

Bootstrap 5 Grid Layout Tutorial

Bootstrap 5's grid system is **powerful, flexible, and mobile-first**, making responsive web design easier.

1. What is the Bootstrap Grid?

- A **12-column system** that helps you organize page content.
 - Uses **rows** (`.row`) to group columns.
 - Columns (`.col`) inside rows define how much horizontal space content takes.
 - Grid is **responsive** — adjusts based on screen size.
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2. Basic Structure

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

- `.container` centers content and adds side padding.
 - `.row` groups columns horizontally.
 - `.col` auto-divides space equally among columns.
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3. Equal Width Columns

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

Each column takes **equal width**: 33.33% if 3 columns.

4. Specifying Column Widths (Using 12-grid system)

Bootstrap grid divides row width into **12 parts**.

Example: 3 columns with widths 3, 6, 3 (out of 12)

```
<div class="row">
  <div class="col-3">25%</div>   <!-- 3/12 -->
  <div class="col-6">50%</div>   <!-- 6/12 -->
  <div class="col-3">25%</div>   <!-- 3/12 -->
</div>
```

5. Responsive Grid Classes

Bootstrap 5 supports breakpoints:

Abbreviation	Screen Size
col-	Extra small (default)
col-sm-	Small $\geq 576\text{px}$
col-md-	Medium $\geq 768\text{px}$
col-lg-	Large $\geq 992\text{px}$
col-xl-	Extra large $\geq 1200\text{px}$
col-xxl-	XXL $\geq 1400\text{px}$

Example: Different layout on mobile and desktop

```
<div class="row">
  <div class="col-12 col-md-6">50% width on md and above, full width on smaller</div>
  <div class="col-12 col-md-6">50% width on md and above, full width on smaller</div>
</div>
```

6. Auto-layout columns

Instead of specifying widths, you can use `.col` to auto size.

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

All columns share the available space equally.

7. Row columns utility (`row-cols-*`)

Bootstrap 5 added easy ways to specify the number of columns per row:

```
<div class="row row-cols-3">
  <div class="col">Col 1</div>
  <div class="col">Col 2</div>
  <div class="col">Col 3</div>
  <div class="col">Col 4</div>
</div>
```

- 3 columns per row.
 - The 4th column wraps to next row automatically.
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8. Gutters (spacing between columns)

- Use `.g-*` classes to control gutters (padding between columns).

Example:

```
<div class="row g-3">
  <div class="col">Col 1</div>
  <div class="col">Col 2</div>
</div>
```

`g-3` adds 1rem (16px) spacing.

9. Nesting columns

You can nest rows inside columns:

```
<div class="row">
  <div class="col">
    Parent Column
    <div class="row">
      <div class="col-6">Nested Col 1</div>
      <div class="col-6">Nested Col 2</div>
    </div>
  </div>
  <div class="col">Parent Col 2</div>
</div>
```

10. Example: Responsive 3-column layout with gutters

```
<div class="container my-5">
  <div class="row row-cols-1 row-cols-md-3 g-4">
    <div class="col bg-primary text-white p-3">Column 1</div>
    <div class="col bg-secondary text-white p-3">Column 2</div>
    <div class="col bg-success text-white p-3">Column 3</div>
    <div class="col bg-danger text-white p-3">Column 4</div>
  </div>
</div>
```

- 1 column on small screens.
- 3 columns on medium+ screens.
- Gutter spacing with `g-4`.