

ASU W.P. CAREY  
SCHOOL of BUSINESS  
ARIZONA STATE UNIVERSITY

## CIS 300 Web Design and Development

Chapter 8 | Responsive Layout Basics

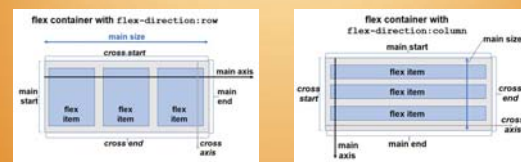
### Learning Objectives

- Describe the purpose of CSS Flexible Box Layout
- Configure a web page that applies CSS Flexible Box Layout
- Describe the purpose of CSS Grid Layout
- Configure a grid container
- Configure grid rows, grid columns, and grid gaps
- 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
- Apply responsive image techniques including the new 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



### The justify-content Property

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



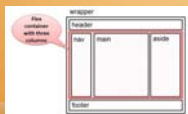
### More flexbox Properties

- 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

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- 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
  - Indicates the flex grow factor
  - Indicates the flex shrink factor
  - Can be used to indicate a proportional flexible item



```

row { flex: 1; }
main { flex: 7; }
aside { flex: 2; }

```

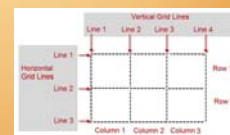
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## CSS Grid Layout

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- 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
- The order property



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## Configure Grid Columns and Grid Rows

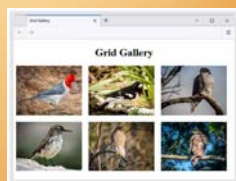
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- The grid-template-columns property
- The grid-template-rows property
- Example:

```

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

```



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## Grid Columns & Grid Rows

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- <https://www.w3.org/TR/css-grid-1/#propdef-grid-template-columns>
- Commonly used values for grid-template-columns and grid-template-rows

Value	Description
<b>numeric length unit</b>	Configures a fixed size with a length unit such as px or em. Example: 220px
<b>numeric percentage</b>	Configures a percentage size. Example: 20%
<b>numeric fr unit</b>	Configures a flex factor unit (denoted by fr) that directs the browser to allocate a fractional part of the remaining space
<b>auto</b>	Configures a size to hold the maximum content
<b>minmax (min, max)</b>	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.
<b>repeat/repetition amount, format value)</b>	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 (auto-fill, 250px)

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## Configure Grid Items

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

```

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; }

```



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## Progressive Enhancement with Grid

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- 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

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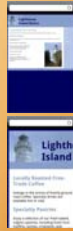
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## Viewport Meta Tag

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- Default action for most mobile devices is to zoom out and scale the web page
- 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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## Telephone & Text Message Hyperlinks

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- Telephone Scheme
  - `<a href="tel:888-555-5555">Call 888-555-5555</a>`
- Many mobile browsers will initiate a phone call when the hyperlink is clicked.
- SMS Scheme
  - `<a href="sms:888-555-5555">Text 888-555-5555</a>`
- Many mobile browsers will initiate a text message to the phone number when the hyperlink is clicked.

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## Responsive Web Design

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- Term coined by Ethan Marcotte
- Progressively enhancing a web page for different viewing contexts
- Techniques:
  - Fluid Layout
  - CSS3 Media Queries
  - Flexible Images



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## CSS3 Media Queries

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- Media Query
  - Determines the capability of the mobile device, such as screen resolution
  - Directs the browser to styles configured specifically for those capabilities
- Link Element Example:
  - `<link href="lighthousemobile.css" media="only screen and (max-device-width: 480px)">`
- CSS Example:

```
@media only screen and (max-width: 480px) {
  header { background-image: url/mobile.gif;
}
```



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## Flexible Images

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- Edit HTML:
  - Remove height and width attributes
- CSS:
  - `img { max-width: 100%; height: auto; }`



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## Responsive Images HTML 5.1 Picture Element

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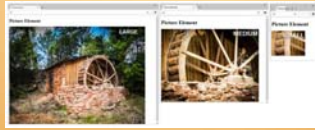
```
<picture>
  <source media="(min-width: 1200px)" srcset="large.jpg">
  <source media="(min-width: 800px)" srcset="medium.jpg">
  <source media="(min-width: 320px)" srcset="small.jpg">
  
</picture>
```

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## Responsive Images HTML 5.1 sizes & srcset Attributes

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```

```

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## Testing Mobile Display Options

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- Test with a mobile device
- Emulators
  - Opera Mobile Emulator
  - Mobilizer
  - Opera Mini Simulator
  - iPhone Emulator
- Test with a Desktop Browser
  - Install an iOS or Android SDK



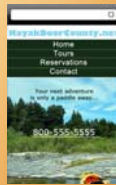
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## Mobile Web Design Best Practices

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- Three Approaches to Mobile Web:
  - Develop a new mobile site with a .mobi TLD
  - Create a separate website hosted within your current domain targeted for mobile users
  - Use CSS to configure your current website for display on both mobile and desktop devices



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## Mobile Web Limitations

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- Small Screen Size
- Low bandwidth
- Limited fonts
- Limited color
- Awkward controls
- Limited processor and memory
- Cost per kilobyte



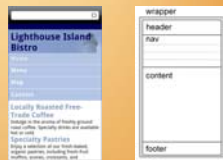
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## Design Techniques for Mobile Web

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- One column design
- Avoid floats, tables, frames
- Descriptive page title
- Descriptive heading tags
- Optimize images
- Descriptive alt text for images
- Eliminate unneeded images
- Navigation in lists
- Provide "Skip to Content" hyperlink
- Provide "Back to Top" hyperlink



Notice the overlap between these techniques and designing to provide for accessibility?

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## CSS Debugging Tips

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- 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!

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