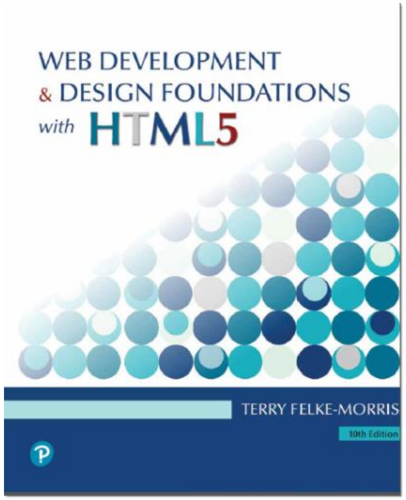
Web Development & Design Foundations with HTML5 10th Edition



CHAPTER 7
RESPONSIVE PAGE LAYOUT

Learning Outcomes

In this chapter, you will learn how to ...

- Describe CSS Flexible Box Layout
- Configure Flexbox Container and Flexbox Items
- Create a web page that applies CSS Flexible Box Layout
- Describe CSS Grid Layout
- Configure a Grid Container
- Create responsive page layouts with CSS Grid Layout
- Configure web pages for mobile display using the viewport meta tag
- Apply responsive web design techniques with CSS media queries, CSS feature queries, and flexible images
- Apply responsive image techniques including the HTML5 picture element

CSS Flexible Box Layout aka flexbox

Purpose: Provide for a flexible, responsive layout
https://www.w3.org/TR/css-flexbox-1/

Best used for one dimension – a row or a column

The **display property** configures a flexbox container
display: flex;

Flex Item – a child element of the flex container

The flex-wrap property

- Determines whether flex items are displayed on multiple lines
- Values are nowrap (default), wrap, wrap-reverse

The flex-direction property

- Configures the flow direction
- Values are row (default), column, row-reverse, and column-reverse

Diagram of a Flex Container

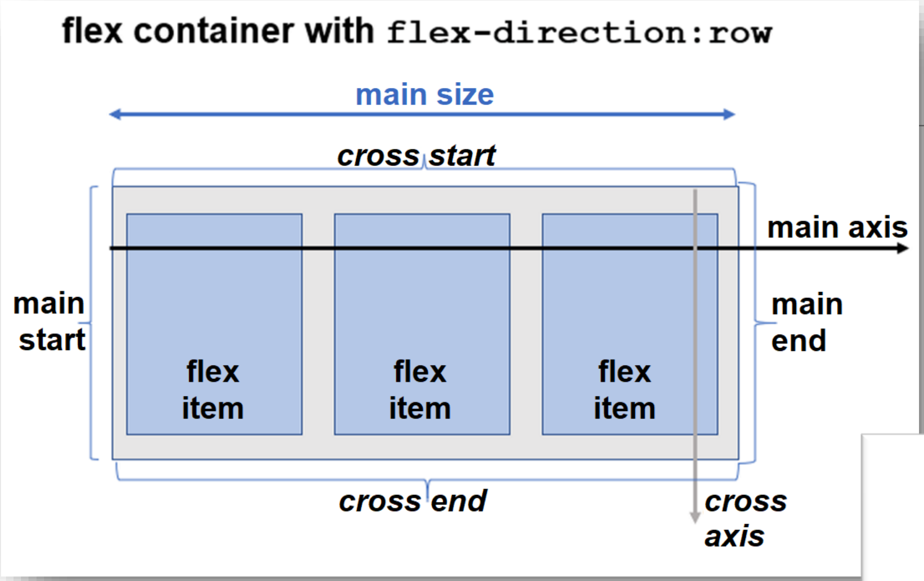


Figure 7.3

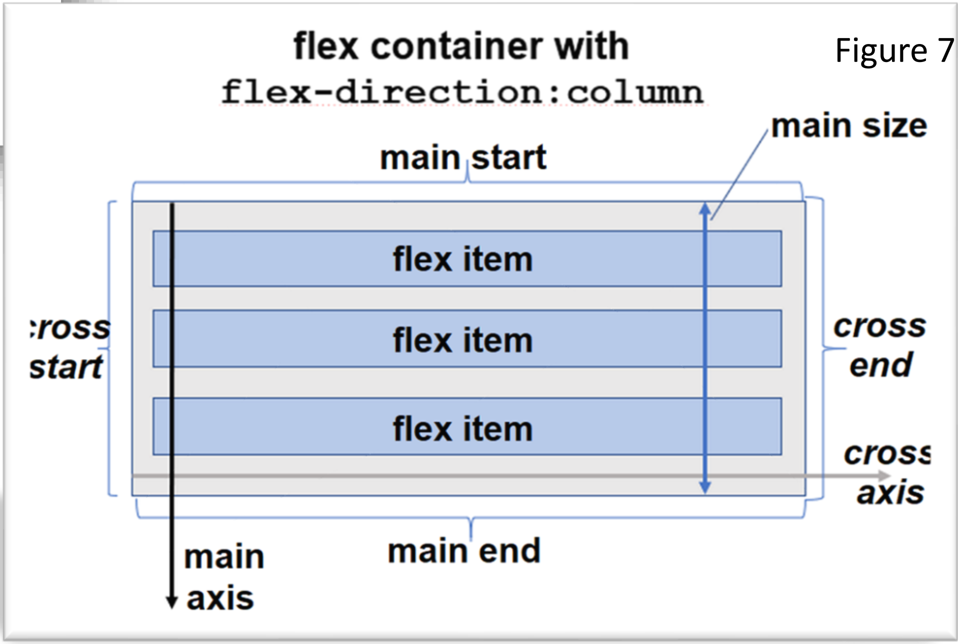
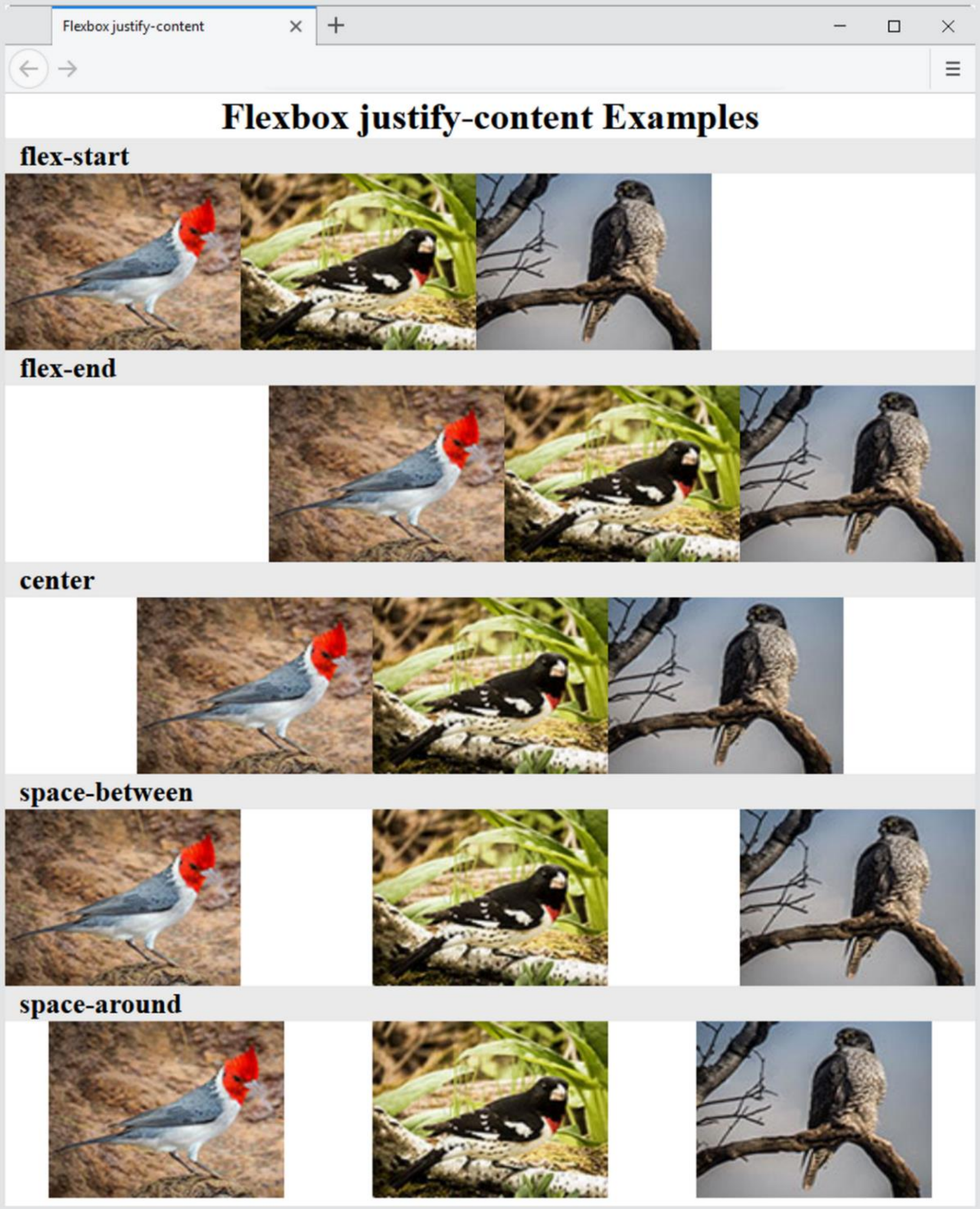


Figure 7.4

The justify-content Property

Configures how the extra space along the main axis should be displayed



Flexbox justify-content Examples

flex-start

flex-end

center

space-between

space-around

Figure 7.5

More flexbox Properties

The align-items Property

- Configures how the browser displays extra space along the cross-axis

The flex-flow Property

- Shorthand to configure flex-direction and flex-wrap properties

The order Property

- Causes the browser to display flex items in different order than they are coded
- Warning – this could be an accessibility issue

Configure Flex Items

By default flex items are flexible in size and allocated the same amount of space in the flex container

The flex property

- Customizes the size of each flex item
- Indicated the flex grow factor
- Indicates the flex shrink factor
- Can be used to indicate a proportional flexible item

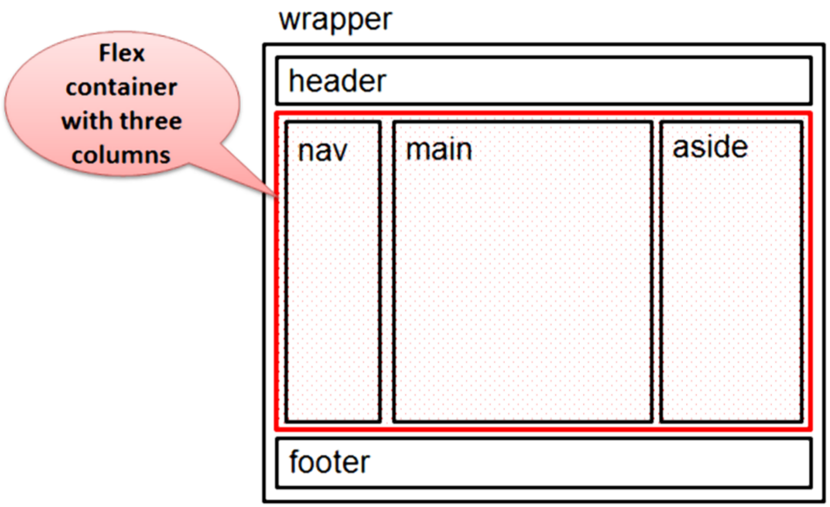


Figure 7.10

```
nav   { flex: 1; }
main { flex: 7; }
aside { flex: 2; }
```

CSS Grid Layout

Purpose: Configure a two-dimensional grid-based layout
The grid can be fixed in dimension or flexible and responsive.
https://www.w3.org/TR/css-grid-1/

The display property

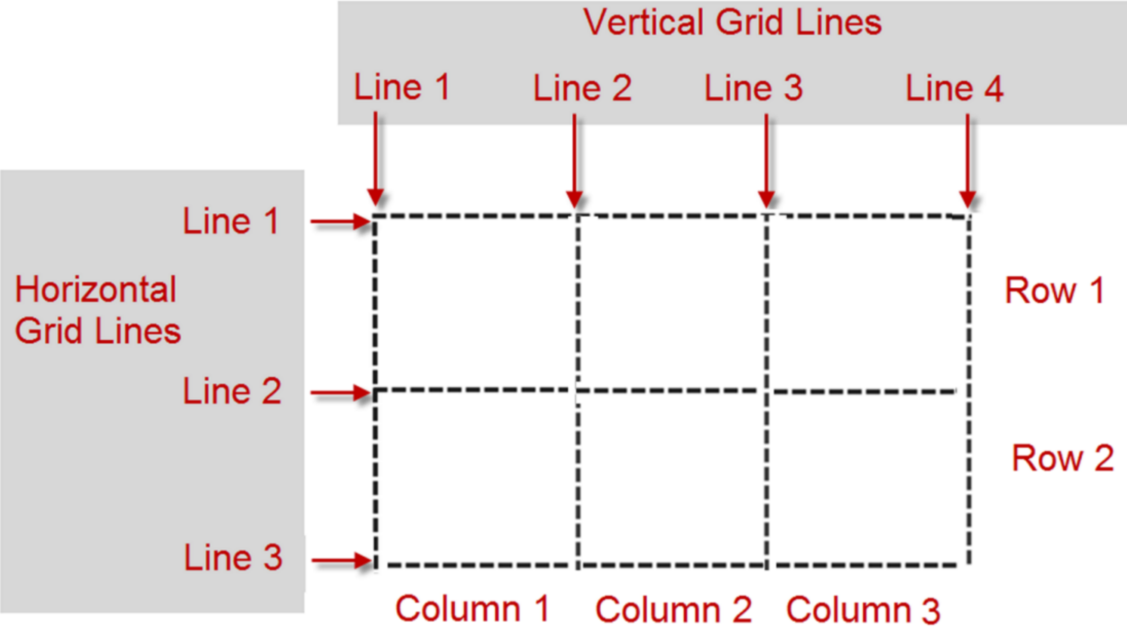
- Configures a grid container
  display: grid;

Grid Item – a child element of the grid container

Grid Terms

- Grid line
- Grid row
- Grid column
- Grid track
- Grid gap

Figure 7.14



Configure Grid Columns and Grid Rows

The grid-template-columns property

The grid-template-rows property

Example:

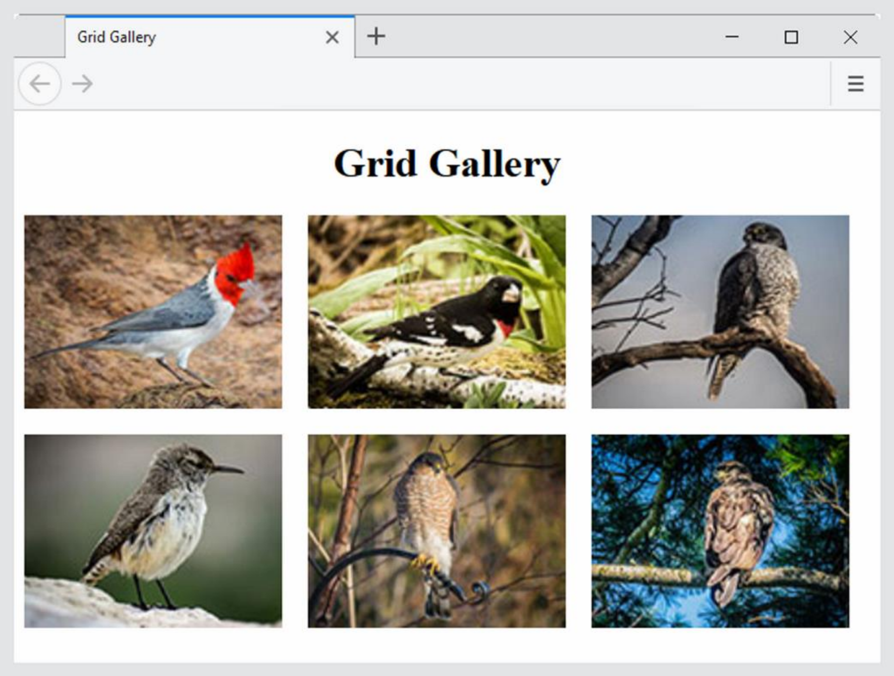


Figure 7.15

```
#gallery { display: grid;
    grid-template-columns: 220px 220px 220px;
    grid-template-rows: 170px 170px; }
```

Grid Columns & Grid Rows

https://www.w3.org/TR/css-grid-1/#propdef-grid-template-columns

Commonly used values for grid-template-columns and grid-template-rows

Table 7.4

Value	Description
numeric length unit	Configures a fixed size with a length unit such as px or em Example: 220px
numeric percentage	Configures a percentage size; Example: 20%
numeric fr unit	Configures a flex factor unit (denoted by fr) that directs the browser to allocate a fractional part of the remaining space
auto	Configures a size to hold the maximum content
minmax (min, max)	Configures a size range greater or equal to min value and less than or equal to max value. The max can be set to a flex factor.
repeat(repetition amount, format value)	Repeats the column or row the number of times specified by the repetition amount numeric value or keyword and uses the format value to configure the column or row. The auto-fill keyword indicates to repeat but stop before an overflow. Example: repeat (autofill, 250px)

Configure Grid Items

The **grid-row property**

- configures the area in rows that is reserved for the item in the grid

The **grid-column property**

- configures the area in columns that is reserved for the item in the grid

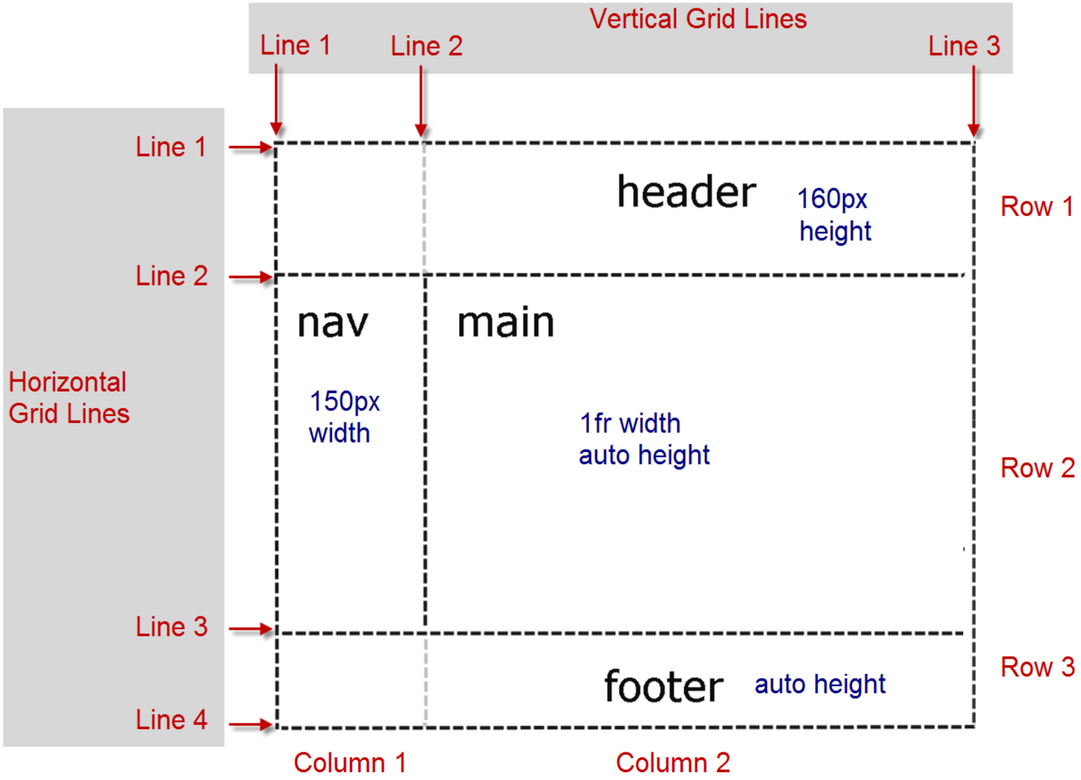


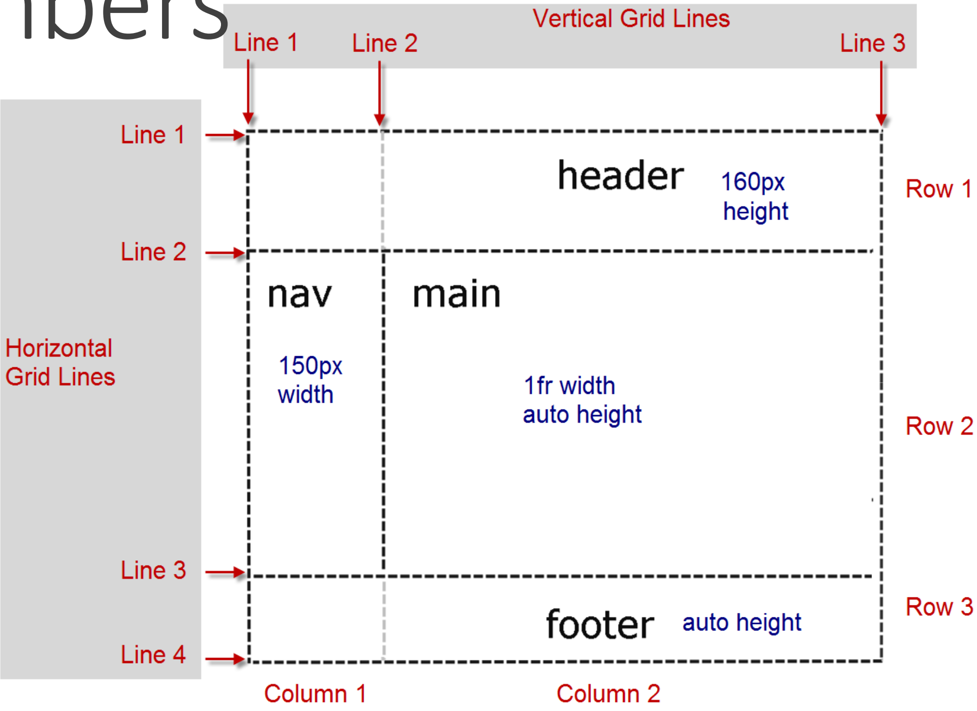
Figure 7.18

Configure Line Numbers

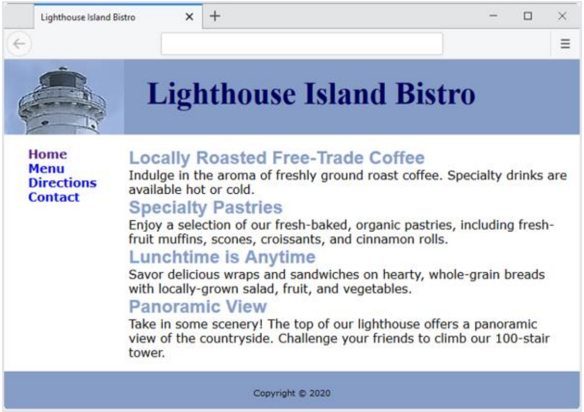
Grid Line Numbers

- Identify the starting and ending line number separated by a / character

Figure 7.18



```
header { grid-row: 1 / 2; grid-column: 1 / 3; }
nav    { grid-row: 2 / 3; grid-column: 1 / 2; }
main   { grid-row: 2 / 3; grid-column: 2 / 3; }
footer { grid-row: 3 / 4; grid-column: 1 / 3; }
```



Lighthouse Island Bistro

Home
Menu
Directions
Contact

Locally Roasted Free-Trade Coffee

Indulge in the aroma of freshly ground roast coffee. Specialty drinks are available hot or cold.

Specialty Pastries

Enjoy a selection of our fresh-baked, organic pastries, including fresh-fruit muffins, scones, croissants, and cinnamon rolls.

Lunchtime is Anytime

Savor delicious wraps and sandwiches on hearty, whole-grain breads with locally-grown salad, fruit, and vegetables.

Panoramic View

Take in some scenery! The top of our lighthouse offers a panoramic view of the countryside. Challenge your friends to climb our 100-stair tower.

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Figure 7.19

https://www.w3.org/TR/css-grid-1/#typedef-grid-row-start-grid-line

Configure Grid Areas (1)

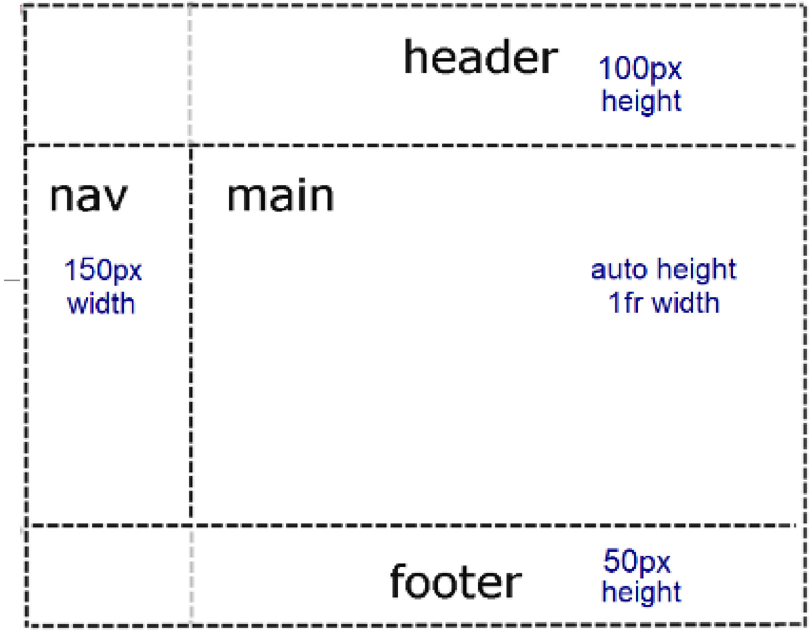
grid-area Property

```
header { grid-area: header; }
nav { grid-area: nav; }
main { grid-area: main; }
footer { grid-area: footer; }
```

grid-template-areas Property

```
#wrapper { display: grid;
      grid-template-columns: 150px 1fr;
      grid-template-rows: 100px auto 50px;
      grid-template-areas:
         "header header"
         "nav main"
         "footer footer"; }
```

https://www.w3.org/TR/css-grid-1/#grid-template-areas-property



header 100px height

nav 150px width

main auto height 1fr width

footer 50px height

Figure 7.21

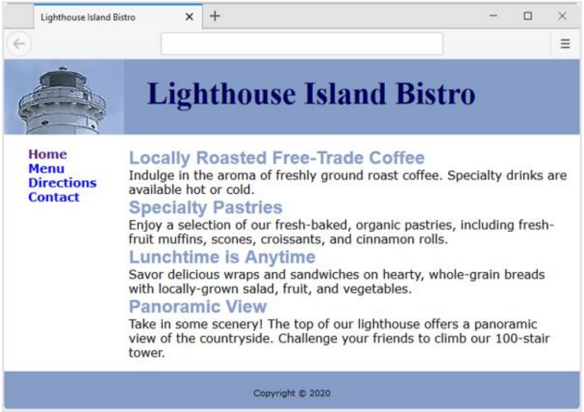


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Figure 7.19

Configure Grid Areas (2)

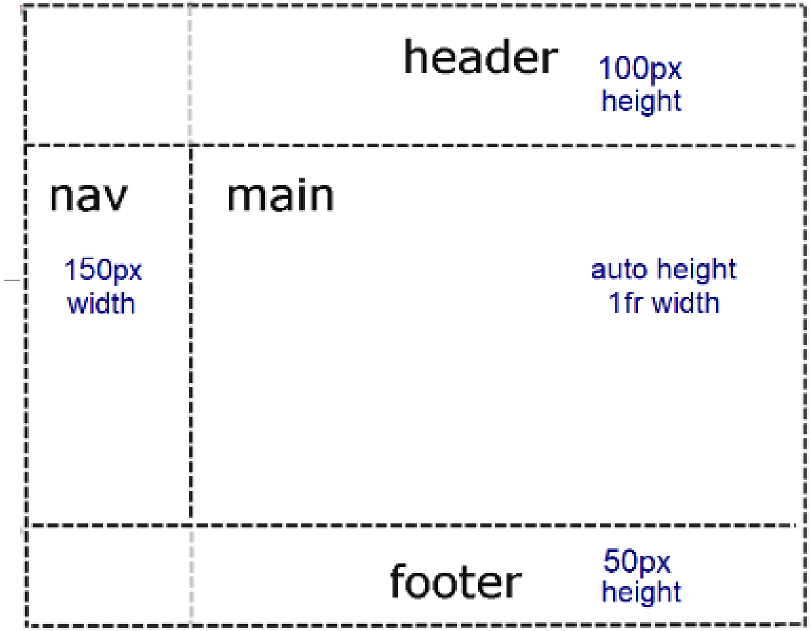
- grid-area Property

```
header { grid-area: header; }
nav { grid-area: nav; }
main { grid-area: main; }
footer { grid-area: footer; }
```

- grid-template Property

```
#wrapper { display: grid;
                  grid-template:
                   "header header header" 100px
                   "nav main aside " auto
                   "footer footer footer" 50px
                    / 150px 1fr 30%;
```

https://www.w3.org/TR/css-grid-1/#propdef-grid-template



header 100px height

nav 150px width

main auto height 1fr width

footer 50px height

Figure 7.21

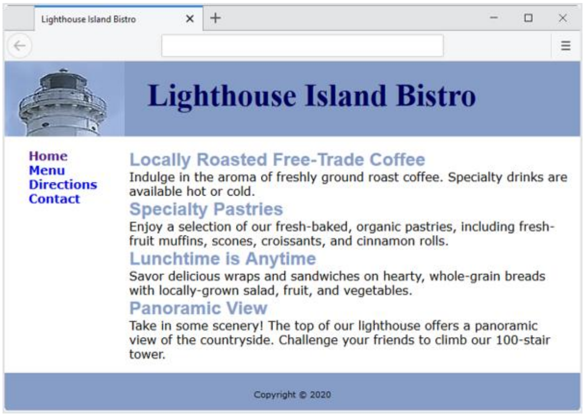


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Figure 7.19

Checkpoint

1. Which CSS property is used to identify a CSS selector as a grid or flexbox container?
2. The CSS justify-content property used in flexbox layout is quite versatile. Choose three values and describe their purposes.
3. Which CSS property can be used to indicate the location and dimensions of named grid areas?

Progressive Enhancement with Grid

CSS Feature Query

- A **feature query** is a conditional that can be used to test for support of a CSS property, and if support is found, apply the specified style rules.

```
@supports ( display: grid) {
.... grid styles go here ...
}
```

Progressive Enhancement Strategy

- Configure web page layout with normal flow or float for browsers and devices that do not support grid
- Configure a feature query with grid layout for modern browsers

Center with Flexbox

```
header { display: flex;
          min-height: 100vh;
           justify-content: center;
          align-items: center;
           background-color: #227093;
           background-image: url(lake.jpg);
           background-size: 100% 100%;
           background-repeat: no-repeat;  }
```

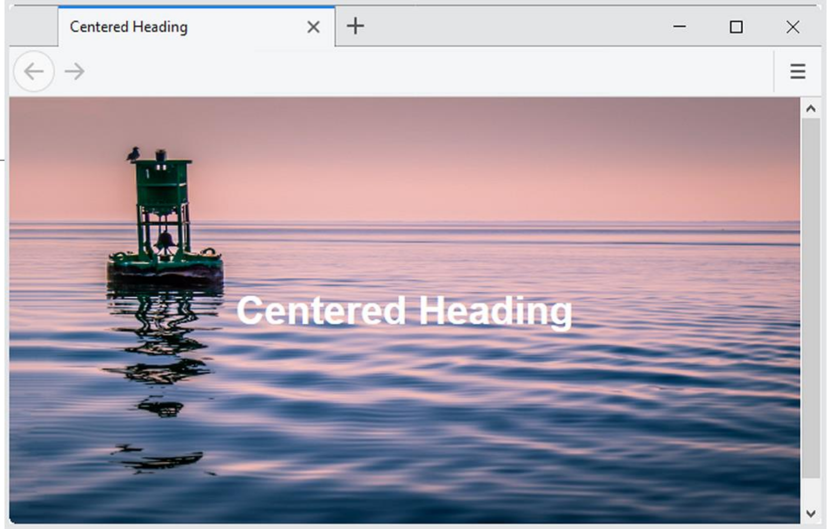
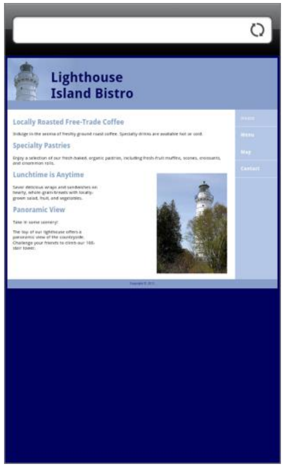


Figure 7.30

Viewport Meta Tag

Default action for most mobile devices is to zoom out and scale the web page



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Panoramic View

Take in some scenery!

The top of our lighthouse offers a panoramic view of the countryside. Challenge your friends to climb our 100-stair tower.

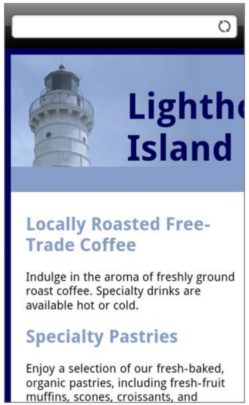
Figure 7.31

Viewport Meta Tag

Created as an Apple extension to configure display on mobile devices

Configures width and initial scale of browser viewport

```
<meta name="viewport" content="width=device-width, initial-scale=1.0">
```



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Island

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Specialty Pastries

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Figure 7.32

CSS Media Queries

Media Query

- Determines the capability of the mobile device, such as screen resolution
- Directs the browser to styles configured specifically for those capabilities

Example with link tag

```
<link href="lighthousemobile.css" rel="stylesheet"
     media="(max-device-width: 480px)">
```

Example within CSS

```
        @media  (max-width: 768px) {
        }
```

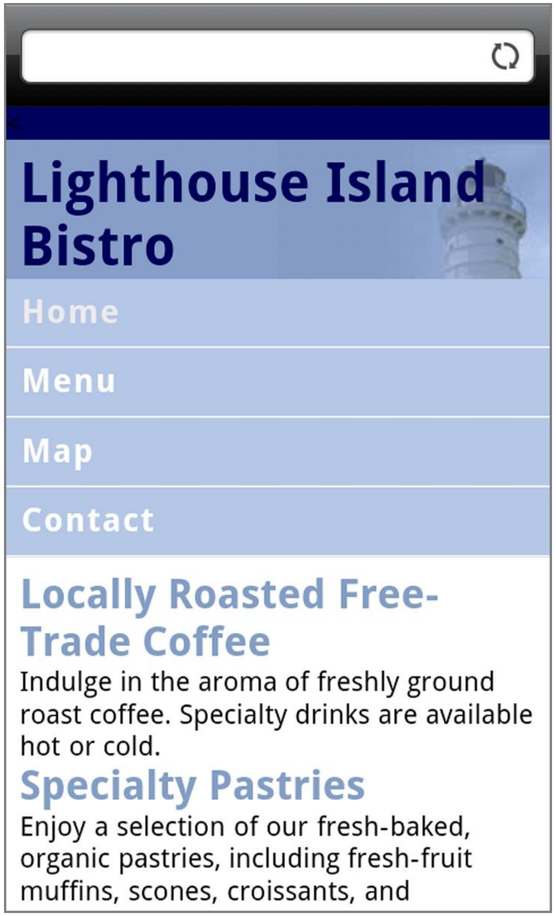

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Figure 7.33

Mobile First Approach

- Responsive design layout strategy
- Term coined by Luke Wroblewski
- The Mobile First Process:
  1. Configure a single-column page layout for narrow screens – smartphones! Test with a small browser window if needed.
  2. Resize the browser viewport to be larger until the design “breaks” and needs to be reworked for a pleasing display—this is the point where you may need to code a media query.
  3. Continue resizing the browser viewport to be larger until the design breaks and code additional media queries.

Responsive Layout with Media Queries

Hands-On Practice 7.8

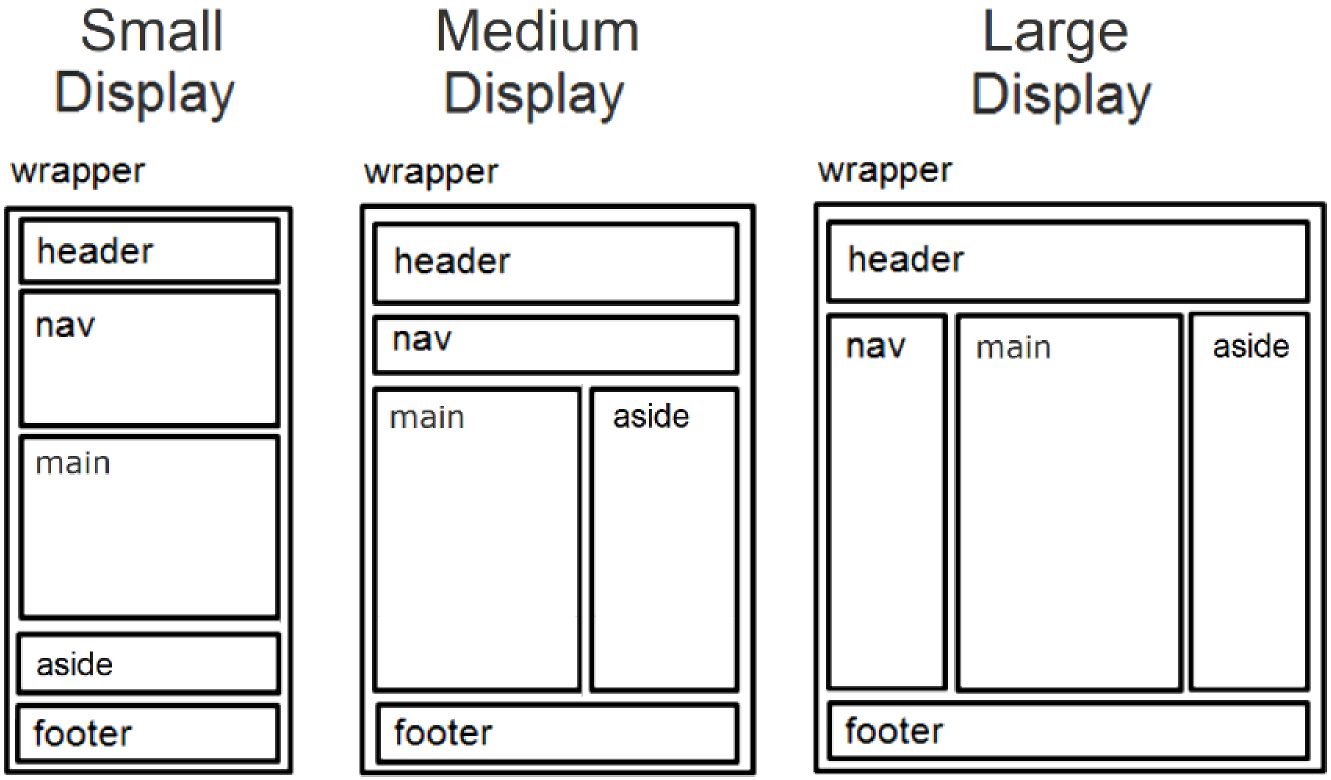


Figure 7.34

Responsive Grid Layout with Media Queries

Hands-On Practice 7.9

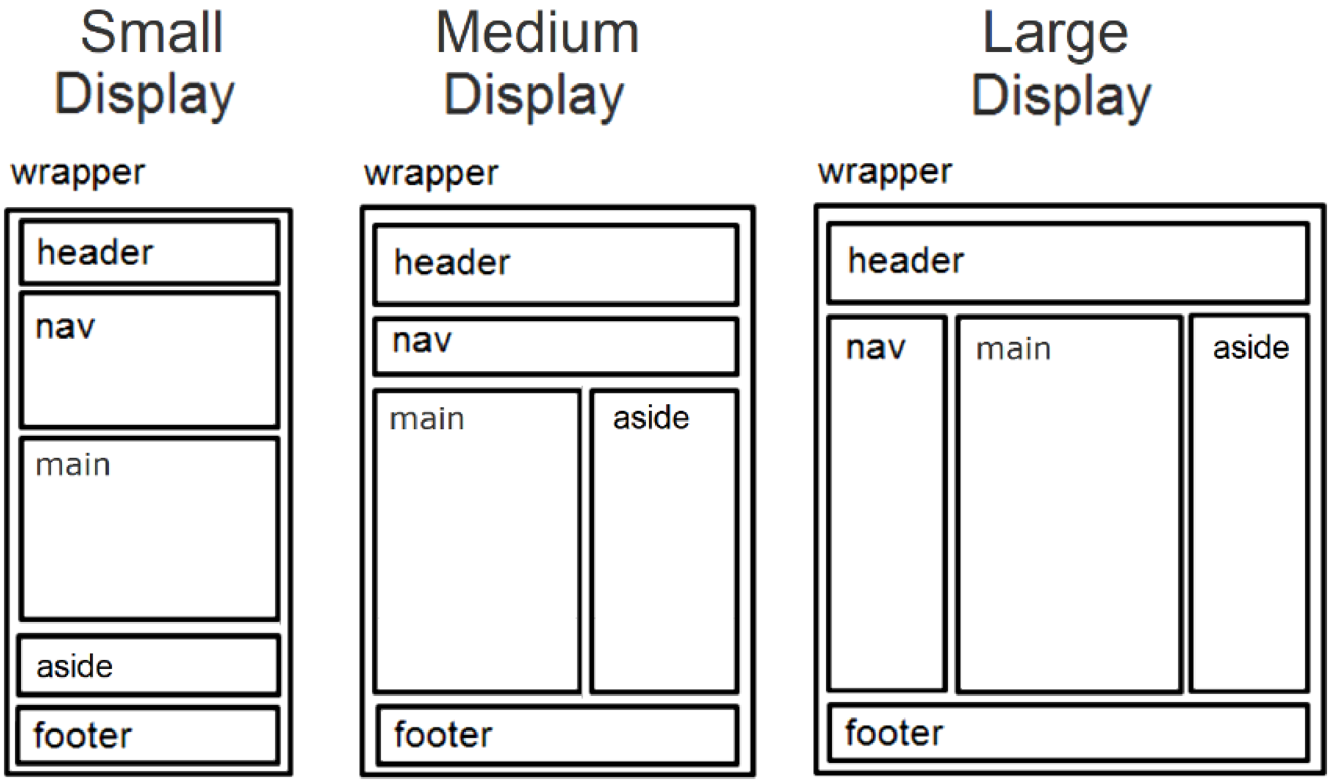
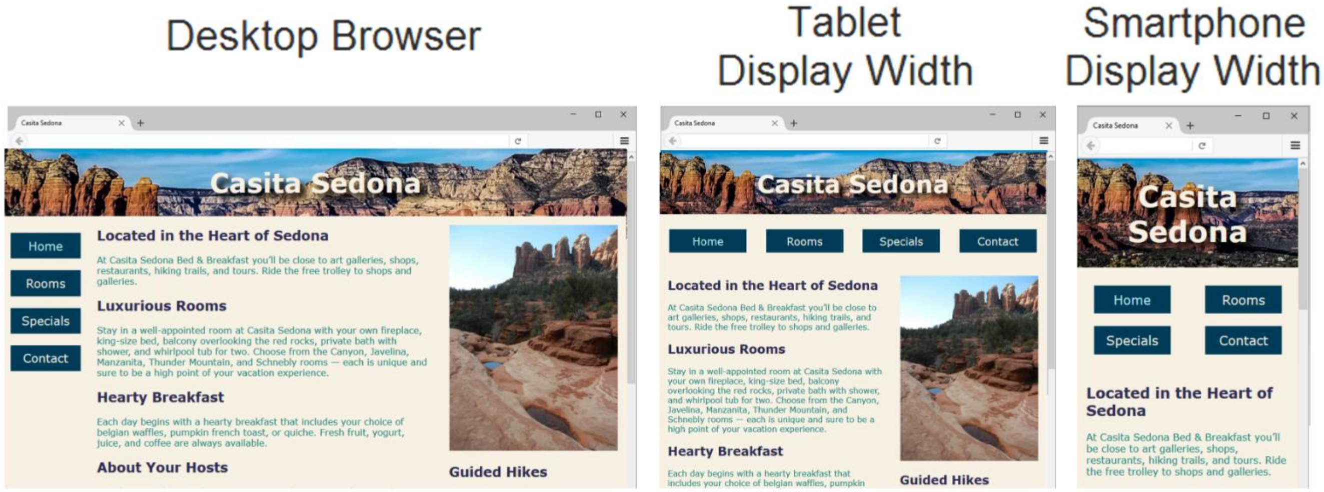


Figure 7.40

Flexible Images


Desktop Browser

Located in the Heart of Sedona

At Casita Sedona Bed & Breakfast you'll be close to art galleries, shops, restaurants, hiking trails, and tours. Ride the free trolley to shops and galleries.

Luxurious Rooms

Stay in a well-appointed room at Casita Sedona with your own fireplace, king-size bed, balcony overlooking the red rocks, private bath with shower, and whirlpool tub for two. Choose from the Canyon, Javelina, Manzanita, Thunder Mountain, and Schnebly rooms — each is unique and sure to be a high point of your vacation experience.

Hearty Breakfast

Each day begins with a hearty breakfast that includes your choice of belgian waffles, pumpkin french toast, or quiche. Fresh fruit, yogurt, juice, and coffee are always available.

About Your Hosts

Guided Hikes

Tablet Display Width

Located in the Heart of Sedona

At Casita Sedona Bed & Breakfast you'll be close to art galleries, shops, restaurants, hiking trails, and tours. Ride the free trolley to shops and galleries.

Luxurious Rooms

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Hearty Breakfast

Each day begins with a hearty breakfast that includes your choice of belgian waffles, pumpkin

Guided Hikes

Smartphone Display Width

Located in the Heart of Sedona

At Casita Sedona Bed & Breakfast you'll be close to art galleries, shops, restaurants, hiking trails, and tours. Ride the free trolley to shops and galleries.

Figure 7.47

Edit HTML:
remove height and width attributes

CSS:

```
img { max-width: 100%;
      height: auto; }
```

Responsive Images
HTML 5.1 Picture Element

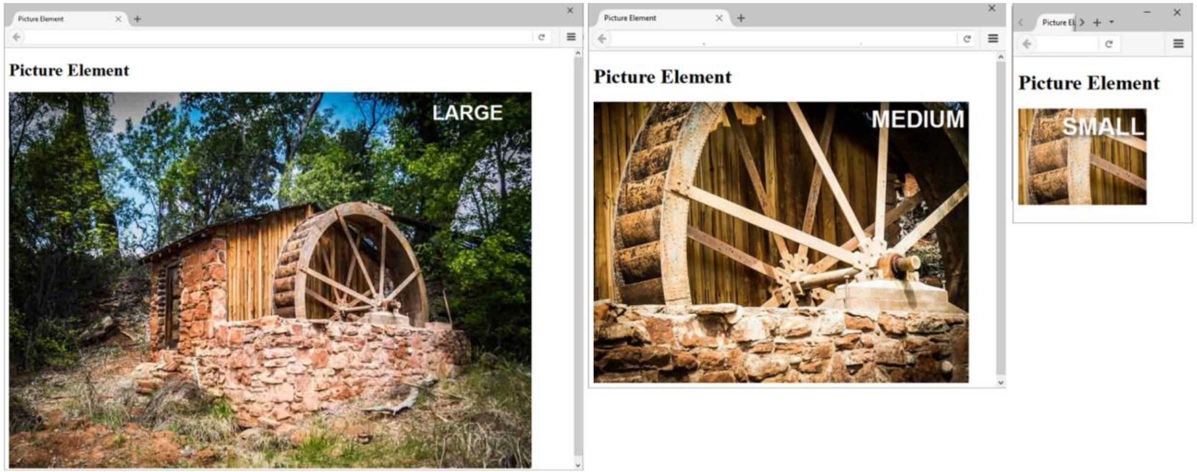


Figure 7.49

```
<picture>
<source media="(min-width: 1200px)" srcset="large.jpg">
<source media="(min-width: 800px)" srcset="medium.jpg">
<source media="(min-width: 320px)" srcset="small.jpg">
<img src="fallback.jpg" alt="waterwheel">
</picture>
```

Responsive Images
HTML 5.1 sizes & srcset Attributes

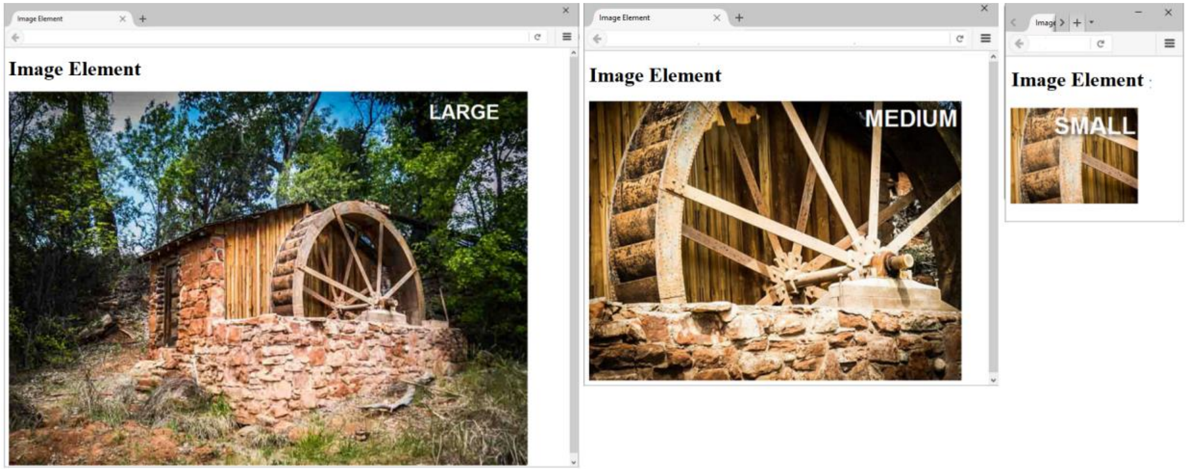


Figure 7.50

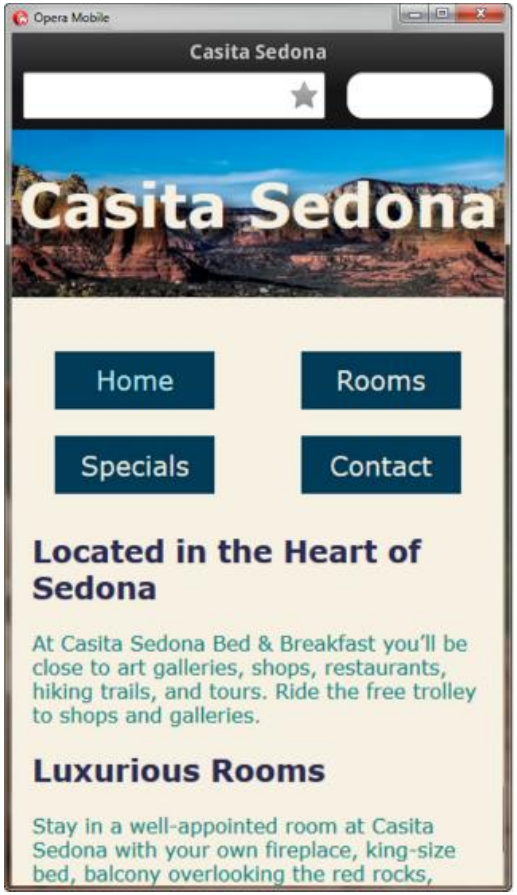
```
<img src="fallback.jpg"
     sizes="100vw"
     srcset="large.jpg 1200w, medium.jpg 800w, small.jpg 320w"
    alt="waterwheel">
```

Checkpoint

1. What is meant by the phrase "Mobile First"?
2. Are there certain values that must be used in CSS media queries? Why or why not?
3. Describe coding techniques that will configure an image with a flexible display.

Testing Mobile Display Options

- Test with a mobile device
- Test with a Desktop Browser
- Other Options
  - Opera Mobile Emulator https://dev.opera.com/articles/opera-mobile-emulator/
  - Google Chrome Dev Tools https://developers.google.com/web/tools/chrome-devtools/device-mode/
  - iPhone Emulator http://www.testiphone.com



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Luxurious Rooms

Stay in a well-appointed room at Casita Sedona with your own fireplace, king-size bed, balcony overlooking the red rocks,

Figure 7.51

CSS Debugging Tips

- Manually check syntax errors
- Use W3C CSS Validator to check syntax errors
  - http://jigsaw.w3.org/css-validator/
- Configure temporary background colors
- Configure temporary borders
- Use CSS comments to find the unexpected

  /* the browser ignores this code */
- Don’t expect your pages to look exactly the same in all browsers!
- Be patient!

Summary

This chapter introduced you to modern layout techniques which configure responsive web pages that display well on desktop browsers and mobile devices.