Getting Started With Website Design

1 – Introduction

About the World Wide Web

Since its launch at the beginning of the 90s, the World Wide Web has become one of the most common uses for the internet. It drives a lot of what we do on computers. From entertainment, education, business and shopping the Web has become a key part of many people's lives. Web browsers, such as Firefox, Chrome, Safari and Edge are some of the most used applications on a computer. Even many of the applications that have become a part of people's everyday routines, such as streaming video and social media are based on the Web. Many commonly used mobile apps, such as YouTube and Facebook, are essentially specialised web browsers.

The Web began in the 80s when Sir Tim Berners Lee (pictured) wanted to create a system to facilitate the sharing of information among researchers. The first web site was created in 1991 and in 1994, the World Wide Web Consortium (W3C)[1] was established to create standards and improve the quality of the web. It was around that time that a new web browser called Netscape Navigator became available, helping to popularise the web due to its ease of use. In 1995 Microsoft released their competing Internet Explorer web browser which pushed the widespread use of the web even further. In recent years, web browsers like Firefox (based on Netscape Navigator), Microsoft Edge (replacement for Internet Explorer), Apple's Safari and Google Chrome have become some of the most commonly used browsers.

Currently, the most widely used web browsers include Google Chrome, Mozilla Firefox (based on Netscape Navigator), Microsoft Edge (replacement for Internet Explorer) and Apple Safari.

Many people have made a career out of creating websites and many businesses have specialised in the field. However, the ability to create websites is not limited to professionals. The web was built on the idea that anyone can create content. These exercises are intended to provide you with the skills and knowledge to create your own websites.

The Website We Will Create

In the following exercises we will be creating a website for a fictional basketball club called the Morley Hooperoos. A club for people who like to play casual / social basketball games. This website will require HTML, CSS, Images and a bit of JavaScript. All which are briefly described in the following section.

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[1] https://www.w3.org/ - World Wide Web consortium website

Building Blocks Of A Website

Hypertext Markup Language (HTML)

Web pages are built using Hypertext Markup Language (HTML). You might have tried your hand at computer programming, but a markup language is different from a programming language. A programming language tells a computer what to do. E.g. add some numbers, store some information, respond to buttons pressed on the keyboard. A Markup language on the other hand, tells a computer how to present a document. Consider the following example.
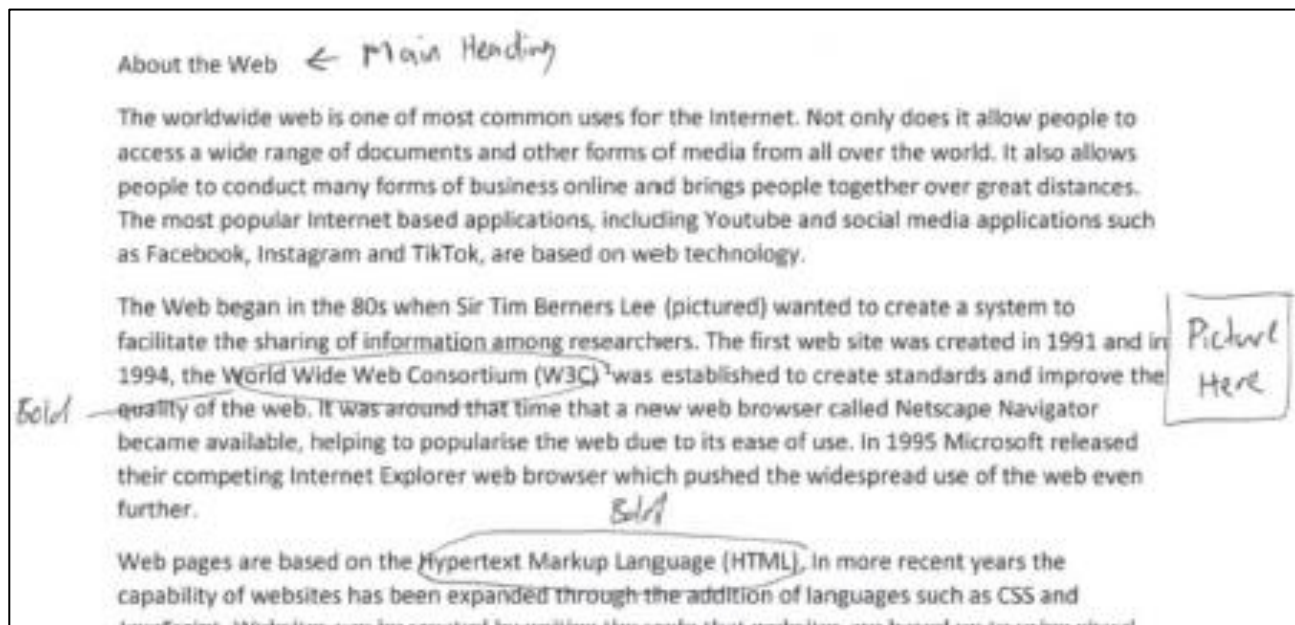
If you had been asked to type this document on a computer, you would notice that the document has been marked with additional information. Make certain parts bold. Add a picture. Format the first line as a heading etc. A markup language performs a similar role. E.g. It would tell the computer where paragraphs and headings are. Where links and pictures are. Even which parts of the text should be emphasised.

Cascading Stylesheets (CSS)

HTML describes the structure of a web page but does not specify how parts of the page will look. For example, HTML might specify that the page will have a heading but won't specify the colour or size of the heading. The appearance of a website is determined through the related Cascading Stylesheets language (CSS). CSS provides a website developer with a great deal of control over how the parts of a web page will look. This includes colours, size and even where things are positioned. As we will see later, there are great benefits to defining the structure (HTML) and presentation (CSS) of a web site separately.

Databases

Many websites require the storage and retrieval of information that will be used in a website. For example, a website might allow users to log in which requires storage of account details. A website also might allow users to shop for products or search for information. In cases like this, websites will use one or more databases to store this information using a Database Management System (DBMS). Information in databases is typically retrieved and manipulated using the Structured Query Language (SQL). These exercises will not cover the SQL language, but it can be a useful element to explore if you plan on creating data driven websites.

Programming

Websites often need to provide more functionality than simply presenting information and programming can provide this. It could be as simple as adding basic functionality that responds to where a visitor to your website clicks with their mouse or something as complex as linking with a database. There are several

programming languages that are commonly used in websites such as Javasript which we will briefly look at later.

Images

Images are often an important part of making a website look good, but there are different types of images that can be used in websites. Each with their own set of advantages and drawbacks.

Raster vs Vector Images

Images on computers are generally either Raster or Vector images. Raster images are made up of different coloured dots called **Pixels** (abbreviated from Picture Element). Vector images on the other hand are made up of geometric shapes.

Below are 2 copies of an image that we will be using in our Morley Hooperoos website. The first image is saved as Raster image while the second image is saved as a Vector image.

Raster

Vector

At the moment, it is difficult to see any difference between the Raster image and the Vector image. However, if we enlarge both images to look more closely, the differences become more obvious.

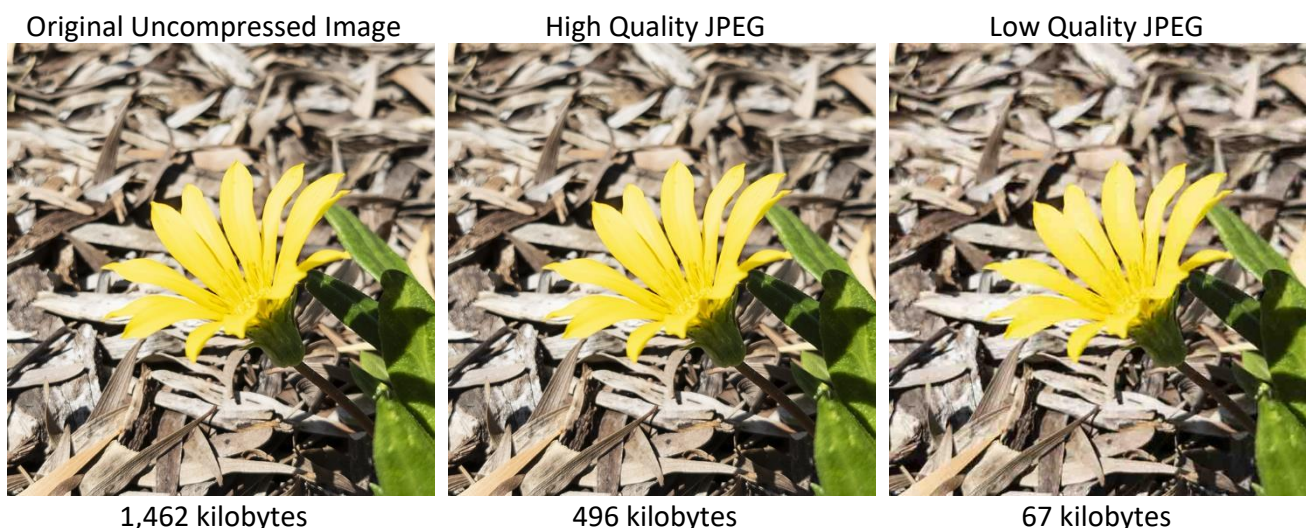**Raster**   **Vector**

As we enlarge the Raster image, we begin to see the individual pixels in the image, so the image starts to look less clear. The more we resize or modify the image, the more the quality declines. With the vector image, however, we can resize it as much as we like, and it will still look nice and clear since it is made of lines and shapes rather than dots.

In addition to being able to resize more easily, vector images tend to be easier to edit and normally save as smaller files. Raster images do have their advantages though. Many of the images that we use on computers are more complex images such as photographs that can't reliably be reproduced using simple shapes. Raster formats are ideal for these types of images while Vector images are commonly used for more simple images such as text, logos, clipart and certain types of artwork.

Common Image Formats in Websites

JPEG

JPEG (from the <u>J</u>oint <u>P</u>hotographic <u>E</u>xperts <u>G</u>roup which created the format) is a common raster image format. It allows high colour images to be saved in a format which preserves quality while reducing file size. Since nobody likes to spend a long time downloading web pages, small file sizes are a definite plus for web use. In the examples below, the first image is the original image as taken from the camera. The second image is a JPEG image saved with high quality settings. That third image is a JPEG image saved with low quality settings which gives a much smaller file size, but with a noticeable loss in image quality & clarity. Most image editing software which is capable of saving images in the JPEG format also allows you to adjust the saved quality which allows you to find a balance between image quality and file size.

Original Uncompressed Image	High Quality JPEG	Low Quality JPEG
1,462 kilobytes	496 kilobytes	67 kilobytes

GIF

GIF (<u>G</u>raphic <u>I</u>nterchange <u>F</u>ormat) is another raster image format that is commonly used for more simple images. Unlike JPEG's millions of colours, GIF images range of colours is limited to 256 colours which might seem like a lot but can make a visible difference with images like photos. GIF is a great format for more simple images that don't require a lot of colours though and can produce very small files, particularly in images where large sections of the image are the same colours. Unlike the JPEG format, GIF also supports animation as well as allowing certain pixels in the image to be transparent.

PNG

PNG (<u>P</u>ortable <u>N</u>etwork <u>G</u>raphic – officially pronounced as "ping") is a more recent Raster image format which was created to combine the best features of JPEG and GIF in a more modern, improved format. It allows images to be saved in high colour like JPEG or more limited colour like GIF. It also allows for partial transparency. Unlike JPEG and GIF, this allows pixels in an image to be completely opaque, or partly transparent.Unlike JPEG and GIF, this allows pixels in an image to be completely transparent, completely opaque, or partially transparent.

Part of the reason for PNG's creation is that the GIF format is proprietary. Meaning that anyone who makes software that can save images in the GIF format must pay fees to the owners of that format. The PNG format in contrast was created to be completely open for use.The PNG format in contrast was created to be completely open for free use.

When it comes to comparing JPEG images with PNG images, JPEG images typically have a smaller file size while PNG images typically retain better image quality. Since PNG is a newer format, it is not supported in as many programs as JPEG though it is now widely supported in modern web browsers.

SVG

Unlike the raster image formats previously described, SVG (Scalable Vector Graphics) is a vector image format. SVG stores information using the XML (Extensible Markup Language) which is a bit like HTML. Except that where HTML describes the components of a web page (headings, paragraphs etc) the XML language used in the SVG format describes the lines and shapes that are used to create a vector image. In the past, vector images were rare in websites as there was no vector format commonly supported in websites. The SVG format was created as an open format that website developers could use to add vector images. As it is a relatively new format, it might not be supported by older web browsers and may not open in some types of image software.

What You Need to Create a Website

There are a range of software applications that you might need to create a website. These can vary widely in features. They can also range from free software to commercial software.

Text Editing Software

To create and edit HTML and CSS all you need is a text editor. You could use a very simple text editor such as the Notepad editor included in Windows. There are also many editors available that are designed specifically for working with computer languages such as HTML, CSS and Javascript. These include free editors such as Notepad++ and Microsoft Visual Studio Code. The screenshots in the following tutorials will show HTML, CSS and JavaScript all being edited by Notepad++. This is a widely used editor that is free and well suited to working with many common computer languages. In addition to simple text editing, it can also assist you when working with languages like HTML by providing useful features such as colour coding to make your code easier to read and auto completion while you are typing code.

Image Editing Software

For creating and editing your own images there are professional options such as Adobe Photoshop (for raster images) and Adobe Illustrator (for Vector Images). Both have been used for images that are used in these tutorials. Most operating systems come with simple image editing software such as Paint 3D in Windows. There are also many free image editing application available online. These include applications that you can install on a computer or mobile device as well as well as browser-based applications such as Adobe Express.

Web Hosting

Once you have created your website, you will need a place to store it online so that other people on the Internet will be able to get to it. Many companies provide web hosting services for this purpose. A professional web hosting service will provide a certain amount of storage space for your website. You would then need to transfer the files in your website from your computer to the web host. This is often accomplished using **FTP** (File Transfer Protocol) which allows for transferring of files between 2 computers over the Internet. Web hosting providers can often also assist you with registering a **Domain Name**. This allows you to register a more personalised address for your website. E.g. www.yourbusiness.com. Each country has different rules and processes for registering internet domain names.

There are also free web hosting services available, though these are often supported by displaying ads on your website.

Integrated Development Environment (IDE)

Many software applications provide a range of development tools bundled together. IDE software is often used by professional software developers including web developers. An IDE might include tools for editing your code (including HTML and CSS) as well as included tools for transferring your web page to your web host. They also often include advanced features for checking your code for errors. Adobe Dreamweaver and Microsoft Visual Studio are both commonly used IDEs.

Creating a Folder Structure

As discussed, a website can consist of multiple components including HTML files, CSS files, images, and JavaScript files. The website will only work correctly when these files can all refer to each other. For example, if your HTML says that an image needs to show in your web page then that image file needs to be in the place where your HTML says it will be.

For this reason, it is easiest to keep all the files in your website together in one location. If your website has a large number of files, then organising them using sub folders can help in maintaining your site. The website we will create will not use a large number of files but to help promote good habits, we will use a few sub folders to organise different files in the site.

Filenames on the Web

On the worldwide web we need to be careful with how we name our files and folders. If you're used to creating folders and saving files on Apple computers or Windows computers, you likely use names that include spaces and capital letters. Spaces should be avoided in file and folder names for websites (you can use another symbol like a dash - instead). It is often best to avoid capital letters also since uppercase and lowercase letters make a difference in names on the web where they don't elsewhere. Keeping file and folder names lowercase simplifies things. For example, the file names **image.jpg** and **Image.jpg** might be considered to be completely different files.

Exercise 1 – Create a Folder Structure for Morley Hooperoos Website

1. On your computer, go to the location where you plan on saving your exercises files as you work through these lessons.

2. Create a new folder called **hooperoos**.

3. Create 3 folders inside that folder. One called **images** which will be used to store the images used in your site. One called **css** and one called **scripts**. They should look like the example below.
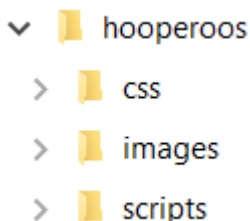
4. Go to the HTML tutorials website (https://oneil.com.au/pc/html.html) and download the sample Images file if you haven't already.

5. Copy the images from the zip archive into your newly created **images** folder so that they will be available when we need them later.
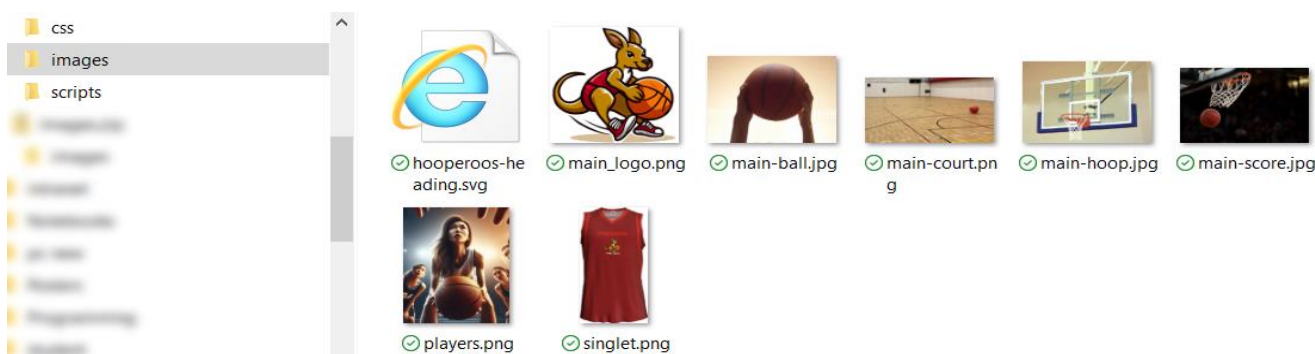
Planning a Website

If you are just creating a simple web page, you might be ok with just "winging it" and making it up as you go along. For anything beyond the most basic web page though, you can save yourself a lot of time and trouble by spending a bit of time planning it before you begin. This could include writing up a description of your website, its purpose, the audience it is intended for etc. It can also involve visual planning such as the following examples.

Interface Design

A website needs to present information in a way that is clear and easy to access. The following pointers can help when creating a good website.

- **Consistency** – The different pages in your website should have a consistent layout from one page to the next. Consistent colours and design across pages will ensure that visitors know that each page is still a part of the same website. Placing elements like headings and navigation in consistent positions helps the user to be able to find their way around.
- **Navigation** – Site navigation should be positioned in a part of the page that makes it easy to see and use. It should provide users with an easy way to get to different sections in your site without having to return to the homepage.
- **Accessibility** – Your website should be usable for as many different visitors as possible. This could mean designing your page so that it works well across different screen sizes such as large desktop monitors and small smartphone screens. This could also mean ensuring that it is usable for people with special needs, such as visually impaired users who might be using text to speech screen reading software to access your website.

Site Map

Once you have spent some time thinking about what sections your website will have, a site map can be a good visual guide to plan your website's structure. It is a chart which shows the different sections in your website and how they relate to each other. It could be a neat diagram created on a computer or could even be a rough sketch on paper. The example below was created using the SmartArt tools included in Microsoft Word.
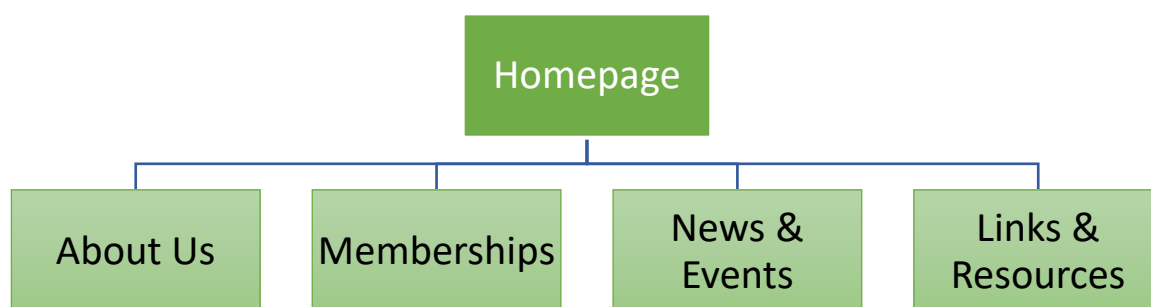
Page Layout Plan

It is useful to plan the layout of your web pages by doing a sketch of the page layout. Again, this could be a simple sketch on paper, or it could be done on the computer. Notes can be added as part of the design process. The following example was done using the basic drawing tools in Microsoft Word. As mentioned in the previous section, a consistent design means that most of your pages will have a similar layout (navigation, headings etc) with only the main content of each page varying. While you are creating the site, you might change your mind on how some parts of it look but a design gives you a good starting point rather than making it up as you go along.

Desktop Layout
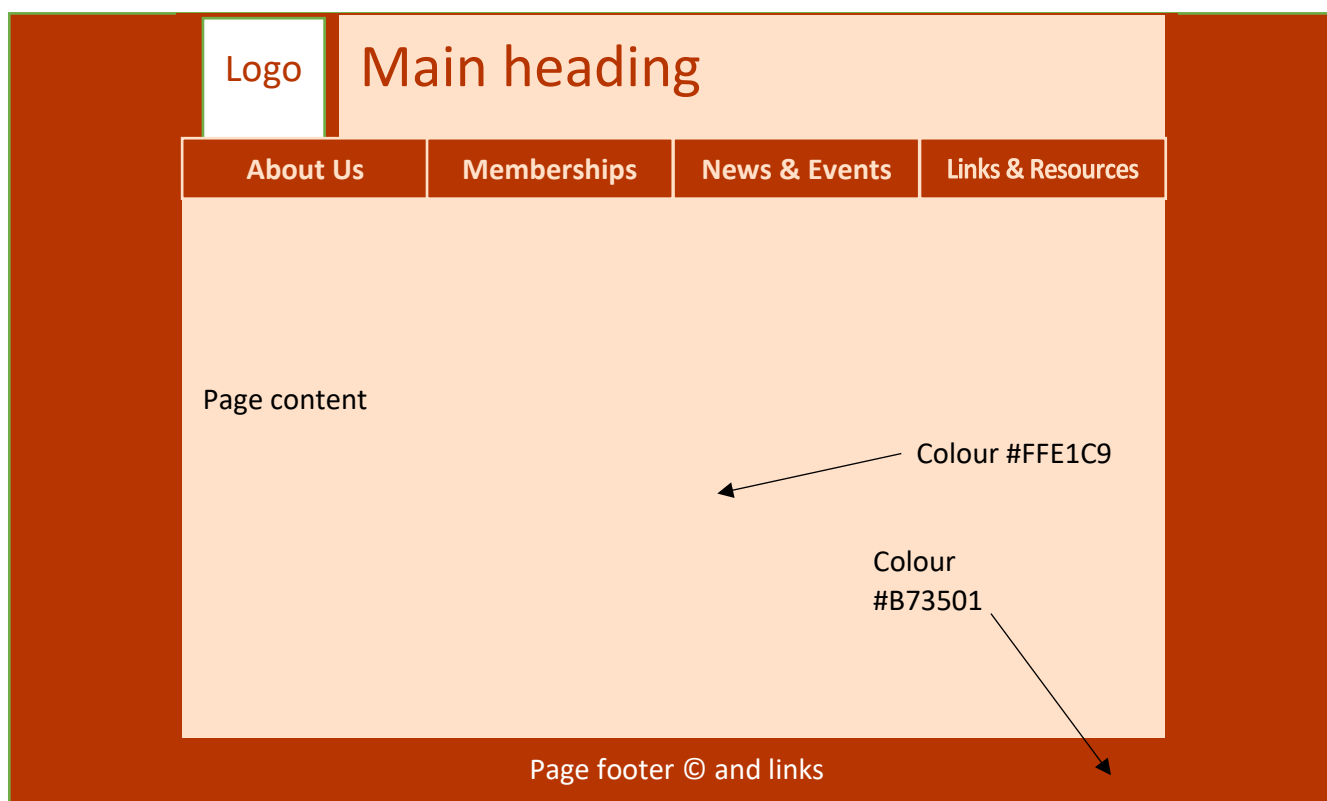
Mobile Layout
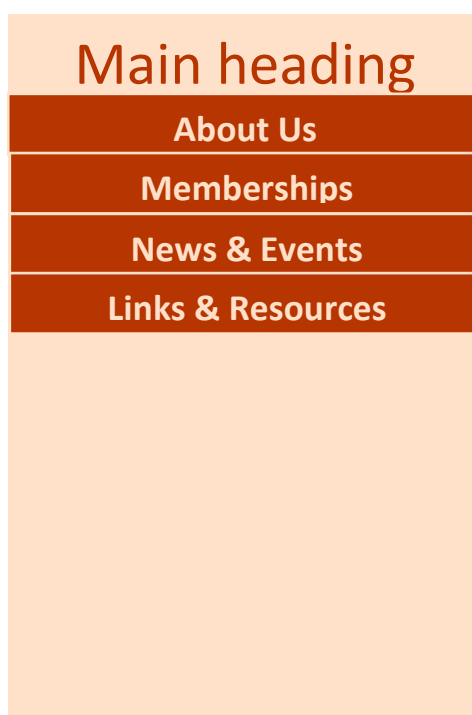
Structure vs Presentation

HTML was originally created as a way of creating documents to be shared on the web and provided the structure for documents. As the web became more widely used, there came a greater demand for being able to determine how a web page looked, especially as the web became used more for business and entertainment. New formatting capabilities were added to HTML to enable people to change things like colours and fonts on a page. These provided limited ability to control how pages looked, but also made HTML code a lot more complicated and difficult to edit with inconsistent results across different web browsers.

CSS was later added to provide web page developers with a way to have far greater control over the appearance of a web page, without making the HTML too long or complex. HTML is used for the structure of your pages while CSS is used for the presentation of your pages. As you will see when we progress through these exercises, keeping the structure and presentation separate makes web pages a lot simpler to create, provides more control and also allows for far more consistent results for visitors to different websites. Some of those older HTML elements that were provided for formatting still work in most browsers, though using CSS for the appearance of your websites is recommended instead. As a result, when you work through these exercises, the web pages you create will look functional but pretty boring when you are editing purely HTML. But will quickly come alive once you start adding CSS.