ILLUMINATE

Software Req Eng - Semester Project

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Table of Contents

Product Perspective

Muslim teens are passing through a crisis of faith right now. There are philosophical questions that they struggle with every day and that go unanswered because they do not have a space at home or Masjid where they can ask all the weird questions comfortably without being judged or labeled as an atheist. To solve this problem using technology, we plan to build Illuminate.
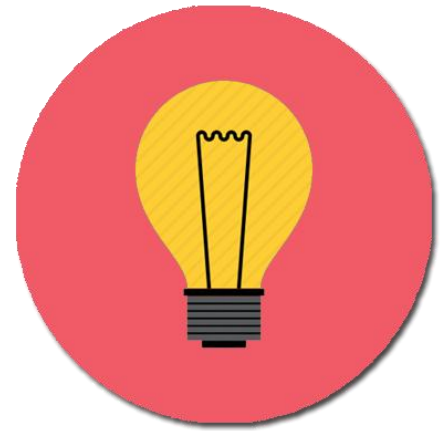
Illuminate is a responsive web and mobile application that offers a community-driven question-and-answer (Q&A) platform and a knowledge market that allows users to search out the answers alone or together with other Muslims more efficiently. The two main features are its search engine capability and its discussion forum.

The former allows the members to post a question and get videos, articles or blogs in the search result from re-known and authentic Islamic websites. Every search result shall be generated by keeping a track of his/her mostly viewed/listened/read speaker or writer (personal user preference) and by keeping a track of what's popular (general preference).

The latter allows the members to post a question and give one another answers. It is a platform where questions can be asked, answers can be searched and shared, mentor-ship can be provided and every member can be helped personally with his struggle. The members can post anonymously or they can post with their name and details. Spam or abusive posts shall be reported and removed.

Muslim teens just do not need speakers; they need counselors and best friends. And Illuminate will provide them just that - a culture around strong friendship & mentor-ship!

SRS Documentation

Functional Requirements

1) Illuminate shall provide a Minimalistic Home page presenting only the most essential elements to the user— the Search Bar, the Search and Discuss Buttons, and the top navigation bar displaying 'Sign in/ Sign Up', 'Discussion forum', 'Notifications' and 'About' links — to preserve the purity of purpose and provide clarity.

2) If the user clicks on the 'Search Button, Content shall be searched from re-known and authentic Islamic websites and displayed. The search results shall be categorized into four types, namely articles/blogs, videos/audios, books and a link stating the number of search results extracted from the discussion forum. The link shall direct the user to the forum. The search results for web content shall be filtered on basis of the user personal preference as well as the general popularity amongst the audience. Controversial content that may incite religious hatred shall be filtered out of the results.

3) If the user clicks on the Discuss Button, Content shall be searched from the site forum. The resulting web page shall display a list of discussion threads ordered on basis of relevance to the search.

4) The discussion forum shall have a hierarchical or **tree-like directory structure**. The top end shall be "**Categories**". Under the categories shall be a number of topics (commonly called threads) where members can start their discussion. Clicking on a category in forum view shall show a list of topics with the same category. A **thread** shall be defined by a title, category and an opening or original post (called the TS (thread starter) or OP (original post), followed by multiple posts where they appear as blocks one after another and can be multiple posts from the same members, even if they are one after the other. It shall also have an associated date that is taken as the date of the last post to order threads.

5) Every post shall be a user-submitted message enclosed into a block containing the user's details and the date and time it was submitted. It shall have an internal limit between a minimum length of 10 characters and an upper limit (either 10,000, 20,000, 30,000, or 50,000 characters.)

6) To **post a question**, the user must be registered with the forum. He can post a question using his name or anonymously. To start a new topic, the user shall click on the + New Topic button that shall present him with a screen where he must give a title (or subject) of the topic and choose a topic category. A drop down list will appear after the title and will contain a list of categories. The user can **edit or delete** their own posts. He can also **Preview** his post before publishing.

7) To **read a topic**, the user do not have to be registered with the forum. He can click on the title to open a discussion.

8) To **post a reply** to an existing topic, the user shall click on the Post Reply button. If this button does not appear, it shall mean that the user is not logged in as a member.

9) A user of the forum shall be automatically be promoted to the **Top Contributor** user group and receive an orange "badge" under his name+avatar based on how their posts are scored by other forum participants. To give reputation, the user shall click on the like icon in the relevant post. If he clicks on the like icon again, that reputation is removed from the user. User wanting to become a TC must have more than or equal to 60% Best answers. This point system shall encourage users to post informative and constructive content.

10) The '**Recently asked**' panel in the discussion forum shall be visible to both the members and the guests (unregistered users browsing the site), and shall provide a simple but comprehensive list of all content that has been updated recently.

11) To **sign up**, the user shall click on the Log In or Sign Up link near the top of the homepage, and then on Sign Up in the box that opens. He shall be asked to choose a user name (an alias), password, and enter a valid email address. He shall be asked his birth date to determine his age followed by a declaration of the terms of service (other documents may also be present) and a request for agreement to said terms. [Note: Entering the email address shall not leave the user open to "spam" as it shall not be shared with other forum users, unless specified otherwise.] The status label Inactive shall be provided by default until the registered user confirms the email address given while registering indeed belongs to the user. Until that time, the registered user can log in to the new account but may not post or reply in the forum.

12) A **User Account** shall be identified by the chosen user name and avatar through which a member carries out activities and contributes. The user can change the account settings by clicking on his user name in the top right corner of the site. The 'Settings' Option shall allow him to manage the public information that is shown to members/non-member about him, his account settings and the Notifications Options. Email and password changes shall require current password. Other users can view information about a particular member by clicking on his user name in a post.

13) To **login to the site**, the user shall click on the Log In or Sign Up link near the top of the homepage to activate the login box. After login, the Login or Signup link shall turn into the user name. Clicking on the user name shall provide a drop down menu. The user can select the logoff link on this menu to logout.

14) **Notifications** shall be provided ON THE SITE when the member returns, by APP notifications and by EMAIL. Since members may miss replies in threads they are interested in, the application shall offer email notification, whereby members can choose to be notified of new posts in their threads.

15) It shall avoid, remove, and mitigate forum **spam**.

16) To **flag inappropriate content** on the forum, the user shall be provided with a Flag link on every post. Clicking on the flag link shall open a window that shall prompt the user to choose a reason why he thinks the content is inappropriate. All flagged items will be reviewed and hidden/deleted if they receive sufficient weight of trusted reports.

17) A user can allow (or not allow) his email address to be visible to other members. The app itself does not allow personal conversations but this email id can be used by the member to send a **private message** to another member using his own mail application.

18) About and FAQ sections shall be provided containing basic information for new members and people not yet familiar with the use of the site.

Non-Functional Requirements

1) Availability: The application shall be available when access to internet is provided i.e. the server should be ready to serve at all times.

2) Backup: A backup of the content of the server shall exist to prevent loss of data incase of any unforeseen events such as physical damage to the
server.

3) Efficiency: The application shall handle data efficiently. The search engine shall perform the search operation efficiently with minimal resource consuming processes.

4) Interoperability: The system components and should be effectively integrated and data integrity should be ensured while writing data into the database
or fetching the data from the database.

5) Performance: Search query results shall be returned in < 1 second given that the download bandwidth available > 150 Kbps. The time taken to register any post on the forum should also be < 1 second. The website should be light and should load up in < 2 seconds. The android application should also take < 2 seconds to load completely.

6) Portability: The methods and technology used to develop the application shall allow the application to be implemented as a web based application and as an android application without much hassle. Porting the application on other platforms in the future should also be easy.

7) Maintainability: The application shall adapt to changes in the availability of technology. Moreover the developers shall develop the website and application in a way that is easily understandable and interpreted by other developers.

8) Quality: The application shall have minimal bugs and errors after being deployed.

9) Reliability: The mean time for the application to crash on the user end shall be > 200 days. The server shall not crash under normal working conditions.

10) Robustness: The mean time for the application to restart after it crashes should be < 10 seconds. Data on the application should not get corrupt in case the application crashes. If the server crashes and data is lost, the time taken for the backup data to be utilized shall be minimal.

11) Scalability: The database shall store data and handle queries for a large, rapidly increasing population of users. The server size shall easily adjust according to the number of users.

12) Usability: The application shall have an aesthetically pleasing dynamic interface which is easy to use by all types of people. The application shall be easy to use for people with little experience of using the web or smartphone applications.

13) Security: The website shall use an HTTPS protocol and all other measures should be taken to ensure the data is not visible to malicious users. The data residing in the server should not be given to any external party and the data should not used for spying upon the users of the application. User will be allowed to login to his account via password protected login system.

14) Testability: The application shall be developed in a manner that allows testing the individual components of the application easily. The dependency between components should be minimum and coherence should be maximum to allow easy component testability. The system as a whole shall be easily testable with test cases clearly defined to find out if any bugs exist in the application.

Domain Requirements

1) The Google Custom Search Engine that is used as the applications search engine allows only upto hundred queries per day with each query returning 10 URL's. This puts a restriction of a maximum of 1000 URL searches per day. There is however an option available to increase the number of queries which will be considered in the upcoming versions of the software.

2) The application shall work only when access to internet with sufficient bandwidth is available.

3) Books with access right policies will not be available in the results returned by the Illuminate Search Engine.

4) The android application must be installed on an android based smartphone with sufficient specifications to run the application.

5) The applications search engine is customized to fetch results from only authorized websites and not all websites.

6) The users on discussion forum can only be allowed to continue using the application if they remain within the code of conduct that they agreed with while signing up for the application.

7) Developing the application shall not make use of content that violates the access rights policy.

8) The application shall be developed while keeping in view the cyber laws of the country and that of the organization where it is being developed.
Legislative laws must not be violated. The IEEE code of ethics must also be followed throughout the software design life cycle.

Use Case Model
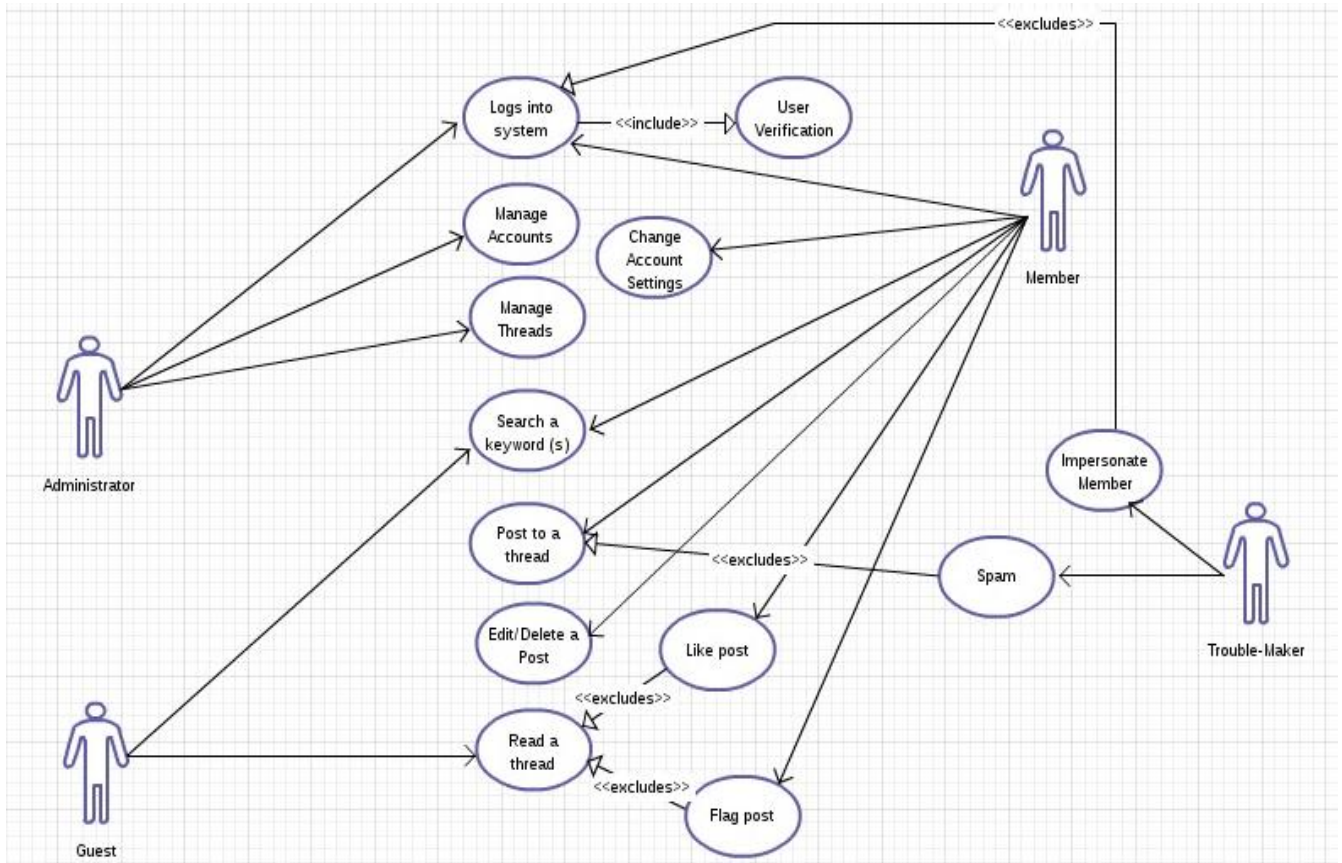
Scenarios

SCENARIO 1

Fatima had a discussion with her friends in college where they discussed the implications of wearing a hijab. Some of her friends believed that it is obligatory for females to observe a hijab in public while others believe that it is more of a personal choice rather than an obligation. Fatima got confused so she wanted to do learn more about the hijab. She couldnt approach her family for guidance because she was afraid that her family members would not approve of fatima's doubt's regarding the hijab as all of her famale family members observed a hijab without questioning the purpose of wearing it. Fatima decided to search the net for answers. There was a lot of content available but the content was very diverse and she did not know who to trust or whose opinion was correct. Therefore Fatima decided to login to her account on the illuminate application that was residing on her android smartphone. She used the application's search engine to look up for content available on the web and also for any discussionsrelating to hijab on the illuminate discussion forum. She was happy to find out that her search query gave links to answersprovided by her favourite scholars, writers and also other reknown knowledgable scholars in an aesthetically pleasant way.Moreover the search results provided her links to discussions on the Illuminate discussion forum that discussed the topic Fatima was interested in. She followed the discussion thread and found out that she was not the only one facing such problems in her society. She found very satisfying answers relatable to her situation by a lot of people on the forum. Thinking that she might need help from them later she added them as friends on the forum

and after their approval she could get access to their info which depended on the level of privacy set by the users. Fatima was satisfied with the answers provided by the Illuminate search engine and also by the content of the discussion forum. She was also now in direct contact with the friends she added on the discussion forum as they got access to each others facebook ID's and cellphone numbers.

SCENARIO 2

Ahmed was a very kind and gentle person who would not even hurt a fly. He was a practicing Muslim but there were questions that boggled his mind over and over again. One of such questions was whether the concept of hell is just or is it too harsh. Ahmed searched the net to find appropriate answers. He also went to the masjid and approached the elders of his family to find satisfying answers to such controversial questions but his efforts went in vain. Therefore he decided to set up an account on Illuminate to search for content from the web and find if there were any satisfying answers available on the discussion forum. Ahmed could not find any satisfying answers on the app but he added a few acquaintances, local scholars as well internationally known scholars as friends on the app. He decided to create a discussion thread so people could discuss the topic he is interested in and maybe someone will provide good answers to the questions Ahmed posted. He also tagged his favourite scholars on the discussion thread hoping that they will respond to his questions. Ahmed logged into his account after 2 days and to his delight his favourite scholars had provided satisfying answers to the questions Ahmed had posted. Ahmed was happy that the application had helped him and he recommended his friends to use the application as well. There was a little problem though. As Ahmed had kept his discussion thread public there were users that posted inappropriate comments. Ahmed then reported the comments and within a few hours the inappropriate comments were deleted.
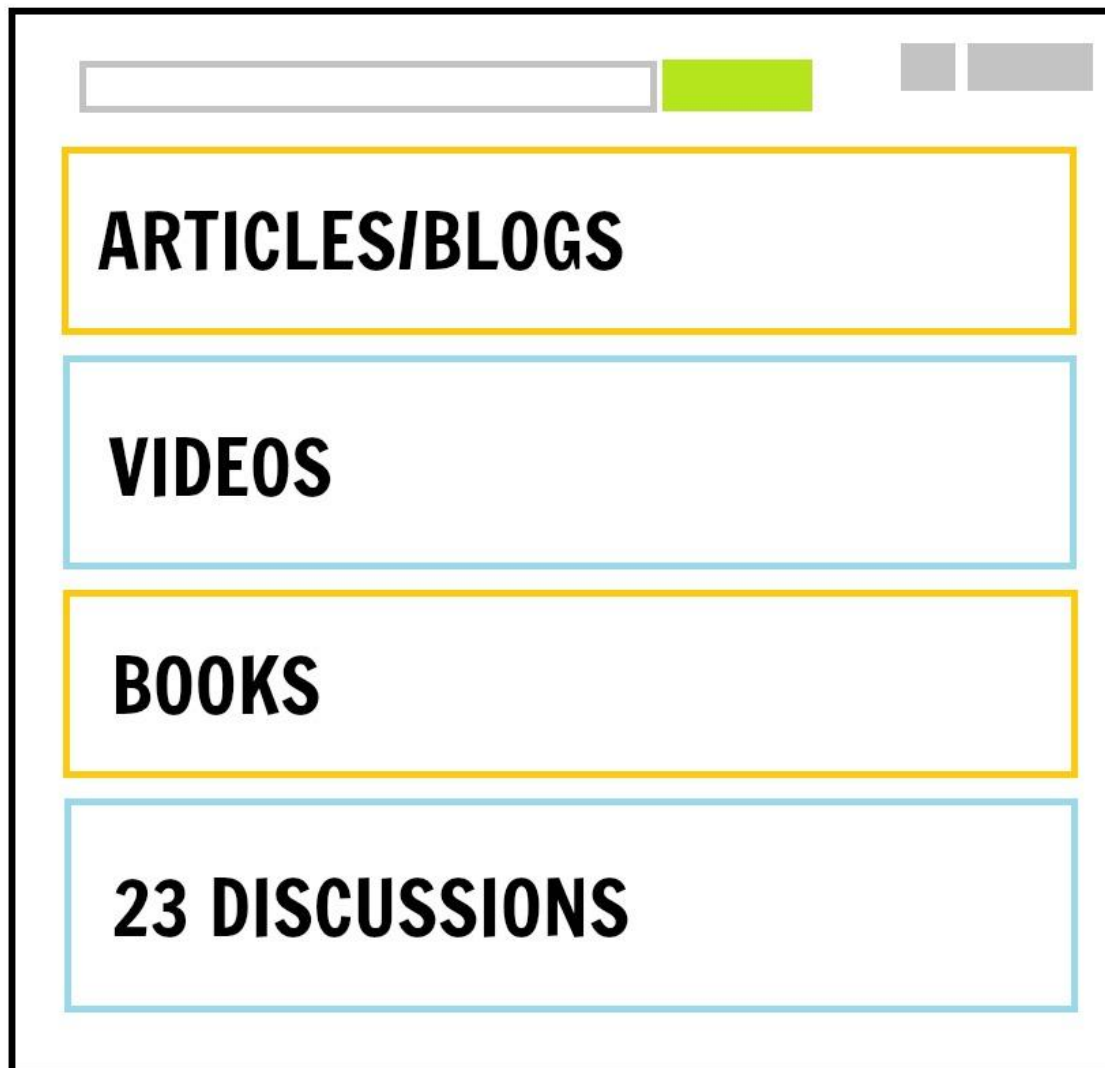
UI Mock ups

Homepage
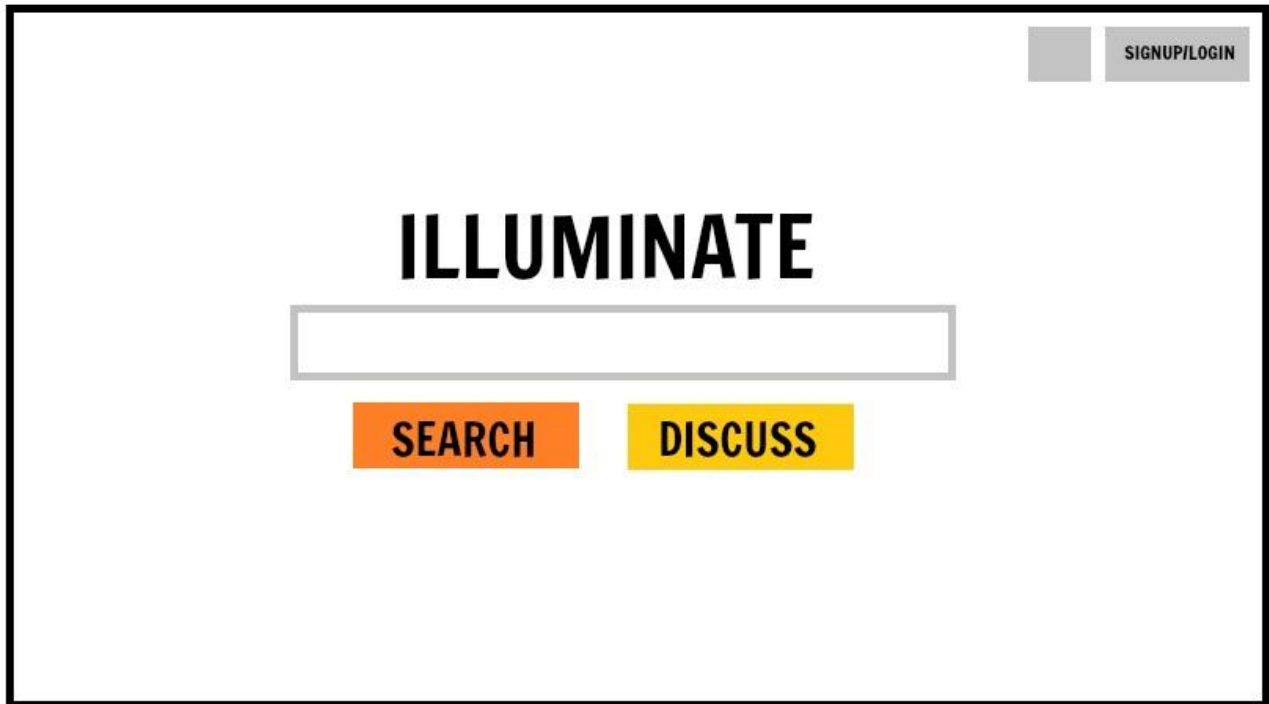
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Search Results

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Discussion Forum

+ Add New Topic

DISCUSSION 1

DISCUSSION 2

DISCUSSION 3

DISCUSSION 4

If the user clicks on the Discuss Button, Content shall be searched from the site forum. The resulting web page shall display a list of discussion threads ordered on basis of relevance to the search.

System Architecture

Illuminate is a distributed application that shall implement the Client Server Architecture. A Web Server shall provide the resources and services, i.e. host the website and the database. Many client devices (PC, Laptops, Mobile, and Tablets) shall request these resources using the web browser or the Android Application.

System Diagram

Component Diagram
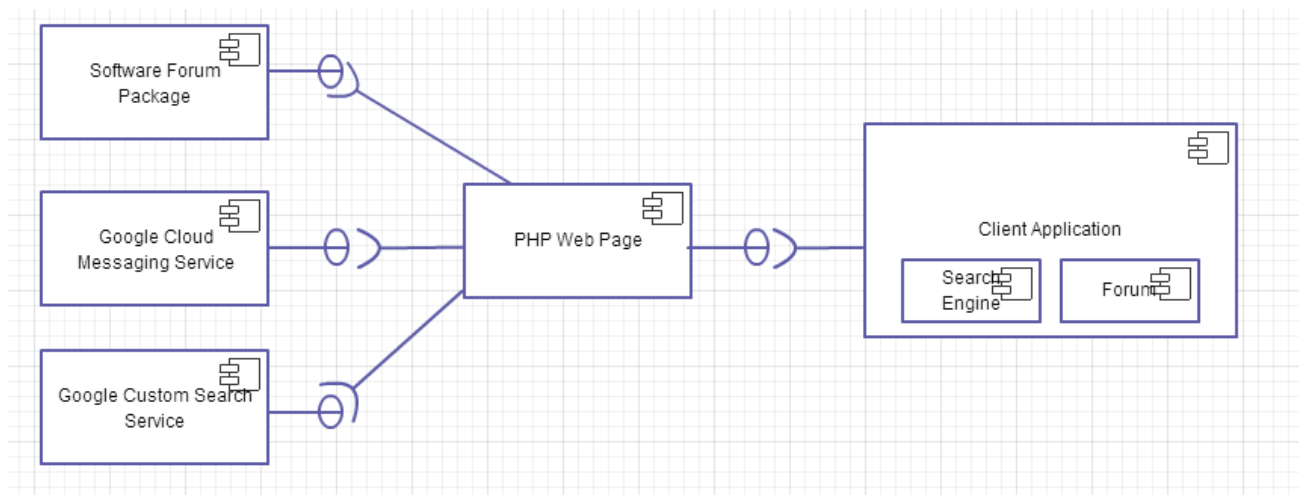
Service Implementation Interfaces

Three services are being used in our project:

    I.   Google Custom Search

   II.   Google Cloud Messaging Service

  III.   Forum software package (phpBB)

Google Custom Search Service Interface

Connect(Search Engine ID)

- inputs the Search Engine ID
- outputs connection status

Search(Search Engine ID, keyword)

- inputs the Search Engine ID and the search keyword
- outputs the acknowledgement

Display(Search Engine ID, Results[])

- inputs the Search Engine ID of our Search Engine and the search results themselves
- outputs success status

Google Cloud Messaging (GCM) Services Interface

Connect(User_ID)
- inputs the Application ID
- outputs connection status

PushMessage(User_ID, Notification)
- inputs the Application ID of the Mobile App the notification is being sent to
  and the Notification itself
- outputs success status

Forum software package (phpBB)

Create_Category(Category_Name)
- inputs the Category Name
- outputs the Category ID of the created Category and status

Create_thread(Category_ID, t_title, t_OP, t_date)
- inputs the title, the parent category ID, the opening post and the associated date
- outputs the Thread ID of the created thread and status

Create_post(User_ID, T_ID, Date_Time, Size)
- inputs the user's details, the parent thread ID, size of post and the date and time it was
submitted
- outputs the Post ID of the created thread and status

Preview_post(User_ID, T_ID, Date_Time, Size)
- inputs the user's details, the parent thread ID, size of post and the date and time it was
submitted
- outputs the post preview and status

Edit_post(Post_ID, T_ID)
- inputs the post and the parent thread ID
- outputs the editing status

Delete_post(Post_ID, T_ID)
- inputs the post and the parent thread ID
- outputs the editing status

Like_post(Post_ID, T_ID, User_ID, Like_ID)
- inputs the post and the parent thread ID,
  and the User ID of the post writer and the one who liked it
- increments the like count

Flag_post(Post_ID, T_ID, User_ID, Like_ID_reason_ID)
- inputs the post and the parent thread ID, the Reason ID to identify the reason behind reporting

and the User ID of the post writer and the one who flagged it

- outputs a confirmation message

Sign up(User_Name, Password, Email, Age, Agree_Stat)
- inputs user name (an alias), password, and email address

- outputs a User_ID

Change_password(User_ID, Current_pass, New_pass)
- inputs user name, current password, and new password

- outputs a confirmation message

Change_email(User_ID, Current_pass, New_email)
- inputs user name, current password, and new email

- outputs a confirmation message

TurnOn_Email(UserName, Password)
- inputs user name and current password

- outputs a confirmation message that the email notifications have been turned on

Delete_User(User_ID, Current_pass)
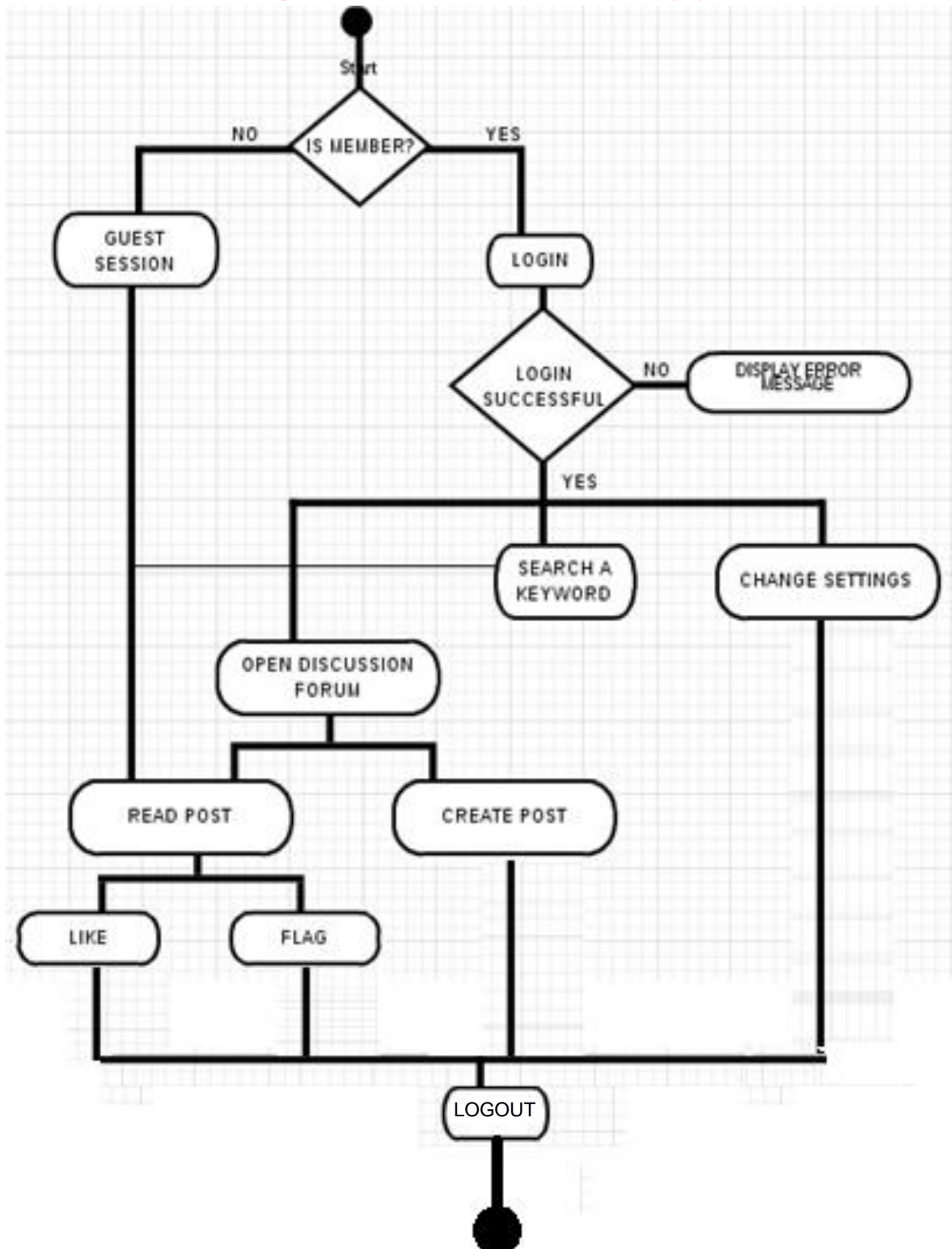- inputs user name and current password

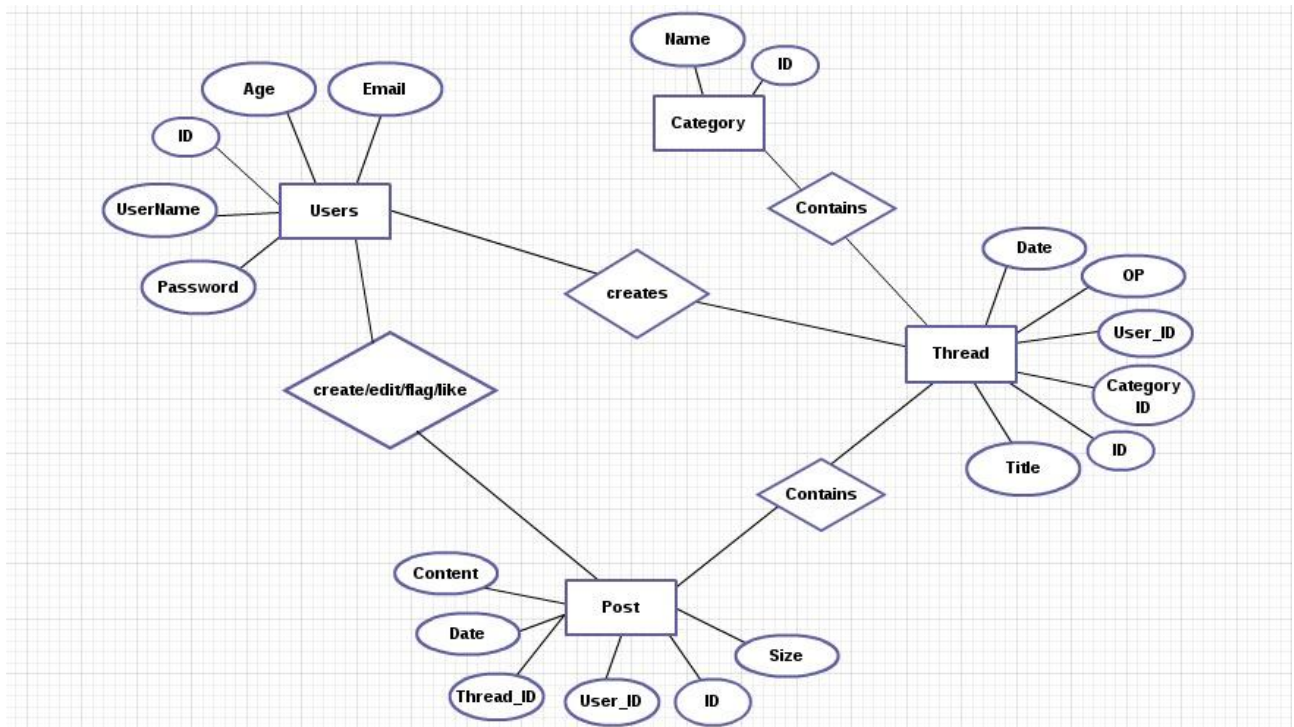- outputs a confirmation message

Login(UserName, Password)
- inputs user name and current password

- outputs a confirmation message

Workflow Diagram of the whole application

Database: ER Diagram

Team Composition & Progress Chart

The team consists of two members, namely Zaryab Khan and Atiqa Zafar. Amongst whom the project development has been divided in the following manner.

	People Assigned	% Complete	November 2014	December 2014
SRE PROJECT		10%		
▼ Software Requirement Phase		100%		
Requirement elicitation	Atiqa Zafar, Zaryab Kh...	100	Atiqa Zafar, Zaryab Khan	
Requirement analysis	Atiqa Zafar, Zaryab Kh...	100	Atiqa Zafar, Zaryab Khan	
▼ Software Design Phase		80%		
Design Diagrams	Atiqa Zafar, Zaryab Kh...	100	Atiqa Zafar, Zaryab Khan	
Design Diagrams	Atiqa Zafar, Zaryab Kh...	0	Atiqa Zafar, Zaryab Khan	
▼ Front end Development		0%		
Webpage	Atiqa Zafar	0		Atiqa Zafar
Android	Atiqa Zafar	0		Atiqa Zafar
▼ Back end Development		0%		
PHP Website Homepage	Zaryab Khan	0		Zaryab Khan
PHP Search Engine	Zaryab Khan	0		Zaryab Khan
Integrating Forum	Zaryab Khan	0		Zaryab Khan
▼ Testing		0%		
Designing test cases	Zaryab Khan	0		Zaryab Khan
Testing modules against test cases	Atiqa Zafar	0		Atiqa Zafar