

# SEC201.2 Web-Based Programming

HTML Basics and HTML5

# Outline

- Components and Structure of a Website
  - What Comprises a Website
  - Structure of a Website
  - What kinds of files
- HTML
  - What is HTML
  - History and Philosophy of HTML
  - Internet Browsers
  - Editors
- HTML Tag Syntax
- DOM & Basic HTML Structure
- Common HTML Tags

# What Comprises a Website?

## Components of a Website



HTML files &



images

## Viewed through a Web Browser



**Safari**

common on Apple



**Chrome**

from Google



**Internet Explorer & Edge**

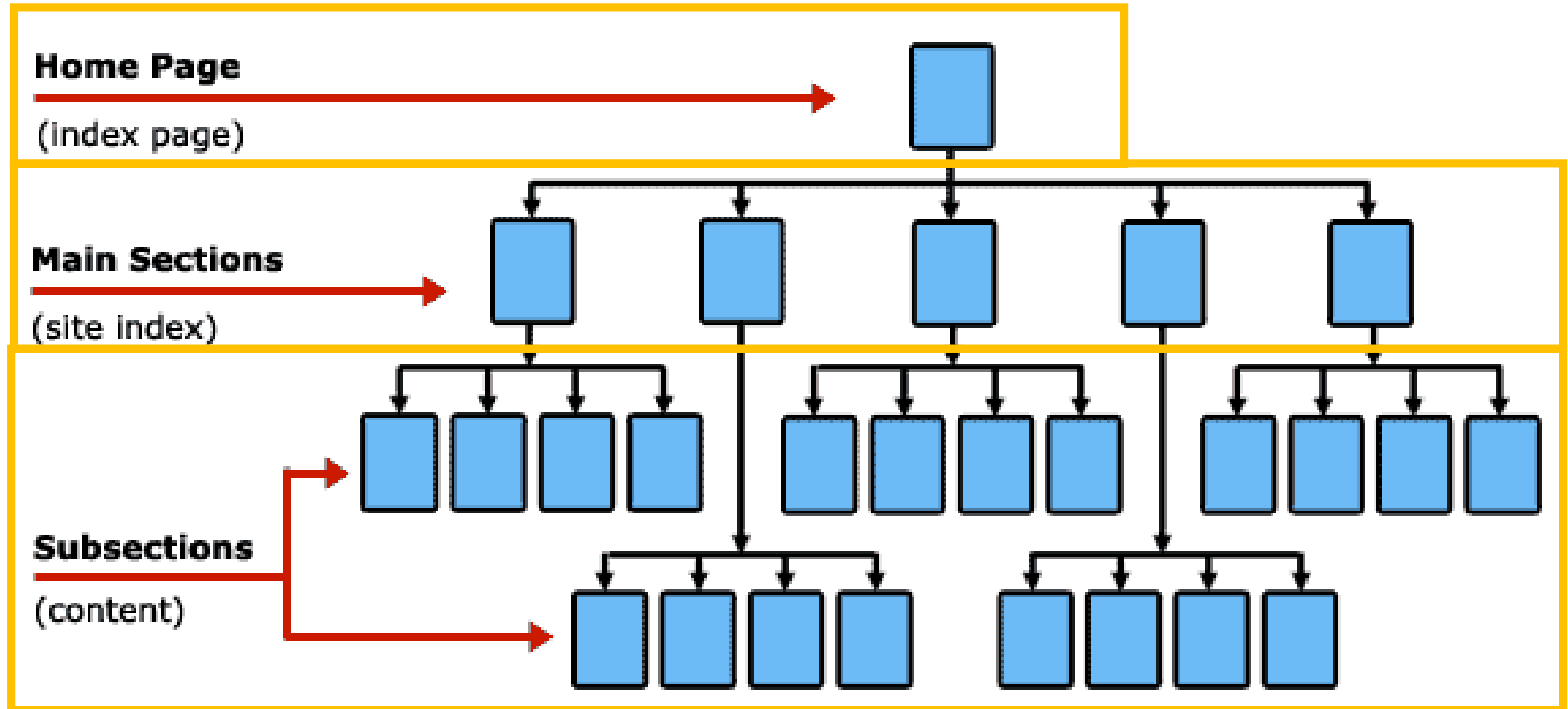
from Microsoft



**Firefox**

from the  
Mozilla Foundation

# Structure of a Website



# What Kinds of Files

## Files Viewed through a Web Browser



Hypertext Markup  
Language



**Structure**



Cascading Style  
Sheets



**Style**



JavaScript



**Behavior**



Images, pictures, art  
& graphics

# Example 1: Structure, Style, Behavior

- HTML

[week4-sampleCodes/Structure Style Behavior Difference/structure.html](#)

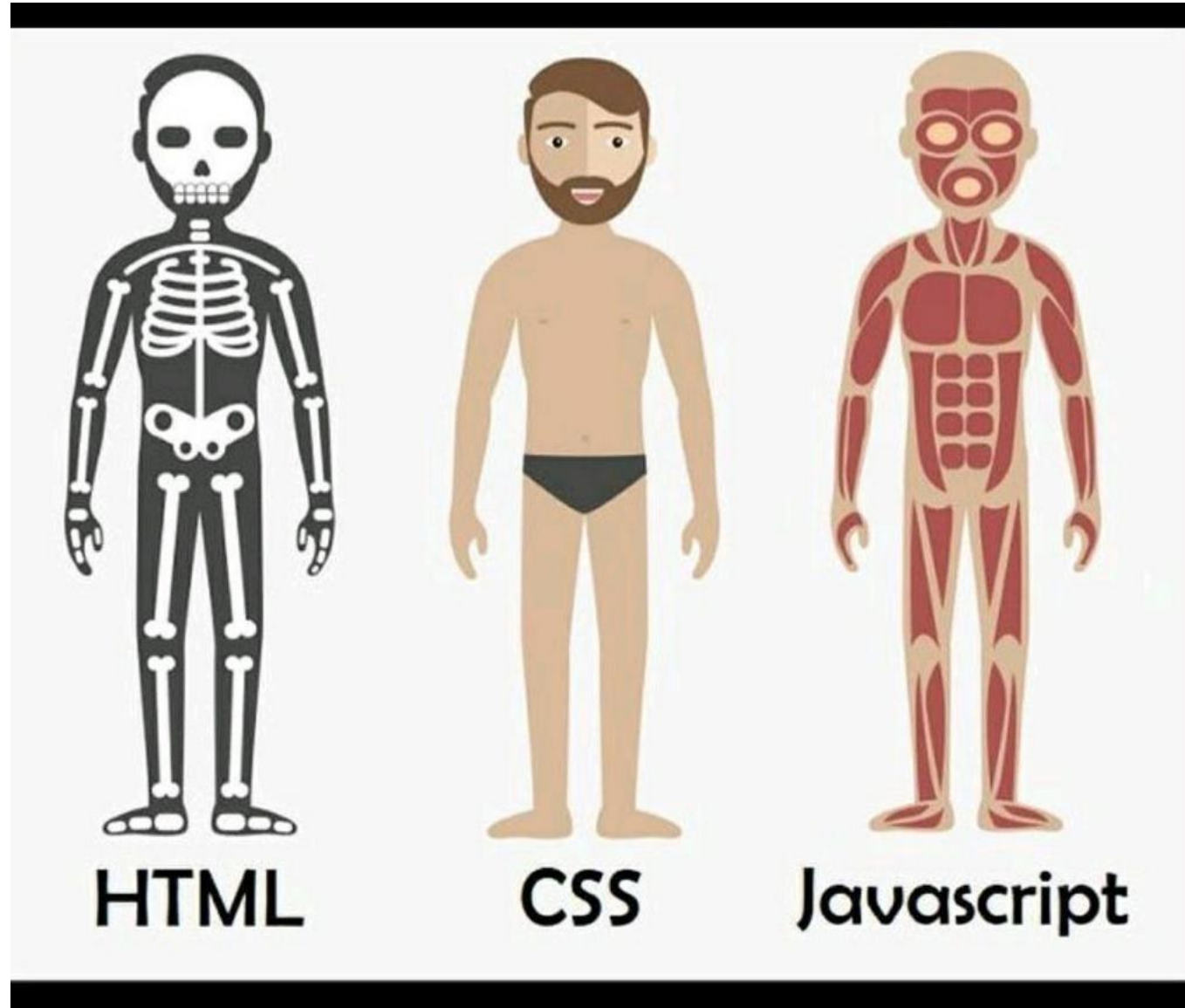
- HTML + CSS

[week4-sampleCodes/Structure Style Behavior Difference/style.html](#)

- HTML + CSS + JS

[week4-sampleCodes/Structure Style Behavior Difference/behavior.html](#)

## Example 2: Structure, Style, Behavior



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# What is HTML?

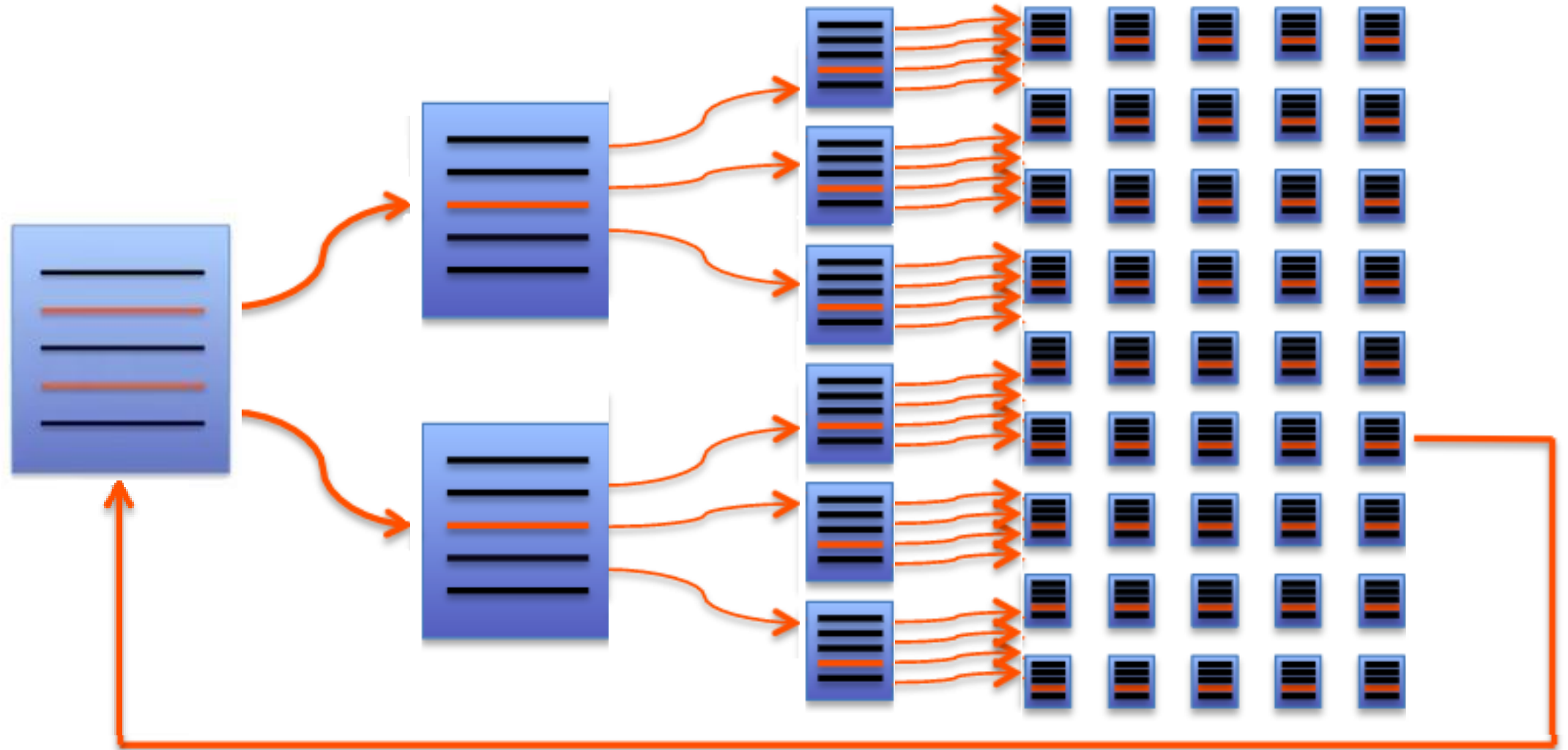
- HTML stands for Hyper Text Markup Language
- HTML is the standard markup language for creating Web pages
- HTML describes the structure of a Web page
- HTML consists of a series of elements
- HTML elements tell the browser how to display the content
- HTML elements label pieces of content such as "this is a heading", "this is a paragraph", "this is a link", etc.

What is HTML?



*What does HTML Stand For?*

# Hypertext Markup Language



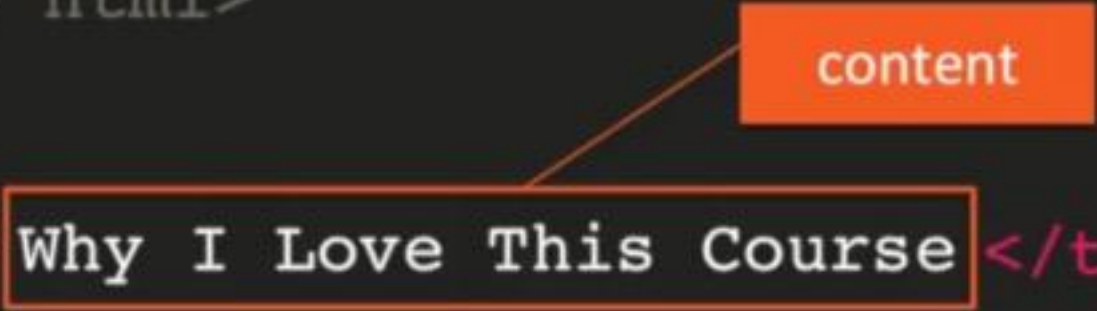
# Hypertext Markup Language

## Hypermedia



# Hypertext Markup Language

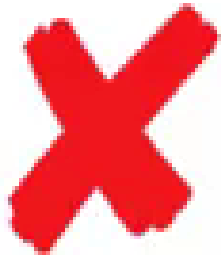
```
<!doctype html>
<html>
<head>
  <title>Why I Love This Course</title>
</head>
<body> [...]
</body>
</html>
```



The diagram illustrates the structure of an HTML document. An orange box labeled "content" is connected by a line to a white box with an orange border that contains the text "Why I Love This Course". This white box is positioned over the `<title>` and `</title>` tags in the code snippet, indicating that the text inside these tags is the content being referred to.

# Hypertext Markup Language

```
<h1>  
  <div>Hello World!</h1>  
</div>
```



```
<h1>  
  <div>Hello World!</div>  
</h1>
```



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# The Evolution of HTML

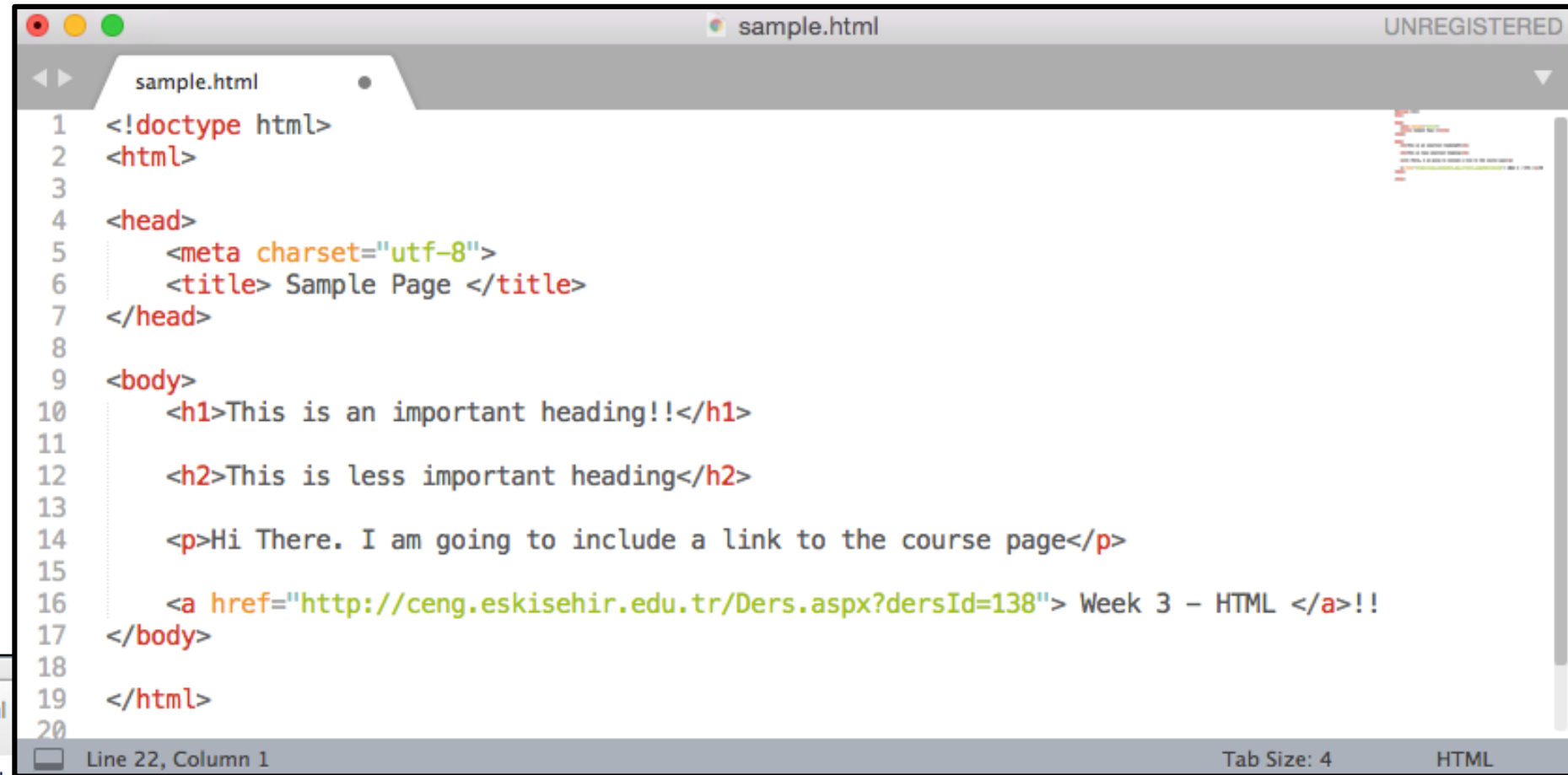
- Markup languages are not the same as programming languages, they use **tags** to annotate documents
- In HTML the tags indicate where headings, images, lists, links, line breaks, and other components should go



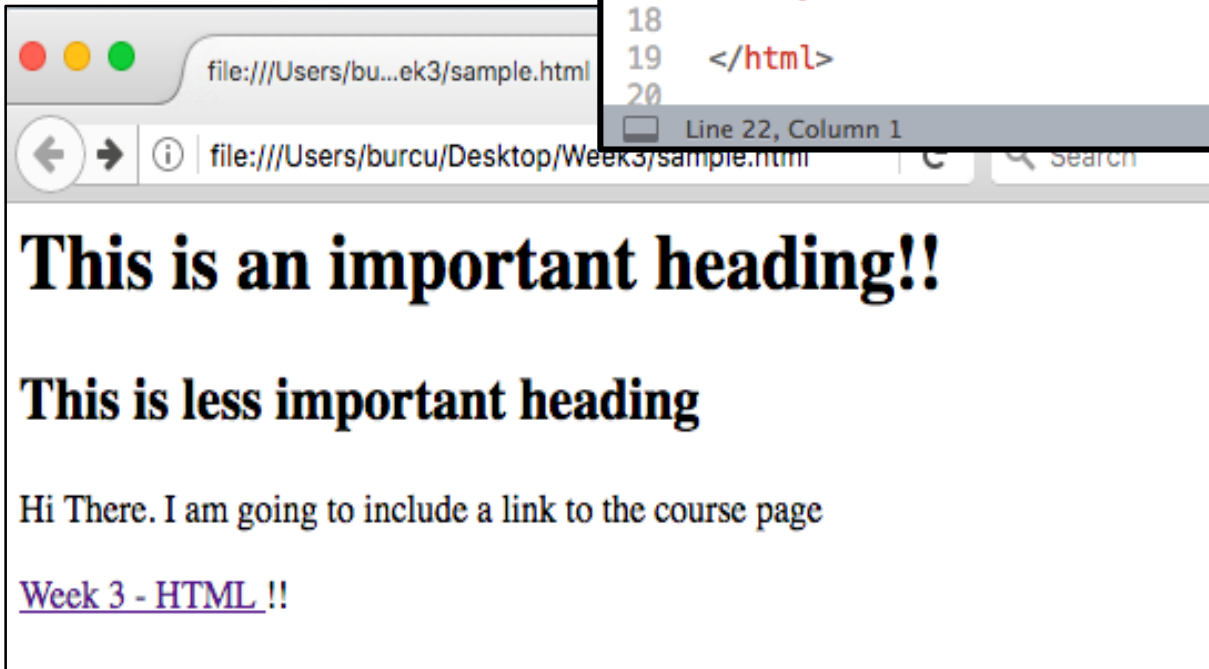
# .html Files

- When your computer opens a .html file, it knows to open it in an Internet browser (Chrome, Firefox, Safari, etc.)
- The browser can read this file and know how to display it on the screen
- Screen readers and other assistive devices can also utilize the HTML tags to present the information in special ways

# HTML Files



```
1 <!doctype html>
2 <html>
3
4 <head>
5     <meta charset="utf-8">
6     <title> Sample Page </title>
7 </head>
8
9 <body>
10     <h1>This is an important heading!!</h1>
11
12     <h2>This is less important heading</h2>
13
14     <p>Hi There. I am going to include a link to the course page</p>
15
16     <a href="http://ceng.eskisehir.edu.tr/Ders.aspx?dersId=138"> Week 3 - HTML </a>!!
17 </body>
18
19 </html>
20
```

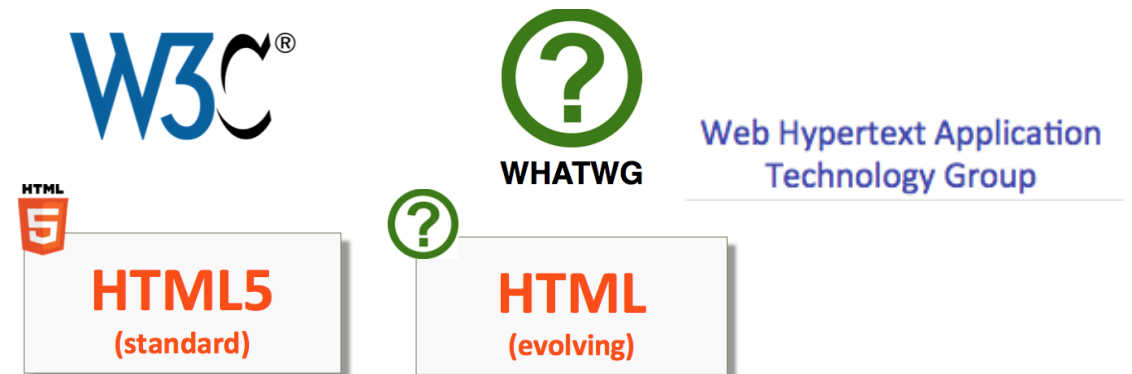


HTML is similar to English, so you can understand it even if you don't know much about it.

[week4-sampleCodes/sample.html](http://week4-sampleCodes/sample.html)

# HTML History

- HTML was present in the document sharing system that Berners-Lee developed at CERN in the early 1990's
- The HTML Working Group, created by the IETF, released HTML 2.0 as a standard in 1995
- Additional versions of this standard have since been created under the W3C ([www.w3.org](http://www.w3.org))
- HTML5, released in 2011, incorporates new features such as video playback and drag-drop capabilities



# Declarative Programming

- Markup languages are examples of **declarative programming languages**:
  - Programming flow control is not specified
  - Programs specify what not how
- In the case of markup languages such as HTML, this means that you specify what should appear on a webpage, but not how it should look (i.e., how it's styled) or behave (e.g., when it's visible, animations)
- If created properly, HTML documents should follow the separation of content and presentation principle

# Semantic HTML

- There is a design principle related to publishing entitled **separation of content and presentation** – the meaning (i.e., semantics) of a document should be separated from how this meaning is presented to readers
- Advantages associated with using this design principle:
  - The same content can be rendered differently, depending upon the needs of the user (e.g., as text, as braille, etc.)
  - You can change in one place how a recurrent item in the document is style
  - By capturing the meaning of a document, further intelligent machine processing of the document is supported

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# Internet Browsers

- The purpose of browsers is to read HTML documents and display them
- Browsers do not display the HTML tags, but use them to render the content of the page (or determine how to display the document)
- Different browsers have their pros and cons
- Most people have a preferred browser
- You need to test your site on multiple browsers
- Browsers can vary in how well they adhere to HTML5 standards
- Different versions of browsers need to be considered as well

# Internet Explorer & Microsoft Edge



- One of the most popular browsers
- Preinstalled on Microsoft Windows and free to download
- Not available on the Mac

## Safari



- Works on Mac and Windows operating systems
- Free to download
- Default browser on iPhones and iPads





# Google Chrome

- Freeware browser developed by Google
- Fast browsing
- Greater security



# Firefox

- Free browser developed by Mozilla
- Works on Windows and Mac
- Secure and fast
- Resource heavy

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# Editors: How to use an Editor to create an HTML file

1. Decide how you will organize your files
2. Decide on a naming convention
  - No spaces
  - No Turkish characters
3. Decide on an editor
  - Windows (**Notepad**, **Notepad++**, **Sublime\***)
  - Mac (**TextEdit**, **TextWrangler**, **Sublime\***)
  - Online editors
    - <https://codepen.io/>

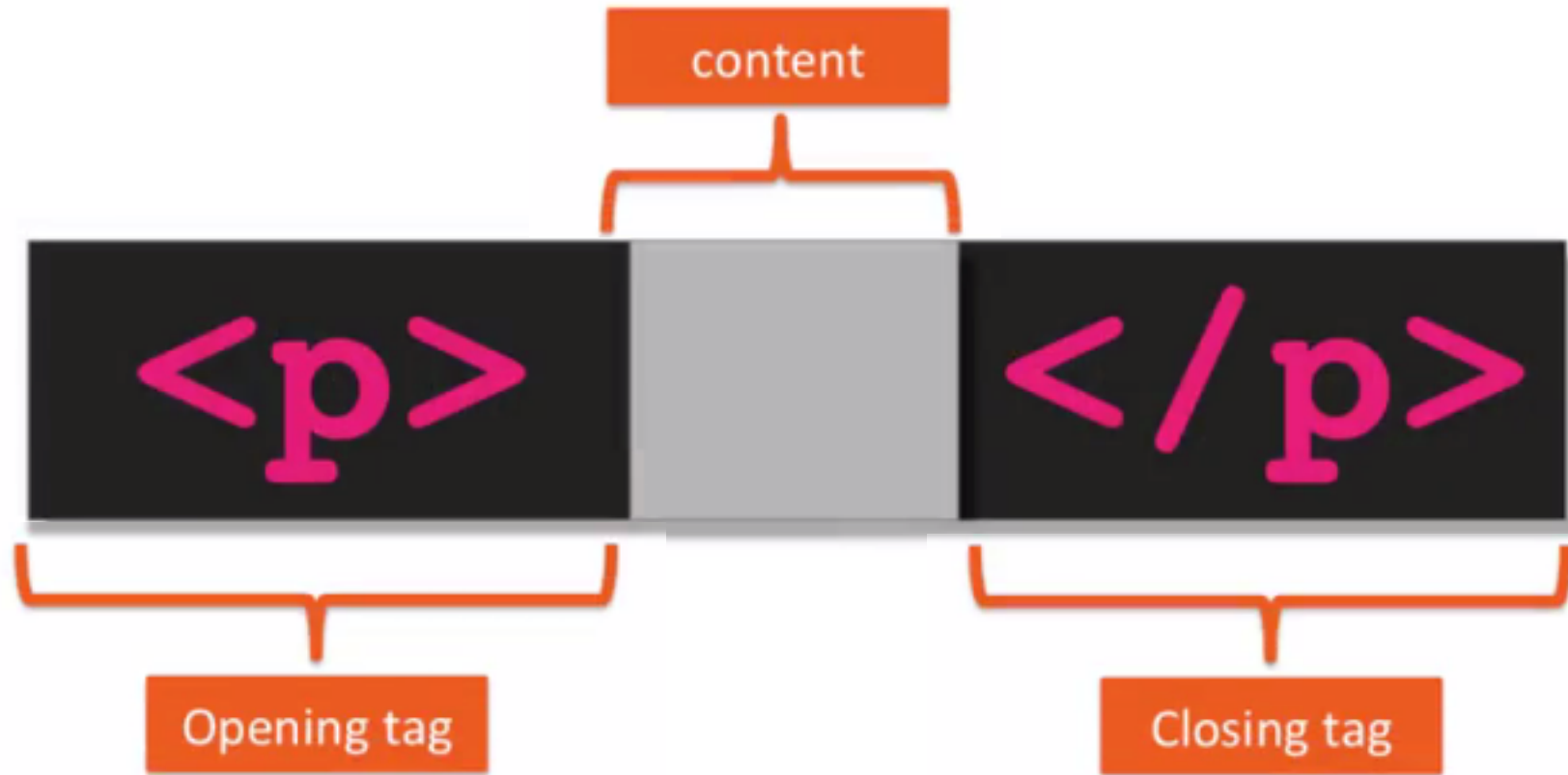
# HTML Editors - Getting Started

1. Open your editor
2. Write some HTML (add Doctype, head, and body tags)
3. Name and Save the HTML File (Ctrl-S or Command-S)
4. Open/View the HTML Page in Browser

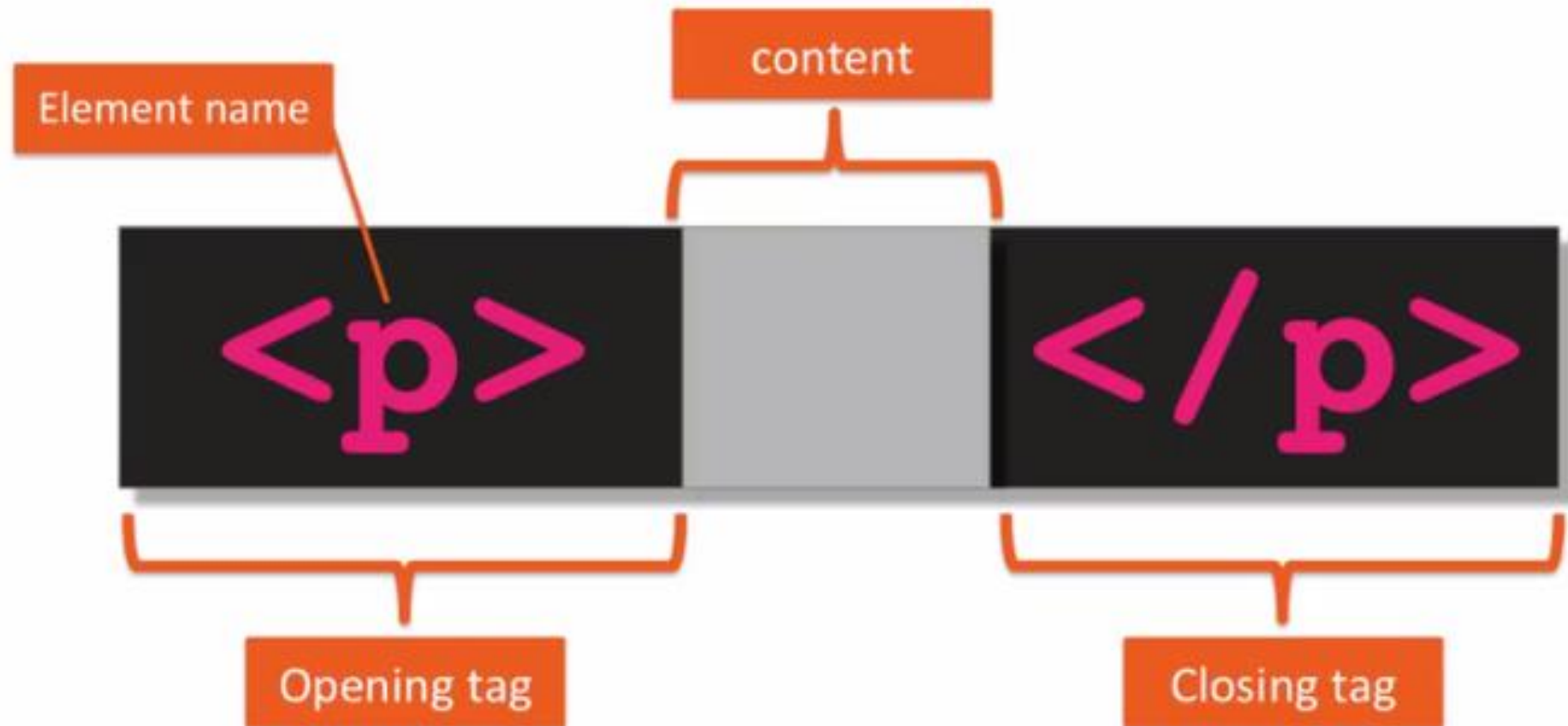
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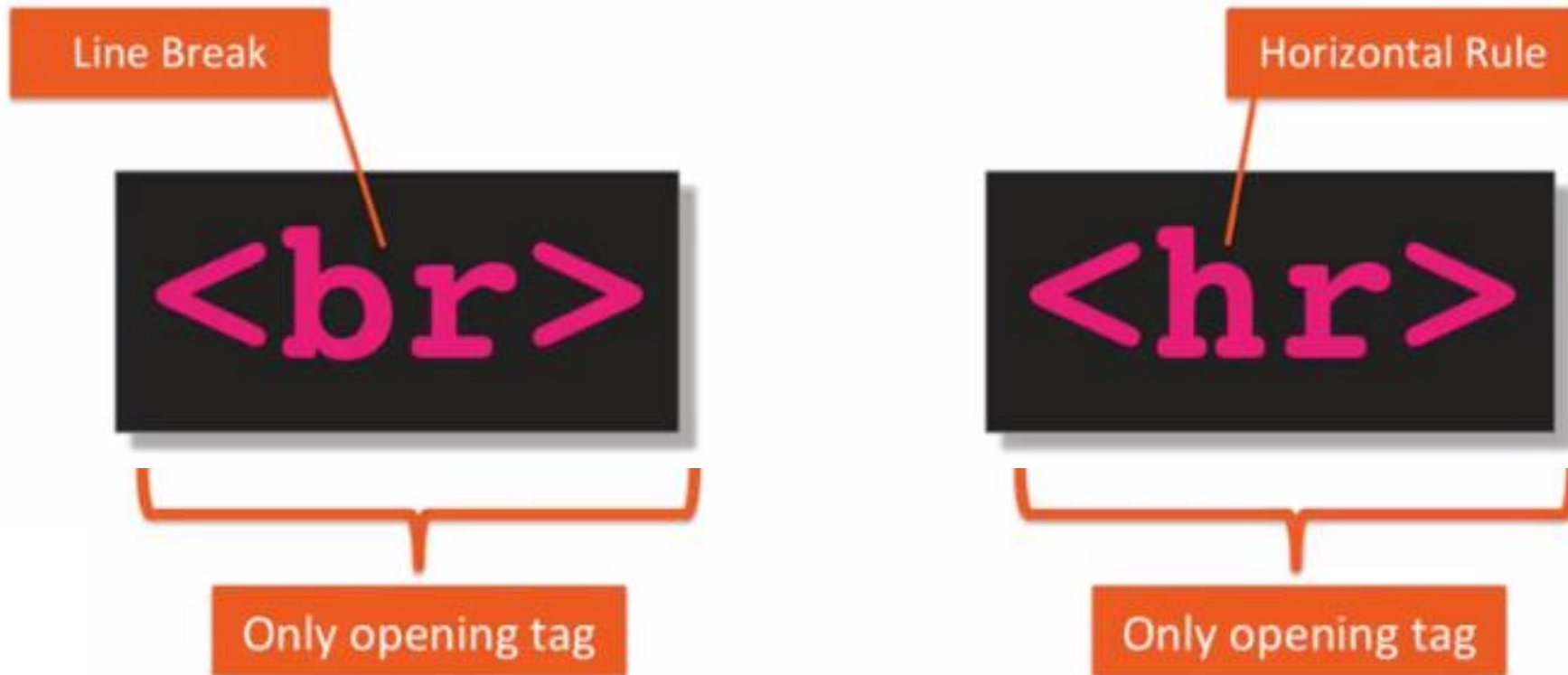
# HTML Tag Syntax



# HTML Tag Syntax



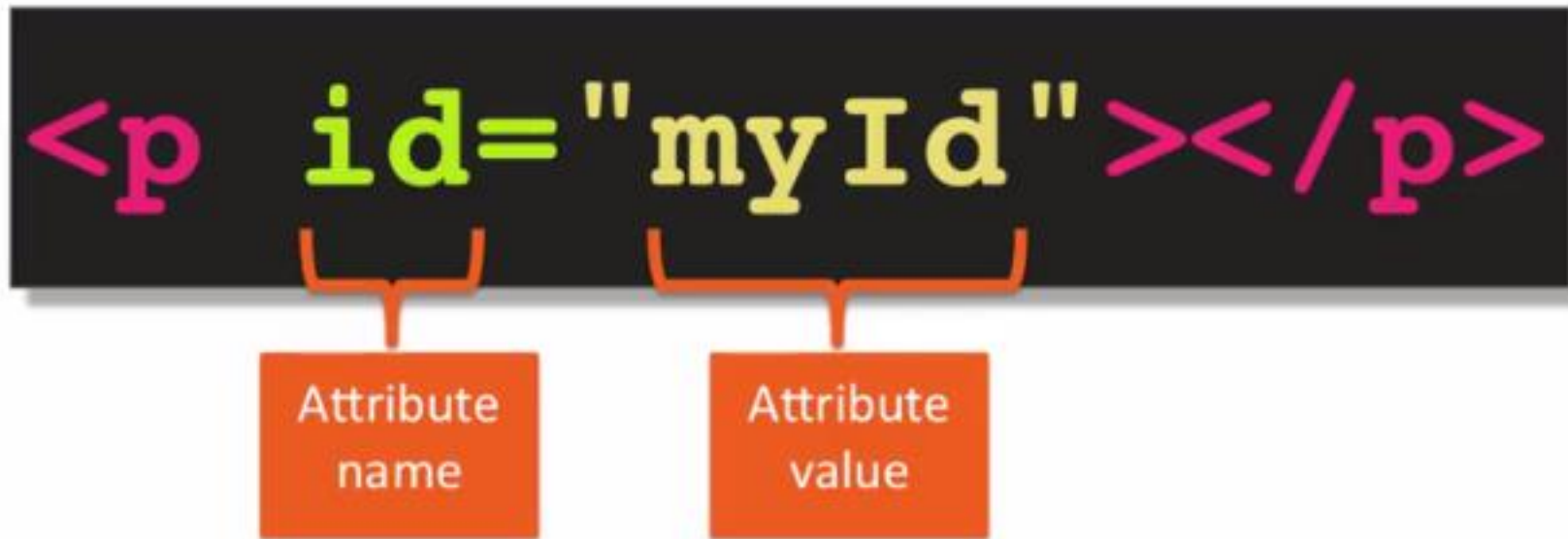
# HTML Tag Syntax



**Most HTML tags have a closing tag that matches its opening tag but not all!**

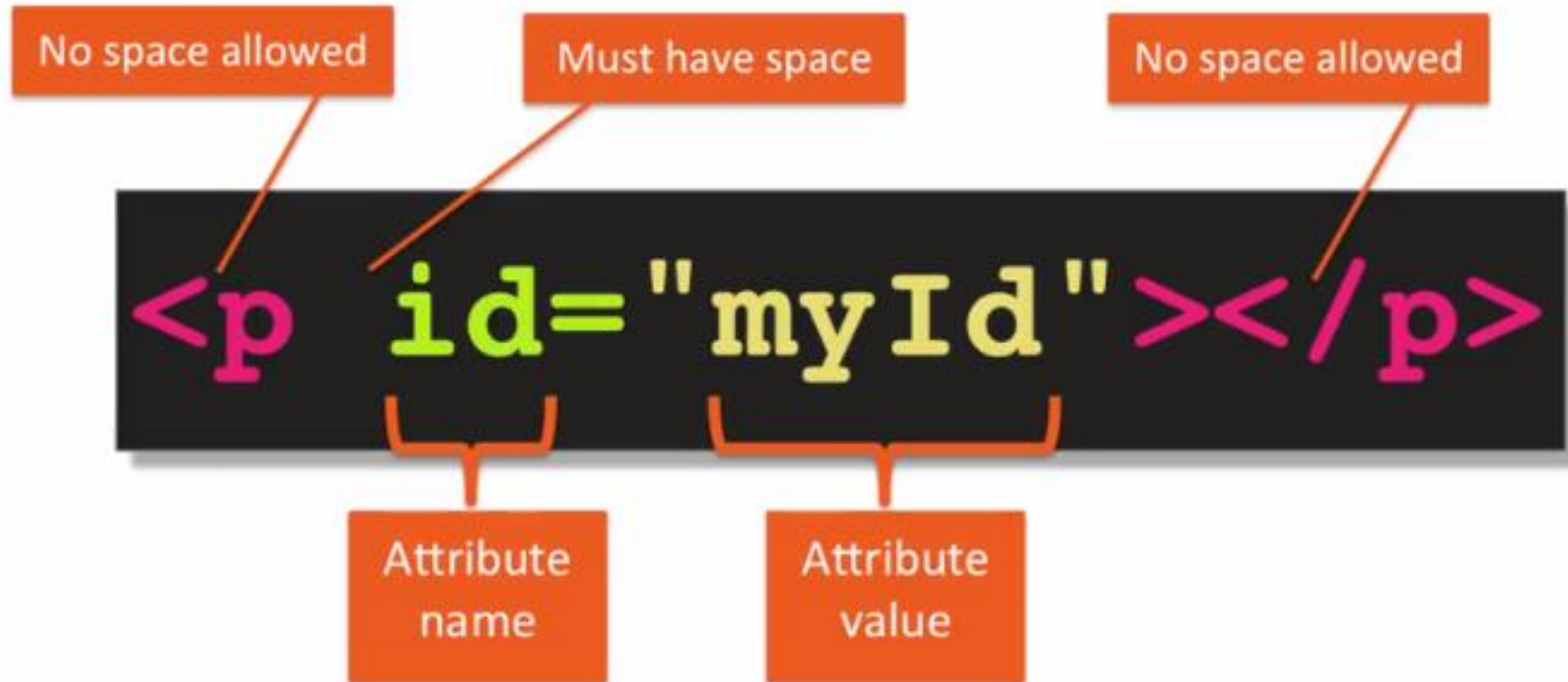


# HTML Tag Syntax - Attribute



```
<a href="http://shayhowe.com/">Shay Howe</a>
```

# HTML Tag Syntax – Spacing Rules



# HTML Tag Syntax – Quotes in Attribute Value

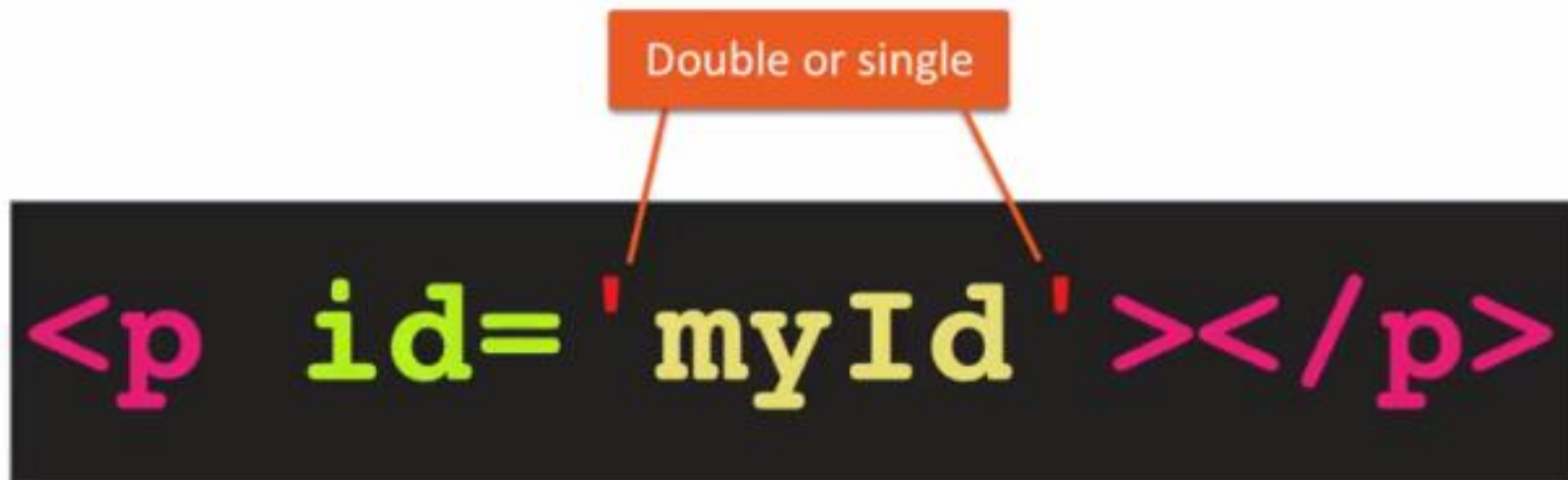
Value in quotes

```
<p id="myId"></p>
```

A diagram illustrating the use of double quotes in an HTML attribute value. It shows the HTML tag `<p id="myId"></p>` on a black background. The opening tag `<p` is pink, `id=` is green, and `"myId"` is yellow. An orange box labeled "Value in quotes" has two lines pointing to the double quotes surrounding the attribute value "myId".

Double or single

```
<p id='myId'></p>
```

A diagram illustrating the use of single quotes in an HTML attribute value. It shows the HTML tag `<p id='myId'></p>` on a black background. The opening tag `<p` is pink, `id=` is green, and `'myId'` is yellow. An orange box labeled "Double or single" has two lines pointing to the single quotes surrounding the attribute value 'myId'.

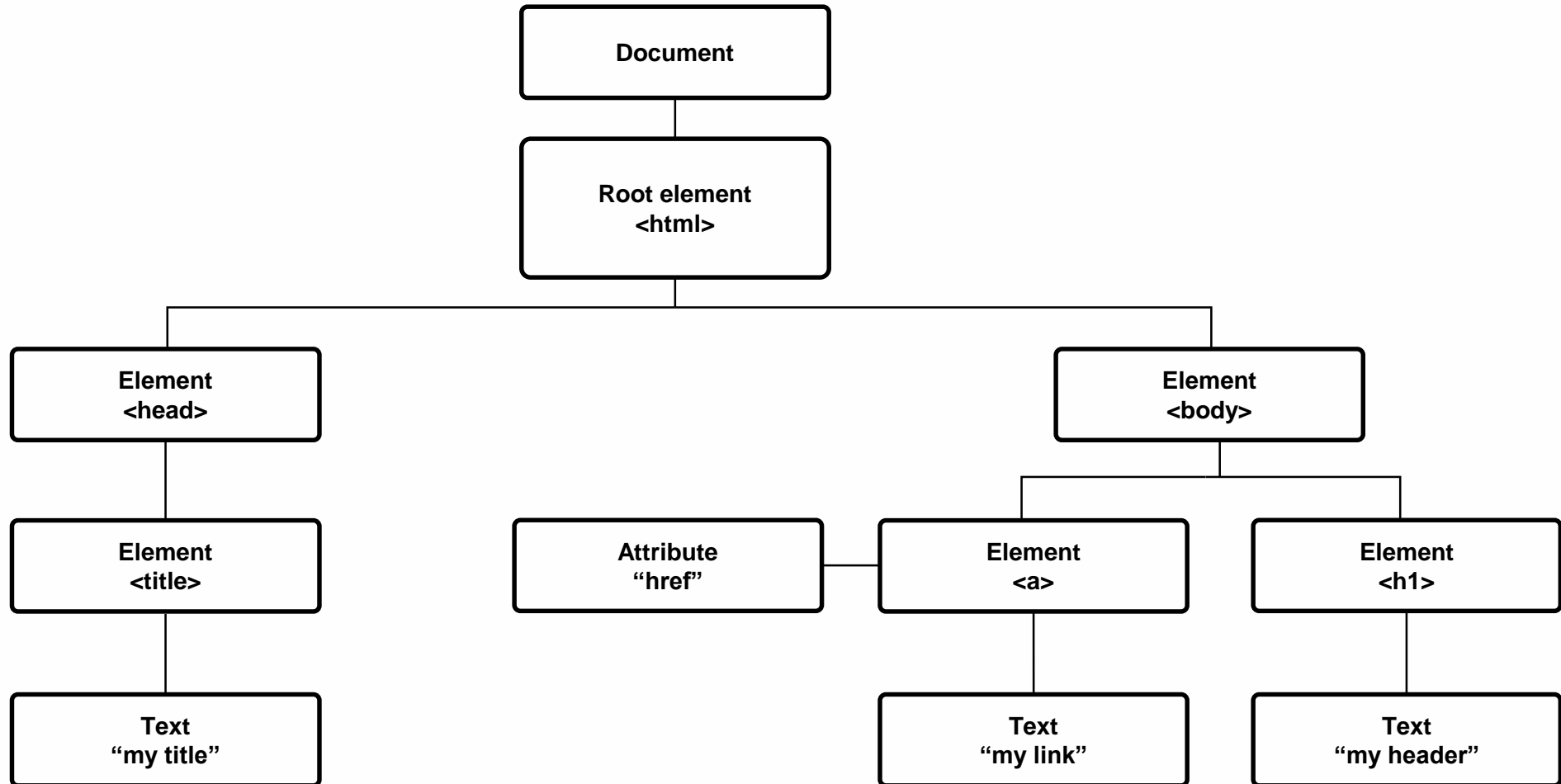
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# Document Object Model (DOM)

- Basis of HTML5 is “New features should be based on HTML, CSS, the DOM, and JavaScript...”
- DOM provides common tree-like structure that all pages should follow
- Computer Scientists love trees (the mathematical kind) because we can test them

# HTML is built on the DOM



# Three parts of a well-formed document

- Doctype
  - Version of HTML that you will be using

- Head
  - Metadata

- Body
  - Displayable content



The HTML document itself  
begins with **<html>** and ends  
with **</html>**

# Doctype

- All HTML documents must start with a document type declaration
- Represents the document type, and helps browsers to display web pages correctly
- It must only appear once, at the top of the page (before any HTML tags)
- The **<!DOCTYPE>** declaration not case sensitive
- The **<!DOCTYPE>** declaration for HTML5 is:
  - **<!DOCTYPE html>**
- Previous versions dictated backwards compatibility
  - **<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">**
  - **<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">**



# Head

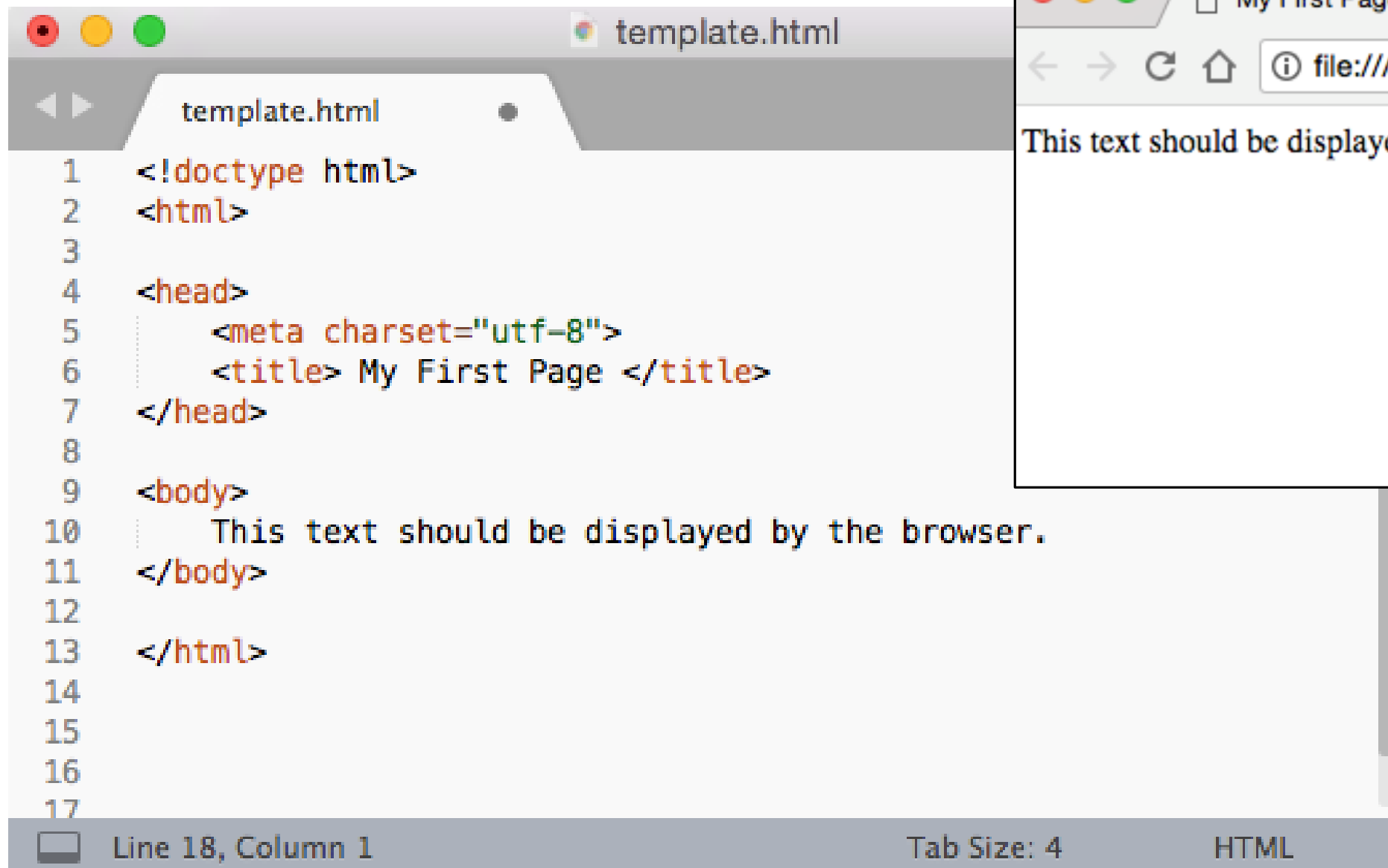
- Additional information used by the browser
  - Meta data (data about data) – language, title, character set
  - Supporting files – JavaScript, CSS - Styling, Add-ons
- Other than title, meta-data is not displayed

# Body

- Bulk of your page
- Important to write well-formatted (tree-like) code
- The visible part of the HTML document
  - **Note:** Most of the content is displayed by the browser, but there may be some meta-data too (ex: script)

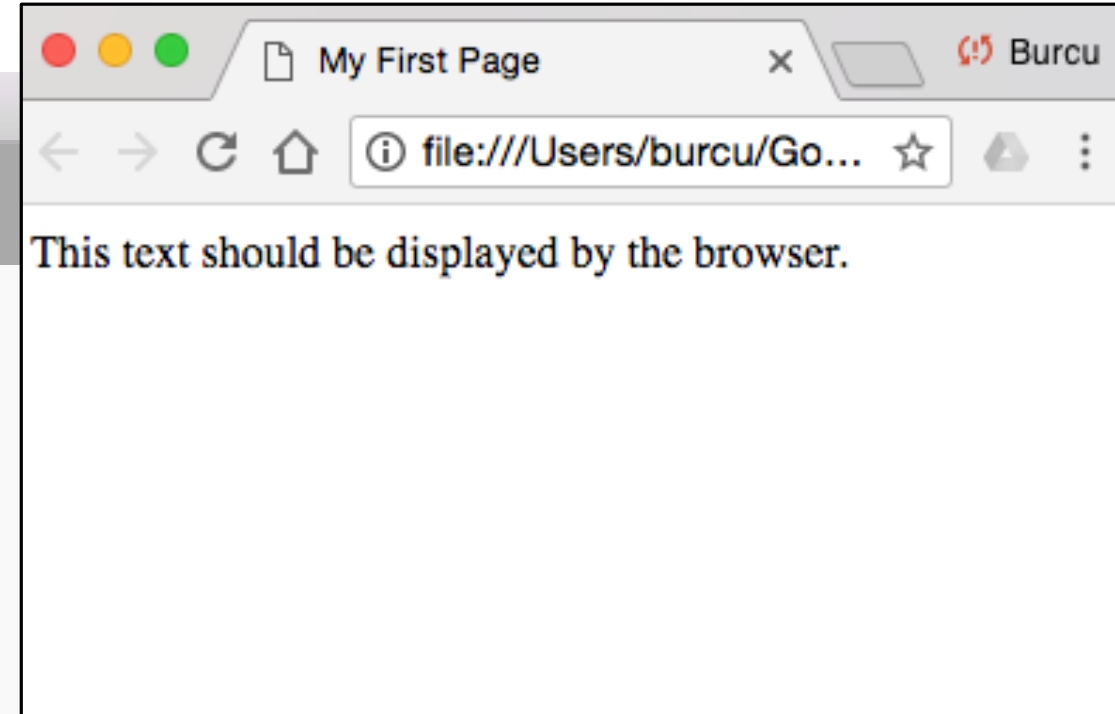
# Example

[week4-sampleCodes/template.html](http://week4-sampleCodes/template.html)



```
1 <!doctype html>
2 <html>
3
4 <head>
5     <meta charset="utf-8">
6     <title> My First Page </title>
7 </head>
8
9 <body>
10     This text should be displayed by the browser.
11 </body>
12
13 </html>
14
15
16
17
```

Line 18, Column 1      Tab Size: 4      HTML

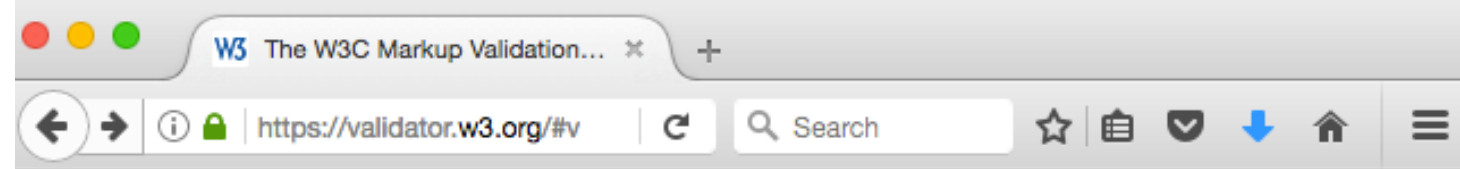


# Validate the Code

<https://validator.w3.org/>

Well-formed pages use the DOM structure

- Use beginning and end tags
- Close inner tags before outer ones
- Use valid attributes



## Markup Validation Service

Check the markup (HTML, XHTML, ...) of Web documents

Validate by URI    Validate by File Upload    **Validate by Direct Input**

### Validate by direct input

Enter the Markup to validate:

```
<!doctype html>
<html>

<head>
  <meta charset="utf-8">
  <title> My First Page </title>
</head>

<body> This text should be displayed by the browser.
</body>

</html>
```

► More Options

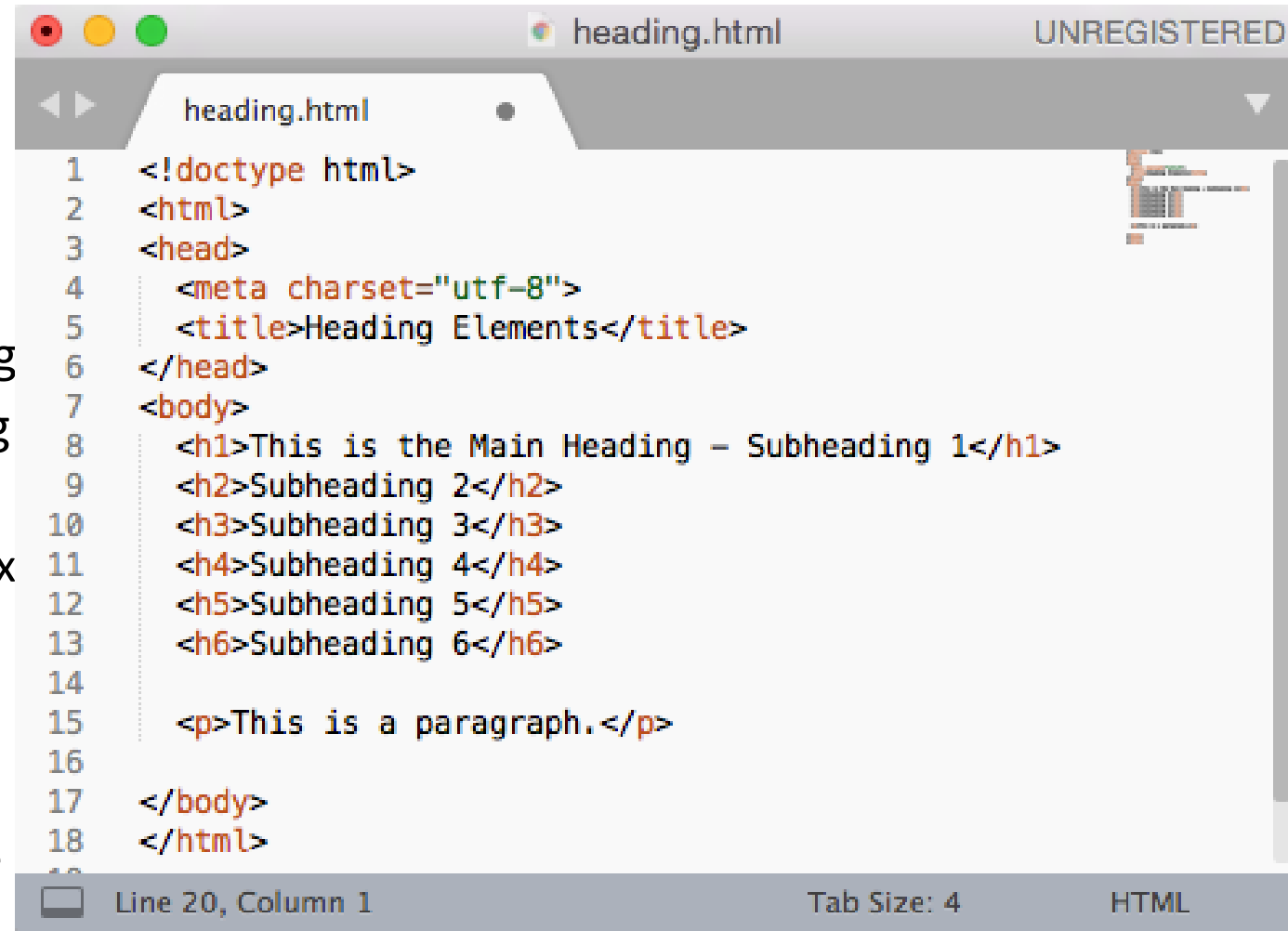
Check

This validator checks the [markup validity](#) of Web documents in HTML, XHTML, SMIL, MathML, etc. If you wish to validate specific content such as RSS/Atom

# Common Tags

## ■ HTML Headings

- <h1>, <h2>, <h3>, <h4>, <h5>, <h6>
- <h1> defines the most important heading
- <h6> defines the least important heading
- These tags have **syntax** and **semantics**
  - Search engines use the headings to index the structure and content of your web pages
  - Users skim your pages by its headings
  - It is important to use headings to show the document structure, not for to make text big or bold



```
1  <!doctype html>
2  <html>
3  <head>
4      <meta charset="utf-8">
5      <title>Heading Elements</title>
6  </head>
7  <body>
8      <h1>This is the Main Heading - Subheading 1</h1>
9      <h2>Subheading 2</h2>
10     <h3>Subheading 3</h3>
11     <h4>Subheading 4</h4>
12     <h5>Subheading 5</h5>
13     <h6>Subheading 6</h6>
14
15     <p>This is a paragraph.</p>
16
17 </body>
18 </html>
```

The screenshot shows a code editor window titled 'heading.html' with a status bar indicating 'UNREGISTERED'. The code is an HTML document with a doctype, head section containing a meta charset and a title 'Heading Elements', and a body section containing six headings (h1 through h6) and a paragraph. The h1 tag is highlighted in red in the original image. The status bar at the bottom shows 'Line 20, Column 1', 'Tab Size: 4', and 'HTML'.

# Common Tags

- Paragraphs

- `<p>...</p>`

- Line Breaks

- `<br>` element defines a line break
  - The `<br>` tag is an empty tag - has no end tag

- Horizontal Ruler

- `<hr>` tag defines a thematic break in an HTML page, and is most often displayed as a horizontal rule
  - Used to separate content or define a change in an HTML page

- Comments

- `<!-- ... -->`

[week4-sampleCodes/links-to-samples/paragraph.html](http://week4-sampleCodes/links-to-samples/paragraph.html)

# Common Tags

## ■ Formatting Elements

Designed to display special types of text:

- |   |                    |
|---|--------------------|
| ■ <code>&lt;b&gt;...&lt;/b&gt;</code>           | - Bold text        |
| ■ <code>&lt;strong&gt;...&lt;/strong&gt;</code> | - Important text   |
| ■ <code>&lt;i&gt;...&lt;/i&gt;</code>           | - Italic text      |
| ■ <code>&lt;em&gt;...&lt;/em&gt;</code>         | - Emphasized text  |
| ■ <code>&lt;mark&gt;...&lt;/mark&gt;</code>     | - Marked text      |
| ■ <code>&lt;small&gt;...&lt;/small&gt;</code>   | - Small text       |
| ■ <code>&lt;del&gt;...&lt;/del&gt;</code>       | - Deleted text     |
| ■ <code>&lt;ins&gt;...&lt;/ins&gt;</code>       | - Inserted text    |
| ■ <code>&lt;sub&gt;...&lt;/sub&gt;</code>       | - Subscript text   |
| ■ <code>&lt;sup&gt;...&lt;/sup&gt;</code>       | - Superscript text |

*Browsers display `<strong>` as `<b>`, and `<em>` as `<i>`. However, there is a difference in the meaning of these tags: `<b>` and `<i>` defines bold and italic text, respectively, but `<strong>` and `<em>` means that the text is "important", hence they add "semantic importance" to the text*

[week4-sampleCodes/links-to-samples/formatting.html](http://week4-sampleCodes/links-to-samples/formatting.html)

# Common Tags

## ■ Links

- HTML links are hyperlinks
- You can click on a link and jump to another document
- When you move the mouse over a link, the mouse arrow will turn into a little hand
- In HTML, links are defined with the `<a>` tag

```
<a href="url">link text</a>
```

- The ***href*** attribute specifies the destination address of the link
- The ***link text is*** the visible part
  - External Links [week4-sampleCodes/links-to-samples/links.html](http://week4-sampleCodes/links-to-samples/links.html)
  - Local Links [week4-sampleCodes/links-to-samples/links-same-page.html](http://week4-sampleCodes/links-to-samples/links-same-page.html)



# Common Tags

## ▪ Lists

- Unordered List
- Ordered List
- HTML Description List

[week4-sampleCodes/links-to-samples/links.html](http://week4-sampleCodes/links-to-samples/links.html)

[week4-sampleCodes/links-to-samples/unordered-lists.html](http://week4-sampleCodes/links-to-samples/unordered-lists.html)

[week4-sampleCodes/links-to-samples/ordered-lists.html](http://week4-sampleCodes/links-to-samples/ordered-lists.html)

[week4-sampleCodes/links-to-samples/description-lists.html](http://week4-sampleCodes/links-to-samples/description-lists.html)

## ▪ Special Entries

[https://www.w3schools.com/html/html\\_entities.asp](https://www.w3schools.com/html/html_entities.asp)

## ▪ Images

[week4-sampleCodes/links-to-samples/images.html](http://week4-sampleCodes/links-to-samples/images.html)

## ▪ Tables

[week4-sampleCodes/links-to-samples/table.html](http://week4-sampleCodes/links-to-samples/table.html)

[week4-sampleCodes/links-to-samples/table-with-image.html](http://week4-sampleCodes/links-to-samples/table-with-image.html)

# HTML Blocks

- Every HTML element has a default display value depending on what type of element it is
- The two display values are:
  - **Block-Level Elements:** A block-level element always starts on a new line and takes up the full width available (stretches out to the left and right as far as it can)

|              |           |          |              |           |          |         |      |         |            |
|--------------|-----------|----------|--------------|-----------|----------|---------|------|---------|------------|
| <address>    | <article> | <aside>  | <blockquote> | <canvas>  | <dd>     | <div>   | <dl> | <dt>    | <fieldset> |
| <figcaption> | <figure>  | <footer> | <form>       | <h1>-<h6> | <header> | <hr>    | <li> | <main>  | <nav>      |
| <noscript>   | <ol>      | <p>      | <pre>        | <section> | <table>  | <tfoot> | <ul> | <video> |            |

- **Inline Elements:** An inline element does not start on a new line and only takes up as much width as necessary

|          |          |           |         |          |         |       |            |          |        |        |
|----------|----------|-----------|---------|----------|---------|-------|------------|----------|--------|--------|
| <a>      | <abbr>   | <acronym> | <b>     | <bdo>    | <big>   | <br>  | <button>   | <cite>   | <code> | <dfn>  |
| <em>     | <i>      | <img>     | <input> | <kbd>    | <label> | <map> | <object>   | <output> | <q>    | <samp> |
| <script> | <select> | <small>   | <span>  | <strong> | <sub>   | <sup> | <textarea> | <time>   | <tt>   | <var>  |

# HTML Content Models

## Block-Level Elements

- Render to begin on a new line (by default)
- May contain inline or other block-level elements
- Roughly Flow Content (HTML5 category)

## Inline Elements

- Render on the same line (by default)
- May only contain other inline elements
- Roughly Phrasing Content (HTML5 category)

### Example: Divs & Spans

`<div>Hello World</div>`

The **<div>** element is often used as a container for other HTML elements

`<span>Hello World</span>`

The **<span>** element is often used as a container for some text

- ✓ HTML5 replaces these definitions with more complex set of content categories - Officially not part of HTML5, but still used
- ✓ However, this distinction remains practical because it aligns well with existing CSS rules

# Additional Resources

- **Getting to Know HTML**

- <http://learn.shayhowe.com/html-css/getting-to-know-html/>

- **W3Schools**

- <https://www.w3schools.com/html/default.asp>

- **Week4 – Sample Examples**

- “week4-sampleCodes.zip” in Mergen course website

# Summary

- HTML
  - Annotates content
  - Defines document structure
- Right and wrong syntax
- 3 Core Web Technologies
  - HTML, CSS, JavaScript