Exercise Solutions

Chapter 1

1. Search the Internet for a good web hosting service. Describe features of your chosen web hosting service that would make it a good service for your needs.
2. To determine the popularity of various web browsers, go to <http://gs.statcounter.com>.
3. In https://mars.jpl.nasa.gov/msl/images/PIA16082\_Mitrofanov1F-thm.jpg,what is each of the following?

https – hypertext transfer protocol (or just “a protocol”)

mars – the web server computer or a subdomain (either answer is acceptable)

jpl.nasa.gov – the domain

msl/images – the directory path to the target file

PIA16082\_Mitrofanov1F-thm.jpg – the file that is to be viewed (the .jpg extension indicates a picture file)

1. A container has a start tag and an end tag, and it contains content between its two tags. A void element has just one tag, and its content is stored within the tag.
2. The doctype instruction tells the browser what type of document the web page is.
3. The strong and p elements are not nested properly. To correct the problem, move the </strong> end tag up, like this:

<p>

I hate when I'm studying and a velociraptor throws bananas at me.

Does that happen to anyone else?

<strong>I hope not!</strong>>

</p>

1. Provide HTML5 code for a paragraph that contains the following Spanish text.

<p lang="es">

La vanidad es tan fantastica, que hasta nos induce a

preocuparnos de lo que pensaran de nosotros una vez

muertos y enterrados.

</p>

1. Use a p element if the enclosed text forms something that would normally be considered a paragraph. On the other hand, use a div element if the enclosed text is related in some way, but the text would not normally be considered a paragraph.
2. Name something important that Ian Hickson did for the Web.

Wikipedia shows these acceptable answers:

Author and maintainer of WHATWG’s HTML standard.

Co-editor of the CSS 2.1 specification.

1. Describe in your own words something interesting on the W3C site. What URL(s) did you use to find your information?
2. Given the following code, what error messages does W3C’s HTML checker generate?

h7 is not a valid element.

There is a start tag (<h7>) without a matching end tag.

Chapter 2

1. Why do companies like their programmers to follow standard coding conventions?

So the resulting programs are easier to maintain (program maintenance means debugging and enhancing a program after it has been released initially).

1. What does Google’s Style Guide have to say about trailing whitespace?

Google’s Style Guide says to remove all trailing whitespace.

1. The following code has been converted so that it is compliant with HTML5 standards and also proper coding conventions.

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="utf-8">

<meta name="author" content="John Dean">

<title>Mock Trial How-To</title>

</head>

<body>

<h1>Mock Trial Opening Statements</h1>

<hr>

<p>

<strong>Prosecuting Attorney</strong>:<br>

Good morning, I am the prosecuting attorney, and I represent the State.

I will call three witnesses. At the conclusion of the case, we will

ask you to convict the defendant of the crime as charged, thank you.

</p>

<p>

<strong>Defense Attorney</strong>:<br>

Ladies and Gentlemen of the jury, I intend to prove that my client

xxxxxx is innocent of the alleged murder of yyyyyy, and the evidence

presented by the prosecution is circumstantial.

</p>

</body>

</html>

1. An HTML comment container for a copyright notice:

<!—-

INVESTMENT INTELLIGENCE SYSTEMS CORP.

THIS MATERIAL IS COPYRIGHTED AS AN UNPUBLISHED WORK UNDER

SECTIONS 104 AND 408 OF TITLE 17 OF THE UNITED STATES CODE.

UNAUTHORIZED USE, COPYING OR OTHER REPRODUCTION IS PROHIBITED BY LAW.

-->

1. Specify one or more of the content model categories (such as “phrasing” or “flow”) or specify “empty.”
   1. What are the permitted contents of the blockquote element?

flow content (which means plain text plus flow elements)

* 1. What are the permitted contents of the br element?

empty

* 1. What are the permitted contents of the q element?

phrasing content (which means plain text plus phrasing elements)

1. Provide an HTML5 code fragment for a paragraph element that displays this message:

Attention Walmart shoppers:

Christmas sales begin September 15 at 5 am, just in time for the holidays.

Any year is OK.

<p>

Attention Walmart shoppers:<br>

Christmas sales begin <time datetime="2020-09-15">September

15</time> at <time datetime="05:00">5 am</time>,

just in time for the holidays.

</p>

Acceptable alternative:

<p>

Attention Walmart shoppers:<br>

Christmas sales begin <time datetime="2020-09-15 05:00">

September 15 at 5 am</time>,

just in time for the holidays.

</p>

Acceptable alternative:

Use a datetime value of "2020-09-15T05:00"

1. Provide an HTML5 code fragment for a paragraph element that renders a definition for the acronym SSD and generates a tooltip for the words that SSD stands for.

<p>

An <dfn><abbr title=”solid-state drive”>SSD</abbr></dfn>

is a permanent storage device for a computer. SSD’s are

faster and sturdier than hard drives, but more expensive.

</p>

1. Using the b, u, and i elements is generally frowned upon. So why does the W3C include them in their HTML5 standard?

Because those elements have been used a lot in old web pages. The W3C doesn’t want to cause all those web pages to break if they are run with an HTML5 doctype. That would slow HTML5’s adoption.

1. Provide a paragraph element that would render the following line.

The ampersand symbol is "&". The greater than or equal symbol is "≥".

<p>

The ampersand symbol is "&amp;".

&nbsp;&nbsp;

The greater than symbol is "&ge;".

</p>

1. Specify an HTML code fragment that would render the quadratic equation as follows:

x = (-b ±(b2 - 4ac)½) / 2*a*

<var>x</var> = -<var>b</var>

&plusmn;(<var>b</var><sup>2</sup>

- 4<var>a</var><var>c</var>)<sup>&frac12;</sup>)

/ 2<var>a</var>

As an alternative to &plusmn, it’s OK to use &pm; or &PlusMinus;

Chapter 3

1. If you want to apply both selectors to one class attribute, use

a) class = "scary-font boxed"

1. What is special about the span element such that it is a good candidate for using CSS?

The span element does not introduce any style information on its own. It is a generic element. Thus, in adding a class attribute to a span element, the class attribute's value can more effectively specify the appearance of the span container's contents.

1. Provide the math that explains why RGB values can be used to represent approximately 16 million different colors.

Each of the 3 colors in an RGB value uses 8 bits, so an RGB value uses 24 bits total. 24 bits provides for 224 unique values, which is 16,777,216, which is approximately 16 million.

or

There are 256 values for each color, and 2563 = 16,777,216, which is approximately 16 million.

1. Provide a class selector rule that specifies the foreground and background colors shown in the following “Feliz Navidad!” text.



Full credit for numerical values that are close to those shown below. View the code on the web if unsure.

.christmas {

color: hsla(120,100%,25%,0.8);

background-color: hsl(0,100%,90%);

}

1. What's wrong with the following rule?

h1 {font-family: Helvetica;}

Since not all browsers support all font types, you should always include a generic font family at the end of a list of fonts. Helvetica is a specific font, not a generic font family.

1. Specify a class selector rule that attempts to use a font named Cracked.

To find the appropriate generic font, go to <http://www.w3.org/TR/css-fonts-3/#font-family-prop>.

.fun-font {font-family: Cracked, "Comic Sans MS", fantasy;}

1. What does the book’s coding conventions document say about specifying zero values for CSS properties?

Normally, if you have a zero value for a CSS property, you should omit the unit in order to make the code more compact. However, for a color value that uses a percentage value, you must include the % unit even when the value is 0%.

1. What's wrong with this rule?

p {margin: 2 px;}

Spaces are not allowed within the margin's value (i.e., "2 px" should be "2px").

Chapter 4

1. Provide a type selector CSS rule for the ul element that causes list items to be displayed with check mark symbols (✓) at the left.

ul {list-style-image: url("checkMark.gif");}

1. Here’s the style container that could be used in conjunction with the given body container to produce the provided web page:

<style>

ul {background-color: yellow;}

.underlined {text-decoration: underline;}

.superFun {font-weight: bold;}

</style>

1. Provide the code for a description list that defines three or more video game terms.

<dl>

<dt>cheat</dt>

<dd>A special code that allows you to bypass the normal limitations

of a game.</dd>

<dt>RPG</dt>

<dd>Role-Playing Game. A lengthy game with elaborate storylines.</dd>

<dt>spawning</dt>

<dd>The live creation of a character.</dd>

</dl>

1. What CSS property should you use to make an aside element display next to another element, so the two elements share the same line?

float property

1. What entity forms the lowest priority rung in the cascade of places where CSS rules can be defined?

user agent style sheet

1. What is the difference between a child selector and a descendent selector?

Example child selector:

section > h2

The above selector matches h2 elements that are immediately inside of a section element.

Example descendent selector:

section h2

The above selector matches h2 elements that are anywhere inside of a section element (immediately inside or otherwise).

1. Assuming the rest of the web page’s code is valid, the following code fragments generate a nested list with three borders.
   1. Describe what each of the three borders surrounds (for your description, it’s OK to provide a screenshot and that’s it).
   2. For each rule, describe which element(s) the rule applies to.

<style>

ul li {border-style: solid; }

ul > li {border-color: red;}

</style>

<body>

<ul>

<li>one</li>

<li>two

<ol>

<li>three</li>

</ol>

</li>

</ul>

</body>



* The first rule matches all three li elements, so it generates all three borders.
* The second rule matches just the first two li elements because they are the only li elements that are children of a ul container. It provides the red color for the first two borders.

1. Assuming the rest of the web page’s code is valid, the following code fragments generate a nested list.
   1. Describe the font size and color for each of the three list items (for your description, it’s OK to provide a screenshot and that’s it).
   2. For each rule, describe which element(s) the rule affects and whether the effect comes from the rule directly matching that element or whether it comes from CSS inheritance.

<style>

ol > li {font-size: 200%;}

ul {color: blue;}

.green {color: green;}

</style>

<body>

<ul>

<li>one

<ol>

<li>two

<ul>

<li class="green">three</li>

</ul>

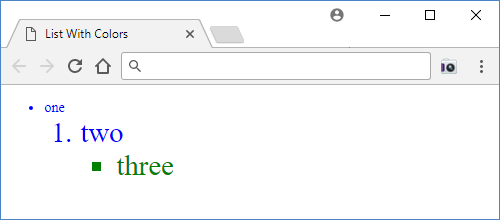
</li>

</ol>

</li>

</ul>

</body>



* The first rule matches the second li element and the font-size property’s value is inherited by the third li element. Thus, the second and third list items display with a font size that’s 200% of normal.
* The second rule matches the ul element and the color property’s value is inherited by all three li elements. Thus, that rule attempts to display all three list items with blue text.
* The third rule matches the third li element. That causes the third list item to override its blue text (from the second row) with green text.

Chapter 5

1. Suppose you have a table implemented with a table element, and borders are displayed around each table cell and around the table’s perimeter. Provide a CSS rule that eliminates the gaps between each of the adjacent borders.

table {border-collapse: collapse;}

1. What colgroup element code and CSS code need to be added to the given code in order to produce the shown web page?

Inside the style container, add this:

colgroup {border: thin solid;}

Inside the table container, add this:

<colgroup span="1">

<colgroup span="2">

<colgroup span="1">

1. What is the purpose of a pseudo-class?

A pseudo-class conditionally selects an element(s) from a group of elements specified by a standard selector.

1. Describe the effect of this CSS rule:

tr:nth-of-type(odd) {color: red;}

Every odd-numbered table row will display its text using red.

1. Global Temperatures table with tbody containers:

.recentYears td {color: red;}

<table>

<caption>Average Annual Global Temperatures</caption>

<thead>

<tr>

<th>Year</th>

<th>Temp<br>Rank</th>

<th>Avg<br>Temp (&deg;F)</th>

</tr>

</thead>

<tbody class="recentYears">

<tr><th>2016</th><td>1</td><td>58.98</td></tr>

<tr><th>2015</th><td>2</td><td>58.77</td></tr>

</tbody>

<tbody>

<tr><th>2014</th><td>3</td><td>58.53</td></tr>

<tr><th>2013</th><td>5</td><td>58.37</td></tr>

<tr><th>2012</th><td>9</td><td>58.33</td></tr>

</tbody>

</table>

1. My Favorite Eras table with improved accessibility:

<table>

<caption>My Favorite Eras</caption>

<thead>

<tr>

<th id="eras">Eras</th>

<th id="events" colspan="2">Events</th>

</tr>

</thead>

<tbody>

<tr>

<th id="mesozoic" headers="eras" rowspan="2">

Mesozoic<br>251 to 65.5 mya</th>

<td headers="mesozoic events">

Evolutionary split between reptiles and dinosaurs</td>

<td headers="mesozoic events">235 mya</td>

</tr>

<tr>

<td headers="mesozoic events">

South America breaks away from Africa</td>

<td headers="mesozoic events">105 mya</td>

</tr>

<tr>

<th id="cenozoic" headers="eras" rowspan="3">

Cenozoic<br>65.5 mya to today</th>

<td headers="cenozoic events">Modern mammals appear</td>

<td headers="cenozoic events">40 mya</td>

</tr>

<tr>

<td headers="cenozoic events">

Tool-making humanoids appear</td>

<td headers="cenozoic events">2 mya</td>

</tr>

<tr>

<td headers="cenozoic events">

First Rolling Stones reunion tour</td>

<td headers="cenozoic events">11,000 years ago</td>

</tr>

</tbody>

</table>

1. March Madness web page:

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="utf-8">

<meta name="author" content="John Dean">

<title>March Madness</title>

<style>

html {display: flex; justify-content: center;}

body {display: table;}

.row {display: table-row;}

.cell {

display: table-cell;

border: thin solid;

text-align: center;

vertical-align: middle;

}

.end {width: 200px; padding: 10px;}

th {width: 40px;}

tr:nth-of-type(5) td:nth-of-type(1n+3), tr:nth-of-type(1n+6) {

background-color: gold;

}

</style>

</head>

<body>

<div class="row">

<div class="end cell">

<h1>MARCH MADNESS</h1>

</div>

<table class="cell">

<caption><h3>March</h3> </caption>

<tr>

<th>Sun</th><th>Mon</th><th>Tues</th><th>Wed</th><th>Thur</th>

<th>Fri</th><th>Sat</th>

</tr>

<tr>

<td></td><td></td><td></td><td></td><td></td><td></td><td>1</td>

</tr>

<tr>

<td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td>

<td>8</td>

</tr>

<tr>

<td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td>

<td>15</td>

</tr>

<tr>

<td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td>

<td>22</td>

</tr>

<tr>

<td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td>

<td>29</td>

</tr>

<tr>

<td>30</td><td>31</td><td></td><td></td><td></td><td></td><td></td>

</tr>

</table>

<article class="end cell">

<h3>The Jayhawks</h3>

Hail to thee our alma mater,<br>

towering toward the blue.<br>

Lift the banner ever skyward,<br>

Hail to old KU.

</article>

</div>

</body>

</html>

1. Provide a CSS rule that uses absolute positioning to position the image in the top-right corner of the image’s surrounding container, 10 pixels from the top edge and 10 pixels from the right edge.

.cow-picture {

position: absolute;

top: 10px;

right: 10px;

}

Chapter 6

1. Provide a link element (and nothing else) that, when clicked, causes an end user to download an image file of a dog in a tree. Search for a real image and use its URL.

<a download

href="http://barkpost.com/wp-content/uploads/2014/04/dog-in-tree.jpg">

dog in a tree</a>

1. Provide proper HTML5 container code (start tag, enclosed content, end tag) for a link that takes the user to a page named hawaii.html that's located in a directory named vacation. The vacation directory is a subdirectory in the current directory's parent directory.

<a href="../vacation/hawaii.html">Hawaii pictures</a>

1. How are an absolute URL and a path-absolute URL different?

An absolute URL specifies a target resource that’s on a web server different from the current web page. A path-absolute URL specifies a target that’s on the same web server as the current web page and the path starts from the web server’s root directory.

1. Provide code for a link element such that, when it’s clicked, it causes the browser to jump to the **Drivers education classes** heading. Also provide the code for the h4 heading element that is the target of that link.

<a href="#drivers-education">Drivers education classes</a>

<h4 id="drivers-education">Drivers education classes</h4>

1. Provide three CSS rules that implement links as follows. All links should have no underlining. Unvisited links should be dark green. Visited links should be pink.

a {text-decoration: none;}

a:link {color:#00ff00;}

a:visited {color:pink;}

1. How many different levels of transparency can a PNG image have?

256

1. Use GIMP to create a red-bordered heart icon with a transparent outer background and a white interior. Here’s an example, with two hearts pasted on top of some arbitrary large-font text:

Some arbitrary large-font text

1. Here is a device emulator website that shows what responsive web pages look like on different user-specified platforms:

https://www.mobilemoxie.com/tools/mobile\_handset\_emulator

The screenshot should look like Figure 6.18, but the device label should indicate an iPhone.

Chapter 7

1. Provide an img element and an associated CSS rule that could be used to render the sun image such that surrounding text flows down on the right of the sun image.

.float-left {float: left;}

<img class="float-left" src="sunny.gif" alt="Sunny image"

width="53" height="55">

1. Suppose you have an a element and an iframe element, and you want the a element’s href value to load within the iframe element. How can you make that happen?

The value in the a element’s target attribute specifies where the src attribute’s value is supposed to load. By using the iframe’s name attribute value for the a element’s target value, the src attribute’s value will load within the iframe element.

1. Given an img element with class="block-image". Provide a CSS rule that causes the image to display using block formatting.

.block-image {display: block;}

1. Implement a CSS image sprite that toggles between a stationary cartoon animal (a kangaroo?) and that same animal jumping. The toggling occurs when the mouse moves over the image and when the mouse moves away.
2. Provide a class selector rule that uses scaling to cover the web page completely with an image file named goldenLagomorph.jpg. Your code should position the background image with its top-left corner in the top-left corner of the browser window’s viewport.

.honey-bunny {

background-image: url(goldenLagomorph.jpg);

background-size: cover;

background-attachment: fixed;

}

1. Provide a background-image property-value pair that could be used to generate the shown radial background.

background-image:

repeating-radial-gradient(circle, purple, blue 20px, purple 60px);

Chapter 8

1. Why is it appropriate to terminate every statement with a semicolon, even the last one in a function?

Suppose there’s no semicolon at the end of the last statement and someone later adds a new statement after the last statement. If they forget to insert a semicolon between the two statements, that creates a bug. Another reason to insert a semicolon after the last statement is that if you don’t do it, the JavaScript engine does it for you behind the scenes, and that slows things down slightly.

1. For each of the below variable names, indicate (with y or n) whether it's legal and whether it uses proper style.

legal (y/n)? proper style (y/n)?

1. \_totalPages y n
2. 2ndTeam n
3. car Color n
4. weight#of#specimen n
5. seatNumber y y
6. BookCost$ y n
7. Should a restaurant reservation website be implemented with client-side technology or server-side technology? Provide at least two reasons that justify your answer.

Server-side technology, because:

1. Lots of programming code.
2. A database is needed.
3. The code is proprietary.
4. The reservations need to be shared by other users to avoid conflicts.

Example website: http://www.opentable.com/

1. Implement a button that, when clicked, reassigns the form’s controls to their original values.

<input type="reset" value="Start over">

1. Improved function definition:

function displayMessage(name, month, day, year) {

var birthdayWish;

birthdayWish = document.getElementById("msg");

birthdayWish.innerHTML =

name + " was born on " + month + " " + day + ", " +

year + ". Happy birthday!";

} // end displayMessage

camel case displayMessage

spaces after parameter commas

no space between displayMessage and (

space between year) and {

declare birthdayWish with var

camel case birthdayWish

spaces around =

spaces around +

avoid line wrap by pressing enter within the innerHTML assignment and indenting

spaces around was born on

insert a concatenated space between month and day

semicolon after birthday!"

closing } on separate line

// end displayMessage

1. Why is it good to use var for same-named variables that are in different functions?

By declaring the variables with var, each variable is a separate local variable. That means that if one of the variables is reassigned, it won’t affect the other variable. Such separation is normally considered a good thing because that makes it harder for the programmer to accidentally mess things up.

Chapter 9

1. Using the history object, what methods can you call to navigate backwards and forward to web pages that have been visited recently?

The back and forward methods.

1. For the Lie Detector web page, think about the situation where the alert message displays “your reply was false.” Describe the type of person who would generate that output – someone who always tells the truth, someone who always lies, and/or some other type of person?

That output would be generated by someone who tells the truth some of the time, but not all of the time. Except for newborns, most people will tell a white lie every now and then when there’s no consequence.

1. Provide new code for the first three lines of the presidents quiz prompt such that you use \ instead of + for the string continuation mechanism.

<script>

prompt("Of the following U.S. Presidents, which one \

did not die on July 4?\n \

1. In Section 9.9’s Sting Methods subsection, there’s a code fragment that calls toUpperCase and toLowerCase. Provide an alert method call that shows the code fragment’s effect.

alert(

"exclamation = \"" + exclamation + "\"\n" +

"exclamationUpper = \"" + exclamationUpper + "\"\n" +

"exclamationLower = \"" + exclamationLower + "\"");

1. Given the following code fragment. What are the resulting values in var1, var2, var3, var4, and var5?

var name = "Cat in the Hat";

var1 = name.length();

var2 = name.charAt(5);

var3 = name.indexOf(" ");

var4 = name.indexOf("t", 4);

var5 = name.lastIndexOf("t");

var1 = 14

var2 = “n”

var3 = 3

var4 = 7

var5 = 13

1. [after §9.11] Given the following code fragment. What are the resulting values in var1, var2, var3, and var4?

var name = "Anna banana";

var1 = name.substring(4, 8) + " ";

var2 = var1.trim();

var3 = name.replace("an", "ri");

var4 = name.substring(5);

var1 = “ ban ”

var2 = “ban”

var3 = “Anna briana"

var4 = “banana”

1. How is the label element helpful for web accessibility?

By using a label element and tying it to a control, you enable a screen reader’s speech synthesizer to speak the label’s text as a prompt for the control.

1. What’s the best way to associate a button positioned outside a form with the form?

Set the button’s form attribute to the value of the form’s id attribute.

1. Given this code fragment:

if (lineSize) {

alert("There are " + lineSize + " people in line.");

}

else {

alert("The line is empty.");

}

* 1. If lineSize is 0, what’s the output?

The line is empty.

* 1. If lineSize is 5, what’s the output?

There are 5 people in line.

1. Sometimes, JavaScript's == operator is slightly slower than the identity operator. In what situation is that the case?

In comparing two values with ==, if the values are of different types, the JavaScript engine attempts to convert them to the same type before performing the comparison. And that slows things down.

1. Assume this:

var x = 15;

var y = .4;

Evaluate the following expressions:

* 1. 4 - x / 2 + y

4 – 15 / 2 + .4 ⇒

4 – 7.5 + .4 ⇒

-3.5 + .4 ⇒

-3.1

* 1. x % 4 + 4 % x ⇒

15 % 4 + 4 % 15 ⇒

3 + 4 ⇒

7

* 1. 2 \*\* 3 / 2 \* 3 ⇒

8 / 2 \* 3 ⇒

4 \* 3 ⇒

12

* 1. y != 0 && !(y > 4 || true) ⇒

.4 != 0 && !(.4 > 4 || true) ⇒

.4 != 0 && !(false || true) ⇒

.4 != 0 && !(true) ⇒

.4 != 0 && false ⇒

true && false ⇒

false

Chapter 10

1. Assume the following code is part of a working web page. What message will the alert dialog display?

var msg = "Usie:";

var x = 3;

while (x > 0) {

msg += " " + x

x--;

}

alert(msg);

Usie: 3 2 1

1. Assume the following code is part of a working web page. The following code is supposed to display the sum of 1 through 4 (with a dialog that says “Sum = 10”) and the product of 1 through 4 (with a dialog that says “Product = 24”). Find the errors and fix them.

var count = 1;

var sum = 0;

var product = 0;

while (count < 4) {

sum += count;

product \*= count;

if (count == 4)

alert("Sum = " + sum);

alert("Product = " + product);

count++;

}

The fixes are underlined:

var product = 1;

while (count <= 4) {

if (count == 4) {

alert("Sum = " + sum);

alert("Product = " + product);

}

1. Assume the following code is part of a working web page. What message will console.log display?

var userTurn = true;

var userTurns = computerPoints = 0;

do {

if (userTurn) {

userTurns++;

}

else {

computerPoints++;

}

userTurn = !userTurn;

} while (userTurns < 2);

console.log("computer points: " + computerPoints);

computer points: 1

1. Suppose you have a variable named quantity that holds a number. Provide an if statement heading that checks to see whether quantity holds a whole number.

if (quantity == Math.floor(quantity)) {

1. Given the following web page code that generates the factorial for a user-entered number. Provide a standard for loop that could be used to replace the while loop.

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="utf-8">

<meta name="author" content="John Dean">

<title>Factorial Generator</title>

<script>

// This function generates a factorial.

function generateFactorial(form) {

var num; // a user-entered number

var factorial; // factorial of num

var count; // multiplicand for factorial calculation

num = form.elements["number"].valueAsNumber;

factorial = 1;

count = 2;

while (count <= num) {

factorial \*= count;

count++;

}

form.elements["result"].value = num + "! = " + factorial;

} // end generateFactorial

</script>

</head>

<body>

<form>

<label for="number">Enter a whole number:</label>

<input type="number" id="number"

min="0" max="15" step="1" required>

<br><br>

<input type="button" value="Generate Factorial"

onclick="generateFactorial(this.form);">

<br><br>

<output id="result"></output>

</form>

</body>

</html>

for (let count=2; count<=num; count++) {

factorial \*= count;

}

1. The web page code in the prior exercise generates the factorial for a user-entered number. Why would it be inappropriate to replace the while loop with a for...of loop?

Because there’s no collection to loop through.

1. Provide code that generates the following radio button group. You don’t need to provide code for a complete web page – just the code for a CSS rule and a container that generates the radio buttons, the border, and the border’s caption.



fieldset {display: inline;}

<fieldset>

<legend>Gender:</legend>

<input type="radio" name="gender" value="male">male

&nbsp;

<input type="radio" name="gender" value="female">female

</fieldset>

1. Why didn’t JavaScript’s inventor use background-color for the JavaScript property name?

The hyphen would be interpreted as a minus sign and the JavaScript engine might try to perform subtraction because of it.

1. How can Figure 10.15C’s applyFontSelections function be modified so it uses the classList property to add values to the message element’s class attribute?

To clear the class attribute’s value, you won’t need selectors = ""; Instead, you should use:

message.className = "";

To add a value to the class attribute, you won’t need selectors += fontFeature.value + " "; and message.className = selectors; Instead, you should use:

message.classList.add(fontFeature.value);

1. Assume the following code is part of a working web page. The prefix-mode decrement operator works the same as the prefix-mode increment operator except subtraction is performed instead of addition. What message will console.log display?

var a = b = 10;

var c = d = 20;

console.log("a = " + ++a + ", b = " + b++ +

"\nc = " + --c + ", d = " + d--);

a = 11, b = 10

c = 19, d = 20

Chapter 11

1. Describe the two ways that the this keyword can be used.

When you’re inside an event handler, the this keyword refers to the enclosing element.

When you’re inside a constructor or inside a method, the this keyword accesses the object that’s associated with the constructor or method.

1. Suppose you have a Human class with a class property named avgAge.
   1. Why is it appropriate to have avgAge be a class property instead of a regular property?
   2. Assume that the avgAge property gets assigned a value only after a Human object gets instantiated. Provide an if statement for the Human constructor that takes care of the avgAge property for the first instantiated Human object. Specifically, check for avgAge not having a value and if that’s the case, assign an age parameter to the avgAge property.

It’s appropriate to have avgAge be a class property because the property pertains to the class as a whole, not an individual Human object.

if (Human.avgAge == undefined) {

Human.avgAge = age;

}

1. Improve the Point Tracker web page presented earlier by displaying a colored point whenever the user clicks his/her mouse.

Add to the bottom of pointTracker.html:

<span id="pt1Graphic"></span>

<span id="pt2Graphic"></span>

Add to pointTracker.js:

var prevPointColor; // the most recent point's color

// This function stores a user's click location as a point and displays

// a colored dot at that location.

function captureClick(e) {

if (Point.getCount() == 0) {

point1 = new Point(e.clientX, e.clientY);

updateClickedPoint(

point1, document.getElementById("pt1Graphic"),

document.getElementById("pt1Location"));

}

else if (Point.getCount() == 1) {

point2 = new Point(e.clientX, e.clientY);

updateClickedPoint(

point2, document.getElementById("pt2Graphic"),

document.getElementById("pt2Location"));

}

else {

point1 = point2;

point2 = new Point(e.clientX, e.clientY);

updateClickedPoint(

point1, document.getElementById("pt1Graphic"),

document.getElementById("pt1Location"));

updateClickedPoint(

point2, document.getElementById("pt2Graphic"),

document.getElementById("pt2Location"));

}

} // end captureClick

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// This function handles a click by displaying a dot and the dot's

// location.

function updateClickedPoint(point, pointGraphic, pointLocation) {

pointGraphic.style.left = point.x + "px";

pointGraphic.style.top = point.y + "px";

pointGraphic.style.borderRadius = "50%";

pointGraphic.style.backgroundColor = point.color;

pointLocation.innerHTML = point.value();

pointLocation.style.color = point.color;

} // end updateClickedPoint

1. Improve the previous exercise’s web page by enabling the user to drag the points. While dragging a point, update the point’s coordinates label.

Add to the bottom of pointTracker.html:

<span id="pt1Graphic" draggable="true" ondrag="dragDot(event);"></span>

<span id="pt2Graphic" draggable="true" ondrag="dragDot(event);"></span>

Add to pointTracker.js:

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// By default, it's illegal to drop an element onto another element.

// To enable that behavior when dragging the dot graphic's span

// element, we add a drag event handler that disables the default

// behavior.

document.addEventListener(

"dragover",

function (event) {event.preventDefault();},

false);

// This function enables a user to drag a dot and updates the dot's

// location during the process.

function dragDot(e) {

var point = null; // the point that is being dragged

var pointGraphic; // the dot graphic that is being dragged

if (e.target == document.getElementById("pt1Graphic")) {

updateDraggedPoint(e, point1, document.getElementById("pt1Location"));

}

else if (e.target == document.getElementById("pt2Graphic")) {

updateDraggedPoint(e, point2, document.getElementById("pt2Location"));

}

} // end dragDot

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// This function handles the updates for a dragged point.

function updateDraggedPoint(e, point, pointLocation) {

e.target.style.left = e.clientX + "px";

e.target.style.top = e.clientY + "px";

point.x = e.clientX;

point.y = e.clientY;

pointLocation.innerHTML = point.value();

} // end updateDraggedPoint

1. Suppose you have an iAgree variable that holds a checkbox control object. Provide an addEventListener method call that adds an onchange event handler to the checkbox. The event handler should call a function named agree.

iAgree.addEventListener("change", agree);

1. Refer back to Figure 11.10, which shows a class diagram for Employee, PartTime, and FullTime classes. Provide the class definition for the PartTime class.

class PartTime extends Employee {

constructor(name, id, hourlyWage) {

super(name, id);

this.hourlyWage = hourlyWage;

this.hoursWorked = 0;

} // end constructor

// Add specified hours to the PartTime object.

addHours(hours) {

this.hoursWorked += hours;

} // end addHours

// Returns employee’s name at left of calculated payment value.

calculatePayment() {

return this.name + ": " + this.hoursWorked \* this.hourlyWage;

} // end calculatePayment

} // end class PartTime

1. Assume the following code is part of a working web page. What message will console.log display?

var i = 0;

var msg = "";

for (; i<3; i++) {

switch (i + i) {

case 0:

msg += "uno ";

break;

case 1: case 2:

msg += "dos ";

case 3:

msg += "tres ";

default:

msg += "cuatro ";

} // end switch

} // end for

console.log("msg = " + msg);

msg = uno dos tres cuatro cuatro

1. Declare an empty deck array. Use a loop to fill the array with string values that represent the 52 cards of a normal deck. Here’s the list of 52 values:

1C, …, 13C, 1D, …, 13D, 1H, …, 13H, 1S, …, 13S

var deck = new Array();

for (let i=0; i<52; i++) {

if (i < 13) {

suit = "C";

}

else if (i < 26) {

suit = "D";

}

else if (i < 39) {

suit = "H";

}

else {

suit = "S";

}

deck[i] = (i % 13 + 1) + suit;

} // end for

console.log("deck = " + deck);

1. Implement a Cheerleader class with name and height properties. Improve the provided web page such that it stores cheerleader objects in an array and sorts the array by cheerleaders’ heights.

cheer.html:

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="utf-8">

<meta name="author" content="John Dean">

<title>Stunt Group</title>

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

</head>

<body>

<label for="name">Cheerleader's name:</label>

<input type="text" id="name">

<br>

<label for="name">Cheerleader's height:</label>

<input type="text" id="height">

<br><br>

<input type="button" value="Add cheerleader"

onclick="addCheerleader();">

<br><br>

<input type="button" value="Display stunt group"

onclick="displayStuntGroup();">

<br><br>

<div id="stunt-group"></div>

</body>

</html>

cheer.js:

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* cheer.js

\* John Dean

\*

\* This file implements a Cheerleader class and functions

\* that manipulate an array of Cheerleader objects.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

var stuntGroup = new Array();

class Cheerleader {

constructor(name, height) {

this.name = name;

this.height = height;

} // end constructor

getName() {

return this.name;

}

getHeight() {

return this.height;

}

} // end class Cheerleader

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

function addCheerleader() {

var cheerleader;

cheerleader = new Cheerleader(

document.getElementById("name").value,

document.getElementById("height").value

)

stuntGroup.push(cheerleader);

stuntGroup.sort(compareCheerleaders);

} // end addCheerleader

function compareCheerleaders(c1, c2) {

if (c1.getHeight() < c2.getHeight()) {

return -1;

}

else if (c1.getHeight() > c2.getHeight()) {

return 1;

}

else {

return 0;

}

} // end compareCheerleaders

function displayStuntGroup() {

var stuntGroupList = "";

for (let i = 0; i < stuntGroup.length; i++) {

stuntGroupList += stuntGroup[i].getName() +

", " + stuntGroup[i].getHeight() + " cm<br>";

}

document.getElementById("stunt-group").innerHTML = stuntGroupList;

} // end displayStuntGroup

1. Describe what happens to the bookMtgList array if the following code executes. In your answer, you must mention the 0 return value.

bookMtgList.sort(function (a, b) {return 0;});

When the comparison function returns 0, no swapping takes place. Since the comparison function always returns 0, no swapping takes place and the bookMtgList array does not get modified.

1. Improve the Book Club web page by adding a delete button for each book meeting. When the user clicks a book meeting’s delete button, the book meeting should be removed from the bookMtgList array and it should disappear from the displayed schedule.

class BookMeeting {

...

// Return book meeting information as a table row

bookMtgEntry(mtgIndex) {

return "<div class='row'>" +

"<span>" + this.date.toDateString() + ":</span>" +

"<span>" + this.author + ", <cite>" + this.title + "</cite></span>" +

"<input type='button' value='delete'" +

" onclick=deleteMtg(" + mtgIndex + ")>" +

"</div>";

} // end bookMtgEntry

} // end BookMeeting

...

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// Delete a book club meeting.

function deleteMtg(mtgIndex) {

bookMtgList.splice(mtgIndex, 1);

displayList();

} // end deleteMtg

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// Display the the list of book club meetings.

function displayList() {

var listContent = ""; // The contents of the list of book meetings

for (let i=0; i<bookMtgList.length; i++) {

listContent += bookMtgList[i].bookMtgEntry(i);

}

document.getElementById("list").innerHTML = listContent;

} // end displayList

Chapter 12

1. In the Rectangles web page, add a 1-pixel-width black dashed border to the second rectangle that shows where the rectangle’s fill border would be if there were no strokeRect method call.

ctx.setLineDash([5]); // or something similar to [5]

ctx.strokeStyle = "black";

ctx.lineWidth = 1;

ctx.strokeRect(140, 80, 70, 140);

1. If you want to display text with a border and a filled interior, why should you normally call strokeText after fillText?

By calling strokeText last, it draws on top of the characters’ fill color, so strokeText’s border lines display with their full widths. On the other hand, if you call fillText after strokeText, the inner half of the border lines gets overlaid by the fill color.

1. Given this code:

ctx.font = "100px Arial, sans-serif";

ctx.fillText("Bullseye", canvas.width / 2, canvas.height / 2);

What code would you need to insert above the given code in order to center a “Bullseye” string horizontally and vertically?

ctx.textAlign = "center";

ctx.textBaseline = "middle";

1. Provide a JavaScript function that generates the Text Baseline Examples web page shown in Figure 12.5.

function draw() {

var ctx; // the canvas object's context

ctx = document.getElementById("canvas").getContext("2d");

ctx.strokeStyle = "springgreen"; // color for baseline lines

ctx.font = "25px 'Times New Roman', serif";

ctx.beginPath();

ctx.moveTo(0, 40);

ctx.lineTo(500, 40);

ctx.stroke();

ctx.textBaseline = "alphabetic";

ctx.fillText(

"For this text, textBaseline=\"alphabetic\" & y=40.", 10, 40);

// For a smaller file size, delete all but the first beginPath

// and all but the last stroke. That would use a single path.

ctx.beginPath();

ctx.moveTo(0, 80);

ctx.lineTo(500, 80);

ctx.stroke();

ctx.textBaseline = "bottom";

ctx.fillText(

"For this text, textBaseline=\"bottom\" & y=80.", 10, 80);

ctx.beginPath();

ctx.moveTo(0, 120);

ctx.lineTo(500, 120);

ctx.stroke();

ctx.textBaseline = "middle";

ctx.fillText(

"For this text, textBaseline=\"middle\" & y=120.", 10, 120);

ctx.beginPath();

ctx.moveTo(0, 160);

ctx.lineTo(500, 160);

ctx.stroke();

ctx.textBaseline = "top";

ctx.fillText(

"For this text, textBaseline=\"top\" & y=160.", 10, 160);

} // end draw

1. Implement a function that draws five filled-in lavender circles.

function draw() {

var ctx; // the canvas object's context

var x; // x value for the circles' center points

ctx = document.getElementById("canvas").getContext("2d");

ctx.strokeStyle = "darkviolet";

ctx.fillStyle = "lavender";

ctx.lineWidth = 4;

x = 80;

for (let i=0; i<5; i++) {

ctx.beginPath();

ctx.arc(x, 35, 25, 0, 2 \* Math.PI);

ctx.fill();

ctx.stroke();

x += 75;

} // end for

} // end draw

1. Add code to the Umbrella web page’s draw function in order to display a right-side curved handle.

In the umbrella’s shaft code, between the lineTo and stroke method calls, insert this:

ctx.arc(108, 120, 8, Math.PI, 0, true); // umbrella handle

1. Rewrite the Face Web page’s initialize function so that it uses the rect method instead of the strokeRect method.

function initialize() {

// x and y coordinates for the face's center point.

const CENTER\_X = 250;

const CENTER\_Y = 250;

const RADIUS = 150; // face's radius

const TITLE\_BASELINE = 75; // y value for title's baseline

const EYE\_WIDTH = 8;

const EYE\_HEIGHT = 6;

var ctx; // the canvas object's context

ctx = document.getElementById("canvas").getContext("2d");

ctx.fillStyle = "blue";

ctx.textAlign = "center";

ctx.font = "75px Arial, sans-serif";

ctx.fillText("Hello", CENTER\_X, TITLE\_BASELINE);

ctx.strokeStyle = "orange";

ctx.fillStyle = "yellow";

ctx.lineWidth = 4;

// draw circle

ctx.beginPath();

ctx.arc(CENTER\_X, CENTER\_Y, RADIUS, 0, 2 \* Math.PI);

ctx.fill();

// draw eyes

ctx.moveTo(CENTER\_X - RADIUS / 3, CENTER\_Y - RADIUS / 3);

ctx.rect(CENTER\_X - RADIUS / 3,

CENTER\_Y - RADIUS / 3, EYE\_WIDTH, EYE\_HEIGHT);

ctx.moveTo(CENTER\_X + RADIUS / 3 - EYE\_WIDTH, CENTER\_Y - RADIUS / 3);

ctx.rect(CENTER\_X + RADIUS / 3 - EYE\_WIDTH,

CENTER\_Y - RADIUS / 3, EYE\_WIDTH, EYE\_HEIGHT);

// draw mouth

ctx.moveTo(CENTER\_X - RADIUS / 3, CENTER\_Y + RADIUS / 3);

ctx.lineTo(CENTER\_X + RADIUS / 3, CENTER\_Y + RADIUS / 3);

ctx.stroke();

} // end initialize

1. Add expand and shrink buttons to the Moving Face web page.

Add to the bottom of the HTML file:

<input type="button" value="Expand"

onclick="expand();">

<input type="button" value="Shrink"

onclick="shrink();">

Add to the bottom of the JavaScript file:

function expand() {

const SCALE\_FACTOR = 1.25; // expand by 25%

const INVERSE\_SCALE\_FACTOR = 1 - SCALE\_FACTOR;

ctx.translate(INVERSE\_SCALE\_FACTOR \* CENTER\_X,

INVERSE\_SCALE\_FACTOR \* CENTER\_Y);

ctx.scale(SCALE\_FACTOR, SCALE\_FACTOR);

drawFace();

} // end expand

function shrink() {

const SCALE\_FACTOR = .8; // scale by 80%

const INVERSE\_SCALE\_FACTOR = 1 - SCALE\_FACTOR;

ctx.save();

ctx.setTransform(1, 0, 0, 1, 0, 0);

ctx.clearRect(0, 0, canvas.width, canvas.height);

ctx.restore();

ctx.translate(INVERSE\_SCALE\_FACTOR \* CENTER\_X,

INVERSE\_SCALE\_FACTOR \* CENTER\_Y);

ctx.scale(SCALE\_FACTOR, SCALE\_FACTOR);

drawHeading();

drawFace();

} // end shrink

1. In the Moving Face web page, the moveUp function calls the clearRect method like this:

ctx.clearRect(0, 0, canvas.width, canvas.height);

We could have used 500 and 400 instead of canvas.width and canvas.height. Which technique is better and why?

Using canvas.width and canvas.height is better because your code will be more maintainable.