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Hypertext Mark-up Language (HTML): The standard mark-up language for web pages.

HTML elements:

- Known as 'tags'
- The building blocks of HTML pages
- Represented by <> tags
- Can have attributes that provide additional information about the element

Web pages coded using HTML are read by web browsers, which then interpret the tags and render the page visually.

Hex colours need a # (e.g. #FF05E5).

<html>: Indicates the language used
<head>: Contains data about the page (metadata)
<title>: Gives the webpage a title in the bar at the top of the browser
<body>: Contains the contents of the page
<h1>: A large heading
<h2>: A medium sized heading (sub heading)
<h3>: A small heading (sub-sub heading)
<img>: Used to link an image to a webpage (the image is stored in a separate file).

- src: Specifies the path to the image
- alt: Specifies an alternate text for the image
- width: Specifies the width of the image
- height: Specifies the height of the image
- No closing tag

<a>: An anchor tag; Used to link a webpage to another webpage

- href: Indicates the link's destination.

<p>: Contains a paragraph of text
: Contains an item in a list
: Ordered list (numbers); requires two tags: one to signify the start and end of the ordered list (<ol>) and one for each list item (<li>). List items should be indented.
: Unordered list (bullet points); requires two tags: one to signify the start and end of the unordered list (<ul>) and one for each list item (<li>). List items should be indented.
<link>: Defines the relationship between the current document and an external resource.; no closing tag

- href: Indicates the link's destination
- rel = "stylesheet"

<style>: Used to define style information (CSS) for a document.
: Defines a division or a section in an HTML document, used as a container for HTML elements
<script>: Used to embed a JavaScript script. This script is executed by the client
<form>: Used to create an HTML form for user input.
<input>: Specifies an input field where the user can enter data.

- Textbox: type = “text”, attribute name gives a name
- Submit button: type = “submit”, attribute name gives a name

Cascading Style Sheets (CSS): Describes how HTML elements are to be displayed on screen

Embedded: An internal style sheet; used for a single HTML page; defined inside the <style> element, inside the head section.

```
<style>
ElementName {property:value;}
etc
</style>
```

Inline: Used for a single element; Add the style attribute to the element.

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<OpeningTag style = “property:value;”>
External: An external style sheet; used for an entire website; Add a reference to this file inside the <link> element, inside the head section.

background-color: Sets the background colour of an element.
border-color: Sets the colour of an element's four borders. This property can have from one to four values.
border-style: Sets the style of an element's four borders. This property can have from one to four values.
border-width: The border-width property sets the width of an element's four borders. This property can have from one to four values.
color (named & hex colours): Specifies the colour of text.
font-family: Specifies the font for an element. Can hold several fonts as a "fallback" system.
font-size: Sets the size of a font.
height: Sets the height of an element.
width: Sets the width of an element.

Selector: Selects the HTML element you want to style.
Elements: Selects HTML elements based on the element name
Identifier: Selects HTML elements based on the ID attribute
ID: For a single element, unique within a page, write a #, followed by the ID
Classes: Selects HTML elements based on the class attribute
Class: For multiple elements, write a . character, followed by the class name.

```
ElementName/.ClassName/#IDName {
        property:value;
        etc
}
```

By changing the contents of an HTML element

```
chosenElement = document.getElementById(“example”);
chosenElement.innerHTML = “Hello World”;
```

By writing directly to the document

```
document.write(“Hello World”);
```

By using an alert box

```
alert(“Hello World”);
```

JavaScript: used to calculate, manipulate and validate data in websites
<form>: Used to create HTML forms for user input; action = link to server
<input>: Specifies an input field where the user can enter data.

- Textbox: type = “text”, attribute name gives a name
- Submit button: type = “submit”, attribute name gives a name

<textarea>: Defines a multi-line text input control.

- rows = number of rows, cols = number of columns, attribute name gives a name

<button>: Defines a clickable button.

- type = “button”; onclick = “SpecifyFunction”

<select>: Used to create a drop-down list, attribute name gives a name
<option>: Inside a <select> element; defines the available options in the drop-down list, value = value sent to server
<optgroup>: Used to group related options in a <select> element (drop-down list). label = name of group
<fieldset>: Used to group related elements in a form.
<label>: Defines a label for several elements. for = ID of element
<output>: Used to represent the result of a calculation

When you submit a search on a search engine, it runs your request against its index.
Indexing: The process of a search engine collecting, sorting, and storing data in its index. Searching the index is very fast. It must be constantly updated to add new sites, remove old sites, and update broken links.

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Search engines use programs called spiders. They travel the WWW, index any pages, content, and metadata they find and map links between pages by following all hyperlinks. Thus, they continuously add to and update the index.

PageRank algorithm: Used to rank website pages, by checking the number and quality of links **to** a page to determine how important that page is. It assumes that more important websites are linked to by more websites.

$$PR(A) = (1-d) + d\ (PR(T1)/C(T1) + \ldots + PR(Tn)\ /C(Tn))$$

Original PageRank value of all pages = 1
PR(A) is the PageRank value of page A
C(Tn) is the total count of outbound links from web page n, including the inbound link to page A
PR(Tn)/C(Tn) is the share of the vote page A gets from pages T1 through Tn

> The average user will then end their browsing session or enter a n ew web address rather than following another link. Don't need to know the PageRank™ of any back-linked pages. You may need many iterations before the value stops homing in and finds the correct value. Once the final PageRank™ is achieved, the average PageRank™ of all pages will be 1.

PageRank value: The probability that a user will reach that website. Can be reached either by following a series of links, or by picking a website at random from the internet. After randomly picking a website, d is the probability that the user will follow a link from that website to another website (equates to around six clickthrough links). (1-d) is the probability that the user will pick a website at random from the Internet.

Client-Side Processing: Where the client does the processing, instead of the server. Often uses JS. Advantages: Reduces web traffic, reduces server load, no delays in processing local data. Disadvantages: Web browser needs JS to be enabled, difficult to index a JS-heavy page, need IT skills to write JS code.

Server-Side Processing: Where the server does the processing, instead of the client. Advantages: Clients do not need to have JS enabled, pages load faster, search engine friendly (easier to index), More secure. Disadvantages: Adds server loads and web traffic, needs considerable IT skills to write server code