag** represents a ***generic document*** or ***application section***. It can be used together with **h1-h6** to indicate the ***document structure***.
- **article**: This **tag** represents an ***independent piece of content of a document***, such as a **blog entry** or **newspaper article**.
- **aside**: This **tag** represents a ***piece of content that is only slightly related*** to ***the rest of the page***.
- **header**: This **tag** represents the ***header of a section***.
- **footer**: This **tag** represents a **footer** for a ***section*** and can contain ***information about the author***, ***copyright information***, etc.
- **nav**: This **tag** represents a ***section of the document intended for navigation***.
- **dialog**: This **tag** can be used to ***mark up a conversation***.
- **figure**: This **tag** can be used to ***associate a caption together with some embedded content***, such as a **graphic** or **video**.

- The markup for an **HTML5** ***document*** would look like the following:

Structure of the HTML5 Document:

```
<!DOCTYPE html>
<html>
        <head>
                <meta  charset="utf-8">
                <title>...</title>
        </head>
        <body>
                <header>...</header>
                <nav>...</nav>
                <article>
                        <section>
                            ...
                        </section>
                </article>
                <aside>...</aside>
                <footer>...</footer>
        </body>
</html>
```

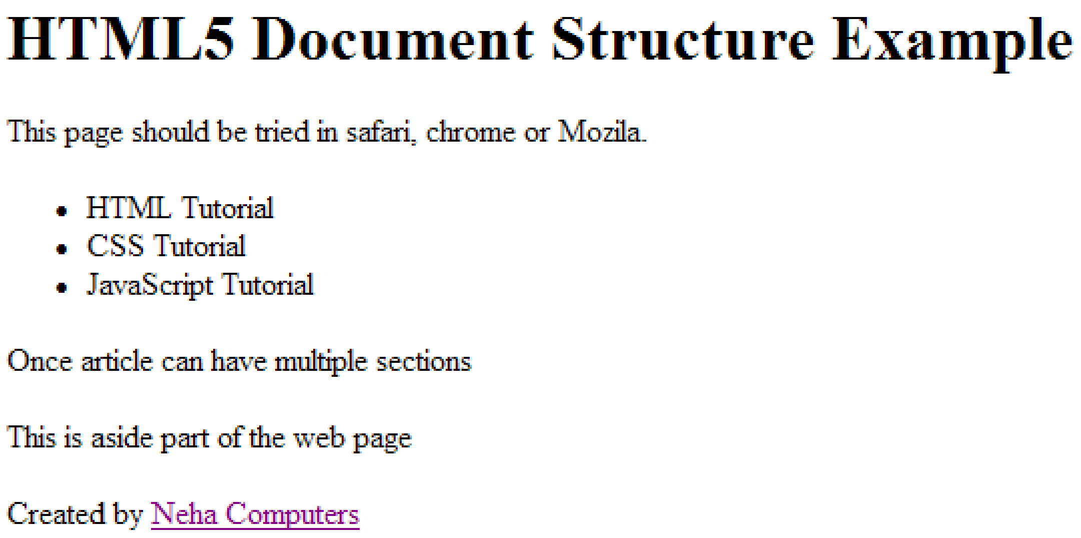
Example:

```
<!DOCTYPE html>
<html>
        <head>
                <meta  charset="utf-8">
                <title>...</title>
        </head>
```

```
<body>
        <header role="banner">
            <h1>HTML5 Document Structure Example</h1>
            <p>This page should be tried in safari, chrome or Mozila.</p>
        </header>
        <nav>
            <ul>
                <li><a href="http://www.google.co.in/html">HTML
                    Tutorial</a></li>
                <li><a href="http://www.google.co.in/css">CSS
                    Tutorial</a></li>
                <li><a href="http://www.google.co.in/javascript">JavaScript
                    Tutorial</a></li>
            </ul>
        </nav>
        <article>
                <section>
                        <p>Once article can have multiple sections</p>
                </section>
        </article>
        <aside>
                <p>This is aside part of the webpage</p>
                </aside>
                <footer>
                        <p>Created by <a href="http://www.google.co.in/">Neha
                    Computers</a></p>
                </footer>
        </body>
</html>
```

It will produce the following result:

OUTPUT:



HTML5 Document Structure Example

This page should be tried in safari, chrome or Mozila.

- HTML Tutorial
- CSS Tutorial
- JavaScript Tutorial

Once article can have multiple sections

This is aside part of the web page

Created by Neha Computers

Standard Attributes

- The attributes listed below are supported by almost all the **HTML5** tags.

Attribute: **accesskey**
Options: ***User Defined***
Function: Specifies a keyboard shortcut to access an element.

Attribute: **align**
Options: ***right, left, center***
Function: Horizontally aligns tags

Attribute: **background**
Options: URL
Function: Places a background image behind an element

Attribute: **bgcolor**
Options: ***numeric, hexidecimal, RGB values***
Function: Places a background color behind an element

Attribute: **class**
Options: ***User Defined***
Function: Classifies an element for use with Cascading Style Sheets.

Attribute: **contenteditable**
Options: ***true, false***
Function: Specifies if the user can edit the element’s content or not.

Attribute: ***contextmenu***
Options: ***Menu id***
Function: Specifies the context menu for an element.

Attribute: **data-XXXX**
Options: ***User Defined***
Function: Custom attributes. Authors of a HTML document can define their own attributes. Must start with "data-".

Attribute: **draggable**
Options: ***true,false, auto***
Function: Specifies whether or not a user is allowed to drag an element.

Attribute: **height**
Options: ***Numeric Value***
Function: Specifies the height of tables, images, or table cells.

Attribute: **hidden**

Options: ***hidden***
Function: Specifies whether element should be visible or not.

Attribute: **id**
Options: ***User Defined***
Function: Names an element for use with Cascading Style Sheets.

Attribute: **item**
Options: ***List of elements***
Function: Used to group elements.

Attribute: **itemprop**
Options: ***List of items***
Function: Used to group items.

Attribute: **spellcheck**
Options: ***true, false***
Function: Specifies if the element must have it's spelling or grammar checked.

Attribute: **style**
Options: ***CSS Style***
Function: sheet Specifies an inline style for an element.

Attribute: **subject**
Options: ***User define***
Function: id Specifies the element’s corresponding item.

Attribute: **tabindex**
Options: ***Tab number***
Function: Specifies the tab order of an element.

Attribute: **title**
Options: ***User Defined***
Function: "Pop-up" title for your elements.

Attribute: **valign**
Options: ***top, middle, bottom Vertically***
Function: aligns tags within an HTML element.

Attribute: **width**
Options: ***Numeric Value***
Function: Specifies the width of tables, images, or table cells.

Custom Attributes

- A new feature being introduced in **HTML5** is the addition of **custom data attributes**.
- A custom data attribute starts with data- and would be named based on your requirement.

Here is a simple example:

```
<div class="example" data-subject="physics" data-level="complex">
...
</div>
```

- The above code will be ***perfectly valid*** **HTML5** with two custom attributes called **datasubject** and **data-level**. You would be able to get the values of these attributes using **JavaScript APIs** or **CSS** in similar way as you get for standard attributes.

HTML5 - Events
Chapter 4

- When users visit your website, they ***perform various activities*** such as ***clicking on text*** and ***images*** and ***links***, ***hover over*** defined **elements**, etc.
- These are examples of what **JavaScript** calls **events**.
- We can write our ***event handlers*** in **Javascript** or **VBscript** and you can specify these ***event handlers*** as a value of **event tag attribute**.
- The **HTML5** specification defines various **event attributes** as listed below:
- We can use the following set of ***attributes*** to ***trigger*** any **javascript** or ***vbscript code*** given as

value, when there is any **event** that ***takes place*** for any **HTML5 element**.

Attribute: offline
Value: script
Description: Triggers when the document goes offline

Attribute: onabort
Value: script
Description: Triggers on an abort event

Attribute: onafterprint
Value: script
Description: Triggers after the document is printed

Attribute: onbeforeonload
Value: script
Description: Triggers before the document loads

Attribute: onbeforeprint
Value: script
Description: Triggers before the document is printed

Attribute: onblur
Value: script
Description: Triggers when the window loses focus
Attribute: oncanplay
Value: script
Description: Triggers when media can start play, but might has to stop for buffering

Attribute: oncanplaythrough
Value: script
Description: Triggers when media can be played to the end, without stopping for buffering

Attribute: onchange
Value: script
Description: Triggers when an element changes

Attribute: onclick
Value: script
Description: Triggers on a mouse click

Attribute: oncontextmenu
Value: script

Description: Triggers when a context menu is triggered

Attribute: ondblclick
Value: script
Description: Triggers on a mouse double-click
Attribute: ondrag
Value: script
Description: Triggers when an element is dragged

Attribute: ondragend
Value: script
Description: Triggers at the end of a drag operation

Attribute: ondragenter
Value: script
Description: Triggers when an element has been dragged to a valid

Attribute: ondragleave
Value: script
Description: Triggers when an element leaves a valid drop target

Attribute: ondragover

Value: script
Description: Triggers when an element is being dragged over a valid drop target

Attribute: ondragstart
Value: script
Description: Triggers at the start of a drag operation

Attribute: ondrop
Value: script
Description: Triggers when dragged element is being dropped

Attribute: ondurationchange
Value: script
Description: Triggers when the length of the media is changed

Attribute: onemptied
Value: script
Description: Triggers when a media resource element suddenly becomes empty.

Attribute: onended
Value: script
Description: Triggers when media has reach the end

Attribute: onerror
Value: script
Description: Triggers when an error occur

Attribute: onfocus
Value: script
Description: Triggers when the window gets focus

Attribute: onformchange
Value: script
Description: Triggers when a form changes

Attribute: onforminput
Value: script
Description: Triggers when a form gets user input

Attribute: onhaschange
Value: script
Description: Triggers when the document has change

Attribute: oninput

Value: script
Description: Triggers when an element gets user input

Attribute: oninvalid
Value: script
Description: Triggers when an element is invalid

Attribute: onkeydown
Value: script
Description: Triggers when a key is pressed

Attribute: onkeypress
Value: script
Description: Triggers when a key is pressed and released

Attribute: onkeyup
Value: script
Description: Triggers when a key is released

Attribute: onload
Value: script
Description: Triggers when the document loads

Attribute: onloadeddata
Value: script
Description: Triggers when media data is loaded

Attribute: onloadedmetadata
Value: script
Description: Triggers when the duration and other media data of a media element is loaded

Attribute: onloadstart
Value: script
Description: Triggers when the browser starts to load the media data

Attribute: onmessage
Value: script
Description: Triggers when the message is triggered

Attribute: onmousedown
Value: script
Description: Triggers when a mouse button is pressed

Attribute: onmousemove

Value: script
Description: Triggers when the mouse pointer moves

Attribute: onmouseout
Value: script
Description: Triggers when the mouse pointer moves out of an element

Attribute: onmouseover
Value: script
Description: Triggers when the mouse pointer moves over an element

Attribute: onmouseup
Value: script
Description: Triggers when a mouse button is released

Attribute: onmousewheel
Value: script
Description: Triggers when the mouse wheel is being rotated

Attribute: onoffline
Value: script
Description: Triggers when the document goes offline

Attribute: onoine
Value: script
Description: Triggers when the document comes online

Attribute: ononline
Value: script
Description: Triggers when the document comes online

Attribute: onpagehide
Value: script
Description: Triggers when the window is hidden

Attribute: onpageshow
Value: script
Description: Triggers when the window becomes visible

Attribute: onpause
Value: script
Description: Triggers when media data is paused

Attribute: onplay
Value: script

Description: Triggers when media data is going to start playing

Attribute: onplaying
Value: script
Description: Triggers when media data has start playing

Attribute: onpopstate
Value: script
Description: Triggers when the window's history changes

Attribute: onprogress
Value: script
Description: Triggers when the browser is fetching the media data

Attribute: onratechange
Value: script
Description: Triggers when the media data's playing rate has changed

Attribute: onreadystatechange
Value: script
Description: Triggers when the ready-state changes

Attribute: onredo
Value: script
Description: Triggers when the document performs a redo

Attribute: onresize
Value: script
Description: Triggers when the window is resized

Attribute: onscroll
Value: script
Description: Triggers when an element's scrollbar is being scrolled

Attribute: onseeked
Value: script
Description: Triggers when a media element's seeking attribute is no longer true, and the seeking has ended
Attribute: onseeking
Value: script
Description: Triggers when a media element's seeking attribute is true, and the seeking has begun

Attribute: onselect

Value: script
Description: Triggers when an element is selected

Attribute: onstalled
Value: script
Description: Triggers when there is an error in fetching media data

Attribute: onstorage
Value: script
Description: Triggers when a document loads

Attribute: onsubmit
Value: script
Description: Triggers when a form is submitted

Attribute: onsuspend
Value: script
Description: Triggers when the browser has been fetching media data, but stopped before the entire media file was fetched

Attribute: ontimeupdate
Value: script

Description: Triggers when media changes its playing position

Attribute: onundo
Value: script
Description: Triggers when a document performs an undo

Attribute: onunload
Value: script
Description: Triggers when the user leaves the document

Attribute: onvolumechange
Value: script
Description: Triggers when media changes the volume, also when volume is set to "mute"

Attribute: onwaiting
Value: script
Description: Triggers when media has stopped playing, but is expected to resume

HTML5 - Web Forms 2.0
Chapter 5

- **Web Forms 2.0** is an ***extension*** to the forms features found in **HTML4**.
- The **<input>** ***element*** in **HTML4**
- **HTML4** input **elements** use the ***type attribute*** to specify the ***data type***.
- **HTML4** ***provides following types***:

Type: text
Description: A free-form text field, nominally free of line breaks.

Type: password
Description: A free-form text field for sensitive information, nominally free of

Type: line
Description: breaks

Type: checkbox
Description: A set of zero or more values from a predefined list.

Type: radio
Description: An enumerated value.

Type: submit
Description: A free form of button initiates form submission.

Type: file
Description: An arbitrary file with a MIME type and optionally a file name.

Type: image
Description: A coordinate, relative to a particular image's size, with the extra semantic that it must be the last value selected and initiates form submission.

Type: hidden
Description: An arbitrary string that is not normally displayed to the user.

Type: select
Description: An enumerated value, much like the radio type.

Type: textarea
Description: A free-form text field, nominally with no line break restrictions.

Type: button
Description: A free form of button which can initiates any event related to

button.

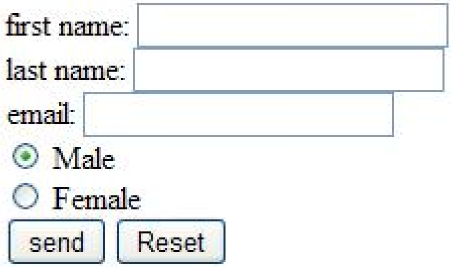
- Following is the ***simple example*** of using **labels**, **radio buttons**, and **submit buttons**:

HINT: Write a detailed program to demo the following code.

```
<!doctype html>
<html lang="en">
 <head>
  <title>Document</title>
 </head>
 <body>
<form action="http://example.com/cgiscript.pl" method="post">
<p>
<label for="firstname">first name: </label>
<input type="text" id="firstname"><br />
<label for="lastname">last name: </label>
 <input type="text" id="lastname"><br />
<label for="email">email: </label>
<input type="text" id="email"><br>
<input type="radio" name="sex" value="male" checked> Male<br>
<input type="radio" name="sex" value="female"> Female<br>
```

```
<input type="submit" value="send"> <input type="reset">
</p>
</form>
 </body>
</html>
```

OUTPUT:



first name:

last name:

email:

● Male

○ Female

The <input> element in HTML5

HTML4 input elements use the **type attribute** to specify the **data type**. **HTML4** provides following types:

Type: text
Description: A free-form text field, nominally free of line breaks.

Type: password
Description: A free-form text field for sensitive information, nominally free of

line breaks.

Type: checkbox
Description: A set of zero or more values from a predefined list.

Type: radio
Description: An enumerated value.

Type: submit
Description: A free form of button initiates form submission.

Type: file
Description: An arbitrary file with a MIME type and optionally a file name.

Type: image
Description: A coordinate, relative to a particular image's size, with the extra semantic that it must be the last value selected and initiates form submission.

Type: hidden
Description: An arbitrary string that is not normally displayed to the user.

Type: select

Description: An enumerated value, much like the radio type.

Type: textarea
Description: A free-form text field, nominally with no line break restrictions.

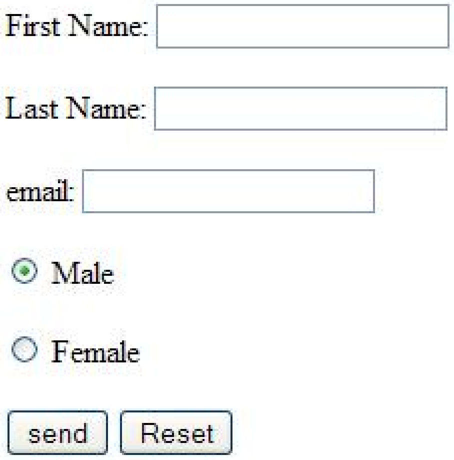
Type: button
Description: A free form of button which can initiates any event related to button.

- Following is the ***simple example*** of using **labels**, **radio buttons**, and **submit buttons**:

```
<!doctype html>
<html lang="en">
 <head>
<form action="http://example.com/cgiscript.pl" method="post">
<p>
<label for="firstname">First Name: </label>
<input type="text" id="firstname" ><br><br>
<label for="lastname">Last Name: </label>
<input type="text"  id="lastname"><br><br>
<label for="email">email: </label>
<input type="text"  id="email"><br><br>
<input type="radio" name="sex" value="Male" Checked> Male<br><br>
```

```
<input type="radio" name="sex" value="Female"> Female<br><br>
<input type="submit" value="send"> <input type="reset">
</p>
</form>
  <title>Document</title>
 </head>
 <body>

 </body>
</html>
```

OUTPUT:



First Name:

Last Name:

email:

● Male

○ Female

The <input> element in HTML5

- Apart from the above-mentioned attributes, **HTML5** input elements introduced several new values for the **type attribute**. These are listed below.

Note: Try all the following example using latest version of **Opera browser**.

Type: datetime
Description: A date and time (year, month, day, hour, minute, second, fractions of a second) encoded according to ISO 8601 with the time zone set to UTC.

Type: datetimelocal
Description: A date and time (year, month, day, hour, minute, second, fractions of a second) encoded according to ISO 8601, with no time zone information.

Type: date
Description: A date (year, month, day) encoded according to ISO 8601.

Type: month
Description: A date consisting of a year and a month encoded according to ISO 8601.

Type: week
Description: A date consisting of a year and a week number encoded according to ISO 8601.

Type: time
Description: A time (hour, minute, seconds, fractional seconds) encoded according to ISO 8601.

Type: number
Description: It accepts only numerical value. The step attribute specifies the precision, defaulting to 1.

Type: range
Description: The range type is used for input fields that should contain a value from a range of numbers.

Type: email
Description: It accepts only email value. This type is used for input fields that should contain an e-mail address. If you try to submit a simple text, it forces to enter only email address in **email@example.com** format.

Type: url
Description: It accepts only **URL value**. This type is used for input fields that should contain a URL address. If you try to submit a simple text, it forces to enter only URL address either in http://www.example.com format or in http://example.com format.

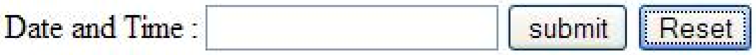
HTML5 - datetime

- A **date** and **time** (year, month, day, hour, minute, second, fractions of a second) encoded according to ISO 8601 with the time zone set to UTC.

Example

```
<!DOCTYPE HTML>
<html>
<body>
<form action = "/cgi-bin/html5.cgi" method = "get">
Date and Time : <input type = "datetime" name = "newinput" />
<input type = "submit" value = "submit" />
<input type="reset">
</form>
</body>
</html>
```

OUTPUT:

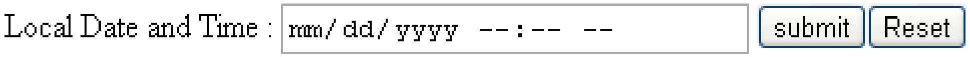


HTML5 - datetime local

A **date** and **time** (year, month, day, hour, minute, second, fractions of a second) encoded according to ISO 8601, with no time zone information.

```
<!DOCTYPE HTML>
<html>
<body>
<form action = "/cgi-bin/html5.cgi" method = "get">
Local Date and Time : <input type = "datetime-local" name = "newinput" />
<input type = "submit" value = "submit" /><input type="reset">
</form>
</body>
</html>
```

OUTPUT:



Local Date and Time : mm/dd/yyyy --:-- --

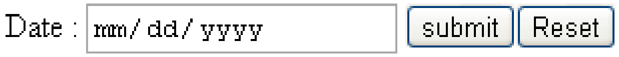
HTML5 – date

A **date** (year, month, day) encoded according to ISO 8601.

```
<!DOCTYPE HTML>
<html>
<body>
<form action = "/cgi-bin/html5.cgi" method = "get">
Date : <input type = "date" name = "newinput" />
<input type = "submit" value = "submit" /><input type="reset">
```

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

OUTPUT:



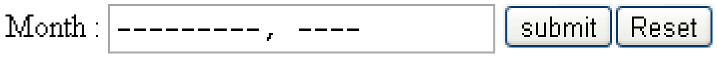
HTML5 – month

A date consisting of a year and a month encoded according to ISO 8601.

Example

```
<!DOCTYPE HTML>
<html>
<body>
<form action = "/cgi-bin/html5.cgi" method = "get">
Month : <input type = "month" name = "newinput" />
<input type = "submit" value = "submit" /><input type="reset">
</form>
</body>
</html>
```

OUTPUT:



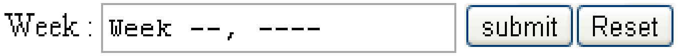
HTML5 - week

A date consisting of a year and a week number encoded according to ISO 8601.

Example

```
<!DOCTYPE HTML>
<html>
<body>
<form action = "/cgi-bin/html5.cgi" method = "get">
Week : <input type = "week" name = "newinput" />
<input type = "submit" value = "submit" /><input type="reset">
</form>
</body>
</html>
```

OUTPUT:



HTML5 – time

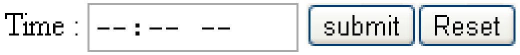
A time (hour, minute, seconds, fractional seconds) encoded according to ISO 8601.

Example

```
<!DOCTYPE HTML>
<html>
<body>
```

```
<form action = "/cgi-bin/html5.cgi" method = "get">
Time : <input type = "time" name = "newinput" />
<input type = "submit" value = "submit" /><input type="reset">
</form>
</body>
</html>
```

OUTPUT:



HTML5 – number

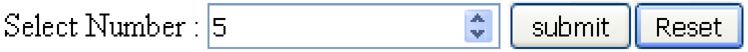
It ***accepts*** only ***numerical value***. The ***step attribute*** specifies the ***precision***, **defaulting to 1**.

Example

```
<!DOCTYPE HTML>
<html>
<body>
<form action = "/cgi-bin/html5.cgi" method = "get">
Select Number : <input type = "number" min = "0" max = "10" step "1"
value = "5" name = "newinput" />
<input type = "submit" value = "submit" /><input type="reset">
</form>
</body>
```

```
</html>
```

OUTPUT:



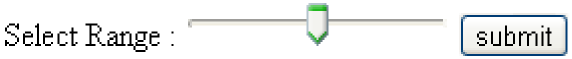
HTML5 – range

- The **range type** is used for **input fields** that should contain a value from a **range of numbers**.

Example

```
<!DOCTYPE HTML>
<html>
<body>
<form action = "/cgi-bin/html5.cgi" method = "get">
Select Range : <input type = "range" min = "0" max = "10" step "1"
value = "5" name = "newinput" />
<input type = "submit" value = "submit" /><input type="reset">
</form>
</body>
</html>
```

OUTPUT:



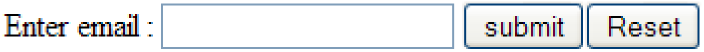
HTML5 - email

It ***accepts*** only **email value**. This type is used for input fields that should contain an e-mail address. If you try to submit a simple text, it ***forces*** to ***enter only email address*** in email@example.com format.

Example

```
<!DOCTYPE HTML>
<html>
<body>
<form action = "/cgi-bin/html5.cgi" method = "get">
Enter email : <input type = "email" name = "newinput" />
<input type = "submit" value = "submit" /><input type="reset">
</form>
</body>
</html>
```

OUTPUT:



HTML5 – URL

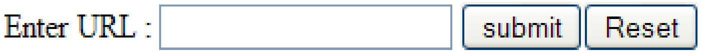
It ***accepts*** only **URL value**. This type is used for input fields that should contain a URL address. If you try to submit a simple text, it forces to enter only URL address either in http://www.example.com format or in http://example.com format.

Example

```
<!DOCTYPE HTML>
<html>
<body>
```

```
<form action = "/cgi-bin/html5.cgi" method = "get">
Enter URL : <input type = "url" name = "newinput" />
<input type = "submit" value = "submit" /><input type="reset">
</form>
</body>
</html>
```

OUTPUT:



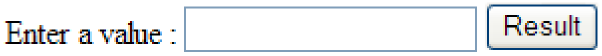
The <output> element

HTML5 introduced a **new element <output>** which is used to represent the result of ***different types of output***, such as ***output written by a script***. You can use the for attribute to specify a ***relationship between*** the **output element** and **other elements** in the document that ***affected the calculation*** (for example, as **inputs** or **parameters**). The value of the for ***attribute*** is a ***space-separated list of IDs of other elements***.

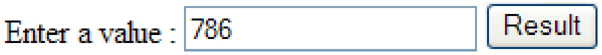
```
<html>
<script type="text/javascript">
function showResult()
{
```

```
x = document.forms["myform"]["newinput"].value;
document.forms["myform"]["result"].value=x;
}
</script>
<body>
<form action="/cgi-bin/html5.cgi" method="get" name="myform">
Enter a value : <input type="text" name="newinput" />
<input type="button" value="Result" onclick="showResult();" />
<output name="result"/><input type="reset">
</form>
</body>
</html>
```

OUTPUT:

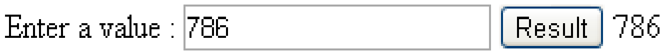


Enter a value : Result



Enter a value : 786 Result

Click on **Result button**.



Enter a value : 786 Result 786

The placeholder attribute

HTML5 introduced a **new attribute** called **placeholder**. This attribute on **<input>** and **<textarea>** elements provide a **hint** to the ***user of what can be entered in the field***.

Note: The placeholder text ***must not contain carriage returns*** or line-feeds.

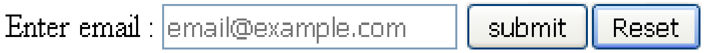
Here is the ***simple syntax for placeholder attribute***:

```
<input type="text" name="search" placeholder="search the web"/>
```

Note: This attribute is supported by latest versions of **Mozilla**, **Safari** and **Crome browsers** only.

```
<!DOCTYPE HTML>
<html>
<body>
<form action="/cgi-bin/html5.cgi" method="get">
Enter email : <input type="email" name="newinput"
placeholder="email@example.com"/>
<input type="submit" value="submit" /><input type="reset">
</form>
</body>
</html>
```

OUTPUT:



Enter email : email@example.com

The autofocus attribute

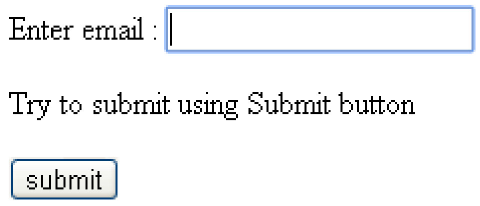
- This is a simple ***one-step pattern***, easily programmed in JavaScript at the time of document load, automatically focus one particular form field.
- **HTML5** ***introduced*** a new attribute called autofocus which would be used as follows:

```
<input type="text" name="search" autofocus/>
```

Note: This attribute is supported by latest versions of **Mozilla**, **Safari** and **Chrome** ***browsers*** only.

```
<!DOCTYPE HTML>
<html>
<body>
<form action="/cgi-bin/html5.cgi" method="get">
Enter email : <input type="text" name="newinput" autofocus/>
<p>Try to submit using Submit button</p>
<input type="submit" value="submit" />
</form>
</body>
</html>
```

OUTPUT:



Enter email :

Try to submit using Submit button

The required attribute

- Now you ***do not need to have JavaScript for client-side validations like empty text box*** would never be submitted because **HTML5** introduced a new attribute called required which would be used as follows and would insist to have a value:

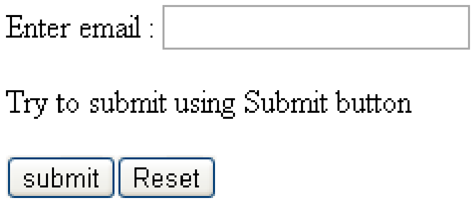
```
<input type="text" name="search" required/>
```

Note: This attribute is supported by latest versions of Mozilla, Safari and Chrome browsers only.

```
<!DOCTYPE HTML>
<html>
<body>
<form action="/cgi-bin/html5.cgi" method="get">
Enter email : <input type="text" name="newinput" required/>
<p>Try to submit using Submit button</p>
<input type="submit" value="submit" /><input type="reset">
</form>
```

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

OUTPUT:



Enter email :

Try to submit using Submit button

HTML5 - SVG
Chapter 6

- **SVG** stands for **Scalable Vector Graphics** and it is a language for describing **2D-graphics** and ***graphical applications*** in **XML** and the **XML** is then ***rendered*** by an **SVG viewer**.
- **SVG** is mostly useful for ***vector type diagrams*** like **Pie charts**, **Two-dimensional graphs** in an ***X,Y coordinate system*** etc.
- **SVG** became a **W3C Recommendation** 14. January 2003 and you can check latest version of **SVG** specification at **SVG Specification**.

Viewing SVG Files

- Most of the ***web browsers*** can display **SVG** just like they can display **PNG**, **GIF**, and **JPG**.
- **Internet Explorer** users may have to install the **Adobe SVG Viewer** to be able to view **SVG** in

the ***browser***.

Embedding SVG in HTML5

HTML5 allows **embedding SVG** directly using **<svg>...</svg>** ***tag*** which has following simple syntax .
<svg xmlns="http://www.w3.org/2000/svg">
...
</svg>

Firefox 3.7 has also introduced a configuration option ("**about:config**") where you can enable **HTML5** using the following steps .

- Type **about:config** in your Firefox address bar.
- Click the "I'll be careful, I promise!" button on the warning message that appears (and make sure you adhere to it!).
- Type **html5.enable** into the **filter bar** at the top of the page.
- Currently it would be disabled, so click it to toggle the value to true.

Now your **Firefox HTML5** parser should be enabled and you should be able to experiment with the following examples.

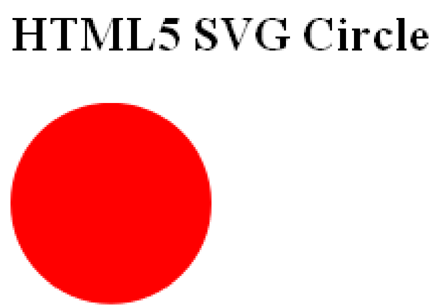
HTML5 - SVG Circle

- Following is the **HTML5** version of an **SVG *example*** which would ***draw a circle using* <circle>**

tag

```
<!DOCTYPE html>
<html>
<head>
<title>SVG</title>
<meta charset="utf-8" />
</head>
<body>
<h2>HTML5 SVG Circle</h2>
<svg id="svgelem" height="200" xmlns="http://www.w3.org/2000/svg">
<circle id="redcircle" cx="50" cy="50" r="50" fill="red" />
</svg>
</body>
</html>
```

OUTPUT:



HTML5 SVG Circle

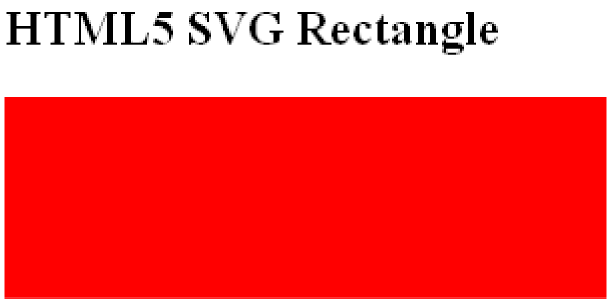
HTML5 - SVG Rectangle:

- Following is the **HTML5** version of an **SVG** example which would draw a rectangle using **<rect> tag**:

```
<!DOCTYPE html>
<html>
<head>
<title>SVG</title>
<meta charset="utf-8" />
</head>
<body>
<h2>HTML5 SVG Rectangle</h2>
<svg id="svgelem" height="200" xmlns="http://www.w3.org/2000/svg">
<rect id="redrect" width="300" height="100" fill="red" />
</svg>
```

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

OUTPUT:


HTML5 SVG Rectangle

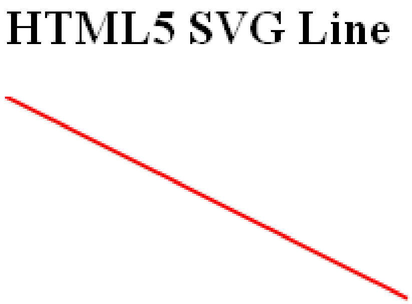
HTML5 - SVG Line:

- Following is the **HTML5** version of an **SVG** example which would draw a line using **<line> tag**:

```
<!DOCTYPE html>
<html>
<head>
<title>SVG</title>
<meta charset="utf-8" />
</head>
<body>
<h2>HTML5 SVG Line</h2>
```

```
<svg id="svgelem" height="200" xmlns="http://www.w3.org/2000/svg">
<line x1="0" y1="0" x2="200" y2="100" style="stroke:red;stroke-width:2"/>
</svg>
</body>
</html>
```

OUTPUT:



HTML5 SVG Line

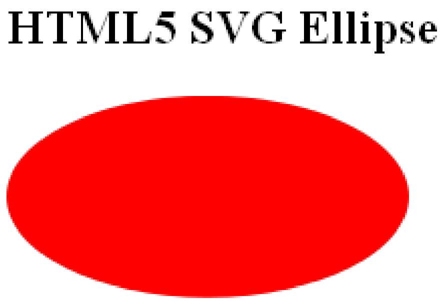
HTML5 - SVG Ellipse

- Following is the **HTML5** version of an **SVG** example which would draw an ellipse using **<ellipse> tag**:

```
<!DOCTYPE html>
<html>
<head>
<title>SVG</title>
<meta charset="utf-8" />
```

```
</head>
<body>
<h2>HTML5 SVG Ellipse</h2>
<svg id="svgelem" height="200" xmlns="http://www.w3.org/2000/svg">
<ellipse cx="100" cy="50" rx="100" ry="50" fill="red" />
</svg>
</body>
</html>
```

OUTPUT:



HTML5 SVG Ellipse

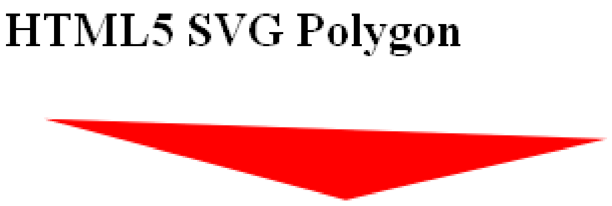
HTML5 - SVG Polygon:

- Following is the **HTML5** version of an **SVG** example which would draw a **polygon** using **<polygon> tag**:

```
<!DOCTYPE html>
```

```
<html>
<head>
<title>SVG</title>
<meta charset="utf-8" />
</head>
<body>
<h2>HTML5 SVG Polygon</h2>
<svg id="svgelem" height="200" xmlns="http://www.w3.org/2000/svg">
<polygon points="20,10 300,20, 170,50" fill="red" />
</svg>
</body>
</html>
```

OUTPUT:



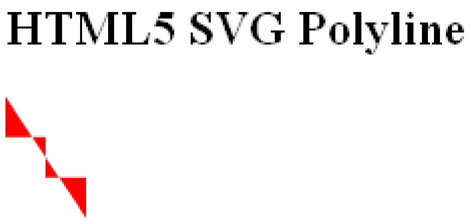
HTML5 SVG Polygon

HTML5 - SVG Polyline:

- Following is the **HTML5** version of an **SVG** example which would draw a **polyline** using **<polyline> tag**:

```
<!DOCTYPE html>
<html>
<head>
<title>SVG</title>
<meta charset="utf-8" />
</head>
<body>
<h2>HTML5 SVG Polyline</h2>
<svg id="svgelem" height="200" xmlns="http://www.w3.org/2000/svg">
<polyline points="0,0 0,20 20,20 20,40 40,40 40,60" fill="red" />
</svg>
</body>
</html>
```

OUTPUT:



HTML5 SVG Polyline

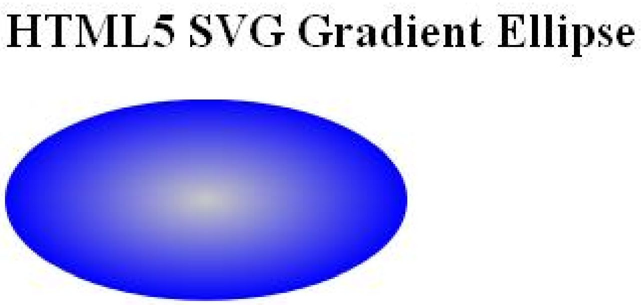
HTML5 - SVG Gradients

Following is the HTML5 version of an SVG example which would draw an ellipse using <ellipse> tag and would use <radialGradient> tag to define an SVG radial gradient. Similarly, you can use <linearGradient> tag to create SVG linear gradient.

```
<!DOCTYPE html>
<html>
<head>
<title>SVG</title>
<meta charset="utf-8" />
</head>
<body>
<h2>HTML5 SVG Gradient Ellipse</h2>
<svg id="svgelem" height="200" xmlns="http://www.w3.org/2000/svg">
<defs>
<radialGradient id="gradient" cx="50%" cy="50%" r="50%" fx="50%"
fy="50%">
```

```
<stop offset="0%" style="stop-color:rgb(200,200,200); stopopacity:
0"/>
<stop offset="100%" style="stop-color:rgb(0,0,255); stopopacity:
1"/>
</radialGradient>
</defs>
<ellipse cx="100" cy="50" rx="100" ry="50" style="fill:url(#gradient)" />
</svg>
</body>
</html>
```

OUTPUT:



HTML5 SVG Gradient Ellipse

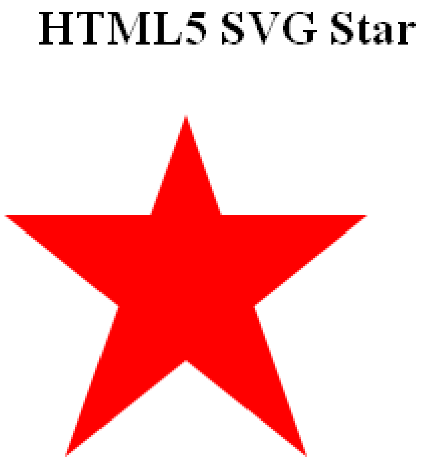
HTML5 - SVG Star

Following is the HTML5 version of an SVG example which would draw a star using <polygon> tag.

```
<html>
```

```
<head>
<style>
#svgelem{
position: relative;
left: 50%;
-webkit-transform: translateX(-40%);
-ms-transform: translateX(-40%);
transform: translateX(-40%);
}
</style>
<title>SVG</title>
<meta charset="utf-8" />
</head>
<body>
<h2 align="center">HTML5 SVG Star</h2>
<svg id="svgelem" height="200" xmlns="http://www.w3.org/2000/svg">
<polygon points="100,10 40,180 190,60 10,60 160,180" fill="red"/>
</svg>
</body>
</html>
```

OUTPUT:



HTML5 SVG Star

HTML5 - MathML
Chapter 7

- The HTML syntax of HTML5 allows for MathML elements to be used inside a document using <math>...</math> tags.

Most of the web browsers can display MathML tags. If your browser does not support MathML, then I would suggest you to use latest version of Firefox.

MathML Examples

- Following is a valid HTML5 document with MathML

```
<!doctype html>
<html>
<head>
```

```
<meta charset="UTF-8">
<title>Pythagorean theorem</title>
</head>
<body>
<math xmlns="http://www.w3.org/1998/Math/MathML">
<mrow>
<msup><mi>a</mi><mn>2</mn></msup>
<mo>+</mo>
<msup><mi>b</mi><mn>2</mn></msup>
<mo>=</mo>
<msup><mi>c</mi><mn>2</mn></msup>
</mrow>
</math>
</body>
</html>
```

OUTPUT:

$$a^2 + b^2 = c^2$$

Using MathML Characters:

- Consider, following is the markup which makes use of the characters &InvisibleTimes:

```
<!doctype html>
```

```
<html>
<head>
<meta charset="UTF-8">
<title>MathML Examples</title>
</head>
<body>
<math xmlns="http://www.w3.org/1998/Math/MathML">
<mrow>
<mrow>
<msup>
<mi>x</mi>
<mn>2</mn>
</msup>
<mo>+</mo>
<mrow>
<mn>4</mn>
<mo>?</mo>
<mi>x</mi>
</mrow>
<mo>+</mo>
<mn>4</mn>
</mrow>
```

```
<mo>=</mo>
<mn>0</mn>
</mrow>
</math>
</body>
</html>
```

OUTPUT:

$x^2 + 4x + 4 = 0$

Matrix Presentation Examples:

- Consider the following example which would be used to represent a simple 2x2 matrix

```
<!doctype html>
<html>
<head>
<meta charset="UTF-8">
<title>MathML Examples</title>
</head>
<body>
<math xmlns="http://www.w3.org/1998/Math/MathML">
<mrow>
```

```
<mi>A</mi>
<mo>=</mo>
<mfenced open="[" close="]">
<mtable>
<mtr>
<mtd><mi>x</mi></mtd>
<mtd><mi>y</mi></mtd>
</mtr>
<mtr>
<mtd><mi>z</mi></mtd>
<mtd><mi>w</mi></mtd>
</mtr>
</mtable>
</mfenced>
</mrow>
</math>
</body>
</html>
```

OUTPUT:

$$A = \begin{bmatrix} x & y \\ z & w \end{bmatrix}$$

HTML5 - Web Storage
Chatper 8

- HTML5 introduces two mechanisms, similar to HTTP session cookies, for storing structured data on the client side and to overcome following drawbacks.
- Cookies are included with every HTTP request, thereby slowing down your web application by transmitting the same data.
- Cookies are included with every HTTP request, thereby sending data unencrypted over the internet.
- Cookies are limited to about 4 KB of data. Not enough to store required data.
- The two storages are session storage and local storage and they would be used to handle different situations.

- The latest versions of pretty much every browser supports **HTML5** Storage including Internet Explorer.

Session Storage

- The Session Storage is designed for scenarios where the user is carrying out a single transaction, but could be carrying out multiple transactions in different windows at the same time.

Example

- For example, if a user buying plane tickets in two different windows, using the same site. If the site used cookies to keep track of which ticket the user was buying, then as the user clicked from page to page in both windows, the ticket currently being purchased would "leak" from one window to the other, potentially causing the user to buy two tickets for the same flight without really noticing.

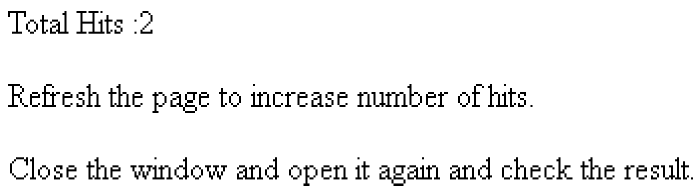
- **HTML5** introduces the sessionStorage attribute which would be used by the sites to add data to the session storage, and it will be accessible to any page from the same site opened in that window, i.e., session and as soon as you close the window, the session would be lost.

- Following is the code which would set a session variable and access that variable:

```
<!DOCTYPE HTML>
<html>
<body>
<script type="text/javascript">
if( sessionStorage.hits ){
sessionStorage.hits = Number(sessionStorage.hits) +1;
}else{
sessionStorage.hits = 1;
}
```

```
document.write("Total Hits :" + sessionStorage.hits );
</script>
<p>Refresh the page to increase number of hits.</p>
<p>Close the window and open it again and check the result.</p>
</body>
</html>
```

OUTPUT:



```
Total Hits :2

Refresh the page to increase number of hits.

Close the window and open it again and check the result.
```

Local Storage:

- The Local Storage is designed for storage that spans multiple windows, and lasts beyond the current session. In particular, Web applications may wish to store megabytes of user data, such as entire user-authored documents or a user's mailbox, on the client side for performance reasons.

- Again, cookies do not handle this case well, because they are transmitted with every request.

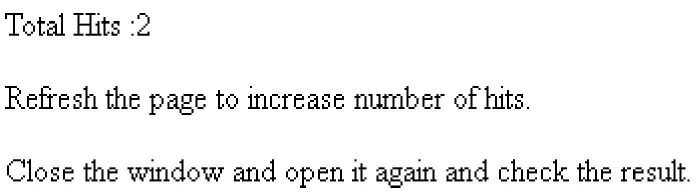
Example:

- HTML5 introduces the localStorage attribute which would be used to access a page's local storage area without no time limit and this local storage will be available whenever you would use that page.

- Following is the code which would set a local storage variable and access that variable every time this page is accessed, even next time, when you open the window:

```
<!DOCTYPE HTML>
<html>
<body>
<script type="text/javascript">
if( localStorage.hits ){
localStorage.hits = Number(localStorage.hits) +1;
}else{
localStorage.hits = 1;
}
document.write("Total Hits :" + localStorage.hits );
</script>
<p>Refresh the page to increase number of hits.</p>
<p>Close the window and open it again and check the result.</p>
</body>
</html>
```

OUTPUT:



```
Total Hits :2

Refresh the page to increase number of hits.

Close the window and open it again and check the result.
```

Delete Web Storage:

- Storing sensitive data on local machine could be dangerous and could leave a security hole.

- The Session Storage Data would be deleted by the browsers immediately after the session gets terminated.

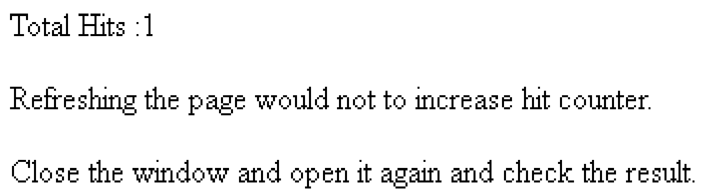
- To clear a local storage setting you would need to call localStorage.remove('key'); where 'key' is the key of the value you want to remove. If you want to clear all settings, you need to call localStorage.clear() method.

- Following is the code which would clear complete local storage:

```
<!DOCTYPE HTML>
<html>
<body>
```

```
<script type="text/javascript">
localStorage.clear();
// Reset number of hits.
if( localStorage.hits ){
localStorage.hits = Number(localStorage.hits) +1;
}else{
localStorage.hits = 1;
}
document.write("Total Hits :" + localStorage.hits );
</script>
<p>Refreshing the page would not to increase hit counter.</p>
<p>Close the window and open it again and check the result.</p>
</body>
</html>
```

OUTPUT:



Total Hits :1

Refreshing the page would not to increase hit counter.

Close the window and open it again and check the result.

HTML5 - Web SQL Database
Chapter 9

- The Web SQL Database API isn't actually part of the HTML5 specification but it is a separate specification which introduces a set of APIs to manipulate client-side databases using SQL.

- I'm assuming you are a great web developer and if that is the case then no doubt, you would be well aware of SQL and RDBMS concepts. If you still want to have a session with SQL then, you can go through our SQL Tutorial.

- Web SQL Database will work in latest version of Safari, Chrome and Opera.

The Core Methods:

- There are following three core methods defined in the spec that I am going to cover in this tutorial:
- openDatabase: This method creates the database object either using existing database or creating new one.
- transaction: This method gives us the ability to control a transaction and performing either commit or rollback based on the situation.

- executeSql: This method is used to execute actual SQL query.

Opening Database:

- The openDatabase method takes care of opening a database if it already exists, this method will create it if it already does not exist.

- To create and open a database, use the following code .

```
var db = openDatabase('mydb', '1.0', 'Test DB', 2 * 1024 * 1024);
```

- The above method took the following five parameters .
  - Database name
  - Version number
  - Text description
  - Size of database
  - Creation callback

- The last and 5th argument, creation callback will be called if the database is being created. Without this feature, however, the databases are still being created on the fly and correctly versioned.

Executing queries:

- To execute a query you use the database.transaction() function. This function needs a single argument, which is a function that takes care of actually executing the query as follows:

```
var db = openDatabase('mydb', '1.0', 'Test DB', 2 * 1024 * 1024);
db.transaction(function (tx) {
tx.executeSql('CREATE TABLE IF NOT EXISTS LOGS (id unique, log)');
});
```

- The above query will create a table called LOGS in 'mydb' database.

INSERT Operation:

- To create enteries into the table we add simple SQL query in the above example as follows:

```
var db = openDatabase('mydb', '1.0', 'Test DB', 2 * 1024 * 1024);
db.transaction(function (tx) {
tx.executeSql('CREATE TABLE IF NOT EXISTS LOGS (id unique, log)');
tx.executeSql('INSERT INTO LOGS (id, log) VALUES (1, "foobar")');
tx.executeSql('INSERT INTO LOGS (id, log) VALUES (2, "logmsg")');
});
```

- We can pass dynamic values while creating entering as follows: .

```
var db = openDatabase('mydb', '1.0', 'Test DB', 2 * 1024 * 1024);
db.transaction(function (tx) {
```

```
tx.executeSql('CREATE TABLE IF NOT EXISTS LOGS (id unique, log)');
tx.executeSql('INSERT INTO LOGS (id,log) VALUES (?, ?'), [e_id, e_log];
});
```

- Here e_id and e_log are external variables, and executeSql maps each item in the array argument to the "?"s.

READ Operation:

- To read already existing records we use a callback to capture the results as follows:

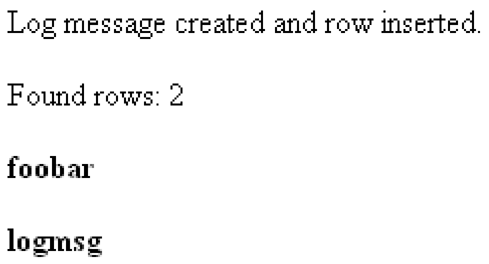
```
var db = openDatabase('mydb', '1.0', 'Test DB', 2 * 1024 * 1024);
db.transaction(function (tx) {
tx.executeSql('CREATE TABLE IF NOT EXISTS LOGS (id unique, log)');

tx.executeSql('INSERT INTO LOGS (id, log) VALUES (1, "foobar")');
tx.executeSql('INSERT INTO LOGS (id, log) VALUES (2, "logmsg")');
});
db.transaction(function (tx) {
tx.executeSql('SELECT * FROM LOGS', [], function (tx, results) {
var len = results.rows.length, i;
msg = "<p>Found rows: " + len + "</p>";
document.querySelector('#status').innerHTML += msg;
for (i = 0; i < len; i++){
alert(results.rows.item(i).log );
}
}, null);
});
```

Final Example:

- So finally, let us keep this example in a full-fledged HTML5 document as follows and try to run it with **Safari browser**.

```
<!DOCTYPE HTML>
<html>
<head>
<script type="text/javascript">
var db = openDatabase('mydb', '1.0', 'Test DB', 2 * 1024 * 1024);
var msg;
db.transaction(function (tx) {
tx.executeSql('CREATE TABLE IF NOT EXISTS LOGS (id unique, log)');
tx.executeSql('INSERT INTO LOGS (id, log) VALUES (1, "foobar")');
tx.executeSql('INSERT INTO LOGS (id, log) VALUES (2, "logmsg")');
msg = '<p>Log message created and row inserted.</p>';
document.querySelector('#status').innerHTML = msg;
});
db.transaction(function (tx) {
tx.executeSql('SELECT * FROM LOGS', [], function (tx, results) {
var len = results.rows.length, i;
msg = "<p>Found rows: " + len + "</p>";
document.querySelector('#status').innerHTML += msg;
for (i = 0; i < len; i++){
msg = "<p><b>" + results.rows.item(i).log + "</b></p>";
document.querySelector('#status').innerHTML += msg;
}
}, null);
});
</script>
</head>
<body>
<div id="status" name="status">Status Message</div>
</body>
</html>
```

OUTPUT:



Log message created and row inserted.

Found rows: 2

foobar

logmsg

HTML5 - Server Sent Events
Chapter 10

- Conventional web applications generate events which are dispatched to the web server.
- For example, a simple click on a link requests a new page from the server.
- The type of events which are flowing from web browser to the web server may be called client-sent events.
- Along with HTML5, WHATWG Web Applications 1.0 introduces events which flow from web server to the web browsers and they are called Server-Sent Events (SSE). Using SSE you can push **DOM** events continuously from your web server to the visitor's browser.

- The event streaming approach opens a persistent connection to the server, sending data to the client when new information is available, eliminating the need for continuous polling.

- Server-sent events standardize how we stream data from the server to the client.

Web Application for SSE:

- To use Server-Sent Events in a web application, you would need to add an <eventsource> element to the document.

- The src attribute of <eventsource> element should point to an URL which should provide a persistent HTTP connection that sends a data stream containing the events.

- The URL would point to a PHP, PERL or any Python script which would take care of sending event data consistently.

- Following is a simple example of web application which would expect server time.

```
<!DOCTYPE HTML>
<html>
<head>
<script type="text/javascript">
/* Define event handling logic here */
</script>
</head>
<body>
<div id="sse">
```

```
<eventsource src="/cgi-bin/ticker.cgi" />
</div>
<div id="ticker">
<TIME>
</div>
</body>
</html>
```

Server Side Script for SSE:

- A server side script should send Content-type header specifying the type text/eventstream as follows:

```
print "Content-Type: text/event-stream\n\n";
```

- After setting Content-Type, server side script would send an Event: tag followed by event name. Following example would send Server-Time as event name terminated by a new line character.

```
print "Event: server-time\n";
```

- Final step is to send event data using Data: tag which would be followed by integer of string value terminated by a new line character as follows:

```
$time = localtime();
print "Data: $time\n";
```

- Finally, following is complete ticker.cgi written in Perl -

```
#!/usr/bin/perl:

print "Content-Type: text/event-stream\n\n";
while(true){
print "Event: server-time\n";
$time = localtime();
print "Data: $time\n";
sleep(5);
}
```

Handle Server-Sent Events:

- Let us modify our web application to handle server-sent events. Following is the final example.

```
<!DOCTYPE HTML>
<html>
<head>
<script type="text/javascript">
```

```
document.getElementsByTagName("eventsource")[0].addEventListener("server-time",
eventHandler, false);
function eventHandler(event)
{
// Alert time sent by the server
document.querySelector('#ticker').innerHTML = event.data;
}
</script>
</head>
<body>
<div id="sse">
<eventsource src="/cgi-bin/ticker.cgi" />
</div>
<div id="ticker" name="ticker">
[TIME]
</div>
</body>
</html>
```

OUTPUT:

```
[TIME]
```

Note: Before testing Server-Sent events, I would suggest that you make sure your web browser supports this concept.

HTML5 - WebSockets
Chapter 11

- **WebSockets** is a next-generation bidirectional communication technology for web applications which operates over a single socket and is exposed via a JavaScript interface in HTML 5 compliant browsers.

- Once you get a Web Socket connection with the web server, you can send data from browser to server by calling a send() method, and receive data from server to browser by an onmessage event handler.

- Following is the API which creates a new WebSocket object.

```
var Socket = new WebSocket(url, [protocal] );
```

- Here first argument, url, specifies the URL to which to connect. The second attribute, protocol is optional, and if present, specifies a sub-protocol that the server must support for the connection to be successful.

WebSocket Attributes:

- Following are the attribute of WebSocket object. Assuming we created Socket object as mentioned above:

Attribute: Socket.readyState

Description: The readonly attribute readyState represents the state of the connection. It can have the following values:

- A value of 0 indicates that the connection has not yet been established.
- A value of 1 indicates that the connection is established and communication is possible.
- A value of 2 indicates that the connection is going through the closing handshake.
- A value of 3 indicates that the connection has been closed or could not be opened.

Attribute: Socket.bufferedAmount

Description: The readonly attribute bufferedAmount represents the number of bytes of UTF-8 text that have been queued using send() method.

WebSocket Events:

- Following are the events associated with WebSocket object. Assuming we created Socket object as mentioned above:

Event: open

Event Handler: Socket.onopen

Description: This event occurs when socket connection is established.

Event: message

Event Handler: Socket.onmessage

Description: This event occurs when client receives data from server.

Event: error

Event Handler: Socket.onerror

Description: This event occurs when there is any error in communication.

Event: close

Event Handler: Socket.onclose

Description: This event occurs when connection is closed.

WebSocket Methods:

- Following are the methods associated with WebSocket object. Assuming we created Socket object as mentioned above:

Method: Socket.send()

Description: The send(data) method transmits data using the connection.

Method: Socket.close()

Description: The close() method would be used to terminate any existing connection.

WebSocket Example:

- A WebSocket is a standard bidirectional TCP socket between the client and the server. The socket starts out as a HTTP connection and then "Upgrades" to a TCP socket after a HTTP handshake. After the handshake, either side can send data.

Client Side HTML & JavaScript Code:

- At the time of writing this tutorial, there are only few web browsers supporting WebSocket() interface. You can try following example with latest version of Chrome, Mozilla, Opera and Safari.

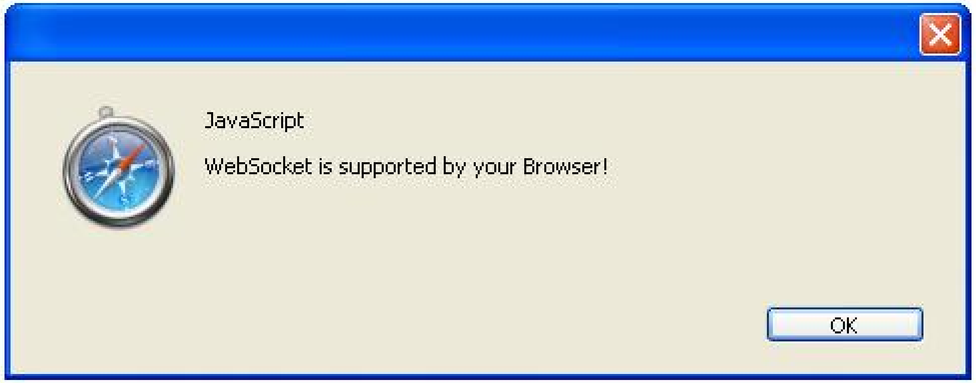
```
<!DOCTYPE HTML>
<html>
<head>
<script type="text/javascript">
function WebSocketTest()
{
if ("WebSocket" in window)
{
alert("WebSocket is supported by your Browser!");
// Let us open a web socket
var ws = new WebSocket("ws://localhost:9998/echo");
ws.onopen = function()
{
```

```
// Web Socket is connected, send data using send()
ws.send("Message to send");
alert("Message is sent...");
};
ws.onmessage = function (evt)
{
var received_msg = evt.data;
alert("Message is received...");
};
ws.onclose = function()
{
// websocket is closed.
alert("Connection is closed...");
};
}
else
{
// The browser doesn't support WebSocket
alert("WebSocket NOT supported by your Browser!");
}
}
</script>
```

```
</head>
<body>
<div id="sse">
<a href="javascript:WebSocketTest()">Run WebSocket</a>
</div>
</body>
</html>
```

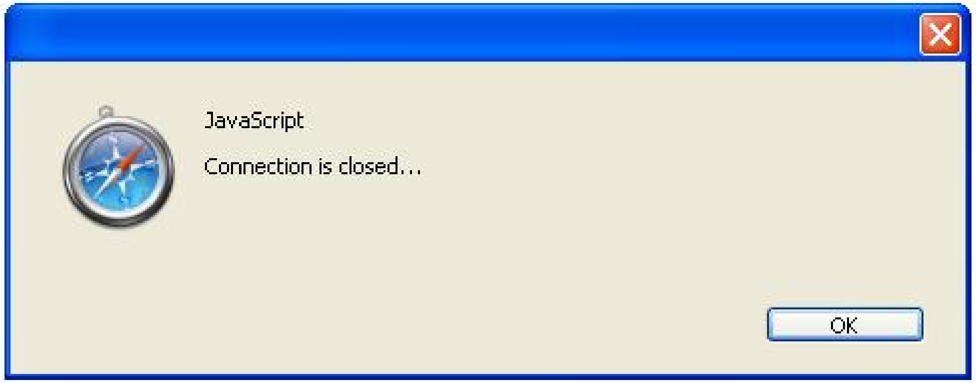
OUTPUT:

Run WebSocket



JavaScript

WebSocket is supported by your Browser!



JavaScript

Connection is closed...

Install pywebsocket:

- Before you test above client program, you need a server which supports WebSocket. Download mod_pywebsocket-x.x.x.tar.gz from pywebsocket which aims to provide a Web Socket extension for Apache HTTP Server and install it following these steps.

- Unzip and untar the downloaded file.
- Go inside pywebsocket-x.x.x/src/ directory.
- $python setup.py build
- $sudo python setup.py install
- Then read document by:
    - o $pydoc mod_pywebsocket

- This will install it into your python environment.]

Start the Server:

- Go to the pywebsocket-x.x.x/src/mod_pywebsocket folder and run the following command.

```
$sudo python standalone.py -p 9998 -w ../example/
```

- This will start the server listening at port 9998 and use the handlers directory specified by the -w option where our echo_wsh.py resides.

- Now using Chrome browser open the html file your created in the beginning. If your browser supports WebSocket(), then you would get alert indicating that your browser supports WebSocket and finally when you click on "Run WebSocket" you would get Goodbye message sent by the server script.

HTML5 - Canvas
Chapter 12

- **HTML5** ***element*** **<canvas>** gives you an easy and powerful way to draw **graphics** using **JavaScript**. It can be used to **draw graphs**, **make photo compositions** or do **animations**.

- Here is a ***simple* <canvas> *element*** which has only **two** specific **attributes *width*** and ***height*** plus all the core **HTML5 attributes** like **id**, **name** and **class**, etc.

```
<canvas id="mycanvas" width="100" height="100"></canvas>
```

- You can easily find that <**canvas**> ***element*** in the **DOM** using **getElementById()** method as follows:

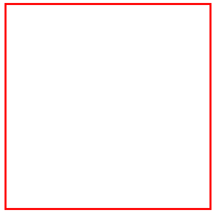
```
var canvas = document.getElementById("mycanvas");
```

- Let us see a simple example on using <**canvas**> ***element*** in **HTML5** document.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#mycanvas{border:1px solid red;}
</style>
</head>
<body>
<canvas id="mycanvas" width="100" height="100"></canvas>
</body>
```

```
</html>
```

OUTPUT:



The Rendering Context:

- The <**canvas**> is initially ***blank***, and to display something, a script first needs to access the rendering context and draw on it.

- The **canvas element** has a **DOM** ***method*** called **getContext**, used to obtain the rendering **context** and its ***drawing functions***.
- This function takes one parameter, the type of **context2d**.

- Following is the code to get required context along with a check if your browser supports <**canvas**> ***element***:

```
var canvas = document.getElementById("mycanvas");
if (canvas.getContext){
```

```
var ctx = canvas.getContext('2d');
// drawing code here
} else {
// canvas-unsupported code here
}
```

Browser Support:

- The latest versions of Firefox, Safari, Chrome and Opera all support for HTML5 Canvas but IE8 does not support canvas natively.

- You can use ExplorerCanvas to have canvas support through Internet Explorer. You just need to include this JavaScript as follows:
<!--[if IE]><script src="excanvas.js"></script><![endif]-->

HTML5 Canvas Examples:

- This tutorial covers the following examples related to **HTML5 <canvas>** ***element***.

Examples: Drawing Rectangles

Description: Learn how to draw rectangle using **HTML5** <**canvas**> ***element***

Examples: Drawing Paths

Description: Learn how to make shapes using paths in **HTML5** < **canvas** > element

Examples: Drawing Lines

Description: Learn how to draw lines using **HTML5** <**canvas**> ***element***

Examples: Drawing Bezier

Description: Learn how to draw Bezier curve using **HTML5** <**canvas**> ***element***

Examples: Drawing Quadratic

Description: Learn how to draw quadratic curve using **HTML5** < **canvas** > element

Examples: Using Images

Description: Learn how to use images with **HTML5 <canvas>** ***element***

Examples: Create Gradients

Description: Learn how to create gradients using **HTML5 <canvas>** ***element***

Examples: Styles and Colors

Description: Learn how to apply styles and colors using **HTML5 <canvas>** ***element***

Examples: Text and Fonts

Description: Learn how to draw amazing text using different fonts and their size.

Examples: Pattern and Shadow

Description: Learn how to draw different patterns and drop shadows.

Examples: Canvas States

Description: Learn how to save and restore canvas states while doing complex drawings on a canvas.

Examples: Canvas Translation

Description: This method is used to move the canvas and its origin to a different point in the grid.

Examples: Canvas Rotation

Description: This method is used to rotate the canvas around the current origin.

Examples: Canvas Scaling

Description: This method is used to increase or decrease the units in a canvas grid

Examples: Canvas Transform

Description: These methods allow modifications directly to the transformation matrix.

Examples: Canvas Composition

Description: This method is used to mask off certain areas or clear sections from the canvas.

Examples: Canvas Animation

Description: Learn how to create basic animation using **HTML5** ***canvas*** and **JavaScript**.

HTML5 Canvas - Drawing Rectangles:

There are **three *methods*** that draw rectangles on the canvas:

Sr.No.	**Method and Description**
1	**fillRect(x,y,width,height)** This method draws a filled rectangle.
2	**strokeRect(x,y,width,height)** This method draws a rectangular outline.
3	**clearRect(x,y,width,height)** This method clears the specified area and makes it fully transparent

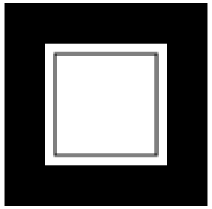
- Here x and y specify the position on the canvas (relative to the origin) of the top-left corner of the rectangle and width and height are width and height of the rectangle.

Example:

- Following is a simple example which makes use of above mentioned methods ***to draw*** a nice **rectangle**.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
width: 100px;
height:100px;
margin: 0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// Get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
// Draw shapes
ctx.fillRect(25,25,100,100);
ctx.clearRect(45,45,60,60);
ctx.strokeRect(50,50,50,50);
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body id="test" onload="drawShape();">
<canvas id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:



HTML5 Canvas - Drawing Paths:

- We require the following methods to draw paths on the canvas:

Sr.No.: 1
Method and Description: **beginPath()**
This method resets the current path.

Sr.No.: 2
Method and Description: **moveTo(x, y)**
This method creates a new subpath
with the given point.

Sr.No.: 3
Method and Description: **closePath()**
This method marks the current

subpath as closed, and starts a new subpath with a point the same as the start and end of the newly closed subpath.

Sr.No.: 4
Method and Description: **fill()**
This method fills the subpaths with the current fill style.

Sr.No.: 5
Method and Description: **stroke()**
This method strokes the subpaths with the current stroke style.

Sr.No.: 6
Method and Description: **arc(x, y, radius, startAngle, endAngle, anticlockwise)**
Adds points to the subpath such that the arc described by the circumference of the circle described by the arguments, starting at the given start angle and ending at the given end angle, going in the given direction, is added to the path, connected to the previous point by a straight line.

Example:

- Following is a simple example which makes use of above mentioned methods to draw a shape.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
width: 100px;
height:100px;
margin: 0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
// Draw shapes
ctx.beginPath();
ctx.arc(75,75,50,0,Math.PI*2,true); // Outer circle
ctx.moveTo(110,75);
ctx.arc(75,75,35,0,Math.PI,false); // Mouth
ctx.moveTo(65,65);
ctx.arc(60,65,5,0,Math.PI*2,true); // Left eye
ctx.moveTo(95,65);
ctx.arc(90,65,5,0,Math.PI*2,true); // Right eye
ctx.stroke();
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body id="test" onload="drawShape();">
<canvas id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:

HTML5 Canvas - Drawing Lines:

Line Methods:

- We require the following methods to draw lines on the canvas:

Sr.No.	Method and Description
1	**beginPath()** ***This method resets the current path.***
2	**moveTo(x, y)** ***This method creates a new subpath with the given point.***

3 **closePath()**

This method marks the current subpath as closed, and starts a new subpath with a point the same as the start and end of the newly closed subpath.

Sr.No. Method and Description

4 **fill()**

This method fills the subpaths with the current fill style.

Sr.No. Method and Description

5 **stroke()**

This method strokes the subpaths with the current stroke style.

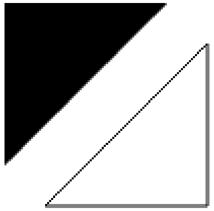
Sr.No. Method and Description

6 **lineTo(x, y)**

This method adds the given point to the current subpath, connected to the previous one by a straight line.

Example:

- Following is a simple example which makes use of the above-mentioned methods to draw a triangle.



Line Properties:

- There are several properties which allow us to style lines.

Sr.No.	**Property and Description**
1	**lineWidth [= value]** ***This property returns the current line width and can be set, to change the line width.***

Sr.No.	**Property and Description**
2	**lineCap [= value]**

This property returns the current line cap style and can be set, to change the line cap style. The possible line cap styles are butt, round, and square

Sr.No. Property and Description

3 **lineJoin [= value]**

This property returns the current line join style and can be set, to change the line join style. The possible line join styles are bevel, round, and miter.

Sr.No. Property and Description

4 **miterLimit [= value]**

This property returns the current miter limit ratio and can be set, to change the miter limit ratio.

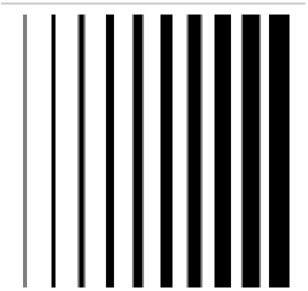
Example:

- Following is a simple example which makes use of lineWidth property to draw lines of different width.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
```

```
#test {
width: 100px;
height:100px;
margin: 0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
for (i=0;i<10;i++){
ctx.lineWidth = 1+i;
ctx.beginPath();
ctx.moveTo(5+i*14,5);
ctx.lineTo(5+i*14,140);
ctx.stroke();
}
}
else
{
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body id="test" onload="drawShape();">
<canvas id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:



HTML5 Canvas - Drawing Bezier Curves:

- We need the following methods to draw Bezier curves on the canvas:

Sr.No.	**Method and Description**
1	**beginPath()** ***This method resets the current path.***

Sr.No.	**Method and Description**
2	**moveTo(x, y)** ***This method creates a new subpath with the given point.***

Sr.No.	**Method and Description**
3	**closePath()** ***This method marks the current subpath as closed, and starts a new subpath with a point the same as the start and end of the newly closed subpath.***

Sr.No.	**Method and Description**
4	**fill()** ***This method fills the subpaths with the current fill style.***

Sr.No.	**Method and Description**
5	**stroke()** ***This method strokes the subpaths with the current stroke style.***

6	**bezierCurveTo(cp1x, cp1y, cp2x, cp2y, x, y)** ***This method adds the given point to the current path, connected to the previous one by a cubic Bezier curve with the given control points.***

- The x and y parameters in bezierCurveTo() method are the coordinates of the end point. cp1x and cp1y are the coordinates of the first control point, and cp2x and cp2y are the coordinates of the second control point.

Example:

- Following is a simple example which makes use of above mentioned methods to draw a **Bezier curves**.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
width: 100px;
height:100px;
margin: 0px auto;
}
```

```
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
ctx.beginPath();
ctx.moveTo(75,40);
ctx.bezierCurveTo(75,37,70,25,50,25);
ctx.bezierCurveTo(20,25,20,62.5,20,62.5);
ctx.bezierCurveTo(20,80,40,102,75,120);
ctx.bezierCurveTo(110,102,130,80,130,62.5);
ctx.bezierCurveTo(130,62.5,130,25,100,25);
ctx.bezierCurveTo(85,25,75,37,75,40);
ctx.fill();
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body id="test" onload="drawShape();">
<canvas id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:

HTML5 Canvas - Drawing Quadratic Curves:

- We require the following methods to draw quadratic curves on the canvas:

Sr.No.	**Method and Description**
1	**beginPath()** ***This method resets the current path.***

Sr.No.	Method and Description
2	**moveTo(x, y)** *This method creates a new subpath with the given point.*

Sr.No.	Method and Description
3	**closePath()** *This method marks the current subpath as closed, and starts a new subpath with a point the same as the start and end of the newly closed subpath.*

Sr.No.	Method and Description
4	**fill()** *This method fills the subpaths with the current fill style.*

Sr.No.	Method and Description
5	**stroke()** *This method strokes the subpaths with the current stroke style.*

Sr.No.	Method and Description
6	**quadraticCurveTo(cpx, cpy, x, y)** *This method adds the given point to the current path, connected to the previous one by a quadratic Bezier curve with the given control point.*

- The x and y parameters in quadraticCurveTo() method are the coordinates of the end point. cpx and cpy are the coordinates of the control point.

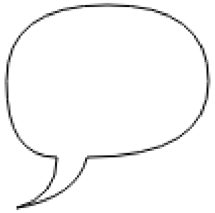
Example:

- Following is a simple example which makes use of above mentioned methods to draw a Quadratic curves.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
width: 100px;
height:100px;
margin: 0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
// Draw shapes
ctx.beginPath();
ctx.moveTo(75,25);
ctx.quadraticCurveTo(25,25,25,62.5);
ctx.quadraticCurveTo(25,100,50,100);
ctx.quadraticCurveTo(50,120,30,125);
ctx.quadraticCurveTo(60,120,65,100);
ctx.quadraticCurveTo(125,100,125,62.5);
ctx.quadraticCurveTo(125,25,75,25);
ctx.stroke();
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body id="test" onload="drawShape();">
```

```
<canvas  id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:



HTML5 Canvas - Using Images:

- This tutorial would show how to import an external image into a canvas and then how to draw on that image by using following methods:

Sr.No.	**Method and Description**
1	**beginPath()** ***This method resets the current path.***

Sr.No.	**Method and Description**
2	**moveTo(x, y)**

This method creates a new subpath with the given point.

Sr.No.	**Method and Description**
3	**closePath()** *This method marks the current subpath as closed, and starts a new subpath with a point the same as the start and end of the newly closed subpath.*

Sr.No.	**Method and Description**
4	**fill()** *This method fills the subpaths with the current fill style.*

Sr.No.	**Method and Description**
5	**stroke()** *This method strokes the subpaths with the current stroke style.*

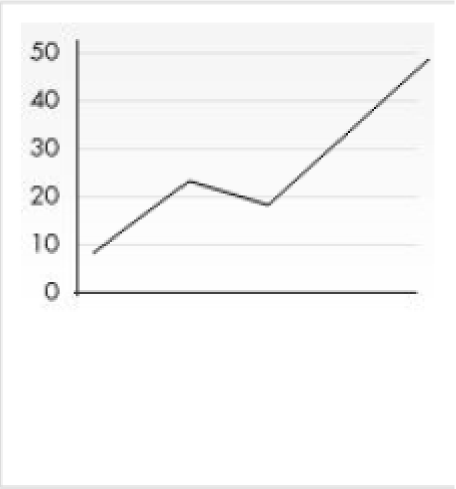
Sr.No.	**Method and Description**
6	**drawImage(image, dx, dy)** *This method draws the given image onto the canvas. Here image is a reference to an image or canvas object. x and y form the coordinate on the target canvas where our image should be placed.*

Example:

- Following is a simple example which makes use of above mentioned methods to import an image.

```
<!DOCTYPE HTML>
<html>
<head>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
// Draw shapes
var img = new Image();
img.src = '/images/backdrop.jpg';
img.onload = function(){
ctx.drawImage(img,0,0);
ctx.beginPath();
ctx.moveTo(30,96);
ctx.lineTo(70,66);
ctx.lineTo(103,76);
ctx.lineTo(170,15);
ctx.stroke();
}
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body onload="drawShape();">
<canvas id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:



Note: This image is displayed. Refer it later. Change path.

HTML5 Canvas - Create Gradients:

- **HTML5** ***canvas*** allows us to fill and stroke shapes using linear and radial gradients using the following methods:

Sr.No.	**Method and Description**
1	**addColorStop(offset, color)** ***This method adds a color stop with the given color to the gradient at the given offset. Here 0.0 is the offset at one end of the gradient, 1.0 is the offset***

at the other end.

Sr.No.	Method and Description
2	**createLinearGradient(x0, y0, x1, y1)** *This method returns a CanvasGradient object that represents a linear gradient that paints along the line given by the coordinates represented by the arguments. The four arguments represent the starting point (x1,y1) and end point (x2,y2) of the gradient.*

Sr.No.	Method and Description
3	**createRadialGradient(x0, y0, r0, x1, y1, r1)** *This method returns a CanvasGradient object that represents a radial gradient that paints along the cone given by the circles represented by the arguments. The first three arguments define a circle with coordinates (x1,y1) and radius r1 and the second a circle with coordinates (x2,y2) and radius r2.*

Linear Gradient Example:

- Following is a simple example which makes use of above mentioned methods to create Linear gradient.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
```

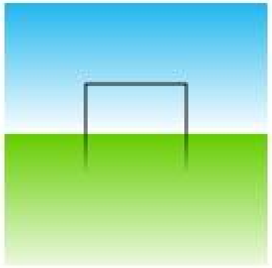
```
width:100px;
height:100px;
margin:0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
// Create Linear Gradients
var lingrad = ctx.createLinearGradient(0,0,0,150);
```

```
lingrad.addColorStop(0, '#00ABEB');
lingrad.addColorStop(0.5, '#fff');
lingrad.addColorStop(0.5, '#66CC00');
lingrad.addColorStop(1, '#fff');
var lingrad2 = ctx.createLinearGradient(0,50,0,95);
lingrad2.addColorStop(0.5, '#000');
lingrad2.addColorStop(1, 'rgba(0,0,0,0)');
// assign gradients to fill and stroke styles
ctx.fillStyle = lingrad;
ctx.strokeStyle = lingrad2;
// draw shapes
ctx.fillRect(10,10,130,130);
ctx.strokeRect(50,50,50,50);
```

```
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
```

```
<body id="test" onload="drawShape();">
<canvas id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:



Radial Gradient Example:

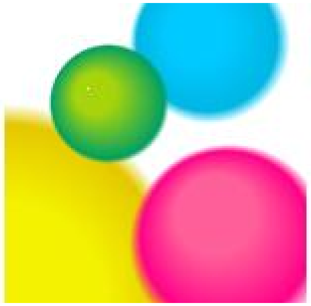
- Following is a simple example which makes use of the above-mentioned methods to create Radial gradient.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
width:100px;
```

```
height:100px;
margin:0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
// Create gradients
var radgrad = ctx.createRadialGradient(45,45,10,52,50,30);
radgrad.addColorStop(0, '#A7D30C');
radgrad.addColorStop(0.9, '#019F62');
radgrad.addColorStop(1, 'rgba(1,159,98,0)');
var radgrad2 = ctx.createRadialGradient(105,105,20,112,120,50);
radgrad2.addColorStop(0, '#FF5F98');
radgrad2.addColorStop(0.75, '#FF0188');
radgrad2.addColorStop(1, 'rgba(255,1,136,0)');
var radgrad3 = ctx.createRadialGradient(95,15,15,102,20,40);
radgrad3.addColorStop(0, '#00C9FF');
radgrad3.addColorStop(0.8, '#00B5E2');
radgrad3.addColorStop(1, 'rgba(0,201,255,0)');
var radgrad4 = ctx.createRadialGradient(0,150,50,0,140,90);
radgrad4.addColorStop(0, '#F4F201');
radgrad4.addColorStop(0.8, '#E4C700');
radgrad4.addColorStop(1, 'rgba(228,199,0,0)');
// draw shapes
ctx.fillStyle = radgrad4;
ctx.fillRect(0,0,150,150);
ctx.fillStyle = radgrad3;
ctx.fillRect(0,0,150,150);
ctx.fillStyle = radgrad2;
ctx.fillRect(0,0,150,150);
ctx.fillStyle = radgrad;
ctx.fillRect(0,0,150,150);
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
```

```
</head>
<body id="test" onload="drawShape();">
<canvas  id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:



HTML5 Canvas - Styles and Colors:

- HTML5 canvas provides the following two important properties to apply colors to a shape:

Sr.No.	Method and Description
1	**fillStyle** ***This attribute represents the color or style to use inside the shapes.***

Sr.No.	Method and Description
2	**strokeStyle** ***This attribute represents the color or style to use for the lines around shapes.***

- By default, the stroke and fill color are set to black which is CSS color value #000000.

A fillStyle Example:

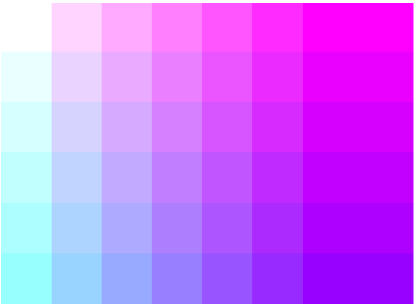
Following is a simple example which makes use of the above-mentioned fillStyle attribute to create a nice pattern.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
width: 100px;
height:100px;
margin: 0px auto;
}
</style>
<script type="text/javascript">
```

```
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
// Create a pattern
for (var i=0;i<7;i++){
for (var j=0;j<7;j++){
ctx.fillStyle='rgb(' + Math.floor(255-20.5*i)+ ','+
Math.floor(255 - 42.5*j) + ',255)';
ctx.fillRect( j*25, i* 25, 55, 55 );
}
}
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
```

```
<body id="test" onload="drawShape();">
<canvas id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:



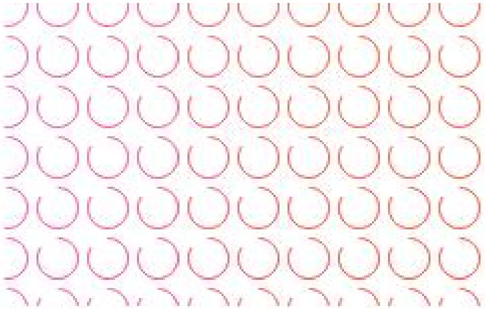
A strokeStyle Example:

- Following is a simple example which makes use of the above-mentioned fillStyle attribute to create another nice pattern.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
```

```
#test {
width: 100px;
height:100px;
margin: 0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
// Create a pattern
for (var i=0;i<10;i++){
for (var j=0;j<10;j++){
ctx.strokeStyle='rgb(255,'+ Math.floor(50-2.5*i)+','+
Math.floor(155 - 22.5 * j ) + ')';
ctx.beginPath();
ctx.arc(1.5+j*25, 1.5 + i*25,10,10,Math.PI*5.5, true);
ctx.stroke();
}
}
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body id="test" onload="drawShape();">
<canvas id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:



HTML5 Canvas - Text and Fonts:

- **HTML5** canvas provides capabilities to create text using different font and text properties listed below:

Sr.No.	Property and Description
1	**font [= value]** ***This property returns the current font settings and can be set, to change the font.***
2	**textAlign [= value]** ***This property returns the current text alignment settings and can be set, to change the alignment. The possible values are start, end, left, right, and center.***
3	**textBaseline [= value]** ***This property returns the current baseline alignment settings and can be set, to change the baseline alignment. The possible values are top, hanging, middle , alphabetic, ideographic and bottom.***

Sr.No.	**Property and Description**
4	**fillText(text, x, y [, maxWidth])** ***This property fills the given text at the given position indicated by the given coordinates x and y.***

Sr.No.	**Property and Description**
5	**strokeText(text, x, y [, maxWidth])**

- This property strokes the given text at the given position indicated by the given coordinates x and y.

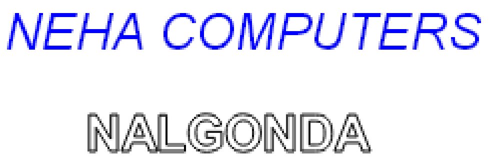
Example:

- Following is a simple example which makes use of above mentioned attributes to draw a text.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
width: 100px;
height:100px;
margin: 0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
ctx.fillStyle = '#00F';
ctx.font = 'Italic 25px Sans-Serif';
ctx.textBaseline = 'Top';
ctx.fillText ('NEHA COMPUTERS', 40, 50);
ctx.font = 'Bold 25px Sans-Serif';
ctx.strokeText('NALGONDA', 80, 100);
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
```

```
</script>
</head>
<body id="test" onload="drawShape();">
<canvas id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:



```
NEHA COMPUTERS

NALGONDA
```

HTML5 Canvas - Pattern and Shadow:

Create Pattern:

There is following method required to create a pattern on the canvas:

Sr.No.	**Method and Description**
1	**createPattern(image, repetition)** ***This method will use image to create the pattern. The***

second argument could be a string with one of the following values: repeat, repeat-x, repeaty, andno-repeat. If the empty string or null is specified, repeat will. be assumed.

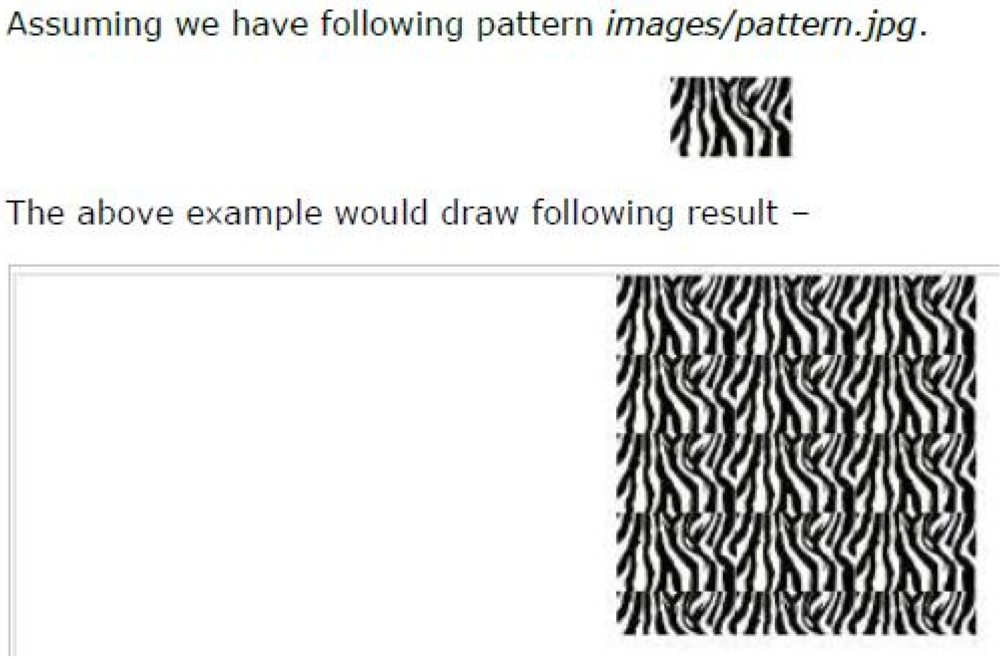
Example:

- Following is a simple example which makes use of above mentioned method to create a nice pattern.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
width:100px;
height:100px;
margin: 0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
// create new image object to use as pattern
var img = new Image();
img.src = 'images/pattern.jpg';
img.onload = function(){
// create pattern
var ptrn = ctx.createPattern(img,'repeat');
ctx.fillStyle = ptrn;
ctx.fillRect(0,0,150,150);
}
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body id="test" onload="drawShape();">
```

```
<canvas  id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:



Assuming we have following pattern *images/pattern.jpg*.

The above example would draw following result –

Note: Try to change the pathname of the pattern.

Create Shadows:

- **HTML5** canvas provides capabilities to create nice shadows around the drawings. All drawing operations are affected by the four global shadow attributes.

Sr.No.	Property and Description
1	**shadowColor [= value]** ***This property returns the current shadow color and can be set, to change the shadow color.***

Sr.No.	Property and Description
2	**shadowOffsetX [= value]** ***This property returns the current shadow offset X and can be set, to change the shadow offset X.***

Sr.No.	Property and Description
3	**shadowOffsetY [= value]** ***This property returns the current shadow offset Y and can be set, change the shadow offset Y.***

Sr.No.	Property and Description
4	**shadowBlur [= value]** ***This property returns the current level of blur applied***

to shadows and can be set, to change the blur level.

Example:

- Following is a simple example which makes use of above mentioned attributes to draw a shadow.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
width: 100px;
height:100px;
margin: 0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
```

```
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
ctx.shadowOffsetX = 2;
ctx.shadowOffsetY = 2;
ctx.shadowBlur = 2;
ctx.shadowColor = "rgba(0, 0, 0, 0.5)";
ctx.font = "30px Times New Roman";
ctx.fillStyle = "Black";
ctx.fillText("This is shadow test", 5, 30);
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body id="test" onload="drawShape();">
<canvas id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:

This is shadow test

HTML5 Canvas - Save and Restore States:

- **HTML5** canvas provides two important methods to save and restore the canvas states. The canvas drawing state is basically a snapshot of all the styles and transformations that have been applied and consists of the followings.

- The transformations such as translate, rotate and scale etc.
- The current clipping region.
- The current values of the following attributes: strokeStyle, fillStyle, globalAlpha, lineWidth, lineCap, lineJoin, miterLimit, shadowOffsetX, shadowOffsetY, shadowBlur, shadowColor, globalCompositeOperation, font, textAlign, textBaseline.

- Canvas states are stored on a stack every time the save method is called, and the last saved state is returned from the stack every time the restore method is called.

1 **save()**
This method pushes the current state onto the stack.

Sr.No.	Method and Description
2	**restore()** ***This method pops the top state on the stack, restoring the context to that state.***

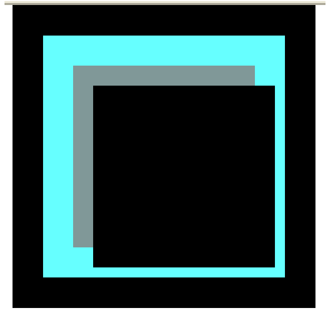
Example:

- Following is a simple example which makes use of above mentioned methods to show how the restore is called, to restore the original state and the last rectangle is once again drawn in black.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
width: 100px;
height:100px;
margin: 0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
```

```
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
// draw a rectangle with default settings
ctx.fillRect(0,0,150,150);
// Save the default state
ctx.save();
// Make changes to the settings
ctx.fillStyle = '#66FFFF'
ctx.fillRect( 15,15,120,120);
// Save the current state
ctx.save();
// Make the new changes to the settings
ctx.fillStyle = '#993333'
ctx.globalAlpha = 0.5;
ctx.fillRect(30,30,90,90);
// Restore previous state
ctx.restore();
// Draw a rectangle with restored settings
ctx.fillRect(45,45,60,60);
// Restore original state
ctx.restore();
// Draw a rectangle with restored settings
ctx.fillRect(40,40,90,90);
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body id="test" onload="drawShape();">
<canvas id="mycanvas"></canvas>
</body>
</html>
```

OUTPUT:



HTML5 Canvas - Translation:

- **HTML5** canvas provides translate(x, y) method which is used to move the canvas and its origin to a different point in the grid.

Here argument x is the amount the canvas is moved to the left or right, and y is the amount it's moved up or down.

Example:

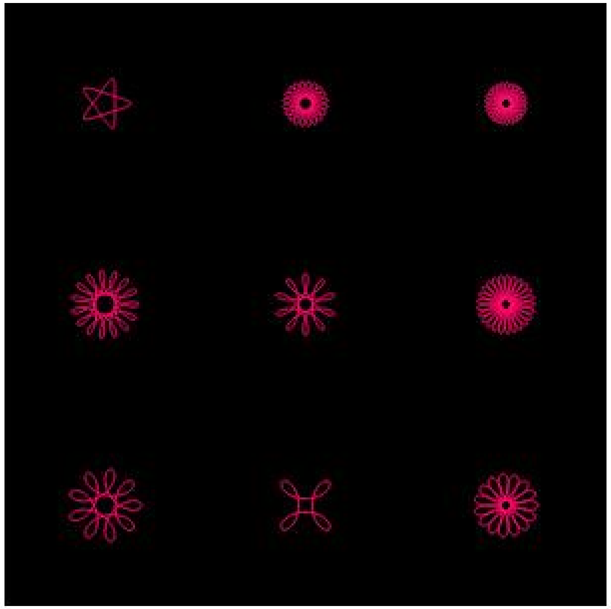
- Following is a simple example which makes use of above method to draw various Spirographs.

```
<!DOCTYPE HTML>
<html>
<head>
```

```
<style>
#test {
width:100px;
height:100px;
margin:0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
ctx.fillRect(0,0,300,300);
for (i=0;i<3;i++) {
for (j=0;j<3;j++) {
ctx.save();
ctx.strokeStyle = "#FF0066";
ctx.translate(50+j*100,50+i*100);
drawSpirograph(ctx,10*(j+3)/(j+2),-2*(i+3)/(i+1),10);
ctx.restore();
}
}
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
function drawSpirograph(ctx,R,r,O){
var x1 = R-O;
var y1 = 0;
var i = 1;
ctx.beginPath();
ctx.moveTo(x1,y1);
do {
if (i>20000) break;
var x2 = (R+r)*Math.cos(i*Math.PI/72) -
(r+O)*Math.cos(((R+r)/r)*(i*Math.PI/72))
var y2 = (R+r)*Math.sin(i*Math.PI/72) -
(r+O)*Math.sin(((R+r)/r)*(i*Math.PI/72))
ctx.lineTo(x2,y2);
x1 = x2;
```

```
y1 = y2;
i++;
} while (x2 != R-O && y2 != 0 );
ctx.stroke();
}
</script>
</head>
<body id="test" onload="drawShape();">
<canvas id="mycanvas" width="400" height="400"></canvas>
</body>
</html>
```

OUTPUT:



HTML5 Canvas - Rotation:

- **HTML5** canvas provides rotate(angle) method which is used to rotate the canvas around the current origin.

- This method only takes one parameter and that's the angle the canvas is rotated by. This is a clockwise rotation measured in radians.

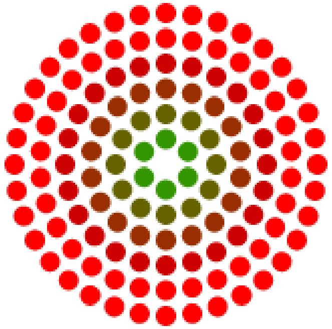
Example:

- Following is a simple example which we are running two loops where first loop determines the number of rings, and the second determines the number of dots drawn in each ring.

```
<!DOCTYPE HTML>
<html>
<head>
<style>
#test {
width: 100px;
height:100px;
margin: 0px auto;
}
</style>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
ctx.translate(100,100);
for (i=1; i<7; i++){
ctx.save();
ctx.fillStyle = 'rgb('+(51*i)+','+(200-51*i)+',0)';
for (j=0; j < i*6; j++){
ctx.rotate(Math.PI*2/(i*6));
ctx.beginPath();
ctx.arc(0,i*12.5,5,0,Math.PI*2,true);
ctx.fill();
}
ctx.restore();
}
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body id="test" onload="drawShape();">
<canvas id="mycanvas" width="400" height="400"></canvas>
</body>
```

</html>

OUTPUT:



HTML5 Canvas - Scaling:

- **HTML5** canvas provides scale(x, y) method which is used to increase or decrease the units in our canvas grid. This can be used to draw scaled down or enlarged shapes and bitmaps.

- This method takes two parameters where x is the scale factor in the horizontal direction and y is the scale factor in the vertical direction. Both parameters must be positive numbers.

- Values smaller than 1.0 reduce the unit size and values larger than 1.0 increase the unit size. Setting the scaling factor to precisely 1.0 doesn't affect the unit size.

Example:

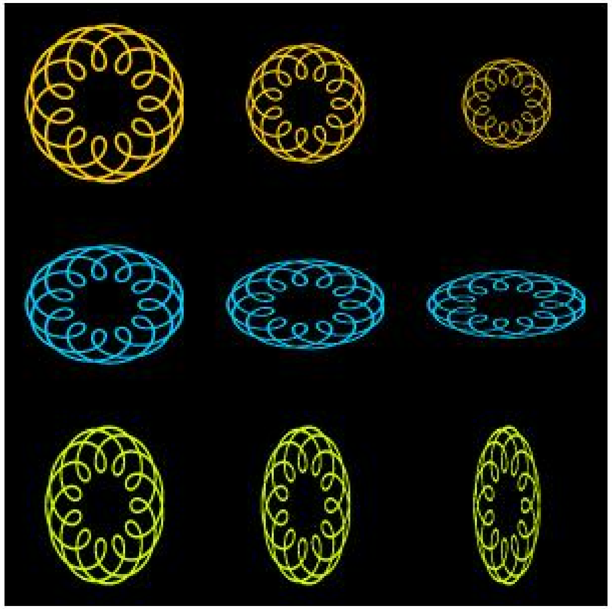
- Following is a simple example which uses spirograph function to draw nine shapes with different scaling factors.

```
<!DOCTYPE HTML>
<html>
<head>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
ctx.strokeStyle = "#fc0";
ctx.lineWidth = 1.5;
ctx.fillRect(0,0,300,300);
// Uniform scaling
ctx.save()
ctx.translate(50,50);
drawSpirograph(ctx,22,6,5);
```

```
ctx.translate(100,0);
ctx.scale(0.75,0.75);
drawSpirograph(ctx,22,6,5);
ctx.translate(133.333,0);
ctx.scale(0.75,0.75);
drawSpirograph(ctx,22,6,5);
ctx.restore();
// Non uniform scaling (y direction)
ctx.strokeStyle = "#0cf";
ctx.save()
ctx.translate(50,150);
ctx.scale(1,0.75);
drawSpirograph(ctx,22,6,5);
ctx.translate(100,0);
ctx.scale(1,0.75);
drawSpirograph(ctx,22,6,5);
ctx.translate(100,0);
ctx.scale(1,0.75);
drawSpirograph(ctx,22,6,5);
ctx.restore();
// Non uniform scaling (x direction)
ctx.strokeStyle = "#cf0";
ctx.save()
ctx.translate(50,250);
ctx.scale(0.75,1);
drawSpirograph(ctx,22,6,5);
ctx.translate(133.333,0);
ctx.scale(0.75,1);
drawSpirograph(ctx,22,6,5);
ctx.translate(177.777,0);
ctx.scale(0.75,1);
drawSpirograph(ctx,22,6,5);
ctx.restore();
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
function drawSpirograph(ctx,R,r,O){
var x1 = R-O;
var y1 = 0;
var i = 1;
ctx.beginPath();
ctx.moveTo(x1,y1);
```

```
do {
if (i>20000) break;
var x2 = (R+r)*Math.cos(i*Math.PI/72) -
(r+O)*Math.cos(((R+r)/r)*(i*Math.PI/72))
var y2 = (R+r)*Math.sin(i*Math.PI/72) -
(r+O)*Math.sin(((R+r)/r)*(i*Math.PI/72))
ctx.lineTo(x2,y2);
x1 = x2;
y1 = y2;
i++;
}
while (x2 != R-O && y2 != 0 );
ctx.stroke();
}
</script>
</head>
<body onload="drawShape();">
<canvas id="mycanvas" width="400" height="400"></canvas>
</body>
</html>
```

OUTPUT:



HTML5 Canvas - Transforms:

- **HTML5** canvas provides methods which allow modifications directly to the transformation matrix. The transformation matrix must initially be the identity transform. It may then be adjusted using the transformation methods.

Sr.No.	**Method and Description**
1	**transform(m11, m12, m21, m22, dx, dy)**

This method changes the transformation matrix to apply the matrix given by the arguments.

Sr.No.	**Method and Description**
2	**setTransform(m11, m12, m21, m22, dx, dy)** ***This method changes the transformation matrix to the matrix given by the arguments.***

- The transform(m11, m12, m21, m22, dx, dy) method must multiply the current transformation matrix with the matrix described by:

m11	m21	dx
m12	m22	dy
0	0	1

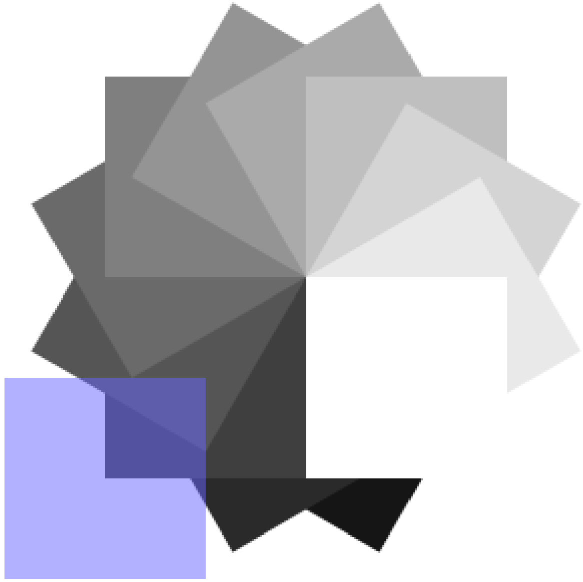
- The setTransform(m11, m12, m21, m22, dx, dy) method must reset the current transform to the identity matrix, and then invoke the transform(m11, m12, m21, m22, dx, dy) method with the same arguments.

Example:

- Following is a simple example which makes use of **transform()** and **setTransform()** ***methods***.

```
<!DOCTYPE HTML>
<html>
<head>
<script type="text/javascript">
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
var sin = Math.sin(Math.PI/6);
var cos = Math.cos(Math.PI/6);
ctx.translate(200, 200);
var c = 0;
for (var i=0; i <= 12; i++) {
c = Math.floor(255 / 12 * i);
ctx.fillStyle = "rgb(" + c + "," + c + "," + c + ")";
ctx.fillRect(0, 0, 100, 100);
ctx.transform(cos, sin, -sin, cos, 0, 0);
}
ctx.setTransform(-1, 0, 0, 1, 200, 200);
ctx.fillStyle = "rgba(100, 100, 255, 0.5)";
ctx.fillRect(50, 50, 100, 100);
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body onload="drawShape();">
<canvas id="mycanvas" width="400" height="400"></canvas>
</body>
</html>
```

OUTPUT:



HTML5 Canvas - Composition:

- **HTML5** canvas provides compositing attribute globalCompositeOperation which affect all the drawing operations.

- We can draw new shapes behind existing shapes and mask off certain areas, clear sections from the canvas using globalCompositeOperation attribute as shown below in the example.

- There are following values which can be set for globalCompositeOperation:

Attribute **Description**

source-over ***This is the default setting and draws new shapes on top of the existing canvas content.***

Attribute **Description**

source-in ***The new shape is drawn only where both the new shape and the destination canvas overlap. Everything else is made transparent.***

Attribute **Description**

source-out ***The new shape is drawn where it doesn't overlap the existing canvas content.***

Attribute **Description**

source-atop ***The new shape is only drawn where it overlaps the existing canvas content.***

Attribute **Description**

lighter ***Where both shapes overlap the color is determined by adding color values.***

Attribute	**Description**
xor	***Shapes are made transparent where both overlap and drawn normal everywhere else.***

Attribute	**Description**
destination-over	***New shapes are drawn behind the existing canvas content.***

Attribute	**Description**
destination-in	***The existing canvas content is kept where both the new shape and existing canvas content overlap. Everything else is made transparent.***

Attribute	**Description**
destination-out	***The existing content is kept where it doesn't overlap the new shape.***
destination-atop	***The existing canvas is only kept where it overlaps the new shape. The new shape is drawn behind the canvas content.***

Attribute	**Description**
darker	***Where both shapes overlap the color is determined by subtracting color values.***

Example:

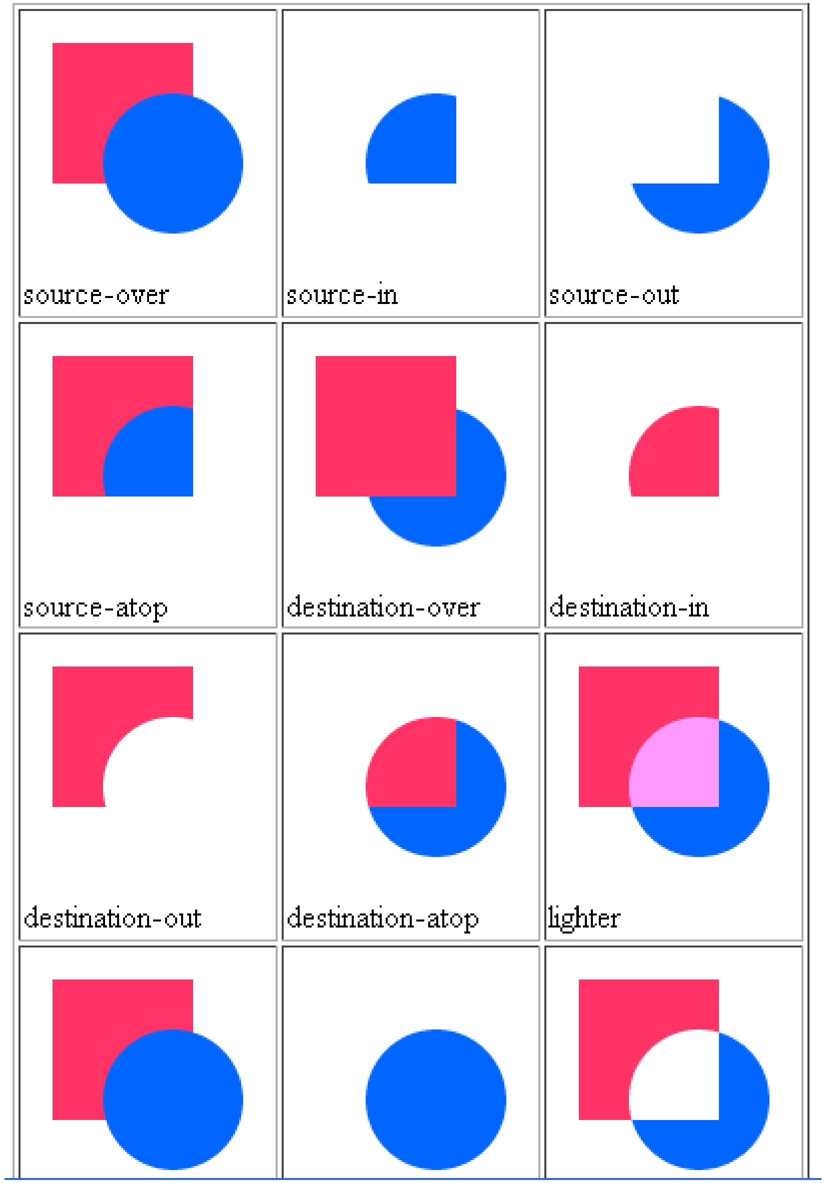
- Following is a simple example which makes use of **globalCompositeOperation** attribute to create all possible compositions

```
<!DOCTYPE HTML>
<html>
<head>
<script type="text/javascript">
var compositeTypes = [
'source-over','source-in','source-out','source-atop',
'destination-over','destination-in','destination-out',
'destination-atop','lighter','darker','copy','xor'
];
function drawShape(){
for (i=0;i<compositeTypes.length;i++){
var label = document.createTextNode(compositeTypes[i]);
document.getElementById('lab'+i).appendChild(label);
var ctx = document.getElementById('tut'+i).getContext('2d');
// draw rectangle
ctx.fillStyle = "#FF3366";
ctx.fillRect(15,15,70,70);
// set composite property
ctx.globalCompositeOperation = compositeTypes[i];
// draw circle
ctx.fillStyle = "#0066FF";
ctx.beginPath();
ctx.arc(75,75,35,0,Math.PI*2,true);
ctx.fill();
}
}
</script>
</head>
<body onload="drawShape();">
<table border="1" align="center">
<tr>
<td><canvas id="tut0" width="125" height="125"></canvas><br/>
<label id="lab0"></label>
</td>
<td><canvas id="tut1" width="125" height="125"></canvas><br/>
<label id="lab1"></label>
</td>
<td><canvas id="tut2" width="125" height="125"></canvas><br/>
```

```
<label id="lab2"></label>
</td>
</tr>
<tr>
<td><canvas id="tut3" width="125" height="125"></canvas><br/>
<label id="lab3"></label>
</td>
<td><canvas id="tut4" width="125" height="125"></canvas><br/>
<label id="lab4"></label>
</td>
<td><canvas id="tut5" width="125" height="125"></canvas><br/>
<label id="lab5"></label>
</td>
</tr>
<tr>
<td><canvas id="tut6" width="125" height="125"></canvas><br/>
<label id="lab6"></label>
</td>
<td><canvas id="tut7" width="125" height="125"></canvas><br/>
<label id="lab7"></label>
</td>
<td><canvas id="tut8" width="125" height="125"></canvas><br/>
```

```
<label id="lab8"></label>
</td>
</tr>
<tr>
<td><canvas id="tut9" width="125" height="125"></canvas><br/>
<label id="lab9"></label>
</td>
<td><canvas id="tut10" width="125" height="125"></canvas><br/>
<label id="lab10"></label>
</td>
<td><canvas id="tut11" width="125" height="125"></canvas><br/>
<label id="lab11"></label>
</td>
</tr>
</table>
</body>
</html>
```

OUTPUT:


source-over
source-in
source-out
source-atop
destination-over
destination-in
destination-out
destination-atop
lighter

HTML5 Canvas - Animations:

- **HTML5** canvas provides necessary methods to draw an image and erase it completely. We can take Javascript help to simulate good animation over a HTML5 canvas.

- Following are the two important Javascript methods which would be used to animate an image on a canvas:

Sr.No.	**Method and Description**
1	**setInterval(callback, time);** ***This method repeatedly executes the supplied code after a given timemilliseconds.***

Sr.No.	**Method and Description**
2	**setTimeout(callback, time);** ***This method executes the supplied code only once after a given time milliseconds.***

Example:

- Following is a simple example which would rotate a small image repeatedly.

```
<!DOCTYPE HTML>
<html>
<head>
<script type="text/javascript">
var pattern= new Image();
function animate(){
pattern.src = '/html5/images/pattern.jpg';
setInterval(drawShape, 100);
}
function drawShape(){
// get the canvas element using the DOM
var canvas = document.getElementById('mycanvas');
// Make sure we don't execute when canvas isn't supported
if (canvas.getContext){
// use getContext to use the canvas for drawing
var ctx = canvas.getContext('2d');
ctx.fillStyle = 'rgba(0,0,0,0.4)';
ctx.strokeStyle = 'rgba(0,153,255,0.4)';
ctx.save();
ctx.translate(150,150);
var time = new Date();
ctx.rotate( ((2*Math.PI)/6)*time.getSeconds() + (
(2*Math.PI)/6000)*time.getMilliseconds() );
ctx.translate(0,28.5);
ctx.drawImage(pattern,-3.5,-3.5);
ctx.restore();
}
else {
alert('You need Safari or Firefox 1.5+ to see this demo.');
}
}
</script>
</head>
<body onload="animate();">
<canvas id="mycanvas" width="400" height="400"></canvas>
</body>
</html>
```

OUTPUT:

Note: Change the file and its patch.

HTML5 - Audio & Video
Chapter 13

- **HTML5** features include native audio and video support without the need for Flash.

- The **HTML5** <**audio**> and <**video**> tags make it simple to add media to a website. You need to set src attribute to identify the media source and include a controls attribute so the user can play and pause the media.

Embedding Video:

- Here is the simplest form of embedding a video file in your webpage:

```
<video src="foo.mp4" width="300" height="200" controls>
Your browser does not support the <video> element.
</video>
```

- The current HTML5 draft specification does not specify which video formats browsers should support in the video tag. But most commonly used video formats are:

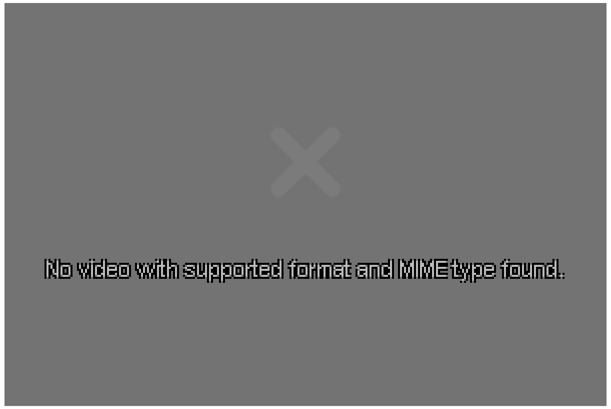
  - **Ogg**: Ogg files with Thedora video codec and Vorbis audio codec.
  - **mpeg4**: MPEG4 files with H.264 video codec and AAC audio codec.

- You can use <**source**> tag to specify media along with media type and many other attributes. A video element allows multiple source elements and browser will use the first recognized format:

```
<!DOCTYPE HTML>
<html>
<body>
<video width="300" height="200" controls autoplay>
<source src="/html5/foo.ogg" type="video/ogg" />
<source src="/html5/foo.mp4" type="video/mp4" />
Your browser does not support the <video> element.
</video>
```

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

OUTPUT:



No video with supported format and MIME type found.

Note: Try with known file name.

Video Attribute Specification:

- The **HTML5** video tag can have a number of attributes to control the look and feel and various functionalities of the control:

Attribute: **autoplay**
Description: ***This Boolean attribute if specified, the video will automatically***

begin to play back as soon as it can do so without stopping to finish loading the data.

Attribute: **autobuffer**
Description: *This Boolean attribute if specified, the video will automatically begin buffering even if it's not set to automatically play*.

Attribute: **controls**
Description: *If this attribute is present, it will allow the user to control video playback, including volume, seeking, and pause/resume playback.*

Attribute: **height**
Description: *This attribute specifies the height of the video's display area, in CSS pixels.*

Attribute: **loop**
Description: *This Boolean attribute if specified, will allow video automatically seek back to the start after reaching at the end.*

Attribute: **preload**
Description: *This attribute specifies that the video will be loaded at page load, and ready to run. Ignored if autoplay is present.*

Attribute: **poster**
Description: ***This is a URL of an image to show until the user plays or seeks.***

Attribute: **src**
Description: ***The URL of the video to embed. This is optional; you may instead use the <source> element within the video block to specify the video to embed***

Attribute: **width**
Description: ***This attribute specifies the width of the video's display area, in CSS pixels.***

Embedding Audio:

- **HTML5** supports <audio> tag which is used to embed sound content in an HTML or XHTML document as follows.

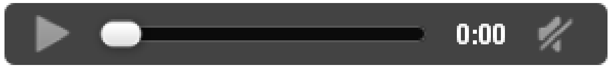
```
<audio src="foo.wav" controls autoplay>
Your browser does not support the <audio> element.
</audio>
```

- The current **HTML5** draft specification does not specify which audio formats browsers should support in the audio tag. But most commonly used audio formats are ogg, mp3 and wav.

- You can use <source> tag to specify media along with media type and many other attributes. An audio element allows multiple source elements and browser will use the first recognized format:

```
<!DOCTYPE HTML>
<html>
<body>
<audio controls autoplay>
<source src="/html5/audio.ogg" type="audio/ogg" />
<source src="/html5/audio.wav" type="audio/wav" />
Your browser does not support the <audio> element.
</audio>
</body>
</html>
```

OUTPUT:



Audio Attribute Specification:

- The **HTML5** audio tag can have a number of attributes to control the look and feel and various functionalities of the control:

Attribute: **autoplay**
Description: ***This Boolean attribute if specified, the audio will automatically begin to play back as soon as it can do so without stopping to finish loading the data.***

Attribute: **autobuffer**
Description: ***This Boolean attribute if specified, the audio will automatically begin buffering even if it's not set to automatically play.***

Attribute: **controls**
Description: ***If this attribute is present, it will allow the user to control audio playback, including volume, seeking, and pause/resume playback.***

Attribute: **loop**
Description: ***This Boolean attribute if specified, will allow audio***

automatically seek back to the start after reaching at the end.

Attribute: ***preload***
Description: ***This attribute specifies that the audio will be loaded at page load, and ready to run. Ignored if autoplay is present.***

Attribute: **src**
Description: ***The URL of the audio to embed. This is optional; you may instead use the <source> element within the video block to specify the video to embed***

Handling Media Events:

- The **HTML5** audio and video tag can have a number of attributes to control various functionalities of the control using JavaScript:

Event: **abort**
Description: ***This event is generated when playback is aborted.***

Event: **canplay**
Description: ***This event is generated when enough data is available that the media can be played.***

Event: **ended**
Description: ***This event is generated when playback completes.***

Event: **error**
Description: ***This event is generated when an error occurs.***

Event: **loadeddata**
Description: ***This event is generated when the first frame of the media has finished loading.***

Event: **loadstart**
Description: ***This event is generated when loading of the media begins.***

Event: **pause**
Description: ***This event is generated when playback is paused.***

Event: **play**
Description: ***This event is generated when playback starts or resumes.***

Event: **progress**
Description: ***This event is generated periodically to inform the progress of the***

downloading the media.

Event: **ratechange**
Description: *This event is generated when the playback speed changes.*

Event: **seeked**
Description: *This event is generated when a seek operation completes.*

Event: **seeking**
Description: *This event is generated when a seek operation begins.*

Event: **suspend**
Description: *This event is generated when loading of the media is suspended.*

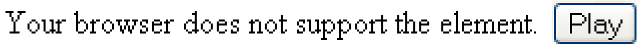
Event: **volumechange**
Description: *This event is generated when the audio volume changes.*

Event: **waiting**
Description: *This event is generated when the requested operation (such as playback) is delayed pending the completion of another operation (such as a seek).*

Following is the example which allows to play the given video:

```
<!DOCTYPE HTML>
<head>
<script type="text/javascript">
function PlayVideo(){
var v = document.getElementsByTagName("video")[0];
v.play();
}
</script>
</head>
<html>
<body>
<form>
<video width="300" height="200" src="/html5/foo.mp4">
Your browser does not support the <video> element.
</video>
<input type="button" onclick="PlayVideo();" value="Play"/>
</form>
</body>
</html>
```

OUTPUT:


Your browser does not support the element.

Note: Try to load the video later.

Configuring Servers for Media Type:

- Most servers don't by default serve **Ogg** or **mp4** media with the correct **MIME *types***, so you'll likely need to add the appropriate configuration for this.

```
AddType        audio/ogg .oga

AddType        audio/wav .wav

AddType        video/ogg .ogv .ogg

AddType        video/mp4 .mp4
```

HTML5 . Geolocation
Chapter 14

- **HTML5 Geolocation API** lets you ***share your location*** with your favorite web sites.
- A **JavaScript** can capture your **latitude** and **longitude** and can be sent to **backend web server**

and do ***fancy location-aware things*** like ***finding local businesses*** or ***showing your location on a map***.

- Today most of the browsers and mobile devices support **Geolocation API**.
- The **geolocation APIs** work with a new property of the **global navigator object** ie. **Geolocation object** which can be created as follows:

```
var geolocation = navigator.geolocation;
```

- The **geolocation object** is a ***service object*** that allows **widgets** to retrieve information about the geographic location of the device.

Geolocation Methods:

The geolocation object provides the following methods:

Method: **getCurrentPosition()**
Description: ***This method retrieves the current geographic location of the user.***

Method: **watchPosition()**
Description: ***This method retrieves periodic updates about the current geographic location of the device.***

Method: **clearWatch()**
Description: ***This method cancels an ongoing watchPosition call.***

Example:

- ***Following is a sample code to use any of the above method***:

```
        function   getLocation()
        {
        var geolocation = navigator.geolocation;
geolocation.getCurrentPosition(showLocation, errorHandler);
        }
```

- Here **showLocation** and **errorHandler** are ***callback methods*** which would be used to get actual position as explained in next section and to handle errors if there is any.

Geolocation getCurrentPosition() API:

Description:

- The **getCurrentPosition** ***method*** retrieves the ***current geographic location of the device***.
- The location is expressed as a set of ***geographic coordinates*** together with information about ***heading*** and ***speed***.
- The location information is returned in a **Position object**.

Syntax:

- ***Here is the syntax of this method***:

getCurrentPosition(showLocation, ErrorHandler, options);

Parameters:

- ***Here is the detail of parameters***:

.

- **showLocation:** This specifies the callback method that retrieves the location information. This method is called ***asynchronously*** with an object corresponding to the Position object which stores the returned location information.

- **ErrorHandler**: This optional parameter specifies the callback method that is invoked when an error occurs in processing the asynchronous call. This method is called with the PositionError object that stores the returned error information.

- **options**: This optional parameter specifies a set of options for retrieving the location information. You can specify (a) Accuracy of the returned location information (b) Timeout for retrieving the location information and (c) Use of cached location information.

Return value:

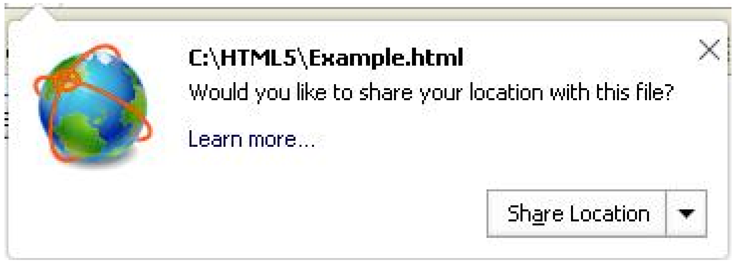
The **getCurrentPosition** method does not return a value.

Example:

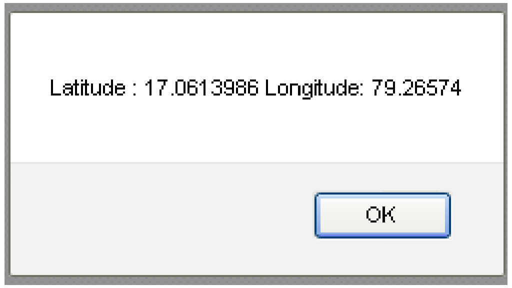
```
<!DOCTYPE HTML>
<html>
<head>
<script type="text/javascript">
function showLocation(position) {
var latitude = position.coords.latitude;
var longitude = position.coords.longitude;
alert("Latitude : " + latitude + " Longitude: " + longitude);
}
function errorHandler(err) {
if(err.code == 1) {
alert("Error: Access is denied!");
}
else if( err.code == 2) {
alert("Error: Position is unavailable!");
}
}
function getLocation(){
if(navigator.geolocation){
// timeout at 60000 milliseconds (60 seconds)
var options = {timeout:60000};
navigator.geolocation.getCurrentPosition(showLocation,
errorHandler, options);
}
else{
alert("Sorry, browser does not support geolocation!");
}
}
</script>
</head>
<body>
<form>
<input type="button" onclick="getLocation();" value="Get Location"/>
</form>
```

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

OUTPUT:


C:\HTML5\Example.html

Would you like to share your location with this file?


Latitude : 17.0613986 Longitude: 79.26574

Geolocation watchPosition() API:

Description:

- The watchPosition method retrieves periodic updates about the current geographic location of the device. The location is expressed as a set of geographic coordinates together with information about heading and speed.

- The location information is returned in a Position object. Each update returns a new Position object.

Syntax:

- Here is the syntax of this method:

  watchPosition(showLocation, ErrorHandler, options);

Parameters:

- Here is the detail of parameters:

  - **showLocation**: This specifies the callback method that retrieves the location information. This method is called asynchronously with an object corresponding to the Position object which stores the returned location information.

  - **ErrorHandler**: This optional parameter specifies the callback method that is invoked when an error occurs in processing the asynchronous call. This method is called with the

PositionError object that stores the returned error information.

- **options**: This optional parameter specifies a set of options for retrieving the location information. You can specify (a) Accuracy of the returned location information (b) Timeout for retrieving the location information and (c) Use of cached location information.

Return value:

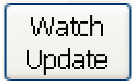
- The watchPosition method returns a unique transaction ID (number) associated with the **asynchronous** call. Use this ID to cancel the watchPosition call and to stop receiving location updates.

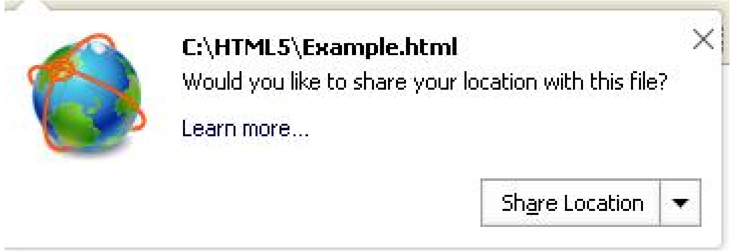
Example:

```
<!DOCTYPE HTML>
<head>
<html>
<script type="text/javascript">
var watchID;
var geoLoc;
function showLocation(position) {
var latitude = position.coords.latitude;
var longitude = position.coords.longitude;
alert("Latitude : " + latitude + " Longitude: " + longitude);
}
function errorHandler(err) {
if(err.code == 1) {
alert("Error: Access is denied!");
}
else if( err.code == 2) {
alert("Error: Position is unavailable!");
}
}
function getLocationUpdate(){
if(navigator.geolocation){
// timeout at 60000 milliseconds (60 seconds)
var options = {timeout:60000};
geoLoc = navigator.geolocation;
watchID = geoLoc.watchPosition(showLocation, errorHandler, options);
}
else{
alert("Sorry, browser does not support geolocation!");
}
}
</script>
```

```
</head>
<body>
<form>
<input type="button" onclick="getLocationUpdate();" value="Watch
Update"/>
</form>
</body>
</html>
```

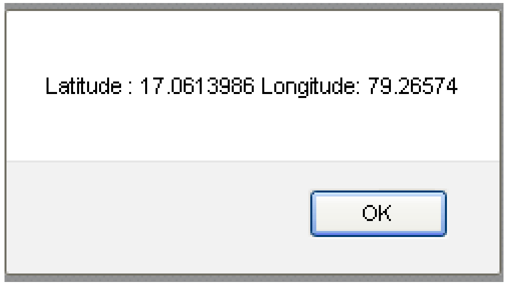
OUTPUT:




C:\HTML5\Example.html

Would you like to share your location with this file?

Learn more...


Latitude : 17.0613986 Longitude: 79.26574

Geolocation clearWatch() API:

Description:

- The clearWatch method cancels an ongoing watchPosition call. When cancelled, the watchPosition call stops retrieving updates about the current geographic location of the device.

Syntax:

- ***Here is the syntax of this method***:

```
clearWatch(watchId);
```

Parameters:

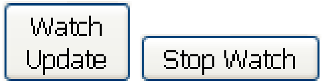
- ***Here is the detail of parameters***:
  - **watchId**: This specifies the unique ID of the watchPosition call to cancel. The ID is returned by the watchPosition call.
  - **Return value**: The clearWatch method does not return a value.

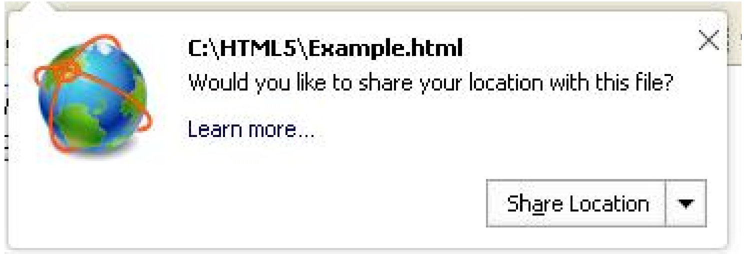
Example:

```
<!DOCTYPE HTML>
<html>
<head>
<script type="text/javascript">
var watchID;
var geoLoc;
function showLocation(position) {
var latitude = position.coords.latitude;
var longitude = position.coords.longitude;
alert("Latitude : " + latitude + " Longitude: " + longitude);
}
function errorHandler(err) {
if(err.code == 1) {
alert("Error: Access is denied!");
}
else if( err.code == 2) {
alert("Error: Position is unavailable!");
}
}
function getLocationUpdate(){
if(navigator.geolocation){
```

```
// timeout at 60000 milliseconds (60 seconds)
var options = {timeout:60000};
geoLoc = navigator.geolocation;
watchID = geoLoc.watchPosition(showLocation, errorHandler, options);
}
else{
alert("Sorry, browser does not support geolocation!");
}
}
function stopWatch(){
geoLoc.clearWatch(watchID);
}
</script>
</head>
<body>
<form>
<input type="button" onclick="getLocationUpdate();" value="Watch
Update"/>
<input type="button" onclick="stopWatch();" value="Stop Watch"/>
</form>
</body>
</html>
```

OUTPUT:




C:\HTML5\Example.html

Would you like to share your location with this file?

Location Properties:

- Geolocation methods getCurrentPosition() and getPositionUsingMethodName() specify the callback method that retrieves the location information. These methods are called asynchronously with an object **Position** which stores the complete location information.

- The Position object specifies the current geographic location of the device. The location is expressed as a set of geographic coordinates together with information about heading and speed.
- The following table describes the properties of the Position object. For the optional properties if the system cannot provide a value, the value of the property is set to null.

Property: **coords**
Type: ***objects***

Description: Specifies the geographic location of the device.
The location is expressed as a set of geographic coordinates together with information about heading and speed.

Property: **coords.latitude**
Type: ***Number***
Description: Specifies the latitude estimate in decimal degrees.
The value range is [-90.00, +90.00].

Property: **coords.longitude**
Type: ***Number***
Description: Specifies the longitude estimate in decimal degrees. The value range is [-180.00, +180.00].

Property: **coords.altitude**
Type: ***Number***
Description: [Optional] Specifies the altitude estimate in meters above the WGS 84 ellipsoid.

Property: **coords.accuracy**
Type: ***Number***
Description: [Optional] Specifies the accuracy of the latitude and longitude estimates in meters.

Property: **coords.altitudeAccuracy**
Type: ***Number***
Description: [Optional] Specifies the accuracy of the altitude estimate in meters.

Property: **coords.heading**
Type: ***Number***
Description: [Optional] Specifies the device's current direction of movement in degrees counting clockwise
relative to true north.

Property: **coords.speed**
Type: ***Number***
Description: [Optional] Specifies the device's current ground speed in meters per second.

Property: **timestamp**
Type: ***date***
Description: Specifies the time when the location information was retrieved and the Position object created.

Example:

- Following is a sample code which makes use of Position object. Here showLocation method is a callback method:

```
function showLocation( position )
{
        var latitude = position.coords.latitude;
        var longitude = position.coords.longitude;
        ...
}
```

Handling Errors:

- Geolocation is complicated, and it is very much required to catch any error and handle it gracefully.

- The geolocations methods getCurrentPosition() and watchPosition() make use of an error handler callback method which gives PositionError object. This object has following two properties:

Property:	**code**
Type:	***Number***

Description: Contains a numeric code for the error.

Property: **message**
Type: ***String***
Description: Contains a human-readable description of the error.

- The following table describes the possible error codes returned in the PositionError object.

Code: **0**
Constant: ***UNKNOWN_ERROR***
Description: The method failed to retrieve the location of the device due to an unknown error.

Code: **1**
Constant: ***PERMISSION_DENIED***
Description: The method failed to retrieve the location of the device because the application does not have permission to use the Location Service.

Code: **2**
Constant: ***POSITION_UNAVAILABLE***
Description: The location of the device could not be determined.

Code: **3**
Constant: ***TIMEOUT***
Description: The method was unable to retrieve the location information within the specified maximum timeout interval.

Example:

- Following is a sample code which makes use of PositionError object. Here errorHandler method is a callback method:

```
function errorHandler( err )
{
        if (err.code == 1) {
        // access is denied
}
        ...
}
```

Position Options:

- Following is the actual syntax of getCurrentPosition() method:

getCurrentPosition(callback, ErrorCallback, options)

- Here third argument is the PositionOptions object which specifies a set of options for retrieving the geographic location of the device.

- Following are the options which can be specified as third argument:

Property: **enableHighAccuracy**
Type: ***Boolean***
Description: Specifies whether the widget wants to receive the most accurate location estimate possible. By default this is false.

Property: **timeout**
Type: ***Number***
Description: The timeout property is the number of milliseconds your web application is willing to wait for a position.

Property: **maximumAge**
Type: ***Number***
Description: Specifies the expiry time in milliseconds for cached location information.

Example:

- Following is a sample code which shows how to use above mentioned methods:

```
function getLocation()
{
    var geolocation = navigator.geolocation;
    geolocation.getCurrentPosition(showLocation, errorHandler,
    {maximumAge: 75000});
}
```

HTML5 - Microdata
Chapter 15

- Microdata is a standardized way to provide additional semantics in your web pages.

- Microdata lets you define your own customized elements and start embedding custom properties in your web pages. At a high level, microdata consists of a group of name-value pairs.

- The groups are called items, and each name-value pair is a property. Items and properties are represented by regular elements.

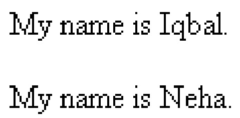
Example:

- To create an item, the itemscope attribute is used.
- To add a property to an item, the itemprop attribute is used on one of the item's descendants.

- Here there are two items, each of which has the property "name":

```
<html>
<body>
<div itemscope>
<p>My name is <span itemprop="name">Iqbal</span>.</p>
</div>
<div itemscope>
<p>My name is <span itemprop="name">Neha</span>.</p>
</div>
</body>
</html>
```

OUTPUT:



My name is Iqbal.

My name is Neha.

- Properties generally have values that are strings but it can have following data types:

Global Attributes:

- Microdata introduces five global attributes which would be available for any element to use and give context for machines about your data.

Attribute: **itemscope**
Description: This is used to create an item. The itemscope attribute is a Boolean attribute that tells that there is Microdata on this page, and this is where it starts.

Attribute: **itemtype**
Description: This attribute is a valid URL which defines the item and provides the context for the properties.

Attribute: **itemid**
Description: This attribute is global identifier for the item.
itemprop This attribute defines a property of the item.

Attribute: **itemref**
Description: This attribute gives a list of additional elements to crawl to find the name-value pairs of the item.

Properties Datatypes:

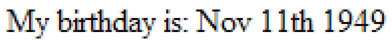
- Properties generally have values that are strings as mentioned in above example but they can also have values that are URLs. Following example has one property, "image", whose value is a URL:

```
<div itemscope>
<img itemprop="image" src="tp-logo.gif" alt="TutorialsPoint">
</div>
```

- Properties can also have values that are dates, times, or dates and times. This is achieved using the time element and its **datetime** attribute.

```
<html>
<body>
<div itemscope>
My birthday is:
<time itemprop="birthday" datetime="1949-11-13">
Nov 11th 1949
</time>
</div>
</body>
</html>
```

OUTPUT:



```
My birthday is: Nov 11th 1949
```

- Properties can also themselves be groups of name-value pairs, by putting the itemscope attribute on the element that declares the property.

Microdata API support:

- If a browser supports the HTML5 microdata API, there will be a getItems() function on the global document object. If browser doesn't support microdata, the getItems() function will be undefined.

```
    function        supports_microdata_api()
    {
        return !!document.getItems;
}
```

- Modernizr does not yet support checking for the microdata API, so you¡¦ll need to use the function like the one listed above.

- The **HTML5** microdata standard includes both HTML markup (primarily for search engines) and a set of DOM functions (primarily for browsers).

- You can include microdata markup in your web pages, and search engines that don't understand the microdata attributes will just ignore them. But if you need to access or manipulate microdata through the DOM, you'll need to check whether the browser supports the microdata DOM API.

Defining Microdata Vocabulary:

- To define microdata vocabulary you need a namespace URL which points to a working web page. For example http://data-vocabulary.org/Person can be used as the namespace for a personal microdata vocabulary with the following named properties:

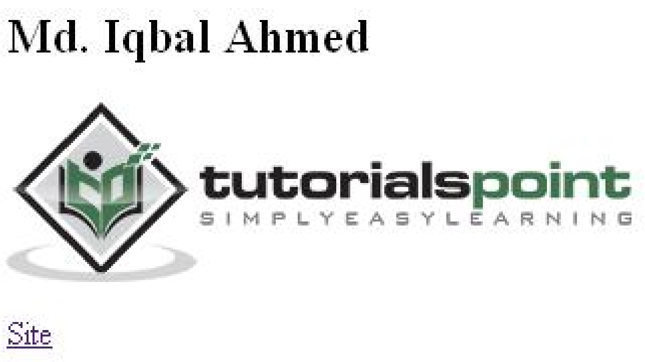
  - **name -** Person name as a simple string
  - **Photo -** A URL to a picture of the person.
  - **URL -** A website belonging to the person.

- Using about properties a person microdata could be as follows:

```
<html>
<body>
<div itemscope>
<section itemscope itemtype="http://data-vocabulary.org/Person">
<h1 itemprop="name">Md. Iqbal Ahmed</h1>
<p>
<img itemprop="photo"
```

```
src="http://www.tutorialspoint.com/green/images/logo.png">
</p>
<a itemprop="url" href="#">Site</a>
</section>
</div>
</body>
</html>
```

OUTPUT:



Md. Iqbal Ahmed

Site

- Google supports microdata as part of their Rich Snippets program.
- When Google's web crawler parses your page and finds microdata properties that conform to the http://datavocabulary.org/Person vocabulary, it parses out those properties and stores them alongside the rest of the page data.

- You can test above example using Rich Snippets Testing Tool using http://www.tutorialspoint.com/html5/microdata.htm

- For further development on Microdata you can always refer to **HTML5 Microdata**.

HTML5 - Drag & drop
Chapter 16

- **Drag and Drop** (**DnD**) is powerful User Interface concept which makes it easy to copy, reorder and deletion of items with the help of mouse clicks. This allows the user to click and hold the mouse button down over an element, drag it to another location, and release the mouse button to drop the element there.

- To achieve drag and drop functionality with traditional HTML4, developers would either have to either have to use complex JavaScript programming or other JavaScript frameworks like jQuery etc.

- Now **HTML5** came up with a Drag and Drop (DnD) API that brings native DnD support to the browser making it much easier to code up.

- **HTML5 DnD** is supported by all the major browsers like Chrome, Firefox 3.5 and Safari 4 etc.

Drag and Drop Events:

- There are number of events which are fired during various stages of the drag and drop operation. These events are listed below:

Events: **dragstart**
Description: Fires when the user starts dragging of the object.

Events: **dragenter**
Description: Fired when the mouse is first moved over the target element while a drag is occurring. A listener for this event should indicate whether a drop is allowed over this location. If there are no listeners, or the listeners perform no operations, then a drop is not allowed by default.

Events: **dragover**
Description: This event is fired as the mouse is moved over an element when a drag is occurring. Much of the time, the operation that occurs during a listener will be the same as the dragenter event.

Events: **dragleave**
Description: This event is fired when the mouse leaves an element while a drag is occurring. Listeners should remove any highlighting or insertion markers used for drop feedback.

Events: **drag**

Description: Fires every time the mouse is moved while the object is being dragged.

Events: **drop**
Description: The drop event is fired on the element where the drop was occurred at the end of the drag operation. A listener would be responsible for retrieving the data being dragged and inserting it at the drop location.
Events: **dragend**
Description: Fires when the user releases the mouse button while dragging an object.

Note: Note that only drag events are fired; mouse events such as mousemove are not fired during a drag operation.

The DataTransfer Object:

- The event listener methods for all the drag and drop events accept Event object which has a readonly attribute called **dataTransfer**.

- The **event.dataTransfer** returns **DataTransfer** object associated with the event as follows:

```
function EnterHandler(event)
{
        DataTransfer dt = event.dataTransfer;
        .............
    }
```

- The DataTransfer object holds data about the drag and drop operation. This data can be retrieved and set in terms of various attributes associated with DataTransfer object as explained below:

S.N.: 1

DataTransfer attributes and their description:

dataTransfer.dropEffect [= value]

- Returns the kind of operation that is currently selected.
- This attribute can be set, to change the selected operation.
- The possible values are none, copy, link, and move.

S.N.: 2

DataTransfer attributes and their description:

dataTransfer.effectAllowed [= value]

- Returns the kinds of operations that are to be allowed.
- This attribute can be set, to change the allowed operations.

- The possible values are none, copy, copyLink, copyMove, link, linkMove, move, all and uninitialized.

S.N.: 3
DataTransfer attributes and their description:

dataTransfer.types

- Returns a DOMStringList listing the formats that were set in the dragstart event. In addition, if any files are being dragged, then one of the types will be the string "Files".

S.N.: 4
DataTransfer attributes and their description:

dataTransfer.clearData ([format])

- Removes the data of the specified formats. Removes all data if the argument is omitted.

S.N.: 5
DataTransfer attributes and their description:

dataTransfer.setData(format, data)

- Adds the specified data.

S.N.: 6
DataTransfer attributes and their description:

data = dataTransfer.getData(format)

- Returns the specified data. If there is no such data, returns the empty string.

S.N.: 7
DataTransfer attributes and their description:

dataTransfer.files

- Returns a FileList of the files being dragged, if any.

S.N.: 8
DataTransfer attributes and their description:

dataTransfer.setDragImage(element, x, y)

- Uses the given element to update the drag feedback, replacing any previously specified feedback.

S.N.: 9

DataTransfer attributes and their description:

dataTransfer.addElement(element)

- Adds the given element to the list of elements used to render the drag feedback.

Drag and Drop Process:

- Following are the steps to be carried out to implement Drag and Drop operation:

Step 1: **Making an Object Draggable**

Here are steps to be taken:

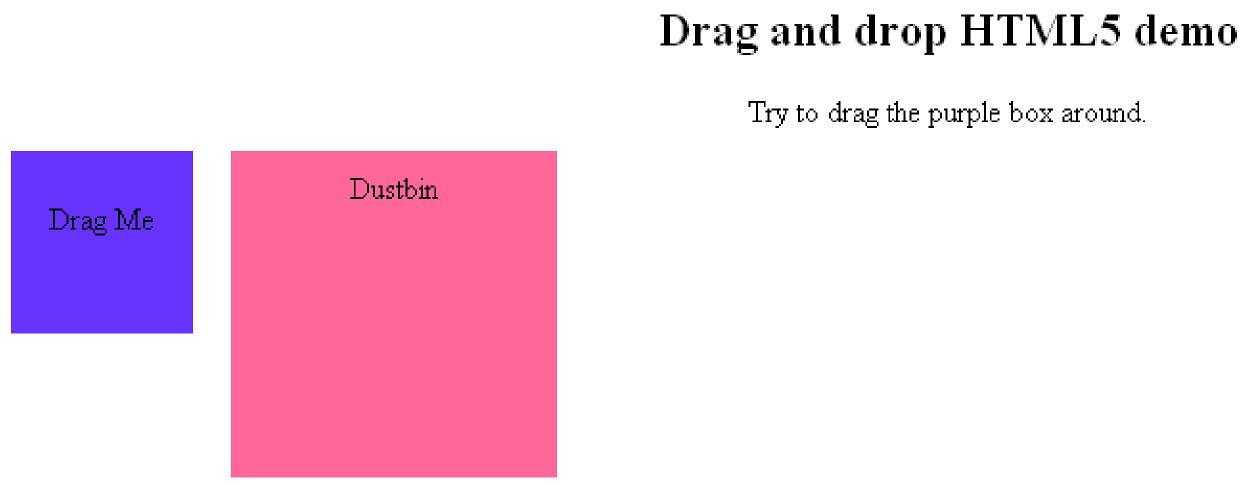
- If you want to drag an element, you need to set the draggable attribute to true for that element.

- Set an event listener for dragstart that stores the data being dragged.
- The event listener dragstart will set the allowed effects (copy, move, link, or some combination).

Following is the example to make an object draggable:

```
<!DOCTYPE HTML>
<html>
<head>
<style type="text/css">
#boxA, #boxB {
float:left;padding:10px;margin:10px; -moz-user-select:none;
}
#boxA { background-color: #6633FF; width:75px; height:75px; }
#boxB { background-color: #FF6699; width:150px; height:150px; }
</style>
<script type="text/javascript">
function dragStart(ev) {
ev.dataTransfer.effectAllowed='move';
ev.dataTransfer.setData("Text", ev.target.getAttribute('id'));
ev.dataTransfer.setDragImage(ev.target,0,0);
return true;
}
</script>
</head>
<body>
<center>
<h2>Drag and drop HTML5 demo</h2>
<div>Try to drag the purple box around.</div>
<div id="boxA" draggable="true"
ondragstart="return dragStart(event)">
<p>Drag Me</p>
</div>
<div id="boxB">Dustbin</div>
</center>
</body>
</html>
```

OUTPUT:



Drag and drop HTML5 demo

Try to drag the purple box around.

Step 2: **Dropping the Object**:

- To accept a drop, the drop target has to listen to at least three events.

  - The dragenter event, which is used to determine whether or not the drop target is to accept the drop. If the drop is to be accepted, then this event has to be canceled.

  - The dragover event, which is used to determine what feedback is to be shown to the user. If the event is canceled, then the feedback (typically the cursor) is updated based on the dropEffect attribute's value.

  - Finally, the drop event, which allows the actual drop to be performed.

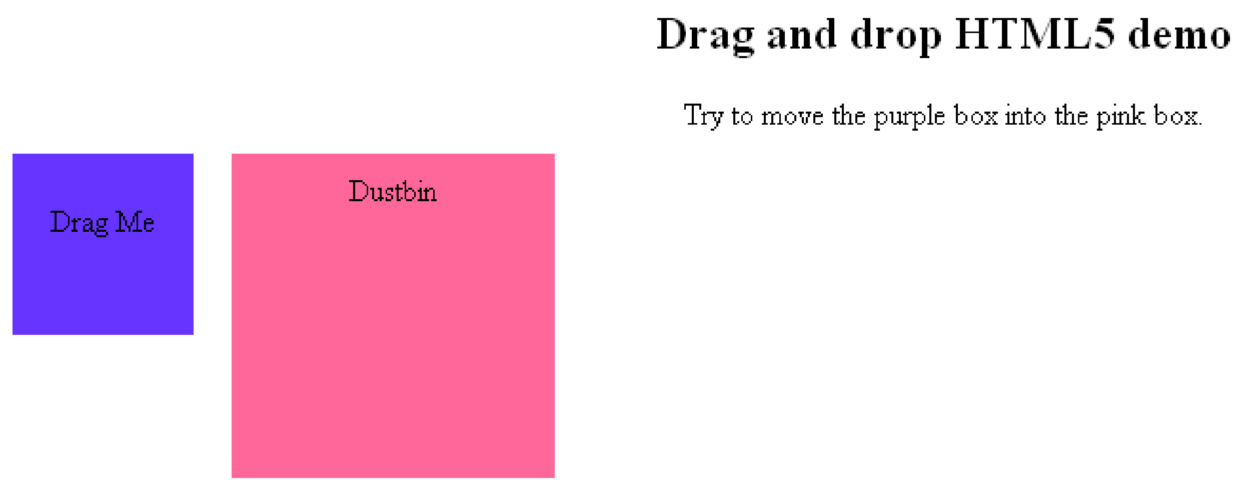
- Following is the example to drop an object into another object:

```
<!DOCTYPE HTML>
<html>
<head>
<style type="text/css">
#boxA, #boxB {
float:left;padding:10px;margin:10px;-moz-user-select:none;
}
#boxA { background-color: #6633FF; width:75px; height:75px; }
#boxB { background-color: #FF6699; width:150px; height:150px; }
</style>
<script type="text/javascript">
function dragStart(ev) {
ev.dataTransfer.effectAllowed='move';
ev.dataTransfer.setData("Text", ev.target.getAttribute('id'));
ev.dataTransfer.setDragImage(ev.target,0,0);
return true;
}
function dragEnter(ev) {
```

```
event.preventDefault();
return true;
}
function dragOver(ev) {
return false;
}
function dragDrop(ev) {
var src = ev.dataTransfer.getData("Text");
ev.target.appendChild(document.getElementById(src));
ev.stopPropagation();
return false;
}
</script>
</head>
<body>
<center>
<h2>Drag and drop HTML5 demo</h2>
<div>Try to move the purple box into the pink box.</div>
<div id="boxA" draggable="true"
ondragstart="return dragStart(event)">
<p>Drag Me</p>
</div>
```

```
<div id="boxB" ondragenter="return dragEnter(event)"
ondrop="return dragDrop(event)"
ondragover="return dragOver(event)">Dustbin</div>
</center>
</body>
</html>
```

OUTPUT:



Drag and drop HTML5 demo

Try to move the purple box into the pink box.

HTML5 - Web Workers
Chapter 17

- JavaScript was designed to run in a single-threaded environment, meaning multiple scripts cannot run at the same time. Consider a situation where you need to handle UI events, query and process large amounts of API data, and manipulate the DOM.

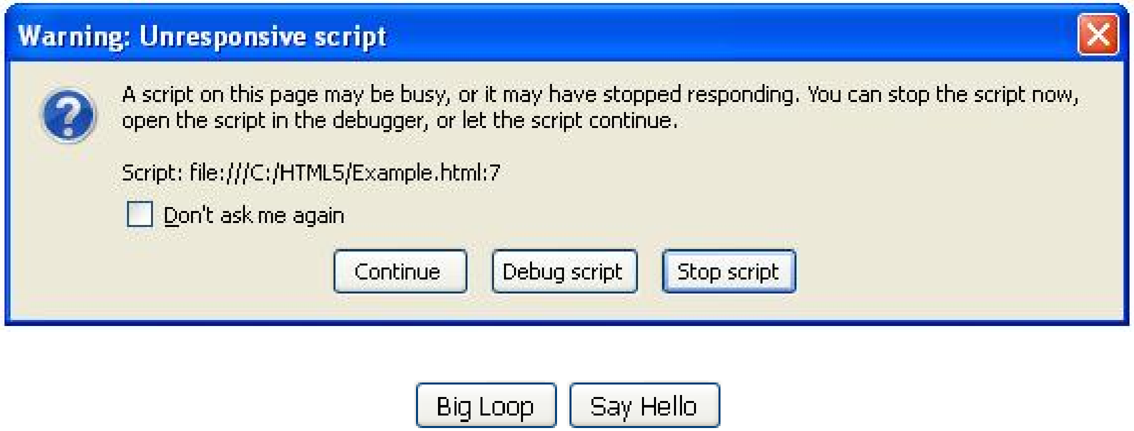
- **JavaScript** will hang your browser in situation where CPU utilization is high. Let us take a simple example where JavaScript goes through a big loop:

```
<!DOCTYPE HTML>
<html>
<head>
<title>Big for loop</title>
<script>
function bigLoop(){
for (var i = 0; i <= 10000000000; i += 1){
var j = i;
}
alert("Completed " + j + "iterations" );
}
function sayHello(){
alert("Hello sir...." );
}
</script>
</head>
<body>
```

```
<input type="button" onclick="bigLoop();" value="Big Loop" />
<input type="button" onclick="sayHello();" value="Say Hello" />
</body>
</html>
```

OUTPUT:

- When you click Big Loop button it displays following result in Firefox:



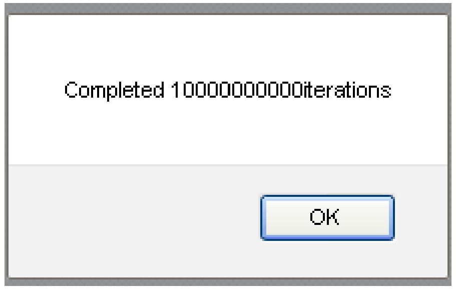
Warning: Unresponsive script

A script on this page may be busy, or it may have stopped responding. You can stop the script now, open the script in the debugger, or let the script continue.

Script: file:///C:/HTML5/Example.html:7

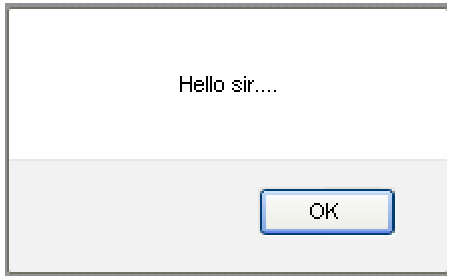
□ Don't ask me again

- The below message is displayed when you click on Big Loop button.



Completed 10000000000iterations

- Click on **OK** button.
- Click on Say Hello button. The following message will be displayed.



Hello sir....

- Click on **OK** button.

What is Web Workers?

- The situation explained above can be handled using **Web Workers** who will do all the computationally expensive tasks without interrupting the user interface and typically run on separate threads.

- Web Workers allow for long-running scripts that are not interrupted by scripts that respond to clicks or other user interactions, and allows long tasks to be executed without yielding to keep the page responsive.

- Web Workers are background scripts and they are relatively heavy-weight, and are not intended to be used in large numbers. For example, it would be inappropriate to launch one worker for each pixel of a four megapixel image.

- When a script is executing inside a Web Worker it cannot access the web page's window object (window.document), which means that Web Workers don't have direct access to the web page and the DOM API. Although Web Workers cannot block the browser UI, they can still consume CPU cycles and make the system less responsive.

How Web Workers Work?

- Web Workers are initialized with the URL of a JavaScript file, which contains the code the worker will execute. This code sets event listeners and communicates with the script that spawned it from the main page. Following is the simple syntax:

```
var worker = new Worker('bigLoop.js');
```

- If the specified javascript file exists, the browser will spawn a new worker thread, which is downloaded asynchronously. If the path to your worker returns an **404 error**, the worker will fail silently.

- If your application has multiple supporting JavaScript files, you can import them **importScripts()** method which takes file name(s) as argument separated by comma as follows:

```
importScripts("helper.js", "anotherHelper.js");
```

- Once the Web Worker is spawned, communication between web worker and its parent page is done using the **postMessage()** method. Depending on your browser/version, postMessage() can accept either a string or JSON object as its single argument.

- Message passed by Web Worker is accessed using onmessage event in the main page. Now let us write our bigLoop example using Web Worker. Below is the main page (hello.htm) which will spawn a web worker to execute the loop and to return the final value of variable**j**:

```
<!DOCTYPE HTML>
<html>
<head>
<title>Big for loop</title>
<script>
var worker = new Worker('bigLoop.js');
worker.onmessage = function (event) {
alert("Completed " + event.data + "iterations" );
};
function sayHello(){
alert("Hello sir...." );
}
</script>
</head>
<body>
<input type="button" onclick="sayHello();" value="Say Hello"/>
</body>
</html>
```

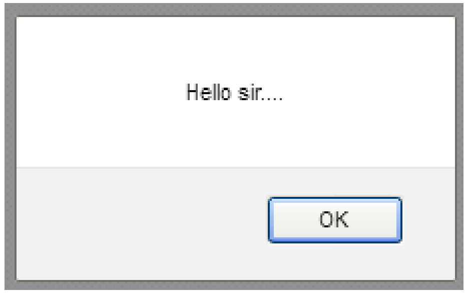
- Following is the content of bigLoop.js file. This makes use of postMessage() API to pass the communication back to main page:

```
        for (var i = 0; i <= 1000000000; i += 1)
        {
                var j = i;
}
postMessage(j);
```

This will produce the following result:

OUTPUT:

- Click on Say Hello button.



Hello sir....

- Click on OK button.

Stopping Web Workers:

- Web Workers don't stop by themselves but the page that started them can stop them by calling **terminate()** method.

```
worker.terminate();
```

- A terminated Web Worker will no longer respond to messages or perform any additional computations. You cannot restart a worker; instead, you can create a new worker using the same URL.

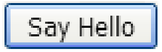
Handling Errors:

- The following shows an example of an error handling function in a Web Worker JavaScript file that logs errors to the console. With error handling code, above example would become as following:

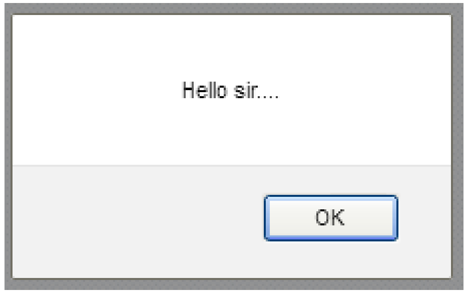
```
<!DOCTYPE HTML>
<html>
<head>
<title>Big for loop</title>
<script>
var worker = new Worker('bigLoop.js');
worker.onmessage = function (event) {
alert("Completed " + event.data + "iterations" );
};
worker.onerror = function (event) {
console.log(event.message, event);
};
function sayHello(){
alert("Hello sir...." );
}
</script>
</head>
<body>
<input type="button" onclick="sayHello();" value="Say Hello"/>
```

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

OUTPUT:



- Click on Say Hello button.

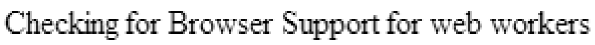

Hello sir....

- Click on OK button.

Checking for Browser Support:

- Following is the syntax to detect a Web Worker feature support available in a browser:

OUTPUT:


Checking for Browser Support for web workers

HTML5 – IndexedDB
Chapter 18

- The indexeddb is a new HTML5 concept to store the data inside user's browser. indexeddb is more power than local storage and useful for applications that requires to store large amount of the data. These applications can run more efficiency and load faster.

Why to use indexeddb?

- The W3C has announced that the Web SQL database is a deprecated local storage specification so web developer should not use this technology any more. indexeddb is an alternative for web SQL data base and more effective than older technologies.

Features:

- it stores key-pair values
- it is not a relational database
- IndexedDB API is mostly asynchronous
- it is not a structured query language
- it has supported to access the data from same domain

IndexedDB:

- Before enter into an indexeddb, we need to add some prefixes of implementation as shown below:

```
window.indexedDB = window.indexedDB || window.mozIndexedDB ||
window.webkitIndexedDB || window.msIndexedDB;
window.IDBTransaction = window.IDBTransaction || window.webkitIDBTransaction ||
window.msIDBTransaction;
window.IDBKeyRange = window.IDBKeyRange || window.webkitIDBKeyRange ||
window.msIDBKeyRange

if (!window.indexedDB) {
window.alert("Your browser doesn't support a stable version of IndexedDB.")
}
```

Open an IndexedDB database:

- Before creating a database, we have to prepare some data for the data base.let's start with company employee details.

```
const employeeData = [
{ id: "01", name: "Gopal K Varma", age: 35, email:
"contact@tutorialspoint.com" },

{ id: "02", name: "Prasad", age: 24, email: "prasad@tutorialspoint.com" }
];
```

Adding the data:

- Here adding some data manually into the data as shown below: .

```
function          add() {
var request = db.transaction(["employee"], "readwrite")
.objectStore("employee")
.add({ id: "01", name: "prasad", age: 24, email: "prasad@tutorialspoint.com"
});
request.onsuccess = function(event) {
alert("Prasad has been added to your database.");
};
request.onerror = function(event) {
alert("Unable to add data\r\nPrasad is already exist in your database! ");
}
}
```

Retrieving Data:

- We can retrieve the data from the data base using with get():

```
function          read() {
var transaction = db.transaction(["employee"]);
var objectStore = transaction.objectStore("employee");
var request = objectStore.get("00-03");
request.onerror = function(event) {
alert("Unable to retrieve daa from database!");
};
request.onsuccess = function(event) {
if(request.result) {
alert("Name: " + request.result.name + ", Age: " + request.result.age
+ ", Email: " + request.result.email);
}
else {
alert("Kenny couldn't be found in your database!");
}
};
}
```

- Using with get(), we can store the data in object instead of that we can store the data in cursor and we can retrieve the data from cursor.

```
function readAll() {
var objectStore = db.transaction("employee").objectStore("employee");
objectStore.openCursor().onsuccess = function(event) {
var cursor = event.target.result;
if (cursor) {
alert("Name for id " + cursor.key + " is " + cursor.value.name + ",
Age: " + cursor.value.age + ", Email: " + cursor.value.email);
cursor.continue();
}
else {
alert("No more entries!");
}
};
}
```

Removing the data:

- We can remove the data from IndexedDB with remove().Here is how the code looks like:

```
function remove() {
var request = db.transaction(["employee"], "readwrite")
.objectStore("employee")
.delete("02");
request.onsuccess = function(event) {
alert("prasad entry has been removed from your database.");
};
}
```

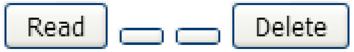
HTML Code:

- To show all the data we need to use onClick event as shown below code:

```
<!DOCTYPE html>
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<title>IndexedDb Demo | onlyWebPro.com</title>
</head>
<body>
<button onclick="read()">Read </button>
<button onclick="readAll()"></button>
```

```
<button onclick="add()"></button>
<button onclick="remove()">Delete </button>
</body>
</html>
```

OUTPUT:



- The final code should be as:

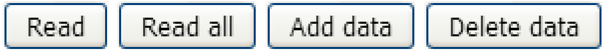
```
<!DOCTYPE html>
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<script type="text/javascript">
//prefixes of implementation that we want to test
window.indexedDB = window.indexedDB || window.mozIndexedDB ||
window.webkitIndexedDB || window.msIndexedDB;
//prefixes of window.IDB objects
window.IDBTransaction = window.IDBTransaction ||
window.webkitIDBTransaction || window.msIDBTransaction;
window.IDBKeyRange = window.IDBKeyRange || window.webkitIDBKeyRange ||
window.msIDBKeyRange
if (!window.indexedDB) {
window.alert("Your browser doesn't support a stable version of
IndexedDB.")
}
const employeeData = [
{ id: "00-01", name: "gopal", age: 35, email:
"gopal@tutorialspoint.com" },
{ id: "00-02", name: "prasad", age: 32, email:
"prasad@tutorialspoint.com" }
];
var db;
var request = window.indexedDB.open("newDatabase", 1);
request.onerror = function(event) {
console.log("error: ");
};
request.onsuccess = function(event) {
db = request.result;
console.log("success: "+ db);
};
request.onupgradeneeded = function(event) {
```

```
var db = event.target.result;
var objectStore = db.createObjectStore("employee", {keyPath:
"id"});
for (var i in employeeData) {
objectStore.add(employeeData[i]);
}
}
function read() {
var transaction = db.transaction(["employee"]);
var objectStore = transaction.objectStore("employee");
var request = objectStore.get("00-03");
request.onerror = function(event) {
alert("Unable to retrieve daa from database!");
};
request.onsuccess = function(event) {
// Do something with the request.result!
if(request.result) {
alert("Name: " + request.result.name + ", Age: " +
request.result.age + ", Email: " + request.result.email);
}
else {
alert("Kenny couldn't be found in your database!");
}
};
}
function readAll() {
var objectStore =
db.transaction("employee").objectStore("employee");
objectStore.openCursor().onsuccess = function(event) {
var cursor = event.target.result;
if (cursor) {
alert("Name for id " + cursor.key + " is " +
cursor.value.name + ", Age: " + cursor.value.age + ", Email: " +
cursor.value.email);
cursor.continue();
}
else {
alert("No more entries!");
}
};
}
function add() {
var request = db.transaction(["employee"], "readwrite")
.objectStore("employee")
```

```
.add({ id: "00-03", name: "Kenny", age: 19, email:
"kenny@planet.org" });
request.onsuccess = function(event) {
alert("Kenny has been added to your database.");
};
request.onerror = function(event) {
alert("Unable to add data\r\nKenny is aready exist in your
database! ");
}
}
function remove() {
var request = db.transaction(["employee"], "readwrite")
.objectStore("employee")
.delete("00-03");
request.onsuccess = function(event) {
alert("Kenny's entry has been removed from your database.");
};
}
</script>
</head>
<body>
<button onclick="read()">Read </button>
```

```
<button onclick="readAll()">Read all </button>
<button onclick="add()">Add data </button>
<button onclick="remove()">Delete data </button>
</body>
</html>
```

OUTPUT:



HTML5 - Web Messaging
Chapter 19

- Web Messaging is the way for documents to separates browsing context to share the data without Dom. It overrides the cross domain communication problem in different domains, protocols or ports.

- For example, you want to send the data from your page to ad container which is placed at iframe or voice-versa, in this scenario, Browser throws a security exception. With web messaging we can pass the data across as a message event.

Message Event:

- Message events fires Cross-document messaging, channel messaging, server-sent events and web sockets.it has described by Message Event interface.

Attributes:

Attributes: **data**
Description: Contains string data

Attributes: **origin**
Description: Contains Domain name and port

Attributes: **lastEventId**
Description: Contains unique identifier for the current message event.

Attributes: **source**
Description: Contains to A reference to the originating document¡¦s window

Attributes: **ports**
Description: Contains the data which is sent by any message port

Sending a cross-document message:

- Before send cross document message, we need to create a new web browsing context either by creating new iframe or new window. We can send the data using with postMessage() and it has two arguments. They are as

    - **message** - The message to send
    - **targetOrigin** - Origin name

Examples:

Sending message from iframe to button:

```
var iframe = document.querySelector('iframe');
var button = document.querySelector('button');

var clickHandler = function(){

iframe.contentWindow.postMessage('The message to
send.','https://www.tutorialspoint.com);
}
button.addEventListener('click',clickHandler,false);
```

Receiving a cross-document message in the receiving document:

```
var messageEventHandler = function(event){
// check that the origin is one we want.
if(event.origin == 'https://www.tutorialspoint.com'){
alert(event.data);
}
}
window.addEventListener('message', messageEventHandler,false);
```

Channel messaging:

- Two-way communication between the browsing contexts is called channel messaging. It is useful for communication across multiple origins.

The MessageChannel and MessagePort Objects:

- While creating messageChannel, it internally creates two ports to sending the data and forwarded to another browsing context.

  - **postMessage() -** Post the message throw channel
  - **start() -** It sends the data
  - **close() -** it close the ports

- In this scenario, we are sending the data from one iframe to another iframe. Here we are invoking the data in function and passing the data to DOM.

```
var loadHandler = function(){
var mc, portMessageHandler;
mc = new MessageChannel();

window.parent.postMessage('documentAHasLoaded','http://foo.example',[mc.port2]);

portMessageHandler = function(portMsgEvent){
alert( portMsgEvent.data );
}
mc.port1.addEventListener('message', portMessageHandler, false);

mc.port1.start();
}
window.addEventListener('DOMContentLoaded', loadHandler, false);
```

- Above code, it is taking the **data** from **port 2**, now it will pass the data to second iframe.

```
var loadHandler = function(){
var iframes, messageHandler;
iframes = window.frames;
messageHandler = function(messageEvent){
if( messageEvent.ports.length > 0 ){
// transfer the port to iframe[1]

iframes[1].postMessage('portopen','http://foo.example',messageEvent.ports);
}
}
window.addEventListener('message',messageHandler,false);
}
window.addEventListener('DOMContentLoaded',loadHandler,false);
```

- Now second document handles the data by using the portMsgHandler function.

```
var loadHandler(){
// Define our message handler function
var messageHandler = function(messageEvent){

// Our form submission handler
var formHandler = function(){
var msg = 'add <foo@example.com> to game circle.';
messageEvent.ports[0].postMessage(msg);
}
document.forms[0].addEventListener('submit',formHandler,false);
}
window.addEventListener('message',messageHandler,false);
}
window.addEventListener('DOMContentLoaded',loadHandler,false);
```

HTML5 - CORS
Chapter 20

- **Cross-origin resource sharing** (**CORS**) is a mechanism to allows the restricted resources from another domain in web browser.

- For suppose, if you click on HTML5- video player in html5 demo sections. it will ask camera permission. If user allow the permission then only it will open the camera or else it doesn't open the camera for web applications.

Making a CORS request:

- Here **Chrome**, **Firefox**, **Opera** and **Safari** all use the XMLHttprequest2 object and Internet Explorer uses the similar XDomainRequest object, object.

```
function createCORSRequest(method, url) {
var xhr = new XMLHttpRequest();

if ("withCredentials" in xhr) {
// Check if the XMLHttpRequest object has a "withCredentials" property.
// "withCredentials" only exists on XMLHTTPRequest2 objects.
xhr.open(method, url, true);
}
else if (typeof XDomainRequest != "undefined") {
// Otherwise, check if XDomainRequest.
// XDomainRequest only exists in IE, and is IE's way of making CORS
requests.
xhr = new XDomainRequest();
xhr.open(method, url);
}

else {
// Otherwise, CORS is not supported by the browser.
xhr = null;
}
return xhr;
}
```

```
var xhr = createCORSRequest('GET', url);
if (!xhr) {
throw new Error('CORS not supported');
}
```

Event handles in CORS:

Event Handler: **onloadstart**
Description: Starts the request

Event Handler: **onprogress**
Description: Loads the data and send the data

Event Handler: **onabort**
Description: Abort the request

Event Handler: **onerror**
Description: request has failed

Event Handler: **onload**
Description: request load successfully

Event Handler: **ontimeout**
Description: time out has happened before request could complete

Event Handler: **onloadend**
Description: When the request is complete either successful or failure

- **Example of onload or onerror even**t:

```
xhr.onload = function() {
var responseText = xhr.responseText;

// process the response.
console.log(responseText);
};

xhr.onerror = function() {
console.log('There was an error!');
};
```

- **Example of CORS with handler**:

- Below example will show the example of makeCorsRequest() and onload handler.

```
// Create the XHR object.
function createCORSRequest(method, url) {
var xhr = new XMLHttpRequest();

if ("withCredentials" in xhr) {

// XHR for Chrome/Firefox/Opera/Safari.
xhr.open(method, url, true);


}

else if (typeof XDomainRequest != "undefined") {
// XDomainRequest for IE.
xhr = new XDomainRequest();
xhr.open(method, url);
}

else {
// CORS not supported.
xhr = null;
```

```
}
return xhr;

}

// Helper method to parse the title tag from the response.
function getTitle(text) {
return text.match('<title>(.*)?</title>')[1];
}

// Make the actual CORS request.
function makeCorsRequest() {

// All HTML5 Rocks properties support CORS.
var url = 'http://www.tutorialspoint.com';

var xhr = createCORSRequest('GET', url);

if (!xhr) {
alert('CORS not supported');
return;
```

```
}
// Response handlers.
xhr.onload = function() {
var text = xhr.responseText;
var title = getTitle(text);
alert('Response from CORS request to ' + url + ': ' + title);

};
xhr.onerror = function() {
alert('Woops, there was an error making the request.');
};
xhr.send();
}
```

HTML5 - Web RTC
Chapter 21

- Web RTC introduced by World Wide Web Consortium (W3C). That supports browser-tobrowser applications for voice calling, video chat, and P2P file sharing.

- If you want to try out? web RTC available for Chrome, Opera, and Firefox. A good place to start is the simple video chat application at here. Web RTC implements three API's as shown below:

- MediaStream . get access to the user's camera and microphone.
- RTCPeerConnection . get access to audio or video calling facility.
- RTCDataChannel . get access to peer-to-peer communication.

MediaStream:

- The MediaStream represents synchronized streams of media, For an example, Click on HTML5 Video player in HTML5 demo section or else click here.

- The above example contains stream.getAudioTracks() and stream.VideoTracks(). If there is no audio tracks, it returns an empty array and it will check video stream,if webcam connected, stream.getVideoTracks() returns an array of one MediaStreamTrack
representing the stream from the webcam. A simple example is chat applications, a chat application gets stream from web camera, rear camera, microphone.

Sample code of MediaStream:

```
function gotStream(stream) {
window.AudioContext = window.AudioContext || window.webkitAudioContext;
var audioContext = new AudioContext();
// Create an AudioNode from the stream
var mediaStreamSource = audioContext.createMediaStreamSource(stream);

// Connect it to destination to hear yourself
// or any other node for processing!
mediaStreamSource.connect(audioContext.destination);
}
navigator.getUserMedia({audio:true}, gotStream);
```

Screen capture:

- It's also possible in Chrome browser with mediaStreamSource and it requires HTTPS. This feature is not yet available in opera. Sample demo is available at here.

Session Control, Network & Media Information:

- Web RTC required peer-to-peer communication between browsers. This mechanism required signaling, network information, session control and media information. Web developers can choose different mechanism to communicate between the browsers such as SIP or XMPP or any two way communications. A sample example of XHR is here.

Sample code of createSignalingChannel():

```
var signalingChannel = createSignalingChannel();
var pc;
var configuration = ...;

// run start(true) to initiate a call
function start(isCaller) {
pc = new RTCPeerConnection(configuration);

// send any ice candidates to the other peer
pc.onicecandidate = function (evt) {
signalingChannel.send(JSON.stringify({ "candidate": evt.candidate }));
};

// once remote stream arrives, show it in the remote video element
pc.onaddstream = function (evt) {
remoteView.src = URL.createObjectURL(evt.stream);
};

// get the local stream, show it in the local video element and send it
navigator.getUserMedia({ "audio": true, "video": true }, function (stream) {
selfView.src = URL.createObjectURL(stream);
pc.addStream(stream);

if (isCaller)
pc.createOffer(gotDescription);

else
pc.createAnswer(pc.remoteDescription, gotDescription);

function gotDescription(desc) {
pc.setLocalDescription(desc);
signalingChannel.send(JSON.stringify({ "sdp": desc }));

}
});
}

signalingChannel.onmessage = function (evt) {
if (!pc)
start(false);
var signal = JSON.parse(evt.data);

if (signal.sdp)
pc.setRemoteDescription(new RTCSessionDescription(signal.sdp));
```

Extra Matter

Neha Computers, Nalgonda Location:

Latitude : **17.0613986**

Longitude: **79.26574**

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http://html5doctor.com/the-main-element/

Site to make website:

http://www.silex.me/

This site is useful to check any tags:

https://www.w3schools.com/tags/att_meta_charset.asp

---

https://www.w3schools.com/tags/tryit.asp?

---

https://books.google.co.in/books?id=wghaAgAAQBAJ&pg=PT159&lpg=PT159&dq=what+is+the+significance+of+%3Cheader+role%3D%22banner%22%3E?&source=bl&ots=x6-FUalfcz&sig=DK02WRMQ5vi_O8wFQL-lXDBckME&hl=en&sa=X&ved=0ahUKEwjZtvy51KbTAhXGRo8KHVY4BsUQ6AEINjAD#v=onepage&q&f=false

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Extra Information:

Location-Aware Browsing:

Firefox can tell websites where you’re located so you can find info that’s more relevant and more useful. It’s about making the Web smarter – and is done in a way that totally respects your privacy. Give it a try!

Frequently asked Questions:

Q: What is Location-Aware Browsing?
Answer:

Websites that use location-aware browsing will ask where you are in order to bring you more relevant information, or to save you time while searching. Let’s say you’re looking for a pizza restaurant in your area. A website will be able to ask you to share your location so that simply searching for “pizza” will bring you the answers you need... no further information or extra typing required.

Or, if you’re mapping out directions to get somewhere, the website will know where you’re starting from so all you have to do is tell it where you want to go.

This service is totally optional – Firefox doesn’t share your location without your permission – and is done with the utmost respect for your privacy. And, like all elements of Firefox, it’s being created using open standards to ease adoption by Web developers.

Q: How does it work?
Answer:

When you visit a location-aware website, Firefox will ask you if you want to share your location.

If you consent, Firefox gathers information about nearby wireless access points and your computer’s IP address. Then Firefox sends this information to the default geolocation service provider, Google Location Services, to get an estimate of your location. That location estimate is then shared with the requesting website.

If you say that you do not consent, Firefox will not do anything.

Q: How accurate are the locations?
Answer:
Accuracy varies greatly from location to location. In some places, our service providers may be able to provide a location to within a few meters. However, in other areas it might be much more than that. All locations returned by our service providers are estimates only and we do not guarantee the accuracy of the locations provided. Please do not use this information for emergencies. Always use com-

mon sense.

Q: What information is being sent, and to whom? How is my privacy protected?
Answer:

Your privacy is extremely important to us, and Firefox never shares your location without your permission. When you visit a page that requests your information, you'll be asked before any information is shared with the requesting website and our third-party service provider.

By default, Firefox uses Google Location Services to determine your location by sending:

your computer's IP address,
information about the nearby wireless access points, and
a random client identifier, which is assigned by Google, that expires every 2 weeks.

For a complete description of information collected and used by Firefox, please see the Firefox Privacy Notice.

Google Location Services then returns your estimated geolocation (e.g., latitude and longitude). For a complete description of information collected and used by Google, please see the Google Geolocation Privacy Policy.

The information is exchanged over an encrypted connection to protect your privacy. Once Firefox has your location information, it passes it to the website that requested it. At no time is the name or location of the website you are visiting, or are any cookies, ever shared with Google Location Services.

Neither Mozilla or Google will ever use the information collected by Google Location Services to identify or spy on you.

For information about what the requesting website does with your location information, please refer to that website's privacy policy.

For more information about your privacy, you should also read:

Mozilla Firefox Privacy Notice
Google privacy policy

Q: Am I being tracked as I browse the web?

Answer:

No. Firefox only requests a location when a website makes a request, and only shares your location when the user has approved the request. Firefox does not track or remember your location as you browse.

Q: How do I undo a permission granted to a site?

Answer: