Chapter 9
Web services

Computer Science

Class XII (As per CBSE Board)

Web services

Web service - is a standardized medium,protocol or language to propagate communication between the client and server applications on the World Wide Web. A web service is a software module that is designed to perform a certain set of tasks.

Web services are invoked by the user directly or indirectly to provide services to the program/software which is being used as a part of WWW.User may be unaware about such web services.

The web services can be searched for over the network and can also be invoked accordingly.

When invoked, the web service would be able to provide the functionality to the client, which invokes that web service.

Web services

Many people think that the internet and the world wide web (WWW) are the same thing. While they are closely linked, they are very different systems.

The internet is a huge network of computers all connected together. The world wide web ('www' or 'web' for short) is a collection of webpages found on this network of computers. Our web browser uses the internet to access the web.

The World Wide Web is a way of exchanging information between computers on the Internet, tying them together into a vast collection of interactive multimedia resources.

World Wide Web was created by Timothy Berners Lee in 1989 at CERN in Geneva. World Wide Web came into existence as a proposal by him, to allow researchers to work together effectively and efficiently at CERN. Eventually it became World Wide Web.

Web architecture –
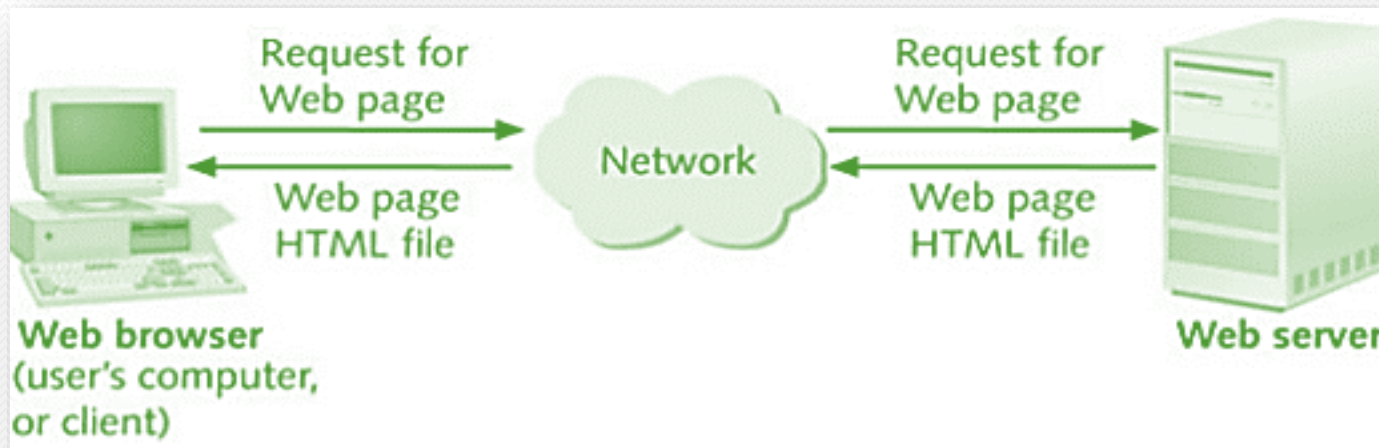
Web is a two – tiered architecture.

- A web browser display information contents
- Web server that transfers information to the client

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HTML – Hyper text markup language is a document design language not a programming language. It provide various kinds of tags(commands) used to define the structure and appearance of web page.

HTML was created by Sir Tim Berners-Lee in late 1991 but was not released officially, which was published in 1995 as HTML 2.0. HTML5 is the latest evolution of the standard that defines HTML.

Basic structure of HTML document –

```
<html>
        <head>
                <title>simple document</title>
        </head>
        <body>
                <p>a simple paragraph</p>
        </body>
</html>
```

Save above content in text editor with .html extension and open it in web browser to run it(tags).Generally/Most of the tags are written as part of <body> tag.

List of HTML Tags

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Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

XML is Platform Independent and Language Independent: The main benefit of xml is that we can use it to take data from a program like Microsoft SQL, convert it into XML then share that XML with other programs and platforms. You can communicate between two platforms which are generally very difficult.

Difference between HTML and XML

BASIS FOR COMPARISON	XML	HTML
Expands to	Extensible Markup Language	Hypertext Markup Language
Basic	Provides a framework for markup	HTML is predefined markup language.
Structural	Information Provided	Does not contain structural information
Language type	Case sensitive	Case insensitive
Purpose of the language	Transfer of information	Presentation of the data
Errors	Not allowed	Small errors can be ignored.
Whitespace	Can be preserved.	Does not preserve white spaces.
Closing tags	Compulsory to use closing tags.	Closing tags are optional.
Nesting	Must be properly done.	Not much valuable.

Structure of XML Document System

A XML Document is intended to display data like HTML. An XML document system comprises the following-

☐ **Style Sheet (CSS or XSL)**

It defines the style (How it would appear i.e. font, color, size alignment etc.) of the elements.

☐ **Grammar Structure (DTD)**

It is optional component in XML document system and defines the Rules of the document (Tag definitions).

☐ **XML File**

It contains and describes actual data.

How to Prepare XML Document

In order to prepare XML Document system, you may do the following steps-

❑ **Prepare XML document file as per problem**

    XML document is divided into two part.

      1. **The Prolog :**

        Preface or Introduction to the XML document. It includes An XML declaration, Comments etc.

      2. **The Data Instance :**

        It contains actual data.

❑ **Prepare a style-sheet file for XML file**

    It contains style rules that tells a browser how to display an XML document.

❑ **Link the XML file with Style sheet**

Example to create XML document
❑ Expected View on Browser

Suppose we want to make an XML document which is displayed in browser as shown here

Computer Parts

Mother Board

    Asus

    P3B-F
    1230.00

TFT Monitor

    LG Electronics
    995e
    8500.00

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❑ **Preparation of XML (test.xml) document**

```
<?xml version="1.0" encoding = UTF-8"  ?>
<?xml-stylesheet type="text/css" href="parts.css"?>
<PARTS>
<TITLE> Computer Parts </TITLE>
   <PART>
   <PARTNAME>Mother Board</PARTNAME>
   <MANUFACTURER>Asus</MANUFACTURER>
   <MODEL>P3B-F</MODEL>
   <COST>1230.00</COST>
   </PART>
   <PART>
   <PARTNAME>TFT Monitor</PARTNAME>
   <MANUFACTURER>LG Electronics</MANUFACTURER>
   <MODEL>995e</MODEL>
   <COST>8500.00</COST>
   </PART>
</PARTS>
```

Linking of .css (Style Sheet) file

Data Instance

❑ **Preparation of StyleSheet (part.css) file**

PARTS   {display:block}

TITLE   {display:block; font-fanily:arial; color:#008000;
                 font-weight:600; font-size:16 margine-top:12pt;
                 text-align:center}

PART   {display:block}

PARTNAME   {display:block; font-fanily:arial; color:#008000;
                 font-weight:400; font-size:14 margine-left:10pt;
                 margin-top: 10pt}

MANUFACTURER {display:block; font-fanily:arial; color:#600060;
                 font-weight:400; font-size:14 margine-left:30pt;
                 margin-top: 10pt}

MODEL   {display:block; font-fanily:arial; color:#600060;
                 font-weight:400; font-size:14 margine-left:30pt;
                 margin-top: 10pt}

COST   {display:block; font-fanily:arial; color:#800000;
                 font-weight:400; font-size:14 margine-left:30pt;
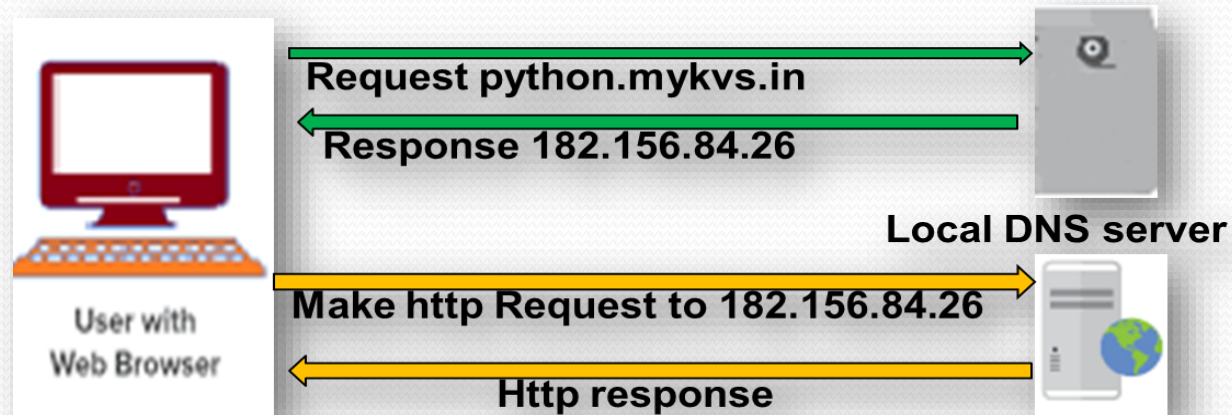   margin-left: 5pt}

HTTP - HTTP stands for hypertext transfer protocol and is used to transfer data across the Web. It allow users of the World Wide Web to exchange information found on web pages. When accessing any web page entering http:// in front of the address tells the browser to communicate over HTTP.

How It Works-

It is a connectionless text based protocol. Clients (web browsers) send requests through *request object* of http to web servers for web pages / images etc.Web server respond accordingly through *response object* of http After this cycle(request – response), the connection between client and server across the Internet is disconnected. A new connection must be made for each request(means for each web page).
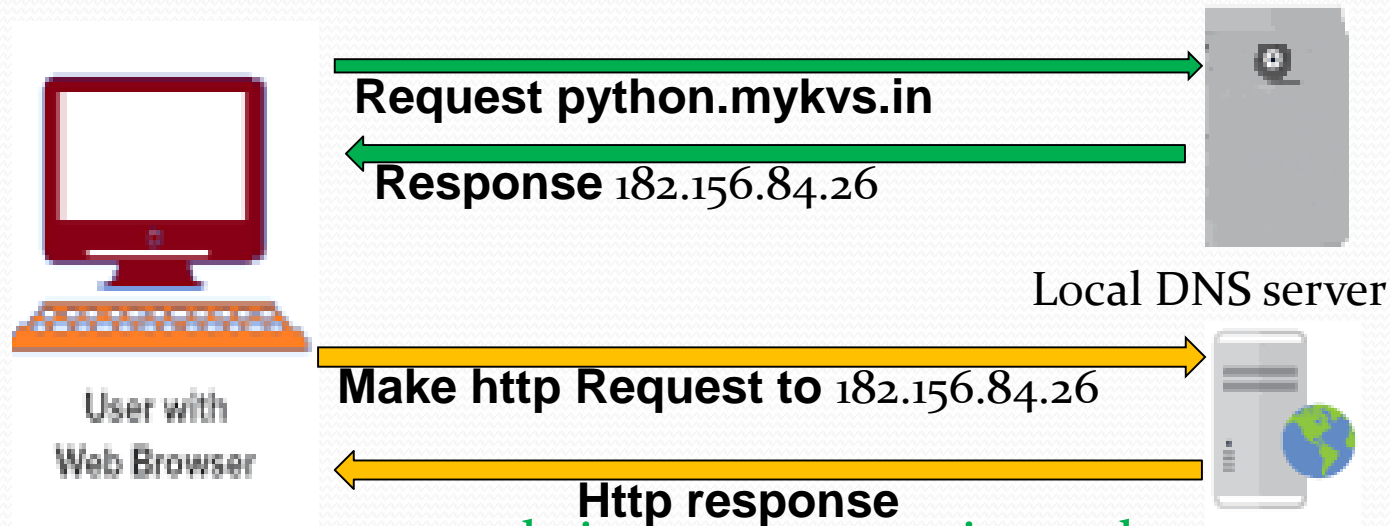
This diagram shows the working of http protocol. Working with dns server and working with web Server both.

Request python.mykvs.in
Response 182.156.84.26

Local DNS server

Make http Request to 182.156.84.26
Http response

User with
Web Browser

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DNS –The Domain Name System, translates human readable domain names (for example, www.python.mykvs.in) to machine readable IP addresses (for example, 182.156.84.26). ... DNS servers translate requests for names into IP addresses.

Request python.mykvs.in

Response 182.156.84.26

Local DNS server

Make http Request to 182.156.84.26

Http response

User with
Web Browser

A domain name is our website name. e.g. in python.mykvs.in , in is primary domain,mykvs is subdomain of in and python is subdomain of mykvs.

Generic domain name - .com,.edu,.gov,.mil,.net,.org etc

Country specific domain name - .in for india,.us for united states

Visit : python.mykvs.in for regular updates

URL –Uniform Resource Locator is defined as the global address of documents and other resources on the World Wide Web. The URL is an address that sends users to a specific resource online, such as a webpage, video or other document or resource.
e.g.

http://python.mykvs.in/syllabus/cs12.pdf

protocol   subdomain domain name   path

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Web page - A html document which can be displayed in a web browser.

Website - A collection of web pages which are grouped together and usually connected together in various ways. Often called a "web site" or simply a "site."

Web browser – A software which interpret html document and display them in human readable form is known as web browser. E.g. Firefox, Google Chrome, Opera, Microsoft Internet Explorer or Edge, or Apple's Safari. These are also often called just "pages."

Web server – A software which host website and return web pages to web client(web browser) on request. E.g. Apache Tomcat, Microsoft's Internet Information Services (IIS) Windows Server , Nginx web server , Jigsaw , Zeus web server

Domain Name-Domain name is the address of your website that people type in the browser's URL bar to visit your website.

Web hosting - Web hosting is the place where all the files of your website live. It is like the home of our website where it actually lives.

A good way to think about this is if the domain name is the address of our house, then web hosting is the actual house that address points to. All websites on the internet, need web hosting.

Domain names and web hosting are two different services. However, they work together to make websites possible.It is possible with the system known as DNS.

There are four main types of web hosting:

- Shared hosting – share by multiple domains/web sites.
- VPS (virtual private server) hosting - The main server is split into multiple virtual servers—hence the name. These virtual servers can be customized by individual websites.
- Dedicated hosting - Websites being hosted on a dedicated server have complete technical control over the server settings. We choose the software, configurations, and anything else we need.
- Cloud hosting - Cloud hosting plans come with multiple remote servers. Each server has different responsibilities. If one of the servers is compromised or has a problem, the other servers on the network will take over those responsibilities and pick up the slack.

Web script - A computer programming language for adding dynamic capabilities to World Wide Web pages. The CGI component on the server contains small programs called scripts that take information from the browser system or provide it for display.

Scripting languages are like programming languages that allow us to write programs in form of script. These scripts are interpreted not compiled and executed line by line. Two types of scripting languages are used.

* Client Side Scripting languages
* Server Side Scripting languages

Client Side Scripting

Server Side Scripting
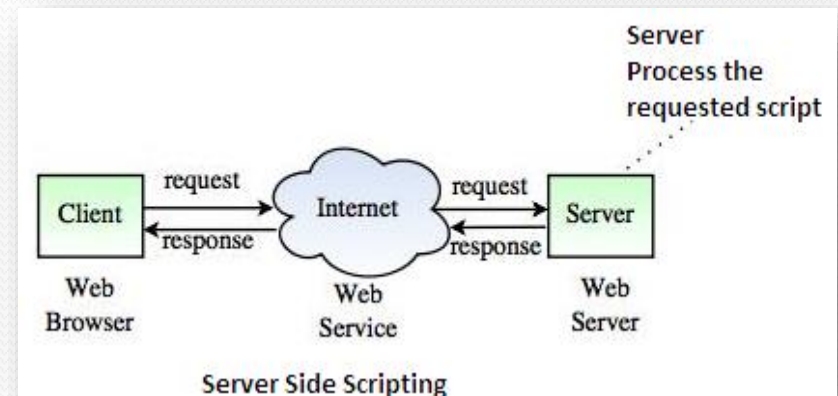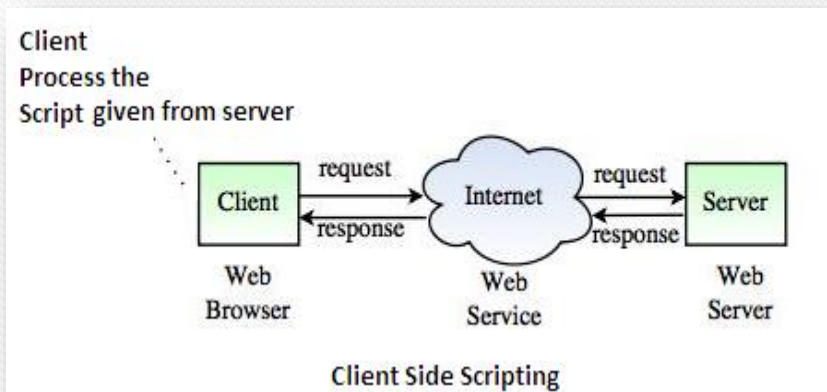
Client-side Scripting - refers to the programs that are executed on client-side. Client-side scripts contains the instruction for the browser to be executed in response to certain user's action. Suppose we want to develop web page for simple calculation then client side scripting must be preferred as the numbers will be entered at the client side and can be executed at client computer. If such data are to be processed at server end then suppose 100 user calculate then 100 threads of process will be running over the server as a result server speed will be slowed down.

Following table describes commonly used Client-Side scripting languages:

- JavaScript- It is a prototype based scripting language. It inherits its naming conventions from java. All java script files are stored in file having .js extension.

- VBScript - It is an open source web programming language developed by Microsoft. It is superset of JavaScript and adds optional static typing class-based object oriented programming.

- PHP is an acronym for "PHP: Hypertext Preprocessor" ,is a widely-used, open source scripting language & is free to download and use run on both

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Sever-side scripting acts as an interface for the client and also limit the user access the resources on web server. It can also collects the user's characteristics in order to customize response.Suppose a user login in a web application then user will enter user name and password ,which will be sent to server end and will be checked at server only for login purpose.

- ASP-Active Server Pages (ASP)is server-side script engine to create dynamic web pages. It supports Component Object Model (COM) which enables ASP web sites to access functionality of libraries such as DLL.

- Java Server Page (JSP) - is a technology for controlling the content or appearance of Web pages through the use of servlets, small programs that are specified in the Web page and run on the Web server to modify the Web page before it is sent to the user who requested it. Sun Microsystems, the developer of Java, also refers to the JSP technology as the Servlet application program interface (API). JSP is comparable to Microsoft's Active Server Page (ASP) technology.

- PHP is an acronym for "PHP: Hypertext Preprocessor" ,is a widely-used, open source scripting language & is free to download and use run on both client and server.