

Information Technologies

Anselm Spoerri PhD (MIT)

SC&I @ Rutgers University

aspoerri@rutgers.edu

anselm.spoerri@gmail.com

Lecture 5 - Overview

Bootstrap 4 – Grid System and Core Concepts

- **Responsive Layout** Framework
- **Installation:** CDN vs Local
- **Grid System** 12 columns
- Core Concepts: **Containers**, **Rows** and **Columns**
- **Columns: col-SIZE-SPAN** and Multiple Columns

Bootstrap 4 – **Demo**

Lectures – Week 5 Content

<http://comminfo.rutgers.edu/~aspoerri/Teaching/InfoTech/Lectures.html#week5>

Bootstrap

Bootstrap.js popular, used by many sites

Framework | Responsive Layout | Mobile First | Use HTML, CSS and JS

v4 : <https://www.w3schools.com/bootstrap4/default.asp>

v3 : <https://www.w3schools.com/bootstrap/default.asp>

Need to **Organize** and **Write Code** in **Specific Way**

Pre-built CSS (need to use specific classes) and JS Functionality

Used for **Prototyping** and **Scaffolding** web sites

Installation: **Basic** or **Advanced** and requires **jQuery**

https://www.w3schools.com/bootstrap4/bootstrap_get_started.asp

<https://getbootstrap.com/docs/4.0/getting-started/introduction/>

<https://getbootstrap.com/docs/3.3/getting-started/>

Standard = CDN vs **Customize = Download Source**

Bootstrap 4 – Grid System and Core Concepts

Grid System 12 columns https://www.w3schools.com/bootstrap4/bootstrap_grid_basic.asp

Easy to compute column width and gutter | Added predefined CSS classes

Core Concepts: **Containers**, **Rows** and **Columns**

Container: controls layout and incl. 15px padding

Fixed: responds to **media query** break points (**.container**)

Fluid: responds to parent width (**.container-fluid**)

Rows: horizontal group of columns → placed in **container** and include **columns**

Remove padding using negative margins

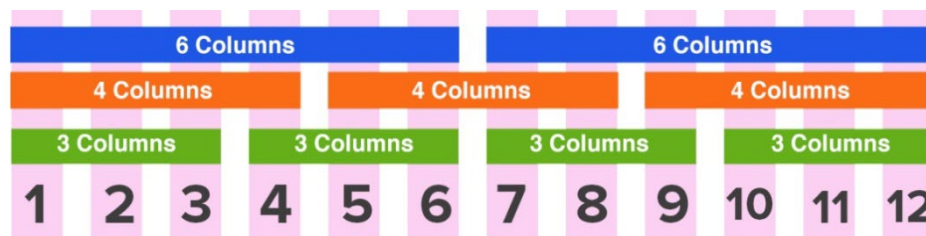
Columns: Gutter = 30px = L = 15px + R = 15px

.col-SIZE-SPAN **SIZE** = break point becomes 1 column | **SPAN** = # columns to span

SIZE: (extra small) | **sm** | **md** | **lg** | **xl**

SPAN: needs to **add up to 12**

Multiple Columns: class="col-sm-6 col-md-4"



Bootstrap 4 – Grid System and Core Concepts

Supports latest, stable releases of all major browsers (IE 9 < not supported)

Default font-size of 16px = 1em and line-height is 1.5. [Typography](#)

Bootstrap 4 Grid System 12 columns and **five** classes:

- .col-** (extra small devices - screen width < **576px**)
- .col-sm-** (small devices - screen width >= **576px**)
- .col-md-** (medium devices - screen width >= **768px**)
- .col-lg-** (large devices - screen width >= **992px**)
- .col-xl-** (xlarge devices - screen width >= **1200px**)

Tips: Each class **scales up** – same widths for sm and md, only need to specify sm.
Easy way to create **equal width columns** for all devices: only use **.col** class.

Difference between Bootstrap 3 and Bootstrap 4

Bootstrap 4 uses **flexbox**, instead of floats. [CSS Flexbox Tutorial](#)

Grid columns without a specified width will automatically layout as equal width

	Extra small	Small	Medium	Large	Extra Large
Class prefix Bootstrap 4	.col-	.col-sm-	.col-md-	.col-lg-	.col-xl-
Screen width	<576px	>=576px	>=768px	>=992px	>=1200px
Bootstrap 3	.col-xs-	.col-xs-	.col-sm-	.col-md-	.col-lg-
		Extra small	Small	Medium	Large

Bootstrap – Grid System and Core Concepts

Columns: col-**SIZE-SPAN** https://www.w3schools.com/bootstrap4/bootstrap_grid_system.asp

SIZE: extra small | **sm** | **md** | **lg** | **xl**

SPAN: needs to **add up to 12**

1 Column → SPAN = **12**

2 Column → SPAN = **6**

3 Column → SPAN = **4**

4 Column → SPAN = **3**

6 Column → SPAN = **2**

12 Column → SPAN = **1**

Multiple Columns: class="col-12 col-sm-6 col-md-4 col-lg-3 col-xl-2"

2 Items → class="col-xl-6"

4 Items → class="col-lg-6 col-xl-3"

6 Items → class="col-md-6 col-lg-4 col-xl-2"

12 Items → class="col-md-6 col-lg-4 col-xl-3"

12 Items → class="col-sm-6 col-md-4 col-lg-3 col-xl-2"

12 Items → class="col-sm-4 col-md-3 col-lg-2 col-xl-1"

Atom Editing: CTRL + / and ALT + F3

Bootstrap – Grid System and Core Concepts

Offset Columns: col-SIZE-**offset**-SPAN

Remember to reset offset at greater screen widths

Nesting Columns: gives more layout flexibility

https://www.w3schools.com/bootstrap4/bootstrap_grid_examples.asp

Utility Classes

.h1h6 also as inline element

.small

.lead

Alignment: .text-left | .text-right | .text-center

Transformation: .text-lowercase | .text-capitalize | .text-uppercase

<blockquote><footer>: .blockquote | .blockquote-reverse

Lists: .list-unstyled | .list-inline

Targets Some Built-In Elements

<mark> | <s> | | <ins> | | | <dl>, <dt>, <dd>

<code> | <kbd> | <var> | <samp> | <pre> | <pre class="pre-scrollable">

Utilities without need for CSS

https://www.w3schools.com/bootstrap4/bootstrap_utilities.asp

Bootstrap 4 – Demo

Create **HTML5** page

Add **meta element**

```
<meta name="viewport" content="width=device-width, initial-scale=1">
```

Add **CDN links** for needed Bootstrap CSS and JS libraries

Create **DIVS** for **.container**, **.row** and **.col-*-***

Add **img** element 12 times

Progressively add **needed CSS classes** for 5 display **sizes**
and specify needed **SPAN**
to achieve **desired responsive layout**

Use Find and Replace to update CSS classes col-applied to column elements