CSS Grid Layout

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Falling Cubes by Gregor Adams

CSS3 Working Clock by Ilia

Modern CSS Layout?

- Floats
- Inline-block
- display: table
- Absolute & Relative positioning
- Frameworks ... lots of frameworks

Our great hopes for layout

- Flexbox
  https://drafts.csswg.org/css-flexbox/
- CSS Grid Layout
  https://drafts.csswg.org/css-grid/
- Box Alignment
  https://drafts.csswg.org/css-align/

Defining a Grid

Defining a Grid

- display: grid;

- display: inline-grid;

With a grid defined on the parent element, all *direct children* become Grid Items.

```
.cards {
  display: grid;



}
```

Defining a Grid

- grid-template-columns
- grid-template-rows

With these properties we define an *explicit grid*. This one has 3 column tracks and 3 row tracks.

http://cssgrid.me/05161

```
.cards {
  display: grid;
  grid-template-columns: 250px 250px 250px;
  grid-template-rows: 200px 200px 200px;

}
```

Defining a Grid

- grid-column-gap
- grid-row-gap
- grid-gap

We can create a gap between rows and columns. This gap acts much like column-gap in multiple column layout.

http://cssgrid.me/05162

```
.cards {
  display: grid;
  grid-template-columns: 250px 250px 250px;
  grid-template-rows: 200px 200px 200px;
  grid-gap: 20px;
}
```

Defining a Grid

The fr unit is a fraction unit, representing a fraction of the available space in the container.

I have created 3 equal width columns, each 1 fraction of the available space.

```
.cards {
  display: grid;
  grid-template-columns: 1fr 1fr 1fr;
  grid-template-rows: 200px 200px 200px;
  grid-gap: 20px;
}
```

Defining a Grid

The fr unit is a fraction unit, representing a fraction of the available space in the container.

We have created 3 columns, the units add up to 4. The space is spilt into 4 equal parts, the first 2 tracks are given 1 part, the fine track 2 parts.

```
.cards {
  display: grid;
  grid-template-columns: 1fr 1fr 2fr;
  grid-template-rows: 200px 200px 200px;
  grid-gap: 20px;
}
```

Defining a Grid

The fr unit is a fraction unit, representing a fraction of the available space in the container.

You can mix fraction units with other length units. Any tracks with a fraction unit share the space left after fixed size tracks and the gaps have been defined.

http://cssgrid.me/05164

```
.cards {
  display: grid;
  grid-template-columns: 500px 1fr 2fr;
  grid-template-rows: 200px 200px 200px;
  grid-gap: 20px;
}
```

Defining a Grid

The repeat syntax lets us define a repeating pattern of tracks.

Here we are creating 3 1fr column tracks.

http://cssgrid.me/05165

```
.cards {
  display: grid;
  grid-template-columns: repeat(3, 1fr);
  grid-template-rows: 200px 200px 200px;
  grid-gap: 20px;
}
```

Defining a Grid

The explicit grid is the one we define with rows and columns. If we didn't define rows however grid would great implicit row tracks for us.

These will be auto sized by default.

http://cssgrid.me/05166

```
.cards {
  display: grid;
  grid-template-columns: repeat(3, 1fr);
  grid-gap: 20px;
}
```

Defining a Grid

We can define the size of implicit rows and column with the properties:

- grid-auto-rows
- grid-auto-columns

http://cssgrid.me/05167

```
.cards {
  display: grid;
  grid-template-columns: repeat(3, 1fr);
  grid-auto-rows: 200px;
  grid-gap: 20px;
}
```

Defining a Grid

Use the auto-fill keyword and grid will create as many tracks that will fit into the container.

http://cssgrid.me/05168

```
.cards {
  display: grid;
  grid-template-columns: repeat(auto-fill, 200px);
  grid-gap: 20px;
}
```

Defining a Grid

The minmax() function enables the creation of flexible grids. The first value is the minimum size of the Grid Track, the second the max size - set that to 1fr to allow the track to take up remaining space.

http://cssgrid.me/05169

```
.cards {
  display: grid;
  grid-template-columns: repeat(auto-fill, minmax(200px,1fr));
  grid-gap: 20px;
}
```

Placing Items on the Grid

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 Lines

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

Highlighted is Column Line 2.

Grid lines relate to writing mode. In a right to left language such as Arabic the first column line is the right-hand line.

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.

Using line numbers

I have created a grid with 3 column tracks and 2 row tracks.

With no placement our blocks lay out one per grid cell.

```
.cards {
  display: grid;
  grid-gap: 20px;
  grid-template-columns: repeat(3,1fr);
  grid-auto-rows: 200px;
}
```

Using line numbers

To place an item on the grid I specify start and end lines using new properties:

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

```
.card:nth-child(1) {
  grid-column-start: 2;
  grid-column-end: 4;
  grid-row-start: 1;
  grid-row-end: 3;
}
```

Using line numbers

These can be expressed as a shorthand:

- grid-column
- grid-row

http://cssgrid.me/051614

```
.card:nth-child(1) {
  grid-column: 2 / 4;
  grid-row: 1 / 3;
}
```

Using line numbers

They can be expressed as one line using grid-area, the order of the values is:

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

```
.card:nth-child(1) {
  grid-area: 1 / 2 / 3 / 4;
}
```

Using line names

We name lines when creating the grid. The name goes in square brackets.

```
.cards {
  display: grid;
  grid-gap: 20px;
  grid-template-columns: [side-start] 1fr
                         [main-start] 1fr 1fr
                         [main-end];
  grid-template-rows:    [main-start] 200px 200px
                         [main-end];
}
```

Using line names

Use the name instead of the line number as the value of the placement properties.

http://cssgrid.me/051616

```
.card:nth-child(1) {
  grid-column: main-start / main-end;
  grid-row: main-start / main-end;
}
```

Lines define Grid Areas

By creating lines named main-start and end for rows and columns, grid has created me a named grid area called ‘main’.

I can use that to position my element rather than the line numbers or names.

http://cssgrid.me/051617

```
.cards {
  display: grid;
  grid-gap: 20px;
  grid-template-columns: [side-start] 1fr
                         [main-start] 1fr 1fr
                         [main-end];
  grid-template-rows:    [main-start] 200px 200px
                         [main-end];
}

.card:nth-child(1) {
  grid-area: main;
}
```

Defining Grid Areas

This time I haven't named my lines, I've just given each element a name.

```
.card:nth-child(1) {
  grid-area: main;
}

.card:nth-child(2) {
  grid-area: side1;
}

.card:nth-child(3) {
  grid-area: side2;
}
```

grid-template-areas

I then use these names to describe my layout as the value of grid-template-areas.

http://cssgrid.me/051618

```
.cards {
  display: grid;
  grid-gap: 20px;
  grid-template-columns: repeat(3, 1fr);
  grid-template-rows:  200px 200px;
  grid-template-areas: "side1 main main"
                       "side2 main main";
}
```

Much Magic.

Line-based placement

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The First Balloon Ascent in England

Following his own account, Lunardi's first act on finding himself fairly above the town was to fortify himself with some glasses of wine, and to devour the leg of a chicken. He describes the city as a vast beehive, St. Paul's and other churches standing out prominently; the streets shrunk to lines, and all humanity apparently transfixed and watching him. A little later he is equally struck with the view of the open country, and his ecstasy is pardonable in a novice. The verdant pastures eclipsed the visions of his own lands. The precision of boundaries impressed him with a sense of law and order, and of good administration in the 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.

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 two columns making 3 column lines.

```
.wrapper {
  width: 100%;
  max-width: 960px;
  margin: 0 auto;
  display: grid;
  grid-template-columns: 2fr 4fr;
  grid-column-gap: 2em;
  grid-row-gap: 20px;
}
```

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

We can omit the -end value if only spanning 1 track.

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

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

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

.content {
  grid-column: 2 ;
  grid-row: 2 ;
}
```

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http://cssgrid.me/051619

boundaries impressed him with a sense of law and order, and of good administration in the 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.

I can add a footer to this layout.

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

Positioning the footer after row line 3.

```
.mainfooter {
  grid-column: 1 / 3;
  grid-row: 3 ;
}
```

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This book is available to read in full on the Project Gutenburg website.

http://cssgrid.me/051620

We didn’t actually specify any row tracks.

Grid creates implicit grid lines for us.

```
.wrapper {
  display: grid;
  grid-template-columns: 2fr 4fr;
  grid-column-gap: 2em;
  grid-row-gap: 20px;
}

.mainfooter {
  grid-column: 1 / 3;
  grid-row: 3 ;
}
```

Typically rows in our layouts are sized to fit their contents, meaning that you can avoid specifying rows and grid will create them as items are positioned into them.

```
.wrapper {
  display: grid;
  grid-template-columns: 2fr 4fr;
  grid-column-gap: 2em;
  grid-row-gap: 20px;
}
```

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-row-gap: 10px;
}

.mainheader {
  grid-row: 1 ;
}

.content {
  grid-row: 2 ;
}

.panel {
  grid-row: 3 ;
}

.mainfooter {
  grid-row: 4 ;
}
```

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http://cssgrid.me/051621

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Redefine the Grid at min-width 550 pixels.

Position items as in the earlier example.

```
@media (min-width: 550px) {
  .wrapper {
    grid-template-columns: 2fr 4fr;
    grid-column-gap: 2em;
    grid-row-gap: 20px;
  }
  .mainheader {
    grid-column: 1 / 3;
    grid-row: 1 ;
  }
  .panel {
    grid-column: 1 ;
    grid-row: 2 ;
  }
  .content {
    grid-column: 2 ;
    grid-row: 2 ;
  }
  .mainfooter {
    grid-column: 1 / 3;
    grid-row: 3 ;
  }
}
```

Named Grid Lines

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Name lines with the name in square brackets.

Remember we are naming grid lines and not grid tracks.

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

Here we are positioning based on line numbers.

```
.mainheader {
  grid-row: 1 ;
}

.content {
  grid-row: 2 ;
}

.panel {
  grid-row: 3 ;
}

.mainfooter {
  grid-row: 4 ;
}
```

Here we are positioning by named lines.

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

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

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

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

Named Areas

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The Story of Aerial Navigation

Excerpts from the book by J.M. Bacon

Chapter listing

- The Dawn of Aeronautics
- The Invention of the Balloon
- The First Balloon Ascent in England
- The Development of Balloon Philosophy

The First Balloon Ascent in England

Following his own account, Lunardi's first act on finding himself fairly above the town was to fortify himself with some glasses of wine, and to devour the leg of a chicken. He describes the city as a vast beehive, St. Paul's and other churches standing out prominently; the streets shrunk to lines, and all humanity apparently transfixed and watching him. A little later

http://cssgrid.me/051623

- John Wise - The American Aeronaut
- The Balloon in the Service of Science
- Some Noteworthy Ascents
- The Highest Ascent on Record

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.

This book is available to read in full on the Project Gutenburg website.

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.

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

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HEADER

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By this time he found [illegible] only two-thirds full at starting, to be so [illegible] 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.

CONTENT

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SIDEBAR

This book is available to read for free on [illegible] Gutenberg website.

FOOTER

Redefining the template areas for the wider layout.

```
@media (min-width: 550px) {

  .wrapper {
    grid-column-gap: 2em;
    grid-row-gap: 20px;
    grid-template-columns: 2fr 4fr;
    grid-template-areas:
      "header  header"
      "sidebar content"
      "footer  footer"
  }

}
```

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Repeating the name of an area causes the area to span across those grid cells.

This can be seen in the header and footer of this layout.

```
@media (min-width: 550px) {

  .wrapper {
    grid-column-gap: 2em;
    grid-row-gap: 20px;
    grid-template-columns: 2fr 4fr;
    grid-template-areas:
      "header  header"
      "sidebar content"
      "footer  footer"
  }

}
```

Repeating the name of an area causes the area to span across those grid cells.

This can be seen in the header and footer of this layout.

```
@media (min-width: 550px) {

  .wrapper {
    grid-column-gap: 2em;
    grid-row-gap: 20px;
    grid-template-columns: 2fr 4fr;
    grid-template-areas:
      "header  header"
      "sidebar content"
      " .  footer"
  }

}
```

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Implicit Named Grid Lines

Named grid areas create four implicit named lines. You can use these in the same way as lines you have explicitly named.

```
.wrapper {
  .wrapper {
    grid-column-gap: 2em;
    grid-row-gap: 20px;
    grid-template-columns: 2fr 4fr;
    grid-template-areas:
      "header  header"
      "sidebar content"
      "footer  footer"
  }
}

.test {
  z-index: 100;
  background-color: red;
  grid-column: content-start;
  grid-row: content-start / footer-end;
}
```

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Test of implicit named lines

This book is available to read in full on the Project

Items on the Grid can be layered using the z-index property.

A 12 column, flexible grid

The Bootstrap grid, and those in other frameworks relies on our describing the layout in the markup.

```
<!-- Stack the columns on mobile by making one full-width and
the other half-width -->
<div class="row">
  <div class="col-xs-12 col-md-8">.col-xs-12 .col-md-8</div>
  <div class="col-xs-6 col-md-4">.col-xs-6 .col-md-4</div>
</div>

<!-- Columns start at 50% wide on mobile and bump up to 33.3%
wide on desktop -->
<div class="row">
  <div class="col-xs-6 col-md-4">.col-xs-6 .col-md-4</div>
  <div class="col-xs-6 col-md-4">.col-xs-6 .col-md-4</div>
  <div class="col-xs-6 col-md-4">.col-xs-6 .col-md-4</div>
</div>

<!-- Columns are always 50% wide, on mobile and desktop -->
<div class="row">
  <div class="col-xs-6">.col-xs-6</div>
  <div class="col-xs-6">.col-xs-6</div>
</div>
```

With CSS Grid Layout we **describe the layout in the CSS** and can redefine that description at any breakpoint.

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">
```

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(12, [col] 1fr );
  grid-template-rows: repeat(5, [row] auto) ;
  grid-column-gap: 1em;
  grid-row-gap: 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.

The box is placed in the first line named row and spans 1 line - the default.

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

Placing box8 on the grid.

Starting on column line 7, spanning 3 lines.

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

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

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 4;
  grid-row: row / span 2;
}

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

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

http://cssgrid.me/051624

SIX COLUMNS | SIX COLUMNS

... and we can do this

FOUR COLUMNS
TWO ROWS

FOUR COLUMNS
THREE ROWS

FOUR COLUMNS

FOUR COLUMNS

THREE COLUMNS | ONE

ONE | THREE COLUMNS

SIX COLUMNS | SIX COLUMNS

The header and footer span the full grid.

The content and panel display side by side.

```
.mainheader {
  grid-column: col / span 12;
  grid-row: row ;
}

.mainfooter {
  grid-column: col / span 12;
  grid-row: row 3 ;
}

.content {
  grid-column: col 5 / span 8;
  grid-row: row 2 ;
}

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

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http://cssgrid.me/051625

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The content and panel display side by side.

```
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  grid-column: col / span 12;
  grid-row: row ;
}

.mainfooter {
  grid-column: col / span 12;
  grid-row: row 3 ;
}

.content {
  grid-column: col 5 / span 8;
  grid-row: row 2 ;
}

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

I change three values to make our panel extend to the foot of the page.

```
.mainheader {
  grid-column: col / span 12;
  grid-row: row ;
}

.mainfooter {
  grid-column: col 5 / span 8;
  grid-row: row 3 ;
}

.content {
  grid-column: col 5 / span 8;
  grid-row: row 2 ;
}

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

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This is the entire CSS defining our layout.

No framework required.

```
.wrapper {
  display: grid;
  grid-template-columns: repeat(12, [col] 1fr );
  grid-template-rows: repeat(5, [row] auto) ;
  grid-column-gap: 1em;
  grid-row-gap: 15px;
}

.mainheader {
  grid-column: col / span 12;
  grid-row: row ;
}

.mainfooter {
  grid-column: col 5 / span 8;
  grid-row: row 3 ;
}

.content {
  grid-column: col 5 / span 8;
  grid-row: row 2 ;
}

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

Gunnar Bittersmann
@g16n

Follow

Devs when told ‘use flexbox & no need for framework’: “Meh!”
Devs when told ‘here’s a flexbox grid framework’: “Yay!”
@velmu @heydonworks

We don’t need a Grid Layout based grid framework. It *is* a grid framework.

Grid Item Placement Algorithm

“The following grid item placement algorithm resolves automatic positions of grid items into definite positions, ensuring that every grid item has a well-defined grid area to lay out into.”

http://dev.w3.org/csswg/css-grid/#grid-item-placement-algorithm

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- The Highest Ascent on Record

The First Balloon Ascent in England

Following his own account, Lunardi's first act on finding himself fairly above the town was to fortify himself with some glasses of wine, and to devour the leg of a chicken. He describes the city as a vast beehive, St. Paul's and other churches standing out prominently; the streets shrunk to lines, and all humanity apparently transfixed and watching him. A little later he is equally struck with the view of the open country, and his ecstasy is pardonable in a novice. The verdant pastures eclipsed the visions of his own lands. The precision of boundaries impressed him with a sense of law and order, and of good administration in the 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.

A list containing images. The landscape images are inside a list item with a class of ‘landscape’.

```
<ul class="wrapper">
  <li><h3>1.</h3>
  <img src="gallery1.jpg" alt="Balloons"></li>
  <li class="landscape"><h3>2.</h3>
  <img src="gallery2.jpg" alt="Balloons"></li>
  <li class="landscape"><h3>3.</h3>
  <img src="gallery8.jpg" alt="Balloons"></li>
  <li><h3>4.</h3>
  <img src="gallery4.jpg" alt="Balloons"></li>
   <li><h3>7.</h3>
  <img src="gallery5.jpg" alt="Balloons"></li>
   <li class="landscape"><h3>6.</h3>
  <img src="gallery6.jpg" alt="Balloons"></li>
   <li><h3>7.</h3>
  <img src="gallery9.jpg" alt="Balloons"></li>
</ul>
```

I have created a grid of four equal columns.

```
.wrapper {
  display: grid;
  grid-template-columns: 1fr 1fr 1fr 1fr;
}
```

1.

2.

3.

4.

7.

6.

7.

When using automatic placement we can create rules for items in our document - for example displaying portrait and landscape images differently.

```
.wrapper {
  display: grid;
  grid-template-columns: 1fr 1fr 1fr 1fr;

}

.landscape {
  grid-column-end: span 2;
}
```

grid-auto-flow

The default value of grid-auto-flow is sparse. Grid will move forward placing items skipping cells if items do not fit .

With a dense packing mode grid will move items out of source order to backfill spaces.

```
.wrapper {
  display: grid;
  grid-template-columns: 1fr 1fr 1fr 1fr;
  grid-auto-flow: dense;
}

.landscape {
  grid-column-end: span 2;
}
```

grid-auto-flow

With grid-auto-flow dense items are displayed out of source order. Grid backfills any suitable gaps.

http://cssgrid.me/051626

Is Grid a competing specification to Flexbox?

Grid and the Box Alignment Module

CSS Box Alignment Module Level 3

“This module contains the features of CSS relating to the alignment of boxes within their containers in the various CSS box layout models: block layout, table layout, flex layout, and grid layout.” - https://drafts.csswg.org/css-align/

I can create this same layout with flexbox or Grid.

With flexbox the items are laid out in a row.

```
.wrapper {
  display: flex;
}

.wrapper li {
  flex: 1 0 25%;
}
```

I can create this same layout with flexbox or Grid.

For Grid I use a single row, 4 column Grid.

```
.wrapper {
  display: grid;
  grid-template-columns: 1fr 1fr 1fr 1fr;
}
```

Flexbox alignment properties for the three landscape images.

http://cssgrid.me/051627

```
.wrapper li:nth-child(2) {
  align-self: center;
}

.wrapper li:nth-child(3) {
  align-self: flex-start;
}

.wrapper li:nth-child(4) {
  align-self: flex-end;
}
```

Grid alignment properties for the three landscape images.

http://cssgrid.me/051628

```
.wrapper li:nth-child(2) {
  align-self: center;
}

.wrapper li:nth-child(3) {
  align-self: start;
}

.wrapper li:nth-child(4) {
  align-self: end;
}
```

When should we use Grid instead of Flexbox then?

Flexbox is for 1 dimensional layout - a column OR a row.

Grid is for 2 dimensional layout - both columns AND rows.

Wrapping list items using flexbox.

```
.flex {
  display: flex;
  flex-wrap: wrap;
  margin: 0 -10px;
}

.flex li {
  flex: 1 1 200px;
  margin: 10px;
}
```

Card 1

Posuere varius ullamcorper ipsum adipiscing dignissim ipsum adipiscing a a quisque malesuada quam purus venenatis sagittis fermentum parturient curabitur montes a metus.

Card 2

Posuere varius ullamcorper ipsum adipiscing dignissim ipsum adipiscing a a quisque malesuada quam purus venenatis sagittis fermentum parturient curabitur montes a metus.

Card 3

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Card 4

Posuere varius ullamcorper ipsum adipiscing dignissim ipsum adipiscing a a quisque malesuada quam purus venenatis sagittis fermentum parturient curabitur montes a metus.

Card 5

Posuere varius ullamcorper ipsum adipiscing dignissim ipsum adipiscing a a quisque malesuada quam purus venenatis sagittis fermentum parturient curabitur montes a metus.

Wrapping list items with Grid Layout.

http://cssgrid.me/051629

```
.grid {
  display: grid;
  grid-template-columns:
    repeat(auto-fill, minmax(200px 1fr));
  grid-gap: 20px;
}
```

Card 1

Posuere varius ullamcorper ipsum adipiscing dignissim ipsum adipiscing a a quisque malesuada quam purus venenatis sagittis fermentum parturient curabitur montes a metus.

Card 2

Posuere varius ullamcorper ipsum adipiscing dignissim ipsum adipiscing a a quisque malesuada quam purus venenatis sagittis fermentum parturient curabitur montes a metus.

Card 3

Posuere varius ullamcorper ipsum adipiscing dignissim ipsum adipiscing a a quisque malesuada quam purus venenatis sagittis fermentum parturient curabitur montes a metus.

Card 4

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Card 5

Posuere varius ullamcorper ipsum adipiscing dignissim ipsum adipiscing a a quisque malesuada quam purus venenatis sagittis fermentum parturient curabitur montes a metus.

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https://cssgrid.me/051634

We like balloons
You can find all kinds of balloon related things here.
Special Shapes
Why are some of them so scary looking?
10 things you discover when taking a balloon ride.
Number 8 will AMAZE you.
Angry people at balloon fiestas
Hot air balloons. A bit weather sensitive.
Balloon photos
I have quite a few.
Sign up for more information about balloons.
Sign me up!

We like balloons
You can find all kinds of balloon related things here.
Special Shapes
Why are some of them so scary looking?
10 things you discover when taking a balloon ride.
Number 8 will AMAZE you.
Angry people at balloon fiestas
Hot air balloons. A bit weather sensitive.
Why not write to the local newspaper to complain about them?
Or tell Twitter how outrageous this ballons not flying at a fiesta thing is.
Balloon photos
I have quite a few.
Sign up for more information about balloons.
Sign me up!

Using the minmax() function with grid-auto-rows.

```
.home-hero {
  display: grid;
  grid-gap: 1px;
  grid-auto-rows: minmax(150px, auto);
}
```

An item on the grid can become a grid or flex container itself.

In this case I am using flexbox and auto margins to push my content to the bottom of the box.

```
.special {
  display: flex;
  flex-direction: column;
}

.special h3{
  margin-top: auto;
}
```

We like balloons

You can find all kinds of balloon related things here.

Special Shapes

Why are some of them so scary looking?

10 things you discover when taking a balloon ride.

Number 8 will AMAZE you.

Angry people at balloon fiestas

Hot air balloons. A bit weather sensitive.

Balloon photos

I have quite a few.

Sign up for more information about balloons.

Sign me up!

An extra box we were not expecting

It just adds itself to the layout.

Grid and Accessibility

Power and responsibility

- **Good** = creating the most accessible source order and using Grid or Flexbox to get the optimal display for each device.
- **Bad** = using Grid or Flexbox as an excuse to forget about the source.
- **Terrible** - stripping out semantic elements to make everything a grid or flex item.

Correct source order is important for speech, for sequential navigation (such as keyboard navigation), and non-CSS UAs such as search engines, tactile browsers, etc. Grid placement only affects the visual presentation!

https://www.w3.org/TR/css-grid-1/#placement-a11y

CSS Grid

No Ordering Applied

1 This appears first in source order.

2 This appears second in source order.

3 This appears third in source order.

4 This appears fourth in source order.

Re-Ordered

1 This appears first in source order.

4 This appears fourth in source order.

3 This appears third in source order.

2 This appears second in source order.

5 This appears fifth in source order.

Grid CSS borrowed from 17 September 2015 Working Draft W3C spec and 14 April 2011 Microsoft IEBlog post.

This example used in the post HTML Source Order vs CSS Display Order.

http://adrianroselli.com/2015/10/html-source-order-vs-css-display-order.html

Léonie Watson | On CSS accessibility and drinking tea | CSS Day 2016

https://vimeo.com/180566024

Also see:
http://tink.uk/flexbox-the-keyboard-navigation-disconnect/

Nested Grids and Subgrids

In this markup the boxes e, f and g are children of the element with a class of d.

http://cssgrid.me/051632

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

I have declared a grid on the wrapper div, and positioned the immediate children - the elements with classes a to d.

http://cssgrid.me/051632

```
.wrapper {
  display: grid;
  grid-gap: 10px;
  grid-template-columns:
   repeat(4, 1fr);
}
.a {
  grid-column: 1 / 3;
  grid-row: 1;
}
.b {
  grid-column: 3 / 5;
  grid-row: 1;
}
.c {
  grid-column: 1 / 3;
  grid-row: 2;
}
.d{
  grid-column: 3 / 5;
  grid-row: 2;
}
```

A

B

C

E

F

G

To make box d a grid itself I declare a grid as normal then position the children of this element.

They take their grid lines from the grid declared on box d.

```
.d{
  grid-column: 3 / 5;
  grid-row: 2;
  display: grid;
  grid-gap: 10px;
  grid-template-columns: 1fr 1fr;
}

.e {
  grid-column: 1 / 3;
   grid-row: 1;
}

.f {
  grid-column: 1;
  grid-row: 2;
}

.g {
  grid-column: 2;
  grid-row: 2;
}
```

A

B

C

E

F

G

Declaring a subgrid

In our existing layout we are creating a completely new grid on box d.

http://cssgrid.me/051632

```
.d{
  grid-column: 3 / 5;
  grid-row: 2;
  display: grid;
  grid-gap: 10px;
  grid-template-columns: 1fr 1fr;
}
```

If we declare that this grid is a subgrid, we can then position the children of this element on the same grid their parent is placed on.

http://cssgrid.me/051633

```
.d{
  grid-column: 3 / 5;
  grid-row: 2;
  display: subgrid;
}
```

“The following features are at-risk, and may be dropped during the CR period:

- the subgrid value”

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

Without subgrid we create the potential for accessibility problems. Authors may remove semantic markup in order to use grid layout.

“Subgrids are essential to the adoption of grids. I hope they’ll be implemented as soon as possible, and before grids are pushed into public release channels.”

Eric Meyer, http://meyerweb.com/eric/thoughts/

Status of CSS Grid Layout

CSS Grid Layout - WD

Global 0% + 6.8% = 6.8%

unprefixed: 0%

Method of using a grid concept to lay out content, providing a mechanism for authors to divide available space for lay out into columns and rows using a set of predictable sizing behaviors

Current aligned | Usage relative | Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			[1] 49						
		[3] 47	[1] 51					4.4	
8	[2] 13	[3] 48	[1] 52	9.1		9.3		4.4.4	
[2] 11	[2] 14	[3] 49	[1] 53	10	[1] 39	10	all	52	51
		[3] 50	[1] 54	TP	[1] 40				
		[3] 51	[1] 55		[1] 41				
		[3] 52	[1] 56						

Notes | Known issues (0) | Resources (10) | Feedback

Supported in WebKit Nightly with `-webkit-` prefix.

Enabled by default in Firefox nightly and developer editions, but not yet on track to be enabled in beta or stable Firefox.
Chrome status: In development
Firefox status: in-development

[1] Enabled in Chrome through the "experimental Web Platform features" flag in chrome://flags

http://caniuse.com/#feat=css-grid

This page and its examples have been created by **Igalia**, who is currently working in the implementation of CSS Grid Layout in Blink and WebKit.

Thanks to **Bloomberg** for sponsoring this work.

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Bug 616605 - (css-grid) CSS Grid Layout

Last Comment

Status: NEW
Whiteboard: [parity-ie][parity-webkit][DevRel:P1]
Keywords: css3, DevAdvocacy

Product: Core (show info)
Component: CSS Parsing and Computation (show other bugs) (show info)
Version: Trunk
Platform: All All

Importance: -- normal with 113 votes (vote)
Target Milestone: ---
Assigned To: Nobody; OK to take it and work on it
QA Contact:
Mentors:

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

Duplicates: ~~466974~~ (view as bug list)
Depends on: 981300 1136908 1151204 1174569 1176790 1194446 1201932 1201941 1217086 1240834 1255393 1266265 1277934 1278058 1281446 ~~975501~~ ~~976787~~ ~~978212~~ ~~978478~~ ~~981752~~ ~~981754~~ ~~983175~~ ~~984760~~ ~~989755~~ ~~994592~~ ~~1000376~~ ~~1000431~~ ~~1000592~~ ~~1002607~~ ~~1004197~~ ~~1005567~~ ~~1008969~~ ~~1009214~~ ~~1009272~~ ~~1009282~~ ~~1009776~~ ~~1034361~~ ~~1056864~~ ~~1107778~~ ~~1107783~~ ~~1107786~~ ~~1117538~~ ~~1118820~~ ~~1139539~~ ~~1144096~~ ~~1145968~~ ~~1146051~~ ~~1147423~~ ~~1151201~~ ~~1151212~~ ~~1151213~~ ~~1151214~~ ~~1151243~~ ~~1151316~~ ~~1153140~~ ~~1163432~~ ~~1163435~~ ~~1163565~~ ~~1172327~~ ~~1174574~~ ~~1176775~~ ~~1176782~~ ~~1176792~~ ~~1176793~~ ~~1185140~~ ~~1194888~~ ~~1194892~~ ~~1209485~~ ~~1211260~~ ~~1226697~~ ~~1227285~~ ~~1229165~~ ~~1230665~~ ~~1238890~~ ~~1251999~~ ~~1258443~~ ~~1264067~~ ~~1264607~~ ~~1266268~~ ~~1272783~~ ~~1278455~~ ~~1279182~~ ~~1279641~~ ~~1281320~~ ~~1282418~~ ~~1282643~~
Blocks: 709467 css3test 914360
Show dependency tree / graph

Reported: 2010-12-03 13:58 PST by adminnu
Modified: 2016-08-08 05:04 PDT (History)
CC List: 95 users (show)

See Also:

Crash Signature: (edit)
QA Whiteboard:
Iteration: ---
Points: ---
Has Regression Range: ---
Has STR: ---
Project Flags:
Tracking Flags: platform-rel: ?

https://bugzilla.mozilla.org/show_bug.cgi?id=616605

Grid by Example

A collection of usage examples for the CSS Grid Layout specification.

What is Grid Layout? | Simple Examples | Page layouts | Browsers | Resources

Current Browser/Rendering Engine Information

You can view data across different browsers at Can I Use. However this information tends to confuse people as it looks as though IE is the only browser with support. Read on to understand the status of Grid Layout in browsers.

Grid is under development in browsers, this development is typically happening behind a browser flag or in an experimental version of the browser. This prevents incomplete or experimental parts of the specification being used in production by web developers.

Due to the experimental nature of this sometimes examples will not work in one browser or another. *Please don't email me to complain that Firefox Nightlies look different to Chrome Canary!* I have linked to the meta bugs below for each browser so if you need to know exactly why one is different to another, take a look at those. This is the way of experimental features.

If you find a bug in a browser implementation then the best thing to do is to search the logged bugs for that browser as this will include known bugs and issues still being worked on. If you have found something new then you can find information about logging bugs with browsers here.

http://gridbyexample.com/browsers/

Why are we looking at something I can’t use yet?

Incomplete List of Mistakes in the Design of CSS

That should be corrected if anyone invents a time machine. :P

- `white-space: nowrap` should be `white-space: no-wrap`
  - and line wrapping behavior should not have been added to `white-space`
- `vertical-align` should not apply to table cells. Instead the CSS3 alignment properties should exist in Level 1.
- `vertical-align: middle` should be `text-middle` because it's not really in the middle.
- Percentage heights should be calculated against `fill-available` rather than being undefined in auto situations.
- Table layout should be sane.
- Box-sizing should be `border-box` by default.
- `background-size` with one value should duplicate its value, not default the second one to `auto`.
- `background-position` and `border-spacing` (all 2-axis properties) should take *vertical* first, to match with the 4-direction properties like `margin`.
- The 4-value shorthands like `margin` should go counter-clockwise (so that the inline-start value is before the block-start value).
- `z-index` should be called `z-order` or `depth` and should Just Work on all elements (like it does on flex items).
- `word-wrap/overflow-wrap` should not exist. Instead, `overflow-wrap` should be a keyword on 'white-space', like `nowrap` (`no-wrap`).
- The top and bottom margins of a box should never have been allowed to collapse together automatically as this is the **root of all margin-collapsing evil**.
- Partial collapsing of margins instead of weird rules to handle min/max-heights?
- Tables (and other non-blocks, e.g. flex containers) should form pseudo-stacking contexts.
- The `currentcolor` keyword should have a dash, `current-color`.
- There should have been a predictable color naming system instead of arbitrary X11 names.
- `border-radius` should have been `corner-radius`.
- Absolutely-positioned replaced elements should stretch when opposite offset properties (e.g. left+right) are set, instead of being start-aligned.
- The `hyphens` property should be called `hyphenate`. (It's called `hyphens` because the XSL:FO people objected to `hyphenate`.)

https://wiki.csswg.org/ideas/mistakes

Get involved with developing specs!

- While a spec is being developed **your feedback is wanted** and can be included in the spec.
- Wait until browsers ship and **you lose that chance.**
- **It just got easier.** CSS Spec issues are now on GitHub.

  http://logs.csswg.org/irc.w3.org/css/2016-05-10/#e684439

Do a good deed for your future self.

More code!

I am creating a list of examples and information at:

http://gridbyexample.com

Thank you!

@rachelandrew