Elearning System

Project Report

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Abstract

E-learning comprises all forms of electronically supported learning and teaching. The information and communication systems, whether networked learning or not, serve as specific media to implement the learning process. The term will still most likely be utilized to reference out-of-classroom and in-classroom educational experiences via technology, even as advances continue in regard to devices and curriculum.

Elearning was made keeping in mind that the various schools and colleges who spend several man hours, which often run into days, giving students assignments and other class related work. This project will not only help them significantly reduce the time consumed in giving the assignments and other class related work, but will also make the overall process very simple and easy to use.

The motive of the project is to reduce the time consumed and to enable fast and easy customization and even faster processing of class work when required as instead of writing and scaling, only values in the php script need to be changed.

Also, this project is completely open source and is made using HTML, CSS, PHP and MySql and the entire code is available to the user as and when required. There is also a Complete Documentation as well as User manual alongwith it for making the developing and using the software a lot easier.

Acknowledgement

The author is highly grateful to Dr. M.S. Saini Director, Guru Nanak Dev Engineering College Ludhiana for providing this opportunity to carry out the six month industrial training at APTECH Ludhiana.

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Navdeep Singh

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Figure 1.1: Guru Nanak Dev Engineering College

I had my Six Month Industrial Training at APTECH Ludhiana. Guru Nanak Dev Engineering College was established by the Nankana Sahib Education Trust Ludhiana. The Nankana Sahib Education Trust i.e NSET was founded in memory of the most sacred temple of Sri Nankana Sahib, birth place of Sri Guru Nanak Dev Ji. With the mission of Removal of Economic Backwardness through Technology Shiromani Gurudwara Parbandhak Committee i.e SGPC started a Poly technical was started in 1953 and Guru Nanak Dev Engineering College was established in 1956.

NSET resolved to uplift Rural areas by admitting 70% of students from these rural areas ever year. This commitment was made to nation on 8th April, 1956, the day foundation stone of the college building was laid by Dr. Rajendra Prasad Ji, the First President of India. The College is now ISO 9001:2000 certified.

Guru Nanak Dev Engineering College campus is spread over 88 acres of prime land about 5 Km s from Bus Stand and 8 Km s from Ludhiana Railway Station on Ludhiana-Malerkotla Road. The college campus is well planned with beautifully laid out tree plantation, pathways, flowerbeds besides the well maintained sprawling lawns all around. It has beautiful building for College,Hostels,Swimming Pool,Sports and Gymnasium Hall Complex, Gurudwara Sahib, Bank, Dispensary, Post Office etc. There are two hostels for boys and one for girls with total accommodation of about 550 students. The main goal of this institute is:

- To build and promote teams of experts in the upcoming specialisations.
- To promote quality research and undertake research projects keeping in view their relevance to needs and requirements of technology in local industry.
- To achieve total financial independence.
- To start online transfer of knowledge in appropriate technology by means of establishing multipurpose resource centres.

1.1 APTECH Ludhiana

My Six Month Industrial Training was done by me at APTECH Ludhiana under the guidance of Mrs. Ritu Verma Centre Head Aptech Ludhiana.

Figure 1.2: Aptech Computer Education

Aptech Computer Education is a premier IT education Institute. Established in 1986, Aptech is a pioneer in IT software & hardware training. The Institute has successfully trained more than 70 lakh (7 million) students through its wide network of education centres located in over 40 countries.

Aptech offers a variety of courses - technology courses for IT students, career programs for students wanting to enter the IT sector, certification courses for IT professionals to enhance their career and basic IT programs for school students, housewives/senior citizens etc. Class timings are such that even working people can attend courses as per their convenience.

Aptech Computer Education has alliances with three of the leading computer technology companies to offer courses that are globally recognized. These tie-ups enable us to provide our students official curriculum of international standards. In addition, students also receive discounts on certification exams and a participation certificate by the respective global alliance partners. Aptech Computer Education prepares students to be a part of this growing industry through its courses, partnerships with technology companies like Microsoft, Red Hat, Oracle & various placement assistance activities.

THE ACADEMY OFFERS:

- World class quality of education.
- A wide range of courses.
- Benefits through partnerships with leading technology companies such as Microsoft, Red Hat, Java & Oracle.
- Job placement assistance after successful completion of career courses

CHAPTER 2

INTRODUCTION TO PROJECT

2.1 Overview

E-learning refers to using electronic applications and processes to learn. e-learning applications and processes include Web-based learning, computer-based learning, virtual classrooms and digital collaboration. Elearning is learning utilizing electronic technologies to access educational curriculum outside of a traditional classroom. Elearning is intended to provide features which make it possible to simplify, improve, and automate the daily class work or activities of a school or college.

Elearning is intended to provide methods or solutions to help our teachers as well as students to improve internal processes, save time and increase efficiency. Elearning is all about using the computer to:

- Make your work less tedious.
- Trim hours of your workload.
- Keeping track of all the work done by students.
- Reduce the Carbon Footprint.
- To reduce the travel time and cost.
- Enhance the computer and internet skills.

The use of computer systems to execute a variety of operations, such as adding downloadable material, online quiz and tests, uploading and giving grades for assignments through internet refers to what we call Elearning. The flexible nature of elearning means that we are likely to encounter it in everyday life. Some people seek it out in for additional learning opportunities, and for career advancement. While others may accidentally stumble upon it when watching a short training on their smartphone about their latest application. The old adage still rings true, and e-Learning brings with it new dimensions in education.

2.2 The Existing System

Existing system is manual system where there is no role of computer. People use pen, paper to make records and consignment notes.

Limitations of previous system

- There was no use computer.
- Record keeping was difficult.
- To search previous data, they have to search lots of stuff.
- It was difficult to keep large amount of information.

2.3 Software Requirement Analysis

A Software Requirements Analysis for a software system is a complete description of the behaviour of a system to be developed. It includes a set of use cases that describe all the interactions the users will have with the software. In addition to use cases, the SRS also contains non-functional requirements. Non-functional requirements are requirements which impose constraints on the design or implementation.

- **Purpose**: Elearning System is a web based software and the main purpose of this project is to:
  1. Reduce the time spent in daily class room activities.
  2. Make the Registration and Usage easier.
  3. Automatically notifying the students about the upcoming events and tests.
  4. Reduce the dependencies between people involved in the process.
  5. Increasing the understanding between the teachers and students.
  6. Keeping students up to date with all the work happening in class and also the future events.
- **General Description**: Elearning system is basically designed for those Organisations or Institutes which gives different types of work to all types of students. Keeping track of different works done by different students and then getting all the reports of the work done is not an easy job. To make these tasks easy with all functions performed quickly, Elearning system will be quiet helpful.

  Administrator will be the super user of the application who will configure system information such as adding new students/teachers and their information or editing or deleting the old ones, managing students and teachers.

  It will be an Institute software, so it is distributed and data centric. This Software is designed on the basis of web application architecture. In this application, MySQL database will be used to store data related to students, teachers, classes, events, institute, etc. Since database is on Server, so any number of users can work simultaneously and can share their data with each other. It is developed using PHP, HTML, CSS and J Query.

- **Users of the System**

  1. Administrator : Administrator can add or update (activate/inactivate) the details, and also can see information of all members of institute and can see his or her information. New classes, subjects and departments can be added or the existing can also be updated.
  2. Teacher : As Teachers are directly related to students, so they are able to add or update the details of students using this section. Administrator can see all the students. Teachers can manage their students and class only, and particular student can see his or her detail.
  3. Student : Students are the end users that benefit from the Elearning System. A student can get information of all services available. They can also view the upcoming events and also the important announcements from the teacher of the institute.

2.3.1 Functional Requiremets

- **Specific Requirements**: This phase covers the whole requirements for the system. After understanding the system we need the input data to the system then we watch the output and determine whether the output from the system is according to our requirements or not. So what we have to input and then what well get as output is given in this phase. This phase also describe the software and non-function requirements of the system.

- **Input Requirements of the System**

  1. Student Details
  2. Teacher Details
  3. Department Details
  4. Class Details
  5. Downloadable Material

- **Output Requirements of the System**

  1. Interface for administrator to configure the system.
  2. Listing of all the services offered.
  3. Interface for students and teachers.
  4. Generation of Results, Grades, Downloadable Material, for students.
  5. Calculation of student progress.
  6. Generation of class calender and classmates list for student.
  7. Generation of the list of classmates of a particular student.

- **Special User Requirements**

  1. Automatic Message Generation and Sending to the concerned person.

- **Software Requirements**

  1. Programming language: PHP 5.4
  2. Web Languages: Html, J Query, CSS
  3. Database: MySQL Database Server 5.1
  4. Documentation: Doxygen 1.8.3
  5. Text Editor: Gedit, Notepad++, Sublime
  6. Operating System: Ubuntu 12.04 or up
  7. Web Server: Apache 2.4

2.3.2 Non functional requirements

1. Scalability: System should be able to handle a number of users. For e.g., handling around hundred users at the same time.
2. Usability: Simple user interfaces that a layman can understand.
3. Speed: Speed of the system should be responsive i.e. Response to a particular action should be available in short period of time. For e.g., Updating the class tasks take few seconds for the changes if the entry is not starred.

2.4 Feasibility Analysis

Feasibility analysis aims to uncover the strengths and weaknesses of a project. In its simplest term, the two criteria to judge feasibility are cost required and value to be attained. As such, a well-designed feasibility analysis should provide a historical background of the project, description of the project or service, details of the operations and management and legal requirements. Generally, feasibility analysis precedes technical development and project implementation. There is some feasibility factors by which we can determine that project is feasible or not:

- **Technical feasibility**: Technological feasibility is carried out to determine whether the project has the capability, in terms of software, hardware, personnel to handle and fulfill the user requirements. The assessment is based on an outline design of system requirements in terms of Input, Processes, Output and Procedures. Elearning system is technically feasible as it is built up in Open Source Environment and thus it can be run on any Open Source platform.

- **Economic feasibility**: Economic analysis is the most frequently used method to determine the cost/benefit factor for evaluating the effectiveness of a new system. In this analysis we determine whether the benefit is gained according to the cost invested to develop the project or not. If benefits outweigh costs, only then the decision is made to design and implement the system. It is important to identify cost and benefit factors, which can be categorized as follows:

  1. Development costs.
  2. Operating costs.

Elearning System is also Economically feasible with 0 Development and Operating Charges as it is developed using open source technologies and the software is operated on Open Source platform.

- **Legal feasibility**: In this type of feasibility study, we basically determine whether the project conflicts with legal requirements, e.g. a data processing system must comply with the local Data Protection Acts. But Elearning System has been developed with properly Licensed technologies. Thus is the legal process.
- **Operational feasibility**: Operational feasibility is a measure of how well a project solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development. All the operations performed in the system are very quick and satisfy all the requirements.
- **Behaviour Feasibility**: In this feasibility, we check about the behavior of the proposed system software i.e. whether the proposed project is user friendly or not, whether users can use the project without any training because of the user friendliness or not. Elearning System is very user friendly as its users interact with it through web.

2.5 Objectives Of Project

With the introduction of new media and technology for learners and teachers, universities have introduced distance learning/distance education. With the above technologies in mind the objective of this project is to develop a system using this internet as one of the delivery mediums. The objective of this report/project is to design and implement a web-based system that allows interaction between instructors and students. This involves developing an intuitive user interface for both teacher and student. Teachers and students are the external entities to the system who can log into the system and use the functionality provided by the system.

The Teachers and the students enter the system through a login tool component. The objective of this system is to develop non-expensive interactive tools like message board tool and chat tool to provide interaction between the student and the teacher. The additional objective of this project is to design a system with reusable components, feasibility and provision for system expansion without compromising system performance. Some other objectives are :

- Facility for submitting assignment online.
- Direct supervision by the teachers.
- To provide free interaction tool between student and teacher.
- To give information about important class events.
- To provide student result card online.
- Upload any valuable material to class.
- View the quiz and assignment scores online.

- To provide information about the students who have completed the given work before the deadline.
- Adding new students to class.
- Making student up to date with every important information through student notifications.

CHAPTER 3

PRODUCT DESIGN

3.1 Product Perspective

The traditional application of an LMS is in educational institutions. Learning management systems have been used for several years to deliver courseware in schools and popularize e-learning. In the last few decades, Institutes have been using learning management systems to deliver training to internal employees and students. The LMS has become a powerful tool for staffing and training, extension schools, and any corporation looking to get a better grasp on the continuing education of its workforce. Its impact has been felt mostly outside of traditional education institutions, though the same technological and market forces are dramatically changing todays classroom as well.

The Elearning system provides all vital information about institute such as all teachers, departments, students, list of events of respective institute in a systematic and user friendly manner. The student can see all his/her classmates and the teacher teaching the particular. The teachers can upload the assignments and quizes to his/her class and also can give marks according to the assignment submitted. On the other hand the student can see the notifications for important tasks also student can view the grades given to him by teacher as well as the quiz scorecard on the dashboard. The system also provides a special option called backpack where the student can save all the important stuff that is on his/her dashboard. Also there is a chat facility by which student and teacher can send each other personal message. Elearning systems are quite popular and useful these days, more and more institutes are implementing these systems. This system is also made to automate and easily manage the daily class work by reducing the use of pen and paper and thus saving a lot of time and money.

3.2 Product Functions

Registeration & Login: The software user would be required to Register through a screen. After authentication and login he would be able to access only those areas for which he is capable to access.

Administrator Maintenance: Administrator can add or update the details directly through admin interface.

Add Class/Student: New class and students can be added by the teacher.

Class Calender: Now the teachers and students can view the important event dates through the class calender.

View Grades: Students can view their result of quizes attempted and assignment grades from their portal.

Change Avatar/Password: Both the teachers and student can change their password as well as avatar from their respective panels.

Add Student: Teacher can add new student to his class.

Send Message: Both the teacher and student can communicate with each other with the messaging facility.

Upload/Submit Assignment: Using this function teacher can upload an assignment to his/her class, on the other hand the student can submit the assignment for evaluation.

3.3 User Characteristics

The objective of this elearning system is to provide an efficient and effective service to the students and teachers of any institute. It is aimed to encourage people to use computers and internet for their daily class work. Students can submit assignments online and or contact any student of their class by using the message facility provided in the system . Teachers can get status of a student's work. The website has unique facility for uploading the content like assignments or any type of quiz along with the facility of backpack. This would help the students and teachers to reduce the use of pen and paper thus this will save a lot of time and money. The students and teachers are the most expected users of this website, but any person who is seeking information for is also a user.

3.4 Constraints

These constraints are given a constraint name and the DBA stores the constraints will its name and instruction internally along with the cell itself. If the data constraints attached to a specific cell in a table reference the contents of another cell in the table then the user will have to use table level constraint. Table level constraints are stored as a part of the global table definition. Constraints types:

- Null/Not Null
- Unique
- Primary Key
- Foreign Key

1. The Not Null Constraint: This ensures that null values are not permitted for the column; they serve as keys for operations on the table. Columns without the not null constraint allow null values. Not null is one of several integrity constraints that may be deined for table.

2. Unique Constraint: This designates a column or combination of columns as a unique key. No two rows in the table can have same value for this key. Null are allowed if the unique key is used on a single column. A column with this constraint will not accept any duplicate values.

3. Primary Key Constraint: As with unique key a primary key enforces uniqueness of the column combination involved and unique index is create to manage this. There may however be only one primary key in a table and this is known as definitive key through which rows in the table are individually identified. NULLS are not allowed primary key column. The LONG data types can not be included in a Primary key. A Primary key can contain 16 columns at most. A unique index is created on the column contained in the Primary key.

4. Foreign Key Constraint: Foreign keys representation relationships between tables. A foreign key is a column whose values are derived from the primary key of the same or same other table. The existing system of a foreign key implies that the table with foreign key is required to the primary key table from which the foreign key derived. A foreign key must have a corresponding primary key value n the primary key table to have a meaning.

3.5 System Design

Systems design is the process or art of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. One could see it as the application of systems theory to product development. There is some overlap with the disciplines of systems analysis, systems architecture and systems engineering.

- External design: External design consists of conceiving, planning out and specifying the externally observable characteristics of the software product. These characteristics include user displays or user interface forms and the report formats, external data sources and the functional characteristics, performance requirements etc. External design begins during the analysis phase and continues into the design phase.

- Logical design: The logical design of a system pertains to an abstract representation of the data flows, inputs and outputs of the system. This is often conducted via modeling, which involves a simplistic (and sometimes graphical) representation of an actual system. In the context of systems design, modeling can undertake the following forms, including:

  - Data flow diagrams
  - Entity Relationship Diagrams

- Physical design: The physical design relates to the actual input and output processes of the system. This is laid down in terms of how data is input into a system, how it is verified/authenticated, how it is processed, and how it is displayed as output.

3.6 Design Notations

Data Flow diagrams:

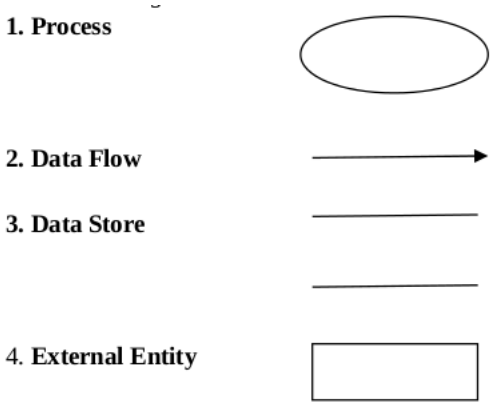

Figure 3.1: DFD Notation

Flow Charts:

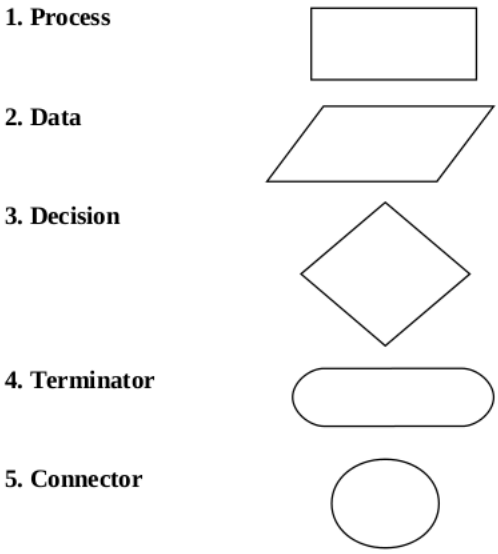

Figure 3.2: Flow Chart Notations

Detailed Design We basically describe the functionality of the system internally. The internal design describes how data is flowing from database to the user and how they both are internally connected. For this reason we can show the design of the system in detailed manner by many ways:

3.7 Flowchart

A flowchart is a type of diagram that represents an algorithm or process, showing the steps as boxes of various kinds, and their order by connecting them with arrows. This diagrammatic representation can give a step-by-step solution to a given problem. Process operations are represented in these boxes, and arrows connecting them represent flow of control. Data flows are not typically represented in a flowchart, in contrast with data flow diagrams; rather, they are implied by the sequencing of operations. Flowcharts are used in analyzing, designing, documenting or managing a process or program in various fields.

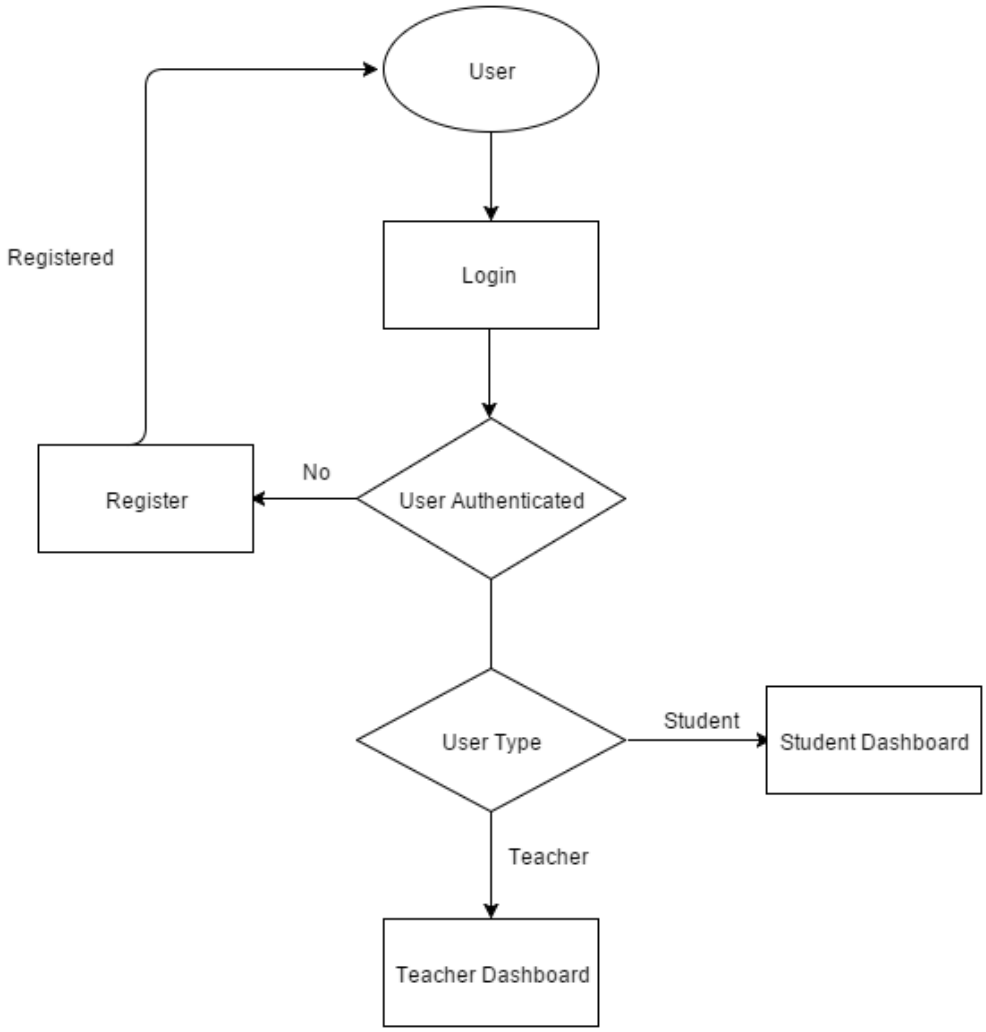

Figure 3.3: Flow Chart For Registration

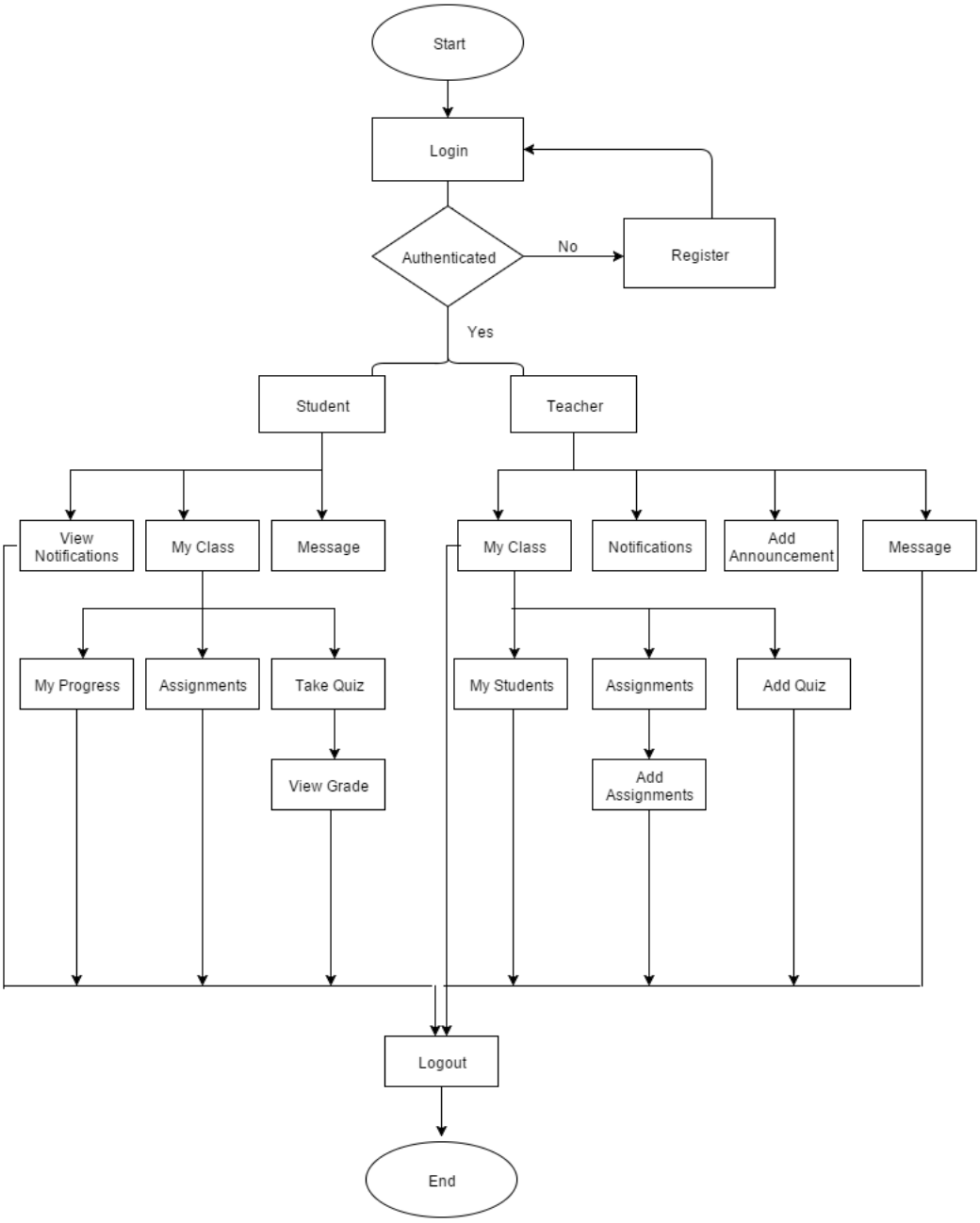

Figure 3.4: Flow Chart For Working of System

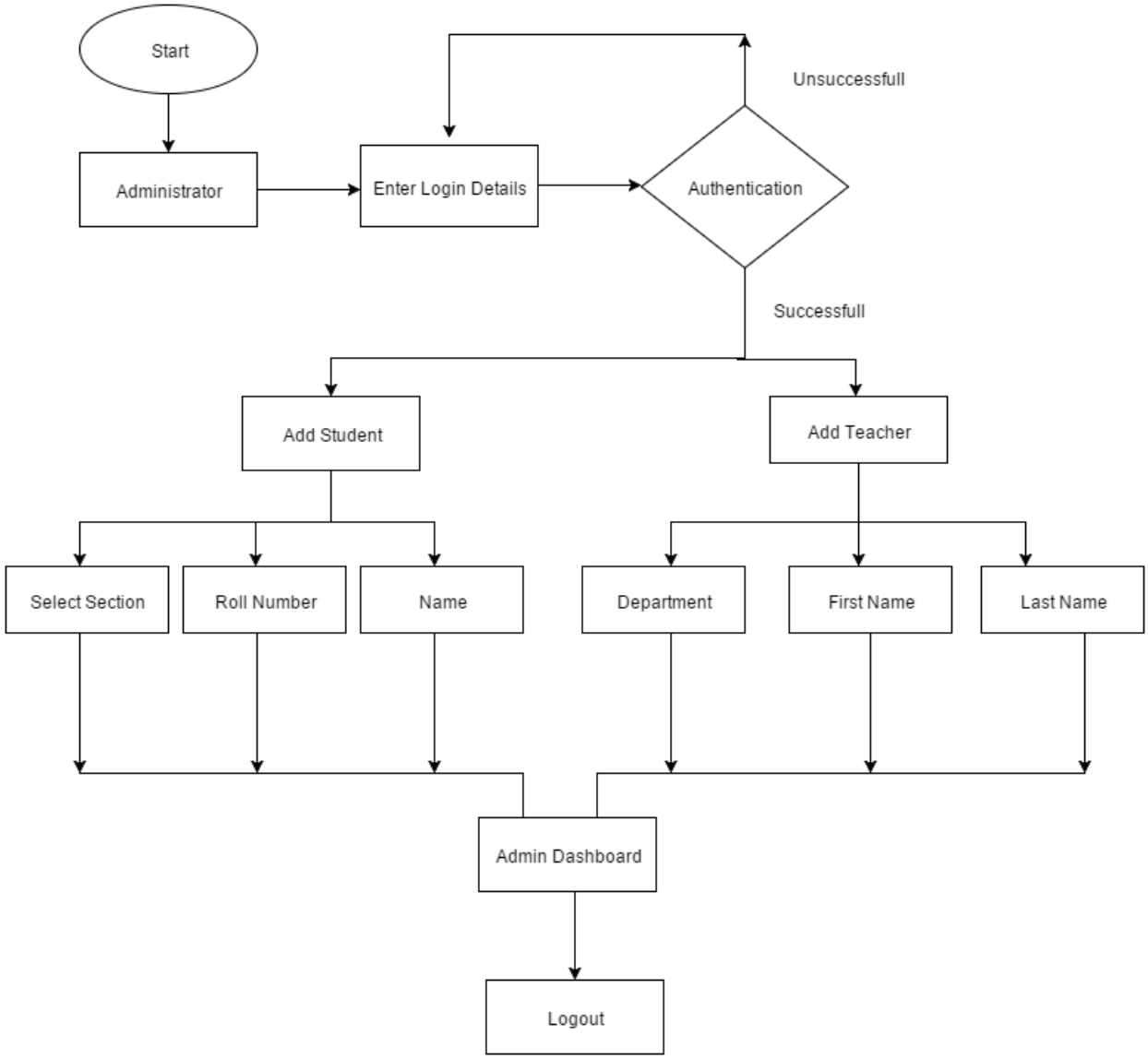

Figure 3.5: Flow Chart For Adding New Teacher/Student

3.8 Database Design

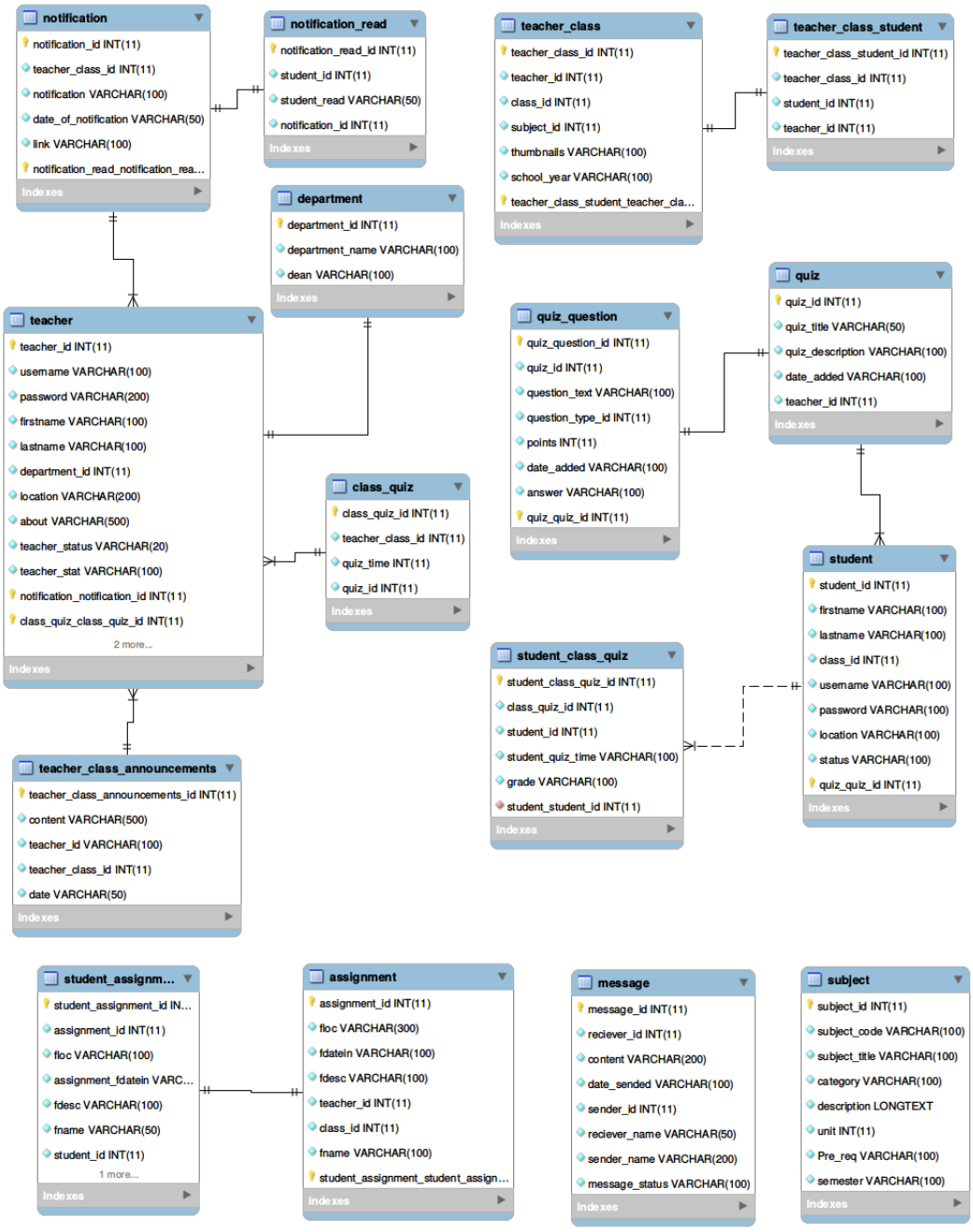

Figure 3.6: Database Design

3.9 Assumptions and Dependencies

3.9.1 Assumptions

For Elearning System, main assumption was that this website may be viewed and even operated by literate person. Viewing the website is different than managing it. However it was not recommended to give access to uneducated people, but as the requirements specified by the client, the website must be designed in such a way that it should be so easy to manage that everyone can work on that.

3.9.2 Dependencies

However as such there is not any serious dependency of this system, but for viewer, it is recommended to it on modern browsers like FireFox and Google Chrome. However it also works with older browsers even with Internet Explorer. For user, it requires a Linux server. However it will also work on windows server if a WAMP/XAMPP server is installed. As there is not hardware dependency of this website, i.e. it is viewable on all type of devices.

CHAPTER 4

DEVELOPMENT AND IMPLEMENTATION

4.1 Introduction to PHP

Figure 4.1: Php logo

PHP is an open source server-side scripting language designed for Web development to produce dynamic Web pages. It is one of the first developed server-side scripting languages to be embedded into an HTML source document rather than calling an external file to process data. The code is interpreted by a Web server with a PHP processor module which generates the resulting Web page. It also has evolved to include a command-line interface capability and can be used in standalone graphical applications.

PHP can be deployed on most Web servers and also as a standalone shell on almost every operating system and platform, free of charge. A competitor to Microsofts Active Server Pages (ASP) server-side script engine and similar languages, PHP is installed on more than 20 million Web sites and 1 million Web servers. Notable software that uses PHP includes Drupal, Joomla, MediaWiki, and WordPress. PHP is a general-purpose scripting language.

It is especially suited to server-side web development where PHP generally runs on a web server. Any PHP code in a requested file is executed by the PHP runtime, usually to create dynamic web page content or dynamic images used on Web sites or elsewhere. It can also be used for command-line scripting and client-side graphical user interface (GUI) applications. PHP can be deployed on most Web servers, many operating systems.

4.1.1 Features of PHP

- Http Authentication
- Cookies and Sessions
- Connection Handling
- Designer-friendly
- Cross platform Compatibility
- Loosely typed Language
- Open Source
- Easy code

4.2 MySQL Database Server

Figure 4.2: Mysql logo

I used the Mysql database for my project. It is world"s most popular open source database It is a relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases. It is named after developer Michael Widenius's daughter, My. The SQL phrase stands for Structured Query Language. MySQL is written in C and C++.

Free-software-open source projects that require a full-featured database management system often use MySQL. MySQL is also used in many high-profile, large-scale World Wide Web products, including Wikipedia, Google (though not for searches) and Facebook.

MySQL is a popular choice of database for use in web applications, and is a central component of the widely used LAMP web application software LAMP is an acronym for Linux, Apache, MySQL, Perl/PHP/Python. MySQL is used in some of the most frequently visited web sites on the Internet, including Flickr, Nokia.com, YouTube, Wikipedia, Google and Facebook.

One of the greatest advantage of Django is that it synchronises the database only with one command withouut having any need to send different queries for insertion, deletion, updation etc. There is a file named models.py which is used for purpose of creating database.

4.2.1 Features of MySQL

- MySQL is a database management system.
- MySQL is a relational database management system.
- MySQL software is Open Source.
- The MySQL Database Server is very fast, reliable, and easy to use.
- MySQL Server works in client/server or embedded systems.
- A large amount of contributed MySQL software is available.

4.2.2 Installation of MySQL

MySql can be installed using following commands:

```
$ sudo apt-get install mysql-server

$ sudo apt-get install mysql-client
```

4.3 Introduction to Bootstrap

Figure 4.3: Bootstrap logo

4.3.1 What is Bootstrap

Bootstrap is a powerful front-end framework for faster and easier web development. It includes HTML and CSS based design templates for common user interface components like Typography, Forms, Buttons, Tables, Navigations, Dropdowns, Alerts, Modals, Tabs, Accordion, Carousel and many other as well as optional JavaScript extensions. Bootstrap also gives you ability to create responsive layout with much less efforts.

4.3.2 Advantages of Bootstrap

The biggest advantage of using Bootstrap is that it comes with free set of tools for creating flexible and responsive web layouts as well as common interface components. Additionally, using the Bootstrap data APIs you can create advanced interface components like Scrollspy and Typeaheads without writing a single line of JavaScript. Here are some more advantages, why one should opt for Bootstrap:

- Save lots of time.
- Responsive features.
- Consistent design .
- Easy to use.
- Compatible with browsers.
- Open Source.
- Consistency.
- Comprehensive List Of Components
- Leveraging Javascript Libraries.
- Frequent Updates.

4.3.3 Installation of Bootstrap

Downloading of Bootstrap is a very easy proccess. Type the commands in the terminal:

$ git clone https://github.com/twbs/bootstrap.git

This will clone the bootstrap files on your pc/laptop and later u can use these files in your project.

4.4 Introduction to Apache Web Server

Figure 4.4: Apache logo

Apache is a web server software notable for playing a key role in the initial growth of the World Wide Web. Apache is developed and maintained by an open community of developers under the auspices of the Apache Software Foundation. The application is available for a wide variety of operating systems, including Unix, FreeBSD, Linux, Solaris, Novell NetWare, Mac OS X, Microsoft Windows, OS/2, TPF, and eComStation. Released under the Apache License, Apache is open-source software.
The goal of this project is to provide a secure, efficient and extensible server that provides HTTP services in sync with the current HTTP standards.

4.4.1 Features of Apache Server

- Apache supports a variety of features, many implemented as compiled modules which extend the core functionality. These can range from server-side programming language support to authentication schemes.
- Apache features configurable error messages, DBMS-based authentication databases, and content negotiation. It is also supported by several graphical user interfaces (GUIs).
- It supports password authentication and digital certificate authentication. Apache has a built in search engine and an HTML authorizing tool and supports FTP.

4.4.2 Installation of Apache Server

Apache web server can be installed using following commands:

```
$ sudo apt-get install apache2
```

4.5 Introduction To Github

Figure 4.5: Github logo

GitHub is a Git repository web-based hosting service which offers all of the functionality of Git as well as adding many of its own features. Unlike Git which is strictly a command-line tool, Github provides a web-based graphical interface and desktop as well as mobile integration. It also provides access control and several collaboration features such as wikis, task management, and bug tracking and feature requests for every project.

GitHub offers both paid plans for private repto handle everything from small to very large projects with speed and efficiency. ositories, and free accounts, which are usually used to host open source software projects. As of 2014, Github reports having over 3.4 million users, making it the largest code host in the world.

GitHub has become such a staple amongst the open-source development community that many developers have begun considering it a replacement for a conventional resume and some employers require applications to provide a link to and have an active contributing GitHub account in order to qualify for a job.

4.6 What is Git?

Figure 4.6: Git logo

Git is a distributed revision control and source code management (SCM) system with an emphasis on speed, data integrity, and support for distributed, non-linear workflows. Git was initially designed and developed by Linus Torvalds for Linux kernel development in 2005, and has since become the most widely adopted version control system for software development.

As with most other distributed revision control systems, and unlike most clientserver systems, every Git working directory is a full-fledged repository with complete history and full version-tracking capabilities, independent of network access or a central server. Like the Linux kernel, Git is free and open source software distributed under the terms of the GNU General Public License version 2 to handle everything from small to very large projects with speed and efficiency.

Git is easy to learn and has a tiny footprint with lightning fast performance. It outclasses SCM tools like Subversion, CVS, Perforce, and ClearCase with features like cheap local branching, convenient staging areas, and multiple workflows.

4.6.1 Installation of Git

Installation of git is a very easy process. The current git version is: 2.0.4. Type the commands in the terminal:

$ sudo apt-get update

$ sudo apt-get install git

This will install the git on your pc or laptop.

4.6.2 Various Git Commands

Git is the open source distributed version control system that facilitates GitHub activities on your laptop or desktop. The commonly used Git command line instructions are:-

Create Repositories

Start a new repository or obtain from an exiting URL

$ git init [project-name]
Creates a new local repository with the specified name

$ git clone [url]
Downloads a project and its entire version history

Make Changes

Review edits and craft a commit transaction

$ git status
Lists all new or modified files to be committed

$ git diff
Shows file differences not yet staged

$ git add [file]
Snapshots the file in preparation for versioning

$ git reset [file]
Unstages the file, but preserve its contents

$ git commit -m "[descriptive message "]
Records file snapshots permanently in version history

Group Changes

Name a series of commits and combine completed efforts

$ git branch
Lists all local branches in the current repository

$ git branch [branch-name]
Creates a new branch

$ git checkout [branch-name]
Switches to the specified branch and updates the working directory

$ git merge [branch]
Combines the specified branchs history into the current branch

$ git branch -d [branch-name]
Deletes the specified branch

Figure 4.7: Donald Knuth, Inventor Of TEX typesetting system

4.7 Introduction to LATEX

LATEX, I have used this tool for preparing my six weeks training report and i found it excellent. So this time again i decided to use it for my report. LATEX (pronounced /letk/, /letx/, /ltx/, or /ltk/) is a document markup language and document preparation system for the TEX typesetting program. Within the typesetting system, its name is styled as LATEX.
Within the typesetting system, its name is styled as LATEX. The term LATEX refers only to the language in which documents are written, not to the editor used to write those documents. In order to create a document in LATEX, a .tex file must be created using some form of text editor. While most text editors can be used to create a LATEX document, a number of editors have been created specifically for working with LATEX.

LATEX is most widely used by mathematicians, scientists, engineers, philosophers, linguists, economists and other scholars in academia. As a primary or intermediate format, e.g., translating DocBook and other XML-based formats to PDF, LATEX is used because of the high quality of typesetting achievable by TEX. The typesetting system offers programmable desktop publishing features and extensive facilities for automating most aspects of typesetting and desktop publishing, including numbering and cross-referencing, tables and figures, page layout and bibliographies.

LATEX is intended to provide a high-level language that accesses the power of TEX. LATEX essentially comprises a collection of TEX macros and a program to process LATEXdocuments. Because the TEX formatting commands are very low-level, it is usually much simpler for end-users to use LATEX.

4.8 Typesetting

LATEX is based on the idea that authors should be able to focus on the content of what they are writing without being distracted by its visual presentation. In preparing a LATEX document, the author specifies the logical structure using familiar concepts such as chapter, section, table, figure,

etc., and lets the LaTeX system worry about the presentation of these structures. It therefore encourages the separation of layout from content while still allowing manual typesetting adjustments where needed.

```
\documentclass[12pt]{article}
\usepackage{amsmath}
\title{\LaTeX}
\date{}
\begin{document}
  \maketitle
  \LaTeX{} is a document preparation system
  for the \TeX{} typesetting program.
   \par
   $E=mc^2$
\end{document}
```

4.8.1 Installing LaTeX on System

Installation of LaTeX on personal system is quite easy. As i have used LaTeX on Ubuntu 14.04 so i am discussing the installation steps for Ubuntu 14.04 here:

- Go to terminal and type
  sudo apt-get install texlive-full
- Your Latex will be installed on your system and you can check for manual page by typing.
  man latex in terminal which gives manual for latex command.
- To do very next step now one should stick this to mind that the document which one is going to produce is written in any type of editor whether it may be your most common usable editor Gedit or you can use vim by installing first vim into your system using command.
  sudo apt-get install vim
- After you have written your document it is to be embedded with some set of commands that Latex uses so as to give a structure to your document. Note that whenever you wish your document to be looked into some other style just change these set of commands.
- When you have done all these things save your piece of code with .tex format say test.tex. Go to terminal and type
  latex path of the file test.tex Or pdflatex path of the file test.tex
  eg: pdflatex test.tex for producing pdf file simultaneously.
  After compiling it type command

  evince filename.pdf
  eg: evince test.pdf
  To see output pdf file.

4.8.2 Graphical Editors for LaTeX

LaTeX is not restricted to command line only there are so many graphical based editors available to be used. These GUi based editors provide an easy interface to user so as to do typesetting in an efficient manner. Some of them are listed below:

- Tex Maker
- LED

And many more but the preferred method to produce LaTeX document is through console mode only.

4.9 Introduction to Doxygen

Doxygen is a documentation generator, a tool for writing software reference documentation. The documentation is written within code, and is thus relatively easy to keep up to date. Doxygen can cross reference documentation and code, so that the reader of a document can easily refer to the actual code.
Doxygen supports multiple programming languages, especially C++, C, C#, Objective-C, Java, Python, IDL, VHDL, Fortran and PHP.[2] Doxygen is free software, released under the terms of the GNU General Public License.

4.9.1 Features of Doxygen

- Requires very little overhead from the writer of the documentation. Plain text will do, Markdown is support, and for more fancy or structured output HTML tags and/or some of doxygen's special commands can be used.
- Cross platform: Works on Windows and many Unix flavors (including Linux and Mac OS X).
- Comes with a GUI frontend (Doxywizard) to ease editing the options and run doxygen. The GUI is available on Windows, Linux, and Mac OS X.
- Automatically generates class and collaboration diagrams in HTML (as clickable image maps) and LaTeX (as Encapsulated PostScript images).
- Allows grouping of entities in modules and creating a hierarchy of modules.
- Doxygen can generate a layout which you can use and edit to change the layout of each page.
- Can cope with large projects easily.

4.9.2 Installation of Doxygen

Doxygen can be installed using following commands:

$ git clone https://github.com/doxygen/doxygen.git

$ cd doxygen

$ ./configure

$ make

4.10 Implementation

Implementation is the process of converting a new or revised system design into an operational one. At the present time there is no system as Imperial Finance which work online and provide information via web. So this is the replacement of the manual financial system. In Imperial Finance most of the finance related task will be performed online.

Types of Implementation:

1. Implementation of a computer system to replace a manual system.
2. Implementation of a new computer system to replace an existing one.
3. Implementation of a modified application to replace an existing one.

Aspects of Implementation:

1. Conversion
2. Post Implementation and review
3. Software maintenance

4.10.1 Implementation of the Project

Elearning System is the implementation of the new system to replace manual one. Working manually is very time consuming and irritating. The project implementation of starts with the Administrator. Administrator will be the super user of the application who will configure system information. There will be a different interface for the Students and Teachers from where they can manage and view the required information.

It is a web based application, so it is distributed and data centric. In this application, MySQL database is used to store data related to Students and Teachers. Since database is on Server, so any number of users can work simultaneously and can share their data with each other.

4.10.2 Conversion Plan

Conversion is the process of changing from one system to another. This plan involves:

1. Creating computer-compatible files.
2. Training the operating staff.
3. Installing terminals and hardware.

4.10.3 Conversion Processes

1. File Conversion.
2. Data Entry.
3. User Training.

4.10.4 Elements of User training

1. The initial training period.
2. At the time of Installation.
3. If required, during Maintenance Phase.

4.11 Post-Implementation and Software Maintenance

Implementation review is an evaluation of a system in terms of the extent to which the system accomplishes stated objectives and actual project costs exceeds initial estimates.

4.11.1 Review Plan

An overall plan covers following aspects:

1. Administrative plan.
2. Personnel requirements plan.
3. Hardware plan.
4. Documentation review plan.

After the implementation of this project, the team will see the post implementation phase. If there will be any concerns, those will be solved based on the user feedback.

4.11.2 Maintenance

In order for a software system to remain useful in its environment it may be necessary to carry out a wide range of maintenance activities upon it. There are bugs to fix, enhancement to add and optimization to make, changes has to be done in older version to make it application for current use of current version to cater the need of future. Maintenance can be of three types:

1. **Corrective Maintenance**: Changes necessitated by actual errors (defects or residual "bugs") in a system are termed corrective maintenance. These defects manifest themselves when the system does not operate as it was designed or advertised to do. A defect or bug can result from design errors, logic errors and coding errors. Design errors occur when for example changes made to the software are incorrect, incomplete, wrongly communicated or the change request misunderstood. In the event of a system failure due to an error, actions are taken to restore operation of the software system. The approach here is to locate the original specifications in order to determine what the system was originally designed to do.
2. **Adaptive Maintenance**: Any effort that is initiated as a result of changes in the environment in which a software system must operate is termed adaptive change. Adaptive change is a change driven by the need to accommodate modifications in the environment of the software system, without which the system would become increasingly less useful until it became

obsolete. The term environment in this context refers to all the conditions and influences which act from outside upon the system, for example business rules, government policies, work patterns, software and hardware operating platforms. A change to the whole or part of this environment will warrant a corresponding modification of the software.

3. **Perfective Maintenance**: This is actually the most common type of maintenance encompassing enhancements both to the function and the efficiency of the code and includes all changes, insertions, deletions, modifications, extensions, and enhancements made to a system to meet the evolving and/or expanding needs of the user. A successful piece of software tends to be subjected to a succession of changes resulting in an increase in its requirements. This is based on the premise that as the software becomes useful, the users tend to experiment with new cases beyond the scope for which it was initially developed. Expansion in requirements can take the form of enhancement of existing system functionality or improvement in computational efficiency. Though efforts have been made to develop error free systems, but no system is perfect, room for improvement is always there. Thus proper documentation for the system has been done so that it will be easy to handle any breakdown or any other type of system maintenance activity.

4.12 Testing

Project testing is an investigation conducted to determine the quality of the project and the services provided by the project. Testing is the process of analyzing a project to detect the differences between existing and required conditions (that is defects/errors/bugs) and to evaluate the features of the project. After complete development of the project it is mandatory to test the project. The main motive of the project testing is to identify whether project is able to meet user requirements or not. To know the better performance of project we have to develop various Test Cases. Now, designing good test cases is a complex art. The complexity comes from three sources

- Test cases help us discover information. Different types of tests are more effective for different classes of information.
- Test cases can be good in a variety of ways. No test case will be good in all of them.
- Our tend to create test cases according to certain testing styles, such as domain testing or risk-based testing. Good domain tests are different from good risk-based tests.

4.12.1 Unit Testing

Unit testing is undertaken after a module has been coded and successfully reviewed. Unit testing (or module testing) is the testing of different units (or modules) of a system in isolation. I have done unit testing for my project. Before combining all modules i have tested the modules independently, and no errors were reported during testing.

4.12.2 Integration Testing

In this type of testing I have used Big Bang Approach, where all the modules making up a system are integrated in a single step. In simple words, all the modules of the system are simply put together and tested. However, this technique is practicable only for very small systems. The

main problem with this approach is that once an error is found during the integration testing, it is very difficult to localize the error as the error may potentially belong to any of the modules being integrated. Therefore, debugging errors reported during big bang integration testing are very expensive to fix. During this testing no errors were reported and the system worked fine.

4.12.3 System Testing

System tests are designed to validate a fully developed system to assure that it meets its requirements. I have performed this testing to the software and all the requirements that were kept in mind before the development of this system are fulfilled. The system as whole worked as expected and also no errors or problems were reported.

4.13 Project Screenshots

Figure 4.8: Home Page

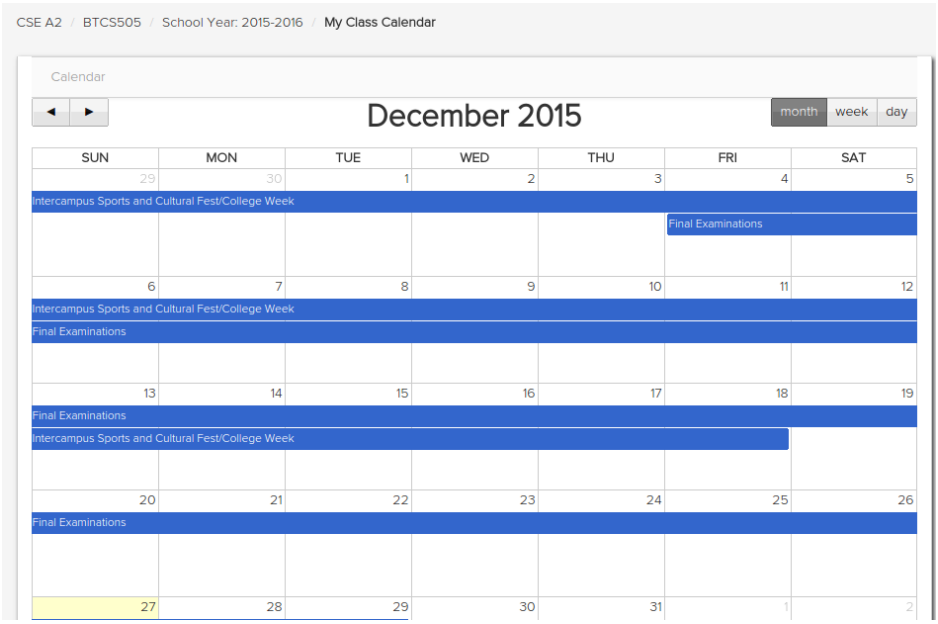

Figure 4.9: Class Calender

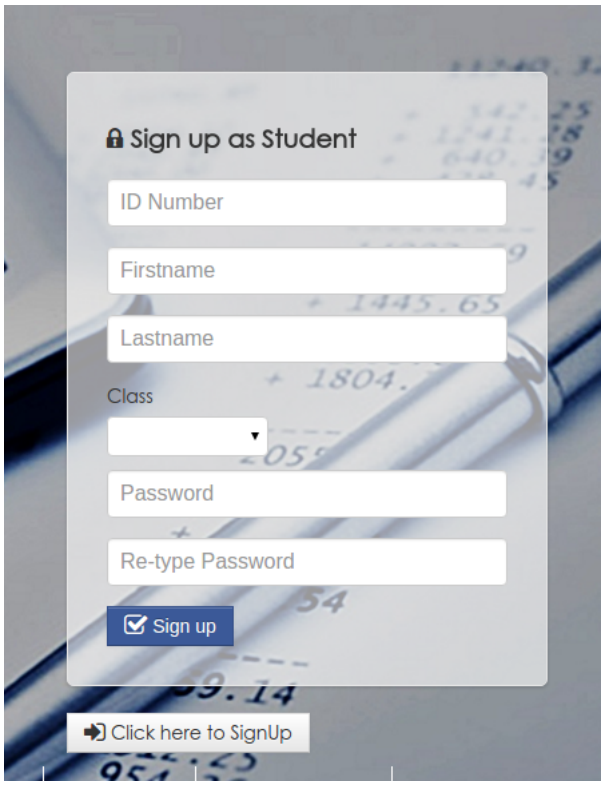

Figure 4.10: Student Signup

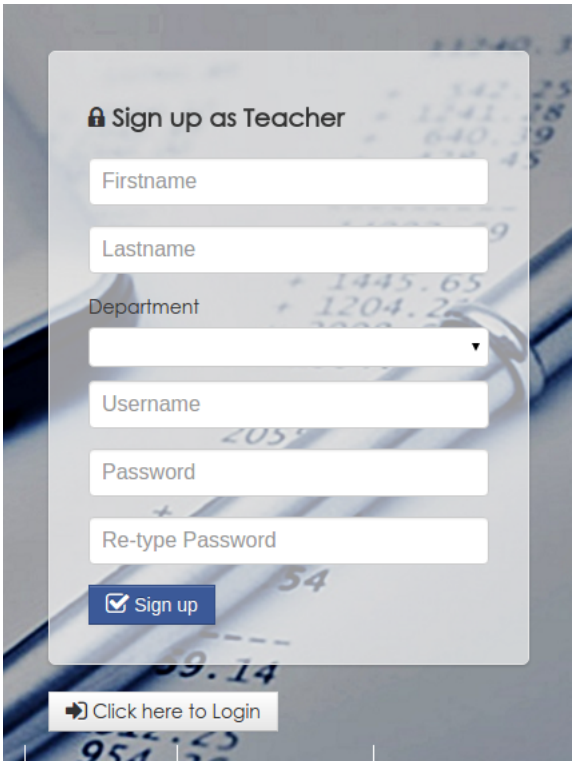

Figure 4.11: Teacher Signup

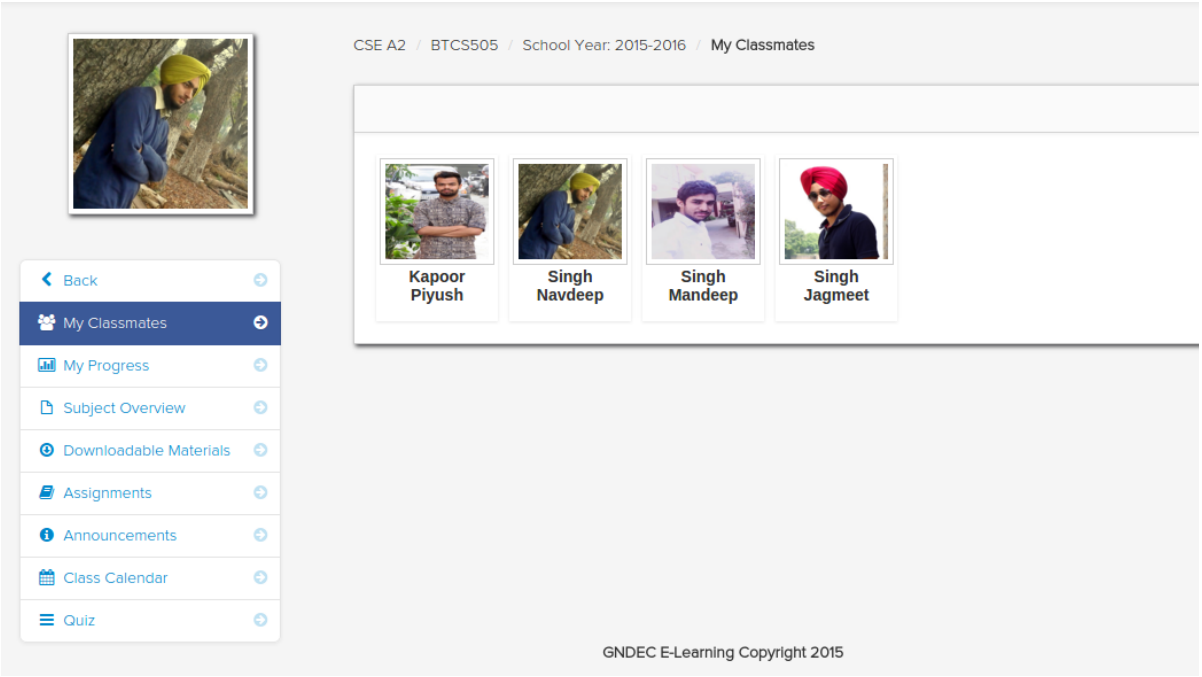

Figure 4.12: Student Dashboard

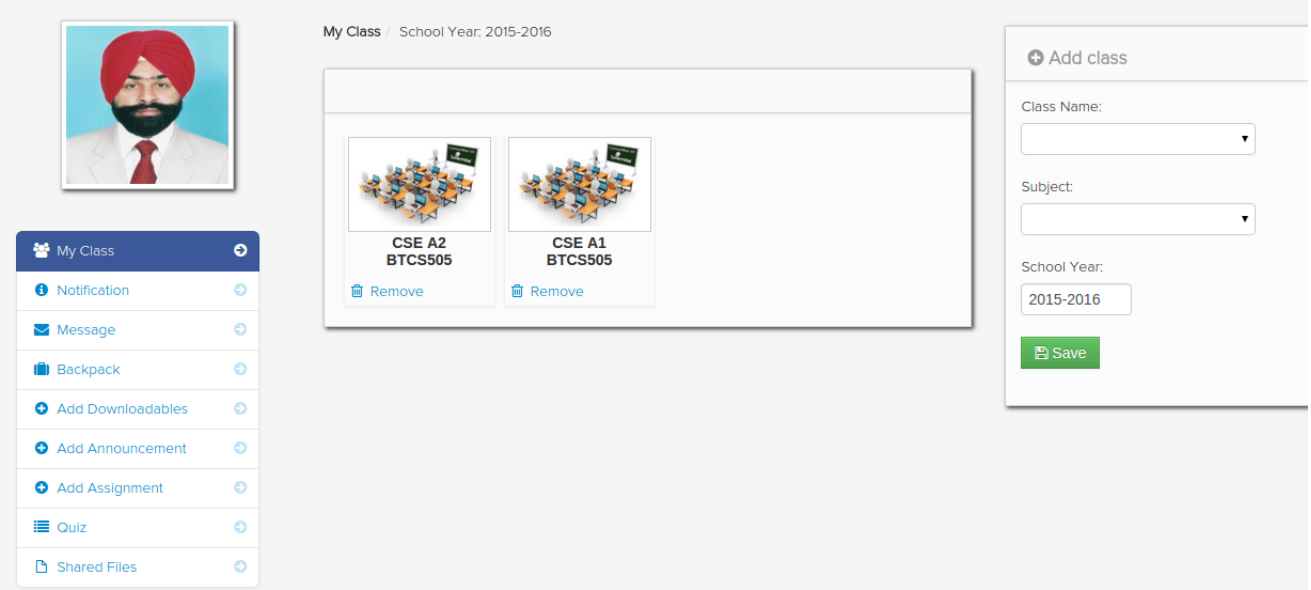

Figure 4.13: Teacher Dashboard

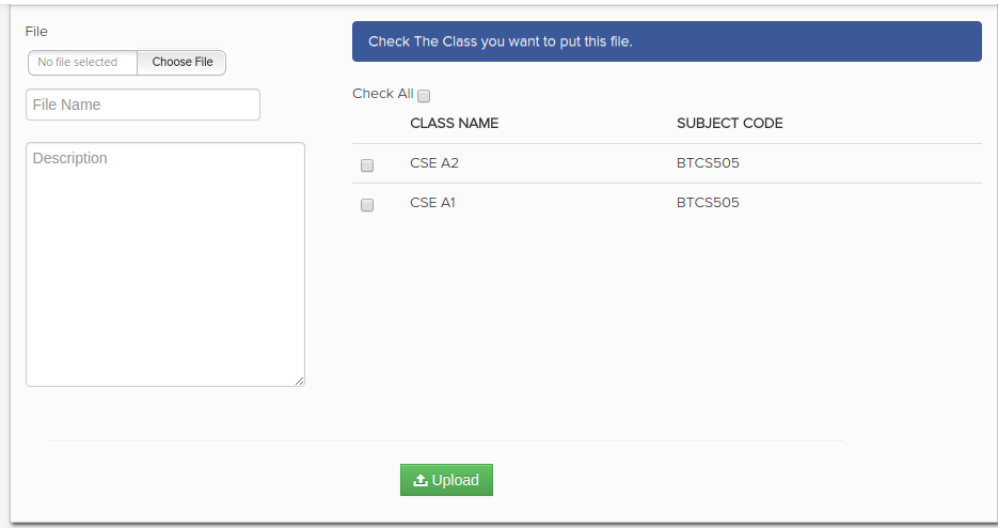

Figure 4.14: Add Assignment

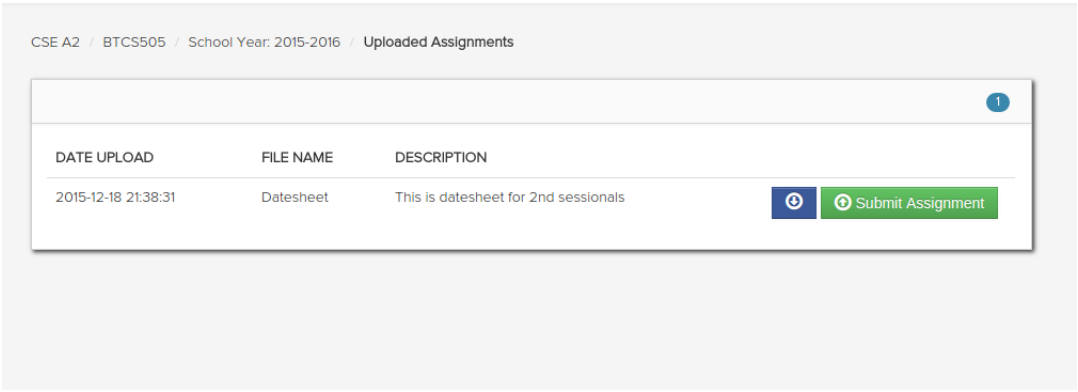

Figure 4.15: Submit Assignment

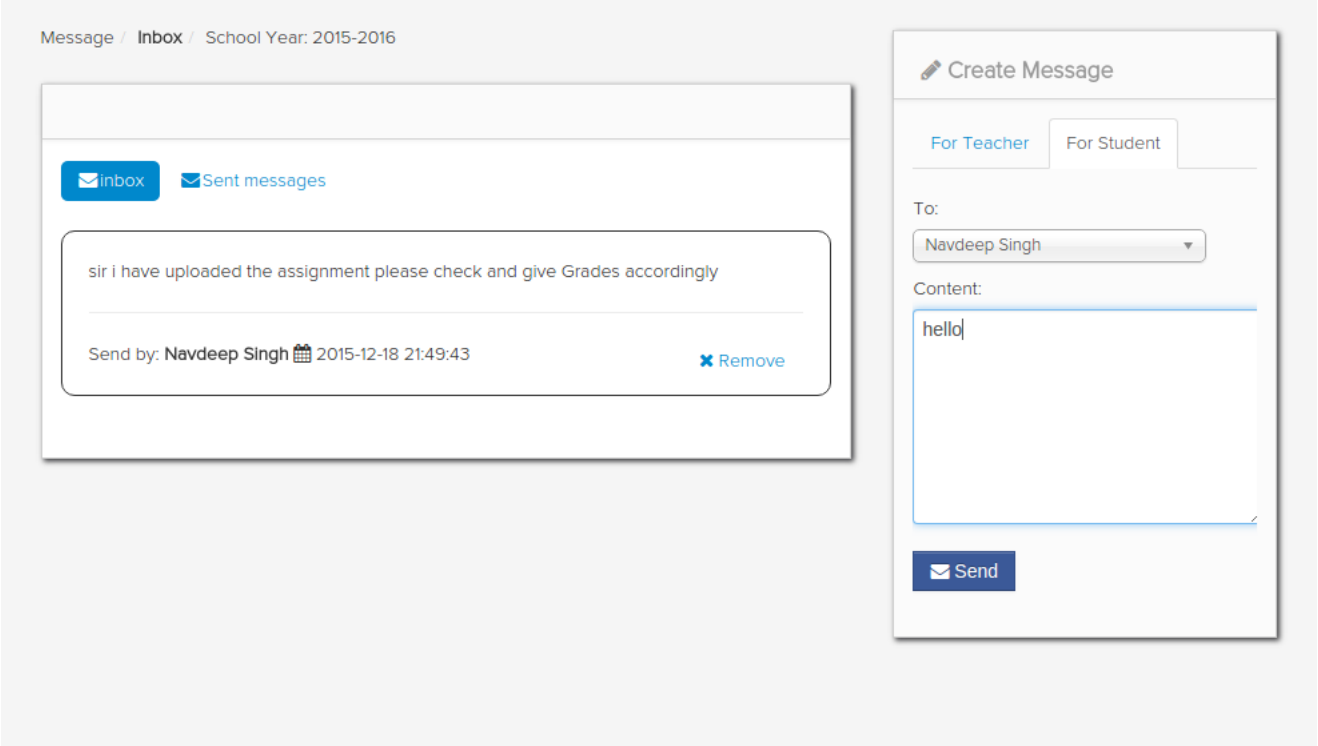

Figure 4.16: Send Message

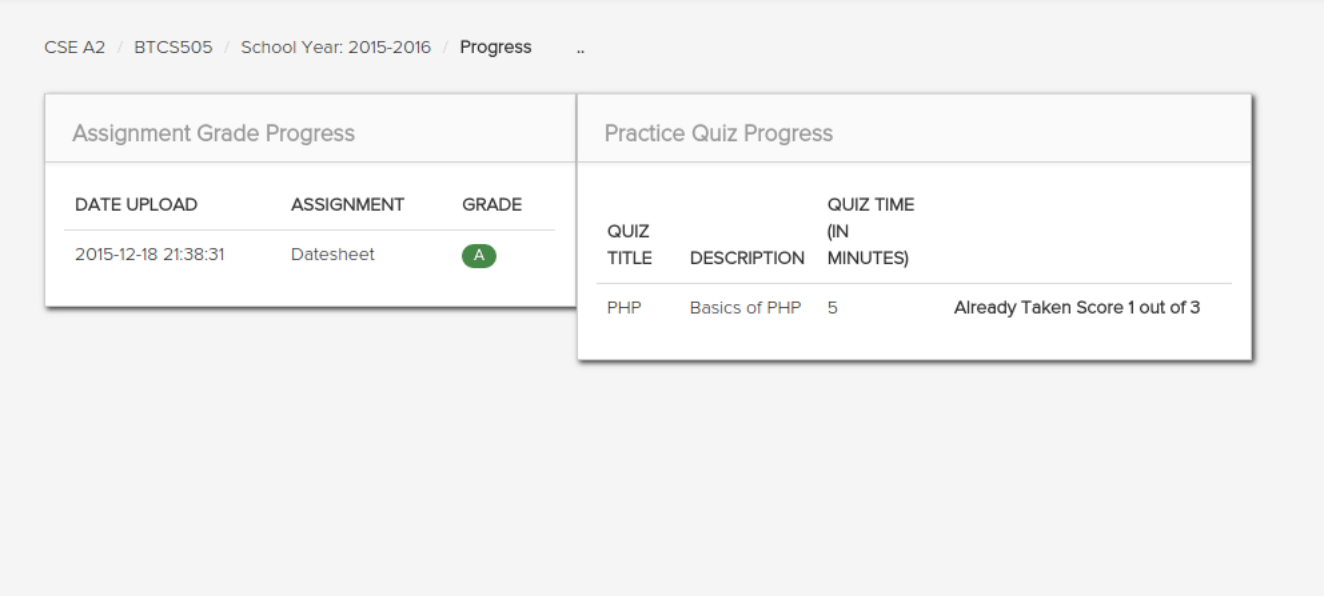

Figure 4.17: View Progress

Figure 4.18: Admin Dashboard

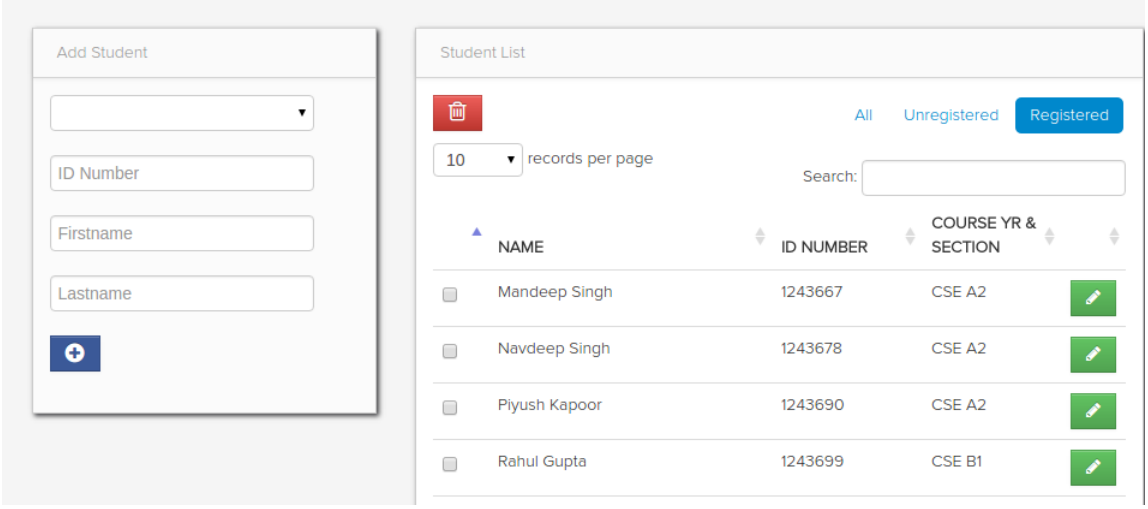

Figure 4.19: Add New Student

CHAPTER 5

CONCLUSION AND FUTURE SCOPE

5.1 Conclusion

I learned a lot by doing this project . During this period I got to learn a vast number of technologies. These are lsited below :

- **Operating system**: Ubuntu
- **Languages used**: PHP, Html, CSS, JQuery
- **Database**: MySql
- **Typesetting**: LaTex
- **Documenter**: Doxygen

So during this project I learned all the above things. Above all I got to know how Softwares are developed from the scratch. Planning, designing, developing code, working in a team, testing etc. These are all very precious things I got to learn during this period. If I talk about the project, Elearning project reduce a lot of manual work. It has automated most of the class work. It is a great project with wider scope and it can be implemented on every school or college as it is user friendly and less time consuming.

5.2 Current status

Elearning System is currently running on my local machine. It has automated most of the class work of an institute. Software has following applications in it:

- Login and registration
- Add new Student/Teacher.
- Upload Assignments.
- View Grades.

- Check Progress.
- Add Announcements/Events
- Send Messages

5.3 Future Scope

Elearning System reduces the manual work and save the time. It also reduces the man power and reduces the burden of handling lots of data. It keeps the backup of the record stored. As the project is complete but still there are many more things or areas which can be added to the project to make that more reliable. It has already done following things:

- The project has already improved the learning experience to a huge extent by automating the processes, reducing the time tremendously from several days to a few minutes and cutting costs hugely.
- Although automated to a large extent, Elearning is still in its initial development stages and there is still scope for a lot of development.
- It is developed using the open source technologies, so it's code will always be available and every institute can upgrade it for using it on their own institute server.
- It can be deployed on the college server keeping in mind it's benefits, as it will take the class experience to whole new extent.
- We plan to add a lot of other features some of which are availability of the sessional exam scores and also the answer sheets of all examinations held during the current semester.

With the advancement in technology everyday i think that this project has a huge scope for future use. We know that there are many popular Online learning systems for example Moodle is one of them. It has connected a large number of people around the world that shows that people are ready to move from pen paper to computer for learning. So keeping in mind these things Elearning System has a great scope for future. I hope it will be deployed on our college server soon.

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