# Web Technologies

## Hyper Text Markup Language

HTML is used to describe the structure of most modern websites; it was first developed by Tim Berners-Lee in 1990 at Cern. It was first implemented in WorldWideWeb, the first web browser [1]. It is based on the Standard Generalized Markup Language, a tag-based language for describing the layout and structure of documents.

As HTML is a tag-based language, content is surrounded by tags which tells the interpreter how to render the content. I.e., Surrounding text with a <b> **tag will make the text bold.** </b>.

HTML has evolved over the years and is now maintained by The Web Hypertext Application Technology Working Group, which also now hosts the Living Standard for HTML (Widely referred to as HTML5) [2].

The WHATWG is a community of developers of all major web browsers, including Google, developers of Chrome, Apple, the developers of Safari, and Mozilla, the developers of Firefox. This group of companies help steer the continued development of HTML and other core web standards which helps ensure that Web Pages render in a consistent manner across a range of browsers and hardware.

### The Canvas

The Canvas is HTML5’s answer to how to render dynamic graphics on a webpage. And is how I plan on rendering graphics to the viewer in my simulation.

Unlike other implementations the Canvas does not require any additional technologies than those defined in the W3C standards, this allows for graphics to be rendered on any modern browser without any additional technologies, such as Microsoft’s Silverlight or Adobe’s Flash player; both of these technologies are now obsolete- partially because of the Canvas’ inclusion in the standard, allowing Canvas elements to be consistently rendered across all modern browsers, and even aboard spacecraft![3].

#### Canvas optimisation via WebGL

WebGL is a JavaScript API for rendering high- performance interacting 3D and 2D graphics on the web, it is technology part of HTML5 and is used in all modern Web Browsers.[4]

As the Canvas element uses WebGL to render content to the user, rather than rendering the Canvas content itself, via the same processor threads allocated to render the rest of the webpage, it allows for hardware-based acceleration of graphics performance, this has been adopted in Chrome, Firefox and Safari via WebKit [5].

This allows for browsers to hardness the power of hardware designed for fast graphics performance, such as dedicated graphics cards which use the DirectX or Vulcan APIs, or the integrated graphics cores inside Apple’s M series of processors, which render using their Metal API. These graphics APIs are used for efficiently rendering of complex 3D scenes commonly found in modern video games, and movies and thanks to WebGL can also be used to render my sine waves slightly faster.

## Cascading Style Sheets (CSS)

Whilst HTML provides the structure of the document CSS

[1] T. Berners-Lee The WorldWideWeb browser W3.org [Online]. Available: <https://www.w3.org/People/Berners-Lee/WorldWideWeb.html>   
[Accessed: 11 November 2022].

[2] Web Hypertext Application Technology Working Group *HTML Living Standard* [Online]. Available: <https://html.spec.whatwg.org/> [ Accessed: 11 November 2022].

[3] Lithios *A Look Under the Hood of SpaceX’s Dragon Capsule* [Online].  
Available: <https://lithiosapps.com/a-look-under-the-hood-of-spacexs-dragon-capsule/> [Accessed 11 November 2022]

[3] Mozilla *WebGL: 2D and 3D graphics for the web* [Online]. Available: <https://developer.mozilla.org/en-US/docs/Web/API/WebGL_API>   
[Accessed: 11 November 2022].

[5] Jen Simmons *New WebKit Features in Safari 15* [Online]. Available: <https://webkit.org/blog/11989/new-webkit-features-in-safari-15/> [Accessed: 11 November 2022].