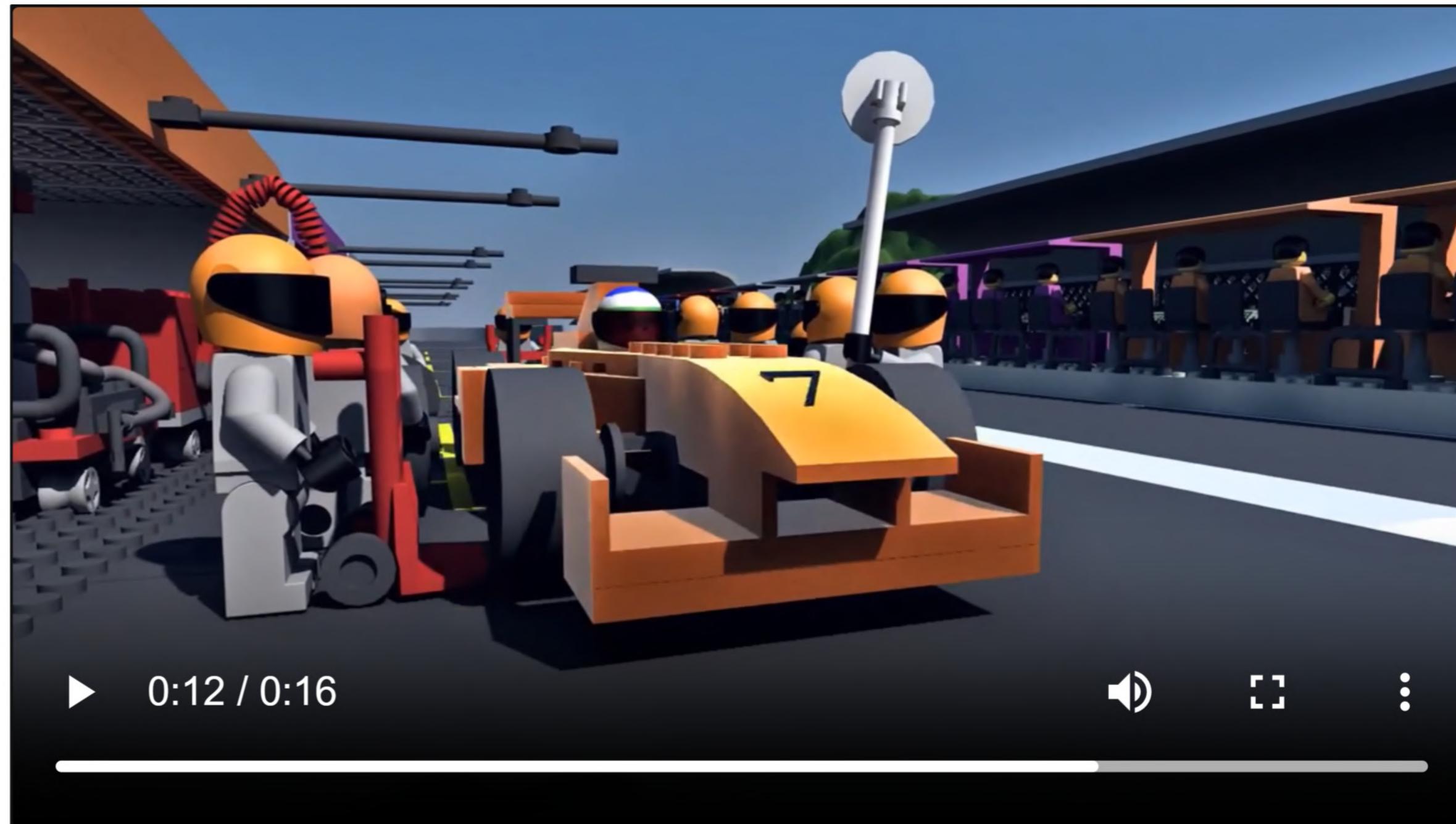


The crew members were able to get their work done quickly.

How do you think this was possible? Is it that easy to change the tires in just a few seconds?

Do you need a specific toolkit to do so?



How do these crew members get their work done so quickly?

1. What do these mechanics use at pit stops to unscrew the tires with such speed?
2. How can these mechanics unscrew the tires with such speed?

Using sophisticated gun tools enables them to do the task quickly.



What do these mechanics use at pit stops to unscrew the tires with such speed?

It's impressive when constructions of buildings can be completed in just a few days.

But how were they able to do so?

It's because most of the structural components that were used in the building were pre-created. This resulted in less construction time overall for the whole structure.



How is it possible to construct a multi-storied building so quickly?

Develop a Responsive Web Page Using Bootstrap



Learning Objectives

- Describe Bootstrap framework
- Develop responsive web pages using mobile-first approach
- Apply Bootstrap's mobile-first flexbox grid to build layouts
- Create responsive images, tables and forms using Bootstrap
- Utilize various Bootstrap components
- Apply Bootstrap utilities

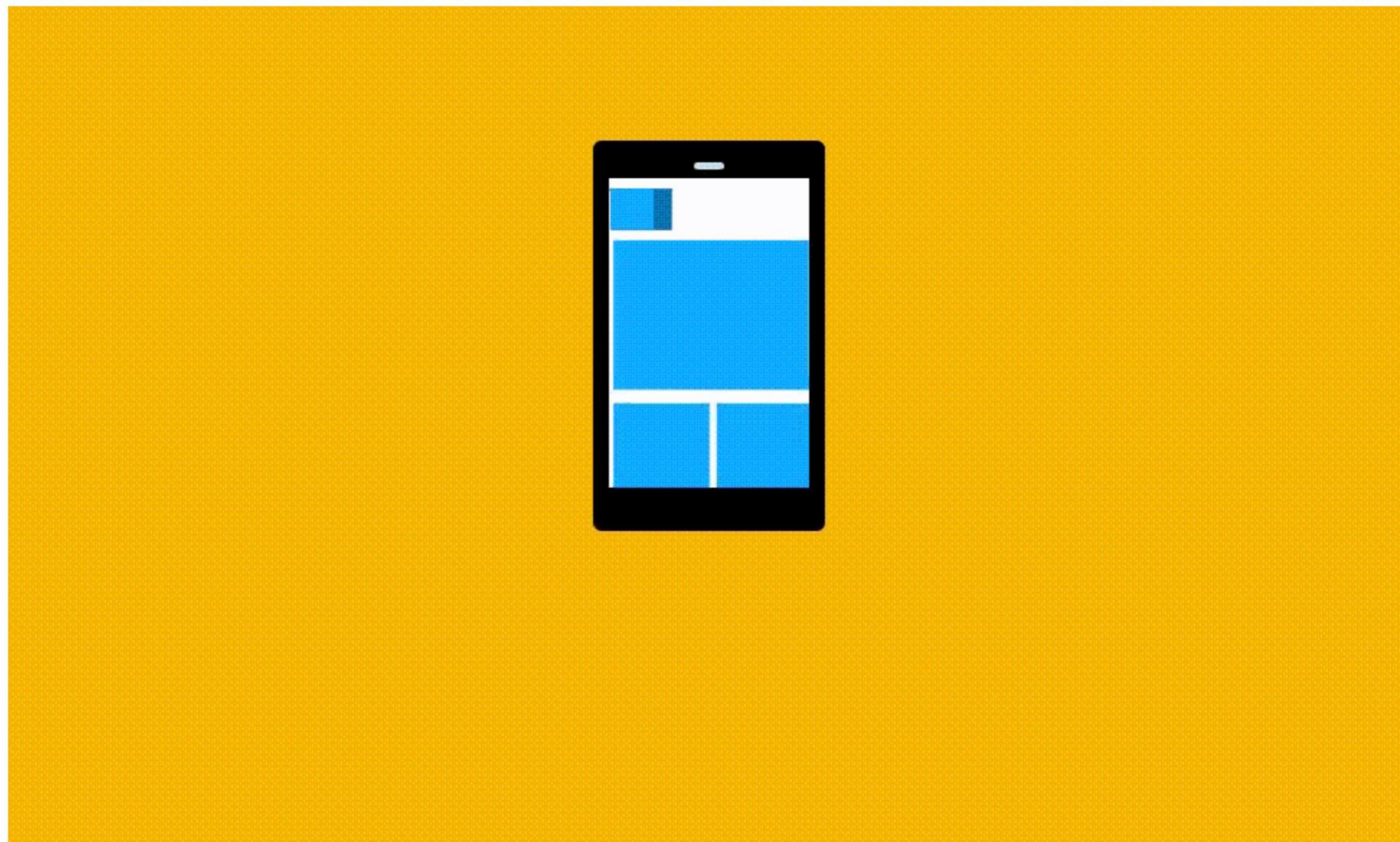


What Is Bootstrap?

Bootstrap is an open-source framework used for faster and easier web development.

- It is the world's most popular CSS framework created for building responsive, mobile-first websites and applications.
- It includes HTML and CSS-based design templates for typography, forms, buttons, tables, navbars, modals, image carousels etc.
- Bootstrap supports the latest, stable releases for all major browsers and platforms.

Responsive Design on Different Screen Sizes



Credit: web.dev

Benefits of a mobile-first approach:

1. Appeal to most Users: As mobile users now comprise most of the internet traffic, it makes sense to start your design using mobile screen dimensions, reflecting and optimizing the site content based on consumer conventions.

2. Prioritized Content: Mobile-first design forces website designers to prioritize information. Since you don't have much space, you need to pick and choose only the most important content to include.

3. Less Bugs: When you begin with a simple mobile code, it ensures all your design elements will work on mobile devices because that's what it's built for!

4. More Responsive for Better UX: Users interact with mobile sites much more differently than with desktop sites.

5. Faster Load Times (and Therefore SEO): If you start with the mobile design first, you can limit the content that appears on the page and speed up load times. It'll also help you rank higher on Google.

Mobile-First Design Approach

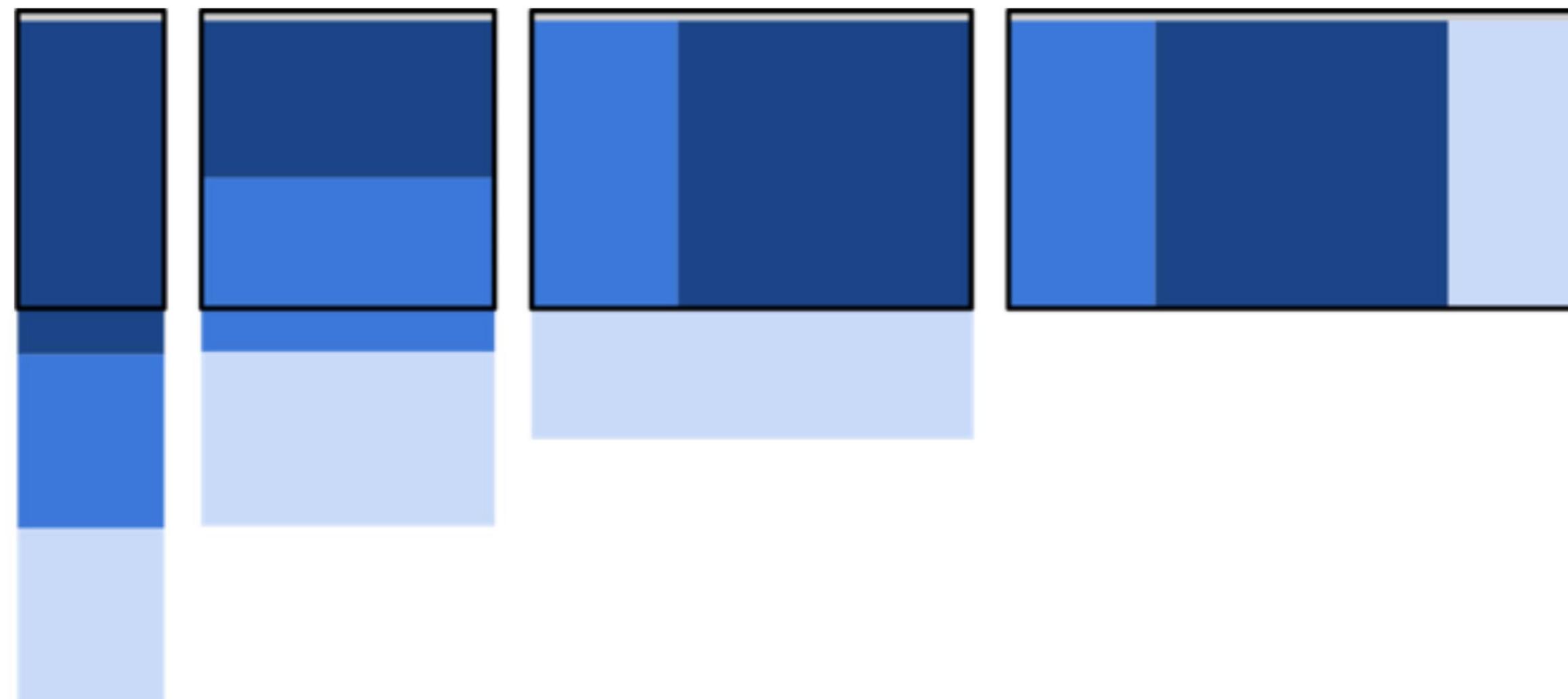
- Mobile-first design is a design strategy where sketching and prototyping are first done on the smallest screen and then on the larger screens.
- For smaller screens, mobile design is limited to making only important content available, while others are ignored.
- Starting design with small screen size and progressively adding content to fit the appropriate screen size is known as progressive enhancement.
- Mobile conversion rates are up at 64%. Designing for mobiles first can then lead to more profit for the business.

Responsive Web Design Pattern

- A design pattern defines a generic approach to a common problem in design.
- Responsive design patterns are used to make a web page responsive across various devices of varying screen sizes.
- Most design patterns use breakpoints to adapt to different screen sizes.

Column Drop Design Pattern

- The Column Drop pattern implements a multi-column layout and ends up with a single column layout, dropping columns along the way as the screen size becomes narrower.
- This pattern relies on stacking columns which adapt to the screen size.



There are two ways to quickly add bootstrap to your project.

Download bootstrap from getbootstrap.com and follow the instructions there.

Include bootstrap from a CDN (Content Delivery Network).

§ jsDelivr CDN supports cached version of Bootstrap's compiled CSS and JavaScript.

○ The following links are added in the HTML file to include bootstrap from a CDN. Check getbootstrap.com website for further instructions.

-
-

Responsive Design Pattern

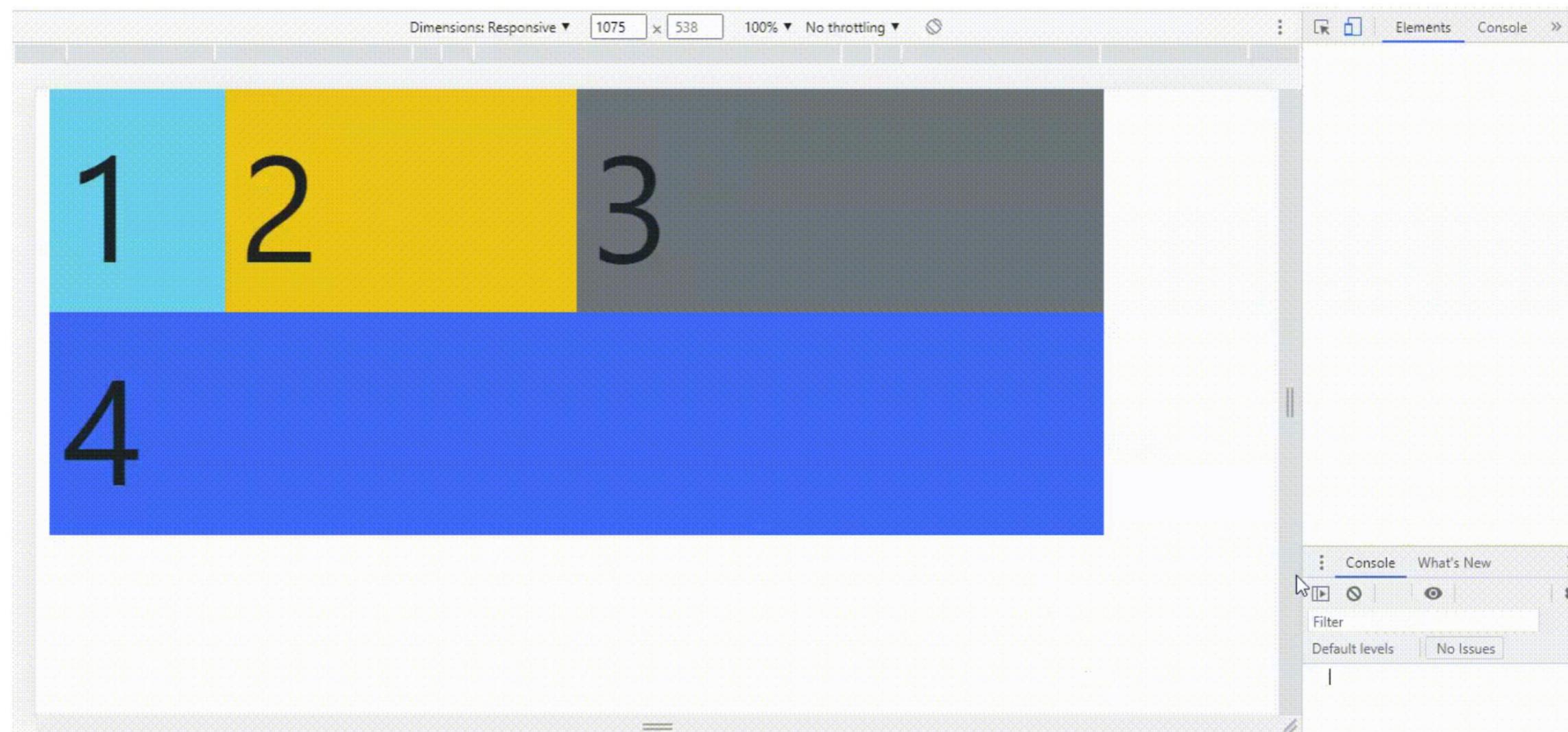
Let's explore the Column drop design pattern to create responsive web design using bootstrap class. Click on the following link to view the demonstration.

[Column Drop Design Pattern](#)

DEMO



Sample Web Page: Column Drop Pattern



Bootstrap class used in the HTML code to achieve the output as shown in the previous slide.

Example Code With Bootstrap Classes

```
<body>
  <div class= "container" >
    <div class= "row" >
      <div class= "bg-info col-md-6 col-lg-2" >1</div>
      <div class= "bg-warning col-md-6 col-lg-4" >2</div>
      <div class= "bg-secondary col-md-12 col-lg-6" >3</div>
      <div class= "bg-primary col-md-12 col-lg-12" >4</div>
    </div>
  </div>
</body>
```

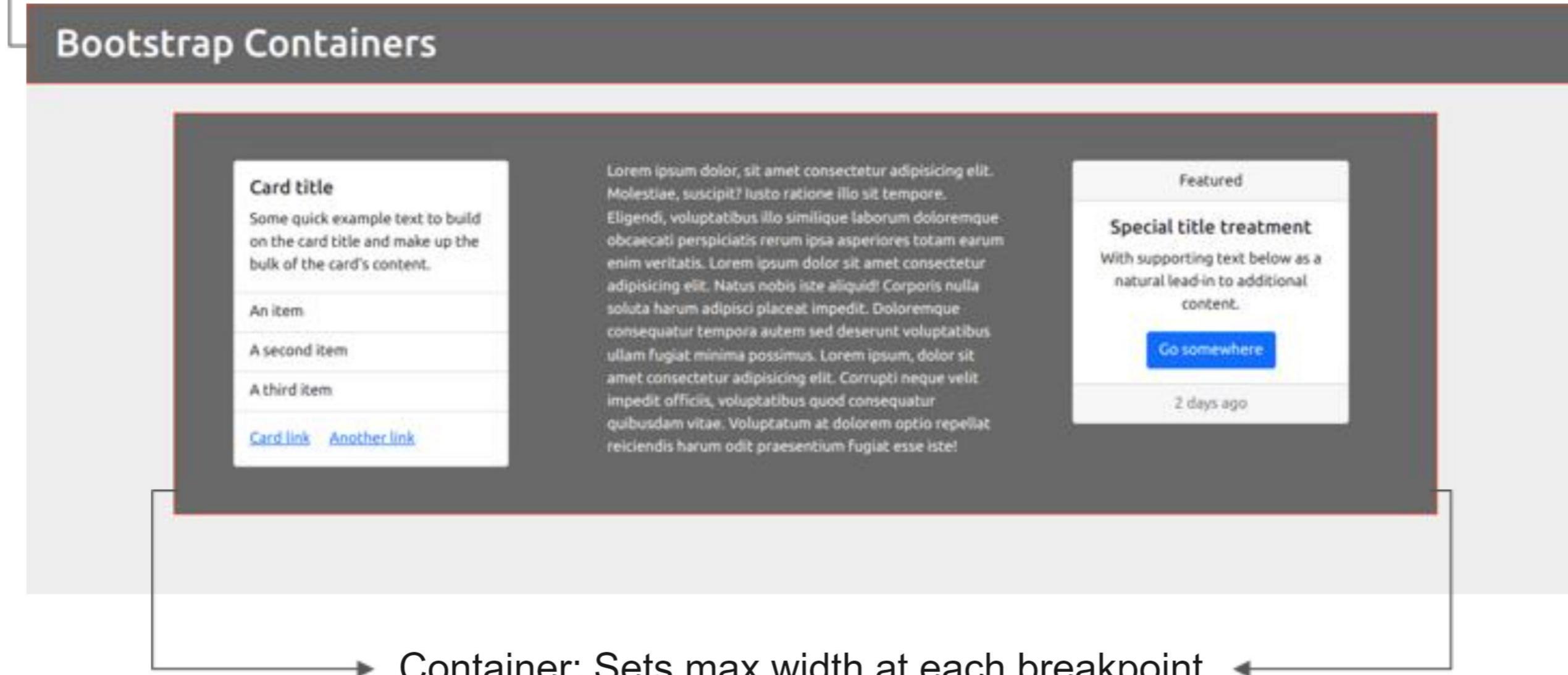
Left image is the desktop view of a responsive web page. Here the header is given .container-fluid bootstrap class and hence occupies 100% width.

But the main section is given .container bootstrap class and sets max-width at each breakpoints.

Right image is the mobile view if the same responsive web page.

Bootstrap Container and Container Fluid

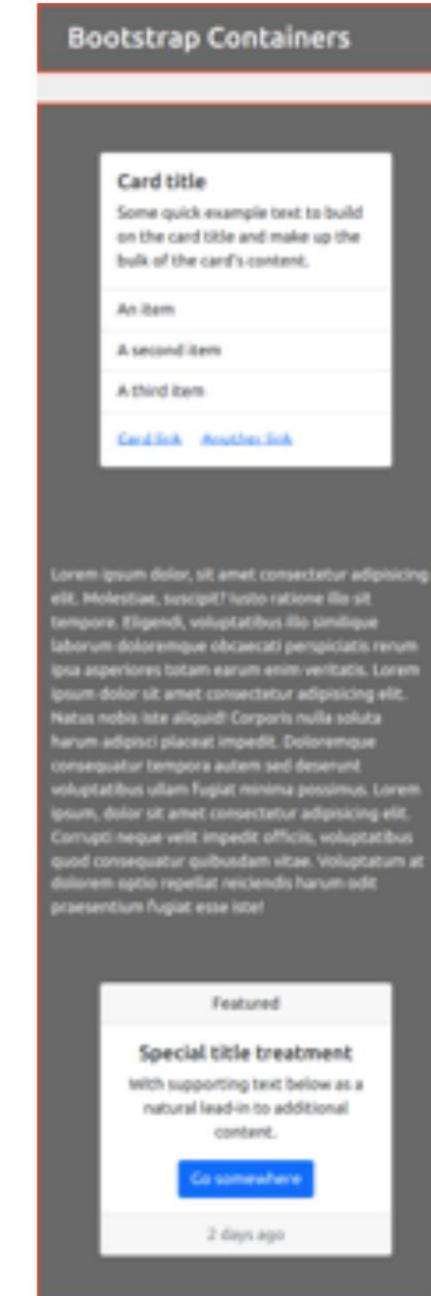
Container Fluid: Sets 100% width at all breakpoints



Desktop View

← →

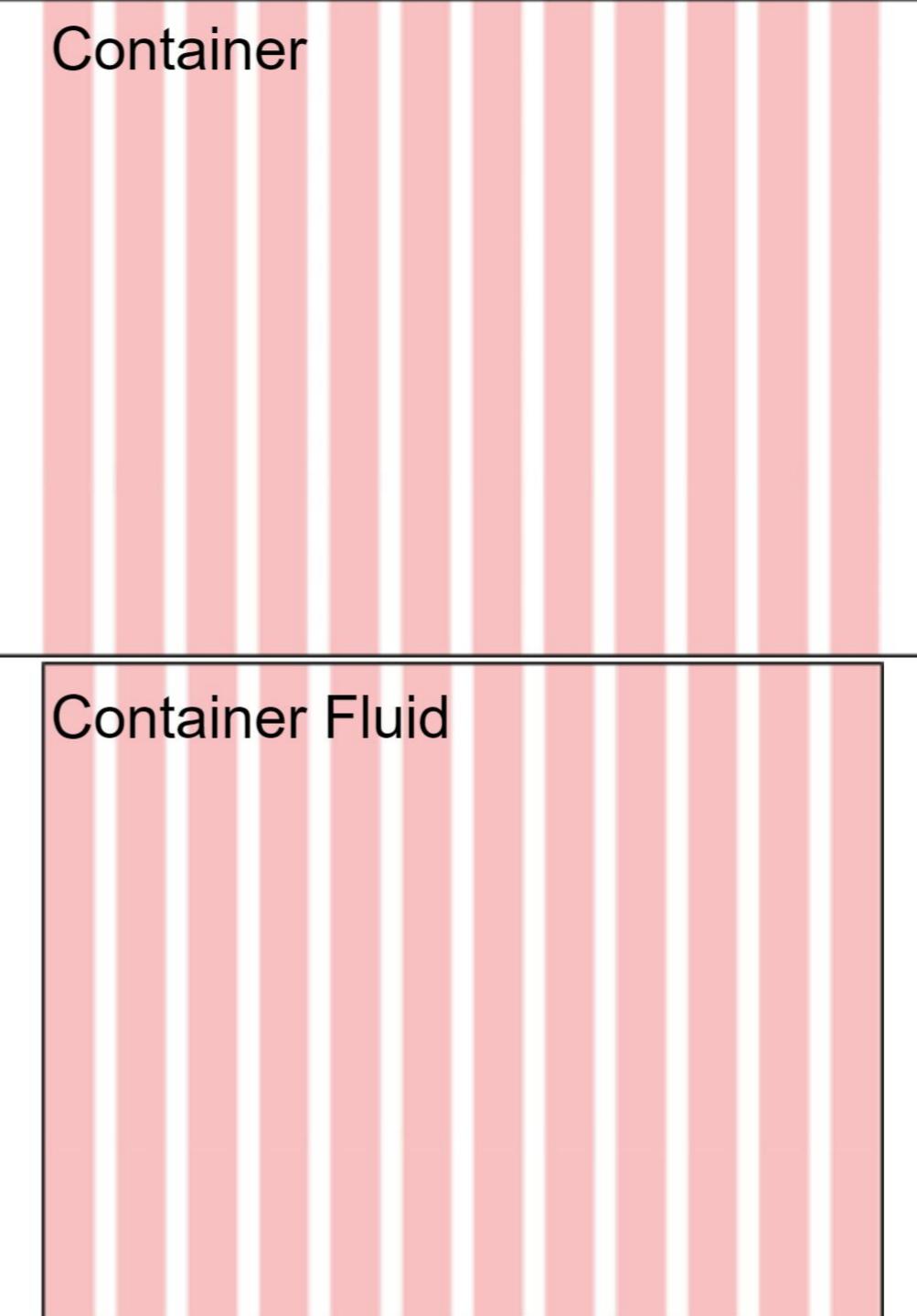
Mobile view



Container's center and horizontally-pad your content. Use .container for a responsive pixel width, .container-fluid for width: 100% across all viewports and devices, or a responsive container (e.g., .container-md) for a combination of fluid and pixel widths.

Bootstrap Container and Container Fluid (cont'd)

- Containers provide a means to centre-align and horizontally-pad your site's contents.
- Use .container for a responsive pixel width or .container-fluid for width: 100% across all viewports and device sizes.

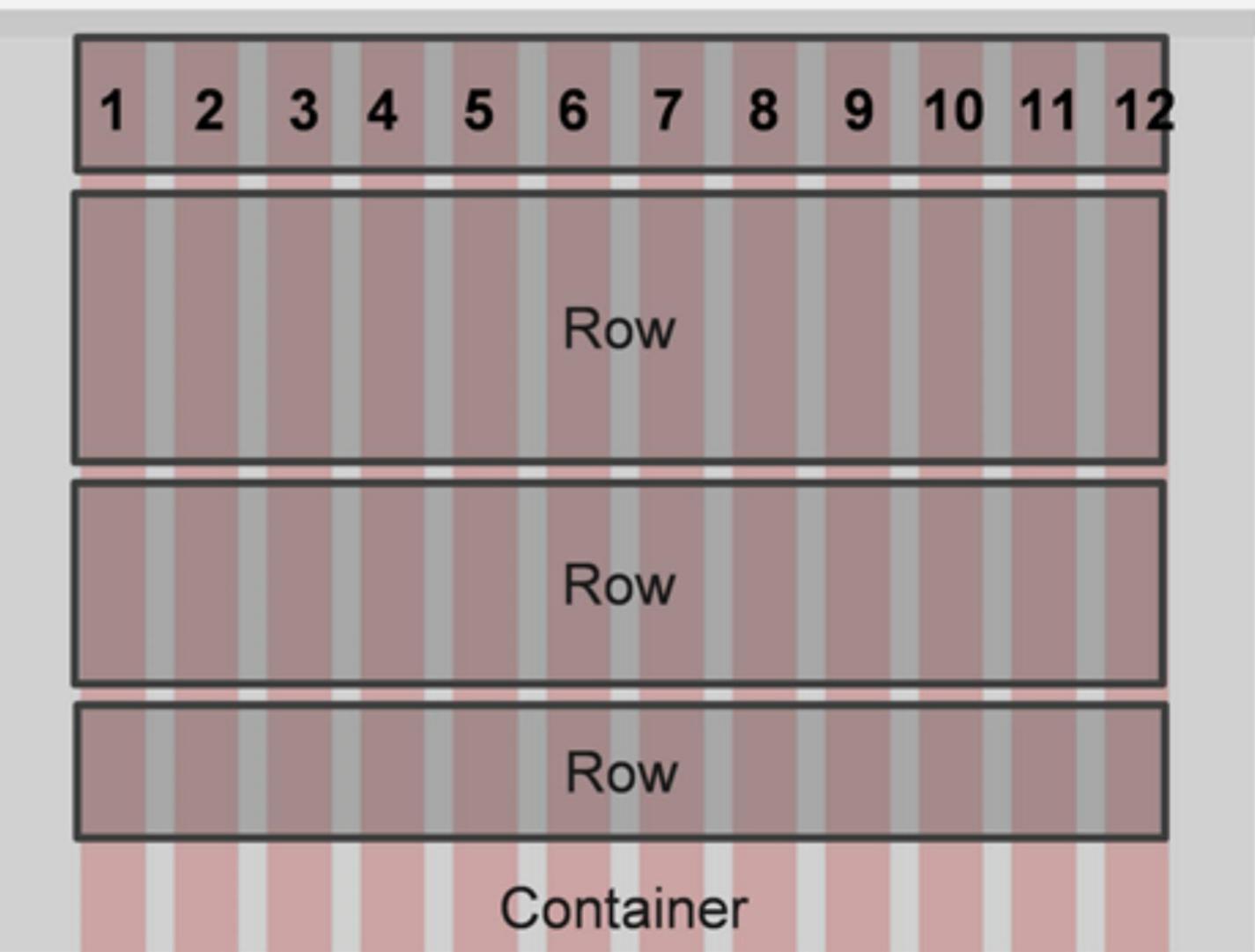


Example Code: Bootstrap Container

```
<div class= "container-fluid">
    <h1 class= "m-3">Bootstrap Containers</h1>
</div>
<div class= "container">
    <div class= "row">
        <div class= "col">
            // code to create card
        </div>
        <div class= "col">
            <p class= "pt-5 pt-sm-0">Lorem ..</p>
        </div>
        <div class= "col">
            //code to create card
        </div>
    </div>
</div>
```

Bootstrap Grid System

- Bootstrap's grid system uses a series of containers, rows, and columns to layout and align content.
- It uses a 12-column system with six responsive tiers.
- It's built with flexbox and is fully responsive. The columns, depending on the screen size, re-arranges automatically.

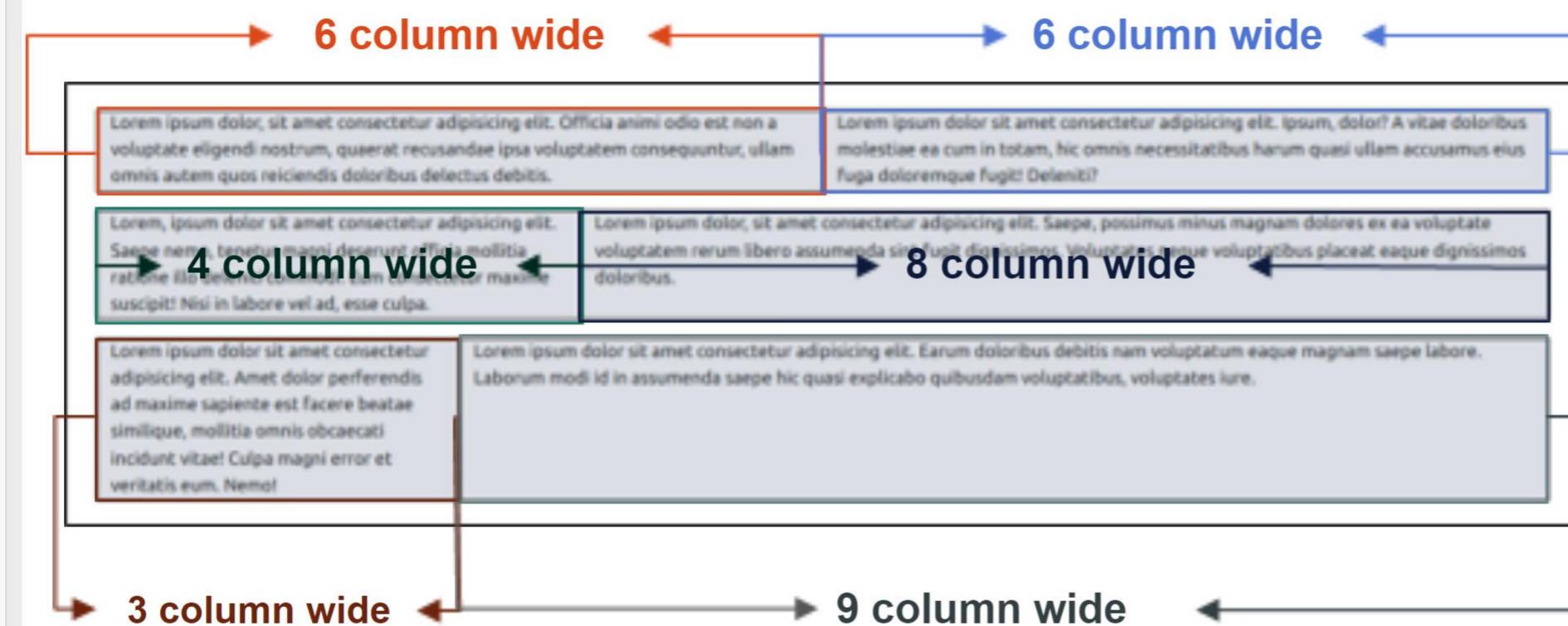


Example: Bootstrap Grid System



Source:07Planning

Responsive Grid System: 12 Column System



Two column Grid: Desktop View

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Single column Grid: Mobile View

Bootstrap Grid System

Let's explore the Bootstrap grid system by creating multicolumn grids. Click on the following link to view the demonstration.

[Bootstrap Grid System](#)

DEMO



Bootstrap class used in the HTML code to achieve the output as shown in the previous slide.

Example Code: Bootstrap Grid System

```
<div class= "container">
  <div class= "row">
    <p class= "col-md-6">Lorem ..</p>
    <p class= "col-md-6">Lorem ..</p>
  </div>
  <div class= "row">
    <p class= "col-md-4">Lorem ..</p>
    <p class= "col-md-8">Lorem ..</p>
  </div>
  <div class= "row">
    <p class= "col-md-3">Lorem ..</p>
    <p class= "col-md-9">Lorem ..</p>
  </div>
</div>
```

Grid System Breakpoints

Bootstrap's grid system can adapt across all six default breakpoints and any breakpoint you customize.
The six default grid tiers are:

- Extra small (xs) : Small Phones
- Small (sm) : Medium Phones
- Medium (md) : Tablets
- Large (lg) : Laptop
- Extra-large (xl) : Desktop
- Extra extra large (xxl) : Large Desktop

Grid System Breakpoints: Class Prefix

| | xs < 576 px | sm >= 576 px | md >= 768 px | lg>=992 px | xl >= 1200 px | xxl>=1400 px |
|--------------------------|-----------------------|------------------------|------------------------|----------------------|-------------------------|------------------------|
| Container (max-width) | None | 540px | 720px | 960px | 1140px | 1320px |
| Class prefix | .col- | .col-sm- | .col-md- | .col-lg- | .col-xl- | .col-xxl- |

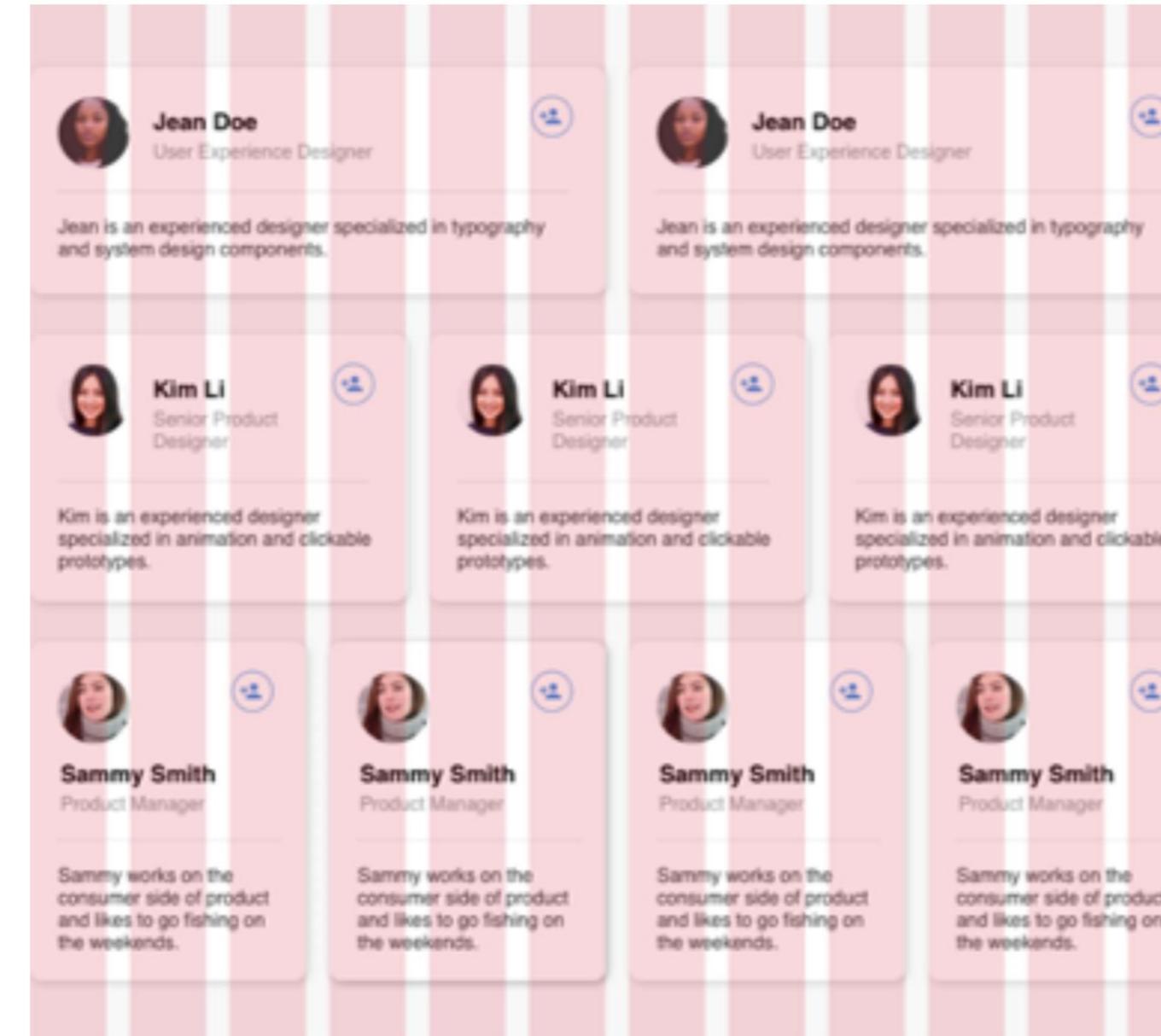
First image: Depending on the need, we can decide the number of columns for each row. There are 3 rows, where the first row has 2 columns, the second row has 3 columns, and the third row has 4 columns.

Second Image: This explains how the content is transformed from a larger screen size width to a medium screen size width.

The first paragraph's content occupies a 6-column width in a larger screen with the same content occupying a 12-column width in a medium screen.

Bootstrap can then provide various classes as mentioned here (col-lg-6, col-md-12) to achieve responsiveness.

Responsive Bootstrap Grid System



.col-lg-6

Lorem ipsum is placeholder text commonly used in the graphic, print, and publishing industries for

***Lorem ipsum*:**
dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exercitationem ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eam iriure dolor in hendrerit in vulputate

.col-lg-5

.col-md-12

Lorem ipsum is placeholder text commonly used in the graphic, print, and publishing industries for

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exercitationem ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo conse-

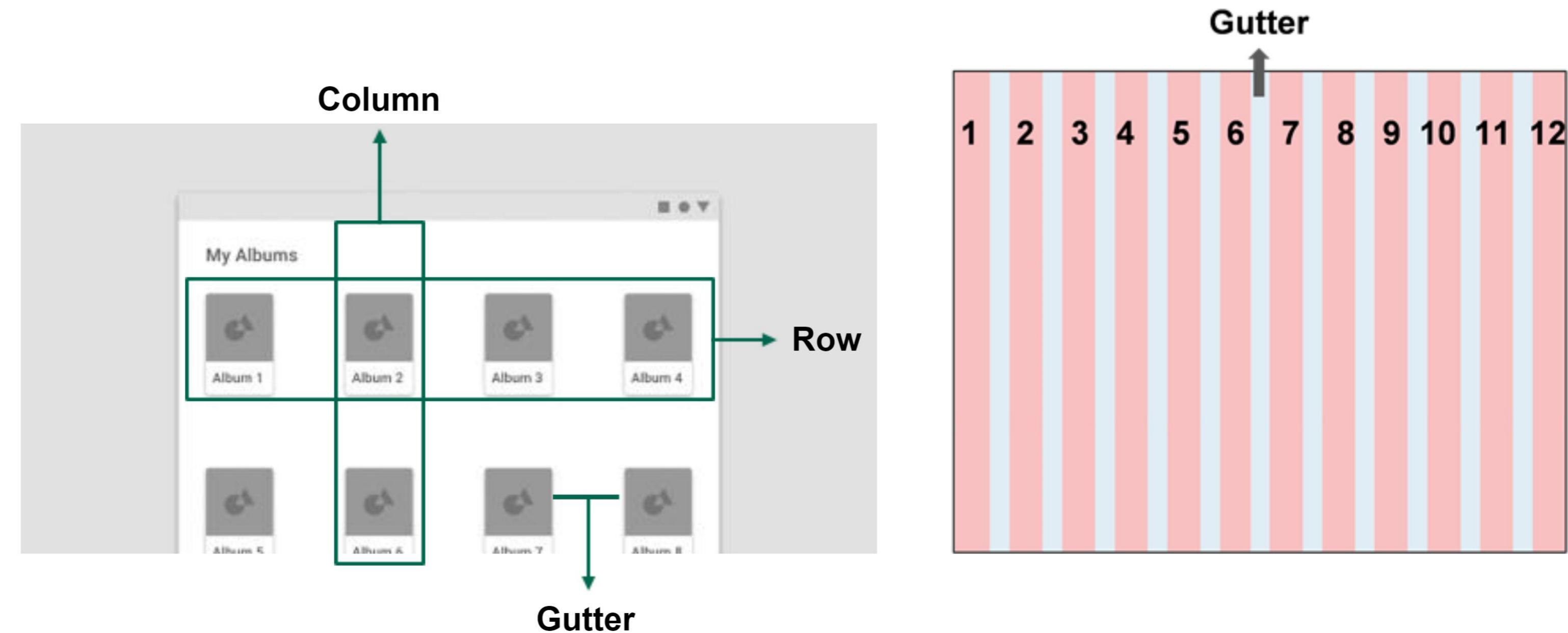
.col-md-5

• Columns are incredibly flexible. There are 12 template columns available per row, allowing you to create different combinations of elements that span any number of columns. Column classes indicate the number of template columns to span (e.g., col-4 spans four). widths are set in percentages, so you always have the same relative sizing.

Gutters are also responsive and customizable. Gutter classes are available across all breakpoints, with all the same sizes as our margin and padding spacing. Change horizontal gutters with .gx-* classes, vertical gutters with .gy-* , or all gutters with .g-* classes. .g-0 is also available to remove gutters.

Bootstrap Columns and Gutters

Each `.col` column has horizontal padding called a gutter for controlling the space between them. Read more about [Gutter classes](#) and [margin and padding spaces](#).



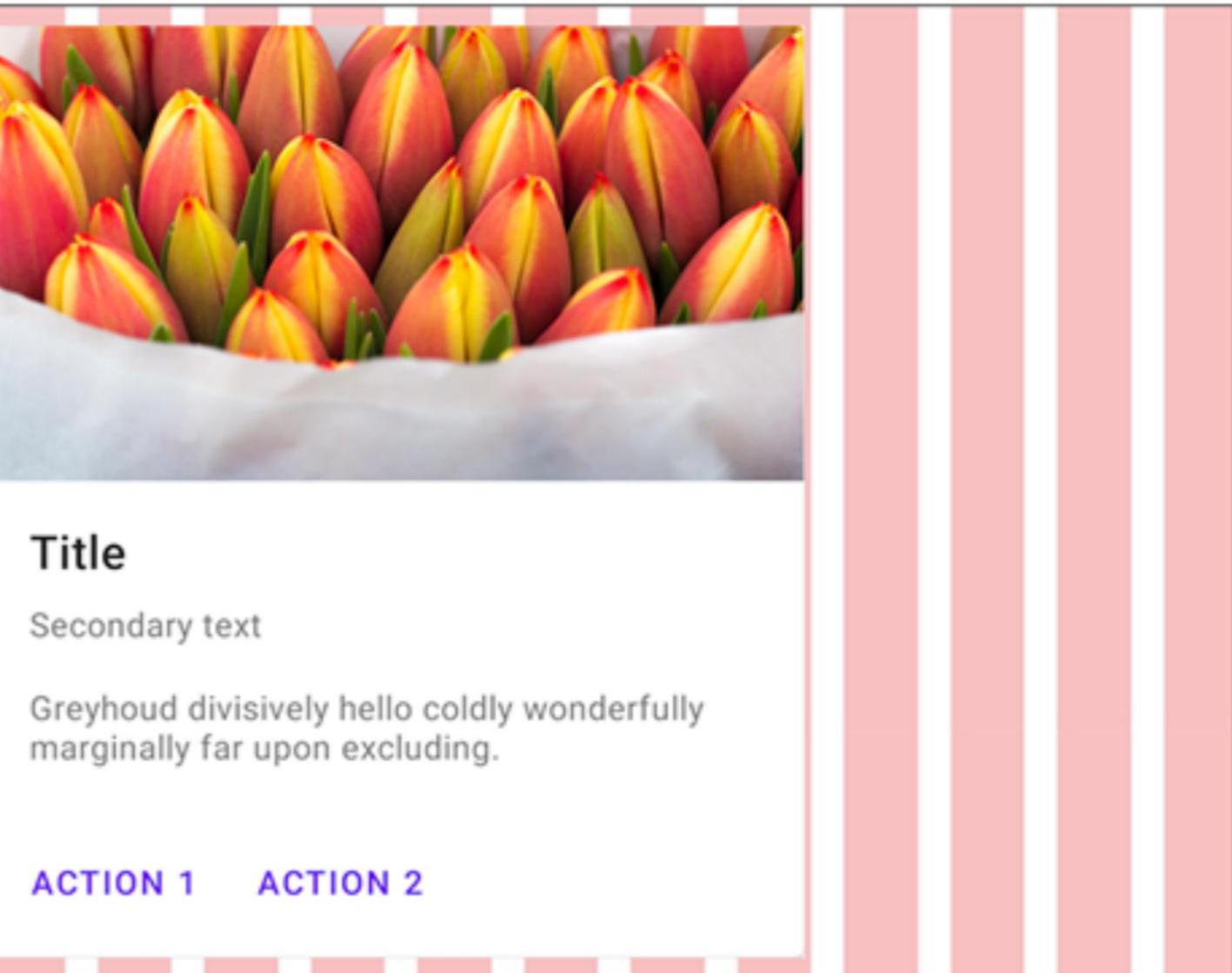
Columns should be immediate children of rows:

Columns in Bootstrap are HTML elements that are associated with the class called `.col`. These elements should come directly under the HTML elements which are associated with the class called `.row`.

Content Placed Within Columns

- In a grid layout, content must be placed within columns.
- Only columns can be considered the immediate children of rows.

```
<div class= "container">
  <div class= "row">
    <div class= "col col-md-6 col-lg-4" style="background-color: #f8d7da;">
      // code to create card
    </div>
  </div>
</div>
```



Bootstrap Responsive Images and Tables

Bootstrap Images

- Responsive images: Images in Bootstrap are made responsive with `.img-fluid`. This applies `max-width: 100%;` and `height: auto;` to the image so that it scales with the parent element.
- Image thumbnails: You can use `.img-thumbnail` to give an image a rounded 1px border appearance.
- Aligning images: You can align images with the float classes or text alignment classes.
- Displaying related images and text: You can use the included `.figure`, `.figure-img` and `.figure-caption` classes to provide some baseline styles for the HTML5 `<figure>` and `<figcaption>` elements.

Bootstrap Responsive Images and Tables

Design and create flexible images and styled tables using Bootstrap classes. We can take the help of the following link to do so.

[Bootstrap Content](#)

DEMO



Example Code: Bootstrap Flexible Images

```
<div class= "container">
    <img src= "https://picsum.photos/900/800" class= "img-fluid rounded" alt= "Nature">
    <figure class= "figure">
        <img src= "https://picsum.photos/900/800" class= "img-fluid rounded" alt= "Nature">
        <figcaption class= "figure-caption"> Nature
        </figcaption>
    </figure>
</div>
```

Bootstrap Table Classes

| Class | Description |
|---------------------------|--|
| .table | Adds basic styling (light padding and only horizontal dividers) to any <table> |
| .table-<contextual-class> | Adds colors to the table, table rows or individual cells |
| .table-striped | Adds zebra-striping to any table row within <tbody> |
| .table-bordered | Adds border on all sides of the table and cells |
| .table-hover | Enables a hover state on table rows within a <tbody> |
| .table-condensed | Makes table more compact by cutting the cell padding in half |

The above images are the preview of tables created using Bootstrap classes.

Basic Table With a Dark Theme

| # | First | Last | Handle |
|---|-------|----------|----------|
| 1 | Mark | Otto | @mdo |
| 2 | Jacob | Thornton | @fat |
| 3 | Larry | the Bird | @twitter |

Striped Table With Borders

| # | First | Last | Handle |
|---|-------|----------|----------|
| 1 | Mark | Otto | @mdo |
| 2 | Jacob | Thornton | @fat |
| 3 | Larry | the Bird | @twitter |

Quick-Check

The .container class provides the _____.

- a) fixed-width container
- b) full-width container
- c) table format
- d) ability to create a form



Quick-Check: Solution

The `.container` class provides the _____.

- a) **fixed-width container**
- b) full-width container
- c) table format
- d) ability to create a form

Explanation:

Option B is wrong because `.container-fluid` is used for a full-width container.

Option C is wrong since `.table` class is used for the table format.

Option D is wrong since there are various form classes that are available to create Bootstrap-styled forms.



Bootstrap Forms

HTML Forms

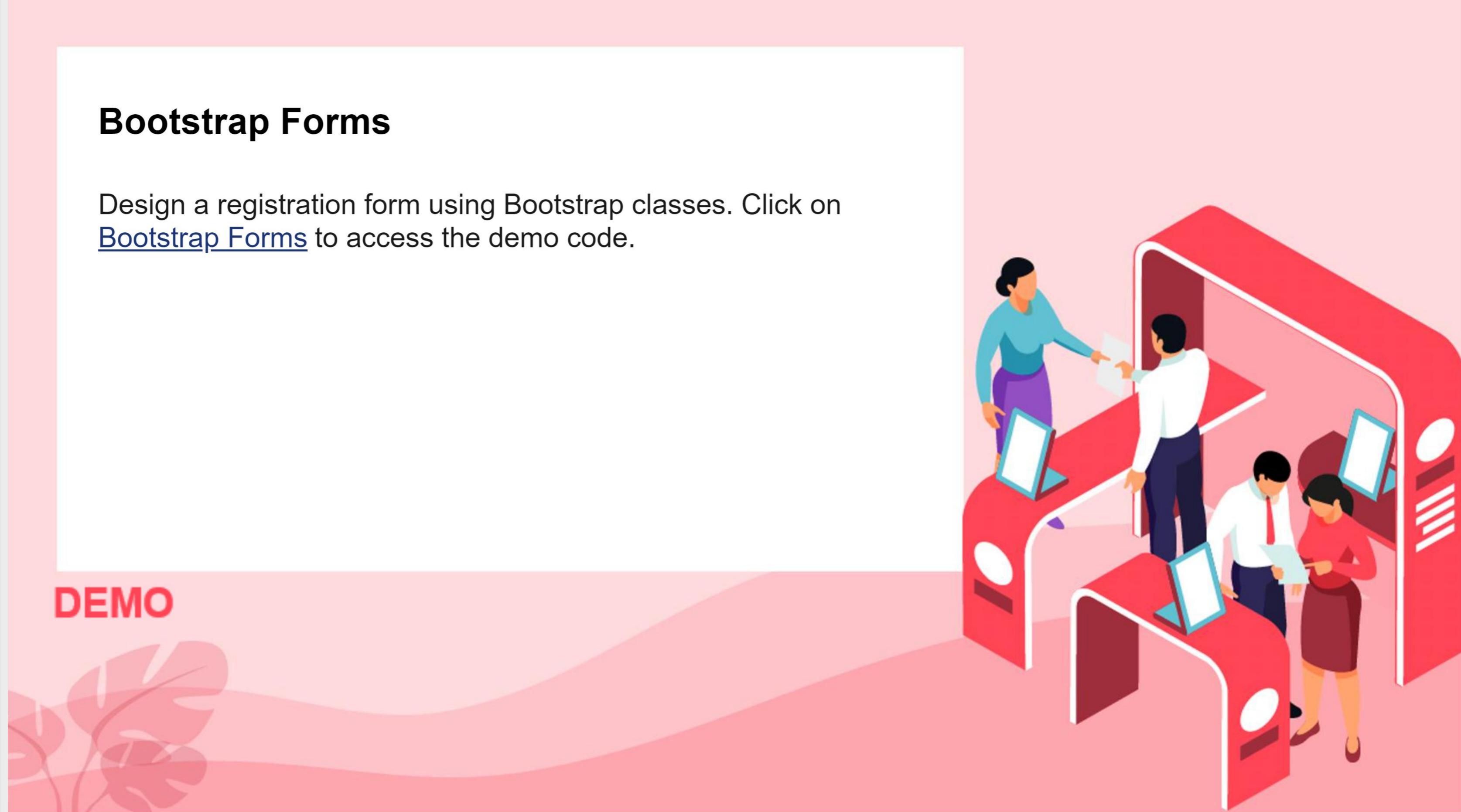
```
<form>
    <label for="fname">First
name:</label><br>
    <input type="text" id="fname"
name="fname"><br>
    <label for="lname">Last
name:</label><br>
    <input type="text" id="lname"
name="lname">
    <button type="submit">
Submit</button>
</form>
```

- The **<form>** HTML element represents a document section containing interactive controls for submitting information.
- It is used to collect user input which is most often sent to a server for processing.
- It is a container for different types of input elements, such as: text fields, checkboxes, radio buttons and submit buttons etc.
- The HTML **<input>** element is the most used form element and can be displayed in many ways, depending on the type attribute.

Bootstrap Forms

Design a registration form using Bootstrap classes. Click on [Bootstrap Forms](#) to access the demo code.

DEMO



Standard rules for all three form layouts:

- Wrap labels and form controls in (needed for optimum spacing)
- Add class .form-control to all textual

```
, and <select> element  
s
```

In an inline form, all of the elements are inline, left-aligned, and the labels are alongside. This only applies to forms within viewports that are at least 768px wide!

Add class .form-inline to the element

A horizontal form means that the labels are aligned next to the input field (horizontal) on large and medium screens. On small screens (767px and below), it will transform into a vertical form (labels are placed on top of each input).

Additional rules for a horizontal form:

Add class .form-horizontal to the element

Add class .control-label to all elements

Bootstrap Forms

Bootstrap provides three types of form layouts:

- Vertical form (default)
- Horizontal form
- Inline form

Bootstrap supports the following form controls:

- input
- textarea
- checkbox
- radio
- select

```
<div class="container">  
  <form class="row g-3">  
    <div class="col-md-6">  
      <label for="inputEmail4" class="form-label">Email</label>  
      <input type="email" class="form-control" id="inputEmail4">  
    </div>  
    <div class="col-md-6">  
      <label for="inputPassword4" class="form-label">Password</label>  
      <input type="password" class="form-control" id="inputPassword4">  
    </div>  
    <div class="col-12">  
      <button type="submit" class="btn btn-primary">Sign in </button>  
    </div>  
  </form>  
</div>
```

The above image is preview of a registration form created using Bootstrap Form classes.

Bootstrap Forms (cont'd)

Enter details below to change profile

Email

Address

Address 2

City

State

Zip

Check me out

Sign in

This is a screenshot of a registration form built using Bootstrap's form classes. The form is contained within a single column and includes fields for email, address, address 2, city, state, zip code, and a checkbox. A prominent blue 'Sign in' button is located at the bottom. The entire form is styled with a clean, modern look typical of Bootstrap's design principles.

Bootstrap Components

- Bootstrap provides a variety of components that can be customized and reused to provide a good user experience and user interactions.
- Few of them are listed below:
 - Jumbotron
 - Alerts
 - Buttons
 - Button Group
 - Badge
 - Progress Bar
 - List Group
 - Card
 - Carousel
 - Nav
 - Navbar
 - Breadcrumbs
 - Toast
 - Tooltip
 - Drop down
 - Collapse
 - Pagination
 - Spinner

Bootstrap Components

- Explore the various Bootstrap components from the official documentation of Bootstrap Framework.
- Each component is available with description, sample code and their respective preview.
- Click [here](#) to explore more.

Bootstrap Components

Implement Bootstrap classes to create various Bootstrap components. Click on the following link to learn about a few common Bootstrap components.

[Bootstrap Components](#)

DEMO



Quick Check

Which plugin is used to cycle through elements, like a slideshow?

- a) Orbit
- b) Slideshow
- c) Scrollspy
- d) Carousel



Quick Check: Solution

Which plugin is used to cycle through elements, like a slideshow?

- a) Orbit
- b) Slideshow
- c) Scrollspy
- d) **Carousel**



Bootstrap Utilities

- Bootstrap provides various helper/utility classes to
 - change the color of the text content
 - change the background-color
 - align the text content
 - style the border
 - adjust the padding and margin of an element
 - float an element
 - add or remove shadow to elements
 - make an element as wide or as tall
 - configure the position of an element
 - responsively toggle the display value of an element

Bootstrap Utilities

Explore various utility classes provided by bootstrap to design a responsive web page. To gain better understanding of the codes click on the following demo link.

[Bootstrap Utilities](#)

DEMO

