LEARNING ASSISTANT

Submitted by

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Submitted for the partial fulfillment for the degree of Bachelor of Technology in Computer Science and Engineering

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CERTIFICATE

This is to certify that the project entitled “Learning Assistant”, prepared by Aditya Ghosh Dastidar(13000115006), Ahana Dutta(13000115007), Akash Biswas(13000115009), Piyush Prabhat(13000115052) of B.Tech (Computer Science & Engineering), Final Year, has been done according to the regulations of the Degree of Bachelor of Technology in Computer Science & Engineering. The candidates have fulfilled the requirements for the submission of the project report.

It is to be understood that, the undersigned does not necessarily endorse any statement made, opinion expressed or conclusion drawn thereof, but approves the report only for the purpose for which it has been submitted.

(Signature of the Internal Guide)

(Signature of the HOD)

(Signature of the External Guide with Designation and Institute / Organization, as applicable)

(Signature of the External Examiner with Designation and Institute)

ACKNOWLEDGEMENT

We would like to express our sincere gratitude to our mentor of the department of Computer Science and Engineering, whose role as project guide was invaluable for the project. We are extremely thankful for the keen interest he / she took in advising us, for the books and reference materials provided for the moral support extended to us.

Last but not the least we convey our gratitude to all the teachers for providing us the technical skill that will always remain as our asset and to all non-teaching staffs for the gracious hospitality they offered us.

Place: Techno India, Salt Lake

Date:

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1. Introduction

1.1 Briefing

Learning Assistant is a software application. It targets freshers entering their first year of college to help them assimilate to college level studies smoothly. As freshers we need to adapt to change of pace in studies from higher secondary school. This software manages the adaptation through due date schedules and relevant information about student's college. That helps the students to get used to the new environment quickly and easily.

1.2 Problem Domain

- Learning Assistant software is useful for undergraduate college students.
- The software is PHP-MYSQL based desktop application. It requires XAMPP Control Panel and phpmyadmin and browser.
- The software is compatible with every operating system supporting php-mysql.

1.3 Related Studies

Interaction with Virtual Assistants like Cortana (Windows 10), Google Assistant (Android), Siri (Apple), etc. gave us the idea for the project. We wanted to create a system that will help a student throughout his/her engineering course. From observation of pre-existing virtual assistant systems, we concluded that the following elements are required for this project:

- Basic Data – Course syllabus, average performance chart
- Syncing – Student's progress through the course, Assignment due dates.
- Performance monitor – Assessment of student's marks.

1.4 Glossary

- Cortana - Cortana is a virtual assistant created by Microsoft for Windows platform. In recent years it has spread to Android and Apple platforms as well. Cortana can set reminders, recognize natural voice without the requirement for keyboard input, and answer questions using information from the Bing search engine.
- Siri - Siri is a virtual assistant part of Apple Inc.'s operating systems. The

assistant uses voice queries and a natural-language user interface to answer questions, make recommendations, and perform actions by delegating requests to a set of Internet services.

- Gantt Chart - A Gantt chart is a horizontal bar chart developed as a production control tool. It is frequently used in project management. A Gantt chart provides a graphical illustration of a schedule that helps to plan, coordinate, and track specific tasks in a project.

2. Problem Definition

2.1 Definition

- Availability of periodic suggestion for the students e.g. Which subjects they should improve their performance.
- It can provide references through links to the open source reading materials.
- Easy access to students' work and academic details.
- It will help the students for easier planning for placement in available companies. Placement records like which companies are recruiting, their basic requirements and other details are also desirable.
- Minimization of time required for tasks like making a planner. Planner will help in recovery in poor subjects.

2.2 Scope

This software system will be a desktop application for any university wishing to streamline adjustment of 1st year students. More specifically to design and develop a simple and intuitive system which shall cater the academic needs of the students. The system shall provide features to the students of an educational institute to monitor their academic progress, schedule their required assignments, easily find contact information about the faculty etc.

The main purpose of the system is to support the students. First year students also get information about location of various labs and classrooms around the institute campus.

In order to develop the software we have used three types of languages:

1.JavaScript

JavaScript (**JS**) is a lightweight interpreted or just-in-time compiled programming language with first-class functions. While it is most well-known as the scripting language for Web pages, many non-browser environments also use it, such as Node.js, Apache CouchDB and Adobe Acrobat. JavaScript is a prototype-based, multi-paradigm, dynamic language, supporting object-oriented, imperative, and declarative (e.g. functional programming) styles. Read more about JavaScript.

This section is dedicated to the JavaScript language itself, and not the parts that are specific to Web pages or other host environments. For information about APIs specific to Web pages, please see Web APIs and DOM.

The standard for JavaScript is ECMAScript. As of 2012, all modern browsers fully support ECMAScript 5.1. Older browsers support at least ECMAScript 3. On June 17, 2015, ECMA International published the sixth major version of ECMAScript, which is officially called ECMAScript 2015, and was initially referred to as ECMAScript 6 or ES6. Since then, ECMAScript standards are on yearly release cycles. This documentation refers to the latest draft version, which is currently ECMAScript 2020.

2.Php

PHP: Hypertext Preprocessor (or simply **PHP**) is a general-purpose programming language originally designed for web development. It was originally created by Rasmus Lerdorf in 1994; the PHP reference implementation is now produced by The PHP Group. PHP originally stood for Personal Home Page, but it now stands for the recursive initialism PHP: Hypertext Preprocessor.

PHP is a server scripting language, and a powerful tool for making dynamic and interactive Web pages. PHP code may be executed with a command line interface (CLI), embedded into HTML code, or it can be used in combination with various web template systems, web content management systems, and web frameworks. PHP code is usually processed by a PHP interpreter implemented as a module in a web server or as a Common Gateway Interface (CGI) executable. The web server combines the results of the interpreted and executed PHP code, which may be any type of data, including images, with the generated web page. PHP can be used for many programming tasks outside of the web context, such as standalone graphical applications and robotic drone control.

The standard PHP interpreter, powered by the Zend Engine, is free software released under the PHP License. PHP has been widely ported and can be deployed on most web servers on almost every operating system and platform, free of charge.

The PHP language evolved without a written formal specification or standard until 2014, with the original implementation acting as the de facto standard which other implementations aimed to follow. Since 2014, work has gone on to create a formal PHP specification.

PHP stores integers in a platform-dependent range, either a 64-bit or 32-bit signed integer equivalent to the C-language long type. Unsigned integers are converted to signed values in certain situations; this behavior is different from other programming languages. Integer variables can be assigned using decimal (positive and negative), octal, hexadecimal, and binary notations.

Floating point numbers are also stored in a platform-specific range. They can be specified using floating point notation, or two forms of scientific notation. PHP has a native Boolean type that is similar to the native Boolean types in Java and C++. Using the Boolean type conversion rules, non-zero values are interpreted as true and zero as false, as in Perl and C++.

The null data type represents a variable that has no value; `NULL` is the only allowed value for this data type.

Variables of the "resource" type represent references to resources from external sources. These are typically created by functions from a particular extension, and can only be processed by functions from the same extension; examples include file, image, and database resources.

Arrays can contain elements of any type that PHP can handle, including resources, objects, and even other arrays. Order is preserved in lists of values and in hashes with both keys and values, and the two can be intermingled. PHP also supports strings, which can be used with single quotes, double quotes, nowdoc or heredoc syntax.

The Standard PHP Library (SPL) attempts to solve standard problems and implements efficient data access interfaces and classes.

3.MySQL

MySQL (/ˌmaɪˌɛsˌkjuːˈɛl/ "My S-Q-L") is an open-source relational database management system (RDBMS). Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language.

MySQL is free and open-source software under the terms of the GNU General Public License, and is also available under a variety of proprietary licenses. MySQL was owned and sponsored by the Swedish company MySQL AB, which was bought by Sun Microsystems (now Oracle Corporation). In 2010, when Oracle acquired Sun, Widenius forked the open-source MySQL project to create MariaDB.

MySQL is a component of the LAMP web application software stack (and others), which is an acronym for Linux, *Apache*, *MySQL*, *Perl/PHP/Python*. MySQL is used by many database-driven web applications, including Drupal, Joomla, phpBB, and WordPress. MySQL is also used by many popular websites, including Facebook, Twitter, Flickr, and YouTube.

MySQL is written in C and C++. Its SQL parser is written in yacc, but it uses a home-brewed lexical analyzer. MySQL works on many system platforms, including AIX, BSDi, FreeBSD, HP-UX, eComStation, i5/OS, IRIX, Linux, macOS, Microsoft Windows, NetBSD, Novell NetWare, OpenBSD, OpenSolaris, OS/2 Warp, QNX, Oracle Solaris, Symbian, SunOS, SCO OpenServer, SCO UnixWare, Sanos and Tru64. A port of MySQL to OpenVMS also exists.

The MySQL server software itself and the client libraries use dual-licensing distribution. They are offered under GPL version 2, or a proprietary license.

Support can be obtained from the official manual. Free support additionally is available in different IRC channels and forums. Oracle offers paid support via its MySQL Enterprise products. They differ in the scope of services and in price. Additionally, a number of third party organisations exist to provide support and services, including MariaDB and Percona.

MySQL has received positive reviews, and reviewers noticed it "performs extremely well in the average case" and that the "developer interfaces are there, and the documentation (not to mention feedback in the real world via Web sites and the like) is very, very good". It has also been tested to be a "fast, stable and true multi-user, multi-threaded sql database server".

2.3 Exclusions

- Lack of teamwork, empathy and support between students.
- Keeping up with the expectations of school admins.
- Applying a prescribed curriculum to all types of students.
- Communication amongst the personal Learning Assistants of different students.

2.4 Assumptions

The beginner users of this software are first year undergraduate students. They have not transitioned from Higher Secondary Education style to College Education style.

The user knows basic computer operations. The user has to be able to install the software on their respective computer systems.

The institute does not have an already existing equivalent support infrastructure for the new students.

3. Project Planning

3.1 Software Life Cycle Model

This software is being developed using Iterative Waterfall Model.

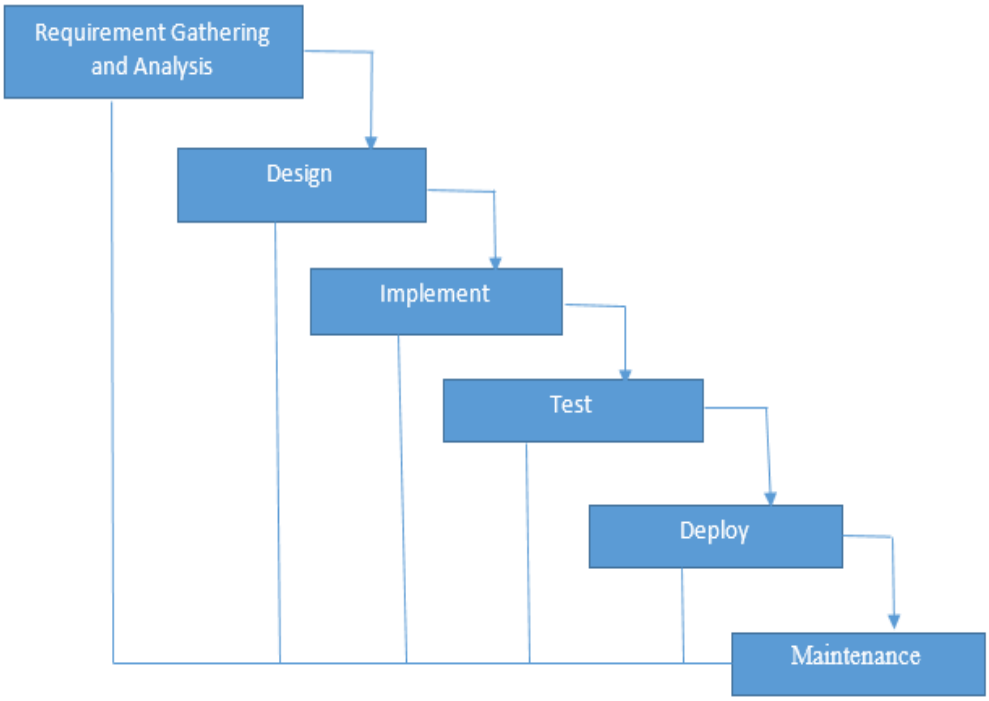

Fig 1

The sequential phases in Waterfall model are −

- **Requirement Gathering and analysis** − All possible requirements of the system to be developed are captured in this phase and documented in a requirement specification document.
- **System Design** − The requirement specifications from first phase are studied in this phase and the system design is prepared. This system design helps in

specifying hardware and system requirements and helps in defining the overall system architecture.

- **Implementation** − With inputs from the system design, the system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality, which is referred to as Unit Testing.
- **Integration and Testing** − All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.
- **Deployment of system** − Once the functional and non-functional testing is done; the product is deployed in the customer environment or released into the market.
- **Maintenance** − There are some issues which come up in the client environment. To fix those issues, patches are released. Also to enhance the product some better versions are released. Maintenance is done to deliver these changes in the customer environment.

Every software developed is different and requires a suitable SDLC approach to be followed based on the internal and external factors.

Some situations where the **use of Waterfall** model is most appropriate are −

- Requirements are very well documented, clear and fixed.
- Product definition is stable.
- Technology is understood and is not dynamic.
- There are no ambiguous requirements.
- Ample resources with required expertise are available to support the product.
- The project is short.

The advantages of waterfall development are that it allows for departmentalization and control. A schedule can be set with deadlines for each stage of development and a product can proceed through the development process model phases one by one.

Development moves from concept, through design, implementation, testing, installation, troubleshooting, and ends up at operation and maintenance. Each phase of development proceeds in strict order.

Some of the major **advantages** of the Waterfall Model are as follows −

- Simple and easy to understand and use
- Easy to manage due to the rigidity of the model. Each phase has specific deliverables and a review process.
- Phases are processed and completed one at a time.

- Works well for smaller projects where requirements are very well understood.
- Clearly defined stages.
- Well understood milestones.
- Easy to arrange tasks.
- Process and results are well documented.

The disadvantage of waterfall development is that it does not allow much reflection or revision. Once an application is in the testing stage, it is very difficult to go back and change something that was not well-documented or thought upon in the concept stage.

The major **disadvantages** of the Waterfall Model are as follows −

- No working software is produced until late during the life cycle.
- High amounts of risk and uncertainty.
- Not a good model for complex and object-oriented projects.
- Poor model for long and ongoing projects.
- Not suitable for the projects where requirements are at a moderate to high risk of changing. So, risk and uncertainty is high with this process model.
- It is difficult to measure progress within stages.
- Cannot accommodate changing requirements.
- Adjusting scope during the life cycle can end a project.
- Integration is done as a "big-bang. at the very end, which doesn't allow identifying any technological or business bottleneck or challenges early.

3.2 Scheduling

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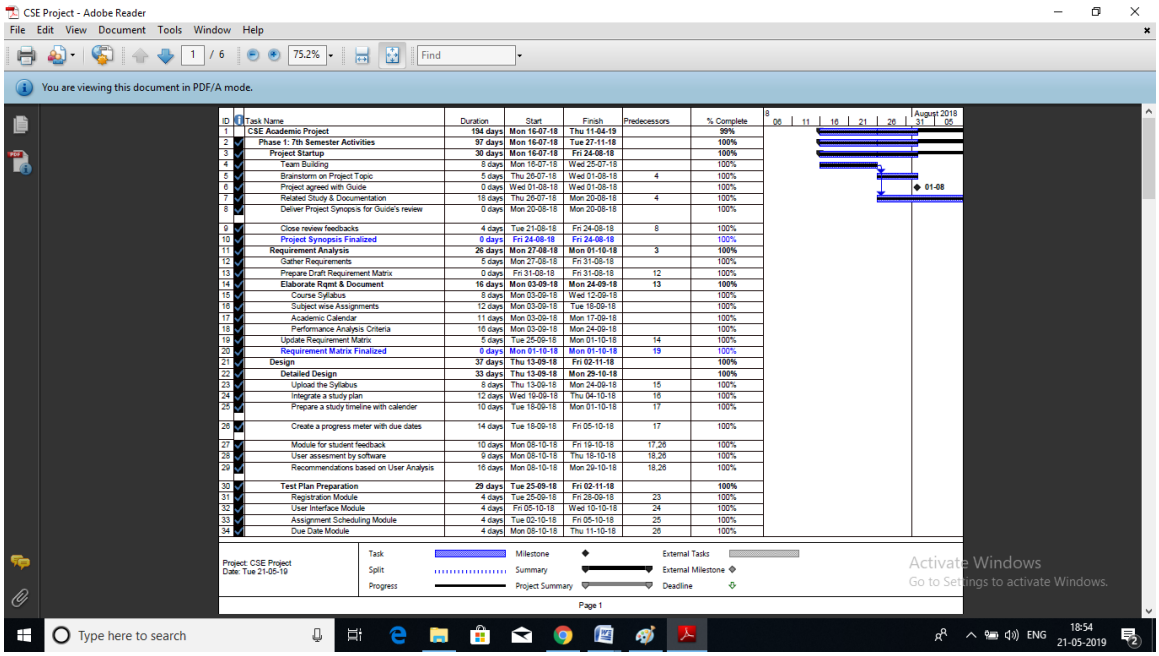

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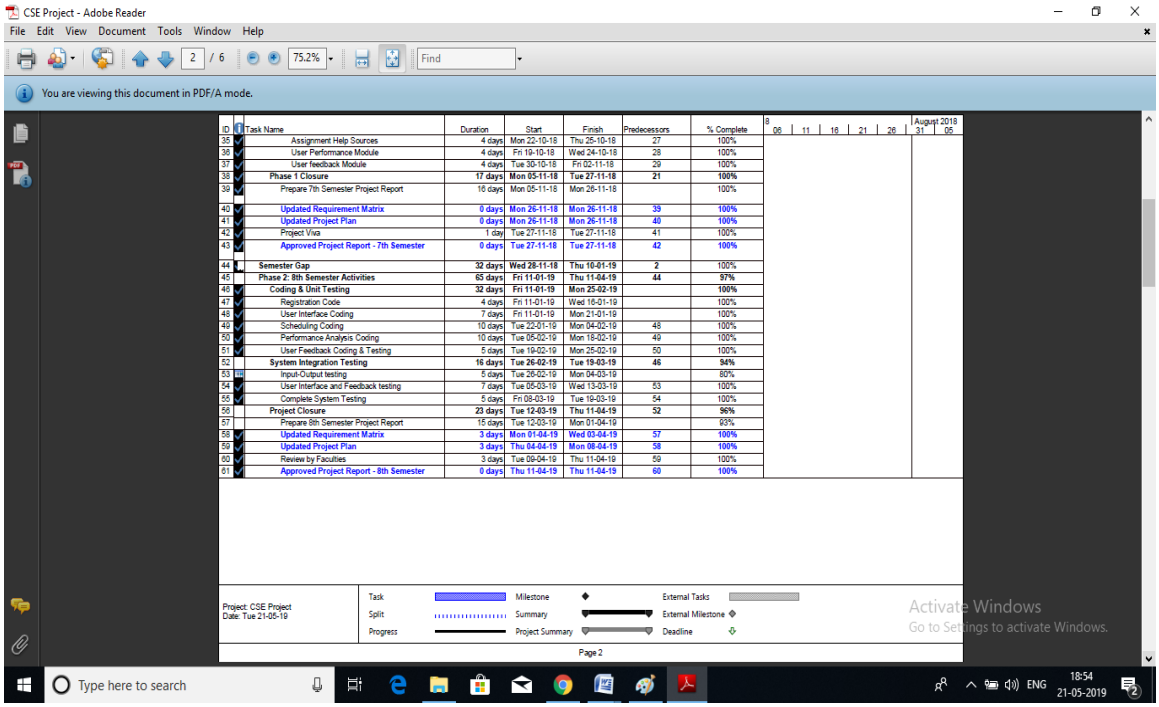

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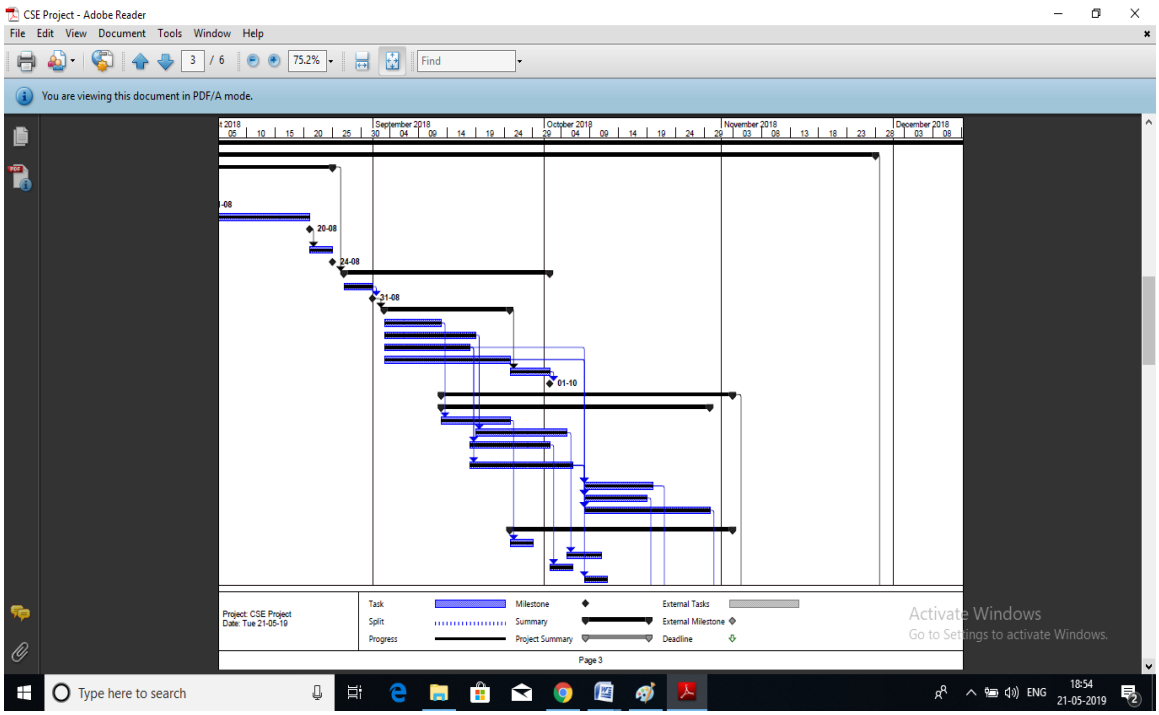
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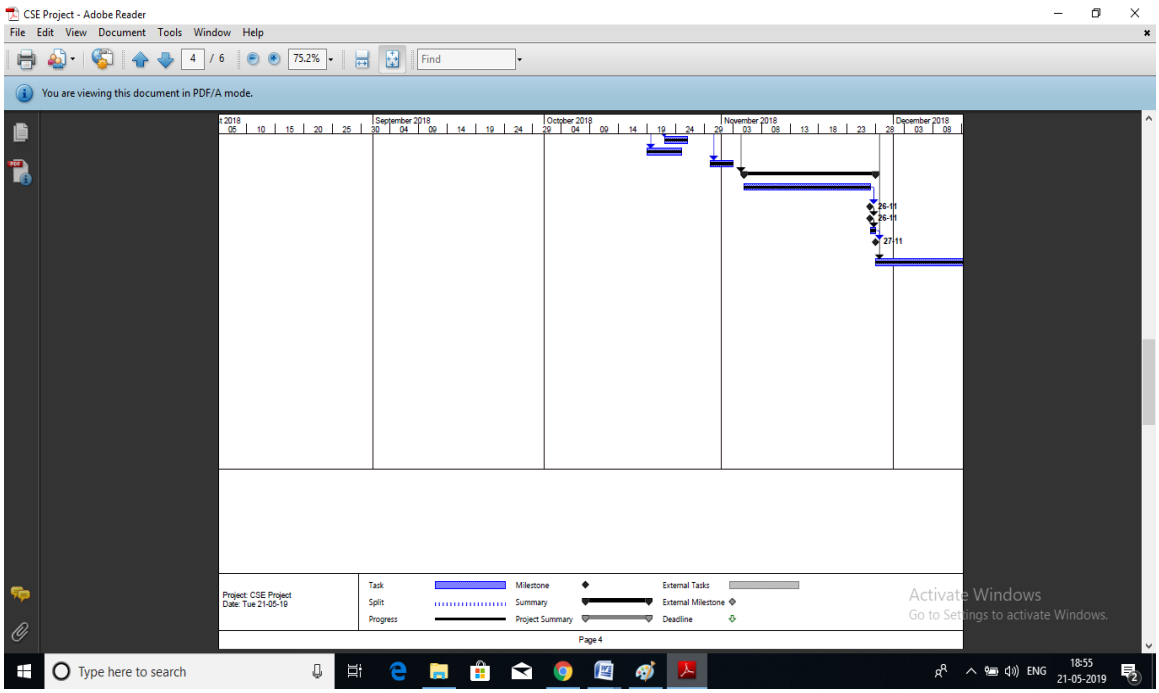
Fig 5: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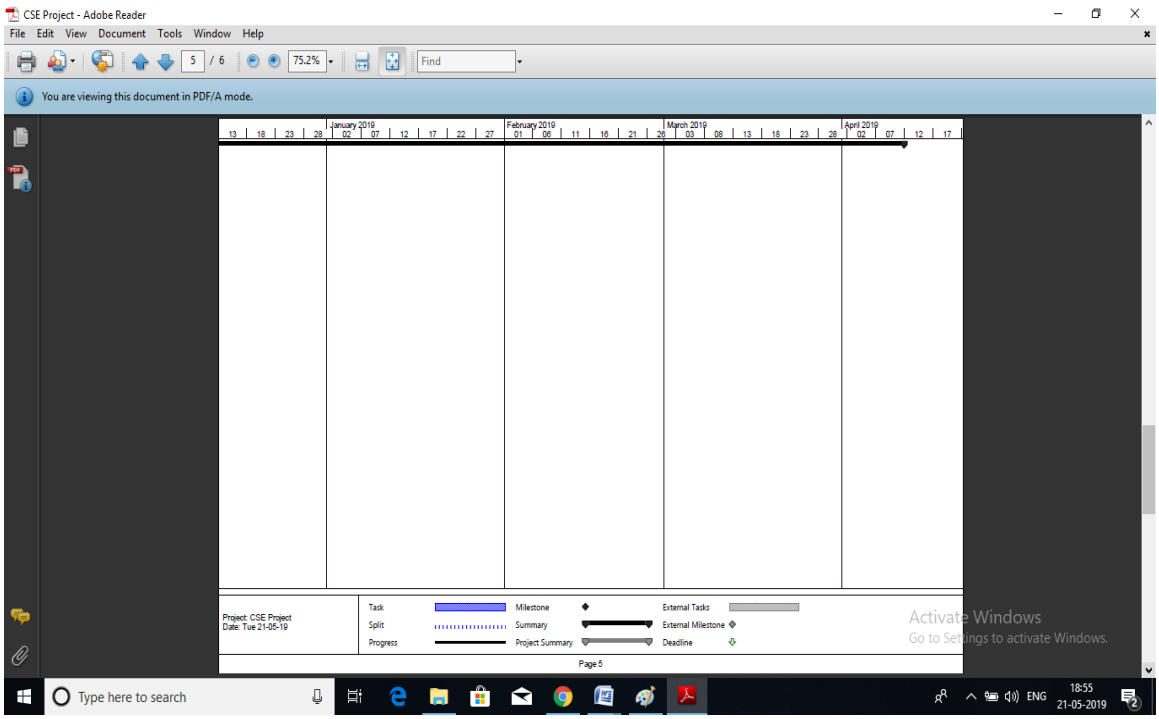
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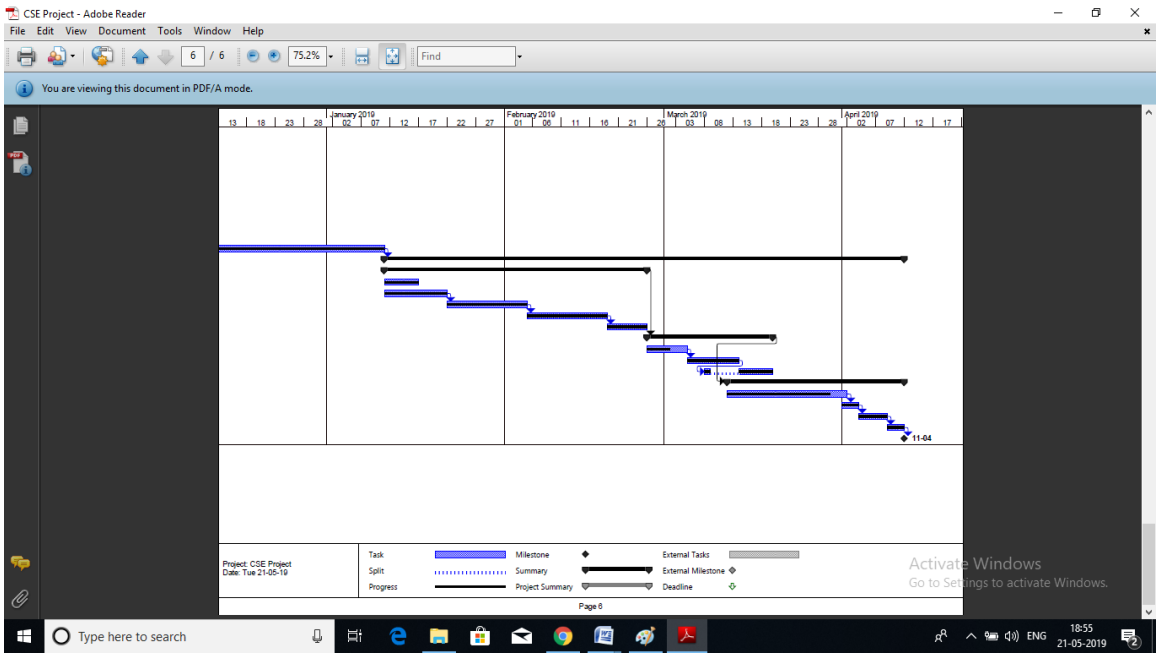
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3.3 Cost Analysis

<u>As the project is totally software based so the Cost required is minimum.</u>

A four-member group developed the project. Each member contributed their efforts for their respective parts.

4. Requirement Analysis

4.1 Requirement Matrix

Fig 8:

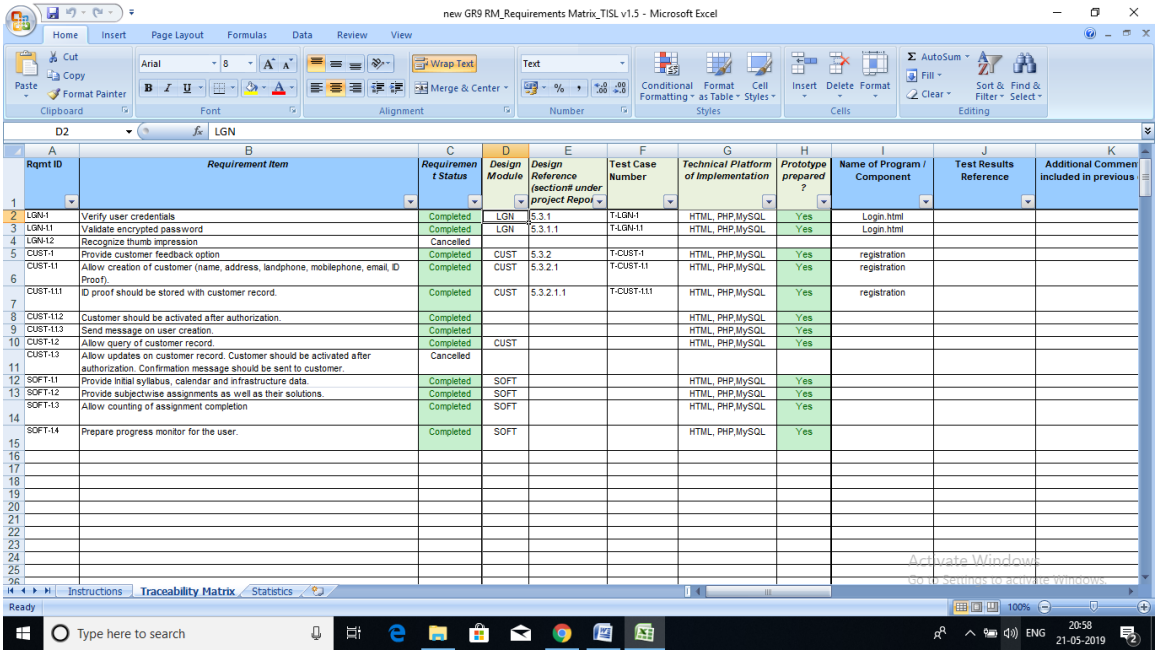
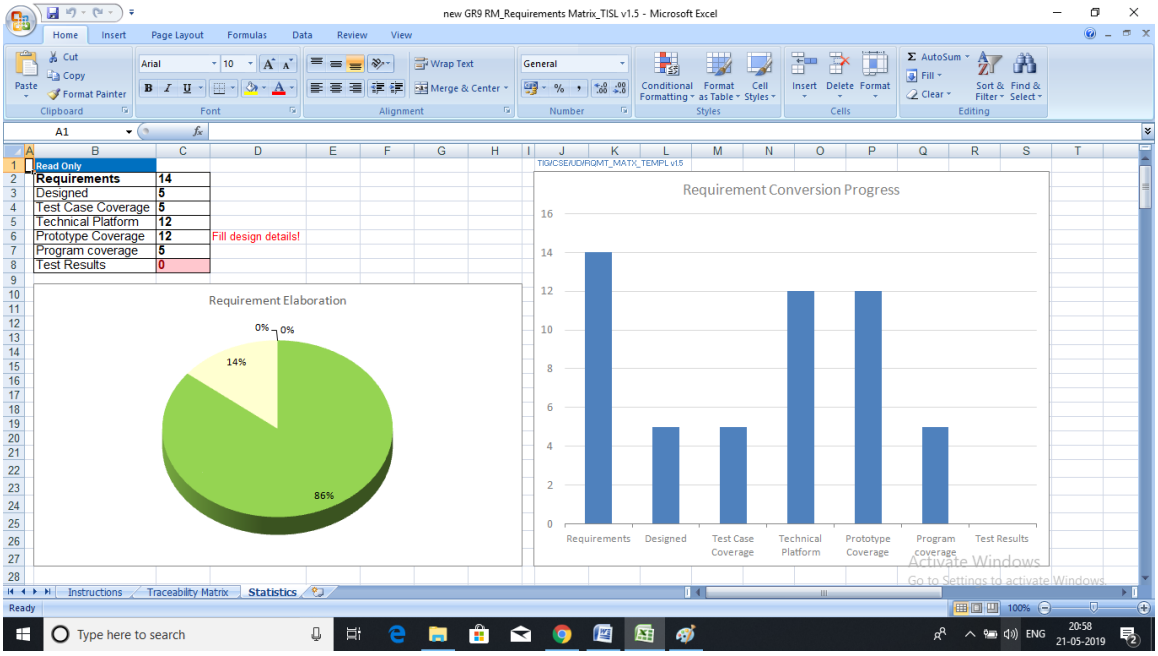


Fig 9:



4.2 Requirement Elaboration

4.2.1 Student credentials

Student must be 1st year of Techno India main Salt Lake.

4.2.2 Password

Password must be encrypted

4.2.3 Query

Query can be entered as a form of question through admin

4.2.2 Syllabus Framework

Syllabus framework makes the whole syllabus into some partition so that the student can completely clear their doubts.

4.2.3 ID proof

ID proof is used to store the record of each student.

4.2.4 Calendar app

Calendar app is used to maintain the time limit of assignment.

4.2.5 Study plan

Create and submit assignment in the given time limit.

4.2.6 Progress monitor

Pie chart show progress report

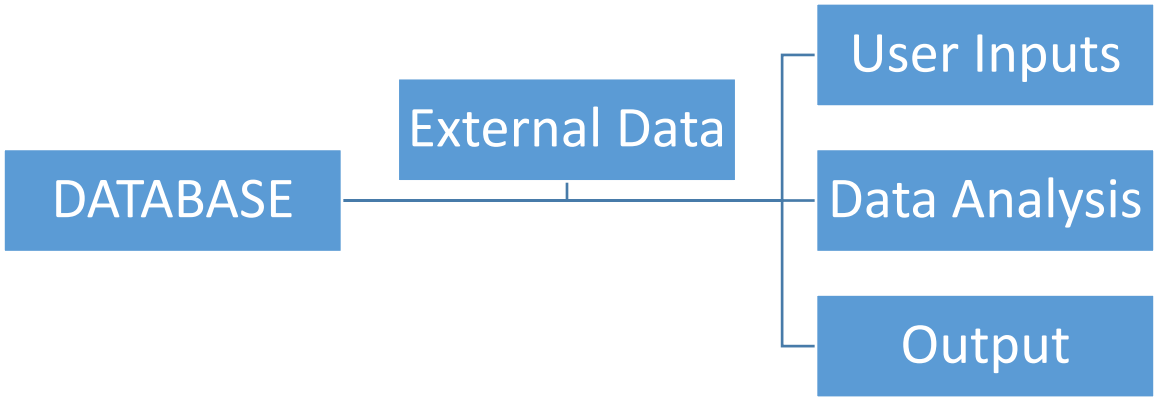
5. Design

5.1 Technical Environment

The project is a Php-Mysql based Application. It uses Xampp for development of software.

The runtime environment is freely available on internet through Xampp control panel.

5.2 Hierarchy of Modules



Database = data store for final product.
External Data = Syllabus data and Academic Calendar
User Inputs = Authentication, Study progress, Assignment completion

Analysis = Assignment Alerts, Rescheduling due assignments, Performance monitor
Output = Performance chart, Assignment Schedule

5.3 Detailed Design

5.3.1 LEVEL-0 DFD

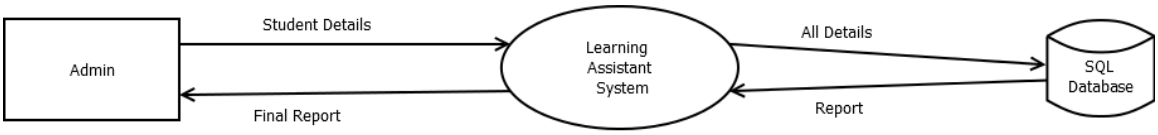


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Fig 10

5.3.2 LEVEL-1 DFD

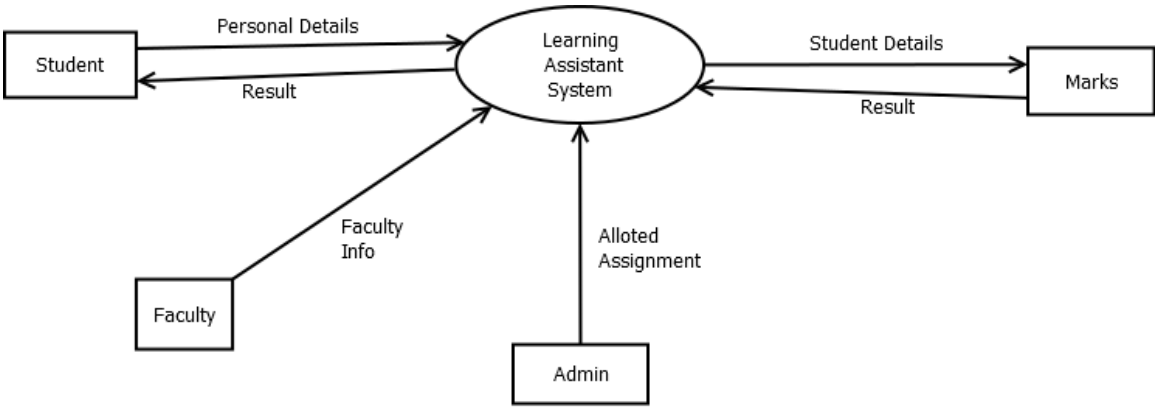

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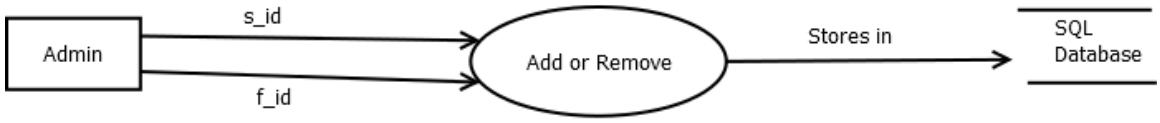
Fig 11

5.3.3 LEVEL-2 DFD



LEVEL-2 DFD

Fig 12

5.4 Test Planning

- Verify user credentials
- Validate encrypted password
- Provide customer feedback option
- Allow creation of customer (name, address, landphone, mobilephone, email, ID Proof).
- ID proof should be stored with customer record.
- Customer should be activated after authorization.
- Send message on user creation.
- Allow query of customer record.
- Provide Initial syllabus, calendar and infrastructure data.
- Provide subjectwise assignments as well as their solutions.
- Allow counting of assignment completion
- Prepare progress monitor for the user

6.Implementation

6.1 Implementation Details

The prospective users for this software system are the fresh student intakes in an institute.
The students need their authentication details for using the system.
The syllabus loaded into the system will sync with academic calendar with help of calendar app. This will permit scheduling of Assignments and progress monitor of the studies.

6.2. System Installation Steps

The software system has been developed using php-mysql. The final compiled project file requires xampp control panel and xampp htdocs folder preinstalled to work.
The xampp can be obtained for any system configuration from website:
https://www.apachefriends.org/download.html
The software product setup can be launched by double clicking the final compiled file.

6.3. System Usage Instructions

The software works best on a personal computer system. The installed software requires a few necessary inputs before being functional:

- Syllabus framework for the student
- Calendar app input for Academic session dates
- Student authentication information

7. Conclusion

7.1 Project Benefits

Learning Assistants engage in three main activities. They interact with groups of students, engage with faculty members in weekly preparation meetings, and participate in the pedagogy course specifically designed for new LAs.

First year students are new to college level studies. They need time to adapt to the new environment. Learning Assistants help the students to settle into the new rhythm. Learning Assistants will enable a more thorough approach

towards learning. Time, as a resource, will be better utilized by the student involved.

7.2 Future Scope for improvements

- The system must be updated so that student of 2nd and 3rd year can be participated.
- The software can be expanded to include institute faculties as well as seniors of new students.
- Intranet access of open source materials via local institute server database will also be possible.

8.References/Bibliography

Learning Assistants are undergraduate students, primarily in mathematics and the sciences, who are prepared to provide support for student learning in interactive classroom environments. One of three major goals of the Learning Assistant program is to foster the development of qualified teachers in the sciences, so Learning Assistants are often chosen for their interest in teaching as well as their understanding of the content. Learning Assistants largely assist with facilitating small group interaction (in group activities, tutorials, and clicker questions, for example), and other activities that capitalize on their skills in identifying and addressing student difficulties with conceptual content.

One main goal of the Learning Assistant program is to assist with Learning Assistants' development as effective teachers. Thus, all new Learning Assistants enroll in a pedagogy course and receive weekly faculty mentorship. Their role is different from that of a Teaching Assistant (TA): Their primary role is to help students learn, through facilitation of student activities, rather than to help the teacher teach. Thus, they receive direct instruction in how to guide students towards an understanding of the content through questioning and how to identify and address common student ideas. They sometimes assist with the grading of homework and exams under the guidance of a faculty mentor.

While sharing many characteristics, Learning Assistants are not peer leaders as in peer-led team learning (PLTL), although the two programs are complementary. Like peer-led team learning, Learning Assistants assist their peers, often in open-ended conceptual activities such as in the recitation tutorials described elsewhere in this module. However, Learning Assistants are explicitly chosen for their interest in teaching, and the program emphasizes the collection of student performance data to drive instruction and affect faculty practices. In addition, Learning Assistants are used more flexibly than in peer-led team learning, from weekly small-group sessions that resemble peer-led team learning

workshops, to working with graduate TAs in recitation or tutorial sessions, and other ways that fit into required or optional course components.

Our e-portfolio, Learning Assistant, enhances the learning experience for your learners and apprentices. With this one system you can:

- gather, assess, quality assure and monitor evidence and coursework
- track learner performance
- support your assessors' decision making with effective quality assurance processes
- record the skills, subject matter expertise and availability of your delivery teams

Because our e-portfolio is already tried and tested, you can be more confident it meets reporting standards for auditors and regulators, like Ofsted and HEFCE.

Learners can access Learning Assistant on any device – and if they use the app, they can use it offline.

With the video and photo upload function, it's simple for them to capture their work – especially for courses that use real-world environments or that aren't desk-based. So it's easy to submit coursework and portfolio evidence.

No more carrying around bulky files or losing paperwork. And because their portfolios are always available, they can work on sections while other pieces are being assessed.

And apprentices can use Learning Assistant to submit their 20% off-the-job training for authorisation and have this tracked.

With Learning Assistant, assessors can easily track whose work has been submitted, mark it, return it with comments or grades or suggest amends.

The convenience of being able to access the portfolio from any device works for quality team members too – especially if you have more than one site or campus.

The built in reporting function means that you can monitor multiple cohorts, check for areas that need more support and check moderation is consistent and fair. You can anonymise data and download reports for sharing with partners – perfect for partnership activity or working with employers in apprenticeships for example.

APPENDIX A

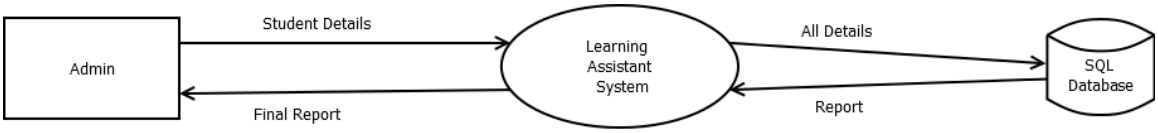


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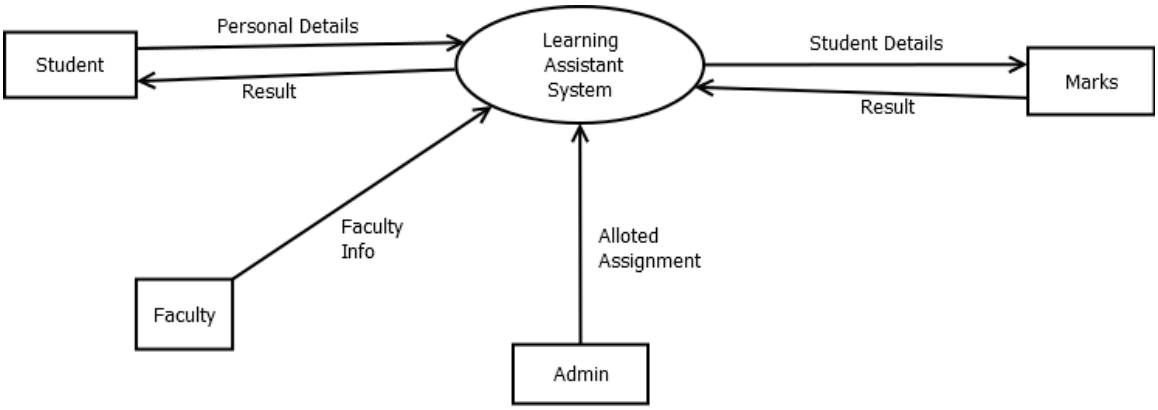
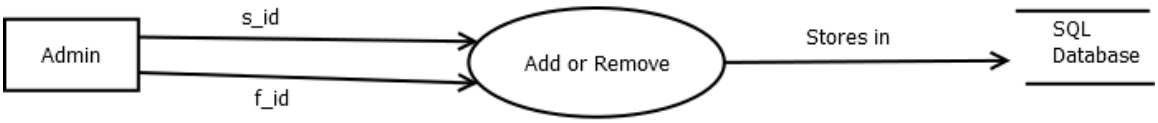
Fig 13



LEVEL-1 DFD

Fig 14



LEVEL-2 DFD

Fig 15

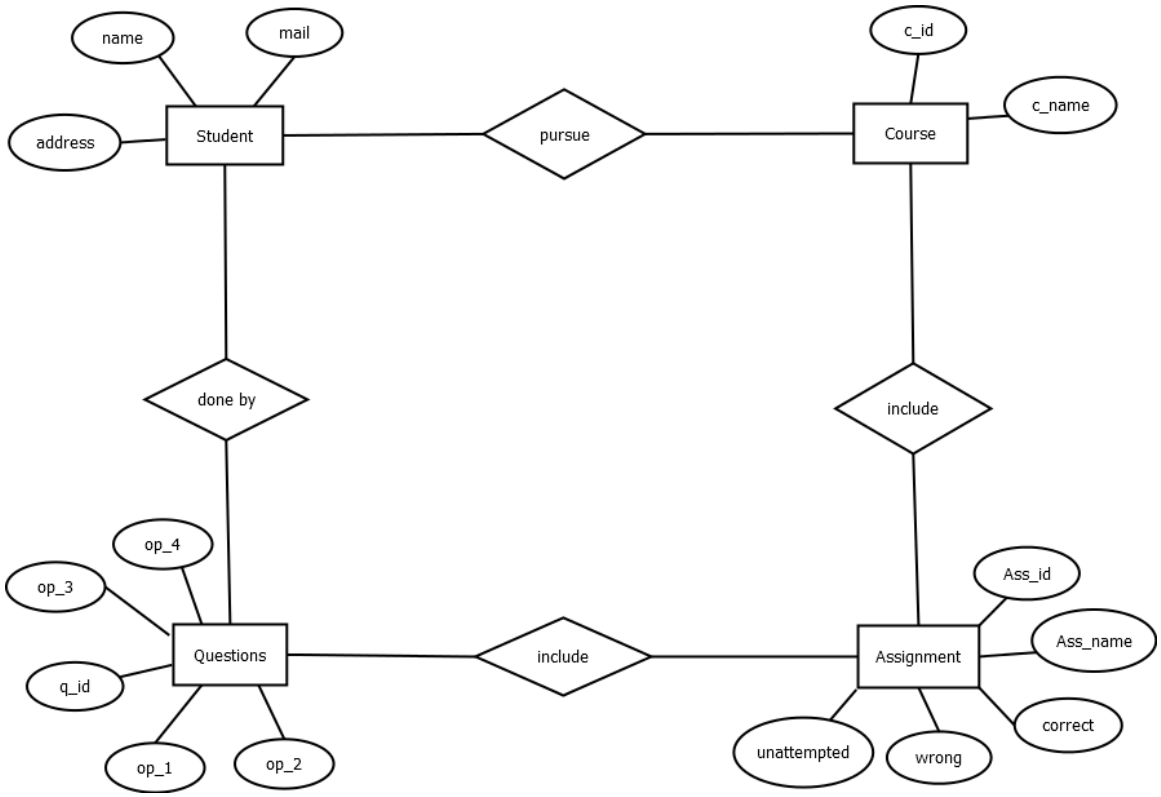
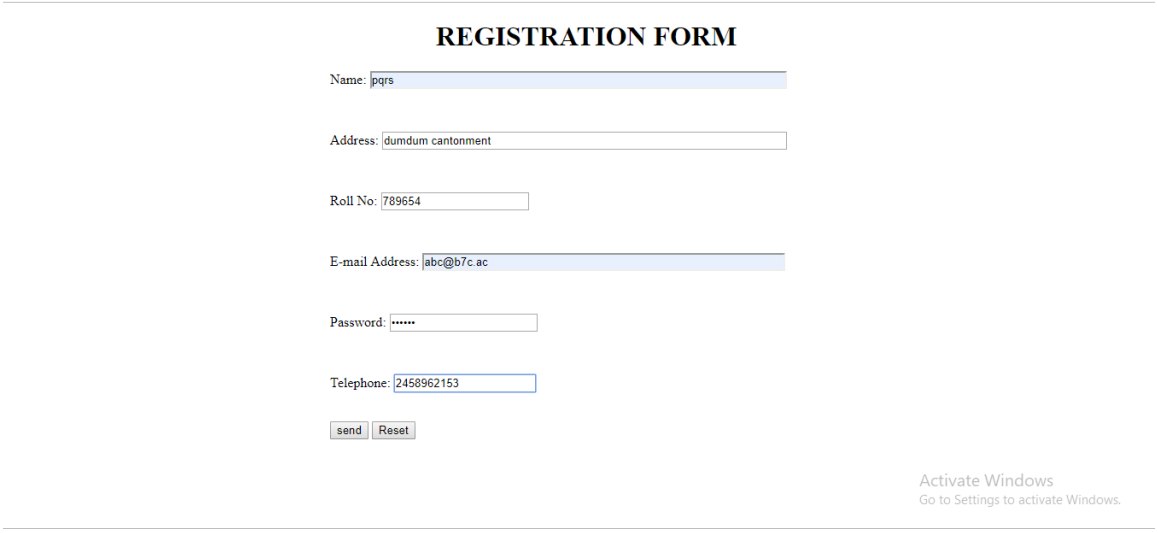
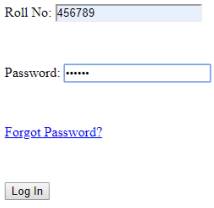


Fig 16: ER DIAGRAM

APPENDIX B



ROLL NO	NAME	EMAIL ID	TELEPHONE
789654	pqrs	abc@b7c.ac	2147483647



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PHYSICS	1
MATH	
MECHANICS	
ELECTRICAL	

Choose Assignment	Submition Date	Status	Syllabus	Exam Status
Assignment 1	19-4-19	Done	Atomic theory	True
Assignment 2	29-5-19	Overdue by 22 days	Light	

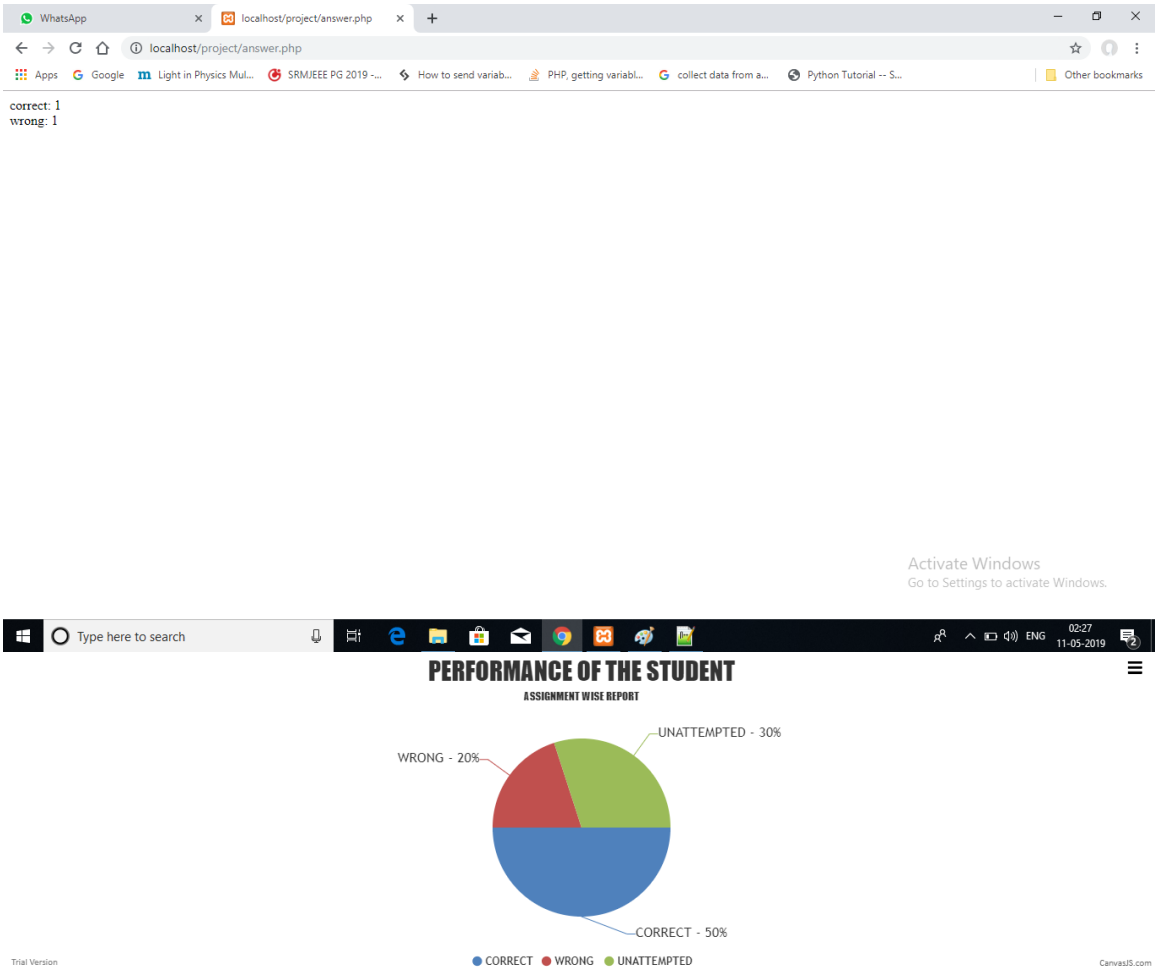
1. Question: Our eyes detect light in:
1. RGB form, Red Blue Green form
2. ROYGBIV, rainbow color form
3. The simple form of a particular color
4. none of these ways

2. Question: Symbol to represent speed of light in vacuum or air is:
1. v
2. c
3. a
4. l

3. Question: Mid-point between lens surface and principle axis is termed as:
1. midway center
2. focal center
3. focal point
4. optical center

Answer Box
1. 2
2. 3
3. 4

Submit



APPENDIX C

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