

# Web Basics-JavaScript

## Lesson 5: Document Object Model

December 20, 2015

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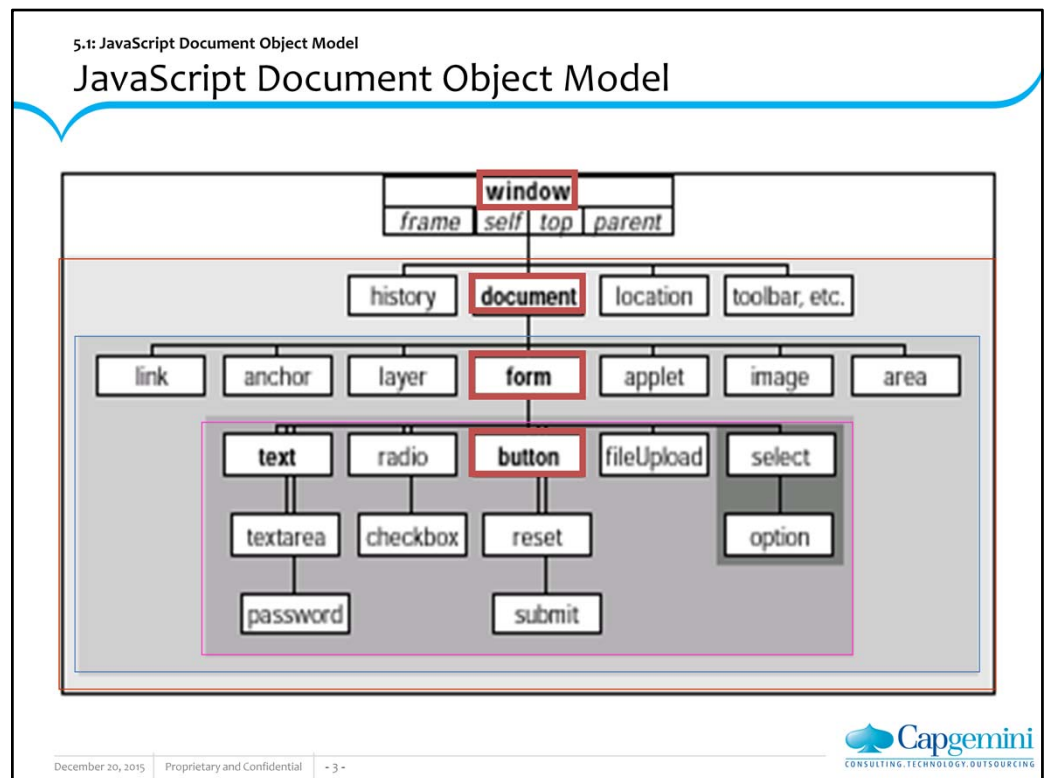
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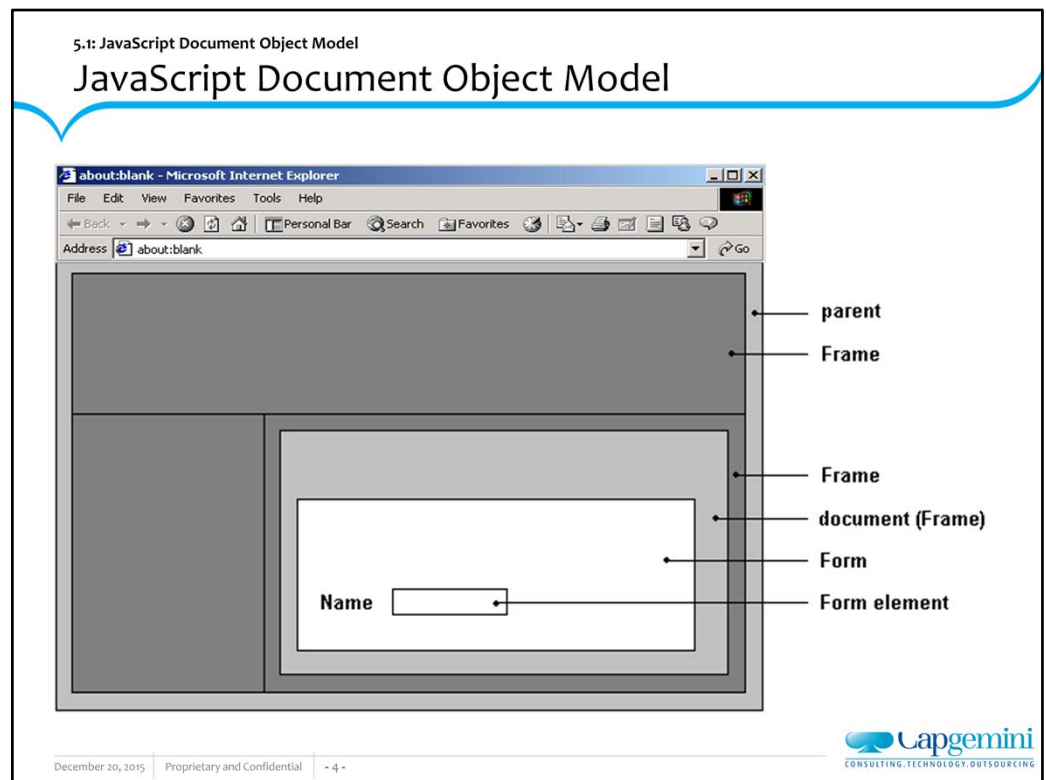
## Lesson Objectives

- **After completing this module you will be able to:**
- Understand the JavaScript Object Model
  - Understand the Window object, Frame and Navigator Object
  - Working with Location and History Object





The figure shows the complete JavaScript document object hierarchy as implemented in Netscape Navigator 4. Notice that the window object is the topmost object in the entire scheme. Everything you script in JavaScript is in the browser's window, be it the window itself or a form element. Of all the objects shown in the figure, you are likely to work most with the ones that appear in **boldface**. Objects whose names appear in *italics* are synonyms for the window object, and are used only in some circumstances. Pay attention to the shading of the concentric rectangles. Every object in the same shaded area is at the same level relative to the window object. When a link from an object extends to the next darker shaded rectangle, that object contains all the objects in darker areas. There exists at most one of these links between levels. A window object contains a document object; a document object contains a form object; a form object contains many different kinds of form elements. Study this figure to establish a mental model for the scriptable elements of a Web page. After you script these objects a few times, the object hierarchy will become second nature to you — even if you do not remember every detail (property, method, and event handler) of every object. At least you know where to look for information.



### Creating JavaScript Objects

Most of the objects that a browser creates for you are established when an HTML document loads into the browser. The same kind of HTML code you used to create links, anchors, and input elements tell a JavaScript-enhanced browser to create those objects in memory. The objects are there whether or not your scripts call them into action.

The only visible differences to the HTML code for defining those objects are one or more optional attributes specifically dedicated to JavaScript. By and large, these attributes specify the event you want the user interface element to react to and what JavaScript should do when the user takes that action. If you rely on the document's HTML code to perform the object generation, you spend more time figuring out how to do things with those objects or have them do things for you. Bear in mind that objects are created in their load order, which is why you should put most, if not all, deferred function definitions in the document's Head. If you create a multi-frame environment, a script in one frame cannot communicate with another frame's objects until both frames load.

5.1: JavaScript Document Object Model

## Object Properties

- Define a particular, current setting of an object
- Property names are case-sensitive
- Each property determines its own read-write status
- Any property you set survives as long as the document remains loaded in the window
- For example:

```
document.forms[0].phone.value = "555-1212"  
document.forms[0].phone.delimiter = "-"
```



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### Object Properties

A property generally defines a particular, current setting of an object. The setting may reflect a visible attribute, such as a document's background color. It may also contain information that is not so obvious, such as the form *action* and *method* when it is submitted.

Document objects have most of their properties assigned by attribute settings of HTML tags that generate the objects. Thus, a property may be a string (for example, a name) or a number (for example, a size). A property can also be an array, such as an array of images contained by a document. If the HTML does not include all attributes, the browser usually provides default value for both attributes and corresponding JavaScript properties.

When used in script statements, property names are case-sensitive. Therefore, if you see a property name listed as *bgColor*, you must use it in a script statement with that exact case usage. But when you set an initial value of a property by way of an HTML attribute, the attribute name (like all of HTML) is not case-sensitive. Thus, **<BODY BGCOLOR="white">** and **<body bgcolor="white">** both set the same property value.

5.1: JavaScript Document Object Model

## Object Methods

- **Command the script gives to that object.**
- **Some methods return values, but that is not a prerequisite.**
- **Predefined by the object model**
  - Assign additional methods to an existing object.

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### Object Methods

An object's method is a command that a script can give to that object. Some methods return values, but that is not a prerequisite for a method. Also, not every object has methods defined for it. In a majority of cases, invoking a method from a script causes some action to take place. It may be an obvious action, such as resizing a window, or something more subtle, such as processing a mouse click.

## 5.2: Event Handlers

## Event Handlers

➤ **Specify how an object reacts to an event**

- Event can be triggered by a user action or a browser action.
- In the earliest JavaScript-enabled browser, event handlers were defined inside HTML tags as extra attributes.

➤ **Event handlers as methods:**

```
document.formName.button1.onclick=f1()
```

➤ **Event handlers as properties:**

```
<INPUT TYPE="button" NAME="button1" onClick="f1()">
```

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### Object Event Handlers

Event handlers specify how an object reacts to an event, whether the event is triggered by a user action (for example, a button click) or a browser action (for example, the completion of a document load). Event Handlers can be specified as methods or they can be specified using attributes in tags.

## 5.3: Window Object

## Working with Window Object

➤ **Window object:**

- Unique position at the top of the JavaScript object hierarchy
  - Exalted location gives *window* object a number of properties and behaviors unlike other objects
- Can be omitted from object references
  - Since everything takes place in a window

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About this Object

The *window* object has the unique position of being at the top of the JavaScript object hierarchy. This exalted location gives it a number of properties and behaviors unlike any other object. Among the list of properties for the window object is one called *self*. This property is synonymous to the window object itself. When you start your browser, it usually opens a window. That window is a valid window object, even if it is blank. This object is also the level at which a script asks the browser to display any of the three styles of the dialog boxes (a plain alert dialog box, an OK-Cancel confirmation dialog box, or a prompt for user text entry).



5.3: Window Object

## Window Object Properties

### ➤ defaultStatus and status

```
window.defaultStatus="Javascript Examples"
```

### ➤ parent

### ➤ frames

```
parent.frames.length    parent.frames[0]
```

### ➤ closed

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Property	Description
defaultStatus	Window.defaultStatus property is normally an empty string, it sets or returns the default text which is in the statusbar of the window
Status	This property sets a text value to be displayed in the status bar
parent	Returns the parent of the current window
frames	All the frames in the current window is returned as an array
closed	Returns a boolean value which indicated if the window has been closed or no

## 5.3: Window Object

## Window Object Methods

➤ **alert(message)**

```
window.alert("Display Message")
```

➤ **confirm(message)**

```
window.confirm("Exit Application ?")
```

➤ **prompt(message,[defaultReply])**

```
var input= window.prompt("Enter value of X")
```



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Method	Description
<b>alert(message)</b>	An alert dialog box is a modal window that presents a message to the user with a single OK button to dismiss the dialog box.
<b>confirm(message)</b>	A confirm dialog box presents a message in a modal dialog box along with OK and Cancel buttons. Such a dialog box can be used to ask a question of the user, usually prior to a script performing actions that will not be undoable.
<b>prompt(message, defaultReply)</b>	The third kind of dialog box that JavaScript can display includes a message from the script author, a field for user entry, and two buttons (OK and Cancel).

5.3: Window Object

## Window Object Methods

- `open("URL", "windowName" [, "windowFeatures"])`

```
newwin=window.open("new/URL","NewWindow", "toolbar,status,resizable")
```

- `close()`
- `moveBy(deltaX,deltaY), moveTo(x,y)`
- `scrollBy(deltaX,deltaY), scrollTo(x,y)`

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<code>open("URL", "windowName" [, "windowFeatures"])</code>	The <code>window.open()</code> method, provides a Web site designer with options for the way a new browser window should look on the user's computerscreen. The optional <code>windowFeatures</code> parameter is <i>one string</i> , that comprises a comma-separated list of assignment expressions. Boolean values for true can be either yes, 1, or just the feature name by itself; for false, use a value of no or 0. If you omit any Boolean attributes, they are rendered as false. Therefore, if you want to create a new window that shows only the toolbar and statusbar and is resizable, the method looks like this: <code>window.open("newURL","NewWindow", "toolbar,status,resizable")</code> .
<code>close()</code>	The <code>window.close()</code> method closes the browser window referenced by the window object.
<code>scrollBy(deltaX,deltaY) scrollTo(x,y)</code>	<code>scrollBy(..)</code> method scrolls the content by the specified number of pixels which is relative scroll. <code>scrollTo(..)</code> is an absolute scroll to the specified coordinates
<code>moveBy(deltaX,deltaY) moveTo(x,y)</code>	<code>MoveBy(..)</code> moves the window relative to the current position. <code>moveT(..)</code> moves it to the specified coordinates

5.3: Window Object

## Window Object Methods

### ➤ setTimeout, clearTimeout

```
y=setTimeout('scroll()', '100')
```

```
clearTimeout(y)
```

### ➤ setInterval, clearInterval

```
y=setInterval('scroll()', '100')
```

```
clearInterval(y)
```

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setTimeout("functionOrExpr", msecDelay [, funcarg1, ..., funcargn])	Javascript holds a statement or function from executing for the desired amount of time. The timeout value is in milliseconds
setInterval("functionOrExpr", msecDelay, language)	Use this method when your script needs to call a function or execute some expression repeatedly with a fixed time delay between calls to that function or expression. The timeinterval is in milliseconds. Optional Language i.e Javascript, vbscript
clearInterval(intervalIDnumber)	Use this method to turn off an interval loop action started with the <i>window.setInterval()</i> method. The parameter is the ID number returned by the <i>setInterval()</i> method.
clearTimeout(timeoutIDnumber)	Use the <i>clearTimeout()</i> method in concert with the <i>window.setTimeout()</i> method when you want your script to cancel a timer that is waiting to run its expression. The parameter for this method is the ID number that the <i>setTimeout()</i> method returns when the timer starts ticking.

5.3: Window Object

## Window Object Event Handlers

### ➤ Event Handler for the Window Object

- onBlur
- onFocus
- onDragDrop
- onLoad
- onMove
- onResize
- onUnload

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### Event Handlers

Table 6.3 Window Object Event Handlers

Event Handler	Description
onBlur onFocus	Fired when window or frame has been activated and deactivated respectively.
onDragDrop	The window's <i>dragDrop</i> event fires whenever a user drops a file or other URL-filled object onto the window. Available only in Nav4.
onLoad	The load event is sent to the current window at the end of the document loading process.
onMove	If a user drags a window around the screen, the action triggers a move event for the window object. Available only in Nav4.
onResize	If a user resizes a window, the action triggers a resize event for the window object.
onUnload	An unload event reaches the current window just before a document is cleared from view. The most common ways windows are cleared are when new HTML documents are loaded into them or when a script begins writing new HTML on the fly for the window or frame.

## 5.4: Frame Object

## Frame Object

- Properties, methods and event handlers are same as the window object
- Behaves exactly like a window object, except that it is created as part of a frameset by another document
- The Event Handlers for a Frame are similar to window object event handlers

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### About This Object

The properties, methods and event handlers of the frame object are same as window object. A frame object behaves exactly like a window object, except that it has been created as part of a frameset by another document. A frame object always has a top and a parent property different from its self property. If you load a document that is normally viewed in a frame into a single browser window, its window is no longer a frame.

## 5.5: Navigator Object

## Navigator Object

- Netscape originally defined the navigator object for the Navigator 2 browser
- Microsoft Internet Explorer also supports the object in its object model
- The properties of the navigator object deal with the browser program the user runs to view documents

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### Navigator Object

Netscape originally defined the navigator object for the Navigator 2 browser. Microsoft Internet Explorer also supports the object in its object model. Properties of the navigator object deal with the browser program the user runs to view documents. Properties include those for extracting the version of the browser and the platform of the client running the browser.

5.5: Navigator Object

## Navigator Object

Properties	
appName	appCodeName
appVersion	userAgent
mimeTypes[ ]	Platform
plugins[ ]	cookieEnabled

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Property	Description
appName appCodeName appVersion userAgent Platform cookieEnabled	The <i>appName</i> and <i>appCodeName</i> properties are simply the official name and the internal code name for the browser. <i>appVersion</i> returns version information of the browser and <i>userAgent</i> returns the user-agent header sent by the browser to the server. Platform returns for which platform the browser is compiled. <i>cookieEnabled</i> determines if cookies are enabled in the browser
plugins[ ]	Returns an array of plugins available on the client browser.
mimeTypes[ ]	Returns an array of MIME types supported by the browser



## Demo

- Window\_object.html
- setTimeout\_method.html
- Window\_ex.html
- setInterval\_method.html



## Lab

- Lab Exercise 6 :
- Working with Document Object Model (DOM)



5.6: Working with Location Object

## Rationale of Location Object

- **The Location object represents information about the URL of any currently open window or of a specific frame of an html document**
  - A multiple-frame window displays the parent window's URL in the Location field
  - Each frame also has a location associated with it, although no overt reference to the frame's URL can be seen in the browser

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### Working with Location Object:

To get URL information about a document located in another frame, the reference to the location object must include the window frame reference.

Most properties of a location object deal with network-oriented information.

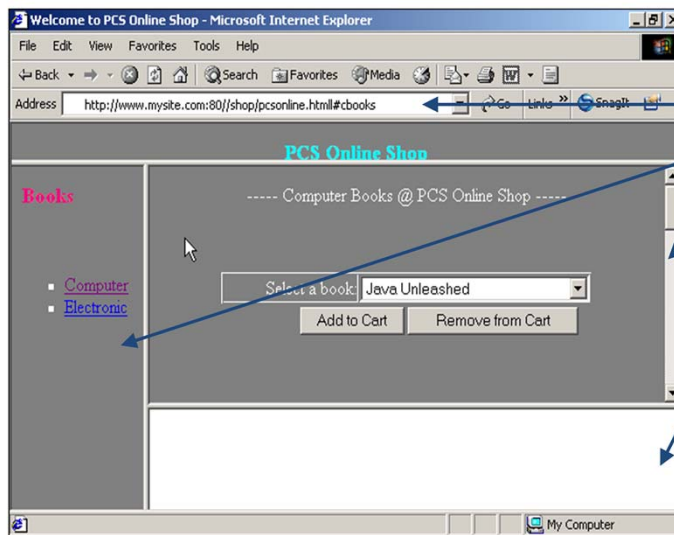
This information includes various data about the physical location of the document on the network, including the host server, the protocol being used, and other components of the URL

The **window.location** object can be handy when a script needs to extract information about the URL, perhaps to obtain a base reference on which to build URLs for other documents to be fetched as the result of user action.

Setting the value of some location properties is the preferred way to control the document that gets loaded into a window or frame.

Location object properties and methods

## Rationale of Location Object



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### Working with Location Object:

- Given a complete URL for a typical WWW page, the **window.location** object assigns property names to various segments of the URL as shown in the above slide.

## Location Object Properties

Let us see some of the Location Object Properties:

Property	Value
protocol	http:
hostname	www.mysite.com
port	80
host	www.mysite.com:80
pathname	/shop/pcsonline.html
hash	#cbook
href	http://www.mysite.com:80/shop/pcsonline.html#cbooks

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### Working with Location Object:

Let us discuss some of the location object properties.

Property	Description
protocol	The first component of any URL is the protocol being used for the particular type of communication. For eg: http,ftp,mailto
hostname	The hostname of a typical URL is the name of the server on the network that stores the document you're viewing in the browser.
port	It retrieves the port number of the URL.
host	The property describes both the hostname and port of a URL.
pathname	The pathname component of a URL consists of the directory structure relative to the server's root volume.
hash	The hash property returns the anchor portion of a URL, including the hash symbol(#).
href	The location.href property supplies a string of the entire URL of the specified window object.
search	It accesses the query string of the URL.

## Location Object Methods

➤ **Let us see some Location Object Methods:**

- assign("URL")
- reload(uncGet)
- replace("URL")



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### Working with Location Object:

#### Location Object Methods:

Let us discuss some Location Object Methods:

Property	Description
assign("URL")	Just as you navigate to another page by assigning a new URL to the location object or location.href property, there also exists a method, location.assign(), that does the same task.
reload(uncGet)	The reload() method performs what is known as a <i>conditional-GET</i> , which means that the file is retrieved from the server or the browser's cache according to the cache preferences in the browser. If your page must perform an <i>unconditional-GET</i> to retrieve continually updated server or CGI-based data, then add a true parameter to the reload() method
replace("URL")	In a complex Web site, you may have pages that you do not want to appear in the user's history list. You cannot prevent a document from appearing in the history list (visible in the Go menu) while the user is looking at that page. However, you can instruct the browser to load another document into that window and replace the current history entry with the entry for the new document.

5.7 : Working with History Object

## Rationale of History Object

- The History object contains an array of previously visited URLs by the visitor

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### Working with History Object:

As a user surfs the Web, the browser maintains a list of URLs for the most recent stops. This list is represented in JavaScript by the history object.

## History Object Properties

Properties	Methods	Event Handlers
current	back()	None
length	forward()	
next	go()	
previous		

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Property	Description
current next previous	It retrieves the current, next and previous URLs in the history list.
length	It retrieves the number of items in the history list.
Methods	Description
back() forward()	It navigates backward and forward in the browser history list.
go(relativeNumber  "URLstring")	It uses the history.go() method for navigating to a specific index or URL in the history list.  This "go" command only accepts items that already exist in the history listing, so you cannot use it in place of setting the window.location object to a brand-new URL.



## Demo on Working with History Object

- Demo with history\_location.html



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Some additional egs:-

History\_back.html  
History\_forward.html  
History\_go.html  
History\_Property.html  
Location\_Assign\_method.html  
Location\_property.html  
Location\_reload\_method.html  
Location\_replace\_method.html

## Lab

### ➤ Lab Exercise 7 :

- Working with Location and History Object.



## Summary

- Document Object Model is a interface that allows programs and scripts to dynamically access and update content, structure and style of documents
- Window object is the topmost object in the entire scheme. It has properties, methods and event handles
- Frame object is a browser object of JavaScript used for accessing HTML frames
- Properties and methods of the frame object are similar to that of Window object in JavaScript
- The history property has an array of history items having details of the URL's visited from within that window
- History object is a JavaScript object and not an HTML DOM object
- The Location object contains information about the current URL



## Review Questions

- **Question 1:** Closed property returns \_\_\_\_\_ if the window object is closed either by a script or by the user.
  - Option 1: 1
  - Option 2: True
  - Option 3: 0
- **Question 2:** An alert dialog box is a modal window that presents a message for users with a single OK button to dismiss it.
  - True / False
- **Question 3:** Window's \_\_\_\_\_ event fires whenever a user drops a file or other URL-filled object onto the window.



## Review Questions (Contd..)

- **Question 4:** The \_\_\_\_\_ and `appName` properties are simply the official name and the internal code name for the browser application.
  - Option 1: Appname
  - Option 2: `appName`
  - Option 3: `appName`
- **Question 5:** The \_\_\_\_ property supplies a string of the entire URL of the specified window object.
  - Option 1: `location.href`
  - Option 2: `hostname`
  - Option 3: `hash`
- **Question 6:** The \_\_\_\_ property describes both the hostname and port of a URL.

