Chapter 1
Introduction to web development

Objectives

Applied

1. Run JavaScript applications that are on the Internet, your computer, or a local server by loading their HTML documents into your browser.
2. Use Chrome's developer tools to find the JavaScript statement that caused an error in a JavaScript application.
3. Use a text editor or IDE like Aptana Studio 3 to edit HTML, CSS, and JavaScript files.
4. If you're using an IDE like Aptana Studio 3 that lets you run applications from it, run an application from the IDE.

Knowledge

1. Describe the components of a web application.
2. Describe HTTP requests and responses.
3. Distinguish between the way a web server processes static web pages and dynamic web pages.
4. Describe the use of JavaScript and jQuery.
5. Describe the use of HTML and CSS.
6. Distinguish between the HTML5 semantic elements and the HTML div and span elements.
7. Describe the use of these HTML attributes: id, class, title, for, and name.
8. Describe the coding for these types of CSS selectors: type, id, and class.
9. Describe the components of a CSS rule set.
10. Describe the components of a URL.
11. Describe the issue of cross-browser compatibility as it relates to the development of web pages and JavaScript applications.
12. In general terms, describe the workarounds for using the HTML5 semantic elements and the ECMAScript 5 features with old browsers.

Chapter 2
Getting started with JavaScript

Objectives

Applied

1. Given the specifications for a JavaScript application that requires only the skills that you've learned so far, code, test, and debug the application.

Knowledge

1. Describe two ways to include JavaScript in the head of an HTML document.
2. Describe how JavaScript can be included in the body of an HTML document.
3. Describe how case-sensitivity, semicolons, and whitespace relate to the syntax for a JavaScript statement
4. List the primary rules for creating a JavaScript identifier.
5. Describe the use of JavaScript comments, including "commenting out" portions of JavaScript code.
6. Describe the syntax for referring to a method or property of an object.
7. Describe the use of the prompt, alert, write, and writeln methods.
8. Describe the three primitive data types used in JavaScript: numeric, string, and Boolean.
9. Describe the use of the arithmetic operators and the rules for evaluating an arithmetic expression.
10. Describe the use of variable declarations and assignment statements with numeric, string, and Boolean data.
11. Describe the use of the + operator and the \n escape sequence when working with strings.
12. Describe the use of the parseInt and parseFloat methods.

Chapter 3
The essential JavaScript statements

Objectives

Applied

1. Given the specifications for a JavaScript application that requires only the skills that you've learned so far, code, test, and debug the application.

Knowledge

1. Describe the rules for evaluating a conditional expression, including the use of the isNaN method.
2. Describe a common error when coding the equality operator.
3. Describe the flow of control of an if statement that has both else if and else clauses.
4. Describe the two ways that you can code a conditional expression that tests whether a Boolean variable is true.
5. Describe the flow of control for while, do-while, and for loops.
6. Describe the use of a JavaScript array, including the use of its index and length property.
7. Describe the use of a for loop with an array.

Chapter 4

How to work with JavaScript objects, functions, and events

Objectives

Applied

1. Given the specifications for a JavaScript application that requires only the skills that you've learned so far, code, test, and debug the application.

Knowledge

1. Given the name of one of the methods or properties that are presented in this chapter for window, document, Textbox, Number, Date, and String objects, describe the use of the method or property.
2. Describe the way Number, String, and Date objects are created.
3. Describe the use of the firstChild and nodeValue properties for working with the DOM.
4. Describe the creation and use of both function expressions and function declarations.
5. Distinguish between local and global variables.
6. Describe the use of strict mode in JavaScript.
7. Describe the creation and use of event handlers, including an event handler for the load event of the window object.

Chapter 5
How to script the DOM with JavaScript

Objectives

Applied

1. Develop DOM scripting applications that work with forms and controls, including applications that create and add nodes to the DOM.

Knowledge

1. Describe the use of the Document Object Model in JavaScript applications.
2. Describe these properties of the Node interface for the DOM: nodeValue, parentNode, childNodes, firstChild, lastChild, and nextElementSibling.
3. Describe these methods of the Document and Element interfaces for the DOM: getElementsByTagName, getElementsByName, and getElementsByClassName.
4. Describe these methods of the Element interface for the DOM: hasAttribute, getAttribute, setAttribute, and removeAttribute.
5. Explain how the DOM HTML specification can simplify coding when compared to the DOM Core specification.
6. Describe the use of a form, submit button, and reset button.
7. Describe the use of Textbox, Textarea, Select, Radio, and Checkbox objects.
8. Describe these methods for working with forms and controls: submit, reset, focus, blur.
9. Describe these events for working with controls: onfocus, onblur, onclick, ondblclick, onchange, onselect.
10. Describe the process of creating and adding nodes to the DOM, including adding rows and cells to a DOM table.

Chapter 6

How to test and debug a JavaScript application

Objectives

Applied

1. Use top-down coding and testing to simplify debugging.
2. Use Chrome's developer tools to debug applications by setting breakpoints, viewing the values of data items, and stepping through the execution of statements.
3. Trace the execution of an application with console.log statements.
4. View the source code for a web page whenever that seems useful.
5. View the changes to the DOM in Chrome's Elements panel.
6. Validate the HTML for a web page whenever that seems useful.

Knowledge

1. Describe three of the typical test phases for a JavaScript application.
2. Distinguish between syntax, runtime, and logic errors.
3. Describe the type of debugging problem that can occur due to the imprecision of floating-point numbers.
4. Describe the type of debugging problem that can occur because JavaScript treats undeclared variables as global variables.

Chapter 7

How to work with numbers, strings, and dates

Objectives

Applied

1. Use numbers, strings, and Date objects in your applications.
2. Use the global isNaN method to check if a variable contains a valid number.
3. Use the random method of the Math object to generate a random integer within a specific range.

Knowledge

1. Describe these special numerical values: Infinity, -Infinity, NaN, Number.MAX_VALUE, and Number.MIN_VALUE.
2. Describe these methods of the Number object: toFixed and toString.
3. Describe these methods of the Math object: round, ceil, floor, max, min, and random.
4. Describe these JavaScript escape sequences: \t, \n, \", \', and \\.
5. Describe these properties and methods of a String object: length, indexOf, substring, toLowerCase, and toUpperCase.
6. Describe how to create a Date object for the current date and time or for a specified date and time.
7. Describe these methods of the Date object: toString, toDateString, toTimeString, getFullYear, getMonth, getDate, setFullYear, setMonth, and setDate.

Chapter 8
How to code control statements

Objectives

Applied

1. Use if statements, including those with else and else if clauses, in your applications.
2. Use switch statements, including those that use fall through and default cases, in your applications.
3. Use while, do-while, and for statements, including those that use break and continue statements, in your applications.
4. Use the && and || operators to select values in your applications.

Knowledge

1. Describe type coercion and distinguish between the equality and identity operators.
2. Describe these relational operators: <, <=, >, >=.
3. Describe these logical operators: !, &&, ||.
4. Explain how to use the conditional operator instead of an if statement.
5. Explain how to use the short-circuit evaluations of the && and || logical operators to select values.
6. Describe what a break statement does in a switch statement and in a loop.
7. Distinguish between the while statement and the do-while statement.
8. Describe how to control the iteration in a for statement.

Chapter 9
How to work with arrays and web storage

Objectives

Applied

1. Use arrays in your applications.
2. Use associative arrays and arrays of arrays in your applications.
3. Use web storage in your applications.

Knowledge

1. Describe how an index is used to access the data that's stored in an array.
2. Describe the length property of an array.
3. Distinguish between the for statement and the for-in statement.
4. Describe these methods of the Array object: push, pop, shift, unshift, splice, sort, join, isArray, indexOf, map, filter, and reduce.
5. Describe the split method of the String object.
6. Distinguish between an array, an associative array, and an array of arrays.
7. Distinguish between session storage and local storage.
8. Describe these methods of the JavaScript localStorage and sessionStorage objects: setItem, getItem, removeItem, and clear.

Chapter 10
How to create and use functions

Objectives

Applied

1. Create and use functions in your applications.
2. Create and use functions that handle a variable number of parameters.
3. Use JavaScript libraries in your applications.

Knowledge

1. Distinguish between a function expression and a function declaration, including which one can be called before it is defined.
2. Distinguish between passing an argument by value and passing an argument by reference.
3. Describe how lexical scope works, including global scope and local scope.
4. Describe the benefits of using JavaScript libraries.
5. Describe the use of the arguments property in a function.
6. Describe the *this* keyword and explain how its value is determined.
7. Describe the use of the call, apply, and bind methods for setting the value of the *this* keyword.

Chapter 11
How to create and use objects

Objectives

Applied

1. Create objects that have properties and methods by using object literals, constructor functions, or the create method of the Object object.
2. Use the properties and methods of the objects you create.
3. Add methods to the prototype of native object types such as String, Date, and Math.
4. Create factory functions that return new objects.

Knowledge

1. Describe the inheritance hierarchy for these JavaScript object types: Object, String, Number, Boolean, Date, Array, and Function.
2. Describe the differences between creating objects with object literals, with constructors, and with the Object.create method.
3. Explain how two variables can refer to the same object.
4. Describe the use of factory functions.
5. Describe the use of prototype objects in terms of inheriting and overriding the methods of an object.
6. Explain how to create and use cascading methods.
7. Describe how to use the delete, in, instanceof, and typeof operators to work with objects.

Chapter 12

How to use regular expressions, handle exceptions, and validate data

Objectives

Applied

1. Create regular expressions and use them to match, find, and replace patterns in strings.
2. Create and throw Error objects.
3. Use try-catch statements to catch errors.

Knowledge

1. Describe the use of regular expressions for matching patterns with strings.
2. Describe how the case-insensitive, global, and multiline flags work with a regular expression.
3. Describe the use of the search, match, and replace methods of a String object.
4. Describe how a regular expression can be used to validate data such as a social security number.
5. Describe how you can create and use Error objects.
6. Describe the function of the try block and the catch block in a try-catch statement.

Chapter 13

How to work with events, images, and timers

Objectives

Applied

1. Create and use a library with cross-browser compatible methods for attaching an event handler, detaching an event handler, and cancelling the default action of an event.
2. Preload the images for an application when the images aren't automatically loaded with the web page.
3. Use one-time and interval timers in your JavaScript applications.

Knowledge

1. Distinguish between HTML events, mouse events, and keyboard events.
2. Describe the use of cross-browser compatible functions or methods for attaching and detaching event handlers.
3. Describe the use of cross-browser compatible functions or methods for preventing the default action of an event.
4. Describe the use of images and preloaded images in applications like image rollovers and slide shows.
5. Describe these timer methods: setTimeout, setInterval, clearTimeout, clearInterval.

Chapter 14

How to work with closures, callbacks, and recursion

Objectives

Applied

1. Use closures, IIFEs, callbacks, and recursion in your applications.

Knowledge

1. Describe how the scope chain works in JavaScript.
2. Describe the use of closures, including how to use closures to create private state.
3. Describe the use of immediately invoked function expressions (IIFEs), including how to use IIFEs to create block scope.
4. Describe the use of callback functions.
5. In general terms, explain how recursive functions work.

Chapter 15

How to work with namespaces, modules, and custom properties

Objectives

Applied

1. Use namespaces in your applications.
2. Code an application that creates and augments an object using the module pattern.
3. Code an object that has read-only accessor properties.

Knowledge

1. Describe the global namespace pollution problem and two ways to avoid it.
2. Describe the use of namespaces and aliases.
3. Describe the use of the module pattern and the benefits of using it.
4. Distinguish between a direct or own property and an inherited property.
5. Distinguish between data properties and accessor properties.
6. Describe the attributes of data properties, the attributes of accessor properties, and the attributes shared by both.
7. Describe the use of descriptor objects with the defineProperty, defineProperties, and create methods of the Object object.
8. Describe the use of the methods of the Object object to inspect property attributes.

Chapter 16
How to work with JSON

Objectives

Applied

1. Use the JSON object to serialize and deserialize data in your applications.
2. Customize the stringify method and the parse method in your applications.

Knowledge

1. Explain what data serialization and deserialization are.
2. Distinquish between binary and textual data formats.
3. Describe the benefits of JSON as a data format.
4. List the six allowed data types in JSON.
5. Describe what the stringify and parse methods do.
6. Describe how to customize the stringify method.
7. Describe the order in which the stringify method serializes data.
8. Describe how to customize the parse method.

Chapter 17

When and how to use jQuery for DOM scripting

Objectives

Applied

1. Use jQuery to work with the DOM in your JavaScript applications.
2. Use jQuery UI widgets and jQuery plugins in your applications.
3. Create and use your own jQuery plugins.

Knowledge

1. Describe the use of jQuery and the benefits of using it.
2. Describe the use of jQuery UI widgets and the benefits of using them.
3. Describe how to find and use jQuery plugins.
4. Describe how to create your own jQuery plugin, including the API standards for plugins.