

# COMP309

## Web-based Technology

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# What is this course about?

It is about...

1. letting you know how websites are created.
2. helping you navigate the different technologies involved in making websites work.
3. making you understand, know and (hopefully) build a skill of the use of something that is quite *technical*.
4. hands-on learning.

Before we get our hands dirty...

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## Software Tools Required

What tools you need for the course  
(and beyond?)

# Software Tools Required

1. A simple text editor (e.g. Notepad) or your favourite IDE (e.g. Atom, Notepad++, etc)
2. A modern web browser (e.g. Firefox, etc)
3. A local web server, database server and PHP scripting language (we use this later).

# Software Tools Required

For **step 3** above download and install Apache web server, MariaDb/MySQL database and PHP.

- **Windows:**
  - Find it here: <http://www.wampserver.com/en/>
  - Select Download and then choose and install the appropriate software for your computer.
- **Linux/Mac:** Search for “LAMP install” and follow instructions.

NB: Watch videos on the Internet about how to use a WAMP server.

Find files here... 📎

<https://bit.ly/3Ml7NGv>

# HTML (Pt. I)

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# What is HTML?

- HTML stands for **Hypertext Markup Language**.
- It is **not** a computer **programming language**; it is a **markup** language used to tell your *browser* how to structure the webpages you visit.
- It can be as complicated or as simple as the web developer wishes it to be.

# What is HTML?

- HTML consists of a series of *elements*, which you use to enclose, wrap, or *mark up* different parts of the content to make it appear or act a certain way.
- The enclosing tags can make a bit of content into a hyperlink to link to another page on the web, italicize words, and so on.
- For example, take the following line of content:

# What is HTML?

- Ordinary written text:

My cat is very grumpy

- Text now with **markup**:

`<p>My cat is very grumpy</p>`

- `<p>` and `</p>` are referred to HTML **tags** or **elements**.

# Anatomy of an HTML document

# Anatomy of an HTML document

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8">
    <title>My test page</title>
  </head>
  <body>
    <p> This is what visitors to your site
    will see. </p>
  </body>
</html>
```

# Anatomy of an HTML document

- **<!DOCTYPE html>**: *The doctype*. In the mists of time, when HTML was young (about 1991/2), doctypes were meant to act as links to a set of rules that the HTML page had to follow to be considered good HTML, which could mean automatic error checking and other useful things.
- However, these days no one really cares about them.

# Anatomy of an HTML document

- **<html></html>**: The **<html>** element. This element wraps all the content on the entire page, and is sometimes known as the root element.
- **<head></head>**: The **<head>** element. This element acts as a container for all the stuff you want to include on the HTML page that isn't the content you are showing to your page's viewers. This includes things like keywords and a page description that you want to appear in search results, CSS to style our content, character set declarations, and more.

# Anatomy of an HTML document

- **<meta charset='utf-8'>**: This element sets the character set your document should use to UTF-8, which includes most characters from the vast majority of human written languages. Essentially it can now handle any textual content you might put on it. There is no reason not to set this, and it can help avoid some problems later on.
- **<title></title>**: The **<title>** element. This sets the title of your page, which is the title that appears in the browser tab the page is loaded in, and is used to describe the page when you bookmark/favourite it.



# Anatomy of an HTML document

- **<body></body>**: The **<body>** element. This contains all the content that you want to show to web users when they visit your page, whether that's text, images, videos, games, playable audio tracks, or whatever else.

# Exercise 1

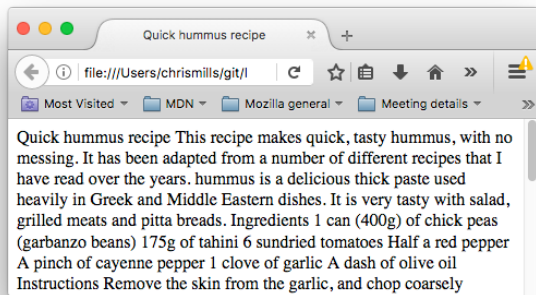
1. Copy the HTML page example listed above on slide 11.
2. Create a new file in your text editor.
3. Write/Paste the code into the new text file.
4. Save the file as *index.html*.
5. Open this file in a web browser to see what the rendered code looks like, and then edit the code and refresh the browser to see what the result is.

## Exercise 2

1. Just below the opening tag of the **<body>** element, add a main title for the document. This should be wrapped inside an **<h1>** opening tag and **</h1>** closing tag.
2. Edit the paragraph content to include some text about something you are interested in.
3. Make any important words stand out in bold by wrapping them inside a **<strong>** opening tag and **</strong>** closing tag.

# Structuring documents with Headings & Paragraphs

# Why do we need structure?



There are no **HTML elements** to give the content structure, so the browser *does not know* what is a heading and what is a paragraph!

# The basics: Headings and Paragraphs

- One of the main jobs of HTML is to give text structure and **meaning** (also known as *semantics*) so that a browser can display it correctly.
- Most structured text is comprised of **headings** and **paragraphs**, irrespective of whether you are reading a story, a newspaper, a college textbook, a magazine, etc.
- Structured content makes the reading experience easier and more enjoyable.

The Tribune  
Prints the News

# Hilo Tribune.

We Lead  
Others Follow

Vol. 10.

HILO, HAWAII, HAWAIIAN ISLANDS, TUESDAY, FEBRUARY 28, 1905.

No. 18.

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Published every Tuesday.

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Business

Advertising

Subscription

Single Copies

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## Notary's Notice of Intention to Foreclose.

Notice is hereby given for the notice

intended that by virtue of the power of

sale contained in a certain mortgage

made, executed and delivered by John

Johnston and Helene M. Johnston, his

wife, on October 24th, 1904, to J. L.

Carter, which said mortgage is recorded

in the office of the Registrar of Conveyances

located in Honolulu, in Volume 214 on

page 240 and 241, and which said mort-

gage was dissolved, by written agreement

made and executed by the said

John Johnston and Helene M. Johnston, and

which said mortgage is recorded in the

office of the Registrar of Conveyances

located in Honolulu, in Volume 214 on

page 240 and 241, and which said mort-

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## KILAUEA CRATER CONTINUES IN ERUPTION

### FOUR DAYS OF ACTIVITY

### ANOTHER OUTBREAK OCCURS

Madame Pele, the great Goddess of Kilauea's fiery furnace, on February 24th, once again from her tremendous slumber and added her share in exhibiting the knowledge of the Father of our country. For four days she played her protean tricks, sending some of our men high into the air, and playing with long fragments of scalded rock as though she were scattering barbers before the wind. With cyclonic and volcanic force, the echoes of crashing, swelling, swelling and boiling lava could be heard ringing within the dark furnace below, as Pele moved from her thousands of fire. Old Kilauea was his quiver's quivering across the dark of darkness, while Pele held sway in his realm of ash, black and charcoal, where the God of Fire in his scalded fury had sent his armies. For the scene, when standing on the towering edge of the peering depths of this House of Fire, one realizes what a prayer he is as compared to the great forces of the nature world that bend his destiny as within the swing of the pendulum.

A TRIBUNE representative went down into the crater on Friday evening to accompany, with a large party of Hiloites, who had that afternoon come up by train from Hilo. He found the activity centered on the main rim of Kilauea, in the direction of Pele. Apparently the first

LATER—Just as the TRIBUNE goes to press a telephone message from the Volcano House brings the news of renewed activity, more grand if possible than before. Parties returning from the crater report that the fire has burst through the landslide which checked the lava flow and a magnificent fountain is playing continuously, the extent of the opening in the old wall being 250 feet in length by 100 feet in width.

## HONOLULU GETS APPROPRIATIONS FOR HARBOR AND LIGHTHOUSE

(By Wire to Pele Tribune.)

Honolulu, Feb. 25.—Delegates Kakuhi catches Governor Carter that the Committee reports favorably an appropriation of \$25,000 for light houses.

[The appropriation refers to Honolulu harbor only, and not to the appropriations for all the islands. This one will be sufficient, it is thought, to secure a very fine light-house.]

Honolulu, Feb. 24.—Governor Carter this afternoon sent the following cablegram:

Washington.  
Center, Governor.  
\$25,000 Honolulu harbor passed House.  
Kakuhi.

## River and Harbor Bill Passes.

Washington, Feb. 24.—The House has passed the River and Harbor bill. It carries \$7,000,000, including a loan to survey the beach-

water.

## Postmaster Print Confirmed.

Washington, D. C., Feb. 25.—J. G. Pratt has been re-elected as Postmaster of Honolulu. He qualifies here.

## Latest Sugar Quotations.

Honolulu, Feb. 27.—off First Centrifugal, 5.40c; per ton \$200.25.  
No. 1 Analytic B, 5.40c; per ton \$200.25.

Fire At New Orleans.

## Drs. Grace and Irwin

Office at

During the absence of Dr. J. J. Grace

Dr. Irwin's office hours will be

from 10 A. M. to 1 P. M. and 2 P. M.

to 5 P. M.

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## Chan. M. LeBlond

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# Structuring Documents

- In HTML, each paragraph has to be wrapped in a `<p>` element, like so:

```
<p>I am a paragraph.</p>
```

- Each heading has to be wrapped in a heading element:

```
<h1>I am the title of the story.</h1>
```



# Structuring Documents

- There are six heading elements: `<h1>`, `<h2>`, `<h3>`, `<h4>`, `<h5>`, and `<h6>`.
- Each element represents a different level of content in the document
- `<h1>` represents the main heading, `<h2>` represents sub-headings, `<h3>` represents sub-subheadings, and so on.
- It's really up to you what exactly the elements involved represent, as long as the hierarchy makes sense.

# Why do we need semantics?

- We need to make sure we are using the correct elements, giving our content the correct **meaning**, **function**, or **appearance**.
- In this context the `<h1>` element is also a semantic element, which gives the text it wraps around the role (or meaning) of "a top level heading on your page."

```
<h1>I am the title of the story.</h1>
```

- More importantly, its semantic value will be used in multiple ways, for example by search engines and screen readers.

## Exercise 3: Let's try this

1. Make a local copy of *structure-eg.txt* in a new directory on your local machine and rename it *structure-eg.html*.
2. Open *structure-eg.html* with your favourite browser to see the output.
3. Now, surround the first line with an **<h1>** header and line 2 with a **<p>**.
4. The two chapters are **<h2>** headers and the text under each is a paragraph.
5. Make the line with “The spectre speaks” an **<h3>** header to differentiate it from the chapters. Make the text below it is also a paragraph.

# The Anatomy of HTML Elements

# Anatomy of an HTML element

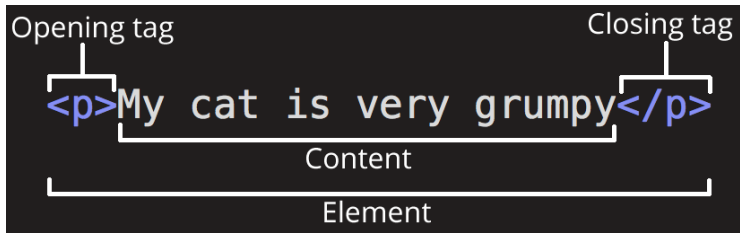
The main parts of our element are:

- **The opening tag:** This consists of the name of the element (in this case, `p`), wrapped in opening and closing angle brackets. This states where the element begins, or starts to take effect — in this case where the start of the paragraph is.
- **The closing tag:** This is the same as the opening tag, except that it includes a forward slash before the element name. This states where the element ends — in this case where the end of the paragraph is. Failing to include a closing tag is a common beginner error and can lead to strange results.

# Anatomy of an HTML element

- **The content:** This is the content of the element, which in this case is just text.
- **The element:** The opening tag plus the closing tag plus the content equals the element.
- And that's basically all that there is to it!

# Anatomy of an HTML element



# Nesting elements



# Nesting Elements

- Elements can be *nested*. What that simply means is that one element can be put inside other elements.
- If we wanted to state that our cat is **very** grumpy, we could wrap the word “very” in an `<strong>` element, which means that the word is to be strongly emphasized:

```
<p>  
  My cat is <strong>very</strong>  
  grumpy.  
</p>
```

# Nesting Elements

- It is important to make sure elements are properly nested.
- In the previous example we opened the *p* element first, then the *strong* element, therefore we have to close the *strong* element first, then the *p*.
- The following is incorrect: Why? 😞

```
<p>  
  My cat is <strong>very grumpy.</p>  
</strong>
```

# Nesting Elements

- If elements are not properly nested, then your web browser will try to make a best guess at what you were trying to say, and you may well get unexpected results. So do it right!

# Empty Elements

- Not all elements follow the above pattern of opening tag, content, closing tag.
- HTML elements with no content are called **empty elements**.
- Some elements consist only of a **single tag**, which is usually used to insert/embed something in the document at the place it is included.
- For example, the **<img>** element embeds an image file onto a page in the position it is included in. Another is the break **<br>** element.

# Empty Elements

For example, the **<img>** element embeds an image file onto a page in the position it is included in. Another is the break **<br>** element.

```
1   
3  
4 <p>  
5   A <br> paragraph with a line break.  
6 </p>
```

# White-space, Entity references & Comments

# Whitespace in HTML

- The two following code snippets are *equivalent*:

```
1 <p>Dogs are silly .</p>  
2  
3 <p>Dogs are  
4     silly .</p>
```

- And so no matter how much white-space you use (which can include space characters, but also line breaks), the HTML parser reduces each one down to a single space when rendering the code.
- Space is important, however, for *readability*.

# Entity references: special characters in HTML

- So what if we want to show some characters that HTML uses as well?
- In HTML, the characters `<`, `>` and `&` are special characters.
- They are part of the HTML syntax itself, so how do you include one of these characters in your text?
- We use **character references**—special codes that represent characters, and can be used in these exact circumstances.
- Each character reference is started with an ampersand (`&`), and ended by a semi-colon (`;`).



# Entity references: special characters in HTML

Table 1: Examples

	Literal character	Character reference equivalent
1.	<	&lt;
2.	>	&gt;
3.	"	&quot;
4.	'	&apos;
5.	&	&amp;
6.		&nbsp;

# Entity references: special characters in HTML

- In the below example, you can see two paragraphs, which are talking about web technologies:

```
<p>
```

```
In HTML, you define a paragraph  
using the <p> element.
```

```
</p>
```

```
<p>
```

```
In HTML, you define a paragraph using  
the &lt;p> element.
```

```
</p>
```

# HTML comments

- Comments are *ignored* by the browser and invisible to the user, and their purpose is to allow you to say how your code works, what the different parts of the code do, etc.
- This can be very useful if you return to a code base that you've not worked on for some time, and can't remember what you did — or if you hand your code over to someone else to work on.

# HTML comments

- To turn a section of content inside your HTML file into a comment, you need to wrap it in the special markers `<!--` and `-->`, for example:

```
1 <p>I'm not inside a comment</p>  
2  
3 <!-- <p>But I am!</p> -->
```

# Assignment

Find and go through the self-test exercise on **vcampus** before the next class.

See you next week, God willing 🙏