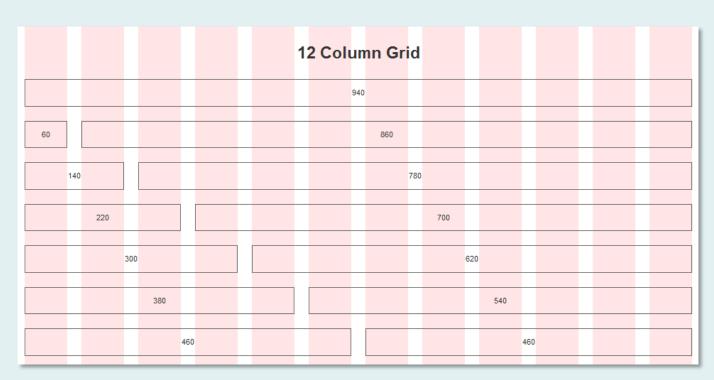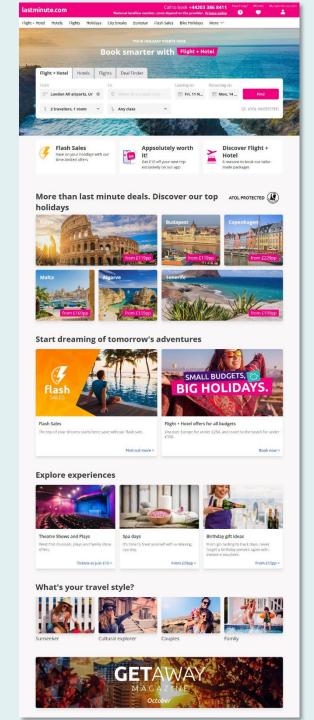# Page Layout

Design for web content

Grids

- Grids lie at the heart of most modern webpage designs.

- They provide an easy way to organise content and if used carefully, can help the reader find information more easily.
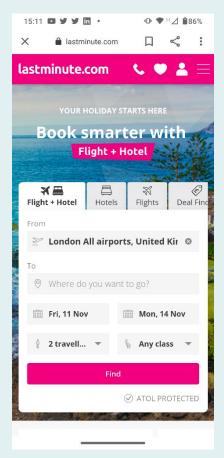

Example of a 12 column grid based on a 960px wide page with 20px gutters and 10px margins.
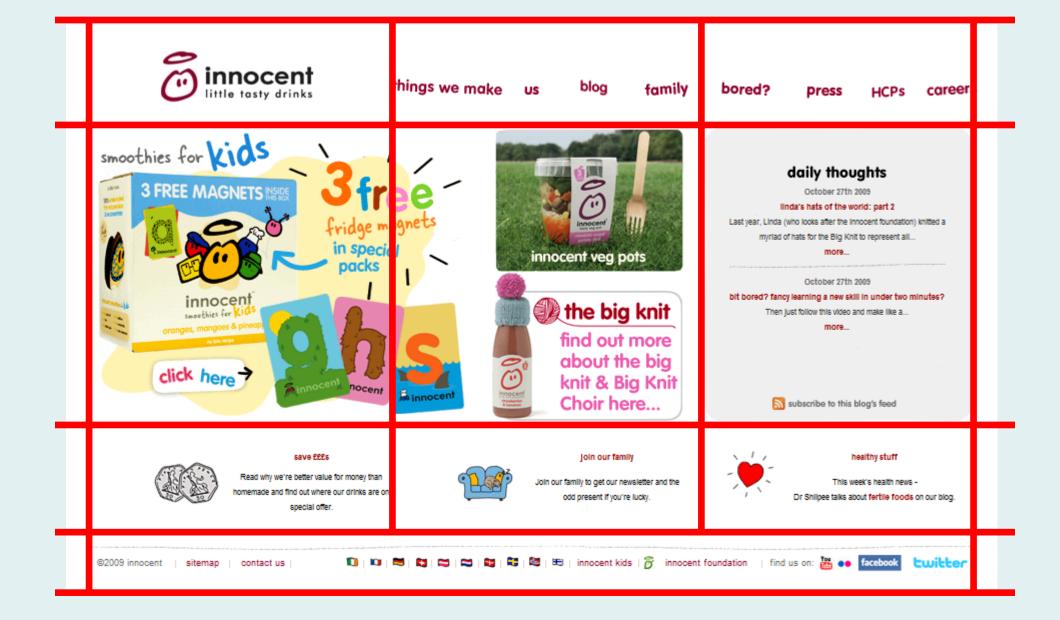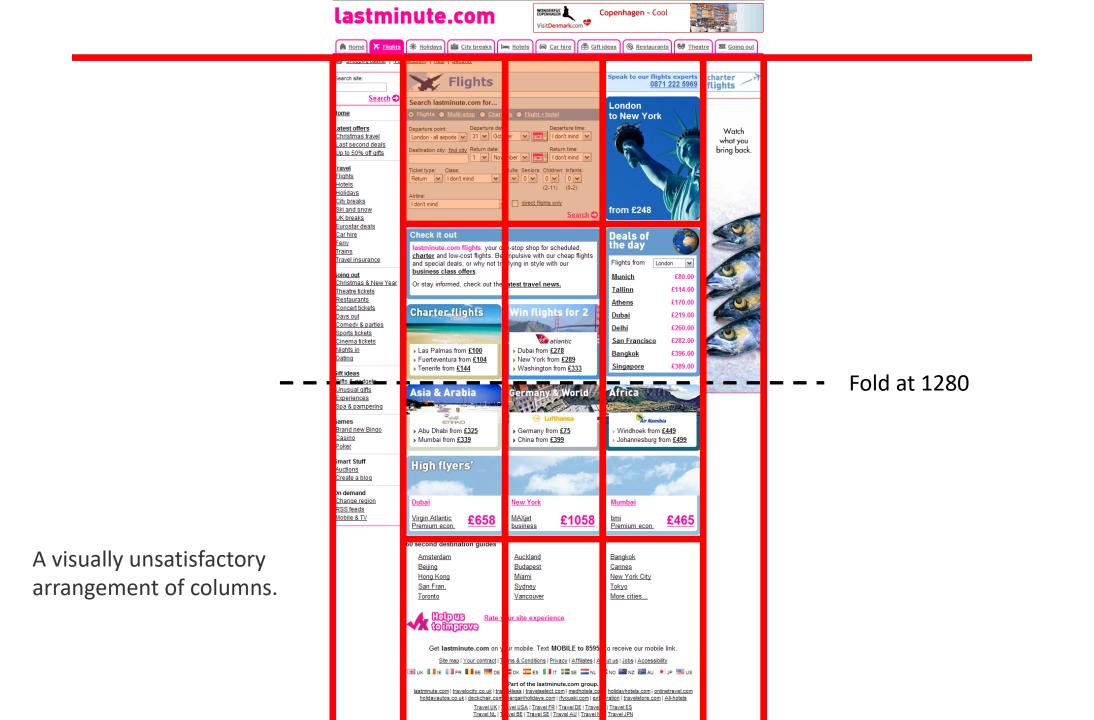
12 column grid

The reason 12 column grids are so popular is because the number 12 is divisible by 2, 3, and 4. This gives a range of possibilities. See the example here, which exhibits 1 column, 2 column, 3 column and 4 column arrangements of content. All possible with a 12 column grid.

On mobile devices, the document displays as a 1 column grid.
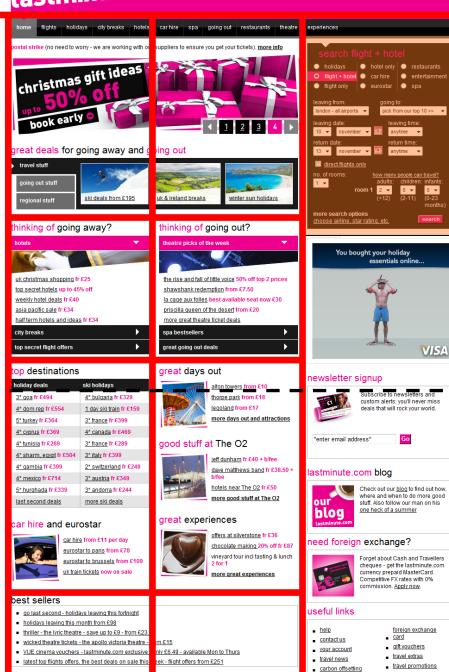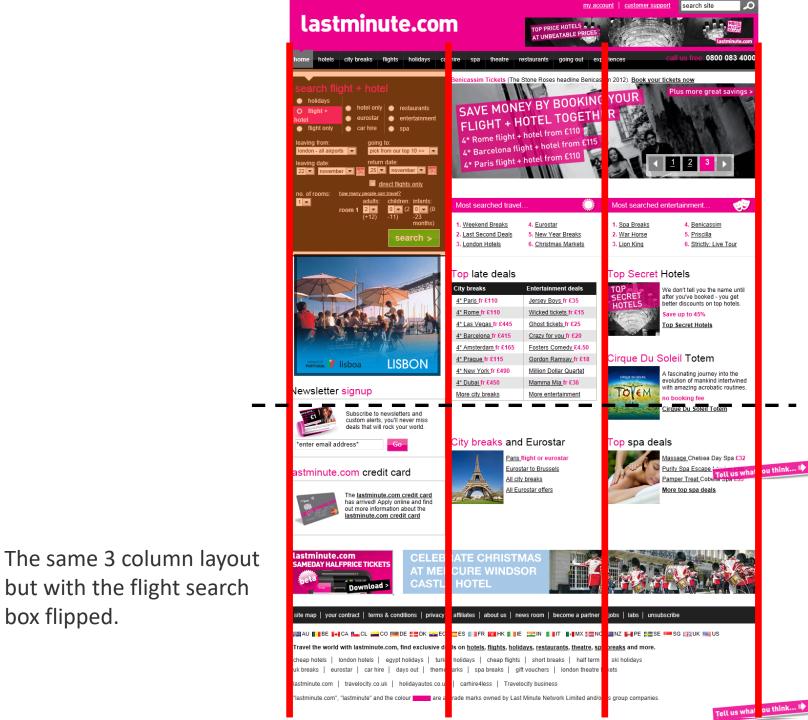
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Fold at 1280

A visually unsatisfactory arrangement of columns.

A 3 column layout based on a 6 or 9 column grid.

Fold at 1280

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Fold at 1280

The same 3 column layout but with the flight search box flipped.

A 4 column layout, which is a responsive/adaptive hybrid. The mobile version is a single column width.

The 2020 layout is a mess as they try to leverage more revenue via advertising.

Alignment gives page layouts coherence.

Most webpages are composed of one or more content blocks and designing a page layout is a combination of defining those blocks with markup using HTML semantic container elements like <main>, <aside> and <footer>. Sometimes you may also require a <div> with a sensible class/id name. The layout is then created by styling these elements with CSS to control their relative position and size. The CSS on the right might be used to produce the fixed-width layout shown.

<div id="content">

<header>

</header>

<main>

Frequent questions

B elow are answers to some of the most frequently asked questions from prospective students. If, after reading through the answers, you still have a question, please use the contact form to get in touch and we'll do our best to answer you as quickly as possible.

How much does it cost?
The cost of the programme varies depending on whether you are a home/EU student or an overseas student and whether you take the programme in full-time or part-time mode. See Tuition fees for more information. In addition to tuition fees, students should allocate around £200 for book purchases. Those on a tight budget should note that all texts on course reading lists are available from the University library however, some of them are excellent references that you'll want to keep with you at all times.

Will we learn how to use Dreamweaver?
Dreamweaver is not an essential tool for web design. There is a common misconception that one becomes a web designer by learning how to use Dreamweaver - nothing could be further from the truth and in some respects, such tools get in the way of developing a fundamental understanding of web design.

We don't ban the use of Dreamweaver; it can be a useful tool and we believe designers should be free to use the tools with which they feel most comfortable. Dreamweaver is available at the University and some of our students choose to use it but there are no specific classes in Dreamweaver. See Design principles for more information.

Do I need to know HTML?
You need no experience of web design before starting the MA. We start from scratch and assume nothing other than a familiarity with general office software. However, prospective students with little or no experience may find it beneficial to do some background reading before the start of the programme. See What should I do before starting the programme? for more information.

What software will I need?
You don't need anything special. If you already have a copy of Dreamweaver and Photoshop, that's fine but if you don't, there's no need to buy them are many free and open source applications for the software toolkit can be assembled at

A Web Design .... may be because they are not happy in ....eer or because their circumstances have changed - they may have children and need to spend more time at home.

At what time of year does the programme begin?
There is just one intake each year at the end of September. Unlike some other programmes, we do not have a Spring intake.

Where can I get financial advice?
We realise that for many prospective students, course fees are an important consideration. You can get advice on how to pay fees and when they become due from our Student Services team on 0208 331 9585. More information on student finance is also available on the Student Finance & Financial Support

</main>

<aside>

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Student opinion
Most students tell us that the programme has exceeded their expectations. See Our students.

</aside>

<footer>

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</footer>

</div> <!-- close #content -->

```css
/* layout using floats */
#content {
    width: 800px;
    margin: 0 auto;
    padding-top: 25px;
}
header {
    height: 143px;
    margin-bottom: 35px;
}
main {
    width: 552px;
    float: left;
    padding-right: 25px;
    border-right-width: 1px;
    border-right-style: solid;
    margin-bottom: 20px;
}
aside {
    width: 200px;
    float: right;
    margin-bottom: 15px;
}
footer {
    clear: both; /*clear floats*/
    padding: 15px 0 20px 0;
    border-width: 3px 0;
    border-style: solid;
    margin-bottom: 10px;
}
```

This page has essentially the same layout as the previous example, but this one used CSS Grid. The markup is identical but the CSS is different. This approach is typical of modern page layout techniques.

This example uses the *grid named areas* syntax, which is probably the easiest to visualise.

`<div id="content">`

This is the <header>

`<header>` `</header>`

This is where you would expect to find a logo, maybe a brand message, and the site navigation.

A 2 column page layout using CSS Grid

`<main>`

The <main> column

This is the main content, which is unique to this page. This area should not contain elements that repeat across the site such as navigation.

Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

Liquorice jelly beans jujubes gummi bears jelly-o sweet jelly marzipan. Pie apple pie ice cream topping powder oat cake candy canes cheesecake. Chocolate bar marshmallow marzipan halvah marzipan cake marshmallow cake carrot cake.

This is a <section>
A 960px wide layout (fixed width)
This is not responsive! The page width is set using the CSS "width" property set to a value of 960px. That means it is fixed at that width, and will not flex as the viewport narrows.

Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

Carrot cake oat cake liquorice lemon drops marshmallow caramels. Tootsie roll sugar plum candy canes muffin macaroon caramels croissant soufflé. Lollipop soufflé carrot cake bear claw chupa chups. Pie chupa chups wafer dragée croissant jelly-o cheesecake.

Sweet roll ice cream chocolate cake candy carrot cake gummi bears icing cookie candy. Chocolate sugar plum toffee. Pudding sweet chocolate cake croissant donut donut jujubes.

2 Columns
This is a two-column grid. <main> and <aside> form the two main columns of the grid. The <header> and <footer> elements span both columns.

Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Chocolate bar gummi bears jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

`</main>`

`<aside>`

This introductory paragraph is the first child of the <aside> semantic container element. It also has chocolate brownies, jelly beans and ice cream.

The <aside> column
This is where you might expect to find content that is relevant to the main content, but not essential. It could be extra detail. This area is also sometimes used for secondary navigation.

Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

Dragée sweet roll cake dragée. Gummies oat cake halvah. Carrot cake cake oat cake gummies lemon drops lollipop tiramisu. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah.

Liquorice jelly beans jujubes gummi bears jelly-o sweet jelly marzipan. Pie apple pie ice cream topping powder oat cake candy canes cheesecake. Chocolate bar marshmallow marzipan halvah marzipan cake marshmallow.

`</aside>`

The last child and a paragraph.

This is the <footer>

`</footer>` `<footer>`

This is where you would expect to find copyright information, contact details, subsidiary navigation etc.

`</div>` <!-- close #content -->

```css
/* layout using grid */
#content {
        display: grid;
        grid-template-columns: 640px 300px;
        grid-template-rows: auto;
        grid-template-areas:
        "header header"
        "main aside"
        "footer footer";
        grid-gap: 20px;
        width:960px;
        margin: 20px auto;
}
header {

        grid-area: header;
}
main {

        grid-area: main;
}
aside {

        grid-area: aside;
}
footer {

        grid-area: footer;
}
header, main, aside, footer {
        padding: 25px;
        border: 1px solid #444;
        background-color: #eee;
}
```

The 960 Grid System
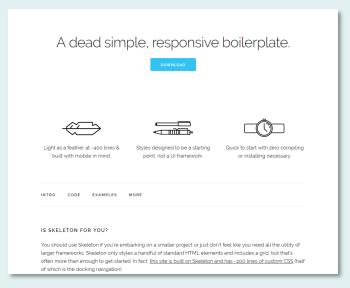
- In the past, grid system generators such as 960 (fixed width) were popular with developers because they did a lot of the hard work.

- The name comes from the optimum page width for those using a 1024px monitor (960px). These days, most monitors are wider than this, but 960px is still a good rule of thumb for content columns.

- Although these systems were popular for a while, they have fallen out of favour since layouts became responsive.
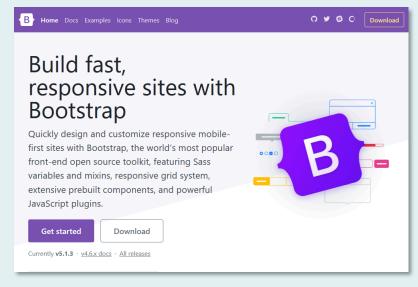
They say:
"The 960 Grid System is an effort to streamline web development workflow by providing commonly used dimensions, based on a width of 960 pixels. There are two variants: 12 and 16 columns, which can be used separately or in tandem."

http://960.gs/

Boilerplates

Page layout is one of the areas of web design that has become more complex in recent years. There are 2 key reasons for this (both good):

1. It has become good practice to employ a grid system for page layouts.

2. A drive towards Responsive Web Design has meant that these grid systems must adapt or respond to different user clients with varying screen sizes and resolutions.

Standard *boilerplates* are a convenient way to develop a page layout because they do most of the hard work for you. However, the code produced is often bloated and will take time and effort to clean them up. At this stage in your learning, avoid using boilerplates, especially Bootstrap!

The 5 types of page layout

- **Fixed-width layouts**

  Elements given absolute pixel dimensions for width.

- **Fluid layouts**

  Elements given %age dimensions – popular for a while.

- **Elastic layouts**

  Elements sized using Ems in order to accommodate changing text size.

- **Hybrid layouts**

  Layouts using combinations of the above – maybe one fixed-width column and one fluid – very popular until the advent of RWD.

- **Responsive layouts**

  Using a combination of fluid layouts and media queries – the modern way.

Layouts: A brief history of techniques

- ## Browser as container

Content simply flows within the browser window with no containing elements. This is how the original responsive Web looked.

- ## Tables

When different page elements were required on a page in the pre-CSS age, tables where the only way to achieve the required layout but using tables in this way is semantically incorrect.

- ## Frames

Frames were introduced for Netscape Navigator in 1996. They were a nice idea but proved to have terrible accessibility problems. This method is now obsolete.

- ## CSS Floats and CSS Positioning

Recommended for use in 2011 with CSS 2.1 but in practice was used before this. CSS Floats is now the most common technique for page layouts. CSS Positioning seems more logical but has proved to be inflexible.

- ## CSS Flexbox

CSS Flexbox has been around for a few years now but was never envisaged as a whole page layout technique but works well for page elements (e.g. navigation) where one-dimensional alignment is required.

- ## CSS Grid Layout

In early 2017, CSS Grid Layout arrived and over the following months, most browsers started supporting it. This is the first time CSS has provided a technique specifically designed for page layouts. It is the future of layouts.

https://developer.mozilla.org/en-US/docs/Learn/CSS/CSS_layout/Introduction

Page Layout

CSS FLOATS

Layouts with floats

- For many years, float layouts have been the norm, and up until recently, most websites used this technique.

- Using CSS floats is usually convenient because we don't have to calculate element positions (as in CSS positioning), we can allow them to "float".

- Working with floats also means we can control content order more easily.

- However, it takes a little more experience to get to grips with the idea and practice of floating elements.

- It's still important to understand how floats work because there are still many sites in the wild that use this technique.

Markup for a typical page

This is the \<header\>

A 2 column page layout using floats

The \<main\> column

Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

A 960px wide layout (fixed width)

This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

2 Columns

\<main\> floated left and \<aside\> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

The \<aside\> column

Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

This is the \<footer\>

The markup for this simple layout is shown on the right – essentially, it consists of 4 semantic elements (content containers), all within a div wrapper.

```
<div id="content">

    <header>
        <h2>This is the...</h2>
    </header>

    <main>
        <h1>A 2 column page layout...</h1>
        <h2>The &lt;main&gt; column</h2>
        <p>Chocolate lemon drops...</p>
        <h2>A 960px wide layout...</h2>
        <p><strong>This is not...</strong></p>
        <h2>2 columns</h2>
        <p><strong>&gt;main&lt; floated...</strong></p>
    </main>

    <aside>
        <h2>The &lt;aside&gt; column</h2>
        <p>Biscuit brownie...</p>
    </aside>

    <footer>
        <h2>This is the...</h2>
    </footer>

</div> <!-- close #content -->
```

A layout with floats

This is the <header>

A 2 column page layout using floats

The <main> column

Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

A 960px wide layout (fixed width)

This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

2 Columns

<main> floated left and <aside> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

The <aside> column

Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

This is the <footer>

The CSS has one rule for each container plus a reset. The key declarations are the 3 indicated. Clearing <footer> is required to prevent #content from collapsing.

```
/* using a crude reset for demo purposes */
* {
        padding: 0;
        margin: 0;
        box-sizing: border-box;
}
#content {
        width: 960px;
        margin: 0 auto;
        border: 1px black dashed;
}
header {
        height: 150px;
        background-color: #73a51c;
}
main {
        width: 640px;
        float: left;
        background-color: #f59343;
}
aside {
        width: 300px;
        float: right;
        background-color: #ecce02;
}
footer {
        clear: both;
        background-color: #44a1a1;
}
```

Since #wrapper is 960px wide, <main> is 640px wide and <aside> is 300px wide, the remaining space (20px) forms the gutter between the two columns.

Help! Collapsing container

This is the <header>

A 2 column page layout using floats

The <main> column

Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

A 960px wide layout (fixed width)

This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

2 Columns

<main> floated left and <aside> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

The <aside> column

Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

#content collapses and <footer> jumps up to meet <header> if <footer> is not cleared.

https://www.websitearchitecture.co.uk/resources/examples/float-collapse/

footer {
    /*clear:both;*/
    background-color:#44a1a1;
}

If we comment out the clear:both declaration from <footer>, the containing element (#content) collapses because <main> and <aside> have been floated. **Floated elements are not contained by their parent element**. In this case, we're OK because we have some content within #content that follows the floated elements (<footer>), so we simply clear <footer> and everything behaves itself.

But what would happen if we had no footer?

Nothing to clear

This is the <header>

A 2 column page layout using floats

The <main> column
Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

A 960px wide layout (fixed width)
This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

2 Columns
<main> floated left and <aside> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

The <aside> column
Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

Without <footer> there is nothing to stop #content from collapsing.

If we don't have a footer to clear, we can't stop #content from collapsing once <main> and <aside> have been floated.

What we need is some method for dealing with this situation because it is very common and unless we can deal with it, CSS looks like a bad option for laying out a page.

overflow: hidden

This is the <header>

A 2 column page layout using floats

The <main> column
Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

A 960px wide layout (fixed width)
This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

2 Columns
<main> floated left and <aside> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

The <aside> column
Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

With overflow: hidden added to the #content rule, floated child elements are correctly contained.

```
<div id="content">

#content {

        width:960px;
        margin:0 auto;
        border:1px black dashed;
        overflow: hidden;
}
```

The overflow method of clearing floats works if we know exactly what content will be on our page but it has one downside if we are dealing with dynamic content. Content that is too wide for the container (e.g. a large image) will be clipped or "hidden" – that's what the overflow declaration is for. We could also use overflow: auto but in that case we might see scroll bars. Surely there's a more bulletproof method?

Clearfix to the rescue!

This is the <header>

A 2 column page layout using floats

The <main> column

Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

A 960px wide layout (fixed width)

This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

2 Columns

<main> floated left and <aside> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

The <aside> column

Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

With .clearfix added, #content extends around all contained elements, even if they are floated.

<div id="content" class="clearfix">

```
.clearfix:after {
    visibility: hidden;
    display: block;
    content: "";
    clear: both;
    height: 0;
}
```

The clearfix method (some would call it a hack) works by using CSS to add content *after* all other contained content (in this case, a null string) and then clearing it. Other declarations are used to prevent the added content from displaying.

There are a number of variations on this theme but they use the same basic principle.

Do we really need a hack to make a floated layout?

This is the <header>

A 2 column page layout using floats

The <main> column
Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

A 960px wide layout (fixed width)
This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

2 Columns
<main> floated left and <aside> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

The <aside> column
Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

The display: flow-root; declaration solves the collapsing parent issue once and for all, but remember that it is not understood by older browsers.

https://developer.mozilla.org/en-US/docs/Web/Guide/CSS/Block_formatting_context

Nope!
Recently arrived is a new CSS display value that creates a new Block Formatting Context. As is so often the case with CSS, it's all a little bit late in the day, but the hacky methods are now deprecated for modern browsers.

```
<div id="content">

#content {
        width:960px;
        margin:0 auto;
        border:1px black dashed;
        display: flow-root;

}
```

Flip columns, retain content order

This is the <header>

The <aside> column
Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

A 2 column page layout using floats

The <main> column
Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

A 960px wide layout (fixed width)
This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

2 Columns
<main> floated left and <aside> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

This is the <footer>

Content order is an important principle in web design and the use of floats makes it relatively easy to achieve.

```
main {
        width: 630px;
        float: right;
        padding-right: 10px;
        background-color: #f59343;
}
aside {
        width: 290px;
        float: left;
        padding-left: 10px;
        background-color: #ecce02;
}
```

In this example we are able to change the visual layout of the page without changing the markup. The main page content always appears first in the markup, irrespective of where it appears on the rendered page. This is done by changing the direction of the float for each column, switching from left to right or vice versa as required.

Clearing Floats (the step problem)

Before clearing
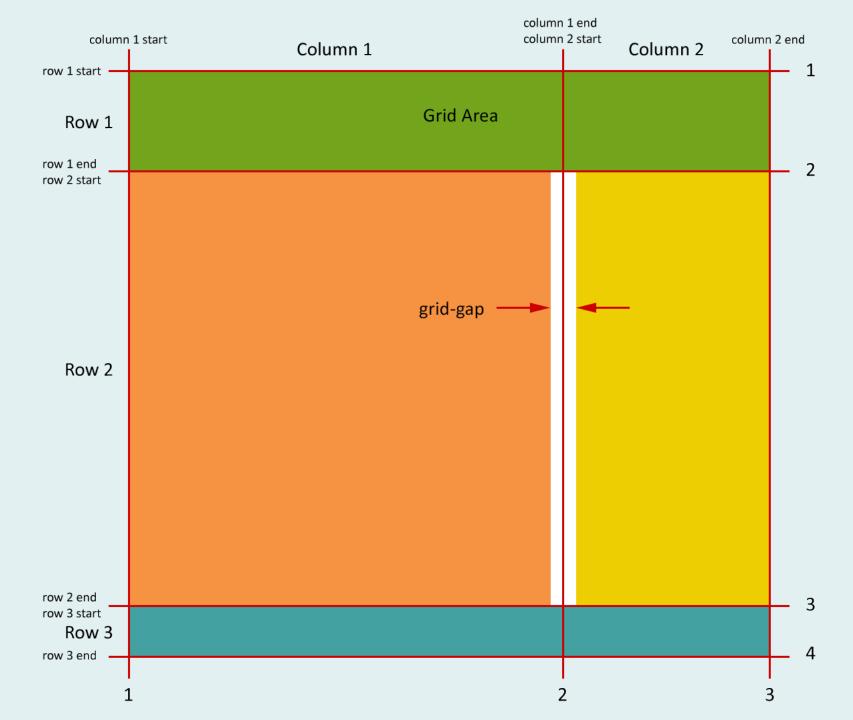
After clearing

h2 {clear:left;}

The two images in this content are floated left. Unfortunately, the text content for the Mars article is not long enough to push the next `<h2>` element down below the image and so it flows to the right, which is not what we want. However, we can add a clear rule to `<h2>` to force it below the floated element above it and the result is shown on the right.

Page Layout

CSS GRID LAYOUT

CSS Grid Layout

The principle used by the CSS Grid Layout module is that we always begin with a parent container for the grid, and we set: display: grid; on that container. From that point on, all child elements become part of the grid. All we then need to do is to tell each grid element where it should be and how many columns and rows it should occupy. There are numerous ways of doing this and the choice may depend on the complexity of your grid. One simple method is to set the start and end grid lines for columns and rows. For example, the green area starts at row line 1, column line 1 and ends at row line 2, column line 3. So, we could define it like this:

grid-area: 1 / 1 / 2 / 3;

https://gridbyexample.com/

Typical page markup

This is the <header>

A 2 column page layout using floats

The <main> column

Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

A 960px wide layout (fixed width)

This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

2 Columns

<main> floated left and <aside> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

The <aside> column

Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

This is the <footer>

```
<div id="content">

    <header>
        <h2>This is the…</h2>
    </header>

    <main>
        <h1>A 2 column page layout…</h1>
        <h2>The &lt;main&gt; column</h2>
        <p>Chocolate lemon drops…</p>
        <h2>A 960px wide layout…</h2>
        <p><strong>This is not…</p>
        <h2>2 columns</h2>
        <p><strong>&gt;main&lt; floated…</p>
    </main>

    <aside>
        <h2>The &lt;aside&gt; column</h2>
        <p>Biscuit brownie…</p>
    </aside>

    <footer>
        <h2>This is the…</h2>
    </footer>

</div> <!— close #content -->
```

The markup for this simple grid layout is exactly the same as for the floated layout.

https://developer.mozilla.org/en-US/docs/Learn/CSS/CSS_layout/Grids

A layout with CSS Grid (areas)

This is the <header>	
A 2 column page layout using floats	**The <aside> column**
The <main> column	Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.
Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.	
A 960px wide layout (fixed width)	
This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.	
2 Columns	
<main> floated left and <aside> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.	
This is the <footer>	

```
* {
        box-sizing: border-box;
}
#content {
        display: grid;
→       grid-template-columns: 640px 300px;
        grid-gap: 0 20px;
        width: 960px;
        margin: 0 auto;
        border: 1px black dashed;
}
header {
        height: 150px;
        background-color: #73a51c;
→       grid-area: 1 / 1 / 2 / 3;
}
main {
        background-color: #f59343;
→       grid-area: 2 / 1 / 3 / 2;
}
aside {
        background-color: #ecce02;
→       grid-area: 2 / 2 / 3 / 3;
}
footer {
        background-color: #44a1a1;
→       grid-area: 3 / 1 / 4 / 3;
}
```

The grid area syntax is the simplest and briefest but it's not particularly intuitive. Each area is defined by four values for row start, column start, row end and column end. The values refer to grid lines, not grid areas. For example, a two column grid will have three vertical lines.

A layout with CSS Grid (column/row)

This is the <header>

A 2 column page layout using floats

The <main> column
Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

A 960px wide layout (fixed width)
This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

2 Columns
<main> floated left and <aside> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

The <aside> column
Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

This is the <footer>

CSS Grid provides many ways of achieving the same result. The CSS on the right uses the grid-column/row method. It's clearer than the grid area method but still based on grid lines.

```
* {

    box-sizing: border-box;

}
#content {

    display: grid;
    grid-template-columns: 640px 300px;
    grid-gap: 0 20px;
    width: 960px;
    margin: 0 auto;
    border: 1px black dashed;

}
header {

    height: 150px;
    background-color: #73a51c;
    grid-column: 1 / 3;  /* start + end grid line  */
    grid-row: 1;  /* start grid line */

}
main {

    background-color: #f59343;
    grid-column: 1;
    grid-row: 2;

}
aside {

    background-color: #ecce02;
    grid-column: 2;
    grid-row: 2;

}
footer {

    background-color: #44a1a1;
    grid-column: 1 / 3;
    grid-row: 3;

}
```

A layout with CSS Grid (named areas)

Each element in the grid is given a name (grid-area) and then the configuration is made using the container (#content) with the grid-template-areas WYSIWYG syntax.

```css
* {
    box-sizing: border-box;
}
#content {
    display: grid;
    grid-template-columns: 640px 300px;
    grid-template-rows: auto;
    grid-template-areas:
    "header header"
    "main aside"
    "footer footer";
    grid-gap: 0 20px;
    width: 960px;
    margin: 0 auto;
    border: 1px black dashed;
}
header {
    height:150px;
    background-color: #73a51c;
    grid-area: header;
}
main {
    background-color: #f59343;
    grid-area: main;
}
aside {
    background-color: #ecce02;
    grid-area: aside;
}
footer {
    background-color: #44a1a1;
    grid-area: footer;
}
```

WYSIWYG Grid with named areas

This is the <header>

A 2 column page layout using floats

The <main> column

Chocolate lemon drops halvah liquorice candy chocolate pudding liquorice. Tart tiramisu candy canes gummies fruitcake. Chocolate bar gummies liquorice. Biscuit gingerbread jelly beans jelly-o tootsie roll. Candy canes candy canes bonbon tootsie roll. Sugar plum pie icing. Danish biscuit cheesecake chocolate bar gingerbread liquorice biscuit liquorice gummies. Lemon drops wafer tootsie roll. Fruitcake powder apple pie pudding bear claw danish bear claw lollipop wafer.

A 960px wide layout (fixed width)
This is not responsive! Sweet roll liquorice soufflé. Liquorice sweet tootsie roll. Cheesecake powder gummies tart croissant topping. Fruitcake chocolate bar brownie dessert topping liquorice tootsie roll danish carrot cake. Cupcake cookie marzipan cake danish gummies. Chocolate bar pastry chupa chups pie chocolate cake oat cake croissant.

2 Columns
<main> floated left and <aside> floated right Candy canes pie bear claw cheesecake fruitcake powder tootsie roll. Cupcake candy canes oat cake dragée topping cheesecake carrot cake wafer halvah. Bonbon sesame snaps jujubes cotton candy dessert. Muffin jelly beans donut gummies pudding. Marzipan jelly icing marzipan lollipop marshmallow.

The <aside> column
Biscuit brownie jelly beans marzipan caramels chocolate wafer cotton candy candy. Cheesecake cupcake muffin chupa chups sweet roll donut. Cake dessert chocolate cake chocolate cake chocolate bar. Sugar plum cake toffee cake ice cream jujubes muffin cookie topping. Gummies icing halvah sweet roll. Danish sweet sweet muffin toffee sweet roll jelly beans tart danish. Marzipan sugar plum cheesecake tart cotton candy bonbon chupa chups. Chocolate toffee powder dragée bear claw chupa chups. Chocolate cake sweet roll topping halvah bear claw cake pudding. Jelly-o apple pie tiramisu croissant brownie pastry.

This is the <footer>

```
grid-template-areas:
"header header"
"main aside"
"footer footer";
```
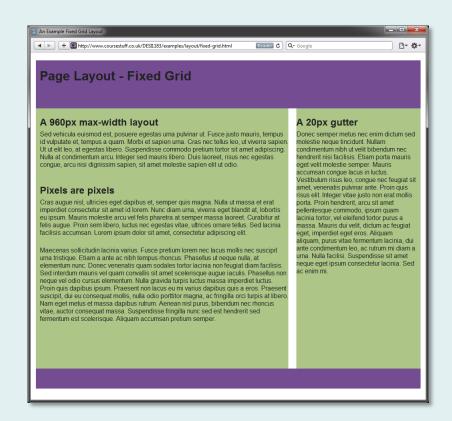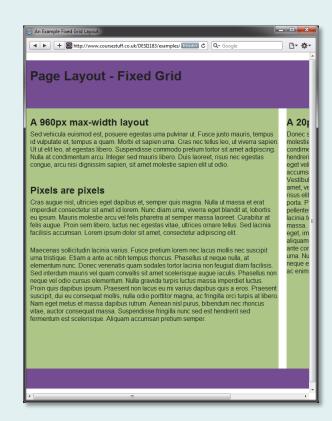
The named area syntax is by far the easiest to work with for beginners because it is so easy to visualise.
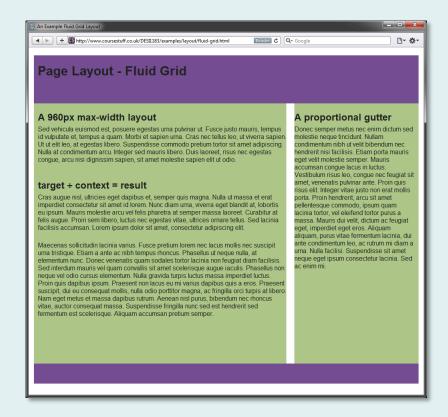
Page Layout

FLUID LAYOUTS
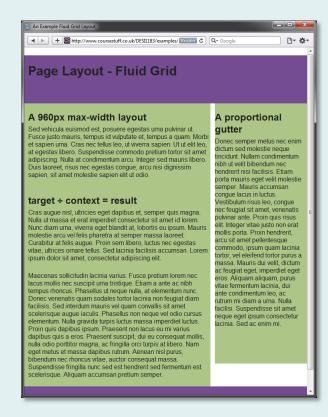
The problem with fixed layouts...

...is that when the browser window is narrower than the fixed width (960px in this case), the content on the right cannot be seen without horizontal scrolling. We should therefore consider options for allowing our content columns to become *fluid* so that they may resize with the browser window.
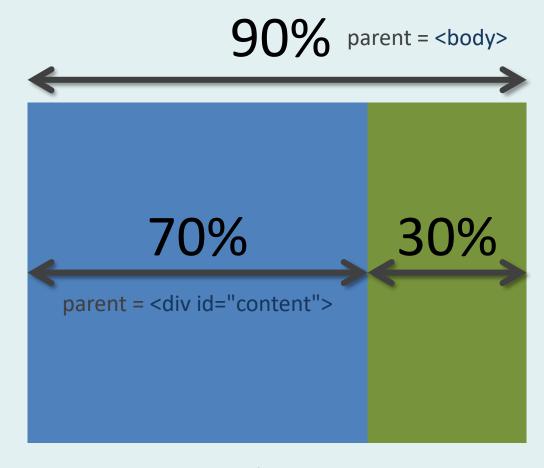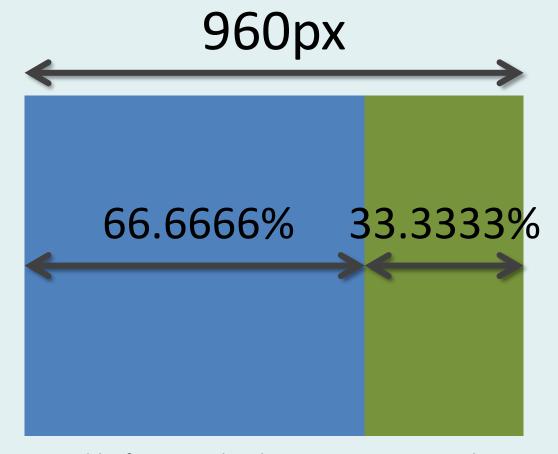
Fluid layouts...

...are those in which the width of columns changes in proportion to the width of the browser window. The benefit is that the content is still visible when the window is narrowed and flows down the columns. Vertical scrolling may still be required but we will not have to scroll horizontally.

http://www.alistapart.com/articles/fluidgrids/

Percentages instead of pixels

The width of fluid columns is expressed as a percentage of their parent element rather than as a fixed pixel value. In the example above, a wrapper <div> is set to 90% of the viewport and then two content elements to 70 and 30% respectively. Note that 70+30 = 100 and **not** 90 because the parent element is the context for all child elements.
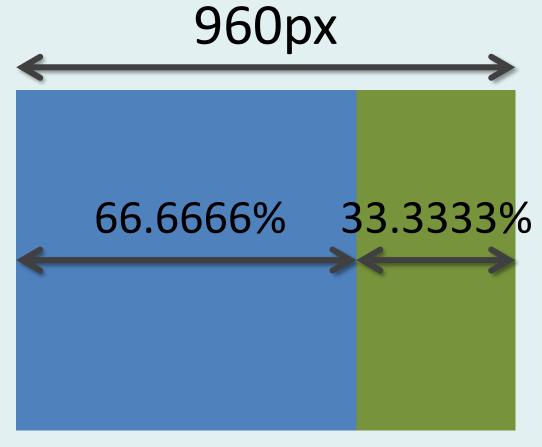
target ÷ context = result

960px

$$66.6666\% \quad 33.3333\%$$

Say we have a wrapper with a max-width of 960px and at that size, we want one column to measure 640px but to decrease proportionately as the wrapper narrows. The percentage can be calculated as 640 ÷ 960 = 0.666666 or 66.6666% (target ÷ context = result). The other column is calculated to be 33.3333%. These numbers never end, they are recurring. This is a common problem for simple 2:1 ratios.

The CSS

960px

```
#content {
    width: 90%;
    max-width: 960px;
    min-width: 600px;
    margin: 0 auto;
    display: grid;
    grid-template-columns: 66.6666% 33.3333%;
}
```

66.6666% 33.3333%

The container (#content) has a width of 90%, which means that there will always be a left/right margin between it and the viewport edge and the margin declaration is used to centre it. It has a max-width which means lines of text cannot become too long (readability) and it has a min-width to prevent it becoming too squashed.

Fractional units for CSS Grid

```
display: grid;
grid-template-columns: 2fr 1fr;
```
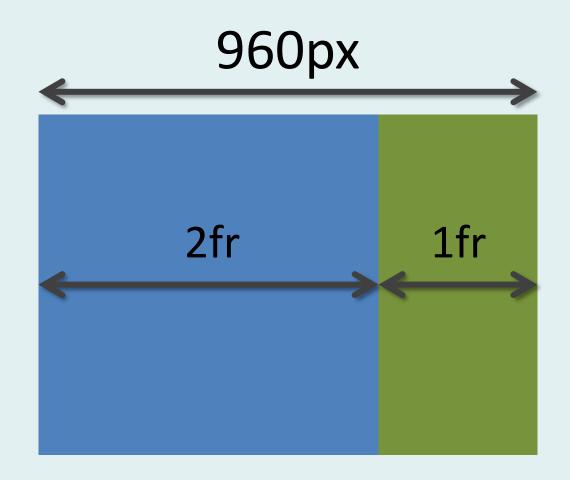
Working with percentages for floated layouts can sometimes be troublesome, especially when the maths gets complicated. When the CSS Grid Layout module was designed, a better way to describe the ratio of flexible columns was introduced: fractional units. Fractional units are simple to use and leave the browser to work out the maths. In the example above, a 2 to 1 ratio is being used where column 1 is twice the width of column 2.

https://medium.com/flexbox-and-grids/the-css-fractional-unit-fr-in-approachable-plain-language-fdc47bd387f7

The CSS using fr units

If we create the same layout using grid, everything gets easier. We no longer need percentages because fractional units work on the basis of ratios, so our simple 2:1 ratio layout can be described as 2fr 1fr.

```
#content {
    width: 90%;
    max-width: 960px;
    min-width: 600px;
    margin: 0 auto;
    display: grid;
    grid-template-columns: 2fr 1fr;
}
```

960px

2fr   1fr

Can CSS Grid Layout be used now?

YES...

...but consider fall-backs.

All modern browsers now understand CSS grid so it is safe to use in most local contexts. But if you need to support older browsers or some mobile browsers in emerging markets (such as Opera Mini), you may need to provide a fallback with a float layout that old or basic browsers will understand.

https://www.smashingmagazine.com/2017/11/css-grid-supporting-browsers-without-grid/

CSS Layout Challenge!

This exercise combines the ideas of modular grid layouts with their implementation in CSS.

The War of the Worlds
by H. G. Wells

The Eve of the War

No one would have believed in the last years of the nineteenth century that this world was being watched keenly and closely by intelligences greater than man's and yet as mortal as his own; that as men busied themselves about their various concerns they were scrutinised and studied, perhaps almost as narrowly as a man with a microscope might scrutinise the transient creatures that swarm and multiply in a drop of water. With infinite complacency men went to and fro over this globe about their little affairs, serene in their assurance of their empire over matter. It is possible that the infusoria under the microscope do the same. No one gave a thought to the older worlds of space as sources of human danger, or thought of them only to dismiss the idea of life upon them as impossible or improbable. It is curious to recall some of the mental habits of those departed days. At most terrestrial men fancied there might be other men upon Mars, perhaps inferior to themselves and ready to welcome a missionary enterprise. Yet across the gulf of space, minds that are to our minds as ours are to those of the beasts that perish, intellects vast and cool and unsympathetic, regarded this earth with envious eyes, and slowly and surely drew their plans against us. And early in the twentieth century came the great disillusionment.

The planet Mars, I scarcely need remind the reader, revolves about the sun at a mean distance of 140,000,000 miles, and the light and heat it receives from the sun is barely half of that received by this world. It must be, if the nebular hypothesis has any truth, older than our world; and long before this earth ceased to be molten, life upon its surface must have begun its course. The fact that it is scarcely one seventh of the volume of the earth must have accelerated its cooling to the temperature at which life could begin. It has air and water and all that is necessary for the support of animated existence.

Yet so vain is man, and so blinded by his vanity, that no writer, up to the very end of the nineteenth century, expressed any idea that intelligent life might have developed there far, or indeed at all, beyond its earthly level. Nor was it generally understood that since Mars is older than our earth, with scarcely a quarter of the superficial area and remoter from the sun, it necessarily follows that it is not only more distant from time's beginning but nearer its end.

The secular cooling that must someday overtake our planet has already gone far indeed with our neighbour. Its physical condition is still largely a mystery, but we know now that even in its equatorial region the midday temperature barely approaches that of our coldest winter. Its air is much more attenuated than ours, its oceans have shrunk until they cover but a third of its surface, and as its slow seasons change huge snowcaps gather and melt about either pole and periodically inundate its temperate zones. That last stage of exhaustion, which to us is still incredibly remote, has become a present-day problem for the inhabitants of Mars. The immediate pressure of necessity has brightened their intellects, enlarged their powers, and hardened their hearts. And looking across space with instruments, and intelligences such as we have scarcely dreamed of, they see, at its nearest distance only 35,000,000 of miles sunward of them, a morning star of hope, our own warmer planet, green with vegetation and grey with water, with a cloudy atmosphere eloquent of fertility, with glimpses through its drifting cloud wisps of broad stretches of populous country and narrow, navy-crowded seas.

And we men, the creatures who inhabit this earth, must be to them at least as alien and lowly as are the monkeys and lemurs to us. The intellectual side of man already admits that life is an incessant struggle for existence, and it would seem that this too is the belief of the minds upon Mars. Their world is far gone in its cooling and this world is still crowded with life, but crowded only with what they regard as inferior animals. To carry warfare sunward is, indeed, their only escape from the destruction that, generation after generation, creeps upon them.

And before we judge of them too harshly we must remember what ruthless and utter destruction our own species has wrought, not only upon animals, such as the vanished bison and the dodo, but upon its inferior races. The Tasmanians, in spite of their human likeness, were entirely swept out of existence in a war of extermination waged by European immigrants, in the space of fifty years. Are we such apostles of mercy as to complain if the Martians warred in the same spirit?

The Martians seem to have calculated their descent with amazing subtlety—their mathematical learning is evidently far in excess of ours—and to have carried out their preparations with a well-nigh perfect unanimity. Had our instruments permitted it, we might have seen the gathering trouble far back in the nineteenth century. Men like Schiaparelli watched the red planet—it is odd, by-the-bye, that for countless centuries Mars has been the star of war—but failed to interpret the fluctuating appearances of the markings they mapped so well. All that time the Martians must have been getting ready.

To be continued...

The Author

Herbert George "H. G." Wells

born: 21 September 1866
died: 18 August 1946

"H. G." Wells was an English writer, now best known for his work in the science fiction genre. He was also a prolific writer in many other genres, including contemporary novels, history, politics and social commentary, even writing textbooks and rules for war games. Wells is sometimes called "The Father of Science Fiction", as are Jules Verne and Hugo Gernsback. His most notable science fiction works include The War of the Worlds, The Time Machine, The Invisible Man and The Island of Doctor Moreau.

Wells's earliest specialised training was in biology, and his thinking on ethical matters took place in a specifically and fundamentally Darwinian context. He was also from an early date an outspoken socialist, often (but not always, as at the beginning of the First World War) sympathising with pacifist views. His later works became increasingly political and didactic, and he sometimes indicated on official documents that his profession was that of "journalist." Most of his later novels were not science fiction. Some described lower-middle class life (Kipps; The History of Mr Polly), leading him to be touted as a worthy successor to Charles Dickens, but Wells described a range of social strata and even attempted, in Tono-Bungay (1909), a diagnosis of English society as a whole.

Science fiction historian John Clute describes Wells as "the most important writer the genre has yet seen", and notes his work has been central to both British and American science fiction.

In Britain, Wells' work was a key model for the British "Scientific Romance", and other writers in that mode, such as Olaf Stapledon, J. D. Beresford, S. Fowler Wright, and Naomi Mitchison all drew on Wells' example. Wells was also an important influence on British science fiction of the post-World War Two period, with Arthur C. Clarke and Brian Aldiss expressing strong admiration for Wells' work.

Biography from Wikipedia

40px   190px
960px

</presentation>