1.2.3

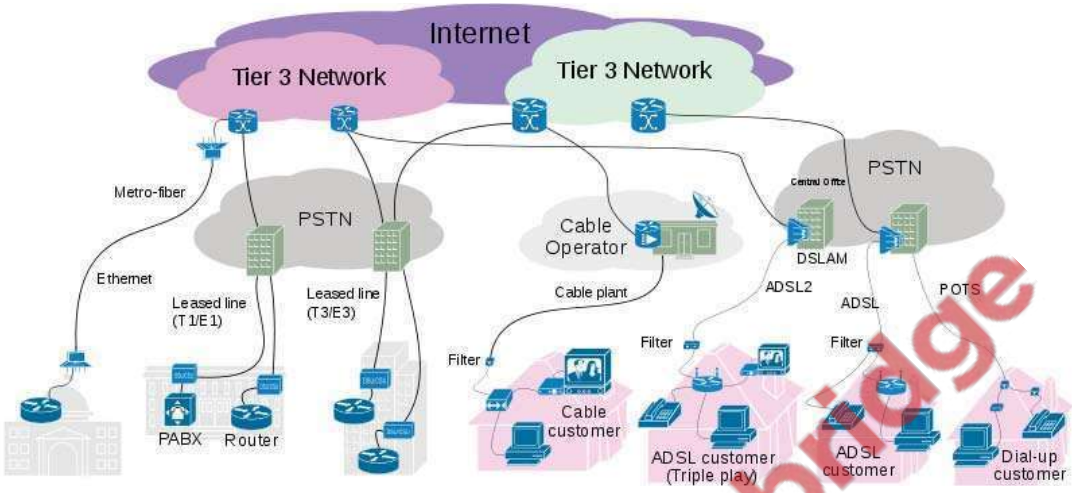
Internet Principle Of Operation

For

IGCSE

1.2.3 Internet principles of operation

Internet Service Provider (ISP):



https://en.wikipedia.org/wiki/Internet_service_provider

An **Internet service provider** (**ISP**) is an organization that provides services for accessing, using, or participating in the Internet. Internet service providers may be organized in various forms, such as commercial, community-owned, non-profit, or otherwise privately owned.

Internet services typically provided by ISPs include Internet access, Internet transit, domain name registration, web hosting, Usenet service etc.

Web browser

https://www.techopedia.com/definition/288/web-browser

A web browser is a software program that allows a user to locate, access, and display web pages. In common usage, a web browser is usually shortened to "browser." Browsers are used primarily for displaying and accessing websites on the internet, as well as other content created using languages such as Hypertext Markup Language (HTML) and Extensible Markup Language (XML).

Browsers translate web pages and websites delivered using Hypertext Transfer Protocol (HTTP) into human-readable content. They also have the ability to display other protocols and prefixes, such as secure HTTP (HTTPS), File Transfer Protocol (FTP), email handling (mailto:), and files (file:). In

addition, most browsers also support external plug-ins required to display active content, such as in-page video, audio and game content.

IP Addressing

An Internet Protocol (IP) address is a unique 32-bit reference number that is allocated to devices on a computer network that uses the Internet Protocol.

Although IP addresses are stored as 32-bit numbers, for our convenience they are usually displayed as a series of 4 decimal numbers, each one representing 8 bits of the original binary address.

32-bit binary version: 11001001101000000101101101111111

Decimal version: 201.64.182.255

Some IP addresses are reserved for private network ranges e.g.

10.0.0.0 - 10.255.255.255

172.16.0.0 - 172.31.255.255

192.168.0.0 - 192.168.255.255

IPv4

IPv4 is the most widely deployed Internet protocol used to connect devices to the Internet. IPv4 uses a 32-bitaddress scheme allowing for a total of 2^32 addresses (just over 4 billion addresses).

IPv6

IPv6 addresses are 128-bit IP address for a total of 3.4x10^38 computers.

IPv6 is written in hexadecimal and separated by colons.

An example IPv6 address could be written like this: **3ffe:1900:4545:3:200:f8ff:fe21:67cf**

Example Question 2.3:

The table shows four statements about IP addresses.

Tick (✓) to show which of the statements are true.

Statement	**True (✓)**
The IP address consists of any number of digits separated by single dots (.)	
Each number in an IP address can range from 0 to 255	
IP addresses are used to ensure that messages and data reach their correct destinations	
Public IP addresses are considered to be more secure than private IP addresses	

Internet Server

Internet server (web server) is a special computer, on which websites are stored. Web Server is constantly switched on and connected to the Internet so that each Internet user around the world can access website at all times. This computer is built up with selected high quality components, which can endure incessant work and high load.

Internet **servers** make the Internet possible. All of the machines on the Internet are either servers or **clients**. The machines that provide services to other machines are servers. And the machines that are used to connect to those services are clients. There are Web servers, e-mail servers, FTP servers and so on serving the needs of Internet users all over the world.

When you connect to www.ruknuddin.com to read a page, you are a user sitting at a client's machine. You are accessing the Ruknuddin Web server. The server machine finds the page you requested and sends it to you. 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 server machine. For example, if you are running a Web browser on your machine, it will want to talk to the Web server on the server machine, not the e-mail server.

A server has a static IP address that does not change very often. A home machine that is dialing up through a modem, on the other hand, typically has an IP address assigned by the ISP every time you dial in. That IP address is unique for your session -- it may be different the next time you dial in. This way, an ISP only needs one IP address for each modem it supports, rather than one for each customer.

HTTP

Short for ***H**yper **T**ext **T**ransfer **P**rotocol*, the underlying protocol used by the World Wide Web. 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.

Uniform Resource Locator (URL):

URL stands for Uniform Resource Locator. It is the address of a web page. Each page has its own unique web address (URL).

This is how a computer locates the web page that user is trying to find.

In this example

- “http” enables browser to know what protocol is being used to access information in the domain
- “ruknuddin.com” is called the domain name.
- "computer2210.html" refers to the specific page.

URL encoding:

Web addresses can be written using hexadecimal rather than denary. Hexadecimal codes are preceded by a % sign. For example, the word "**www.ruknuddin.com"** is written as:

	r	u	k	n	u	d	d	i	n
in hex	%72	%75	%6B	%6E	%75	%64	%64	%69	%6E

w	w	W	.	r	u	k	n	u	d	d	i	n	.	c	o	m
%77	%77	%77	%2E	%72	%75	%6B	%6E	%75	%64	%64	%69	%6E	%2E	%63	%6F	%6D

Some characters are not allowed in URL. URL encoding converts characters into a format that can be transmitted over the Internet.

For example

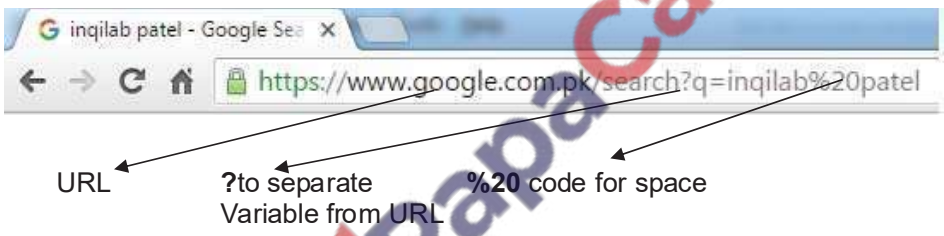
- %20 – is used in URL in place of <space> not allowed in a URL, %20 is the coding for a space (32 in denary)
- ? – separates the URL from all parameters or variables
  e.g. for query to search Inqilabpatel in Google

https://www.google.com.pk/search?q=inqilab%20patel

here **"q"** is variable for query "**?**" separates it from URL

"https://www.google.com.pk/search"

while**"%20"** is used for the space between **"inqilab" and "patel"**



Example Question 2.4:

Consider the URL:

http://cie.org.uk/computerscience.html

(i) Give the meaning of the following parts of the URL.

http .....

.....

cie.org.uk .....

.....

.....

computerscience.html .....

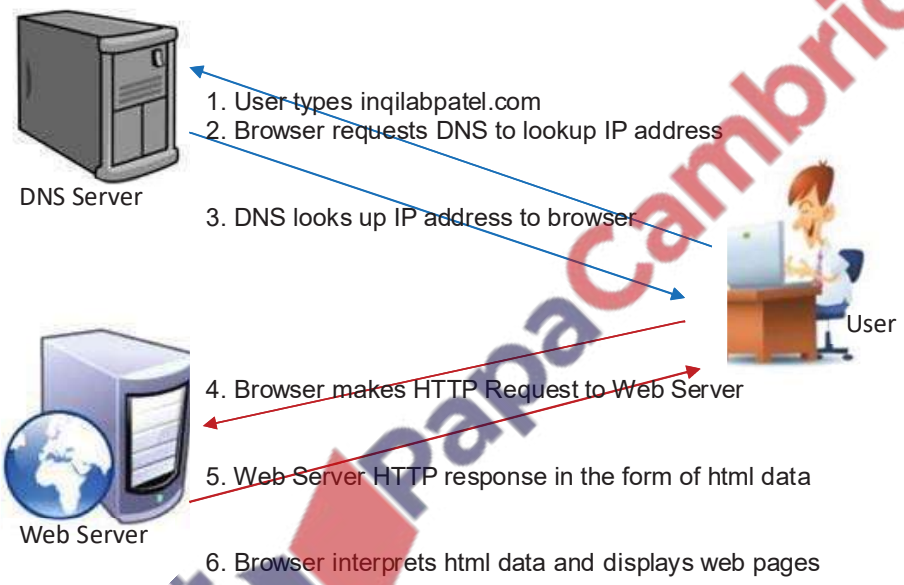
……

…… [3]

Domain Name Server (DNS):

Domain Name Servers (DNS) are the Internet's equivalent of a phone book. They maintain a directory of domain names and translate them to Internet Protocol (IP) addresses.

1. User types URL of a website in web browser address bar.
2. The web browser sends the request of URL to DNS of internet service provider (ISP).
3. DNS searches the IP address of the URL.
4. URL is translated into machine friendly IP address by DNS.
5. The translated IP address is sent to browser.
6. Browser sends http get command to the server of the IP address where website is hosted.
7. The web server sends HTML data to the client web browser.
8. Web page is displayed on client's browser.



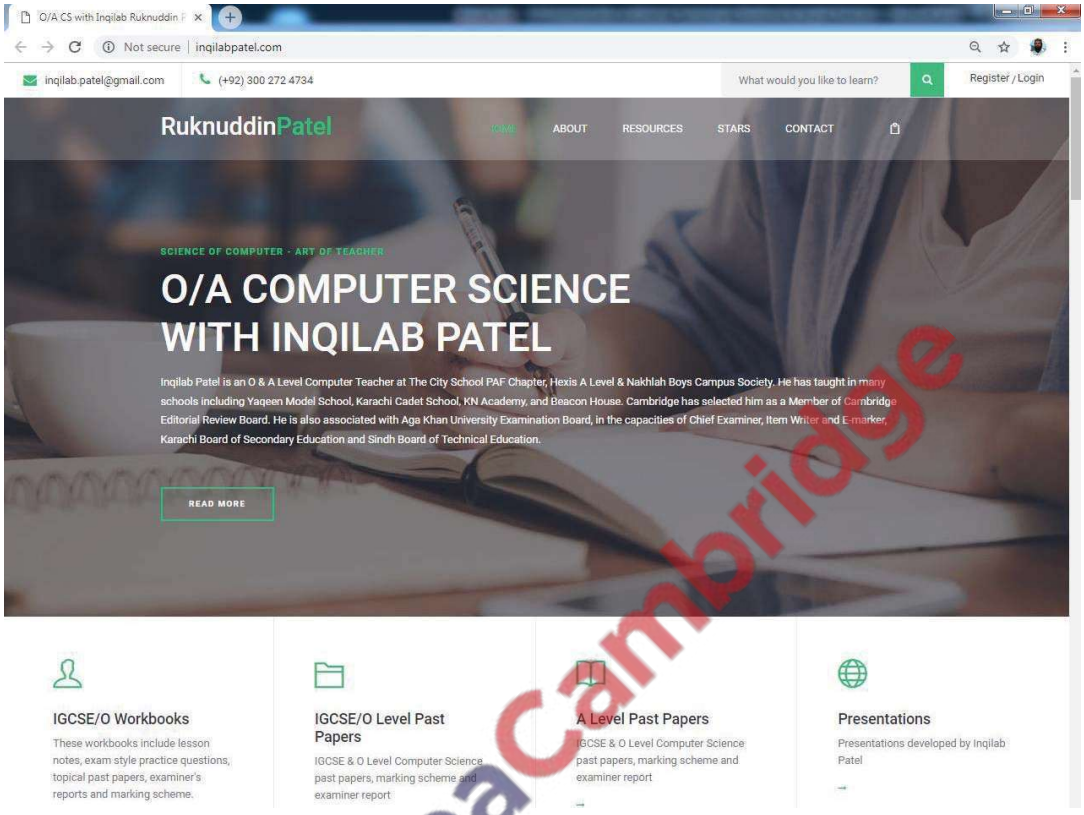
Example Question2.5:

A web page offers a link for users to request another web page. The requested web page contains HTML code.

Put each statement in the correct sequence by writing the numbers 1 to 5 in the right-hand column.

Statement	Sequence No
The requested web page is displayed on the client computer	
The user clicks on the hyperlink and the web page is requested from the web server	
The requested web page content is transmitted to the client computer	
The client computer processes the html code using the web browser software	
The web server locates the requested web page	

WEB DESIGN



A web page is created by writing code in a language called HTML.

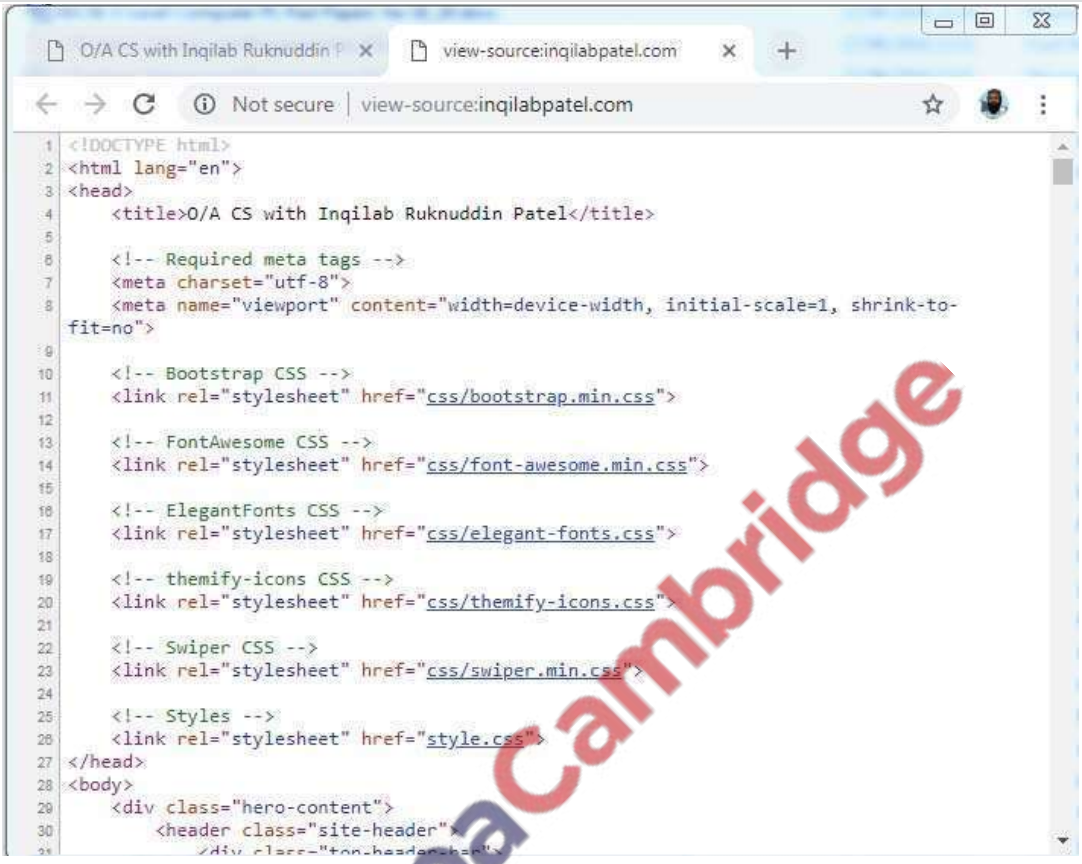
HTML stands for Hyper Text Mark-up Language. It was developed especially to create web pages.

You may be looking at a web page right now and thinking "where is this HTML" - I can't see it.

To see the HTML code of most web pages take these steps:

1. View the page in a web browser.
2. Right click your mouse over the page text and a small menu will appear close to the mouse (right clicking over a picture gives you a different menu) Click on the "View Source" in the menu list.
3. A page full of words and symbols will appear in a separate window

This is the HTML code that makes up the web page you are viewing.



This is what html looks like.

All the coloured text surrounded by **<>** are html 'tags'.

Creating pages using a text editor

Advantages	Disadvantages
Very flexible as you have complete control of the HTML code	You have to know a lot about HTML code
Low cost - Notepad is free with Windows. And there are plenty of 'freeware' text editors available on the Internet.	Slow, as all the code has to be written by hand.
	Easy to make a mistake.
	You have to save the file and look at it in a web browser to see what it actually looks like.

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

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

HTML presentation is format of webpage.
CSS is used to define presentation for web pages, including the design and variations in display for different devices and screen sizes.

When a browser reads a style sheet, it will format the HTML document according to the information in the style sheet.

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Three Ways to Insert CSS

There are three ways of inserting a style sheet:

- External style sheet
- Internal style sheet
- Inline style

External Style Sheet

With an external style sheet, you can change the look of an entire website by changing just one file!

Each page must include a reference to the external style sheet file inside the <link> element. The <link> element goes inside the <head> section:

```
<html>
<head>
<link rel="stylesheet" type="text/css" href="mystyle.css">
</head>
<body>

<h1>In the name of Allah</h1>
<p>TheCity School, PAF Chapter</p>

</body>
</html>
```

An external style sheet can be written in any text editor. The file should not contain any html tags. The style sheet file must be saved with a .css extension.

Here is how the "myStyle.css" looks:

```
body   {
          background-color: #0000ff;
        }

h1       {
        color: 000089;
        margin-left: 20px;
        }
```

Internal Style Sheet

An internal style sheet may be used if one single page has a unique style.

Internal styles are defined within the <style> element, inside the <head> section of an HTML page:

Example:

```
<html>
<head>
<style>
        body {
                background-color: #0000ff;
                }
        h1 {
                color: #980000;
                margin-left: 40px;
        }
</style>
</head>
<body>

        <h1>In the name of Allah</h1>
        <p>The City School, PAF Chapter. </p>

</body>
</html>
```

Inline Styles

An inline style may be used to apply a unique style for a single element.

To use inline styles, add the style attribute to the relevant element. The style attribute can contain any CSS property.

The example below shows how to change the color and the left margin of a <h1> element:

```
<html>
<body>

<h1 style="color: #0000f8; margin-left: 30px ;"> In the name of Allah</h1>
<p>The City School PAF Chapter. </p>

</body>
```

```
</html>
```

Example Question2.6:
HTML code for a website is given below:

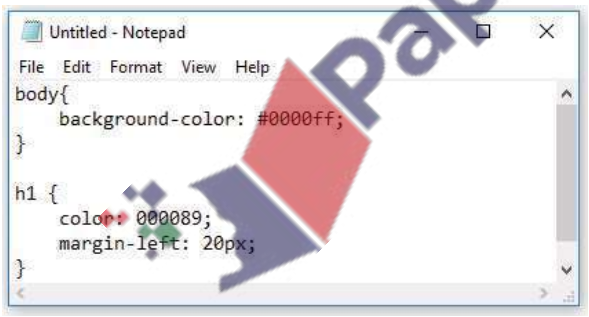
```
<html>
<head>
<title> O Level Computer Science with Inqilab Patel</title>
<style>
body {
    background-color: #0000ff;
}
h1 {
    color: #980000;
    margin-left: 40px;
}
</style>
</head>
<body>

<h1>In the name of Allah</h1>
<p>The Cambridge O Level Computer Science syllabus enables learners
to develop an interest in computing and gain confidence in computational
thinking and programming. Cambridge O Level Computer Science
is an ideal foundation for further study at Cambridge International
A Level, and the skills learnt can also be
used in other areas of study and in everyday life.</p>

</body>
</html>
```

Which lines in the webpage script are related to presentation (style) code?

..... [1]

3 Look at the following two types of files.

a



b

a. Which of the above parts shows the .css file?

..... [1]

Using parts (a) and (b) above differentiate between HTML structure and presentation.

.....

.....

.....

..... [2]

b. Show how a tag is closed

…… [1]