Web programming Fundamentals

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Internet and its Applications

Internet is a system connecting computers around the world using TCP/IP, which stands for Transmission Control Protocol/Internet Protocol, a set of standards for transmitting and receiving digital data.

The Internet consists primarily of the collection of billions of interconnected web pages that are transferred using HTTP (Hypertext Transfer Protocol), and is collectively known as the World Wide Web.

Applications:

- Search engine: It can be used to search anything and everything. Most popular search engines are Google and yahoo searches
- . Shopping: Internet has made shopping very easy and flexible. You can buy or sell online. Communication: It helps people to communicate either with the use of social networking websites or through e-mails and chats.
- Job search: Nowadays, many people search for their jobs online as it is quicker and there is a larger variety of job vacancies present.
- Research: Research papers are present online which helps in the researcher doing a literature review.
- video Conferencing: It enables direct face-to-face communication across networks via web cameras, microphones, and other communication tools.
- E–commerce (electronic commerce or EC) is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the Internet. Largest e-commerce companies in India are Flip kart, Snap deal, and Amazon India.
- On-line payments The rising boom of online payments in India has given way to many new entrants in the industry such as Paytm, Mobikwik, oxigen etc who are majorly wallet driven payment companies.

MIME

MIME stands for (Multipurpose Internet Mail Extensions). It is widely used internet standard for coding binary files to send them as e-mail attachments over the internet. MIME allows an E-mail message to contain a non-ASCII file such as a video image or a sound and it provides a mechanism to transfer a non text characters to text characters. The MIME specification includes the following elements:

1. Message header fields. Five message header fields are defined. These fields provide information about the body of the message.

The five header fields defined in MIME are as follows:

- A. MIME-version. It indicates the MIME version being used. Example: It is represented as: MIME-version: 1.1.
- B. Content-type. It describes the type and subtype of the data in the body of the message. The content type and content subtype are separated by slash.
- C. Content-transfer encoding. It describes how the object within the body has been encoded to US ASCII to make it acceptable for mail transfer. The content transfer encoding field is represented as: Content-transfer-encoding :
- D. Content-Id. It is used to uniquely identify the MIME entities in multiple contexts i.e. it uniquely identifies the whole message in a multiple message environment. This field is represented as: Content-id: id =
- E. Content-description. It is a plaintext description of the object within the body; It specifies whether the body is image, audio or video. This field is represented as: Content-description:

2. Content formats. A number of content formats are defined, thus standardizing representations that support multimedia electronic mail. 3. Transfer encoding. Transfer encoding are defined that enable the conversion of any content format into a form that is protected from alteration by the mail system.

Web Browser

- A Web browser's basic function is to get files from a server and display them on the screen. It normally displays html files with images, PDF, videos etc in a structured layout.
- A browser is a collection of blocks or lines code that performs numerous tasks of showing a webpage on the pc screen.
- *How Web Browsers works?*

World Wide Web is based on the client-server model. A user pc works as a client which receives and sends data to the server. If a web page is requested by a user, the browser contacts the server (where the website is stored) and by getting and interpreting the requested files, it shows the web page on the pc screen.

Ex:Internet Explorer, Google Chrome.

Web Server

- A Web server is software that responds to client (I.e. web browser) requests.
- Every web site requires a web server to process client requests and 'serve up' the pages. Server machine is also referred to as the web server.

How Server Works?

- When client sends request for a web page, the web server search for the requested page if requested page is found then it will send it to client with an HTTP response.
- If the requested web page is not found, web servers will the send an HTTP response: Error 404 Not found.
- If client has requested for some other resources then the web server will contact to the application server and data store to construct the HTTP response

URL

Uniform Resource Locator (URL) refers to a web address which uniquely identifies a document over the internet.

For example, www.wikipedia.com/internet technology/index.html is an URL to the index.html which is stored on Wikipedia web server under internet technology directory.

URL Types

There are two forms of URL as listed below:

Absolute URL

Relative URL

- Absolute URL is a complete address of a resource on the web. This completed address comprises of protocol used, server name, path name and file name.

For example http:// www.wikipedia.com / internet technology /index.htm. Where: http is the protocol. wikipedia.com is the server name. index.htm is the file name. The protocol part tells the web browser how to handle the file.

- Relative URL is a partial address of a webpage. Unlike absolute URL, the protocol and server part are omitted from relative URL.

DNS

- Domain Names is a symbolic string associated with an IP address. There are several domain names available; some of them are generic such as com, edu, gov, net etc, while some country level domain names such as au, in, za, us etc.
- The domain name space refers a hierarchy in the internet naming structure. This hierarchy has multiple levels (from 0 to 127), with a root at the top. Each domain can be partitioned into sub domains and these can be further partitioned and so on
- Name Server contains the DNS database. This database comprises of various names and their corresponding IP addresses

HTTP

HTTP is a communication protocol.

It defines mechanism for communication between browser and the web server. It is also called request and response protocol because the communication between browser and server takes place in request and response pairs.

HTTP Request comprises of lines which contains:

Request line

Header Fields

Message body

The first line i.e. the Request line specifies the request method i.e. Get or Post. The second line specifies the header which indicates the domain name of the server from where index.htm is retrieved.

GET Method: a) Appends form-data into the URL in name/value pairs b) The length of a URL is limited (about 3000 characters) c) Never use GET to send sensitive data! (will be visible in the URL) d) Useful for form submissions where a user want to bookmark the result

POST Method: a) Appends form-data inside the body of the HTTP request (data is not shown is in URL) b) Has no size limitations c) Form submissions with POST cannot be bookmarked.

HTTP contd..

- HTTP Response Like HTTP request, HTTP response also has certain structure.
- HTTP response contains:
- Status line
- Headers
- Message body

The first line of which is often referred to as the status line. In that line the server echoes the HTTP version and gives a response status code (which is a three-digit integer) and a short message known as a reason phrase.

Here's an example

HTTP response: HTTP/1.0 200 OK

Protocol and its types

There are rules governing how data is transferred over networks, how they are compressed, how they are presented on the screen and so on. These set of rules are called protocols.

Various Types of Protocols are:

- HTTP: Hypertext Transfer Protocol, used for transmitting and displaying information in the form of web pages on browsers.
- FTP: File Transfer Protocol, used for file transfer (uploading and downloading) over the Internet.
- POP: The most common protocol for receiving mail is Post Office Protocol (POP). Email clients such as Outlook Express require an address for a POP3 server before they can read mail.
- SMTP: Simple Mail Transfer Protocol used for email Both SMTP and POP3 use TCP for managing the transmission and delivery of mail across the Internet. Ethernet: Used for data transmission over a LAN.
- IP: Internet Protocol is the primary network protocol used on the Internet, developed in the 1970s. IP is often used together with the Transport Control Protocol (TCP)

LISTS

- Lists are the preferred way to display items one after the other, Lists have a tag to start and end the list itself, as well as a tag for each item in the list.
- There are three types of lists:
- ordered
- unordered
- definition lists.

Unordered Lists

- An unordered list is a bulleted list, similar to the menu on the right.
- A number of list items (li elements) will go within the ul tags. Add the text for each item in between some and tags.
- Bullet Type by default a browser will show a round bullet. This can be changed by using the type attribute of the ul tag, which will change the bullet type for the entire list.

Unordered List example

Example for Unordered List

```
<!DOCTYPE html>
<html>
<head>
   <meta charset="UTF-8">
   <title>Example of HTML Unordered List</title>
</head>
<body>
   <h1>HTML Unordered List</h1>
   <ul>
      <li>Chocolate Cake</li>
      <li>Black Forest Cake</li>
      <li>Pineapple Cake</li>
   </ul>
</body>    </html>
```

Ordered Lists

- An ordered list is used to create an indexed list, such as a numbers or alphabetical list.
- A number of list items will then go between the ordered list tags.
- Ordered List Item - an item each item must use the tags the same as with an unordered list.
- But this time the browser will number each item automatically, instead of showing bullets.

Ordered Lists-Example

Example for Ordered List

```
<!DOCTYPE html>
<html>
<head>
    <title>Example of HTML Ordered List</title>
</head>
<body>
        <h1>HTML Ordered List</h1>
        <ol>
      <li>Mix ingredients</li>
      <li>Bake in oven for an hour</li>
      <li>Allow to stand for ten minutes</li>
  </ol>
</body>
</html>
```

Definition Lists

- Definition Lists

This type of list is used to define and describe terms, much like a dictionary.

All entries go within the dl tags. Each entry will usually consist of one dt and one dd element.

Definition Lists Example

```
<html>
<head>
<body>
<dl>
<dt>HTML</dt>
<dd>Hypertext markup language</dd>
<dt>HTTP<dt>
<dd>Hyper text transfer protocol</dd>
</dl></body></html>
```

THANK YOU