WHY CSS GRID IS A GAME-CHANGER FOR WEB DESIGN

CONSTELLATION
Web layouts over the years
Grid or Flexbox?
Grid AND Flexbox
Flexbox → single dimension

flex-direction: row

flex-direction: column
What is CSS grid?

Defines a **two-dimensional** grid-based layout system, optimized for user interface design.
Basic terminology

Grid line

Grid track

Grid gap

Grid area

Grid cell
Flexbox and Grid

Based on the container-child relationship
“Grid works from the **container** in, other layout methods start with the **item**”

—Rachel Andrew
## Layout technique: inline-block

<table>
<thead>
<tr>
<th>Item A</th>
<th>Item B</th>
<th>Item C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item D</td>
<td>Item E</td>
<td>Item F</td>
</tr>
</tbody>
</table>

```css
.ininlineblock__item {
  display: inline-block;
  width: calc(100% / 3);
}
```
Layout technique: **float**

<table>
<thead>
<tr>
<th>Item A</th>
<th>Item B</th>
<th>Item C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item D</td>
<td>Item E</td>
<td>Item F</td>
</tr>
</tbody>
</table>

```css
.float__item {
  float: left;
  width: calc(100% / 3);
}
```
## Layout technique: flex

<table>
<thead>
<tr>
<th>Item A</th>
<th>Item B</th>
<th>Item C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item D</th>
<th>Item E</th>
<th>Item F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

```css
.flexbox {
  display: flex;
  flex-wrap: wrap;
}

.flexbox__item {
  flex: 1 1 calc(100% / 3);
}
```
“Grid is the only layout technique that establishes a relationship between rows and columns of grid items.”
CSS grid basics

Define your grid.

Place items in the grid.
Properties on the Grid container
Defining a grid

```html
<div class="grid1">
  <div class="grid1__item">
    <p>Item A</p>
  </div>
  <div class="grid1__item">
    <p>Item B</p>
  </div>
  <div class="grid1__item">
    <p>Item C</p>
  </div>
  <div class="grid1__item">
    <p>Item D</p>
  </div>
  <div class="grid1__item">
    <p>Item E</p>
  </div>
  <div class="grid1__item">
    <p>Item F</p>
  </div>
</div>
```

```
.grid1 {
  display: grid;
  grid-template-columns: 150px 150px 150px;
  grid-template-rows: 100px 100px;
  grid-gap: 20px;
}
```
“Cede control of your designs to the browsers that render them.”
The \textit{fr} unit

Represents a \textit{fraction} of the \textit{free space} in the grid container.

```
.grid4 {
  display: grid;
  grid-template-columns: 150px 1fr 2fr;
}
```
Fluid CSS grid

```css
.container {
  display: grid;
  grid-template-columns: repeat(3, 3fr 2fr);
}
```
The `minmax()` function

Defines a size range for columns or rows in the grid.

```css
.grid5 {
  display: grid;
  grid-template-columns: minmax(200px, 1fr) 300px 300px;
}
```
The `repeat()` function

To specify a large number of columns or rows that follow a similar pattern

```
.grid6 {
    display: grid;
    grid-template-columns: repeat(4, 75px 120px);
}
```
**auto-fill vs. auto-fit**

Allow browser to determine how many tracks to create depending on track size.

```
repeat(auto-fill, 100px);
```

```
repeat(auto-fit, 100px);
```

**auto-fit collapses empty tracks.**
### auto-fill versus auto-fit

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
</table>

```css
.keyword {
  display: grid;
  grid-template-columns: repeat(auto-fill, minmax(2.5em, 1fr));
}
```
auto-fill versus auto-fit

```
.keyword {
  display: grid;
  grid-template-columns:
  repeat(auto-fit, minmax(2.5em, 1fr));
}
```
Responsive grid without media queries

.container {
    display: grid;
    grid-template-columns: repeat(auto-fill, minmax(10em, 1fr));
}
Aligning your grid items

WARNING: IMPENDING CONFUSION
<table>
<thead>
<tr>
<th>Property</th>
<th>Axis</th>
<th>Aligns</th>
<th>Applies to</th>
</tr>
</thead>
<tbody>
<tr>
<td>justify-content</td>
<td>main/inline</td>
<td>content within element (effectively adjusts padding)</td>
<td>block containers, flex containers and grid containers</td>
</tr>
<tr>
<td>align-content</td>
<td>cross/block</td>
<td></td>
<td>block-level boxes, absolutely-positioned boxes and grid items</td>
</tr>
<tr>
<td>justify-self</td>
<td>inline</td>
<td>element within parent (effectively adjusts margins)</td>
<td>absolutely-positioned boxes, flex items and grid items</td>
</tr>
<tr>
<td>align-self</td>
<td>cross/block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>justify-items</td>
<td>inline</td>
<td>items inside box (controls child items)</td>
<td>block containers and grid containers</td>
</tr>
<tr>
<td>align-items</td>
<td>cross/block</td>
<td></td>
<td>flex-containers and grid-containers</td>
</tr>
</tbody>
</table>

Source: CSS Box Alignment Module Level 3
justify/align-content

ccontent-distribution properties

```
.content {
  justify-content: normal;
  align-content: normal;
  display: grid;
  grid-template-columns: repeat(3, 25%);
  grid-template-rows: repeat(3, 20%);
  grid-gap: 1em;
  grid-template-areas:
    "a b b"
    "a b b"
    "c c d";
}

.content_itemA {
  grid-area: a;
}
```
<table>
<thead>
<tr>
<th>Values</th>
<th>justify-content</th>
<th>align-content</th>
</tr>
</thead>
<tbody>
<tr>
<td>center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>start</td>
<td></td>
<td></td>
</tr>
<tr>
<td>end</td>
<td></td>
<td></td>
</tr>
<tr>
<td>space-around</td>
<td></td>
<td></td>
</tr>
<tr>
<td>space-between</td>
<td></td>
<td></td>
</tr>
<tr>
<td>space-evenly</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
justify/align-self

self-alignment properties

```css
.self {
  display: grid;
  grid-template-columns: repeat(4, 1fr);
  grid-gap: 1em;
  grid-auto-rows: calc(25% - 1em);
  grid-template-areas:
    "a a b b"
    "a a b b"
    "c c d d"
    "c c d d";
}

.self_itemA {
  grid-area: a;
}

.self_itemB {
  grid-area: b;
}
```
justify/align-items

defaults for justify/align-self

```css
.items {
  justify-items: normal;
  align-items: normal;

display: grid;
grid-template-columns: repeat(4, 1fr);
grid-gap: 1em;
grid-auto-rows: calc(25% - 1em);
grid-template-areas:
  "a a b b"
  "a a b b"
  "c c d d"
  "c c d d";
}

.items_itemA {
  grid-area: a;
}
```
Die Fahrzeuge: elektrische Straßenbahn, Autobus, Lastwagen, Fahrräder, Droschken, Autobus, Cyclonette, Motorräder fahren in raschem Tempo vom Mittelpunkt auswärts, dann plötzlich alle umgekehrt, in der Mitte treffen sie sich. Die Miete öffnet sich, ALLES sinkt tief, tief, tief... ein Funkturm.
Self-alignment properties, maybe?

These are not the borders you are looking for
Flexbox to the rescue

That's more like it
Properties on the grid item
Grid placement with grid lines / named lines

grid-template-columns: [first sidebar-start] 250px [sidebar-end content-start] 1fr [content-end last]
grid-template-rows: [first header-start] 100px [header-end content-start] 1fr [content-end footer-start]
Using `grid-column` and `grid-row`

```css
.grid7 {
  display: grid;
  grid-template-columns: repeat(6, 2.6em);
  grid-template-rows: repeat(6, 2.6em);
  justify-content: center;
}

.grid7__item:nth-child(1) {
  grid-column: 4;
  grid-row: 2;
}

.grid7__item:nth-child(3) {
  grid-column: 2;
  grid-row: 5;
}
```
Grid placement with named areas

```
.grid-container {
  display: grid;
  grid-template-areas: "logo stats"
                        "score stats"
                        "board board"
                        "... controls";
}

.logo { grid-area: logo; }
.score { grid-area: score; }
.stats { grid-area: stats; }
.board { grid-area: board; }
.controls { grid-area: controls; }
```
Using grid areas

Item A

Item B

Item C

.grid3 {
  display: grid;
  grid-template-columns: 150px 150px 150px;
  grid-template-rows: 100px 100px 100px;
  grid-template-areas: 'a . .'
  'a . c'
  '. b . c';
}

.grid3 .a { grid-area: a; }
.grid3 .b { grid-area: b; }
.grid3 .c { grid-area: c; }
Founded in 2005, Whitespace is a culturally savvy design agency providing creative direction, branding and interactive services across various mediums, platforms and time zones.
Braun HiFi
Steuergerät
audio 300

In der modernen Aufnahmetechnik ist keine Mühe zu groß, kein Aufwand zu kostspielig, um auch allerletzte Feinheiten einer Interpretation zu erhalten.

Demgegenüber gibt es aber nur wenige HiFi Geräte, die es fertigbringen, den ganzen Nuancenreichum wieder vollends hörbar zu machen.

Ein Gerät mit diesen Fähigkeiten ist das neue "audio 300" eine Kompaktanlage mit ungewöhnlicher technischer Ausrüstung und einem formalen Konzept, das Braun höchste internationale Auszeichnungen eintrug.

braun
Braun HiFi Steuergerät audio 300

In der modernen Aufnahmetechnik ist keine Mühle zu groß, kein Aufwand zu kostspielig, um auch allerfeinste Feinheiten einer Interpretation zu erhalten.

Dagegen gibt es aber nur wenige HiFi Geräte, die es fertigbringen, den ganzen Nutzenreichtum wieder vollends hörbar zu machen.

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Braun HiFi
Steuergerät
audio 300

In der modernen Aufnahmetechnik
ist seine Wirkung gar nicht nur
Aufwand zu konzeptuell, es sind
klangliche Faktoren einer
Interpretation zu erkennen.

Dagegen gibt es aber nur wenige HiFi Geräte, die die
Hörer beeindrucken, das ganze
Klangbild lebendig wieder reflektierend
leben lässt.

Ein Gerät mit diesen Fähigkeiten ist
das neue "Audio 300", eine
Kompaktstaette mit außergewöhnlicher
Technik und der Teilnahme am neuen
Konzept, das Braun
präsentiert internationale
Ausstellungen einzig.

@media screen and (min-aspect-ratio: 1/1) and (min-height: 22em) {
  .steuergerät {
    grid-template-columns: calc((100vw - 3em) / 3) calc((100vw - 3em) / 3);
    grid-template-areas:
      "title detail1 key key"
      "text detail2 key key"
      "text detail3 detail4 braun";
  }
}

@media screen and (min-aspect-ratio: 8/5) and (min-height: 36em) {
  .steuergerät {
    grid-template-columns: calc((100vw - 3em) / 3) calc((100vw - 3em) / 3);
    grid-template-areas:
      "title key . ."
      "text detail1 key detail2 detail3"
      "text . . detail4 .";
  }
}
With his bold, stripped-back typographic approach, Hanson Ho founded H55 in 1999. It is now one of the most recognised and celebrated graphic design studios in Singapore.
THINK GLOBAL GROW LOCAL

We find the offices of Fictree Network tucked away in a quiet but cool street in the Wan Chai district of the city. After visiting the Monocle store across the road, we pop in to chat with David and our conversation quickly leads to the rise of the Creative Sector in his New Homeland.

David: I think there is a push going on, though not as strongly as in Singapore, which is a shame. In Hong Kong the government have identified the Creative Industrie as one of six areas of growth as they try to expand beyond finance, property and shipping.

We've learned that in Hong Kong, technique and production standards are high. But creative design perhaps needs more attention.

Sure, this is the big leap that Asian businesses, especially Chinese businesses need to make. We've had the experience of going through that process with HTC. Many businesses are not yet ready to make the leap, so our first strategy when we came here was to help Asian businesses build global brands. But it's not as simple as just doing communications. They need to invest quite heavily in a long-term strategy, arguing new concepts they never had innovation, marketing. It is a big jump for companies that are used to making things for other people and not designing things for themselves. HTC has been a bit further along because they designed stuff for mobile networks so they had all the competencies.

How did Fictree Network get started?

We are about seven years old. Orange was the foundation client. I joined shortly after it was incorporated. We need eight good clients for an agency. HTC is our most recent large one and we have a couple more big ones in the UK right now.

OK, how many offices does Fictree have?

Three. We've got London - which is our HQ - there are about forty people there. About three or four work in Paris. Then eight of us here in Hong Kong.

Did you initially work in the London office?

Yeah. Back in the days when we were three guys in a garage, just like Google!

What brought you to Hong Kong?

Opportunity and change of scene. I was getting a bit bored with London. The weather but the high tax, low growth. I found that I keep stepping over at Hong Kong when I was on my way to Taiwan to meet with HTC. I used to come here before flying back to London to catch up with some mates. I gradually fell in love with the place. So I thought: 'Well, what do we do about work here?' So here we are.
Building a grid layout

Earlier this year, San Francisco-bred artist and designer Tycho announced a new album on the way for 2016, but gave scant details about the project, leaving fans to speculate about just what the ambient master had in store. Fans need no longer worry, as Tycho's fifth studio album, *Epoch*, has arrived in grand fashion.

9.24.16 PHILADELPHIA
THE ELECTRIC FACTORY

TOUR DATES

READ MORE
Good ol' pencil and paper
Tycho

Artist Spotlight

Tycho is an American ambient music project led by Scott Hansen as primary composer, songwriter and producer. Hailing from San Francisco, California, he is known as ISO50 for his photographic and design works. His music is a combination of downtempo vintage-style synthesizers and ambient melodies.

Tycho

ARTIST SPOTLIGHT

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10.2.2010 Toronto
The Drake Hotel

Tour dates:
“Websites do NOT have to look the same in every browser.”
Tycho

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READ MORE

10.2.2010 TORONTO
THE DRAKE HOTEL

TOUR DATES

main {
  max-width: 45em;
  margin: 0 auto;
  position: relative;
  padding: 1em;
}

::-ms-input-placeholder, :root main {
  display: block;
}

h1 {
  margin-bottom: 0.25em;
}

h2 {
  margin-bottom: 1em;
}

.about {
  margin-bottom: 1em;
}

a {
  margin-bottom: 2em;
}

button {
  padding: 1em 2em;
}
Tycho

Tycho is an American ambient music project led by Scott Hansen, also known as ISO50 for his photographic and design work. His music is a combination of downtempo, vintage-style synthesizers, and ambient melodies.

CSS grid in action

```css
@supports (display:grid) {
  @media (min-width: 42em) and (min-height: 27em) {
    main {
      max-width: none;
      padding: 0;
      display: grid;
      grid-template-columns: 2fr minmax(10em, max-content)
      grid-template-rows: 35vh 40vh 15vh 10vh;
    }

    h1 {
      grid-column: 3 / 6;
      grid-row: 1 / 2;
      z-index: 2;
      padding-left: 0.25em;
      margin-bottom: initial;
    }

    h2 {
      grid-row: 1 / -1;
      grid-column: 6 / 7;
      writing-mode: vertical-rl;
      margin-bottom: initial;
      color: $text;
    }

    hr {
      grid-column: 5 / 6;
      grid-row: 2;
    }
  }
}
```
Tycho

Tycho is an American ambient music project led by Scott Hansen as primary composer, songwriter and producer. Hailing from San Francisco, California, he is known as ISO50 for his photographic and design works. His music is a combination of downtempo vintage-style synthesizers and ambient melodies.

10.2.2010 TORONTO
THE DRAKE HOTEL

READ MORE
Fallback with feature queries

A conditional group rule whose condition tests whether the user agent supports CSS property: value pairs.
Anatomy of a feature query

```
.selector {
    /* Styles that are supported in old browsers */
}

@supports (property:value) {
    .selector {
        /* Styles for browsers that support the specified property */
    }
}
```
Browser support for `@supports`

CSS Feature Queries

CSS Feature Queries allow authors to condition rules based on whether particular property declarations are supported in CSS using the `@supports` at rule.

<table>
<thead>
<tr>
<th>IE</th>
<th>Edge</th>
<th>Firefox</th>
<th>Chrome</th>
<th>Safari</th>
<th>IOS Safari</th>
<th>Opera Mini</th>
<th>Chrome Android</th>
<th>Android Browser</th>
<th>Samsung Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>14</td>
<td>56</td>
<td>62</td>
<td>10</td>
<td>10.2</td>
<td></td>
<td>4.4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>15</td>
<td>57</td>
<td>63</td>
<td>10.1</td>
<td>10.3</td>
<td></td>
<td>4.4.4</td>
<td>5</td>
<td>6.2</td>
</tr>
<tr>
<td>11</td>
<td>16</td>
<td>58</td>
<td>64</td>
<td>11</td>
<td>11.2</td>
<td>all</td>
<td>64</td>
<td>62</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>59</td>
<td>65</td>
<td>11.1</td>
<td>11.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data from caniuse.com | Embed from caniuse.bitsofco.de

Global: 93.52% + 0% = 93.52%
main {
  display: flex;
  flex-wrap: wrap;
  justify-content: space-between;
}

title {
  width: 100%;
}
card {
  flex: auto;
  min-width: 12em;
  height: 12em;
}
```css
@supports (display:grid) {
  main {
    display: grid;
    grid-template-columns: repeat(auto-fill, minmax(10rem, 1fr));
    grid-auto-rows: 8em;
  }

  .title {
    width: initial;
  }

  .card {
    min-width: initial;
    height: initial;
  }

  @media screen and (max-width: 383px) {
    main {
      grid-template-rows: 3em repeat(auto-fill, minmax(10rem, 1fr));
    }
  }

  @media screen and (min-aspect-ratio: 1/1) {
    main {
      grid-template-columns: repeat(4, minmax(10rem, 1fr));
      grid-template-rows: repeat(3, calc(100vh / 3));
      grid-template-areas: "a b c ." "d e . f" "g . h . i";
    }
  }
```
“CSS isn't a programming language. It's a stylesheet language. We shouldn't expect it to behave like a programming language. It has its own **unique landscape and structures**, ones that people with programming language mental maps might not expect.”

—Danielle Huntrods
Demos and examples

- Space Jam website
- Regular grids
- Malerei, Fotografie, Film (pg. 126)
- Braun HiFi print posters
- Simple overlap
- Tycho artist profile
- Fallback with feature queries
- Wismut Labs website
- Demos source code on GitHub
Useful references

- CSS Grid Layout Module Level 1
- Codrops CSS Grid reference
- Grid by Example
- Learn CSS Grid
- Grid Auto-Placement Is Ready
- Automatizing the Grid
- Deep Dive into Grid Layout Placement
- CSS Grid Layout and positioned items
- The Story of CSS Grid, from Its Creators
- CSS Grid Layout is Here to Stay
- The New Layout Standard For The Web: CSS Grid, Flexbox And Box Alignment
THANK YOU!

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Font used is Faune, Alice Savoie / Cnap