Interactive Web Programming

1st semester of 2021

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Heavily based on **Victoria Kirst** slides

Today's schedule

Schedule:

- HTML and CSS
- Inline vs block
- Classes and Ids

Reminders:

- HW0 is due next Tuesday (09/03)

HTML and CSS

Quick Review

Recall: HTML

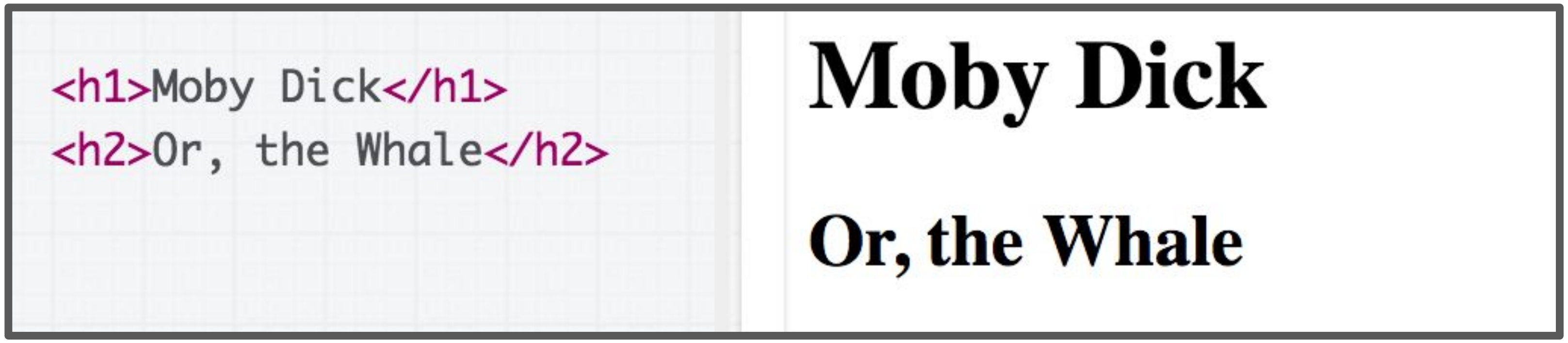
HTML (**H**yper**t**ext **M**arkup **L**anguage)

- Describes the **content** and **structure** of a web page; not a programming language.
- Made up of building blocks called **elements**.

```
<p>
  HTML is <em>awesome!!!</em>
  <img src="puppy.png" />
</p>
```

Some HTML elements

Top-level heading: **h1, h2, … h6**

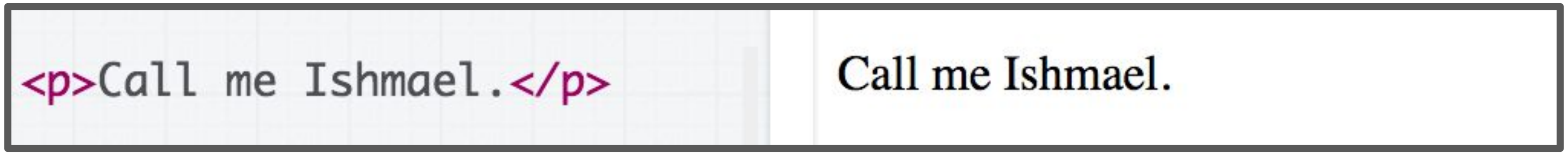


```
<h1>Moby Dick</h1>
<h2>Or, the Whale</h2>
```

Moby Dick

Or, the Whale

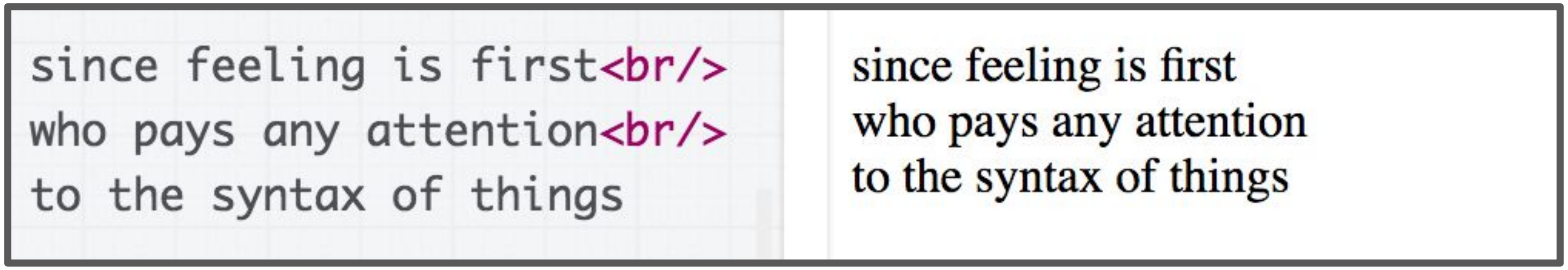
Paragraph: **p**



```
<p>Call me Ishmael.</p>
```

Call me Ishmael.

Line break: **br**



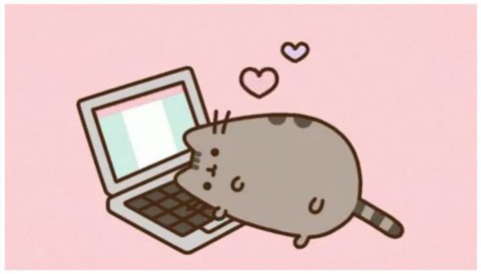
```
since feeling is first<br/>
who pays any attention<br/>
to the syntax of things
```

since feeling is first
who pays any attention
to the syntax of things

Some HTML elements

Image: **`img`**

```
<img src="pusheen.gif" />
```



Link: **`a`** (note: not **`link`**)

```
<a href="google.com">click here!</a>
```

click here!

Strong (bold): **`strong`** (note: don't use **b**)

```
<strong>Be BOLD</strong>
```

Be BOLD

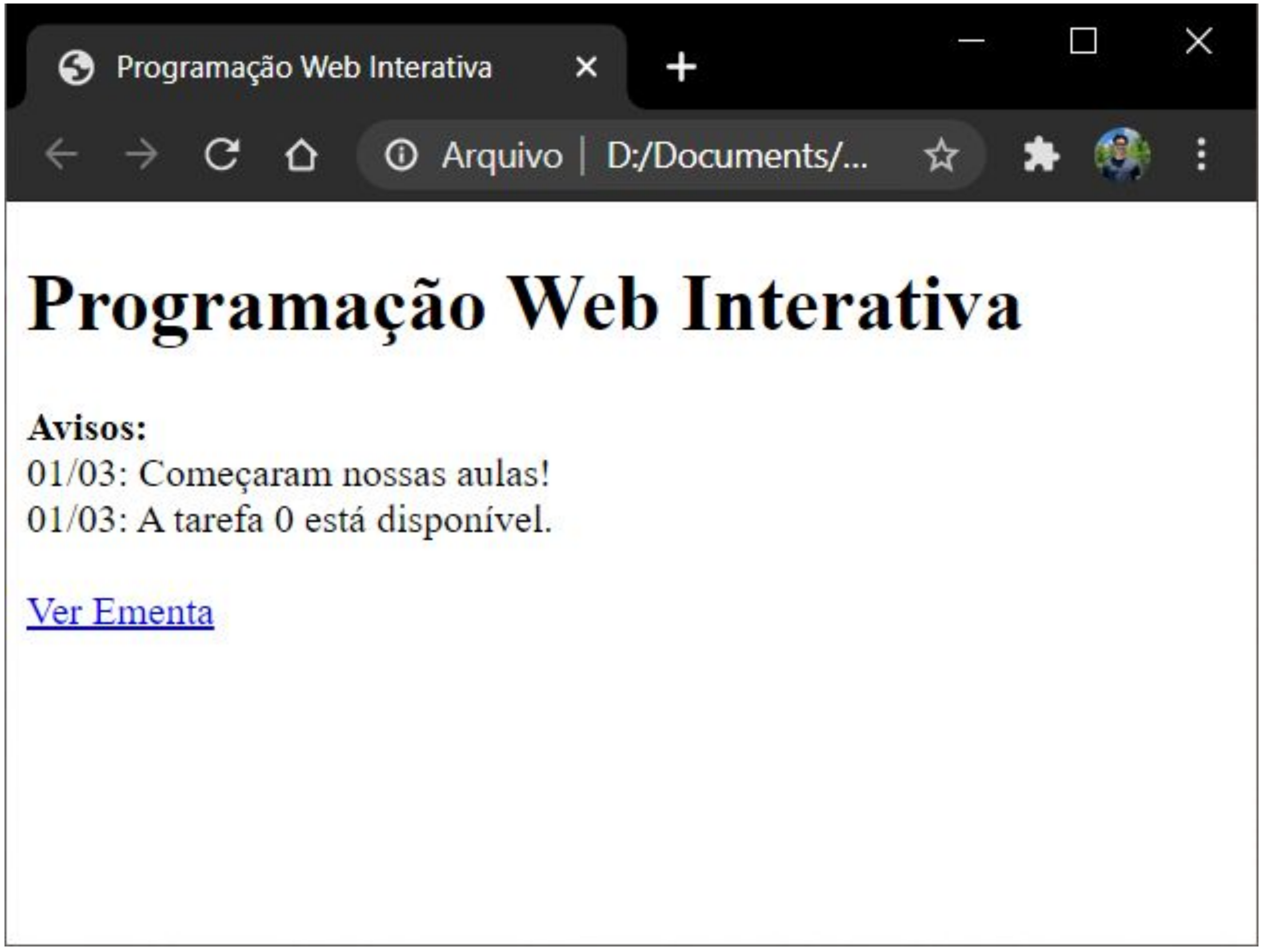
Emphasis (italic): **`em`** (note: don't use **`i`**)

```
He's my <em>brother</em> and all
```

He's my *brother* and all

Recall: Course web page

We wrote some HTML to make the following page:



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Avisos:
01/03: Começaram nossas aulas!
01/03: A tarefa 0 está disponível.

Ver Ementa

That was weird

- We saw that HTML whitespace collapses into one space...

```
<h1>Programação Web Interativa</h1>
<strong>Avisos</strong><br/>
01/03: Começaram nossas aulas!<br/>
```

- Except weirdly the **`<h1>`** heading was on a line of its own, and **`<strong>`** was not.

Recall: CSS

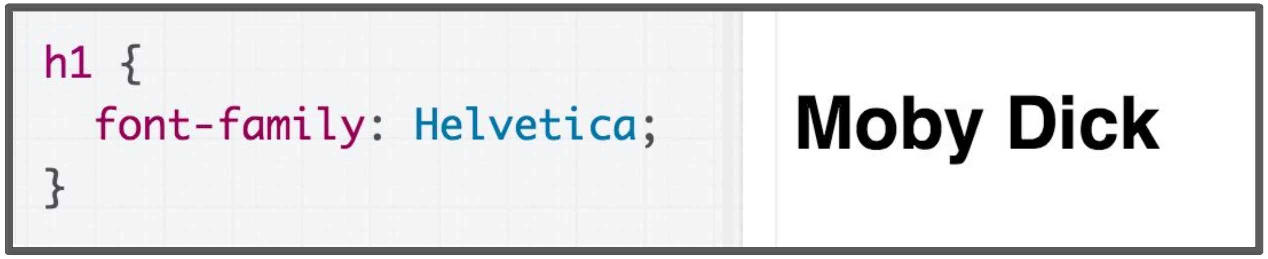
CSS: **C**ascading **S**tyle Sheets

- Describes the **appearance** and **layout** of a web page
- Composed of CSS **rules**, which define sets of styles

```
selector {
  property: value;
}
```

Some CSS properties

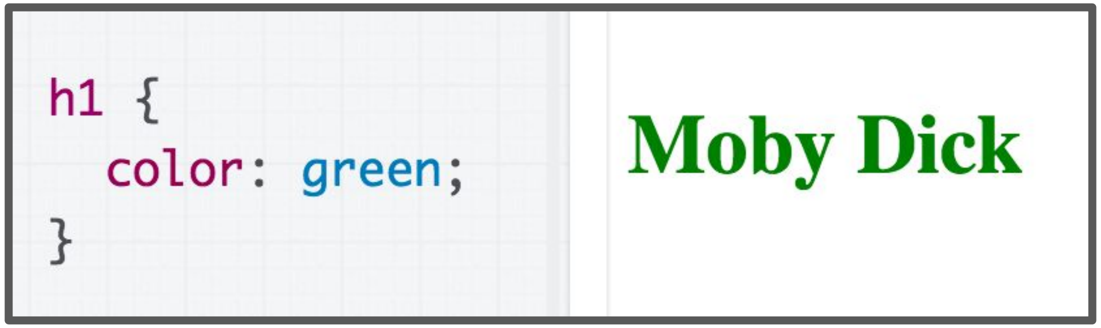
Font face: **`font-family`**



```
h1 {
  font-family: Helvetica;
}
```

Moby Dick

Font color: **`color`**

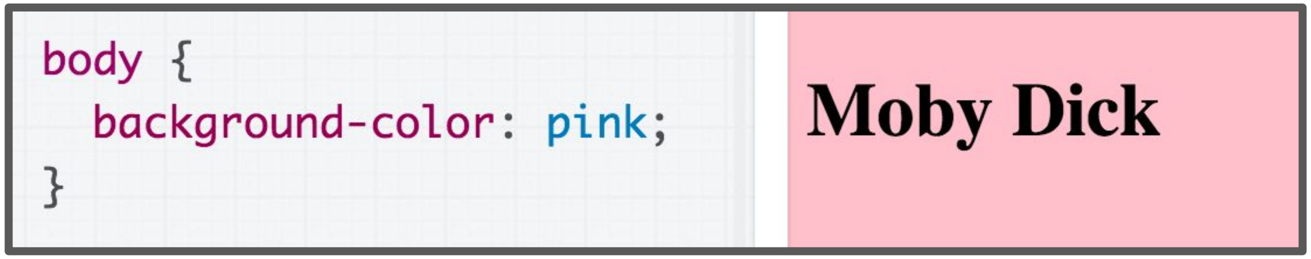


```
h1 {
  color: green;
}
```

Moby Dick

Note that `color` always refers to **font** color, and there's no way to make it mean anything other than font color.

Background color: **`background-color`**



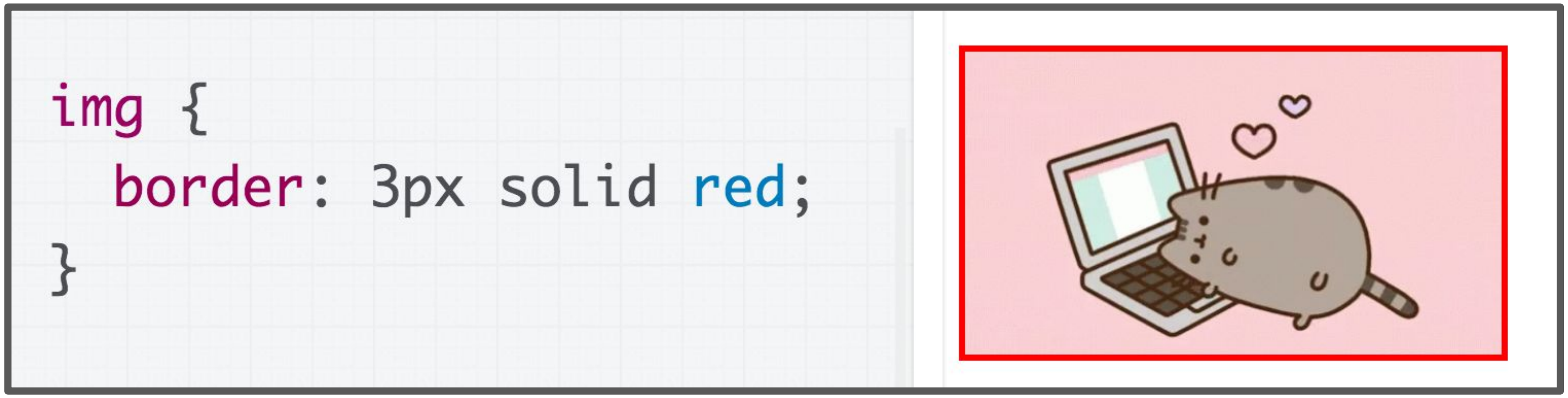
```
body {
  background-color: pink;
}
```

Moby Dick

Assign a `background-color` to body to make the page a different color.

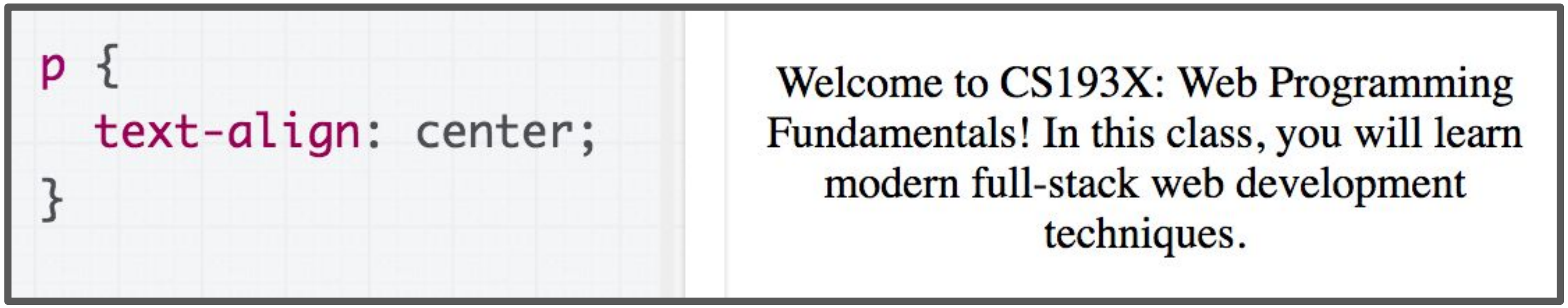
Some CSS properties

Border: **`border`** (border shorthand syntax)



```css
img {
  border: 3px solid red;
}
```

Text alignment: **`text-align`** (note: don't use **`<center>`**)



```css
p {
  text-align: center;
}
```

Welcome to CS193X: Web Programming Fundamentals! In this class, you will learn modern full-stack web development techniques.

CSS colors

140 predefined names (list)

```
color: black;
```

Hex values

```
color: #00ff00;
color: #0f0;
color: #00ff0080;
```

rgb() and rgba()

```
color: rgb(34, 12, 64);
color: rgba(0, 0, 0, 0.5);
```

- The "a" in rgba stands for alpha channel and is a transparency value

- Prefer more descriptive:
  1. Predefined name
  2. rgb / rgba
  3. Hex

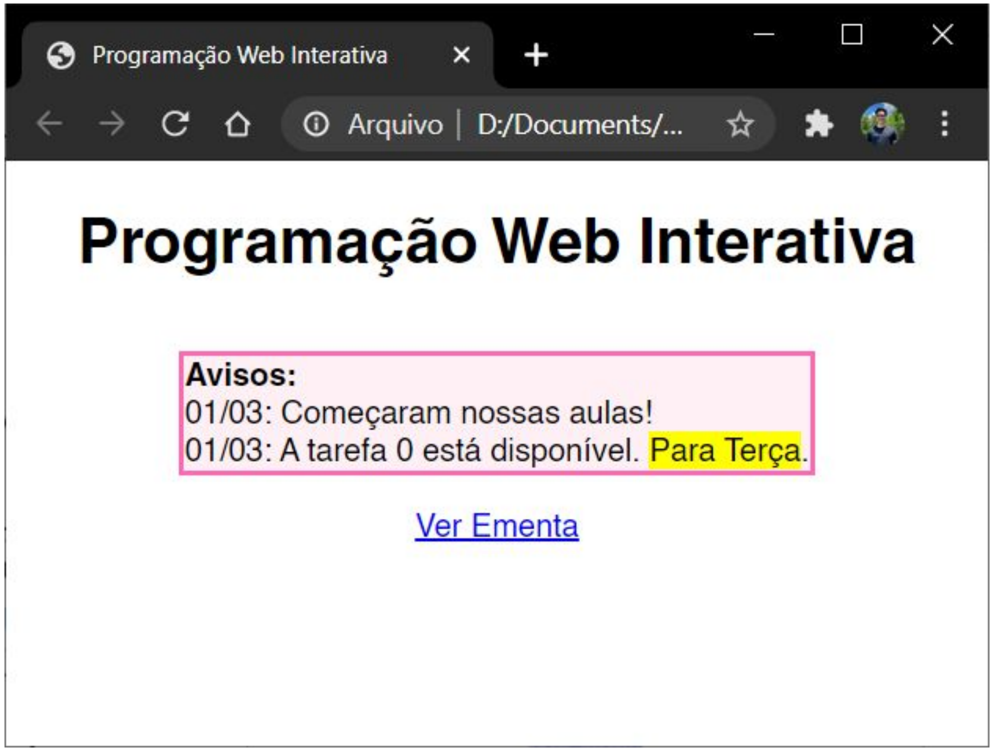
Exercise: Course web page

Let's write some CSS to style our page:

Font face: Helvetica

Border: `hotpink 3px`
Background color: `lavenderblush`
Highlight: `yellow`

- Box is **centered**
- Header and link are **centered**
- Box contents are **left-aligned**



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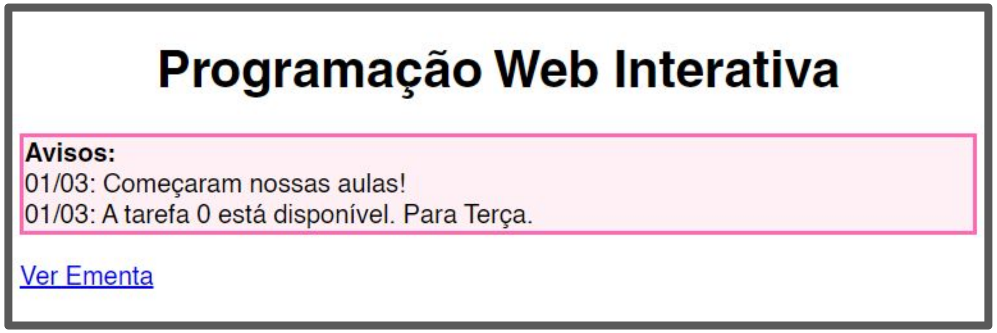
Ver Ementa

CodePen

Solution?!

```
body {
  font-family: Helvetica;
}
h1 {
  text-align: center;
}
a {
  text-align: center;
}
p {
  border: 3px solid hotpink;
  background-color: lavenderblush;
}
```

Produces:



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CSS exercise debrief

We used some **key techniques:**

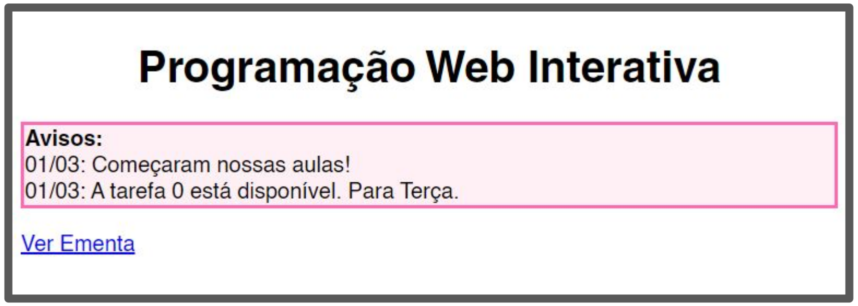
- Add invisible containers in HTML to select groups of elements in CSS.
- Apply styles to parent / ancestor element to style parent and all its children. (Will talk more about this later.)

CSS exercise debrief

But we encountered **more weirdness**...

- `text-align: center;` didn't work on the `<a>` tag
- The box was really wide!
- How to center the box?!
- How do you highlight?!

How do we get from this…



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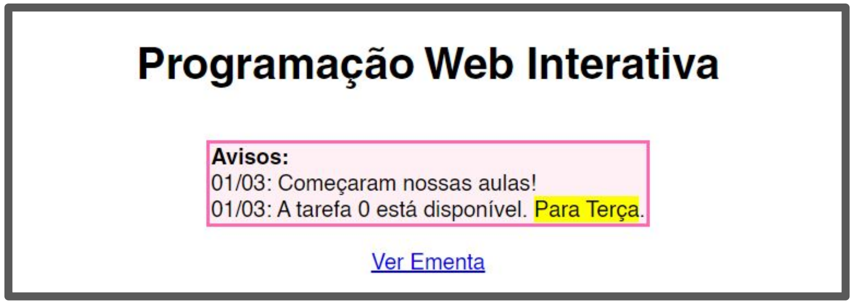
… to this?



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Q: Why is HTML/CSS so bizarre??

A: There is one crucial set of rules we haven't learned yet...

block vs **inline** display

What is HTML?

HTML (**H**ypertext **M**arkup **L**anguage)

- Describes the **content** and **structure** of a web page
- Made up of building blocks called **elements**.

```
<p>
  HTML is <em>awesome!!!</em>
  <img src="puppy.png" />
</p>
```

And there are 3 basic types.

Types of HTML elements

Each HTML element is categorized by the HTML spec into one of three-ish categories:

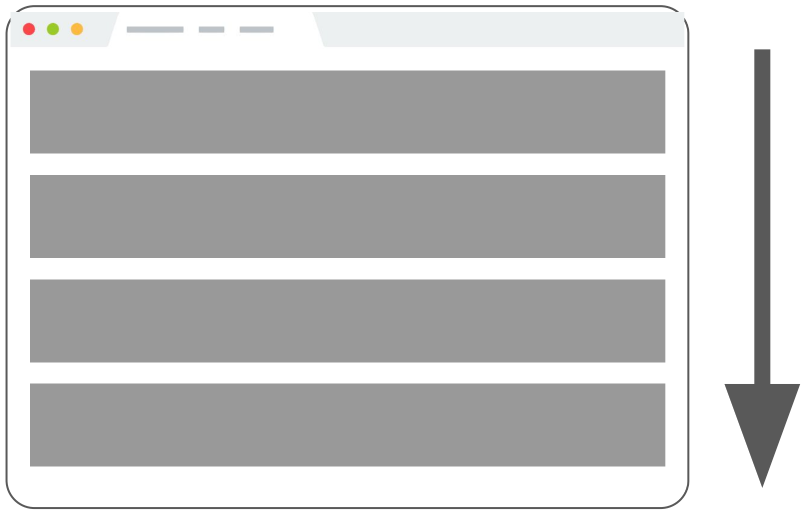
1. **block:** large blocks of content, has height and width
   `<p>`, **`<h1>`**, `<blockquote>`, `<ol>`, `<ul>`, `<table>`
2. **inline:** small amount of content, no height or width
   `<a>`, `<em>`, **`<strong>`**,`<br>`
   a. **inline block:** inline content with height and width
      `<img>`
3. metadata: information about the page, usually not visible
   `<title>`, `<meta>`

Block elements

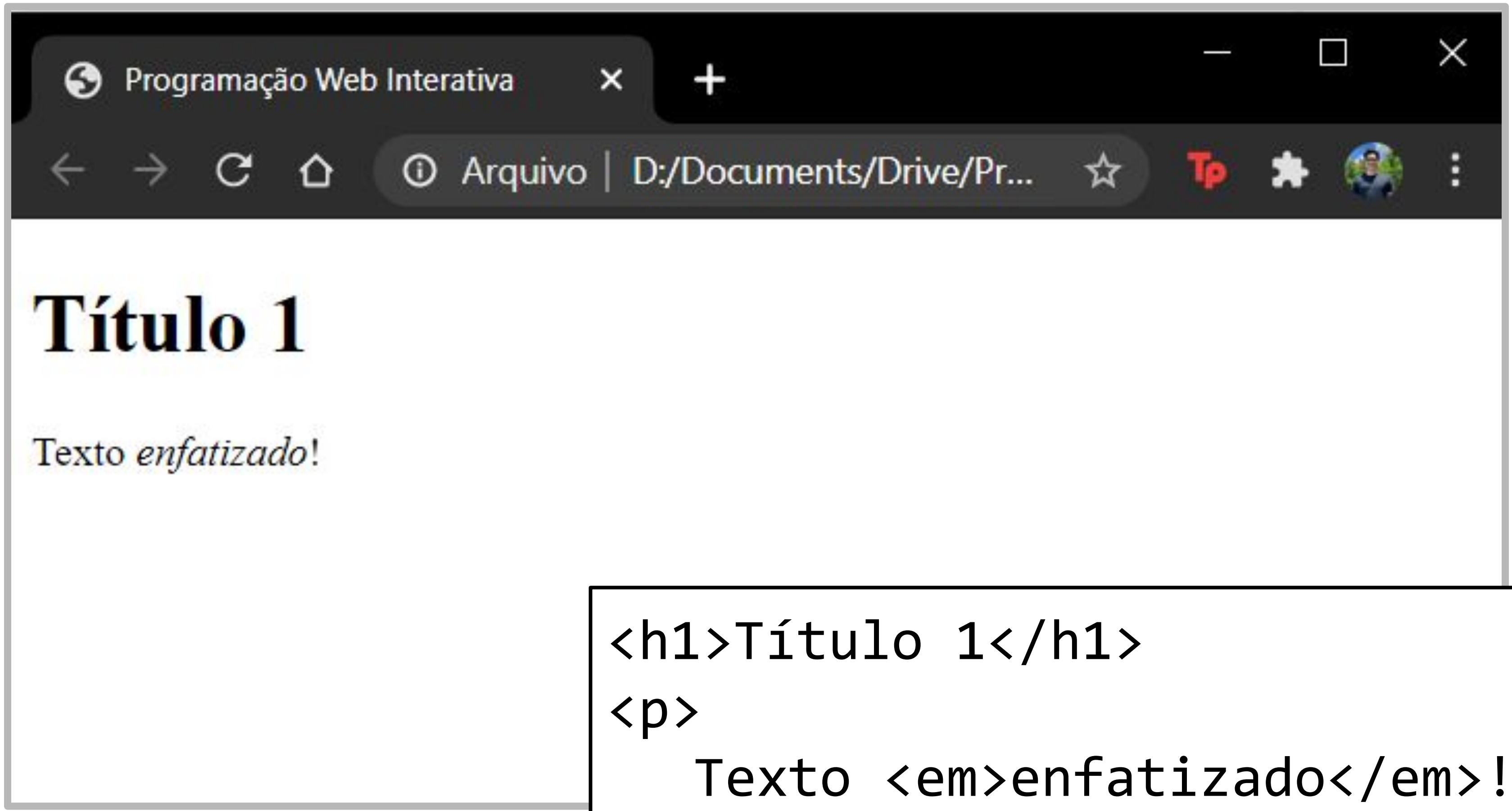
Examples:

`<p>, <h1>, <blockquote>, <ol>, <ul>, <table>`

- Take up the full width of the page (**flows top to bottom**)
- Have a `height` and `width`
- Can have block or inline elements as children



Example: Block



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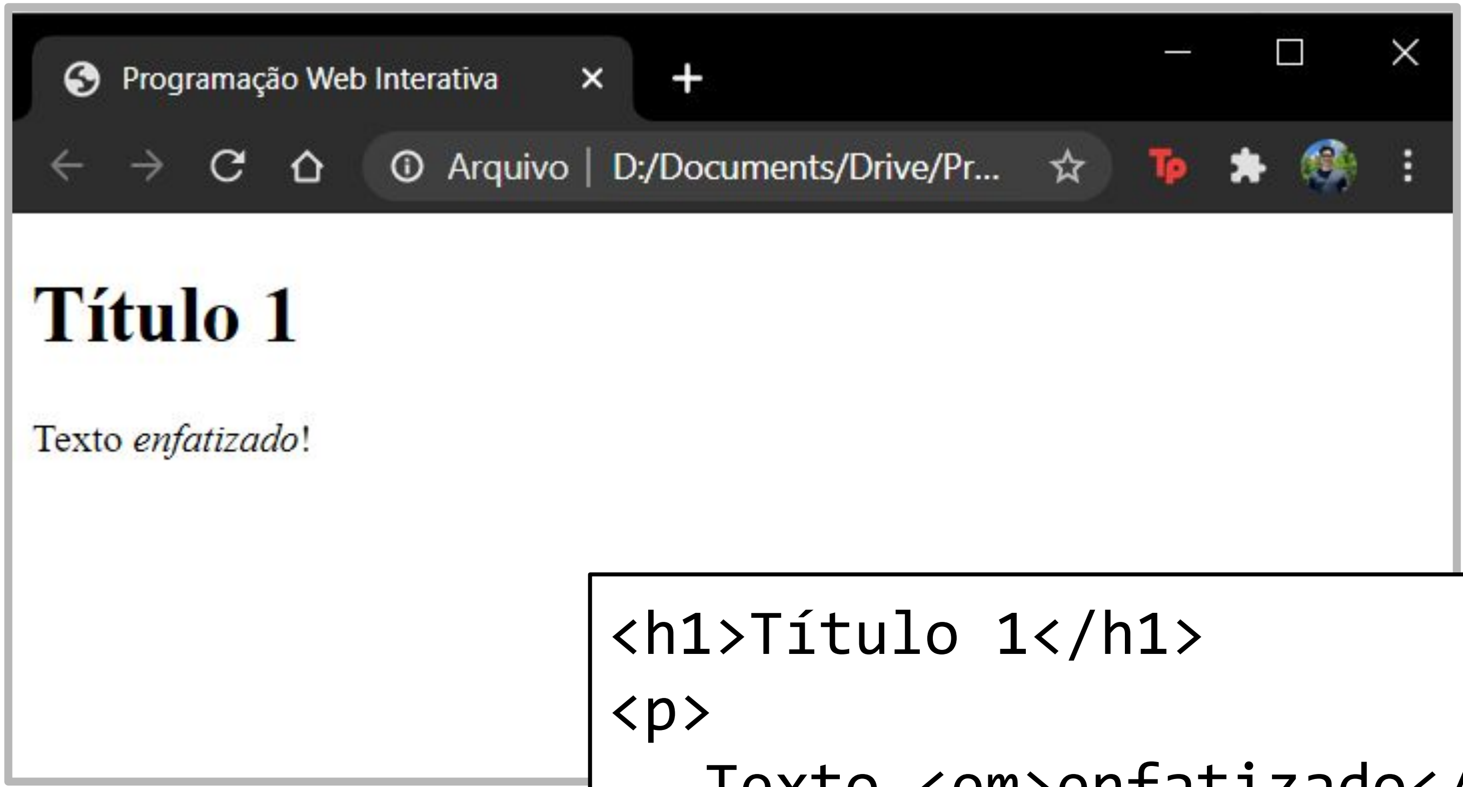
Título 1

Texto *enfatizado*!

```
<h1>Título 1</h1>
<p>
   Texto <em>enfatizado</em>!
</p>
```

Q: What does this look like in the browser?

```
h1 {
  border: 5px solid red;
}
```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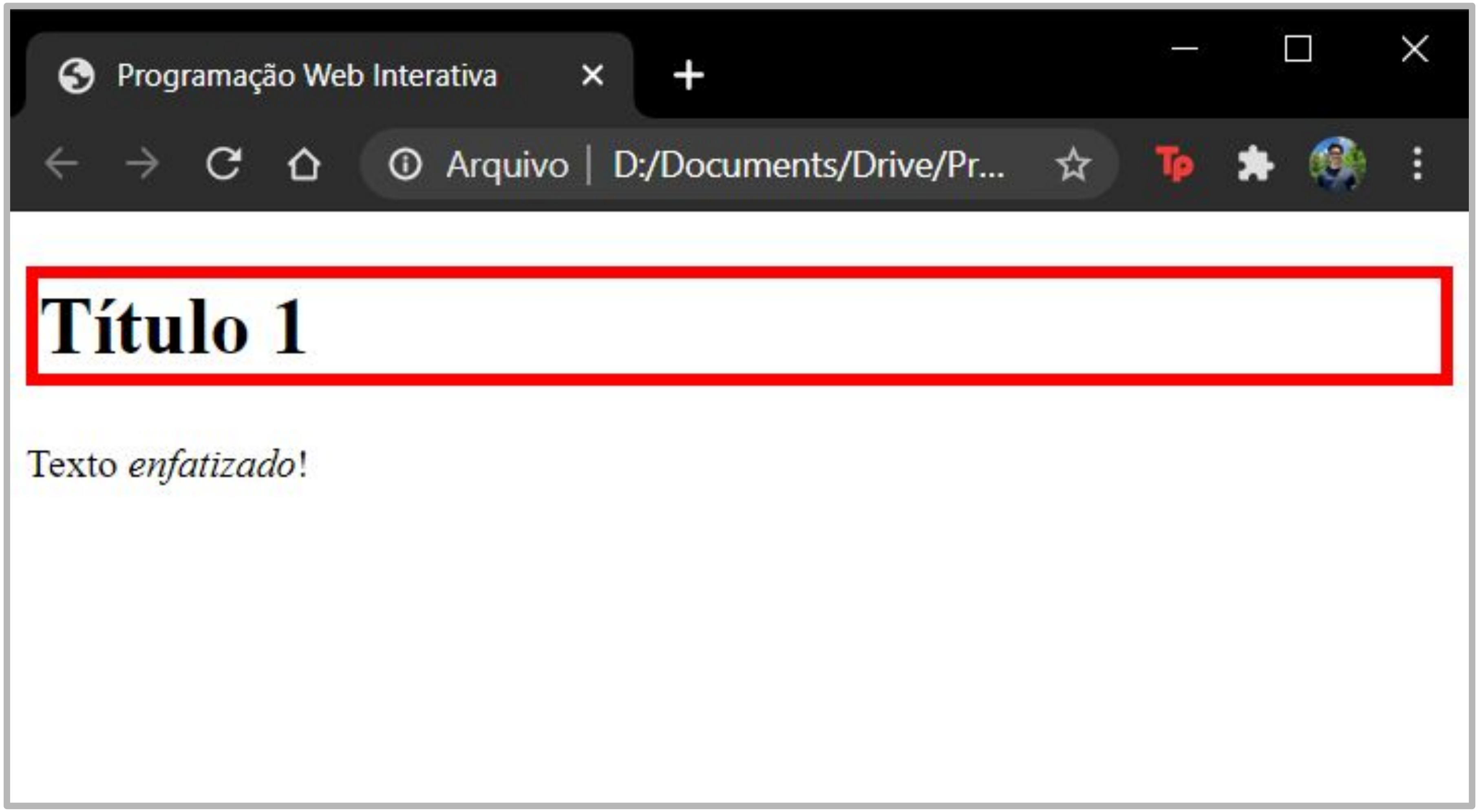
Título 1

Texto *enfatizado*!

```
<h1>Título 1</h1>
<p>
  Texto <em>enfatizado</em>!
</p>
```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Título 1

Texto *enfatizado*!

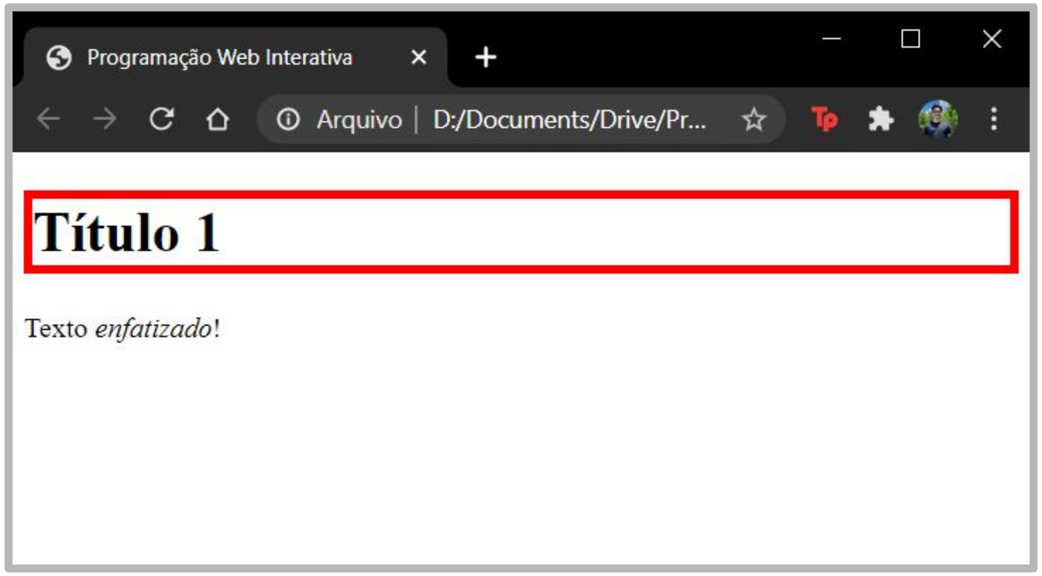
Block-level:
extends the full width of the page

```css
h1 {
  border: 5px solid red;
}
```

```html
<h1>Título 1</h1>
<p>
   Texto <em>enfatizado</em>!
</p>
```

<h1> is block-level, so it extends the full width of the page by default

Note how block-level elements (**h1**, **p**) flow top to bottom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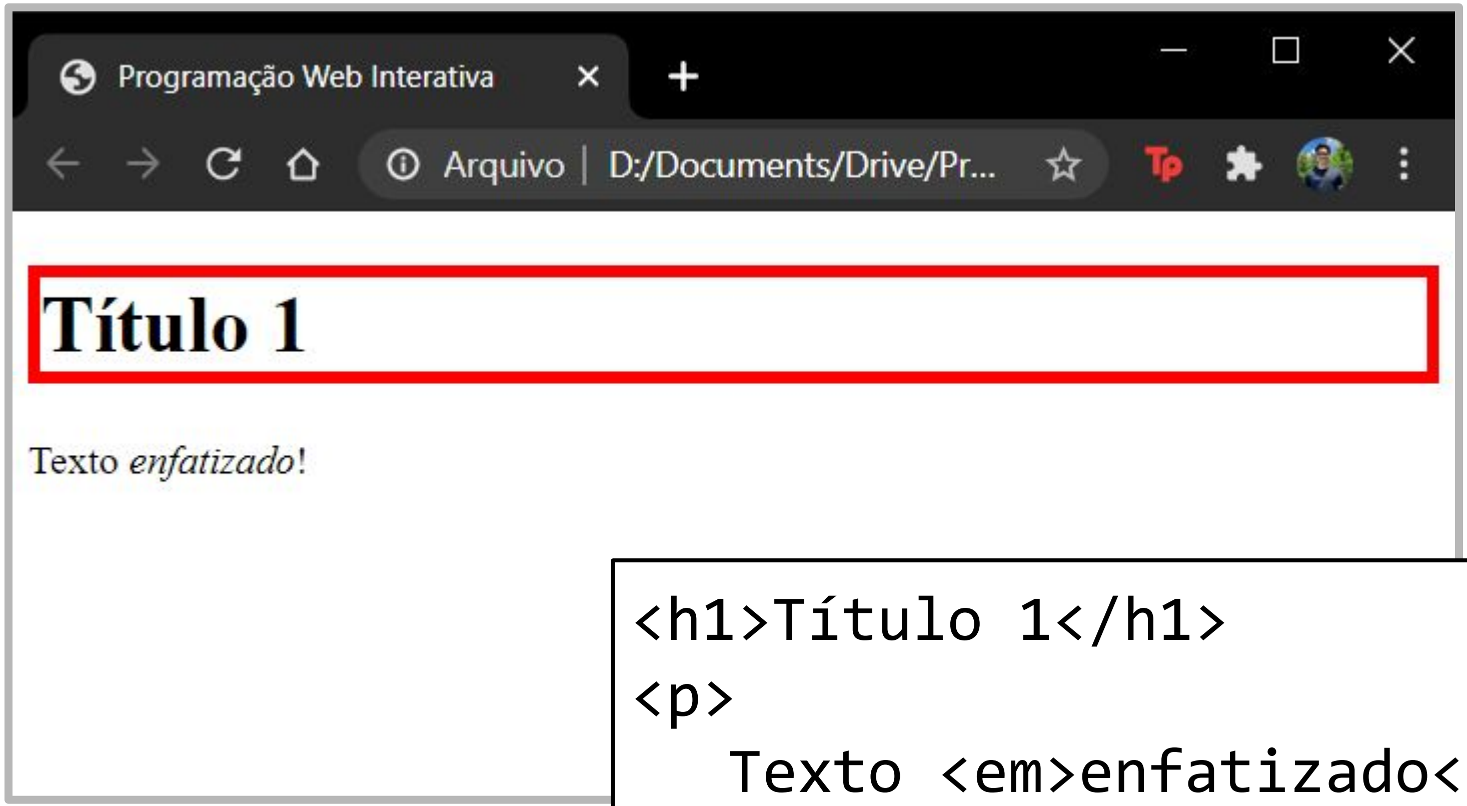
Título 1

Texto *enfatizado*!

Q: What does this look like in the browser?

```
h1 {
  border: 5px solid red;
  width: 50%;
}
```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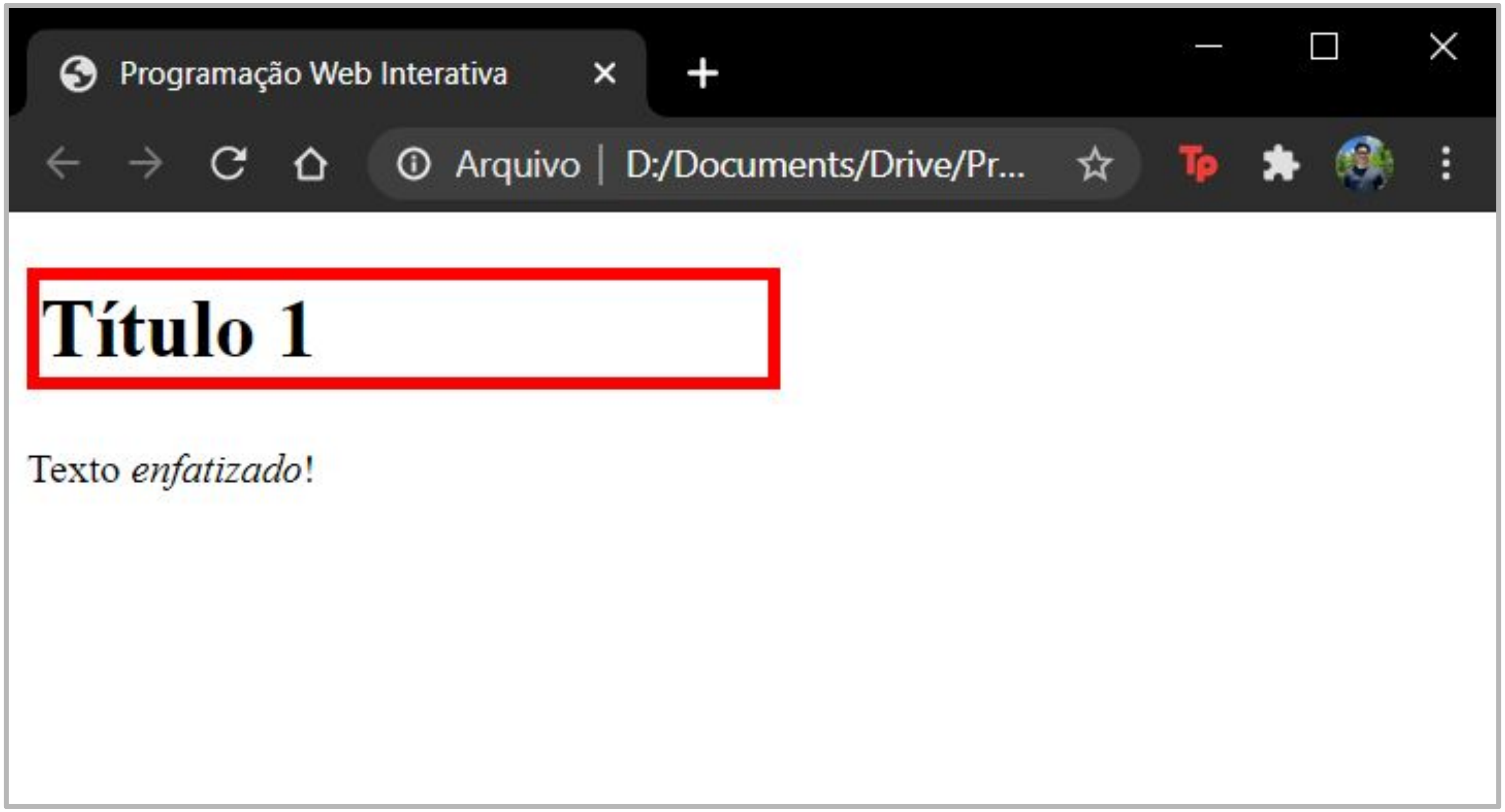
Título 1

Texto *enfatizado*!

```
<h1>Título 1</h1>
<p>
  Texto <em>enfatizado</em>!
</p>
```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Título 1

Texto *enfatizado*!

Block-level

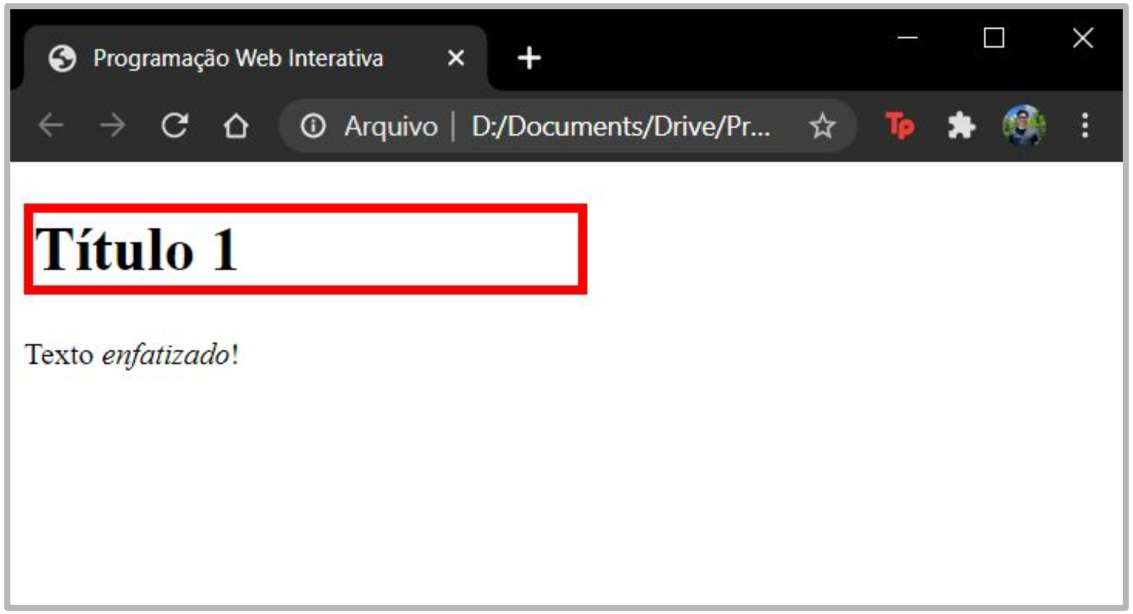
width can be modified

```
h1 {
  border: 5px solid red;
  width: 50%;
}
```

```
<h1>Título 1</h1>
<p>
    Texto <em>enfatizado</em>!
</p>
```

`<h1>` is block-level, so its **`width`** **can** be modified

Block-level elements still flow top to bottom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Título 1

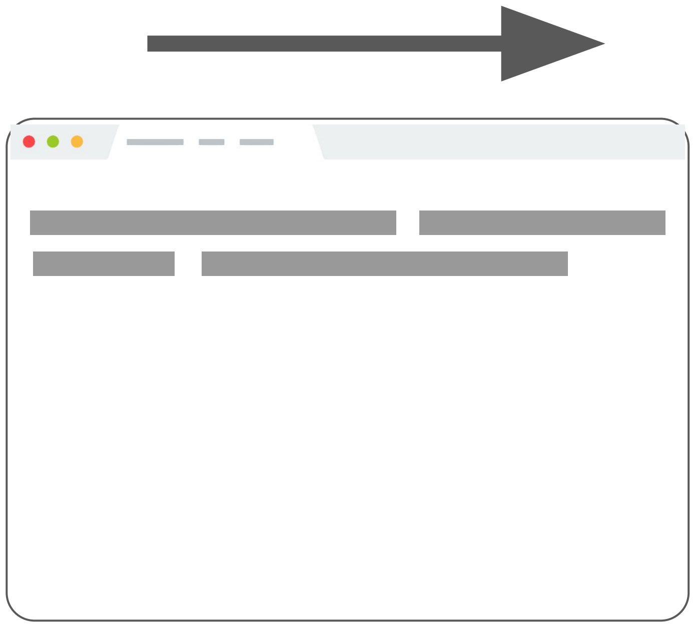
Texto *enfatizado*!

Inline elements

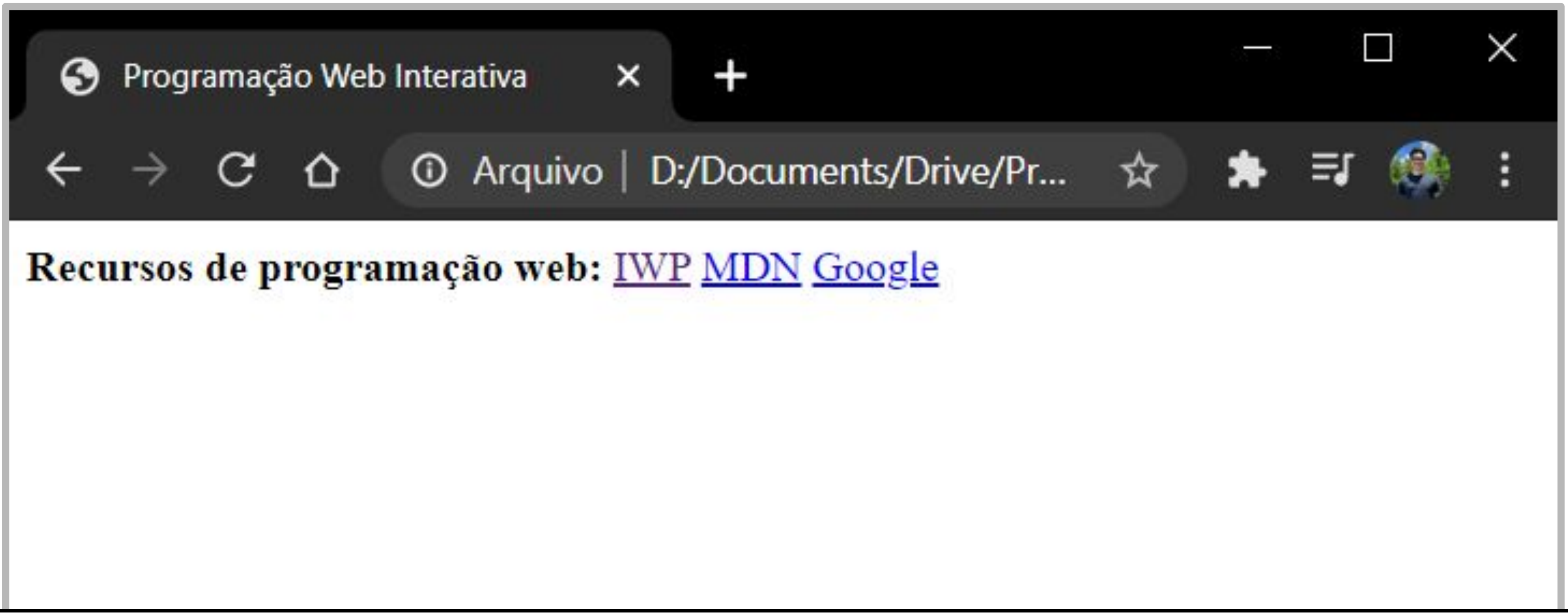
Examples:

`<a>, <em>, <strong>, <br>`

- Take up only as much width as needed (flows left to right)
- **Cannot** have `height` and `width`
- **Cannot** have a block element child
- **Cannot** be positioned (i.e. CSS properties like `float` and `position` do not apply to inline elements)
    - Must position **its containing block element** instead



Example: Inline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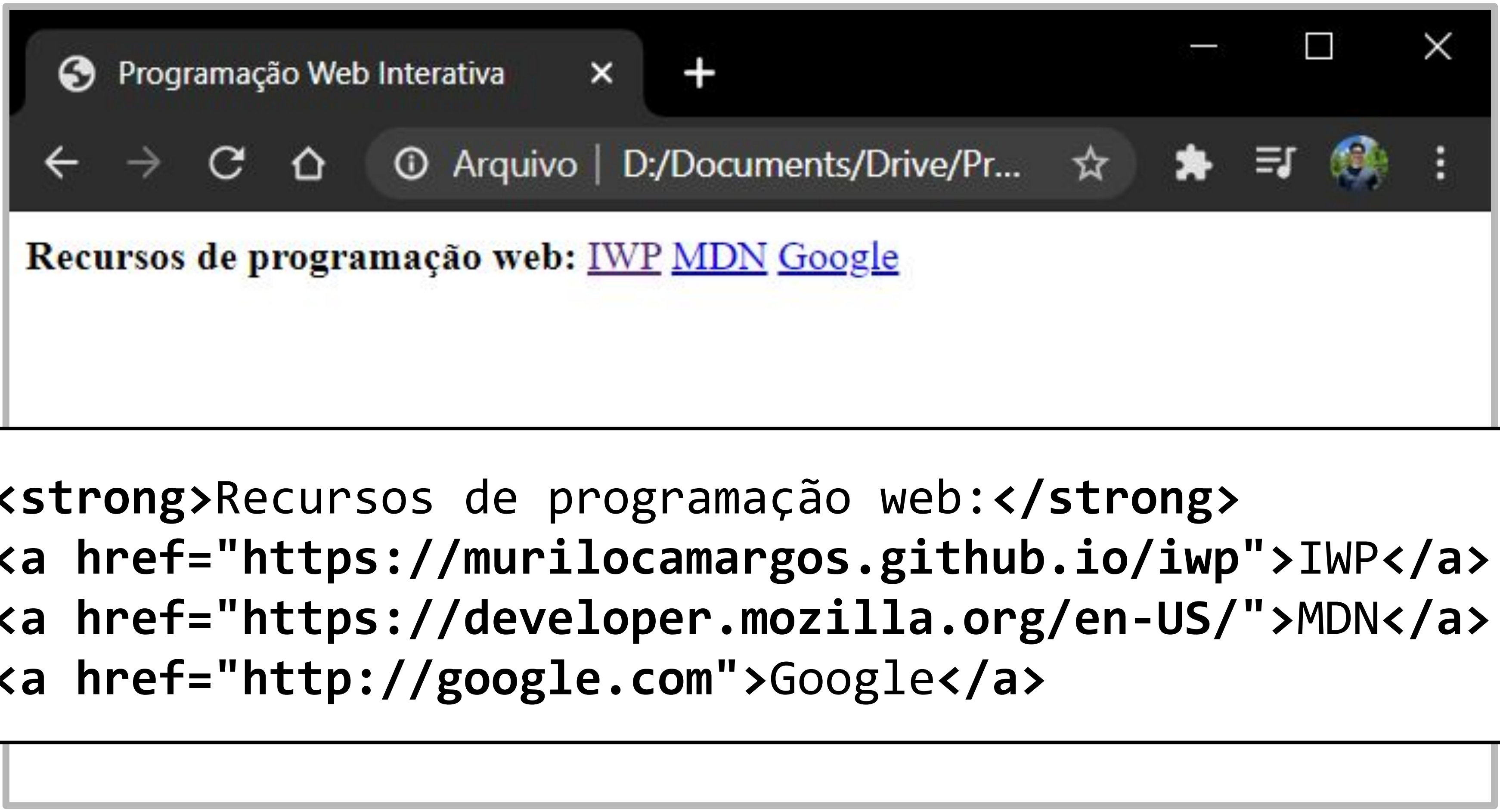
Recursos de programação web: IWP MDN Google

```
<strong>Recursos de programação web:</strong>
<a href="https://murilocamargos.github.io/iwp">IWP</a>
<a href="https://developer.mozilla.org/en-US/">MDN</a>
<a href="http://google.com">Google</a>
```

Q: What does this look like in the browser?

```
strong {
  border: 5px solid red;
  width: 1000px;
}
```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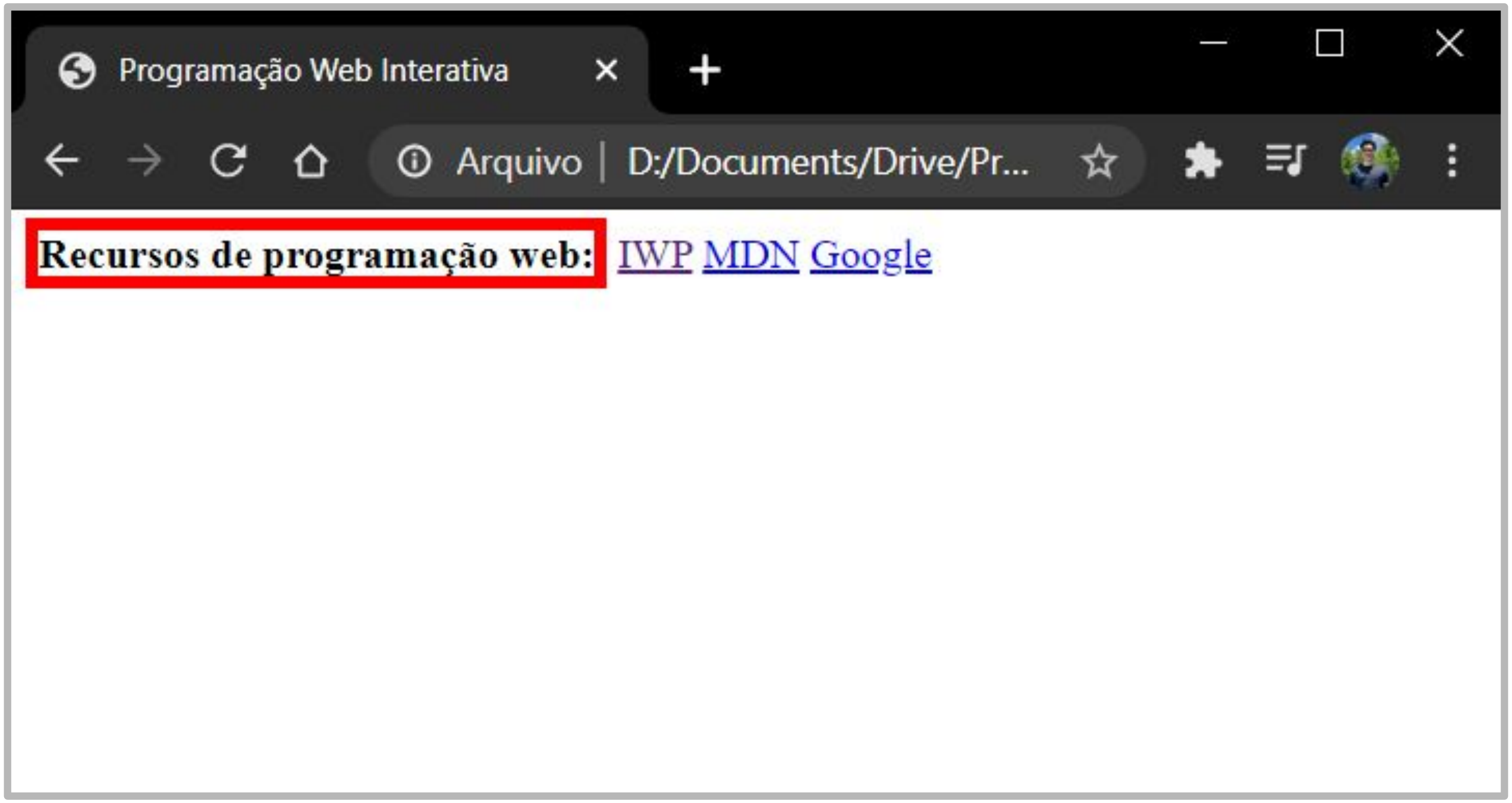
Recursos de programação web: IWP MDN Google

```
<strong>Recursos de programação web:</strong>
<a href="https://murilocamargos.github.io/iwp">IWP</a>
<a href="https://developer.mozilla.org/en-US/">MDN</a>
<a href="http://google.com">Google</a>
```



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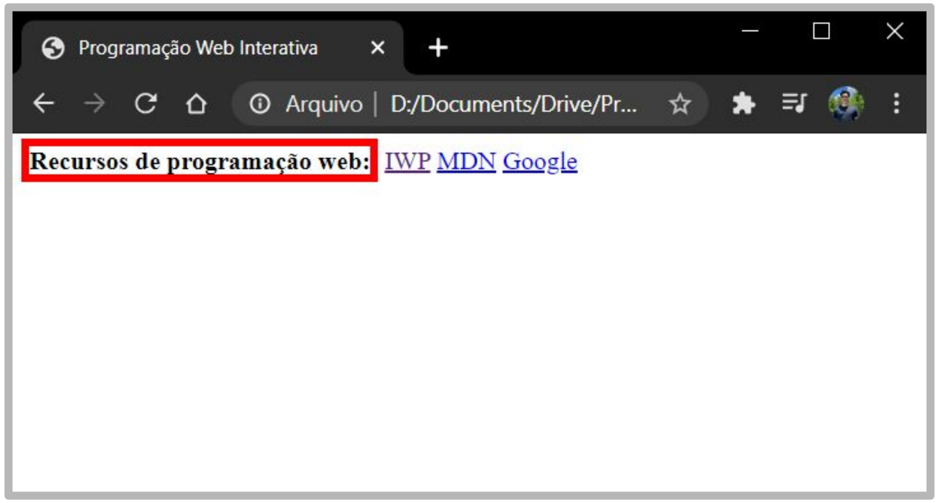
Recursos de programação web: IWP MDN Google

Inline elements ignore `width`

width cannot be modified

```
<strong>Recursos de programação web:</strong>
<a href="https://murilocamargos.github.io/iwp">IWP</a>
<a href="https://developer.mozilla.org/en-US/">MDN</a>
<a href="http://google.com">Google</a>
```


Programação Web Interativa
Arquivo | D:/Documents/Drive/Pr...
Recursos de programação web: IWP MDN Google

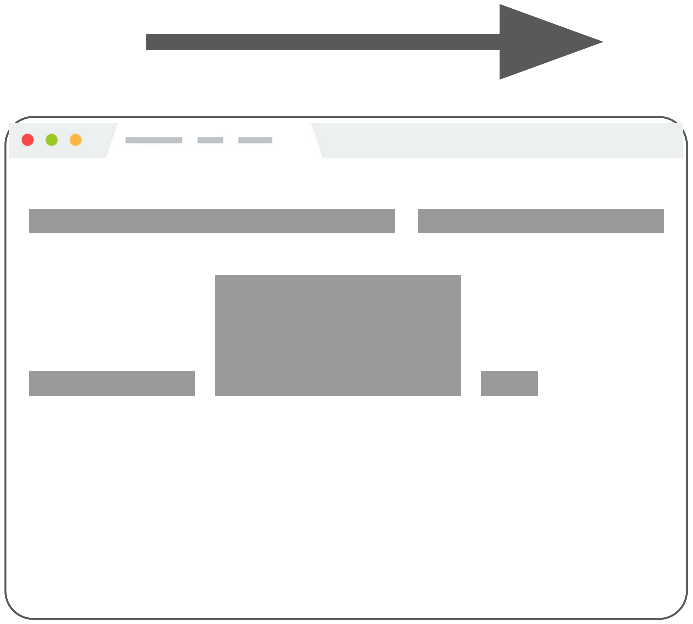
```
strong {
  border: 5px solid red;
  width: 1000px;
  /* Will not work; strong
is inline! */
}
```

Cannot set **`width`** on inline element, so it is ignored.

`inline-block`

Examples: `<img>`, any element with `display: inline-block;`

- Width is the size of the content, i.e. it takes only as much space as needed (flows left to right)
- **Can** have `height` and `width`
- **Can** have a block element as a child
- **Can** be positioned (i.e. CSS properties like `float` and `position` apply)



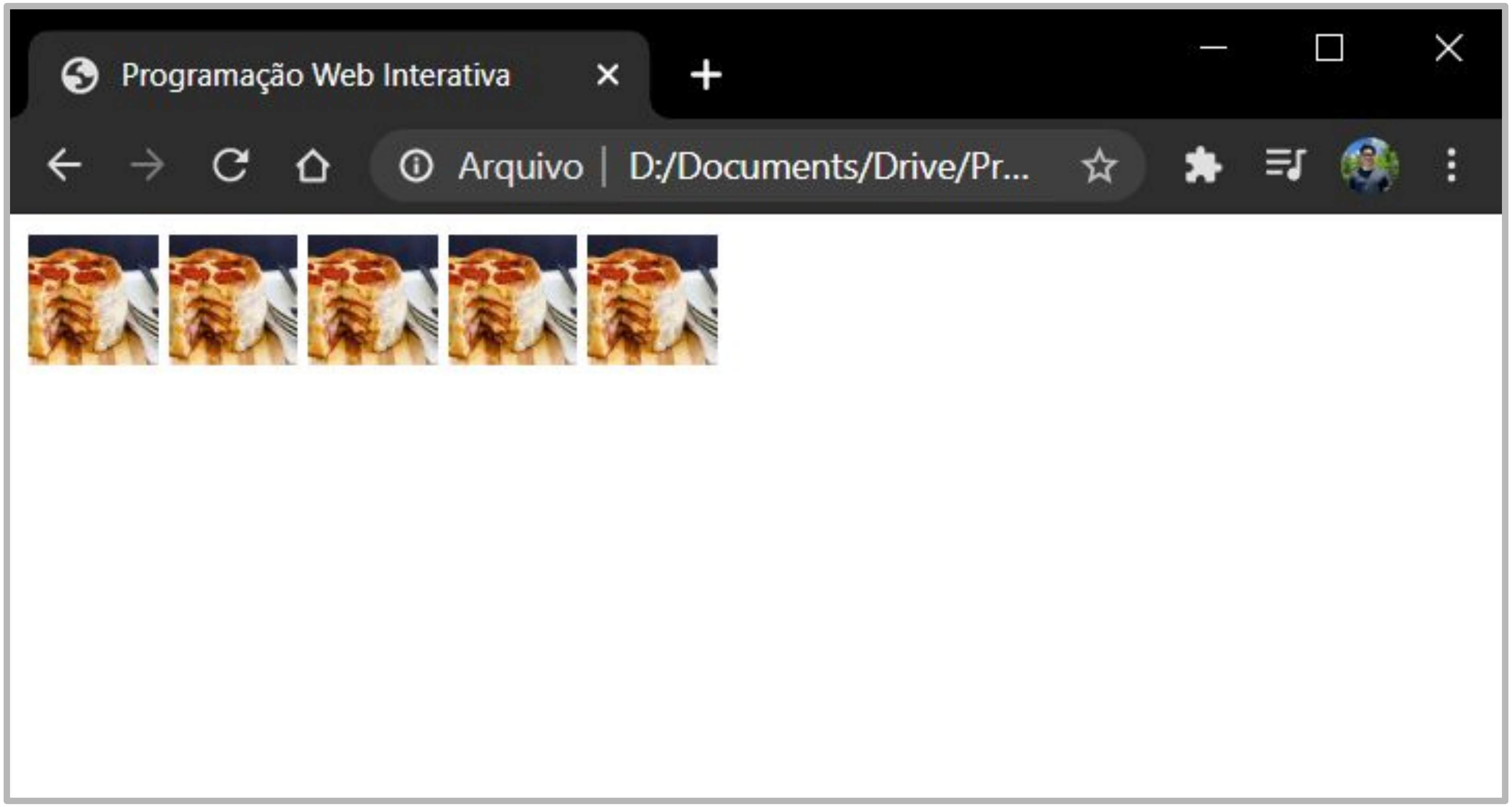
Example: Inline-block

```
img {
  width: 50px;
}
```

Q: What does this look like in the browser?

```
<img src="http://i.imgur.com/a2mAkYQs.jpg" />
<img src="http://i.imgur.com/a2mAkYQs.jpg" />
<img src="http://i.imgur.com/a2mAkYQs.jpg" />
<img src="http://i.imgur.com/a2mAkYQs.jpg" />
<img src="http://i.imgur.com/a2mAkYQs.jpg" />
```

http://i.imgur.com/a2mAkYQs.jpg =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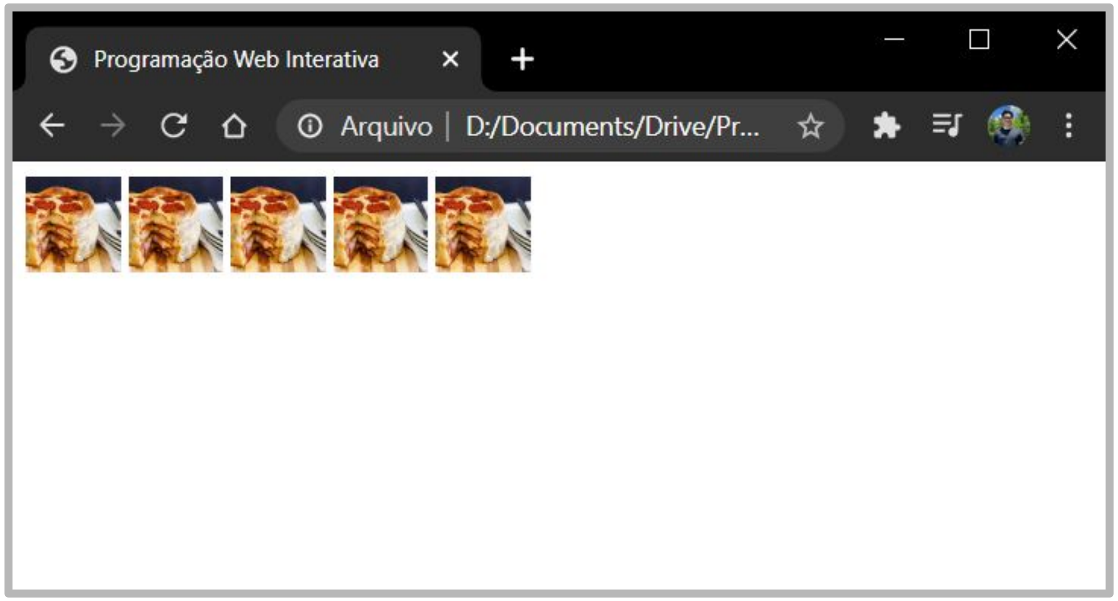
Inline-block

Has width and height; flows left to right

Can set **`width`** on inline-block element, so image width is set to 50px. (Codepen)

`inline-block` flows left to right, so images are right next to each other.


Programação Web Interativa
Arquivo | D:/Documents/Drive/Pr...

```
img {
  width: 50px;
}
```

```
<img src="http://i.imgur.com/a2mAkYQs.jpg" />
<img src="http://i.imgur.com/a2mAkYQs.jpg" />
<img src="http://i.imgur.com/a2mAkYQs.jpg" />
<img src="http://i.imgur.com/a2mAkYQs.jpg" />
<img src="http://i.imgur.com/a2mAkYQs.jpg" />
```

Addendum: **paths**

`img src`, `a href`, and `link href` can all take either **relative** or **absolute** paths to the resource:

- `<a href="about.html">About</a>`
- `<img src="http://i.imgur.com/WJToVGv.jpg" />`
- `<link rel="stylesheet" href="css/style.css"/>`

If you are unfamiliar with paths, check out the following:

- Absolute vs relative paths
- Unix directories and file paths

The `display` CSS property

You can change an element's default rendering type by changing the **`display`** property. Examples:

```
p {
 display: inline;
}
```

```
a {
 display: block;
}
```

Possible values for `display`:

- `block`
- `inline`
- `inline-block`
- some others: link

Review

1. **block:** flows **top-to-bottom**; **has** **`height`** and **`width`**
   `<p>, <h1>, <blockquote>, <ol>, <ul>, <table>`
2. **inline:** flows **left-to-right**; **does not have** **`height`** and **`width`**
   `<a>, <em>, <strong>,<br>`
   a. **inline block:** flows **left-to-right**; **has** **`height`** and **`width`** equal to size of the content
      `<img>`

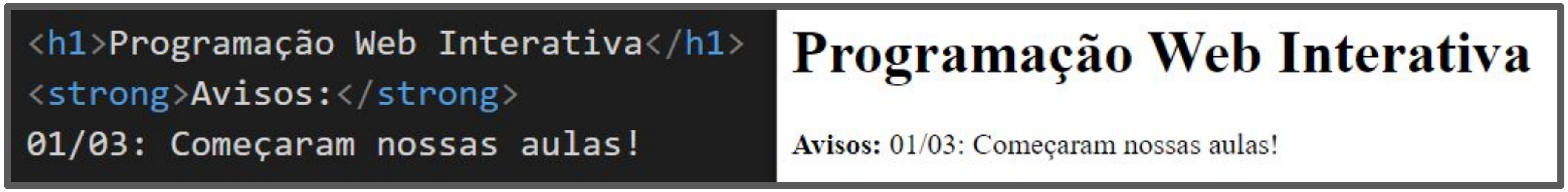
Questions?

Moral of the story:

If your CSS isn't working, see if you're trying to apply block-level properties to inline elements

h1 vs strong mystery

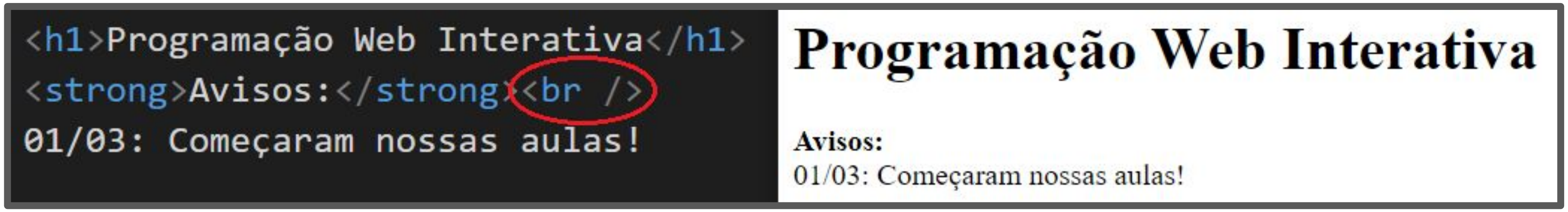
Recall: Weirdly the `<h1>` heading was on a line of its own, and `<strong>` was not. -- **Why?**



```
<h1>Programação Web Interativa</h1>
<strong>Avisos:</strong>
01/03: Começaram nossas aulas!
```

Programação Web Interativa

Avisos: 01/03: Começaram nossas aulas!



```
<h1>Programação Web Interativa</h1>
<strong>Avisos:</strong><br />
01/03: Começaram nossas aulas!
```

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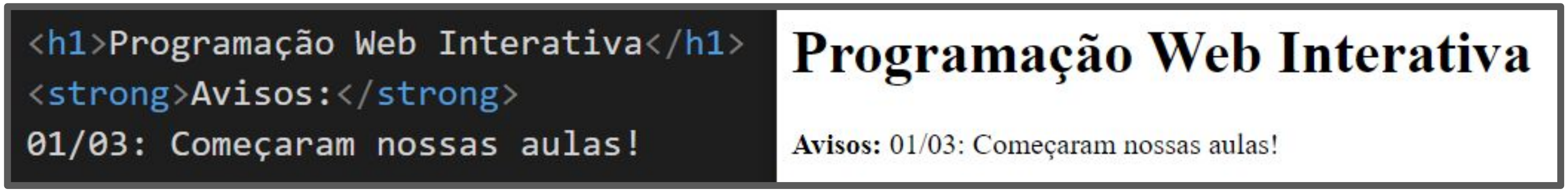
Avisos:
01/03: Começaram nossas aulas!

h1 vs strong demystified!

Recall: Weirdly the `<h1>` heading was on a line of its own, and `<strong>` was not. -- **Why?**



```html
<h1>Programação Web Interativa</h1>
<strong>Avisos:</strong>
01/03: Começaram nossas aulas!
```

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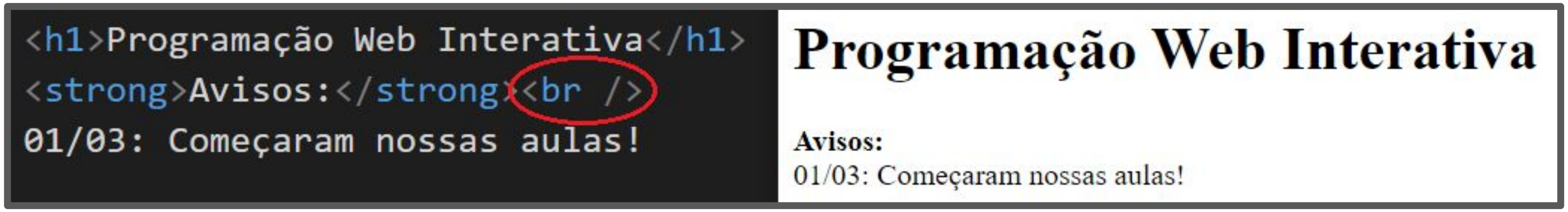
Avisos: 01/03: Começaram nossas aulas!



```html
<h1>Programação Web Interativa</h1>
<strong>Avisos:</strong><br />
01/03: Começaram nossas aulas!
```

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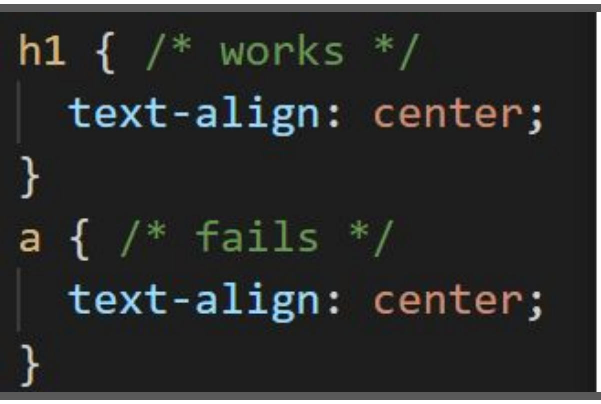
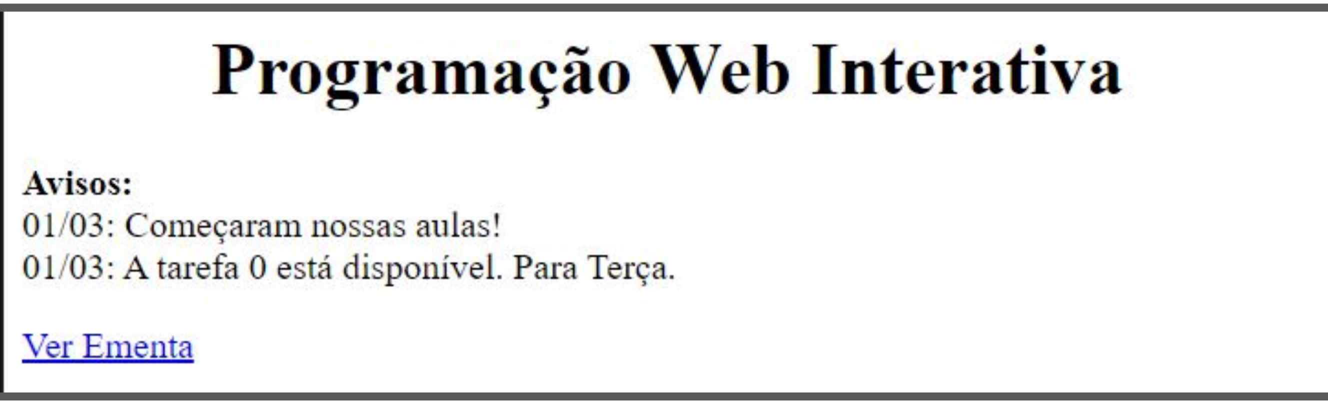
Because h1 is a block-level element,
and `strong` is an inline-level element

`text-align` mystery

Recall: We couldn't set `text-align: center;` on the `<a>` tag directly, but we could center `<h1>`. **Why?**



```
h1 { /* works */
  text-align: center;
}
a { /* fails */
  text-align: center;
}
```



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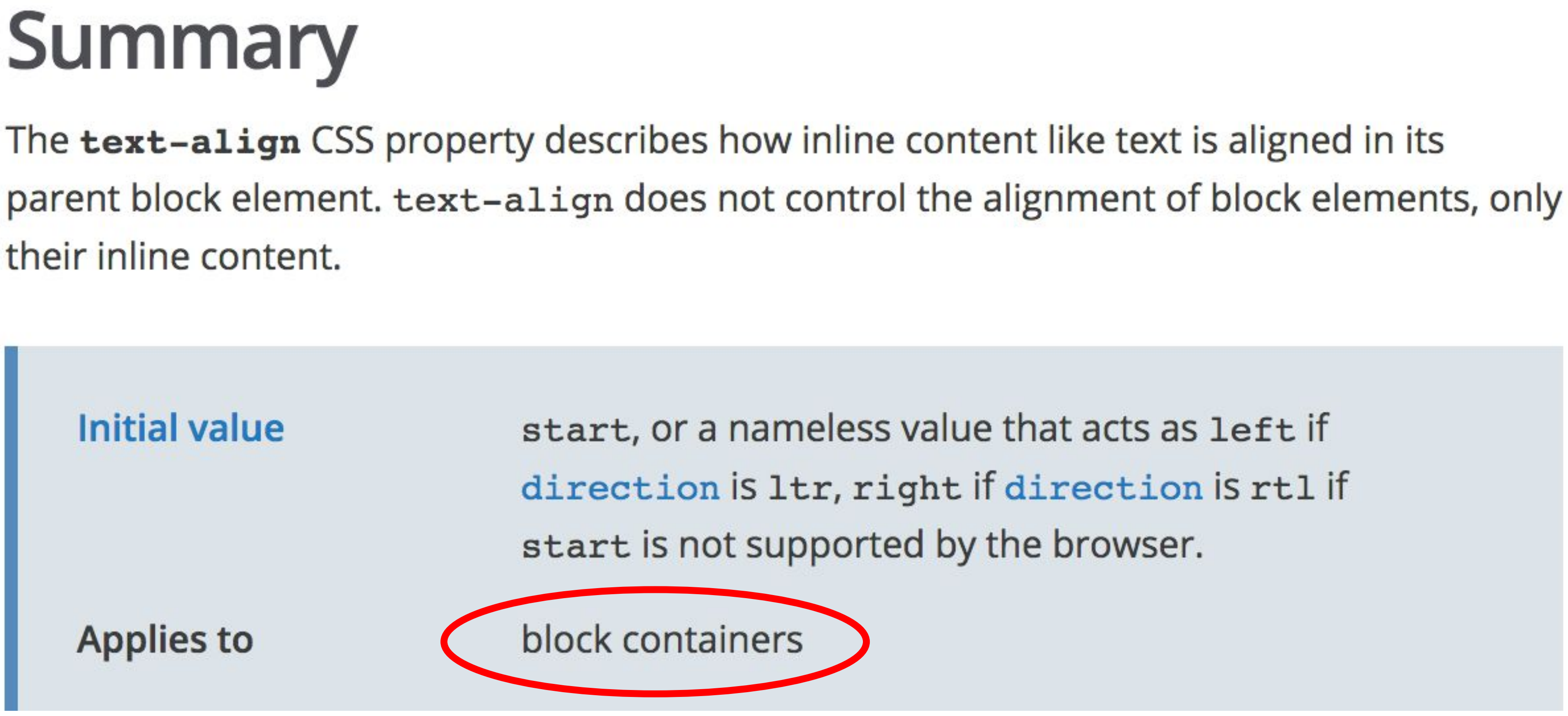
Let's try looking at the MDN description of `text-align`...

`text-align` mystery



Summary

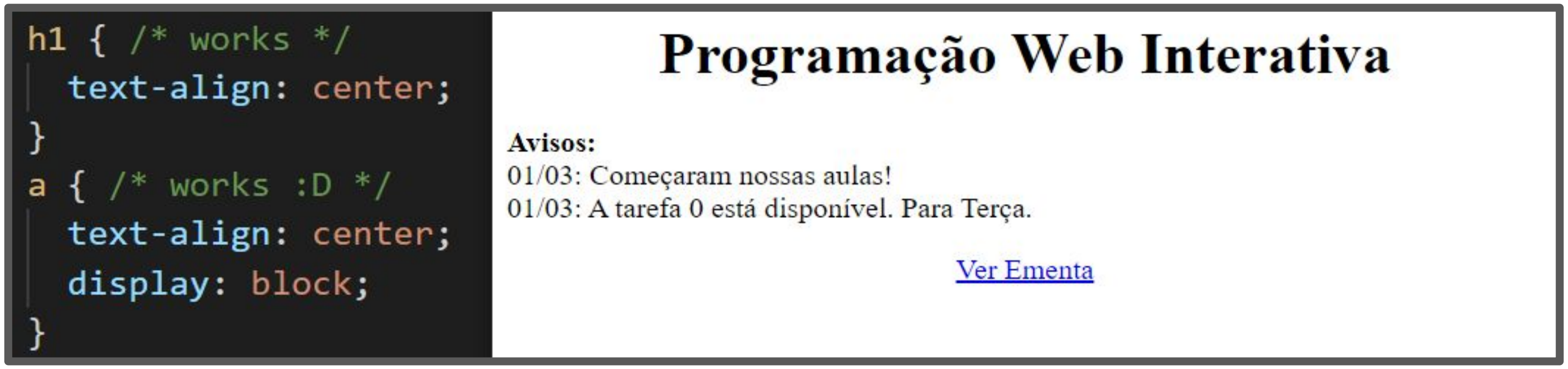
The **`text-align`** CSS property describes how inline content like text is aligned in its parent block element. `text-align` does not control the alignment of block elements, only their inline content.

Initial value	`start`, or a nameless value that acts as `left` if `direction` is `ltr`, `right` if `direction` is `rtl` if `start` is not supported by the browser.
Applies to	block containers

(source)

text-align demystified!

Why? From the spec, **can't apply `text-align` to an inline element**; must apply `text-align` to its block container, or set `a { display : block; }`



```
h1 { /* works */
  text-align: center;
}
a { /* works :D */
  text-align: center;
  display: block;
}
```

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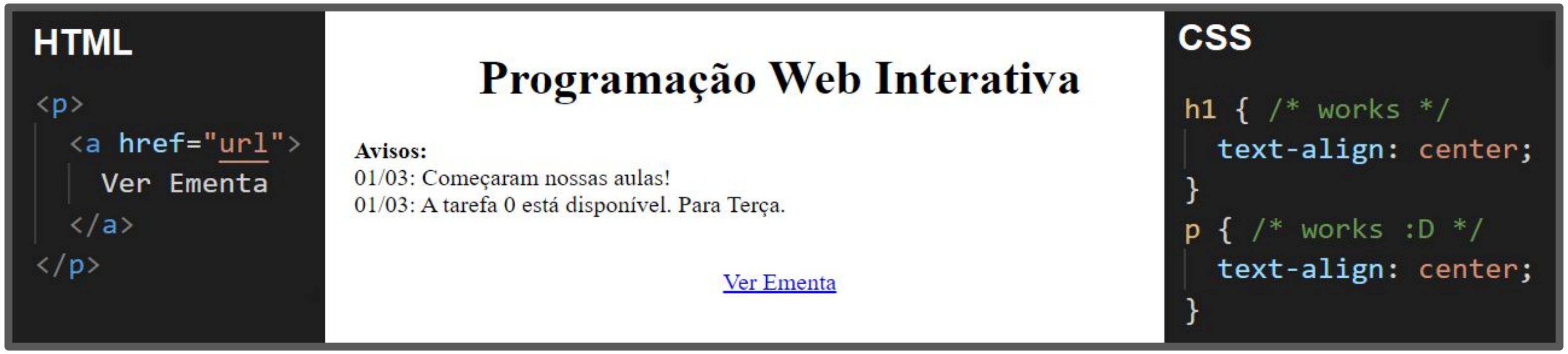

HTML

```
<p>
  <a href="url">
    Ver Ementa
  </a>
</p>
```

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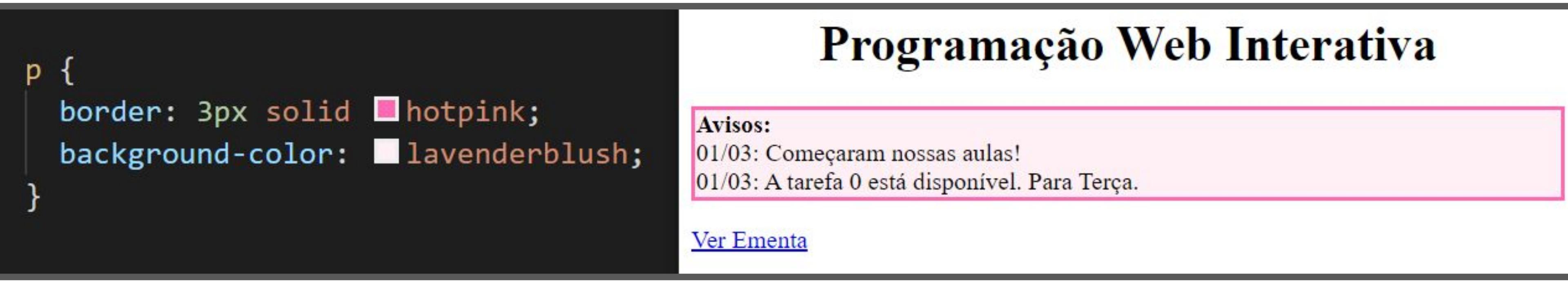
CSS

```
h1 { /* works */
  text-align: center;
}
p { /* works :D */
  text-align: center;
}
```

Box size mystery

Recall: The pink box we put around the announcements extended the entirety of the page.



```css
p {
  border: 3px solid hotpink;
  background-color: lavenderblush;
}
```

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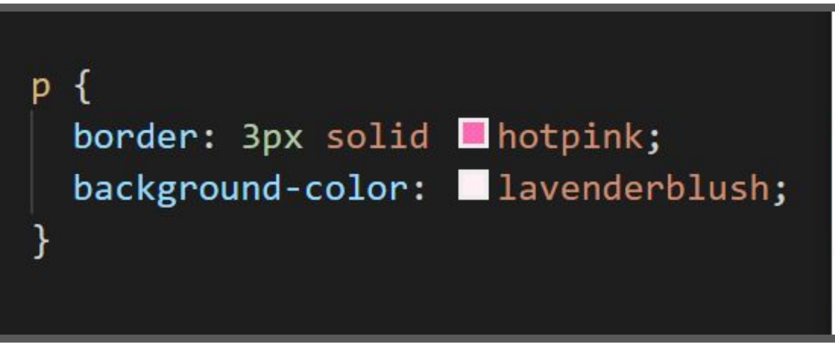
Why?

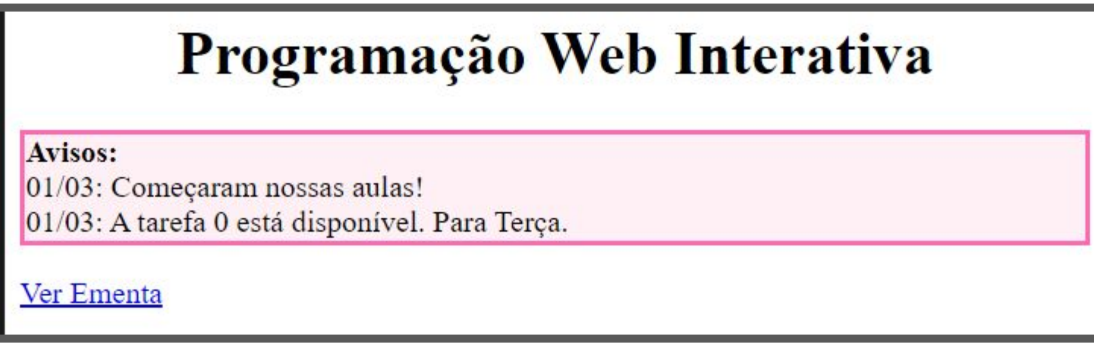
How do we fix this?

Box size mystery

Recall: The pink box we put around the announcements extended the entirety of the page.



```
p {
  border: 3px solid ■hotpink;
  background-color: □lavenderblush;
}
```



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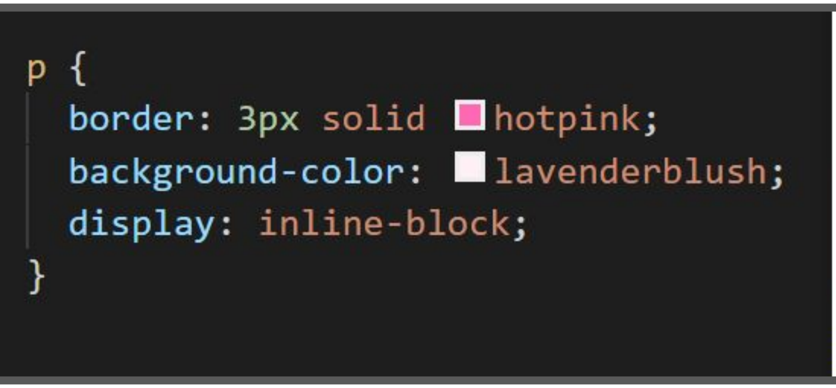
Why? Because p is block-level, so width == width of the page

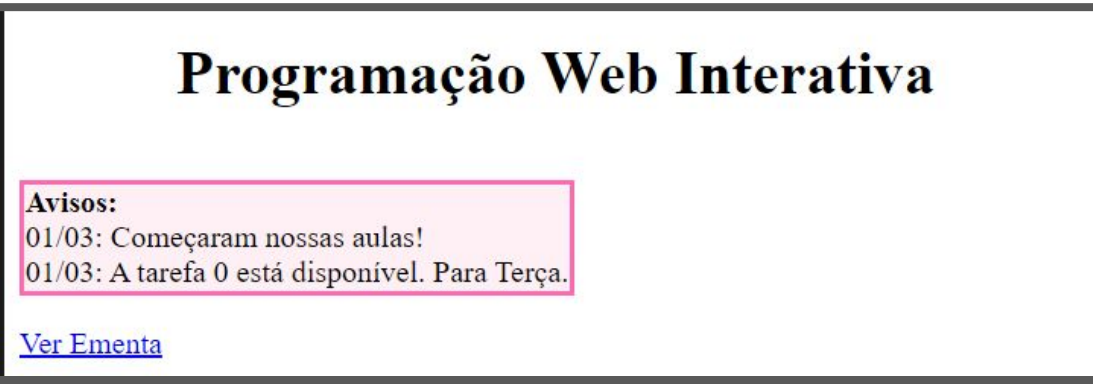
How do we fix this?

Box size mystery: demystified!

Recall: The pink box we put around the announcements extended the entirety of the page.



```
p {
  border: 3px solid ■hotpink;
  background-color: □lavenderblush;
  display: inline-block;
}
```



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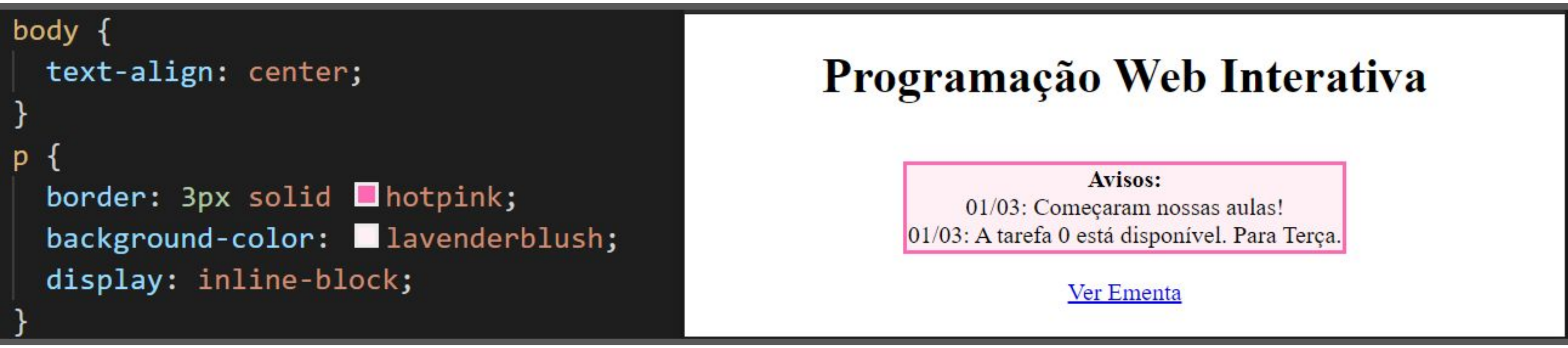
Why? Because p is block-level, so width == width of the page

How do we fix this? Change `display` to `inline-block` (though now the space above the box has increased… will address later!)

Centering the box

We can also center the box by centering the body tag, since p is now `inline-block`.



```
body {
  text-align: center;
}
p {
  border: 3px solid ■hotpink;
  background-color: □lavenderblush;
  display: inline-block;
}
```

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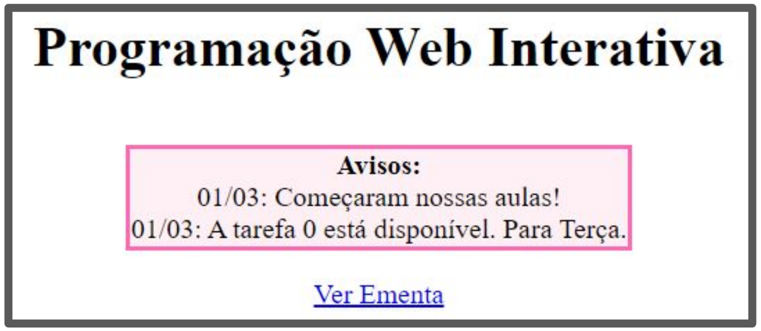
Highlight mystery

Recall: We didn't know how to select a random snippet of text to change its background.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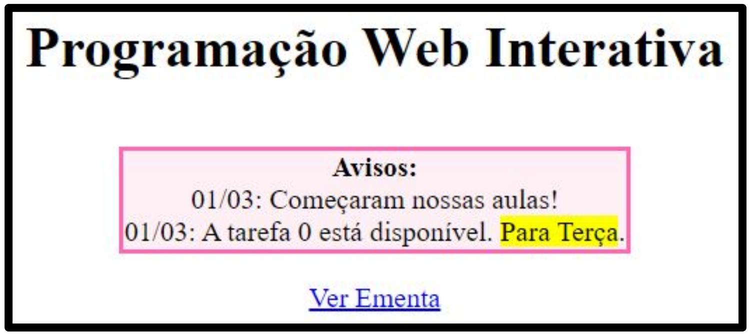
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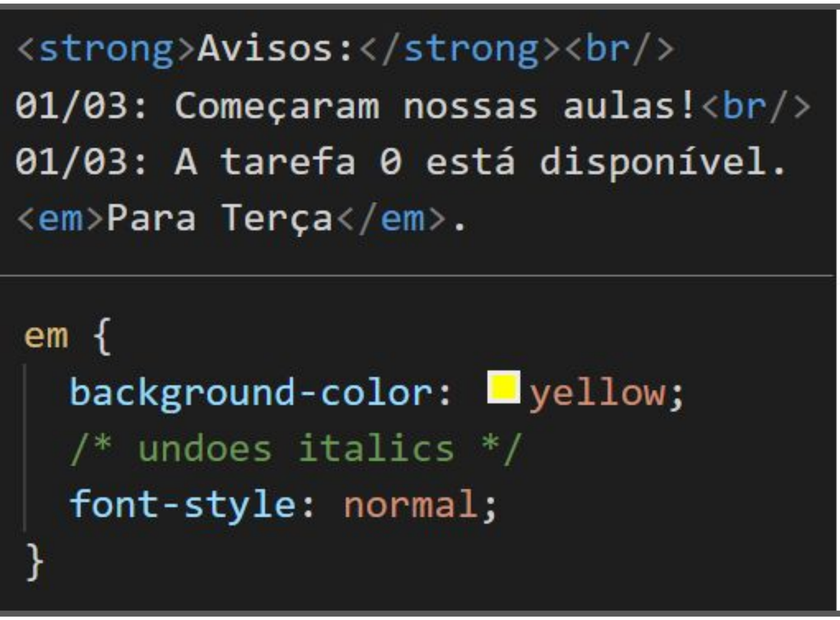
How do we fix this?

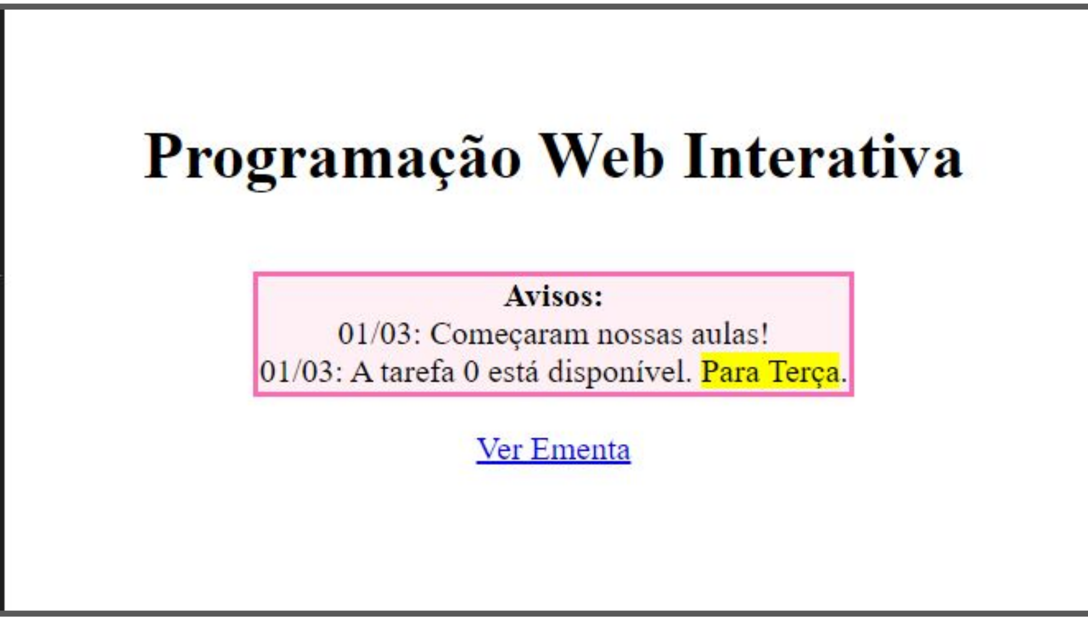
Highlight: demystified!

We can select a random segment of text by wrapping it in an **inline element**:



```
<strong>Avisos:</strong><br/>
01/03: Começaram nossas aulas!<br/>
01/03: A tarefa 0 está disponível.
<em>Para Terça</em>.
```

```
em {
  background-color: yellow;
  /* undoes italics */
  font-style: normal;
}
```



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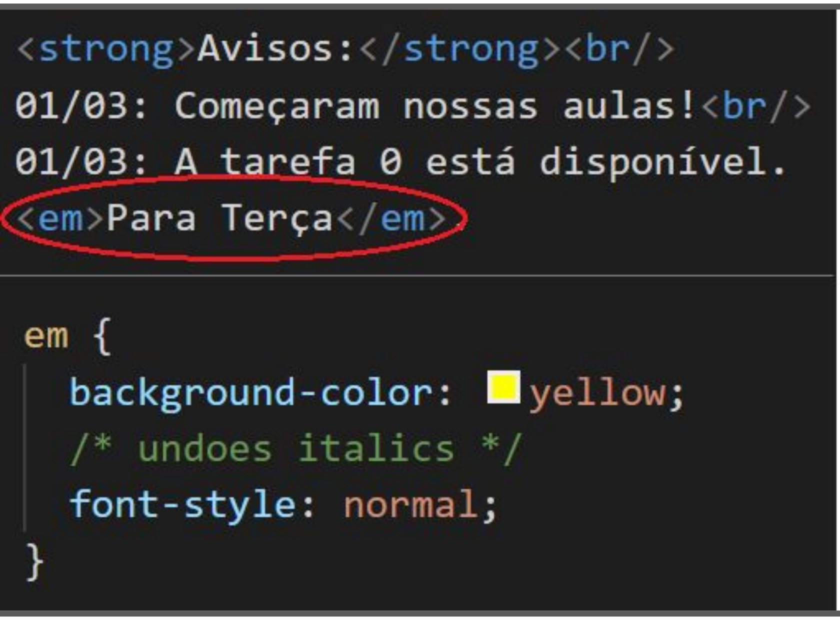
Hmmm… but wouldn't it be better to have a "highlight" element?

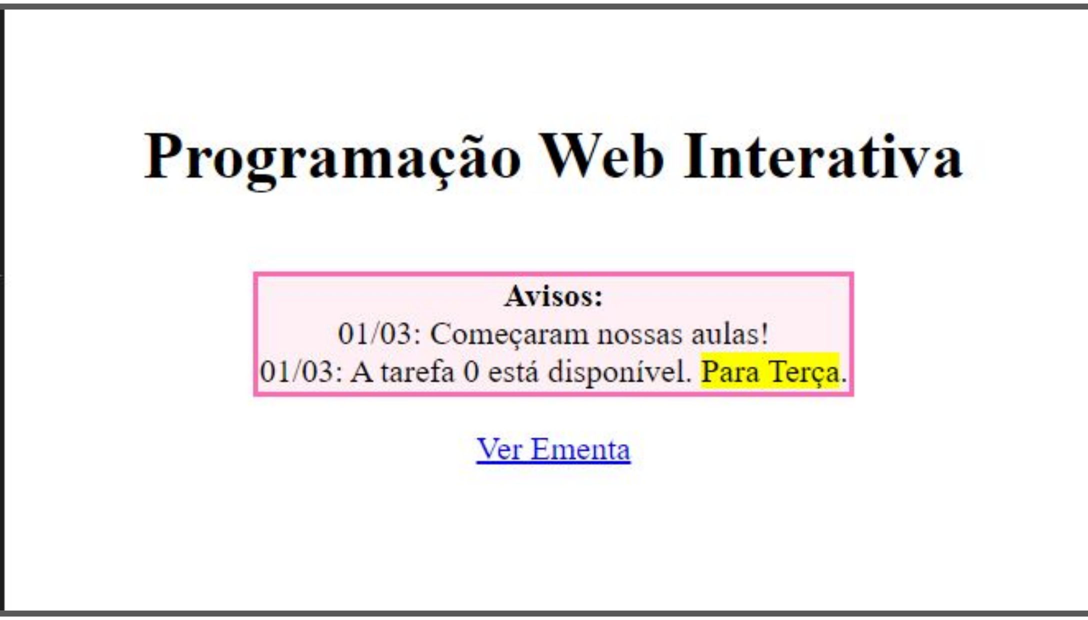
Highlight: demystified!

We can select a random segment of text by wrapping it in an **inline element**:



```
<strong>Avisos:</strong><br/>
01/03: Começaram nossas aulas!<br/>
01/03: A tarefa 0 está disponível.
<em>Para Terça</em>
```

```
em {
  background-color: yellow;
  /* undoes italics */
  font-style: normal;
}
```



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Hmmm… but wouldn't it be better to have a "highlight" element?
How do we make a generic HTML element?

Have you heard of `<div>` and `<span>`?

What are they?

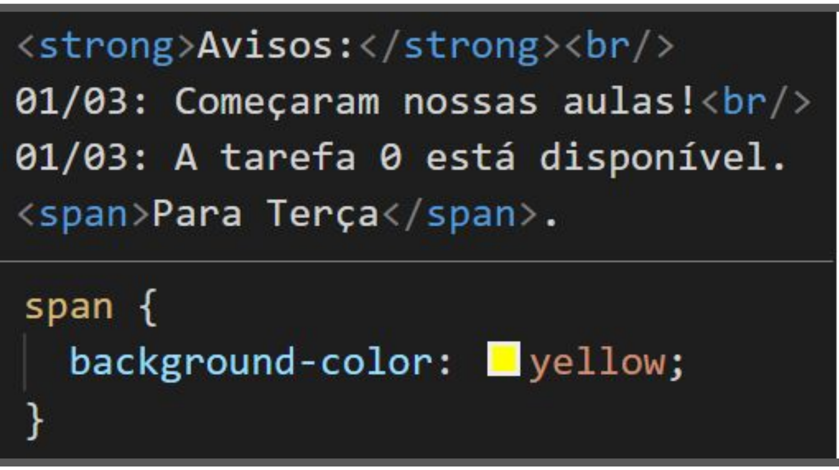
<div> and <span>

Two generic tags with no intended purpose or style:

- `<div>`: a generic **block** element
- `<span>`: a generic **inline** element

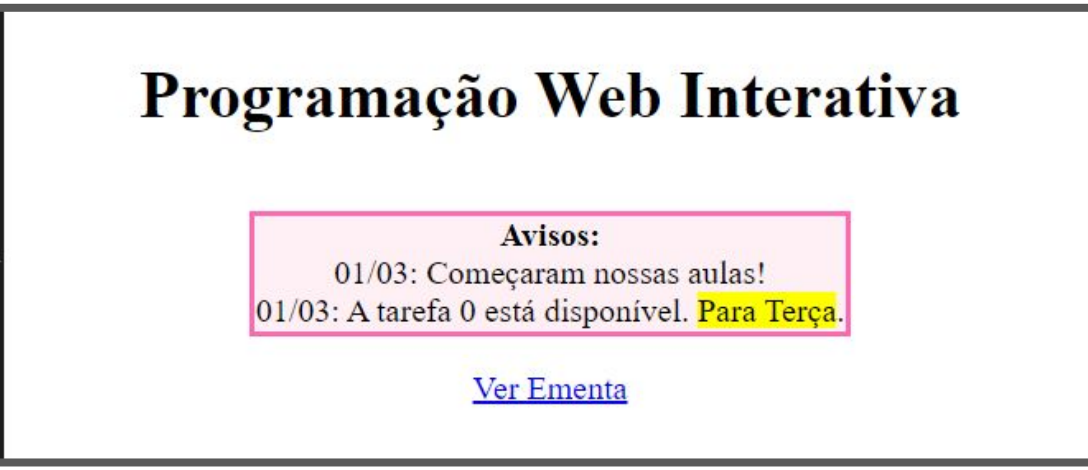
<span> in action

We can use <span> as a generic inline HTML container:



```html
<strong>Avisos:</strong><br/>
01/03: Começaram nossas aulas!<br/>
01/03: A tarefa 0 está disponível.
<span>Para Terça</span>.
```

```css
span {
  background-color: yellow;
}
```



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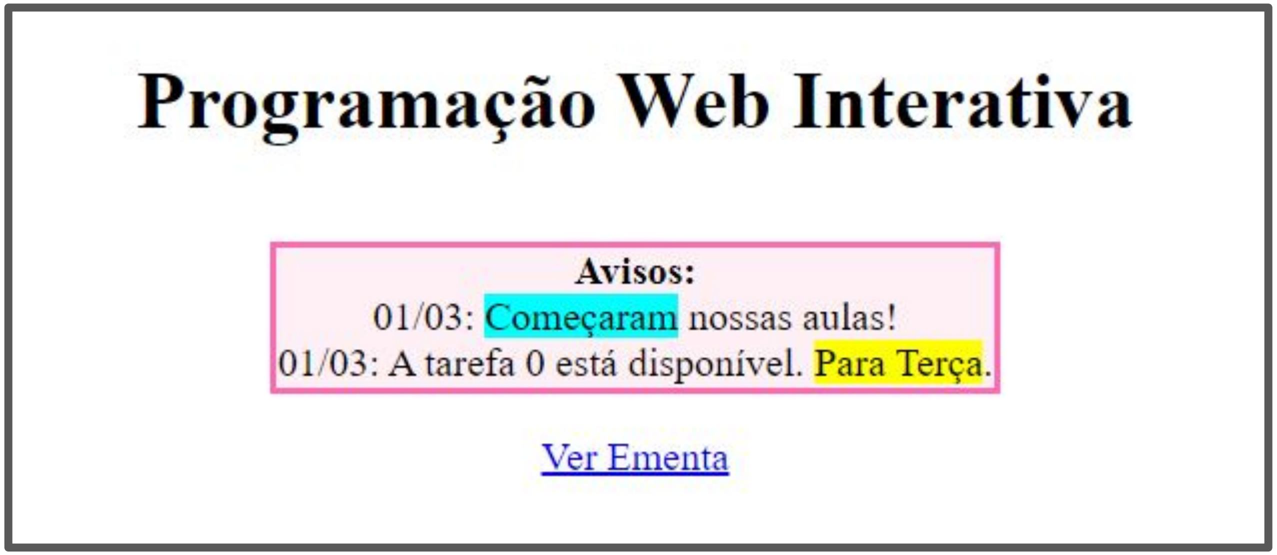
Multiple generic containers?

But won't we often want multiple generic containers?

How do we distinguish two generic containers?

In other words, how do we select a subset of elements instead of **all** elements on the page?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CSS Selectors:
Classes and Ids

Classes and ids

There are 3 basic types of CSS selectors:

Element selector (this is the one we've been using)	**p**	All **`<p>`** elements
✨ **ID selector** ✨	**#abc**	element with **`id="abc"`**
✨ **Class selector** ✨	**.abc**	elements with **`class="abc"`**

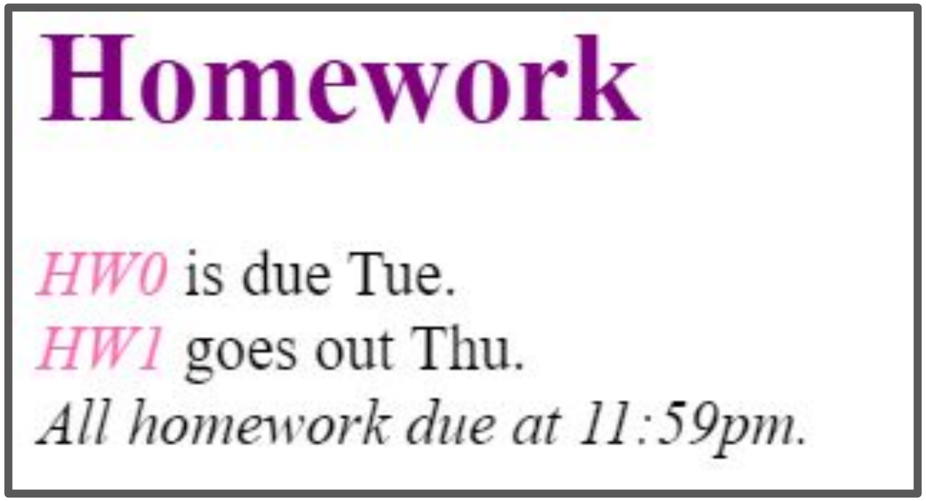
```
<h1 id="title">Homework</h1>
<em class="hw">HW0</em> is due Friday.<br/>
<em class="hw">HW1</em> goes out Monday.<br/>
<em>All homework due at 11:59pm.</em>
```

Classes and ids

```
<h1 id="title">Homework</h1>
<em class="hw">HW0</em> is due Tue.<br/>
<em class="hw">HW1</em> goes out Thu.<br/>
<em>All homework due at 11:59pm.</em>
```

```
.hw {
  color: hotpink;
}

#title {
  color: purple;
}
```



Homework

HW0 is due Tue.
HW1 goes out Thu.
All homework due at 11:59pm.

More on `class` and `id`

- **`class`** and **`id`** are special HTML attributes that can be used on any HTML element
  - **`class`**: Used on 1 or more elements; identifies a **collection** of elements
  - **`id`**: Used on exactly 1 element per page; identifies **one unique** element
- Can apply multiple classes by space-separating them: `<span `**`class="hw new"`**`>HW1</span>`
- Often used with span and div to create generic elements: e.g. **`<span class="highlight">`** is like creating a "highlight" element

Other selectors:
Next time!