BACHELOR OF COMPUTER APPLICATIONS

SEMESTER *5*

DCA3101

WEB DESIGN

Unit 2

World Wide Web

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1. INTRODUCTION

In previous unit, you have studied the concepts about internet.in this unit you will study the World Wide Web (WWW). The web is built on the internet and makes use of many of the mechanisms the internet provides. But most of the people confuse the term internet with World Wide Web. Internet is the physical aspects of computers, networks servers. WWW is an abstraction and set of services on the top of internet. In this unit you will study about web browsers,web servers, web applications and how to develop web site, webpages,search enginesand plug-ins.

1.1 Objectives:

After studying this unit, you should be able to:

- *Describe world wide web*
- *Explain web client and server*
- *Construct the web site?*
- *Define Webpages.*
- *Explain the role of search engine and related plug-ins*

1.2 Introduction To World Wide Web

The World Wide Web (WWW) and the Internet offer new horizons to reach modern global audience. The World Wide Web is a structure of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia which can navigate through hyperlinks. It is a collection of internet resources, hyperlinked text, audio, and video files, and remote sites that can be accessed and searched by browsers based on standards such as HTTP and TCP/IP. Also called the web, it was created in 1989 by the UK physicist Tim Berners-Lee while working at the European Particle Physics Laboratory (called CERN after its French initials Conseil Europeen de Recherches Nucleaires) in Switzerland, as an easier way to access information scattered across the internet.

Tim Berners-Lee outlined his idea for information management in March 1989 under the title Information Management a Proposal, which called for the creation of a shared network for data sharing. The CERN disagreed and rejected this. The original work on the web began in September 1990.The three core web technologies were created in October 1990. HTML, URI, and HTTP were among them. The first web page has been published on the public internet by 1990's end. The community was made accessible to users outside of CERN in 1991.The World Wide Web Consortium, an international group dedicated to creating open web standards, was established in 1994. The majority of users currently utilize the Web 2.0 version. A data-driven and Semantic Web has been proposed as part of Web 3.0, which focuses on employing a machine-based understanding of data.

Features of WWW

The features provided by the WWW are:

- **HyperText Information System:** Hypertext is a method of connecting associated text pages that enables user engagement. Any word or phrase in a hypertext document has the ability to "hyperlink" to information about that word or phrase located in either the current document or another document.
- **Cross-Platform:** Cross-platform apps are those that have built-in web languages like JavaScript and may later be converted for example, using React Native into native apps that can run on any device or operating system.
- **Distributed :** In this case, a client can use a browser to access the services provided by a server. Typically, these services are dispersed throughout a number of sites or websites. A massive global collection of documents known as web pages make up the web from the user's perspective.
- **Open Standards and Open Source:** An open standard is one that can be freely adopted, used, and updated. The open standards XML, SQL, and HTML are just a few well-known examples. Companies in a certain sector cooperate on open standards because doing so enables them to provide their clients and themselves enormous benefits. Open-source software is computer code that has been made available under a

license that allows users to use, examine, modify, and share it with anybody for any reason.

1.3 The Working of WWW

There are two main parts to every web application:

- Client-side, often known as the frontend, is where HTML, CSS, and JavaScript code is written and stored in the browser. Interaction with users happens here.
- The server-side, manages business logic and responds to HTTP requests. Java, PHP, Ruby, Python, and more languages are used to write the server-side code. A part from this, there is an additional component i.e. database server, which sends the requested data to the server-side.

Let's examine the operation of an WWW:

You enter a URL into the browser, like "google.com," and press Enter. The browser will make a request to the Domain Name Server, which will identify the IP address and forward it to the Google server. The server then receives the request, locates the page, and asks for the data to be sent to the browser for display. The needed information is then shown on the page that appears on your screen.

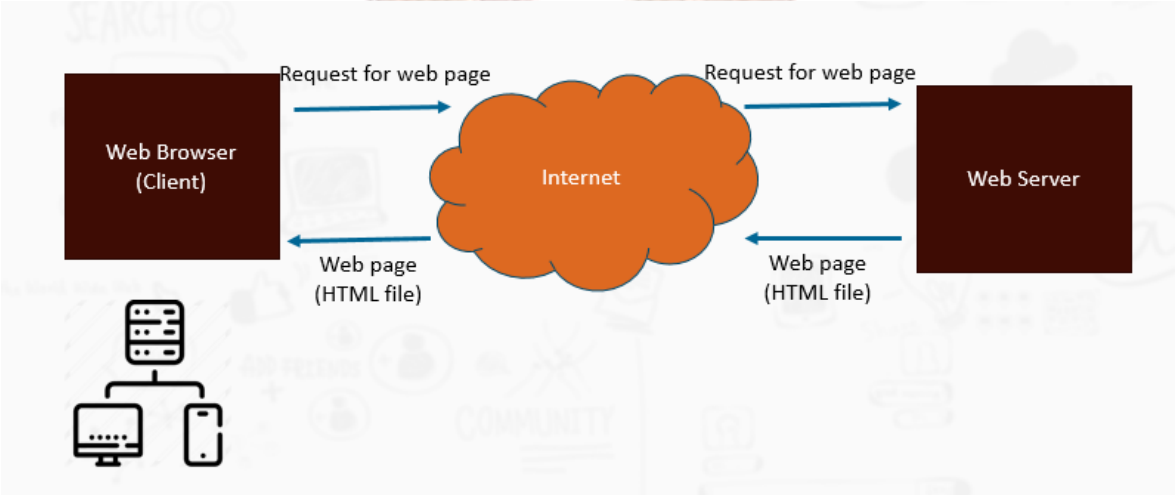

Figure 2.1: Working of WWW

SELF-ASSESSMENT QUESTIONS - 1

1. What does WWW stand for?
2. Which has a significant impact on creating standard procedures for the development of the www?

2. WEB CLIENTS AND WEB SERVERS

A client is any program that uses the service of another program. On the web, a web client is a program, such as browser, editor, that reads or writes information on the web.

The web client is a client side element within application model used for building and developing enterprise applications. Client side components are typically browser applications running on user's computer and connect to server. Example of popular web browser software includes Google Chrome, Microsoft Internet Explorer. Web browser software sends requests for web page files to other computer, which called as servers. Web server receives request from many of different web clients and responds by sending files back to those web client. Each web client renders those files into web page.

A web client contains two parts: dynamic web pages and web browser. Dynamic web pages are produced by components that run in the web tier, and a web browser delivers web pages received from the server. A web client also known as a **"Thin client"** because it does not execute heavy duty operations.

2.1 Web Browser

A web browser can be represented as an application software or program designed to enable users to access, retrieve and view documents and other resources on the Internet. A browser is an application which provides a window to the Web. All browsers are designed to display the pages of information located at Web sites around the world. The most popular browsers on the market today include Microsoft's Internet Explorer and Netscape Navigator.

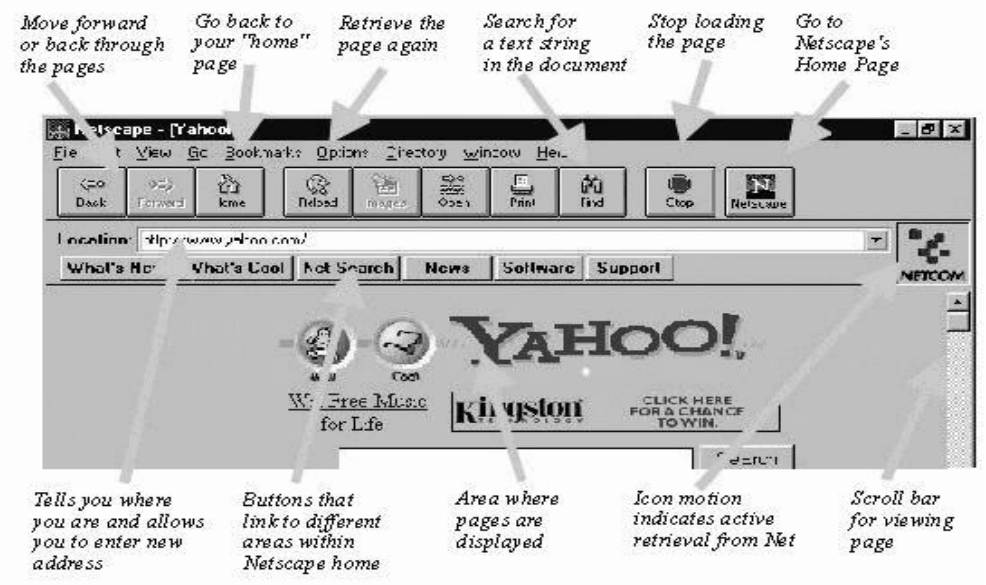

Figure 2.2: Features of a web browser----------*6

In the above figure 2.2 we have discussed various features of web browser

- We can move our page forward or back.
- We can go back to your home.
- Retrieve the page again.
- Search for a text string in the document.
- Browser can tell you where you are and allows.
- We can use scroll bar for moving page.

The commonly used Web Browsers are.

1. ***Internet Explorer:*** Windows Internet Explorer (formerly Microsoft Internet Explorer, commonly abbreviated IE or MSIE) is a series of graphical web browsers developed by Microsoft and included as part of the Microsoft Windows line of operating systems, starting in 1995. Internet Explorer has been the most widely used web browser since 1999, attaining a peak of about 95% usage share during 2002 and 2003 with Internet Explorer 5 and Internet Explorer 6.

2. ***Google chrome:*** Google Chrome is a web browser developed by Google that uses the Web Kit layout engine. It was first released as a beta version for Microsoft Windows on September 2, 2008, and the public stable release was on December 11, 2008. The name is derived from the graphical user interface frame, or "chrome", of web browsers.
   Chrome uses the Web Kit engine and is similar to the default web browser on the Android mobile phone platform. Chrome was assembled from 25 different code libraries from Google and third parties such as Mozilla's Netscape Portable Runtime, Network Security Services, NPAPI, as well as SQ Late and a number of other open-source projects.
3. ***Mozilla Firefox:*** Mozilla Firefox is a free and open source web browser descended from the Mozilla Application Suite and managed by Mozilla Corporation. According to Wikipedia and simple Linux GNU/Linux, as of March 2011, Firefox is the second most widely used browser, particularly in Germany and Poland, where it is the most popular browser with 60% usage and 47% respectively. Mozilla has now officially released version 5 of its browser in over 70 languages. The new Firefox version adds support for CSS (cascading style sheets) animations to enable developers to build more intuitive Web applications and websites. The HTTP idle connection logic has been tuned, as has canvas, JavaScript, memory, and networking performance. Other improvements include standards support for HTML5, XHR, Math ML, SMIL, and canvas, as well as spell checking for some locales.

To display web pages, Firefox uses the Gecko layout engine, which implements most current web standards in addition to several features that are intended to anticipate likely additions to the standards.

There are some features of Mozilla Firefox:

- Tabbed browsing
- Spell checking
- Incremental find
- Live bookmarking
- Download manager
- Private browsing

- Location-aware browsing based exclusively on a Google service
- Integrated search system that uses Google by default in most localizations.

4. ***Opera web browser:***

Opera is a Web browser that provides some advantages over other browsers from Mozilla or Microsoft. Much smaller in size, Opera is known for being fast and stable. Opera is available for a number of operating systems, including BeOS, Symbian OS, Linux, Mac OS, OS/2, Solaris, and Windows. It offers the same capabilities of the more popular browsers including integrated searches and instant messaging, support for JavaScript, cascading style sheets and e-mail.

It is possible to control all main functions of the browser using only the keyboard, and the default keyboard shortcuts can be modified. Opera also supports the use of access keys to allow a computer user to immediately jump to a specific part of a web page via the keyboard. Opera was also one of the first browsers to support mouse gestures, allowing patterns of mouse movement to trigger browser actions, such as "back" or "refresh". Fast, safe, functional, fun searching, and mouse gestures make Opera great browser.

2.2 Web Servers

A Web server is a program that, using the client/server model and the World Wide Web's Hypertext Transfer Protocol (HTTP), serves the files that will form the Web pages to Web users whose computers contain HTTP clients that forward their requests. Web servers often come as part of a larger package of Internet and intranet-related programs for serving e-mail, downloading requests for File Transfer Protocol (FTP) files, and building and publishing Web pages. Figure 2.3 shows the layered structure of web server.

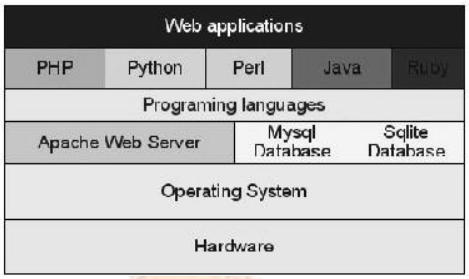

Figure 2.3: Web Server

Web server architecture relies basically on the following principles:

- An operating system that manages hardware resources (the computer) and offers services to high level applications.
- A web server application and a database server application that use operating system services and offers services to high level applications.
- A web application that use web server and database server to generate dynamic web site contents.

Here is a detailed and updated list of the most important and popular web servers:

1. ***Apache web server – the HTTP web server***

   Free and the most popular web server in the world developed by the Apache Software Foundation. Apache web server is open source software and can be installed and made to work on almost all operating systems including Linux, Unix, Windows, FreeBSD, Mac OS X and more. About 60% of the web server machines run the Apache web server.

2. ***Apache Tomcat***

   The Apache Tomcat has been developed to support servlets and JSP scripts. Though it can serve as a standalone server, Tomcat is generally used along with the popular Apache HTTP web server or any other web server. Apache Tomcat is free and open source and can run on different operating systems like Linux, Unix, Windows, Mac OS X, Free BSD.

3. ***Microsoft's Internet Information Services (IIS) Windows Server Internet*** Information Services (IIS) windows web server has been developed by the software giant, Microsoft. It offers higher levels of performance and security than Apache web server and Apache tomcat. It also comes with a good support from the company and is the second most popular server on the web.

4. ***Jigsaw web server***

   Jigsaw (W3C's Server) comes from the World Wide Web Consortium. It is open source and free and can run on various platforms like Linux, Unix, Windows, Mac OS X Free BSD etc. Jigsaw has been written in Java and can run CGI scripts and PHP programs.

5. ***Oracle Web Tier***

   It includes two web server options with reverse proxy and caching solutions that lead to quick serving of web pages and easy handling of even the most demanding http traffic. The iPlanet Web Server, for example, is a high- performance server with enhanced security and multithreaded architecture that scales well on modern 64-bit multiprocessors.

6. ***X5 (Xitami) web server***

   The cross-platform X5 from iMatrix Corporation is the latest generation web server using the company's own multithreading technology (Base2) that makes it scalable to multi cores. As per the iMatrix, X5 can handle thousands of connections without difficulty and thus is useful for long polling in which connections from clients remain open for extended durations.

2.3 Web Applications

A web application as a software system that is accessible over the web. Web applications have certain unique intrinsic characteristics that make web development different and perhaps more challenging compared to traditional software development.

Most web applications are based on the client-server architecture where the client enters information while the server stores and retrieves information.

Internet mail is an example of this, with companies like Yahoo and MSN offering web based email clients.

The new impulsion for web applications is crossing the line into those applications that do not normally need a server to store the information. Your word processor, for example, stores documents on your computer, and doesn't need a server.

Web applications can provide the same functionality and gain the benefit of working across multiple platforms. For example, a web application can act as a word processor, storing information and allowing you to "download" the document onto your personal hard drive.

Google APPS, Microsoft Office Live, and WebEx Web Office are example of newest generation of web applications.

2.4 Web Site Development

A basic web site can be designed by using three main components.

1. **Domain name:** This name is registered and corresponds with where your web site is physically located on a web server, and it is also used for your email account.
2. **Web hosting:** this is the physical storage of your web page on a server that is connected to internet. This machine serves your web page as they requested by web browser, and this machine has an IP address. The DNS translates your domain name into your web account IP address and serves up the appropriate web pages as requested. Your domain registry will store IP address of your DNs.
3. **Website building software:** to make your website you can choose on web design language or you can use website building software to get your website.

2.5 How To Build A Web Site?

The creation and maintenances of website broken down into a process of steps. Following these steps will immensely help you to build a website. All the steps in website creation and maintenance required and effort, but they don't necessary involve any technology for process. Figure 2.4shows the process of web site creation.

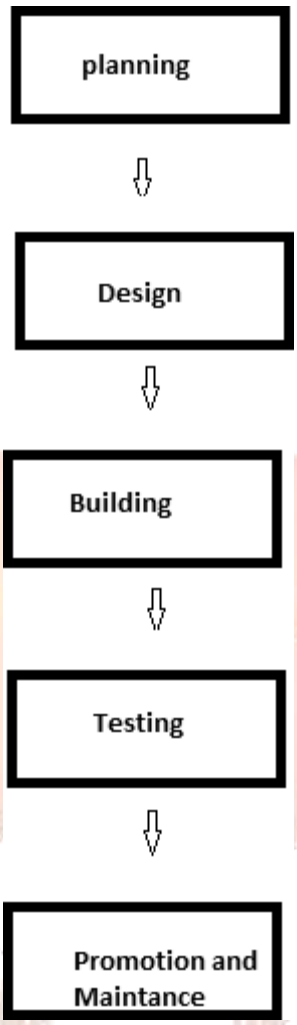

Figure2.4: The process of web site creation

Planning

When you are planning a web site, you need to decide type of site (website is either news/information, Product or reference site), navigations, content. If you can plan page types, you will able to decide what type of pages you need for your site.

Design

If you need a website it is the best thing to design your own and get ideas online and get it exactly the way you want it to look. As you design you will find lots of great details that will help you stand out with your own unique style of website.

Building

Building a web site means, it specifies that you are working on developing web pages. To build your website you should be familiar with design basics (the elements of good design and how to use it on website), HTML (building block of a web page), CSS (styling presentation of web page), etc., technologies which you want to use to build the website.

Testing

Testing is a process of ensuring that everything on your website works properly. Some of things you should test includes navigation (Navigation is nothing but movement from one Web page to another Web page), graphics and content (be sure that no information is missing from your website). Many free tools are available to help you to do the testing.

Promotion and maintenance

After plan, design, build and test of your website, you're ready to launch it into world. You need to promote your website to others, make sure that your site appears on search engine. However, doing all that is still not enough. You need to maintain and update your site.

Here are several reasons why you want to follow the web site creation process outline:

- When you're planning for your website, you ensure that you are building something you want. Without plan it will cause too many obstructions.
- Having clear site design, it allows you to good start up, instead of a blank page. It also gives your website a unified look.
- If you follow the first two steps, when you build your site, you will know what to build, and creating the site will be easier.
- By testing your website, your website will come across as professional, and your visitors will enjoy your website.

- By having a plan on how to promote and maintain your website, it will have a long, successful lifespan.

2.6 Web Content Authoring

Content authoring is preparing information so that it is well presented and accessible to individuals and groups in all possible environments they happen to be. Web content authoring is the process of creating page-level content for your content Management website (WCM).

Web content authoring includes the following activities

1. Defining the content records that populate the content areas of your web site pages.
2. Managing images that you use in your content.

Web content authoring involves the following actions:

1. Managing content records, each of which is the source of a content area on rendered web page. You can define these on an adhoc basic as needed, or by tracking your current and available authoring work in your content designer task list.
   - If you revise pages for your website by adding one or more parts to a content record and configuring existing parts in the content record. Save the changes and publish the content record. A few minutes later, the change become live on all content Management (CM) web sites that use the content record.
   - If you're creating a new page, you must link the content record to a navigation item in the website sitemap to add the published content record to the website. This typically done by the person who manages the web site.
   - There are standard parts that come with CM, and the people who implemented your CM environment might have added some custom parts too.
2. Managing images for use in content records.
3. Approving content records for publishing or deleting by authors who do not have content approve permission.

SELF-ASSESSMENT QUESTIONS - 2

3. A web client contains two parts _____ and _____
4. _____ is based on windows web server has been developed by the software giant, Microsoft.
5. _____ is the physical storage of your web page on a server that is connected to internet.
6. Testing is a process of ensuring that everything on your website works properly? (TRUE/FALSE)

3. WEB PROGRAMMING

Web programming is the intricate art of telling a computer what to do. Programming allows you to make new software and have the computer do new things. Web site programming is the same except you write applications or web pages that are used by a web browser.

The good news is that web site programming can be easy. Web site programming is the practice of writing applications that run on a web server and can be used by many different people.

All web programming is done with web programming languages. These languages can include static technologies like HTMl, XHTML, CSS, JavaScript and XML. However, most web site programming is done using server side web programming languages. This code runs on the server and then gives static information back to the web browser. Most popular webserver programming languages are PHP, ASP.NET, Perl and JSP.

3.1 8Web Pages And Web Contents

Information on the Web is displayed in pages. The page is the basic unit of the web. Web pages are written in the **HTML (Hypertext Markup Language)** language and sent to web browsers by a web server using the **HTTP protocol.** Pages also include hypertext links which allow users to jump to other related information. Hypertext is usually underlined and in a different color and can include individual words, sentences, or even graphics. A Web site is a collection of related Web pages with a common Web address.

A web content contains the paragraphs, Sentences and words on a web page. Technically, web content can be anything that appears on a website, including words, pictures, video, downloadable files (PDF), icons and logos. Having lots of content is no longer enough. The content has to be well organized and its must hang together in a coherent way and communicate value and a good story.

Types of web pages are.

- Static web page.
- Dynamic web page.

- Active web page.

- **Static web page:** Web pages that are static are sometimes referred to as flat or stationary web pages. The client's browser loads them exactly as they are stored on the web server. Such web sites simply have static content. The information may only be read,it cannot be modified or used in any way by the user.One and only HTML is used to construct static web pages. Static web pages are only utilised when the information doesn't need to be changed any more.

  The Benefits of static webpage include performance, dependability, and simplicity. A copy may be stored by the browser in a local disc cache.The Drawbacks is Lack of adaptability, updates take longer to implement because a person must modify the file.

- **Dynamic web page:** A dynamic page keeps the same style and design while displaying changing material to various users. These pages, which are typically created using CGI, AJAX, ASP, or ASP.NET, take longer to load than straightforward static pages. They are typically used to display information that is constantly changing, such as market prices or weather updates.

  Databases and other server-side resources are needed for dynamic sites, which typically contain application code for various services. The look of the website and the content that viewers will see can be kept apart by the page author using a database. When a user makes a request, the website will retrieve the information when it has been uploaded to the database.

- **Active web page:** A computer programme that the server transmits to the browser and that the browser must execute locally constitutes an active web document. When it is running, the active document software can communicate with the user and continuously modify the display.

  The ability to continuously update information is an advantage. For instance, only an active document has the ability to quickly modify the display to show an animated image. More significantly, an active document can directly access information sources and continuously update the display. An active document that displays stock prices, for instance, may continue to retrieve stock information and modify the display without requiring user input.

An active document poses a risk since it has the ability to export or import data.A powerful computer system and more sophisticated browser software are needed to run active documents.The source code for the active documents is typically written. The browser receives an executable form created by the compiler.Java programmes translate their source code into bytecode format, which is then delivered to the browser and locally executed by the Java interpreter.

2 Web sites – Home pages

The home page is the first page users see, and its often the only page they need if you design it correctly. Even though a site may include many lists and libraries representing hundreds or even thousands of documents, you can effectively summarize that content by displaying web parts that show only the most relevant content on the site's home page. A designer should understand the purpose of the website in order to build an effective home page design.

The homepage is a website's initial chance to make an impression, so a site visitor must see exactly what they're looking for the moment they arrive. Defining purpose of the website will help you see what will attract users to the site. This purpose is different from main topic of home page.

This home page divided into section known as sub-home pages, which are the first pages for major sections within the website. There should be a link to the home page on every page on the site.

A homepage also have search key content and upcoming events, allow visitors to quickly find what they are looking for, and tell the visitor what your website does.

3.3 Search Engines

A web search engine is a tool that allows individuals to find information on the World Wide Web.

Example: If you wants to find information on "object oriented programming", you will probably search in Google by typing object oriented programming, as you know world wide

web is so huge that it is absolutely impossible to find all web pages, so it uses search engine to find what you want. But we are able to find what we want within seconds using Google.

How do search engine works?

You are reading a book and want to find reference to a specific word in book. What do you do?

You will look into index, then trace the word in the index, find the page number mentioning there and flip to the corresponding pages.

Search engines also works in similar way. Search engines are constantly building and updating their index to the World Wide Web.

When you search for "object oriented programming" the search engine already has list of web pages that refer to object oriented programming. The only thing left to do is to sort the web pages in order of relevance. This is done based on a number of key factors.

Search engine Optimization

From this discussion it is clear that there are two things involved in getting a web page into search engine results.

Step – 1 Getting into the search engine index

Step – 2 Getting the web page to the top of final sorted results before display.

Step – 1 is relatively easy. You just need to let the search engine for "object oriented programming" knows that the new web page exists. You can do this by pointing to the new page from an existing web page that is already indexed. Some search engines also provides an option to suggest a new URL for inclusion into their index.

Step – 2 is the strong part. Search engines spend a lot of time and effort on making their algorithms find the best way to rank sites. According to Google, there are over 200 factors that determine the rank of web page in the results.

Search engine optimization is the process of trying to get your web pages rank at the top of the search engine results for keywords that are important to you.

3.4 Plug-Ins

Software programs may be configured to a web browser in order to enhance its capabilities. When the browser encounters a sound, image or video file, it hands off the data to other programs, called plug-ins, to run or display the file. Working in conjunction with plug-ins, browsers can offer a seamless multimedia experience. Many plug-ins are available for free.

File formats requiring plug-ins are known as MIME type. MIME stands for Multimedia Internet Mail Extension, and was originally developed to help email software handle a variety of binary file attachments. The use of MIME has expanded to the web. For example, the basic MIME type handled by web browsers is text/html associated with the extension .html

A common plug-in utilized on web is the Adobe Acrobat Reader. The Acrobat Reader allows you to view documents created in Adobe's Portable Document Format (PDF). These documents are the MIME type "application/pdf" and are associated with the file extension .pdf. When the Acrobat Reader has been downloaded to your computer, the program will open and display the file requested when you click on a hyperlink file name with suffix .pdf. The latest versions of the Acrobat reader allow for the viewing of documents within the browser window.

Web browsers are often standardized with a small suite of plug-ins, especially for playing multimedia content. Additional plug-ins may be obtained at the browser's web site, at special download sites on the web, or from web sites of the companies that created the programs.

Once a plug-in is configured to your browser, it will automatically launch when you choose a file type that it uses.

SELF-ASSESSMENT QUESTIONS - 3

7. A web_____ is a tool that allows individuals to find information on the World Wide Web.

   a) Plug-in b) search engine c) protocol d) All of above

8. MIME stands for _____ .

4. SUMMARY

- The World Wide Web is a structure of interlinked hypertext documents accessed via Internet.
- Information on the Web is displayed in pages. The page is the basic unit of the web.
- Web browser software sends requests for web page files to other computer, which called as servers. Web server receives request from many of different web clients and responds by sending files back to those web client.
- Most web applications are based on the client-server architecture where the client enters information while the server stores and retrieves information.
- A web search engine is a tool that allows individuals to find information on the World Wide Web.
- Web browsers are often standardized with a small suite of plug-ins, especially for playing multimedia content.

5. TERMINAL QUESTIONS

1. Explain the functions of web server.
2. Explain the process steps of developing web site.
3. Write short note on:

   A) Web Content B) Home Page.

4. Brief the role of search engine and plug-ins.
5. Explain the types of web pages.

6. ANSWERS

Self Assessment Questions

1. World Wide Web.
2. World Wide Web Consortium.
3. Dynamic web pages and web browser.
4. Internet Information Services (IIS)
5. Web hosting
6. TRUE
7. b) search engine
8. Multimedia Internet Mail Extension

Terminal Questions

1. Web servers often come as part of a larger package of Internet- and intranet-related programs for serving e-mail, downloading requests for File Transfer Protocol (FTP) files, and building and publishing Web pages. For more details refer section2.2.2..
2. The creation and maintenances of website broken down into a process of steps. For more details refer section2.2.5..
3. A) Technically, web content can be anything that appears on a website, including words, pictures, video, downloadable files (PDF), icons and logos. For more details refer section2.3.1. B) The home page is the very first page users seeFor more details refer section 2.3.2
4. A web search engine is a tool that allows individuals to find information on the World Wide Web. For more details refer section2.3.3.
5. The types of webpages are static webpages, dynamic webpages and active webpages For more details refer section 2.3.1

7. REFERENCES

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