

INTERNET:

Internet is a short form of **International Network**. Whenever you need to send a message or retrieve information from another computer, the TCP/IP protocols are what make the transmission possible.

Your request goes out over the network, hitting domain name **servers (DNS)** along the way to find the target server. The DNS points the request in the right direction.

Once the target server receives the request, it can send a response back to your computer. The data might travel a completely different path to get back to you. This flexible approach to data transfer is part of what makes the Internet such a powerful tool.

BROWSER:

Browser, short for web browser, is a software application used to enable computers users to locate and access web pages. Browsers translates the basic HTML (Hypertext Mark Up Language) code that allows us to see images, text videos and listen to audios on websites, along with hyperlinks that let us travel to different web pages. The browser gets in contact with the web server and requests for information. The web server receives the information and displays it on the computer.

There are several types of browsers but the one thing they have in common is that they carry out the same function; they transfer hypertext. Here are some familiar common web browsers:

- Google Chrome
- Mozilla Firefox
- Microsoft Internet Explorer

Every browser features a toolbar that allows you to perform various functions like:

Go back to the first page you started on the internet which is called **Home**. Visit **Previous Page**

Book your **favorite** websites.

Print content you find interesting on web pages Check your web **history**, like the websites you visited in the past.

You can go **forward** and **backwards** to see the previous sites you viewed

There are two basic ways that you can navigate through the browser:

You can click on links on different web pages. Those links will lead you to other web pages.

If you know the URL or the address of the website you can type it in write in the browser's box all the way at the top. There's no need to type in the: http:// part when inserting the address because the browser automatically places it in. Then you have to click enter. So every time you click on a link or enter a URL, your browser will request the information from the web server. If your browser returns to the page with a error message, the address you typed in could be wrong on you may not be connected to the internet.

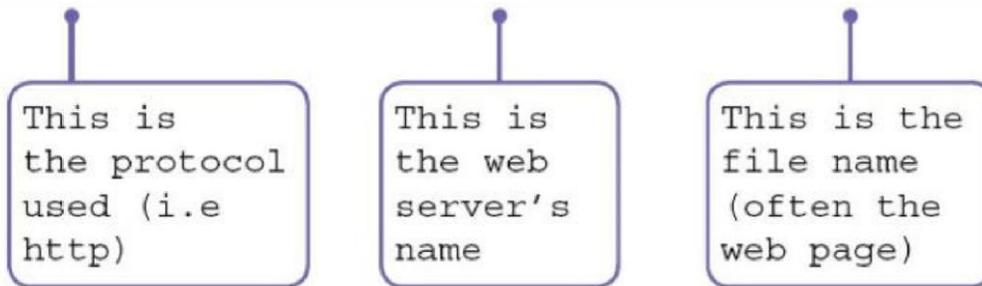
A **WEB BROWSER** is software which allows a user to display a web page on their computer screen. Web browsers interpret or translate the HTML code from websites and show the result of the translation. This can often be in the form of videos, images or sound. Most web browsers share the following features

- they have a HOME page
- they have the ability to store a user's favourite websites/pages
- they keep a history of the websites visited by the user
- they give the ability to go backward and forward to websites opened.

Users can either click on a link, such as

<http://www.adnanusmani.com> or they can type in the uniform resource locator (URL) manually. The web browser will break up the URL into three parts:

https://adnanusmani.com/o-level-2210



What are Internet Servers?

In general, all of the machines on the Internet can be categorized as two types: servers and clients. Those machines that provide services (like Web servers or FTP servers) to other machines are **servers**.

And the machines that are used to connect to those services are **clients**. When you connect to "Yahoo!" at `www.yahoo.com` to read a page, Yahoo! is providing a machine (probably a cluster of very large machines), for use on the Internet, to service your request. Yahoo! is providing a server. Your machine, on the other hand, is probably providing no services to anyone else on the Internet.

Therefore, it is a user machine, also known as a client. It is possible and common for a machine to **be both a server and a client**, but for our purposes here you can think of most machines as one or the other.

A server machine may provide one or more services on the Internet. For example, a server machine might have software running on it that allows it to act as a Web server, an e-mail server and an FTP server. Clients that come to a server machine do so with a specific intent, so clients direct their requests to a specific software server running on the overall server machine. For example, if you are running a Web browser on your machine, it will most likely want to talk

to the Web server on the server machine. Your Telnet application will want to talk to the Telnet server, your e-mail application will talk to the e-mail server, and so on.

Internet Service Provider (ISP)

Each user makes use of an **INTERNET SERVICE PROVIDER (ISP)**; these are companies that provide the user with access to the internet. A monthly fee is usually charged for this service. The ISP will set up a user account which will contain a username and a password; most ISPs also give the user an email address.

Before ISPs became common in the 1990s, internet access was usually limited to users who were part of a university or a government agency.

Internet Protocol (IP) Address

Each device on the internet is given a unique address known as the **INTERNET PROTOCOL (IP) ADDRESS**. This is a 32-bit number which is usually written in the form:

109.108.158.1

A home computer is given an IP address when it connects to the internet. This is assigned by the ISP and is unique for that particular internet session. The only IP addresses that remain fairly unchanged are web servers.

An IP address can be used instead of typing in the full URL. For example: <http://109.108.158.1> would take you straight to the device corresponding to this address.

IP addresses and MAC addresses

You will recall the term **MEDIA ACCESS CONTROL (MAC) ADDRESS** from [Chapter 1](#).

This is a unique number that identifies a device connected to the internet. So what is the difference between an IP address and a MAC address? The IP address gives the location of a device on the internet, whereas the MAC address identifies the device connected to the internet.

You can think of the IP address as the address of the house you live in (it will have some unique way of identifying it, such as a post or zip code). Using this example, the

MAC address can be thought of as a way of uniquely identifying each person living in that house. It is possible to move house (so your IP address will change) but the same people will be living in the new house (so their MAC addresses will remain unchanged).

Hypertext Transfer Protocol (http)

Short for Hypertext Transfer Protocol, the underlying protocol used by the World. HTTP defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.

For example, when you enter a URL in your browser, this actually sends an HTTP command to the Web server directing it to fetch and transmit the requested Web page.

There is much more to HTTP than simply sending the message that an end user wants to see a web page.

Important to communication and the way the entire Internet works, the hypertext transfer protocol or HTTP is a necessary protocol.

The other main standard that controls how the World Wide Web works is HTML, which covers how Web pages are formatted and displayed.

HYPERTEXT TRANSFER PROTOCOL (HTTP) is a set of rules that must be obeyed when transferring files across the internet.

When some form of security (e.g. SSL certification or encryption) is used, then this changes to **https** (you also often see the padlock sign in the status bar).



The letter **s** after http refers to **http over secure**. It is slower to use https than http; https is usually only adopted where sensitive or private data is being transferred across the internet.

HTML

HTML is an abbreviation that stands for Hypertext Markup Language. It is the language of web pages the markup language that browsers read to render web pages.

HTML refers to a markup language that has several versions and web browsers and other user agents have varying levels of support for these versions. In general, the earlier a version is, the more browser support there is for that version.

HTML BASICS

To publish information for global distribution, one needs a universally understood language, a kind of publishing mother tongue that all computers may potentially understand. The publishing language used by the World Wide Web is HTML (from Hypertext Markup Language). HTML gives authors the means to:

Publish online documents with headings, text, tables, lists, photos, etc.

Retrieve online information via hypertext links, at the click of a button.

Design forms for conducting transactions with remote services, for use in searching for information, making reservations, ordering products, etc. Include spread-sheets, video clips, sound clips, and other applications directly in their documents.

HTML Examples

HTML is made up of elements with attributes, some of the most common ones you would see include:

<p> for paragraphs

<a> for links

<div> for dividing up sections of a page

HYPertext MARK-UP LANGUAGE (HTML) is used when writing and developing web pages. HTML isn't a programming language but is simply a mark-up language. A mark-up language is used in the processing, definition and presentation of text (for example, specifying the colour of the text).

HTML uses <tags> which are used to bracket a piece of code; for example, <td> starts a standard cell in an HTML table, and </td> ends it. Whatever is between the two tags has been defined. Here is a short section of HTML code:

```
<HTML>
<HEAD><TITLE>Our First Website</TITLE>
</HEAD>

<BODY>
<tr>
<td><h3>Small car</h3>
<h3>Used car sales</h3>
<h2>Cars from $500</h2>
<br><h2>Cash sales only</h2></td></br>
</tr>
<table border="1">
<colgroup>
<col span="2" style="background-color:red">
<col style="background-color:yellow">
</colgroup>
</BODY>
</HTML>
```

HTML structure and presentation

When writing HTML code, it is very important to realise that there is a difference between the structure and the presentation.

STRUCTURE is the essential part of the HTML document; it includes the semantics (meaning) and structural mark-up of the document.

PRESENTATION is the style of the document; i.e. how the document will look (or even sound if it includes multimedia elements).

These two features must be kept separate throughout the designing of a web page. At the end of the design process, the author should have an HTML document (which contains the structure and the actual content) and a separate **CSS (CASCADING STYLE SHEET)** file.

The css file will contain everything to control the actual presentation of the web page. Some of the <tags> used to create a css file have been shown already in the

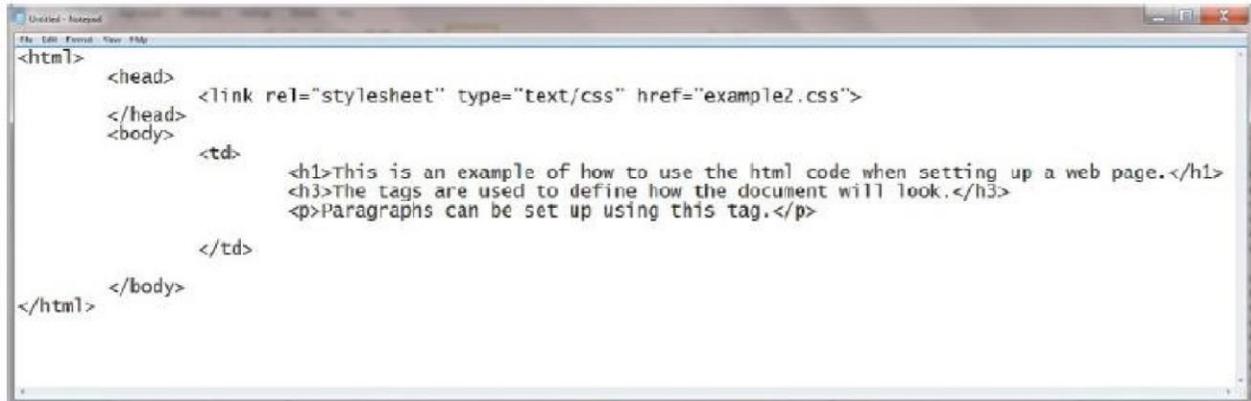
HTML example shown above. The following section shows an example of how these <tags> can be used to create a stylesheet called example2.css.

This is then used in a web page document. The tags (h1, h3 and p) all define how the document will look when this css file (stylesheet) is attached.



```
Untitled - Notepad
File Edit Format View Help
h1 {color:#444400;
    font-family:arial,sans-serif;
    text-align:center;
    font-size:32px}
h3 {color:#000040;
    font-family:serif;
    text-align:justify;
    font-size:16px}
p {color:#404040;
    font-family:sans-serif;
    text-align:justify;
    font-size:12px}
```

This shows how the css file (example2.css) is created for use in the document below; h1, h3 and p have all been defined, so when the file is attached below, a web browser knows how to display this web page



```
<html>
  <head>
    <link rel="stylesheet" type="text/css" href="example2.css">
  </head>
  <body>
    <td>
      <h1>This is an example of how to use the html code when setting up a web page.</h1>
      <h3>The tags are used to define how the document will look.</h3>
      <p>Paragraphs can be set up using this tag.</p>
    </td>
  </body>
</html>
```

Cookies:

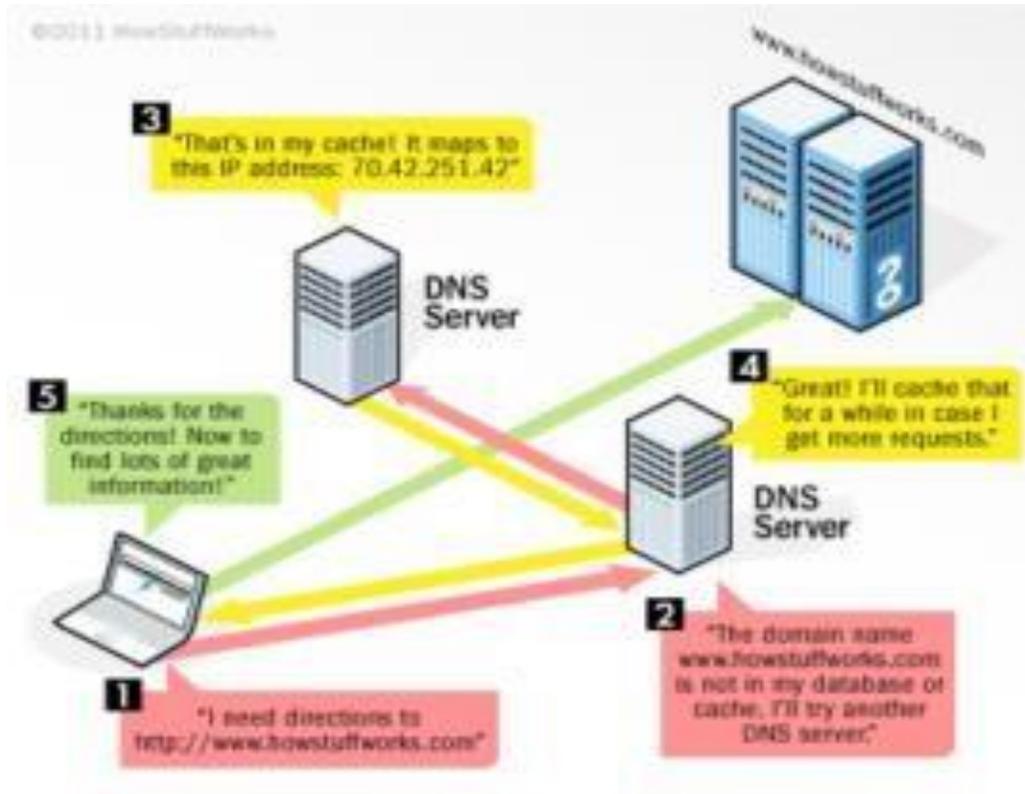
Cookies are very small text files placed on your computer by a Web server when you view some sites online (not all Web sites place cookies). They're used to store data about you and your preferences so that the Web server doesn't have to repeatedly request this information, potentially slowing down load time. Cookies are commonly used to store personal registration data like your name, your address, the contents of a shopping cart, and your preferred layout for a Web page, what map you might be looking at, and so on. Cookies make it easy for Web servers to personalize information to fit your specific needs and preferences when you're visiting a Web site.

Implications of Cookies:

The easiest answer is that cookies, in and of themselves, are completely harmless. However, some Web sites use them to track users as they browse the Web, collecting highly personal information and often discreetly transferring that information to other Web sites without permission or warning. This is why we often hear about Web cookies in the news.

Domain Name Server:

DNS: It's like your computer's GPS for the Internet. Its basic job is to turn a user-friendly domain name like "google.com" into an Internet Protocol (IP) address like 64.233.167.104 that computers use to identify each other on the network. Computers and other network devices on the Internet use an IP address to route your request to the site you're trying to reach. This is similar to dialing a phone number to connect to the person you're trying to call. Thanks to DNS, though, you don't have to keep your own address book of IP addresses. Instead, you just connect through a domain name server, also called a DNS server or name server, which manages a massive database that maps domain names to IP addresses.



Internet Protocol (IP) addresses

Every machine on a network has a unique identifier. Just as you would address a letter to send in the mail, computers use the unique identifier to send data to specific computers on a network. Most networks today, including all computers on the Internet, use the TCP/IP protocol as the standard for communicating on the network. In the TCP/IP protocol, the unique identifier for a computer is called its IP address.

There are two standards for IP addresses: IP Version 4 (IPv4) and IP Version 6 (IPv6). All computers with IP addresses have an IPv4 address, and many are starting to use the new IPv6 address system as well. Here's what these two address types mean: IPv4 uses 32 binary bits to create a single unique address on the network.



An IPv4 address is expressed by four numbers separated by dots. Each number is the decimal (base-10) representation for an eight-digit binary (base-2) number, also called an octet. For example: 216.27.61.137



IPv6 uses 128 binary bits to create a single unique address on the network. An IPv6 address is expressed by eight groups of hexadecimal (base-16) numbers separated by colons, as in

2001: cdba: 0000:0000:0000:0000:3257:9652. Groups of numbers that contain all zeros are often omitted to save space, leaving a colon separator to mark the gap (as in **2001: cdba: 3257:9652**).