JavaScript, Sixth Edition

Chapter 7 Solutions

Short Quiz 1

1. What is object-oriented programming? What is an object?

Object-oriented programming (OOP) refers to the creation of reusable software objects that can be easily incorporated into multiple programs. The term “object” specifically refers to programming code and data that can be treated as an individual unit.

1. Name at least two built-in JavaScript classes.

Arguments, Array, Boolean, Date, Error, Function, Global, JSON, Math, Number, Object, RegExp, String

Short Quiz 2

* 1. What code creates a dateToday variable and assigns the current date and time as its value?

var dateToday = new Date();

* 1. Which method of the Number class do you use to convert a number to a string that is formatted with local numeric formatting style?

toLocaleString()

* 1. What is the result of applying the floor() method of the Math class to a numeric value?

The value is rounded to the next lowest integer.

Short Quiz 3

1. What statement would you use to create a new empty object with the name manifest using an object literal?

var manifest = {};

1. What statement would you use to add a property named itemNum to the manifest object, and assign the property a numeric value of 1501?

manifest.itemNum = 1501;

1. What single statement would you use to create a new empty object with the name manifest that includes a property named itemNum with a value of 1501?

var manifest = {

itemNum: 1501

};

# Review Questions

1. In object-oriented programming, a(n) \_\_\_\_\_\_\_\_\_\_ is a template, or blueprint, that serves as the basis for new objects.
   1. instance
   2. object
   3. method
   4. class
2. In object-oriented programming, a(n) \_\_\_\_\_\_\_\_\_\_ is an object that has been created from an existing template.
   1. instance
   2. property
   3. method
   4. class
3. Which of the following Date class constructors creates a Date object that contains the current date and time from the local computer?
   1. Date()
   2. Date(*milliseconds*)
   3. Date(*date\_string*)
   4. Date(year, month[, *date*, *hours*, *minutes*, *seconds*, *milliseconds*])
4. Which of the following parts of a date value are stored in a Date object using numeric representations, starting with zero, similar to an array?
   1. Day of the month
   2. Month
   3. Year
   4. AM/PM
5. Which Number method converts a number to a string using a specified number of decimal places?
   1. toFixed()
   2. toLocaleString()
   3. toString()
   4. valueOf()
6. Which Number method converts a number to a string that is formatted with local numeric formatting style?
   1. toFixed()
   2. toLocaleString()
   3. toString()
   4. valueOf()
7. Which is the primary reason for using any of the “to” methods of the Number class?
   1. To convert a number for use in calculations
   2. To format a date
   3. To perform calculations
   4. To convert a number that will be displayed to a user
8. Which method of the Math class rounds a value to the next lowest integer?
   1. floor()
   2. max()
   3. min()
   4. round()
9. What is the correct syntax for rounding the number 39.75 to the nearest integer?
   1. new Math = round(39.75);
   2. var mathCalc = new Math(round(39.75));
   3. Math.round(39.75);
   4. round(39.75);
10. Which of the following statements creates an empty object with the name registry?
    1. var registry;
    2. var registry = {};
    3. var registry = "";
    4. var registry = [];
11. Which of the following statements adds a new property named squareFeet to an object named RealEstate?
    1. var RealEstate.squareFeet;
    2. RealEstate.squareFeet = "";
    3. var squareFeed.RealEstate;
    4. squareFeet.RealEstate = "";
12. A property whose value is itself an object is known as a(n) \_\_\_\_\_\_\_\_\_\_.
    1. sub-property
    2. instance
    3. constructor
    4. sub-object
13. Given the object definition

var members = {

founder: "Luis"

};

which statement references the value of the founder property using an associative array?

* 1. founder
  2. members.founder
  3. members["founder"]
  4. members[0]

1. Which statement declares a method named \_\_\_\_\_\_\_\_\_\_ and sets its value to the existing calculateTotal() function?
   1. calcTotal: calculateTotal
   2. calcTotal: calculateTotal()
   3. calcTotal: function(calculateTotal)
   4. calcTotal: function(calculateTotal())
2. The built-in property that specifies the constructor from which an object was extended is called the \_\_\_\_\_\_\_\_\_\_ property.
   1. default
   2. origination
   3. prototype
   4. source
3. Explain the principle of information hiding. What does the term “black box” refer to?

Encapsulation places code inside what programmers like to call a black box; when an object is encapsulated, other parts of the program cannot read or modify the code itself—all internal workings are hidden. When you include encapsulated objects in your programs, users can see only the methods and properties of the object that you allow them to see. Essentially, the principle of information hiding states that any methods and properties that other programmers do not need to access or know about should be hidden. By removing the ability to see inside the black box, encapsulation reduces the complexity of the code, allowing programmers who use the code to concentrate on the task of integrating the code into their programs. Encapsulation also prevents other programmers from accidentally introducing a bug into a program, or from possibly even stealing the code and claiming it as their own.

1. Explain why programmers use the terms “variable” and “object” interchangeably.

The name you use for an instantiated object is really a variable, just like an integer or string variable. The difference is that the data the variable represents happens to be an object instead of a number or string. In the same manner that you use a variable name to represent a primitive data type, such as an integer, in computer memory you also use a variable name to represent an object. Because the objects you declare in your JavaScript program are actually a certain type of variable, you use the var keyword to identify them as variables.

1. Explain why JavaScript is not a true object-oriented programming language.

You can base objects in your programs on built-in JavaScript classes such as the Array and Date objects. However, you cannot create your own classes in JavaScript. For this reason, JavaScript is said to be an object-based programming language instead of an object-oriented programming language.

1. Explain how to assign a new property to a custom object.

Although you can declare properties within an object definition, it’s not required. As an alternative, you can add a new property simply by declaring its value. This is similar to the process of creating a new variable; however, unlike in a variable declaration, you don’t use var or any other keyword to create a new object property. You specify the object name and the new property name with dot syntax, and then use the assignment operator to specify the value.

1. Explain when you would use an object literal and when you would create a constructor function.

The main difference between creating an object with an object literal and using a constructor function is that the constructor function serves as a template, enabling you to create any number of objects with the same set of properties and methods defined in the constructor function. If you need to create a unique object in a program, an object literal is the easiest solution. However, if your program will require multiple instances of an object with the same properties and methods, then creating a constructor function is more efficient.

# Case Projects

## Individual Case Project

Expand your individual website to include a page that calculates the time elapsed since a date entered by a user. The page should include a form that allows users to enter a day, month, and year. The page should then calculate and display the elapsed time in years, months, and days. Note that your program must include code to convert day values in excess of 31 into months, and months in excess of 12 into years.

Grading rubric: Each student should submit a web page that’s part of their individual website that contains a function to calculate elapsed time. The page should include a form that enables users to enter a date, and a button that users can click to calculate the elapsed time. The JavaScript code needs to determine the current date, convert the entered date to a Date object, determine the number of milliseconds between the two dates, and then convert the milliseconds to a number of years, months, and days.

## Team Case Project

In your team website, add a page that enables users to add data to a table by entering data in a form for the contents of one row at a time. Start by deciding what kind of information you want to enable users to enter. Possiblities include players for a fantasy sports team or a summer reading list. Next create a page that contains a form with fields for each item of data you want to collect. The page should also include a table with heading rows corresponding to each of the form fields. As a team, design and code a constructor function to serve as a template for objects containing information about the subject of your page (such as football players or books) . Also create code that (1) generates a new object each time the form content is submitted, and (2) adds a new row to the table that contains the object properties in the appropriate cells. If necessary, use for/in statements to debug your code. When the application works correctly, use the form to enter the data for three different items in the table. Then save the state of the page as a PDF document.

Grading rubric: Each team should submit a web page that’s part of their group website that contains a form and a table. The form should contain related fields that enable users to enter information about a single item, such as a sports player (for instance, first name, last name, team, jersey number) or book (title, author, publisher, publication year). The table should contain a column corresponding to each field in the form, and should add a new row each time the form is submitted, displaying the information entered in the form. The code for the page should use a custom constructor function to create a new object each time the form is submitted. Each team should submit a PDF showing the table with three rows of data.