



Web Programming

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Responsive Web Design

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1. Responsive Web Design

What is Responsive Web Design?

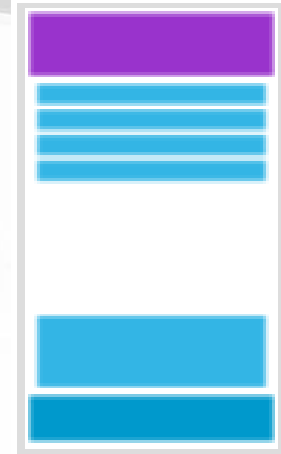
- Responsive web design makes your web page **look good on all devices**
- Responsive web design **uses only HTML and CSS**
(not a program or a JavaScript)



Desktop



Tablet



Phone

The Viewport

- The viewport is the **user's visible area** of a web page

Varies with the device, and will be smaller on a cell phone than on a computer screen

- Setting The Viewport

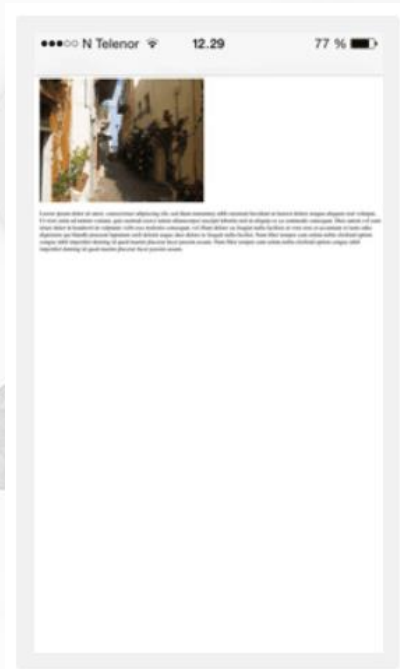
Should include the following **<meta> viewport** element in all web pages

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

- ✓ **<meta>** viewport element gives the browser instructions on how to control the page's dimensions and scaling
- ✓ The **width=device-width** part sets the width of the page to follow the screen-width of the device
- ✓ The **initial-scale=1.0** part sets the initial zoom level

The Viewport

Example



Without the viewport meta tag



With the viewport meta tag

Media Queries

- Media Query uses the **@media** rule to include a block of CSS properties only if a certain condition is true
- Example: If the browser window is 600px or smaller, the background color will be lightblue.

```
@media only screen and (max-width: 600px) {  
  body {  
    background-color: lightblue;  
  }  
}
```


Breakpoint

- Certain parts of the design will behave differently on each side of the breakpoint
- Typical Device Breakpoints

```
/* Extra small devices (phones, 600px and down) */  
@media only screen and (max-width: 600px) {...}
```

```
/* Small devices (portrait tablets and large phones, 600px and up) */  
@media only screen and (min-width: 600px) {...}
```

```
/* Medium devices (landscape tablets, 768px and up) */  
@media only screen and (min-width: 768px) {...}
```

```
/* Large devices (laptops/desktops, 992px and up) */  
@media only screen and (min-width: 992px) {...}
```

```
/* Extra large devices (large laptops and desktops, 1200px and up) */  
@media only screen and (min-width: 1200px) {...}
```

Responsive Web Design

Images

- Using The **max-width** Property

If the max-width property is set to 100%, the image will scale down if it has to, but never scale up to be larger than its original size

- Different Images for Different Devices

```
<picture>  
  <source srcset="img_smallflower.jpg" media="(max-width: 400px)">  
  <source srcset="img_flowers.jpg">  
    
</picture>
```



2. Bootstrap

Source: <https://getbootstrap.com/docs/4.6/getting-started/introduction/>

Bootstrap

- Build **responsive**, mobile-first projects on the web
- Be an open-source toolkit for developing with HTML, CSS, and JS:
 - responsive **grid system**,
 - extensive **prebuilt components**,
 - and **powerful plugins** built on jQuery

Bootstrap Starter template and BootstrapCDN

```
<!doctype html>
<html lang="en">
  <head>
    <!-- Required meta tags -->
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">

    <!-- Bootstrap CSS -->
    <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@4.6.2/dist/css/
bootstrap.min.css" crossorigin="anonymous">

    <title>Bootstrap</title>
  </head>
  <body>
    <!-- Your code -->

    <script src="https://cdn.jsdelivr.net/npm/jquery@3.5.1/dist/jquery.slim.min.js"
crossorigin="anonymous"></script>
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@4.6.2/dist/js/
bootstrap.bundle.min.js" crossorigin="anonymous"></script>
  </body>
</html>
```

Download and Precompiled Bootstrap



```
bootstrap/
├── css/
│   ├── bootstrap-grid.css
│   ├── bootstrap-grid.css.map
│   ├── bootstrap-grid.min.css
│   ├── bootstrap-grid.min.css.map
│   ├── bootstrap-reboot.css
│   ├── bootstrap-reboot.css.map
│   ├── bootstrap-reboot.min.css
│   ├── bootstrap-reboot.min.css.map
│   ├── bootstrap.css
│   ├── bootstrap.css.map
│   ├── bootstrap.min.css
│   └── bootstrap.min.css.map
└── js/
    ├── bootstrap.bundle.js
    ├── bootstrap.bundle.js.map
    ├── bootstrap.bundle.min.js
    ├── bootstrap.bundle.min.js.map
    ├── bootstrap.js
    ├── bootstrap.js.map
    ├── bootstrap.min.js
    └── bootstrap.min.js.map
```

CSS files

CSS files	Layout	Content	Components	Utilities
<code>bootstrap.css</code> <code>bootstrap.min.css</code>	Included	Included	Included	Included
<code>bootstrap-grid.css</code> <code>bootstrap-grid.min.css</code>	Only grid system	Not included	Not included	Only flex utilities
<code>bootstrap-reboot.css</code> <code>bootstrap-reboot.min.css</code>	Not included	Only Reboot	Not included	Not included

JS files

JS files	Popper	jQuery
<code>bootstrap.bundle.js</code> <code>bootstrap.bundle.min.js</code>	Included	Not included
<code>bootstrap.js</code> <code>bootstrap.min.js</code>	Not included	Not included

Containers

- Containers are **required** when using the default grid system.
- Containers are used to contain, pad, and (sometimes) center the content within them.
- Bootstrap comes with three different containers:
 - **.container**: Fixed-width container (which sets a **max-width** at each responsive breakpoint)

```
<div class = "container">  
<!-- Content here -->  
</div>
```
 - **.container-fluid**: Fluid-width (which is **width: 100%** at all breakpoints)

```
<div class = "container-fluid">  
<!-- Content here -->  
</div>
```
 - **.container-{breakpoint}**, which is width: 100% until the specified breakpoint

Containers

	Extra small <576px	Small ≥576px	Medium ≥768px	Large ≥992px	Extra large ≥1200px
<code>.container</code>	100%	540px	720px	960px	1140px
<code>.container-sm</code>	100%	540px	720px	960px	1140px
<code>.container-md</code>	100%	100%	720px	960px	1140px
<code>.container-lg</code>	100%	100%	100%	960px	1140px
<code>.container-xl</code>	100%	100%	100%	100%	1140px
<code>.container-fluid</code>	100%	100%	100%	100%	100%

Responsive breakpoints

```
// Extra small devices (portrait phones, less than 576px)
// No media query for `xs` since this is the default in Bootstrap

// Small devices (landscape phones, 576px and up)
@media (min-width: 576px) { ... }

// Medium devices (tablets, 768px and up)
@media (min-width: 768px) { ... }

// Large devices (desktops, 992px and up)
@media (min-width: 992px) { ... }

// Extra large devices (large desktops, 1200px and up)
@media (min-width: 1200px) { ... }
```

Grid options

- A **twelve-column system**, **five** default responsive **tiers**
- Uses a series of **containers**, **rows**, and **columns** to layout and align content

	Extra small <576px	Small ≥576px	Medium ≥768px	Large ≥992px	Extra large ≥1200px
Max container width	None (auto)	540px	720px	960px	1140px
Class prefix	.col-	.col-sm-	.col-md-	.col-lg-	.col-xl-
# of columns	12				
Gutter width	30px (15px on each side of a column)				

Grid options

Responsive classes - Example

```
<div class="container">  
  <div class="row">  
    <div class="col-12 col-sm-8">Col 1</div>  
    <div class="col-12 col-sm-4">Col 2</div>  
  </div>  
</div>
```

Auto-layout columns

Equal-width

```
<div class="container">  
  <div class="row">  
    <div class="col">1 of 3</div>  
    <div class="col">2 of 3</div>  
    <div class="col">3 of 3</div>  
  </div>  
</div>
```

Auto-layout columns

Equal-width multi-line

```
<div class="container">  
  <div class="row">  
    <div class="col">col</div>  
    <div class="col">col</div>  
  
    <div class="w-100"></div>  
  
    <div class="col">col</div>  
    <div class="col">col</div>  
  </div>  
</div>
```

Offsetting columns

Offset classes

- Move columns to the right using **.offset-{breakpoint}-*** classes. These classes increase the left margin of a column by * columns.
- For example, **.offset-md-4** moves **.col-md-4** over four columns.

```
<div class="container">
  <div class="row">
    <div class="col-md-4">.col-md-4</div>
    <div class="col-md-4 offset-md-4">.col-md-4 .offset-md-4</div>
  </div>
</div>
```


Nesting

- To nest your content with the default grid, add a new **.row** and set of **.col-{breakpoint}-*** columns within an **existing .col-{breakpoint}-*** column.
- Nested rows should include a set of columns that add up to 12 or fewer (it is not required that you use all 12 available columns).

```
<div class="container">
  <div class="row">
    <div class="col-sm-9">
      Level 1: .col-sm-9
      <div class="row">
        <div class="col-8 col-sm-6">
          Level 2: .col-8 .col-sm-6
        </div>
        <div class="col-4 col-sm-6">
          Level 2: .col-4 .col-sm-6
        </div>
      </div>
    </div>
  </div>
</div>
```

Components and Utilities

Link:

- <https://getbootstrap.com/docs/4.6/components/>
- <https://getbootstrap.com/docs/4.6/utilities/>



Components and Utilities

Example

- Outline buttons



```
<button type="button" class="btn btn-outline-primary">Primary</button>  
<button type="button" class="btn btn-outline-secondary">Secondary</button>  
<button type="button" class="btn btn-outline-success">Success</button>  
<button type="button" class="btn btn-outline-danger">Danger</button>  
<button type="button" class="btn btn-outline-warning">Warning</button>  
<button type="button" class="btn btn-outline-info">Info</button>  
<button type="button" class="btn btn-outline-light">Light</button>  
<button type="button" class="btn btn-outline-dark">Dark</button>
```

Components and Utilities

Example

- Media object

64x64

Media heading

Cras sit amet nibh libero, in gravida nulla. Nulla vel metus scelerisque ante sollicitudin. Cras purus odio, vestibulum in vulputate at, tempus viverra turpis. Fusce condimentum nunc ac nisi vulputate fringilla. Donec lacinia congue felis in faucibus.

```
<div class="media">
  
  <div class="media-body">
    <h5 class="mt-0">Media heading</h5>
    Cras sit amet nibh libero, in gravida nulla. Nulla vel metus scelerisque ante sollicitudin. Cras
  </div>
</div>
```

Responsive images

- Images in Bootstrap are made responsive with **.img-fluid**. **max-width: 100%;** and **height: auto;** are applied to the image so that it scales with the parent element.
- Example:

```

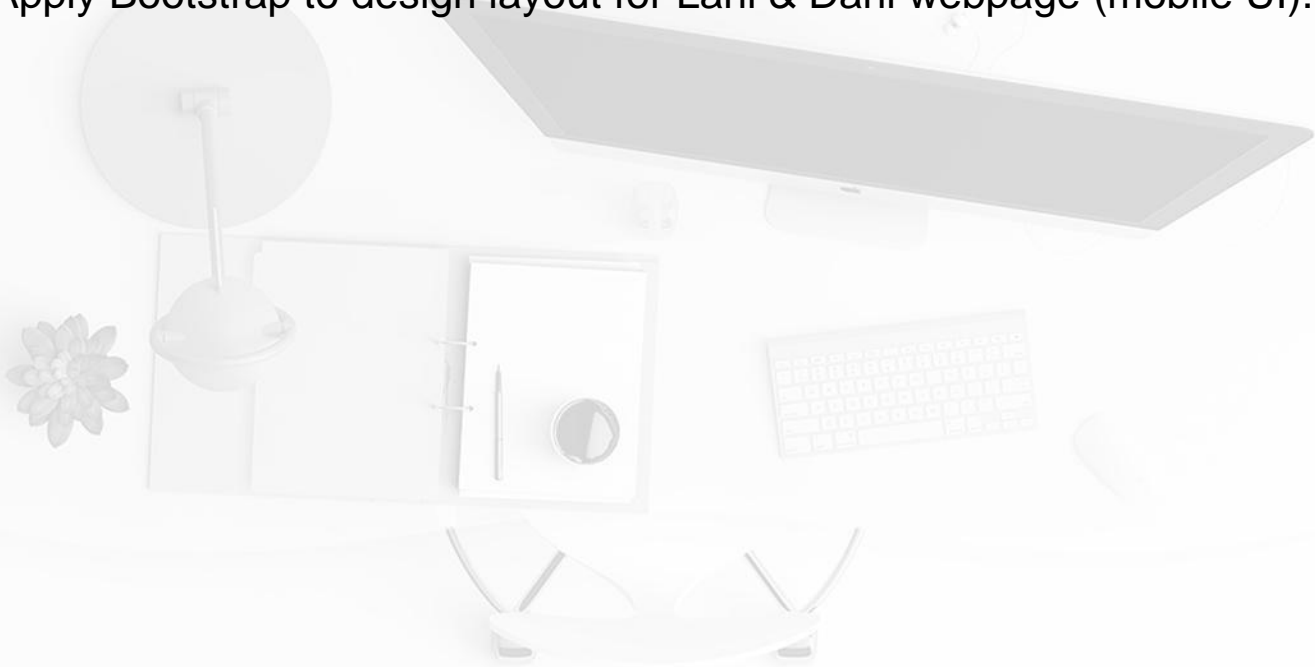
```




Summary

Exercise

Apply Bootstrap to design layout for Lani & Dani webpage (mobile UI).





Q&A