Specification & learning objectives

A Level	Specification point description
1.3.4a	HTML, CSS and JavaScript
1.3.4b	Search engine indexing
1.3.4c	PageRank algorithm
1.3.4d	Server and client-side processing
1.3.3e	Client-server and Peer to Peer
	Lossy v lossless compression

Resources

PG Online textbook page ref: 130-153

Hodder textbook page ref: 222-232

CraignDave videos for SLR 12

Key question: How does a browser display a web page using HTML and CSS?

HTML: Hypertext Mark-up Language, this is the language that is used throughout the web and is how websites are coded, it makes up the millions of pages on the internet. It is a purely text based language that uses tags <example> </example>.

CSS: Cascading style sheets are used to change the appearance of headings and text and designs in html pages. It is used to make professional looking html pages and is the basis for changing certain aspects of a webpage such as the colours and the text.

JavaScript: JavaScript can be used to control the html web pages, and is a way of adding interactivity within a web page. Java script in html can be used for validating web forms, loading new content onto a webpage and for adding interactivity.

Key question: How does a browser display a web page using HTML and CSS?

The world wide web is mostly composed of web pages - text, images and code that can be rendered by a web browser application.
Web pages are written by people, and there is a common set of tools used to write them.

These tools include markup, style sheet, and programming languages such as:
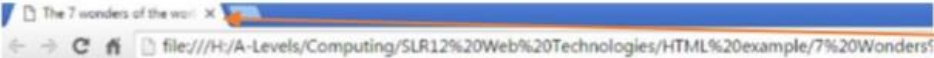•HTML
•CSS
•Javascript

It stands for Hypertext Markup Language. **Hypertext**, because it can allows sections of text to be connected by links. **Markup**, because it specifies the layout and style of a page, and **Language** because it has a grammar and syntax that must be followed.

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HTML Example

General HTML form
```
<html>
<head>
</head>
<body>
</body>
</html>
```

```
<html>
<head>
<title> The 7 wonders of the world</title>
</head>
<body>
<h1 style="Color:purple;"> welcome to our new page - the 7 seven wonders of the world</h1>
<img src="worldamnnnnn.jpg" alt="world" height="300px" width="400px">
<li><a href="file:///H:/A-Levels/Computing/SLR12%20Web%20Technologies/HTML%20example/Great%20pyramid%20of%20Giza.html">Great pyramid of Giza</a></li>
<li><a href="file:///H:/A-Levels/Computing/SLR12%20Web%20Technologies/HTML%20example/Great%20wall%20of%20China.html">Great wall of China</a></li>
<li><a href="file:///H:/A-Levels/Computing/SLR12%20Web%20Technologies/HTML%20example/Petra.html">Petra</a></li>
<li><a href="file:///H:/A-Levels/Computing/SLR12%20Web%20Technologies/HTML%20example/The%20colosseum.html">The Colosseum</a></li>
<li><a href="file:///H:/A-Levels/Computing/SLR12%20Web%20Technologies/HTML%20example/Chichen%20Itza.html">Chichén Itzá</a></li>
<li><a href="file:///H:/A-Levels/Computing/SLR12%20Web%20Technologies/HTML%20example/Machu%20Picchu.html">Machu Picchu</a></li>
<li><a href="file:///H:/A-Levels/Computing/SLR12%20Web%20Technologies/HTML%20example/Taj%20Mahal.html">Taj Mahal</a></li>
<li><a href="file:///H:/A-Levels/Computing/SLR12%20Web%20Technologies/HTML%20example/Christ%20the%20Redeemer.html">Christ the Redeemer</a></li>
</body>
</html>
```

The 7 wonders of the wor...
file:///H:/A-Levels/Computing/SLR12%20Web%20Technologies/HTML%20example/7%20Wonders?

Welcome to our new page - the 7 seven wonders of the world

- Great pyramid of Giza
- Great wall of China
- Petra
- The Colosseum
- Chichén Itzá
- Machu Picchu
- Taj Mahal
- Christ the Redeemer

Here's an example of the code for html and page that is displayed.

After the heading the image of the world is displayed using the <img> tag the name and size of the image have been assigned.

Then a list with bullet points has been used to create hyperlinks to other pages. Shown using <li> tag the hyperlinks have been bullet pointed. And using <a href> tag a hyperlink can be created.

The title between the <head> tag controls the actual tab title of the page, it has been set to "The 7 wonders of the world".

The <body> tag controls the main content of the page and is where you can change the appearance of the page.

In this case the first line of the page is the top heading <h1> and is the title of the page. The colour has been change to purple however a CSS style sheet could be used to change the style even more.

CSS Example

A stylesheet is used in order to change the headings within a HTML file. Within your HTML file you can add the link to your stylesheet created in CSS, whenever you use the tag <h1> the following rules will apply.

Stylesheets can be created in a variety of programs such as Microsoft expression and also notepad.

CSS allows you to make professional looking webpages. It is a way of setting up certain aspects of a webpage such as colours and styles but outside of HTML. Within HTML only basic colours and layouts and styles are allowed.

stylesheet.css ×

```
1  h1 {
2      font-family: Verdana;
3      font-size: medium;
4      color: #039;
5      background-color: #99CCFF;
6      border-width: 1px;
7      border-style: solid;
8      border-color: #039;
9      width: 50%;
10     height: 30px;
11 }
12
```

Changes the font of heading 1 to Verdana as well as changing the size to medium, only small medium and large sizes are available compared to the limitless on word.

The 'Color: #039' bit of code changes the colour of the text, the number used to change the colours is an accepted standard making hundreds of different colours available.

The next line of CSS code changes the background colour to '#99CCFF' which is actually a hexadecimal number allowing a lot more variations.

The next few lines of code create a border for the heading, the border is 1 pixel wide and is solid in thickness and is colour '#039'. It then also sets the size of the border.

Example of JavaScript

Java Script Example

Java Script can control HTML pages, it is a way of adding interactivity into a web page.

The code starts with the standard HTML structure.

The first line of code within the <body> section creates text displaying enter your information and is standard HTML.

The next bit of code creates a button calls it 'my Function' but labels it as 'Submit'.

After the button the section of Java Script code starts, it is triggered by the <script> tag.

```
<!DOCTYPE html>
<html>
<body>

<p>Enter your information:</p>

<button onclick="myFunction()">Submit</button>

<script>
function myFunction() {
    alert("Thank you for submitting!");
}
</script>

</body>
</html>
```

Enter your information:

Submit

In this, Java script has been added into the HTML page so that when the button 'Submit' is clicked it will display a pop up saying 'Thank you for submitting'.

On the right is the actual visuals that are displayed on the web page. It displays a bit of text 'Enter your information', this is then followed by a button called submit.

The code function myFunction() means that when the item myFunction() is clicked something will happen.

When the button is clicked an alert pops up displaying the message 'Thank you for submitting'.

Message from webpage

⚠ Thank you for submitting!

OK

JavaScript
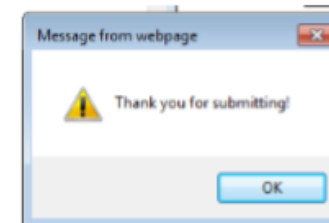
Key question: How do search engines work?

In the old days of the world wide web, you could only find pages by following links from one to another. These days, though, there are billions of individual websites with countless web pages.

Search engines are the solution. There are now many different search engines, each using their own technologies and algorithms to index web pages across the world wide web.

Key terms	
Search engine	Systems that locate resources (web pages, files, pictures) on the World Wide Web.
Search engine optimisation (SEO)	The ability to make a page easier to find on a search engine by altering certain factors about a page.
Web crawler	Internet bots that continuously crawl the web to discover and record publicly available web pages.
Spider	Another name for a web crawler.
Index	A database containing all of the webpages found by web crawlers, which is what users search to find webpages.
Metatag	Describe the content of a webpage which is hidden from users, but can be found by web crawlers to influence a page's PageRank.
PageRank	An algorithm developed to list search results in the order and rank of usefulness and relevance. Was created by the founders of Google.

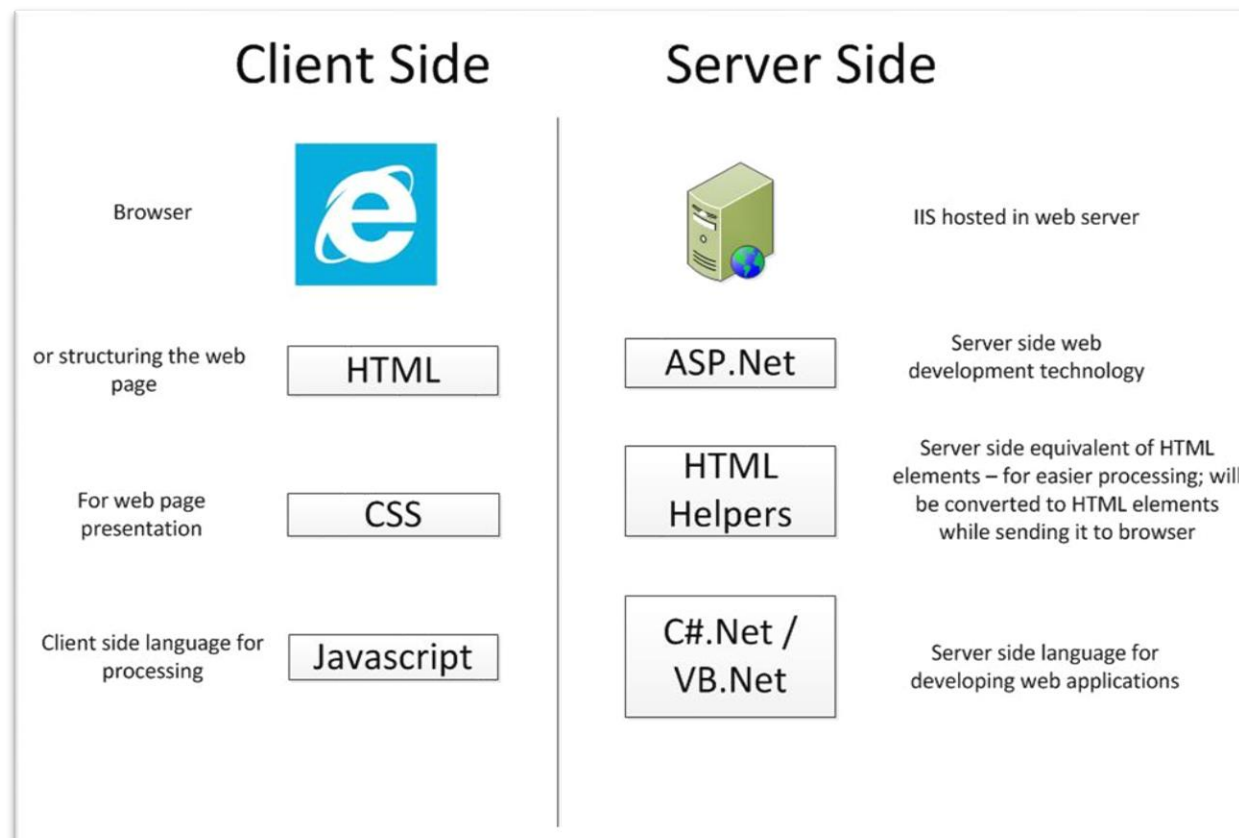Key question: How do search engines work?
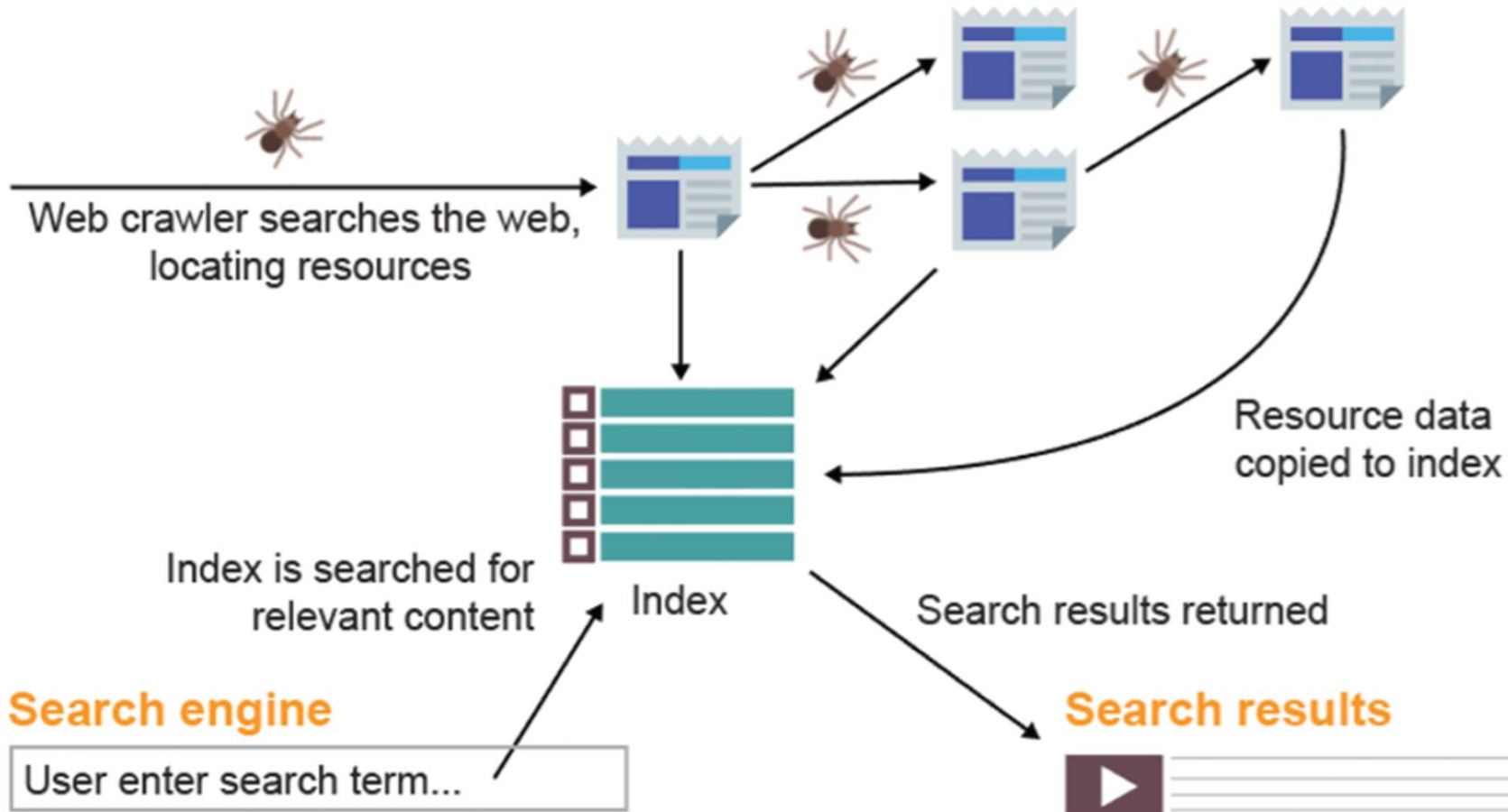
Key question: How is client and server-side processing used on dynamic web pages, and what are the advantages of each method?

On a **dynamic** website there are **client**-side and **server**-side scripts. Client-side and server-side are sometimes referred to as **front-end and back-end**. The client-side of a website refers to the **web browser** and the server-side is where the data and **source code** is stored.
Different types of processing can occur at each side.

Client Side	Server Side
Browser	IIS hosted in web server
or structuring the web page — HTML	ASP.Net — Server side web development technology
For web page presentation — CSS	HTML Helpers — Server side equivalent of HTML elements – for easier processing; will be converted to HTML elements while sending it to browser
Client side language for processing — Javascript	C#.Net / VB.Net — Server side language for developing web applications

Key question: How is client and server-side processing used on dynamic web pages?

Client-side scripts

A client-side script is a program that is processed within the client browser. These kinds of scripts are small programs which are **downloaded**, **compiled** and run by the browser. **JavaScript** is an important client-side scripting language and widely used in dynamic websites. The script can be embedded within the **HTML** or stored in an external file.

External scripts are sent to the client from the server when they are requested. Scripts can also be **executed** as a result of the user doing something like pressing a page button.

Client-side scripts can often be looked at if the user chooses to view the source code of the page. JavaScript code is widely copied and recycled.

Server-side scripts

A server-side script is processed on the web server when the user requests information. These kinds of scripts can run before a web page is loaded. They are needed for anything that requires dynamic data, such as storing user login details. Some common server-side languages include **PHP**, **Python**, **Ruby** and Java. These execute like programming languages on the server. When a server-side script is processed, the request is sent to the server and the result is sent back to the client. This is useful for websites which store large amounts of data, such as search engines or social networks - it would be very slow for the client browser to download all the data.

Typical exam questions

Paintball is a game where teams of players compete in an arena or outdoor zone shooting each other with pain gun pellets. A local paintball centre has just invested in new high-tech body armour which contains sensors. The players wears this body armour during the games and it automatically keeps tracks of how many times they have been hit by a paintball.

Below is an extract from the Paintball company's website. The web page is written in plain HTML.

Paintball Ultimate

Come choose us for the *Ultimate* experience, we provide you with:

- 200 Free paintballs
- Protective eye gear
- Paintball gun
- Full training

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1. Produce some HTML code which might have been used to produced this page. **[4]**

2. Development of the website is being taken over by another company. They have suggested it should be modernised. They have suggested including CSS and JavaScript to bring it more up to date. Explain what each of these web technologies are and suggest one way in which each could be used to enhance the web site. **[8]**

Component 1 | 1.3.4| Web technologies

Target: ☐   Overall grade: ☐

Minimum expectations & learning outcomes

☐	Terms 147-153 from your A Level Key Terminology should be included and formatted.
☐	You must include an annotated example of a short piece of HTML, CSS and JavaScript code.
☐	You must include a comparison of server and client-side processing, what occurs where and why?
☐	You must include a comparison of lossy vs. lossless compression *(AS level only)*.
☐	You must explain how search engines work including indexing of pages and the use of the PageRank algorithm.
☐	Answer the exam questions.

Feedback

Breadth	Depth	Presentation	Understanding
☐ All	☐ Analysed	☐ Excellent	☐ Excellent
☐ Most	☐ Explained	☐ Good	☐ Good
☐ Some	☐ Described	☐ Fair	☐ Fair
☐ Few	☐ Identified	☐ Poor	☐ Poor

Comment & action required

Reflection & Revision checklist

Confidence	Clarification
☹ ☺ ☺	Candidates need to understand the purpose of HTML, CSS and JavaScript.
☹ ☺ ☺	Candidates need to know when each language/markup would be used, and what its purpose and function is.
☹ ☺ ☺	Candidates should have experience of writing webpages using HTML, CSS and JavaScript.
☹ ☺ ☺	Candidates need to be able to recognise the code in Appendix 5d, and be able to read, write, amend and interpret code using HTML, CSS and JavaScript.
☹ ☺ ☺	Candidates need to understand the need for compression (when transferring data over a network).
☹ ☺ ☺	Candidates need to understand the difference between lossy and lossless compression, and the benefits and drawbacks of each type.
☹ ☺ ☺	Candidates need to be able to recommend a type of compression for a given scenario.
☹ ☺ ☺	Candidates should understand how and why search engine results are indexed. They should understand how PageRank ranks these results.
☹ ☺ ☺	Candidates should understand how page rank works at a high level but are not expected to be able to code the algorithm.
☹ ☺ ☺	Candidates need to understand the difference between server and client-side processing and should be aware of examples (for example Javascript code vs PHP code) of processing on both sides.
☹ ☺ ☺	Candidates should be aware of the benefits and drawbacks of both types of processing.