OCTOBER 18, 2023 / #FLEXBOX

The CSS Flexbox Handbook – Complete Guide with Practical Examples

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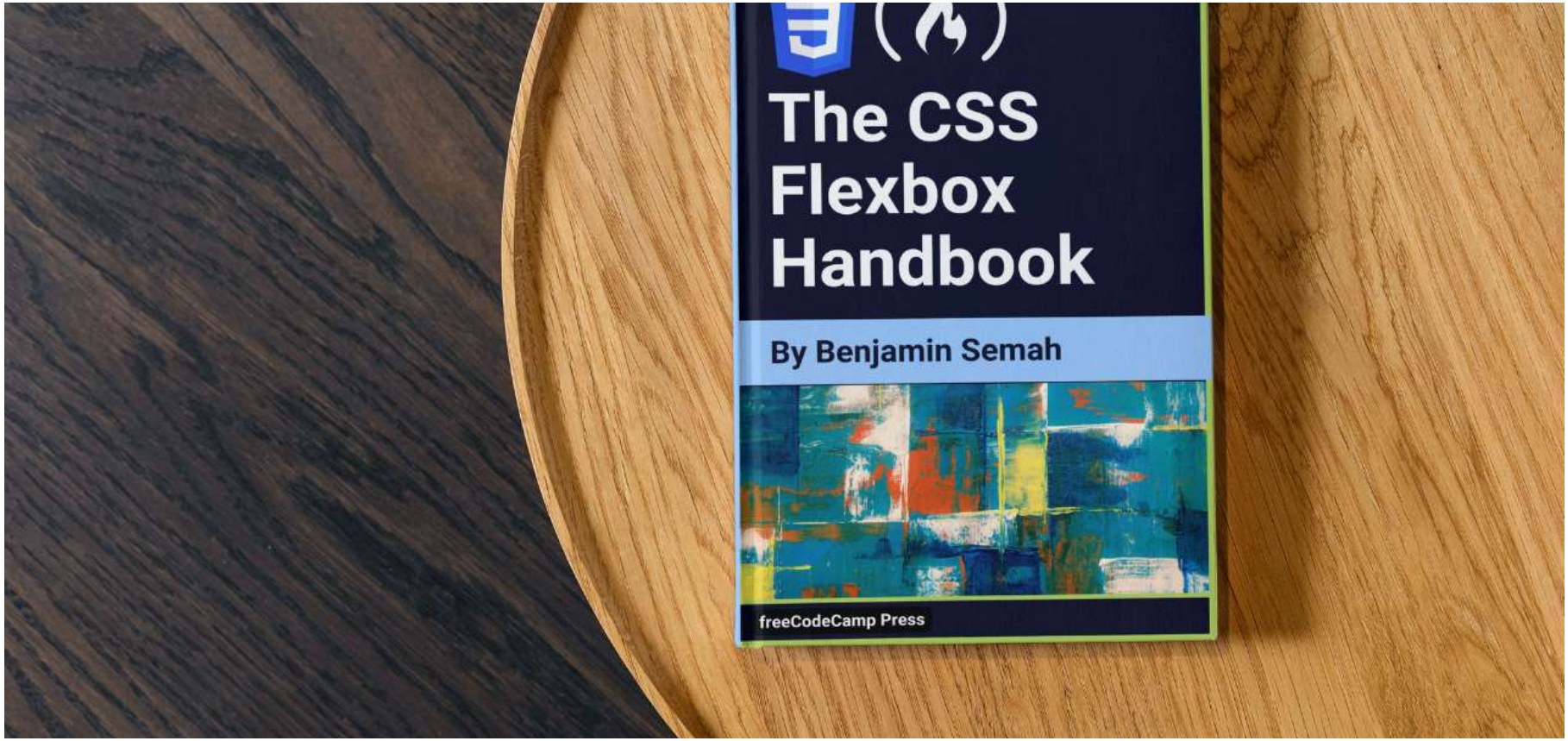

Flexbox is a useful tool for creating beautiful and responsive layouts for web pages. In this guide, you will learn everything you need to

examples.

This is a perfect resource for you if you are a beginner web developer. It'll also be useful if you're an experienced developer who wants to brush up on your responsive web design skills.

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What is Flexbox?

Flexbox is short for "Flexible Box Layout". It's a CSS layout model that simplifies creating complex layouts. It provides a flexible way to align elements and distribute space within a container element.

The Flexbox layout model is bidirectional. This means you can either arrange your elements in rows, columns, or both. More on that later.

What are the benefits of using Flexbox?

Before Flexbox, it was hard to create complex layouts and responsive web pages. You needed a combination of CSS

But with Flexbox, you can now do the following with less difficulty and fewer lines of code:

- Align and center elements using properties like `justify-content` and `align-items`.
- Develop responsive layouts without writing lots of media queries.
- Reorder elements without changing the HTML structure
- Create same-height columns without any extra HTML elements or background images.

Now you know what Flexbox is, along with some of the things you can do with it. Let's see how you can use it.

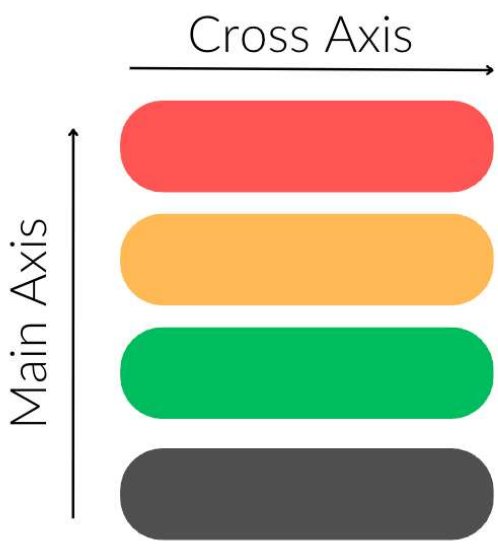
The main axis and the cross-axis

`display` property set to `flex` or `inline-flex`) has a main axis and a cross axis.

The main axis is either horizontal or vertical depending on the value of the `flex-direction` . No worries if you are not familiar with `flex-direction` . You are about to learn it.

The cross axis and main axis when the `flex-direction` is `row`

The following is an example where the the main axis is vertical and the cross axis, is horizontal.



The main axis and cross axis when the `flex-direction` is `column`

Flex Containers and Flex Items

This turns the element into a flex container, and the children of that element become flex items.

Here's an example:

```
<section class="container">
    <div>Flex Item 1</div>
    <div>Flex Item 2</div>
    <div>
        <p>This paragraph is not a flex item</p>
    </div>
</section>
```

```
.container {
  display: flex;
}
```

element, which makes them flex items.

But the paragraph element inside the third div is not a flex item. This is because it's not a direct child of the `.container` element.

Understanding `flex` and `inline-flex`

You can use both `flex` and `inline-flex` to make an element a flex container. The difference is in how they interact with surrounding elements.

`display: flex`

This makes the flex container behave like a block-level element. The flex-container takes up the entire available width of its parent element. It starts on a new line, and the element that comes after it also starts on a new line.

```
<button>Button One</button>

/* Flex Container */
<section class="container">
    <div id="red"></div>
    <div id="gold"></div>
    <div id="green"></div>
</section>

<button>Button Two</button>
```

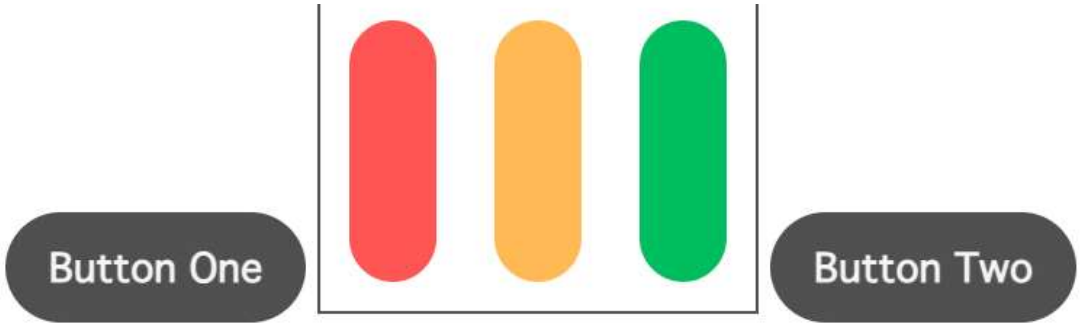
```
.container {
    display: flex;
}
```

Flex containers behave like block elements when you use `display: flex`

The `.container` element takes up the entire available width of the body (its parent element).

`display: inline-flex`

This makes the flex-container behave like an inline-level element. This allows other inline elements (like buttons) to flow alongside it. Using the previous example, this is how the elements will be arranged when you change `display` from `flex` to `inline-flex`.



Flex containers behave like `inline-elements` when you use `display: inline-flex`

The flex container does not take up the entire width of its parent. It uses only as much horizontal space as necessary for its content.

Practice using flex and inline-flex on StackBlitz

The Flex Container Properties

container.

NOTE: You apply these properties on the flex container, and not on its items.

The following are the flex container properties:

- `flex-direction`
- `flex-wrap`
- `flex-flow`
- `justify-content`
- `align-items`
- `align-content`
- `place-content`

The `flex-direction` Property

main axis. This property can take any of these four values:

- `row` (default value)
- `column`
- `row-reverse`
- `column-reverse`

Now, let's look at some examples to see how it all works.

In the following code snippet, we have a `names-container` with four names:

```
<div class="names-container">
    <p id="jill">1. JILL</p>
    <p id="john">2. JOHN</p>
    <p id="jane">3. JANE</p>
    <p id="jack">4. JACK</p>
</div>
```

`flex-direction: row`

This displays the flex-items horizontally from left to right.

```
.names-container {
    display: flex;
    flex-direction: row;
    /* Other styles here... */
}
```

Example of `flex-direction: row`

Example of `flex-direction: column`

`flex-direction: row-reverse`

This is the opposite of the row value. It displays the flex items from right to left.

Example of `flex-direction: row-reverse`

`flex-direction: column-reverse`

This is the opposite of the column value. It displays the flex items from the bottom to the top.

Practice using flex-direction on StackBlitz

A note on the reverse values and accessibility:

There's something you need to keep in mind when you use `row-reverse` and `column-reverse`. As you've already seen, both affect the visual order of elements on the screen.

But the order in your HTML remains unchanged. And that is the order that screen readers and keyboard navigation controls use.

In the example, when you use `row-reverse`, you see Jack's name first on the screen, followed by Jane, John, and Jill.

But for someone using a screen reader, they will hear the names as they appear in the HTML and not as they appear on screen. In this case, they will first hear Jill's name, followed by John, Jane, and Jack.

Sometimes, the space within the flex container will not be enough for the flex items.

In such cases, you use the `flex-wrap` property to choose whether to let the flex-items overflow or begin on a new line.

The `flex-wrap` property accepts any of the following values:

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

To see `flex-wrap` in action, let's add four more names to our `names-container`:

```
    <p id="jane">3. JANE</p>
    <p id="jack">4. JACK</p>
    <p id="sara">5. SARA</p>
    <p id="seth">6. SETH</p>
    <p id="seal">7. SEAL</p>
</div>
```

`flex-wrap: nowrap`

This keeps all the flex items on a single line either in a row or column. It allows the flex items to overflow if there's not enough room in the flex container. See the example below:

```
.names-container {
    display: flex;
    flex-direction: row;
    flex-wrap: nowrap;
    /* Other styles here... */
}
```

Flex items overflows because `flex-wrap` is set to `nowrap`

In this example, three names overflow out of the container because there is not enough space for them.

`flex-wrap: wrap`

This will wrap or push the flex items to the next line if there's not enough room for them.

Flex items wrap or moves to the next line when `flex-wrap` is set to `wrap`

`flex-wrap: wrap-reverse`

This is the opposite of `wrap`. It moves the overflow items to the next line but in a reverse direction.

For example, using `wrap-reverse` on the names container moves overflow items to the next top line instead of the next line below.

Example of `flex-wrap: wrap-reverse`

Practice using flex-wrap on StackBlitz.

The `flex-flow` Shorthand Property

The `flex-flow` property is a shorthand for the `flex-direction` and `flex-wrap` properties. This means that when you use `flex-flow`, you can apply both properties with only a single line of code.

properties.

```
.names-container {
    display: flex;
    flex-direction: column;
    flex-wrap: wrap;
}
```

Or you can use the `flex-flow` shorthand to get the same result.

```
.names-container {
    display: flex;
    flex-flow: column wrap;
}
```

Example of `flex-flow: column wrap`

Practice using flex-flow on StackBlitz.

The `justify-content` Property

This `justify-content` property handles the alignment of flex items on the main axis of the flex container.

You can use it to take care of how space is distributed on the main axis. This property takes any of the following values:

- `center`
- `space-between`
- `space-around`
- `space-evenly`

`justify-content: flex-start`

This places the items at the start of the flex-direction. If the main axis is horizontal with a `flex-direction` of `row` (like the example below), it aligns the items to the left. And if it's vertical (with a `flex-direction` of `column`), it aligns the items to the top.

Using the names container example, this is how `justify-content: flex-start` would look like:

```
    /* Other styles here... */
}
```

Example of `justify-content: flex-start`

`justify-content: flex-end`

This will place the flex items at the end of the flex-direction of the main axis.

Example of `justify-content: flex-end`

`justify-content: center`

This places the flex items at the center of the flex container's main axis.

Example of `justify-content: center`

`justify-content: space-between`

axis. Then space on the main axis is distributed equally among the the elements.

Example of `justify-content: space-between`

`justify-content: space-evenly`

This distributes space equally among the flex items. This means the space before and after each item is the same.

Example of `justify-content: space-evenly`

`justify-content: space-around`

This also distributes space equally between the flex items. The key difference here is that the space before the first item and after the last item is half the space between the flex items.

Example of `justify-content: space-around`

The `align-items` Property

The `align-items` property handles the alignment of flex items on the cross-axis of the flex container. It can take any of the following values:

- `stretch` (default value)
- `flex-start`
- `flex-end`
- `center`
- `baseline`

`align-items: stretch`

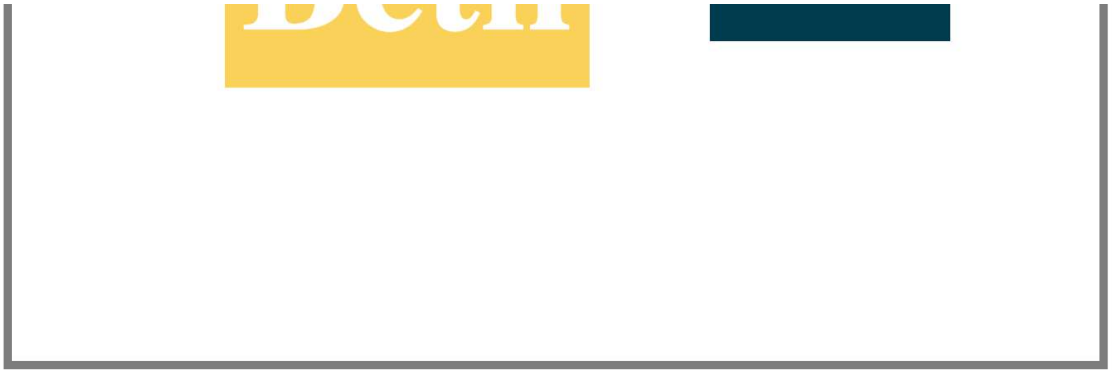
This stretches the flex items to fill up the space within the flex-container.

```
.names-container {
    display: flex;
    align-items: stretch;
    /* Other styles here... */
}
```

Example of `align-items: stretch`

the flex container. If the cross-axis is vertical like in the example below, `align-items: flex-start` will place the items at the top.

```
.names-container {
    display: flex;
    align-items: flex-start;
    /* Other styles here... */
}
```

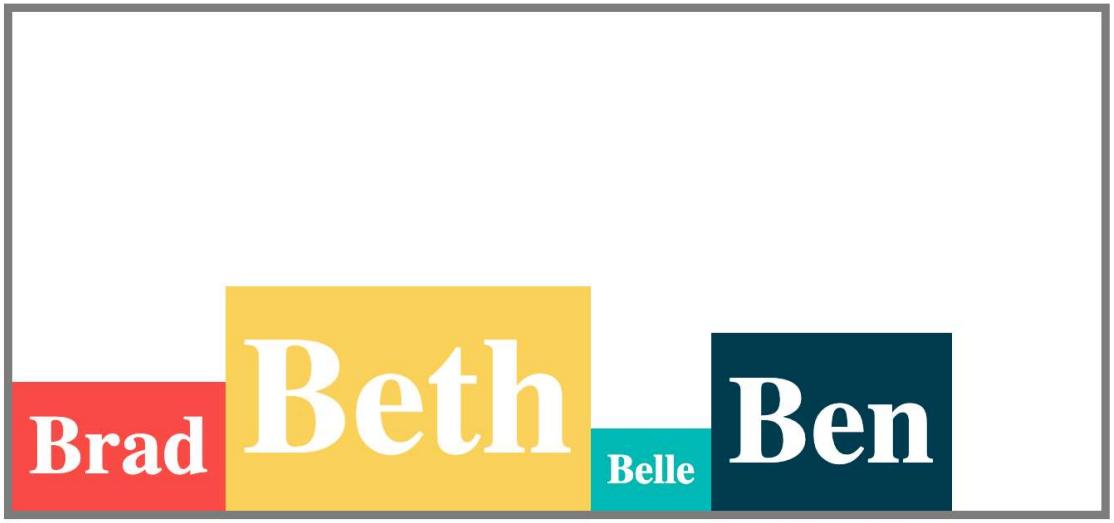


Example of `align-items: flex-start`

`align-items: flex-end`

This will place the flex items at the end of the cross-axis of the flex container. If the cross-axis is vertical like in the example below, `align-items: flex-end` will place the items at the bottom.

```
.names-container {
    display: flex;
    align-items: flex-end;
```



Example of `align-items: flex-end`

`align-items: center`

This aligns flex items at the center of the cross-axis of the flex container.

```
    /* Other styles here... */
}
```

Example of `align-items: center`

align-items: baseline

below:

```
.names-container {
    display: flex;
    align-items: baseline;
    /* Other styles here... */
}
```

The baseline is indicated with the dotted white line

The `align-content` Property

When you have a flex container with wrap (or more than one flex line), you may need to align the lines to distribute the space as you want. That is when you use `align-content`. This property can take any of the following values:

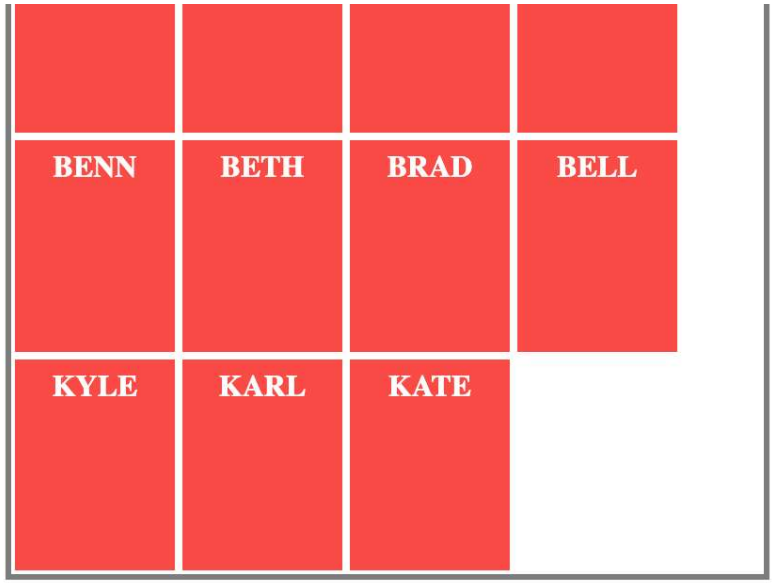
- `stretch` (default value)
- `flex-start`
- `flex-end`
- `center`
- `space-between`
- `space-evenly`
- `space-around`

`wrap` value of `wrap`. This means you can apply the `align-content` property to change the alignment of the flex lines.

`align-content: stretch`

This stretches the flex lines to fill up the space within the flex container's cross-axis.

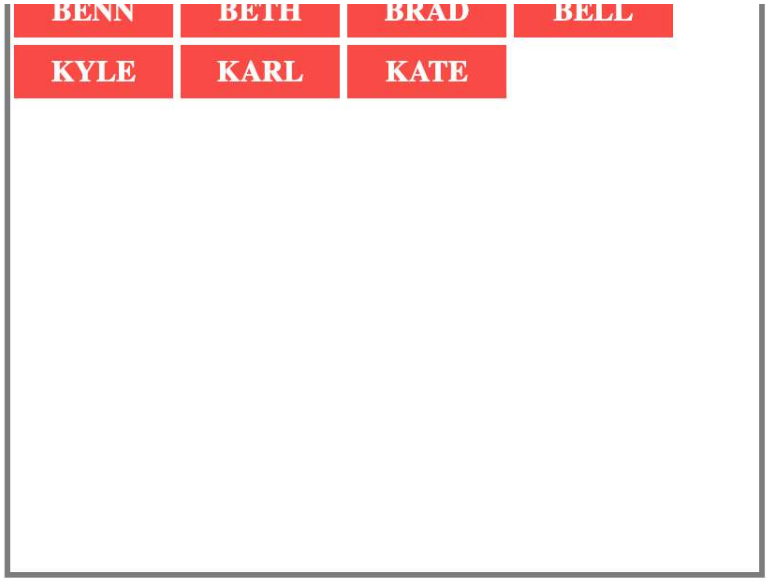
```
.names-container {
    display: flex;
    flex-wrap: wrap;
    align-items: stretch;
    /* Other styles here... */
}
```



Example of `align-content: stretch`

`align-content: flex-start`

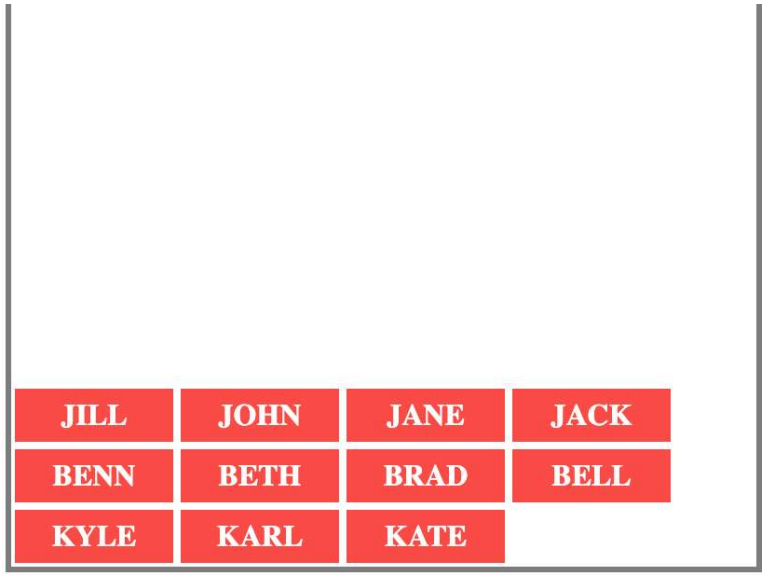
This places the flex lines at the start of the container's cross-axis. For example, if the cross axis is vertical like that of the names container, it will place the flex lines at the top.



Example of `align-content: flex-start`

`align-content: flex-end`

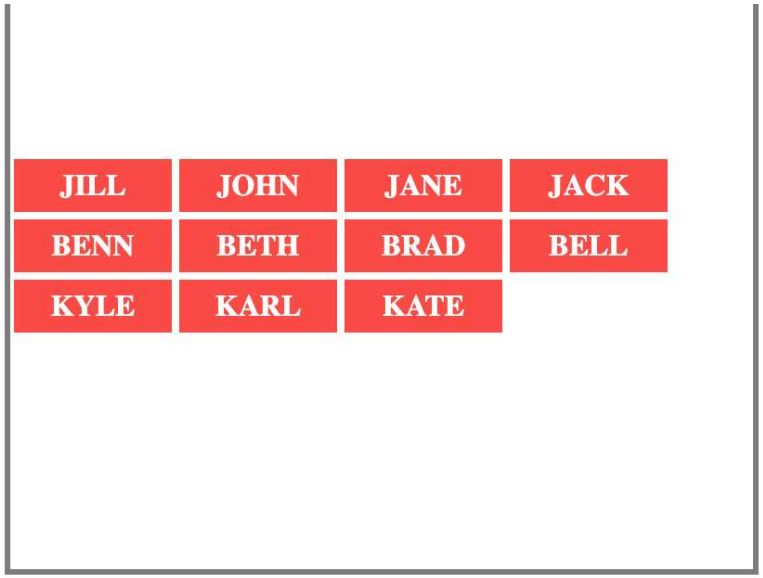
This places the flex lines at the end of the container's cross-axis.



Example of `align-content: flex-end`

`align-content: center`

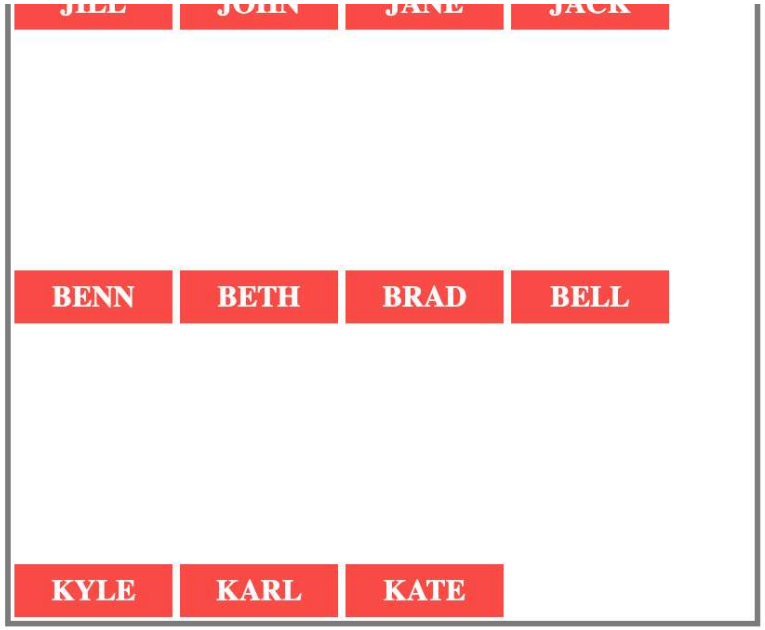
This places the flex lines at the center of the container's cross-axis.



Example of `align-content: center`

`align-content: space-between`

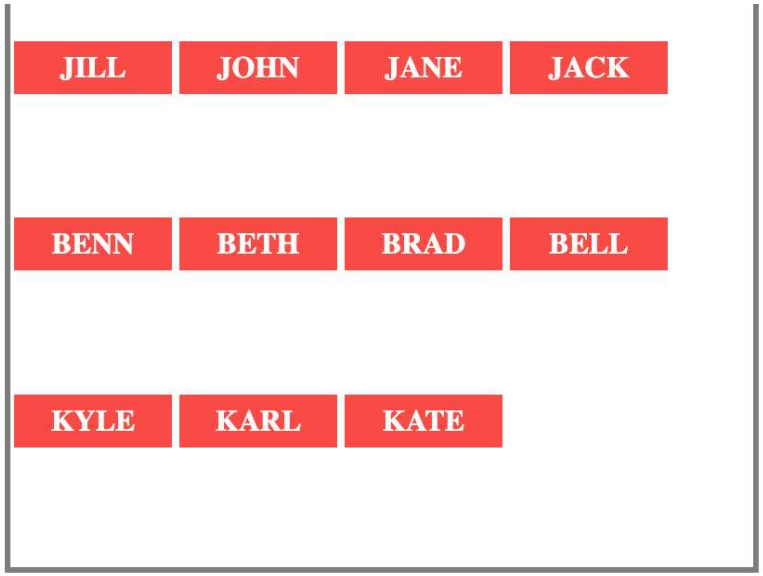
This will place the first flex line at the start of the cross-axis. It also places the last flex line at the end of the cross axis. Then space on the cross-axis is distributed equally between the the lines.



Example of `align-content: space-between`

`align-content: space-evenly`

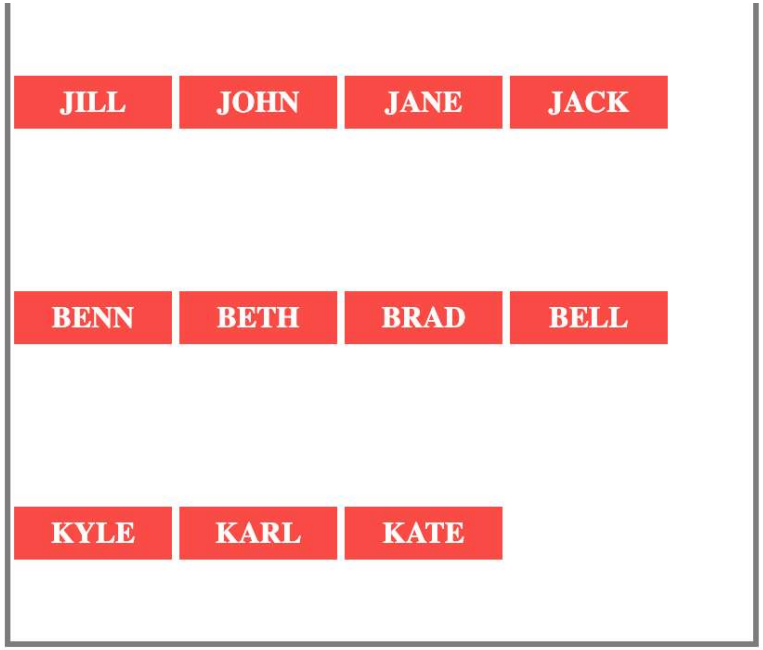
This distributes space equally between the flex lines. This means the space before and after each line is the same.



Example of `align-content: space-evenly`

`align-content: space-around`

This also distributes space equally between the flex lines. The key difference here is the space before the first line and after the last line is half the space between the flex lines.



Example of `align-content: space-around`

Practice using align-content on StackBlitz.

The `place-content` Property

property.

It can take one or two values. When you give it a single value, the browser will apply the same value for both `justify-content` and `align-content`.

And when you give 2 values for `place-content`, the first value will be for `align-content` and the second for `justify-content`.

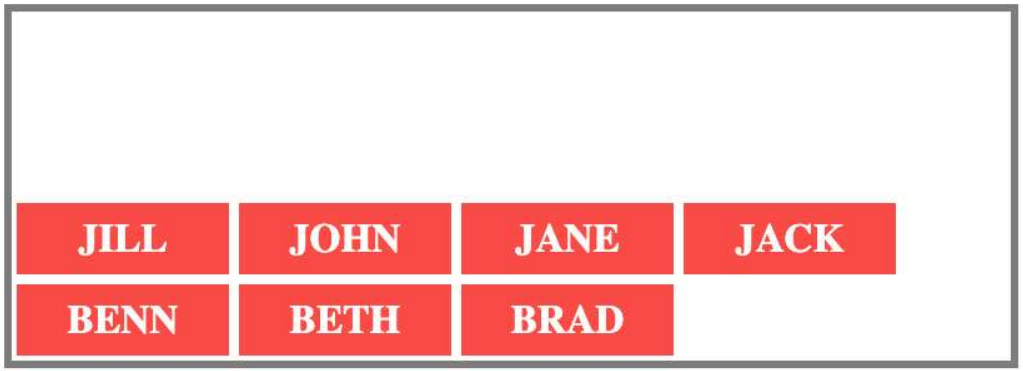
Let's look at an example:

Instead of writing this:

```
.names-container {
    display: flex;
    flex-wrap: wrap;
    align-content: flex-end;
    justify-content: flex-start;
```

You can instead write the following and it will have the same effect:

```
.names-container {
    display: flex;
    flex-wrap: wrap;
    place-content: flex-end flex-start;
    /* Other content */
}
```



Practice using place-content on StackBlitz.

The Flex Item Properties

Every direct child of a flex container is a flex item. So far, you've learned the properties of the flex containers.

Flexbox also has properties that you can apply to individual flex items. They include the following:

- `order`
- `align-self`
- `flex-grow`
- `flex-shrink`
- `flex-basis`
- `flex`

The `order` property determines the order of appearance for the flex items.

The value you give to this property must be a number. A flex item with a lower number will appear before one with a higher number.

In the HTML code, the order for the four names is as follows:

1. Jill
2. John
3. Jane
4. Jack

```
<div class="names-container">
    <p id="jill">1. JILL</p>
    <p id="john">2. JOHN</p>
```

You can change the order of appearance on the screen using the `order` property. See the example below.

Here's how they appear with no `order` properties:

Name cards before add the `order` property

Now, see how they appear when you add the following order properties:

```
#jill {
    order: 2;
    background-color: #fe4f46;
}

#john {
    order: 4;
    background-color: #fcd65c;
}

#jane {
    order: 1;
    background-color:
    #00bab4;
}

#jack {
    order: 3;
    background-color: #003f54;
}
```

The `order` property changes the order of appearance

Practice using the order property on StackBlitz.

Word of caution: Even though the order of appearance changes on screen, the order in the HTML remains unchanged. And it's the order in the HTML that screen readers use. Where possible, it's best practice to change the order in the HTML rather than doing it with Flexbox.

The `align-self` property

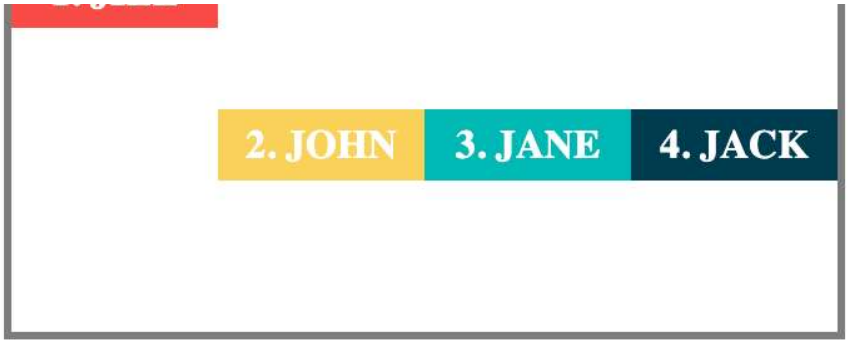
You can use the `align-self` property to give a flex item a different alignment from the other items.

items, the `align-self` property is applied to only specific items.

Example:

```
.names-container {
    display: flex;
    align-items: center;
    /* Other styles */
}

#jill {
    align-self: flex-start;
}
```



Example of `align-self` with a `flex-start` value

In the example, the `align-items` property for the names container has a value of `center`. This aligns all the names at the center.

But using the `align-self` property, you are able to align Jill's name card to the top with a value of `flex-start`.

Practice using the align-self property on StackBlitz.

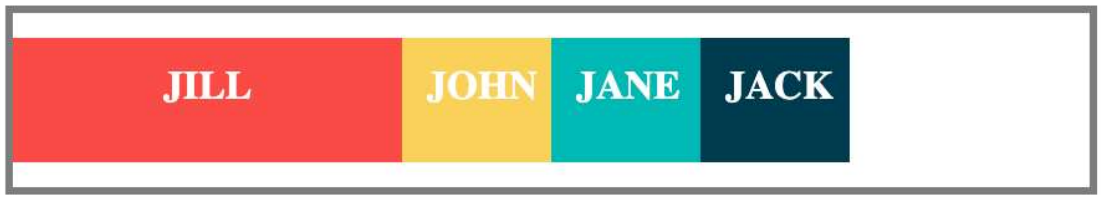
will be some extra space after the items are arranged. See the example below:

```
.names-container {
    display: flex;
    justify-content:
    flex-start;
    /* Other styles */
 }
```

The flex container has more than enough space for the flex items

flex items, the browser will add half of the remaining space to the item's size.

```
#jill {
    flex-grow: 0.5;
}
```



The `flex-grow` property makes the Jill's larger than its initial size

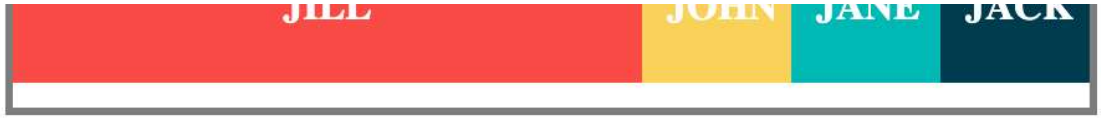
item.

NOTE: If only one item in the container has a `flex-grow` value, then any value of 1 or more will make it take up all the extra space.

For example, the two code snippets below will have the same effect on Jill's card:

```
#jill {
    flex-grow: 1;
}
```

```
#jill {
    flex-grow: 99;
}
```



When only one card has a `flex-grow` of `1` or more

What happens when you add `flex-grow` values to more than one element?

The browser will share the extra space proportionately for them.

For example, when you give Jane a `flex-grow` of `3` and Jack a `flex-grow` of `1`, the browser will share the extra space with a `3:1` ratio.

This means the total value of the extra space becomes `4` (3+1). `Jane` will then get `3/4` of the extra space. And `Jack`

The extra space is shared proportionately betwee `Jane` and `Jack`

Practice using the flex-grow property on StackBlitz.

The `flex-shrink` property

The `flex-shrink` property is the opposite of `flex-grow`.

You use `flex-grow` when you want to increase the flex item's size if there's extra space. But, you use `flex-shrink` when you want to decrease the flex-item's size if there's not enough space in the flex container.

```html
<div class="numbers-container">
    <p id="one">1</p>
    <p id="two">2</p>
    <p id="three">3</p>
    <p id="four">4</p>
</div>
```

```css
.numbers-container {
    display: flex;
    justify-content: flex-start;
    /* Other styles */
}

#one {
    flex-shrink: 2;
    background-color: #fe4f46;
}
```

The first card shrinks to make room for the others

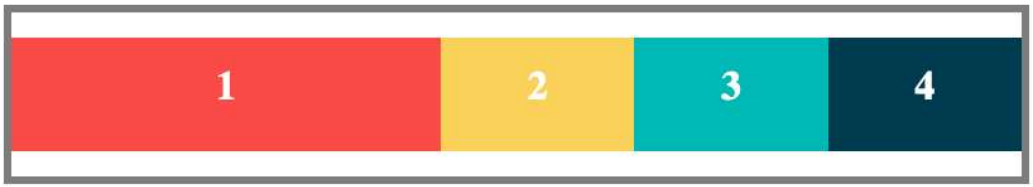
In the example, each of the four numbers has a width of 150px (that's a total of 600px). But the `numbers-container` has a width of 400px which is not enough.

The cards have to shrink to fit in the available space. But Number `1` which with a `flex-shrink` value of 2 shrinks to become twice as small as the other numbers.

What if you don't want a flex item to shrink?

To prevent a flex item from shrinking, give it a `flex-shrink` value of `0`.

items will shrink to fit in the remaining space.



The first card does not shrink because it has a `flex-shrink` value of `0`

Practice using the flex-shrink property on StackBlitz.

The `flex-basis` property

You can use the `flex-basis` property to set the default length of a specific flex item. This is either the width or height of the item depending on the `flex-direction`.

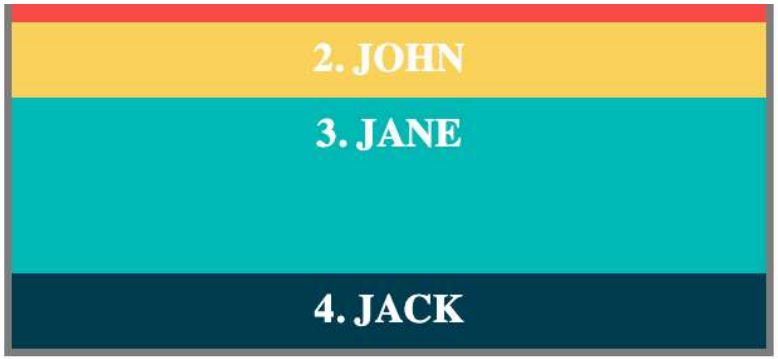
And if `flex-direction` is `column` or `column-reverse`, then the value for `flex-basis` becomes the initial height of the item.

Example:

```
.names-container {
    display: flex;
    flex-direction: column;
    /* Other styles */
}

div {
    height: 20px;
}

#jane {
    flex-basis: 60px;
}
```



Example of `flex-basis` setting the height of an item

In the example, the height for the divs is set at 20px. But Jane gets a `flex-basis` value of 60px. And that overrides the 20px given to all the divs.

Note: The flex-basis of 60px becomes the height for Jane because the `flex direction` is `column`. This means the main axis is vertical.

item.

```
.names-container {
    display: flex;
    flex-direction: row;
    /* Other styles */
}

div {
    width: 70px;
}

#jane {
    flex-basis: 140px;
}
```

While all the other divs have a width of 70px, Jane has a width of 140px set by the `flex-basis`.

Practice using the flex-basis property on StackBlitz.

The `flex` Shorthand Property

You can use `flex` as a shorthand for the `flex-grow`, `flex-shrink`, and `flex-basis` properties.

For example, instead of writing the following:

```
.flex-item {
    flex-grow: 2;
    flex-shrink: 0;
    flex-basis: 50px;
}
```

```
.flex-item {
    flex: 2 0 50px;
}
```

The `flex` property can take up to three values. The order of the values is important. The browser assigns the first value for `flex-grow`, the second for `flex-shrink`, and the third for `flex-basis`.

The default values for `flex` are `1 0 auto`.

This means if you give `flex` a single value of 2, the browser uses 2 for `flex-grow`. And then it sets `flex-shrink` to 0 and `flex-basis` to auto.

Practice using the `flex` property on StackBlitz.

One of the headaches for many front-end developers is centering elements. Flexbox has a perfect solution for that.

There are two steps involved.

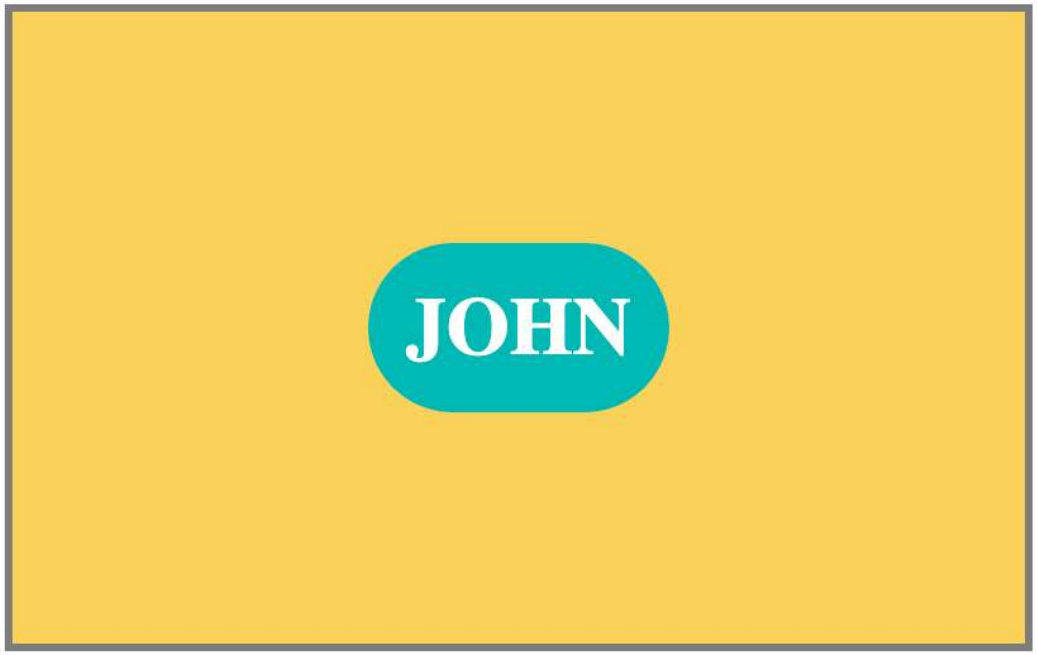
1. Make the parent element a flex container by setting `display` to `flex`.
2. Give a value of `center` to both `justify-content` and `align-items`.

That's it! Your element will be perfectly centered.

Example:

```
<div class="name-container">
    <p>JOHN</p>
</div>
```

```
    display: flex;
    justify-content: center;
    align-items: center;
    /* Other Styles */
}
```



Example of centering an element with Flexbox

entire navigation bar, this will work just fine.

Flexbox Gaps

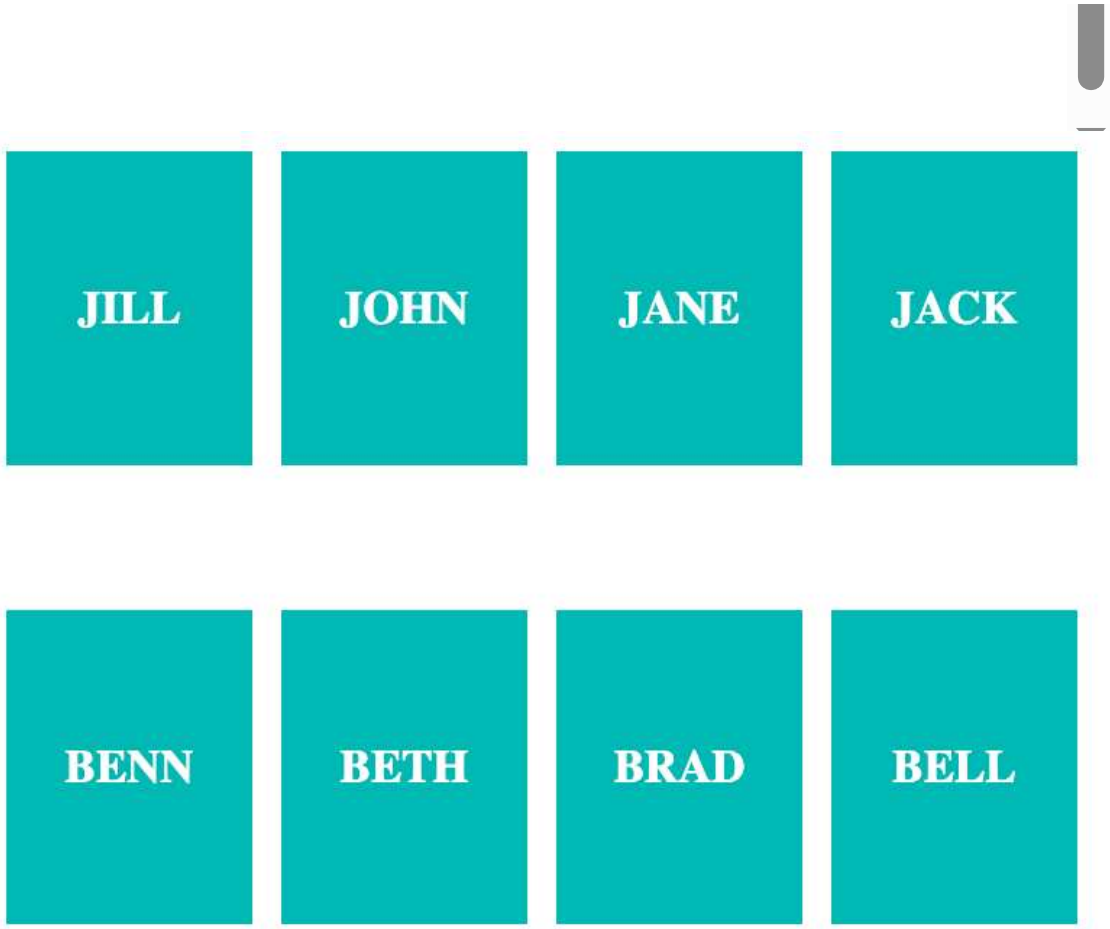
You can use the `gap` property to adjust the space between flex items.

NOTE: You apply the gap property on the flex container and not the flex items.

`gap` can take two values: the first value for gaps between the rows and the second value for gaps between the columns.

Example:

```
.names-container {
    display: flex;
    flex-wrap: wrap;
```

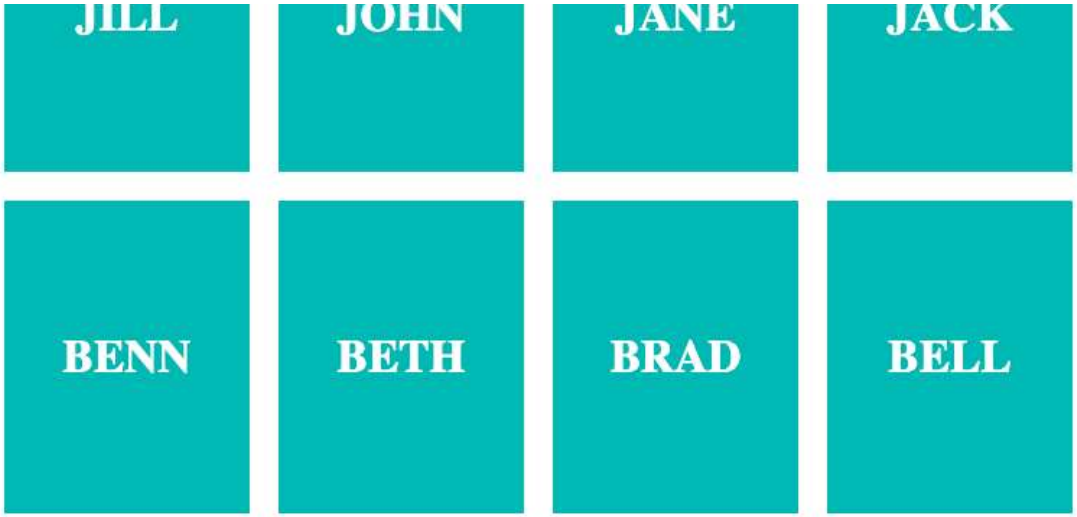


Example of giving two values for the gap property

the same value to both rows and columns.

Example:

```
.names-container {
    display: flex;
    flex-wrap: wrap;
    gap: 10px;
    /* Other Styles */
}
```

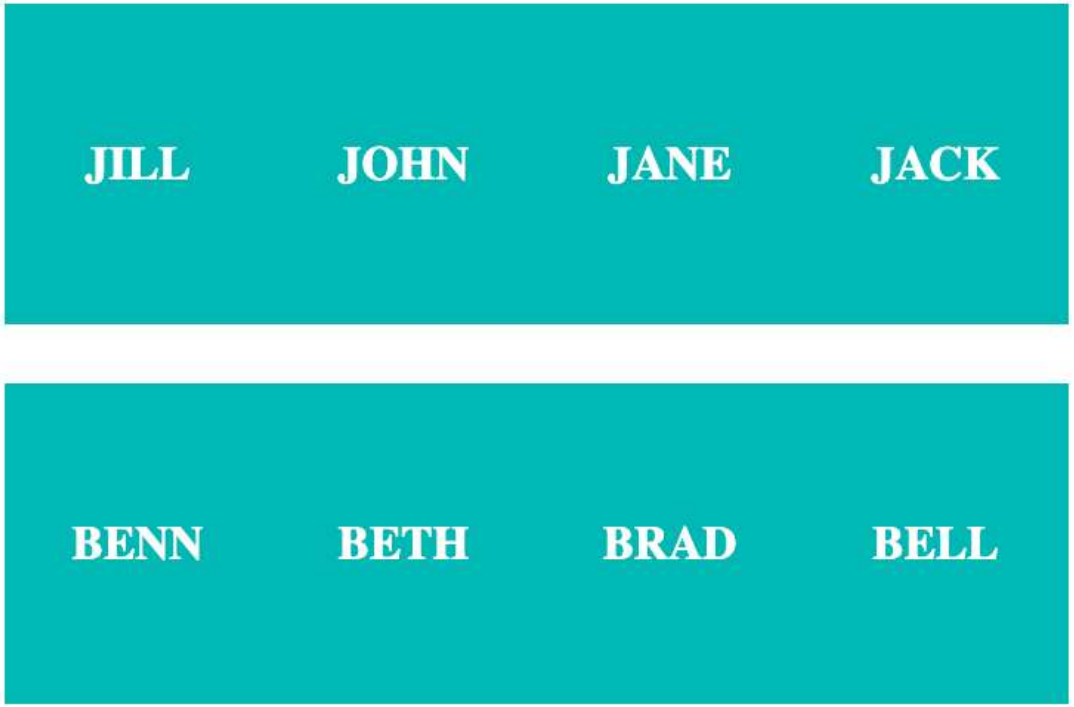


Example of using only one value for both rows and columns gap

You can also use the properties `row-gap` if you need to apply a specific gap value between only the rows. and `column-gap` if you need to add gaps between only the columns.

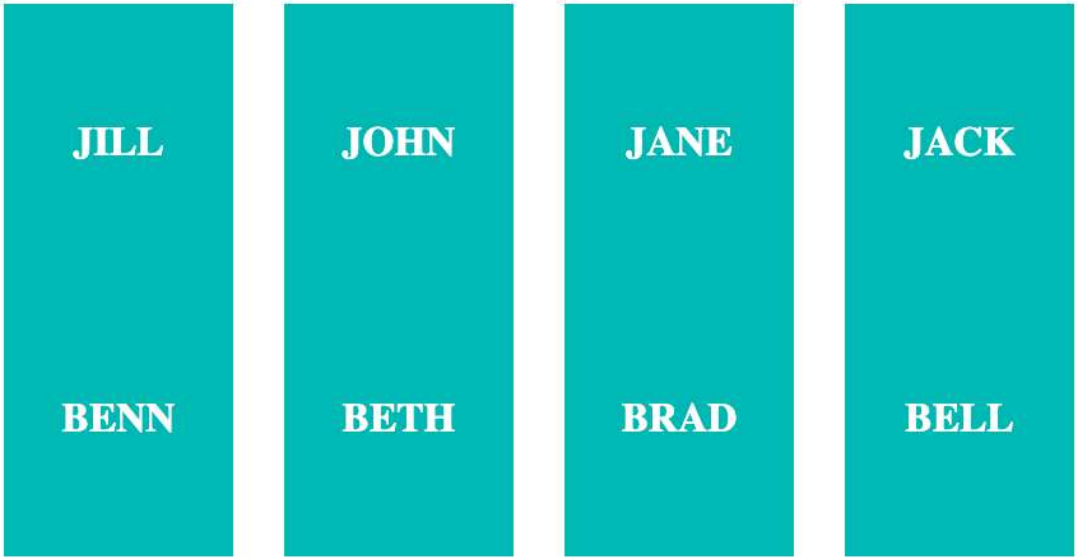
Example: Adding gaps between only the rows:

```
    row-gap: 20px;
    /* Other Styles */
}
```



Example of using `row-gap`

```
.names-container {
    display: flex;
    flex-wrap: wrap;
    column-gap: 20px;
    /* Other Styles */
}
```



Example of using `column-gap`

Practice with Flexbox Games

Want to practice Flexbox in an interactive way? Check out the following games. They provide a hands-on experience for practicing Flexbox in a fun and engaging way.

- Flexbox Froggy
- Flexbox Defense
- Flexbox Zombies

Are There Bugs in CSS Flexbox?

While CSS Flexbox is a powerful layout tool, it's got a few bugs that may surprise you.

A common example is that **some HTML elements cannot act as flex containers**. These include the `<button>`, `<fieldset>`, and `<summary>` elements.

wrapper `div`.

If you are curious about other Flexbox bugs and workarounds, you can have a look at the Flexbugs repository on GitHub.

Conclusion

In this guide, you learned all the Flexbox properties, their values, and how to use them to create responsive layouts. You also learned about some games like Flexbox Froggy you can use for practice.

Thank you for reading, and happy coding! For more in-depth tutorials, feel free to subscribe to my YouTube channel.

If you read this far, thank the author to show them you care. Say Thanks

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