Introduction to CSS Grid Layout

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Fluent, April 2015

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CSS in 2015 is amazing.

The trouble with CSS layout

- Floats and clearfix hacks
- Absolute positioning means elements are taken out of document flow and risk overlaps
- Redundant markup and positioning oddities with display: table
- White space issues with inline-block


Flexbox?
https://www.flickr.com/photos/zervas/2810241612

Seeing Flexbox as the silver bullet for layout issues is likely to lead us down another path of layout hacks.

The cost of taming layout methods

- Developer hours spent learning non-obvious concepts.
- Compromises in terms of document semantics in order to achieve responsive layouts.
- Needing to lean on frameworks to help with complex math.
- Adding markup to create grids
- Using preprocessors to abstract layout hacks

We need a designed for purpose layout system for the sites and applications we develop today.

W3C Working Draft

W3C

CSS Grid Layout Module Level 1

W3C Working Draft, 17 March 2015

This version:

http://www.w3.org/TR/2015/WD-css-grid-1-20150317/

Latest version:

http://www.w3.org/TR/css-grid-1/

Editor's Draft:

http://dev.w3.org/csswg/css-grid/

Previous Versions:

http://www.w3.org/TR/2014/WD-css-grid-1-20140513/

http://www.w3.org/TR/2014/WD-css-grid-1-20140123/

http://www.w3.org/TR/2013/WD-css3-grid-layout-20130402/

http://www.w3.org/TR/2012/WD-css3-grid-layout-20121106/

Feedback:

www-style@w3.org with subject line "`[css-grid] … message topic …`" (archives)

CSS Grid Layout

Our HTML consists of a div with a class of wrapper and six child elements.

```
<div class="wrapper">
  <div class="a">A</div>
  <div class="b">B</div>
  <div class="c">C</div>
  <div class="d">D</div>
  <div class="e">E</div>
  <div class="f">F</div>
</div>
```

To create a grid we use a new value of the display property.

display: grid

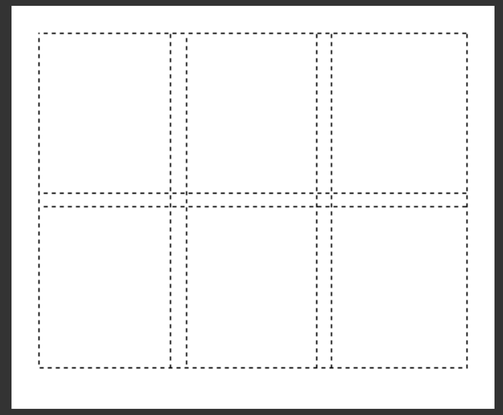
```
.wrapper {
  display: grid;



}
```

We describe the grid using the new properties:

grid-template-columns

grid-template-rows

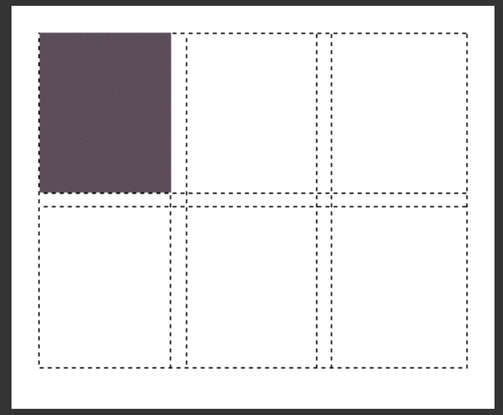
```
.wrapper {
  display: grid;
  grid-template-columns:
    100px 10px 100px 10px 100px;
  grid-template-rows:
    auto 10px auto;
}
```



We position items using the new properties:

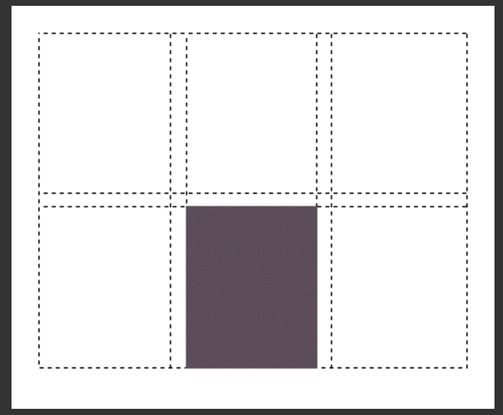
grid-column-start
grid-column-end
grid-row-start
grid-row-end

```
.a {
  grid-column-start: 1;
  grid-column-end: 2;
  grid-row-start: 1;
  grid-row-end: 2;
}
```



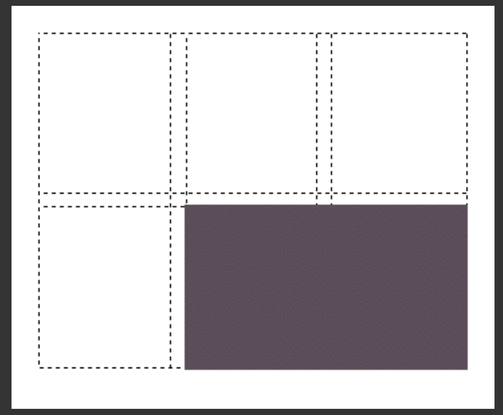
To position an item bottom centre, I start at column line 3, this is the line after the gutter track.

```
.b {
  grid-column-start: 3;
  grid-column-end: 4;
  grid-row-start: 3;
  grid-row-end: 4;
}
```



To span more tracks we just change the end row or column line.

```
.b {
  grid-column-start: 3;
  grid-column-end: 6;
  grid-row-start: 3;
  grid-row-end: 4;
}
```



The longhand for line-based placement means up to 4 properties to position each element.

```
.a {
  grid-column-start: 1;
  grid-column-end: 2;
  grid-row-start: 1;
  grid-row-end: 2;
}

.b {
  grid-column-start: 3;
  grid-column-end: 4;
  grid-row-start: 3;
  grid-row-end: 4;
}
```

Declare start and end values with grid-column and grid-row.

Values are separated by a / symbol.

```
.a {
  grid-column: 1 / 2;
  grid-row: 1 / 2;
}

.b {
  grid-column: 3 / 6;
  grid-row: 3 / 4;
}
```

Declare all 4 values using the grid-area property.

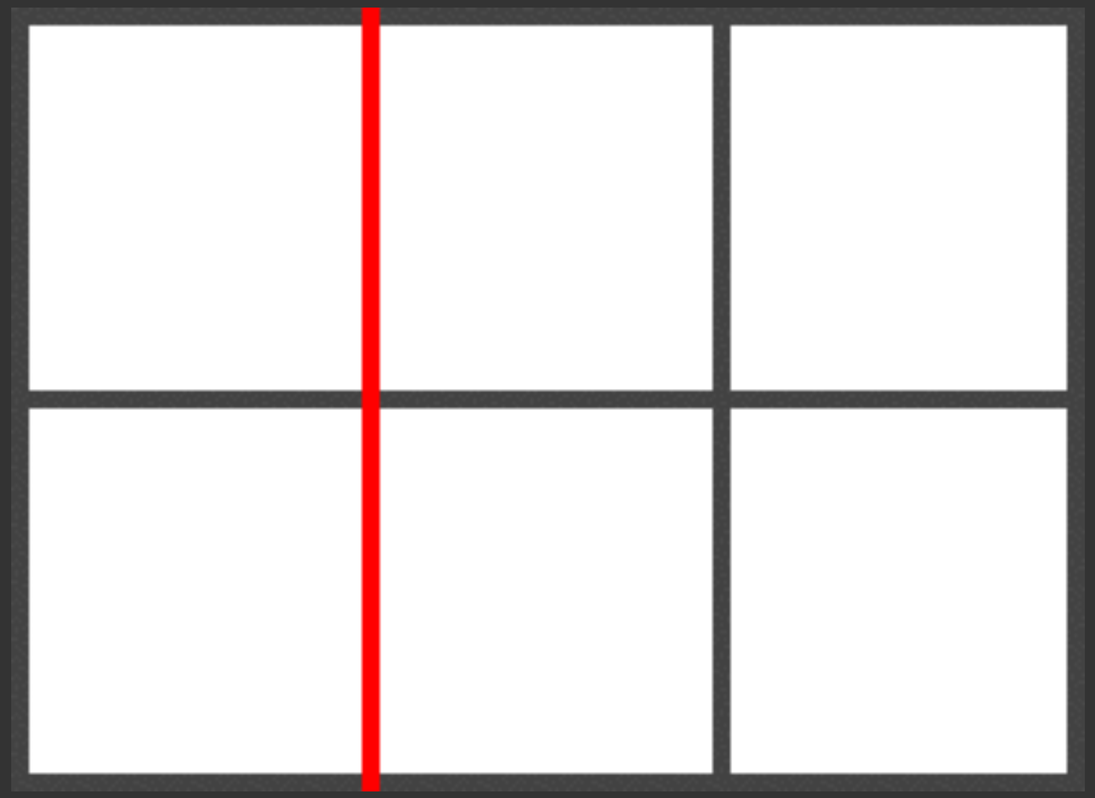
```
.a {
  grid-area: 1 / 1 / 2 / 2;
}

.b {
  grid-area: 3 / 3 / 4 / 6;
}
```

Grid Terminology

Grid Lines

Lines can be horizontal or vertical. They are referred to by number and can be named.

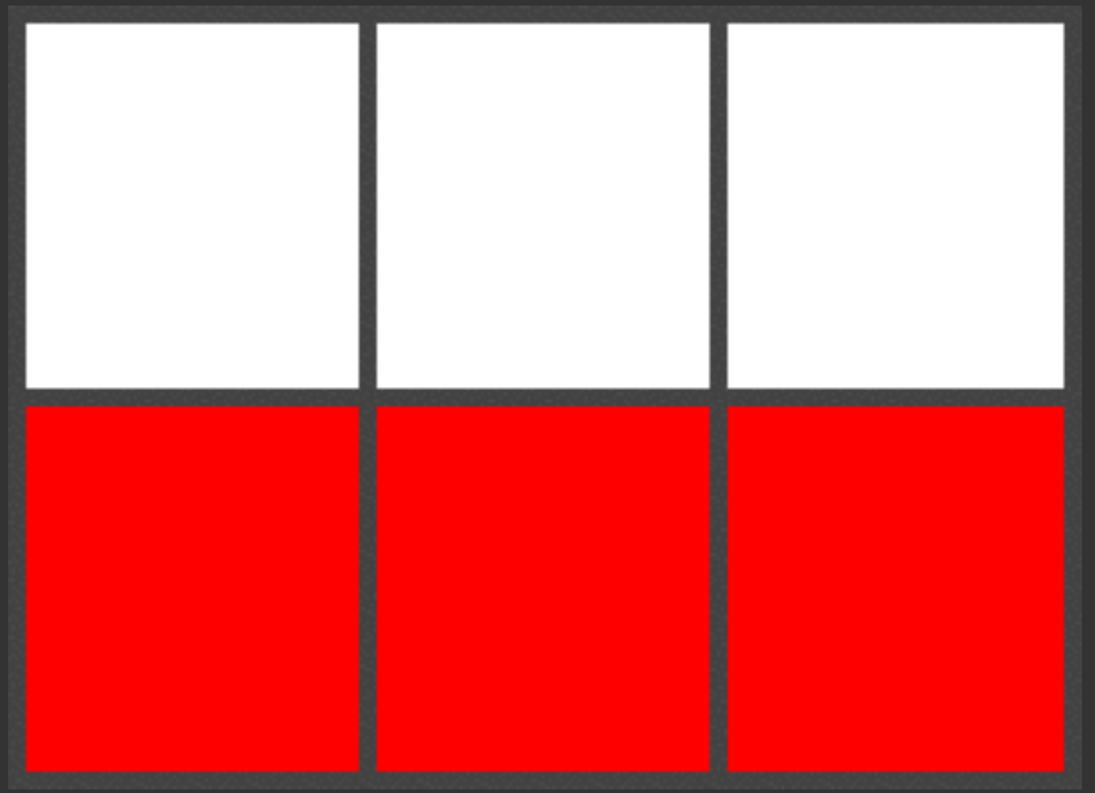
Highlighted is Column Line 2.



Grid Track

A Grid Track is the space between two Grid Lines. Tracks can be horizontal or vertical (rows or columns).

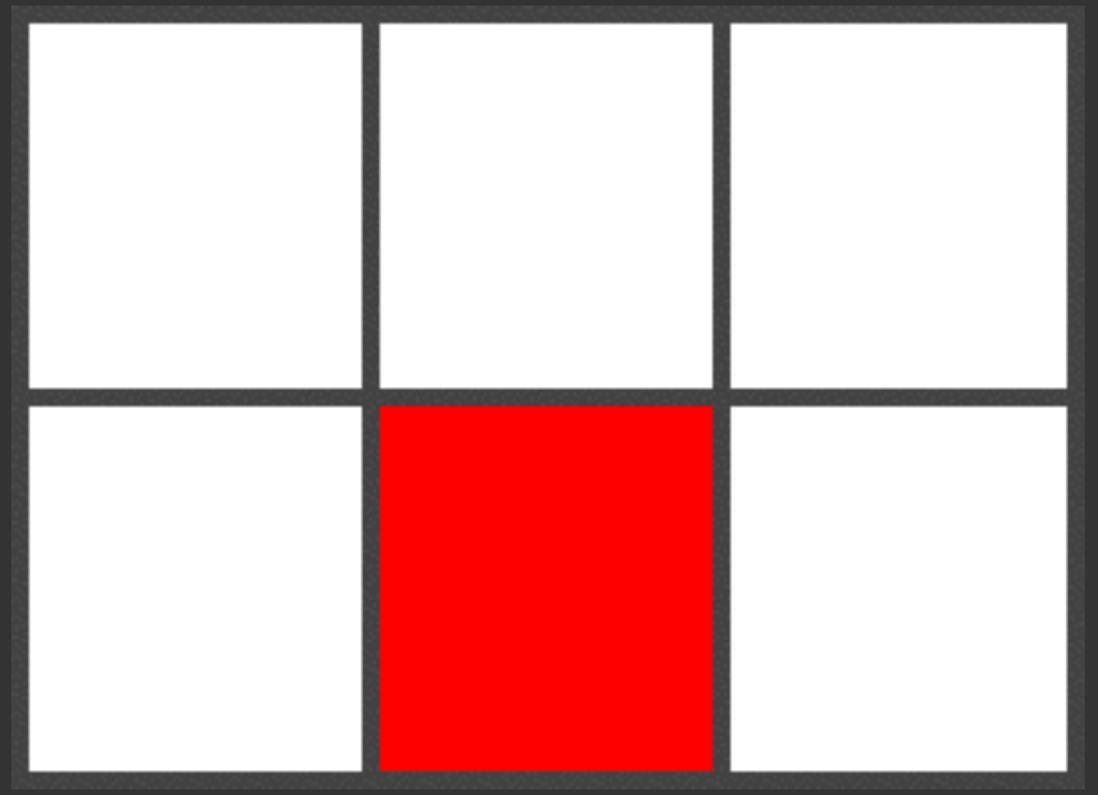
The highlighted Grid Track is between Row Lines 2 and 3.



Grid Cell

The smallest unit on our grid, a Grid Cell is the space between four Grid Lines. It’s just like a table cell.

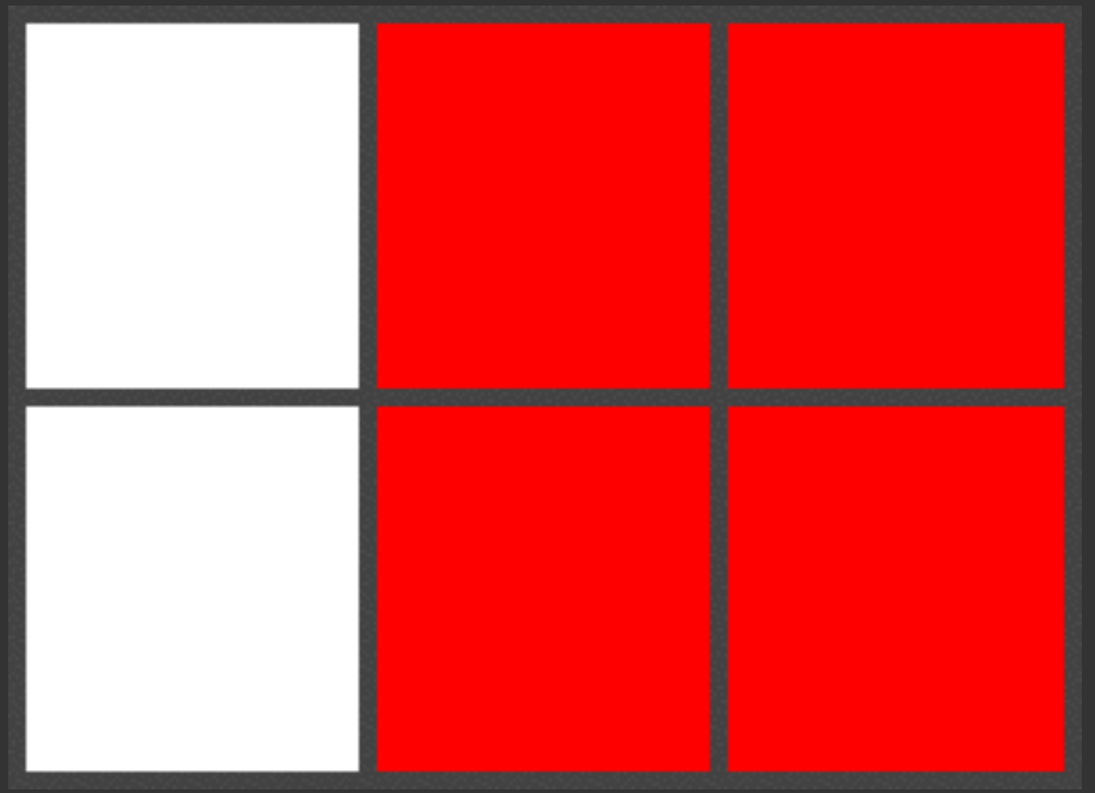
The highlighted Grid Cell is between row lines 2 and 3 and column lines 2 and 3.



Grid Area

Any area of the Grid bound by 4 Grid Lines. It can contain many Grid Cells.

The highlighted Grid Area is between row lines 1 and 3, column lines 2 and 4.



Grid by Example

What is Grid Layout?

Examples

-- Page Layouts

Other Grid Links

Problems with Grid

My Grid Presentations

About

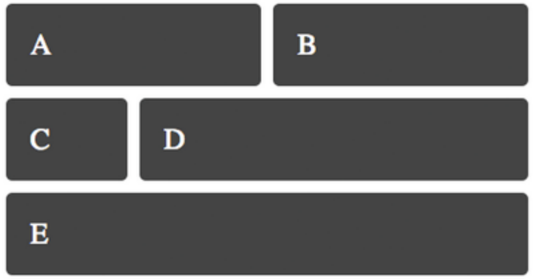
Grid by Example simple usage examples for the CSS3 Grid Layout Module

I have been writing and speaking about the CSS Grid Layout Module for some time now. In order to learn how Grid works I've put together lots of small examples, and I am publishing them here as a resource for anyone else interested in this emerging specification.

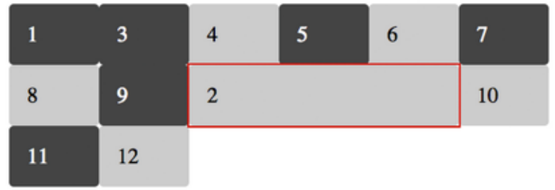
Grid Examples

Line based placement spanning cells

Line based placement named lines with span



Grid auto flow with a positioned element



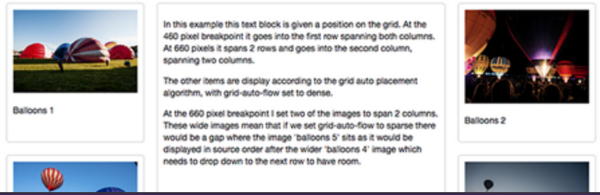
Explore all of the examples

Examples of layout with Grid

Two column responsive layout with footer

Skeleton 12 column grid experiments

Auto placement example



All examples can be found at http://gridbyexample.com. Use Chrome. Enable "Experimental Web Platform Features" flag.

Line-based placement

The Dominion of the Air

The Story of Aerial Navigation

Excerpts from the book by J.M. Bacon

Chapter listing

The First Balloon Ascent in England

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country where he was a sojourner.

By this time he found his balloon, which had been only two-thirds full at starting, to be so distended that he was obliged to untie the mouth to release the strain. He also found that the condensed moisture round the neck had frozen. These two statements point to his having reached a considerable altitude, which is intelligible enough. It is, however, difficult to believe his further assertion that by the use of his single oar he succeeded in working himself down to within a few hundred feet of the earth. The descent of the balloon must, in point of fact, have been due to a copious outrush of gas at his former altitude. Had his oar really been effective in working the balloon down it would not have needed the discharge of ballast presently spoken of to cause it to reascend. Anyhow, he found himself sufficiently near the earth to land a passenger who was anxious to get out. His cat had not been comfortable in the cold upper regions, and now at its urgent appeal was deposited in a corn field, which was the point of first contact with the earth. It was carefully received by a country-woman, who promptly sold it to a gentleman on the other side of the hedge, who had been pursuing the balloon.

http://gridbyexample.com/examples/code/layout9.html

The HTML around my page content.

The various areas of my page are child elements of a div with a class of wrapper.

```
<div class="wrapper">

  <header class="mainheader"></header>

  <div class="panel"></div>

  <div class="content"></div>

</div>
```

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Declaring a grid on wrapper.

The grid has three columns, and four rows.

```
.wrapper {
  width: 100%;
  max-width: 960px;
  margin: 0 auto;
  display: grid;
  grid-template-columns: 30% 5% 65%;
  grid-template-rows: 40px auto 20px auto;
}
```

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Positioning our elements using the grid-column and grid-row shorthand.

This is all we need to do to create our layout.

```
.mainheader {
  grid-column: 1 / 4;
  grid-row: 2 / 3;
}

.panel {
  grid-column: 1 / 2;
  grid-row: 4 / 5;
}

.content {
  grid-column: 3 / 4;
  grid-row: 4 / 5;
}
```

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I can add a footer to this layout - and it doesn’t matter in which unusual place I want to add the markup.

```
<div class="wrapper">
  <header class="mainheader"></header>
  <footer class="mainfooter"></footer>
  <div class="panel"></div>
  <div class="content"></div>
</div>
```

Positioning the footer between row lines five and six.

```
.mainfooter {
  grid-column: 1 / 4;
  grid-row: 5 / 6;
}
```

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Our grid only has 5 row lines specified - yet we placed an item between row lines 5 and 6.

Grid creates an implicit grid line for us.

```
.wrapper {
  display: grid;
  grid-template-columns: 30% 5% 65%;
  grid-template-rows: 40px auto 20px auto;
}

.mainfooter {
  grid-column: 1 / 4;
  grid-row: 5 / 6;
}
```

Grid lines can be explicit or implicit

- Explicit grid lines are those that you specify and give sizing information.

- Implicit lines are created when you place something into a row or column you have not specified with grid-template-rows or grid-template-columns

Grid is “table like” however ...

- Unlike a table for layout Grid does not rely on your content being a particular order in the source.

- Being entirely described in CSS we can move things around the Grid at different breakpoints, introduce or redefine a Grid for any breakpoint.

Using Grid to order the page elements in a single column for narrow screen widths.

```
.wrapper {
  display: grid;
  grid-template-rows:
   10px auto 10px auto 10px auto 10px auto;
}

.mainheader {
  grid-row: 2 / 3;
}

.content {
  grid-row: 4 / 5;
}

.panel {
  grid-row: 6 / 7;
}

.mainfooter {
  grid-row: 8 / 9;
}
```

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Chapter listing

Redefine the Grid at min-width 550 pixels.

Position items as in the earlier example.

```
@media (min-width: 550px) {
  .wrapper {
    grid-template-columns: 30% 5% 65%;
    grid-template-rows: 40px auto 20px auto 20px auto;
  }
  .mainheader {
    grid-column: 1 / 4;
    grid-row: 2 / 3;
  }
  .panel {
    grid-column: 1 / 2;
    grid-row: 4 / 5;
  }
  .content {
    grid-column: 3 / 4;
    grid-row: 4 / 5;
  }
  .mainfooter {
    grid-column: 1 / 4;
    grid-row: 6 / 7;
  }
}
```

Named Grid Lines

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http://gridbyexample.com/examples/code/layout10.html

Name lines with the name in parenthesis.

Remember we name grid lines and not grid tracks.

```
.wrapper {
  display: grid;
  grid-template-rows:
   10px (row-header-start) auto (row-header-end)
   10px (row-content-start) auto (row-content-end)
   10px (row-panel-start) auto (row-panel-end)
   10px (row-footer-start) auto (row-footer-end);
  }
```

Here we are positioning based on line numbers.

```
.mainheader {
  grid-row: 2 / 3;
}

.content {
  grid-row: 4 / 5;
}

.panel {
  grid-row: 6 / 7;
}

.mainfooter {
  grid-row: 8 / 9;
}
```

Here we are positioning by named lines.

```
.mainheader {
  grid-row: row-header-start / row-header-end ;
}

.content {
  grid-row: row-content-start / row-content-end;
}

.panel {
  grid-row: row-panel-start / row-panel-end ;
}

.mainfooter {
  grid-row: row-footer-start / row-footer-end;
}
```

Grid Template Areas

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By this time he found his balloon, which had been only two-thirds full at starting, to be so distended that he was obliged to untie the mouth to release the strain. He also found that the condensed moisture round the neck had frozen. These two statements point to his having reached a considerable altitude, which is intelligible enough. It is, however, difficult to believe his further assertion that by the use of his single oar he succeeded in working himself down to within a few hundred feet of the earth. The descent of the balloon must, in point of fact, have been due to a copious outrush of gas at his former altitude. Had his oar really been effective in working the balloon down it would not have needed the discharge of ballast presently spoken of to cause it to reascend. Anyhow, he found himself sufficiently near the earth to land a passenger who was anxious to get out. His cat had not been comfortable in the cold upper regions, and now at its urgent appeal was deposited in a corn field, which was the point of first contact with the earth. It was carefully received by a country-woman, who promptly sold it to a gentleman on the other side of the hedge, who had been pursuing the balloon.

http://gridbyexample.com/examples/code/layout11.html

We assign a name to the elements on our page.

I am doing this outside of any Media Queries.

```
.mainheader {
  grid-area: header;
}

.content {
  grid-area: content;
}

.panel {
  grid-area: sidebar;
}

.mainfooter {
  grid-area: footer;
}
```

Describe the layout on the parent element using the grid-template-areas property.

A period “.” indicates that this grid cell is empty.

```
.wrapper {
  display: grid;
  grid-template-rows:
  10px auto 10px auto 10px auto 10px auto;
  grid-template-areas:
    "."
    "header"
    "."
    "content"
    "."
    "sidebar"
    "."
    "footer";
}
```

The Dominion of the Air

The Story of Aerial Navigation

Excerpts from the book by J.M. Bacon

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Chapter listing

The Dominion of the Air

The Story of Aerial Navigation

HEADER

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CONTENT

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Chapter listing

SIDEBAR

FOOTER

Redefining the template areas for the wider layout.

```
@media (min-width: 550px) {
  .wrapper {
  grid-template-columns: 30% 5% 65%;
  grid-template-rows:
    2em auto 1em auto 1em auto;
  grid-template-areas:
    ". . ."
    "header header header"
    ". . ."
    "sidebar . content"
    ". . ."
    "footer footer footer"
  }
}
```

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Chapter listing

SIDEBAR

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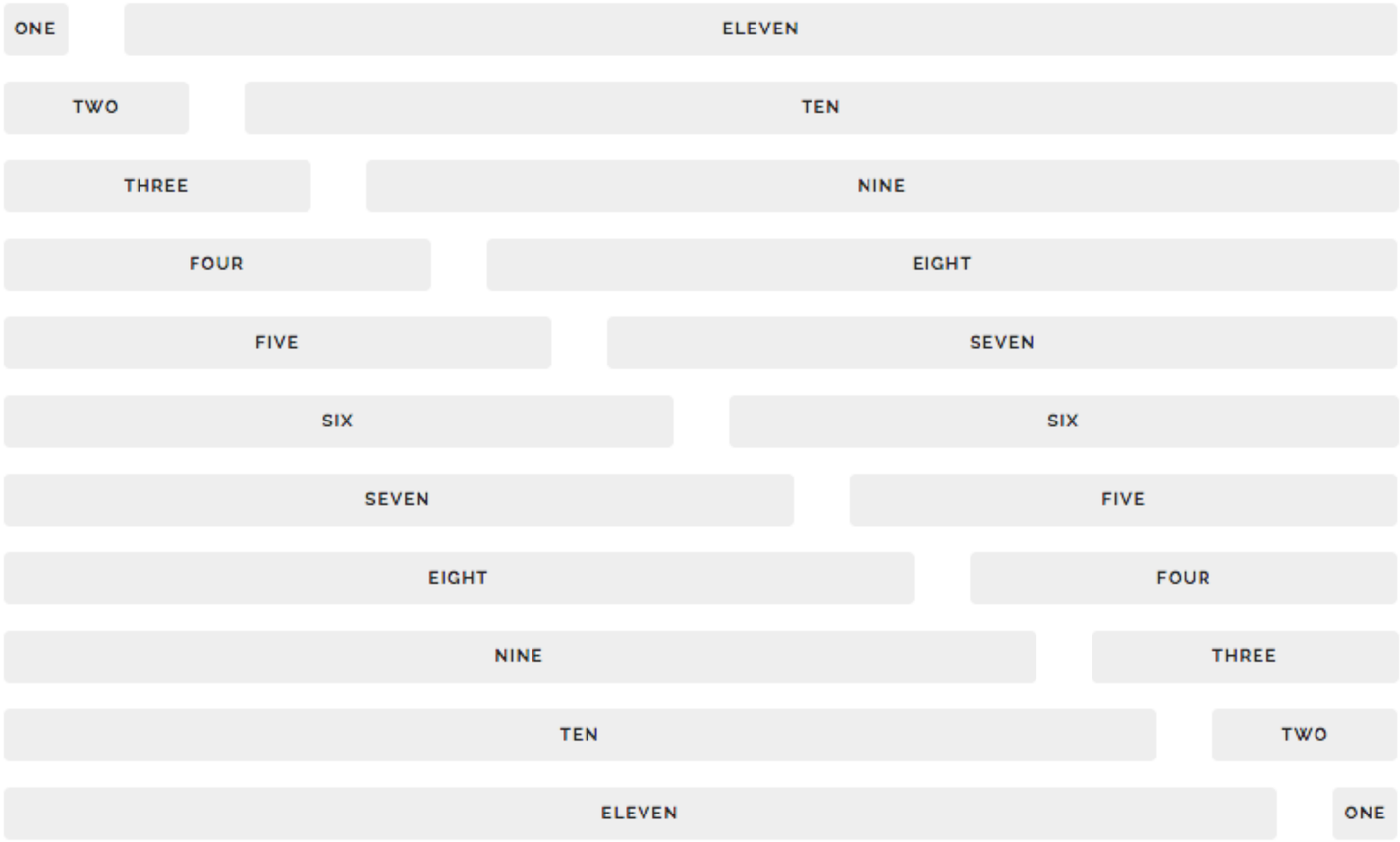
CONTENT

A 12 column, flexible grid

THE GRID

The grid is a 12-column fluid grid with a max width of 960px, that shrinks with the browser/device at smaller sizes. The max width can be changed with one line of CSS and all columns will resize accordingly. The syntax is simple and it makes coding responsive much easier. Go ahead, resize the browser.




```
<!-- .container is main centered wrapper -->
<div class="container">
```

You can use the repeat keyword to repeat all or part of the grid definition.

This would create 4 200 pixel wide tracks, separated by a 20 pixel wide gutter track.

```
grid-template-columns: repeat(4, 200px 20px);
```

The fr unit is a flexible length that represents a fraction of the available space in the grid container.

```
grid-template-columns: 5fr 1fr 10fr 1fr 5fr;
```

We can give multiple grid lines the same name.

This means we can use the span keyword to span n number of lines, rather than specifying a specific grid line.

```
.wrapper {
  grid-template-columns:
    repeat(4, (col) 200px (gutter) 20px);
}

.content {
  grid-column: col 2 / span gutter 2;
}
```

The markup used to create the Grid using the Skeleton framework.

Like the Bootstrap Grid and other similar frameworks it requires classes that describe the grid to be added to the markup.

```
<div class="container">
  <h1>Skeleton Grid</h1>
  <div class="example-grid">
    <div class="row">
      <div class="four columns">Four columns</div>
      <div class="four columns">Four columns</div>
      <div class="four columns">Four columns</div>
    </div>
    <div class="row">
      <div class="eight columns">Eight columns</div>
      <div class="four columns">Four columns</div>
    </div>
    <div class="row">
      <div class="three columns">Three columns</div>
      <div class="three columns">Three columns</div>
      <div class="three columns">Three columns</div>
      <div class="three columns">Three columns</div>
    </div>
    <div class="row">
      <div class="six columns">Six columns</div>
      <div class="six columns">Six columns</div>
    </div>
</div>
```

Skeleton Grid

FOUR COLUMNS | FOUR COLUMNS | FOUR COLUMNS

EIGHT COLUMNS | FOUR COLUMNS

THREE COLUMNS | THREE COLUMNS | THREE COLUMNS | THREE COLUMNS

SIX COLUMNS | SIX COLUMNS

When using CSS Grid Layout we have no need to describe our grid in markup.

```
<div class="wrapper skeleton">
  <h1 class="header">CSS Grid Layout Version</h1>
  <div class="box1">Four columns</div>
  <div class="box2">Four columns</div>
  <div class="box3">Four columns</div>
  <div class="box4">Eight columns</div>
  <div class="box5">Four columns</div>
  <div class="box6">Three columns</div>
  <div class="box7">Three columns</div>
  <div class="box8">Three columns</div>
  <div class="box9">Three columns</div>
  <div class="box10">Six columns</div>
  <div class="box11">Six columns</div>
</div>
```

Defining the 12 column grid.

The repeat keyword repeats the pattern of columns or rows the number of times specified before the comma.

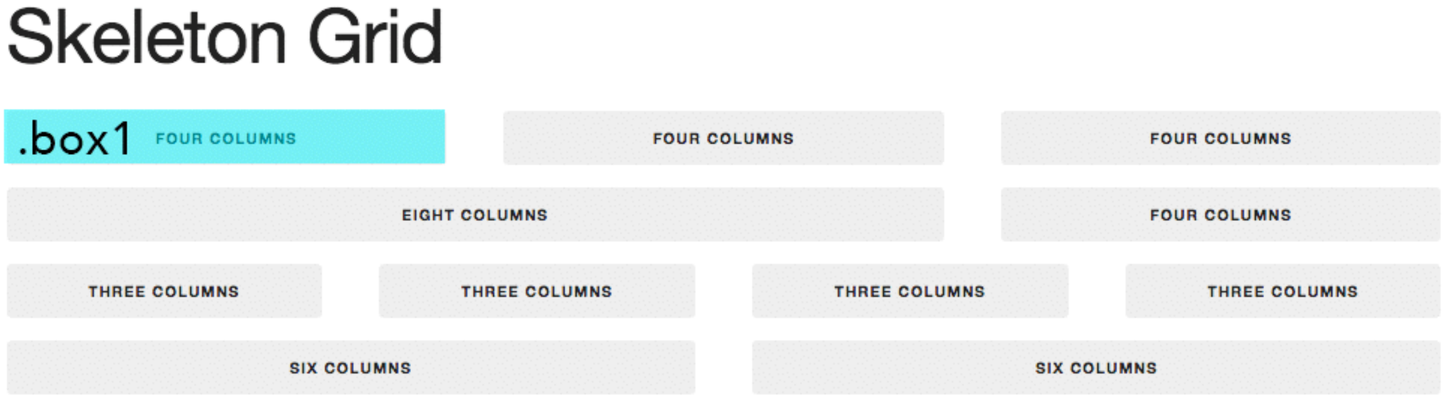
```
.wrapper {
  display: grid;
  grid-template-columns:
   repeat(11, (col) 4fr (gutter) 3.5fr ) (col) 4fr (gutter);
  grid-template-rows:
   auto repeat(4, (row) auto (gutter) 15px);
}
```

Placing box1 on the grid.

Multiple lines have the same name. This means we can use the span keyword. Here I place box1 starting at the first line named col, spanning to the 4th line named gutter.

In the first row named row, spanning to the first line named gutter.

```
.box1 {
  grid-column: col / span gutter 4;
  grid-row: row / span gutter;
}
```

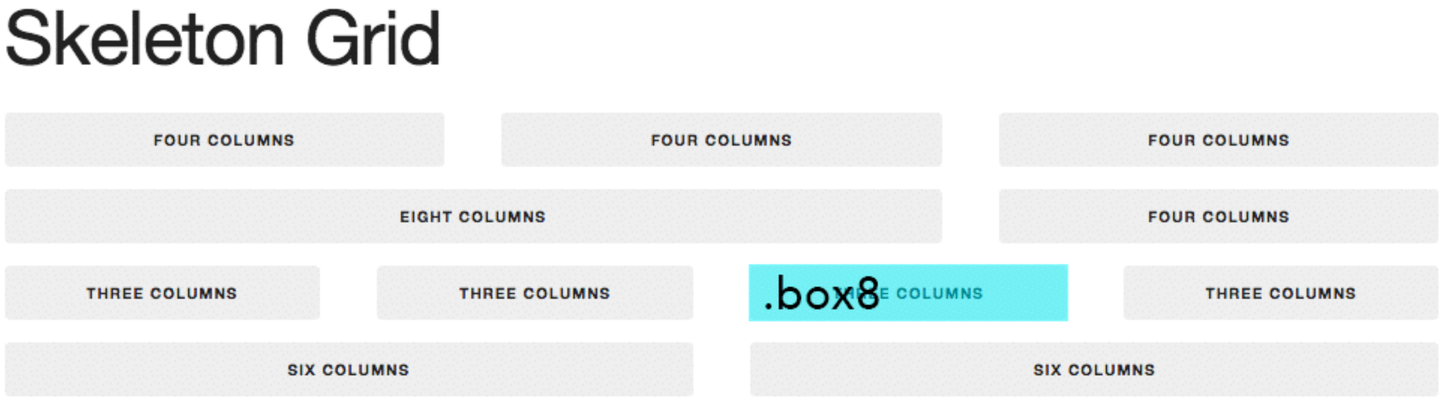


Placing box8 on the grid.

Starting on column line 7, spanning 3 gutter lines.

In the 3rd row named row, spanning 1 gutter line.

```
.box8 {
  grid-column: col 7 / span gutter 3;
  grid-row: row 3 / span gutter;
}
```



Skeleton Grid

FOUR COLUMNS | FOUR COLUMNS | FOUR COLUMNS

EIGHT COLUMNS | FOUR COLUMNS

THREE COLUMNS | THREE COLUMNS | THREE COLUMNS | THREE COLUMNS

SIX COLUMNS | SIX COLUMNS

CSS Grid Layout Version

FOUR COLUMNS | FOUR COLUMNS | FOUR COLUMNS

EIGHT COLUMNS | FOUR COLUMNS

THREE COLUMNS | THREE COLUMNS | THREE COLUMNS | THREE COLUMNS

SIX COLUMNS | SIX COLUMNS

With Grid Layout we can easily span rows just like columns.

```
.box1b {
  grid-column: col / span gutter 4;
  grid-row: row / span gutter 2;
}

.box2b {
  grid-column: col 5 / span gutter 4;
  grid-row: row / span gutter 3;
}
```

http://gridbyexample.com/examples/code/layout12.html

Browser Support

All my examples work in Chrome and Opera unprefixed - you need to enable the Experimental Web Platform Features flag.

You can also use Webkit nightlies, with the -webkit prefix.

The work in Blink and Webkit is being done by Igalia, sponsored by Bloomberg.

IE10 and up has support for the old syntax, with an -ms prefix.

Mozilla are currently implementing Grid in Firefox.

There is a Polyfill under active development: https://github.com/FremyCompany/css-grid-polyfill/

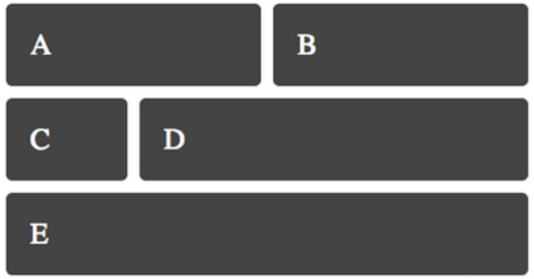
Grid by Example simple usage examples for the CSS3 Grid Layout Module

I have been writing and speaking about the CSS Grid Layout Module for some time now. In order to learn how Grid works I've put together lots of small examples, and I am publishing them here as a resource for anyone else interested in this emerging specification.

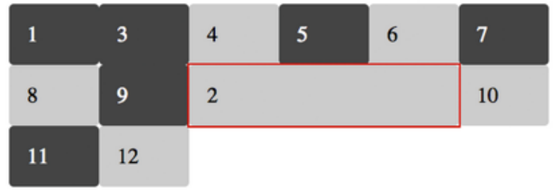
Grid Examples

Line based placement spanning cells

Line based placement named lines with span



Grid auto flow with a positioned element

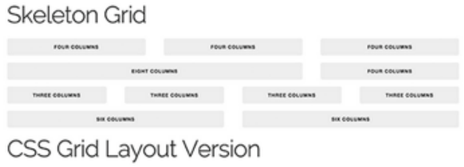


Explore all of the examples

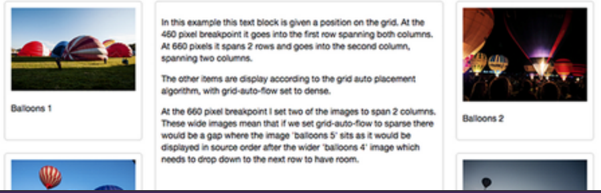
Examples of layout with Grid

Two column responsive layout with footer

Skeleton 12 column grid experiments



Auto placement example



Thank you!

Slides, links to examples and resources:
http://rachelandrew.co.uk/presentations/css-grid

Office Hours Today - 1.30pm Community Lounge.

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me@rachelandrew.co.uk