HTML and CSS

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https://d2v4zi8pl64nxt.cloudfront.net/javascript-seo/5948abfc0e2df5.02876591.gif

Examples are from : https://www.w3schools.com/html/default.asp

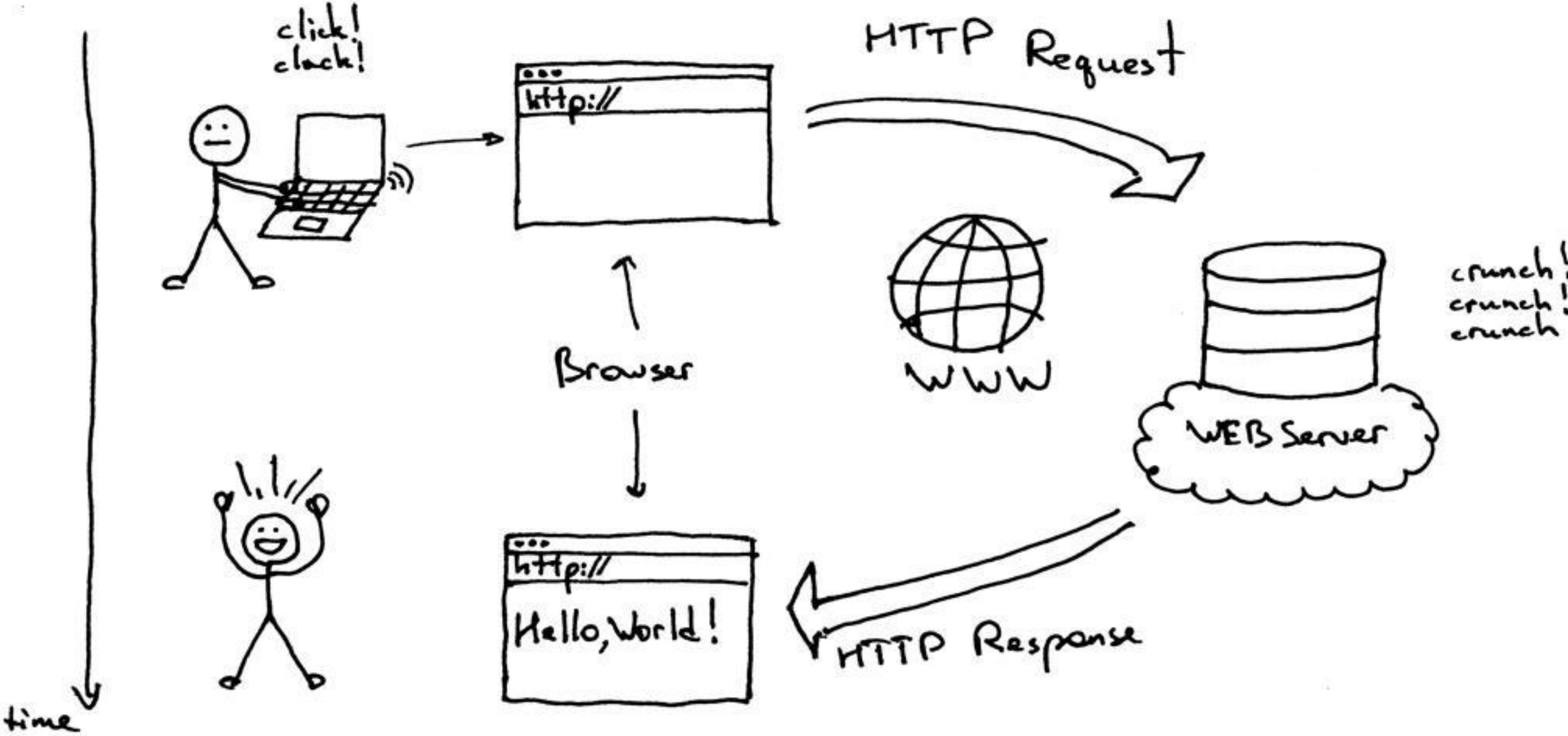
Web

- Enormously popular application that provides a tremendous wealth of information
- Origins: 1989 Tim Berners-Lee (CERN) proposed mechanism to distribute high-energy physics data (reports, photos, blueprints etc)
    - Proposal eventually lead to World Wide Web (WWW)
- 1993, first graphical browser Mosaic was released
- 1994, W3C (world wide web consortium) was formed to develop web and standards

Web Client-Server Interaction

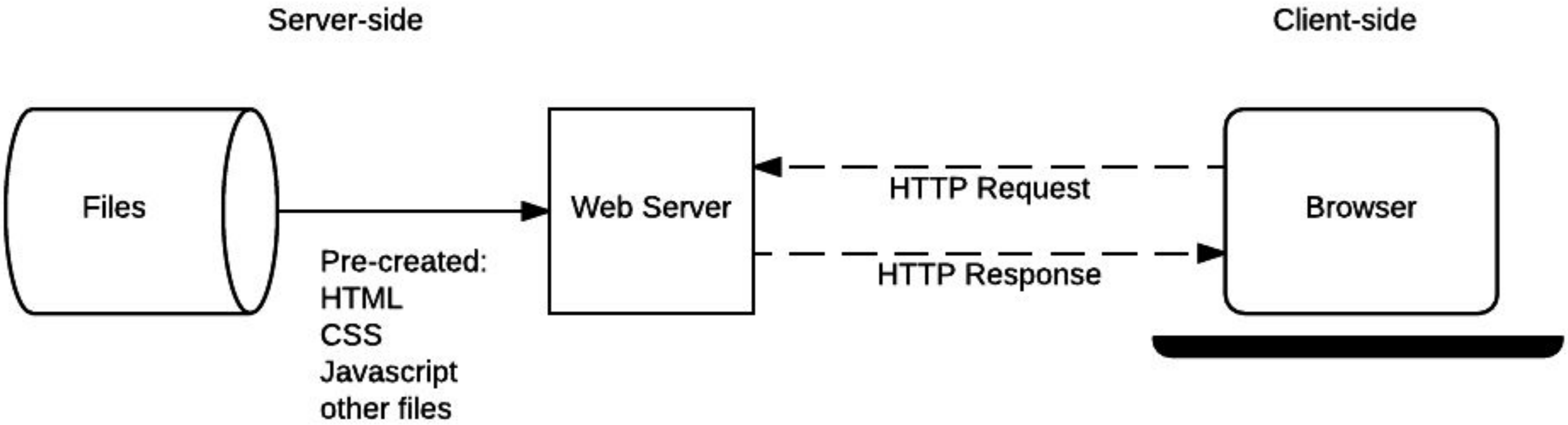
Typical Workflow (At high level)

- Web Request:
  - A user enters a web address (URL) in their browser
    - Web address corresponds to some website
  - One or more requests are sent to the web server hosting the website
- Processing:
  - Server processes each request
    - May run server-side scripts, query databases, or performing other tasks to generate a response.
- Response:
  - The generated response(s) are sent back to user's browser
- Delivery:
  - Browser interprets each response, combines them and displays the web page
- Repeat above steps:
  - User interacts with the page causing more requests to be sent out
  - Receives corresponding responses and sees new information, and so on

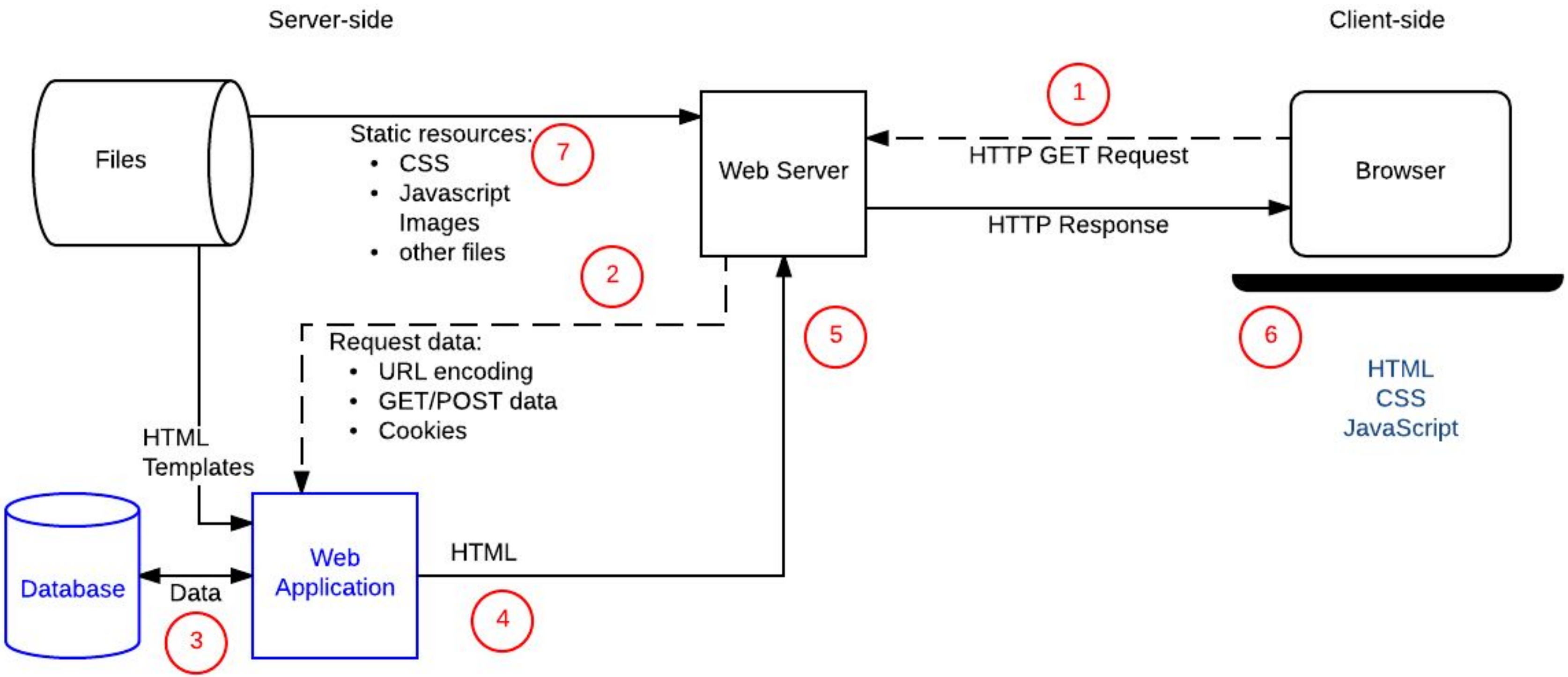

click!
clack!
http://
HTTP Request
crunch!
crunch!
crunch
Browser
WWW
WEB Server
http://
Hello, World!
HTTP Response
time

Static Pages

- Early days of Internet, websites consisted mostly of static resources
  - Developers coded static files (HTML) by hand and deployed on server
- User type website’s URL in browser which results in request(s) to server (via HTTP protocol) asking for static files
- Web server returns static files (e.g HTML) on disk in the form of HTTP response


Server-side
Client-side
Files
Web Server
Browser
HTTP Request
HTTP Response
Pre-created:
HTML
CSS
Javascript
other files

Modern Web: Dynamic Pages



Client-side Programming

- Code that runs in the browser
  - E.g. Javascript
    - Note: HTML, CSS are for markup/styling
- Primarily concerned with improving the appearance and behavior of a rendered web page
  - Selecting and styling UI components, creating layouts, form validation etc

Server Side Programming

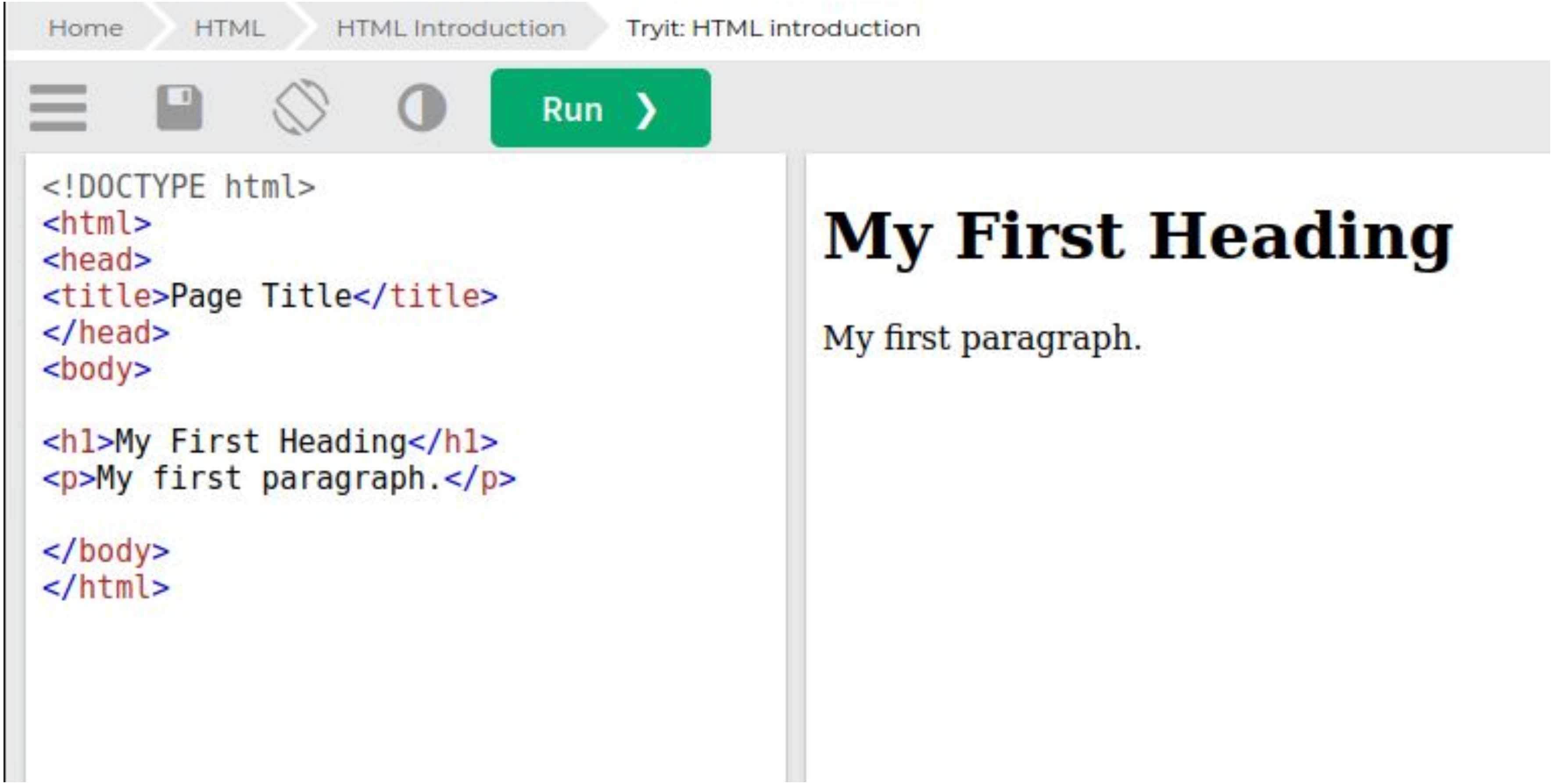
- Code that runs in the server
  - Helps create dynamic pages
  - E.g. PHP, Python, Ruby, C#, and JavaScript (NodeJS)
- Developers typically write their code using web frameworks (Django/Python, Flask etc)
  - Collections of functions, objects, rules and other code constructs
  - Helps solve common problems, speed up development etc

Our Focus: Static Pages and Client Side Programming!

HTML5

- HTML stands for Hyper Text Markup Language
  - Many versions, current version is 5
- Tells browsers how to display content
- Supports text, text elements, tables, embedded images, audio/video elements etc
- Supports hyperlinks: links to other documents or document parts

- Also supports embedded code, executed at client-side browser: javascript
- How to View HTML Source when browsing?
  - Right-click a webpage in browser and select "View Page Source"



```
<!DOCTYPE html>
<html>
<head>
<title>Page Title</title>
</head>
<body>

<h1>My First Heading</h1>
<p>My first paragraph.</p>

</body>
</html>
```

My First Heading

My first paragraph.

From https://www.w3schools.com/html/

Elements/Tags

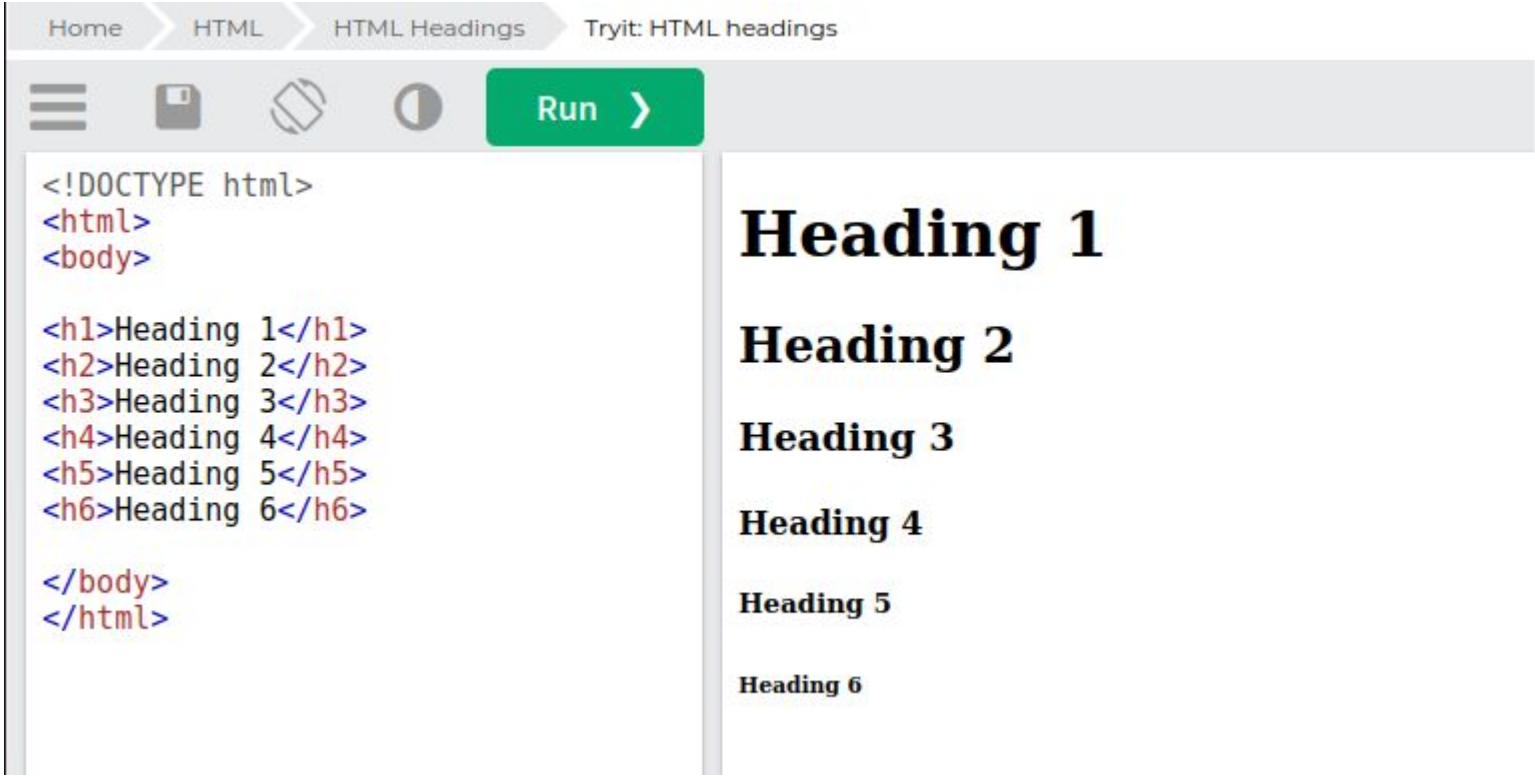
- HTML is just a series of elements
- Element defined by a start tag, some content, and an end tag
- Tag: Enclosed within <,>
  - E.g. <p>, </p>, <li>, </li>
  - HTML tags are not case sensitive; <P> same as <p>.
  - But strongly recommend use of lowercase
- Example Element: <p> This is a para </p>

- The <html> element is the root element and it defines the whole HTML document
- HTML elements with no content are called empty elements.
  - The <br> tag defines a line break, and is an empty element without a closing tag
- Elements can be nested

Attributes

- Attributes provide additional information about elements
  - Always specified in the start tag
- Attributes usually come in name/value pairs like: name="value"
  - E.g: <p style="color:red;">This is a red paragraph.</p>
  - E.g: <a href="https://www.w3schools.com">Visit W3Schools</a>
  - <img src="img_girl.jpg" width="500" height="600">

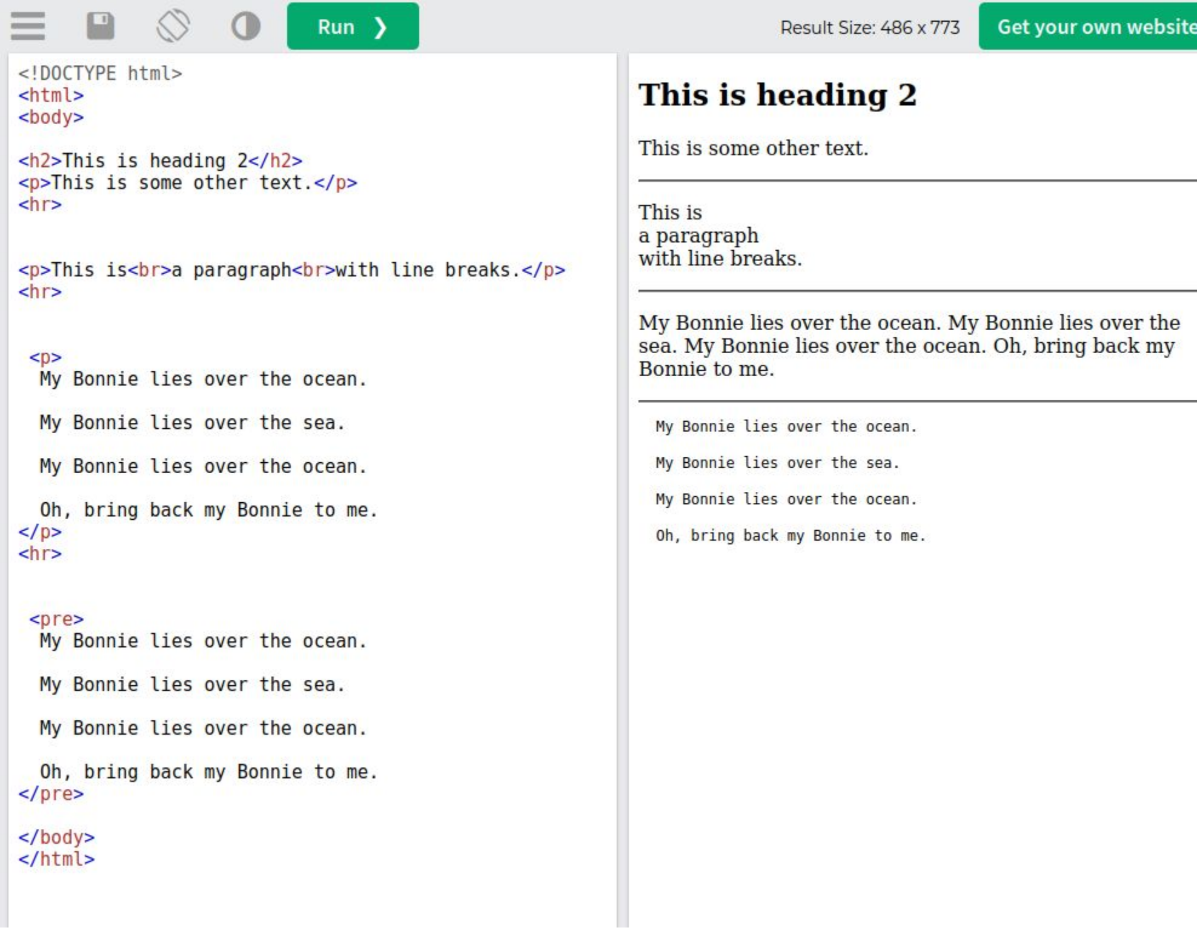
Headings



```
<!DOCTYPE html>
<html>
<body>

<h1>Heading 1</h1>
<h2>Heading 2</h2>
<h3>Heading 3</h3>
<h4>Heading 4</h4>
<h5>Heading 5</h5>
<h6>Heading 6</h6>

</body>
</html>
```

```
Heading 1

Heading 2

Heading 3

Heading 4

Heading 5

Heading 6
```

Paragraph



```html
<!DOCTYPE html>
<html>
<body>

<h2>This is heading 2</h2>
<p>This is some other text.</p>
<hr>


<p>This is<br>a paragraph<br>with line breaks.</p>
<hr>


 <p>
  My Bonnie lies over the ocean.

  My Bonnie lies over the sea.

  My Bonnie lies over the ocean.

  Oh, bring back my Bonnie to me.
</p>
<hr>


 <pre>
  My Bonnie lies over the ocean.

  My Bonnie lies over the sea.

  My Bonnie lies over the ocean.

  Oh, bring back my Bonnie to me.
</pre>

</body>
</html>
```

This is heading 2

This is some other text.

This is
a paragraph
with line breaks.

My Bonnie lies over the ocean. My Bonnie lies over the sea. My Bonnie lies over the ocean. Oh, bring back my Bonnie to me.

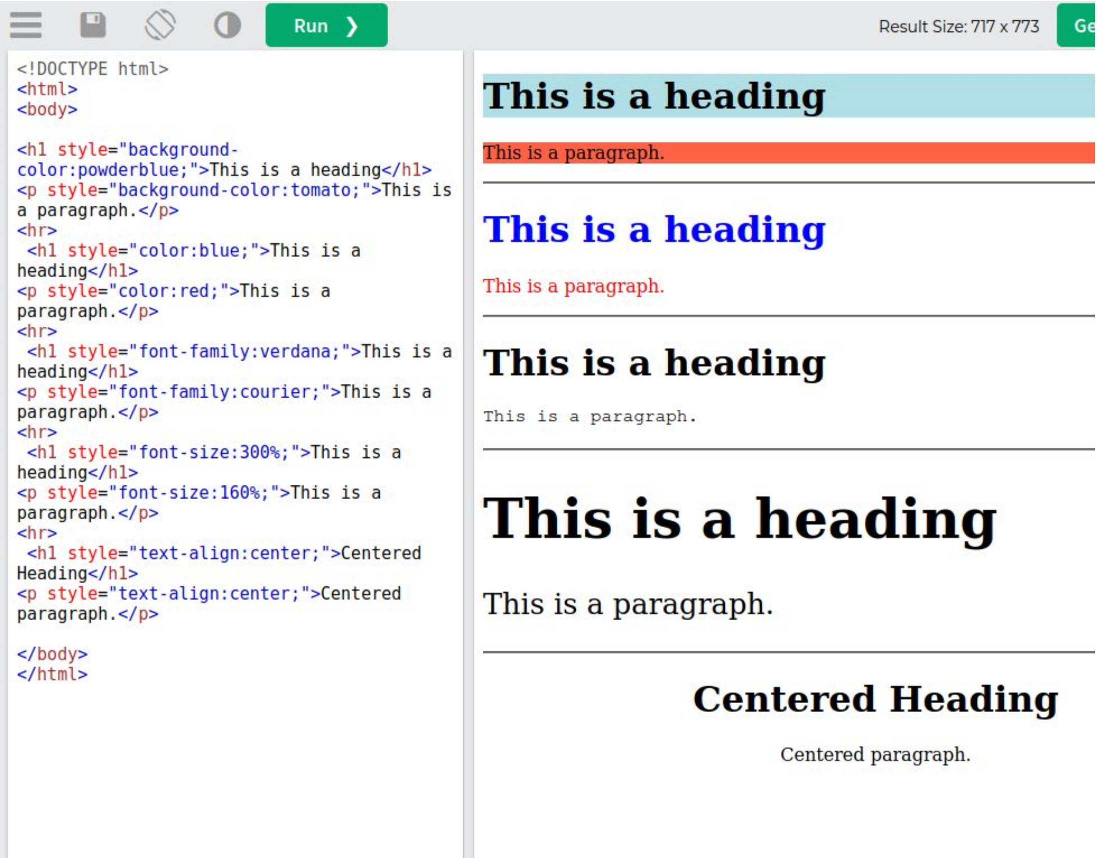
```
  My Bonnie lies over the ocean.

  My Bonnie lies over the sea.

  My Bonnie lies over the ocean.

  Oh, bring back my Bonnie to me.
```

<br> : line break

<Pre>: preformatted text

<hr> tag defines a break in HTML page; often displayed as a horizontal rule

Style



```
<!DOCTYPE html>
<html>
<body>

<h1 style="background-
color:powderblue;">This is a heading</h1>
<p style="background-color:tomato;">This is
a paragraph.</p>
<hr>
 <h1 style="color:blue;">This is a
heading</h1>
<p style="color:red;">This is a
paragraph.</p>
<hr>
 <h1 style="font-family:verdana;">This is a
heading</h1>
<p style="font-family:courier;">This is a
paragraph.</p>
<hr>
 <h1 style="font-size:300%;">This is a
heading</h1>
<p style="font-size:160%;">This is a
paragraph.</p>
<hr>
 <h1 style="text-align:center;">Centered
Heading</h1>
<p style="text-align:center;">Centered
paragraph.</p>

</body>
</html>
```

This is a heading

This is a paragraph.

This is a heading

This is a paragraph.

This is a heading

This is a paragraph.

This is a heading

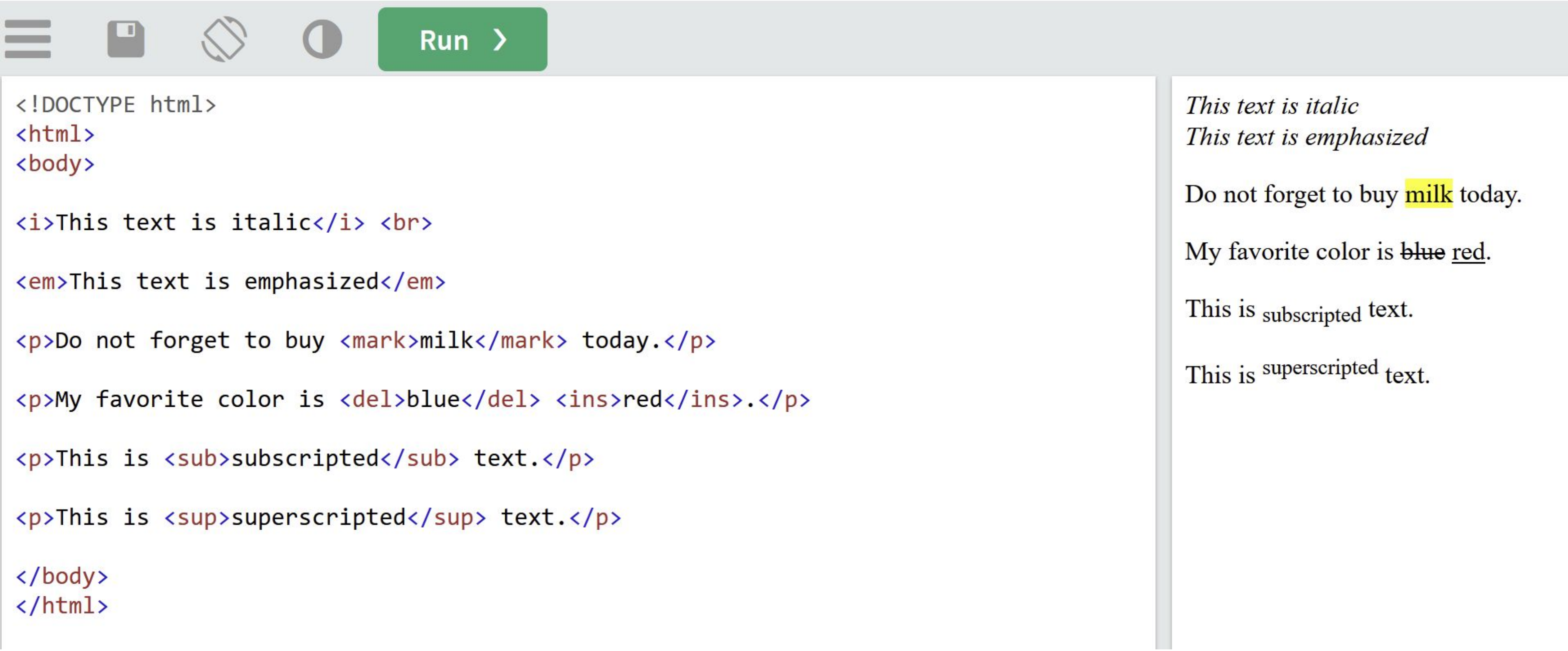
This is a paragraph.

Centered Heading

Centered paragraph.

style attribute add styles to an element, such as color, font, size,

Formatting



```
<!DOCTYPE html>
<html>
<body>

<i>This text is italic</i> <br>

<em>This text is emphasized</em>

<p>Do not forget to buy <mark>milk</mark> today.</p>

<p>My favorite color is <del>blue</del> <ins>red</ins>.</p>

<p>This is <sub>subscripted</sub> text.</p>

<p>This is <sup>superscripted</sup> text.</p>

</body>
</html>
```

This text is italic
This text is emphasized

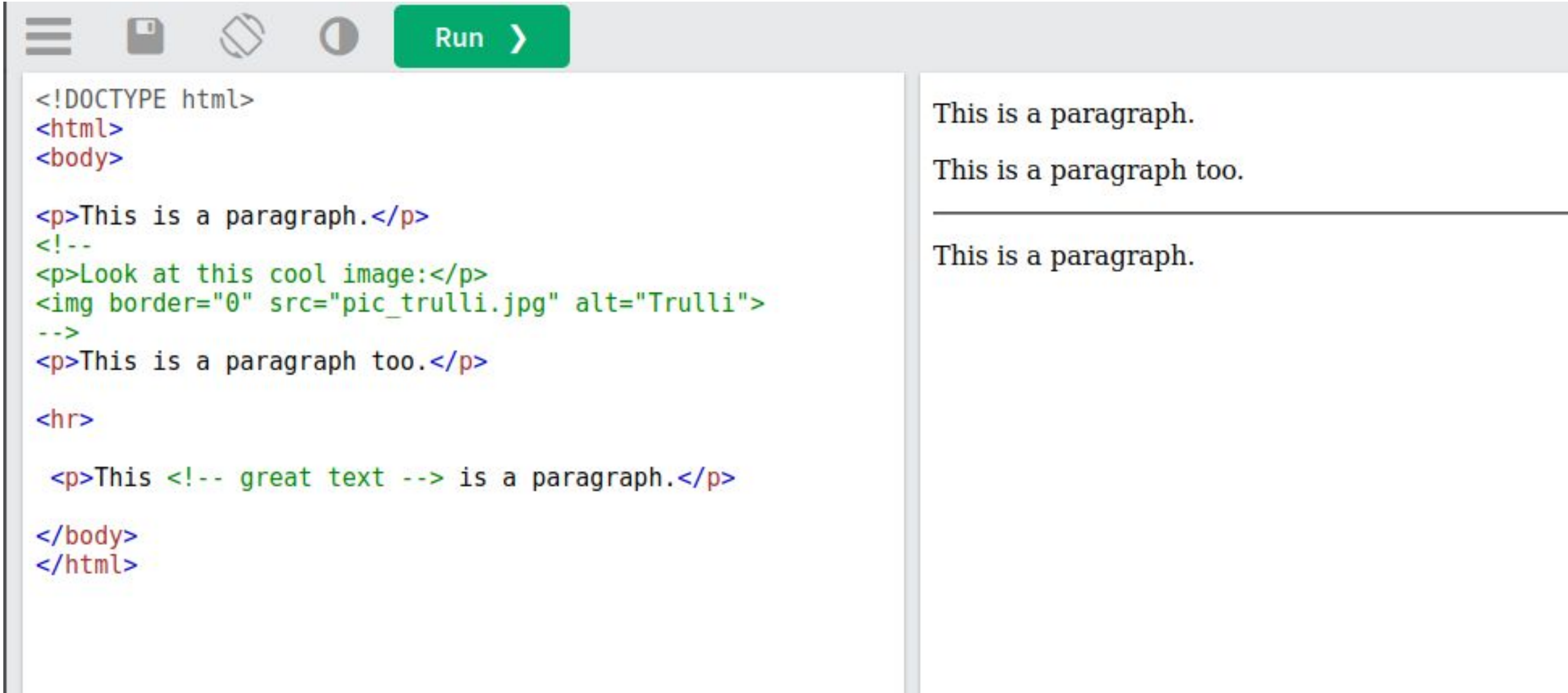
Do not forget to buy milk today.

My favorite color is ~~blue~~ red.

This is subscripted text.

This is superscripted text.

Comment



```
<!DOCTYPE html>
<html>
<body>

<p>This is a paragraph.</p>
<!--
<p>Look at this cool image:</p>
<img border="0" src="pic_trulli.jpg" alt="Trulli">
-->
<p>This is a paragraph too.</p>

<hr>

 <p>This <!-- great text --> is a paragraph.</p>

</body>
</html>
```

This is a paragraph.

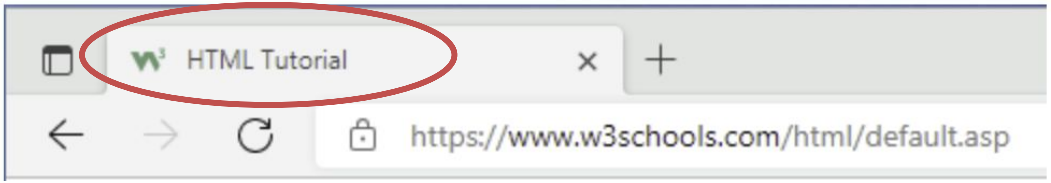
This is a paragraph too.

This is a paragraph.

Favicon

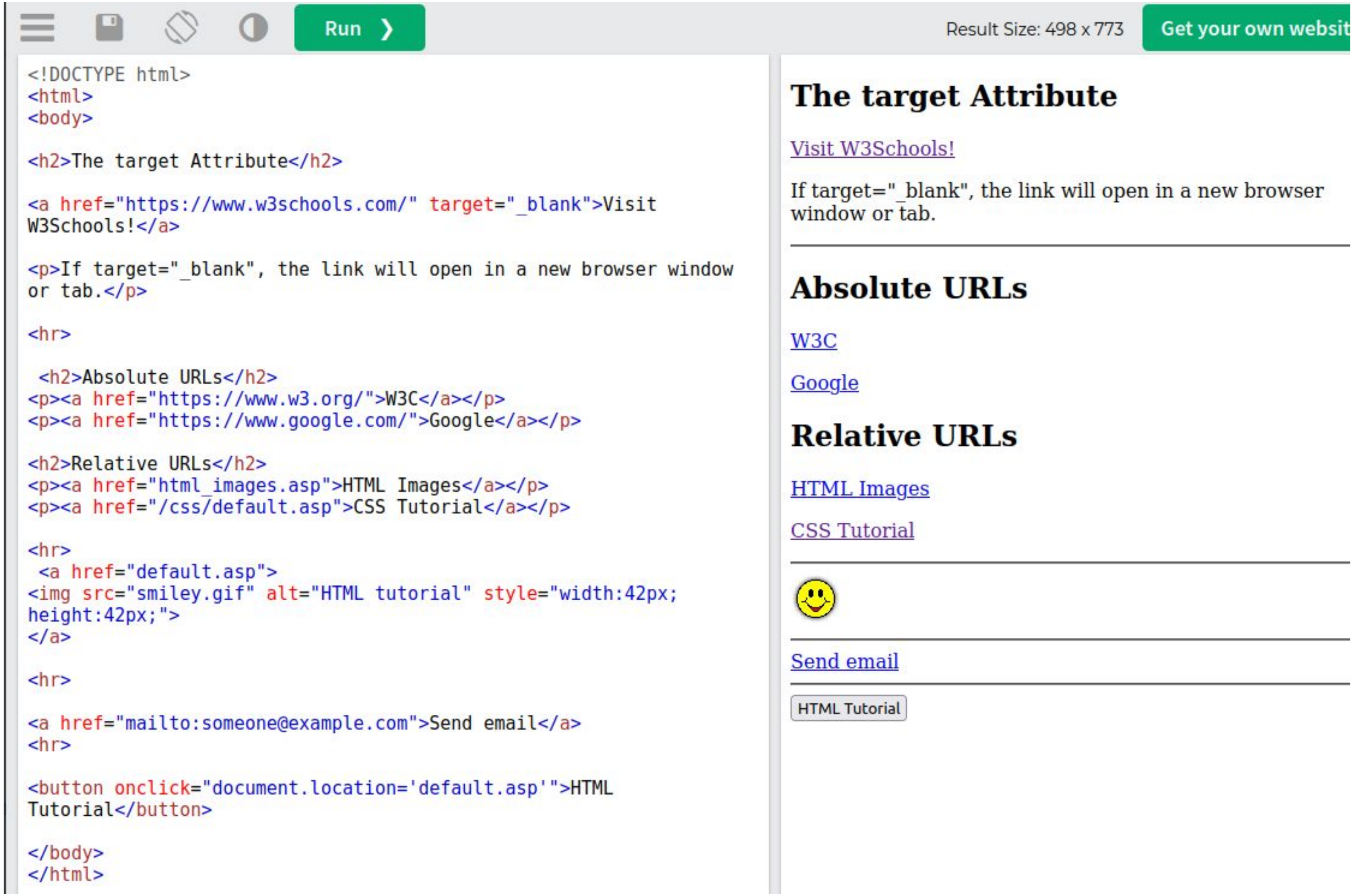
Example

```
<!DOCTYPE html>
<html>
<head>
  <title> HTML Tutorial </title>
  <link rel="icon" type="image/x-icon" href="/images/favicon.ico">
</head>
<body>

<h1>This is a Heading</h1>
<p>This is a paragraph.</p>

</body>
</html>
```



Links

- Use the <a> element to define a link
  a. Use the href attribute to define the link address
  b. Use the target attribute to define where to open the linked document
- Use the <img> element (inside <a>) to use an image as a link
- Use the mailto: scheme inside the href attribute to create a link that opens the user's email program



```
<!DOCTYPE html>
<html>
<body>

<h2>The target Attribute</h2>

<a href="https://www.w3schools.com/" target="_blank">Visit
W3Schools!</a>

<p>If target="_blank", the link will open in a new browser window
or tab.</p>

<hr>

 <h2>Absolute URLs</h2>
<p><a href="https://www.w3.org/">W3C</a></p>
<p><a href="https://www.google.com/">Google</a></p>

<h2>Relative URLs</h2>
<p><a href="html_images.asp">HTML Images</a></p>
<p><a href="/css/default.asp">CSS Tutorial</a></p>

<hr>
 <a href="default.asp">
<img src="smiley.gif" alt="HTML tutorial" style="width:42px;
height:42px;">
</a>

<hr>

<a href="mailto:someone@example.com">Send email</a>
<hr>

<button onclick="document.location='default.asp'">HTML
Tutorial</button>

</body>
</html>
```

The target Attribute

Visit W3Schools!

If target="_blank", the link will open in a new browser window or tab.

Absolute URLs

W3C

Google

Relative URLs

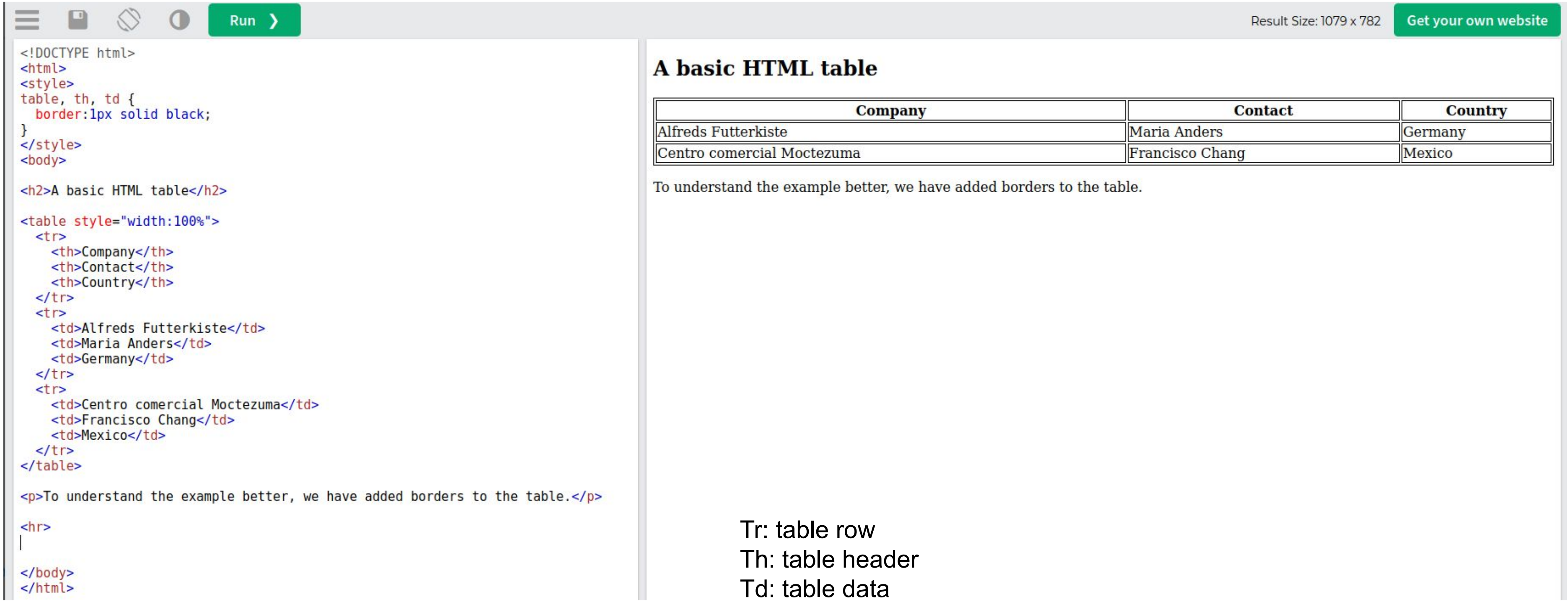
HTML Images

CSS Tutorial

Send email

HTML Tutorial

Tables



```
<!DOCTYPE html>
<html>
<style>
table, th, td {
  border:1px solid black;
}
</style>
<body>

<h2>A basic HTML table</h2>

<table style="width:100%">
  <tr>
    <th>Company</th>
    <th>Contact</th>
    <th>Country</th>
  </tr>
  <tr>
    <td>Alfreds Futterkiste</td>
    <td>Maria Anders</td>
    <td>Germany</td>
  </tr>
  <tr>
    <td>Centro comercial Moctezuma</td>
    <td>Francisco Chang</td>
    <td>Mexico</td>
  </tr>
</table>

<p>To understand the example better, we have added borders to the table.</p>

<hr>


</body>
</html>
```

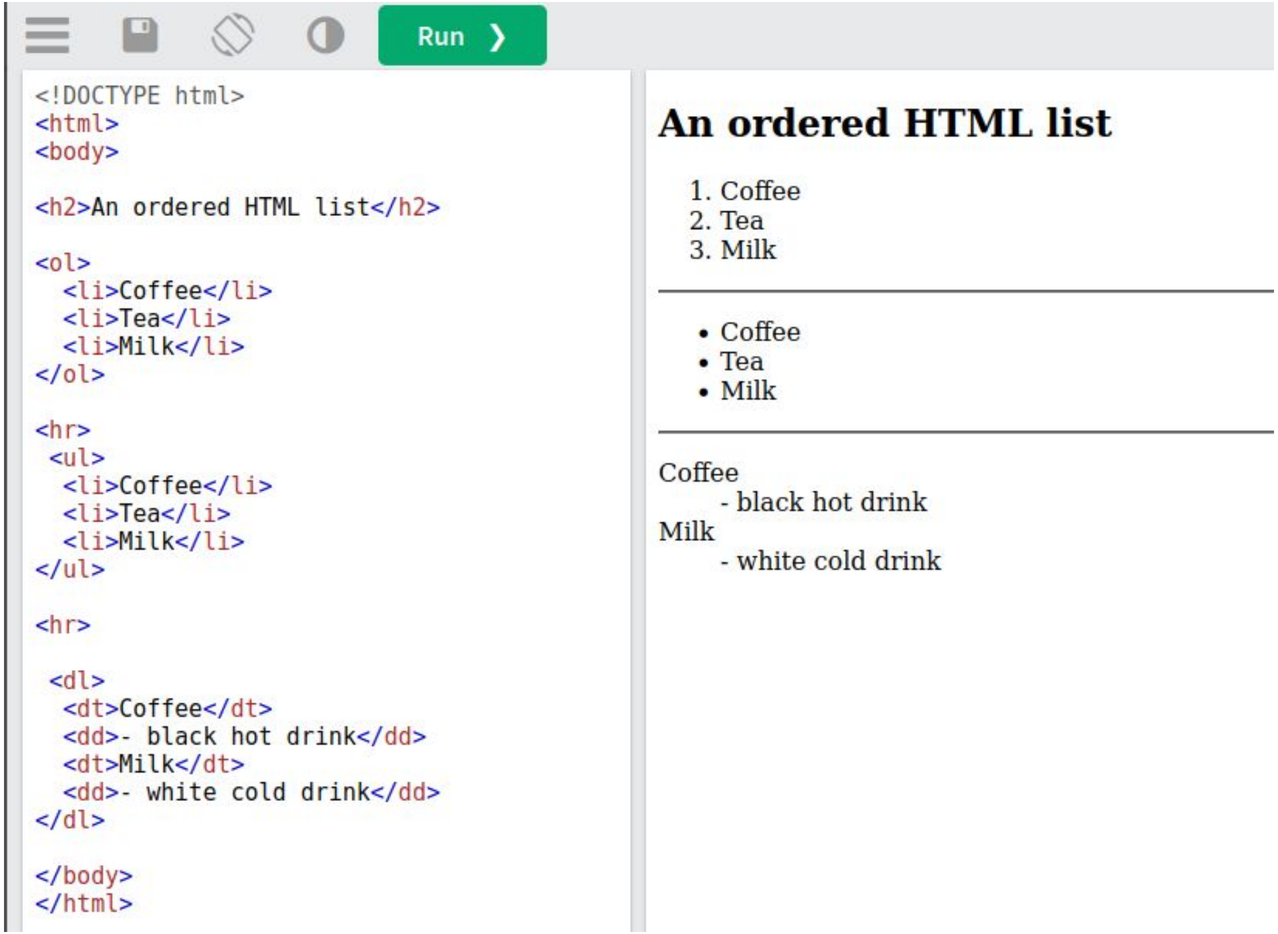
A basic HTML table

Company	Contact	Country
Alfreds Futterkiste	Maria Anders	Germany
Centro comercial Moctezuma	Francisco Chang	Mexico

To understand the example better, we have added borders to the table.

Tr: table row
Th: table header
Td: table data

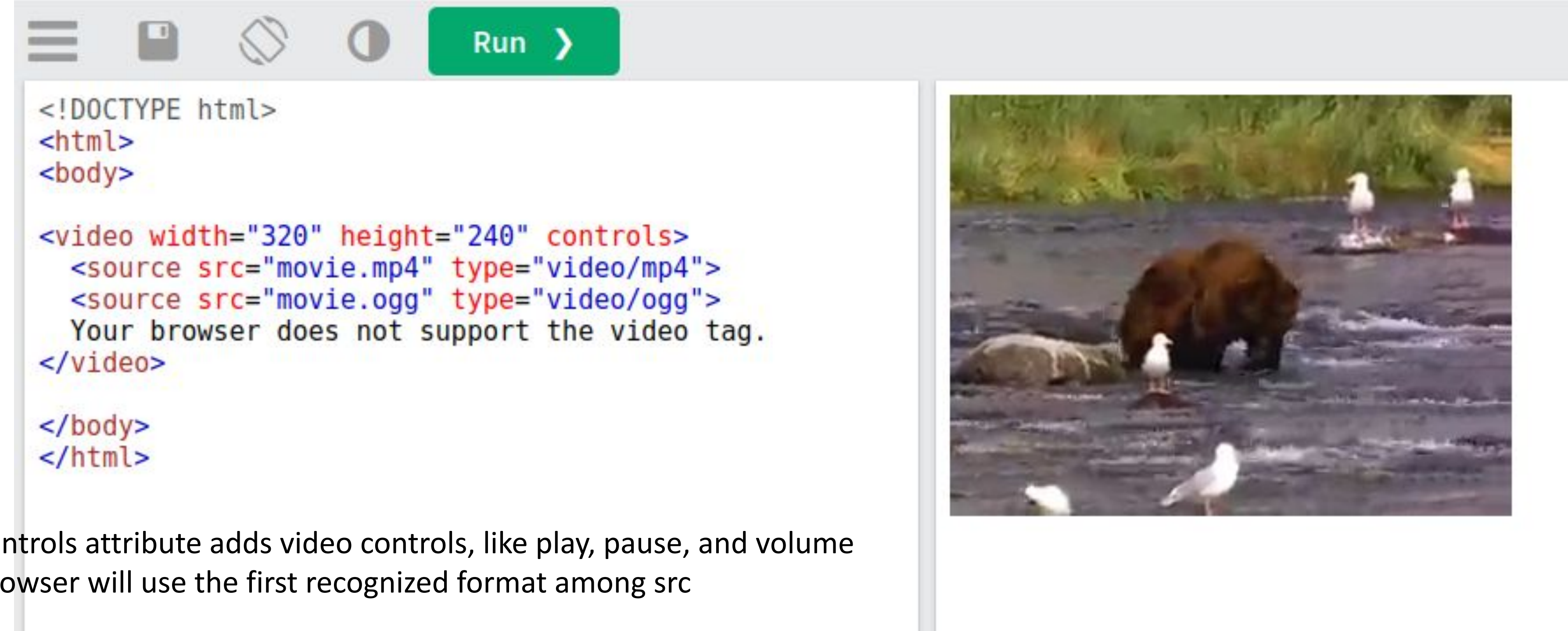
Lists



```
<!DOCTYPE html>
<html>
<body>

<h2>An ordered HTML list</h2>

<ol>
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ol>

<hr>
 <ul>
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ul>

<hr>

 <dl>
  <dt>Coffee</dt>
  <dd>- black hot drink</dd>
  <dt>Milk</dt>
  <dd>- white cold drink</dd>
</dl>

</body>
</html>
```

```
An ordered HTML list

  1. Coffee
  2. Tea
  3. Milk
________________________________

  • Coffee
  • Tea
  • Milk
________________________________

Coffee
    - black hot drink
Milk
    - white cold drink
```

HTML Video

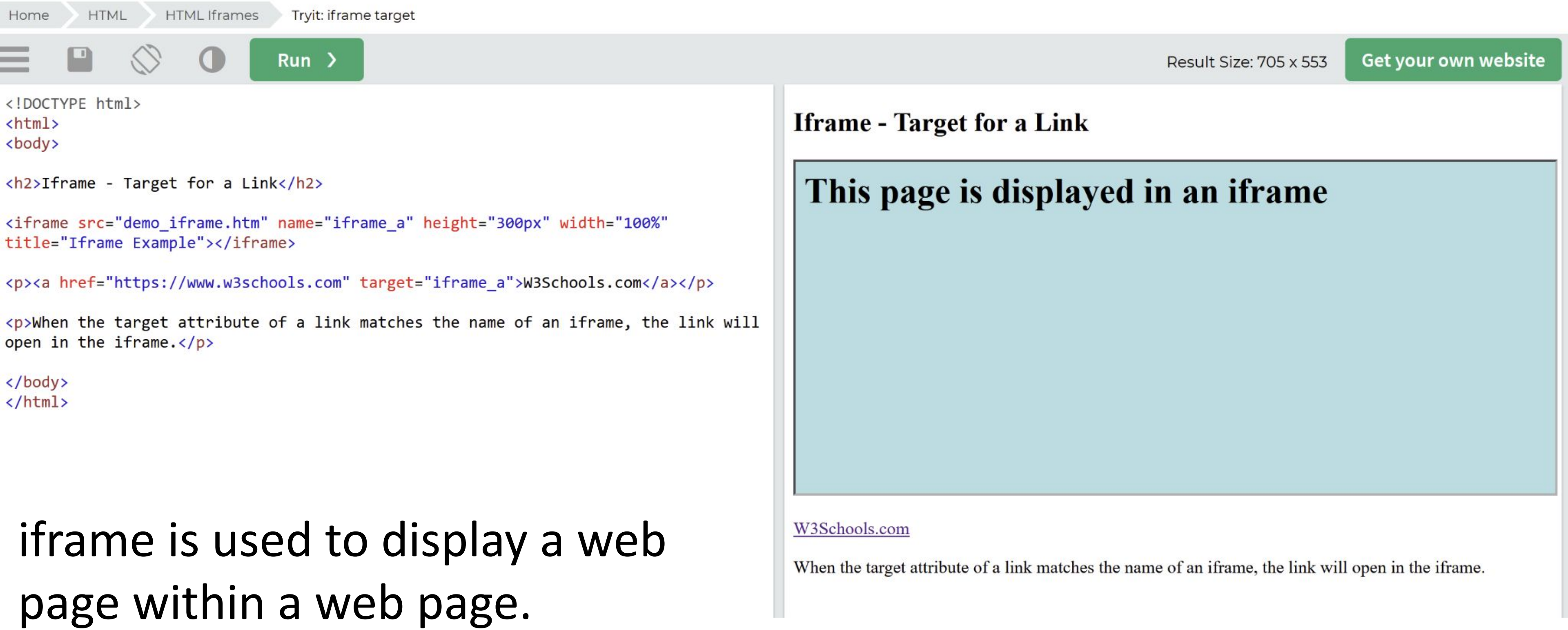


```
<!DOCTYPE html>
<html>
<body>

<video width="320" height="240" controls>
  <source src="movie.mp4" type="video/mp4">
  <source src="movie.ogg" type="video/ogg">
  Your browser does not support the video tag.
</video>

</body>
</html>
```

controls attribute adds video controls, like play, pause, and volume
Browser will use the first recognized format among src

The text between the <video> and </video> tags will only be displayed in browsers that do not support the <video> element.

iframe



```html
<!DOCTYPE html>
<html>
<body>

<h2>Iframe - Target for a Link</h2>

<iframe src="demo_iframe.htm" name="iframe_a" height="300px" width="100%"
title="Iframe Example"></iframe>

<p><a href="https://www.w3schools.com" target="iframe_a">W3Schools.com</a></p>

<p>When the target attribute of a link matches the name of an iframe, the link will
open in the iframe.</p>

</body>
</html>
```

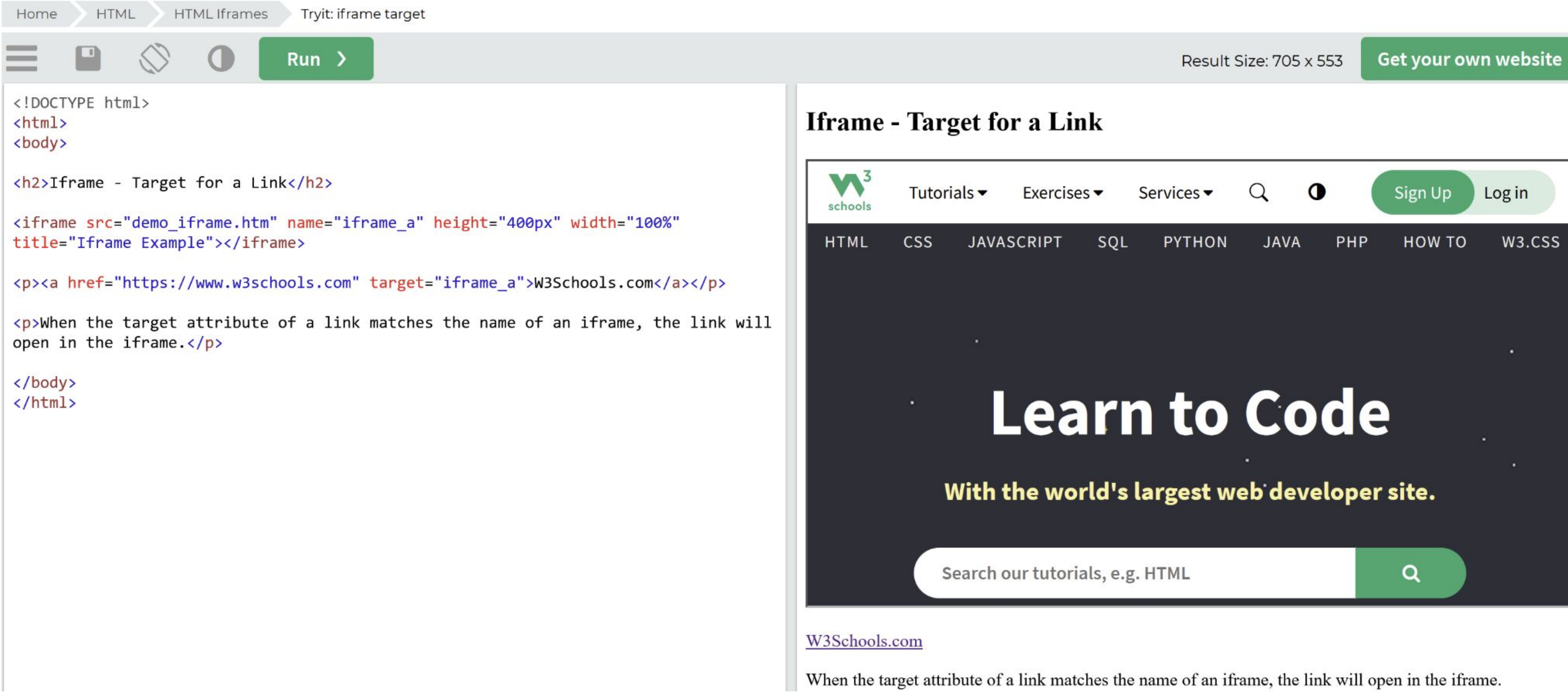
Iframe - Target for a Link

This page is displayed in an iframe

W3Schools.com

When the target attribute of a link matches the name of an iframe, the link will open in the iframe.

iframe is used to display a web page within a web page.



```
<!DOCTYPE html>
<html>
<body>

<h2>Iframe - Target for a Link</h2>

<iframe src="demo_iframe.htm" name="iframe_a" height="400px" width="100%"
title="Iframe Example"></iframe>

<p><a href="https://www.w3schools.com" target="iframe_a">W3Schools.com</a></p>

<p>When the target attribute of a link matches the name of an iframe, the link will
open in the iframe.</p>

</body>
</html>
```

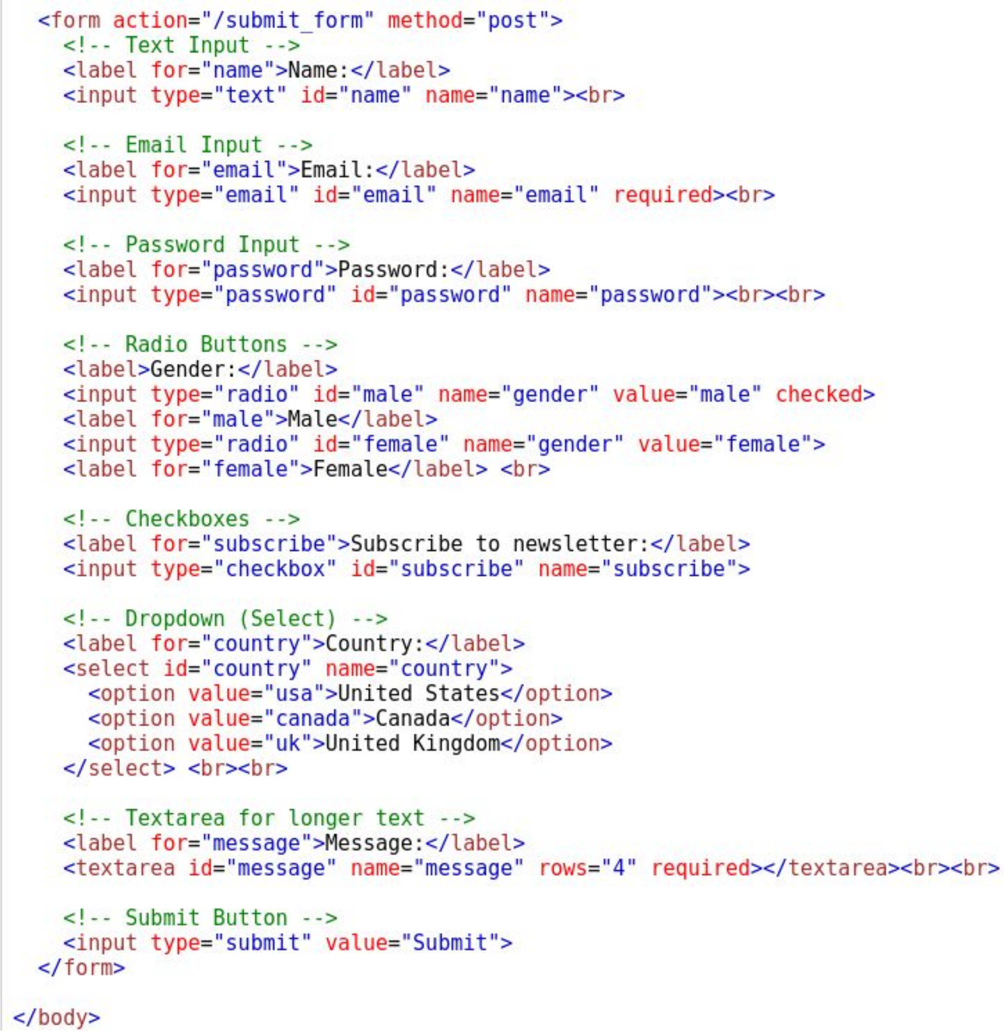
Iframe - Target for a Link

W3Schools.com

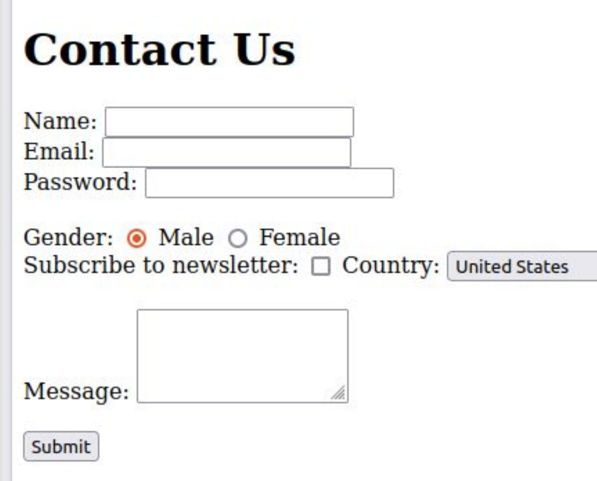
When the target attribute of a link matches the name of an iframe, the link will open in the iframe.

Forms

- HTML form is used to collect user input
- User input is sent to a server for later processing
- <form> element is used to create a HTML form
  - <input> element is the most used form element
    - Displayed in many ways, depending on the type attribute
  - <label> element is useful for screen-reader users
  - <select> defines a dropdown
  - <textarea> defines a multi-line input field (a text area)



```
  <form action="/submit_form" method="post">
    <!-- Text Input -->
    <label for="name">Name:</label>
    <input type="text" id="name" name="name"><br>

    <!-- Email Input -->
    <label for="email">Email:</label>
    <input type="email" id="email" name="email" required><br>

    <!-- Password Input -->
    <label for="password">Password:</label>
    <input type="password" id="password" name="password"><br><br>

    <!-- Radio Buttons -->
    <label>Gender:</label>
    <input type="radio" id="male" name="gender" value="male" checked>
    <label for="male">Male</label>
    <input type="radio" id="female" name="gender" value="female">
    <label for="female">Female</label> <br>

    <!-- Checkboxes -->
    <label for="subscribe">Subscribe to newsletter:</label>
    <input type="checkbox" id="subscribe" name="subscribe">

    <!-- Dropdown (Select) -->
    <label for="country">Country:</label>
    <select id="country" name="country">
      <option value="usa">United States</option>
      <option value="canada">Canada</option>
      <option value="uk">United Kingdom</option>
    </select> <br><br>

    <!-- Textarea for longer text -->
    <label for="message">Message:</label>
    <textarea id="message" name="message" rows="4" required></textarea><br><br>

    <!-- Submit Button -->
    <input type="submit" value="Submit">
  </form>

</body>
```



Contact Us

Name:
Email:
Password:

Gender: ● Male ○ Female
Subscribe to newsletter: □ Country: United States

Message:

- Id and for should match for binding label to input
- More on id later (primarily used for identification and styling
- name attribute is used by server-side script (e.g., PHP, Python, etc.) to identify and process the data

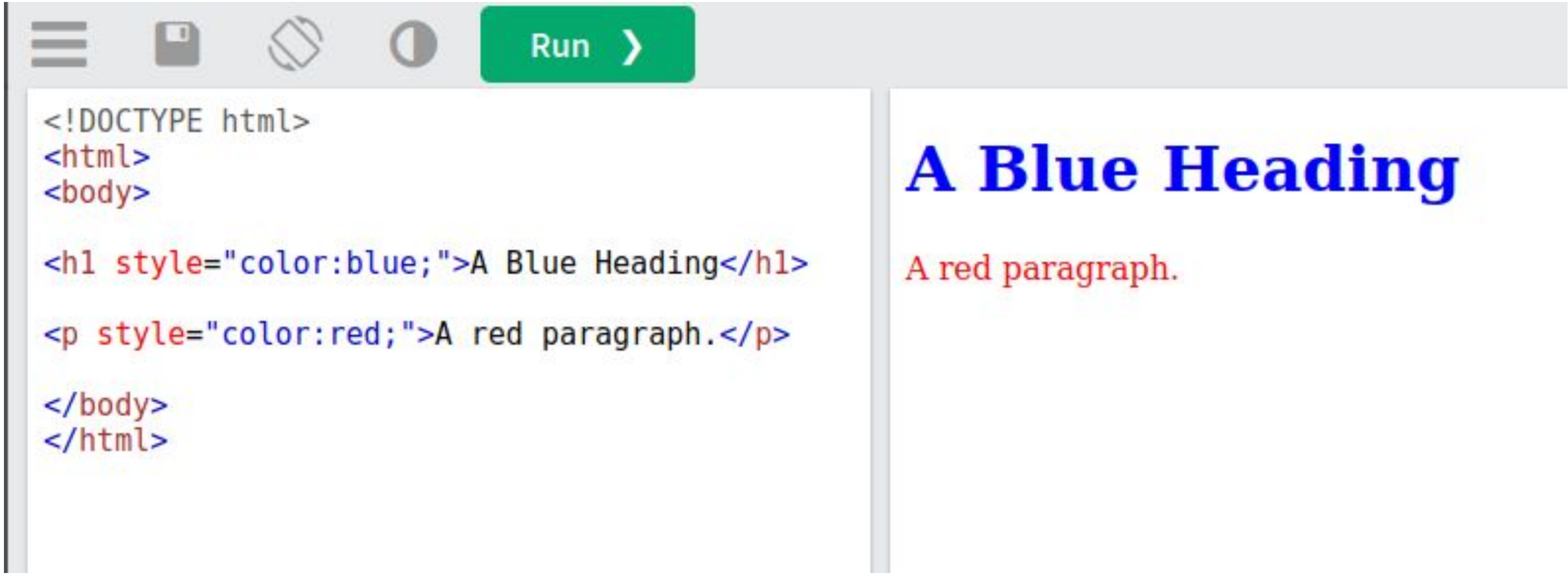
Cascading Style Sheets (CSS)

- HTML designed to define structure and semantics of a document, not so much presentation
  - Initially, developers used tags like <font>, <b>, and <i> to apply styles
  - Messy and hard-to-maintain code
    - Not easy to update/change visual design across pages without altering many files!
- Separate document content from presentation → led to development of CSS
  - Principle of separation of concerns

- Style sheet language used for describing the presentation of a document
  - Presentation: Layout, colors, fonts etc
    - spacing between elements, how elements are positioned and laid out
    - what background images or background colors are to be used
  - Can also help create animations, responsive web designs
    - Responsive: adapt to different screen sizes and devices
- Saves effort, can control the layout of multiple web pages all at once

- CSS can be added to HTML documents in 3 ways:
  - Inline - by using the style attribute inside HTML elements
  - Internal - by using a <style> element in the <head> section
  - External - by using a <link> element to link to an external CSS file (most common)

Inline

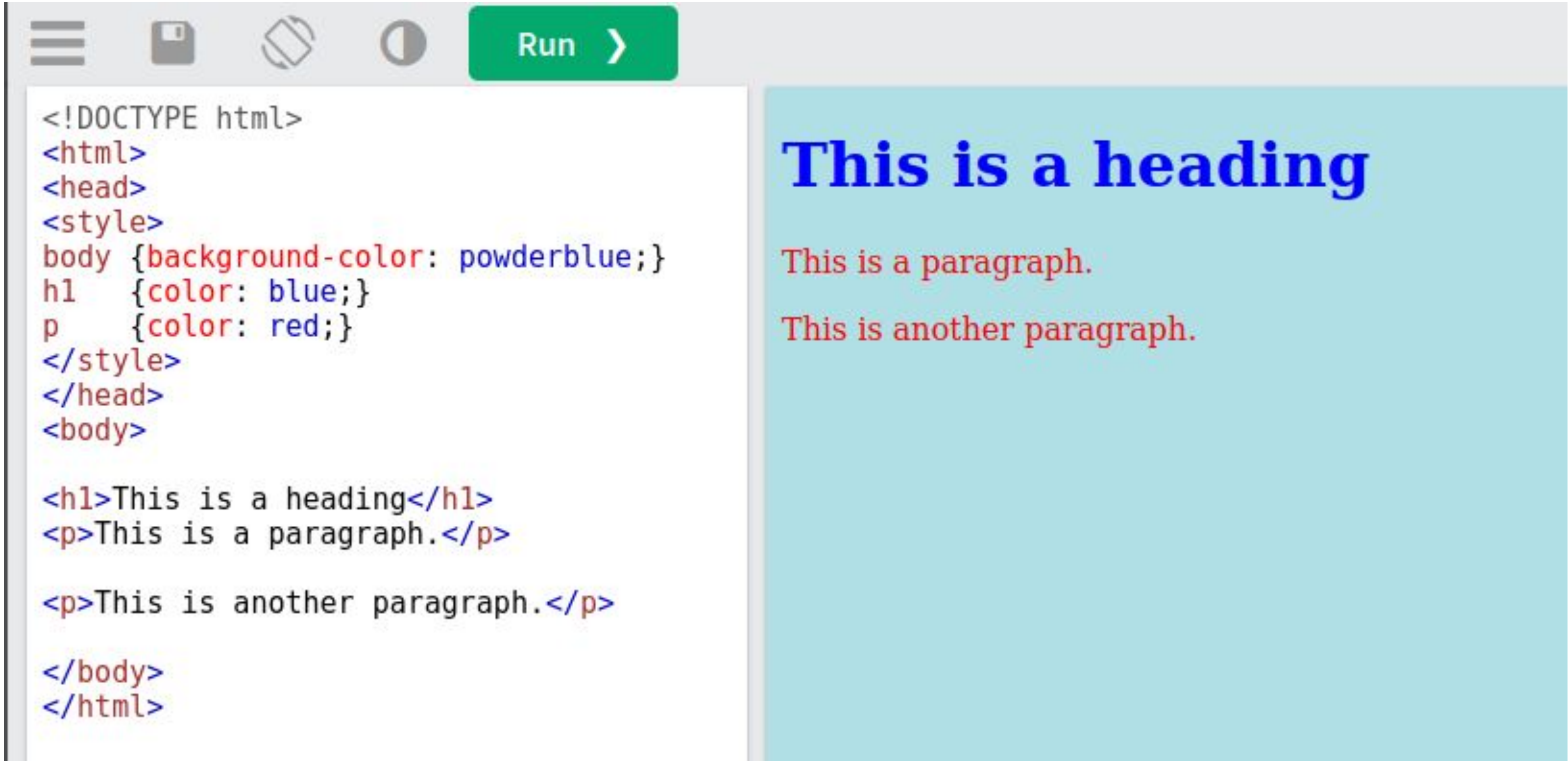


```
<!DOCTYPE html>
<html>
<body>

<h1 style="color:blue;">A Blue Heading</h1>

<p style="color:red;">A red paragraph.</p>

</body>
</html>
```

A Blue Heading

A red paragraph.

Internal



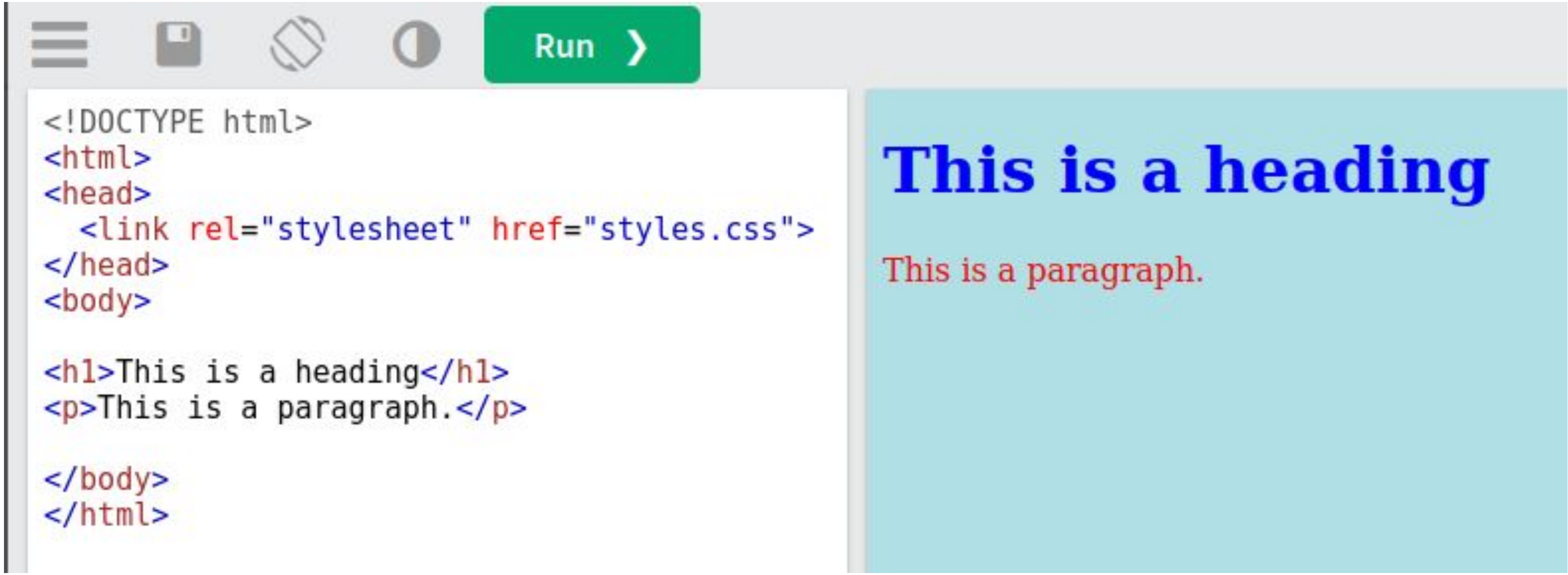
```
<!DOCTYPE html>
<html>
<head>
<style>
body {background-color: powderblue;}
h1   {color: blue;}
p    {color: red;}
</style>
</head>
<body>

<h1>This is a heading</h1>
<p>This is a paragraph.</p>

<p>This is another paragraph.</p>

</body>
</html>
```

This is a heading

This is a paragraph.

This is another paragraph.

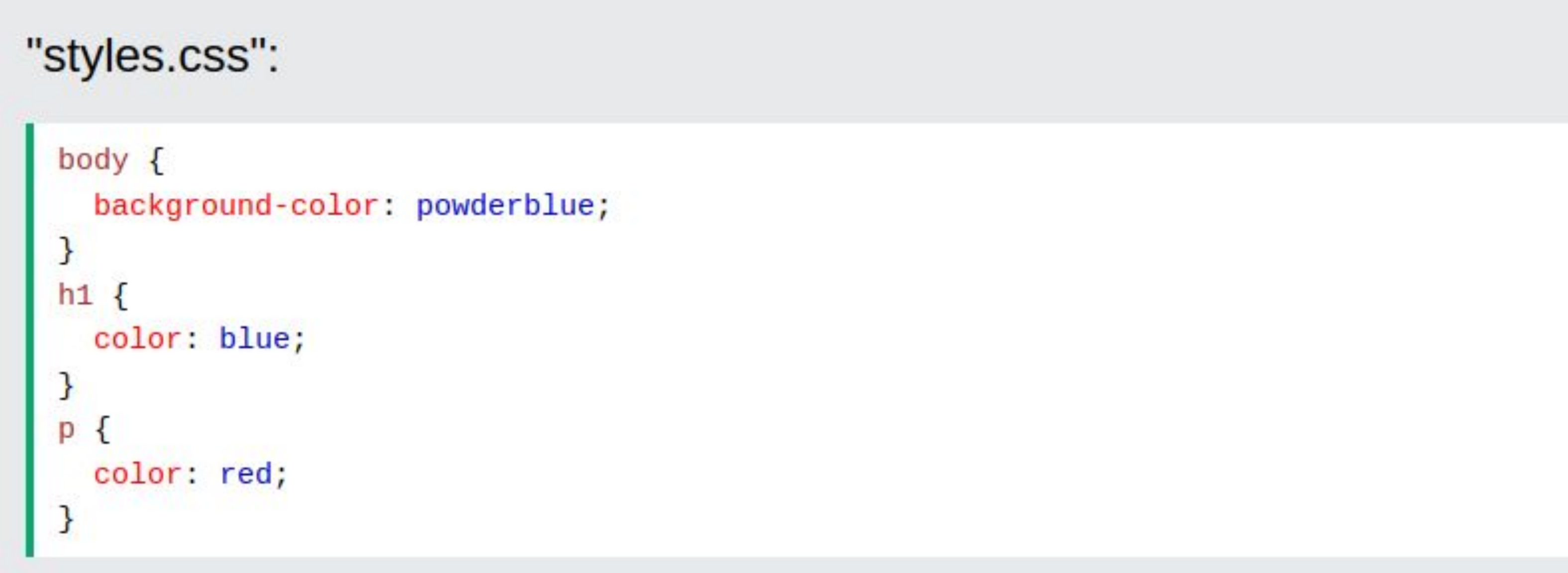
External



```
<!DOCTYPE html>
<html>
<head>
  <link rel="stylesheet" href="styles.css">
</head>
<body>

<h1>This is a heading</h1>
<p>This is a paragraph.</p>

</body>
</html>
```

This is a heading

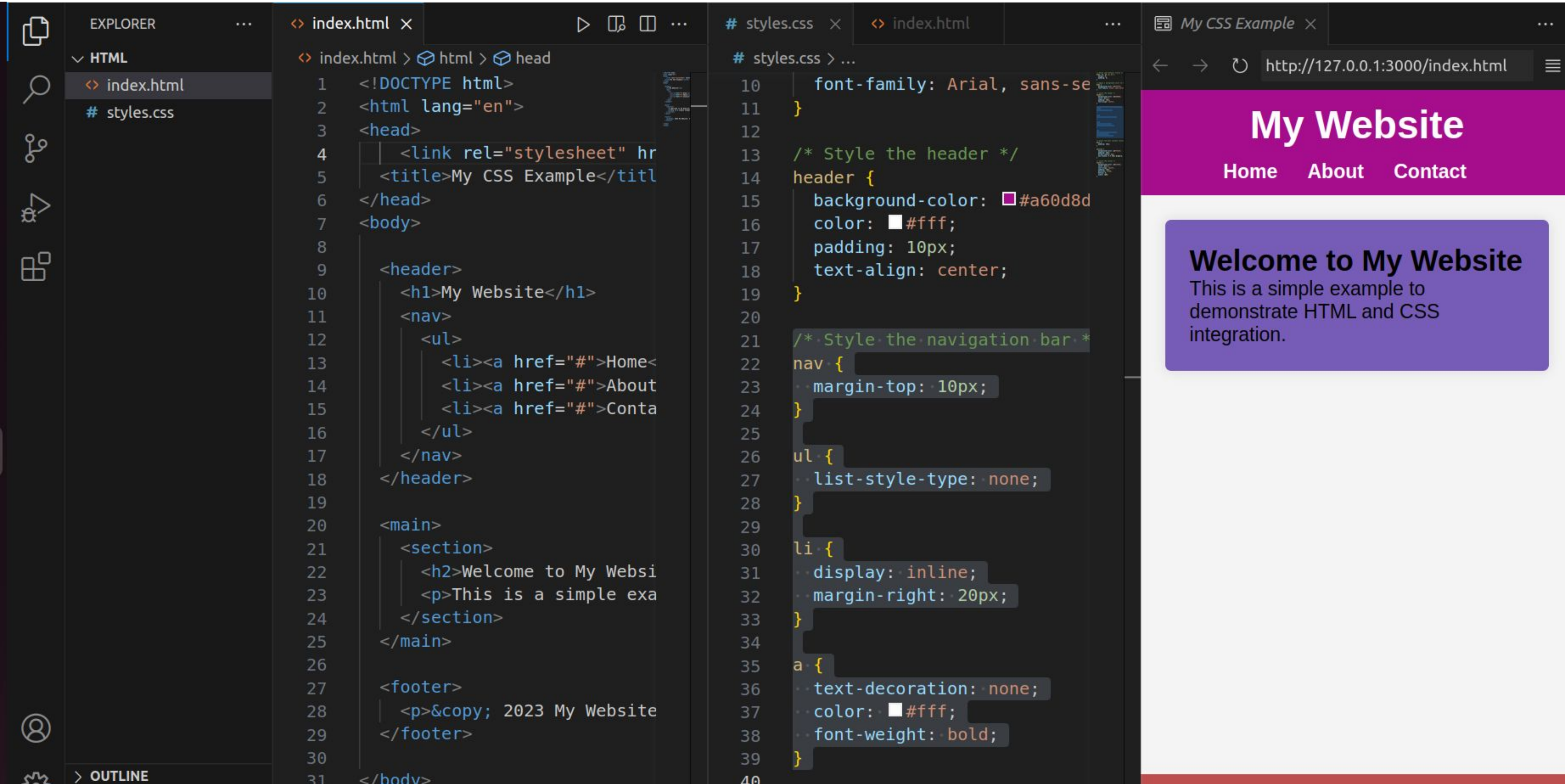
This is a paragraph.



"styles.css":

```
body {
  background-color: powderblue;
}
h1 {
  color: blue;
}
p {
  color: red;
}
```

More Complex Example



```html
<!DOCTYPE html>
<html lang="en">
<head>
    <link rel="stylesheet" hr
    <title>My CSS Example</titl
</head>
<body>

    <header>
        <h1>My Website</h1>
        <nav>
            <ul>
                <li><a href="#">Home<
                <li><a href="#">About
                <li><a href="#">Conta
            </ul>
        </nav>
    </header>

    <main>
        <section>
            <h2>Welcome to My Websi
            <p>This is a simple exa
        </section>
    </main>

    <footer>
        <p>&copy; 2023 My Website
    </footer>

</body>
```

```css
    font-family: Arial, sans-se
}

/* Style the header */
header {
    background-color: #a60d8d
    color: #fff;
    padding: 10px;
    text-align: center;
}

/* Style the navigation bar *
nav {
    margin-top: 10px;
}

ul {
    list-style-type: none;
}

li {
    display: inline;
    margin-right: 20px;
}

a {
    text-decoration: none;
    color: #fff;
    font-weight: bold;
}
```

http://127.0.0.1:3000/index.html

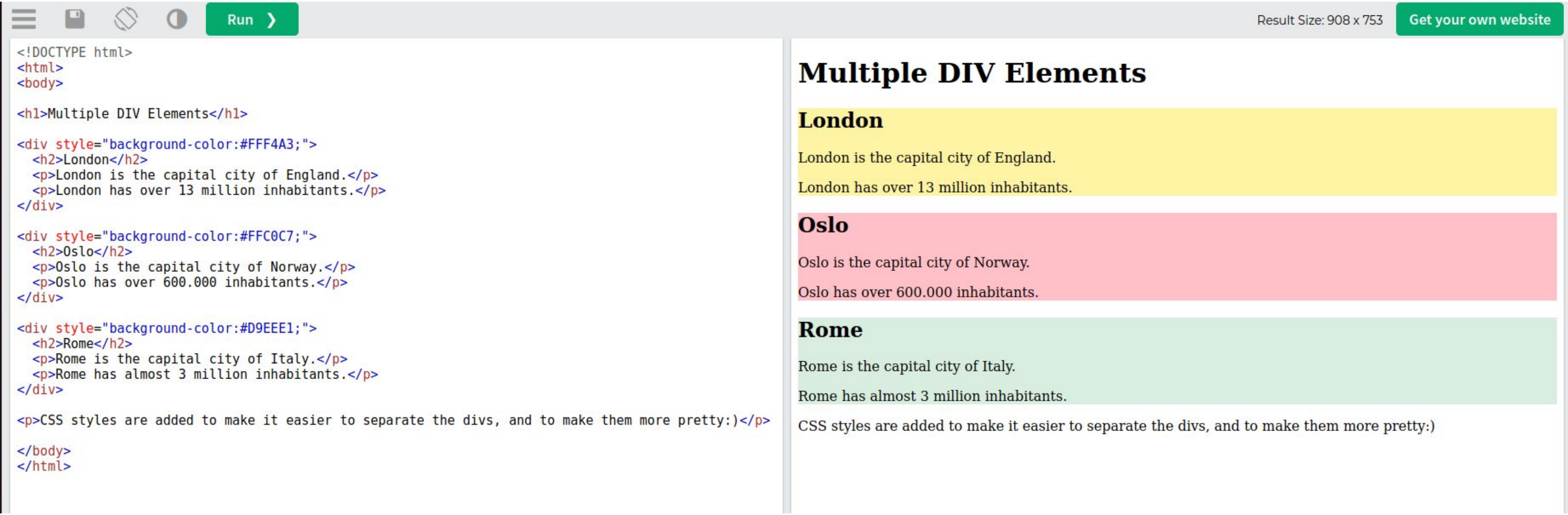
My Website

Home About Contact

Welcome to My Website

This is a simple example to demonstrate HTML and CSS integration.

Div



```html
<!DOCTYPE html>
<html>
<body>

<h1>Multiple DIV Elements</h1>

<div style="background-color:#FFF4A3;">
  <h2>London</h2>
  <p>London is the capital city of England.</p>
  <p>London has over 13 million inhabitants.</p>
</div>

<div style="background-color:#FFC0C7;">
  <h2>Oslo</h2>
  <p>Oslo is the capital city of Norway.</p>
  <p>Oslo has over 600.000 inhabitants.</p>
</div>

<div style="background-color:#D9EEE1;">
  <h2>Rome</h2>
  <p>Rome is the capital city of Italy.</p>
  <p>Rome has almost 3 million inhabitants.</p>
</div>

<p>CSS styles are added to make it easier to separate the divs, and to make them more pretty:)</p>

</body>
</html>
```

Multiple DIV Elements

London

London is the capital city of England.

London has over 13 million inhabitants.

Oslo

Oslo is the capital city of Norway.

Oslo has over 600.000 inhabitants.

Rome

Rome is the capital city of Italy.

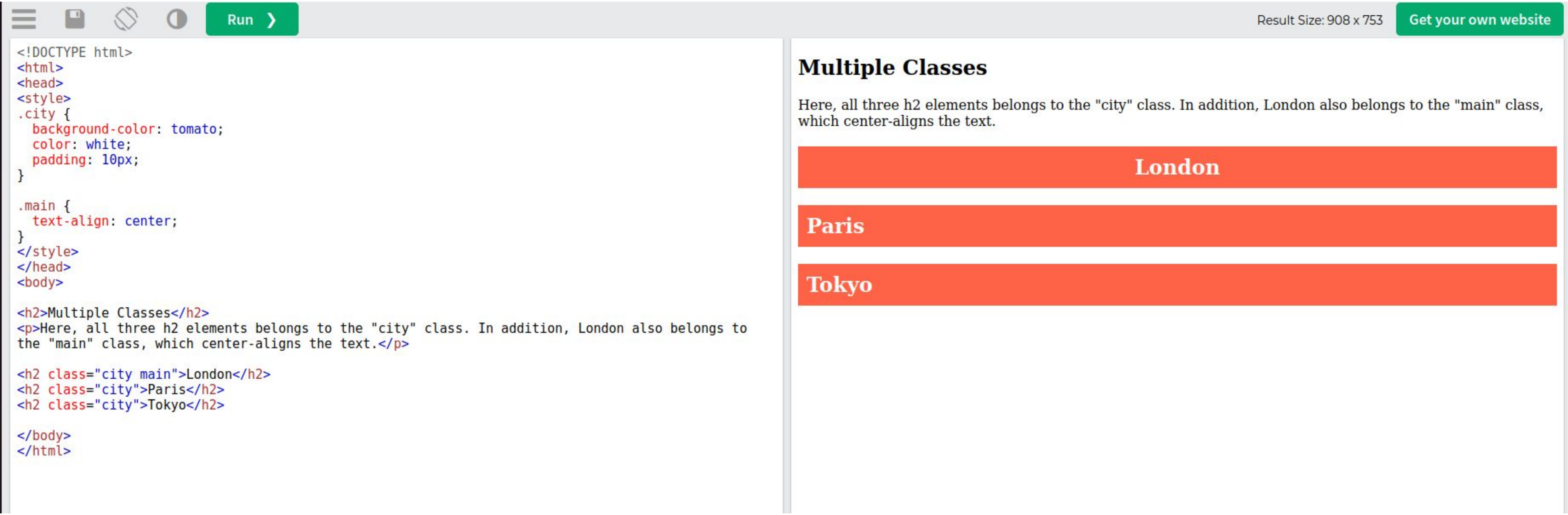
Rome has almost 3 million inhabitants.

CSS styles are added to make it easier to separate the divs, and to make them more pretty:)

- <div> stands for "division", HTML **ELEMENT**
- generic container used to group and structure content on a webpage
- No semantic meaning but serves as a way to organize and apply styles to related elements via CSS

Classes

- class is an attribute to assign a specific class or classes to one or more elements
- Used for styling or scripting purposes
    - Can apply the same styles or behavior to multiple elements



```
<!DOCTYPE html>
<html>
<head>
<style>
.city {
  background-color: tomato;
  color: white;
  padding: 10px;
}

.main {
  text-align: center;
}
</style>
</head>
<body>

<h2>Multiple Classes</h2>
<p>Here, all three h2 elements belongs to the "city" class. In addition, London also belongs to
the "main" class, which center-aligns the text.</p>

<h2 class="city main">London</h2>
<h2 class="city">Paris</h2>
<h2 class="city">Tokyo</h2>

</body>
</html>
```

Multiple Classes

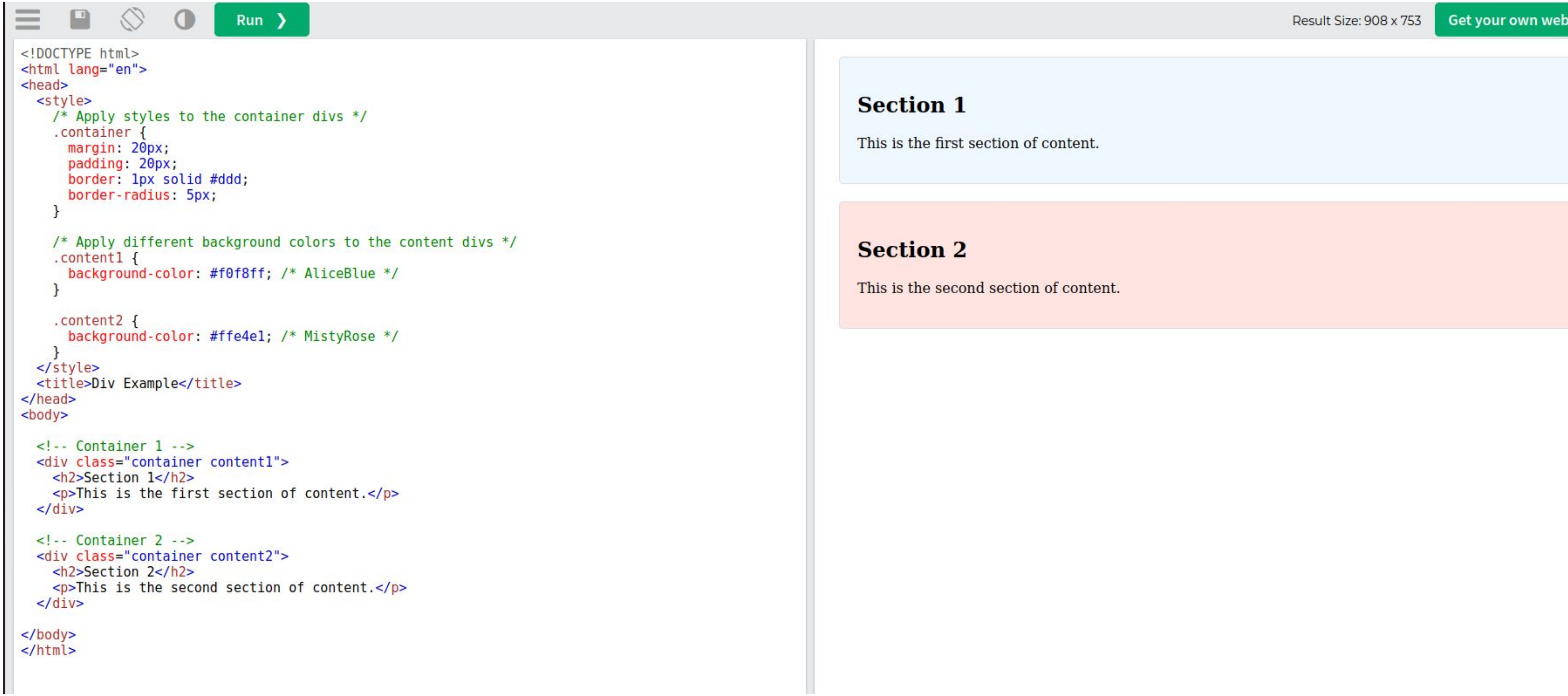
Here, all three h2 elements belongs to the "city" class. In addition, London also belongs to the "main" class, which center-aligns the text.

London

Paris

Tokyo

Div+Class



```
<!DOCTYPE html>
<html lang="en">
<head>
  <style>
    /* Apply styles to the container divs */
    .container {
      margin: 20px;
      padding: 20px;
      border: 1px solid #ddd;
      border-radius: 5px;
    }

    /* Apply different background colors to the content divs */
    .content1 {
      background-color: #f0f8ff; /* AliceBlue */
    }

    .content2 {
      background-color: #ffe4e1; /* MistyRose */
    }
  </style>
  <title>Div Example</title>
</head>
<body>

  <!-- Container 1 -->
  <div class="container content1">
    <h2>Section 1</h2>
    <p>This is the first section of content.</p>
  </div>

  <!-- Container 2 -->
  <div class="container content2">
    <h2>Section 2</h2>
    <p>This is the second section of content.</p>
  </div>

</body>
</html>
```

Section 1

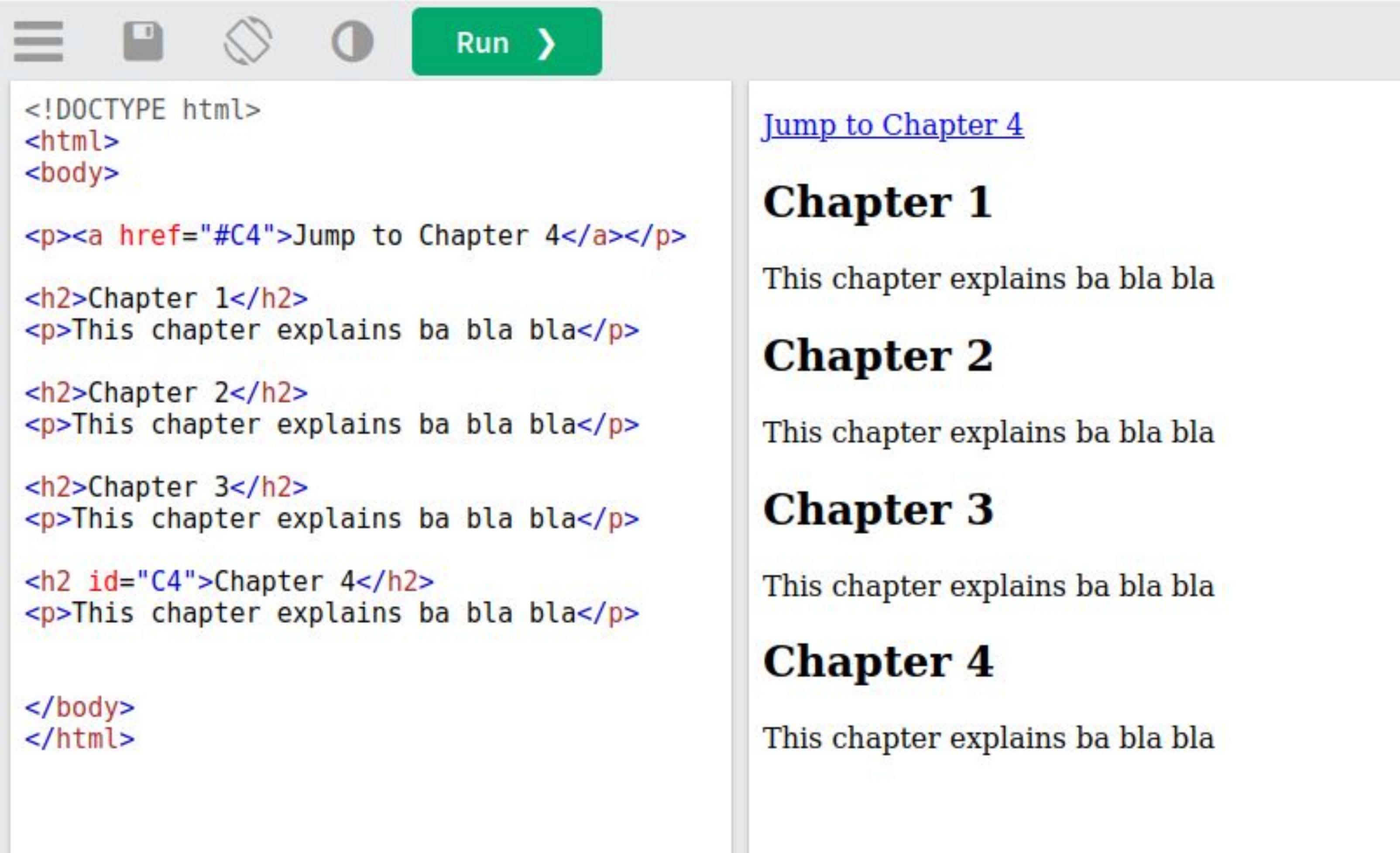
This is the first section of content.

Section 2

This is the second section of content.

id

- id attribute is used to identify a specific element
  - id attribute must be unique within a single HTML document
  - Note class attribute can be applied to multiple elements, and multiple elements can share the same class!
- id attribute is used by CSS and JavaScript to style/select a specific element
  - Use hash character (#), followed by an id name; then, define the CSS properties within curly braces {}
- The value of the id attribute is case sensitive



```
<!DOCTYPE html>
<html>
<body>

<p><a href="#C4">Jump to Chapter 4</a></p>

<h2>Chapter 1</h2>
<p>This chapter explains ba bla bla</p>

<h2>Chapter 2</h2>
<p>This chapter explains ba bla bla</p>

<h2>Chapter 3</h2>
<p>This chapter explains ba bla bla</p>

<h2 id="C4">Chapter 4</h2>
<p>This chapter explains ba bla bla</p>


</body>
</html>
```

Jump to Chapter 4

Chapter 1

This chapter explains ba bla bla

Chapter 2

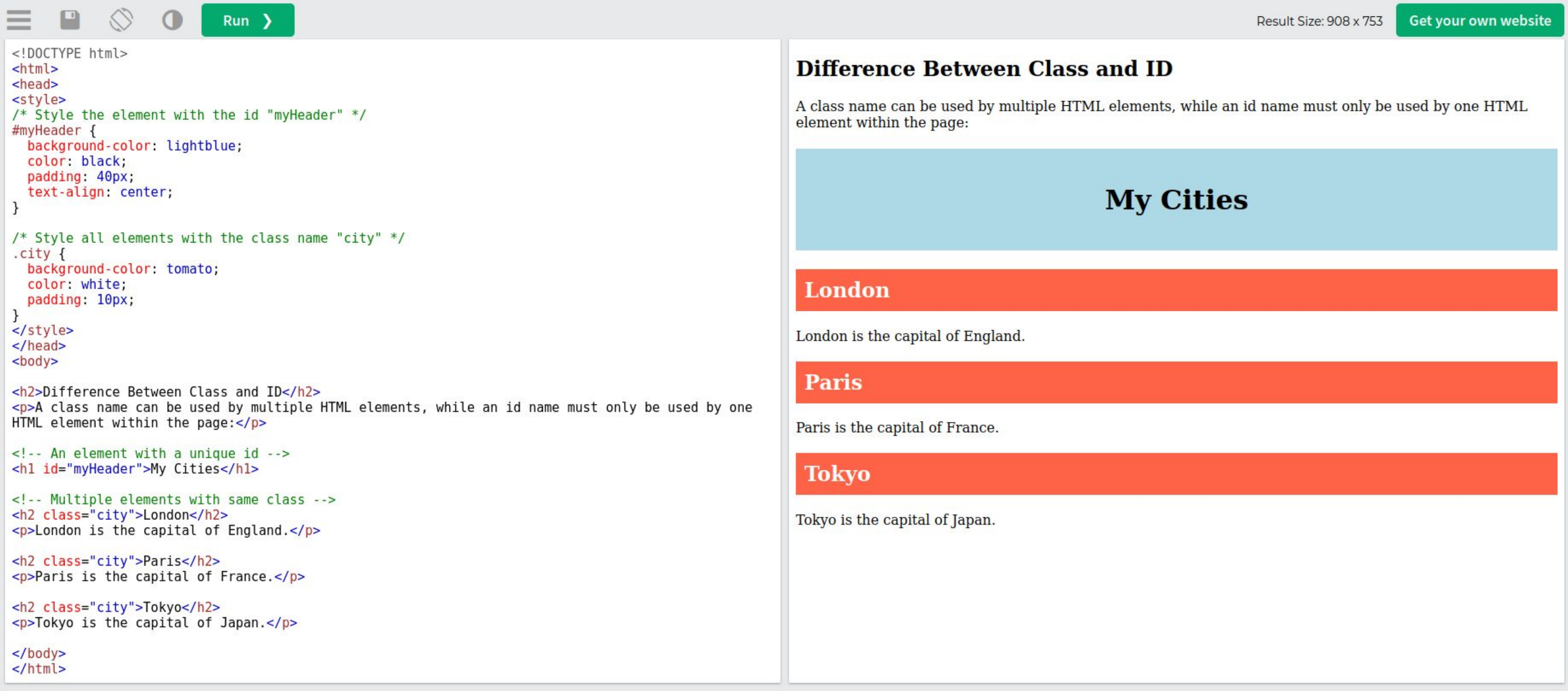
This chapter explains ba bla bla

Chapter 3

This chapter explains ba bla bla

Chapter 4

This chapter explains ba bla bla



```
<!DOCTYPE html>
<html>
<head>
<style>
/* Style the element with the id "myHeader" */
#myHeader {
  background-color: lightblue;
  color: black;
  padding: 40px;
  text-align: center;
}

/* Style all elements with the class name "city" */
.city {
  background-color: tomato;
  color: white;
  padding: 10px;
}
</style>
</head>
<body>

<h2>Difference Between Class and ID</h2>
<p>A class name can be used by multiple HTML elements, while an id name must only be used by one
HTML element within the page:</p>

<!-- An element with a unique id -->
<h1 id="myHeader">My Cities</h1>

<!-- Multiple elements with same class -->
<h2 class="city">London</h2>
<p>London is the capital of England.</p>

<h2 class="city">Paris</h2>
<p>Paris is the capital of France.</p>

<h2 class="city">Tokyo</h2>
<p>Tokyo is the capital of Japan.</p>

</body>
</html>
```

Difference Between Class and ID

A class name can be used by multiple HTML elements, while an id name must only be used by one HTML element within the page:

My Cities

London

London is the capital of England.

Paris

Paris is the capital of France.

Tokyo

Tokyo is the capital of Japan.

References

Core Reference: https://www.w3schools.com/html/default.asp

- CSS in depth: https://www.w3schools.com/css/default.asp