

HYPERTEXT MARK-UP LANGUAGE



Head, Body, And Containers

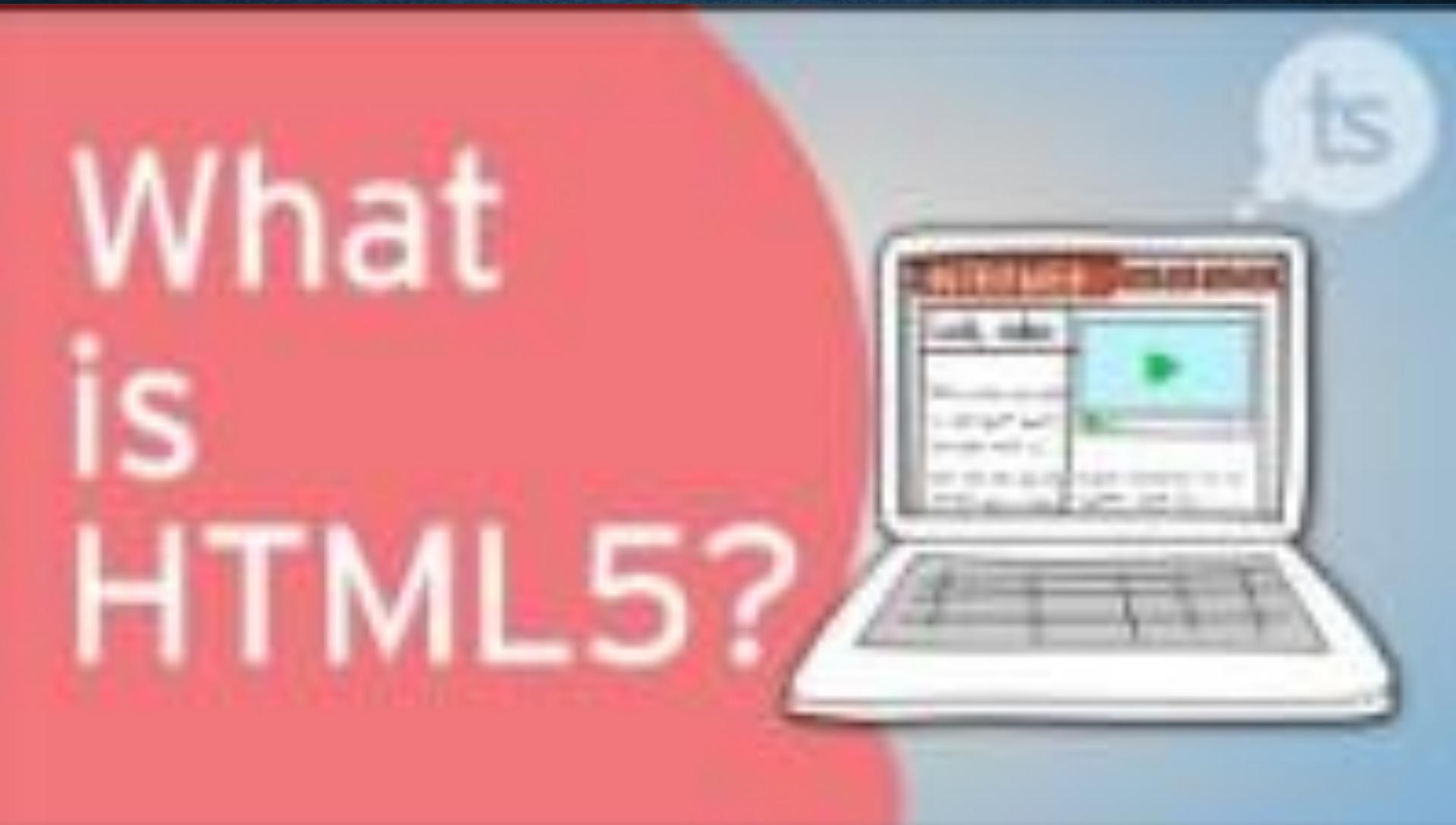
COS216

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VIDEO



<https://www.youtube.com/watch?v=mzPxo7Y6JyA>

HTML - OVERVIEW

- Hypertext Markup Language (HTML)
- Markup language for websites and web applications
 - Some mobile apps also use HTML
- Created in 1991 - 1993 by Tim Berners-Lee at CERN
- Current version: 5.2 (many changes from 2.0/3.0/4.0 to 5.0)
- File extension: .html or .htm
- Mime type: text/html

HTML



HTML - OVERVIEW

- HTML only marks-up and structures data (with some styling)
 - Calculations, behavior, events, and functions are provided in JavaScript (JS)
 - Advanced styling is done in Cascading Style Sheets (CSS)
- Syntax almost identical to XML
 - Has a different declaration
 - Has specific tag names
- Extended from SGML
- Extended to XHTML

```
<!DOCTYPE html>
<html>
<!-- created 2010-01-01 -->
<head>
<title>sample</title>
</head>
<body>
<p>Voluptatem accusantium  
totam rem aperiam.</p>
</body>
</html>
```

HTML

HTML - HISTORY

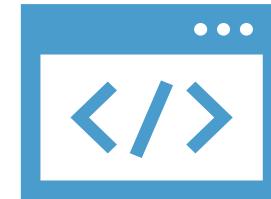
Year	Version
1991	Tim Berners-Lee invented HTML
1995	HTML Working Group defined HTML 2.0
1997	W3C Recommendation: HTML 3.2
1999	W3C Recommendation: HTML 4.01
2000	W3C Recommendation: XHTML 1.0
2014	W3C Recommendation: HTML 5.0
2016	W3C Candidate Recommendation: HTML 5.1

HTML - OVERVIEW



HTML is delivered via

- HTTP
- Emails
- Any other available means

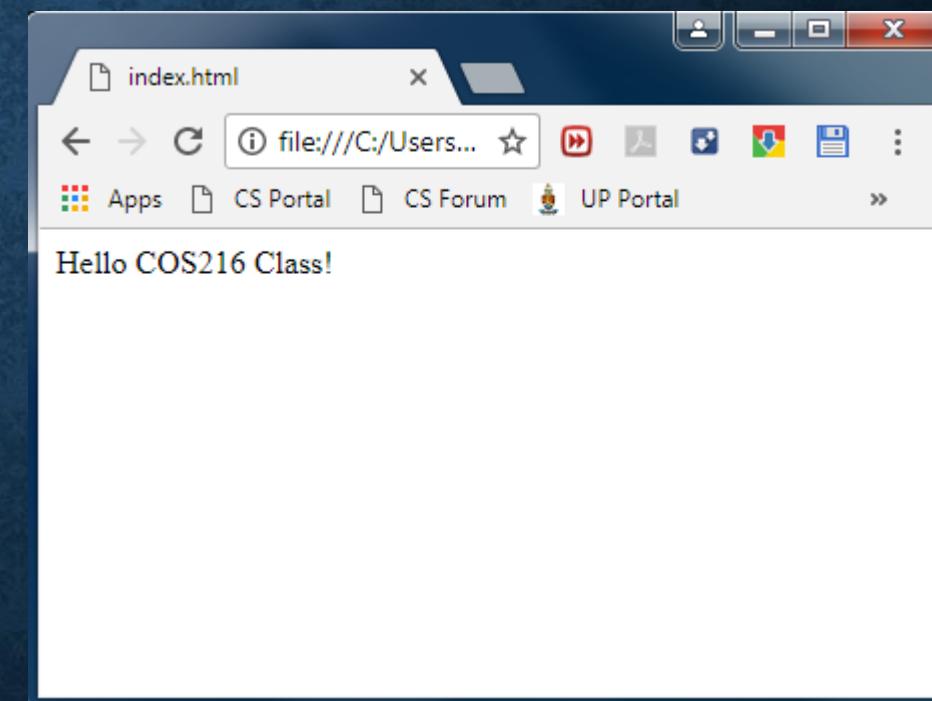


HTML is simple text

- Interpreted and rendered by the browser
- Different browsers might interpret the same thing differently
- Standards maintained by W3C

HTML - EXAMPLE

```
<!DOCTYPE html>
<html>
  <body>
    Hello COS216 Class!
  </body>
</html>
```

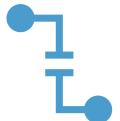


HTML - SYNTAX



HTML is case insensitive

Tag names can be upper or lower case



HTML ignores whitespaces

Elements can be all on one line or separated by newlines, tabs, and spaces



Browsers can handle some mistakes

Some browsers might add a closing tag if you forgot it
Do not rely on browsers to do this
Always validate your document before publishing



Attributes can be enclosed in single or double quotes

HTML - DECLARATION

- Document Type Declaration (DOCTYPE)
- Used by browsers to determine how to render a document
 - Also specifies the standard, encoding, and version
- Most browsers are able to correctly render without a declaration
 - Very important to add it for Internet Explorer and Edge, otherwise the page is a mess
 - Even if not needed, it should always be added
- Must be placed at start of document

HTML - DECLARATION

- For HTML 5:

```
<!DOCTYPE html>
```

- For older HTML versions the DTD has to be specified:

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"  
      "http://www.w3.org/TR/html4/loose.dtd">
```

HTML - COMMENTS

- Comments can be added which are ignored by the browser/parser
 - Opening tag: `<!--`
 - Closing tag: `-->`
 - Example: `<!-- This is my random comment -->`

HTML - ROOT

- HTML documents can only have a single root element
 - Must be present
-
- Opening tag: <`html`>
 - Closing tag: </`html`>
 - Example: <`html`> ... </`html`>

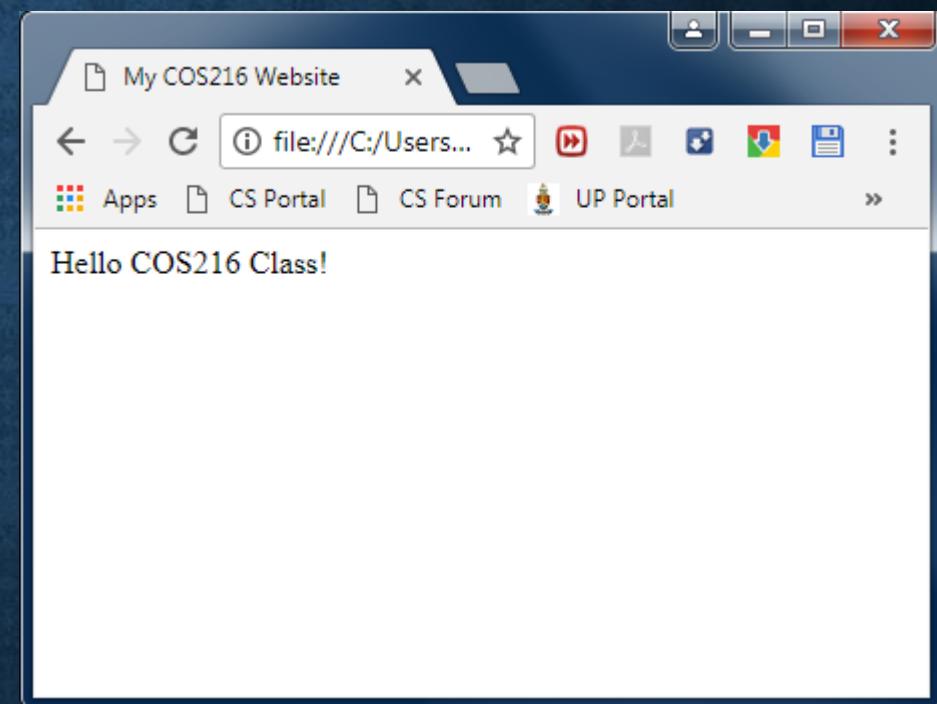
HTML - HEAD AND BODY

- HTML root element may contain 2 child elements
 - Head:
 - Contains the title, metadata, scripts, and stylesheets
 - Nothing in the head is displayed on the website
 - Body
 - Contains the content that is displayed on the website
- ```
<head> ... </head>
```
- ```
<body> ... </ body>
```

HTML - HEAD - TITLE

- The title of the website
- Displayed in the browser tab

```
<head>
    <title>My COS216 Website</title>
</head>
```



HTML - HEAD - META



SPECIFIES VARIOUS
METADATA FOR THE
WEBSITE



META TAGS ARE
OPTIONAL



PARTIALLY USED BY
BROWSER FOR
RENDERING



PARTIALLY USED BY
WEBCRAWLERS AND
SEARCH ENGINES (SEO)

HTML - HEAD - META

- Charset: Specifies the character set used for encoding
- Description, Author, Keywords: The summary, author name, and keywords
- Viewport: Change the scale and resolution for mobile devices
- Refresh: Reload the website every few seconds

```
<head>
    <meta charset="UTF-8">
    <meta name="description" content="The first COS216 site">
    <meta name="keywords" content="COS216,UP,Pretoria">
    <meta name="author" content="Satoshi Nakamoto">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv="refresh" content="30">
</head>
```

HTML - HEAD - SCRIPT

- Adds a scripting language to HTML
 - You may assume that all scripts are JavaScript
 - If no type attribute is defined, defaults to JavaScript
- Can be added to the head or anywhere in the body
- Can be standalone code or an external script

HTML - HEAD - SCRIPT

- Embed JavaScript code directly into HTML

```
<script>  
    // JS code  
</script>
```

```
<script type="text/javascript">  
    // JS code  
</script>
```

- Link to a separate JavaScript file
 - Separately downloaded by the browser
 - Should be placed in the head

```
<script src="myscripts.js"></script>
```

HTML - HEAD - STYLE

- Adds a style language to HTML
 - You may assume that all style sheets are CSS
 - If no type attribute is defined, defaults to CSS
- Must be added to the head
- Can be a standalone style or an external style sheet

HTML - HEAD - STYLE

- Embed CSS directly into HTML

```
<style>  
    /* CSS style */  
</style>
```

```
<style type="text/css">  
    /* CSS style */  
</style>
```

- Link to a separate CSS file
 - Separately downloaded by the browser
 - Should be placed in the head
 - Does not need a closing tag – some browsers actually fail if you add a closing tag

```
<link rel="stylesheet" type="text/css" href="mystyle.css">
```

HTML - BODY

- Contains the content that is displayed on the website
- Can be empty, text, or nested elements

```
<body>
    Hello COS216 Class!
</body>
```

HTML - BODY - BREAK

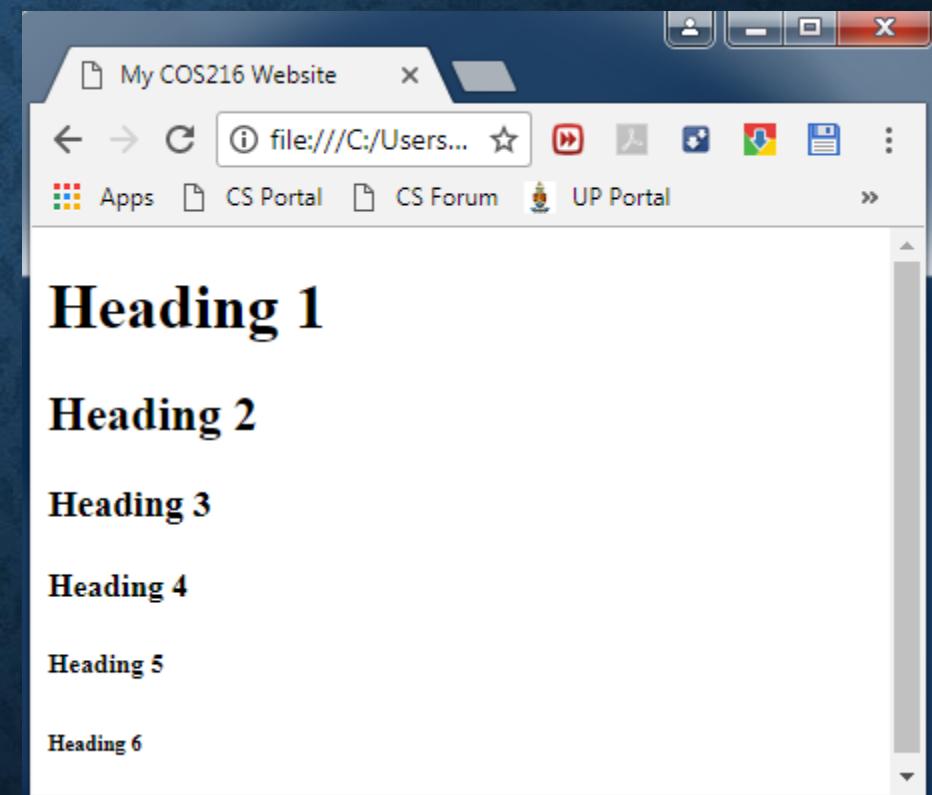
- Break and create a newline
- Does not need a closing tag
- Does not even need the ending slash

```
<body>
    Some text<br/>
    Some more text<br/>
    And some more text
</body>
```

HTML - BODY - HEADING

- Adds a text heading
- Various sizes of headings
 - h1 is the largest
 - h6 is the smallest

```
<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 - BODY - PARAGRAPH

- Adds a paragraph of text
- Text can be added without a paragraph
 - Paragraph provides advance formatting (fonts, sizes, colors)
 - Paragraph adds some whitespace before and after

```
<body>
    <p>My text paragraph for COS216</p>
</body>
```

HTML - BODY - DIVISION

- A division or section that separates content
- Invisible rectangle
- Placed on a separate line

```
<body>
    <div>Text inside an invisible block</div>
</body>
```

HTML - BODY - SPAN

- A division or section that separates content
- Invisible rectangle
- Placed inline
- Span is almost identical to divs
 - Spans are placed on the same line, divs are placed on a separate line
 - Spans can be transformed to divs, and vice versa, using CSS

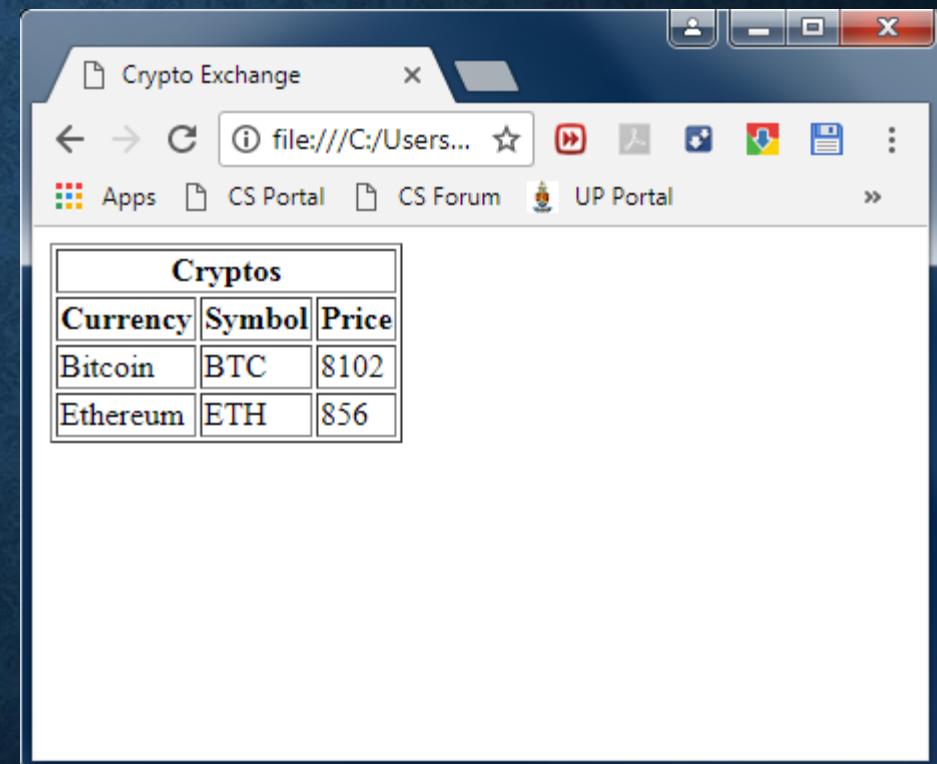
```
<body>
  <span>Text inside an invisible block</span>
</body>
```

HTML - BODY - TABLE

- A traditional grid table
- Consists of:
 - Table (`table`): the outer table container
 - Row (`tr`): A row inside the table
 - Cell (`td`): A cell or column inside a row
 - Header (`th`): A special cell representing the header or top row of the table
- Multiple rows and cells can me merged
 - Use the `colspan` and `rowspan` attributes
- No borders by default

HTML - BODY - TABLE

```
<body>
  <table border="1">
    <tr>
      <th colspan="3">Cryptos</th>
    </tr>
    <tr>
      <th>Currency</th>
      <th>Symbol</th>
      <th>Price</th>
    </tr>
    <tr>
      <td>Bitcoin</td>
      <td>BTC</td>
      <td>8102</td>
    </tr>
    <tr>
      <td>Ethereum</td>
      <td>ETH</td>
      <td>856</td>
    </tr>
  </table>
</body>
```



The screenshot shows a web browser window with the title "Crypto Exchange". The address bar displays "file:///C:/Users...". The window contains a table with a single header row and two data rows. The header row has three columns: "Currency", "Symbol", and "Price". The data rows show two entries: Bitcoin with symbol BTC and price 8102, and Ethereum with symbol ETH and price 856.

Currency	Symbol	Price
Bitcoin	BTC	8102
Ethereum	ETH	856

HTML - EXAMPLE

```
<!DOCTYPE html>
<html>
  <head>
    <title>Crypto Exchange</title>
  </head>
  <body>
    <h1>My Crypto Exchange</h1>
    <p>The first attempt on a simple crypto site</p>
    <span>Bitcoin on one side</span>
    <span> --- </span>
    <span>Ethereum on one side</span>
    <br/><br/>
    <table border="1">
      <tr>
        <th>Currency</th>
        <th>Symbol</th>
        <th>Price</th>
      </tr>
      <tr>
        <td>Bitcoin</td>
        <td>BTC</td>
        <td>8102</td>
      </tr>
      <tr>
        <td>Ethereum</td>
        <td>ETH</td>
        <td>856</td>
      </tr>
    </table>
  </body>
</html>
```

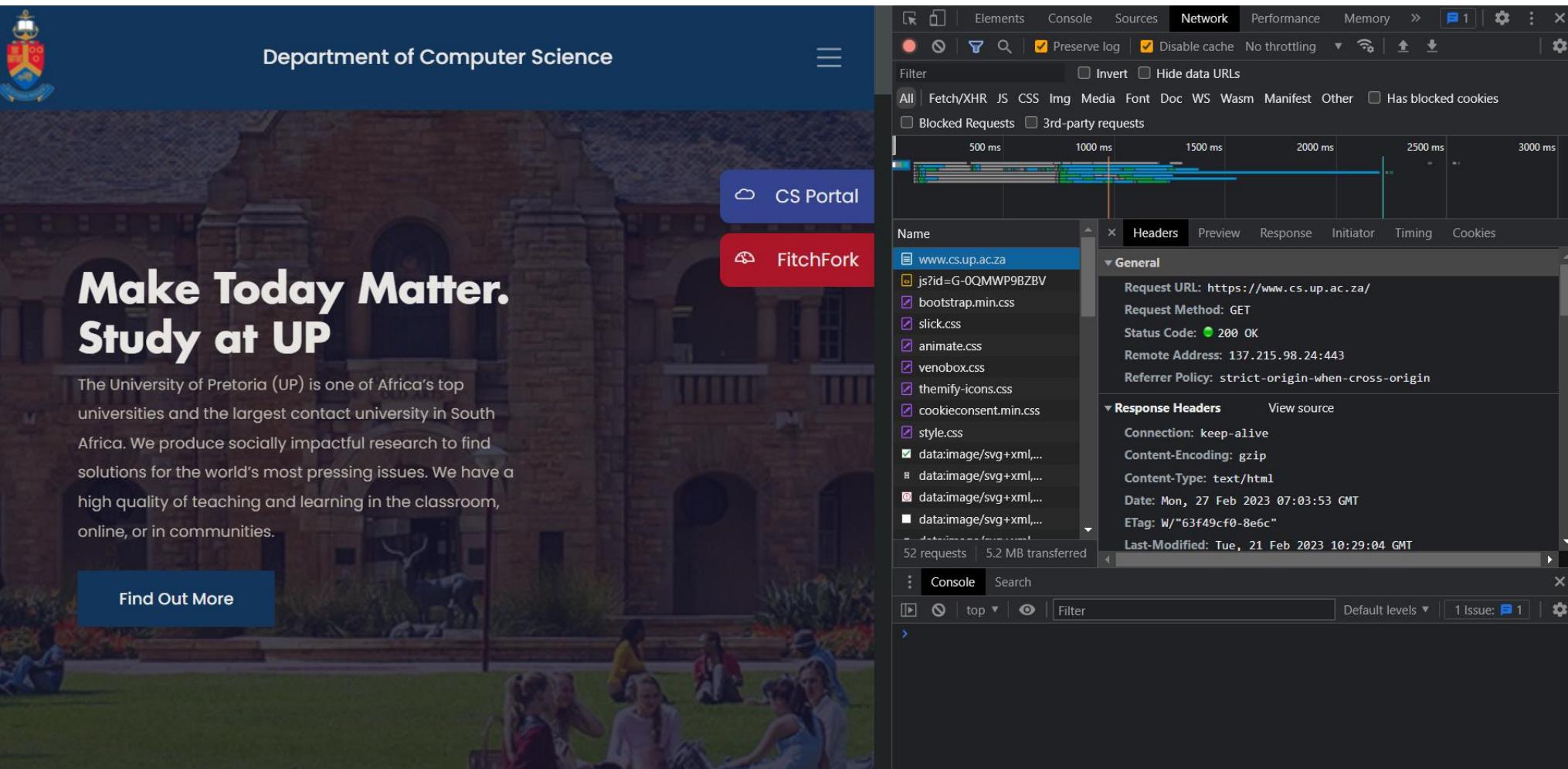


BROWSER DEVELOPER TOOLS

- Most browsers have built-in developer tools
- Allows developers to inspect and debug websites
- In most browsers pressing F12 will show/hide the tools

BROWSER DEVELOPER TOOLS

- Inspect the HTML, JS, and CSS code





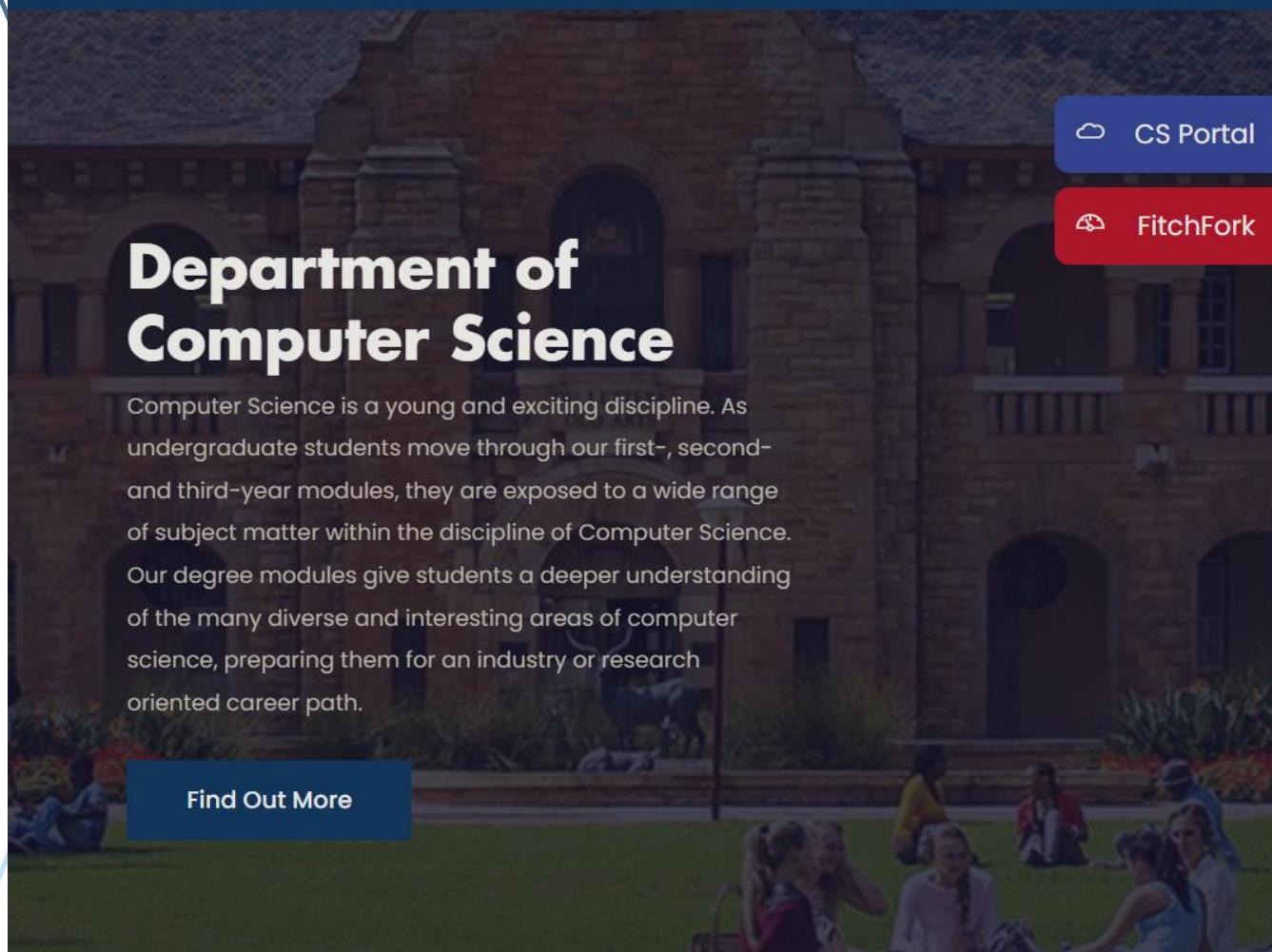
Department of Computer Science



Department of Computer Science

Computer Science is a young and exciting discipline. As undergraduate students move through our first-, second- and third-year modules, they are exposed to a wide range of subject matter within the discipline of Computer Science. Our degree modules give students a deeper understanding of the many diverse and interesting areas of computer science, preparing them for an industry or research oriented career path.

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Console

Default levels ▾ 1 Issue: 1 | 2 hidden

- ⚠ DevTools failed to load source map: Could not load content for [chrome-extension://hnfanknocfeofbddgcijnmhfnkdnaad/requestProvider.js.map](#): System error: net::ERR_BLOCKED_BY_CLIENT
- ⚠ DevTools failed to load source map: Could not load content for [chrome-extension://hnfanknocfeofbddgcijnmhfnkdnaad/content.js.map](#): System error: net::ERR_BLOCKED_BY_CLIENT
- ⚠ DevTools failed to load source map: Could not load content for <https://www.cs.up.ac.za/plugins/bootstrap/bootstrap.min.css.map>: HTTP error: status code 404, net::ERR_HTTP_RESPONSE_CODE_FAILURE
- ⚠ DevTools failed to load source map: Could not load content for <https://www.cs.up.ac.za/plugins/bootstrap/bootstrap.min.js.map>: HTTP error: status code 404, net::ERR_HTTP_RESPONSE_CODE_FAILURE

Console Search

BROWSER DEVELOPER TOOLS

- Other tools are also available
 - Memory inspector
 - Security manager
 - Performance analysis
 - Auditors
 - And more, depending on the browser

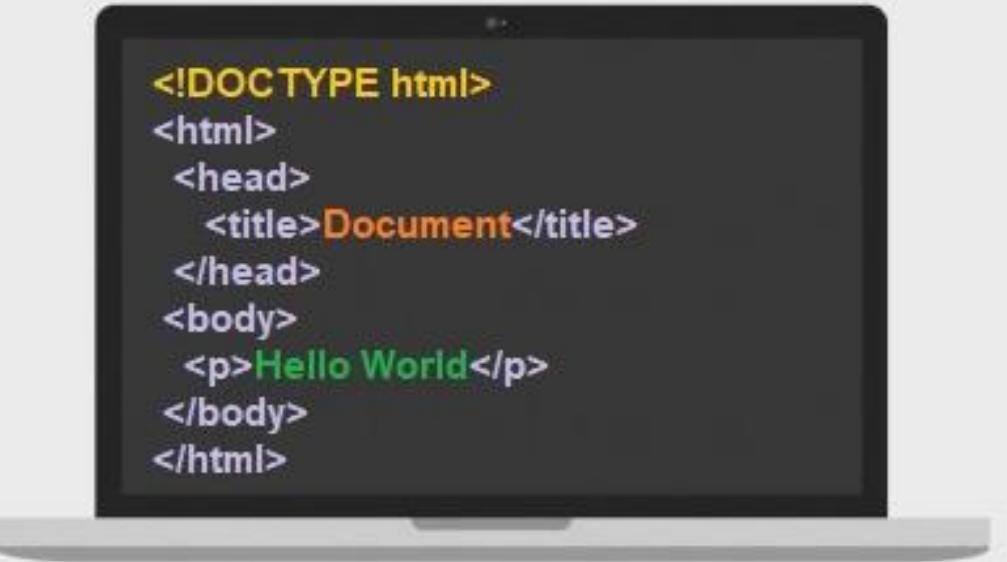
HTML RESOURCES

- All HTML elements, attributes, descriptions, and examples can be found on W3Schools:
- <https://www.w3schools.com/html>

The screenshot shows the w3schools.com homepage with a green header bar. The header includes the logo "w3schools.com", the text "THE WORLD'S LARGEST WEB DEVELOPER SITE", and navigation links for "HTML", "CSS", "JAVASCRIPT", "MORE", "REFERENCES", "EXAMPLES", and a search icon. Below the header, there's a banner with the text "Code your own Google logo with CS First" and a "TRY NOW" button next to a small Google logo. The main content area is titled "HTML5 Tutorial". It features a "Home" link on the left and a "Next >" link on the right. A green sidebar contains the text: "With HTML you can create your own Website.", "This tutorial teaches you everything about HTML.", and "HTML is easy to learn - You will enjoy it."



HTML 5

A laptop computer is shown from a side-on perspective, displaying a dark-themed code editor window. The window contains the following HTML code:

```
<!DOCTYPE html>
<html>
  <head>
    <title>Document</title>
  </head>
  <body>
    <p>Hello World</p>
  </body>
</html>
```

DEMO