

Webpage Layouts

5 Methods

R. Scott Granneman & Jans Carton

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Notes & URLs for this presentation can be found...

- » underneath the link to this slide show on granneman.com
- » at files.granneman.com/presentations/webdev/Layout-Methods.txt

When Tim Berners-Lee created the World Wide Web,
he was focused almost entirely on documents

World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an [executive summary](#) of the project, [Mailing lists](#) , [Policy](#) , November's [W3 news](#) , [Frequently Asked Questions](#) .

[What's out there?](#)

Pointers to the world's online information, [subjects](#) , [W3 servers](#), etc.

[Help](#)

on the browser you are using

[Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#) ,X11 [Viola](#) , [NeXTStep](#) , [Servers](#) , [Tools](#) , [Mail robot](#) , [Library](#))

[Technical](#)

Details of protocols, formats, program internals etc

[Bibliography](#)

Paper documentation on W3 and references.

[People](#)

A list of some people involved in the project.

[History](#)

A summary of the history of the project.

[How can I help ?](#)

If you would like to support the web..

[Getting code](#)

Getting the code by [anonymous FTP](#) , etc.

1st website, last updated November 1992

HTML Tags

This is a list of tags used in the [HTML](#) language. Each tag starts with a tag opener (a less than sign) and ends with a tag closer (a greater than sign). Many tags have corresponding closing tags which identical except for a slash after the tag opener. (For example, the [TITLE](#) tag).

Some tags take parameters, called attributes. The attributes are given after the tag, separated by spaces. Certain attributes have an effect simply by their presence, others are followed by an equals sign and a value. (See the [Anchor](#) tag, for example). The names of tags and attributes are not case sensitive: they may be in lower, upper, or mixed case with exactly the same meaning. (In this document they are generally represented in upper case.)

Currently HTML documents are transmitted without the normal SGML framing tags, but if these are included parsers will ignore them.

Title

The title of a document is given between title tags:

```
<TITLE> ... </TITLE>
```

The text between the opening and the closing tags is a title for the hypertext node. There should only be one title in any node. It should identify the content of the node in a fairly wide context, and should ideally fit on one line.

The title is not strictly part of the text of the document, but is an attribute of the node. It may not contain anchors, paragraph marks, or highlighting. the title may be used to identify the node in a history list, to label the window displaying the node, etc. It is not normally displayed in the text of a document itself. Contrast titles with [headings](#) .

Next ID

Obsolete: NeXT Browser only. May be ignored. This tag takes a single attribute which is the number of the next document-wide numeric identifier to be allocated (not good SGML). Note that when modifying a document, old anchor ids should not be reused, as there may be references stored elsewhere which point to them. This is read and generated by hypertext editors. Human writers of HTML usually use mnemonic alpha identifiers. Browser software may ignore this tag. Example of use:

```
<NEXTID 27>
```

Base Address

Once the Web started to become more widespread,
people wanted to lay out pages in columns ... & more!

5 methods for laying out webpages

1. `<table>`
2. `float`
3. `display: table-cell`
4. `display: flex`
5. `display: grid`

<table>

What's a table for?

Two-dimensional data

Not for page layout... however, that's all we had in the '90s

Table: The Fighter

Level	Base Attack Bonus	Fort Save	Ref Save	Will Save	Special
1st	+1	+2	+0	+0	Bonus feat
2nd	+2	+3	+0	+0	Bonus feat
3rd	+3	+3	+1	+1	
4th	+4	+4	+1	+1	Bonus feat
5th	+5	+4	+1	+1	
6th	+6/+1	+5	+2	+2	Bonus feat
7th	+7/+2	+5	+2	+2	
8th	+8/+3	+6	+2	+2	Bonus feat
9th	+9/+4	+6	+3	+3	
10th	+10/+5	+7	+3	+3	Bonus feat

This is a legit use of a table

At the Mountains of Madness

I am forced into speech because men of science have refused to follow my advice without knowing why. It is altogether against my will that I tell my reasons for opposing this contemplated invasion of the antarctic—with its vast fossil-hunt and its wholesale boring and melting of the ancient ice-cap—and I am the more reluctant because my warning may be in vain. Doubt of the real facts, as I must reveal them, is inevitable; yet if I suppressed what will seem extravagant and incredible there would be nothing left. The hitherto withheld photographs, both ordinary and aërial, will count in my favour; for they are damnably vivid and graphic. Still, they will be doubted because of the great lengths to which clever fakery can be carried. The ink drawings, of course, will be jeered at as obvious impostures; notwithstanding a strangeness of technique which art experts ought to remark and puzzle over.

In the end I must rely on the judgment and standing of the few scientific leaders who have, on the one hand, sufficient independence of thought to weigh my data on its own hideously convincing merits or in the light of certain primordial and highly baffling myth-cycles; and on the other hand, sufficient influence to deter the exploring world in general from any rash and overambitious programme in the region of those mountains of madness. It is an unfortunate fact that relatively obscure men like myself and my associates, connected only with a small university, have little chance of making an impression where matters of a wildly bizarre or highly controversial nature are concerned.

It is further against us that we are not, in the strictest sense, specialists in the fields which came primarily to be concerned. As a geologist my object in leading the Miskatonic University Expedition was wholly that of securing deep-level specimens of rock and soil from various parts of the antarctic continent, aided by the remarkable drill devised by Prof. Frank H. Pabodie of our engineering department. I had no wish to be a pioneer in any other field than this; but I did hope that the use of this new mechanical appliance at different points along previously explored paths would bring to light materials of a sort hitherto unreached by the ordinary methods of collection. Pabodie's drilling apparatus, as the public already knows from our reports, was unique and radical in its lightness, portability, and capacity to combine the ordinary artesian drill principle with the principle of the small circular rock drill in such a way as to cope quickly with strata of varying hardness. Steel head, jointed rods, gasoline motor, collapsible wooden derrick, dynamiting paraphernalia, cording, rubbish-removal auger, and sectional piping for bores five inches wide and up to 1000 feet deep all formed, with needed accessories, no greater load than three seven-dog sledges could carry; this being made possible by the clever aluminum alloy of which most of the metal objects were fashioned. Four large Dornier aëroplanes, designed especially for the tremendous altitude flying necessary on the antarctic plateau and with added fuel-warming and quick-starting devices worked out by Pabodie, could transport our entire expedition from a base at the edge of the great ice barrier to various suitable inland points, and from these points a sufficient quota of dogs would serve us.

We planned to cover as great an area as one antarctic season—or longer, if absolutely necessary—would permit, operating mostly in the mountain-ranges and on the plateau south of Ross Sea; regions explored in varying degree by Shackleton, Amundsen, Scott, and Byrd. With frequent changes of camp, made by aëroplane and involving distances great enough to be of geological significance, we expected to unearth a quite unprecedented amount of material; especially in the pre-Cambrian strata of which so narrow a range of antarctic specimens had previously been secured. We wished also to obtain as great as possible a variety of the upper fossiliferous rocks, since the primal life-history of this bleak realm of ice and death is of the highest importance to our knowledge of the earth's past. That the antarctic continent was once temperate and even tropical, with a teeming vegetable and animal life of which the lichens, marine fauna, arachnida, and penguins of the northern edge are the only survivals, is a matter of common information; and we hoped to expand that information in variety, accuracy, and detail. When a simple boring revealed fossiliferous signs, we would enlarge the aperture by blasting in order to get specimens of suitable size and condition.

...

H.P. Lovecraft

Howard Phillips Lovecraft (August 20, 1890 – March 15, 1937) was an American author who achieved posthumous fame through his influential works of horror fiction. Virtually unknown and only published in pulp magazines before he died in poverty, he is now regarded as one of the most significant 20th-century authors in his genre. Lovecraft was born in Providence, Rhode Island, where he spent most of his life. His father was confined to a mental institution when Lovecraft was three years old. His grandfather, a wealthy businessman, enjoyed storytelling and was an early influence. Intellectually precocious but sensitive, Lovecraft began composing rudimentary horror tales by the age of eight, but suffered from overwhelming feelings of anxiety. He encountered problems with classmates in school, and was kept at home by his highly strung and overbearing mother for illnesses that may have been psychosomatic. ... Despite leaving school in 1908 without graduating—he found mathematics particularly difficult—Lovecraft had developed a formidable knowledge of his favored subjects, such as history, linguistics, chemistry, and astronomy.

Although he seems to have had some social life, attending meetings of a club for local young men, Lovecraft, in early adulthood, was established in a reclusive "nightbird" lifestyle without occupation or pursuit of romantic adventures. In 1913 his conduct of a long running controversy in the letters page of a story magazine led to his being invited to participate in an amateur journalism association. Encouraged, he started circulating his stories; he was 31 at the time of his first publication in a professional magazine. By age 34, he was a regular contributor to the newly founded *Weird Tales* magazine; he turned down an offer of the editorship.

Lovecraft returned to Providence from New York in 1926 and, over the next nine months, he produced some of his most celebrated tales, including "The Call of Cthulhu", canonical to the Cthulhu Mythos. Never able to support himself from earnings as author and editor, Lovecraft saw commercial success increasingly elude him in this latter period, partly because he lacked the confidence and drive to promote himself. He subsisted in progressively straitened circumstances in his last years; an inheritance was completely spent by the time he died at the age of 46.

This is *not* a legit use for a table

LOVECRAFT & LAYOUTS

HTML <table>

At the Mountains of Madness

I am forced into speech because men of science have refused to follow my advice without knowing why. It is altogether against my will that I tell my reasons for opposing this contemplated invasion of the antarctic—with its vast fossil-hunt and its wholesale boring and melting of the ancient ice-cap—and I am the more reluctant because my warning may be in vain. Doubt of the real facts, as I must reveal them, is inevitable; yet if I suppressed what will seem extravagant and incredible there would be nothing left. The hitherto withheld photographs, both ordinary and aërial, will count in my favour; for they are damnably vivid and graphic. Still, they will be doubted because of the great lengths to which clever fakery can be carried. The ink drawings, of course, will be jeered at as obvious impostures; notwithstanding a strangeness of technique which art experts ought to remark and puzzle over.

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LOVECRAFT & LAYOUTS

HTML <table>

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Basic Tables

`<table>`

Creates *table box*

Useless by itself

By default, `<table>`s fit themselves to their content

Required descendant: `<tr>`

Optional children: `<caption>`, `<colgroup>`, `<thead>`,
`<tbody>`, `<tfoot>`

`<tr>`

Creates *table row* of cells

Creates table-row box

Children must be `<th>` or `<td>`

<th>

Table header for a group of cells below or to side

By default, browsers do the following to text:

- » bold
- » horizontally (row) or vertically (column) center

`<td>`

Table data cell

By default, `<td>`s fit themselves to their content

```
1 <h3>Table 1</h3>
2
3 <table>
4   <tr>
5     <th>Header 1.1</th>
6     <th>Header 1.2</th>
7     <th>Header 1.3</th>
8   </tr>
9   <tr>
10    <td>Data 2.1</td>
11    <td>Data 2.2</td>
12    <td>Data 2.3</td>
13  </tr>
14  <tr>
15    <td>Data 3.1</td>
16    <td>Data 3.2</td>
17    <td>Data 3.3</td>
18  </tr>
19 </table>
20
21
22
23 <h3>Table 2</h3>
24
25 <table>
26   <tr>
27     <td></td> <!-- empty cell -->
```

Table 1

Header 1.1	Header 1.2	Header 1.3
Data 2.1	Data 2.2	Data 2.3
Data 3.1	Data 3.2	Data 3.3

Creating Tables

Creating tables by hand is tedious & error-prone

Be lazy! There are easy ways to generate the initial
`<table>` code

HTML Table Generator

[File](#) [Edit](#) [Table](#) [Column](#) [Row](#) [Cell](#) [Help](#)

[Show Example](#)

B *I* A Theme

	A	B	C	D	E
1					
2					
3					
4					

Generate

Do not generate CSS Compact mode

Result (click "Generate" to refresh)

Copy to clipboard

```
1 <style type="text/css">
  table { border-collapse: collapse; border: none; width: 100%; }
  table border="1" style="width: 100%; border-collapse: collapse; text-align: center;">
    <thead>
      <tr>
        <th></th>
        <th>A</th>
        <th>B</th>
        <th>C</th>
        <th>D</th>
        <th>E</th>
      </tr>
    </thead>
    <tbody>
      <tr>
        <th>1</th>
        <td></td>
        <td></td>
        <td></td>
        <td></td>
        <td></td>
      </tr>
      <tr>
        <th>2</th>
        <td></td>
        <td></td>
        <td></td>
        <td></td>
        <td></td>
      </tr>
      <tr>
        <th>3</th>
        <td></td>
        <td></td>
        <td></td>
        <td></td>
        <td></td>
      </tr>
      <tr>
        <th>4</th>
        <td></td>
        <td></td>
        <td></td>
        <td></td>
        <td></td>
      </tr>
    </tbody>
  </table>
```

LaTeX Tables

HTML Tables

Text Tables

Markdown Tables

MediaWiki Tables

Contact

HTML Table Generator

Facebook 107

Twitter 43

File Edit Table Column Row Cell Help

Show Example

Table formatting toolbar with icons for alignment, bold, italic, font selection (Arial), font size (10px), background color, border, and a Theme button.

	A	B	C	D	E
1					
2					
3					
4					

Generate

Do not generate CSS Compact mode

LaTeX Tables

HTML Tables

Text Tables

Markdown Tables

MediaWiki Tables

Contact

HTML Table Generator

File ▾ Edit ▾ Table ▾ Column ▾ Row ▾ Cell ▾ Help ▾

[Show Example](#)

 **B** *I* U Serif font (generic) ▾ 15px ▾   A    Theme

	A	B
1	Writer	Creation
2	Lovecraft	Cthulhu
3	Burroughs	Tarzan of the Apes
4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

 Generate

HTML Table Generator

Show Example

- New table...
- Import CSV file...**
- Paste table data...
- Save table...
- Load table...

B *I* U Arial 10px [Align Left] [Align Center] [Align Right] [Background Color] [Border] [Theme]

3	Burroughs	Tarzan of the Apes
4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian



SIDE NOTE

“...a comma-separated values (CSV) file stores tabular data (numbers & text) in plain text. Each line of the file is a data record. Each record consists of one or more fields, separated by commas. ... CSV is a common data exchange format that is widely supported... Among its most common uses is moving tabular data between programs...” —Wikipedia



SIDE NOTE

Writer, Creation, Publisher

Lovecraft, Cthulhu, "Weird Tales"

Burroughs, "Tarzan of the Apes", "All-Story"

Dent, "Doc Savage", "Doc Savage Magazine"

Haggard, "Allan Quatermain", Novel

Wells, "The Time Traveler", "The New Review"

Howard, "Conan the Barbarian", "Weird Tales"

Sample CSV file



SIDE NOTE

Workbook2

Search Sheet

Home Insert Page Layout Formulas Data Review View

Calibri (Body) 20 A A

General

Conditional Formatting Format as Table Cell Styles

Insert Delete Format

Sort & Filter

N30

A B C D E F G H I J K L M N O P Q R

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

Import CSV into Excel

Import

Select the type of file you want to import:

- CSV file**
Text files that contain comma-separated values.
- FileMaker Pro database**
Files created with FileMaker Pro, like .fp5 or .fp7.
- HTML file**
Hyper-text markup files from your computer.
- Text file**
Text files, which import best when separated by tabs or spaces.

Cancel Import

Sheet1

Ready

100%



SIDE NOTE

Writers & Creations

Home Insert Page Layout Formulas Data Review View

Calibri (Body) 20 A A

General

Conditional Formatting Format as Table Cell Styles

Insert Delete Format

Sort & Filter

L27

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Writer	Creation	Publisher											
2	Lovecraft	Cthulhu	Weird Tables											
3	Burroughs	Tarzan of the Apes	All-Story Magazine											
4	Dent	Doc Savage	Doc Savage Magazine											
5	Haggard	Allan Quatermain	Novel											
6	Wells	The Time Traveler	The New Review											
7	Howard	Conan the Barbarian	Weird Tales											
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														

Sheet1

Ready

100%



SIDE NOTE

	A	B
1	Writer	Creation
2	Lovecraft	Cthulhu
3	Burroughs	Tarzan of
4	Dent	Doc Sava
5	Haggard	Allan Qua
6	Wells	The Time
7	Howard	Conan th

Save As:

Tags:

File Format:

Options...

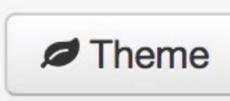
Cancel Save

Export CSV from Excel

HTML Table Generator

[File](#) ▾ [Edit](#) ▾ [Table](#) ▾ [Column](#) ▾ [Row](#) ▾ [Cell](#) ▾ [Help](#) ▾

[Show Example](#)

 **B** *I* U ▾ ▾  A B  Theme

	A	B
1	Writer	Creation
2	Lovecraft	Cthulhu
3	Burroughs	Tarzan of the Apes
4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
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Back to my table...

 Generate

4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

 Generate

Do not generate CSS Compact mode

Result (click "Generate" to refresh)

We don't need all that CSS!

 Copy to clipboard

```
1 <style type="text/css">
2 .tg {border-collapse:collapse;border-spacing:0;}
3 .tg td{font-family:Arial, sans-serif;font-size:14px;padding:10px 5px;border-style:solid;border-width:1px;overflow:hidden;word-break:nor
4 .tg th{font-family:Arial, sans-serif;font-size:14px;font-weight:normal;padding:10px 5px;border-style:solid;border-width:1px;overflow:hi
5 .tg .tg-yw4l{vertical-align:top}
6 </style>
7 <table class="tg">
8   <tr>
9     <th class="tg-yw4l">Connection Method</th>
10    <th class="tg-yw4l">Sample URI (Printer bro at 192.168.0.160)</th>
11  </tr>
12  <tr>
13    <td class="tg-yw4l">Parallel</td>
14    <td class="tg-yw4l">parallel:/dev/lp0</td>
15  </tr>
16  <tr>
```

Extra options... ▼

 Preview

4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

 Generate

Do not generate CSS Compact mode

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```
1 <table>
2   <tr>
3     <th>Writer</th>
4     <th>Creation</th>
5   </tr>
6   <tr>
7     <td>Lovecraft</td>
8     <td>Cthulhu</td>
9   </tr>
10  <tr>
11   <td>Burroughs</td>
12   <td>Tarzan of the Apes</td>
13 </tr>
14 <tr>
15   <td>Dent</td>
16   <td>Doc Savage</td>
```

Extra options... ▾

 Preview

5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

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```
1 <table>
2   <tr>
3     <th>Writer</th>
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13 </tr>
14 <tr>
15   <td>Dent</td>
16   <td>Doc Savage</td>
```

Writer	Creation
Lovecraft	Cthulhu
Burroughs	Tarzan of the Apes
Dent	Doc Savage
Haggard	Allan Quatermain
Wells	The Time Traveler
Howard	Conan the Barbarian



Extra options... ▲

 Preview

7	Howard	Conan the Barbarian
---	--------	---------------------

 Generate

Do not generate CSS Compact mode

Result (click "Generate" to refresh)

 Copy to clipboard

```
15 <td>Dent</td>
16 <td>Doc Savage</td>
17 </tr>
18 <tr>
19 <td>Haggard</td>
20 <td>Allan Quatermain</td>
21 </tr>
22 <tr>
23 <td>Wells</td>
24 <td>The Time Traveler</td>
25 </tr>
26 <tr>
27 <td>Howard</td>
28 <td>Conan the Barbarian</td>
29 </tr>
30 </table>
```



Extra options... 

 Preview

- Layout**
- Center table horizontally
 - Enable table sorting 
 - Make table responsive 

7	Howard	Conan the Barbarian
---	--------	---------------------

 Generate

Do not generate CSS Compact mode

Result (click "Generate" to refresh)

 Copy to clipboard

```
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3 .tg td{font-family:Arial, sans-serif;font-size:14px;padding:10px 5px;border-style:solid;border-width:1px;overflow:hidden;word-break:nor
4 .tg th{font-family:Arial, sans-serif;font-size:14px;font-weight:normal;padding:10px 5px;border-style:solid;border-width:1px;overflow:hi
5 .tg .tg-yw4l{vertical-align:top}
6 th.tg-sort-header::-moz-selection { background:transparent; }th.tg-sort-header::selection { background:transparent; }th.tg-sort-he
7 <table id="tg-4zflW" class="tg">
8   <tr>
9     <th class="tg-yw4l">Writer</th>
10    <th class="tg-yw4l">Creation</th>
11  </tr>
12  <tr>
13    <td class="tg-031e">Lovecraft</td>
14    <td class="tg-031e">Cthulhu</td>
15  </tr>
16  <tr>
```



Enable table sorting 

 Preview

- Layout**
- Center table horizontally
 - Enable table sorting  **
 - Make table responsive 



7	Howard	Conan the Barbarian
---	--------	---------------------

Generate

Do not generate CSS Compact mode

Result (click "Generate" to refresh)

Copy to clipboard

```
1 <style type="text/css">
2 .tg {border-collapse:collapse;border-spacing:0;border-color:#ccc;}
3 .tg td{font-family:Arial, sans-serif;font-size:14px;padding:10px 5px;border-style:solid;border-width:1px;overflow:hidden;word-break:nor
4 .tg th{font-family:Arial, sans-serif;font-size:14px;font-weight:normal;padding:10px 5px;border-style:solid;border-width:1px;overflow:hi
5 .tg .tg-yw4l{vertical-align:top}
6 @media screen and (max-width: 767px) {.tg {width: auto !important;}.tg col {width: auto !important;}.tg-wrap {overflow-x: auto;-webkit-
7 <div class="tg-wrap"><table class="tg">
8   <tr>
9     <th class="tg-yw4l">Writer</th>
10    <th class="tg-yw4l">Creation</th>
11  </tr>
12  <tr>
13    <td class="tg-031e">Lovecraft</td>
14    <td class="tg-031e">Cthulhu</td>
15  </tr>
16  <tr>
```



Make table responsive

Preview

Layout

- Center table horizontally
- Enable table sorting
- Make table responsive



LaTeX Table Generator

Table style icons: alignment, bold, italic, underline, grid, dashed grid, hand, column width, row height, fill, empty, no border, and a dropdown menu for 'Default table style'.

	A	B
1	Writer	Creation
2	Lovecraft	Cthulhu
3	Burroughs	Tarzan of the Apes
4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

 Generate

Result (click "Generate" to refresh)

 Copy to clipboard

```
1 \begin{table}[]
2 \centering
3 \caption{My caption}
4 \label{my-label}
5 \begin{tabular}{|l|l|}
6 \hline
7 Writer & Creation \\ \hline
8 Lovecraft & Cthulhu \\ \hline
9 Burroughs & Tarzan of the Apes \\ \hline
10 Dent & Doc Savage \\ \hline
11 Haggard & Allan Quatermain \\ \hline
12 Wells & The Time Traveler \\ \hline
13 Howard & Conan the Barbarian \\ \hline
14 \end{tabular}
15 \end{table}
```

- Escape special TeX symbols (% , & , _ , # , \$)
- Compress whitespace

Caption above, Center table horizontally ▾

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Text Tables Generator

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	A	B
1	Writer	Creation
2	Lovecraft	Cthulhu
3	Burroughs	Tarzan of the Apes
4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

[Generate](#)

Result (click "Generate" to refresh)

[Copy to clipboard](#)

3	Burroughs	Tarzan of the Apes
4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

 Generate

Result (click "Generate" to refresh)

 Copy to clipboard

```

1 | +-----+-----+
2 | | Writer   | Creation   |
3 | +-----+-----+
4 | | Lovecraft | Cthulhu    |
5 | +-----+-----+
6 | | Burroughs | Tarzan of the Apes |
7 | +-----+-----+
8 | | Dent      | Doc Savage |
9 | +-----+-----+
10 | | Haggard   | Allan Quatermain |
11 | +-----+-----+
12 | | Wells     | The Time Traveler |
13 | +-----+-----+
14 | | Howard    | Conan the Barbarian |
15 | +-----+-----+

```

Use Unicode symbols for table borders

3	Burroughs	Tarzan of the Apes
4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

 Generate

Result (click "Generate" to refresh)

 Copy to clipboard

```
1 | |||  
2 | || Writer || Creation ||  
3 | |||  
4 | || Lovecraft || Cthulhu ||  
5 | |||  
6 | || Burroughs || Tarzan of the Apes ||  
7 | |||  
8 | || Dent || Doc Savage ||  
9 | |||  
10 | || Haggard || Allan Quatermain ||  
11 | |||  
12 | || Wells || The Time Traveler ||  
13 | |||  
14 | || Howard || Conan the Barbarian ||
```

Use Unicode symbols for table borders

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Markdown Tables Generator

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	A	B
1	Writer	Creation
2	Lovecraft	Cthulhu
3	Burroughs	Tarzan of the Apes
4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

[Generate](#) Put tabs between columns Compact mode

	A	B
1	Writer	Creation
2	Lovecraft	Cthulhu
3	Burroughs	Tarzan of the Apes
4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

 Generate

Put tabs between columns Compact mode

Result (click "Generate" to refresh)

 Copy to clipboard

```

1 | | Writer | Creation |
2 | |-----|-----|
3 | | Lovecraft | Cthulhu |
4 | | Burroughs | Tarzan of the Apes |
5 | | Dent | Doc Savage |
6 | | Haggard | Allan Quatermain |
7 | | Wells | The Time Traveler |
8 | | Howard | Conan the Barbarian |

```

You can now import Markdown table code directly using **File/Paste table data...** dialog.

MediaWiki Tables Generator

Table alignment and formatting icons: left, center, right, bold (B), italic (I), and column width adjustment.

	A	B
1	Writer	Creation
2	Lovecraft	Cthulhu
3	Burroughs	Tarzan of the Apes
4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

Generate

Result (click "Generate" to refresh)

Copy to clipboard

2	Lovecraft	Cthulhu
3	Burroughs	Tarzan of the Apes
4	Dent	Doc Savage
5	Haggard	Allan Quatermain
6	Wells	The Time Traveler
7	Howard	Conan the Barbarian

 Generate

Result (click "Generate" to refresh)

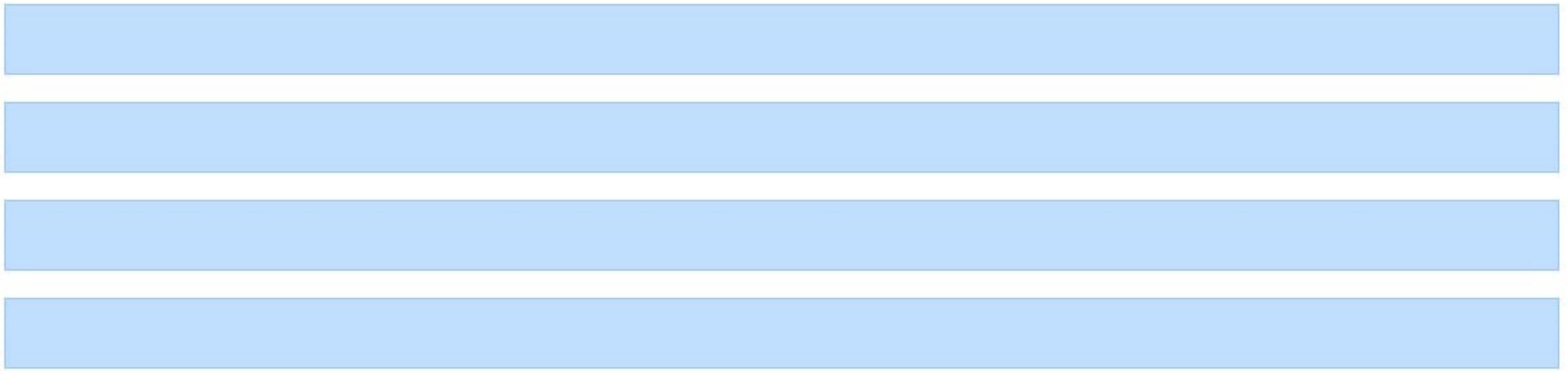
 Copy to clipboard

```
1  {| class="wikitable"
2  ! Writer
3  ! Creation
4  |-
5  | Lovecraft
6  | Cthulhu
7  |-
8  | Burroughs
9  | Tarzan of the Apes
10 |-
11 | Dent
12 | Doc Savage
13 |-
14 | Haggard
15 | Allan Quatermain
16 |-
```

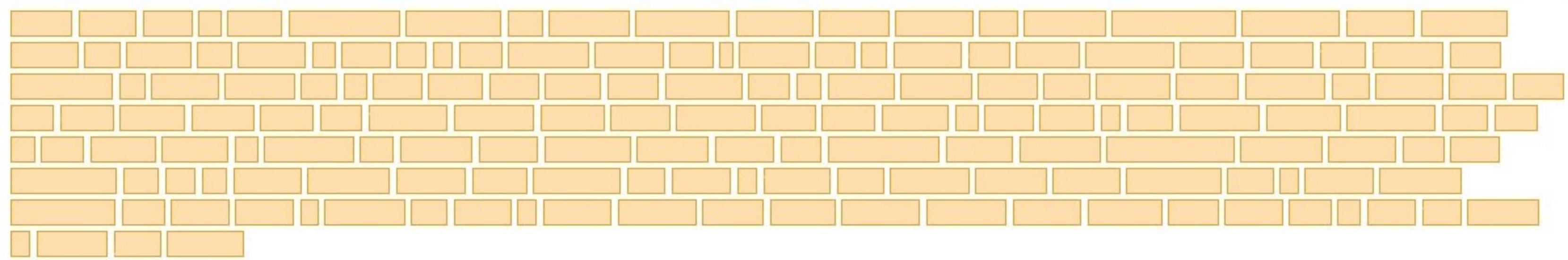
float

The *flow* is the interaction of 3 layout behaviors:

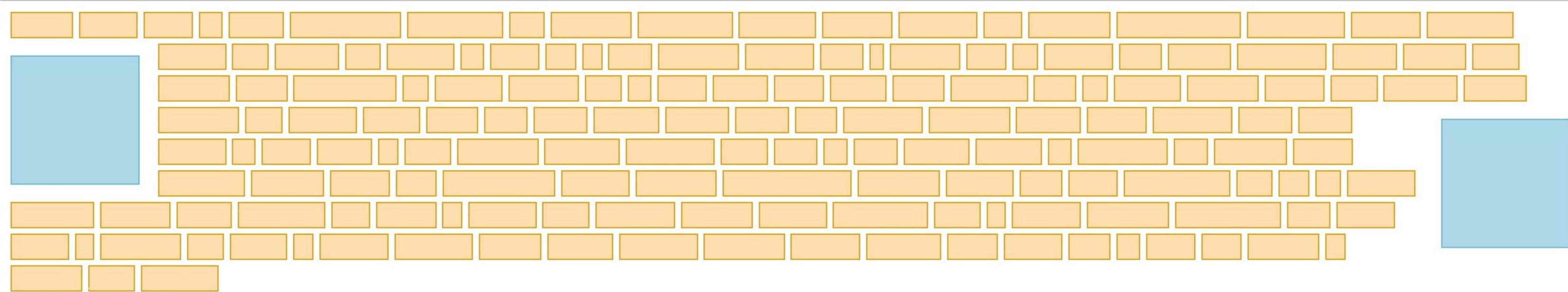
- » Block layout is *stacking*
- » Inline layout is *wrapping*
- » Floated boxes are *moved to one side* & following content flows around it



Block layout means that boxes stack vertically



Inline layout means that boxes wrap to new lines when they cannot fit



Floated boxes are moved to one side & content flows around it

`float`

Element taken out of normal flow & *placed along left or right side of its container*, where text & inline elements will *wrap* around it

Floated elements must have a width, either explicit (using `width`) or implicit (image)

`float: left`

Element floats on *left* side of containing block

`float: right`

Element floats on *right* side of containing block

HTML



```
whether they danced often upon  
Lerion; but the farmer and his wife  
would only make the Elder Sign and  
tell him the way to Nir and Ulthar.
```

```
</p>
```

```

```

```
<p>
```

```
At noon he walked through the one  
broad high street of Nir, which he  
had once visited and which marked his  
farthest former travels in this  
direction: and soon afterward he came
```

CSS



```
img {
```

```
float: left;
```

```
}
```

```
/* Beautification (not part of lesson)*/
```

```
img {
```

```
margin: .2em 1em .5em .5em;
```

```
}
```

JS



Carter detoured at the proper place, and heard behind him the frightened fluttering of some of the more timid Zoogs. He had known they would follow him, so he was not disturbed; for one grows accustomed to the anomalies of these prying creatures. It was twilight when he came to the edge of the wood, and the strengthening glow told him it was the twilight of morning. Over fertile plains rolling down to the Skai he saw the smoke of cottage chimneys, and on every hand were the hedges and ploughed fields and thatched roofs of a peaceful land. Once he stopped at a farmhouse well for a cup of water, and all the dogs barked affrightedly at the inconspicuous Zoogs that crept through the grass behind. At another house, where people were stirring, he asked questions about the gods, and whether they danced often upon Lerion; but the farmer and his wife would only make the Elder Sign and tell him the way to Nir and Ulthar.



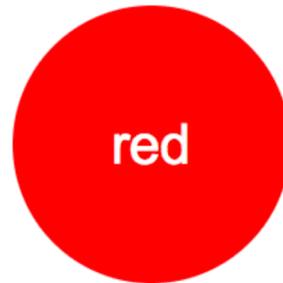
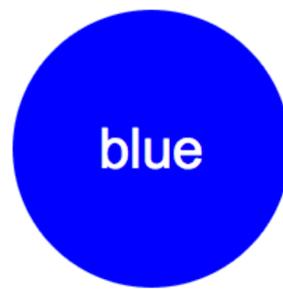
At noon he walked through the one broad high street of Nir, which he had once visited and which marked his farthest former travels in this direction; and soon afterward he came to the great stone bridge across the Skai, into whose central piece the masons had sealed a living human sacrifice when they built it thirteen-hundred years before. Once on the other side, the frequent presence of cats (who all arched their backs at the trailing Zoogs) revealed the near neighborhood of Ulthar; for in Ulthar, according to an ancient and significant law, no man may kill a cat. Very pleasant were the suburbs of Ulthar, with their little green cottages and neatly fenced farms; and still pleasanter was the quaint town itself, with its old peaked roofs and

overhanging upper stories and numberless chimney-pots and narrow hill streets where one can see old cobbles whenever the graceful cats afford space enough. Carter, the cats being somewhat dispersed by the half-seen Zoogs, picked his way directly to the modest Temple of the Elder Ones where the priests and old records were said to be; and once within that venerable circular tower of ivied stone—which crowns Ulthar's highest hill—he sought out the patriarch Atal, who had been up the forbidden peak Hatheg-Kia in the stony desert and had come down again alive.

Atal, seated on an ivory dais in a festooned shrine at the top of the temple, was fully three centuries old; but still very keen of mind and memory. From him Carter learned many things about the gods, but mainly that they are indeed only Earth's gods, ruling feebly our own dreamland and having no power or habitation elsewhere. They might, Atal said, heed a man's prayer if in good humour; but one must not think of climbing to their onyx stronghold atop Kadath in the cold waste. It was lucky that no man knew where Kadath towers, for the fruits of ascending it would be very grave. Atal's companion Banni the Wise had been drawn screaming into the sky for climbing merely the known peak of Hatheg-Kia. With unknown Kadath, if ever found, matters would be much worse; for although Earth's gods may sometimes be surpassed by a wise mortal, they are protected by the Other Gods from Outside, whom it is better not to discuss. At least twice in the world's history the Other Gods set their seal upon Earth's primal granite; once

What happens when you float a box against another floated box?

```
1 <div class="blue">blue</div>
2 <div class="red">red</div>
3 <div class="green">green</div>
4 <p>
5 Lorem ipsum dolor sit amet, consectetur
  adipiscing elit. Fusce orci libero,
  mollis id neque et, feugiat semper
  libero. In porta porta aliquet. Donec
  sit amet condimentum tellus. In hac
  habitasse platea dictumst. Aenean
  placerat tortor et elit dictum, id
  consequat elit pulvinar.
6 </p>
7 <p>
8 Donec dictum hendrerit blandit. Donec
  accumsan scelerisque lacus quis
  aliquet. Fusce quam ipsum, venenatis
  eget porttitor ut, pulvinar id metus.
  Cum sociis natoque penatibus et magnis
  dis parturient montes, nascetur
  ridiculus mus. Phasellus id gravida
  augue.
9 </p>
```



Lorem ipsum dolor sit amet, consectetur adipiscing elit. Fusce orci libero, mollis id neque et, feugiat semper libero. In porta porta aliquet. Donec sit amet condimentum tellus. In hac habitasse platea dictumst. Aenean placerat tortor et elit dictum, id consequat elit pulvinar.

Donec dictum hendrerit blandit. Donec accumsan scelerisque lacus quis aliquet. Fusce quam ipsum, venenatis eget porttitor ut, pulvinar id metus. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Phasellus id gravida augue.

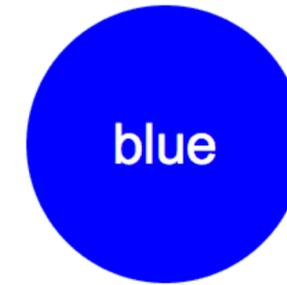
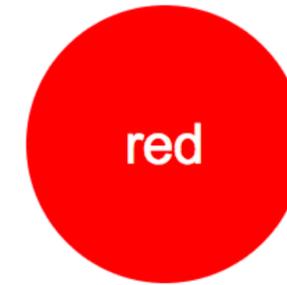
No float!

```
HTML
1 <div class="blue">blue</div>
2 <div class="red">red</div>
3 <div class="green">green</div>
4 <p>
5 Lorem ipsum dolor sit amet,
consectetur adipiscing elit. Fusce
orci libero, mollis id neque et,
feugiat semper libero. In porta porta
aliquet. Donec sit amet condimentum
tellus. In hac habitasse platea
dictumst. Aenean placerat tortor et
elit dictum, id consequat elit
pulvinar.
6 </p>
```

```
CSS
1 .blue {
2   float: right;
3 }
4
5 .red {
6   float: right;
7 }
8
9 .green {
10  float: right;
11 }
12
```

```
JS
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Fusce orci libero, mollis id neque et, feugiat semper libero. In porta porta aliquet. Donec sit amet condimentum tellus. In hac habitasse platea dictumst. Aenean placerat tortor et elit dictum, id consequat elit pulvinar.



Donec dictum hendrerit blandit. Donec accumsan scelerisque lacus quis aliquet. Fusce quam ipsum, venenatis eget porttitor ut, pulvinar id metus. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Phasellus id gravida augue.

Float!

What happens when you float a box against another floated box, & there's not enough room?

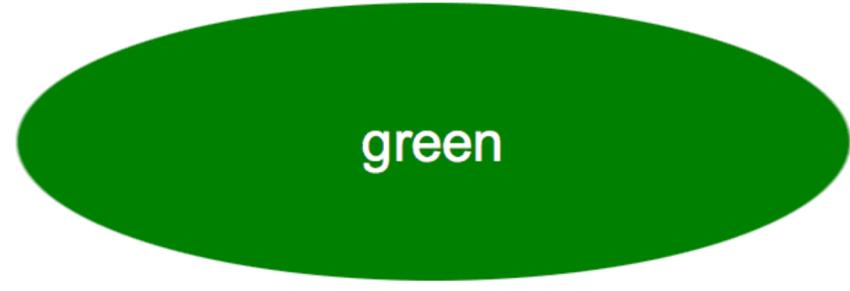
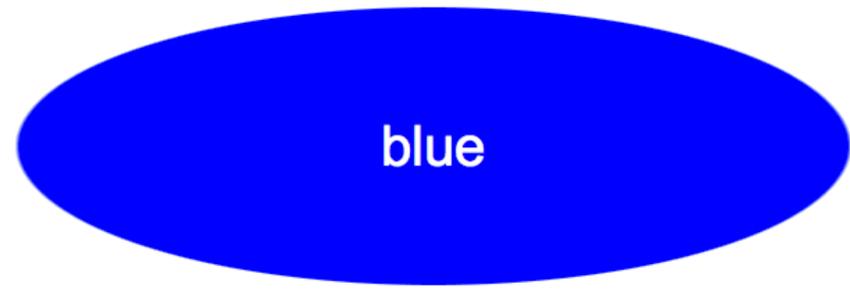
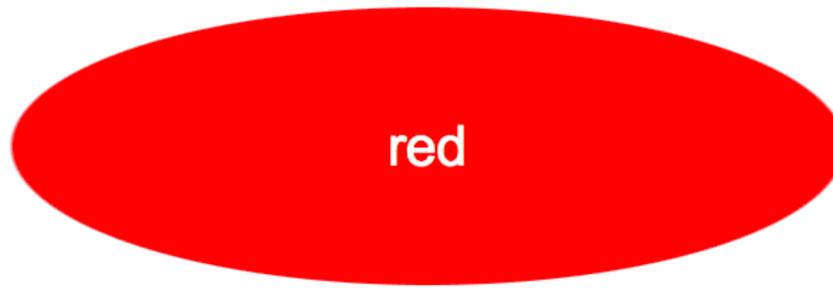
```
HTML
1 <div class="blue">blue</div>
2 <div class="red">red</div>
3 <div class="green">green</div>
4 <p>
5 Lorem ipsum dolor sit amet,
consectetur adipiscing elit. Fusce
orci libero, mollis id neque et,
feugiat semper libero. In porta
porta aliquet. Donec sit amet
condimentum tellus. In hac
habitasse platea dictumst. Aenean
placerat tortor et elit dictum, id
consequat elit pulvinar.
6 </p>
```

```
CSS
1 .blue {
2   float: right;
3 }
4
5 .red {
6   float: right;
7 }
8
9 .green {
10  float: right;
11 }
12
```

```
JS
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Fusce orci libero, mollis id neque et, feugiat semper libero. In porta porta aliquet. Donec sit amet condimentum tellus. In hac habitasse platea dictumst. Aenean placerat tortor et elit dictum, id consequat elit pulvinar.

Donec dictum hendrerit blandit. Donec accumsan scelerisque lacus quis aliquet. Fusce quam ipsum, venenatis eget porttitor ut, pulvinar id metus. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Phasellus id gravida augue.



`clear`

Specifies that the element *should not float or wrap*, but should instead move down below the float

`clear: left`

Element moves down to *clear past left floats*

`clear: right`

Element moves down to *clear past right floats*

`clear: both`

Element moves down to *clear past left & right floats*

HTML

```
1 <div class="blue">blue</div>
2 <p>
3 Lorem ipsum dolor sit amet,
  consectetur adipiscing elit. Fusce
  orci libero, mollis id neque et,
  feugiat semper libero. In porta porta
  aliquet. Donec sit amet condimentum
  tellus. In hac habitasse platea
  dictumst. Aenean placerat tortor et
  elit dictum, id consequat elit
  pulvinar.
4 </p>
5 <p class="cleared">
6 Donec dictum hendrerit blandit. Donec
  accumsan scelerisque lacus quis
```

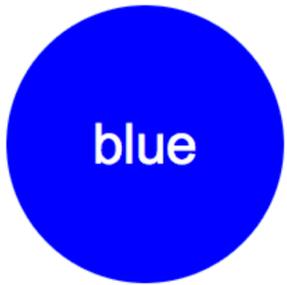
CSS

```
1 .blue {
2   float: right;
3 }
4
5 .cleared {
6   /* clear: both; */
7 }
8
9 /* For beautificaiton only */
10
11 .blue {background-color: blue;}
12 .red {background-color: red;}
```

JS

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Fusce orci libero, mollis id neque et, feugiat semper libero. In porta porta aliquet. Donec sit amet condimentum tellus. In hac habitasse platea dictumst. Aenean placerat tortor et elit dictum, id consequat elit pulvinar.

Donec dictum hendrerit blandit. Donec accumsan scelerisque lacus quis aliquet. Fusce quam ipsum, venenatis eget porttitor ut, pulvinar id metus. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Phasellus id gravida augue.



HTML

```
1 <div class="blue">blue</div>
2 <p>
3 Lorem ipsum dolor sit amet,
  consectetur adipiscing elit. Fusce
  orci libero, mollis id neque et,
  feugiat semper libero. In porta porta
  aliquet. Donec sit amet condimentum
  tellus. In hac habitasse platea
  dictumst. Aenean placerat tortor et
  elit dictum, id consequat elit
  pulvinar.
4 </p>
5 <p class="cleared">
6 Donec dictum hendrerit blandit. Donec
  accumsan scelerisque lacus quis
```

CSS

```
1 .blue {
2   float: right;
3 }
4
5 .cleared {
6   clear: both;
7 }
8
9 /* For beautificaiton only */
10
11 .blue {background-color: blue;}
12 .red {background-color: red;}
```

JS

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Fusce orci libero, mollis id neque et, feugiat semper libero. In porta porta aliquet. Donec sit amet condimentum tellus. In hac habitasse platea dictumst. Aenean placerat tortor et elit dictum, id consequat elit pulvinar.



Donec dictum hendrerit blandit. Donec accumsan scelerisque lacus quis aliquet. Fusce quam ipsum, venenatis eget porttitor ut, pulvinar id metus. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Phasellus id gravida augue.

						
float	4	1	1	1	1 1	1
clear	4	1	1	1	1 1	1

Why did the Web developer drown?

Why did the Web developer drown?

She didn't know if she should `float: left` or `float: right`!

display:

table-cell

`display`

Specifies *type of rendering box* used for element

- » `block`
- » `inline`
- » `table`, `table-row`, & `table-cell`
- » `list-item`
- » `inline-block`
- » `inline-table`
- » `flex`
- » `none`

```
display: block
```

Generates *block boxes that line up vertically*, relative to parents & siblings

HTML

less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual:

```
2 <div>
```

```
3   "Ph'nglui mglw'nafh Cthulhu R'lyeh
   wgah'nagl fhtagn."
```

```
4 </div>
```

```
5 Then the men, having reached a spot
   where the trees were thinner, came
   suddenly in sight of the spectacle
   itself. Four of them reeled, one
   fainted, and two were shaken into a
   frantic cry which the mad cacophony
```

CSS

```
1 /* The element generates a block box.
   The standard box model is used. */
```

```
2
3 div {
4   display: block;
5 }
```

```
6
7 /* ↓ Not part of the lesson ↓ */
```

```
8
9 div {
10  margin: 2em;
11  border: 2em solid hsla(0, 100%, 50%,
```

JS

Only poetry or madness could do justice to the noises heard by Legrasse's men as they ploughed on through the black morass toward the red glare and muffled tom-toms. There are vocal qualities peculiar to men, and vocal qualities peculiar to beasts; and it is terrible to hear the one when the source should yield the other. Animal fury and license here whipped themselves to daemoniac heights by howls and squawking ecstasies that tore and reverberated through those nighted woods like pestilential tempests from the gulfs of hell. Now and then the less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual:

"Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl fhtagn."

Then the men, having reached a spot where the trees were thinner, came suddenly in sight of the spectacle itself. Four of them reeled, one fainted, and two were shaken into a frantic cry which the mad cacophony fortunately deadened. Legrasse dashed swamp water on the face of the fainting man, and all stood trembling and nearly hypnotised with horror.

`display: inline`

Generates *inline boxes that break horizontally across lines* when they are too wide to fit their containers

Content determines width

`border` on all 4 sides, but `margin` & `padding` only work on left & right

Default value for all boxes

```
HTML [Tidy] [X]
1 <div>
2 <div>
3   "Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl
4   fhtagn."
5 </div>
6 Then the men, having reached a spot where the
7 trees were thinner, came suddenly in sight of
8 the spectacle itself. Four of them reeled, one
9 fainted, and two were shaken into a frantic cry
10 which the mad cacophony fortunately deadened.
```

```
CSS [Tidy] [View Compiled] [X]
1 /* The element generates one or more inline
2 element boxes. All parts of the box model are
3 drawn, but only the left and right margin,
4 border, and padding occupy space in the flow.
5 */
6
7 div {
8   display: inline;
9 }
10
11 /* ↓ Not part of the lesson ↓ */
12
```

Only poetry or madness could do justice to the noises heard by Legrasse's men as they ploughed on through the black morass toward the red glare and muffled tom-toms. There are vocal qualities peculiar to men, and vocal qualities peculiar to beasts; and it is terrible to hear the one when the source should yield the other. Animal fury and license here whipped themselves to daemoniac heights by howls and squawking ecstasies that tore and reverberated through those nighted woods like pestilential tempests from the gulfs of hell. Now and then the less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual: "Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl fhtagn." Then the men, having reached a spot where the trees were thinner, came suddenly in sight of the spectacle itself. Four of them reeled, one fainted, and two were shaken into a frantic cry which the mad cacophony fortunately deadened. Legrasse dashed swamp water on the face of the fainting man, and all stood trembling and nearly hypnotised with horror.

```
display: none
```

Removes element from flow & hides it as though it did not exist

Also removes all descendants

(Unlike `visibility: hidden`, which hides the element but leaves it in flow as though it were still there)

HTML

from the gulfs of hell. Now and then the less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual:

```
2 <div>
```

```
3   "Ph'nglui mglw'nafh Cthulhu R'lyeh  
   wgah'nagl fhtagn."
```

```
4 </div>
```

```
5 Then the men, having reached a spot  
   where the trees were thinner, came  
   suddenly in sight of the spectacle  
   itself. Four of them reeled, one  
   fainted, and two were shaken into a
```

CSS

```
1 /* Turns off the display of an element  
   (it has no effect on layout); all  
   descendant elements also have their  
   display turned off. The document is  
   rendered as though the element did not  
   exist. */
```

```
2  
3 div {  
4   display: none;  
5 }
```

```
6  
7 /* ↓ Not part of the lesson ↓ */
```

JS

Only poetry or madness could do justice to the noises heard by Legrasse's men as they ploughed on through the black morass toward the red glare and muffled tom-toms. There are vocal qualities peculiar to men, and vocal qualities peculiar to beasts; and it is terrible to hear the one when the source should yield the other. Animal fury and license here whipped themselves to daemoniac heights by howls and squawking ecstasies that tore and reverberated through those nighted woods like pestilential tempests from the gulfs of hell. Now and then the less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual: Then the men, having reached a spot where the trees were thinner, came suddenly in sight of the spectacle itself. Four of them reeled, one fainted, and two were shaken into a frantic cry which the mad cacophony fortunately deadened. Legrasse dashed swamp water on the face of the fainting man, and all stood trembling and nearly hypnotised with horror.



ABOUT

VISIT

ANIMALS 

CONSERVATION

EDUCATION

EVENTS

MEMBERSHIP

GIVE



- About the Animals
- Veterinary Hospital
- Animal Food & Nutrition Center
- Science & Research
- Enrichment & Training
- Species Survival Plans
- So You Want to be a Zookeeper?

19,000 animals

+ 90 acres

+ 18 students

= one wild preschool

Learn about our
reduced
rates!

SCHOOL



FEATURES

- Summer Zoo Weekends & Jungle Boogie
- Stingrays at Caribbean Cove
- Jammin' at the Zoo presented by Macy's - August 27
- Grevy's zebra foal and other summer babies

```
display: table
```

Generates *box that behaves like a* `<table>`

- » Content determines width
- » Box lines up vertically, relative to parents & siblings
- » Can set `margin`, `padding`, & `border`

HTML

less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual:

```
2 <div>
3   "Ph'nglui mglw'nafh Cthulhu R'lyeh
   wgah'nagl fhtagn."
4 </div>
```

5 Then the men, having reached a spot where the trees were thinner, came suddenly in sight of the spectacle itself. Four of them reeled, one fainted, and two were shaken into a frantic cry which the mad cacophony

CSS

```
1 /* The element generates a table
   element box. Note that the box is sized
   by its content. Inside the table box,
   an anonymous table row object is
   created. */
```

```
2
3 div {
4   display: table;
5 }
```

```
6
7 /* ↓ Not part of the lesson ↓ */
8
```

JS

Only poetry or madness could do justice to the noises heard by Legrasse's men as they ploughed on through the black morass toward the red glare and muffled tom-toms. There are vocal qualities peculiar to men, and vocal qualities peculiar to beasts; and it is terrible to hear the one when the source should yield the other. Animal fury and license here whipped themselves to daemoniac heights by howls and squawking ecstasies that tore and reverberated through those nighted woods like pestilential tempests from the gulfs of hell. Now and then the less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual:

"Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl fhtagn."

Then the men, having reached a spot where the trees were thinner, came suddenly in sight of the spectacle itself. Four of them reeled, one fainted, and two were shaken into a frantic cry which the mad cacophony fortunately deadened. Legrasse dashed swamp water on the face of the fainting man, and all stood trembling and nearly hypnotised with horror.

```
display: table-row
```

Generates *box that behaves like* `<tr>`

- » No `margin`, `padding`, or `border`
- » Content determines width

You will never use this

HTML

gulfs of hell. Now and then the less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual:

```
2 <div class="table-row">
3   "Ph'nglui mglw'nafh Cthulhu R'lyeh
   wgah'nagl fhtagn."
4 </div>
```

5 Then the men, having reached a spot where the trees were thinner, came suddenly in sight of the spectacle itself. Four of them reeled, one fainted, and two were shaken into a frantic cry which the mad cacophony of

CSS

```
1 /* The element generates a table-row
   box. Outside the table-cell box, an
   anonymous table object is created.
   Inside the table-row box, an anonymous
   table cell object is created. The box
   model does not include margin, border,
   or padding. */
```

```
2
3 .table-row {
4   display: table-row;
5 }
```

JS

Only poetry or madness could do justice to the noises heard by Legrasse's men as they ploughed on through the black morass toward the red glare and muffled tom-toms. There are vocal qualities peculiar to men, and vocal qualities peculiar to beasts; and it is terrible to hear the one when the source should yield the other. Animal fury and orgiastic license here whipped themselves to daemoniac heights by howls and squawking ecstasies that tore and reverberated through those nighted woods like pestilential tempests from the gulfs of hell. Now and then the less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual:

"Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl fhtagn."

Then the men, having reached a spot where the trees were thinner, came suddenly in sight of the spectacle itself. Four of them reeled, one fainted, and two were shaken into a frantic cry which the mad cacophony of the orgy fortunately deadened. Legrasse dashed swamp water on the face of the fainting man, and all stood trembling and nearly hypnotised with horror.

```
display: table-cell
```

Generates *box that behaves like* `<td>`

- » Content determines width
- » No `margin`
- » Lines up horizontally with other `<td>`s in a row

HTML

from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual:

```
2 <!-- Duplicate this div to see how
multiple adjacent table-cell boxes
behave. -->
3 <div class="table-cell">
4   "Ph'nglui mglw'nafh Cthulhu R'lyeh
   wgah'nagl fhtagn."
5 </div>
```

6 Then the men, having reached a spot where the trees were thinner, came suddenly in sight of the spectacle itself. Four of them reeled, one fainted, and two were shaken into a

CSS

```
1 /* The element generates a table-cell
box. Outside the table-cell box,
anonymous table row and table objects
are created. The box model does not
include margin. */
```

```
2
3 .table-cell {
4   display: table-cell;
5 }
```

```
6
7 /* ↓ Not part of the lesson ↓ */
8
```

JS

Only poetry or madness could do justice to the noises heard by Legrasse's men as they ploughed on through the black morass toward the red glare and muffled tom-toms. There are vocal qualities peculiar to men, and vocal qualities peculiar to beasts; and it is terrible to hear the one when the source should yield the other. Animal fury and orgiastic license here whipped themselves to daemoniac heights by howls and squawking ecstasies that tore and reverberated through those nighted woods like pestilential tempests from the gulfs of hell. Now and then the less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual:

"Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl fhtagn."

Then the men, having reached a spot where the trees were thinner, came suddenly in sight of the spectacle itself. Four of them reeled, one fainted, and two were shaken into a frantic cry which the mad cacophony of the orgy fortunately deadened. Legrasse dashed swamp water on the face of the fainting man, and all stood trembling and nearly hypnotised with horror.

```
HTML Tidy X
2 <!-- Duplicate this div to see how multiple
   adjacent table-cell boxes behave. -->
3 <div class="table-cell">
4   "Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl
   fhtagn."
5 </div>
6 <div class="table-cell">
7   "Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl
   fhtagn."
8 </div>
9 Then the men, having reached a spot where the
   trees were thinner, came suddenly in sight of
```

```
CSS Tidy View Compiled X
1 /* The element generates a table-cell box.
   Outside the table-cell box, anonymous table
   row and table objects are created. The box
   model does not include margin. */
2
3 .table-cell {
4   display: table-cell;
5 }
6
7 /* ↓ Not part of the lesson ↓ */
8
9 div {
```

Only poetry or madness could do justice to the noises heard by Legrasse's men as they ploughed on through the black morass toward the red glare and muffled tom-toms. There are vocal qualities peculiar to men, and vocal qualities peculiar to beasts; and it is terrible to hear the one when the source should yield the other. Animal fury and orgiastic license here whipped themselves to daemoniac heights by howls and squawking ecstasies that tore and reverberated through those nighted woods like pestilential tempests from the gulfs of hell. Now and then the less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual:



Then the men, having reached a spot where the trees were thinner, came suddenly in sight of the spectacle itself. Four of them reeled, one fainted, and two were shaken into a frantic cry which the mad cacophony of the orgy fortunately deadened. Legrasse dashed swamp water on the face of the fainting man, and all stood trembling and nearly hypnotised with horror.

```
HTML Tidy X
3 <div class="table-cell">
4   "Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl
   fhtagn."
5 </div>
6 <div class="table-cell">
7   "Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl
   fhtagn."
8 </div>
9 <div class="table-cell">
10  "Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl
   fhtagn."
11 </div>
```

```
CSS Tidy View Compiled X
1 /* The element generates a table-cell box.
   Outside the table-cell box, anonymous table
   row and table objects are created. The box
   model does not include margin. */
2
3 .table-cell {
4   display: table-cell;
5 }
6
7 /* ↓ Not part of the lesson ↓ */
8
9 div {
```

Only poetry or madness could do justice to the noises heard by Legrasse's men as they ploughed on through the black morass toward the red glare and muffled tom-toms. There are vocal qualities peculiar to men, and vocal qualities peculiar to beasts; and it is terrible to hear the one when the source should yield the other. Animal fury and orgiastic license here whipped themselves to daemoniac heights by howls and squawking ecstasies that tore and reverberated through those nighted woods like pestilential tempests from the gulfs of hell. Now and then the less organized ululation would cease, and from what seemed a well-drilled chorus of hoarse voices would rise in sing-song chant that hideous phrase or ritual:

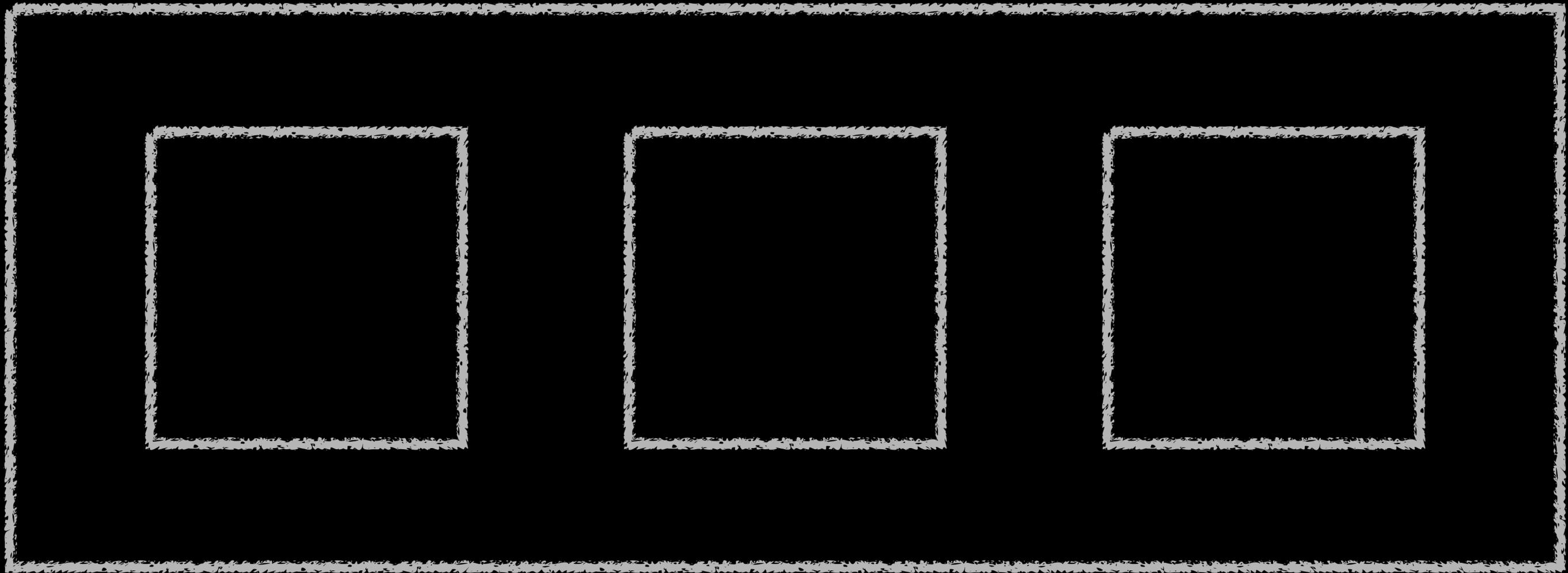


Then the men, having reached a spot where the trees were thinner, came suddenly in sight of the spectacle itself. Four of them reeled, one fainted, and two were shaken into a frantic cry which the mad cacophony of the orgy fortunately deadened. Legrasse dashed swamp water on the face of the fainting man, and all stood trembling and nearly hypnotised with horror.

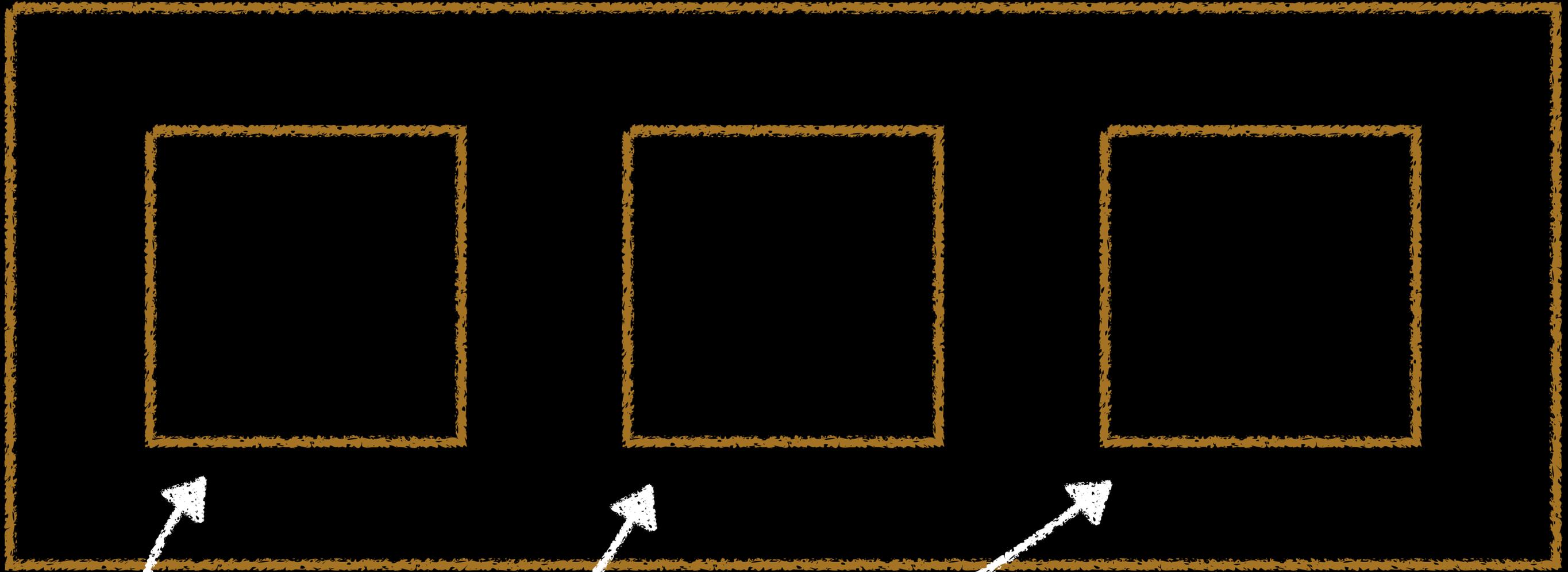
It's not OK to use `<table>` for layout

It's perfectly OK & even a good idea to use `display: table & display: table-cell` for layout

display: flex



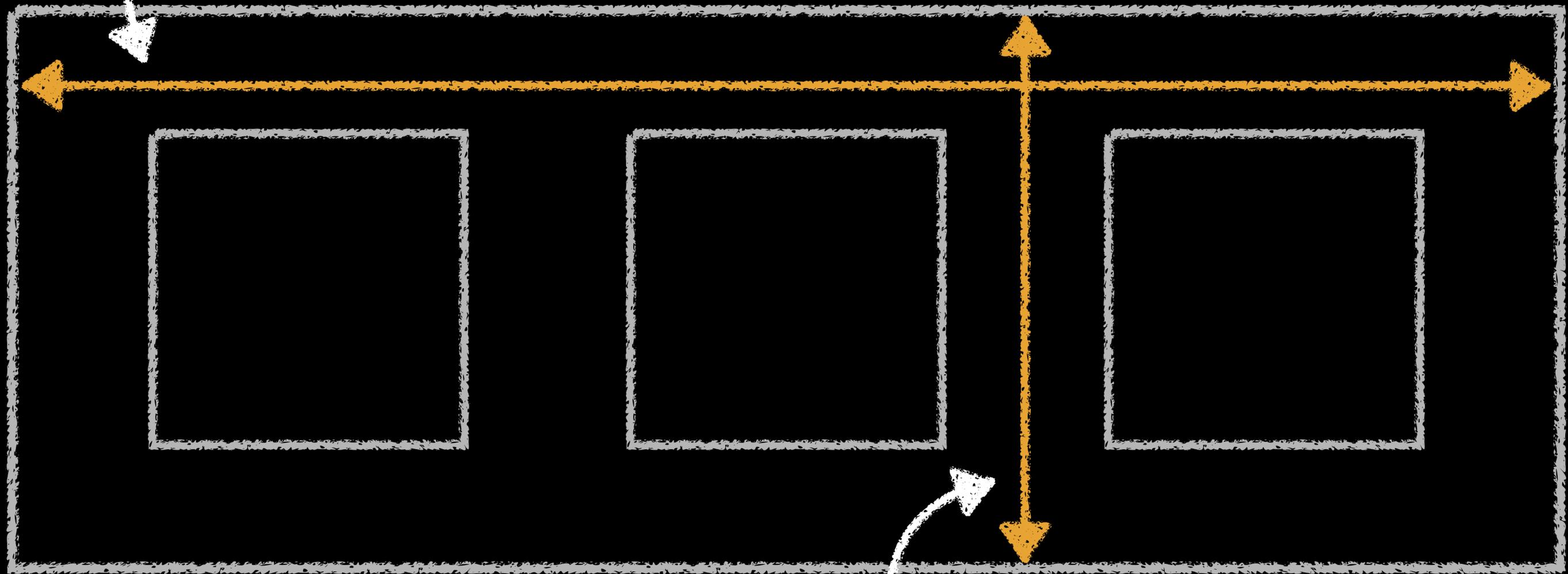
Flex Container



Flex Items

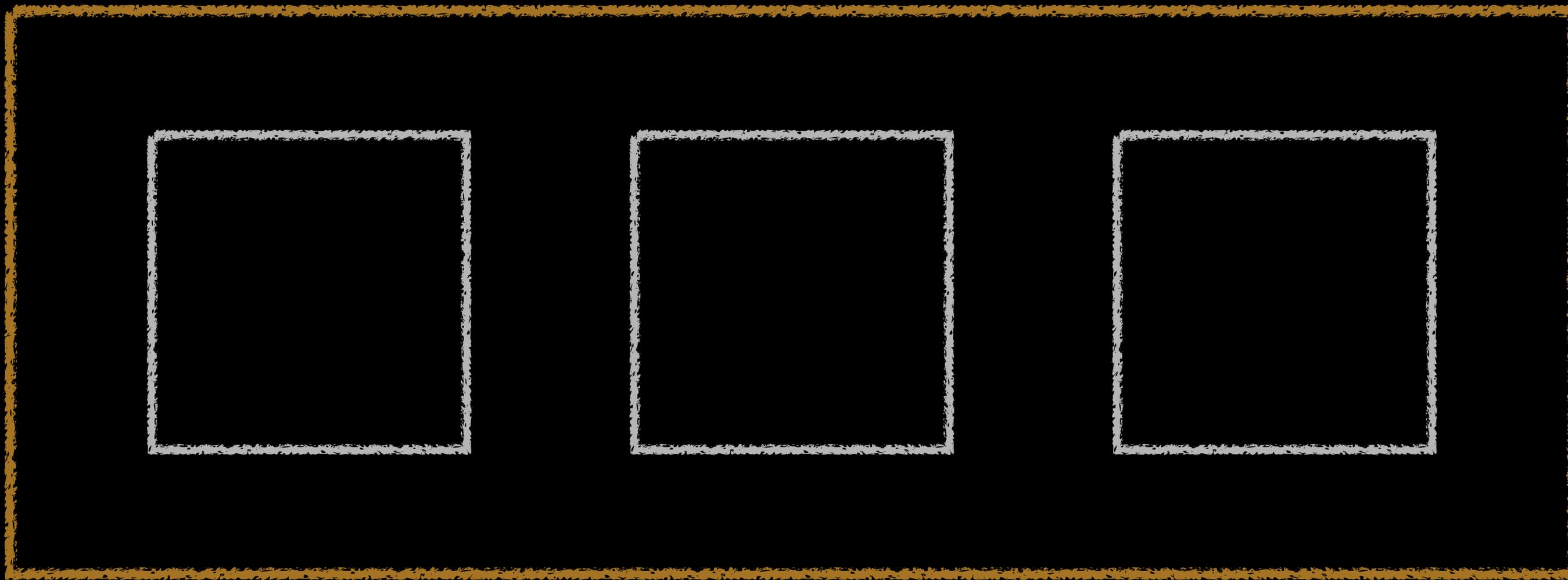


Main Axis: primary axis on which flex items are laid out (\leftrightarrow or \updownarrow)



Cross Axis: perpendicular to the main axis

Cross Start



Main Start



Main End



Cross End



On the following slides, you'll see these symbols



Flex container



Flex items



Main axis



Cross axis

What triggers
the flexbox layout
algorithm?

```
display: flex
```

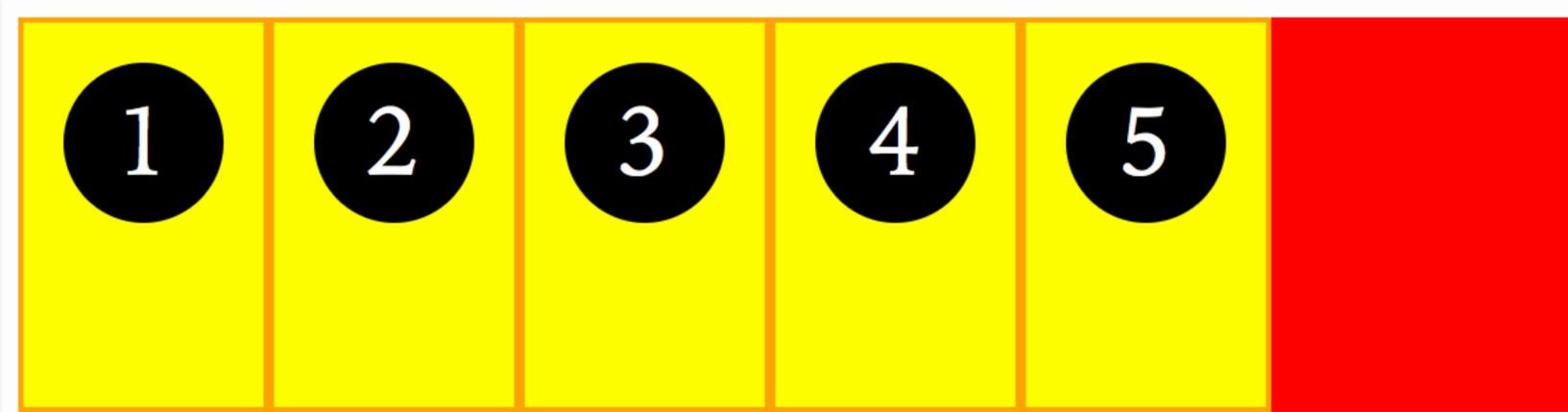
Generates a *block-like box that behaves according to the flexbox model*:

- » Becomes a flex container that lines up vertically, relative to parents & siblings
- » *Immediate* children become *flex items*
- » Changes the layout mode inside it



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   background-color: red;
4 }
5
6 .flex-item {
7   width: 90px;
8   background-color: yellow;
9   border: 2px solid orange;
10  height: 4em;
11 }
12
```



display:

flex



iOS



11

12

28

9

29

9.2

4.4

What direction
& in what order
do flex items go?

`flex-direction`

Specifies *how flex items are laid out in the flex container* by setting...

- » the main axis: \leftrightarrow \updownarrow
- » the direction of the flow along the main axis



`flex-direction`

Values:

» `row` (default) →

» `row-reverse` ←

» `column` ↓

» `column-reverse` ↑



```
flex-direction: row
```

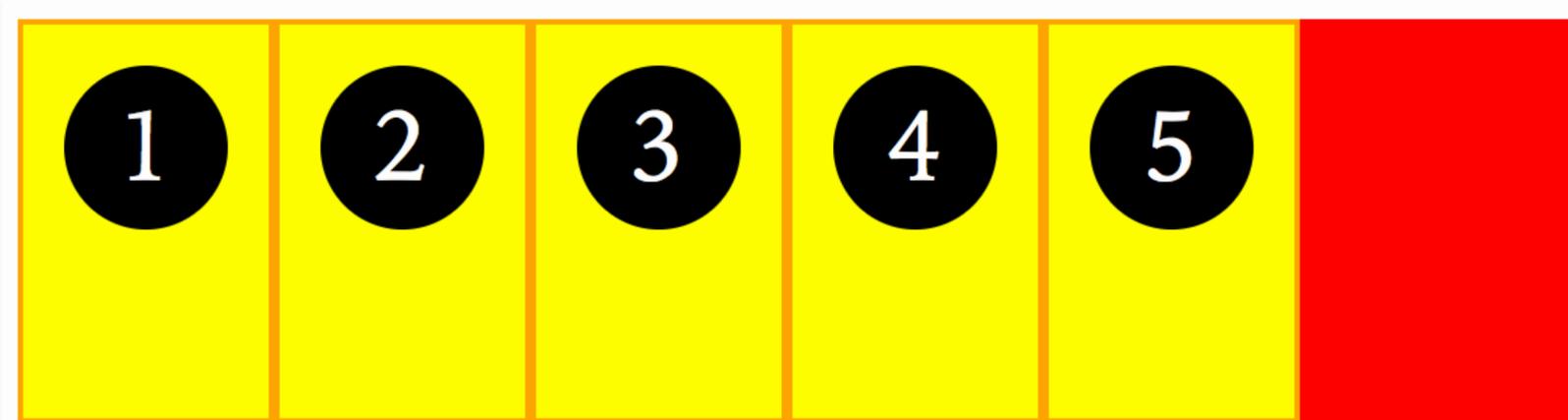
Flex items are stacked in a row *from left-to-right*

(If the default for your locale is `direction: rtl`, then it's the opposite)



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-direction: row; /* default */
4   /* flex-direction: row-reverse;
5   flex-direction: column;
6   flex-direction: column-reverse; */
7 }
8
9 .flex-item {
10  width: 90px;
11  background-color: yellow;
12  border: 2px solid orange;
```



`flex-direction: row-reverse`

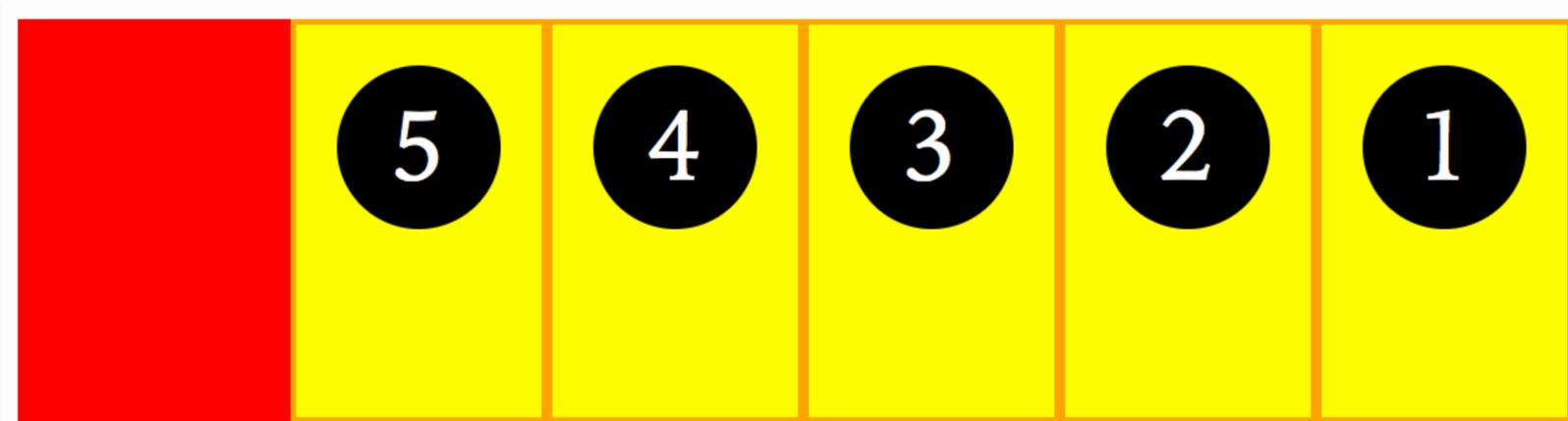
Flex items are stacked in a row *from right-to-left*

(If the default for your locale is `direction: rtl`, then it's the opposite)



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-direction: row-reverse;
4   /* flex-direction: row;
5   flex-direction: column;
6   flex-direction: column-reverse; */
7 }
8
9 .flex-item {
10  width: 90px;
11  background-color: yellow;
12  border: 2px solid orange;
```



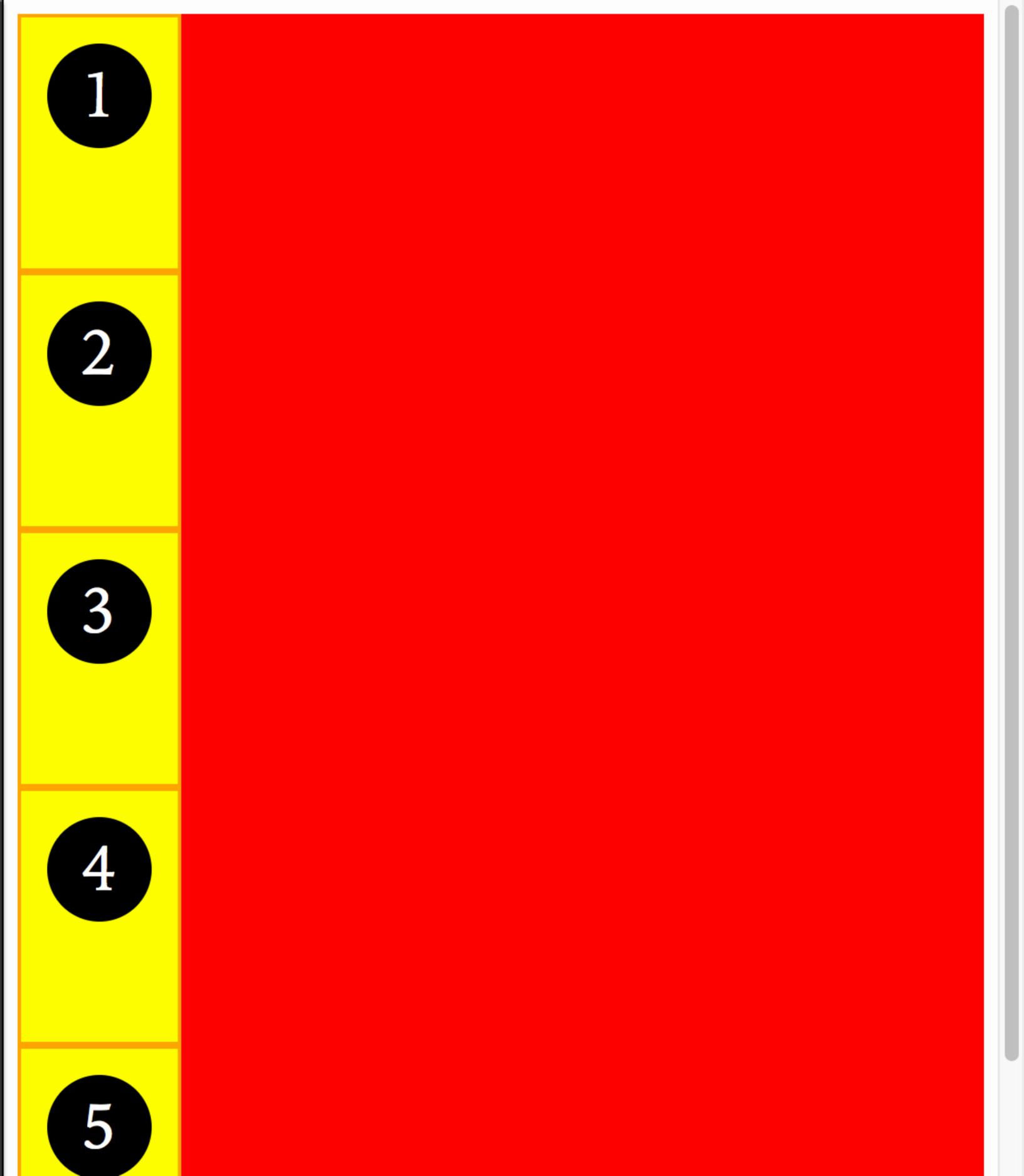
```
flex-direction: column
```

Flex items are stacked *in a column from top-to-bottom*



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-direction: column;
4   /* flex-direction: row;
5   flex-direction: row-reverse;
6   flex-direction: column-reverse; */
7 }
8
9 .flex-item {
10  width: 90px;
11  background-color: yellow;
12  border: 2px solid orange;
```



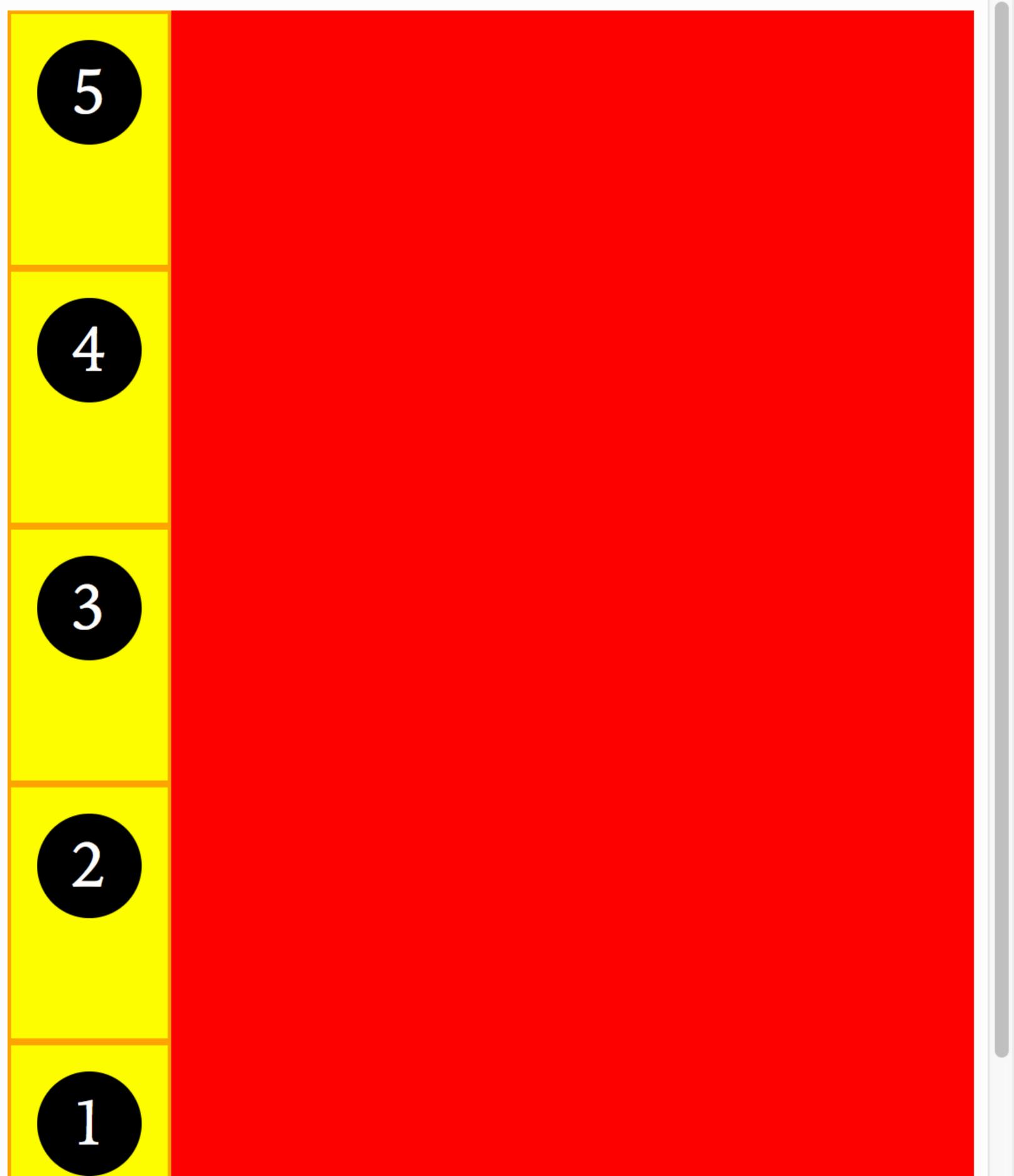
```
flex-direction: column-reverse
```

Flex items are stacked *in a column from bottom-to-top*



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-direction: column-reverse;
4   /* flex-direction: row;
5   flex-direction: row-reverse;
6   flex-direction: column; */
7 }
8
9 .flex-item {
10  width: 90px;
11  background-color: yellow;
12  border: 2px solid orange;
```



You can apply `display: flex` on flex items

Add `flex-direction` to the mix & you can really have something



```
HTML Tidy x
1 <div class="honors">
2   <div class="honors-row">
3     <p>
4       2003-
5     </p>
6   <p>
7     Co-manager
8     <br>Central West End Linux Users Group
9   </p>
10 </div>
11 <div class="honors-row">
12 <p>
13   2002-2003
14 </p>
15 <p>
16   Vice President
17   <br><a href="http://www.sluug.org/">St. Louis
18   Unix Users Group</a>
19 </p>
20 </div>
21 <div class="honors-row">
22 <p>
```

2003- Co-manager
Central West End Linux Users Group

2002-2003 Vice President
[St. Louis Unix Users Group](http://www.sluug.org/)

Summer 1992 NEH Summer Seminar for School Teachers
University of Pennsylvania
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```
CSS Tidy View Compiled x
```

```
JS Tidy x
```

```
HTML Tidy X
1 <div class="honors">
2   <div class="honors-row">
3     <p>
4       2003-
5     </p>
6     <p>
7       Co-manager
8       <br>Central West End Linux Users Group
9     </p>
10  </div>
```

```
CSS Tidy View Compiled X
1 .honors {
2   display: flex;
3   flex-direction: column;
4 }
5
6 .honors-row {
7   display: flex;
8 }
9
10 .honors-row p:first-child {
11   width: 7em;
12 }
```

```
JS Tidy X
```

2003-	Co-manager Central West End Linux Users Group
2002-2003	Vice President St. Louis Unix Users Group
Summer 1992	NEH Summer Seminar for School Teachers University of Pennsylvania Fully funded member of 6-week course

Let's make that responsive

```
HTML
1 <div class="honors">
2   <div class="honors-row">
3     <p>
4       2003-
5     </p>
6     <p>
7       Co-manager
8       <br>Central West End Linux Users Group
9     </p>
10  </div>
11 <div class="honors-row">
12   <p>
13     2002-2003
```

```
CSS
1 @media (min-width: 768px) {
2   .honors {
3     display: flex;
4     flex-direction: column;
5   }
6   .honors-row {
7     display: flex;
8   }
9   .honors-row p:first-child {
10    width: 7em;
11  }
12 }
```

```
JS
```

2003-
Co-manager
Central West End Linux Users Group

2002-2003
Vice President
[St. Louis Unix Users Group](#)

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University of Pennsylvania
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```
HTML
1 <div class="honors">
2   <div class="honors-row">
3     <p>
4       2003-
5     </p>
6     <p>
7       Co-manager
8       <br>Central West End Linux Users Group
9     </p>
10  </div>
11 <div class="honors-row">
12   <p>
13     2002-2003
14   </p>
```

```
CSS
13
14 @media (max-width: 767px) {
15   .honors-row p:first-child {
16     font-weight: 700;
17     margin-bottom: 0;
18   }
19   /* .honors-row p:nth-child(2) { */
20   .honors-row > p + p {
21     margin-top: 0;
22   }
23 }
24
```

```
JS
```

2003-

Co-manager

Central West End Linux Users Group

2002-2003

Vice President

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iOS



flex-direction

11

12

22

9

21

9.2

4.4

How do you distribute
flex items
in the container?

`justify-content`

Defines *how space is distributed between & around flex items* along the main axis of their container

Values:

- » `flex-start` (Default)
- » `flex-end`
- » `center`
- » `space-between`
- » `space-around`



```
justify-content: flex-start
```

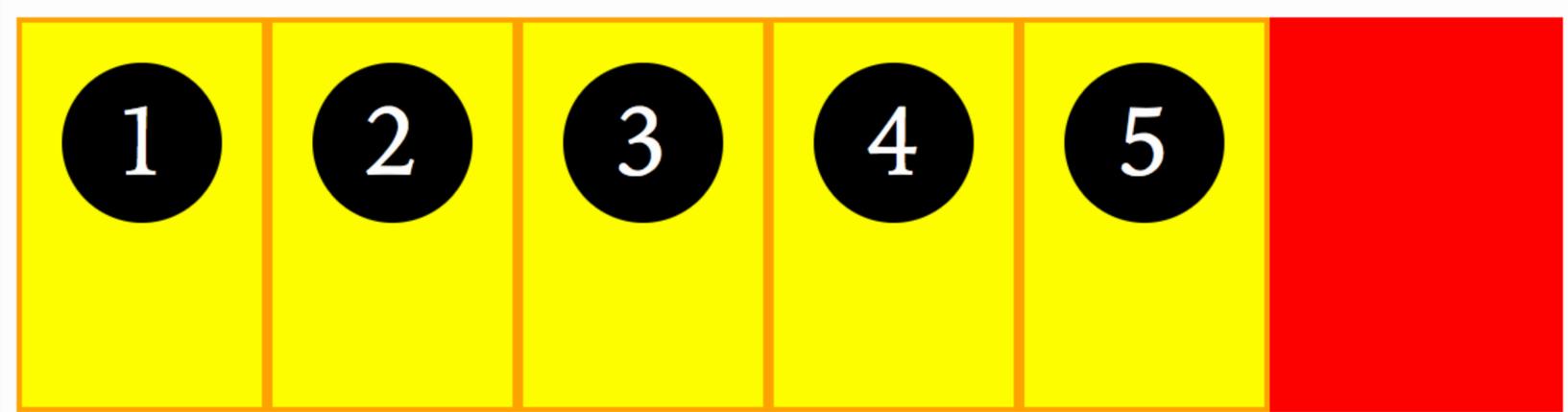
Aligns flex items to the *left side of the flex container*,
going left-to-right

Default value for `justify-content`



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   justify-content: flex-start;
4   /* justify-content: flex-end;
5   justify-content: center;
6   justify-content: space-between;
7   justify-content: space-around; */
8 }
9
10 .flex-item {
11   width: 90px;
12   background-color: yellow;
```



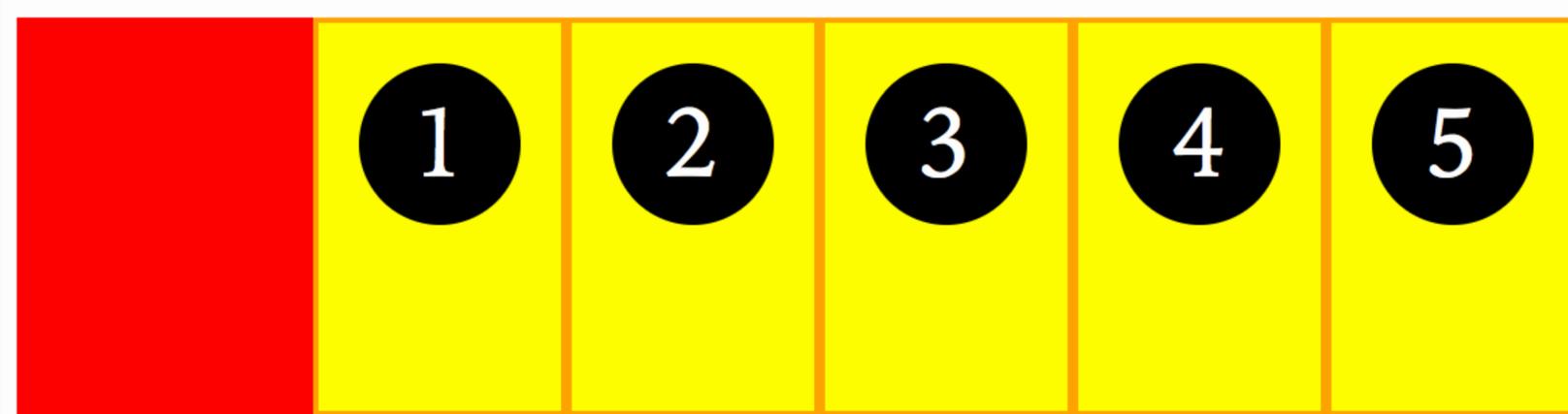
```
justify-content: flex-end
```

Aligns flex items to the *right side of the flex container*,
still going left-to-right



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   justify-content: flex-end;
4   /* justify-content: flex-start;
5   justify-content: center;
6   justify-content: space-between;
7   justify-content: space-around; */
8 }
9
10 .flex-item {
11   width: 90px;
12   background-color: yellow;
```



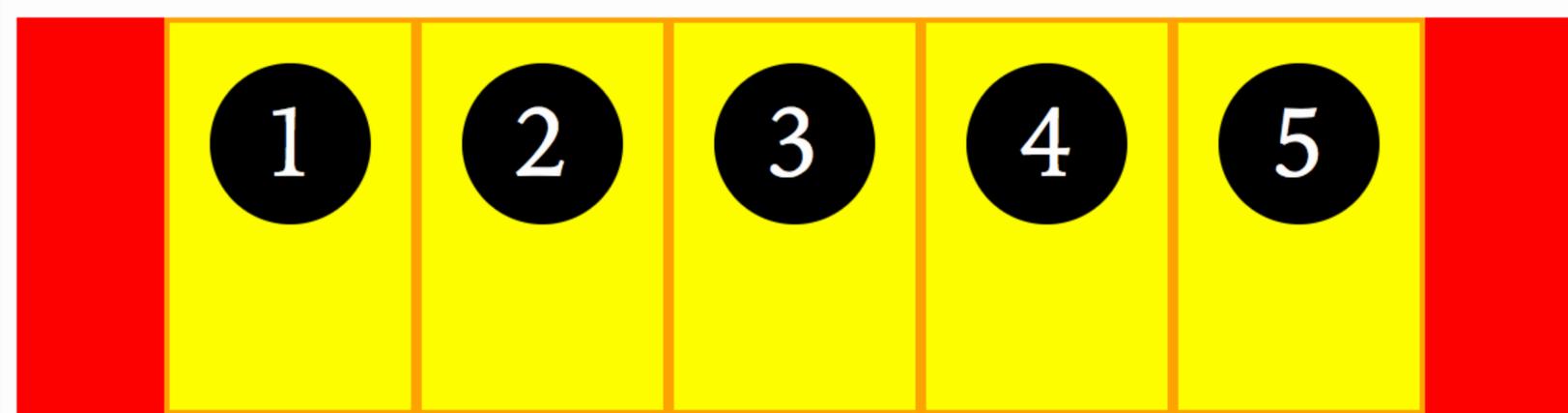
```
justify-content: center
```

Aligns flex items at the *center of the flex container*,
going left-to-right



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

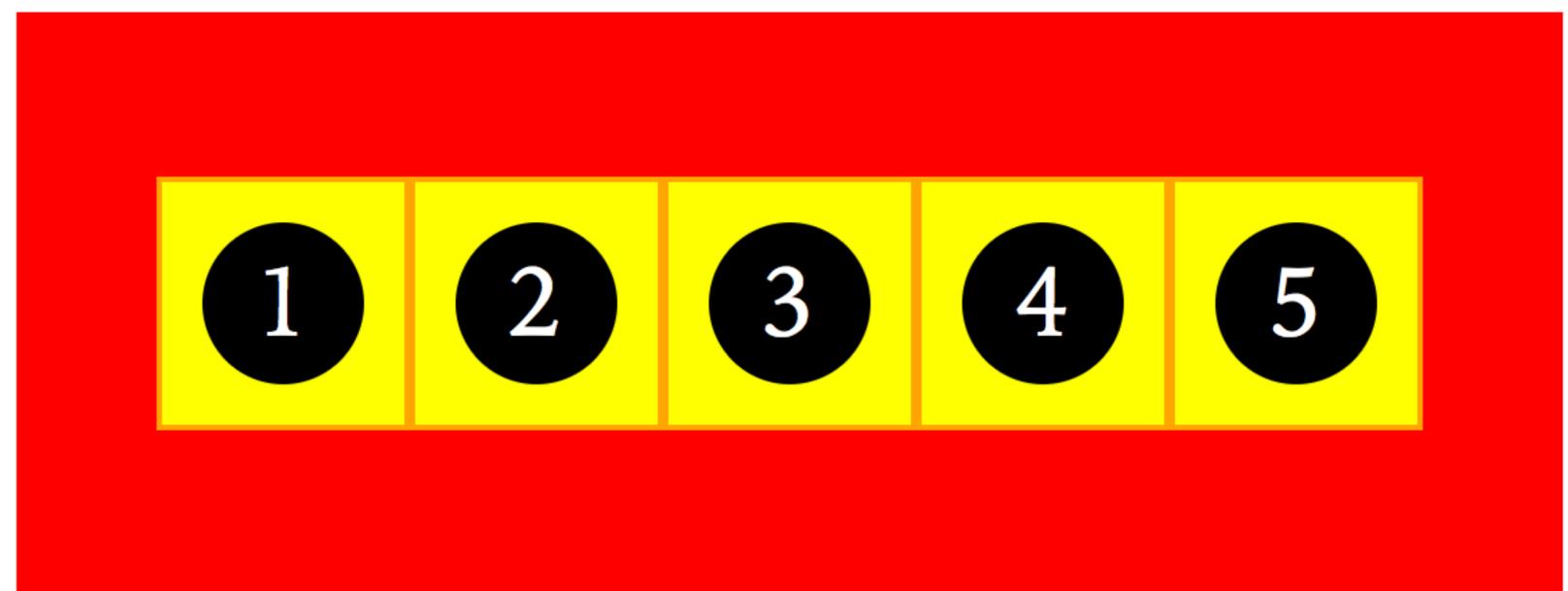
```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   justify-content: center;
4   /* justify-content: flex-start;
5   justify-content: flex-end;
6   justify-content: space-between;
7   justify-content: space-around; */
8 }
9
10 .flex-item {
11   width: 90px;
12   background-color: yellow;
```



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span><!--
   <span>6</span>--></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   height: 6em;
4   /* align-items: stretch;
5   align-items: flex-start;
6   align-items: flex-end; */
7   align-items: center;
8   /* align-items: baseline; */
9   justify-content: center;
10 }
11
12 .flex-item {
13   width: 90px;
14   background-color: yellow;
```

```
JS Tidy X
```



`justify-content: space-between`

Flex items have *equal spacing between them*, with first & last flex items aligned to edges of the flex container



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   justify-content: space-between;
4   /* justify-content: flex-start;
5   justify-content: flex-end;
6   justify-content: center;
7   justify-content: space-around; */
8 }
9
10 .flex-item {
11   width: 90px;
12   background-color: yellow;
```



No space before first flex item (or after last flex item), but equal space between flex items

`justify-content: space-around`

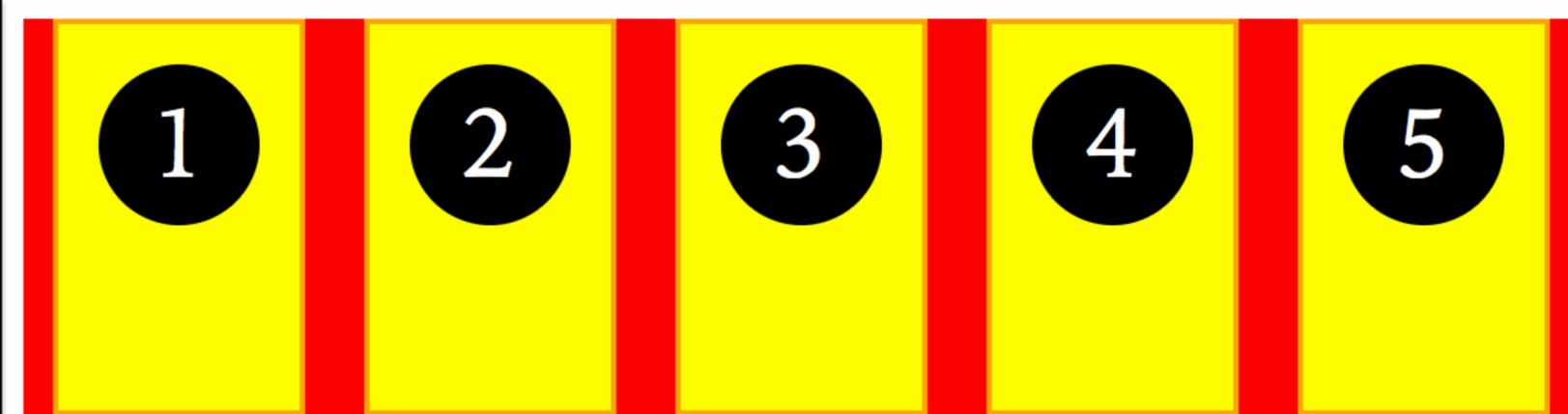
Flex items have *equal spacing around them*, with first & last flex items getting half-sized spaces on the ends

Empty space before the first, and after the last, flex items equals half of the space between two adjacent items



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   justify-content: space-around;
4   /* justify-content: flex-start;
5   justify-content: flex-end;
6   justify-content: center;
7   justify-content: space-between; */
8 }
9
10 .flex-item {
11   width: 90px;
12   background-color: yellow;
```



Space before 1st flex item (& after last flex item) is 1/2 of space between flex items

`justify-content`

						
11	12	29	9	29	9.2	4.4

How are flex items
aligned
in the container?

`align-items`

Aligns flex items in the cross axis of the current flex line

Values:

- » `stretch` (Default)
- » `flex-start`
- » `flex-end`
- » `center`
- » `baseline`



`align-items: stretch`

Flex items *fill the whole height (or width) from cross start to cross end* of the flex container

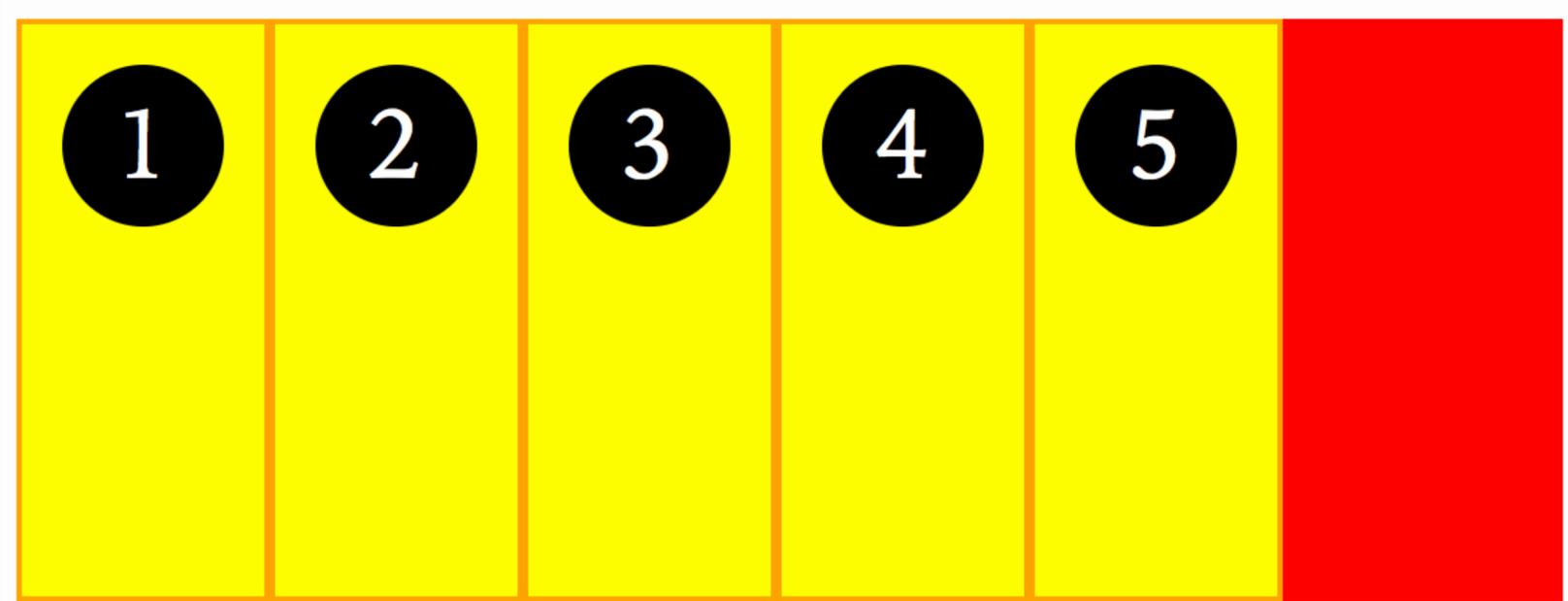
Obviously the flex item cannot have a set height

Default value for `align-items`



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   height: 6em;
4   align-items: stretch;
5   /* align-items: flex-start;
6   align-items: flex-end;
7   align-items: center;
8   align-items: baseline; */
9 }
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15 }
```



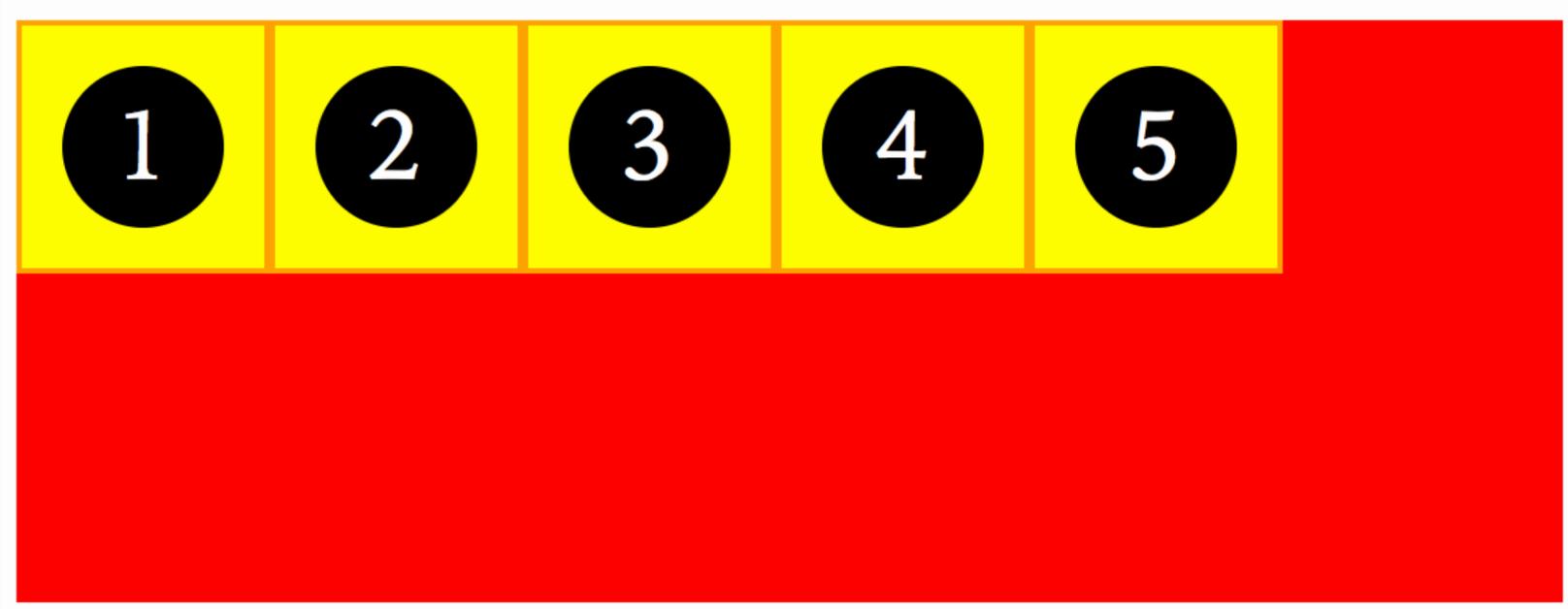
```
align-items: flex-start
```

Flex items *stack from the cross start* of the flex container



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   height: 6em;
4   align-items: flex-start;
5   /* align-items: stretch;
6   align-items: flex-end;
7   align-items: center;
8   align-items: baseline; */
9 }
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15 }
```



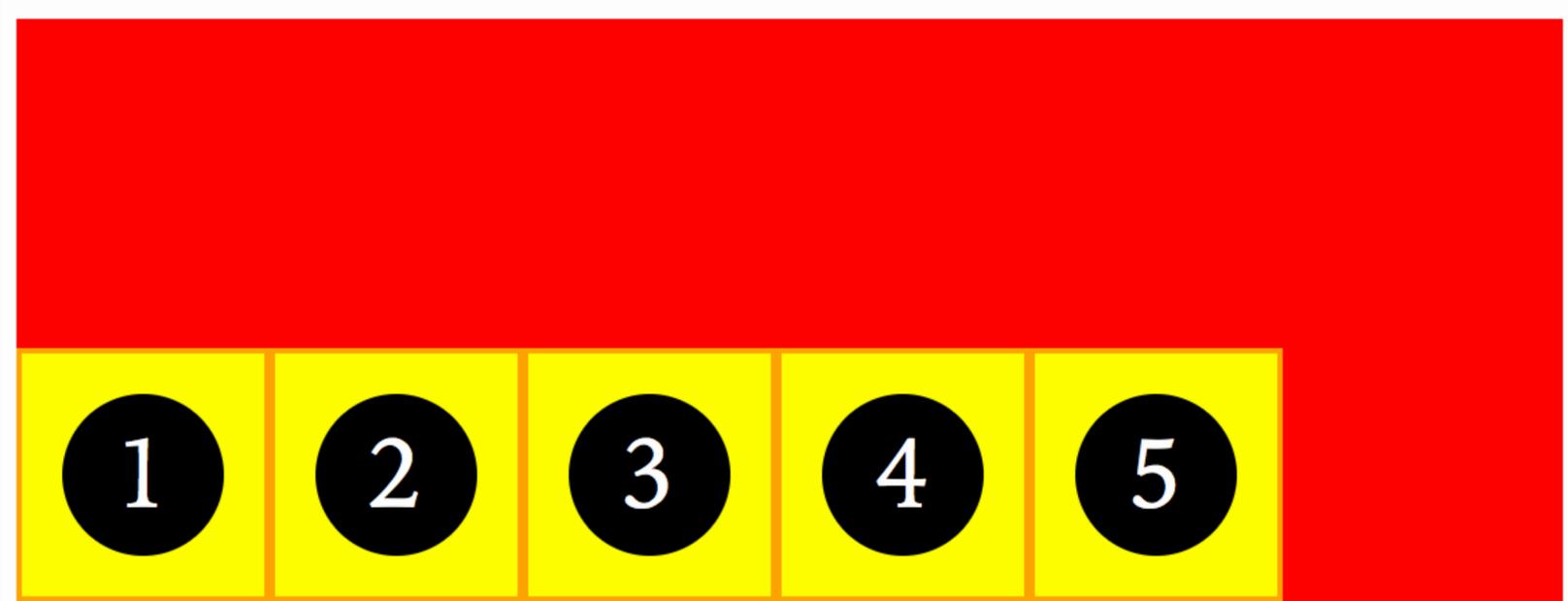
```
align-items: flex-end
```

Flex items *stack from the cross end* of the flex container



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   height: 6em;
4   align-items: flex-end;
5   /* align-items: stretch;
6   align-items: flex-start;
7   align-items: center;
8   align-items: baseline; */
9 }
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15 }
```



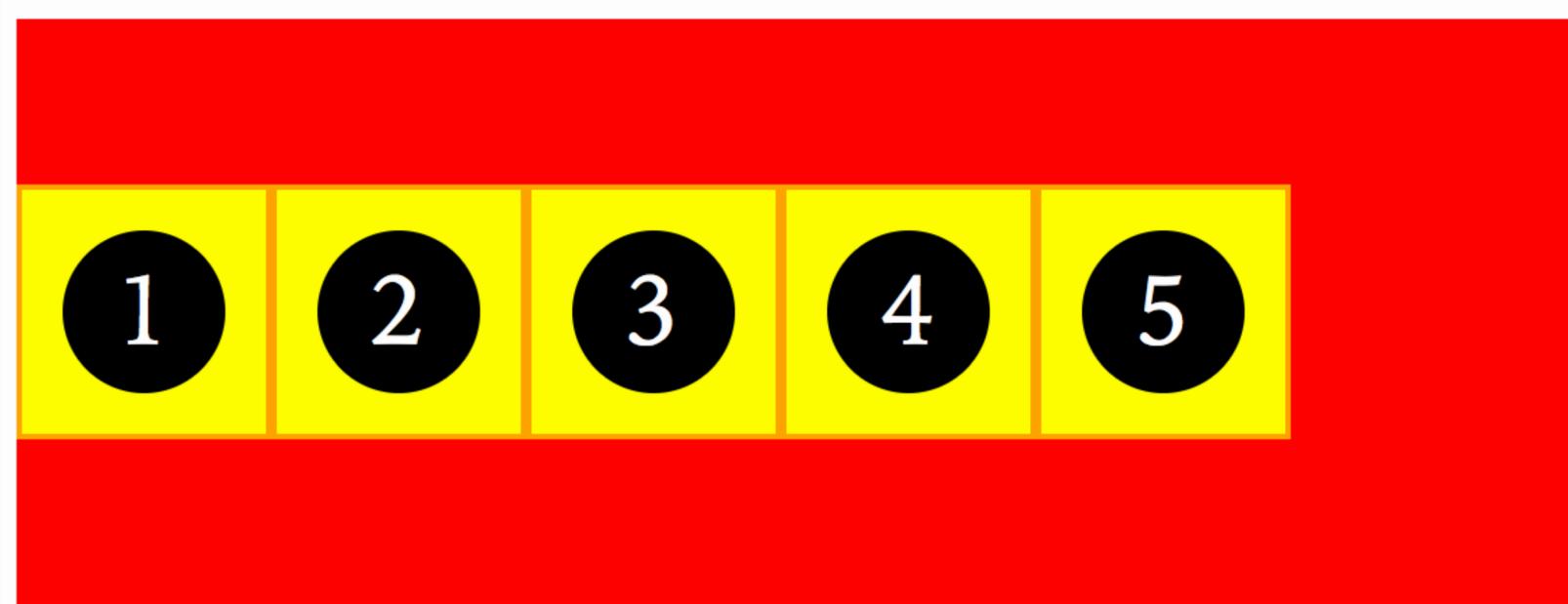
```
align-items: center
```

Flex items *stack from the center of the cross axis* of the flex container



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   height: 6em;
4   align-items: center;
5   /* align-items: stretch;
6   align-items: flex-start;
7   align-items: flex-end;
8   align-items: baseline; */
9 }
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15 }
```



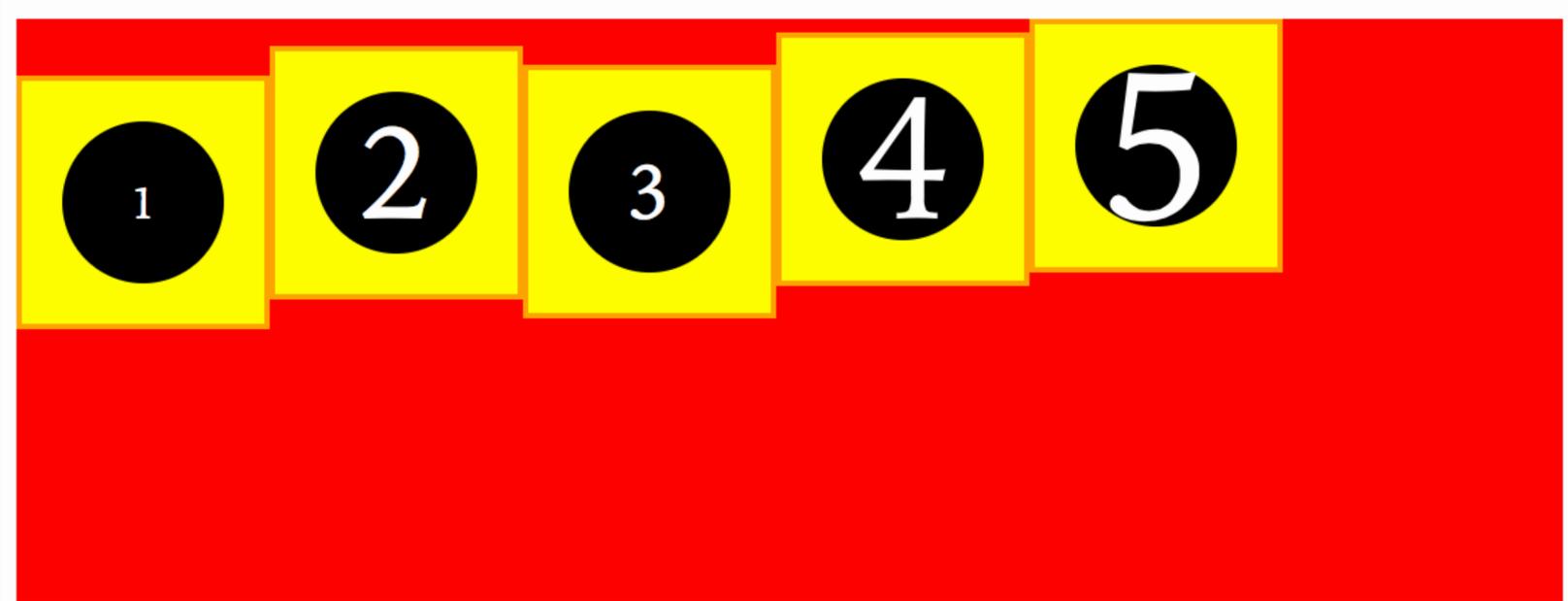
```
align-items: baseline
```

Flex items *stack so that the baselines are aligned* inside the flex container



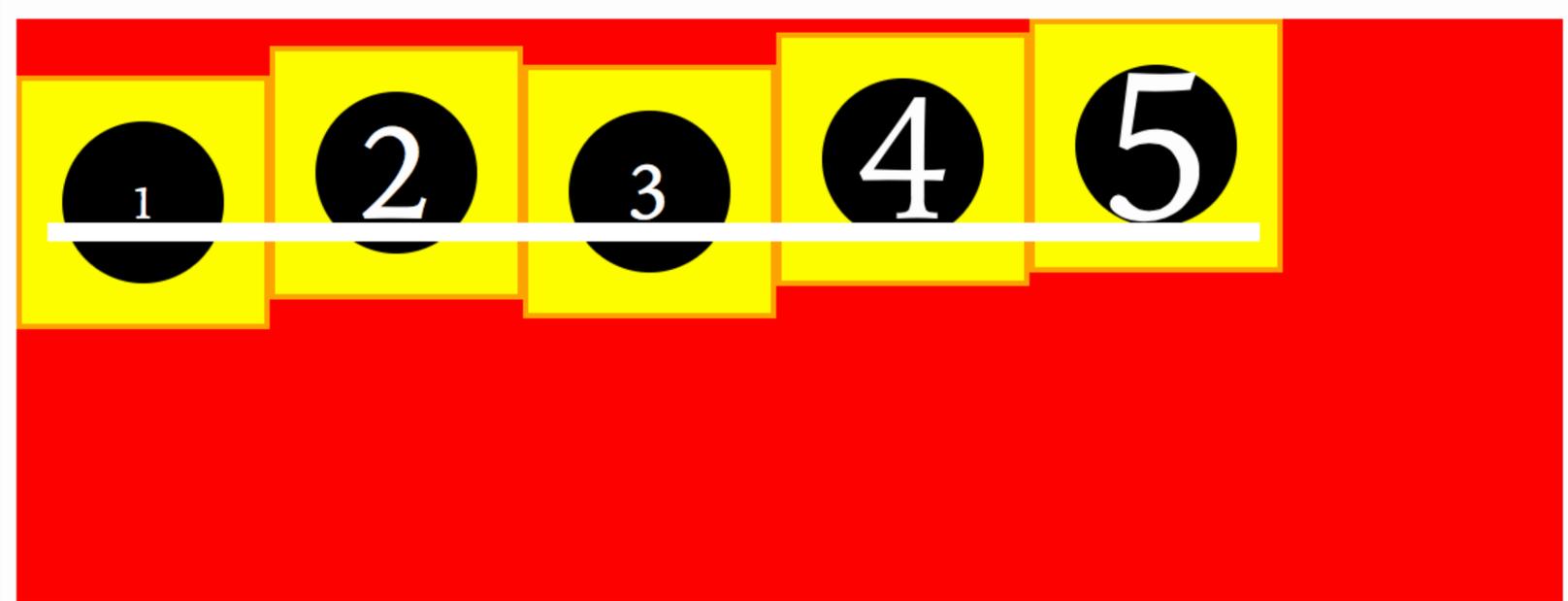
```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   height: 6em;
4   align-items: baseline;
5   /* align-items: stretch;
6   align-items: flex-start;
7   align-items: flex-end;
8   align-items: center; */
9 }
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15 }
```



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   height: 6em;
4   align-items: baseline;
5   /* align-items: stretch;
6   align-items: flex-start;
7   align-items: flex-end;
8   align-items: center; */
9 }
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15 }
```



`align-items`



11



12



28



9



29

iOS

9.2



4.4

How big should
each flex item be?

flex-grow

Specifies *if a flex item can grow if necessary to take up available space* inside the flex container, based on proportion

Value: `<number>`

- » No negative numbers
- » Default is `0`: do not grow



CSS Tricks (a fantastic site) says this about `flex-grow`:

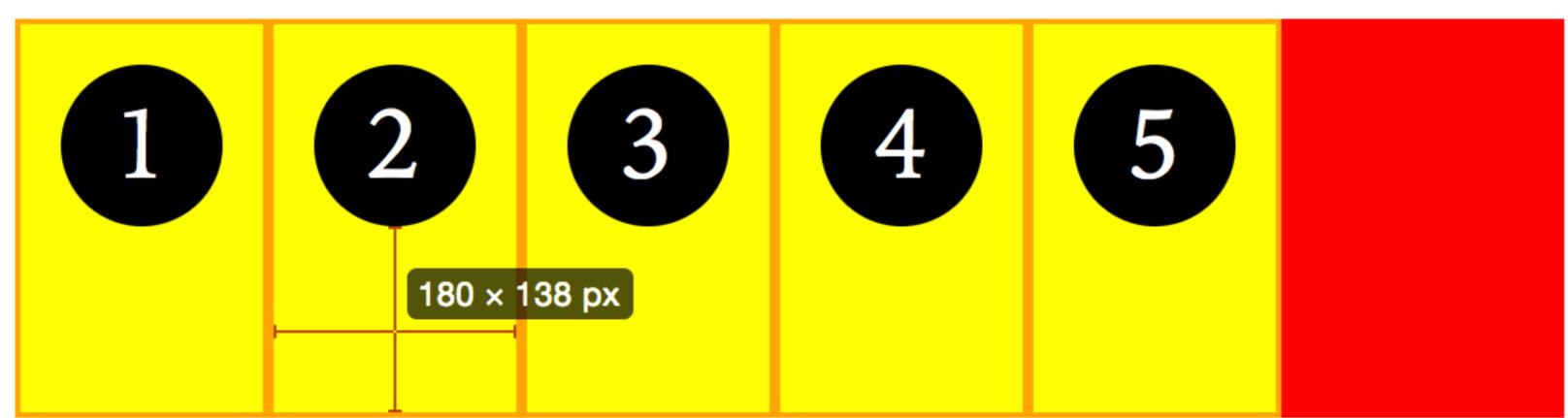
“If all items have `flex-grow` set to 1, every child will set to an equal size inside the container. If you were to give one of the children a value of 2, that child would take up twice as much space as the others.”

This is wrong! The number doesn't determine the size of the flex items; it determines *what proportion of the available space the flex item can take* if it grows



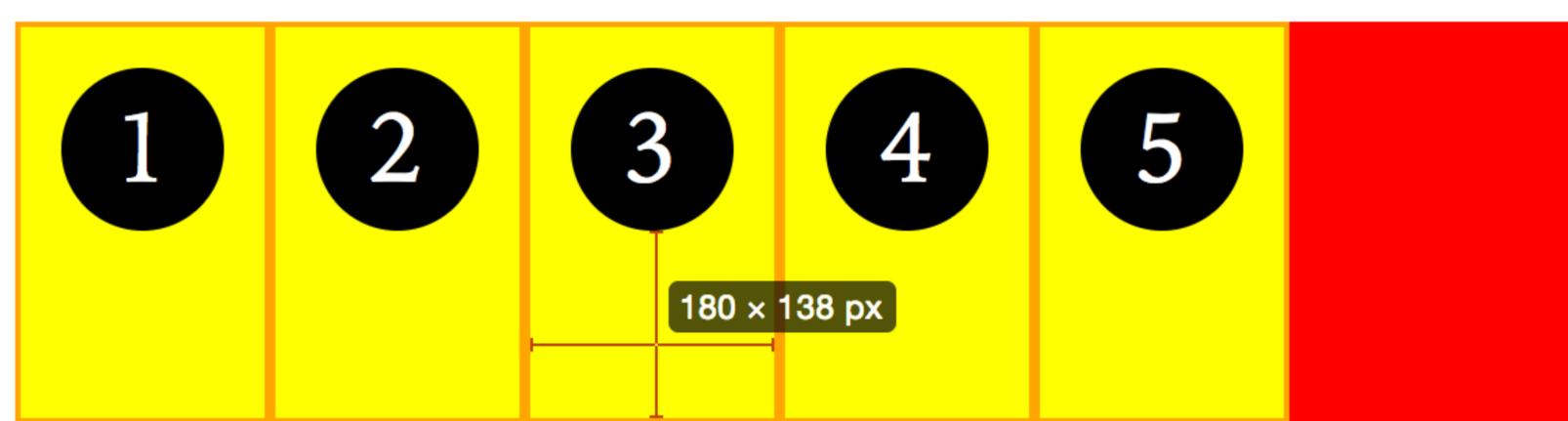
```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3 }
4
5 .flex-1 {flex-grow: 0;}
6 .flex-2 {flex-grow: 0;}
7 .flex-3 {flex-grow: 0;}
8 .flex-4 {flex-grow: 0;}
9 .flex-5 {flex-grow: 0;}
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15   height: 4em;
16 }
```



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

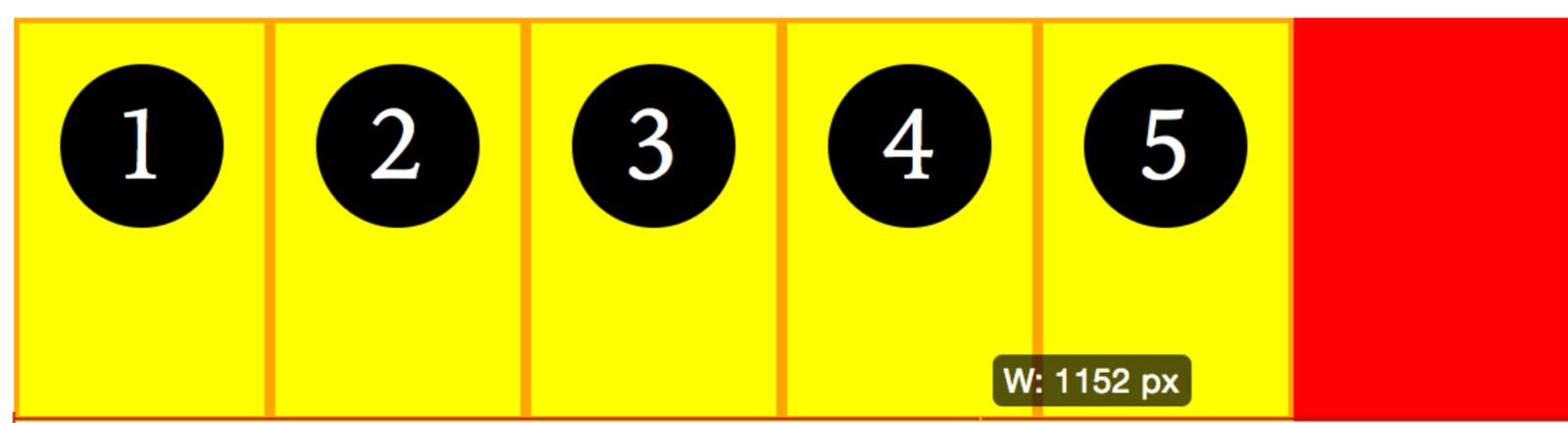
```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3 }
4
5 .flex-1 {flex-grow: 0;}
6 .flex-2 {flex-grow: 0;}
7 .flex-3 {flex-grow: 0;}
8 .flex-4 {flex-grow: 0;}
9 .flex-5 {flex-grow: 0;}
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15   height: 4em;
16 }
```



A value of `0` means that none of the flex items grow, & the `width` of `90px` is used (the measurement above says `180px` because my Mac has a Retina screen, so 1 CSS pixel = 2 device pixels)

```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

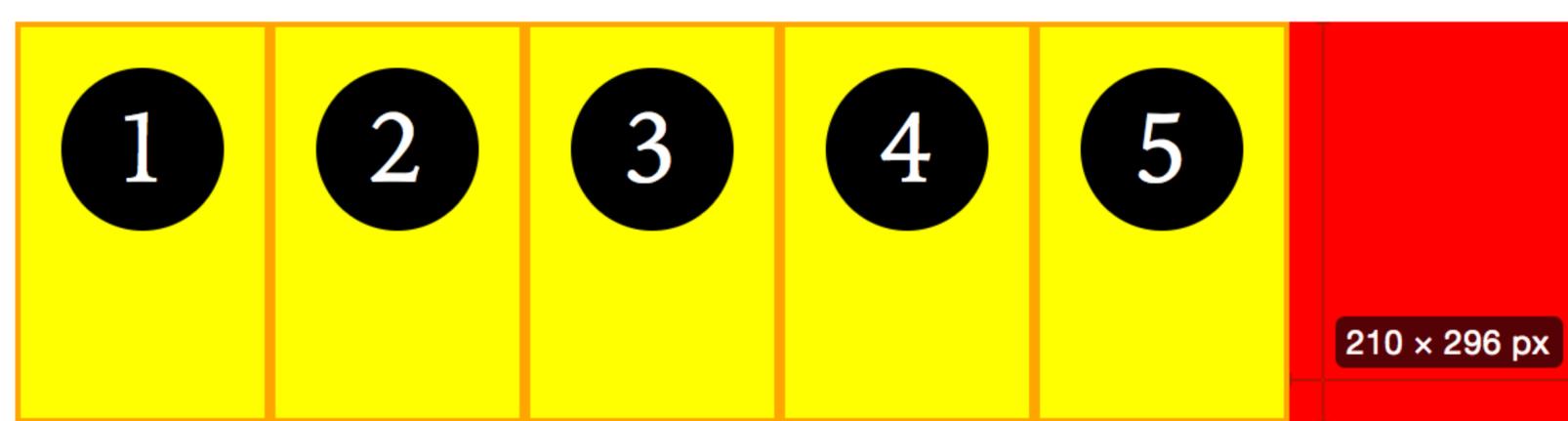
```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3 }
4
5 .flex-1 {flex-grow: 0;}
6 .flex-2 {flex-grow: 0;}
7 .flex-3 {flex-grow: 0;}
8 .flex-4 {flex-grow: 0;}
9 .flex-5 {flex-grow: 0;}
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15   height: 4em;
16 }
```



The flex container is 1152 pixels wide

```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

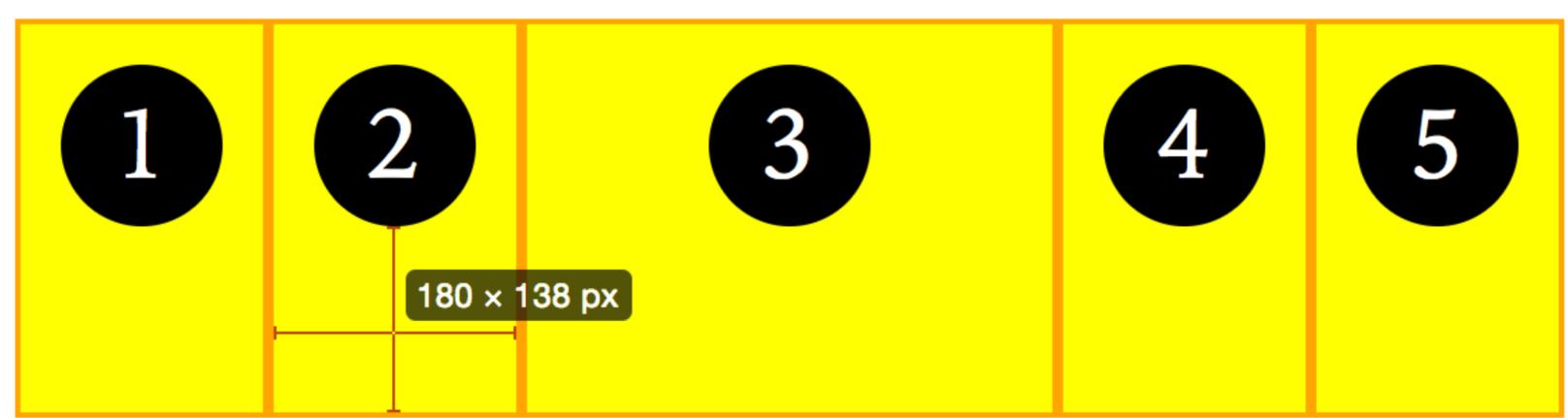
```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3 }
4
5 .flex-1 {flex-grow: 0;}
6 .flex-2 {flex-grow: 0;}
7 .flex-3 {flex-grow: 0;}
8 .flex-4 {flex-grow: 0;}
9 .flex-5 {flex-grow: 0;}
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15   height: 4em;
16 }
```



There are 210 pixels of unused space inside the 1152-pixel wide flex container

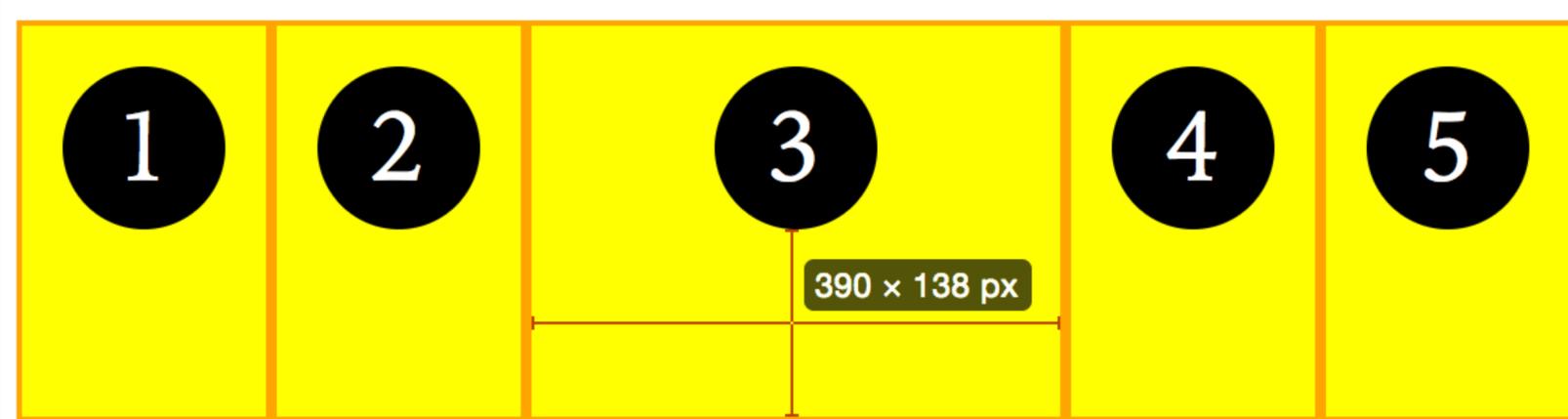
```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3 }
4
5 .flex-1 {flex-grow: 0;}
6 .flex-2 {flex-grow: 0;}
7 .flex-3 {flex-grow: 1;}
8 .flex-4 {flex-grow: 0;}
9 .flex-5 {flex-grow: 0;}
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15   height: 4em;
16 }
```



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3 }
4
5 .flex-1 {flex-grow: 0;}
6 .flex-2 {flex-grow: 0;}
7 .flex-3 {flex-grow: 1;}
8 .flex-4 {flex-grow: 0;}
9 .flex-5 {flex-grow: 0;}
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15   height: 4em;
16 }
```

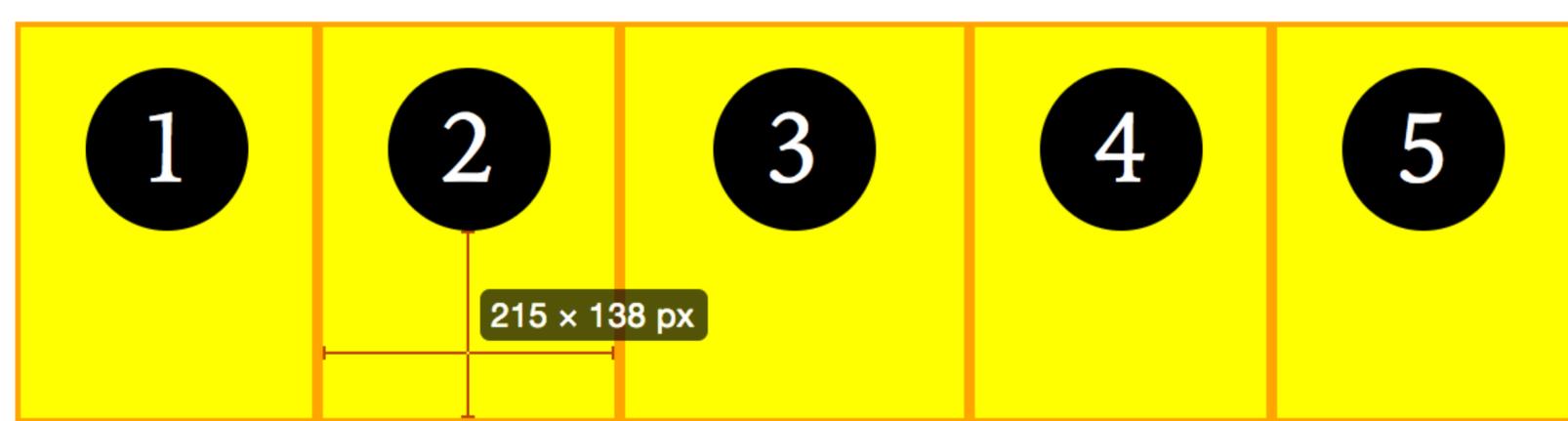


4 flex items with a value of 0 do not grow, but the flex item with a value of 1 grows to take all of the unused space ($180+210=390$)

Flex items with a value of 0 use the **width** of 90px, but the flex item with a value of 1 ignores it

```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3 }
4
5 .flex-1 {flex-grow: 1;}
6 .flex-2 {flex-grow: 1;}
7 .flex-3 {flex-grow: 2;}
8 .flex-4 {flex-grow: 1;}
9 .flex-5 {flex-grow: 1;}
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15   height: 4em;
16 }
```

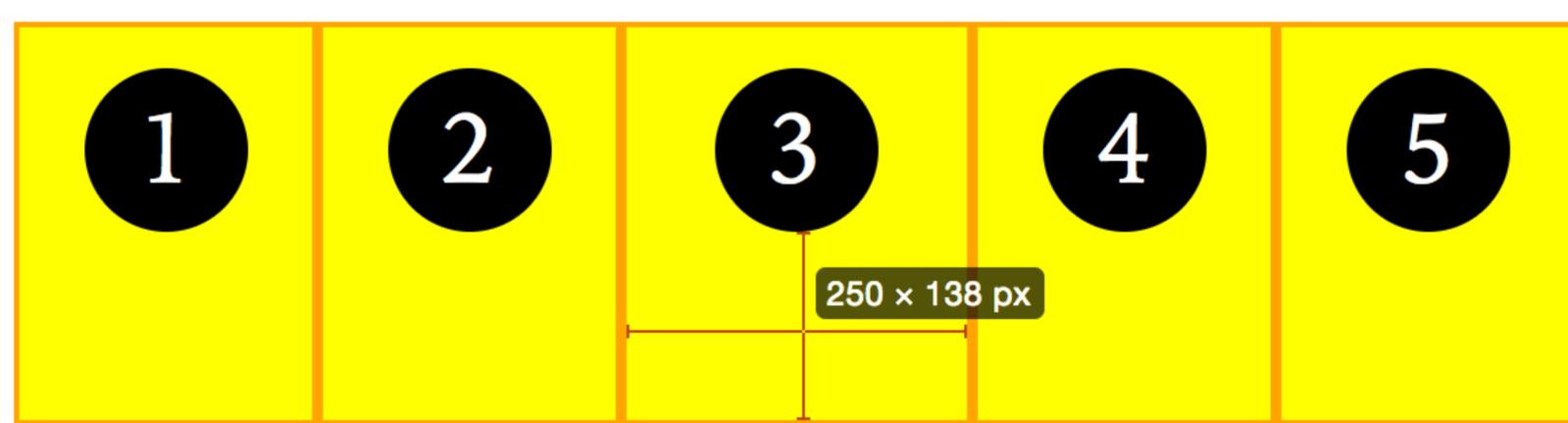


4 flex items with a value of 1 grow ($180 + 35 = 215$)

Flex items with a value of 1 ignore the **width** of **90px**

```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3 }
4
5 .flex-1 {flex-grow: 1;}
6 .flex-2 {flex-grow: 1;}
7 .flex-3 {flex-grow: 2;}
8 .flex-4 {flex-grow: 1;}
9 .flex-5 {flex-grow: 1;}
10
11 .flex-item {
12   width: 90px;
13   background-color: yellow;
14   border: 2px solid orange;
15   height: 4em;
16 }
```



4 flex items with a value of 1 grew by 35px, while the flex item with a value of 2 grows by 70px (180+70=250), 2× the proportion of the others

Flex items with a value different from 0 ignore the width of 90px

flex-shrink

Specifies *if a flex item can shrink if necessary to take up available negative space* inside the flex container

Value: `<number>`

- » No negative numbers
- » Default is `1`, so all flex items can be shrunk
- » `0` means do not shrink & maintain original size

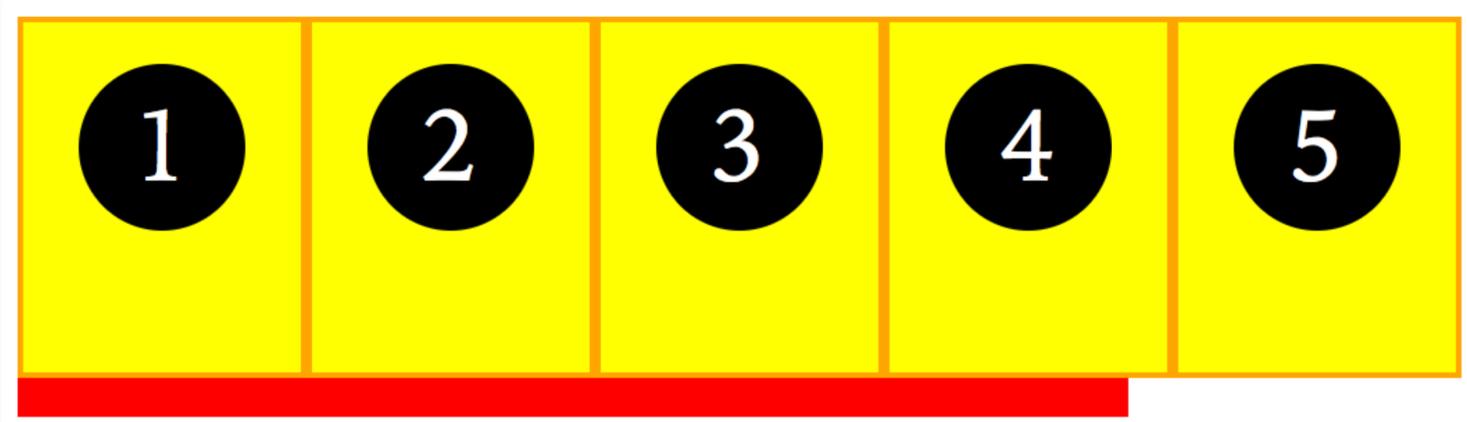


Text & flex-shrink



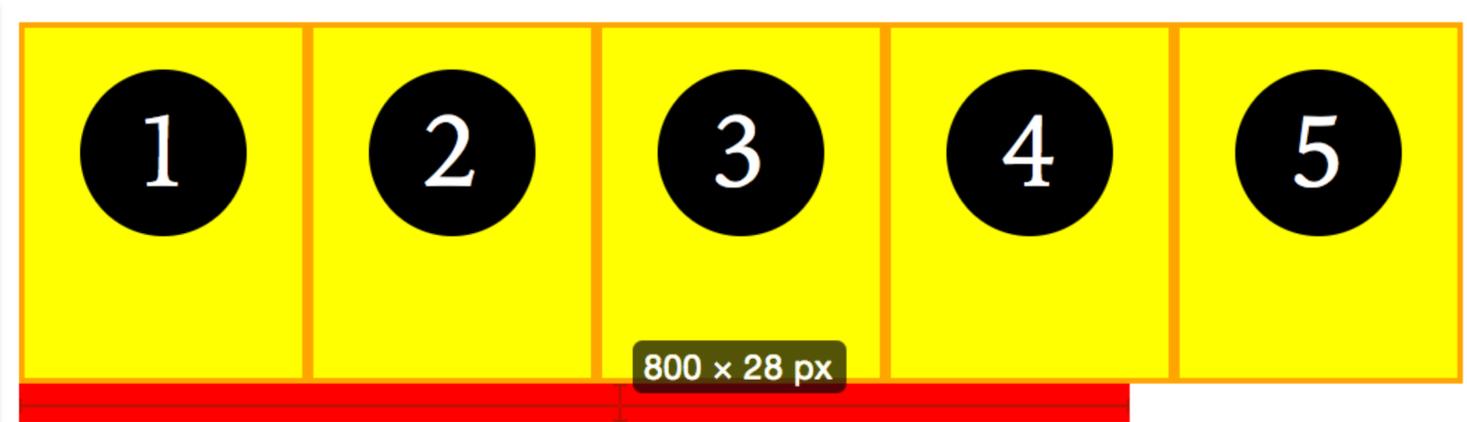
```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   width: 400px;
4 }
5
6 .flex-item {
7   width: 100px;
8   flex-shrink: 0;
9   background-color: yellow;
10  border: 2px solid orange;
11  height: 3.5em;
12 }
13
```



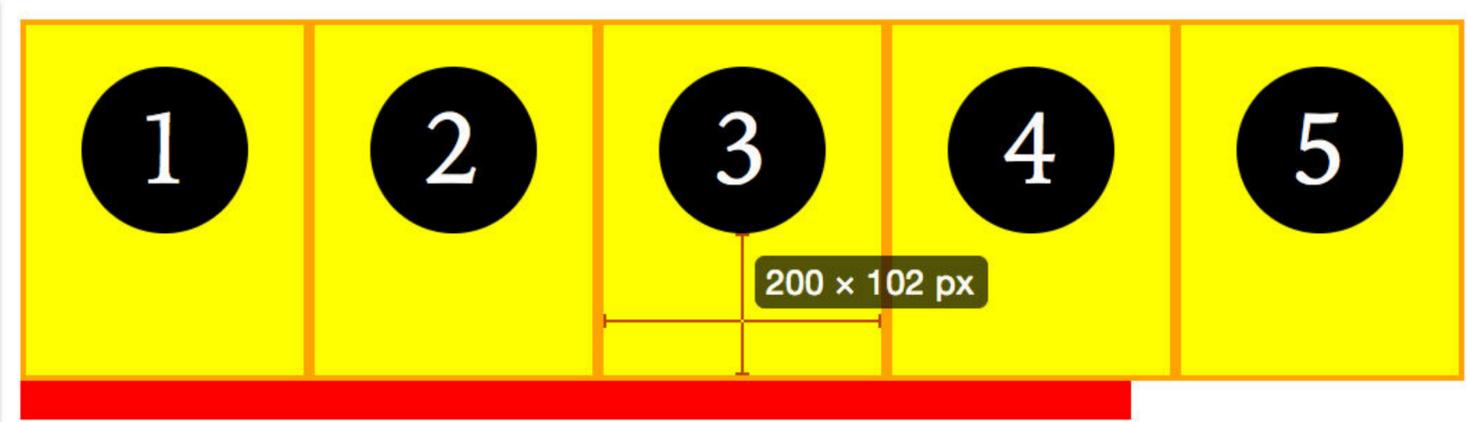
```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   width: 400px;
4 }
5
6 .flex-item {
7   width: 100px;
8   flex-shrink: 0;
9   background-color: yellow;
10  border: 2px solid orange;
11  height: 3.5em;
12 }
13
```

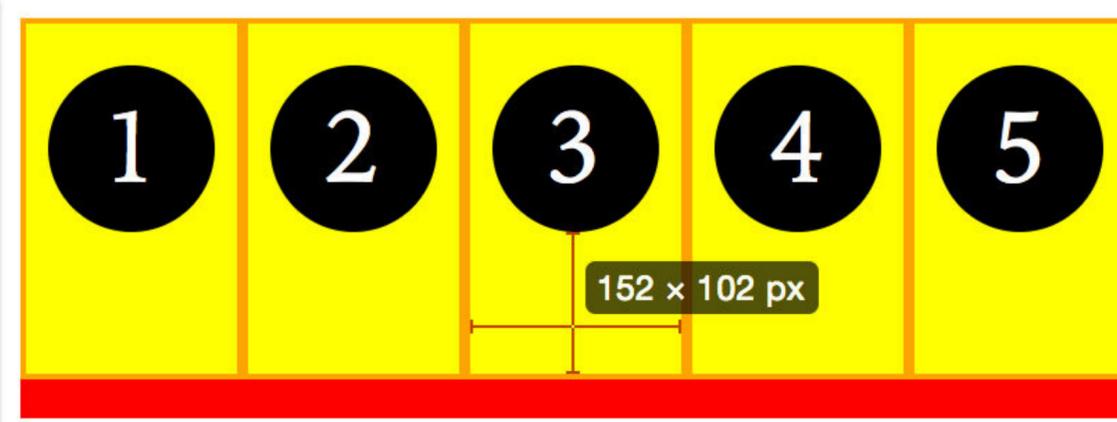


```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   width: 400px;
4 }
5
6 .flex-item {
7   width: 100px;
8   flex-shrink: 0;
9   background-color: yellow;
10  border: 2px solid orange;
11  height: 3.5em;
12 }
13
```



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item flex-1"><span>1</span></div>
3   <div class="flex-item flex-2"><span>2</span></div>
4   <div class="flex-item flex-3"><span>3</span></div>
5   <div class="flex-item flex-4"><span>4</span></div>
6   <div class="flex-item flex-5"><span>5</span></div>
7 </div>
```



$$152 \times 5 = 760$$

What about the other 40?

Borders!

$$4 + 8 + 8 + 8 + 8 + 4 = 40$$

$$760 + 40 = 800$$

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   width: 400px;
4 }
5
6 .flex-item {
7   width: 100px;
8   flex-shrink: 1;
9   background-color: yellow;
10  border: 2px solid orange;
11  height: 3.5em;
12 }
13
```

Images & `flex-shrink`



```
HTML Tidy X
1 <div class="flex-container">
2   
4   
6   
8   
10  
12 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   width: 500px;
4   justify-content: space-between;
5   align-items: center;
6 }
7
8
9
10
11
12
```



```
HTML Tidy X
1 <div class="flex-container">
2   
4   
6   
8   
10  
12 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   width: 500px;
4   justify-content: space-between;
5   align-items: center;
6 }
7
8 img {flex-shrink: 1;}
9
10
11
12
```



```
HTML Tidy X
1 <div class="flex-container">
2   
4   
6   
8   
10  
12 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   width: 500px;
4   justify-content: space-between;
5   align-items: center;
6 }
7
8 img {flex-shrink: 0;}
9
10
11
12
```



```
HTML Tidy X
1 <div class="flex-container">
2   
4   
6   
8   
10  
12 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   width: 500px;
4   justify-content: space-between;
5   align-items: center;
6 }
7
8 img {flex-shrink: 1;}
9
10 .flex-3 {flex-shrink: 0;}
11
12
```



Note that...

- » the default for `flex-grow` is `0`: do not grow
- » the default for `flex-shrink` is `1`: shrink if necessary



							
<code>flex-grow</code>	11	12	28	9	29	9.2	4.4
<code>flex-shrink</code>	11	12	28	9	29	9.2	4.4

What if you have
more flex items
than will fit
in the container?

`flex-wrap`

Specifies if flex container *lays out flex items in single or multiple lines*, & the direction new lines are stacked in

Only applies if the flex container is too small to contain the flex items



`flex-wrap`

Values:

- » `nowrap` (default)
- » `wrap`
- » `wrap-reverse`



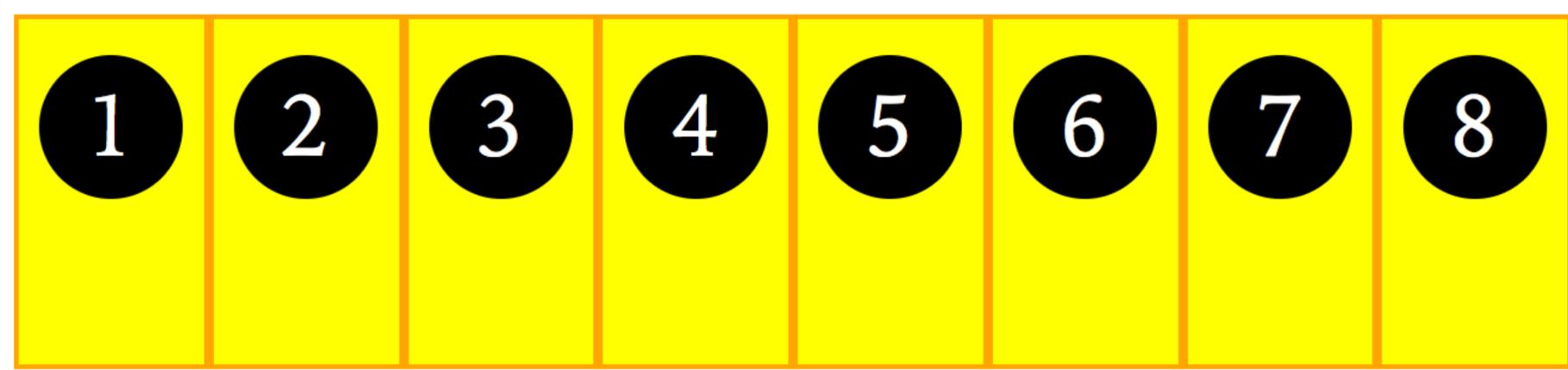
```
flex-wrap: nowrap
```

Flex items are displayed in one row & they are *shrunk* to fit the width of the flex container



```
HTML Tidy x
1 <div class="flex-container">
2   <div class="flex-item"><span>1</span></div>
3   <div class="flex-item"><span>2</span></div>
4   <div class="flex-item"><span>3</span></div>
5   <div class="flex-item"><span>4</span></div>
6   <div class="flex-item"><span>5</span></div>
7   <div class="flex-item"><span>6</span></div>
8   <div class="flex-item"><span>7</span></div>
9   <div class="flex-item"><span>8</span></div>
10 </div>
```

```
CSS Tidy View Compiled x
1 .flex-container {
2   display: flex;
3   flex-wrap: nowrap;
4   /* flex-wrap: wrap;
5   flex-wrap: wrap-reverse;*/
6 }
7
8 .flex-item {
9   width: 90px;
10  background-color: yellow;
11  border: 2px solid orange;
12  height: 4em;
```



These are *not* 90px wide

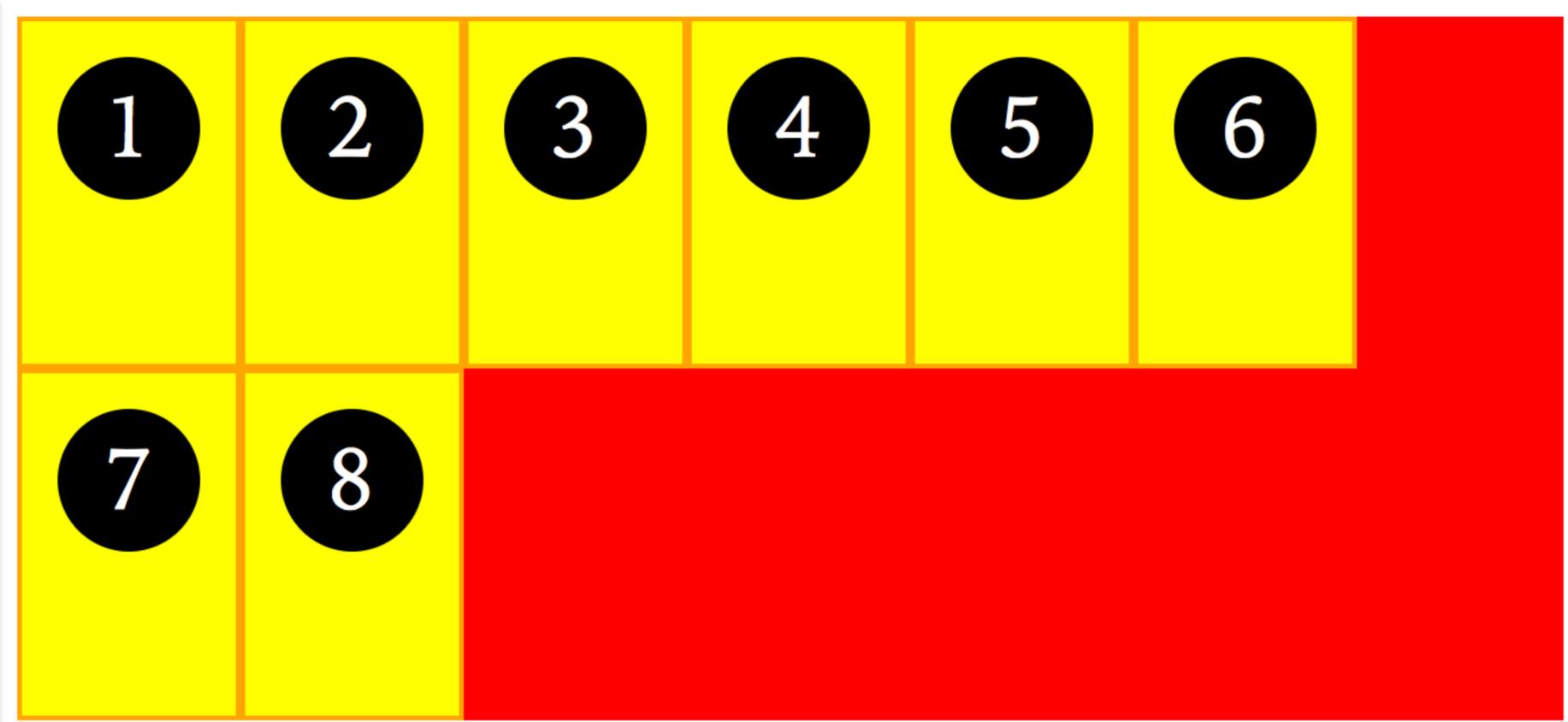
```
flex-wrap: wrap
```

Flex items are *displayed in multiple rows*, from left-to-right and top-to-bottom



```
HTML
1 <div class="flex-container">
2   <div class="flex-item"><span>1</span></div>
3   <div class="flex-item"><span>2</span></div>
4   <div class="flex-item"><span>3</span></div>
5   <div class="flex-item"><span>4</span></div>
6   <div class="flex-item"><span>5</span></div>
7   <div class="flex-item"><span>6</span></div>
8   <div class="flex-item"><span>7</span></div>
9   <div class="flex-item"><span>8</span></div>
10 </div>
```

```
CSS
1 .flex-container {
2   display: flex;
3   flex-wrap: wrap;
4   /* flex-wrap: nowrap;
5   flex-wrap: wrap-reverse;*/
6 }
7
8 .flex-item {
9   width: 90px;
10  background-color: yellow;
11  border: 2px solid orange;
12  height: 4em;
```



These are 90px wide

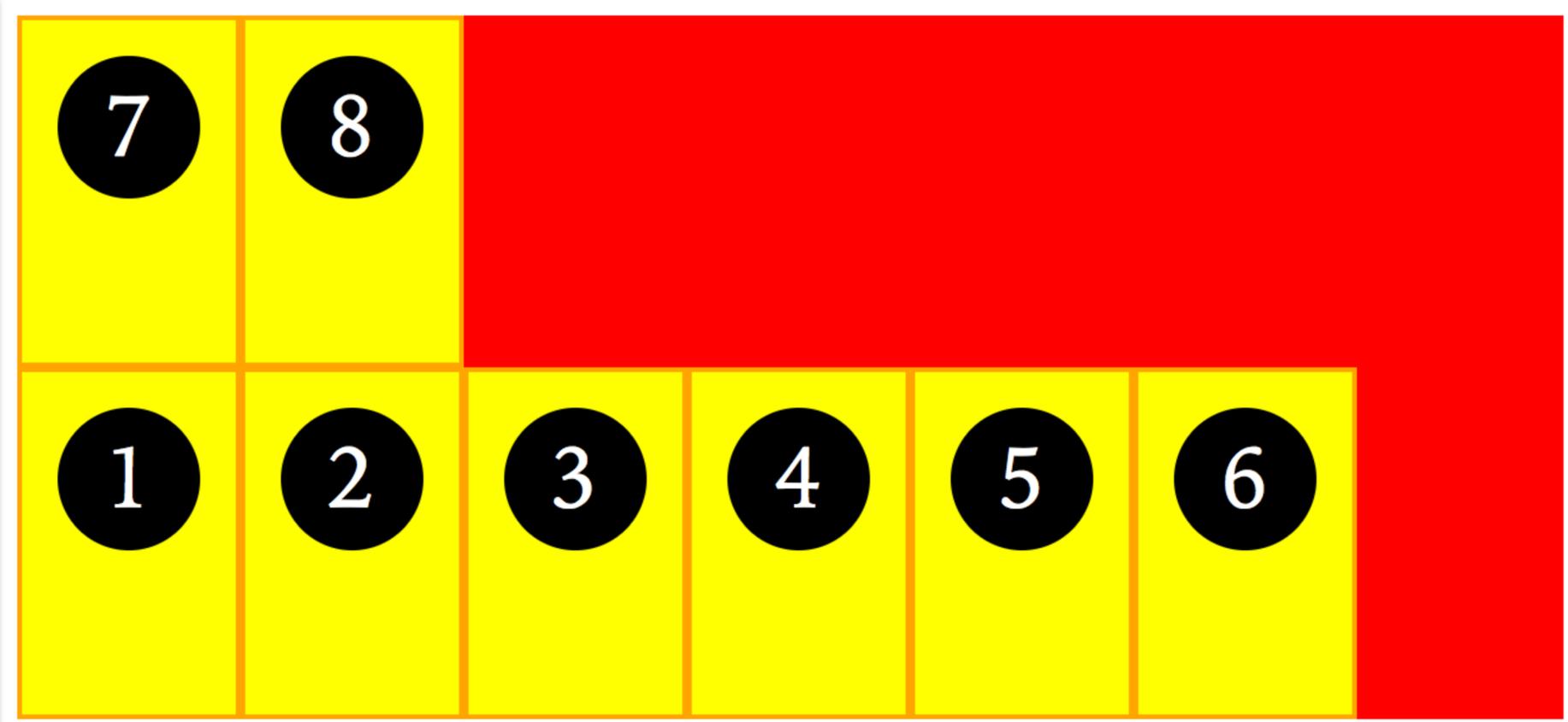
`flex-wrap: wrap-reverse`

Flex items are *displayed in multiple rows*, from left-to-right *but from bottom-to-top*



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item"><span>1</span></div>
3   <div class="flex-item"><span>2</span></div>
4   <div class="flex-item"><span>3</span></div>
5   <div class="flex-item"><span>4</span></div>
6   <div class="flex-item"><span>5</span></div>
7   <div class="flex-item"><span>6</span></div>
8   <div class="flex-item"><span>7</span></div>
9   <div class="flex-item"><span>8</span></div>
10 </div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-wrap: wrap-reverse;
4   /* flex-wrap: nowrap;
5   flex-wrap: wrap; */
6 }
7
8 .flex-item {
9   width: 90px;
10  background-color: yellow;
11  border: 2px solid orange;
12  height: 4em;
```



`align-content`

Aligns multiple lines of flex items within the flex container when there is extra space in the cross axis

Similar to how `justify-content` aligns individual items within the main axis



`align-content`

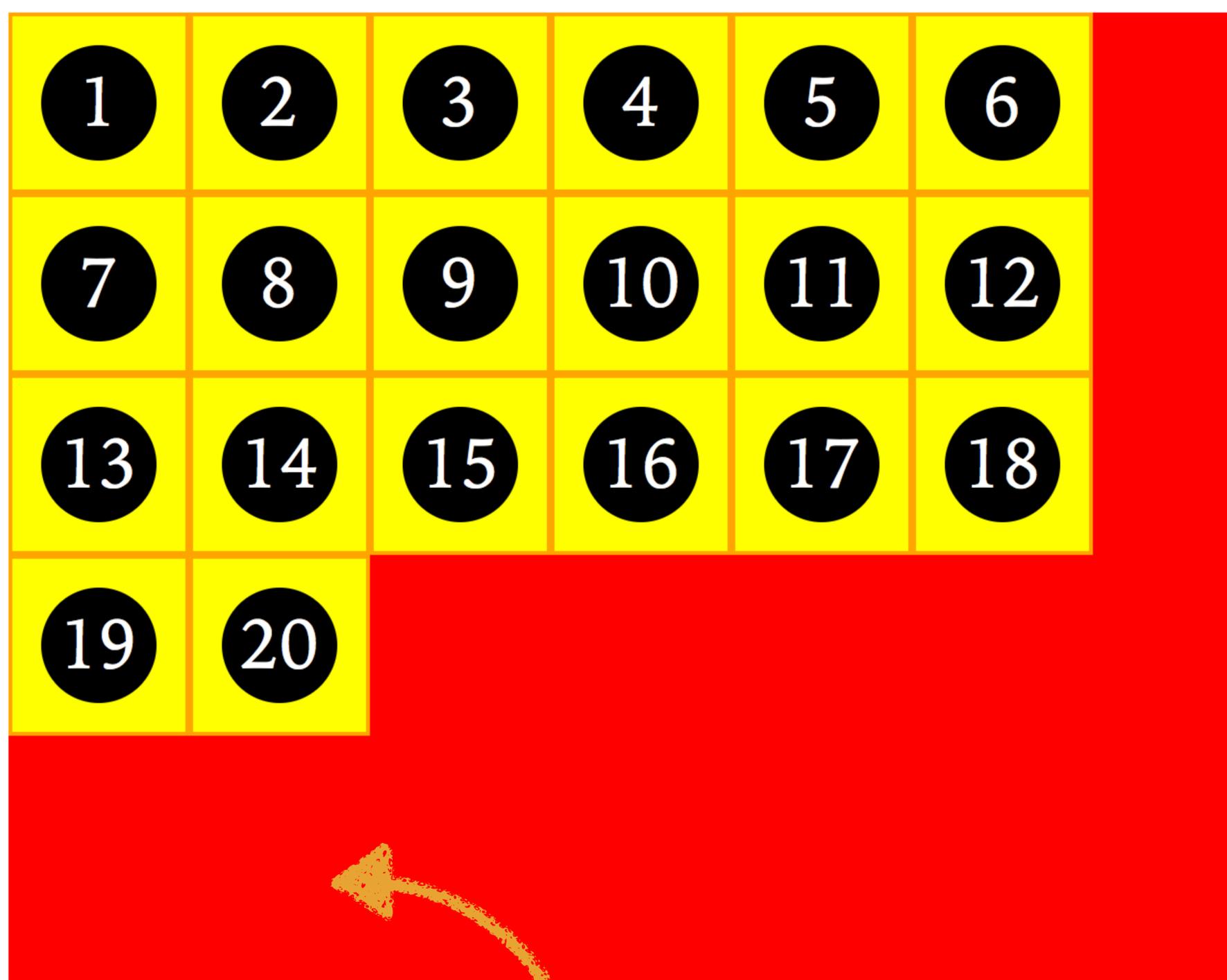
Values:

- » `stretch` (Default)
- » `flex-start`
- » `flex-end`
- » `center`
- » `space-between`
- » `space-around`



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item"><span>1</span></div>
3   <div class="flex-item"><span>2</span></div>
4   <div class="flex-item"><span>3</span></div>
5   <div class="flex-item"><span>4</span></div>
6   <div class="flex-item"><span>5</span></div>
7   <div class="flex-item"><span>6</span></div>
8   <div class="flex-item"><span>7</span></div>
9   <div class="flex-item"><span>8</span></div>
10  <div class="flex-item"><span>9</span></div>
11  <div class="flex-item"><span>10</span></div>
12  <div class="flex-item"><span>11</span></div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-wrap: wrap;
4   align-items: flex-start;
5   align-content: flex-start;
6   /* align-content: stretch;
7   align-content: flex-end;
8   align-content: center;
9   align-content: space-between;
10  align-content: space-around; */
11 }
12
```



What to do about this extra space?

`align-content` only effects layout when there are *multiple lines* of flex items inside the flex container

If there is only a single line of flex items, `align-content` has no effect on the layout



`align-content: stretch`

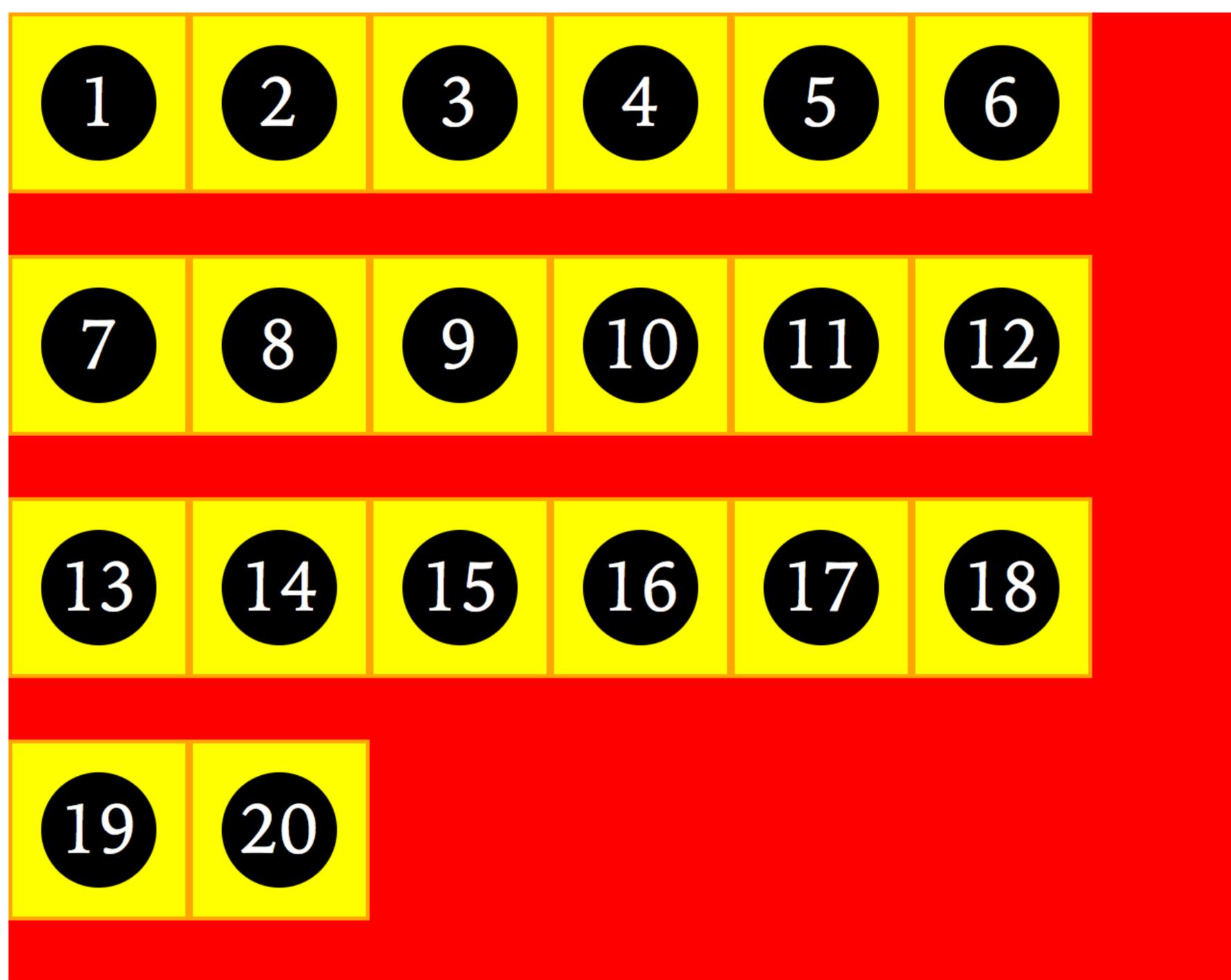
Flex items display with *distributed space after every row* of flex items

Default for `align-content`



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item"><span>1</span></div>
3   <div class="flex-item"><span>2</span></div>
4   <div class="flex-item"><span>3</span></div>
5   <div class="flex-item"><span>4</span></div>
6   <div class="flex-item"><span>5</span></div>
7   <div class="flex-item"><span>6</span></div>
8   <div class="flex-item"><span>7</span></div>
9   <div class="flex-item"><span>8</span></div>
10  <div class="flex-item"><span>9</span></div>
11  <div class="flex-item"><span>10</span></div>
12  <div class="flex-item"><span>11</span></div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-wrap: wrap;
4   align-items: flex-start;
5   align-content: stretch;
6   /* align-content: flex-start;
7   align-content: flex-end;
8   align-content: center;
9   align-content: space-between;
10  align-content: space-around; */
11 }
12
```



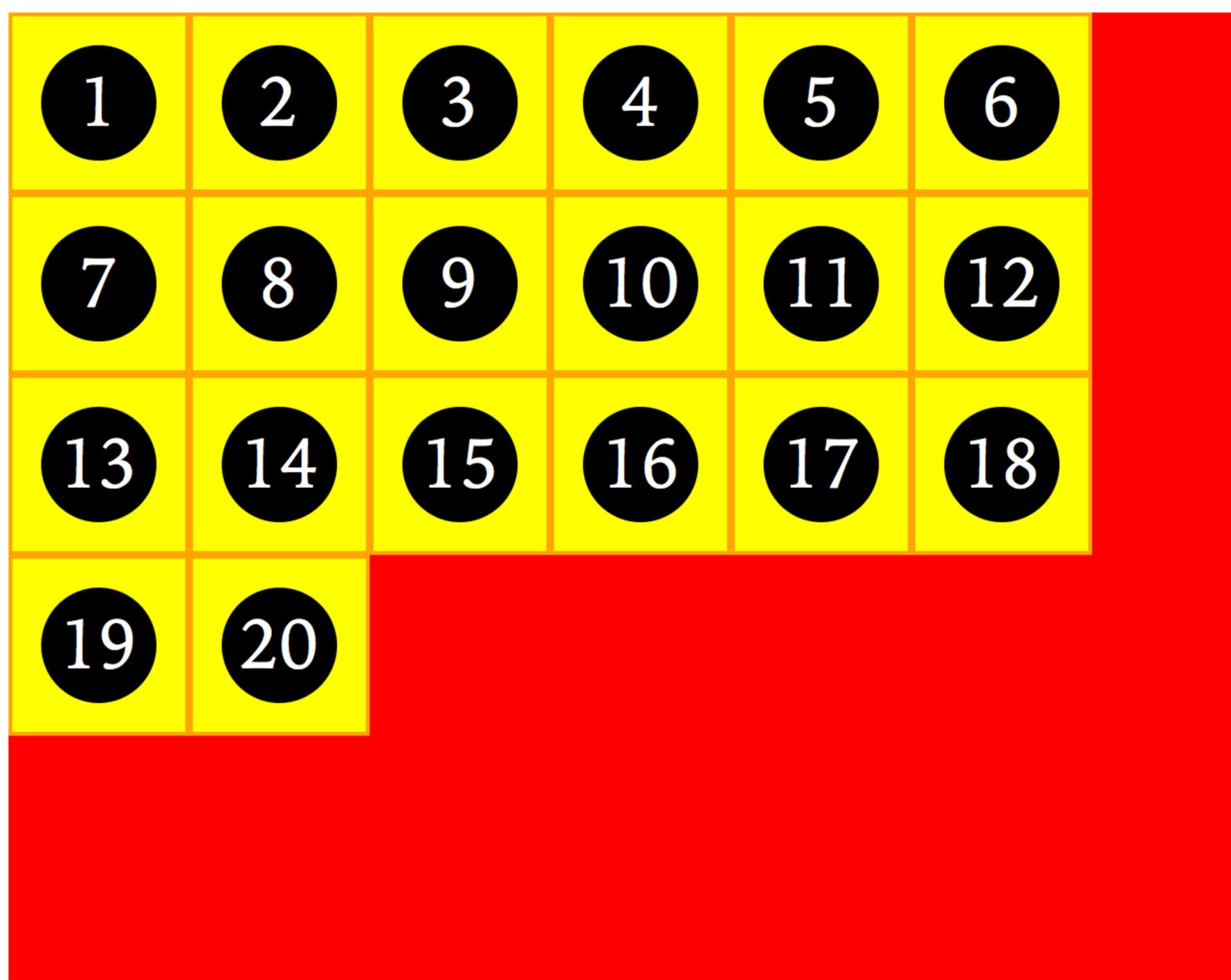
```
align-content: flex-start
```

Flex items *begin at the cross start* of the flex container



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item"><span>1</span></div>
3   <div class="flex-item"><span>2</span></div>
4   <div class="flex-item"><span>3</span></div>
5   <div class="flex-item"><span>4</span></div>
6   <div class="flex-item"><span>5</span></div>
7   <div class="flex-item"><span>6</span></div>
8   <div class="flex-item"><span>7</span></div>
9   <div class="flex-item"><span>8</span></div>
10  <div class="flex-item"><span>9</span></div>
11  <div class="flex-item"><span>10</span></div>
12  <div class="flex-item"><span>11</span></div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-wrap: wrap;
4   align-items: flex-start;
5   align-content: flex-start;
6   /* align-content: stretch;
7   align-content: flex-end;
8   align-content: center;
9   align-content: space-between;
10  align-content: space-around; */
11 }
12
```



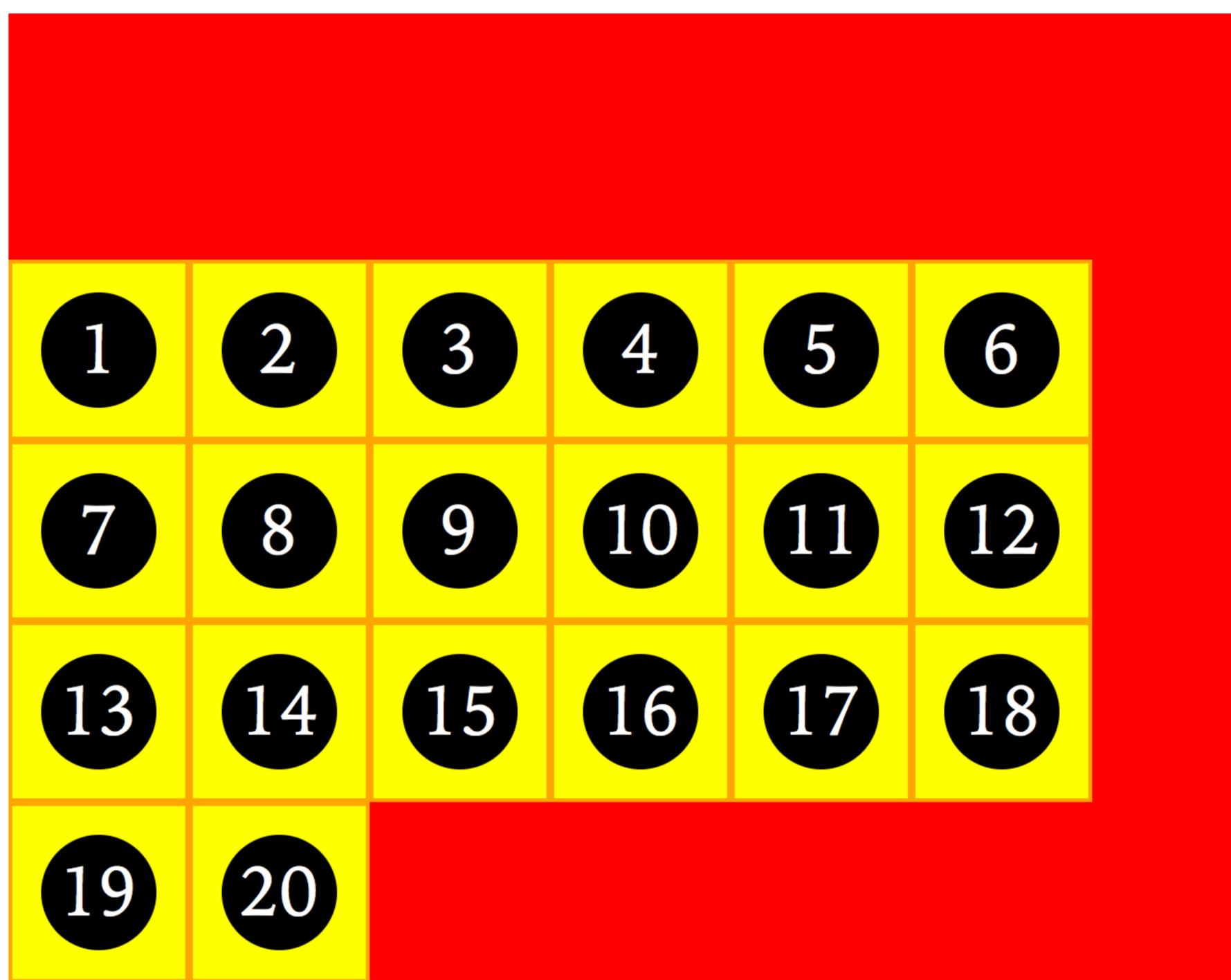
```
align-content: flex-end
```

Flex items are *stacked at the cross end* of the flex container, but not starting there



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item"><span>1</span></div>
3   <div class="flex-item"><span>2</span></div>
4   <div class="flex-item"><span>3</span></div>
5   <div class="flex-item"><span>4</span></div>
6   <div class="flex-item"><span>5</span></div>
7   <div class="flex-item"><span>6</span></div>
8   <div class="flex-item"><span>7</span></div>
9   <div class="flex-item"><span>8</span></div>
10  <div class="flex-item"><span>9</span></div>
11  <div class="flex-item"><span>10</span></div>
12  <div class="flex-item"><span>11</span></div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-wrap: wrap;
4   align-items: flex-start;
5   align-content: flex-end;
6   /* align-content: stretch;
7   align-content: flex-start;
8   align-content: center;
9   align-content: space-between;
10  align-content: space-around; */
11 }
12
```



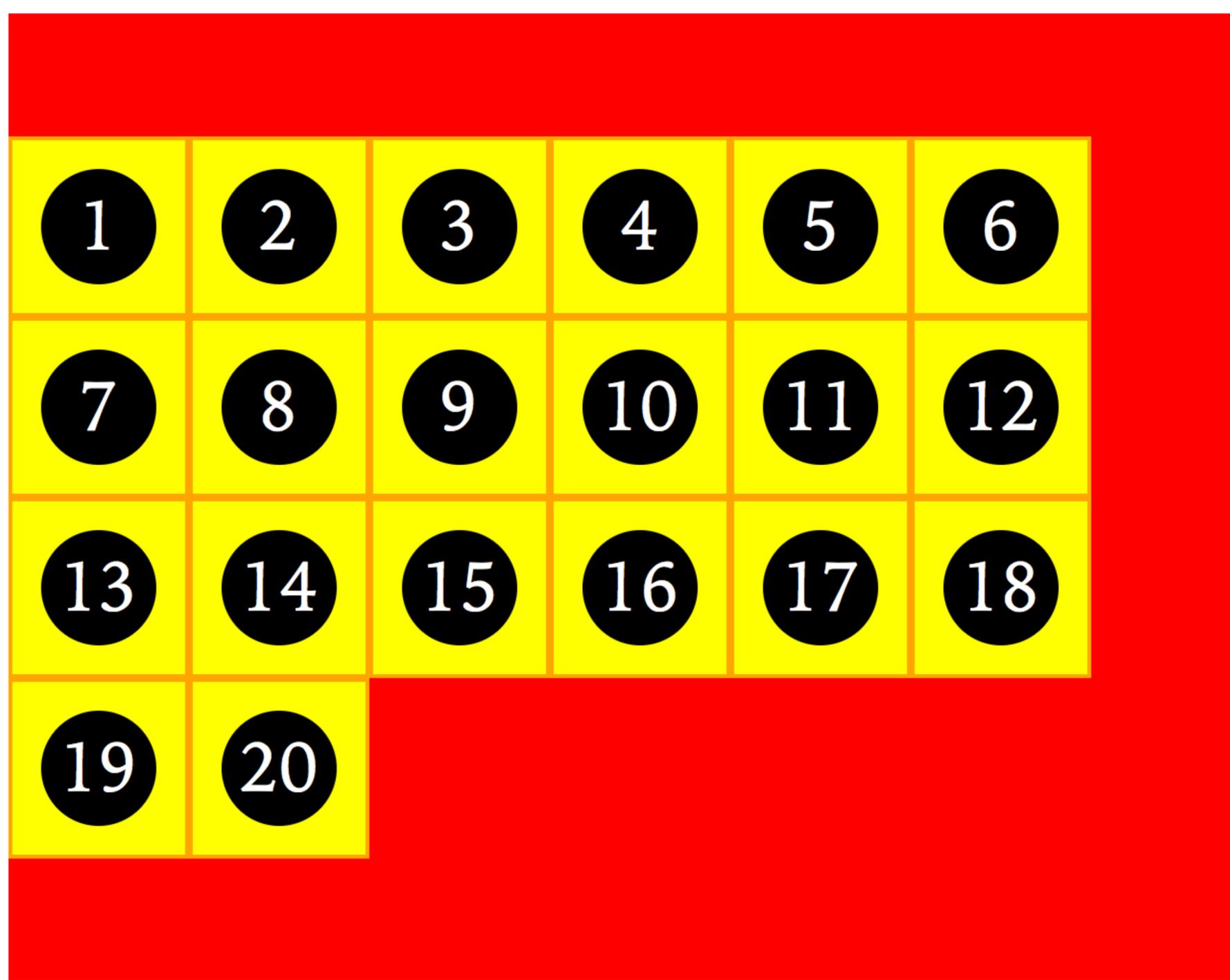
```
align-content: center
```

Flex items are *stacked in the center of the cross axis* of the flex container



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item"><span>1</span></div>
3   <div class="flex-item"><span>2</span></div>
4   <div class="flex-item"><span>3</span></div>
5   <div class="flex-item"><span>4</span></div>
6   <div class="flex-item"><span>5</span></div>
7   <div class="flex-item"><span>6</span></div>
8   <div class="flex-item"><span>7</span></div>
9   <div class="flex-item"><span>8</span></div>
10  <div class="flex-item"><span>9</span></div>
11  <div class="flex-item"><span>10</span></div>
12  <div class="flex-item"><span>11</span></div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-wrap: wrap;
4   align-items: flex-start;
5   align-content: center;
6   /* align-content: stretch;
7   align-content: flex-start;
8   align-content: flex-end;
9   align-content: space-between;
10  align-content: space-around; */
11 }
12
```



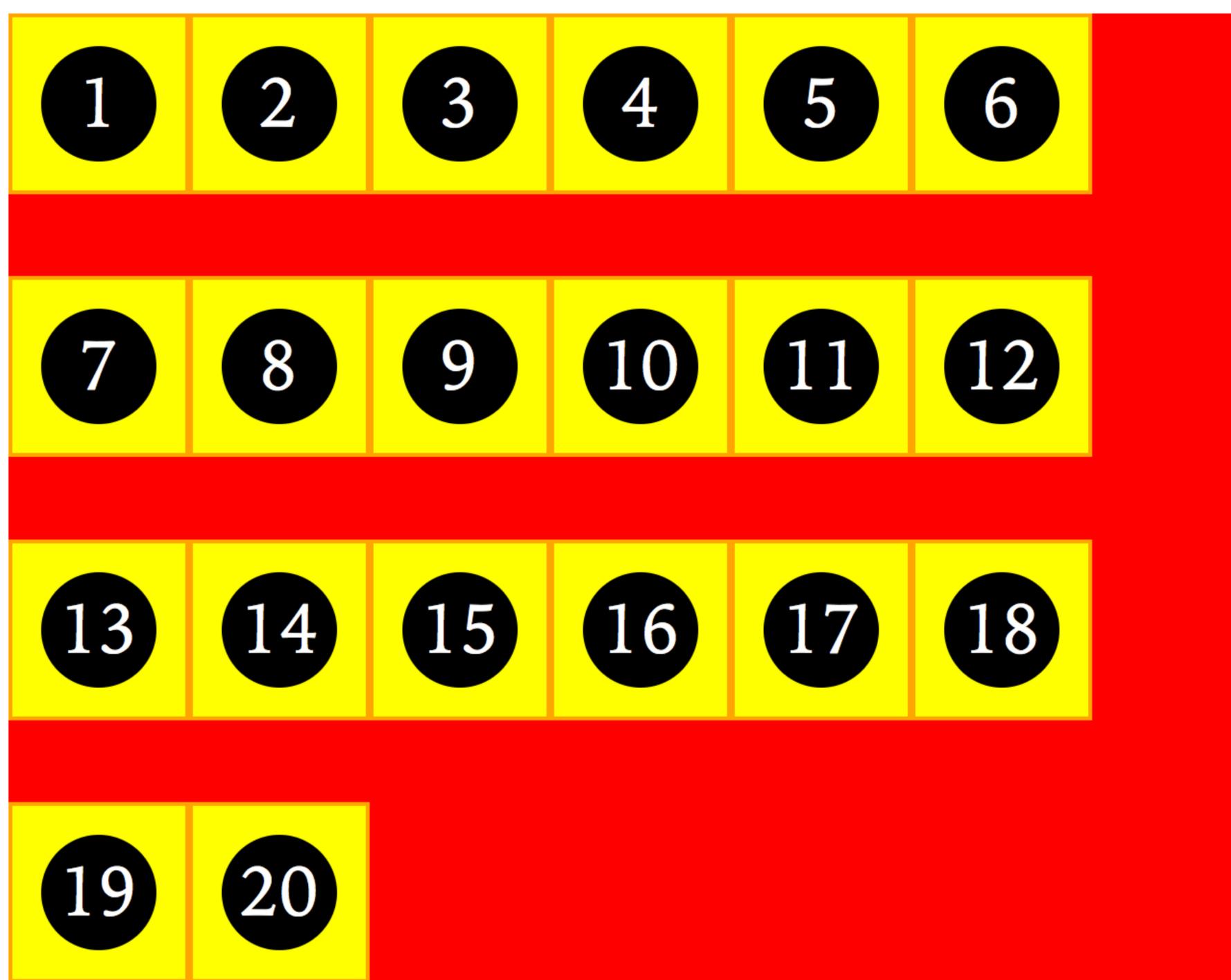
`align-content: space-between`

Rows of flex items have *equal spacing between them*, with first & last rows aligned to the top & bottom edges of the flex container



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item"><span>1</span></div>
3   <div class="flex-item"><span>2</span></div>
4   <div class="flex-item"><span>3</span></div>
5   <div class="flex-item"><span>4</span></div>
6   <div class="flex-item"><span>5</span></div>
7   <div class="flex-item"><span>6</span></div>
8   <div class="flex-item"><span>7</span></div>
9   <div class="flex-item"><span>8</span></div>
10  <div class="flex-item"><span>9</span></div>
11  <div class="flex-item"><span>10</span></div>
12  <div class="flex-item"><span>11</span></div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-wrap: wrap;
4   align-items: flex-start;
5   align-content: space-between;
6   /* align-content: stretch;
7   align-content: flex-start;
8   align-content: flex-end;
9   align-content: center;
10  align-content: space-around; */
11 }
12
```



No space after last row (or before 1st row), but equal space between rows

`align-content: space-around`

Rows of flex items have *equal spacing around them*, even the first & last row

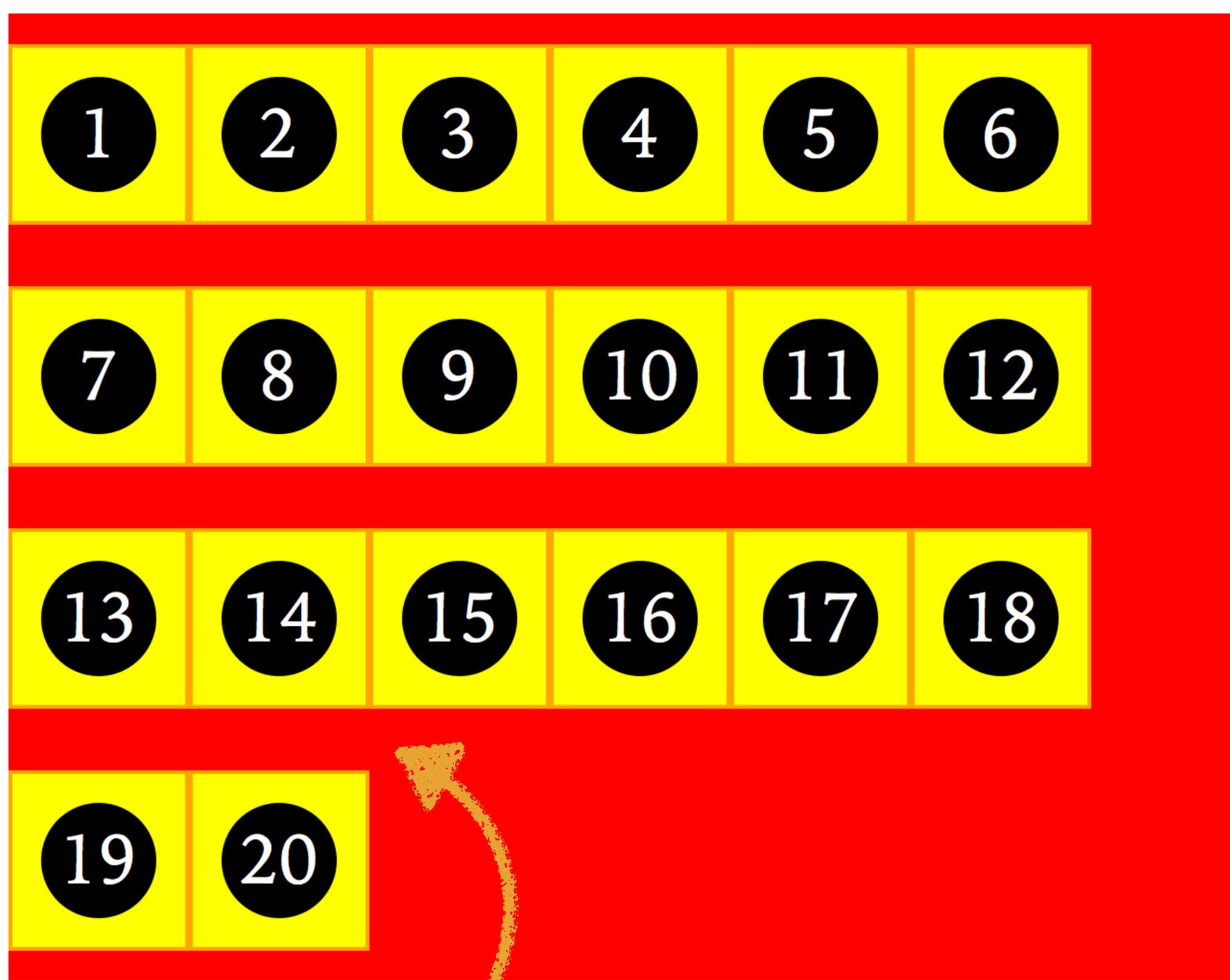
Empty space before the first row, and after the last row, equals half of the space between two adjacent rows

Similar to `justify-content: space-around`, but focuses on rows instead of flex items



```
HTML Tidy X
1 <div class="flex-container">
2   <div class="flex-item"><span>1</span></div>
3   <div class="flex-item"><span>2</span></div>
4   <div class="flex-item"><span>3</span></div>
5   <div class="flex-item"><span>4</span></div>
6   <div class="flex-item"><span>5</span></div>
7   <div class="flex-item"><span>6</span></div>
8   <div class="flex-item"><span>7</span></div>
9   <div class="flex-item"><span>8</span></div>
10  <div class="flex-item"><span>9</span></div>
11  <div class="flex-item"><span>10</span></div>
12  <div class="flex-item"><span>11</span></div>
```

```
CSS Tidy View Compiled X
1 .flex-container {
2   display: flex;
3   flex-wrap: wrap;
4   align-items: flex-start;
5   align-content: space-around;
6   /* align-content: stretch;
7   align-content: flex-start;
8   align-content: flex-end;
9   align-content: center;
10  align-content: space-between; */
11 }
12
```



Space after last row (& before 1st row) is 1/2 of space between rows

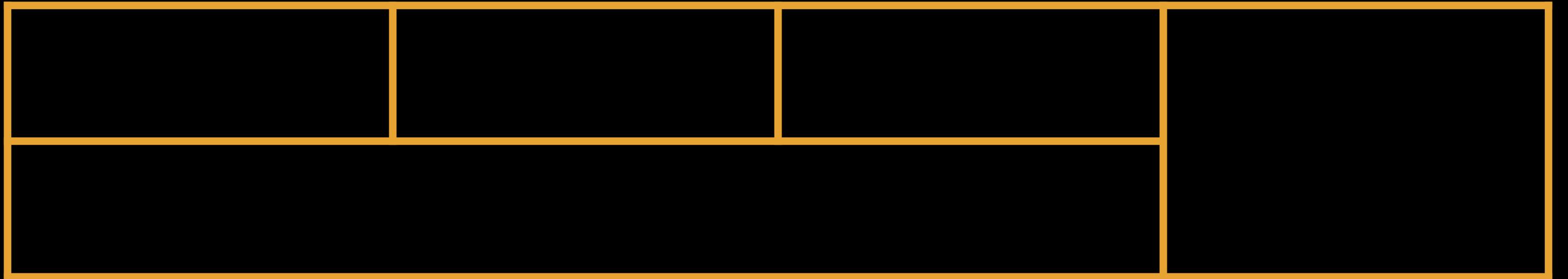
display: grid

Flexbox is for distributing elements across an area by assigning a direction & then following from there

Grid assigns objects within a flexible, defined intersecting set of horizontal & vertical lines in both directions



Flexbox



Grid



CSS Grid Layout - CR

Method of using a grid concept to lay out content, providing a mechanism for authors to divide available space for layout into columns and rows using a set of predictable sizing behaviors. Includes support for all `grid-*` properties and the `fr` unit.

Usage % of all users
Global 84.95% + 2.91% = 87.85%
unprefixed: 84.95%

As of October 2018

Current aligned | Usage relative | Date relative | Apply filters | Show all | ?

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Blackberry Browser	Opera Mobile *	Chrome for Android	Firefox for Android	IE M
		2-39	4-28										
		3 40-51	1 29-56		10-27								
6-9	2 12-15	4 52-53	4 57	3.1-10	1 28-43	3.2-10.2							
2 10	16	54-61	58-69	10.1-11.1	44-55	10.3-11.2		2.1-4.4.4	7	12-12.1			2
2 11	17	62	70	12	56	11.4	all	67	10	46	69	62	2
	18	63-64	71-73	TP		12							

Notes | Known issues (2) | Resources (13) | Feedback

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

² Partial support in IE refers to supporting an *older version* of the specification.

Concepts & Terms

With tables, Flexbox you can visualize the layout itself via the HTML

Grid, however, defines all layout in the CSS
Dev tools allow you to inspect something besides DOM items — layout structures instead

Grid is about using CSS to define layout scaffolding & then placing rendered boxes onto that scaffolding

Grid *container* defines the grid structure

Grid is composed of *lines, cells, areas, tracks*

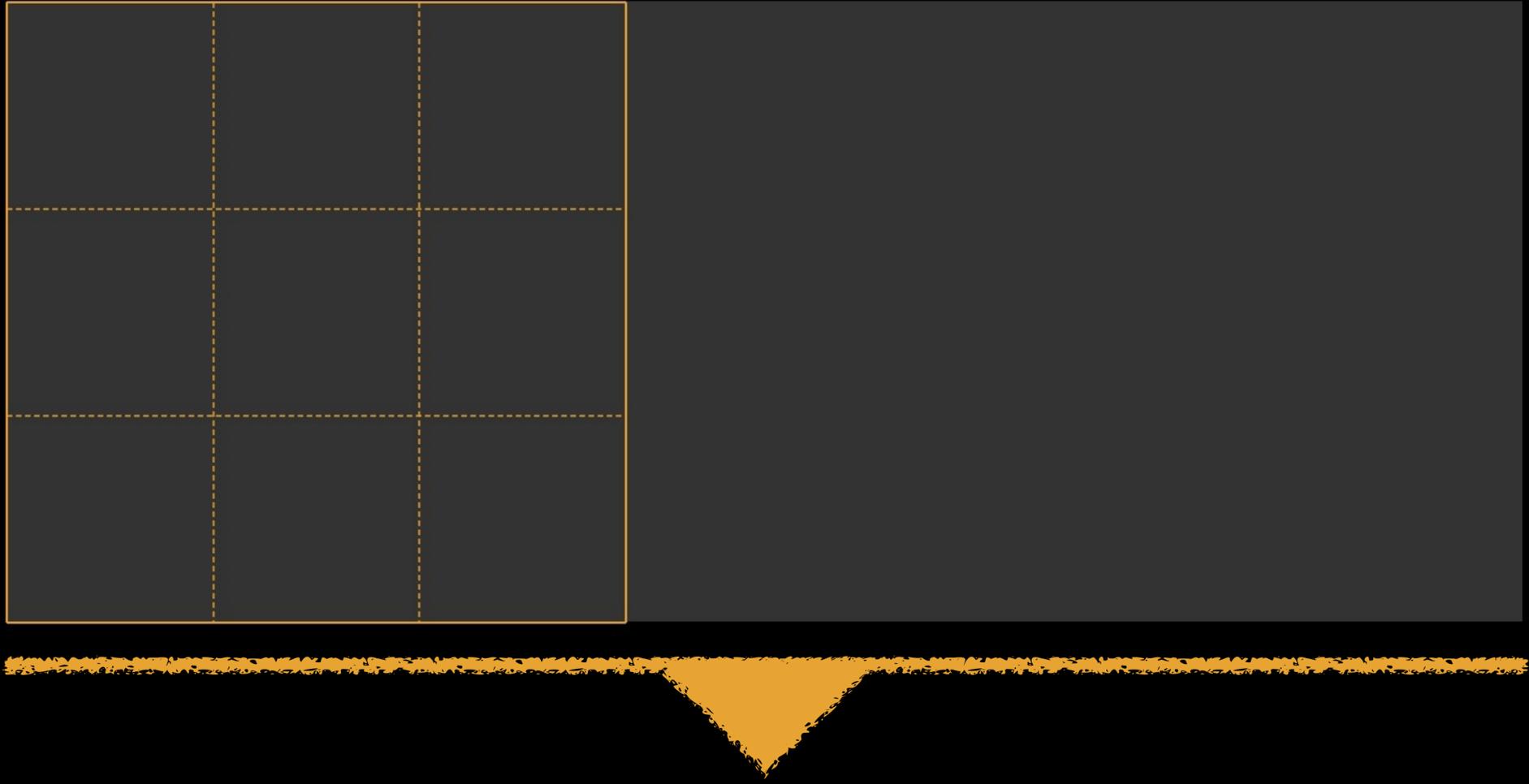
Grid *items* are placed into areas

Grid *gutters* are thick lines between tracks

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

```
JS
```

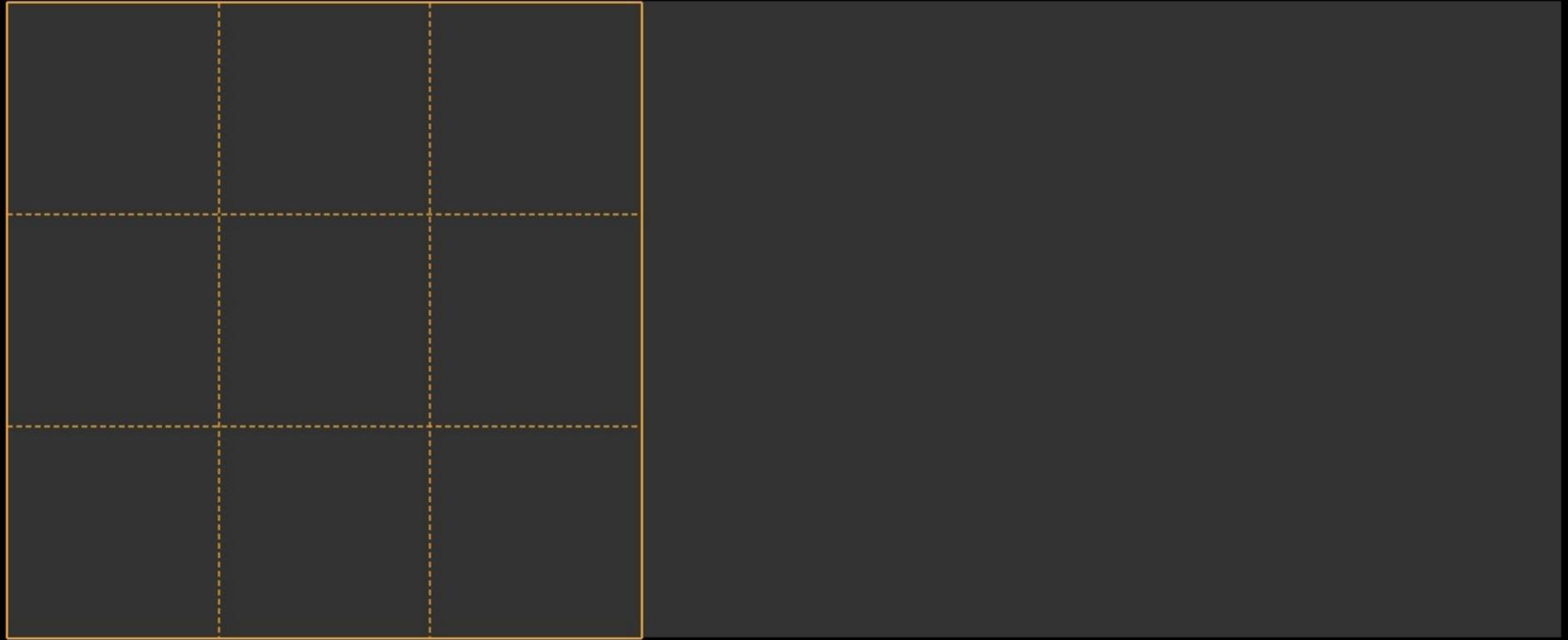


- Grid container*
- » creates a *grid layout context*
 - » can be bigger (or smaller) than the grid itself

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

```
JS
```

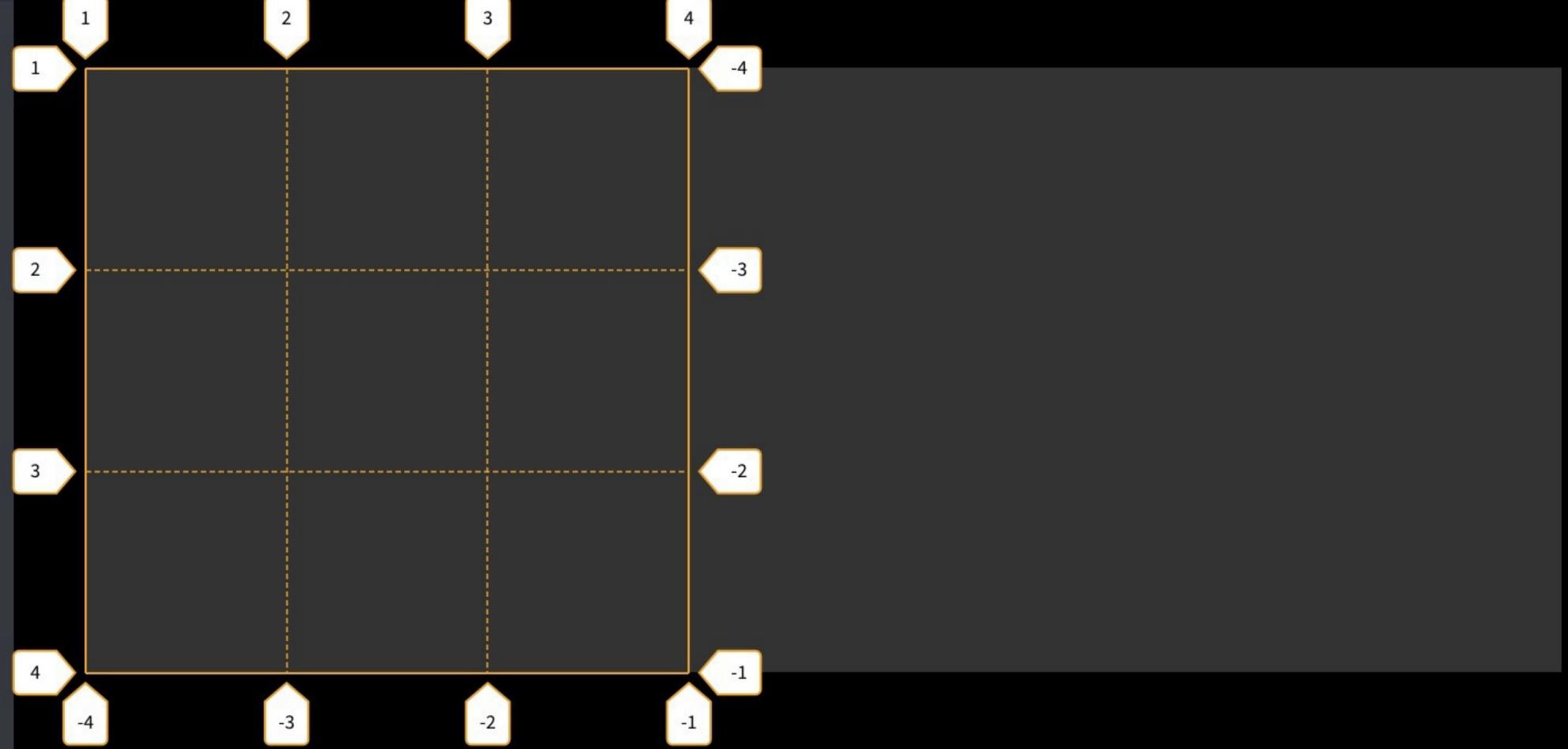


Grid lines divide the grid, & they are key to understanding grid layout

This grid has 8 lines

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

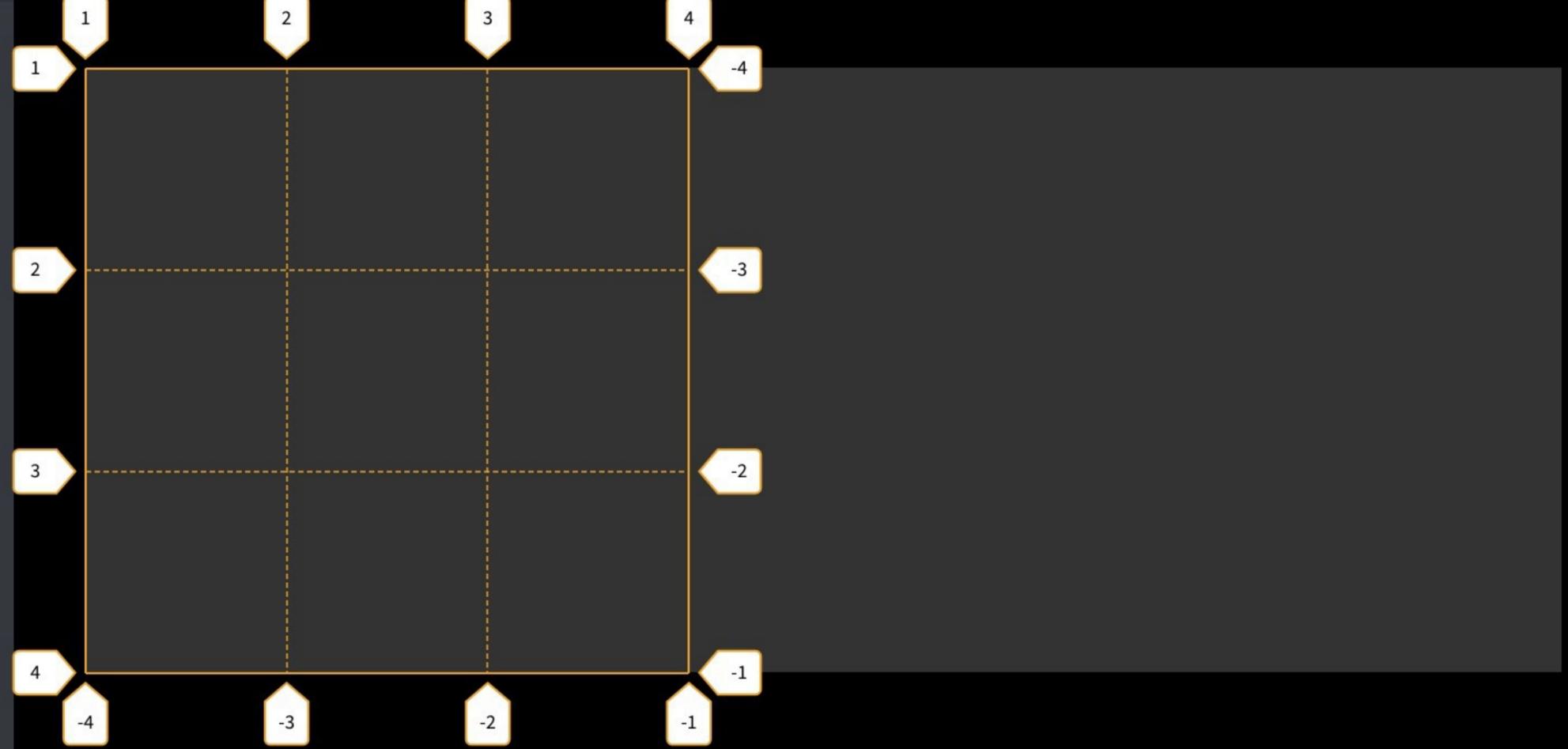


Grid lines are numbered

```
JS
```

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

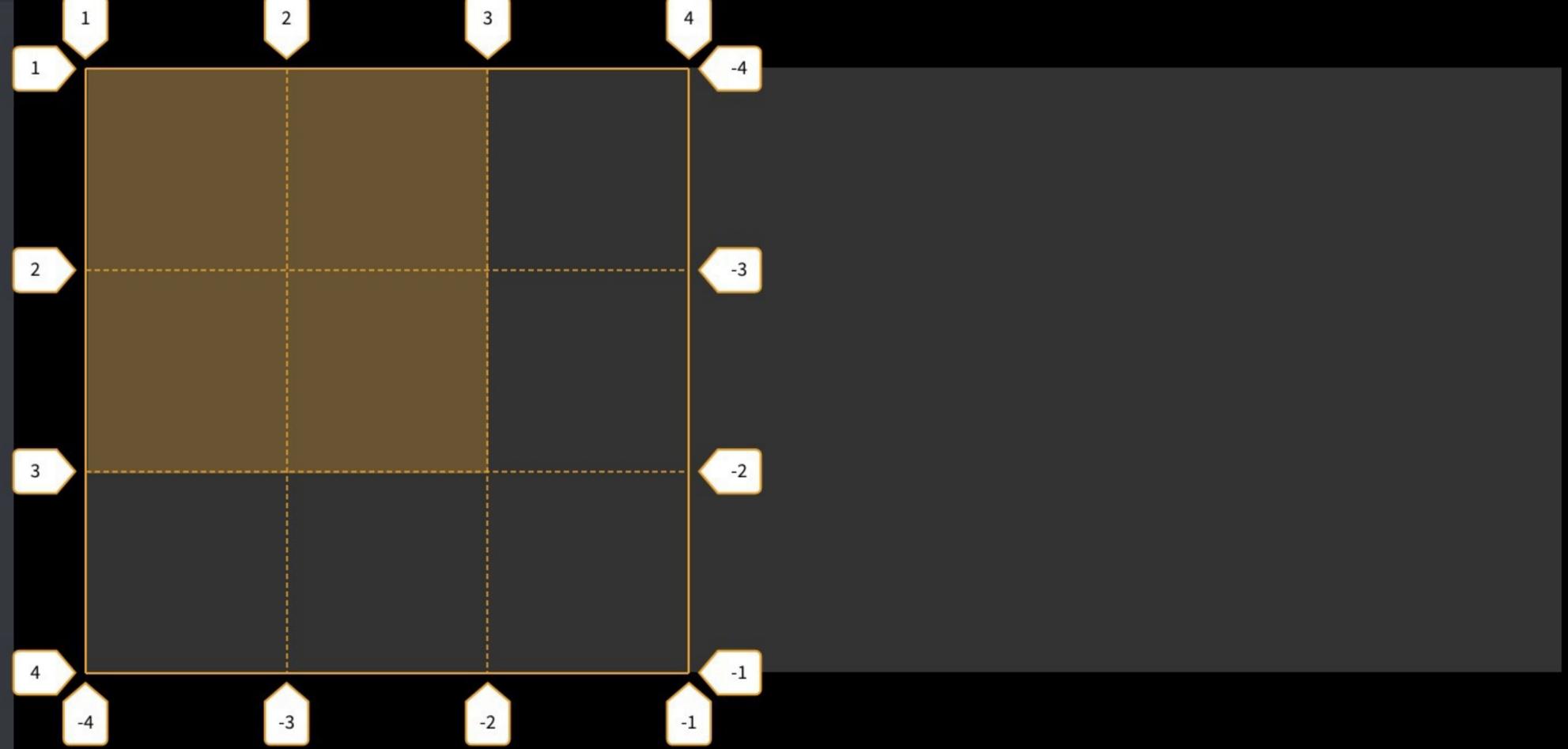


Space between 4 adjacent grid lines defines a *grid cell*

This grid has 9 cells

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

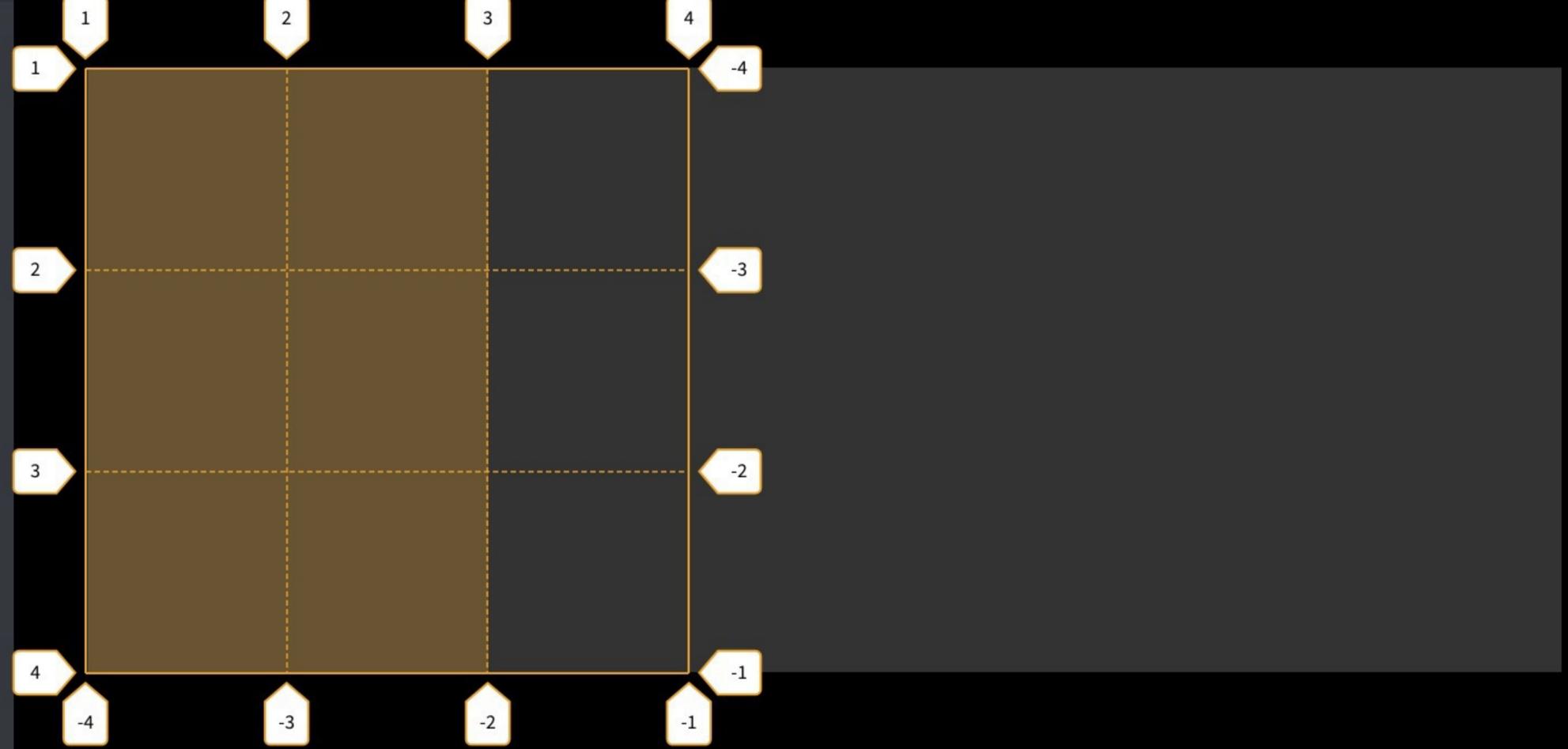


Grid area is defined by 4 (not necessarily adjacent) grid lines

```
JS
```

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```



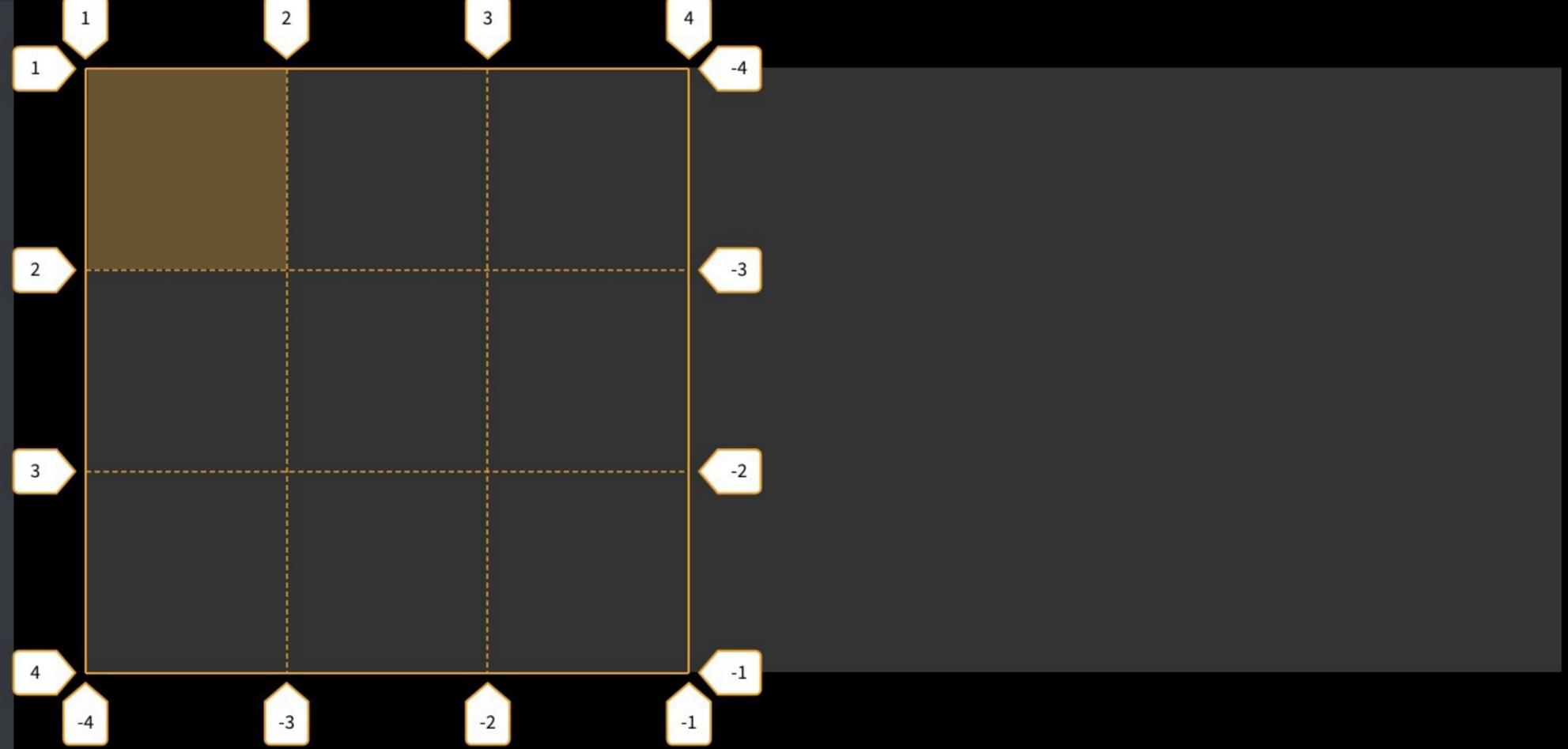
Grid area is surrounded by 4 grid lines around any number of cells

```
JS
```

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

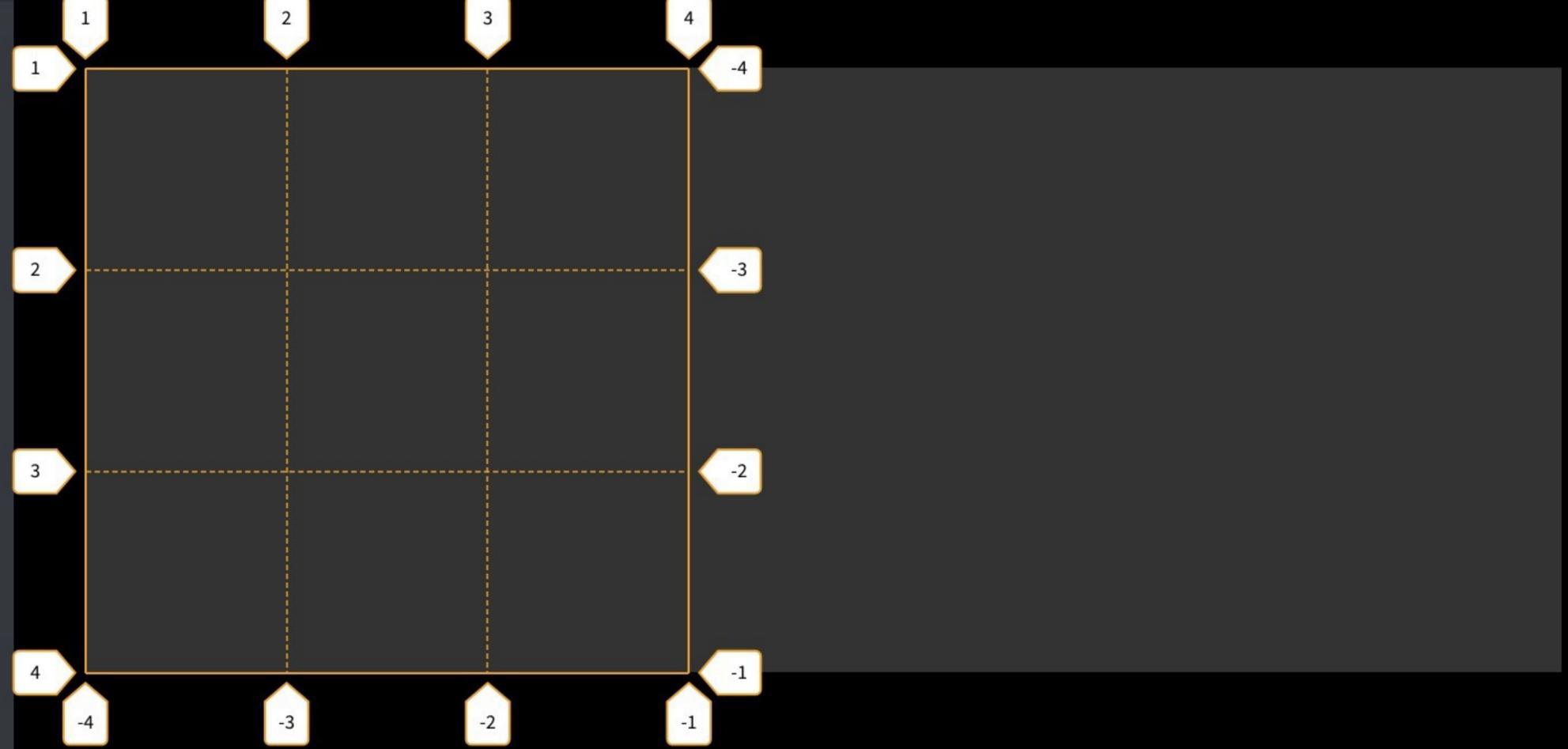
```
JS
```



A cell is an area, but not all areas are cells!

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

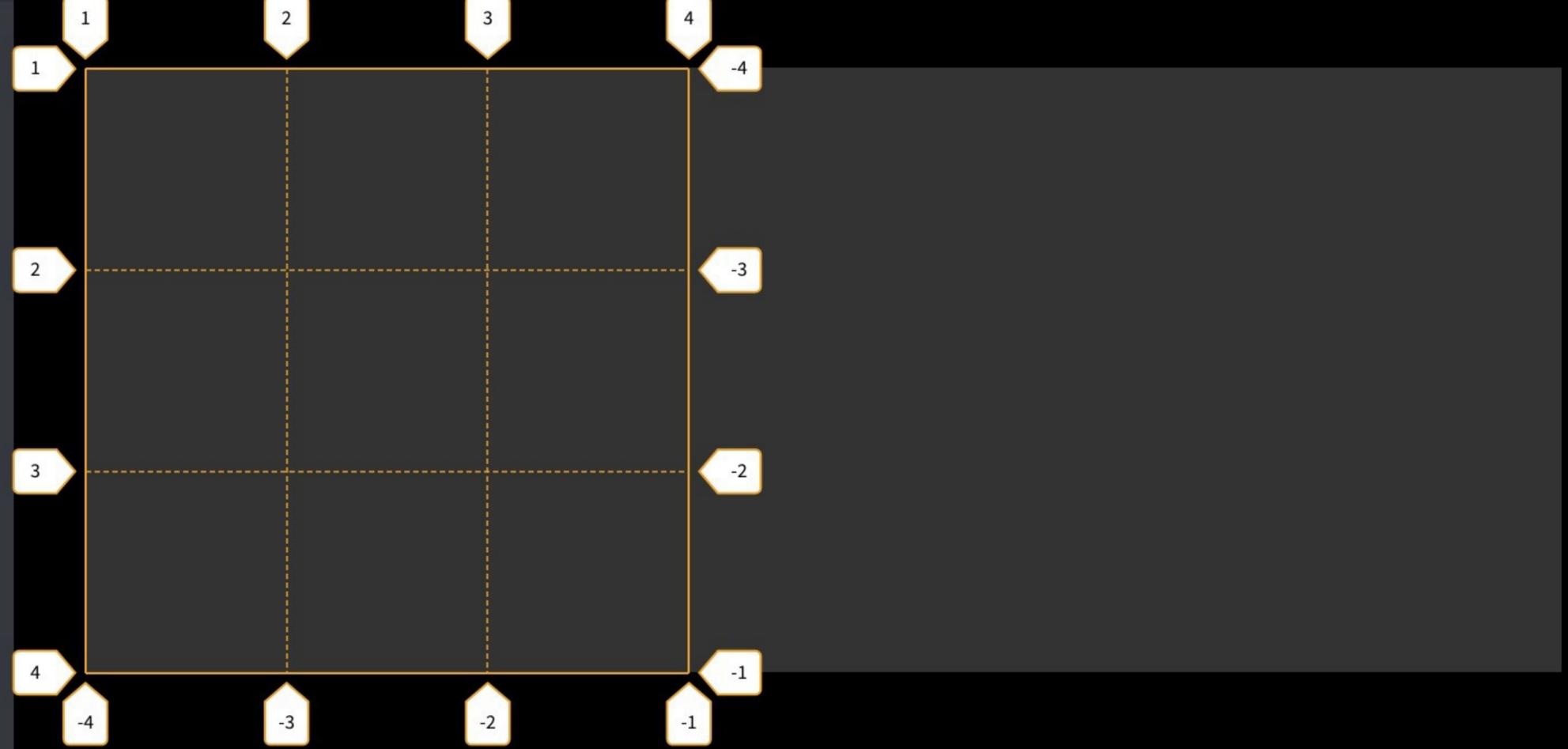


How many areas are in this grid?

```
JS
```

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

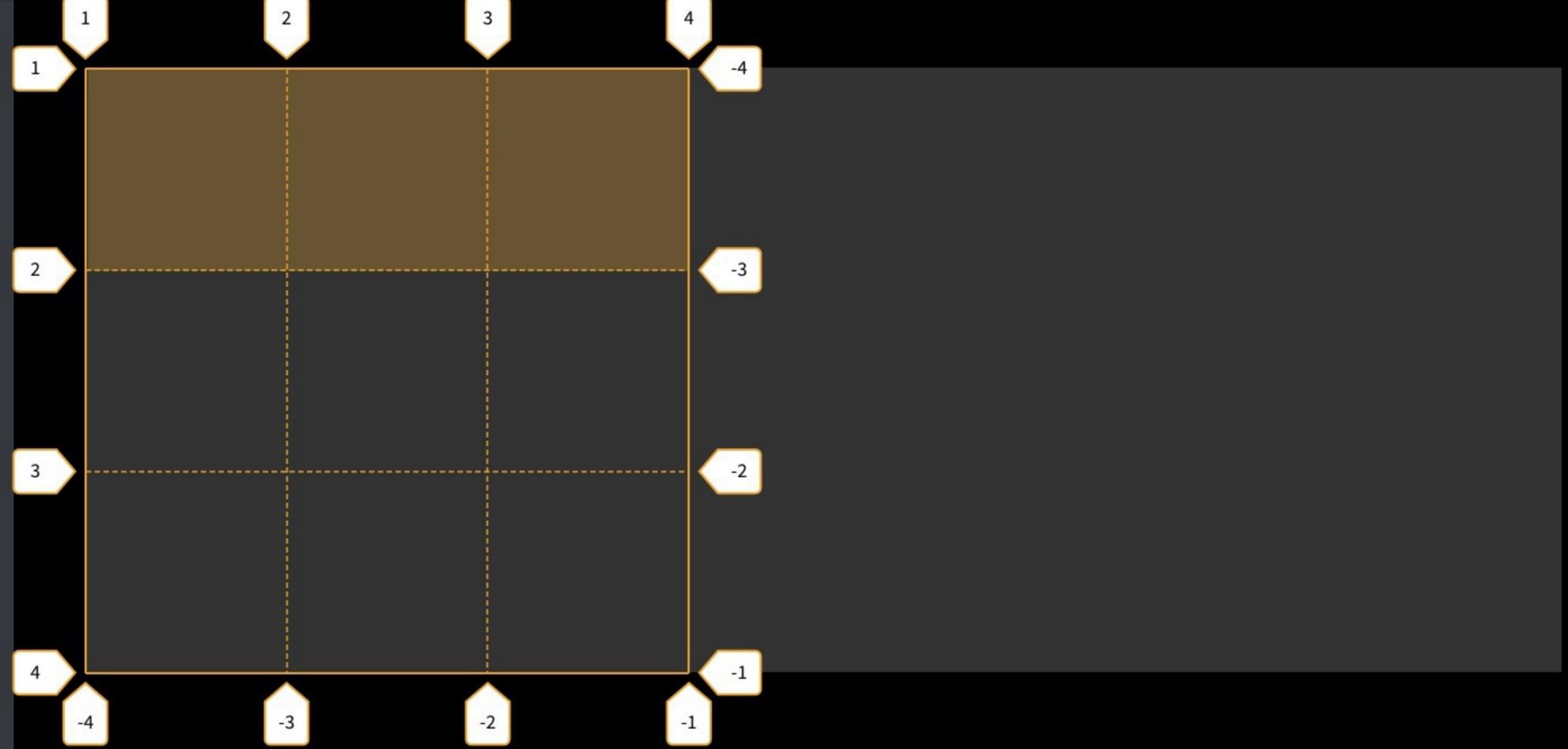


How many areas are in this grid?

36!

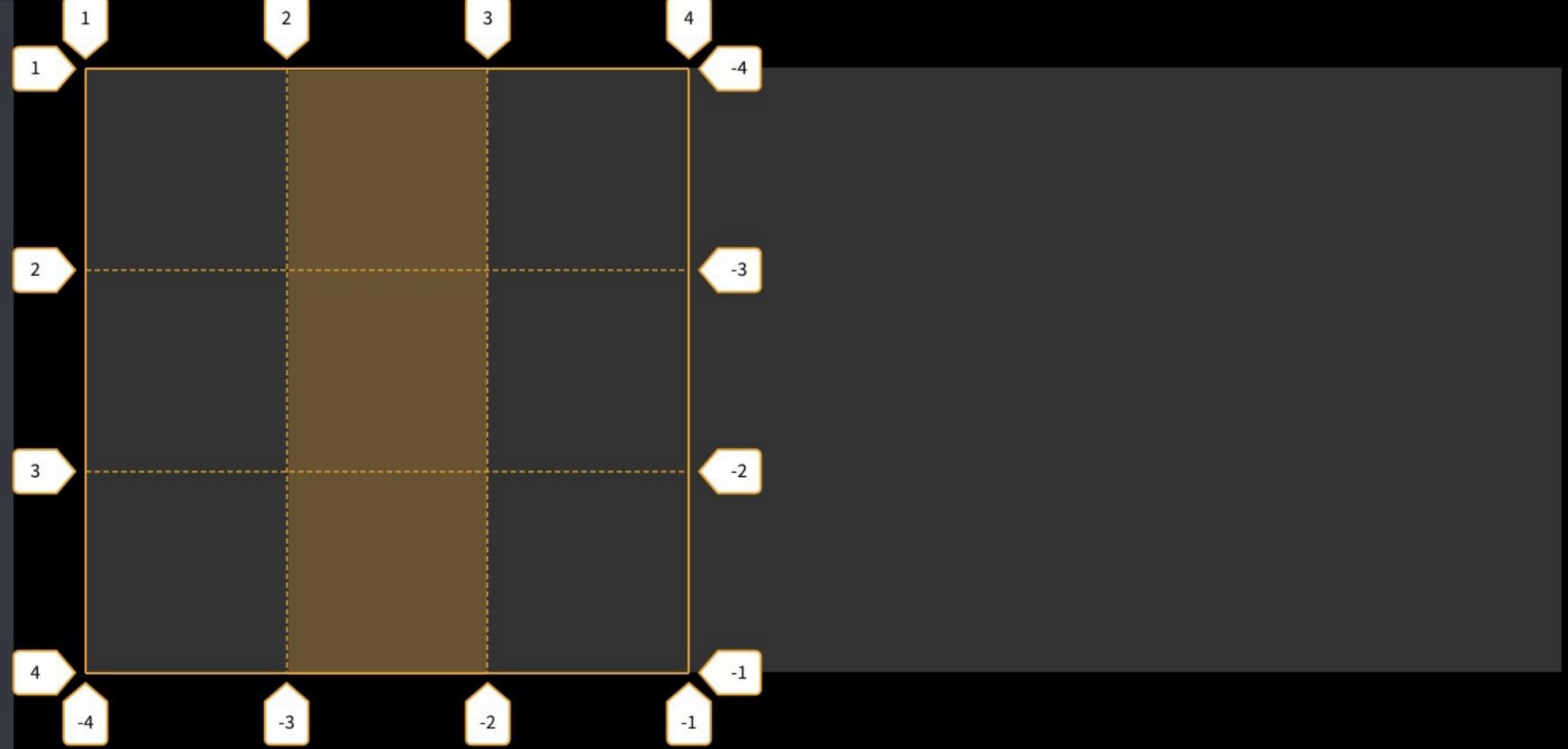
```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```



Space between 2 adjacent grid lines defines *grid tracks* of columns or rows

```
HTML
1 <div class="grid-container">
2
3 </div>
```



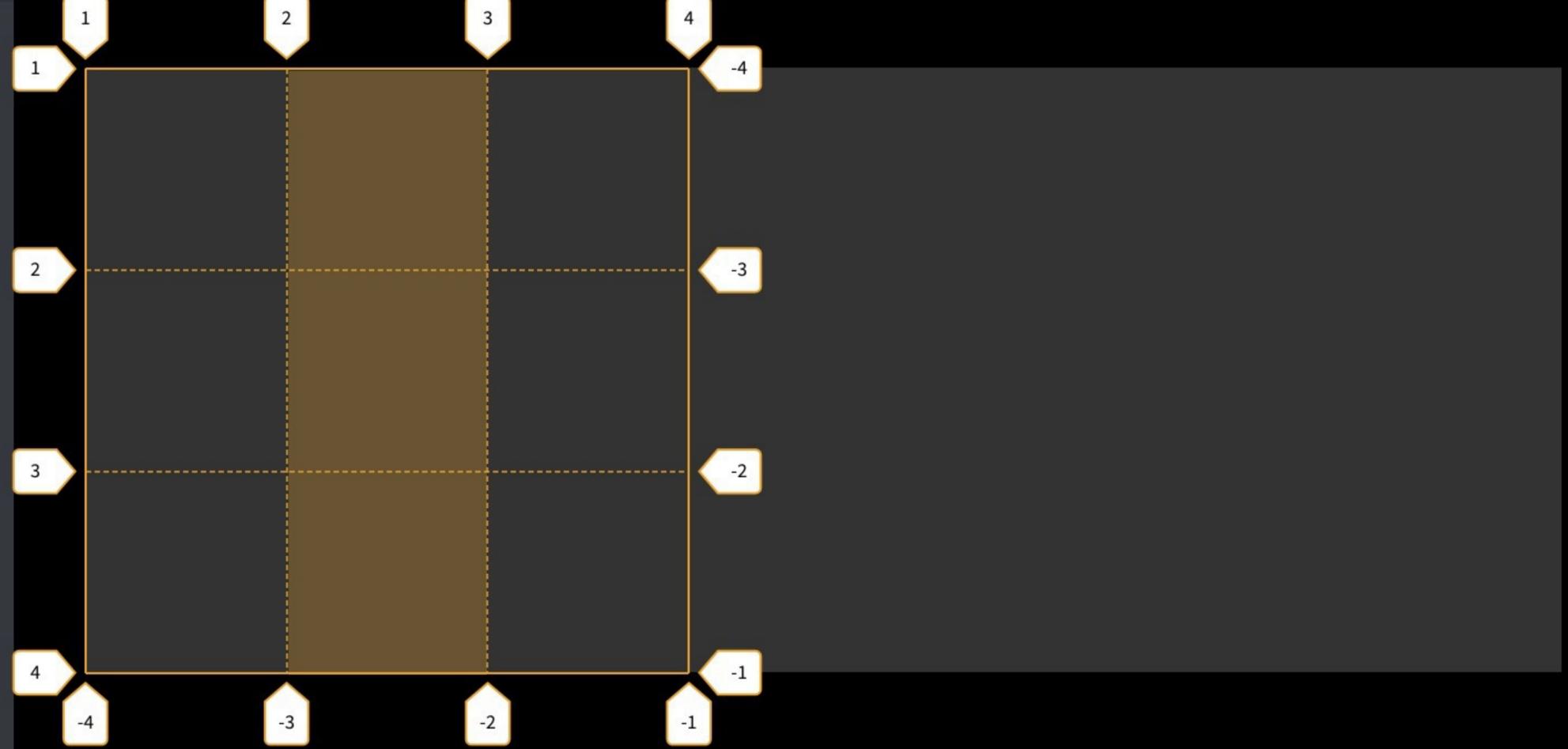
```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

```
JS
```

A column track

How many total tracks are in this grid?

```
HTML
1 <div class="grid-container">
2
3 </div>
```



```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

A column track

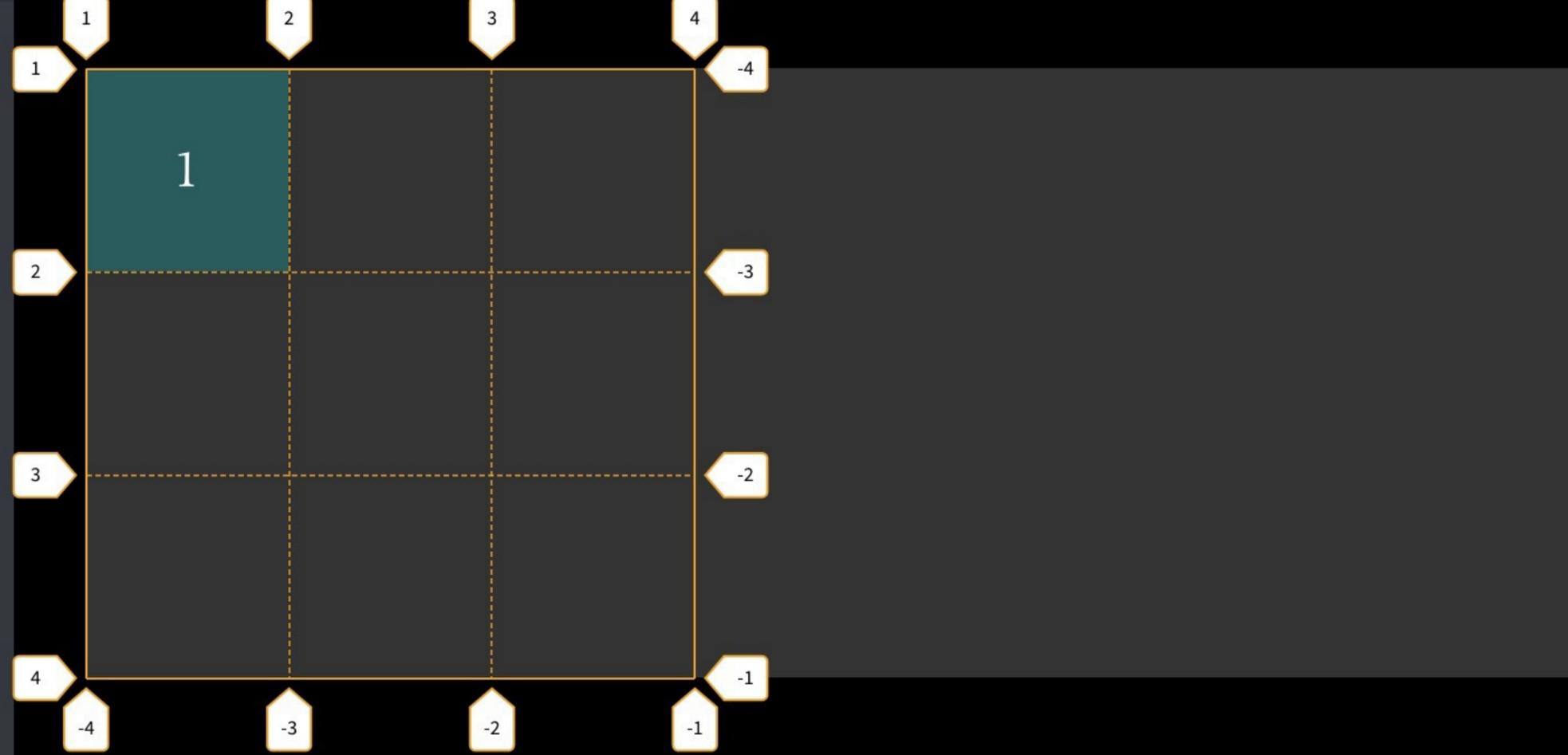
How many total tracks are in this grid?

6!

```
JS
```

```
HTML
1 <div class="grid-container">
2   <div></div>
3 </div>
```

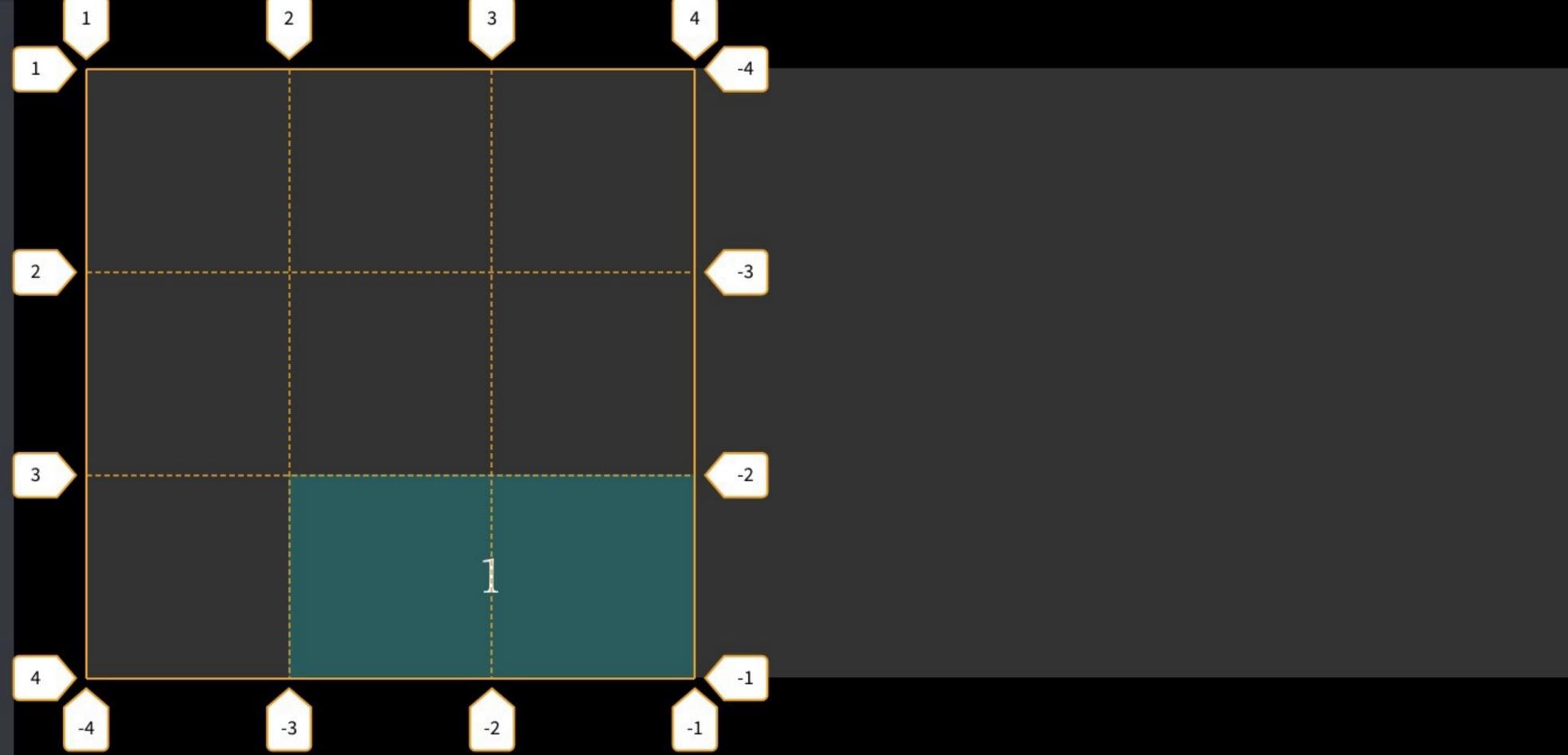
```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```



Grid items are placed into grid areas based on grid lines — in this case, an area equal to 1 cell

```
JS
```

```
HTML
1 <div class="grid-container">
2   <div></div>
3 </div>
```



```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
7 div > div {
8   grid-row: 3/4;
9   grid-column: 2/4;
10 }
```

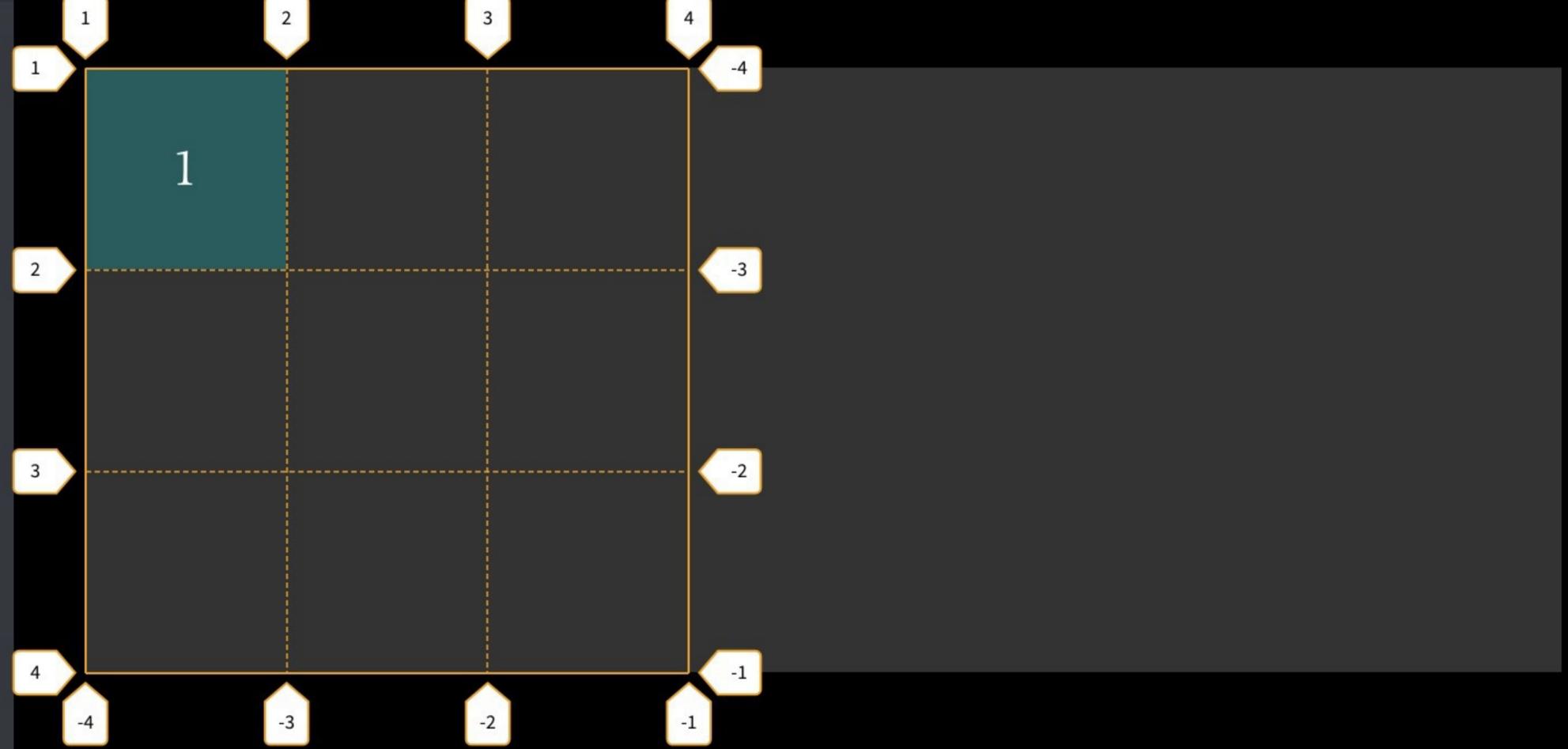
Grid items are placed into areas that can span more than 1 cell

```
JS
```

```
HTML
1 <div class="grid-container">
2   <div></div>
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

```
JS
```

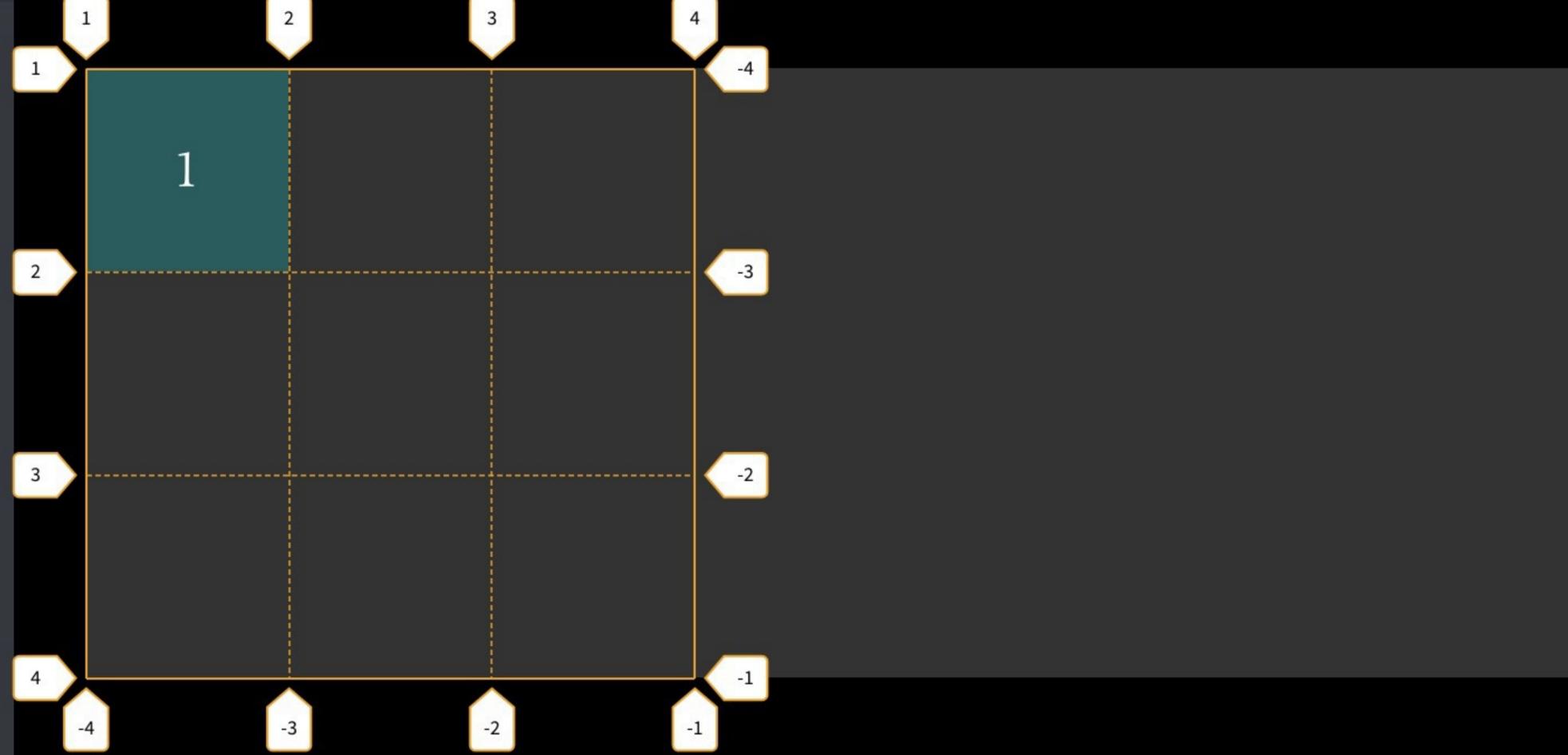


All direct children of grid container
are grid items*

* With a few exceptions

```
HTML
1 <div class="grid-container">
2   <div></div>
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```



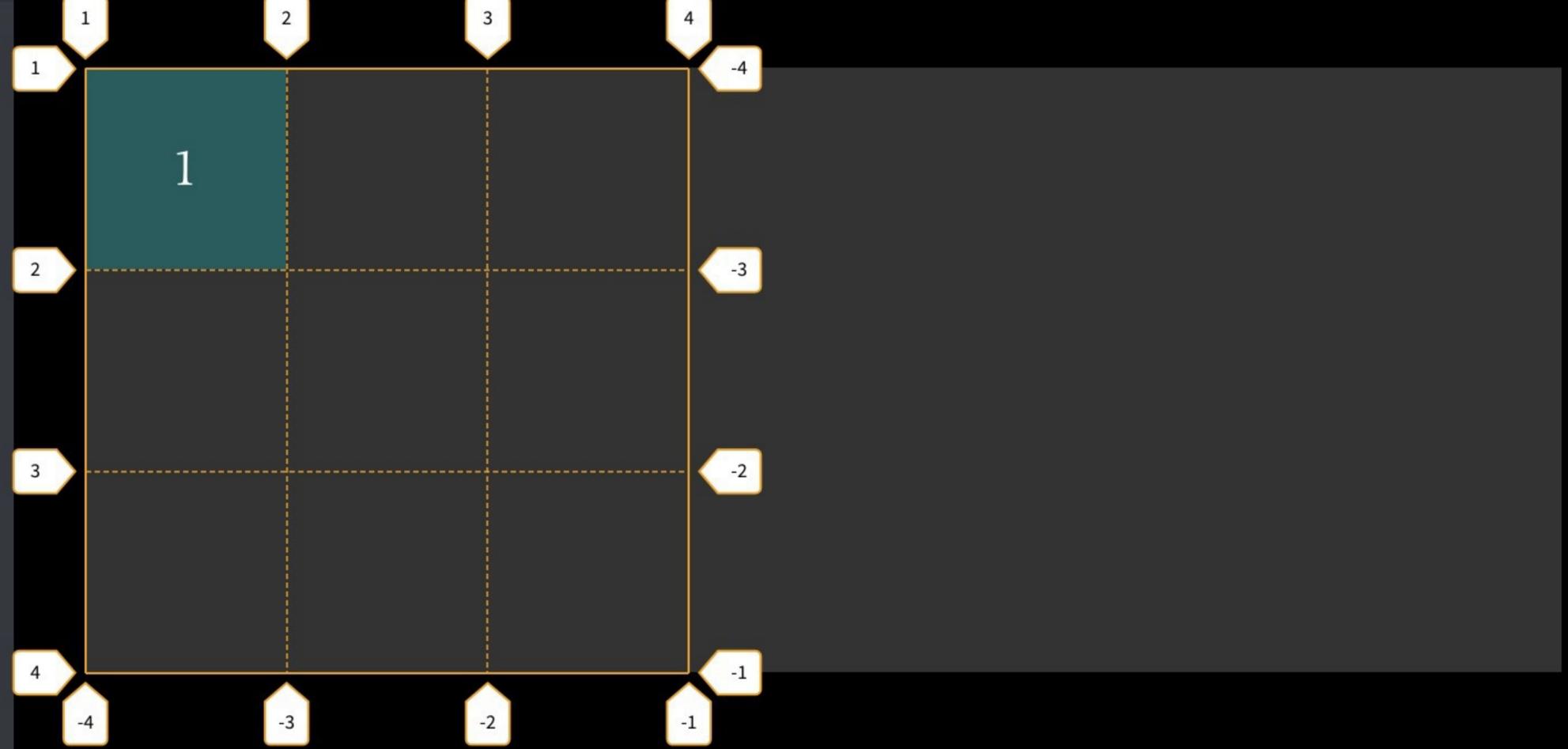
This grid has 9 cells but only 1 item

Cells are *not* part of the DOM so you *cannot* select them with CSS

```
JS
```

```
HTML
1 <div class="grid-container">
2   <div></div>
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```



Grid item between:

- » row lines 1 & 2, & column lines 1 & 2
- » row lines -3 & -4, & column lines -3 & -4
- » any others?

```
JS
```

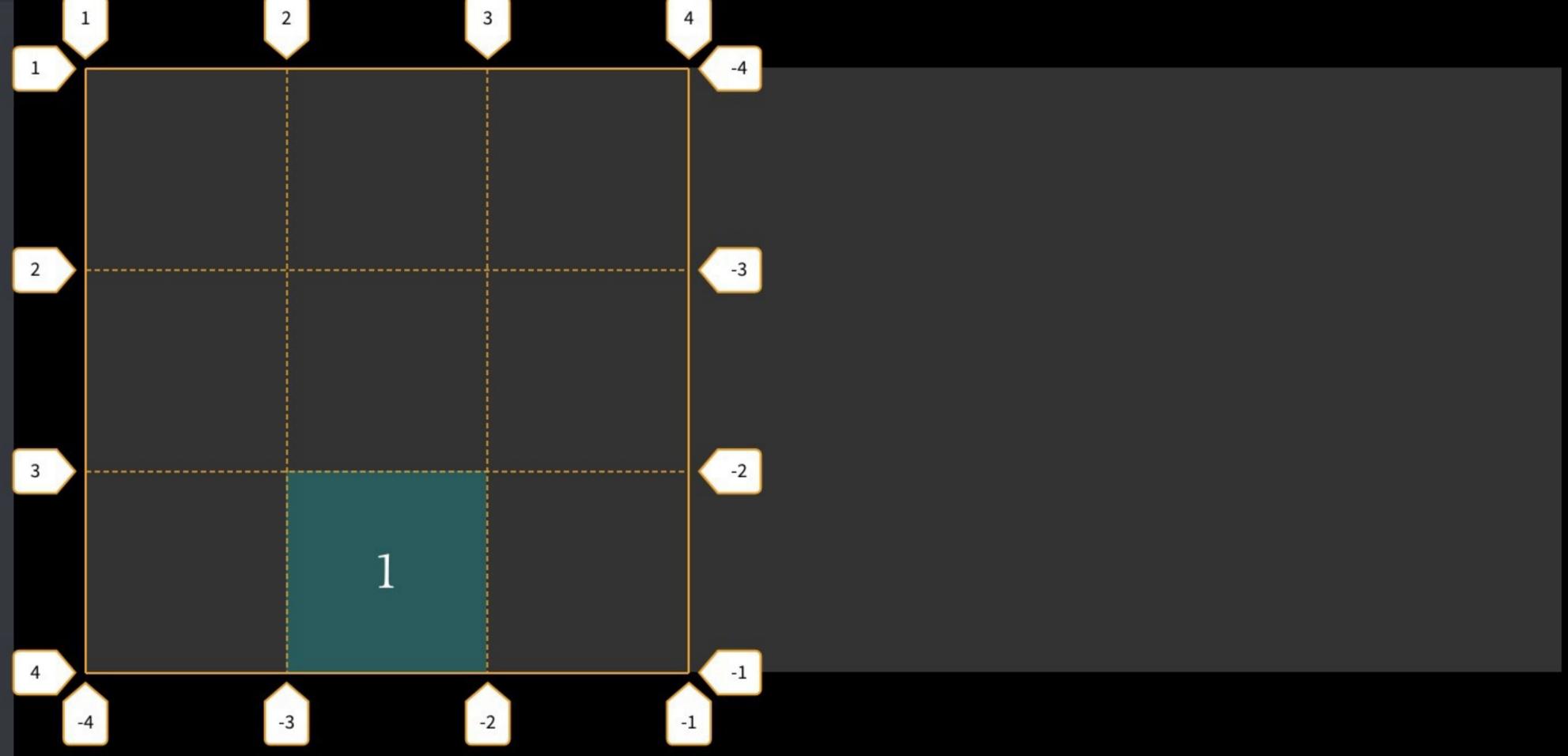
HTML

```
1 <div class="grid-container">
2   <div></div>
3 </div>
```

CSS Compiled

```
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
7 div > div {
8   grid-row: 3/4;
9   grid-column: 2/3;
10 }
```

JS



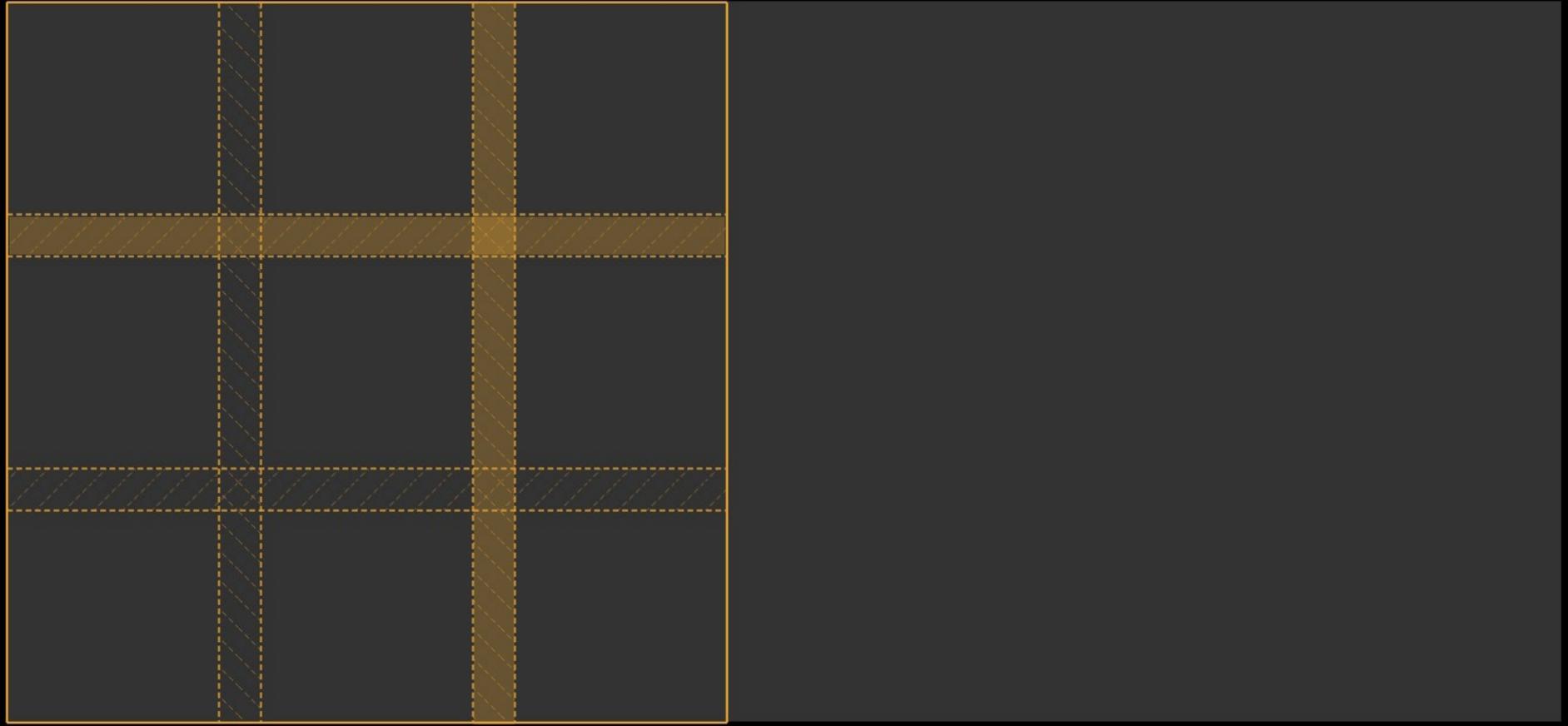
Grid item between:

- » row lines 3 & 4, & column lines 2 & 3
- » row lines -1 & -2, & column lines -2 & -3
- » any others?

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5   grid-gap: 20px;
6 }
7
```

```
JS
```



Grid gutters are basically thick lines creating space between tracks

Your First Grid

`display: grid`

`grid-template-columns`

`grid-template-rows`

`grid-gap`

`grid-row-start`

`grid-row-end`

`grid-column-start`

`grid-column-end`

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3 }
4
```

```
JS
```

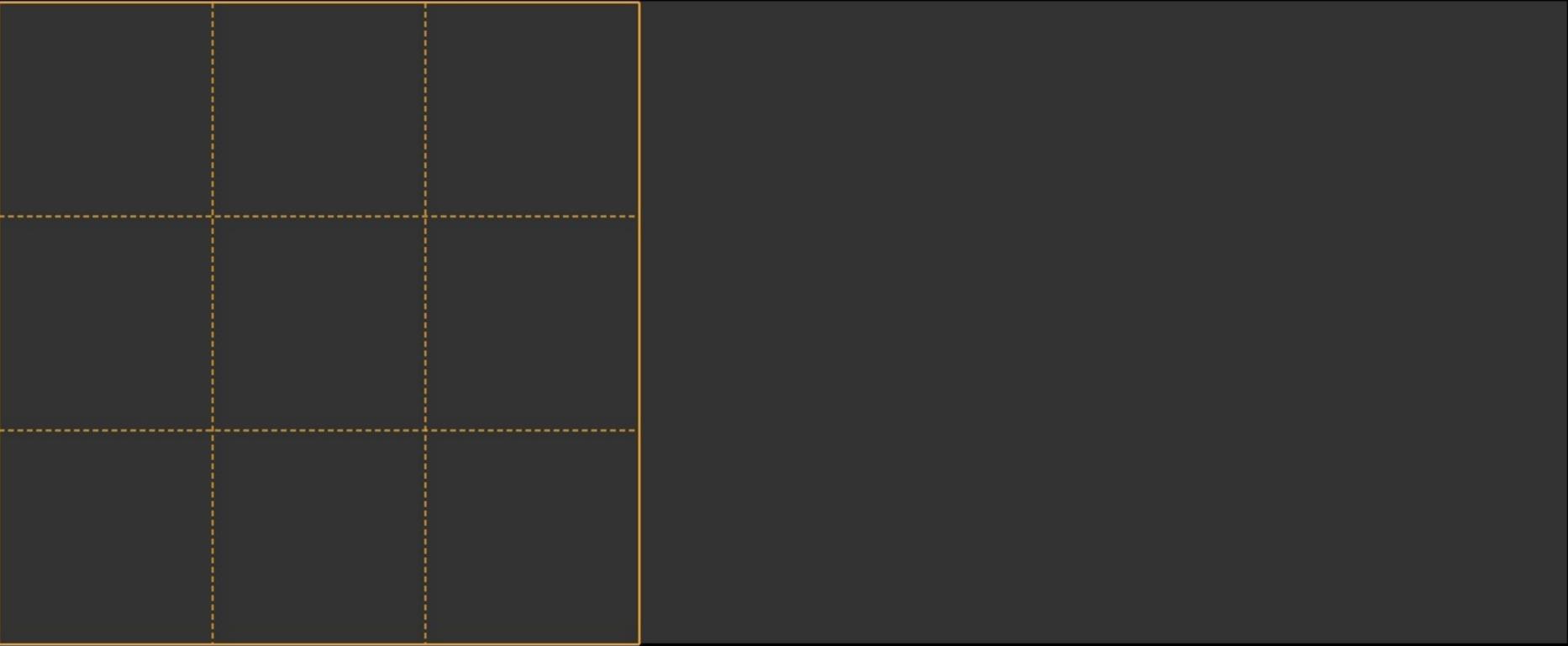
Create a grid layout context
with `display: grid`

Nothing to see because we
triggered the grid layout but
haven't yet built a grid

```
HTML
1 <div class="grid-container">
2
3 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5 }
6
```

```
JS
```



Build the grid with tracks using **grid-template-columns** & **grid-template-rows**

Now we see the grid container because there's a grid inside it

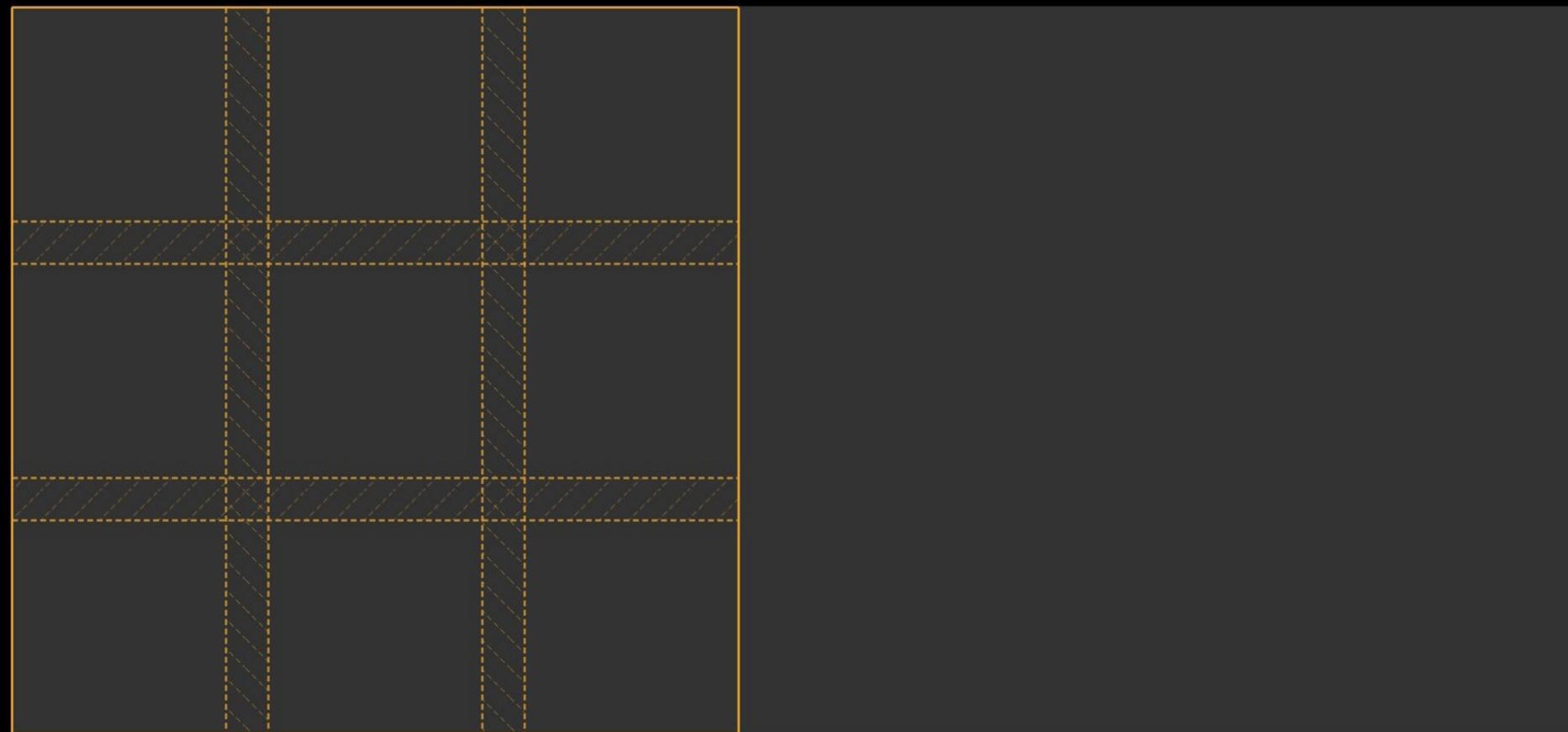
HTML

```
1 <div class="grid-container">
2
3 </div>
```

CSS Compiled

```
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5   grid-gap: 20px;
6 }
7
```

JS



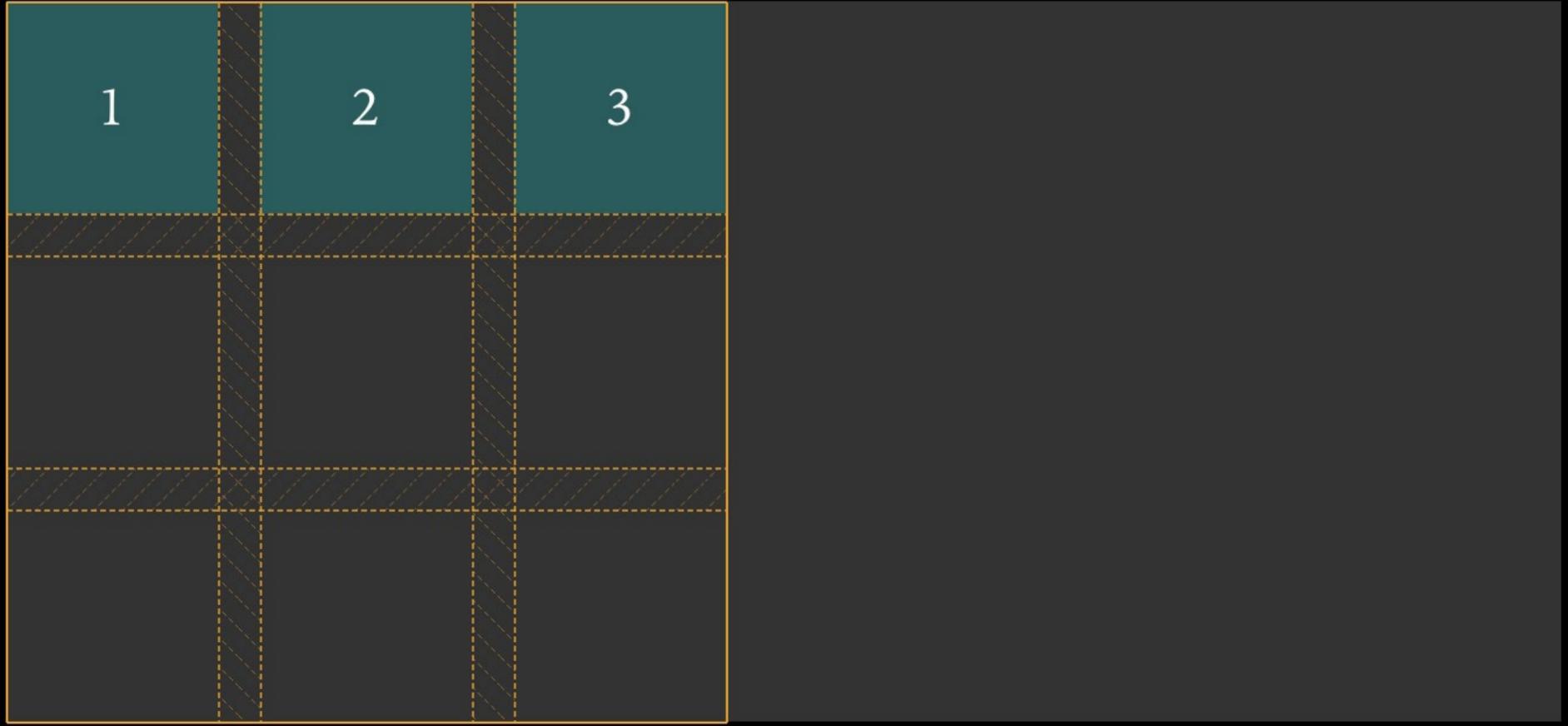
Add space between tracks using
`grid-gap`

Note the grid is now 340×340

```
HTML
1 <div class="grid-container">
2   <div></div>
3   <div></div>
4   <div></div>
5 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5   grid-gap: 20px;
6 }
7
```

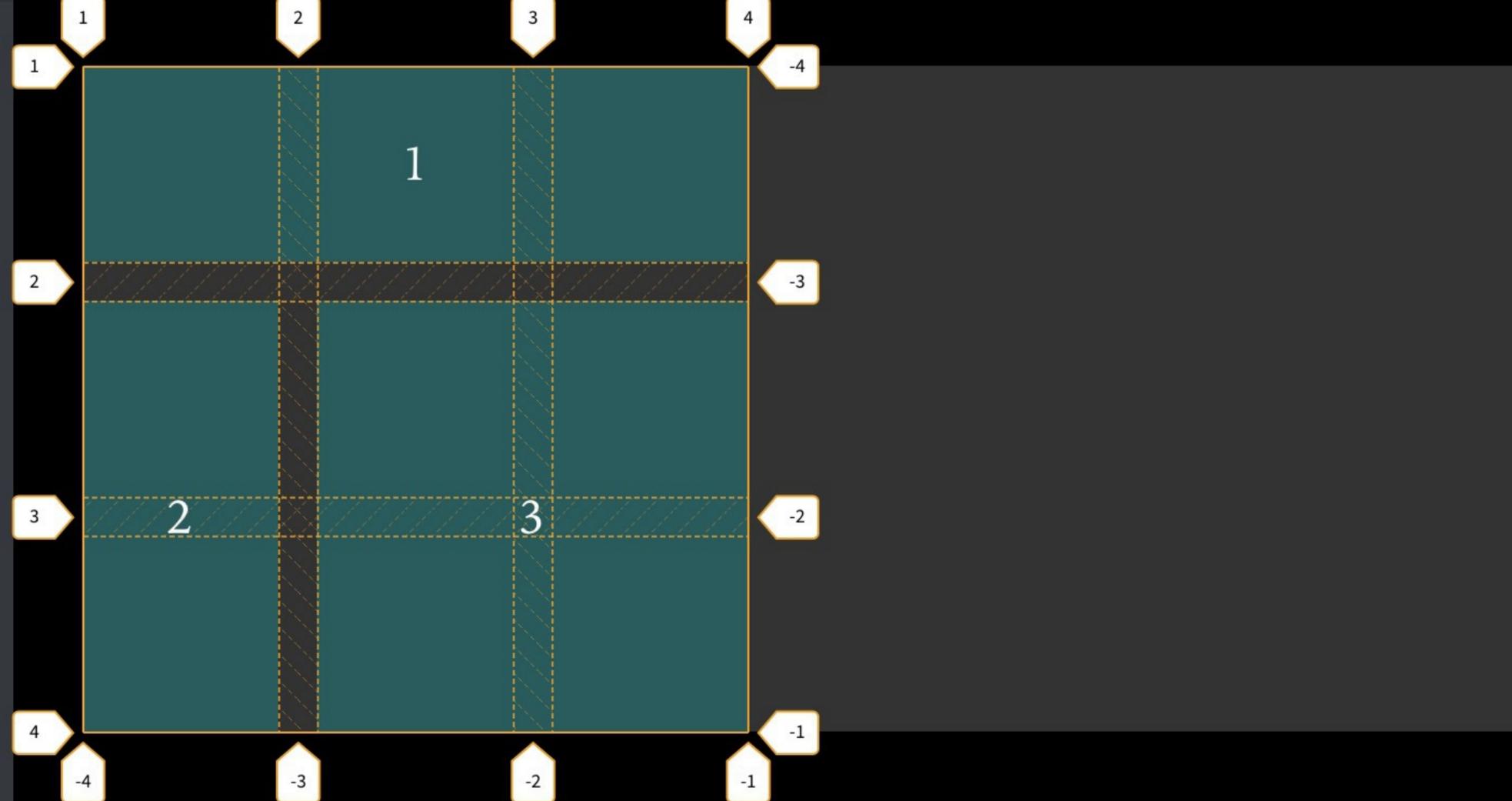
```
JS
```



Add grid items, which are placed automatically by default

```
HTML
1 <div class="grid-container">
2   <div></div>
3   <div></div>
4   <div></div>
5 </div>

CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5   grid-gap: 20px;
6 }
7 .grid-container > :nth-child(1) {
8   grid-column-start: 1;
9   grid-column-end: 4;
10 }
11 .grid-container > :nth-child(2) {
12   grid-row-start: 2;
13   grid-row-end: 4;
14 }
15 .grid-container > :nth-child(3) {
16   grid-column-start: 2;
17   grid-column-end: 4;
18   grid-row-start: 2;
19   grid-row-end: 4;
20 }
```



Place grid items using line numbers

Tracks

Track Sizing

Various ways to size row & column tracks

- » `<length>`
- » `<flex> fr unit`
- » `max-content`
- » `min-content`
- » `fit-content()`
- » `minmax()`
- » `<percentage>`

<length> data type; e.g.:

- » 10px
- » 10em
- » 10rem
- » 10vh

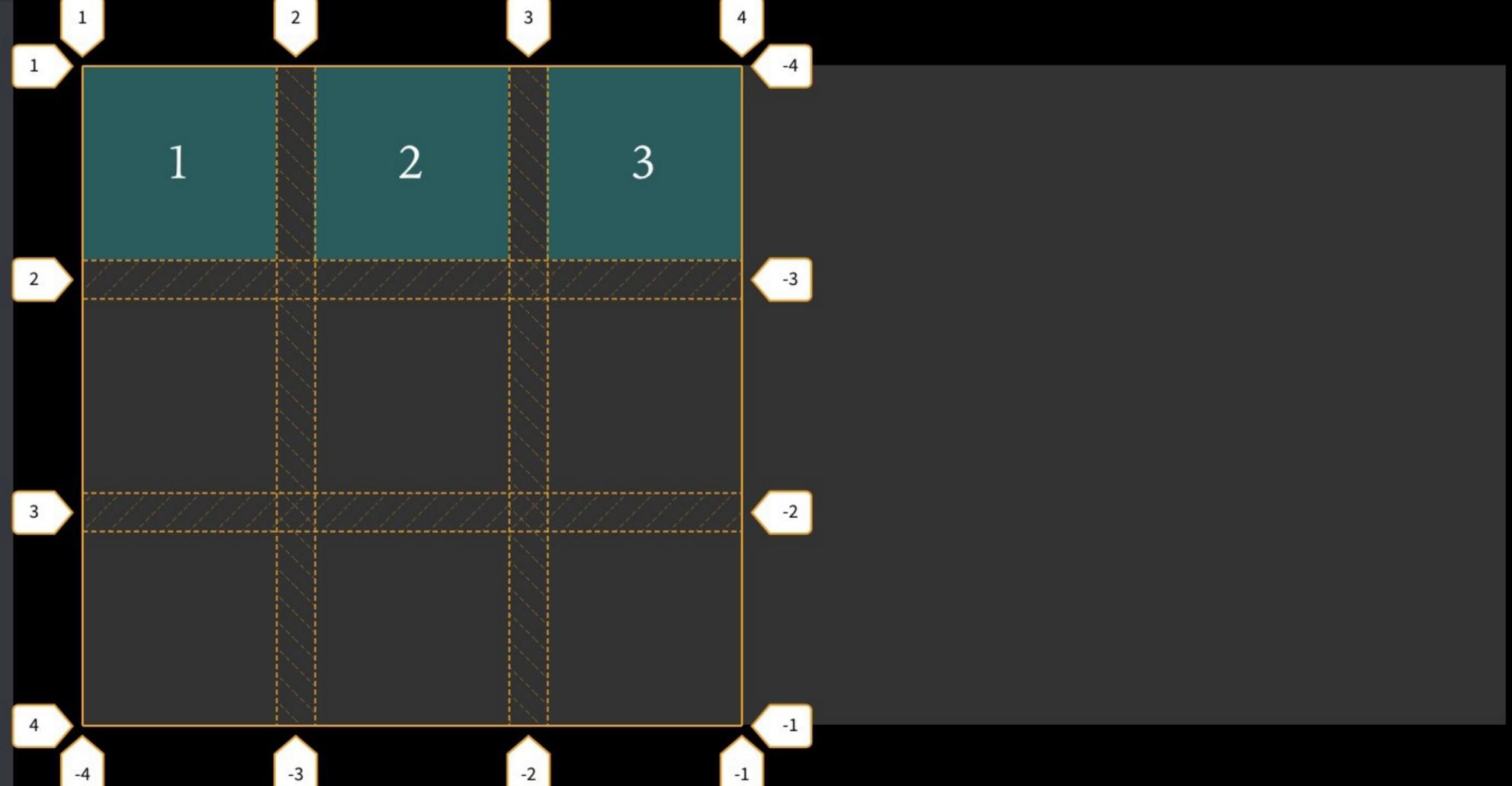
More in *CSS Typography & CSS Data Types*

HTML

```
1 <div class="grid-container">
2   <div></div>
3   <div></div>
4   <div></div>
5 </div>
```

CSS Compiled

```
1 .grid-container {
2   display: grid;
3   grid-template-columns: 100px 100px 100px;
4   grid-template-rows: 100px 100px 100px;
5   grid-gap: 20px;
6 }
7
```



`fr`

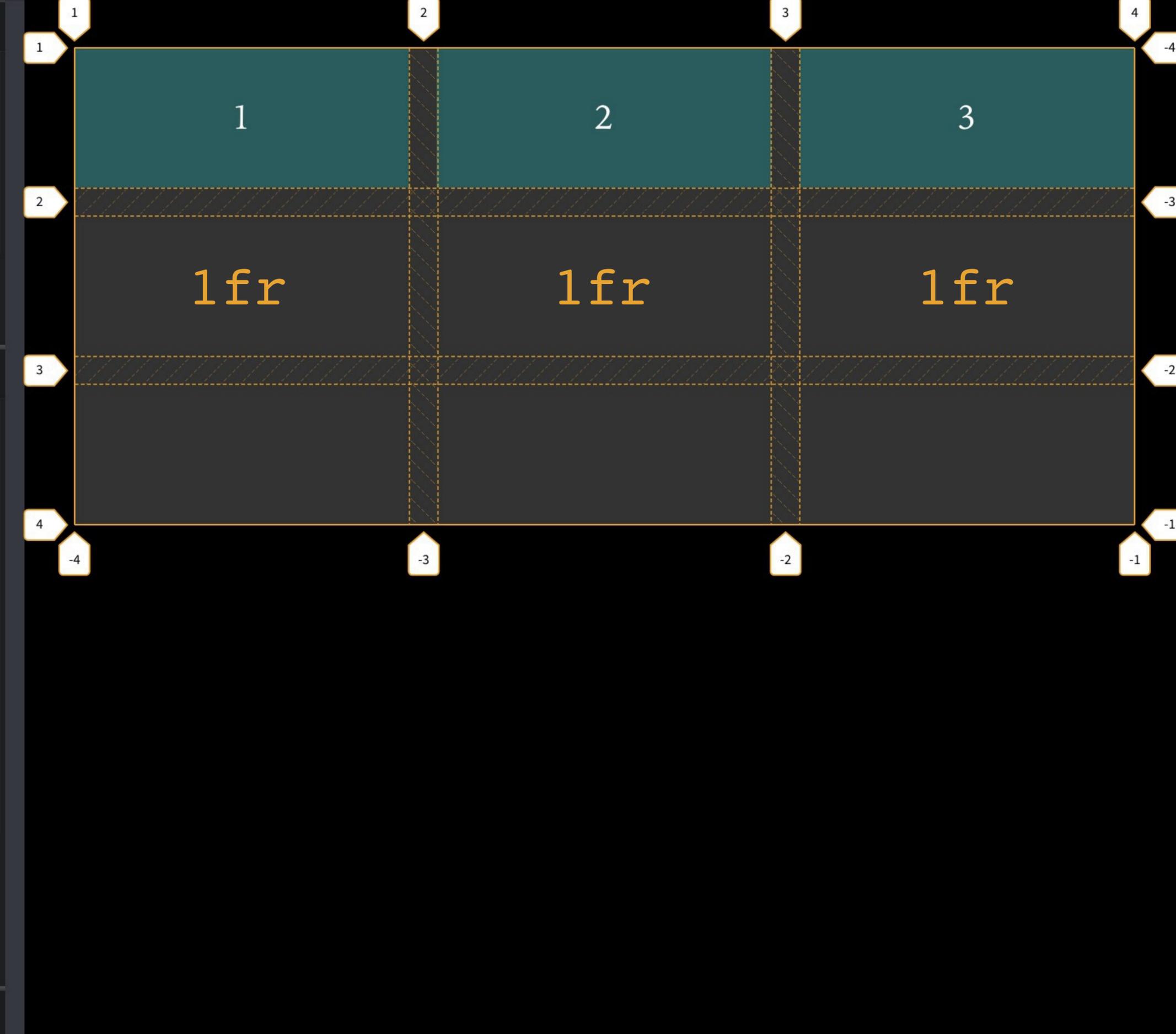
Grid introduces a new unit: `fr`, short for *fraction of the free space* in the grid container

`fr` is calculated after any non-flexible items

```
grid-template-columns: 200px 1fr 200px;  
grid-template-rows: 1fr 2fr 1fr;
```

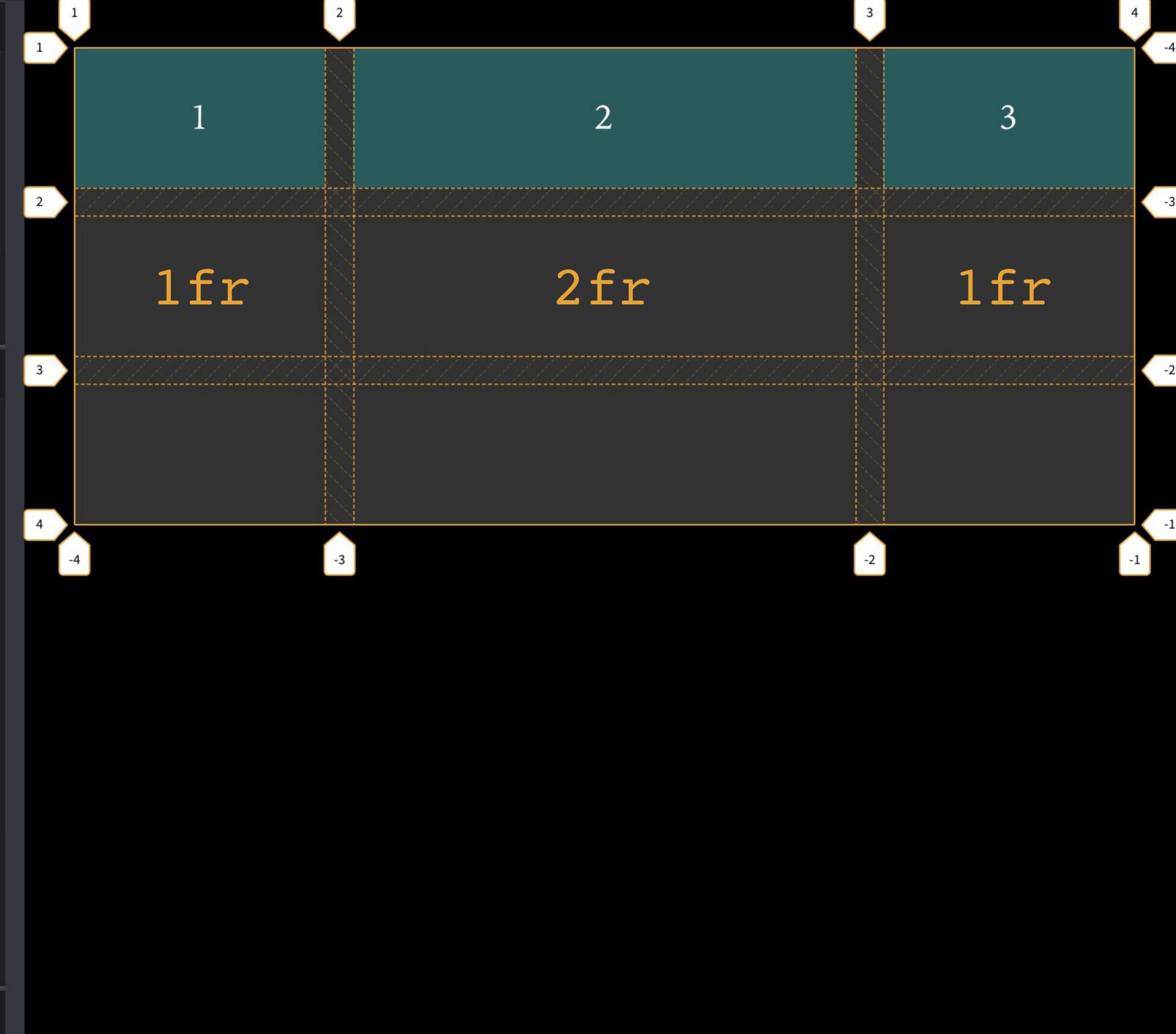
```
HTML
1 <div class="grid-container">
2   <div></div>
3   <div></div>
4   <div></div>
5 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-gap: 20px;
4   grid-template-columns: 1fr 1fr 1fr;
5   grid-template-rows: 100px 100px 100px;
6 }
7
```



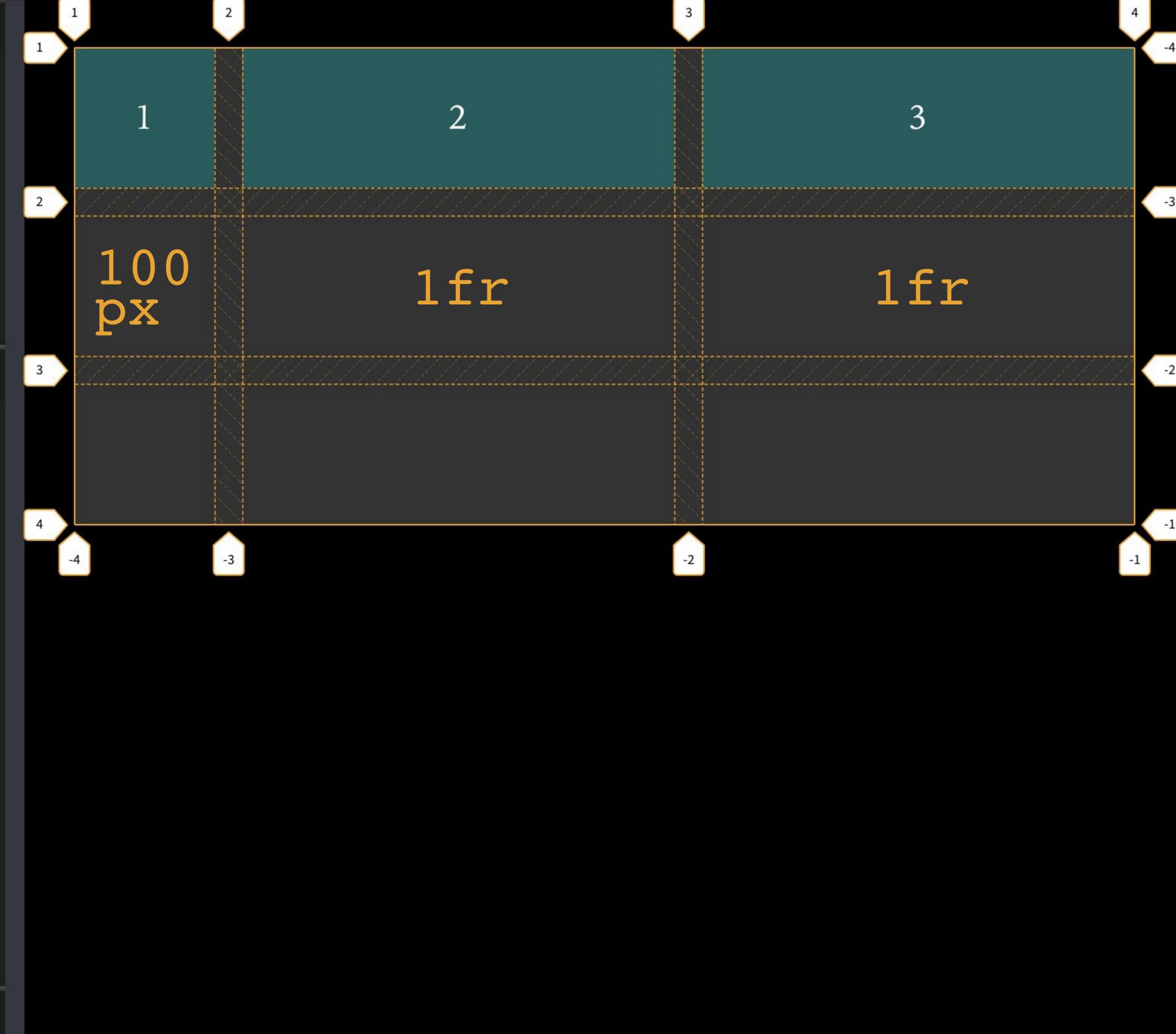
```
HTML
1 <div class="grid-container">
2   <div></div>
3   <div></div>
4   <div></div>
5 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-gap: 20px;
4   grid-template-columns: 1fr 2fr 1fr;
5   grid-template-rows: 100px 100px 100px;
6 }
7
```



```
HTML
1 <div class="grid-container">
2   <div></div>
3   <div></div>
4   <div></div>
5 </div>
```

```
CSS Compiled
1 .grid-container {
2   display: grid;
3   grid-gap: 20px;
4   grid-template-columns: 100px 1fr 1fr;
5   grid-template-rows: 100px 100px 100px;
6 }
7
```



```
JS
```

HTML

```
1 <div class="grid-container">
2   <div></div>
3   <div></div>
4   <div></div>
5 </div>
```

CSS (SCSS)

```
1 .grid-container {
2   display: grid;
3   grid-gap: 20px;
4   // grid-template-columns: 1fr 1fr 1fr;
5   // grid-template-columns: 1fr 2fr 1fr;
6   // grid-template-columns: 100px 1fr 1fr;
7   // grid-template-columns: 100px minmax(100px, 250px) 100px;
8   // grid-template-columns: 100px max-content 100px;
9   // grid-template-columns: 100px min-content 100px;
10  // grid-template-columns: 100px fit-content(250px) 100px;
11  // grid-template-columns: 100px minmax(100px, 250px) 100px;
12  grid-template-columns: 100px 100px 100px;
13  grid-template-rows: 100px 100px 100px;
```

JS



Track sizing playground

[codepen.io/websanity/
pen/oQLoBL](https://codepen.io/websanity/pen/oQLoBL)

							
<code>fr</code>	10 -ms-	16	52	10.1	10.3	57	57
<code>max-content</code>	10 -ms-	16	52	10.1	10.3	57	57
<code>min-content</code>	10 -ms-	16	52	10.1	10.3	57	57
<code>fit-content()</code>	10 -ms-	16	51	10.1	10.3	29	57
<code>minmax()</code>	?	12	52	10.1	10.3	57	-

Thank you!

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jans@websanity.com

websanity.com

Webpage Layouts

5 Methods

R. Scott Granneman & Jans Carton

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Last updated 2018-11-19

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Changelog

2018-11-19 1.5: Moved several flexbox materials over from *CSS - Layout*; fixed bad ligatures; updated screenshots for flex inside flex; updated theme to Granneman 1.5; minor formatting fixes; switched out flow stuff in `float`; removed 2nd table example; hid 2nd example for `align-items: flex-start`; fixed chapter titles; added Grid stuff from *CSS - Layout - Grid*

Changelog

2017-11-02 1.4: Corrected wording; applied Granneman 1.4 theme; fixed minor issues; mentioned Grid

2015-11-30 1.3: Further corrections to make things easier to understand

2015-11-17 1.2: Revised & corrected

2015-11-04 1.1: Created presentation by pulling in parts of others & adding new stuff

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