Learnest

Software Design Specification

(Session 2016 - 2017)

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Recommendation

The software design specification entitled **"Learnest"** submitted by **Ashish Malgawa, Fatema Engineeringwala and Samarth Jain** is a satisfactory account of the bonafide work done for Project Phase I of project work and is recommended for approval.

Date:

Dr. Vivek Kapoor
Project Guide

Software Design Specification Approval Sheet

The software design specification entitled **"Learnest"** submitted by by **Ashish Malgawa, Fatema Engineeringwala and Samarth Jain** is approved for Project Phase I of Project work.

Internal Examiner
Date:

External Examiner
Date:

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Chapter 1: Introduction

1.1 Overview and issues involved

This project titled **Learnest** for a University, is a web based application for the online implementation which can be used for a campus or University which can be used by all the people who needs to use it at any moment and at any time from any place. It aims at creating a Courses portal for a campus or University. This allows registered users of the system to access the materials (Video lectures and related documents) published for their course.

Finding right content is always a tedious task for a student because of numerous websites which claim to give the right content to its users and even if students find the right content then they need to pay money to learn something from it.

A more tedious task is for the faculty to distribute the content to all the students and they need to share the same content each year to the new batch.

1.2 Problem definition

Think of the days when learners had to browse through hefty manuscripts to get detailed information about a particular topic after that access to knowledge and information has been improvised with time in the past few years. Now people have started using the internet and they need to browse numerous websites to quench their thirst for the knowledge and data that they are looking for and getting the right information from the right source to the target audience still remains a challenge even in this highly sophisticated ultra-modern technology laden era.

Furthermore, attending each and every class is something which is not always possible due to various reasons. Even if it is, it does not ensure long term retention of the content.

1.3 Proposed solution

This project will help students to find and access the required content easily for free. It will also help in saving the valuable time and money of the students which could be used in doing several productive things.

After attending a traditional classroom lecture it is not possible for everyone to remember each and every tiny detail about the lecture, but if those lectures are recorded and made available to each and every student and can be accessed at any point of time then this website will solve the problem.

Once the material (documents, lectures and ppts) is uploaded, the faculty need not to upload the same content again and again each year. This will also smoothen the process of distributing the files among the students.

The project serve administrator to view the details of faculty and students and maintain their database in an efficient and effective manner so that their maintenance will be easy. The services providing for administrator are approving the faculty, maintain the personal details of faculty and students, add/delete the courses, activate the exam paper for a test, view feedbacks.

The services provided to the faculty are the faculty can view and update their personal details, add a course, upload or delete the content (Video lectures and related documents) for a course, conduct a test for the students, and places key and results of a test, view their messages and reply to the students.

The services provided to the students are view and update their details, view and download the content of a course, like and comment on the content, take a test and view the key and result of an exam, give feedback to the admin or faculty.

Chapter-2 Literature Survey

2.1 Methodology

2.1.1 Website

A website is a collection of web pages (documents that are accessed through the Internet), such as the one you're looking at now. A web page is what you see on the screen when you type in a web address, click on a link, or put a query in a search engine. A web page can contain any type of information, and can include text, color, graphics, animation and sound.

2.1.2 Web Server

A **Web server** is a program that uses HTTP (Hypertext Transfer Protocol) to serve the files that form **Web** pages to users, in response to their requests, which are forwarded by their computers' HTTP clients. Dedicated computers and appliances may be referred to as **Web servers** as well.

2.1.3 Web Portal

A **Web portal** is most often a specially designed **web** site that brings information together from diverse sources in a uniform way. Usually, each information source gets its dedicated area on the page for displaying information (a portlet); often, the user can configure which ones to display.

2.1.4 Web Service

A **web service** is any piece of software that makes itself available over the internet and uses a standardized XML messaging system. XML is used to encode all communications to a **web service**. For example, a client invokes a **web service** by sending an XML message, then waits for a corresponding XML response.

2.2 Technologies and Tools that will be used

2.2.1 Hyper Text Markup Language

- HTML stands for Hyper Text Markup Language
- HTML is the standard markup language for creating Web pages.
- HTML describes the structure of Web pages using markup
- HTML elements are the building blocks of HTML pages
- HTML elements are represented by tags
- HTML tags label pieces of content such as "heading", "paragraph", "table", and so on
- Browsers do not display the HTML tags, but use them to render the content of the page.

2.2.2 JavaScript

JavaScript is an interpreted programming or script language from Netscape. It is somewhat similar in capability to Microsoft'sVisual Basic, Sun's Tcl, the UNIX-derived Perl, and IBM's REXX. In general, script languages are easier and faster to code in than the more structured and compiled languages such as C and C++. Script languages generally take longer to process than compiled languages, but are very useful for shorter programs.

2.2.3 Cascading Style Sheets

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.

2.2.4 Angular JS

AngularJS is a very powerful JavaScript Framework. It is used in Single Page Application (SPA) projects. It extends HTML DOM with additional attributes and makes it more responsive to user actions. AngularJS is open source, completely free, and used by thousands of developers around the world. It is licensed under the Apache license version 2.0.

2.2.5 BootStrap

Twitter Bootstrap is the most popular front end framework in the recent time. It is sleek, intuitive, and powerful mobile first front-end framework for faster and easier web development. It uses HTML, CSS and Javascript. This tutorial will teach you the basics of Bootstrap Framework using which you can create web projects with ease. The tutorial is divided into sections such as Bootstrap Basic Structure, Bootstrap CSS, Bootstrap Layout Components and Bootstrap Plugins. Each of these sections contain related topics with simple and useful examples.

2.2.6 JSON

JSON or JavaScript Object Notation is a lightweight text-based open standard designed for human-readable data interchange. The JSON format was originally specified by Douglas Crockford, and is described in RFC 4627. The official Internet media type for JSON is application/json. The JSON filename extension is .json. This tutorial will help you understand JSON and its use within various programming languages such as PHP, PERL, Python, Ruby, Java, etc.

2.2.7 AJAX

AJAX stands for **A**synchronous **Ja**vaScript and **X**ML. AJAX is a new technique for creating better, faster, and more interactive web applications with the help of XML, HTML, CSS, and Java Script.

Ajax uses XHTML for content, CSS for presentation, along with Document Object Model and JavaScript for dynamic content display.

Conventional web applications transmit information to and from the server using synchronous requests. It means you fill out a form, hit submit, and get directed to a new page with new information from the server.

With AJAX, when you hit submit, JavaScript will make a request to the server, interpret the results, and update the current screen. In the purest sense, the user would never know that anything was even transmitted to the server.

XML is commonly used as the format for receiving server data, although any format, including plain text, can be used.

AJAX is a web browser technology independent of web server software.

A user can continue to use the application while the client program requests information from the server in the background.

Intuitive and natural user interaction. Clicking is not required, mouse movement is a sufficient event trigger.

Data-driven as opposed to page-driven.

2.2.8 PHP

The PHP Hypertext Preprocessor (PHP) is a programming language that allows web developers to create dynamic content that interacts with databases. PHP is basically used for developing web based software applications. This tutorial helps you to build your base with PHP.

PHP started out as a small open source project that evolved as more and more people found out how useful it was. Rasmus Lerdorf unleashed the first version of PHP way back in 1994.

- PHP is a recursive acronym for "PHP: Hypertext Preprocessor".
- PHP is a server side scripting language that is embedded in HTML. It is used to manage dynamic content, databases, session tracking, even build entire e-commerce sites.
- It is integrated with a number of popular databases, including MySQL, PostgreSQL, Oracle, Sybase, Informix, and Microsoft SQL Server.

- PHP is pleasingly zippy in its execution, especially when compiled as an Apache module on the Unix side. The MySQL server, once started, executes even very complex queries with huge result sets in record-setting time.

- PHP supports a large number of major protocols such as POP3, IMAP, and LDAP. PHP4 added support for Java and distributed object architectures (COM and CORBA), making n-tier development a possibility for the first time.

- PHP is forgiving: PHP language tries to be as forgiving as possible.

- PHP Syntax is C-Like.

2.2.9 MySQL

MySQL is the most popular Open Source Relational SQL database management system. MySQL is one of the best RDBMS being used for developing web-based software applications.

This tutorial will give you quick start with MySQL and make you comfortable with MySQL programming.

MySQL is a fast, easy-to-use RDBMS being used for many small and big businesses. MySQL is developed, marketed, and supported by MySQL AB, which is a Swedish company. MySQL is becoming so popular because of many good reasons:

- MySQL is released under an open-source license. So you have nothing to pay to use it.

- MySQL is a very powerful program in its own right. It handles a large subset of the functionality of the most expensive and powerful database packages.

- MySQL uses a standard form of the well-known SQL data language.

- MySQL works on many operating systems and with many languages including PHP, PERL, C, C++, JAVA, etc.

- MySQL works very quickly and works well even with large data sets.

- MySQL is very friendly to PHP, the most appreciated language for web development.

- MySQL supports large databases, up to 50 million rows or more in a table. The default file size limit for a table is 4GB, but you can increase this (if your operating system can handle it) to a theoretical limit of 8 million terabytes (TB).

- MySQL is customizable. The open-source GPL license allows programmers to modify the MySQL software to fit their own specific environments.

2.2.10 Integrated Development Environment (Brackets)

An **integrated development environment** (**IDE**) is a software application that provides comprehensive facilities to computer programmers for software development. An IDE normally consists of a source code editor, build automation tools and a debugger. Most modern IDEs have intelligent code completion. Some IDEs, such as NetBeans and Eclipse, contain a compiler, interpreter, or both; others, such asSharpDevelop and Lazarus, do not. The boundary between an integrated development environment and other parts of the broader *software development environment* is not well-defined. Sometimes a version control system, or various tools to simplify the construction of a Graphical User Interface (GUI), are integrated. Many modern IDEs also have a class browser, an object browser, and a class hierarchy diagram, for use in object-oriented software development.

We are using Brackets which is one of the IDEs since, it is a lightweight, yet powerful, modern text editor. We blend visual tools into the editor so you get the right amount of help when you want it without getting in the way of your creative process.

It has following features:-

- Inline Editors

  Instead of jumping between file tabs, Brackets lets you open a window into the code you care about most. Want to work on the CSS that applies to a specific ID? Put your mouse cursor on that ID, push Command / Ctrl+E and Brackets will show you all the CSS selectors with that ID in an inline window so you can work on your code side-by-side without any popups.

- Live Preview

  Get a real-time connection to your browser. Make changes to CSS and HTML and you'll instantly see those changes on screen. Also see where your CSS selector is being applied in the browser by simply putting your cursor on it. It's the power of a code editor with the convenience of in-browser dev tools.

- Preprocessor Support

  Work with preprocessors in a whole new way. We know how important preprocessors are to your workflow. That’s why we want to make Brackets the best code editor for preprocessors out there. With Brackets you can use Quick Edit and Live Highlight with your LESS and SCSS files which will make working with them easier than ever.

Chapter-3 Analysis

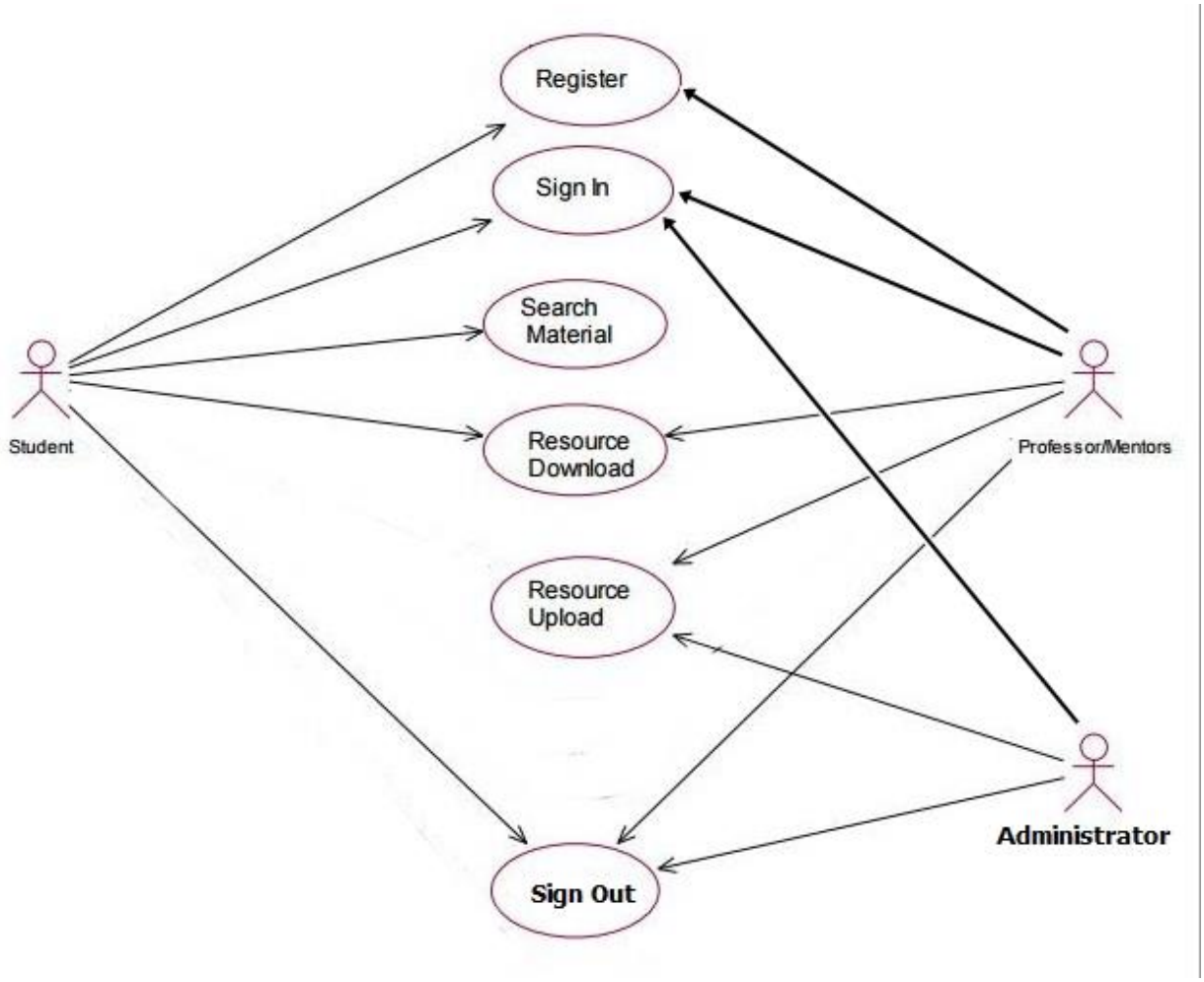
3.1 Software Requirements

1. Browser(IE9 and above)
2. Pdf reader(Adobe Reader)
3. Document Viewer(MS Office)
4. Media Player(VLC)
5. Adobe Flash Player

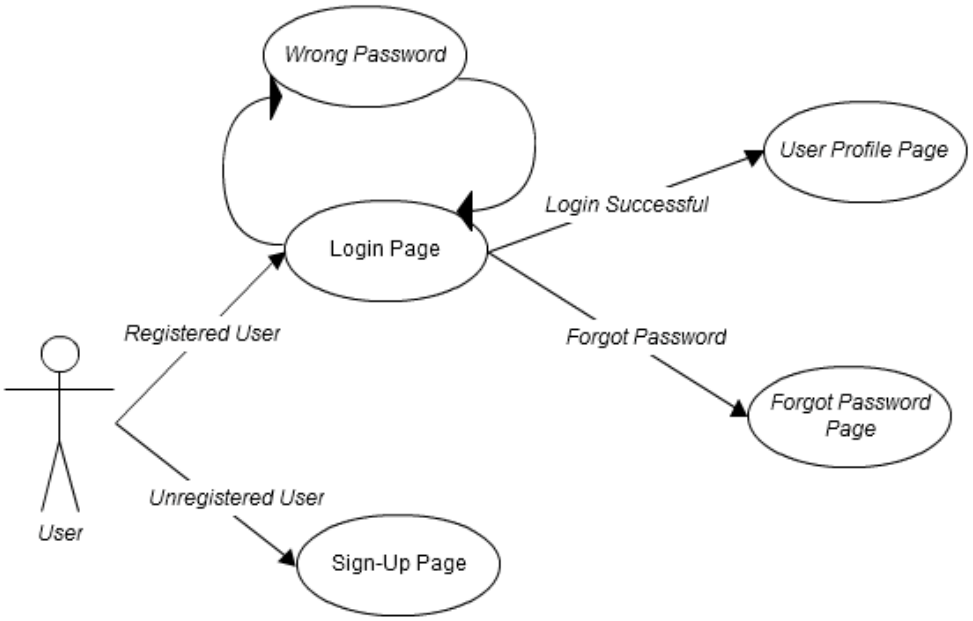
3.2 Hardware Requirements

1. P-4
2. RAM -256 MB

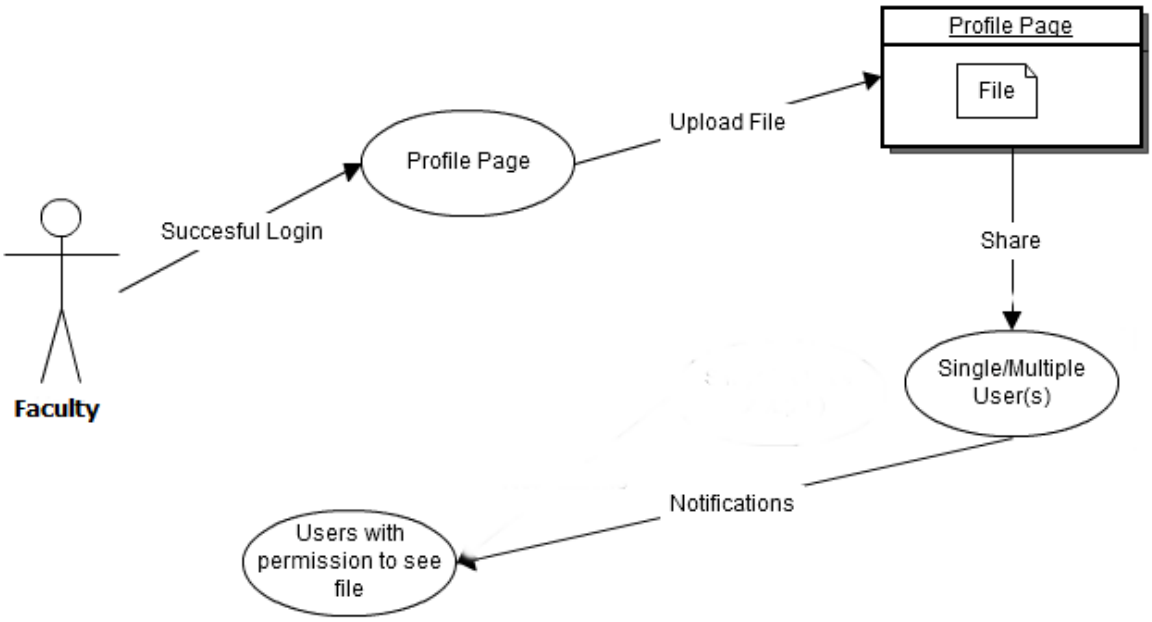
3.3 Use Case Model



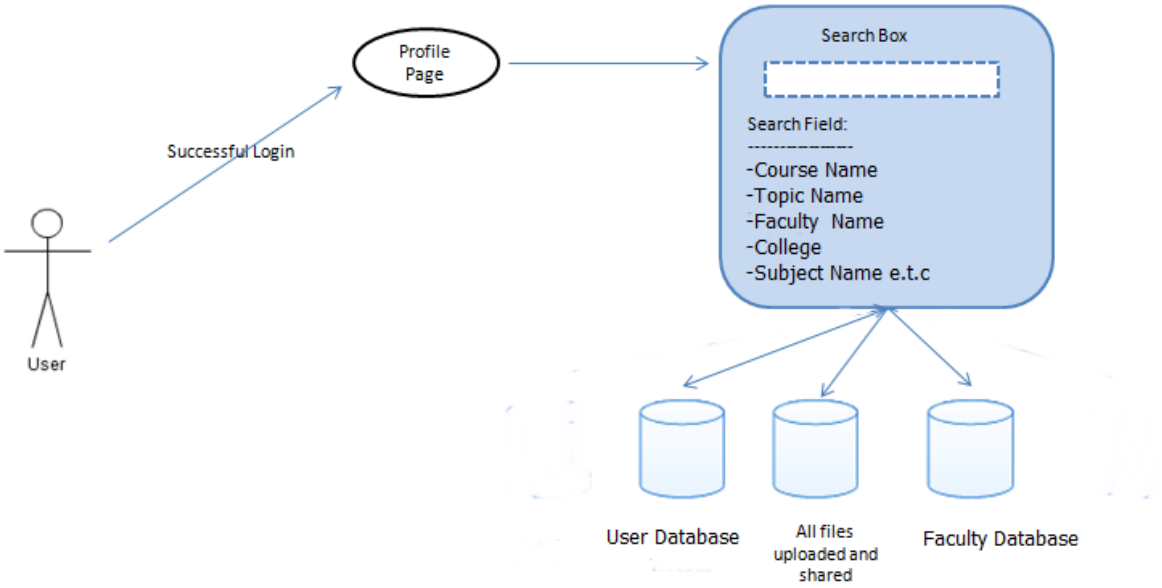
3.3.1 User Login



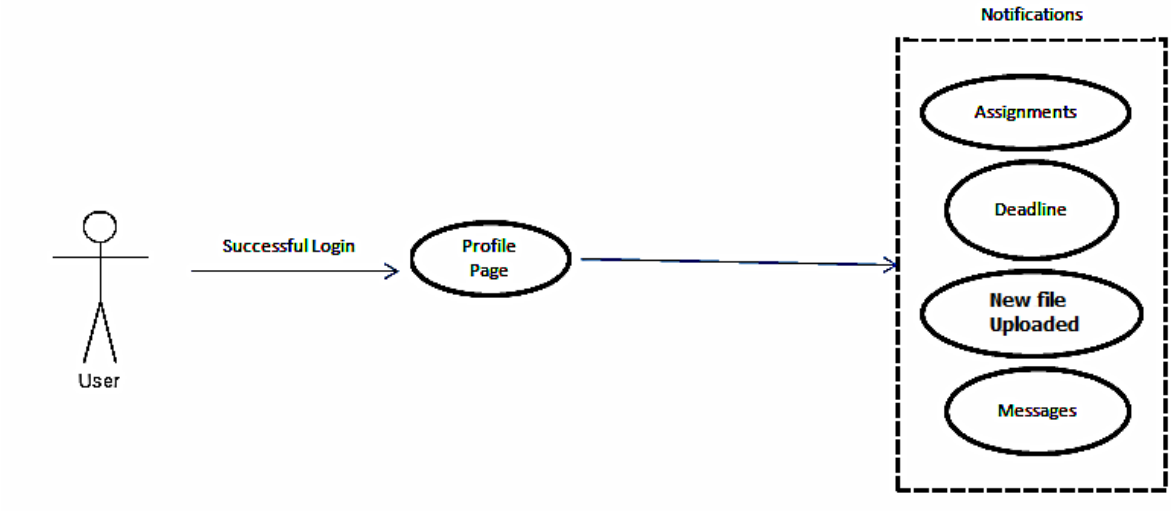
3.3.2 Content Sharing (File Upload)



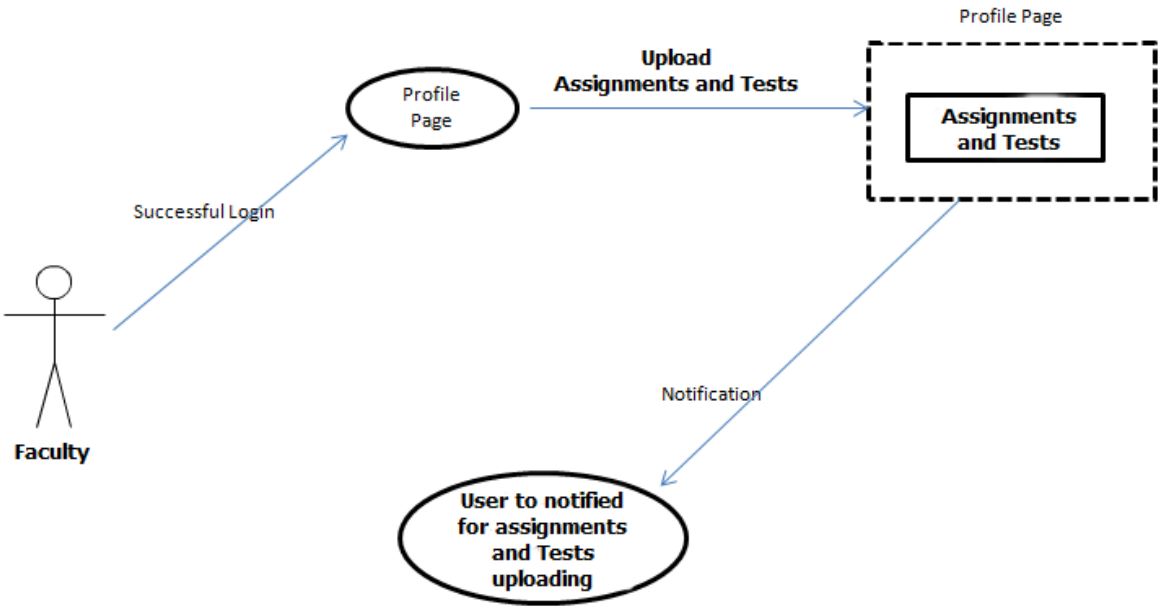
3.3.3 Search



3.3.4 Notifications



3.3.5 Assignments and Tests



3.4 Use Case Description

3.4.1 User Login

- **Brief Description:** This use case describes how Actor logs in to system using existing profile.
- **User:** A user with an existing profile which may be a Student of Faculty.
- **Flow of Events**

I. Basic Flow

This use case starts when the actor wishes to log into the Education Portal.

1. The system requests that the actor enter his/her username and password.
2. The actor enters his/her username and password.
3. The system validates the entered username and password and logs the actor into the system.

II. Invalid Name/Password

If, in the **Basic Flow**, the actor enters an invalid username and/or password, the system displays an error message. The actor can choose to either return to the beginning of the **Basic Flow** or cancel the login, at which point the use case ends.

III. Alternative Flows

- **Forgot Username or Password**

1. The actor has forgotten his/her username, password, or both, and clicks the "Forgot Username/Password?" link
2. The system resets the actors account and sends an e-mail notification with the link to reset his/her Password.
3. The actor utilizes the new username/password information to log in through the basic flow

- **New User**

1. The actor browses to the "Sign In" page.
2. The actor chooses the "New User" link on the "Sign In" page.
3. The actor enters his/her account information and chooses a username and password
4. The system validates the information entered
5. The system sends the user an e-mail invitation with verification notification.
6. The actor must confirm their new account by clicking the verification link in the e-mail.
7. The actor is logged in and his/her account information page is displayed.

- **Input Data:** Profile username and password.
- **Output Data:** Corresponding page data of the actors.
- **Pre-conditions:** Actor is not logged in to a profile, input profile may or may not exists in data base, actor may have forgotten the username/password..
- **Post-conditions:** Actor's computer has been supplied with appropriate cookie, page data is appropriate for selected profile.

3.4.2 Content Sharing (Upload Files)

- **Brief Description :** This use case allows a Faculty to log into the system and is on any page and wants to share some content (pdf, ppt etc) on a group level .
- **User:** A legitimate faculty logged into the system.

- **Basic Flow**

1. This use case starts when the Faculty who is already logged into the system, uploads a file to be shared using the upload box and selects a subset of other users of the group with whom the Faculty wants to share the file.
2. The file then gets uploaded to the server.
3. The desired users can download files after logging in.

- **Input Data:** The file to be shared.
- **Output Data**: File ready to download by other users.
- **Invariants**: The uploaded file.
- **Pre-conditions**: User is logged in; file exists on user's computer.
- **Post-conditions**: Any other person to whom the content was made available is able to download it.

3.4.3 Download Files

- **Brief Description:** This use case allows a Faculty/Student to log into the system download a particular file.
- **User:** Any user of the academic portal i.e. Faculty or Student.
- **Basic Flow:**

1.This use case starts when the User logs into the system.

2.The User then selects a file he/she wants to download.

3.The desired users then downloads the files. The file is then transferred from the server to the user's computer.

- **Input Data:** Request to download a particular file.
- **Output Data:** File is downloaded on user's computer.
- **Invariants:** The user and the file.
- **Pre-conditions:** User is logged in and the file must be shared with him or with the group which he is a member of.
- **Post-conditions:** The user has downloaded the file successfully.

3.4.4 Search Result

- **Brief Description:** This use case allows a user to search for a particular keyword.
- **User:** Any user of the academic portal.

- **Flow of Events:**

I. **Basic Flow:**

1. The use case starts with User who logs into the system.
2. The User then enters a keyword into the search box of the web page and clicks on the search button.
3. The system then returns the matching results to the keyword.
4. User clicks on the desired link. User can navigate back to the earlier pages if wishes

II. **Alternate Flow**:

If searched keyword has no matching results, System displays the message “No matches found for the entered text”.

- **Input Data:** The keyword.
- **Output Data:** Search Results.
- **Invariants:** The user and the portal itself.
- **Pre-conditions:** User is logged in.
- **Post-conditions:** User gets the desired material

3.4.5 Notifications

- **Brief Description:** The Use Case allows the User to get notifications of assignments, deadlines and other important messages.
- **User:** Any User of the academic portal.
- **Basic Flow:**
    1. The Use Case starts when the User logs into the system and enables the desired notifications from settings.
    2. The User then starts receiving desired notifications.
- **Input Data**: User enables the notifications from settings.
- **Output Data**: Notifications.
- **Invariants:** The user and the portal itself.
- **Pre-conditions:** User has chosen to receive notifications.
- **Post-conditions**: User receives the desired notifications.

Chapter-4 Design

4.1 Technology Selection

4.1.1 PHP

We are using PHP because

1: Simple and easy to learn

PHP scripting is definitely one of the easiest, if not *the* easiest scripting language to learn and grasp for developers. This is partially due to the similarities PHP syntax has with C and Java. Even if the only knowledge of development that you have is with HTML, picking up PHP is still fairly easy. For developers just starting out, PHP is often the first scripting language they learn because it?s clear and easy to understand.

2: Support

The last thing you want as a developer is to be ?stuck? with a coding issue and not have anywhere to go for help or answers. Since PHP is so popular and widely used, finding help or documentation for PHP online is extremely easy. The best part is the support is free through forums, PDFs, blogs, and social media. The fact that it?s open source also contributes to the large support community of PHP and LAMP (Linux, Apache, MySQL, and PHP) in general. PHP has the largest user base of any scripting language.

3: Freedom

When comparing PHP to a language such as ASPX, the level of freedom you get is far superior. As mentioned in reason #2, PHP is open source. You can use any text editor in order to code PHP such as Notebook++, jEdit, Emacs, Bluefish, or even just Notepad if you feel inclined. If you want to develop applications with ASPX, you?re going to be limited to Microsoft Visual Studio. Restrictions are never a good thing, especially with coding.

PHP also isn?t OS specific. You can run PHP on:

– Linux

– Mac OSX

– Windows

– UNIX

4: Free

There are no costs associated with using PHP, including updates. Keeping costs down is a goal of any business and developers as well. So the fact that you can code programs with PHP for free is a huge benefit that you won?t get with JPS, ASP, or other scripting languages that require paid hosting. There are no licenses, restrictions, or royalty fees involved at all. PHP is 100% free for anyone to use.

5: Integration

PHP is used for so many web applications and actually powers over 30% of the web. Systems such as MongoDB, Memcache, and Pusher all integrate with PHP. Almost any industry you can think of uses PHP applications in some fashion including banks, hospitals, government, and large corporations.

6: Frameworks

Almost every benefit of PHP seems to go back to the fact that the community is so large. The number of PHP frameworks available is even further proof of how strong the PHP community is. Whether you?re looking for database access libraries, session management, or code reuse, you will have no problem finding PHP frameworks to give you a helping hand. Some popular PHP frameworks include:

– Aiki

– Symfony

– Zend

– Silex

– Slim

7: Easier to fix problems

When it comes to web application development, you?re bound to run into issues and come across the occasional ?fail?. But the benefit you get with PHP is that problems aren?t as difficult to find and fix as they are with other languages. This is because with each request, PHP cleans up and starts over. So an issue with one request will not necessarily disrupt another.

8: Scalability

In the world of IT, the word scalability is like gold. Whether you?re dealing with databases, hosting, or in this case, programming, scalability is never a bad thing. Due to the way PHP is built, you can easily increase your cluster size by adding more servers as your projects grow.

9: Object Oriented

PHP actually has the ability to call Java and Windows COM objects. In addition to this, you can create custom classes. Other classes can actually borrow from those custom classes as well which extends the capabilities of PHP even further.

10: Speed

Since PHP does not use a lot of a system?s resources in order to run, it operates much faster than other scripting languages. Hosting PHP is also very easy and lot of hosts provide support for PHP. Even when used with other software, PHP still retains speed without slowing down other processes. Being that PHP is a mature language, it is also fairly stable because all the kinks have been worked out over the years.

4.1.2 MySQL

We are using MySQL because it is the widely used open source database. MySQL is the backend database of most of the websites. The advantages of MySQL are:

- MySQL is an open source database system. Hence it can be downloaded and used by the developer for free.
- MySQL is robust and it provides excellent performance due to usage of MyISAM.

- MySQL occupies very less disk space.
- MySQL can be easily installed in all major operating systems like Microsoft Windows, Linux, UNIX.
- MySQL can be easily learnt using the tutorials that are available on internet.
- Though MySQL is open source, it offers most of the features provided by Oracle and other leading databases.
- MySQL is best suited for small and medium applications.
- Since MySQL is acquired by Sun, Java is soon expected to include enhanced MySQL connectivity.

4.1.3 Angular JS

- AngularJS provides capability to create Single Page Application in a very clean and maintainable way.
- AngularJS provides data binding capability to HTML thus giving user a rich and responsive experience
- AngularJS code is unit testable.
- AngularJS uses dependency injection and make use of separation of concerns.
- AngularJS provides reusable components.
- With AngularJS, developer write less code and get more functionality.
- In AngularJS, views are pure html pages, and controllers written in JavaScript do the business processing.

On top of everything, AngularJS applications can run on all major browsers and smart phones including Android and iOS based phones/tablets.

4.1.4 HTML5

We are using HTML5 because of its following features:-

1. Mutuality

Due to usability purpose the web sites made by developers are highly interactive nowadays and for this developers need to include fluid animations, stream video, play music and Social Network sites like Facebook and Twitter into the websites. Till now they have only the option to integrate it with the help of Flash or Silverlight, Flex or javascript like tools. But these consume so much time to develop and even the complexity of web application also increased. But now with the help of HTML5 it is possible to embed video and audio, high quality drawings, charts and animation and many other rich content without using any plugins and third party programmas as the functionality is built into the browser

2. Cleaner markup / Improved Code

HTML 5 will enable web designers to use cleaner, neater code, we can remove most div tags and replace them with semantic HTML 5 elements.

3. Improved Semantics

Now it is easy to see which parts of the page are headers, nav, footers, aside, etc as the tags are specific for these all and most importantly know what their meaning and purpose is in whole the format. By using HTML5 elements we can increase the semantic value of the web page as the codes are very standardized.

4. Elegant forms

HTML5 enables designer to use more fancier forms. Even it makes form validation native to HTML, User interface enhancements and reduced need for JavaScript (only needed in browsers that don’t support form types). There will be different type of text inputs, search and different fields for different purpose.

5. Consistency

As websites adopt the new HTML5 elements we will see more greater consistency in terms of the HTML used to code a web page on one site compared to another. This will make it more easier for designers and developers to immediately understand how a web page is structured.

6. Improved Accessibility

Different technologies can elaborate on the features with the help of HTML5, as they can Immediately make more detailed understanding of the structure of a page by take a look at HTML5 elements it has.

7. Fulfill the need of Web application

Many new features and standards have emerged as part of HTML 5. Once you detect the available features in today's browsers, you can take advantage of those features in your application. Main focus of HTML5 is to make easier application with easy front-ends, drag and drop tools, discussion boards, wikis and other useful elements.

8. Offline Application cache

All browsers have some kind of caching m After a sometime, you open up your laptop and click the Back button in the browser hoping to see the previous page that was opened. However, as you are not connected to the internet and the browser didn't cache the page properly, you are unable to view that page. You then click the Forward button thinking that at least that page will load, but it doesn't. You need to reconnect to the internet to be able to view the pages. HTML 5, thankfully, provides a smarter solution. While building the site, the developer can specify the files that the browser should cache. So, even if you refresh the page when you are offline, the page will still load correctly. This sort of caching has several advantages like offline browsing, files load much faster and reduced load on server

9. Client-side database

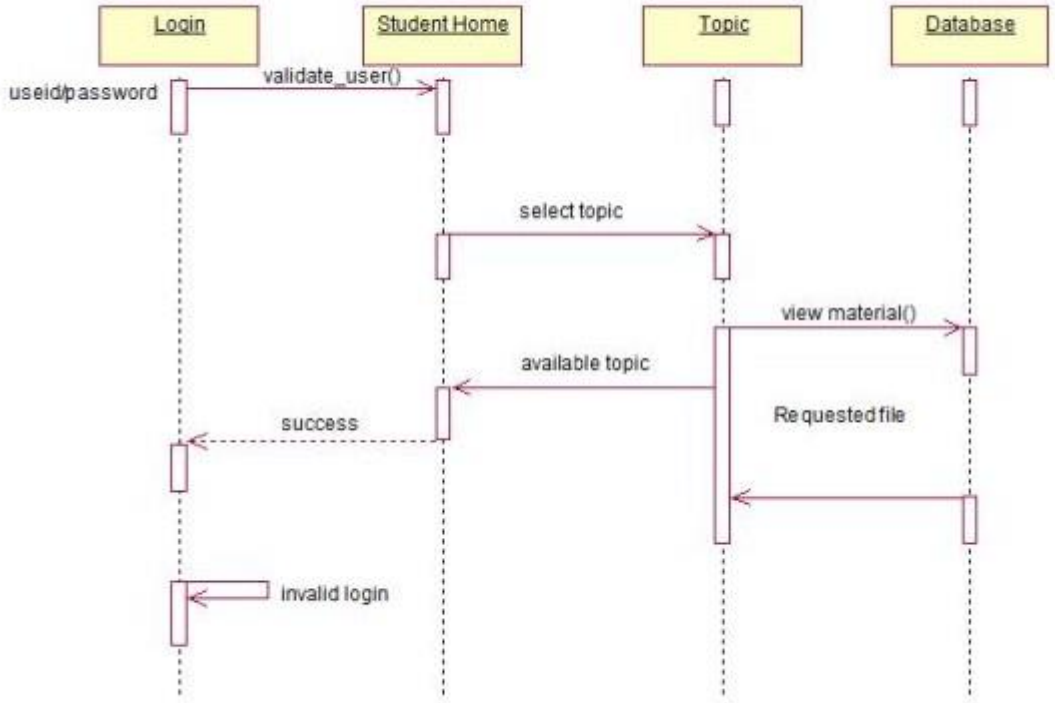
While cookies have been used to track unique user data for years, they have serious disadvantages. The largest flaw is that all of your cookie data is added to every HTTP request header. This can end up having a measurable impact on response time. So a best practice is to reduce cookie size. With HTML5 we can do better by using sessionStorage and localStorage(two different storage in HTML5) in place of cookies. It is not a permanent database, but enables you to store structured data, temporarily.

10. Geolocation support

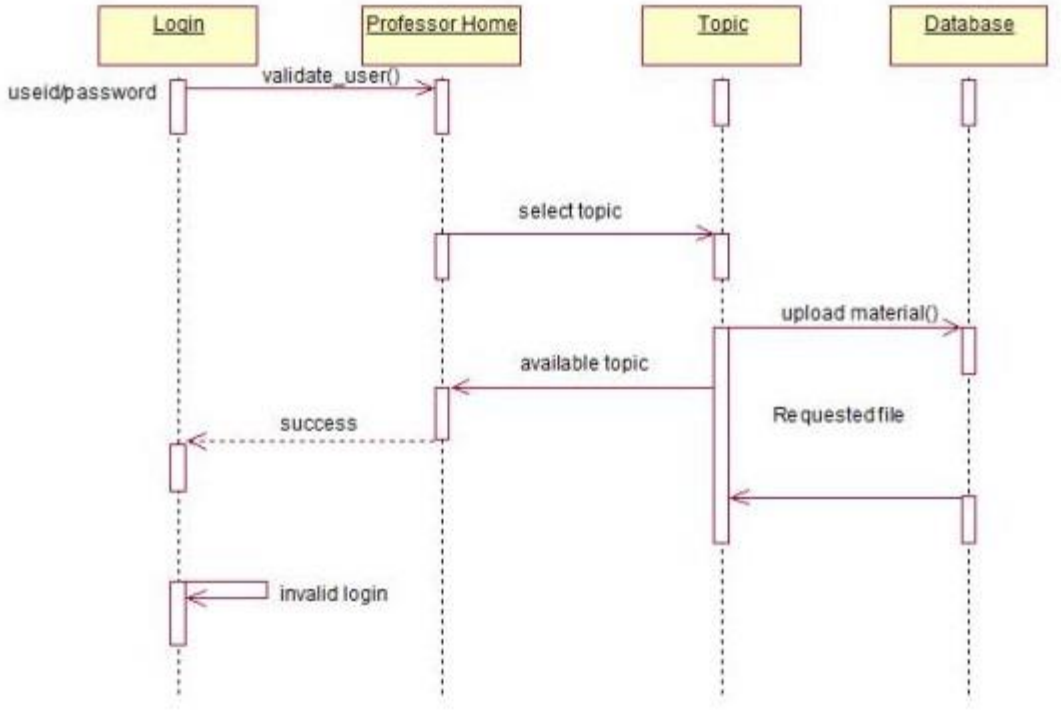
With help of Geolocation any one can find out where you are in the world and sharing that information with people. There is different ways to figure out where you are — your IP address, your wireless network connection, which cell tower your phone is talking to, or dedicated GPS hardware that calculates latitude and longitude from information sent by satellites in the sky. But The new HTML5 geolocation APIs make location, whether generated via GPS or other methods, directly available to any HTML5-compatible browser-based application.

4.2 Sequence diagrams.

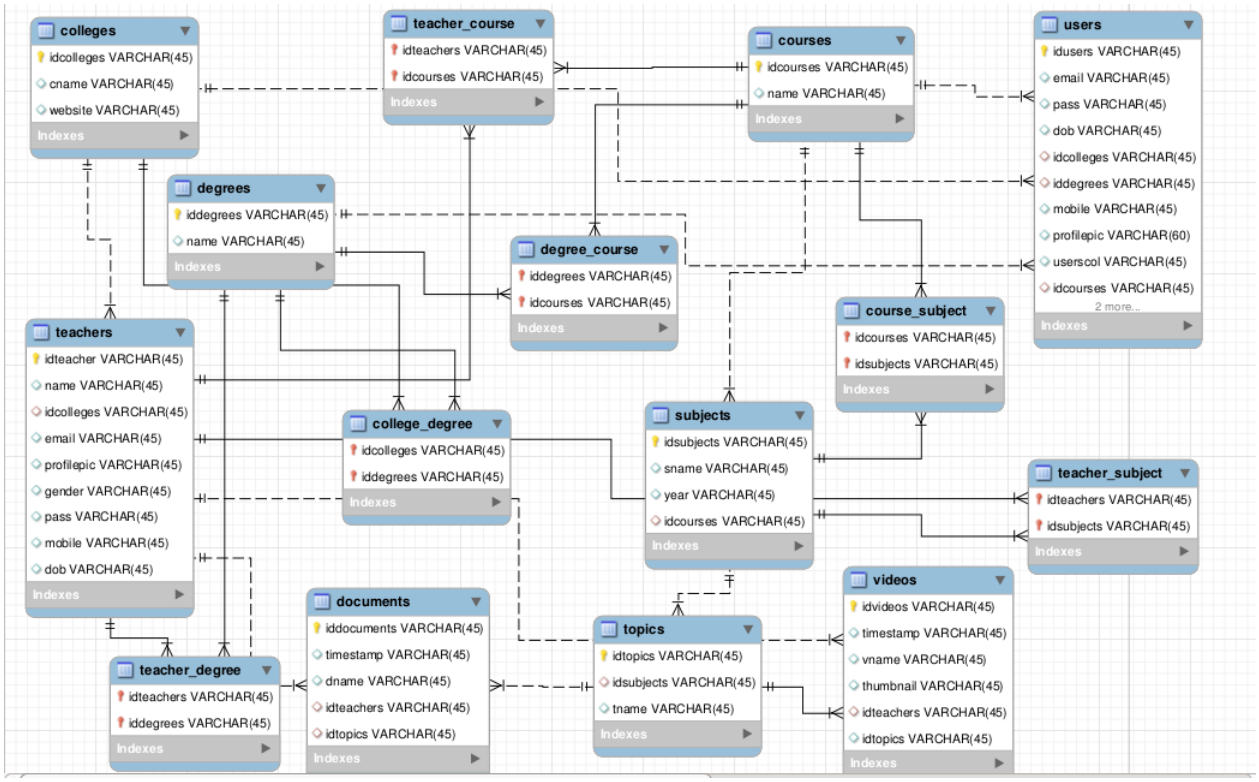
(a) **Student**



(b) Professors/Mentor



4.3 Class Diagram Design .



Chapter – 5 Conclusion

After the completion of this project we will gain more expertise in creating a website, its documentation and other things related to the project. The limitations of our website is the hardware and software constraints which are minimally required in order to run the website plus the system should have a stable internet connection without it the user won't be able to access our website. Furthermore, it also requires a good knowledge of English language and the user should know how to operate a computer.

This project is aimed to design and develop a portal for online learning and access to material for students of various courses, various department of DAVV University. The ultimate achievements would be: the portal has been able to allow easy and free access of course material to students, students would be able to communicate with their respective faculties and vice versa, faculties would be able to upload their notes and other material once and for all the students.

References

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- https://en.wikipedia.org/wiki/Main_Page
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