Tutorial 06

Working with Tables and Columns

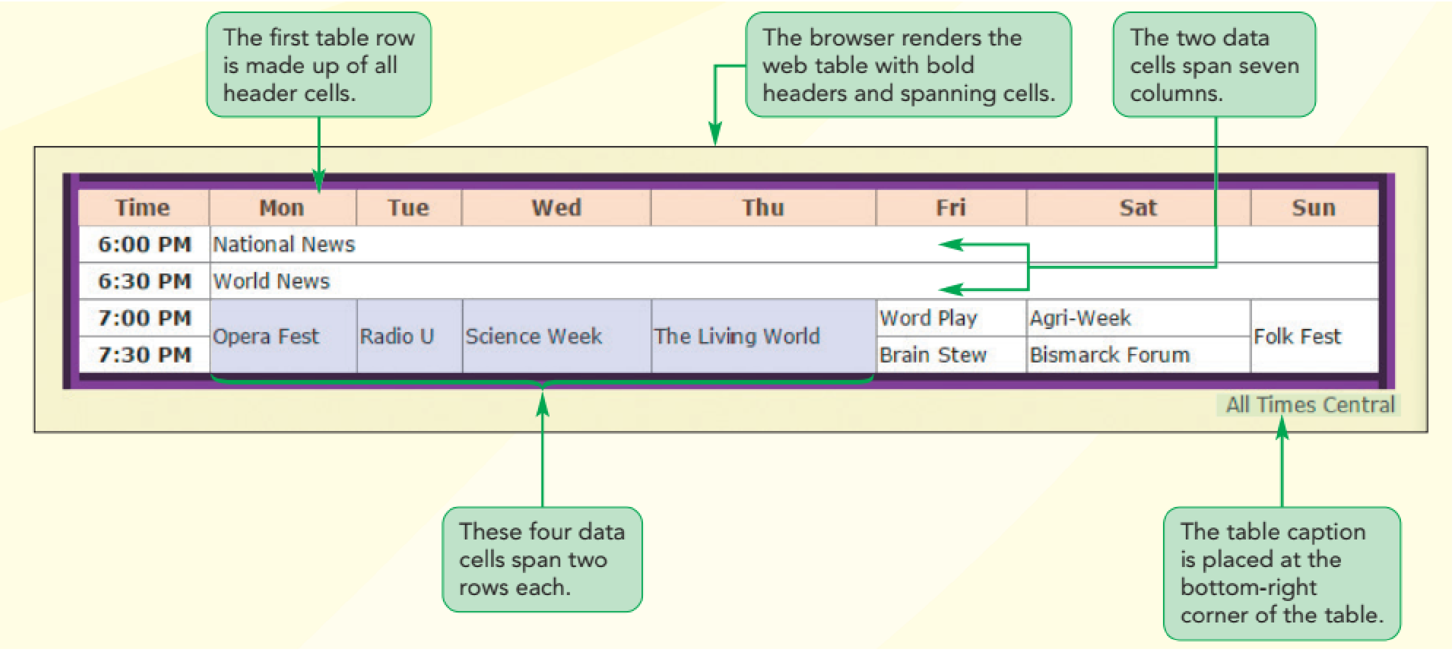
Objectives

- Explore the structure of a web table
- Create table heading and data cells
- Apply CSS styles to a table
- Create cells that span multiple rows and columns
- Add a caption to a table

Objectives (continued)

- Create row and column groups
- Apply styles to row and column groups
- Display page elements in table form
- Create a multi-column layout

Structure of a Web Table



The first table row is made up of all header cells.

The browser renders the web table with bold headers and spanning cells.

The two data cells span seven columns.

Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun
6:00 PM	National News						
6:30 PM	World News						
7:00 PM	Opera Fest	Radio U	Science Week	The Living World	Word Play	Agri-Week	Folk Fest
7:30 PM					Brain Stew	Bismarck Forum	

All Times Central

These four data cells span two rows each.

The table caption is placed at the bottom-right corner of the table.

Introducing Web Tables

- **Web table**
  - HTML structure that consists of multiple table rows
  - Each table row contains one or more table cells
  - The cells themselves can contain additional HTML elements
  - Effective tool for organizing and classifying web page content
  - Consists of a `table` element

Marking Tables and Table Rows

- A `table` element contains a collection of table rows marked using the `tr` (table row) element
- A table contains cells within each row
- Size of a table is defined by
    - Number of table rows
    - Number of cells within rows

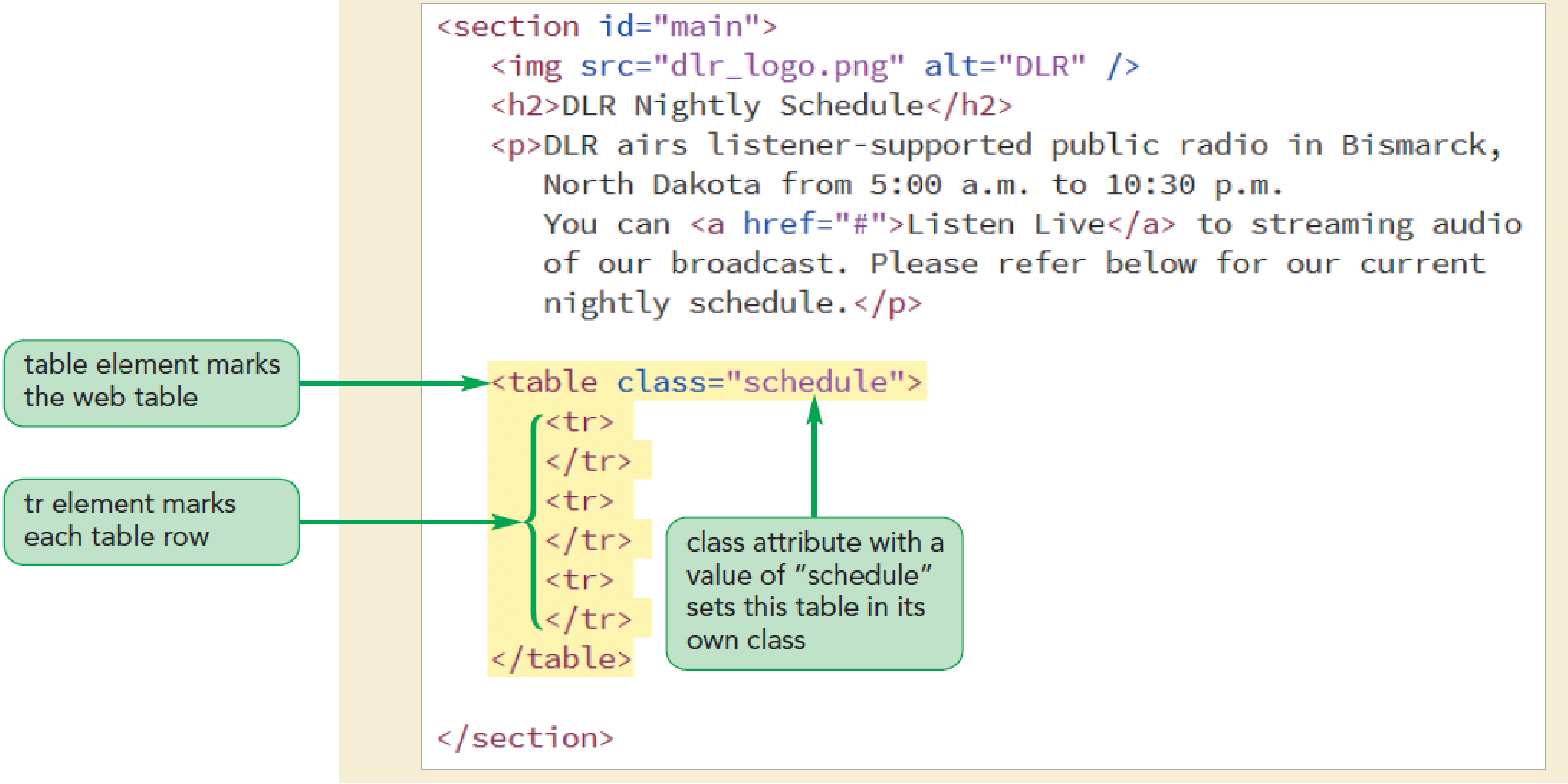
Marking Tables and Table Rows (continued 1)

- General structure of a web table:

```
<table>
    <tr>
        table cells
    </tr>
    <tr>
        table cells
    </tr>
    …
 </table>
```

Marking Tables and Table Rows (continued 2)

Figure 6-2 Marking a table and table rows



```
<section id="main">
   <img src="dlr_logo.png" alt="DLR" />
   <h2>DLR Nightly Schedule</h2>
   <p>DLR airs listener-supported public radio in Bismarck,
      North Dakota from 5:00 a.m. to 10:30 p.m.
      You can <a href="#">Listen Live</a> to streaming audio
      of our broadcast. Please refer below for our current
      nightly schedule.</p>

   <table class="schedule">
      <tr>
      </tr>
      <tr>
      </tr>
      <tr>
      </tr>
   </table>

</section>
```

table element marks the web table

tr element marks each table row

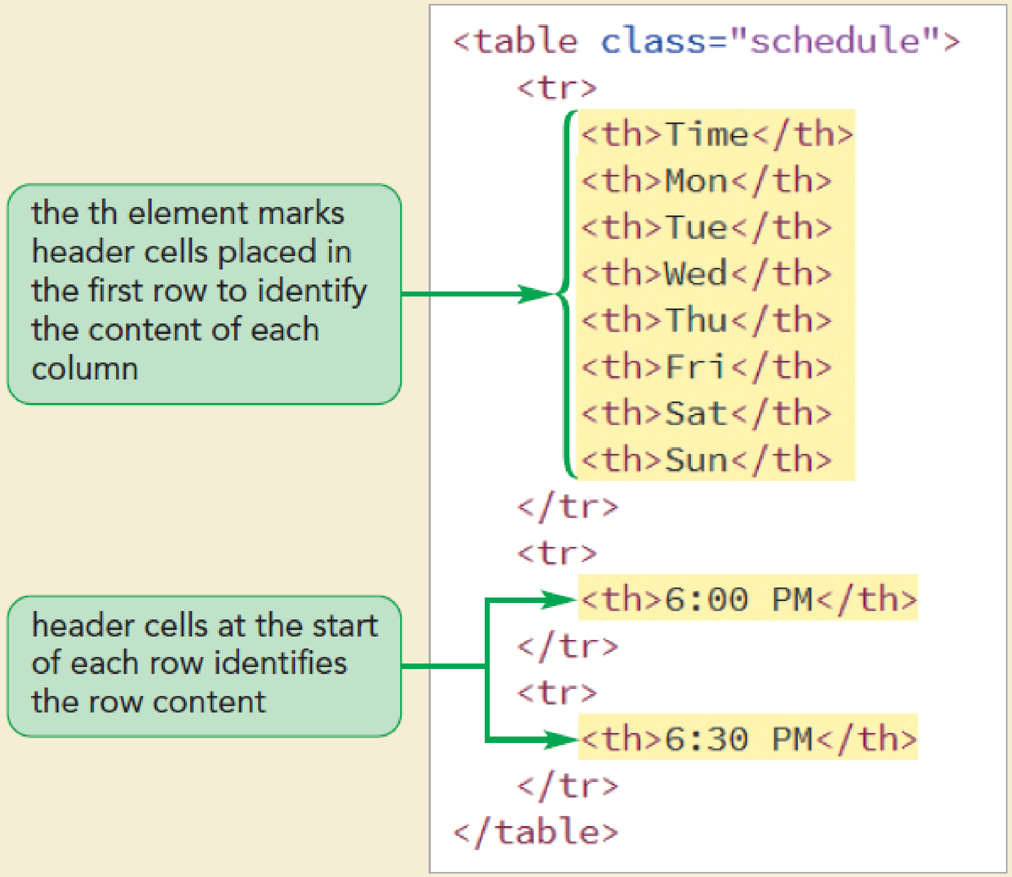
class attribute with a value of "schedule" sets this table in its own class

Marking Table Headings and Table Data

- Web tables support two types of table cells
  - Header cells
    - Contains content placed at the top of a column or beginning of a row
    - By default, displays text in bold and centers text horizontally
    - Marked using the `th` element
  - Data cells
    - Contains content within columns or rows
    - By default, displays text as unformatted text and is aligned to the left within the cell
    - Marked using the `td` element

Marking Table Headings and Table Data (continued 1)

Figure 6-3 Marking table header cells



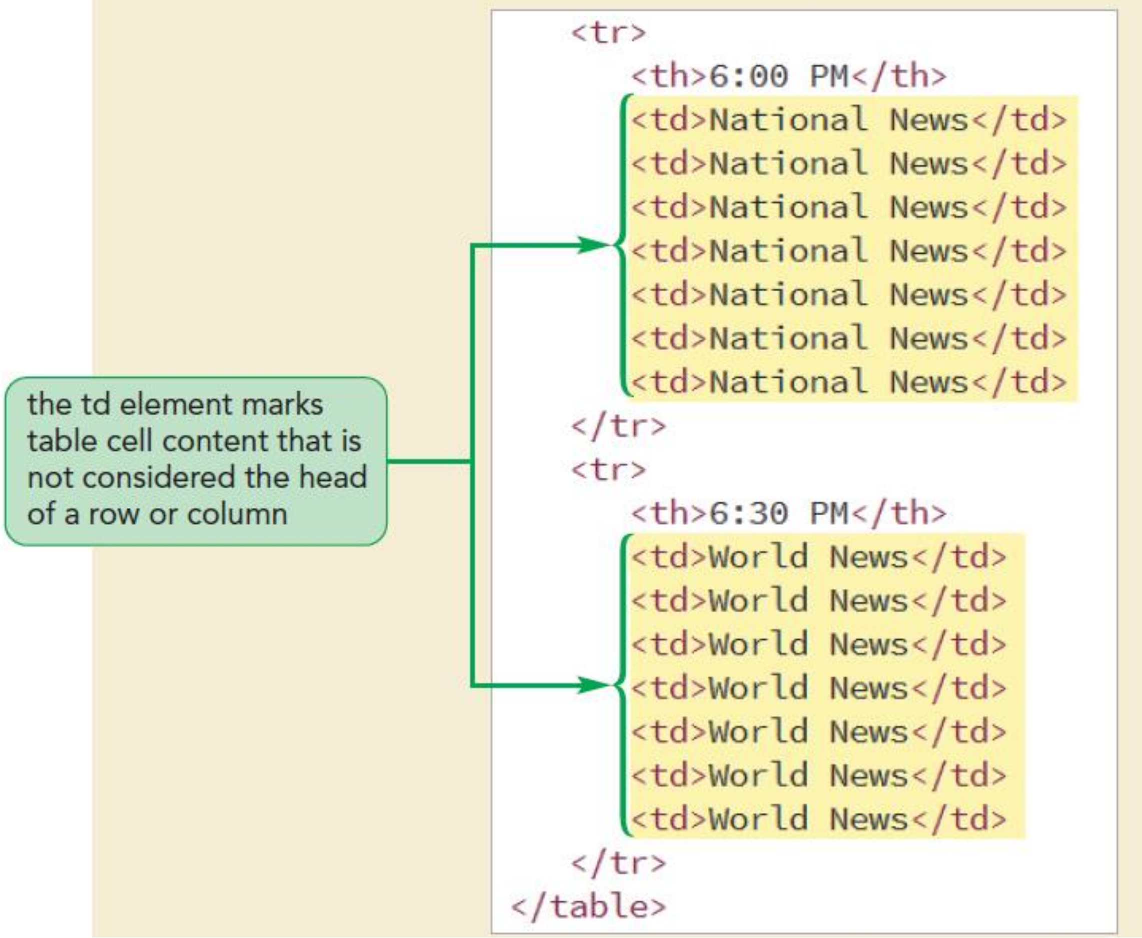
the th element marks header cells placed in the first row to identify the content of each column

header cells at the start of each row identifies the row content

```
<table class="schedule">
   <tr>
      <th>Time</th>
      <th>Mon</th>
      <th>Tue</th>
      <th>Wed</th>
      <th>Thu</th>
      <th>Fri</th>
      <th>Sat</th>
      <th>Sun</th>
   </tr>
   <tr>
      <th>6:00 PM</th>
   </tr>
   <tr>
      <th>6:30 PM</th>
   </tr>
</table>
```

Marking Table Headings and Table Data (continued 2)

Figure 6-4 Marking table data cells



```
  <tr>
    <th>6:00 PM</th>
    <td>National News</td>
    <td>National News</td>
    <td>National News</td>
    <td>National News</td>
    <td>National News</td>
    <td>National News</td>
    <td>National News</td>
  </tr>
  <tr>
    <th>6:30 PM</th>
    <td>World News</td>
    <td>World News</td>
    <td>World News</td>
    <td>World News</td>
    <td>World News</td>
    <td>World News</td>
    <td>World News</td>
  </tr>
</table>
```

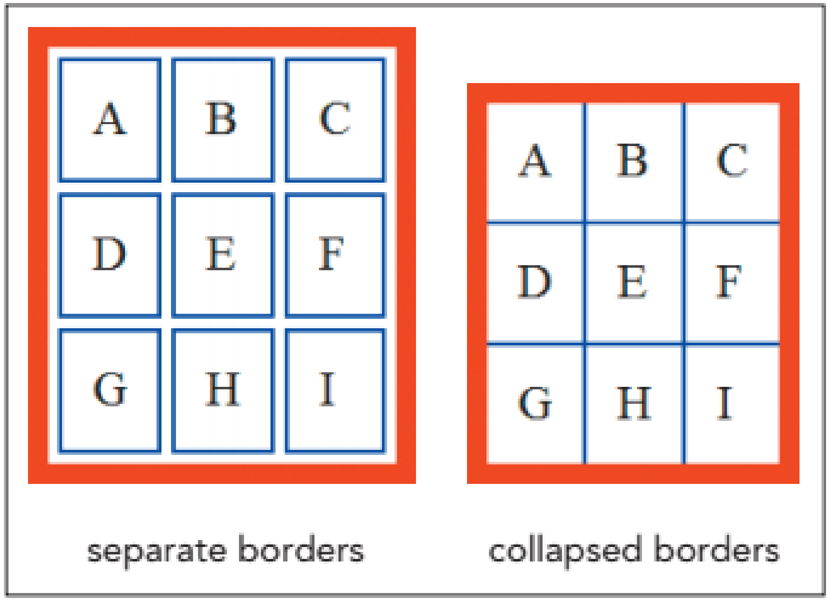
the td element marks table cell content that is not considered the head of a row or column

Adding Table Borders with CSS

- The CSS `border` property is used to add borders to any part of a web table
- Borders need not be of the same style
- Two style choices for borders
  - Separate borders
  - Collapsed borders

Adding Table Borders with CSS (continued 1)

Figure 6–8 Separate and collapsed borders



Adding Table Borders with CSS (continued 2)

- To choose between separate or collapsed borders model apply the following property to the `table` element:

  ```
  border-collapse: type;
  ```

  where `type` is either `separate` or `collapse`
- The separate borders model sets the spacing between borders using:

  ```
  border-spacing: value
  ```

  where `value` is in CSS units of measure

Adding Table Borders with CSS (continued 3)

- The collapsed borders model
  - Borders from adjacent elements are merged to form a single border
  - Borders are joined to combine their features
  - Combining adjacent borders with different widths, styles, or colors is complicated

Adding Table Borders with CSS (continued 4)

- Five rules to reconcile the differences between adjacent borders
  - If either border has a style of `hidden`, the collapsed border is hidden
  - Border style of `none` is overridden by another border style
  - The style of wider border takes priority over the narrower border if neither border is hidden

Adding Table Borders with CSS (continued 5)

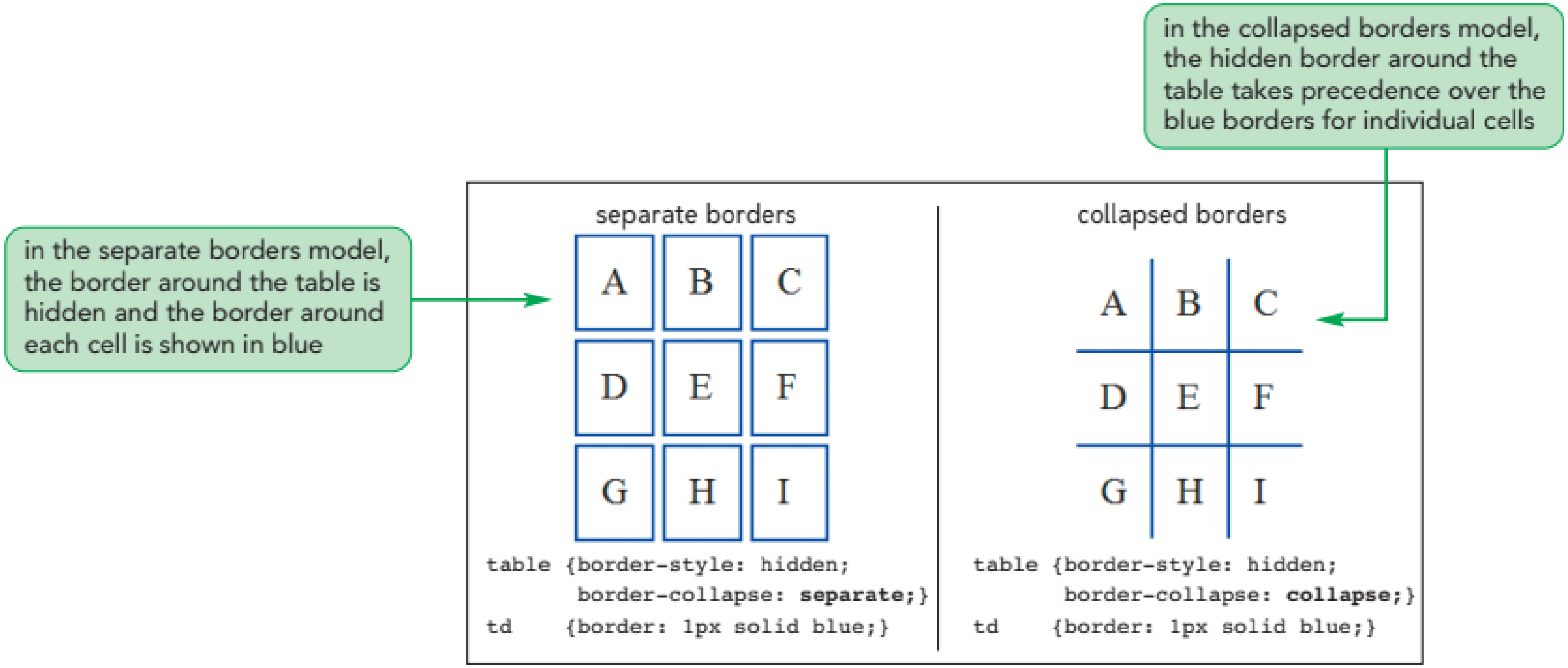
- Five rules (continued)
  - Double borders have higher precedence followed by solid, dashed, ridge, outset, groove and inset
  - If borders differ only in color, precedence is given to borders

Adding Table Borders with CSS (continued 6)

- Precedence to borders in decreasing order
  - Borders around individual table cells
  - Borders for table rows
  - Borders for row groups
  - Borders for columns
  - Borders for column groups
  - Borders around the entire table

Adding Table Borders with CSS (continued 7)

Figure 6–9 Reconciling hidden borders



in the collapsed borders model, the hidden border around the table takes precedence over the blue borders for individual cells

in the separate borders model, the border around the table is hidden and the border around each cell is shown in blue

```
table {border-style: hidden;
       border-collapse: separate;}
td    {border: 1px solid blue;}
```

```
table {border-style: hidden;
       border-collapse: collapse;}
td    {border: 1px solid blue;}
```

Spanning Rows and Columns

- Spanning cells
  - Single cell that occupies more than one cell row and/or column
  - Created by adding `rowspan` and/or `colspan` attributes to `td` or `th` elements
  - Spanning starts in the cell with `rowspan` or `colspan` attributes and covers the cells in the right and below the initial cell

Spanning Rows and Columns (continued 1)

```
rowspan="rows"
```

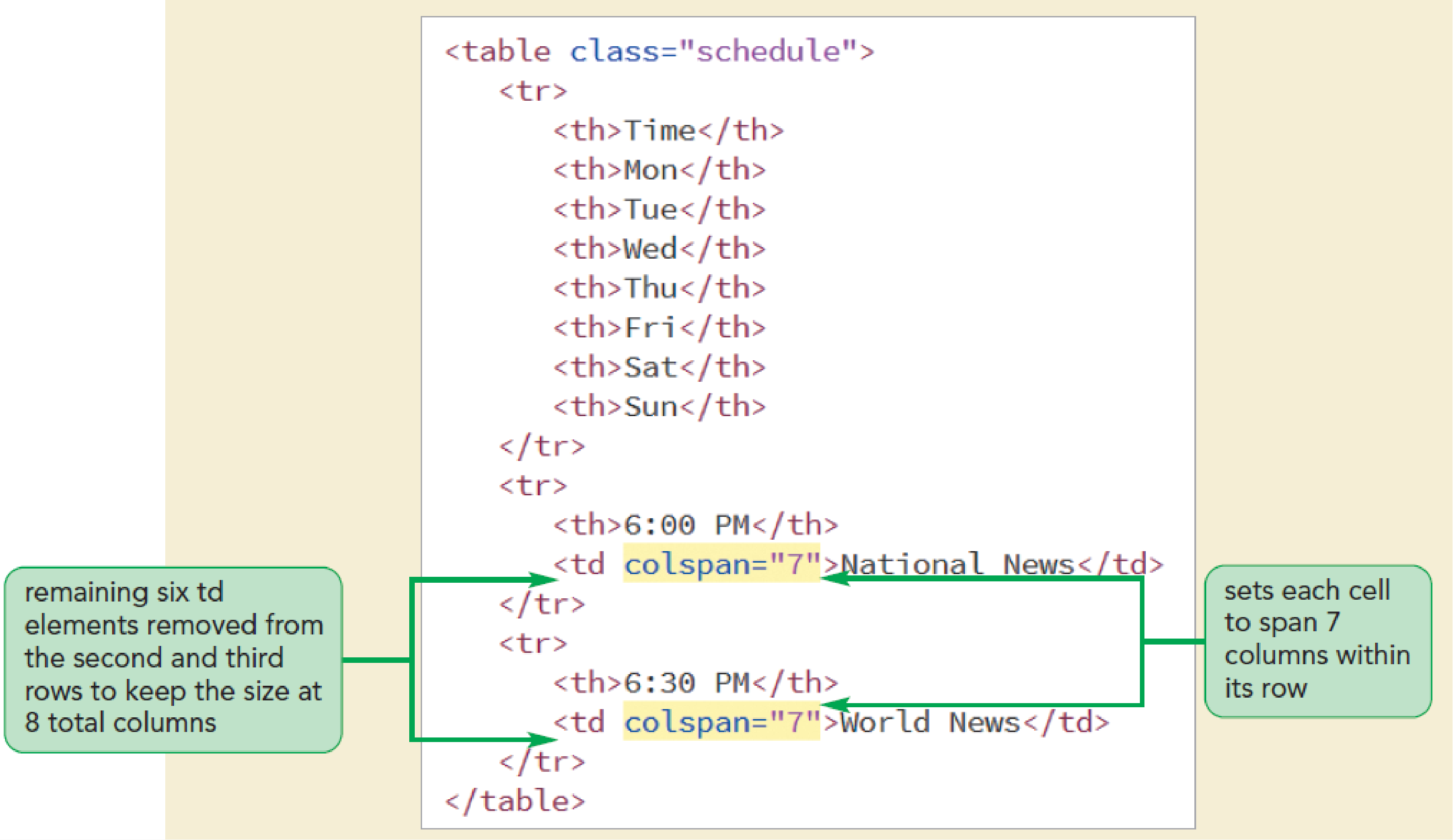
where `rows` is the number of rows that the cell occupies

```
colspan = "cols"
```

where `cols` is the number of columns that the cell occupies

Spanning Rows and Columns (continued 2)

Figure 6-13 Spanning several columns with a single cell



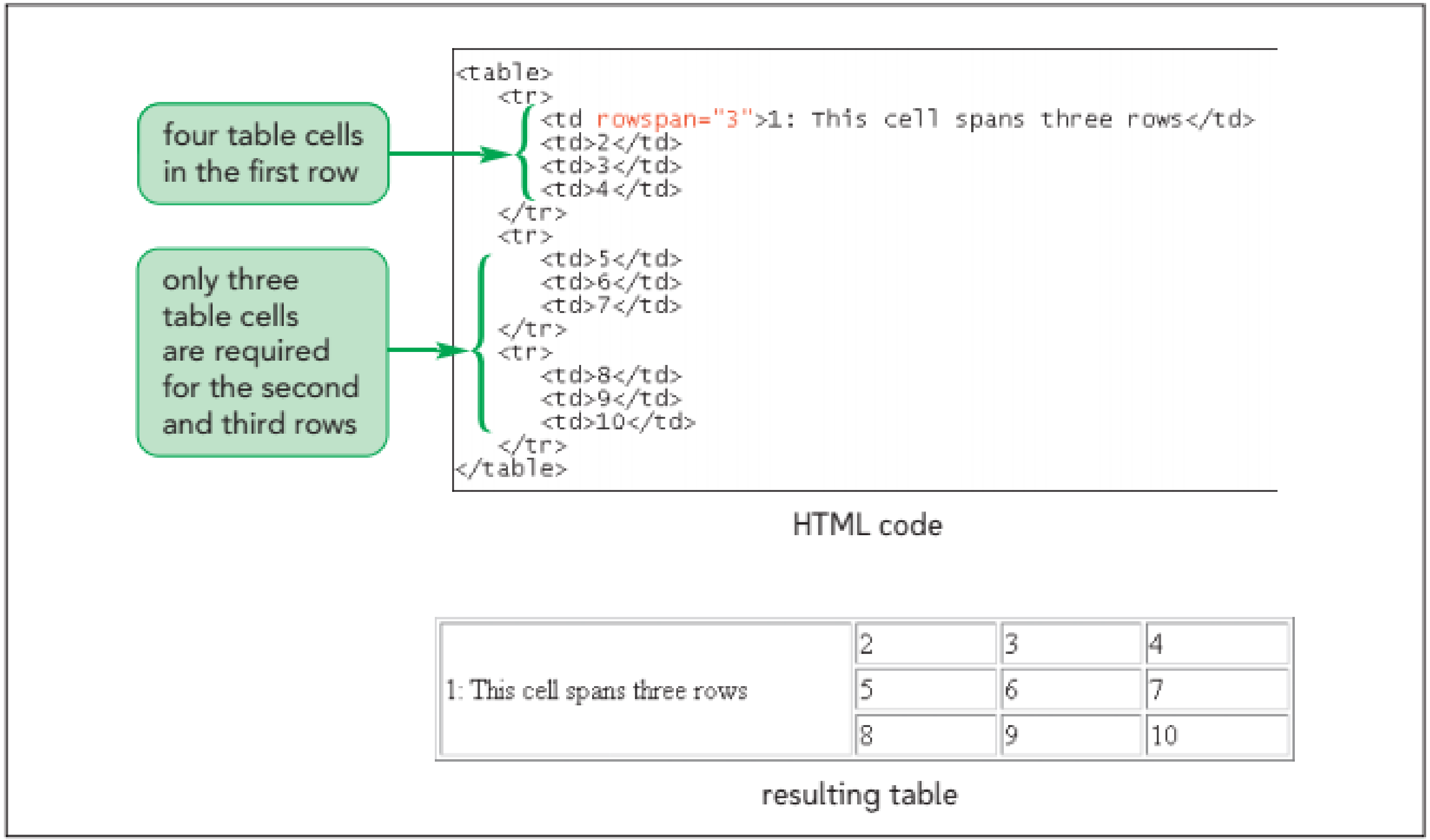
```
<table class="schedule">
   <tr>
      <th>Time</th>
      <th>Mon</th>
      <th>Tue</th>
      <th>Wed</th>
      <th>Thu</th>
      <th>Fri</th>
      <th>Sat</th>
      <th>Sun</th>
   </tr>
   <tr>
      <th>6:00 PM</th>
      <td colspan="7">National News</td>
   </tr>
   <tr>
      <th>6:30 PM</th>
      <td colspan="7">World News</td>
   </tr>
</table>
```

remaining six td elements removed from the second and third rows to keep the size at 8 total columns

sets each cell to span 7 columns within its row

Spanning Rows and Columns (continued 3)

Figure 6–15 Row-spanning cells



four table cells in the first row

only three table cells are required for the second and third rows

```
<table>
   <tr>
      <td rowspan="3">1: This cell spans three rows</td>
      <td>2</td>
      <td>3</td>
      <td>4</td>
   </tr>
   <tr>
      <td>5</td>
      <td>6</td>
      <td>7</td>
   </tr>
   <tr>
      <td>8</td>
      <td>9</td>
      <td>10</td>
   </tr>
</table>
```

HTML code

1: This cell spans three rows	2	3	4
	5	6	7
	8	9	10

resulting table

Creating a Table Caption

- Marked using the caption element

  `<caption>content</caption>`

  where `content` is the content contained within the caption
- Listed immediately after the `<table>` tag
- Only one caption is allowed per web table
- Inherits the text styles associated with the table

Creating a Table Caption (continued 1)

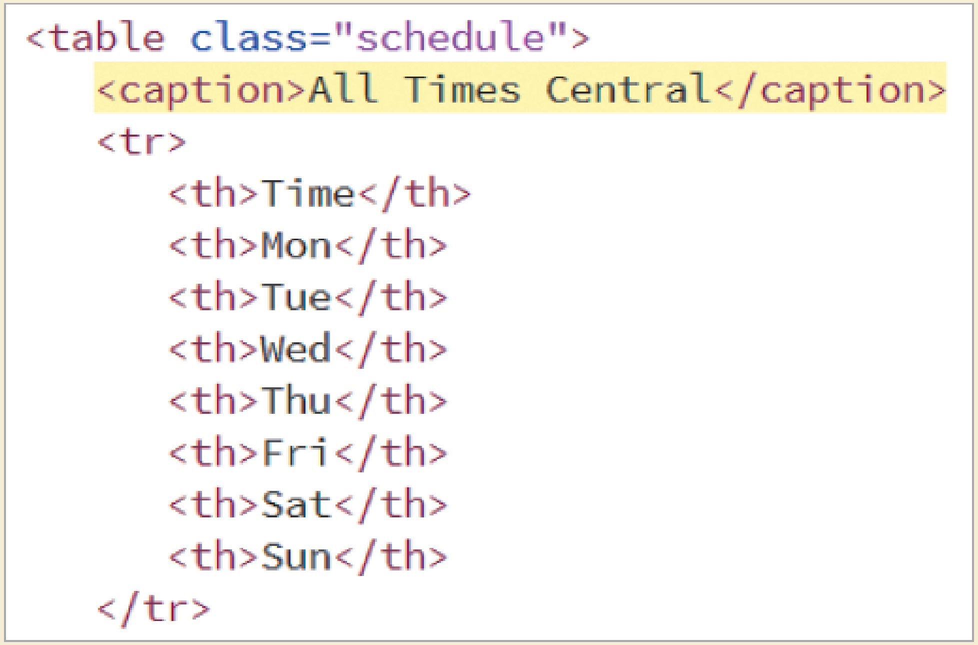
- By default, captions are placed above the tables
- To specify the location, use the `caption-side` property

```
caption-side: position;
```

where `position` is either `top` or `bottom`

Creating a Table Caption (continued 2)

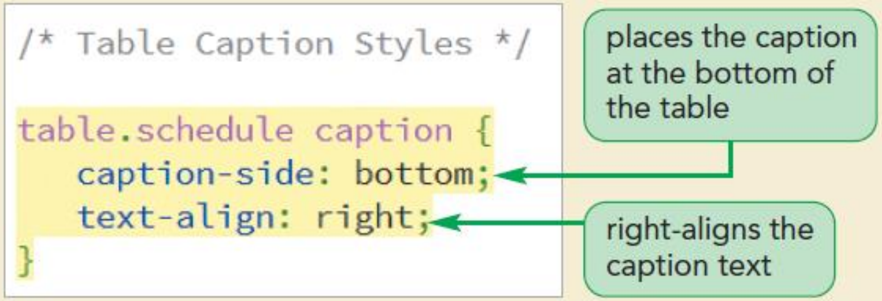
Figure 6-20 Adding a caption to a web table



```
<table class="schedule">
   <caption>All Times Central</caption>
   <tr>
      <th>Time</th>
      <th>Mon</th>
      <th>Tue</th>
      <th>Wed</th>
      <th>Thu</th>
      <th>Fri</th>
      <th>Sat</th>
      <th>Sun</th>
   </tr>
```

Creating a Table Caption (continued 3)

Figure 6-21 Adding a caption to a web table

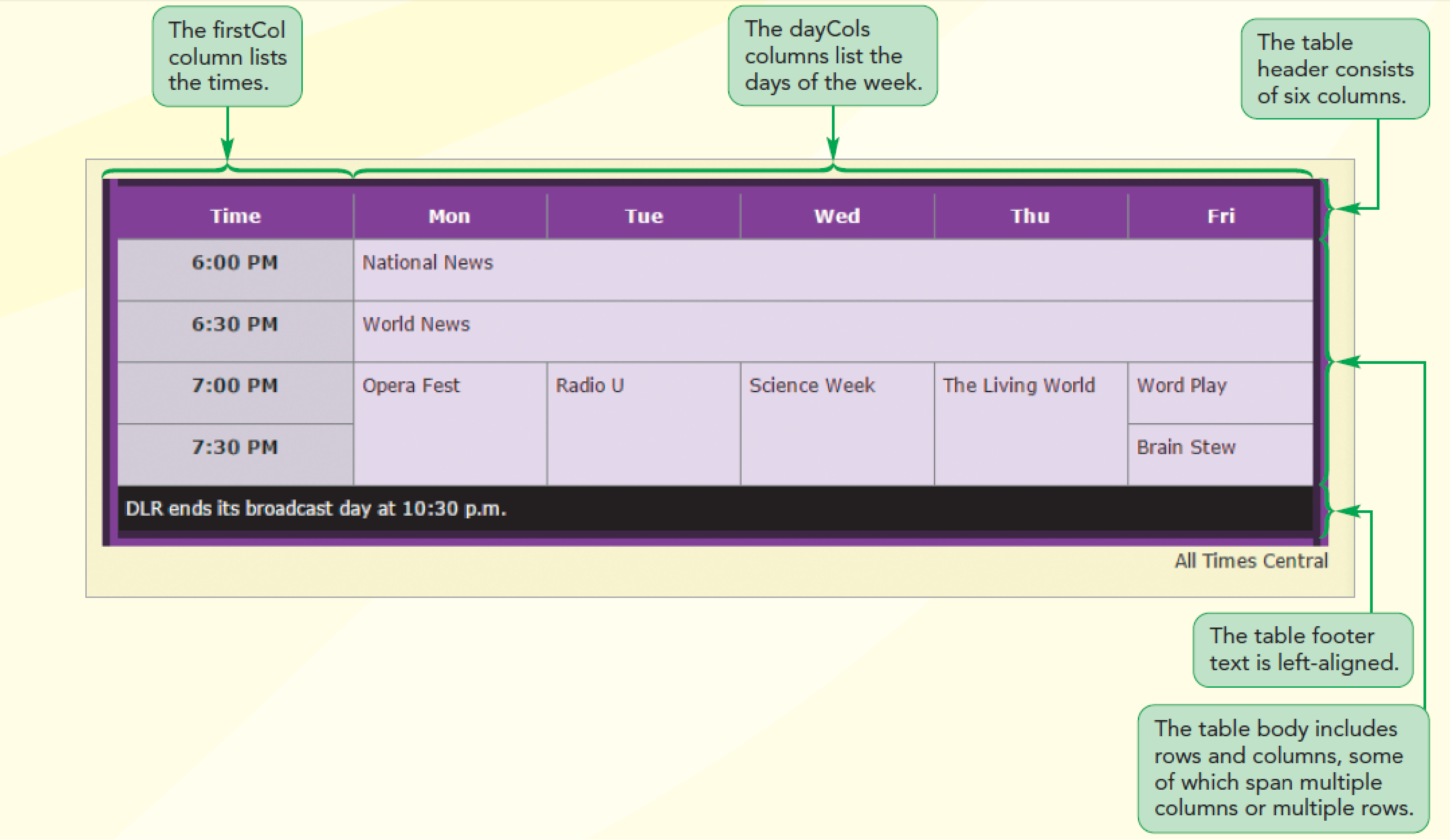


```
/* Table Caption Styles */

table.schedule caption {
   caption-side: bottom;
   text-align: right;
}
```

places the caption at the bottom of the table

right-aligns the caption text

Rows and Column Groups



The firstCol column lists the times.

The dayCols columns list the days of the week.

The table header consists of six columns.

Time	Mon	Tue	Wed	Thu	Fri
6:00 PM	National News				
6:30 PM	World News				
7:00 PM	Opera Fest	Radio U	Science Week	The Living World	Word Play
7:30 PM					Brain Stew
DLR ends its broadcast day at 10:30 p.m.					

All Times Central

The table footer text is left-aligned.

The table body includes rows and columns, some of which span multiple columns or multiple rows.

Creating Row Groups

- Row groups contain specific table information
- Allows the creation of different styles for groups of rows
- HTML supports three row groups
  - Rows that belong to the table head
    - Marked using `thead` element
  - Rows that belong to the table footer
    - Marked using `tfoot` element
  - Rows that belong to the table body
    - Marked using `tbody` element

Creating Row Groups (continued 1)

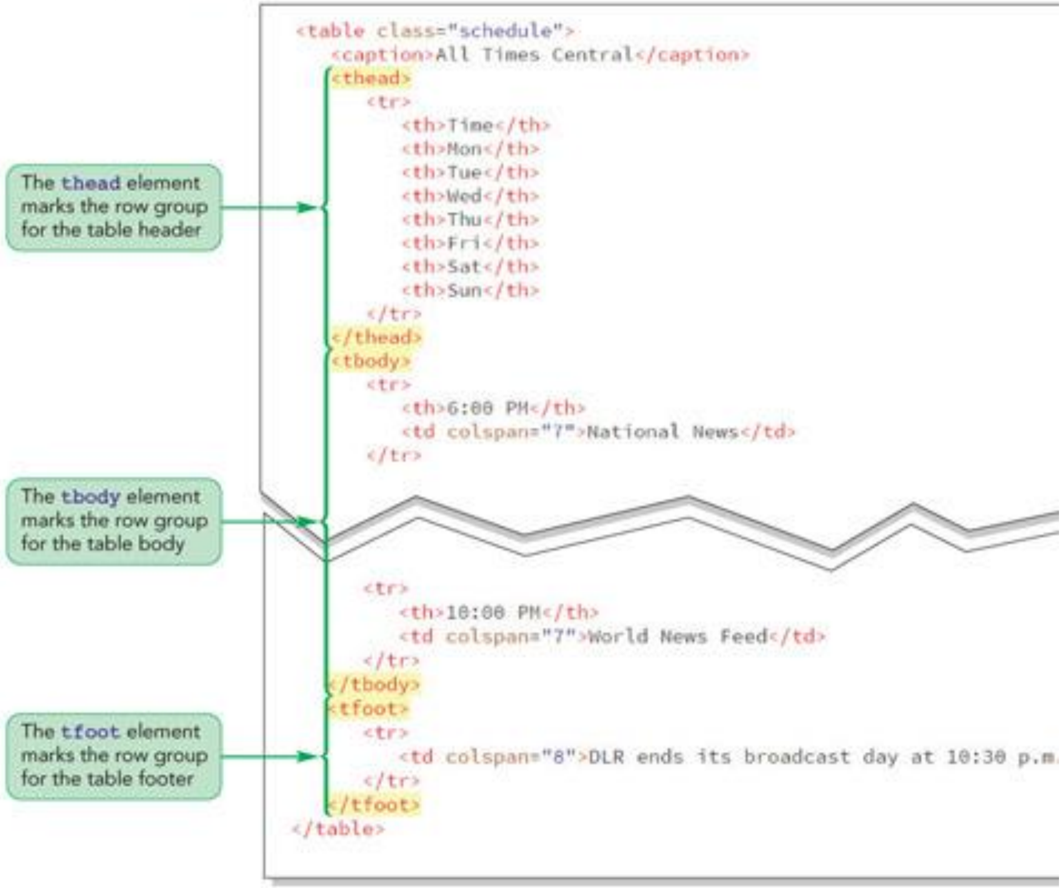
- The general structure of a web table divided into row groups

```
<table>
  <thead>table rows</thead>
  <tfoot>table rows</tfoot>
  <tbody>table rows</tbody>
</table>
```

- Only one `thead` and `tfoot` element is allowed per table

Creating Row Groups (continued 2)

Figure 6–23 Marking row groups



```
<table class="schedule">
   <caption>All Times Central</caption>
   <thead>
      <tr>
         <th>Time</th>
         <th>Mon</th>
         <th>Tue</th>
         <th>Wed</th>
         <th>Thu</th>
         <th>Fri</th>
         <th>Sat</th>
         <th>Sun</th>
      </tr>
   </thead>
   <tbody>
      <tr>
         <th>6:00 PM</th>
         <td colspan="7">National News</td>
      </tr>

      <tr>
         <th>10:00 PM</th>
         <td colspan="7">World News Feed</td>
      </tr>
   </tbody>
   <tfoot>
      <tr>
         <td colspan="8">DLR ends its broadcast day at 10:30 p.m.
      </tr>
   </tfoot>
</table>
```

The thead element marks the row group for the table header

The tbody element marks the row group for the table body

The tfoot element marks the row group for the table footer

Creating Column Groups

- Columns are determined implicitly based on the number of cells within the table rows
- Columns can be referenced using the `colgroup` element

Creating Column Groups (continued 1)

- Example of `colgroup` element:

```
<table>
   <colgroup>
         columns
   </colgroup>
   table rows
</table>
```

where `columns` are the individual columns defined within the group and `table rows` are the table rows

Creating Column Groups (continued 2)

- The columns within the `colgroup` element are identified by the following `col` element:

  ```
  <col span="value" />
  ```

  where `value` is the number of columns spanned by the `col` element
- If no `span` attribute is included, the `col` element references a single column

Creating Column Groups (continued 3)

- Once columns are defined using the `colgroup` and `col` elements individual columns can be identified
- Use the `id` and/or `class` attributes for the purposes of applying CSS styles to specific columns

Creating Column Groups (continued 4)

- Columns and column groups accept only CSS style properties to modify
  - Column borders
  - Background
  - Width
  - Visibility

Creating Column Groups (continued 5)

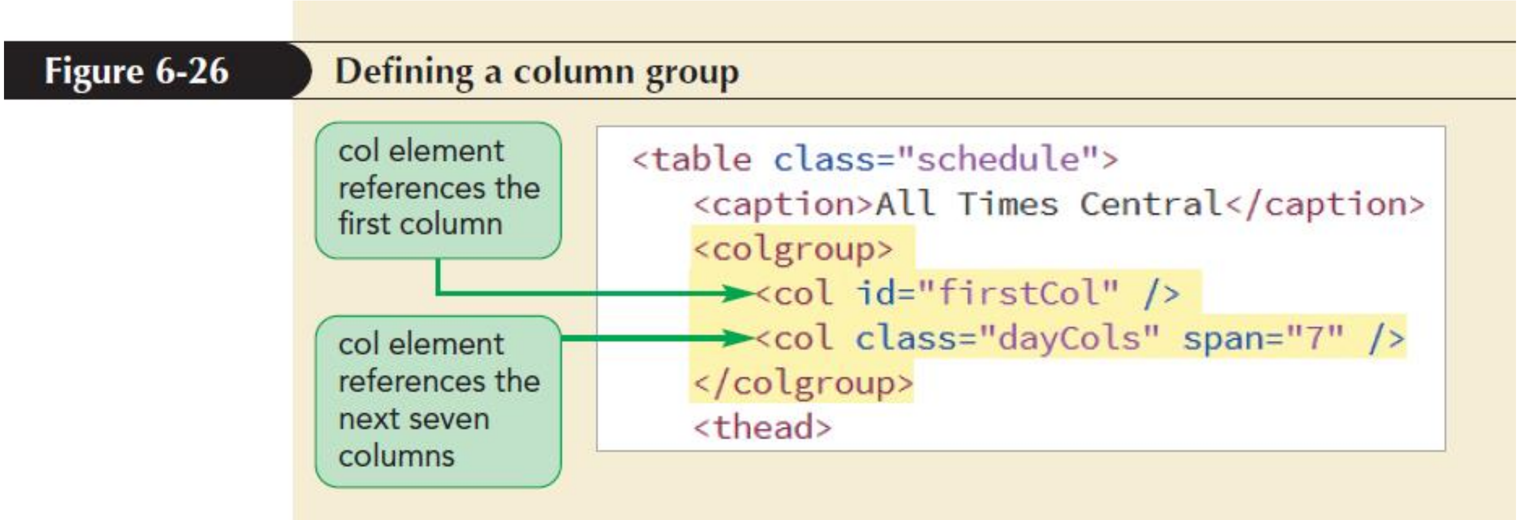


Figure 6-26 Defining a column group

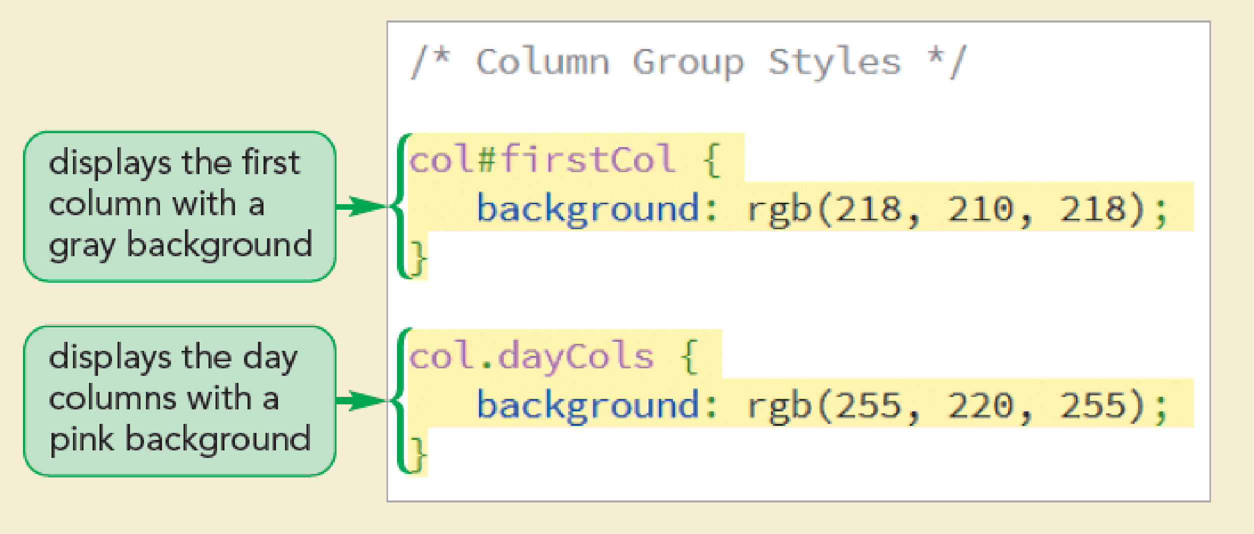
col element references the first column

col element references the next seven columns

```
<table class="schedule">
   <caption>All Times Central</caption>
   <colgroup>
      <col id="firstCol" />
      <col class="dayCols" span="7" />
   </colgroup>
   <thead>
```

Creating Column Groups (continued 6)

Figure 6-27 Formatting the table columns



displays the first column with a gray background

displays the day columns with a pink background

```
/* Column Group Styles */

col#firstCol {
   background: rgb(218, 210, 218);
}

col.dayCols {
   background: rgb(255, 220, 255);
}
```

Exploring CSS Styles and Web Tables

- Levels of precedence in the table styles in decreasing order
  - Table cells
  - Rows
  - Row groups
  - Columns
  - Column groups
  - Table

Working with Width and Height

- By default, browsers attempt to fit more content in each column before wrapping the cell text
- Extra space is divided equally among columns if the width of a table is larger than its individual columns
- Column widths are set using the `width` property

CENGAGE

Working with Width and Height (continued 1)

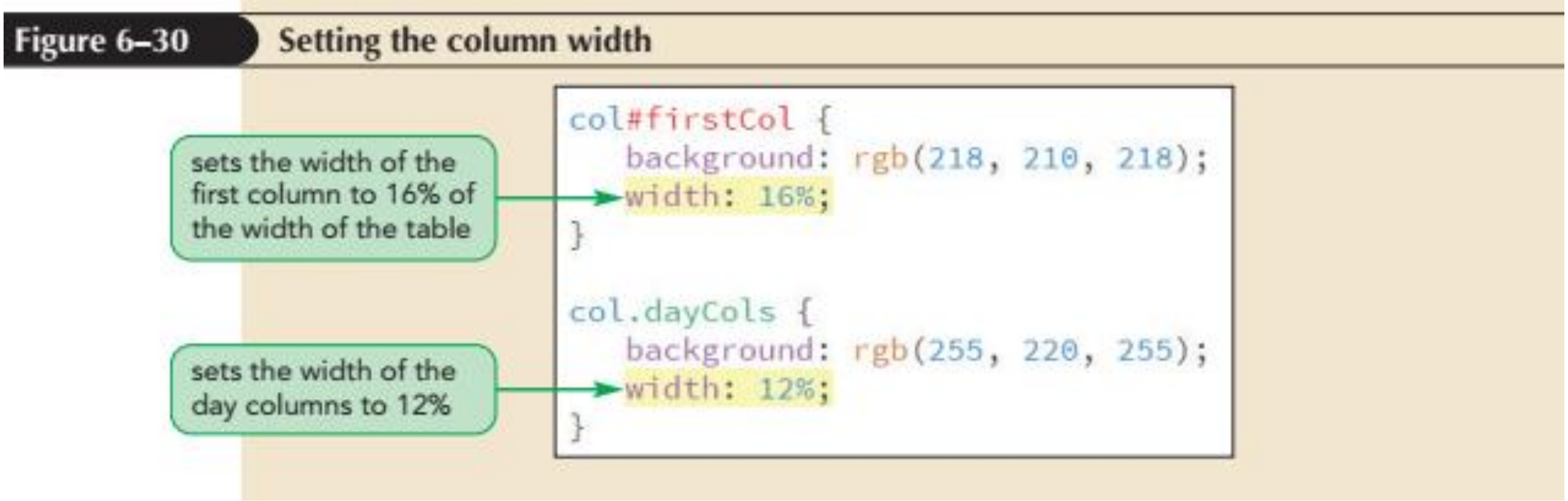


Figure 6–30 Setting the column width

sets the width of the first column to 16% of the width of the table

sets the width of the day columns to 12%

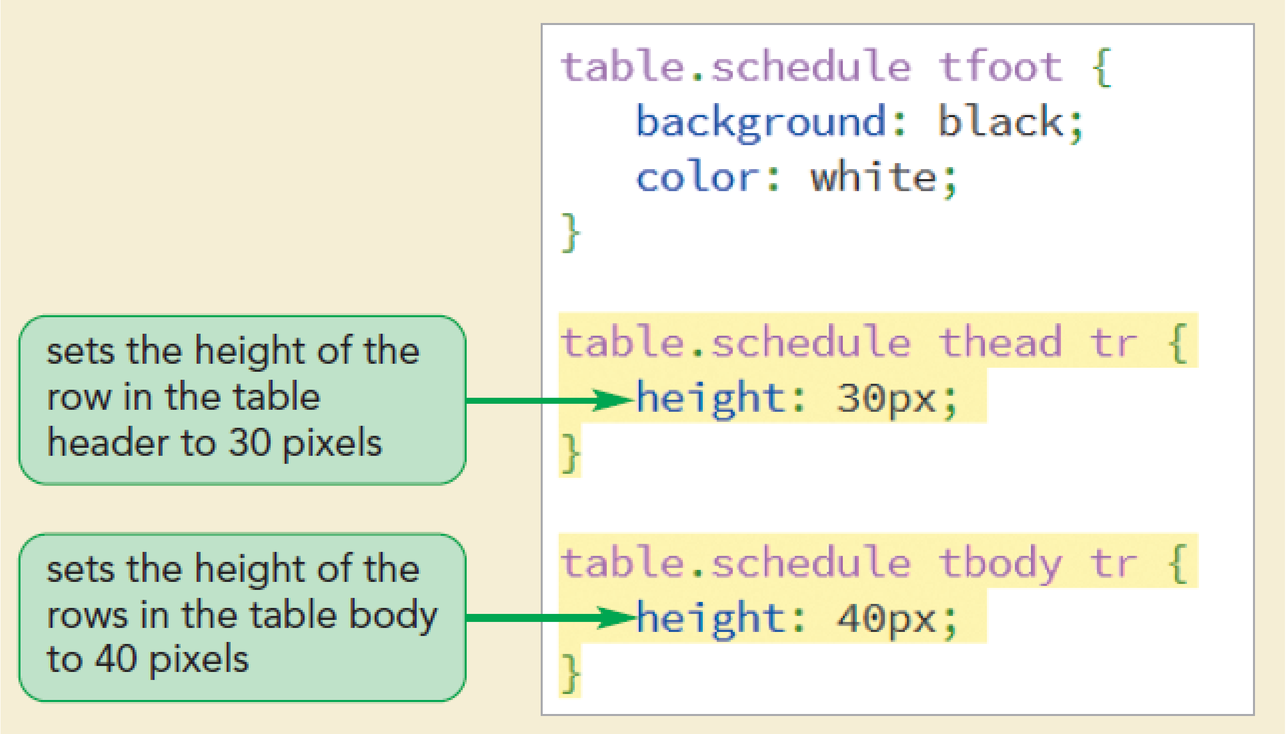
```
col#firstCol {
   background: rgb(218, 210, 218);
   width: 16%;
}

col.dayCols {
   background: rgb(255, 220, 255);
   width: 12%;
}
```

Working with Width and Height (continued 2)

- The height of each row is based on the height of the tallest cell
- A uniform row height is defined by applying the height style to table rows within each row group
- The `vertical-align` property is used to move the cell text

Working with Width and Height (continued 3)

Figure 6-31 Setting the row height



```
table.schedule tfoot {
   background: black;
   color: white;
}

table.schedule thead tr {
   height: 30px;
}

table.schedule tbody tr {
   height: 40px;
}
```

sets the height of the row in the table header to 30 pixels

sets the height of the rows in the table body to 40 pixels

Applying Table Styles to Other Page Elements

- Can use the CSS `display` property to apply a table layout to other HTML elements
  - Paragraphs, block quotes, lists

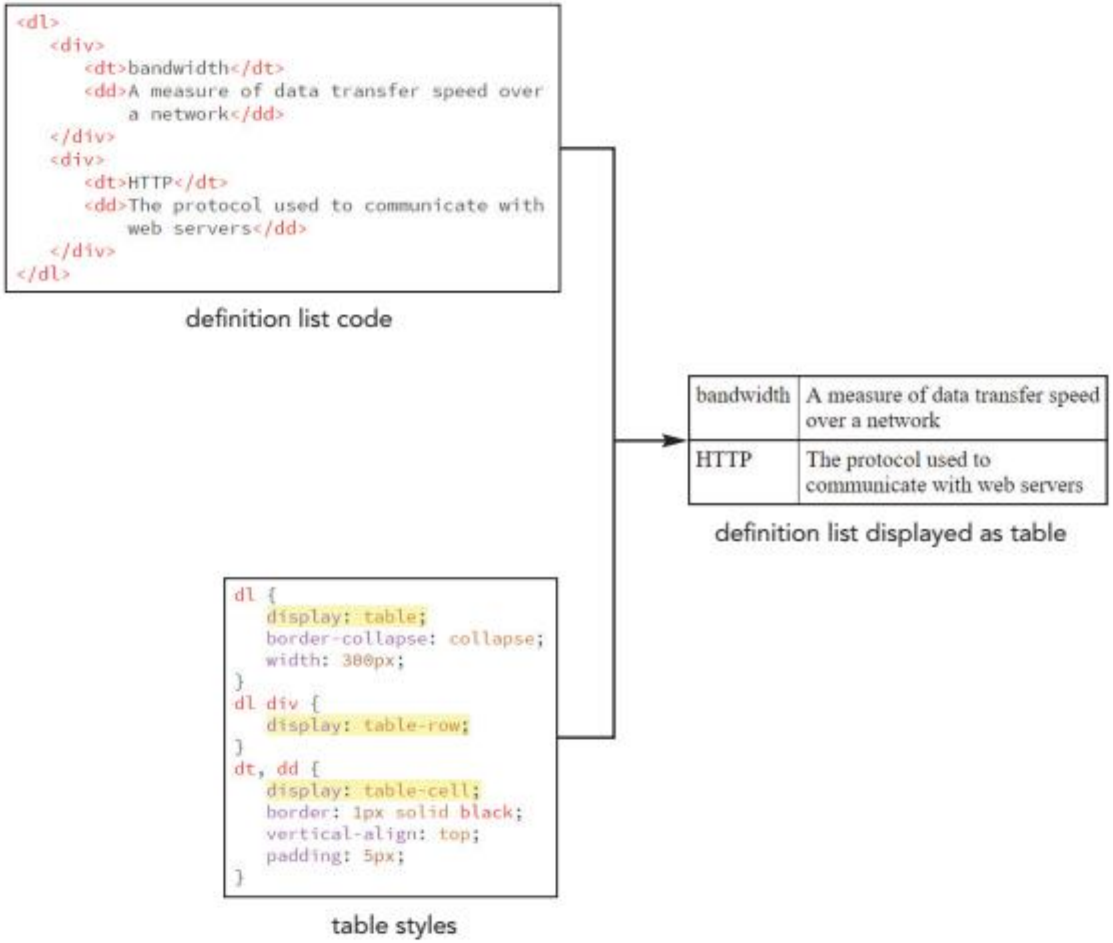
Applying Table Styles to Other Page Elements (continued 1)

Display Style	Equivalent HTML Element
`display: table;`	`table (treated as a block-level element)`
`display: table-inline;`	`table (treated as an inline element)`
`display: table-row;`	`tr`
`display: table-row-group;`	`tbody`
`display: table-header-group;`	`thead`
`display: table-footer-group;`	`tfoot`
`display: table-column;`	`col`
`display: table-column-group;`	`colgroup`
`display: table-cell;`	`td or th`
`display: table-caption;`	`caption`

CENGAGE

Applying Table Styles to Other Page Elements (continued 2)

Figure 6–36 Applying table styles to a definition list



```
<dl>
   <div>
      <dt>bandwidth</dt>
      <dd>A measure of data transfer speed over
         a network</dd>
   </div>
   <div>
      <dt>HTTP</dt>
      <dd>The protocol used to communicate with
         web servers</dd>
   </div>
</dl>
```

definition list code

bandwidth	A measure of data transfer speed over a network
HTTP	The protocol used to communicate with web servers

definition list displayed as table

```
dl {
   display: table;
   border-collapse: collapse;
   width: 380px;
}
dl div {
   display: table-row;
}
dt, dd {
   display: table-cell;
   border: 1px solid black;
   vertical-align: top;
   padding: 5px;
}
```

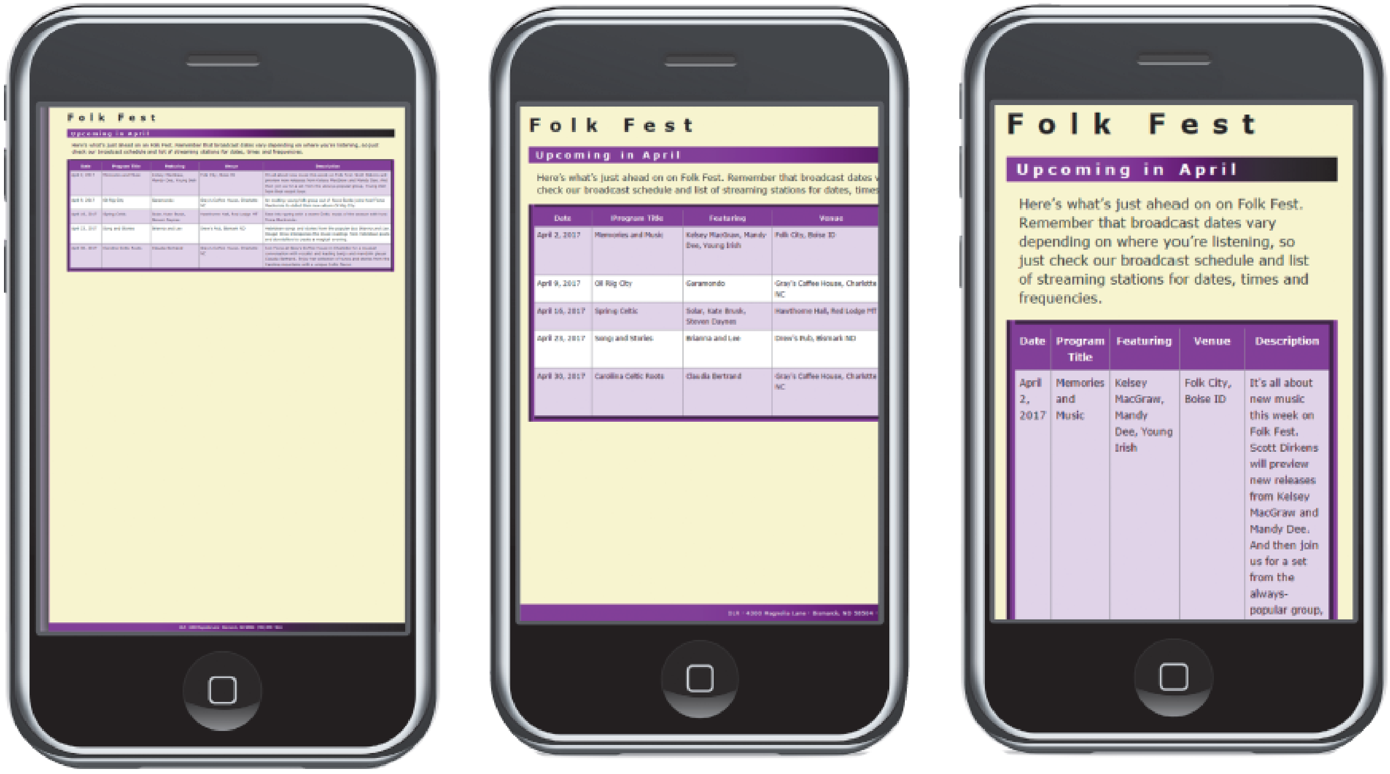
table styles

Tables and Responsive Design

- Tables do not scale well to mobile devices
- Problems faced by users to view a table in a mobile device
  - Table is too small to read
  - Table does not fit the visual viewport
  - Table columns are too narrow to read the cell content

Tables and Responsive Design (continued 1)

Figure 6-37 Web tables on mobile devices



Folk Fest

Upcoming in April

Here's what's just ahead on on Folk Fest. Remember that broadcast dates v
check our broadcast schedule and list of streaming stations for dates, times

Date	Program Title	Featuring	Venue
April 2, 2017	Memories and Music	Kelsey MacGraw, Mandy Dee, Young Irish	Folk City, Boise ID
April 9, 2017	Oil Rig City	Garamondo	Gray's Coffee House, Charlotte NC
April 16, 2017	Spring Celtic	Solar, Kate Brush, Steven Daynes	Hawthorne Hall, Red Lodge MT
April 23, 2017	Songs and Stories	Brianna and Lee	Drew's Pub, Bismark ND
April 30, 2017	Carolina Celtic Roots	Claudia Bertrand	Gray's Coffee House, Charlotte NC

515 · 4300 Magnolia Lane · Bismarck, ND 58504

Folk Fest

Upcoming in April

Here's what's just ahead on on Folk Fest. Remember that broadcast dates vary depending on where you're listening, so just check our broadcast schedule and list of streaming stations for dates, times and frequencies.

Date	Program Title	Featuring	Venue	Description
April 2, 2017	Memories and Music	Kelsey MacGraw, Mandy Dee, Young Irish	Folk City, Boise ID	It's all about new music this week on Folk Fest. Scott Dirkens will preview new releases from Kelsey MacGraw and Mandy Dee. And then join us for a set from the always-popular group,

complete table is too small to read

table is easier to read but does not fit within the viewport

table fits within the viewport but columns are too narrow to read comfortably

BenBois/openclipart

Tables and Responsive Design (continued 2)

- A new layout of table data for mobile screens is required
- Several table columns are reduced to two:
  - One column containing all data labels
  - Second column containing data associated with each label

Tables and Responsive Design (continued 3)

- To create a responsive web table, add the text of data labels as attributes of all `td` elements in the table body
- Store data labels using a **data attribute**
- General format of a data attribute is

  `data-text=“value”`

  where `text` is the name of the data attribute and `value` is its value

Tables and Responsive Design (continued 4)

- Data attributes use names specific to the function it is used for
- For example, the following code uses a data attribute named `data-label` to store the text of the labels associated with the data cell:

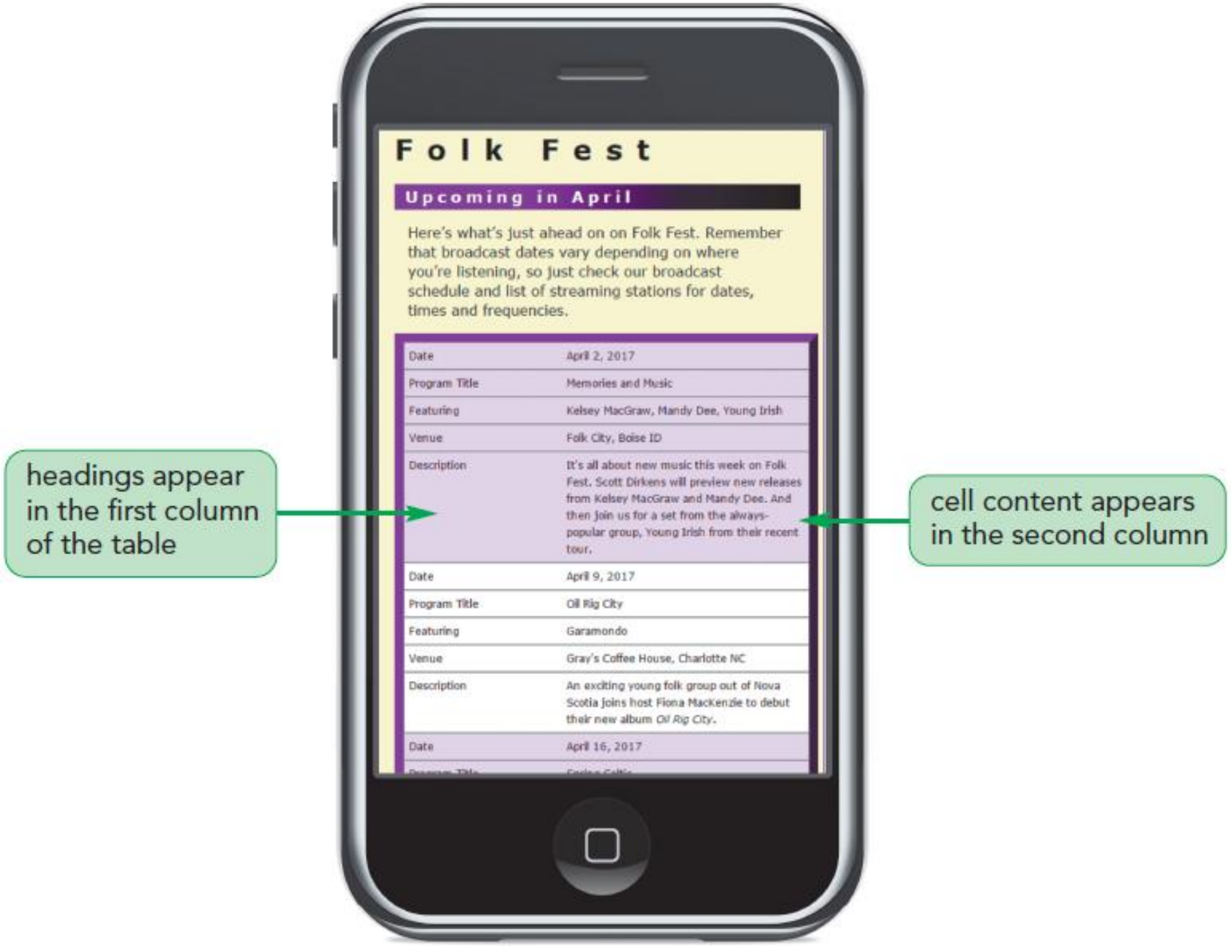
```
<td data-label=“Date”>April 2,
   2021</td>
```

Tables and Responsive Design (continued 5)

- The result is a list of data cells that are aligned as block elements
- Within each block element, the data label is followed by the data cell content
- The goal is to transform table with multiple columns into two-column layout

Tables and Responsive Design (continued 6)

Figure 6-38 Two-column layout for a mobile device



Folk Fest

Upcoming in April

Here's what's just ahead on on Folk Fest. Remember that broadcast dates vary depending on where you're listening, so just check our broadcast schedule and list of streaming stations for dates, times and frequencies.

Date	April 2, 2017
Program Title	Memories and Music
Featuring	Kelsey MacGraw, Mandy Dee, Young Irish
Venue	Folk City, Boise ID
Description	It's all about new music this week on Folk Fest. Scott Dirkens will preview new releases from Kelsey MacGraw and Mandy Dee. And then join us for a set from the always-popular group, Young Irish from their recent tour.
Date	April 9, 2017
Program Title	Oil Rig City
Featuring	Garamondo
Venue	Gray's Coffee House, Charlotte NC
Description	An exciting young folk group out of Nova Scotia joins host Fiona MacKenzie to debut their new album *Oil Rig City*.
Date	April 16, 2017

headings appear in the first column of the table
cell content appears in the second column

Designing a Column Layout

- Column layout enables display of content side-by-side in a page
- Layouts that use float elements or flexboxes differ from column layout
  - Single element can flow from one column to the next
  - Flow of content adjusts to match the page width

Setting the Number of Columns

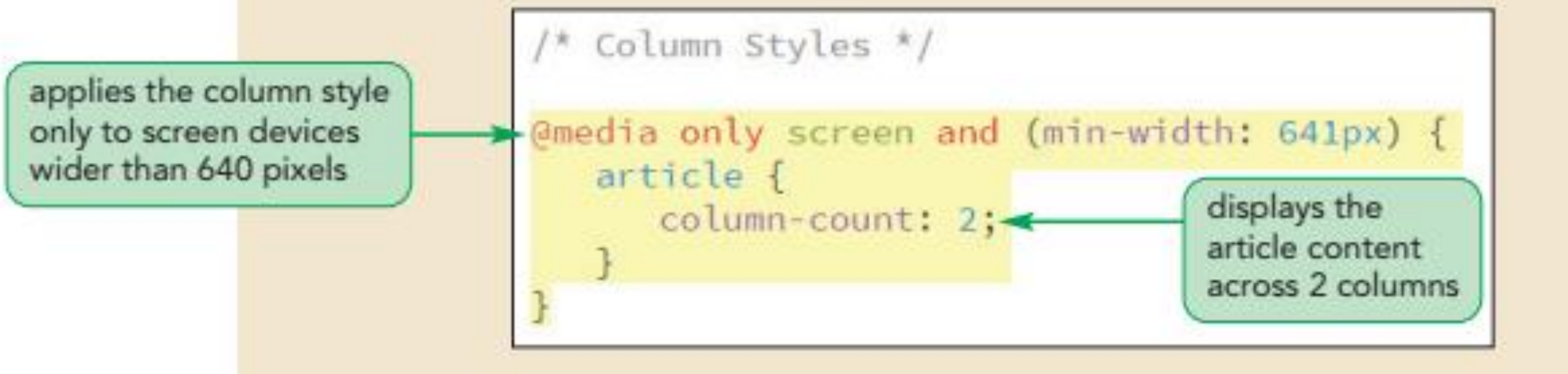
- Size of a column is set using the `column-count` property

  ```
  column-count: value;
  ```

  where `value` is the number of columns in the layout
- Browser extensions are included to ensure cross-browser compatibility

Setting the Number of Columns (continued)

Figure 6–40 Applying a 2-column layout to the article element



```
/* Column Styles */

@media only screen and (min-width: 641px) {
   article {
      column-count: 2;
   }
}
```

applies the column style only to screen devices wider than 640 pixels

displays the article content across 2 columns

Defining Column Widths and Gaps

- Columns are laid out evenly across the width of the parent element by default
- To set the column width, use the `column-width` property

  ```
  column-width: size;
  ```

  where `size` is the minimum width of the column
- Column width acts like the basis value for items in a flexbox

Defining Column Widths and Gaps (continued 1)

- The `column-width` and `column-count` properties are combined to form shorthand columns property

```
columns: width count;
```

- The default gap between columns is 1em
- To set a different gap size, use the `column-gap` property

```
column-gap: size;
```

where `size` is the width of the gap

Defining Column Widths and Gaps (continued 2)

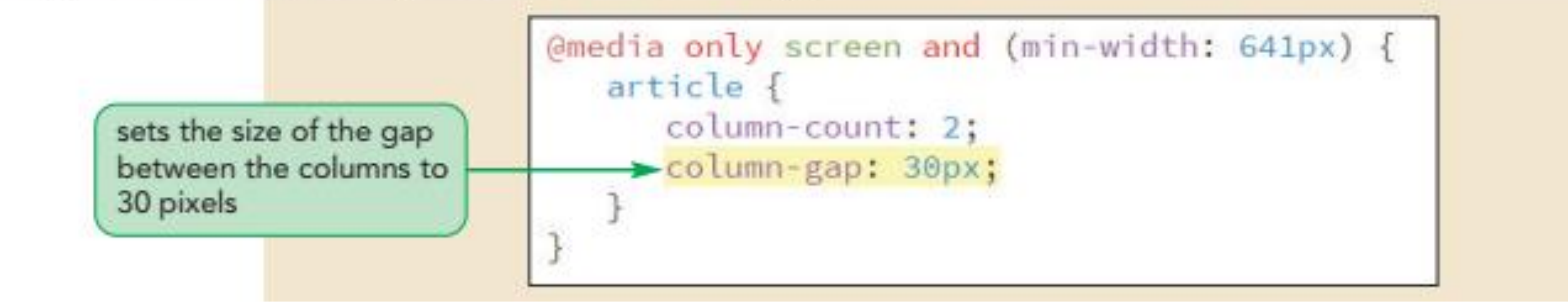
- Another way to separate columns is with a graphic dividing line created using the `column-rule` property

  ```
  column-rule: border;
  ```

  where `border` defines the style of dividing line
- The `column-rule` property can be broken into individual properties like `column-rule-width`, `column-rule-style`, and `column-rule-color`

Defining Column Widths and Gaps (continued 3)

Figure 6–42 Setting the size of the column gap



```
@media only screen and (min-width: 641px) {
   article {
      column-count: 2;
      column-gap: 30px;
   }
}
```

sets the size of the gap between the columns to 30 pixels

Managing Column Breaks

- The size of column orphans is controlled using the `orphans` property

  ```
  orphans: value;
  ```

  where `value` is the minimum number of lines stranded before a column break
- The size of column widows is controlled using the `widows` property

  ```
  widows: value;
  ```

  where `value` is the minimum number of lines placed after a column break

Managing Column Breaks (continued 1)

- Other properties to define column breaks

  ```
  break-before: type;
  break-after: type;
  ```

  where `type` is one of the following:

  - `auto` (browser automatically sets column break)
  - `always` (to always place a column break)
  - `avoid` (to avoid placing a column break)

Managing Column Breaks (continued 2)

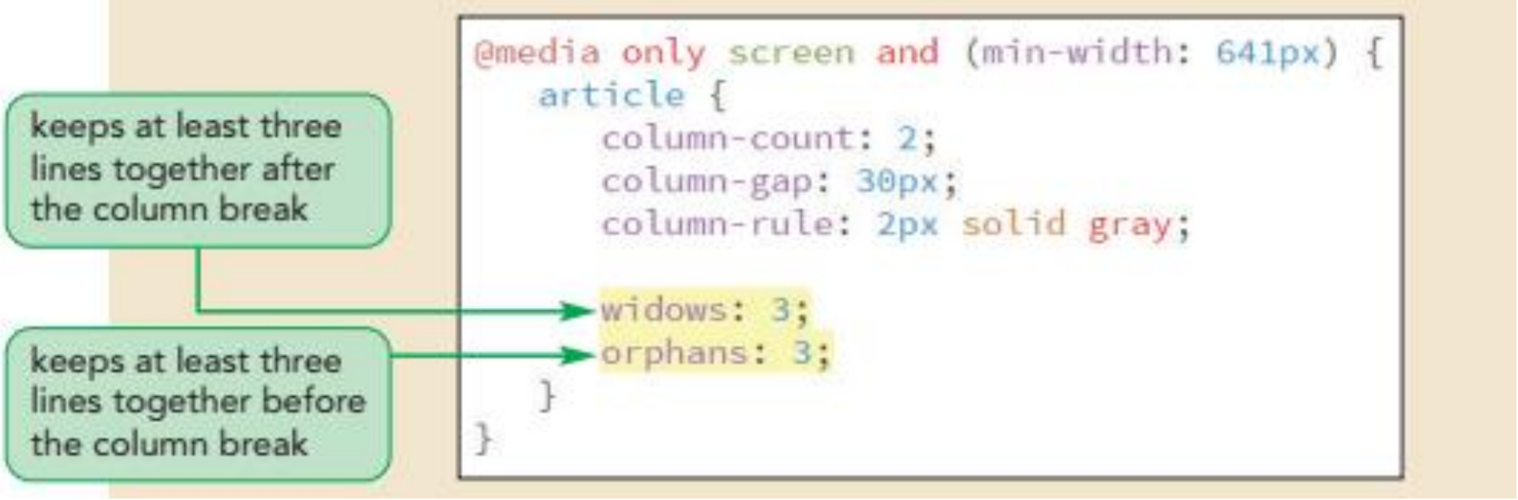
- To control placement of column breaks within an element, use the property

  `break-inside: type;`

  where *type* is either `auto` or `avoid`

Managing Column Breaks (continued 3)

Figure 6–45 Defining widows and orphans around column breaks



```
@media only screen and (min-width: 641px) {
   article {
      column-count: 2;
      column-gap: 30px;
      column-rule: 2px solid gray;

      widows: 3;
      orphans: 3;
   }
}
```

keeps at least three lines together after the column break

keeps at least three lines together before the column break

Spanning Cell Columns

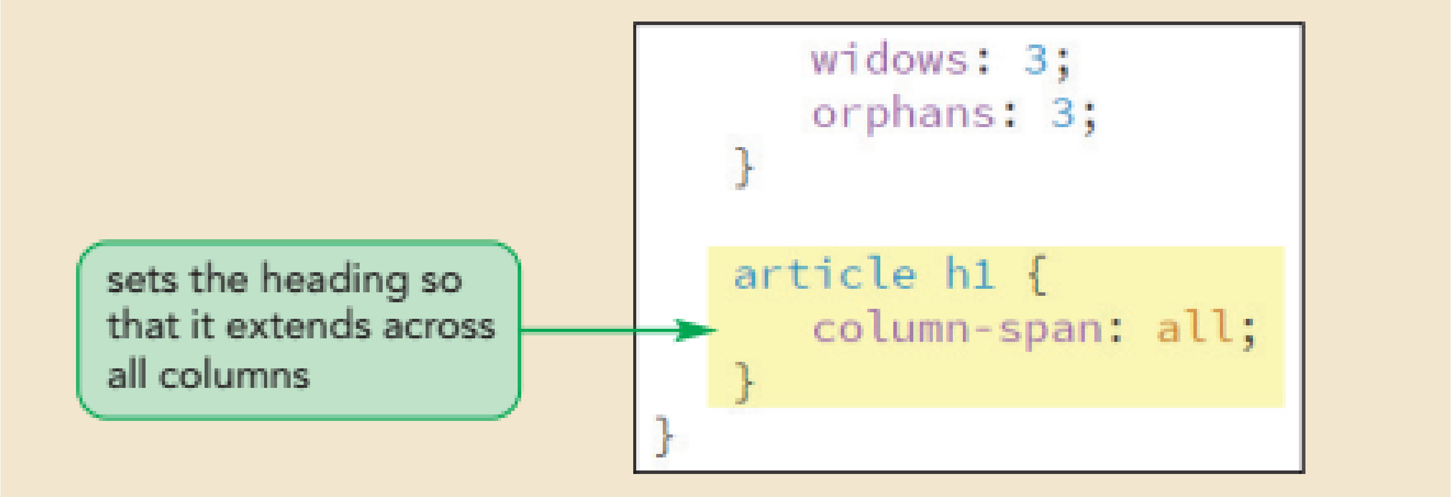
- To span cell columns, use the `column-span` property

  ```
  column-span: span;
  ```

  where `span` is either `none` to prevent spanning or `all` to enable the content to span across all the columns

Spanning Cell Columns (continued)

Figure 6–46 Creating a column-spanning heading



```
        widows: 3;
        orphans: 3;
    }

    article h1 {
        column-span: all;
    }
}
```

sets the heading so that it extends across all columns