Mini Project Report

on

Web Browser

Named as Flash Browser

Rajkiya Engineering College, Bijnor

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THANK YOU...!

CERTIFICATE

This is to certify that the project entitled "**WEB BROWSER**" is being submitted by **Shagun Singh** (1907350130056), **Navneet Sagar** (1907350130042), **Akash Chaurasia** (1907350130010), **Aditya Kumar** (1907350130009) in partial fulfillment for the degree of Bachelor of Technology in Information Technology of **Rajkiya Engineering College, Bijnor** (Affiliated to DR. A. P J. ABDUL KALAM TECHNICAL UNIVERSITY Lucknow) is a record of their own work, carried out under our supervision

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Signature of Faculty(s)

Content

Introduction

A browser is a software program that is used to explore, retrieve, and display the information available on the World Wide Web. This information may be in the form of pictures, web pages, videos, and other files that all are connected via hyperlinks and categorized with the help of URLs (Uniform Resource Identifiers). For example, you are viewing this page by using a browser.

A browser is a client program as it runs on a user computer or mobile device and contacts the webserver for the information requested by the user. The web server sends the data back to the browser that displays the results on internet supported devices. On behalf of the users, the browser sends requests to web servers all over the internet by using HTTP

(Hypertext Transfer Protocol). A browser requires a smartphone, computer, or tablet and internet to work.

History of Web Browser

- The **World Wide Web** was the first web browser. It was created by W3C Director Tim Berners-Lee in **1990**. Later, it was renamed **Nexus** to avoid confusion caused by the actual World Wide Web.
- The **Lynx** browser was a text-based browser, which was invented in **1992**. It was not able to display the graphical content.
- Although, the first graphical user interface browser was NCSA Mosaic. It was the first most popular browser in the world, which was introduced in **1993**.
- In **1994**, there were some improvements occurred in Mosaic and came to Netscape Navigator.
- In **1995,** Microsoft introduced the **Internet Explorer** It was the first web browser developed by Microsoft.
- A research project started on Opera in **1994**. Later, it was publicly introduced in 1996.
- **Apple's Safari** browser was introduced in **2003**. It was specifically released for Macintosh computers.
- In **2004**, Mozilla introduced **Firefox** as Netscape Navigator.
- In **2007**, a browser **Mobile Safari** was released as Apple mobile web browser.
- The popular browser **Google Chrome** was launched in **2008**.
- The fast-growing mobile-based browser **Opera Mini** was released in **2011**.
- The Microsoft **Edge** browser was launched in **2015**.

Most Web browsers offer common features such as:

1. **Refresh button:** Refresh button allows the website to reload the contents of the web pages. Most of the web browsers store local copies of visited pages to enhance the performance by using a caching mechanism. Sometimes, it stops you from seeing the updated information; in this case, by clicking on the refresh button, you can see the updated information.
2. **Home button:** It provides users the option to bring up the predefined home page of the website.
3. **Web address bar:** It allows the users to enter a web address in the address bar and visit the website.
4. **Tabbed browsing:** It provides users the option to open multiple websites on a single window. It helps users to read different websites at the same time. For example, when you search for anything on the browser, it provides you a list of search results for your query. You can open all the results by right-clicking on each link, staying on the same page.
5. **Bookmarks:** It allows the users to select particular website to save it for the later retrieval of information, which is predefined by the users.

What is the URL (Uniform Resource Locator)?

A **uniform resource locator** is the address of a resource on the internet or the World Wide Web

. It is also known as a web address or uniform resource identifier (URI). For example, **https: www.ecosia.com**, which is the URL or web address for the **Ecosia** Website.
website.
A URL represents the address of a resource, including the protocol used to access it.

A URL includes the following information:

- It uses the protocol to access the resource.
- It defines the location of a server by IP address or the domain name.
- It includes a fragment identifier, which is optional.
- It contains the location of the resource in the directory of the server.

A URL forwards user to a particular online resource, such as a video, webpage, or other resources. For example, when you search information on Google, the search results display the URL of the relevant resources in response to your search query. The title which appears in the search results is a hyperlink of the URL of the webpage. It is a **Uniform Resource Identifier**, which refers to all kinds of names and addresses of the resources on the webservers. URL's first part is known as a **protocol identifier**, and it specifies the protocol to use, and the second part, which is known as a resource name, represents the IP address or the domain name of a resource. Both parts are differentiated by a colon and two forward slashes like **http://www.ecosia.com.**

Technical Platform

PYCHARM

JetBrains has developed PyCharm as a cross-platform IDE for Python. In addition to supporting versions 2.x and 3.x of Python, PyCharm is also compatible with Windows, Linux, and macOS. At the same time, the tools and features provided by PyCharm help programmers to write a variety of software applications in Python quickly and efficiently. The developers can even customize the PyCharm UI according to their specific needs and preferences. Also, they can extend the IDE by choosing from over 50 plug-ins to meet complex project requirements.

Features and Tools Provided by PyCharm

- Code Editor
- Code Navigation
- Refactoring
- Support for Popular Web Technologies
- Support for Popular Python Web Frameworks
- Database Tools
- Visual Debugger

VISUAL STUDIO CODE

Microsoft Visual Studio is an IDE made by Microsoft and used for different types of software development such as computer programs, websites, web apps, web services, and mobile apps. It contains completion tools, compilers, and other features to facilitate the software development process.

Visual Studio has been around for over 20 years. Its first version was Visual Studio 97. Since then, there were a lot of different versions, the current one is Microsoft Visual Studio 2019.

The Visual Studio IDE (integrated development environment) is a software program for developers to write and edit their code. Its user interface is used for software development to edit, debug and build code. Visual Studio includes a code editor supporting IntelliSense (the code completion component) as well as code refactoring. The integrated debugger works both as a source-level debugger and a machine-level debugger. Other built-in tools include a code profiler, designer for building GUI applications, web designer, class designer, and database schema designer.

HTML 5

HTML is the standard markup language for creating Web pages.

- HTML stands for Hyper Text Markup Language
- HTML is the standard markup language for creating Web pages
- HTML describes the structure of a Web page
- HTML consists of a series of elements
- HTML elements tell the browser how to display the content
- HTML elements label pieces of content such as "this is a heading", "this is a paragraph", "this is a link", etc.

Sample Code

- The **<!DOCTYPE html>** declaration defines that this document is an HTML5 document
- The **<html>** element is the root element of an HTML page
- The **<head>** element contains meta information about the HTML page
- The **<title>** element specifies a title for the HTML page (which is shown in the browser's title bar or in the page's tab)
- The **<body>** element defines the document's body, and is a container for all the visible contents, such as headings, paragraphs, images, hyperlinks, tables, lists, etc.
- The **<h1>** element defines a large heading
- The **<p>** element defines a paragraph

The purpose of a web browser (Chrome, Edge, Firefox, Safari) is to read HTML documents and display them correctly.

A browser does not display the HTML tags, but uses them to determine how to display the document.

CSS 3

Cascading **S**tyle **S**heets, fondly referred to as CSS, is a simple design language intended to simplify the process of making web pages presentable.

CSS handles the look and feel part of a web page. Using CSS, you can control the color of the text, the style of fonts, the spacing between paragraphs, how columns are sized and laid out, what background images or colors are used, layout designs,variations in display for different devices and screen sizes as well as a variety of other effects.

CSS is easy to learn and understand but it provides powerful control over the presentation of an HTML document. Most commonly, CSS is combined with the markup languages HTML or XHTML.

Advantages of CSS

- **CSS saves time**
- **Pages load faster**
- **Easy maintenance**
- **Superior styles to HTML**
- **Multiple Device Compatibility**
- **Global web standards**

JAVA SCRIPT

JavaScript is a dynamic computer programming language. It is lightweight and most commonly used as a part of web pages, whose implementations allow client-side script to interact with the user and make dynamic pages. It is an interpreted programming language with object-oriented capabilities.

JavaScript was first known as **LiveScript,** but Netscape changed its name to JavaScript, possibly because of the excitement being generated by Java. JavaScript made its first appearance in Netscape 2.0 in 1995 with the name **LiveScript**. The general-purpose core of the language has been embedded in Netscape, Internet Explorer, and other web browsers.

The ECMA-262 Specification defined a standard version of the core JavaScript language.

- JavaScript is a lightweight, interpreted programming language.
- Designed for creating network-centric applications.

- Complementary to and integrated with Java.
- Complementary to and integrated with HTML.
- Open and cross-platform

Python

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

It is used for:

- web development (server-side),
- software development,
- mathematics,
- system scripting.

What can Python do?

- Python can be used on a server to create web applications.
- Python can be used alongside software to create workflows.
- Python can connect to database systems. It can also read and modify files.
- Python can be used to handle big data and perform complex mathematics.
- Python can be used for rapid prototyping, or for production-ready software development.

Why Python?

- Python works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc).
- Python has a simple syntax similar to the English language.
- Python has syntax that allows developers to write programs with fewer lines than some other programming languages.

- Python runs on an interpreter system, meaning that code can be executed as soon as it is written. This means that prototyping can be very quick.
- Python can be treated in a procedural way, an object-oriented way or a functional way.

Good to know

- The most recent major version of Python is Python 3, which we shall be using in this tutorial. However, Python 2, although not being updated with anything other than security updates, is still quite popular.
- In this tutorial Python will be written in a text editor. It is possible to write Python in an Integrated Development Environment, such as Thonny, Pycharm, Netbeans or Eclipse which are particularly useful when managing larger collections of Python files.

Python Syntax compared to other programming languages

- Python was designed for readability, and has some similarities to the English language with influence from mathematics.
- Python uses new lines to complete a command, as opposed to other programming languages which often use semicolons or parentheses.
- Python relies on indentation, using whitespace, to define scope; such as the scope of loops, functions and classes. Other programming languages often use curly-brackets for this purpose.

Example

```
print("Hello, World!")
```

MODULES

PyQt 5

PyQt is a python binding of the open-source widget-toolkit Qt, which also functions as a cross-platform application development framework. Qt is a popular C++ framework for writing GUI applications for all major desktop, mobile, and embedded platforms (supports Linux, Windows, MacOS, Android, iOS, Raspberry Pi, and more).
PyQt is a free software developed and maintained by Riverbank Computing, a company based in England, whereas Qt is developed by a Finnish firm called The Qt Company.

Features of PyQT

Here are important features of PyQt:

Learn PyQt which consists of more than six hundred classes covering a range of features such as

- Graphical User Interfaces
- SQL Databases
- Web toolkits
- XML processing
- Networking

How to install PyQt5

In this PyQt5 tutorial, we will see the two ways of installing PyQt:

- Using Wheel files
- Building and Installing from Source

Qt (pronounced cute) is a complex system, and the PyQt codebase contains compiled C++ and Python code under the hood. As a result,

it is a complicated process to build and install it from the source compared to other python libraries. However, you can easily install PyQt5 using wheels.

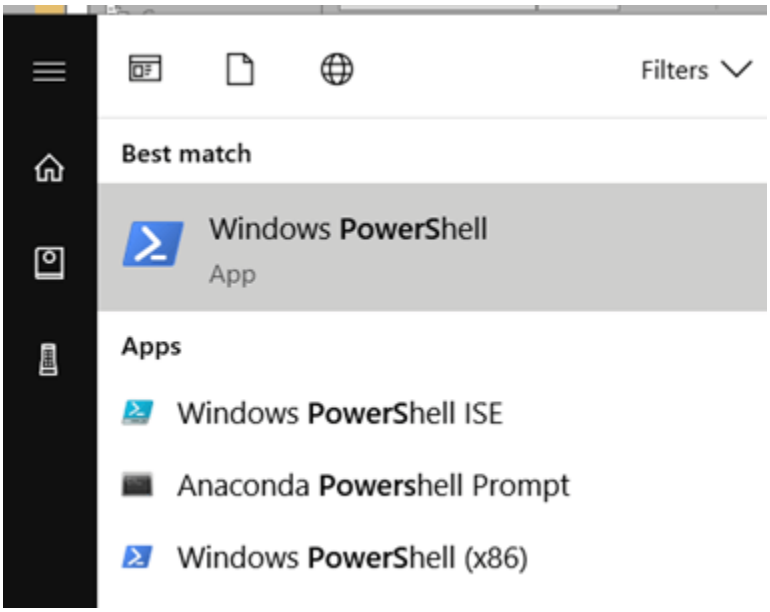
Installation with wheels

Wheels are the new standard Python packaging and distribution format. Simply speaking, a wheel is a ZIP archive with a special name and **.whl** file extension. Wheels can be installed using pip (Python's package manager), which is included by default in the recent versions of Python.

So, if you have Python 3.4 or later installed, you already have pip. If, however, you are using an older version of Python, you must download and install pip before going forward. You can search for instructions for that at this link: https://pypi.org/project/pip/.

To install PyQt5,

Step 1) Open Command prompt.
Open the Command Prompt or PowerShell in your Windows machine.

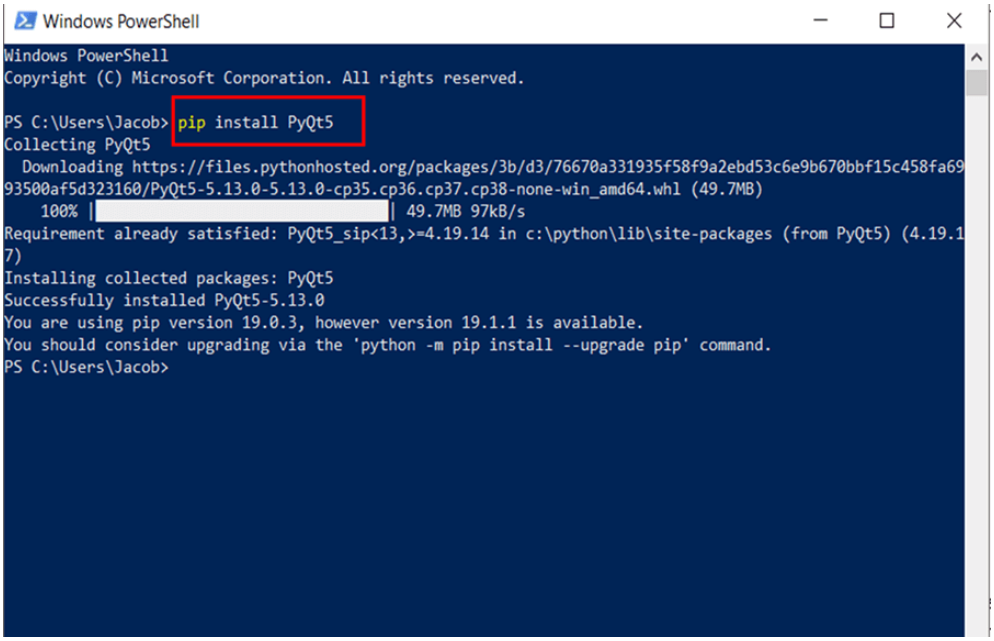


Step 2) Type in the following.

pip install PyQt5

Step 3) Installation successful.

This step in this PyQt5 tutorial will download the PyQt5 whl package (about 50 MB) and install it on your system.



Alternatively, you can also download a Windows binary for the version of python installed on your computer.

Once it is complete, proceed to the next section in this PyQt5 tutorial to write your first GUI app.

OS and SYS

The os and sys modules provide numerous tools to deal with filenames, paths, directories. The os module contains two sub-modules **os.sys** (same as sys) and os.path that are dedicated to the system and directories; respectively.

os module

Whenever possible, you should use the functions provided by these modules for file, directory, and path manipulations. These modules are wrappers for platform-specific modules, so functions like **os.path.split** work on UNIX, Windows, Mac OS, and any other platform supported by Python.

You can build multi-platform path using the proper separator symbol:

```
>>> import os
>>> import os.path
>>> os.path.join(os.sep, 'home', 'user', 'work')
'/home/user/work'

>>> os.path.split('/usr/bin/python')
('/usr/bin', 'python')
```

- Functions

The **os** module has lots of functions. We will not cover all of them thoroughly but this could be a good start to use the module.

- Manipulating Directories
- Removing a file
- Renaming files or directories
- Permission

sys module

When starting a Python shell, Python provides 3 file objects called stadnard input, stadn output and standard error. There are accessible via the sys module:

sys.stderr
sys.stdin
sys.stdout

The **sys.argv** is used to retrieve user argument when your module is executable.
Another useful attribute in the **sys.path** that tells you where Python is searching for modules on your system. see *Module* for more details.

- sys.platform returns the platform version (e.g., linux2)
- sys.version returns the python version
- sys.version_info returns a named tuple

sys.exitfunc	sys.last_value	sys.pydebug
sys.flags	sys.long_info	sys.real_prefix
sys.builtin_module_names	sys.float_info	sys.setcheckinterval
sys.byteorder	sys.float_repr_style	
sys.maxsize	sys.setdlopenflags	

Recursion

See the *Functions* section to know more about recursions. You can limit the number of recursions and know about the number itself using the sys.getrecursionlimit() and sys.setrecursionlimit() functions.

Component of a Web browser

The primary components of a browser are shown in the below image:

1. **User Interface:** The user interface is an area where the user can use several options like address bar, back and forward button, menu, bookmarking, and many other options to interact with the browser.
2. **Browser Engine:** It connects the UI (User Interface) and the rendering engine as a bridge. It queries and manipulates the rendering engine based on inputs from several user interfaces.

3. **Rendering Engine:** It is responsible for displaying the requested content on the browser screen. It translates the HTML, XML files, and images, which are formatted by using the CSS. It generates the layout of the content and displays it on the browser screen. Although it can also display the other types of content by using different types of plugins or extensions. such as:
    - Internet Explorer uses **Trident**
    - Chrome & Opera 15+ use **Blink**
    - Chrome (iPhone) & Safari use **Webkit**
    - Firefox & other Mozilla browsers use **Gecko**
4. **Networking:** It retrieves the URLs by using internet protocols like HTTP or FTP. It is responsible for maintaining all aspects of Internet communication and security. Furthermore, it may be used to cache a retrieved document to reduce network traffic.
5. **JavaScript Interpreter:** As the name suggests, JavaScript Interpreter translates and executes the JavaScript code, which is included in a website. The translated results are sent to the rendering engine to display results on the device screen.
6. **UI Backend:** It is used to draw basic combo boxes and Windows (widgets). It specifies a generic interface, which is not platform-specific.
7. **Data Storage:** The data storage is a persistence layer that is used by the browser to store all sorts of information locally, like cookies. A browser also supports different storage mechanisms such as IndexedDB, WebSQL, localStorage, and FileSystem. It is a database stored on the local drive of your computer where the browser is installed. It handles user data like cache, bookmarks, cookies, and preferences.

How does a browser work?

When a user enters a web address or URL in the search bar like javatpoint.com, the request is passed to a domain name servers (DNS). All of these requests are routed via several routers and switches.

The domain name servers hold a list of system names and their corresponding IP addresses. Thus, when you type something in the browser search bar, it gets converted into a number that determines the computers to which the search results are to be displayed.

The browser acts as a part of the client-server model. A browser is a client program that sends the request to the server in response to the user search queries by using Hypertext Transfer Protocol or HTTP

. When the server receives the request, it collects information about the requested document and forwards the information back to the browser. Thereafter, the browser translates and displays the information on the user device.

List of Internet Browsers

There are various types of internet browsers, which are as follows:

- **Microsoft Edge:**

- **Google Chrome:**

- **Flash Browser (Project Browser):**

About Flash Browser

- Flash browser is a web browser which act as an **Interface between the User and Web servers.**
- Flash browser is a software application that resides on a computer and is used to **locate** and **display web pages**.
- Flash browser is for **Retrieving, Presenting** and **Trans versing** information resources on the world wide web.

User interface

Most major web browsers have these user interface elements in common:[14]

- Back and forward buttons to go back to the previous resource and forward again.
- A refresh or reload button to reload the current resource.
- A stop button to cancel loading the resource. In some browsers, the stop button is merged with the reload button.
- A home button to return to the user's home page
- An address bar to input the Uniform Resource Identifier (URI) of the desired resource and display it.
- A search bar to input terms into a search engine
- A status bar to display progress in loading the resource and also the URI of links when the cursor hovers over them, and page zooming capability.

Major browsers also possess incremental find features to search within a web page.

Privacy and security

Most browsers support HTTP Secure and offer quick and easy ways to delete the web cache, cookies, and browsing history. For a comparison of the current security vulnerabilities of browsers, see comparison of web browsers.

Standards support

Early web browsers supported only a very simple version of HTML. The rapid development of web browsers led to the development of non-standard dialects of HTML, leading to problems with interoperability. Modern web browsers support a combination of standards-based and de facto HTML and XHTML, which should be rendered in the same way by all browsers.

The browser's main functionality

The browser main functionality is to present the web resource you choose, by requesting it from the server and displaying it on the browser window. The resource format is usually HTML but also PDF, image and more. The location of the resource is specified by the user using a URI (Uniform resource Identifier). More on that in the network chapter.

The way the browser interprets and displays HTML files is specified in the HTML and CSS specifications. These specifications are maintained by the W3C (World Wide Web Consortium) organization, which is the standards organization for the web. The current version of HTML is 4 (http://www.w3.org/TR/html401/). Version 5 is in progress. The current CSS version is 2 (http://www.w3.org/TR/CSS2/) and version 3 is in progress. For years browsers conformed to only a part of the specifications and developed their own extensions. That caused serious compatibility

issues for web authors. Today most of the browsers more or less conform to the specifications.

Browsers' user interface have a lot in common with each other. Among the common user interface elements are:

- Address bar for inserting the URI
- Back and forward buttons
- A refresh and stop buttons for refreshing and stopping the loading of current documents
- Home button that gets you to your home page

Strangely enough, the browser's user interface is not specified in any formal specification, it is just good practices shaped over years of experience and by browsers imitating each other. The HTML5 specification doesn't define UI elements a browser must have, but lists some common elements. Among those are the address bar, status bar and tool bar. There are, of course, features unique to a specific browser like Firefox downloads manager.
More on that in the user interface chapter.

The browser's high level structure

The browser's main components are (1.1):

1. The user interface - this includes the address bar, back/forward button etc. Every part of the browser display except the main window where you see the requested page.
2. The browser engine - the interface for querying and manipulating the rendering engine.

3. The rendering engine - responsible for displaying the requested content. For example if the requested content is HTML, it is responsible for parsing the HTML and CSS and displaying the parsed content on the screen.

4. Networking - used for network calls, like HTTP requests. It has platform independent interface and underneath implementations for each platform.

5. UI backend - used for drawing basic widgets like combo boxes and windows. It exposes a generic interface that is not platform specific. Underneath it uses the operating system user interface methods.

6. JavaScript interpreter. Used to parse and execute the JavaScript code.

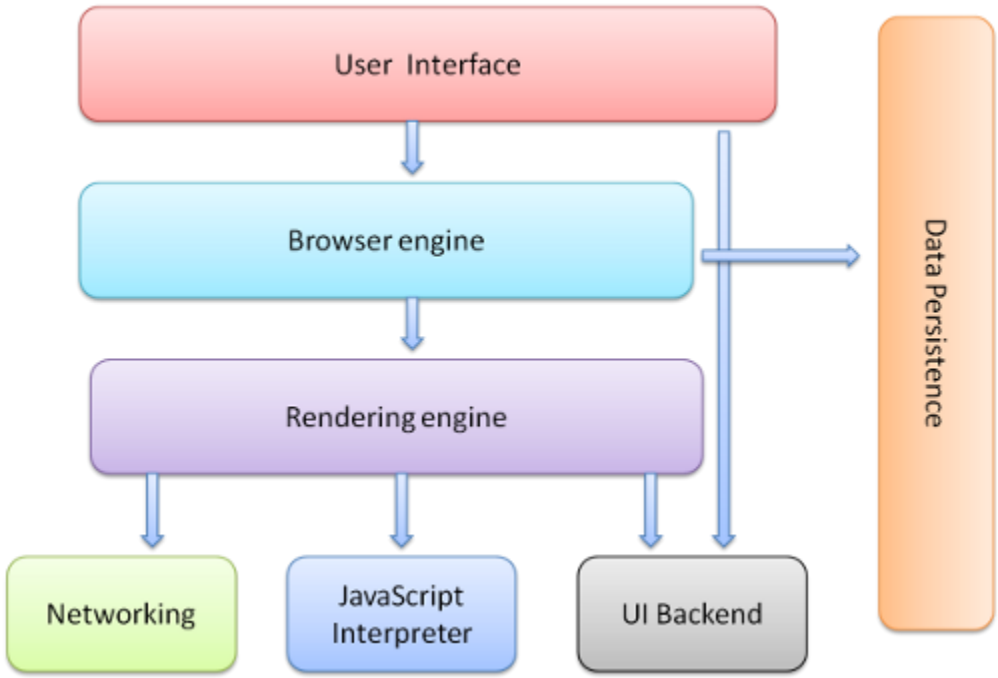
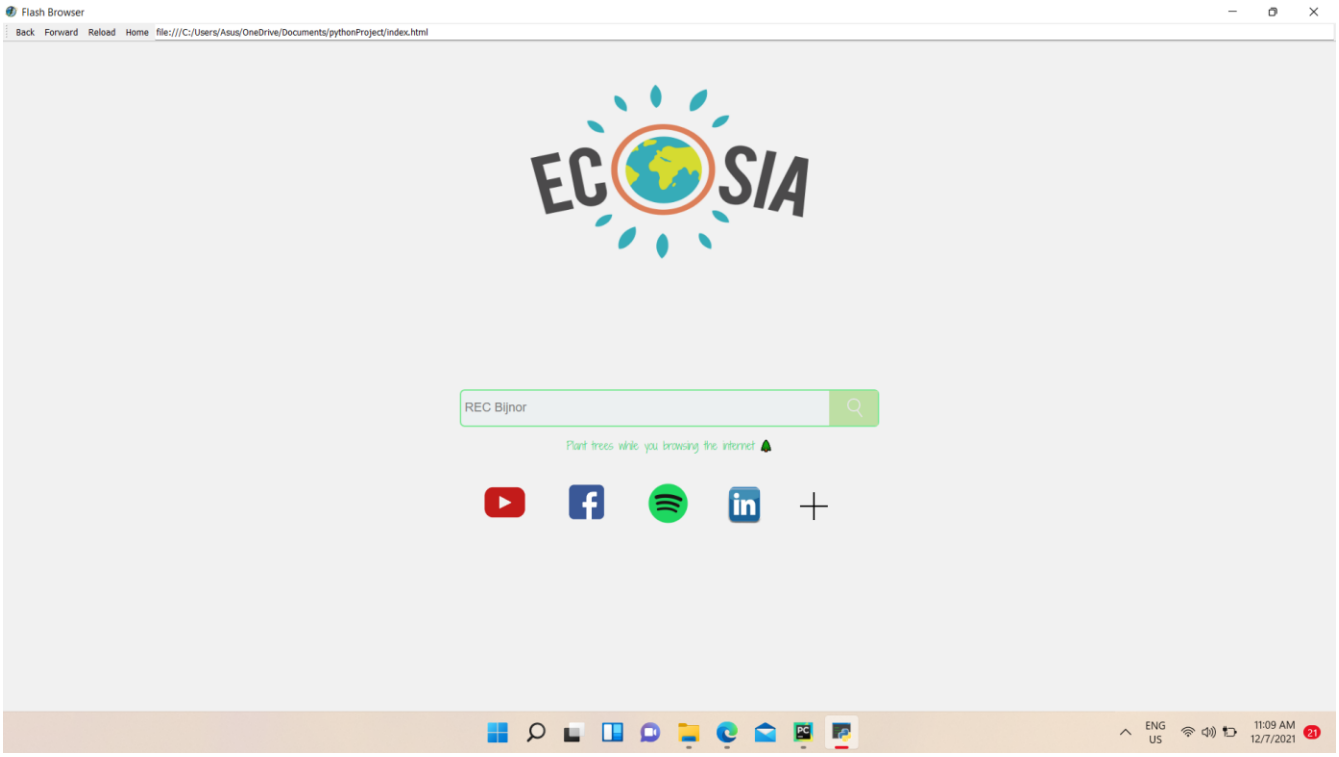


Figure 1: Browser main components.

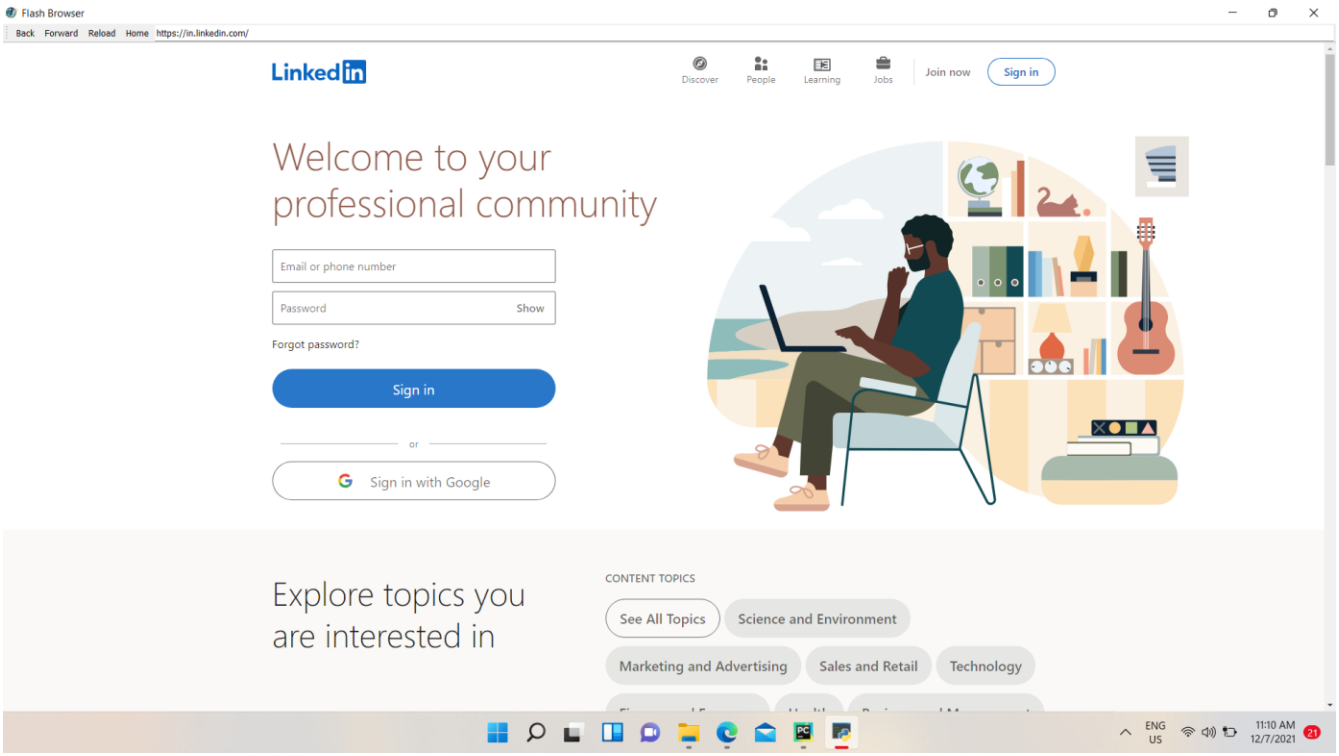
It is important to note that Chrome, unlike most browsers, holds multiple instances of the rendering engine - one for each tab,. Each tab is a separate process.

Test Results

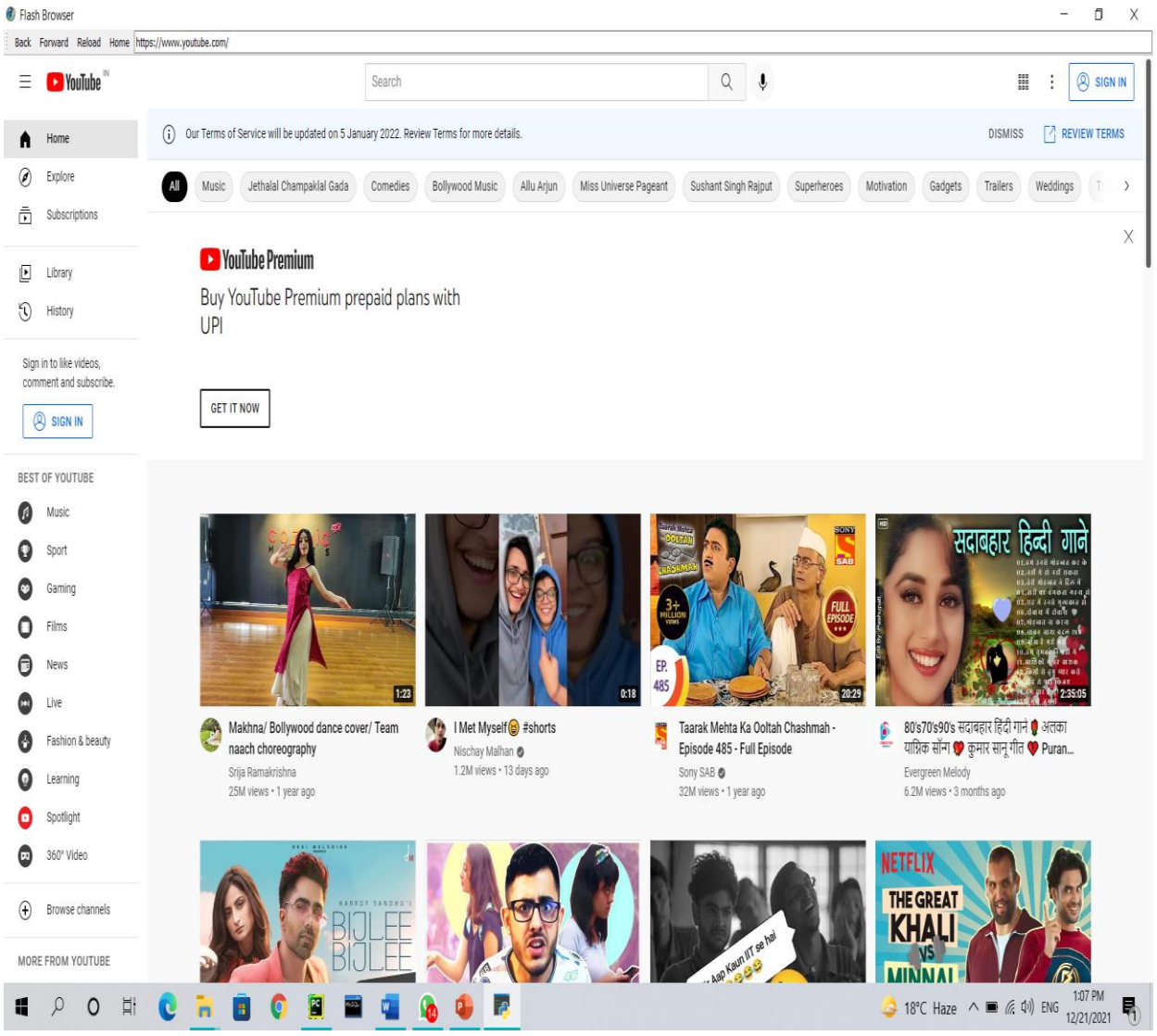
Homepage



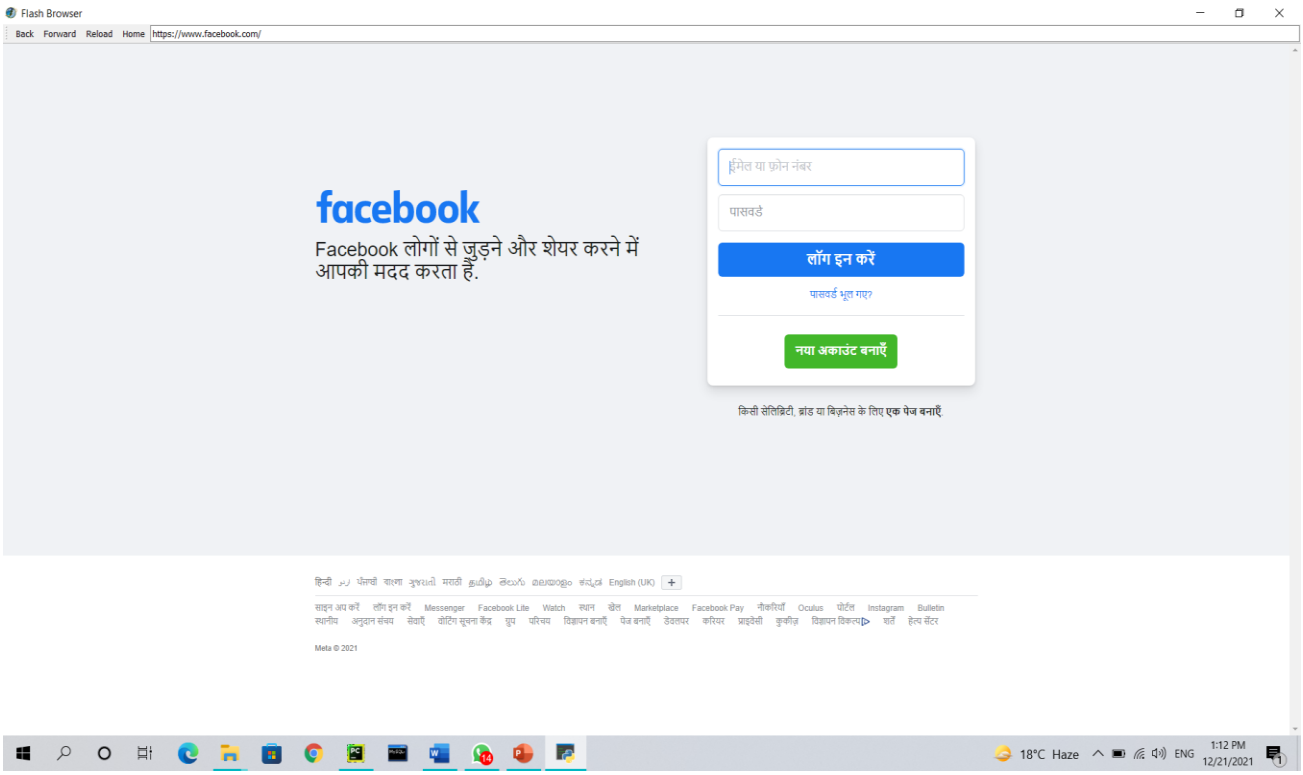
LinkedIn Site by clicking on LinkedIn quick access icon.



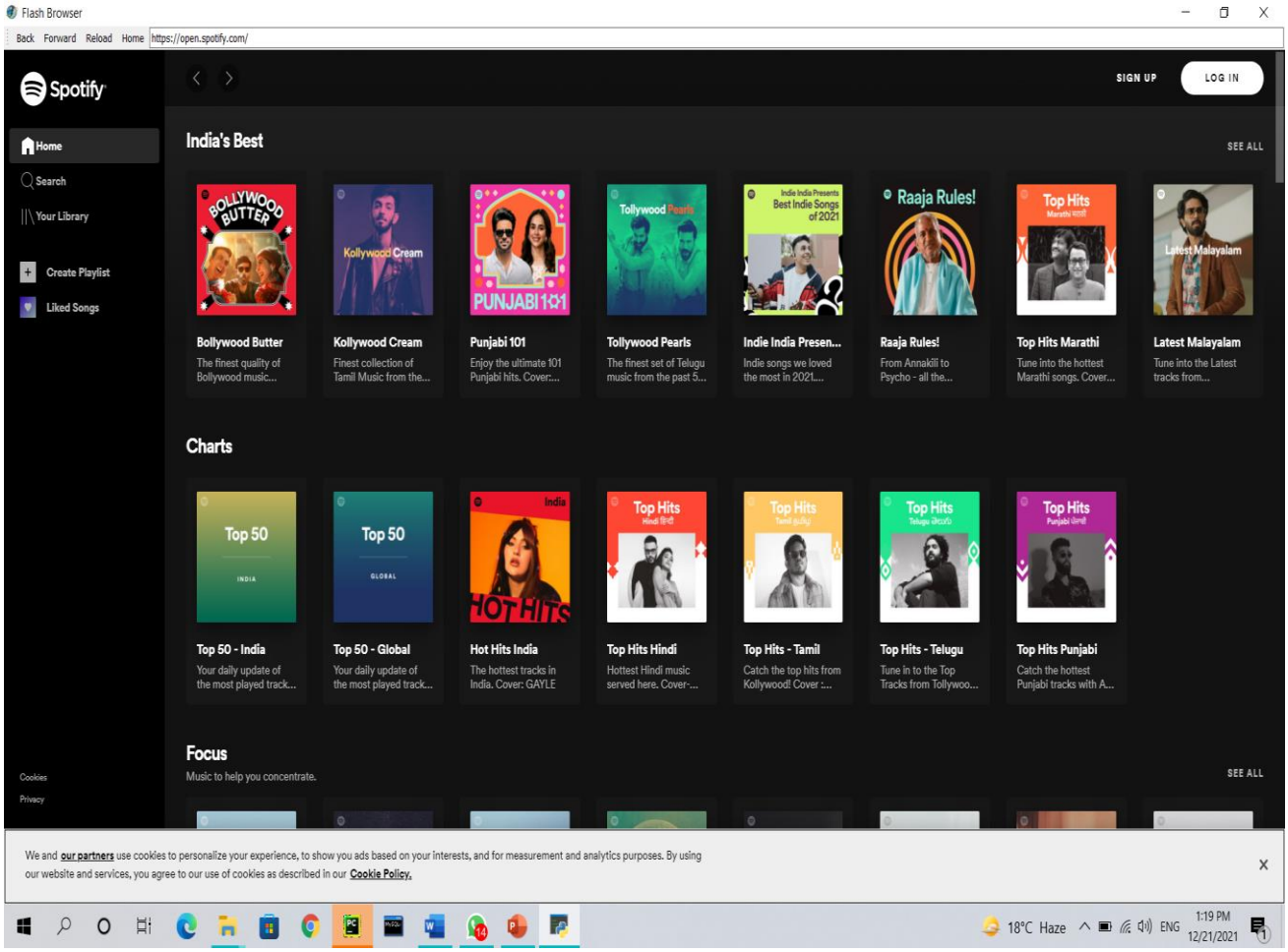
YouTube Site by clicking on YouTube access icon.



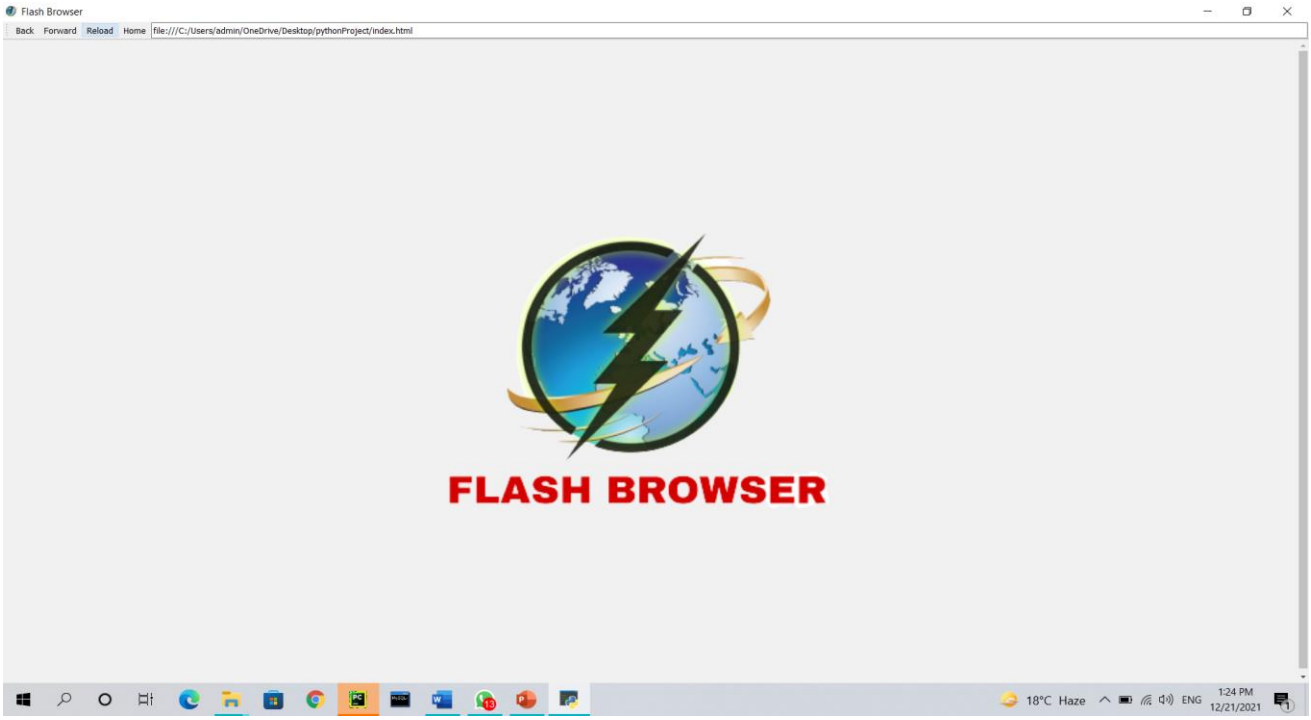
Facebook Site by clicking on Facebook access icon.



Spotify Site by clicking on Spotify access icon.



Splash Screen while clicking reload button.



Future development Updates

Book Mark

A bookmark is **a web browser feature used to save a web site's URL address for future reference.** Bookmarks save user and browser time, which is especially useful for Web pages with long URLs or accessing a specific part of the site that might not be the homepage for the site.

History

Web browsing history refers to the list of web pages a user has visited, as well as associated metadata such as page title and time of visit. It is usually stored locally by web browsers in order to provide the user with a history list to go back to previously visited pages. It can reflect the user's interests, needs, and browsing habits.

Username linking

When you browse to a website using flash browser, you can see a list of all the users who have logged in to that site from your computer. This can be convenient when you've forgotten your username on a particular site. It also allows others to view your usernames, making it easier for them to log in under your name.

Pop-up notifications

A popup notification is a message that appears on your users' browser or desktop. They're designed to grab your audience's attention and engage them in some way.

USER MANUAL

Requirements

- RAM – 256 MB
- Storage – 400 MB
- Standard I/O devices like keyboard, mouse, etc.
- Internet Connectivity
- Operating System – Windows XP/2000/7 or Higher

BIBLIOGRAPHY

- Youtube www.youtube.com
- Prutor for Python www.prutor.ai
- For Problem Solving www.github.com
- For various sources www.google.com
- Reference Books