Lecture 5: Introduction to JavaScript

Scripts, Variables and Expressions, predefined functions, event-driven programming

Example of JavaScript

```
<html>
  <head>
    <title> An JavaScript example </title>
    <script>
      name = prompt("Please enter your name");
      document.write("Hi "+ name);
    </script>
  </head>
  <body>
  </body>
</html>
```

Variable

- **Variable** is a “container” to store the information you want to store.
- Variable value: The content stored in the “container”; it can change during the execution.
- Variable name: A name to refer the information in the “container”. Naming rules:
  - Variable names are **case-sensitive**.
  - They must begin with letters (a-z, A-Z) or underscore character(_).

Data types

- The types of information that can be stored in variables are called data types.
- **Numbers**
  - Integers: positive, 0, or negative.
    - Representation in JS: As in math
  - Floating-point numbers
    - Representation in JS
      - With decimal point: 314.15
      - With scientific notation: 3.1415e2
- **Booleans**: **true** or **false** (the case does matter!)
- **Strings**: Strings are delineated by single (‘) or double quotation (“) marks. (Use single quotes to type strings that contain quotation marks.)
  - E.g. **“**This is course CIS 1.0**”**
- Objects
- Null
- Undefined

Expressions

- Each JavaScript data type is associated with a specific set of predefined operators.
- Strings can be concatenated using the + operator.
  - E.g str = “first half” + “second half”
- Numbers have a predefined standard arithmetic operators +(addition), -(subtraction), *(multiplication), and / (division)
  - E.g t = 10 + 4/2 + 3 * 5
- An ***expression*** is any valid set of literals, variables, operators, and expressions that evaluates to a single value; the value can be a number, a string, or a logical value.

Structure of JavaScript

- Instructions are separated by semi-colons or line-breaks

```
<html>
  <head>
    <title> An JavaScript example </title>
    <script>
      name = prompt("Please enter your name");
      document.write("Hi "+ name);
    </script>
  </head>
  <body>
  </body>
</html>
```

window.prompt

- Function: Displays a Prompt dialog box with a message and an input field.
- **Syntax:** prompt(*message*, [*inputDefault*])
- **Parameters**
  - *message* is any string or a property of an existing object; the string is displayed as the message.
  - *inputDefault* is a string, integer, or property of an existing object that represents the default value of the input field. **InputDefault is optional; it can be omitted.**
- **Example**
  - **document.prompt(“Please enter a year”, “2006”);**

document.write

- **Function:** Writes one or more HTML expressions to a document in the specified window.
- **Syntax :** document.write(*expression1* [,*expression2*], ...[,*expressionN*])
- **Parameters**
  - *expression1* through *expressionN* are any JavaScript expressions or the properties of existing objects.
- Example:
  - document.write(“This is a message produced by write method”);

window.alert(string)

- Function: Displays an Alert dialog box with a message and an **OK** button.
- **Syntax**
  - alert("*message*")
- **Parameters**
  - *message* is any string or a property of an existing object.
- Example: alert(“This is an alert message”);

document.bgColor

- A property of document: A string specifying the color of the document background.
- **Syntax**
  - document.bgColor
- Example: document.bgColor = “red”
  - This instruction will set the document background color to be red.

window.confirm

- Function: Displays a Confirm dialog box with the specified message and **OK** and **Cancel** buttons.
- **Syntax**
  - confirm("*message*")
- **Parameters**
  - *message* is any string or a property of an existing object.
- Example: confirm(“Please confirm this message”);

window.open

- Function: Opens a new web browser window.
- **Syntax**
  - [*windowVar* =][window].open("*URL*", "*windowName*", ["*windowFeatures*"])
- **Parameters**
  - *windowVar* is the name of a new window. Use this variable when referring to a window's properties, methods, and containership.
  - *URL* specifies the URL to open in the new window. See the *location* object for a description of the URL components.
  - *windowName* is the window name to use in the TARGET attribute of a FORM or <A> tag. *windowName* can contain only alphanumeric or underscore (_) characters.
- Example: window.open(http://www.gc.cuny.edu, “aNewWindow”);

window.close

- Function: Closes the specified window.
- **Syntax**
  - *windowReference*.close()
- **Parameters**
  - *windowReference* is a valid way of referring to a window, as described in the window object.
- Example: window.close()
  - Close the current window; window is a windowReference to the current active window.

window.moveBy

- Function: Moves the window by the specified horizontal and vertical offsets.
- Syntax: window.moveBy(param1, param2)
- Parameters:
  - param1: the horizontal offset in pixels.
  - param2: the vertical offset in pixels.

JavaScript Objects

- Objects have characteristics and behaviors
  - Properties
  - Methods
- An example html **docment** in JavaScript
  - Properties
    - document.fgColor
    - document.bgColor
    - Etc.
  - Methods
    - document..write

JavaScript Objects: window and document

- window
  - Properties
    - document: window.document
    - location: window.location
    - status: window.status
    - Etc.
  - Methods
    - alert(): window.alert(..)
    - prompt(): window.prompt(…)
    - confirm(): window.confirm(…)
    - moveBy(), open(), close(), etc.
- document
  - Properties
    - fgColor: docment.fgColor - foreground color
    - bgColor: document.bgColor – background colr
    - Etc.
  - Methods
    - write: document..write(…)

Events and Event Handlers

- An **event** is a user action.
- An event handler is JavaScript code which responds to the user action.
- An example: onMouseOver

```
<A HREF="#"
        onMouseOver = "doucment.bgColor = 'red'; return true"
>
Watch this link!
</A>
```

JavaScript Reserved Words

- The words below can not be used as variable names:

abstract else instanceof switch
boolean enum int synchronized
break export interface this
byte extends long throw
case false native throws
catch final new transient
char finally null true
class float package try
const for private typeof
continue function protected var
debugger goto public void
default if return volatile
delete implements short while
do import static with
double in super

Syntax

- The **syntax of JavaScript** is a set of rules that defines how a JavaScript program will be written and interpreted
  - Rules for variable names
  - Rules for valid data types
  - Rules for valid instructions
  - More…

Important Issues

- The language instructions must be written in lower case
- All the instructions must be spelled correctly and exactly
- Parts of an instruction need to be separated by space and not run together
- The correct punctuations are required

About Java Script

- Interpreted high level programming language
- Purpose
  - Dynamic changes to the webpage
  - Real time changes to the webpage
- History
  - Netscape with Sun Microsystems developed it as a web programming language
  - Since Netscape Navigator 2.0
  - Since Microsoft Internet Explorer 3.0
- Characteristics of the java script
  - Allows interactive content on webpage
  - Client-based: work on the browser-side not the server-side
  - No manipulation of files and directories
  - Does not carry out graphics

Summary

- JavaScript
- Variables, data types and expressions
- JavaScript object properties
  - window.status, window.location, document.bgColor, document.fgColor
- JavaScript functions
  - window.prompt, window.alert, window.confirm, window.open, window.moveBy, window.close
  - docment.write
- Event and event handler