COS 5005-B - SOFTWARE ENGINEERING WITH GROUP PROJECT

Coursework Assignment - 2

Software Requirement

Specification For Web Browser

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## Introduction

We are going to develop a web browser. This web browser will be capable of rendering HTML pages, saving bookmarks, maintaining history, converting HTML pages to PDF documents and downloading files including audio, video etc. User can create account to maintain his passwords, history and bookmarks. Team consist of six members, they will be working on this project to shape this into a valuable product so that intended audience get satisfied and perform different functions on this application.

### 1.1. Purpose

This manual is going to discuss the behaviour of our system. This document will help user to understand each and every functionality of the browser. It explains the purpose and features of the system, the interfaces of the system, what system will do and the constraints under which it will operate. This document is intended for both user and the developers of the system.

### 1.2. Scope of the Project

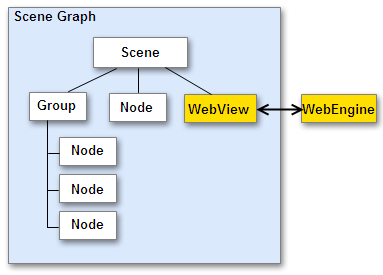
Project, web browser is a desktop based application which will help users to access web content. It is a desktop application which will run on windows and linux operating system. Application has many features like maintaining bookmarks, accessing web pages, managing web history, downloading and converting html pages into pdf documents. User can create account in the browser which will help to manage passwords and help to maintain the privacy of user. The interface of the application will be user friendly and help new user to learn different functionalities very easily.

## 2. Overview of Document

The below mentioned sub headings discuss and explain about the interaction of application with user and with other systems and also explains its functionality. These sub headings describe what type of user will interact with application and their constraints on the application. Moreover, what kind of functionalities application provides to user. At the end, the user limitation and characteristics will be presented.

### 2.1 Perspective

This software is a desktop application. This application will be used to search any web content from the web server by inputting the url in search bar . The requested web page will be displayed below the search bar in main window. This application will need internet to communicate with web server. When user will enter a valid URL then this application will resolve DNS of the given url to get the IP of the web page from web server and then establishes HTTP/HTTPS request over TCP connection to get the document from the web server. After receiving the required page, contents of the page are parsed into a dom tree with webengine (html, css, javascript parser engine) and then rendered on application’s window with javafx webview(a renderer provided with JDK1.8). The functionality of rendering and establishing TCP or UDP connection and resolving the DNS is provided by WebEngine and WebView. Both of these functionalities are embedded in our application. As shown below in the diagram:

[[1]](#footnote-0)

The visited links and bookmarks will need a database to be stored. The history, passwords and bookmarks of different sites will be stored in database. We will try to implement some unique features like suggesting more visited pages which include, frequently visited bookmarked pages. Application will be capable of suggesting visited links based upon user’s search habits as the part of home page. Application will maintain the count of most visited links along with their access time and the duration to make intelligent selection of suggested pages on user’s home page.we will try to implement user account’s synchronization among different devices. Synchronization requires an external server, which holds the user account record and synchronize among different devices. The records may include user bookmarks, and history,saved password etc.

### 2.2 Functions

User can create account to login first time, search, download, bookmark the pages, save history and generate pdf files.User can save his online account information such as username and password which will be entered by the browser next time he visits that site. The results of the search will be based on user input. The history will be maintained in the application so that user can revisit the links saved in database. The pdf viewer is not embedded so user can not view pdf file but user can download it. When user will try to open any pdf file it will automatically start downloading. User can convert HTML pages to PDF.

### 2.3 User characteristics

The user of this desktop application is the primary user who wants to search the web content. This desktop application provides the user a GUI interface to browse easily and perform different tasks of there choice. User need a platform like windows or linux to operate this application. User should know how to interact with the computer and usage of internet connection. User has to enter the URL of the required web content or page in search bar and in response, user will get the output of the given URL in form of a webpage.

### 2.4 Constraints

The Internet connection is a constraint for the application, without internet user will be unable to run this application. Since the application fetches data from different servers over the internet so it has to create connection with the DNS server over the Internet. If there is internet connection problem or loading pages interrupts then user must have some knowledge to solve these problems. This application needs database to save data to reuse it in near future, which includes maintaining history of different links, adding bookmarks of the favourite sites and the most necessary saving passwords of different user’s online accounts details e.g username,password.

## 3 Assumptions and Dependencies:

1. User needs following software components for application to work properly.

* Windows, Linux operating system.
* Graphical user interface.
* JDK1.8 or above.

1. User knows how to use computer.
2. User can understand the basic English language.
3. User knows the basics of software and its usage.
4. User knows little about the functionalities of browser.

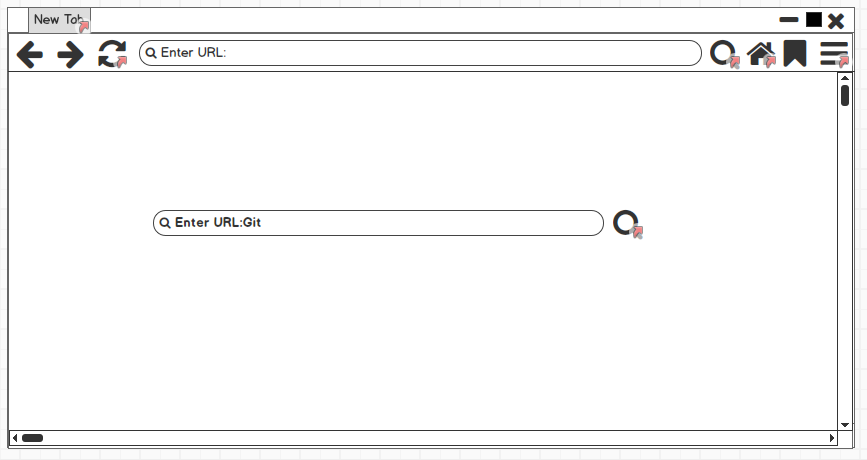
## 4. Requirements:

It should be a stand alone desktop application. Software should provides the functionality of user’s online account management, searching, downloading, bookmarks, history maintenance as well as conversion of html page to pdf. Details are given below.

### 4.1 User Interface

#### 4.1.1 Homepage

The following figure shows the home page of application. This page consist of address bar where user can enter URL to access any thing through internet from web servers. Likewise, forward and backward buttons are available to navigate between different pages on the same tab. User can reload the web page and can bookmark the link. It also contains the search, bookmark and refresh button.

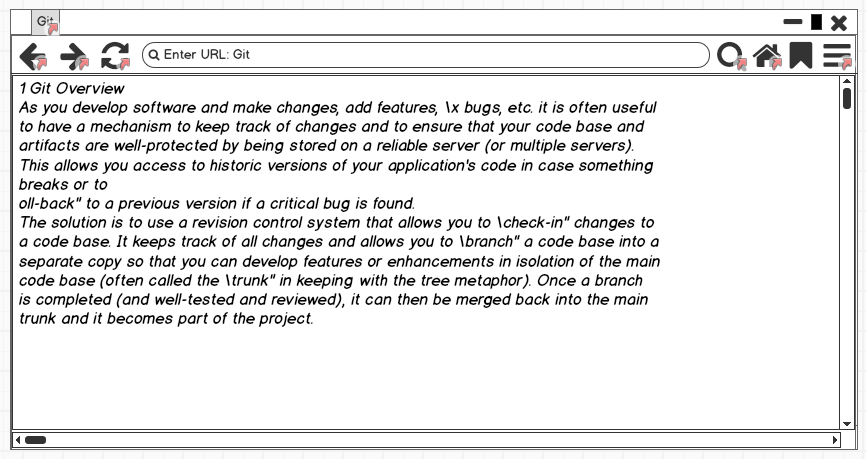


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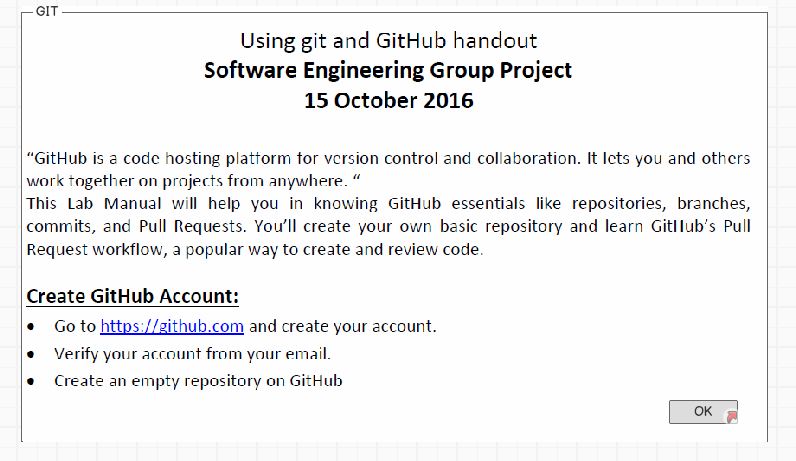
#### 4.1.2 Search

The following figure shows the result of a URL entered by user into the search bar. First user will enter url and click on the search button and requested contents will be displayed on the screen. The result of the URL may contain document, video, audio etc. This is the functionality of search bar and search button.



#### 4.1.3 Converting HTML page to PDF

The following figure shows a PDF document which was created by our application. When a user open any HTML page and want to convert it into PDF document, user can easily do this by just clicking on the create PDF button.



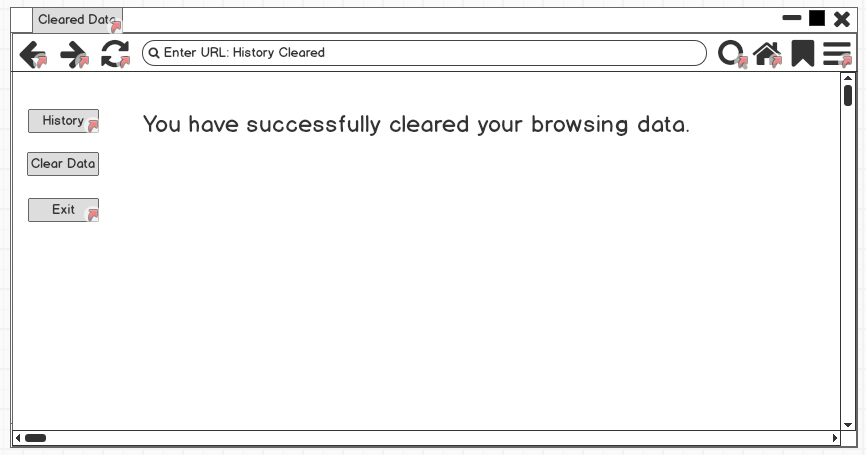
#### 4.1.3 Settings

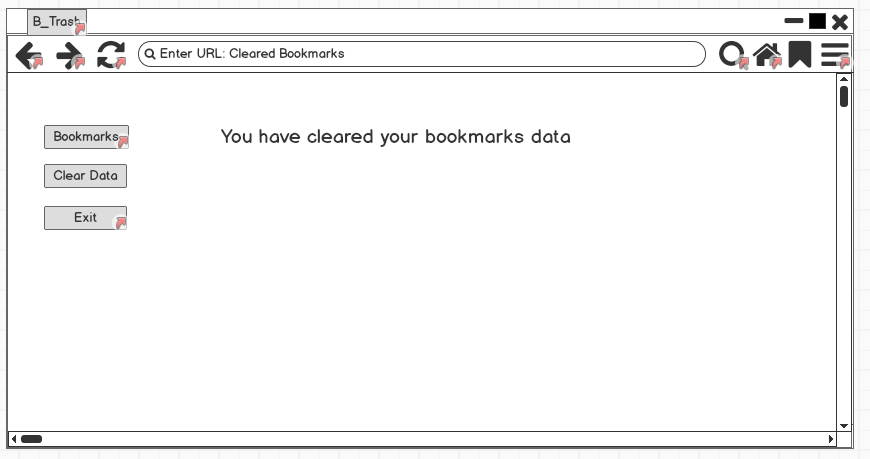
The following figure shows the setting page of browser application. This page consist of different buttons which include manage password, clear browsing or bookmarks data, change proxy setting etc.

##### Settings.PNG

#### 4.1.4 Clear Browsing data:

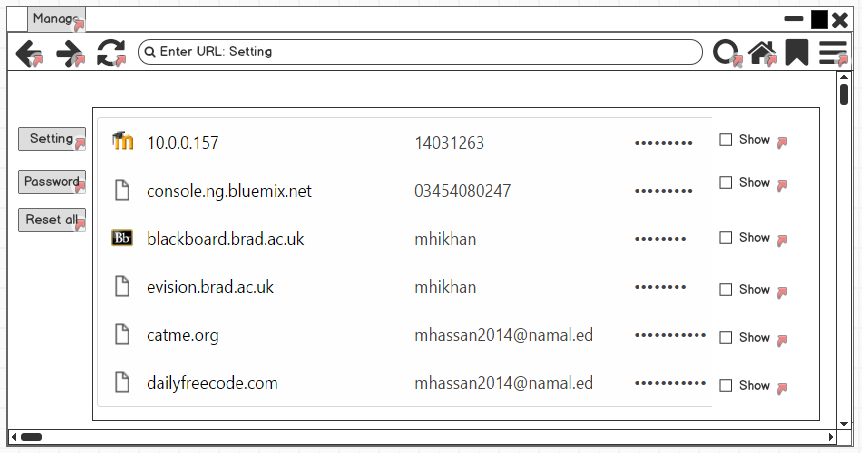
If user has pressed clear browsing data button, all browsing data till now will be cleared. The following figure shows the confirmation that your browsing data has been cleared.

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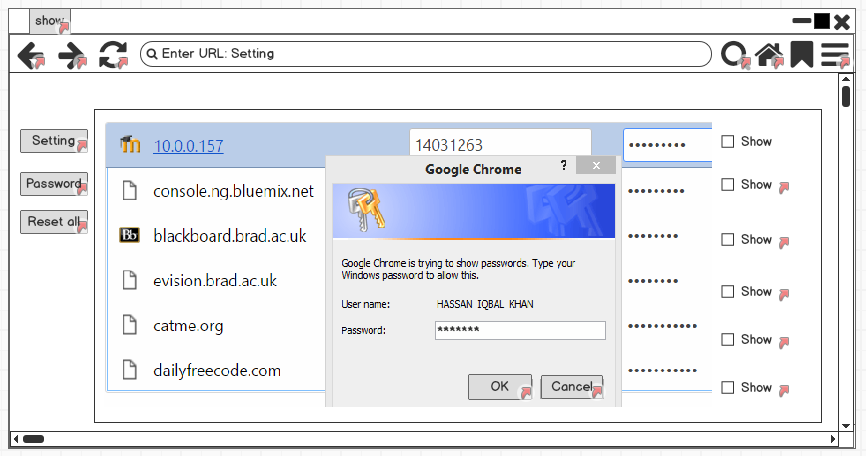
****

#### 4.1.5 Manage Password

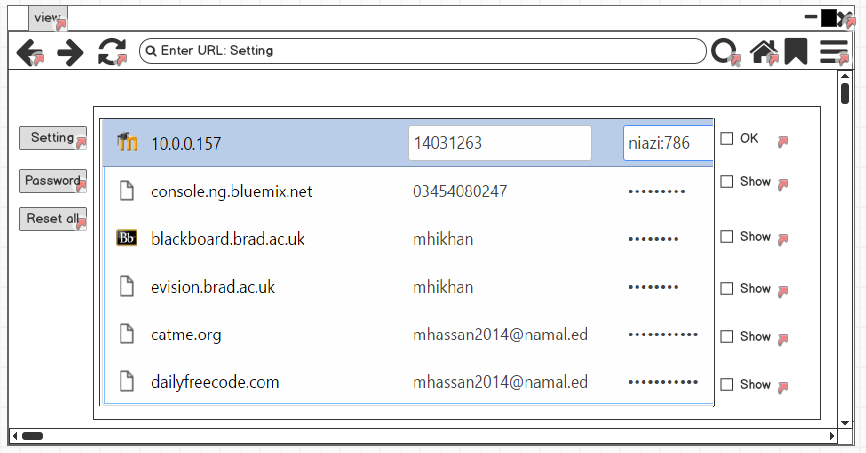
If user wants to see the already saved passwords of different accounts, user just has to click manage password button and a new window will open which contains the information of all the saved passwords. The following figure shows some passwords which have been saved by the application.



Now if user wants to see any saved password, user have to click “Show” button, now the application will ask user to enter the master password to show the saved passwords. The following figure shows the dialogue box which asks master password to show the saved password.

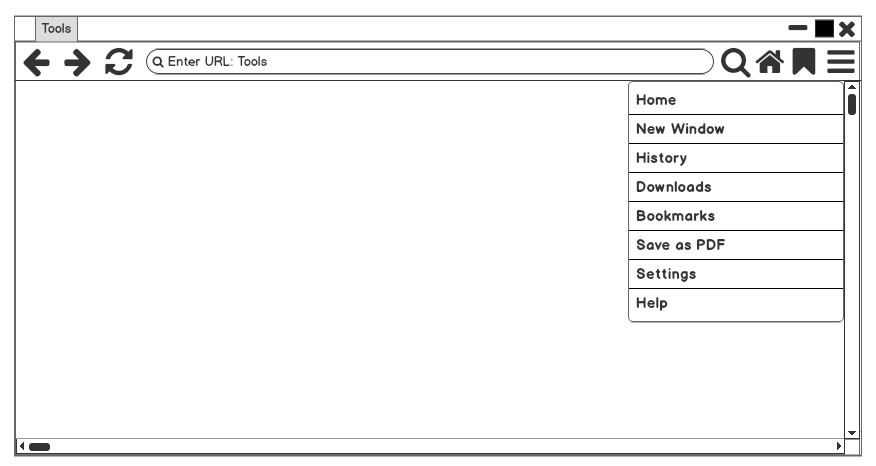


Now if user has entered valid password, so the application will show the saved passwords of different accounts. The following figure shows the window of passwords of different accounts.



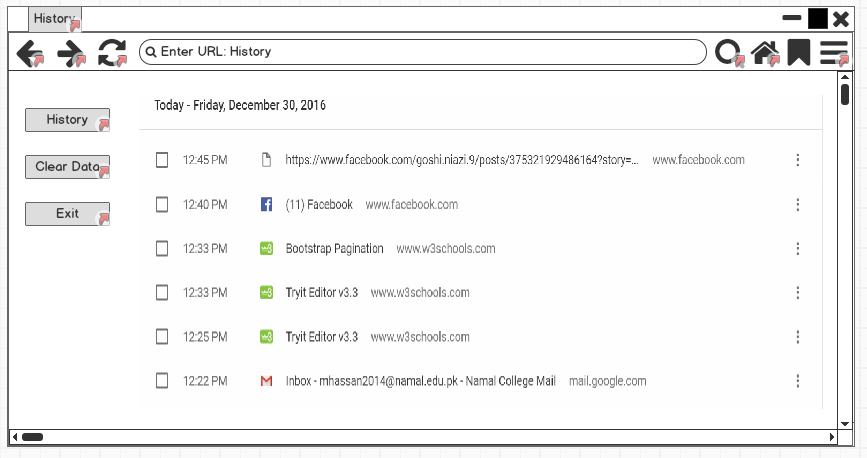
#### 4.1.6 Hamburger

The following figure shows the hamburger transition. In this figure different buttons are shown through which user can navigate between different pages. User can go to downloads page, bookmarks page, history page etc.



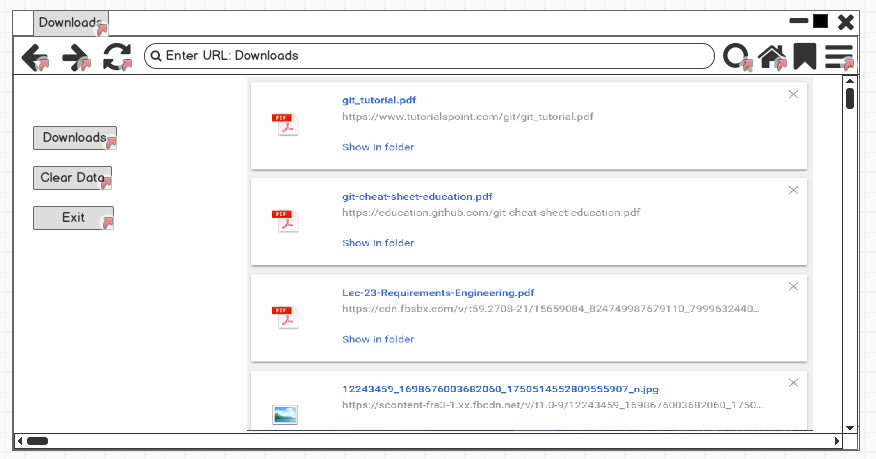
#### 4.1.7 History

Following figure shows the history of the web pages user have visited till now. This page consist of different buttons including clear history and exit button. If user clicks clear history button, all the history will be deleted. If user clicked exit button then application will be terminated.



#### 4.1.8 Downloads

Following figure shows the links and description of downloads of different videos, documents, audio etc fles user has downloaded till now. This page consist of different buttons including clear downloads and exit button. If user clicked clear downloads button, all the downloads record will be deleted.



### 4.2 Functional Requirements:

Each requirement is explained in the following headings:

**Functional Requirement 1.1**

**Title:** User registration

**Description:**

When a new user will start using browser he has to create an account to save his history, bookmarks and passwords. If user will not create account he will be unable to save his history, bookmarks etc. Now user will click create account button. Application will ask user for first, last name valid email address and a password. When user will enter this information, application will store this information in the database and will allow user to login using his email id and password to avail facility of saving bookmarks and history etc.

**Functional Requirement 1.2**

**Title:** User Log in

**Description:**

When user has opened browser, he will have to login to his/her account so that he/she should be able to save history, bookmarks and passwords of new accounts. User will have to login just once when he/she is running browser, when user will close browser his account will be automatically logged out. Browser has facility of knowing the inactivity of the user. If user become inactive for some time then browser will automatically restrict user to see his database stuff. If user want to see his history, bookmarks etc user has to enter the pin code, he/she has set while creating account. If the pin code is correct user will be granted access to his database.

**Functional Requirement 1.3**

**Title:** Recover Password

**Description:**

In case user has forgotten the password, the application provides the functionality to recover password by sending email to the user mail account with a recovery key. This recovery key will be used to reset the password for the specific user account related to that email address. User can set new password by providing new password into required fields of the user interface. When new password is entered application will save password into the database. This new password will be used for the user to login next time.

**Functional Requirement 1.4**

**Title:** Search Bar

**Description:**

Application includes search bar to search the web page, fetch it and display it on screen. In search bar user will enter the valid url of the required page or of website and the content of the web will be fetched and displayed in the application window. User can interact with the web page and can download content. Search bar will check whether the given url is a valid url or not. If url is invalid application does not respond to the url. If url is valid then application shows the result relevant to that url.

**Functional Requirement 1.5**

**Title:** Navigation

**Description:**

When user will open any page and navigate the new links on the same tab, then user can move forward or backward on same tab. Forward and backward navigation provided by user interface help user to move to previous links or move to next links if user has already opened some links.

**Functional Requirement 1.6**

**Title:** Home Page

**Description:**

Main page of the application also known as the home page is same as the main page of Google chrome. This page has different buttons to perform different tasks. These buttons include:

* **Search button:** When user enter url into search bar and click this button, application shows the result of the link.
* **PDF button:** If user has opened any html page and want to create pdf of current page, user will just click this button and application will convert html page to pdf and store it on the local machine.
* **Bookmark:** If user has opened any link and want to save it for future use, then user will just click this button and link will be saved into database along with the time and date.
* **Download:** If user has opened any downloadable file and clicked this button, then application should start downloading the specific file.
* **Hamburger:** When user clicked this button a small window is opened which contains following button:
* History
* Bookmarks
* Downloads
* Setting

**Functional Requirement 1.7**

**Title:** Profile Page

**Description:**

User has profile page which include the information about the user account e.g username, email, location, change password etc.

**Functional Requirement 1.8**

**Title:** Create Account

**Description:**

User can create account for the browser. Creating account includes user info e.g email address, account password. User account can be used to access user related bookmarks, history details, saved passwords, account settings etc.

**Functional Requirement 1.9**

**Title:** History

**Description:**

User search different pages all the time. So, browser maintains the history of each and every link in its database. When user want to see his history, he will just click on this button and a new page will open which will contain all the links user has visited. History section includes past hour, past day, past month and last six month history details. History information will contain date, time and link of that web page. User can also delete history by clicking on clear button.

**Functional Requirement 1.10**

**Title:** Bookmarks

**Description:**

When user will click this button, all the links which user has bookmarked till now will be displayed in new window along with the time and date of access. If user has opened any page and clicked small icon then the current web page will be bookmarked. URL of web page will be stored in the database and user don’t have to search that page again and again. If user want to visit that page again he just has to click on that link and application will open the page of specific link.

**Functional Requirement 1.11**

**Title:** Save HTML as PDF

**Description:**

Download pdf button create pdf of the current web page. If user has opened any static html page and click this button, application asks user to specify location for saving the generated pdf file. When user provide the specific place for saving pdf, application will save the file to the specified location. Browser will also maintains the history of all PDF files.

**Functional Requirement 1.12**

**Title:** Downloader

**Description:**

Browser provides downloader facility, which detect downloading media and starts downloading by showing notification of downloading started. User can check the downloading history and status of downloading file by going to the downloads page. User can view the status of the current downloading file, time, date and url of the file as well as user can also view the history of previously downloaded files.

**Functional Requirement 1.13**

**Title:** Password Vault

**Description:**

Password locker provide user the functionality of password vault which will save the user’s name and password of those websites on which user has been created an account and includes autofill when he revisits those websites. Password locker will manage user passwords, and if user wants to access his saved passwords, application will requires authentication from the user to access his password for security reasons.

**Functional Requirement 1.14**

**Title:** Manage Users

**Description:**

Browser supports multiple accounts. Each account has its own bookmarks, history saved password etc. When user will login to his account only he can see his own history of visited sites, bookmarks and saved passwords.

**Functional Requirement 1.15**

**Title:** Prefered Language

**Description:**

English will be the prefered language for our web browser. It will not support any other language.

**Functional Requirement 1.16**

**Title:** Multi Tabs

**Description:** Application will have multi tab feature with which user will be able to search in different tabs. Each tab will provide the facility to search the web content. User can switch between different tabs to see the web content opened in each tab. Each tab will work independently.

## 5. System Dependency and Availability

**Title:** JDK Version

**Description:** Software uses javafx for its user interface design, which is included in JDK version 1.8 or prior to it. Software uses webengine (html , css parser and javascript rendering engine) and webview to show the rendered page on the window.

**Title:** Internet Connection

**Description:** Internet connection is required for the browser to fetch the remote content. User may use offline for localhost but to access the outside world internet connection is required. User can access their history, bookmarks without having internet because these things will be stored in their personal system which does not need internet connection to be opened.

**Title:** Operating System

**Description:** Software can function on Windows platform as well Linux or Mac or any platform with JDK 1.8 or above installed.

**Title:** Hardware Specification

**Description:** Software requires computer with minimum ram of 512 Mb and Hard disk with 70Mb or above. Network Interface Card(NIC) for the connectivity to the internet. And a working physical connection to the internet.

## 6. Accuracy Requirements

**Title:** Search results of History

**Description:** Search feature has the functionality to filter the result based upon user input. It is very fast and dynamic search with no longer latency in search where user can feel uncomfortable.

**Title:** Search results of Bookmarks

**Description:** Like history, bookmarks section also provides user facility to search through bookmarks quickly by putting input in search field..

**Title:** Search results of Users

**Description:** Application ensures that when user wants to search anything he gets the accurate result according to his entered text or url.

**Title:** Download Files

**Description:** Download section of the software includes file statistic to be downloaded. This section provides the individual file details like url, time, date, completion status etc. as well as details of pervious downloaded files.

**Title:** Download HTML to PDF

**Description:**Software includes feature of converting html page to pdf and saving it to user machine in a specific folder.

## 7. Application Attributes

In this section the system reliability, security and consistency of the application is mentioned.

### 7.1 Reliability

Reliability of any system depends upon the functionality of the system when it is required.

**Description:**

* Reliability of the system means that system will respond continuously.
* The application will give result of every search.
* System will maintain history of each link visited.
* System will maintain bookmarks and will save them in database.
* System will show history and bookmarks when user will need them.
* System will maintain pas.

### 7.2 Availability

Availability of the system means that when and where we can use that system without any error.

**Description:**

This application mostly depends on internet to search any thing around the world. But their are many functionalities which does not require internet to work for example user can see history and bookmarks without internet. User can see passwords without internet.

**Internet Connection (Must be connected)**

**Description:**

Main functionality of the application is to search content of the link entered by user into search bar. So for searching, the application needs internet connection. If there is no internet connection user will be unable to search any type of web content.

### 7.3 Security

**Title:** Admin Login Security

**Description:** The application will have a pin code to access the secured features of the browser.

**Testing:** (how much attempts)Application contains public view and private view. Public view contains normal setting of the browser and private view contains user related settings and the data of that user that is bookmarks, history and downloads etc. At start, application requires a single attempt to login through the pin code. If login succeeded then view will be switched to user private view.

**Title:** User Create Account

**Description:** User has to create his account to use the services of this application.

**Testing:** multiple accounts created and tested to access the secured features manually.

**Title:** Attempts to use browser

**Description:** Application will have key combination or pattern or pin code lock for browser.

**Testing:** It depends on the account of the user, if user is using his own account to access different things and search web content, then he will be able to do so without any hesitation. But if the user is trying to access someone else’s account, then the application would not respond.

**Title:** Attempts to view history or bookmarks

**Description:** To access the history or bookmarks a specific pattern will be used by user so that user will remember as he has entered this pattern during creating his account.

**Testing:** Specific patterns of different accounts were used to see history and bookmarks. It was not possible to see history and bookmarks without specific pattern of the account.

**Title:** Password Recovery or Reset

**Description:** In case the user forget password or want to reset. The user can recover password through email.

**Testing:** If user forgot the password, he/she can recover it by providing his email address. There is a forget password option in user login portal by clicking on that email is sent to the user email id with a pin code with which user can reset the password.

### 7.4 Portability

**Title:** Application Portability

**Description:** The window and linux platform will be adaptable for this application.

**Testing:** Different attempts on different platform to check the application is working fine on each platform.

### 7.5 Maintainability

**Title:** Application addition

**Description**: The application will be easily extendable. The application code should be written in a format that development team can add further functionality and embed function in it.

**Title:** Application testing

**Description:** The application should be developed in such a format that each function could be tested easily during testing.

## 8. Non-functional Requirements

There are different types of non-functional requirements. Some are exterior and some are interior non-functional requirements. So we will first explain the exterior non-functional requirements.

### Exterior or External non-Functional Requirement

First are exterior (or external) non-functional requirements types that generally are observable and important to the user:

#### 8.1.1 Usability

This system is very easy to understand. If user stuck at any place using the browser, he can easily get help by the instructions provided at each step. User will feel very comfortable while using browser because it is in simple and use understandable language. There is no word or phrase which will make user difficult in understanding the purpose of that word or phrase.

#### 8.1.2 Reliability

The application is very reliable and mainly relies on the user. If user has some understanding about the application he will never feel difficulty. This is a network based application, so availability of internet is mandatory in whole application. It has reliability that user can switch easily from one tab to another and then again come on the same page without losing the information or data.

#### 8.1.3 Correctness

Application would manage data including bookmarks, history and downloads, so everything would correctly defined and managed by the application. Each date is written in the predefined manner and user do not have to worry about the order of date and time.

#### 8.1.4 Appearance

The appearance of the application is fascinating, color scheming is according to user experience. Design usability would be enhanced so that user can easily use different features of the application. User interface would be quite familiar with other browsers like chrome safari or firefox so that user find no problem by switching his favourite browser to our application. To make user interface more interactive, controls and features sections would be divided and easily accessible from their respective menus. Application is going to be rich in features as well user centric designed so that new user can use it easily and can enjoy the unique features of our browser.

#### 8.1.5 Availability

Application availability depends on the availability of internet. If user has internet facility, user can use application whenever and wherever he wants to use it. But their are some functionalities which are also available without internet connection. Offline functionality includes opening bookmarks and history folder and watching their previous records as well as accessing downloaded content and saved PDF files. User can change his account related setting as well. Online features include surfing the web, opening bookmarked URLs or revisiting the websites saved in history as well downloading content from the internet.

#### 8.1.6 Safety

This is very simple desktop based application and will never harm computer or laptop. It does not contains any bugs or virus which can damage user’s computer so anyone can feel free to use this browser on their computers.

#### 8.1.7 Security

Now a days privacy is very important for the users. They do not want others to see their personal data so our application will give user the opportunity to keep his personal data to be secured.

This application can be used by many users at a time but it has one main functionality. If user creates his account in this application then only that user can see and manage his personal information by logging in to his account by using username and password. So no other person can access other user’s personal data. User can use his account or can surf the web without logging into his account in this case user history and bookmarks are not being stored.

#### 8.1.8 Privacy

When user creates his account in the browser. He secure his all private data by providing password and username. Whenever he want to see his private data he has to login into his account using his own username and password.

### Interior or Internal non-Functional Requirements

Second are interior (or internal) non-functional requirements types. These functionalities are generally observable and important to engineers/builders/operators but often not to users:

#### **8.2.1 Database:**

An embedded database is managed by the application. History, bookmarks and downloads are saved in their respective tables in a database. Whenever user will instal this application in their computer. It will automatically create a database and four tables named “History”, “Bookmarks” and “Downloads” and “Users”. Every data will be store in their respective tables. Whenever user will run application he/she has to create account to get the functionality of saving history, bookmarks etc. User will click signup button and will enter personal data to signup for application. This information will be stored into “users” table and this information will be required when user will login to the application. Whenever user will visit any site, that site will be stored into database in “History” table. Now, if user has opened any page and he wants to add that page into his favourite sites, he will just click bookmarks button and the link of that page will be added to “Bookmarks” table in the database. Now if user is downloading any file, the information of that file will be stored into “Downloads” table in the database.

#### 8.2.2 Performance Requirements:

Following are some performance requirements of this application.

* + If user wants to create new account and has clicked sign-up button, then application should ask user to enter his/her personal information. Personal information includes username, email id, password and pin. If email id is verified then application should ask user for password and a pin and then confirmation message should appear which will tell user that you have successfully created your account. Next time user can sign-in using this account.
  + If user want to search anything and if URL entered by the user is valid, then application should display the required web page which may or may not contains pictures, videos, audios. This link will be added to database in respective user’s account.
  + If user clicked on hamburger, then application should show all buttons available in that hamburger. The buttons available in hamburger includes:
* Downloads
* History
* Bookmarks
* Settings
  + If user has opened any html page and user clicked on bookmark icon, the application should bookmark that page and add it to bookmarks table into database.
  + If user has also opened any html page which also contains some pictures and user clicked PDF icon then application should ask user to specify the place for saving the pdf document and that page should be saved as PDF on the user’s specified place.
  + If hamburger is opened and user clicked “History” button, then application should show all history of the URLs, user has visited till now.
  + If hamburger is opened and user clicked setting button, then application should open the setting page of the application.
  + If user want to see his/her all saved passwords in the application, then application should ask user for username and master password, if username and password matched, then application should show user all his/her saved passwords. If username or password is incorrect, then application should show a rejection message and take user to the home page of the application.
  + If user clicked forward or backward button and if there are new or previous links opened on same tab, then application should take user to previous or next link.
  + If user clicked refresh button, then application should reload the same page opened at the movement.
  + If user clicked new tab, then application should take user to new tab which will start from a home page.
  + If user clicked close button, then application should be closed.
  + If user clicked maximize button, then application should fit on the desktop size and if clicked again then application should come to its previous size.

#### 8.2.3 Home Page:

The first page of browser is the main or homepage and it is same as the home page of a google chrome. This page contains different buttons which are described below:

##### 8.2.3.1 Search bar:

When user enters a valid url into search bar and then press enter or clicks search button, the browser should show the results of the entered url. Search result may contain different type of links, images, text audio or videos.

##### 8.2.3.2 PDF:

When user has opened any html page and want to save it to their personal computer, then user has to click pdf icon. If user has clicked pdf icon then application should ask user specify the place to save the pdf document. When user will specify the place and clicks the “Ok” button, application should start converting html page to pdf document and saved it into specified place. Application should notify user for successfully creating pdf document along with the path.

##### 8.2.3.3 Bookmarks:

User has opened some page and wants to save its url into his favourite sites then user will click bookmark icon. If user click bookmark icon then application should save the url into bookmarks table in the database along with the time of access and date. If user want to see his favourite sites, he just has to click the bookmarks button in hamburger and application should open bookmarks table which includes all the links along with date and time.

##### 8.2.3.4 Forward:

If user has visited different links on the same tab, then it help user to navigate between those links on same tab. When user clicked forward icon and any link was opened which is next to the current link then application should take user to that link. If user has not opened any new links, then the forward icon should remain disabled.

##### 8.2.3.5 Backward:

If user has visited different links on the same tab, then it help user to navigate between those links on same tab. When user clicked backward icon and any link was opened which is previous to the current link then application should take user to that link. If user has not opened any new links, then the backward icon should remain disabled.

##### 8.2.3.6 New Tab:

When user has clicked this button, the application should take user to new tab which will start from the home page and it should not affect the other tabs which user has already opened in the browser.

#### 8.2.4 Hamburger:

When user has clicked this button a side bar will appear on the same page and will contain following buttons:

##### 8.2.4.1 History:

User search different pages all the time. So, browser maintains the history of each and every link in its database. When user wants to see his history, he will just click on this button and a new page will open which will show all the history. History information will contain date, time and link of the web pages user has visited. User can also delete history by clicking on clear button. If the user has visited same link many time then that link will be updated according to current date and time.

##### 8.2.4.2 Setting:

When user is using browser and he wants to change his password or wants to see his accounts and their details, he will just click on setting button. Application should take user to a new tab, which is the setting tab and includes following buttons:

##### 8.2.4.3 Clear browsing data:

If user clicks this button a popup will appear which will ask for the confirmation that “Are you sure, you want to delete your browsing data?”, if user clicks “yes” his all browsing data should be cleared. If user clicks “no” then application should redirected user to the setting page.

##### 8.2.4.4 Reset browser:

If user wants to restore the application to its default behaviour than there is a reset button in the setting menu to reset the application. If user clicks on this button, popup should appear and application should ask user for confirmation. If user press “yes” his browser should be reset to its default behaviour and all his bookmarks, history, passwords and downloads information will be cleared.

##### 8.2.4.5 Manage Passwords:

If user press this button, application will ask user to enter master password. User will enter password and will press “OK” button. Application will authenticate password and if it is correct, application will allow user to see his all saved passwords. Now user can delete his passwords but he cannot change them. On the other hand if password entered is wrong, then application will redirect user to settings page or home page.

#### 8.2.5 Create account:

When user use the application for first time. The application will ask user to create account. User can fill his credentials to create account or skip this step but he/she can later on create his/her account by going to the application setting menu. When user click this button, popup will appear and ask user to enter email address and password to create his account. Creating browser account will help user to secure his private search, history, bookmarks and passwords of other accounts including gmail, facebook, twitter, skype and many more.

#### 8.2.6 PDF:

When user search some page and an HTML page is opened in the browser and user wants to create PDF of that page or he wants to save the page, user will click this button and browser will automatically convert html page into PDF document. This PDF document will be saved in the folder where user has installed the application.

#### 8.2.7 Bookmarks:

When user clicked this button, the page he has opened will be bookmarked which means that the URL of that page will be stored in the database and user do not have to search that page again and again. He will just click the bookmarked page and it will open without going to any other page. User may create different folders to place his bookmarked content in different categories. User can access his/her bookmarked content from the bookmarks button which will lead to bookmarks manager menu.

#### 8.2.8 Downlaods:

When user click on this button the application takes user to the downloads page. This page contains the name, time and location of the downloaded item in the machine. This page has two more buttons which are described below:

##### 8.2.8.1 Reset downloads:

If user clicks this button a popup will appear which will ask for confirmation that if user is sure about clearing his data. If user press “yes” button his all downloads record will be cleared from the browser and it can not be undone. If user press “no” button the browser will take user to the main page or the downloads page.

##### 8.2.8.2 Exit:

If user clicks on this button the application will take user to the main page of the browser.

## 9 External Interface Requirements:

This section will cover the detailed description of the hardware, software and communication interfaces and user interface.

#### 9.1 Hardware Interfaces

This browser will support the desktop systems so hardware requirement includes computer. Since the application must run on the Internet, network interface card(NIC) is the hardware requirement for the application to run correctly. Internet will be hardware interface for the System e.g Ethernet, Modem, Cable, WAN-LAN.

#### 9.2 Software Interfaces

This web browser application will be deployed on all versions of the Windows, Linux and Ubuntu. This application run on http/https protocol which shall be used to establish connection between client and web server. It also uses TCP for transferring the files and data between client.

#### 9.3 Communication Interfaces.

The Application Web browser will support the following network protocols for communication between client and web server.

##### 9.3.1 IP

Internet protocol is primary protocol for delivering distinguished protocol packets from source to destination based on their addresses. ‘

##### 9.3.2 TCP

Transmission Control Protocol provides reliable and ordered delivery of stream of bytes from a program to another program between two computers. It controls flow of the data, the rate at which data is exchanged and traffic congestion control.

##### 9.3.3 HTTP/HTTPS

Hypertext Transfer Protocol is a protocol for distributed, collaborative Information systems. It is used for retrieving inter-lined resources, called hypertext documents. When IP is configured, then HTTP sends request to web Server to establish http connection to communicate with the server to get the services from server to get files, objects and other required pages. The server reply with the response which contains the requested object to the client through this HTTP connection. To meet the requirements of the current internet security, application supports HTTPS connection. To fetch the content of website HTTPS connection is required. Application handles the required SSL certification itself to provide users secure communication.

## 10 Objectives:

1. User can search anything throughout the internet.
2. User can maintain history of sites he visited.
3. User can manage bookmarks for his favorite sites.
4. User can manage passwords and keep them secure by creating his own account in the browser.
5. User can save HTML page as PDF document.
6. User can download anything using downloader of the browser.
7. User can navigate between different pages, user recently visited.

## 11 Out-Scope:

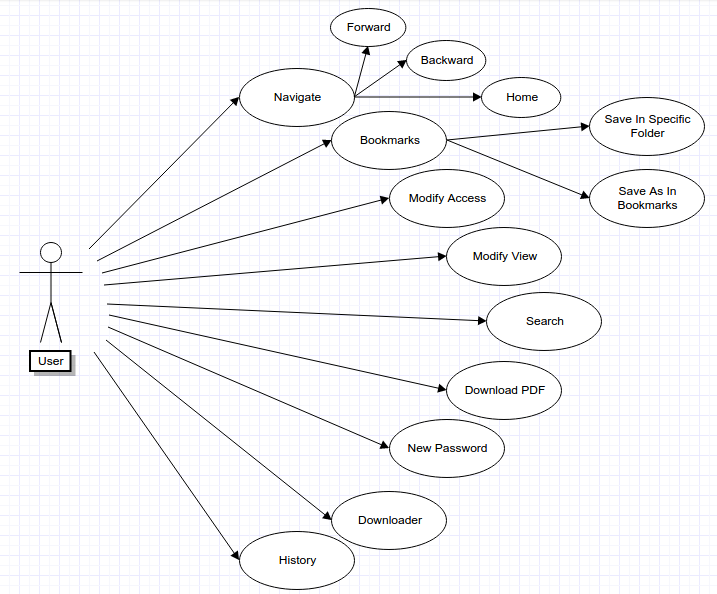
There are many plugins attached with modern browsers to make them feature rich and more powerful, but in our browser we are not making any plugins support. Browsers have their own search engines like chrome, yahoo, ask.com but we are not implementing any embeded search engine facility. Browser requires a valid url to load the required web page. Browser does not maintain cookies. Many modern browser have functionalities like suggested pages, most visited pages, user’s history based suggestions, forms autofill, restore options, developers tools etc. but our browser does not support these features. Web browser is mainly focused on providing basic functionalities related to searching, downloading, managing the history, saving html page as PDF document, manage bookmarks as well as maintenance of user security and privacy etc. Most modern browser facilitate users with accounts information synchronization among different accounts eg bookmarks, saved accounts passwords etc.

## 12 Intended Audience:

The intended audience for this document are those who will be using or further developing this project like developers, testers, designers, managers and writers. In our context this document has been written for the client and the mentor for getting detailed understanding of our project. Through this document client or any other user can easily understand the functionality of this application.

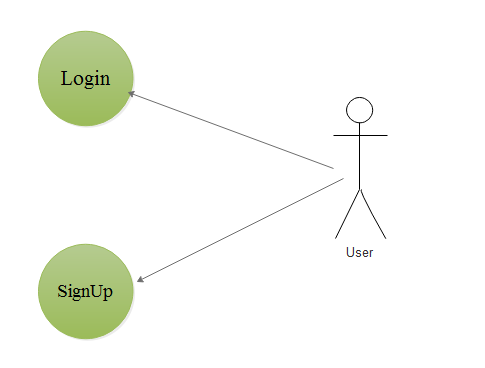
## 13 Use Cases:

##### 13.1 Use case diagram:

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##### 13.2 Login and SignUp

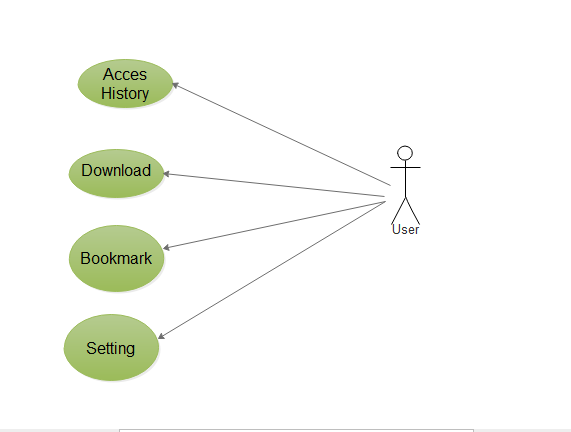


**Primary actor:** User

**Description:**

* User run browser and clicked signup button.
* Application ask for user credentials.
* Application save credentials into database.
* User login using username and password.

##### 13.3 User Access

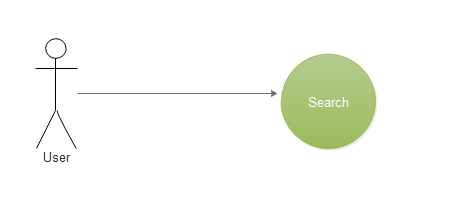


**Primary actor:** User

**Description:**

* User clicked bookmarks button
* Application shows the links saved in the bookmarks table.
* User clicked Download button
* Application shows the links saved in downloads table
* User clicked History button.
* Application shows the links saved in history table.

##### 13.4 Search:

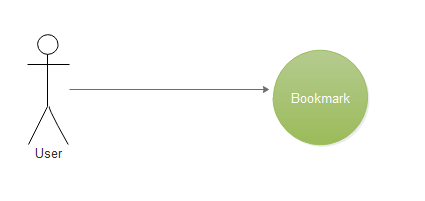


**Primary actor:** User

**Description:**

1. Search bar of the browser will enable user to search any online content by entering url of the webpage.

##### 13.5 Bookmarks:



**Primary actor:** User

**Description:**

1. By using bookmark feature, user will be able to manage the record of favourite sites so that they can revisit them in near future.
2. These bookmarks will be saved into browser and user can visit them any time.

##### 13.6 History:

**Primary actor:** User

**Description:**

1. User search different pages whenever he wants.

2. History keeps the record of every search made by the user and this feature also provides the facility to the user to check history and reopen previously visited web pages and it also provides the facility of cleaning the history of user’s choice.

##### 13.7 Downloads:

**Primary actor:** User

**Description:**

1. User can download any document, picture, audio or video, software etc. using the downloader.
2. User can maintain a list of downloads which he has downloaded till now.
3. User can delete his downloads history.

##### download.PNG

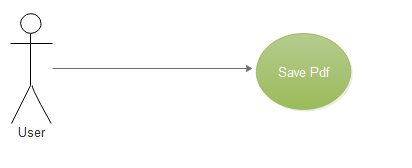
##### 13.8 Master password:

**Primary actor:** User

**Description:**

1. User have to create account in the web browser.
2. User can now create master password to secure his history, bookmarks and other passwords.

##### 13.9 Save as PDF:



**Primary actor:** User

**Description:**

1. User has opened an html page.
2. User clicks PDF button.
3. HTML page is saved as PDF document on the local machine.

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