

Lesson 3: Grid System in Bootstrap 5

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1. Lesson 1: What is Bootstrap 5?
2. Lesson 2: Learning about Containers

Bootstrap is one of the most popular responsive web development frameworks today. It includes HTML, CSS, and JavaScript.

According to Wikipedia, 'in graphic design, a grid (usually a 2D structure) is made up of a series of intersecting vertical and horizontal lines to form the structure of content. It is widely used in layout design and content structure in print design. In web design, it is a very effective method for quickly creating consistent layouts using HTML and CSS.'

So what is the grid system in Bootstrap 5?

The Grid system in Bootstrap 5 allows you to create up to 12 columns on a page. You can use all 12 columns individually or group them together to create wider columns.

Bootstrap's grid system is responsive, and the columns automatically adjust to the screen size.

Bootstrap 's grid system is built with flexbox, allowing you to create up to 12 columns on a page. If you don't want to use all 12 columns separately, you can group them together to create wider columns.

This grid system is responsive, meaning the columns can automatically rearrange to fit the screen size. Make sure the total number of columns is a maximum of 12 or fewer (you don't necessarily need to use all 12 columns).

1 cột	1 cột	1 cột	1 cột	1 cột	1 cột	1 cột	1 cột	1 cột	1 cột	1 cột	1 cột
gộp 4 cột				gộp 4 cột				gộp 4 cột			
gộp 4 cột				gộp 8 cột							
gộp 6 cột						gộp 6 cột					
gộp 12 cột											

Grid classes

Bootstrap 5's Grid system has 6 classes:

1. **.col-** (micro-device - screen width less than 576px)
2. **.col-sm-** (small device - screen width equal to or greater than 576px)
3. **.col-md-** (medium device - screen width equal to or greater than 768px)
4. **.col-lg-** (large device - screen width equal to or greater than 992px)
5. **.col-xl-** (extremely large device - screen width equal to or greater than 1200px)
6. **.col-xxl-** (extremely large device - screen width equal to or greater than 1400px)

These classes can be combined to create a more dynamic and flexible layout.

Tip: Since the class will increase/decrease proportionally, if you want to set the same width for sm both md, just specify it sm.

Grid options

The following table summarizes how the Bootstrap 5 grid system works on different screen sizes:

	Extra small (576px)	Small (>=576px)	Medium (>=768px)	Large (>=992px)	Extra Large (>=1200px)	XXL (>=1400px)
Class	.col-	.col-sm-	.col-md-	.col-lg-	.col-xl-	.col-xxl-
Phạm vi Grid	Ngang mọi lúc	Bắt đầu từ 576px, dần ngang phía trên các thiết bị	Bắt đầu từ 768px, dần ngang phía trên các thiết bị	Bắt đầu từ 992px, dần ngang phía trên các thiết bị	Bắt đầu từ 1200px, dần ngang phía trên các thiết bị	Bắt đầu từ 1400px, dần ngang phía trên các thiết bị
Chiều rộng Container	Không (tùy chọn)	540px	720px	960px	1140px	1320px
Phù hợp với	Thiết bị di động	Thiết bị di động ngang	Máy tính bảng	Laptop	Laptop và Desktop	Laptop và Desktop

S? c?t	12	12	12	12	12	12
Chi?u r? ng Gutter	1.5rem (.75rem trên m?i bên c?a 1 c?t)	1.5rem (.75rem trên m?i bên c?a 1 c?t)	1.5rem (.75rem trên m?i bên c?a 1 c?t)	1.5rem (.75rem trên m?i bên c?a 1 c?t)	1.5rem (.75rem trên m?i bên c? a 1 c?t)	1.5rem (.75rem trên m?i bên c? a 1 c?t)
Có th? l? ng	Có	Có	Có	Có	Có	Có
Offset	Có	Có	Có	Có	Có	Có
Th? t? c?t	Có	Có	Có	Có	Có	Có

Rules for the Grid System in Bootstrap

The Grid System in Bootstrap has a few rules:

1. Rows must be placed within a **.container** (fixed-width) or **.container-fluid** (full-width) file for proper alignment and padding.
2. Use rows to create horizontal column groups.
3. Content should be placed in columns, and only columns can be children of rows.
4. Predefined classes such as **.row** and **.col-sm-4** are available to quickly create grid layouts.
5. Columns create gutter (space between column contents) through padding. This padding is compensated row-by-row for the first and last columns via negative margin in **.rows**.
6. Grid columns are created by specifying the number of columns out of a total of 12 that you want to create. For example, the following 3 columns would use **3.col-sm-4**.
7. Column widths are calculated as a percentage, so they are very flexible and their size corresponds to their parent element.

The basic structure of Bootstrap 5 Grid

The following is the basic structure of a grid in Bootstrap 5:

In Example 1 : After creating a row (), you add the number of columns you need (corresponding to the appropriate classes). The first symbol represents responsiveness: sm, md, lg, xl, or xxl; while the second symbol represents a number, so a maximum of 12 numbers per row is allowed. `.col-*`

In Example 2 : Instead of adding a number to each column `col`, you can let Bootstrap handle the layout, creating columns of equal width:

1. **If there** are 2 elements , then each element is 50%.
2. **The three col** elements each have a width of 33.33%.
3. 4 cols, each col is 25%.
4. .

You can use this `.col-sm | md | lg | xl | xxl` to make the columns responsive.

Below are some basic examples of basic grid layouts in Bootstrap 5.

Create 3 equal columns

The example below will show you how to create three columns of equal width, across all devices and screen sizes.

You need to add the following div tags:

```
n?i dung trong c?t n?i dung trong c?t n?i dung trong c?t
```

Below is the complete HTML file:

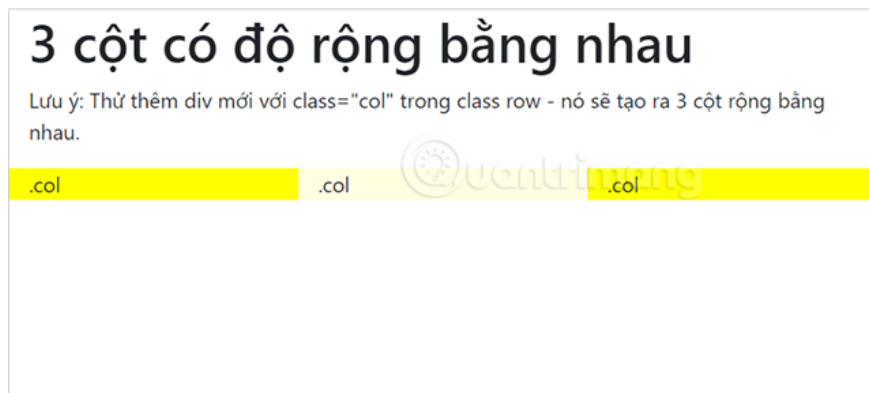
```
Ví d? Bootstrap
```

3 columns of equal width

Note: Try adding a new div with `class="col"` inside the row class - it will create 3 columns of equal width.

```
.col .col .col
```

When you run the file above, you will get the layout shown below:



Creating Responsive Columns in Bootstrap

The example below will show you how to create four columns of equal width starting from the width of a tablet screen and scaling for larger screens. On phones or screens smaller than 576px, the columns will automatically stack.

In this case, you need to use the following div tags:

```
<div class="col-sm-3">Nội dung trong cột</div> <div class="col-sm-3">Nội dung trong cột</div> <div class="col-sm-3">Nội dung trong cột</div> <div class="col-sm-3">Nội dung trong cột</div>
```

And the complete HTML file would be:

```
<div class="row"><div class="col-sm-3">Ví dụ Bootstrap</div></div>
```

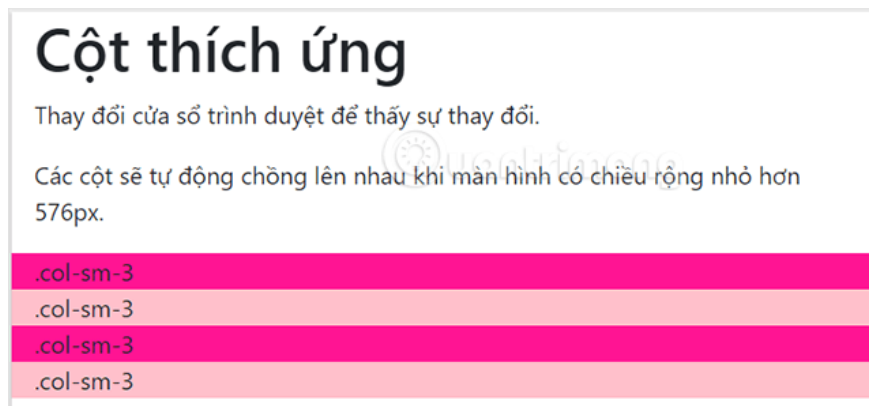
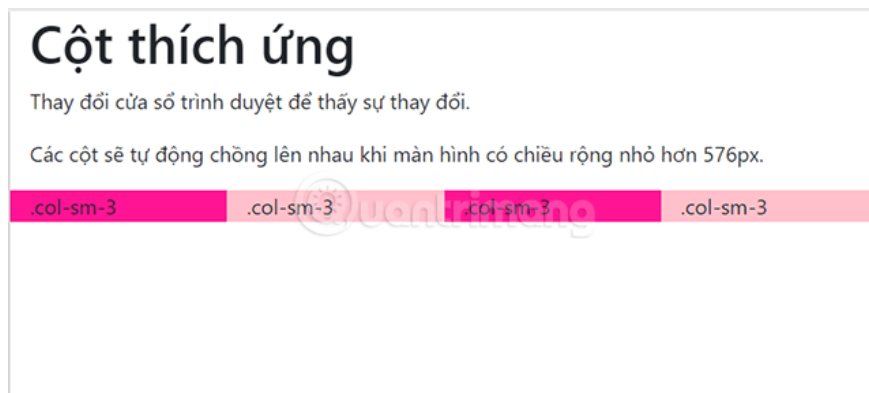
Adaptive column

Change your browser window to see the change.

The columns will automatically overlap when the screen width is less than 576px.

```
<div class="col-sm-3">Ví dụ Bootstrap</div> <div class="col-sm-3">Ví dụ Bootstrap</div> <div class="col-sm-3">Ví dụ Bootstrap</div> <div class="col-sm-3">Ví dụ Bootstrap</div>
```

When you run the file above, you will get two layouts: one for screens wider than 576px, and one for screens smaller than 576px, as shown below:



Create two responsive columns with different widths.

Next is an example of how to create two columns of different widths, starting from a tablet screen and expanding to larger screens. Let's say we create one column `sm-4` and one column `sm-8`; then you would use the following `div` tags:

```
<div class="col-sm-4">Nội dung cột</div> <div class="col-sm-8">Nội dung cột</div>
```

The complete HTML file will now look like this:

```
<div class="col-sm-4">Ví dụ Bootstrap</div>
```

2 columns of different widths

Change the width of your browser window to see the effect.

The columns will automatically overlap when the screen is smaller than 576px.

```
<div class="col-sm-4">Ví dụ Bootstrap</div>
```

After running the file above, you will get two layouts corresponding to screen widths larger than 576px and smaller than 576px.



Mix and combine

Don't want to just stack simple columns in several Grid levels? Then combine different classes for each level as needed. The example below will help you better visualize how it works:

`.col-md-8 .col-6 .col-md-4 .col-6 .col-md-4 .col-6 .col-md-4 .col-6 .col-md-4`



Nesting

To nest content with the default grid, add `.row` and group columns `.col-sm-*` within the column `.col-sm*`. Nested rows consist of a set of added columns, up to 12 or fewer.

Level 1: `.col-sm-3` Level 2: `.col-8 .col-sm-6` Level 2: `.col-4 .col-sm-6`



Here are some things to remember about how the Grid system works in Bootstrap 5:

1. Grid systems can support multiple responsive **breakpoints** . **Breakpoints are based on min-width** media queries , meaning they affect that breakpoint and all other breakpoints above it (e.g., `.col-sm-4` applies to sm, md, lg, xl, xxl). This means you can control the container, column size, and behavior of each **breakpoint** .
2. **The container** centers and pads horizontally across the content. Use `.container` for responsive pixel length, `.container-fluid` for **width: 100%** across all viewports and devices, or a responsive container (e.g., `.container-md`).
3. Rows are packed into columns. Each column has vertical **padding** called gutter to control the space between them. Padding is then disabled on rows with negative alignment indices to ensure that content within the column appears in the bottom right position. Rows also support edit classes.
4. **The gutter** is also responsive and customizable.

You can try using this online CSS editor to run the HTML files above, or install Bootstrap on your computer and use the editor to create the HTML file yourself.

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