

Design and Development of a University Web-Based Discussion Forum

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Author: Mutanuka Lushingo Boyd

Dept of ICT
School of Engineering
Information and Communications University,
Lusaka, Zambia.
mutanukaboyd@gmail.com

Advisor: Lameck Nsama

Dept of ICT
School of Engineering
Information and Communications University,
Lusaka, Zambia.
lamecknsama64@gmail.com

Abstract—

A University Web-based discussion forum project is developed using PHP and MySQL and is based on the idea of sharing knowledge using internet. The project is made up of two modules users and admin. Users can register themselves, ask questions, and answer anyone's question, approve an answer given to asked question. Admin can create, read, update and delete notifications, which will be shown on the landing page of users.

Student centered learning and the creation of student centered spaces online are gaining credibility in educational sceneries. We know that effective learning requires access to social and academic networks for both study material and emotional support; as such, online communities can offer a holistic knowledge construction, support mechanism, and recognize that affective activity is effective. Social forums, often called 'Cybernetic Cafes' or 'Common Rooms' are being set up for courses or for programs, depending on the student need. These spaces provide students to come together and discuss unlimited topics, including social activities and educational ideas. They are supportive spaces for students, most successful with large first and second year courses where students would not otherwise have the opportunity to communicate with others outside their own tutorial group.

Online discussion forums provide an advantage over conventional discussion rooms or conferences wherein a user can access and be part of discussions from anywhere around the globe.

1. CHAPTER ONE: INTRODUCTION TO THE RESEARCH

Online web-based interaction forums have continued to attract more and more membership world over today as distance between members doesn't matter. Therefore, the writer chose to venture in a software development research-oriented study to design a web-based discussion forum for one of our Zambian higher education school of learning. The online system should be able to keep students, alumnus, lecturers and support staffs can always share constructive, developmental and innovation ideas to the well-being of the learning institution. Computer conferencing is a widely used function of computer-mediated communications (CMC) (Garrison, 1997; Rourke & Anderson, 2002). Unlike in the traditional face-to-face delivery of tertiary education where spontaneous and somewhat unstructured conversations can take place, and are encouraged as crucial to student engagement with the process of learning, discussion through computer conferencing is generally more reflective, asynchronous and structured in nature (Dixson, Kuhlhorst, & Reiff, 2006; Garrison, 1997; Stodel, Thompson, & MacDonald, 2006). Despite the differences with face to-face communications, computer conferencing is increasingly available and utilised in the delivery of university courses through several mediums, most commonly in the

guise of discussion forums. Although computer conferencing is becoming more and more common in the delivery of university level courses, understanding of how to best utilise it remains modest amongst academics (Stodel et al., 2006). E-learning environments and higher education Teaching a course online is distinctly different from delivering it in a face-to face mode (Kelly, Ponton, & Rovai, 2007). E-learning environments establish a framework for regular contact between student and instructor as well as collaborative activities between students, without the requirement of a face-to-face encounter (Garrison, 1997; Kear & Heap, 2007). An online mode of course delivery permits greater flexibility for participants with the opportunity of studying almost anywhere at any time (Dixson et al., 2006; Leh, 2002). However, in a study conducted by O'Quinn and Corry into instructor perceptions of online courses, one instructor described the teacher's role in such courses as "the preparation and workload are extremely demanding. The teacher is responsible for all aspects of the course plus technical and support areas." (2002, p. 13). Hence, many instructors deem online courses and even online components of courses to be highly time demanding with limited reward or recognition for effort (O'Quinn & Corry, 2002; Rourke & Anderson, 2002; Spector, 2005). Yet, studies have shown that students do not consider the instructor to be as important in the online environment as in the face-to-face classroom (e.g. Kelly et al., 2007). From the instructor's perspective, the convenience and accessibility of this mode of course delivery generates an onus upon the instructor to be regularly, if not almost continuously, online to field, guide and encourage questions, postings and dialogue on course content. Furthermore, to be absent or off-line for any significant length of time carries the risk of being viewed by course participants as unresponsive and uninterested which, in turn, lead to participants reduced usage or

withdrawal from online aspects of a course. This conception of online teaching and learning largely replicates the traditional face-to-face

1.2. Motivation and Significance of The Study

The proposed system is dedicated to better the discussion forum for the University rather than the irritating social media that is so far a failed alternative. The system will accommodate every registered student of the university besides the graduates and administrators. It will bring to an end the limitations associated with social media forums. Will Morris, writer at Word Candy at word press also said most online forums are fairly straight forward? They enable you to register an account, create threads, and post in response to other users' messages. In most cases, forums also include user role systems, so you can have admins and moderators at the top managing the site, while regular users retain minimal permissions.

Aside from that basic functionality, there are a few other features you'll want to keep an eye out for in the best web forum software if you want to offer a rich experience: *Profile customization*. Enabling users to customize their profiles can increase engagement since it makes them feel more at home and in control.

- a. *A powerful text editor*. Forums are almost 100% text-based, so you'll want to offer your users a robust editor to create and customize their posts.
- b. *Private messaging*. Many forums are all about public discussion, but enabling private messaging is a smart way to foster interpersonal relationships.
- c. *Comment signatures*. Just like profile customization, this option can help you increase engagement and gives users the chance to have a little fun.
- d. *Achievement systems*. A lot of forums set up user 'levels' that can be unlocked after a certain level of activity or amount of time. It rewards users for participating in your forum frequently.

Whichever forum software you choose doesn't need to offer *all* of these features. What you need mostly depends on the kind of experience you want to provide. For example, if you just want to set up a forum that lets users submit support queries, it can be overkill to enable signatures and achievements. However, most forums can benefit from as many modern features as possible. In fact, it's smart to provide an experience that's as close as possible to a social media platform, so users feel compelled to keep coming back. For that reason, you'll want to look for the best forum software that offers as many of the above features as possible, even if you don't intend to use them right away.

1.3. Scope

The Web-based discussion forum activity allows students and lecturers to exchange ideas by posting comments as part of a 'thread'. User can also like any of the thread posted by a user and admin can set any post as favourite. The scope is to spread the content/message with the people and get the replies on the same.

1.4. Problem Statement

The social media groupings created by a selected group of students in search of information has not yield any results. Also, common online discussion forums so far noted in Zambia, are not stand-alone discussion forums entirely, but are components of institutional websites e.g. Lmeaka Internet Forum hosted by Swedish Embassy, Zambia Public Procurement Authority online discussion forum, Information and Communication University, etc. The discussion forums have been designed and made by some institutions of learning, as they appreciate their peers' advice to improve their learning. Alamri et al. (2014) revealed that students are likely to have positive intentions towards using ODFs because the use of ODFs supports social interaction and teamwork. Importantly, they found that collectivism has a significant positive influence on a student's perception of learning (Alamri et al., 2014). Holmes, Tracy, Painter, Oestreich, and Park

(2015) asserted that collaborative discussion occurs in traditional learning and extends in ODFs increasing active knowledge acquisition, because using ODFs can engage students in active learning. In ODFs, "engaged students are mentally involved in their learning through deep thinking and interactive activities and educational experiences" (Salter & Conneely, 2015, p. 18). Besides,

1.5. Aim

To design and develop a web-based University discussion forum that will be more independent, secure and limited to university academic and professional matters rather than a social media forum that is mainly directed to social life.

1.6. Objectives

- i. To develop an online discussion forum that will support learning and not always tutor/lecturer-centred, its role will be essential, especially as an online community begins to develop.
- ii. To design a system that is user friendly and allow group of students become a community of participants who can begin grow in their understandings of course material and individual contributions to the knowledge construction process.
- iii. Develop a system that is more secure and independent as a discussion forum.

1.7. Research Questions

Some questions that the study sought to answer were;

- 1 What factors will perfect the use of an online discussion forums rather than the use of social media?
- 2 What features can improve and make the web-based discussion forum, easy to use in order to foster e-learning in higher education of learning?
- 3 What components of the system will make it more secure from unauthorised users?
- 4 What features will make the system more independent in order to help in the dissemination

of information among learners and their tutors at higher institution of learning?

1.8. Organization of the thesis

Web-based discussion forums as an important opportunity for knowledge exchange as well as a teaching method to provide learners with learning opportunities that do not necessarily have temporal and geographic barriers. This teaching method is widely considered to be an example of new technologies being used in a blended educational environment to supplement traditional face to-face teaching methods. This project reviews the effectiveness of online discussion forums and the teachers' involvement in online discussion forums. The findings reveal that using online discussion forums might contribute to positive learning outcomes and that teachers play an important role in students' online learning progress. Therefore, it is of great value for Zambian Lecturers to build an understanding about their role in creating efficient online discussion forums. This Project also discusses how online discussion forums might be used effectively in Zambia despite existing social, educational and political barriers.

1.9. Summary

The project University Web-based discussion forums, is a significant knowledge-exchanging arrangement and teaching method, it provides learners with learning opportunities that do not necessarily have temporal and geographic barriers (*Nandi, Hamilton, Harland, & Warburton, 2011*). This web-based online platform provides a virtual space for students to engage in social interactions where they can post ideas, discuss, and debate with others. In addition, online discussion forums are widely considered as an example of new technologies being used in a blended educational environment to supplement traditional face-to-face teaching methods (*Cheng, Pare, Collimore, & Joordens, 2010*).

2. CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

With the growing number of netizens (*online community*) in Zambia which includes higher educational institutions, it is timely enough to move with the trends and adopt we-based learning and knowledge sharing via cybernetic models to foster effective interaction among students, alumni's and tutors. Therefore, as the trend manifest itself gradually, educational institutions should also turn to blended learning.

2.2. Review of the Literature

The advancement of technology and learners' advanced computer skills has made it possible for online learning to develop quickly. Interactions between lecturers and Students are now more often happening online (Sheard, Ceddia, Hurst and Tuovinen, 2003). Online learning increases the opportunities for learner participation and improves participation of learners who may feel more withdrawn to engage in discussions in a traditional classroom setting (Dengler, 2008). This has prompted an increase in the amount of research being performed on online learning environments. Identifying the most successful technology tools available in higher education and deploying them effectively in the classroom in order to improve student learning are now an important research issue facing accounting education (B. Apostolou, J. M. Hassell, 2006-2009) Clearly, there is significant value in the use of online discussion forums. However, collaboration and constructivist approaches to teaching do not just happen by making the technology available (Garrison, 2007). Although online discussion forums have been widely used for about a decade, there is much emerging literature that is rich in effective strategies and tactics for their use. A framework of key concepts or critical elements is useful as a means of organizing such strategies and tactics. The following section reviews some elements of best practices identified by Rose and Smith (2007) and Roper (2007) within this organizing framework,

such as giving clear directions, providing instructors' feedback, promoting motivation, setting expectations, organizing discussions and determining the types of questions. Giving clear directions, a lecturer must be sure to provide students with directions for online discussions that are simple, to the point and do not cause any confusion among the students (*Rose & Smith, 2007*). It should be made clear whether the discussion will be synchronous or asynchronous. If it is a synchronous discussion, the students will need to know where and when to meet; and if it is asynchronous, the students need to know if they must meet a deadline for responding to the questions posted.

2.3. Related Works

A merging of internet-based learning with face to face interactions (*Garrison and Hanuka, 2004*), computer-based conference, online forums are growing into essential mediums for continuing professional education and group collaboration (*Kanuka and Anderson, 1997*) Being a computer facilitated conference, online forums are growing. Therefore, as the trend manifest itself gradually, educational institutions should also turn to combined learning: a merging of internet-based learning with face to face interactions (*Garrison and Hanuka, 2004*). Being a computer-based conference, online forums are growing into essential mediums for continuing professional education and group collaboration (*Kanuka and Anderson, 1997*). The *College SA a South African TVET institution* is one good example that has successfully adopted the web-based learning in its distance oriented studies while *Information and communication University Zambia* is also one outstanding institution of learning that employed online forums to reach its learners via its *AIMS* and *Dspace* that also include an interaction platform where students can communicate with administrators.

In *China*, the introduction of antiretroviral treatment increased the number of people living with HIV/AIDS (PLWHA). New technologies, such as social media, online discussion forums were useful for enhancing HIV surveillance, especially given the lack of Chinese research, which is related to stigma and discrimination. Thus, the relative anonymity of web-based discussion forums made it useful for evaluating. An Internet-based group of plastic surgeons was formed in *India* in February 2001. It has 1290 members and seeks to facilitate online discussion. These discussions were reviewed to assess their value in education and aiding patient management. All messages and discussions between August 2007 and July 2008 were examined retrospectively. Data were collected regarding topics, replies, and use of clinical images. Therefore, a total of 2217 messages were exchanged within 330 separate discussions (mean = 6.7 messages per discussion, range = 0–45). A total of 164 discussions contained photographs (50%). Mean number of photographs per discussion was five (range = 0–34). Discussions included requests for advice on complex cases (40%), interesting cases and their management/outcome (25%) and courses/conferences (30%). Topics discussed include training/courses (26.7%), cleft (15.4%), aesthetics (13.1%), trauma (12.5%), head and neck (8.4%), cutaneous (6.4%), perineal/genital reconstruction (6.1%), and scar management (4.7%).

2.4. Summary

This has proved beyond doubt that online discussion Forums like this facilitate discussion between individuals in remote locations. They provide easy access to the expertise of a large cohort of highly experienced surgeons. Most discussions were clinical, involving challenging situations. The discussions are open and non-judgmental, hence encouraging contribution and healthy debate. We encourage its use as an educational tool and a platform for discussion.

3. CHAPTER THREE: METHODOLOGY

3.1. Introduction

The study was mainly online research based, comparing analysis of existing web-based discussion forums hence data was collected from a number of university social groupings, using a combination of methods, which included interviews and group individual views as regard to information sharing challenges and methods to improve. Students were invited to participate in the study via postings on 3 different social media forums that include lecturers and alumni and students. The data were collected using synchronous qualitative group postings, interviews and were analyzed using thematic analysis.

3.2. Baseline Study

This system will be organized as stipulated below to foster the security levels;

i. A Simple Discussion

Students will see the threads they have create in the [forum](#) as the first post of the discussion. Below it, student will find the replies that have been posted.

ii. Each User can post a discussion

The view will be the same as in the previous case, the only difference being the “Create Thread” option. Viewing a forum page, the student will see the text they have written at the 'Thread Title' space while creating the forum, and, if there are any, the discussions that have been started.

iii. Question and Answer forum

The Q & A forum is best used when you have a particular question that you wish to have answered. In a Q and A forum, a user posts the question and other people respond with possible answers.

iv. Question and Answer forum

The Q & A forum is best used when you have a particular question that you wish to have answered. In a Q and A forum, user post the question and other users respond with possible answers. This feature allows equal initial posting opportunity among all students, thus encouraging original and independent thinking.

v. Standard forum displayed in blog-like format

This forum behaves in the same way as the default standard forum for general use, allowing users to start their own discussions. However, it displays differently in that the first post of each discussion is displayed (as in a blog) so that users can read it and then choose to respond by clicking the original post.

Modules and their Description

The system comprises of 4 major modules with their sub-modules as follows:

1. Admin:
 - a. *Login*: Canteen person need to login using valid login credentials to access the system.
 - b. *Add Lecturer*: System allows admin to add lecturer with their details such as name, email, contact, etc...
 - c. *Approve Student / Alumni*: Students/Alumni, who have registered themselves successfully, will be sent to admin for approval of an account. Once the admin approves the registration then only Student/Alumni can access their account.
 - d. *Accept Thread*: Whatever thread/post is added by the lecturer/student/alumni will be first sent to admin for approval. Once admin approve the thread/post, it can be viewable to all.
 - e. *View Thread*: Admin can view all the accepted thread/post with its details and mark any thread/post as favourite.
2. Lecturer:
 - a. *Login*: A Lecturer need to login using valid login credentials to access the system.
 - b. *Create/View Thread*: A lecturer can create a thread by mentioning the thread content, which will be sent to admin for approval. All the threads added by the lecturer can be viewable once it is approved by the admin.
3. Alumni:

a. *Register*: The alumni person needs to register himself/herself with basic registration details and need to create a valid login id and password.

b. *Login*: Alumni person need to login using valid login credentials to access the system.

c. *Create/View Thread*: An alumni person can create a thread by mentioning the thread content, which will be sent to admin for approval. All the threads added by the person can be viewable once it is approved by the admin.

4. Student:

a. *Register*

b. *Login*: A Student need to login using valid login credentials to access the system.

Create/View Thread: A student can create a thread by mentioning the thread content, which will be sent to admin for approval. All the threads added by the student can be viewable once it is approved by the admin.

Existing System & Proposed System

i. Problem with current scenario

a. Traditionally, student need to visit university every time when they have any queries or need to know any information about an activity.

b. Students need to travel to university, which might be far away to get any info or answers.

c. It may consume student's time and travelling may cost student.

d. The system is not flexible enough.

e. All the activities are handwritten and stored in a book/sheet, which is riskier and may get misplaced somewhere.

ii. Drawbacks of the existing system

a. Maintenance of the system is very difficult.

b. There is a possibility for getting inaccurate results.

c. User friendliness is very less.

d. It consumes more time for processing the task.

Data Collection

Brainstorming is a technique used to arrive at the problem statement, for increasing creativity in problem solving. Brainstorming is a free exchange of ideas among people. In a brainstorming session, people offer solutions to problems as if there were no restrictions. Ideas are presented as they come to mind. I took time to brain-storm at various forums regarding the benefits and the challenges that the current information management systems possesses. Social media groupings on the cyber space was another forum that helped in the data collection.

Research Approach

a. Observation

The most information was gathered through observation in a few web based interactions designed for students and their university administrators. I chose this method as it is free from most biases that may colour data acquired through other sources. Information received didn't require verification. Interviews was used but people were often misrepresenting facts. Information received through observation was accomplished in several ways.

It is often helpful for a systems developer to spend some time in the user area, either watching the operation of the current system or actually participating in it. This serves two purposes (1) the system developer gets to know the users and perhaps will be better able to satisfy their needs; and (2) the systems developer obtains a more realistic view of the actual data in the system.

With the systems walk-through technique, the observer assumes the role of each document in the system and follows its course from beginning to end, observing how each document is prepared and distributed throughout the organization. This provides an opportunity to meet with the systems users, observe attitudes, evaluate performances, and see how each part of a system relates to other parts.

More importantly, the systems analyst can meet the users in their own environment and learn their thoughts and attitudes, their needs, and what will inspire them to cooperate in making the system work.

b. Work Measurement

The researcher knew the volume of transactions and the time and cost to complete specific tasks. Just like many organizations have established administrative work measurement programs to provide corporate management with data to evaluate performance. These programs can be a prime source of data for the systems analyst. (*Data Processing Systems Analysis and Design, Robert J. Condon, 3rd edition, pg. 147-161, 171- 180*)

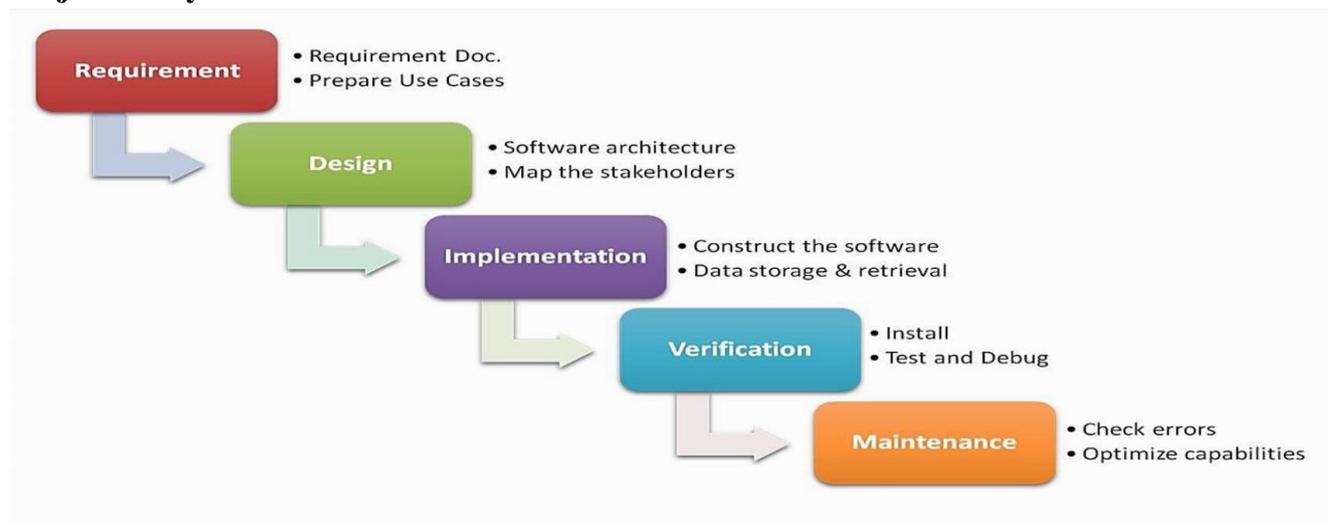
When a work measurement system does not exist, a systems analyst may, with the cooperation of the

supervisor in the user area, set one up temporarily. The objective of this approach is to determine precisely the volume of data moving through a user area and precisely how long it takes to process these data. The researcher also determined the bottlenecks in the existing systems and should become more aware of the exceptions to normal processing and how they are handled.

Work measurement programs, when not handled properly, produce problems. People are sensitive about having their productivity measured, especially in a white-collar environment, where it is not often done. Such a program should be instituted only when the data anticipated from the program are vital to the systems study.

3.2.1. Development of The Application

Project Lifecycle Details for Waterfall Model



The waterfall Model is a linear sequential flow. In which progress is seen as flowing steadily downwards (like a waterfall) through the phases of software implementation. This means that any phase in the development process begins only if the previous phase is complete. The waterfall approach does not define the process to go back to the previous phase to handle changes in requirement. The waterfall approach is the earliest approach that was used for software development.

S. No	Phase	Activities Performed	Deliverables
1	Requirement Analysis	<ol style="list-style-type: none"> 1. Capture all the requirements. 2. Do brainstorming and walkthrough to understand the requirements. 3. Do the requirements feasibility test to ensure that the requirements are testable or not. 	RUD (Requirements Understanding Document)
2	System Design	<ol style="list-style-type: none"> 1. As per the requirements, create the design 2. Capture the hardware / software requirements. 3. Document the designs 	HLD (High Level Design document) LLD (Low level design document)
3	Implementation	<ol style="list-style-type: none"> 1. As per the design create the programmes / code 2. Integrate the codes for the next phase. 3. Unit testing of the code 	Programs Unit test cases and results
4	System Testing	<ol style="list-style-type: none"> 1. Integrate the unit tested code and test it to make sure if it works as expected. 2. Perform all the testing activities (Functional and non-functional) to make sure that the system meets the requirements. 3. In case of any anomaly, report it. 4. Track your progress on testing through tools like traceability metrics, ALM 5. Report your testing activities. 	Test cases Test reports Defect reports Updated matrices.
5	System Deployment	<ol style="list-style-type: none"> 1. Make sure that the environment is up 2. Make sure that there are no sav 1 defects open. 3. Make sure that the test exit criteria are met. 4. Deploy the application in the respective environment. 5. Perform a sanity check in the environment after the application is deployed to ensure the application does not break. 	User Manual Environment definition / specification
6	System maintenance	<ol style="list-style-type: none"> 1. Make sure that the application is up and running in the respective environment. 2. In case user encounters and defect, make sure to note and fix the issues faced. 3. In case any issue is fixed; the updated code is deployed in the environment. 4. The application is always enhanced to incorporate more features, update the environment with the latest features 	User Manual List of production tickets List of new features implemented.

Advantages of using Waterfall model are as follows:

Simple and easy to understand and use.

- a. For smaller projects, waterfall model works well and yield the appropriate results.
- b. Since the phases are rigid and precise, one phase is done one at a time, it is easy to maintain.
- c. The entry and exit criteria are well defined, so it easy and systematic to proceed with quality.
- d. Results are well documented.

3.2.2. System Design

Systems design is the process of defining elements of a system like modules, architecture, components and their interfaces and data for a system based on the specified requirements. It is the process of defining, developing and designing systems which satisfies the specific needs and requirements of a business or organization.

A systemic approach is required for a coherent and well-running system. Bottom-Up or Top-Down approach is required to take into account all related variables of the system. A designer uses the modelling languages to express the information and knowledge in a structure of system that is defined by a consistent set of rules and definitions. The designs can be defined in graphical or textual modelling languages.

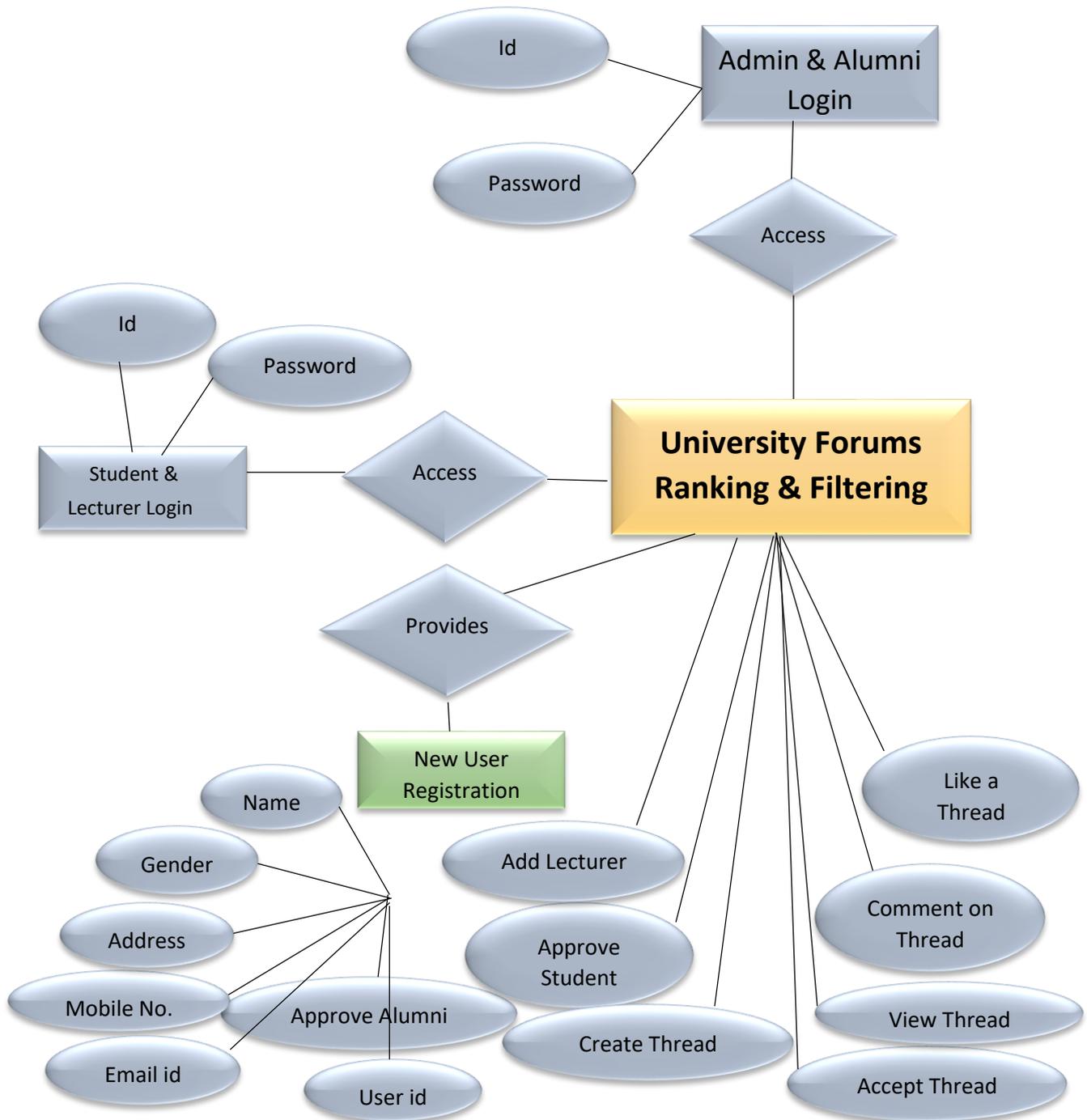
Some of the examples of graphical modelling languages are

- a. Unified Modelling Language (UML): To describe software both structurally and behaviourally with graphical notation.
- b. Flowchart: A schematic or stepwise representation of an algorithm.
- c. Business Process Modelling Notation (BPMN): Used for Process Modelling language.
- d. Systems Modelling Language (SysML): Used for systems engineering.

Design methods:

- a. Architectural design: To describes the views, models, behaviour, and structure of the system.
- b. Logical design: To represent the data flow, inputs and outputs of the system. Example: ER Diagrams (Entity Relationship Diagrams).
- c. Physical design: Defined as a) How users add information to the system and how the system represents information back to the user. b) How the data is modelled and stored within the system. c) How data moves through the system, how data is validated, secured and/or transformed as it flows through and out of the system.

Project Design: E-R Diagram



Use Case Diagram

Fig. Use Case Diagram of Admin

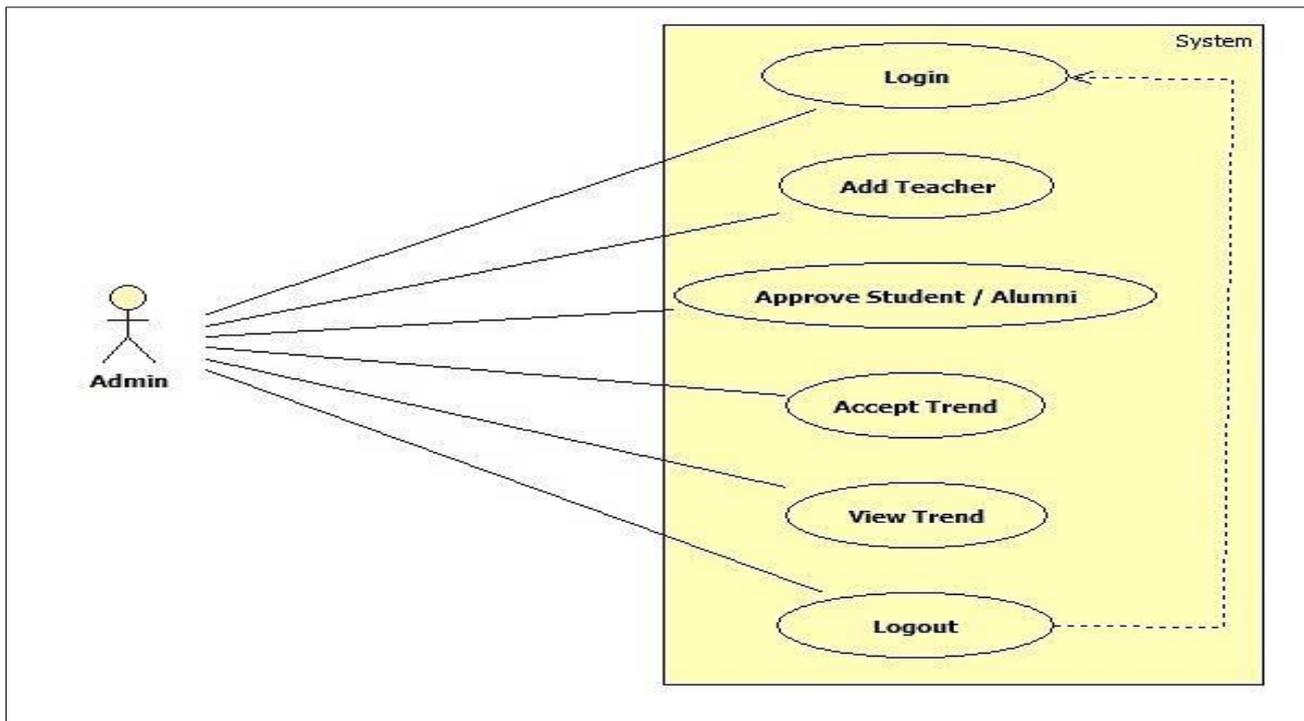


Fig. Use Case Diagram of Lecturer

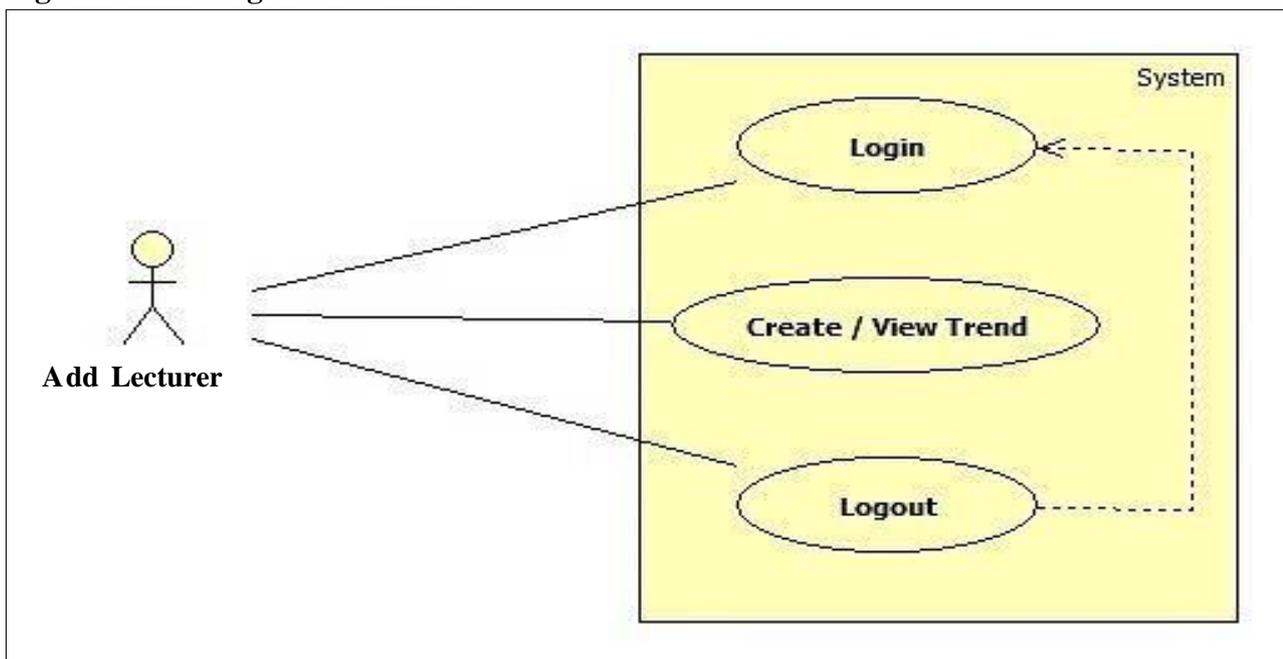
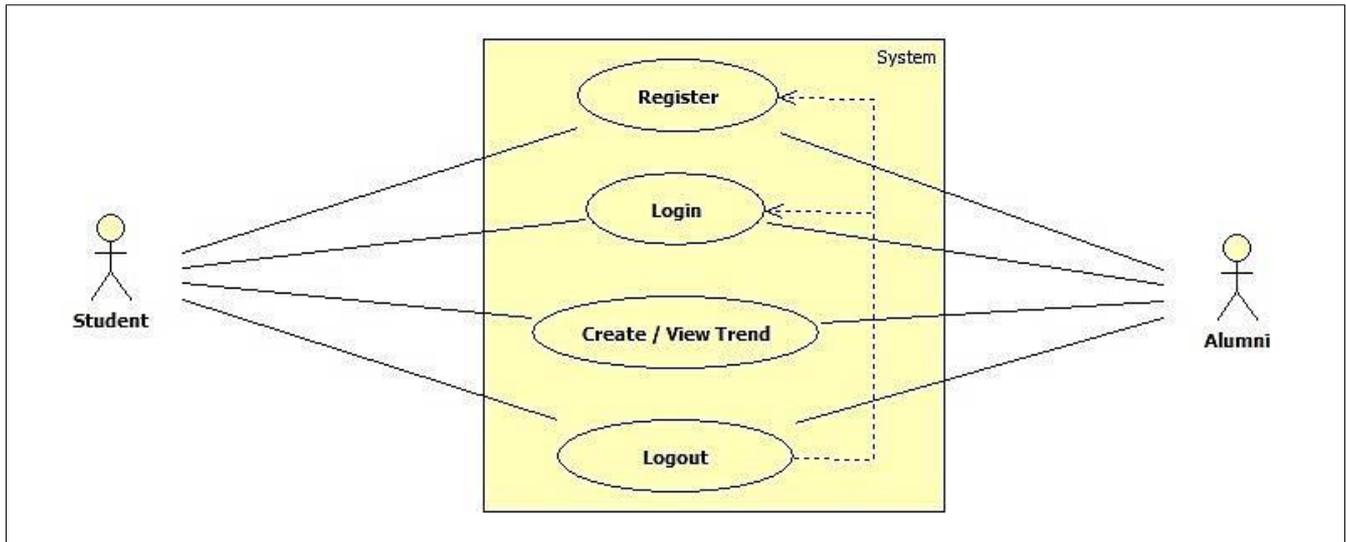


Fig. Use Case Diagram of Student and Alumni



Sequence Diagram

Fig. Sequence Diagram of Admin

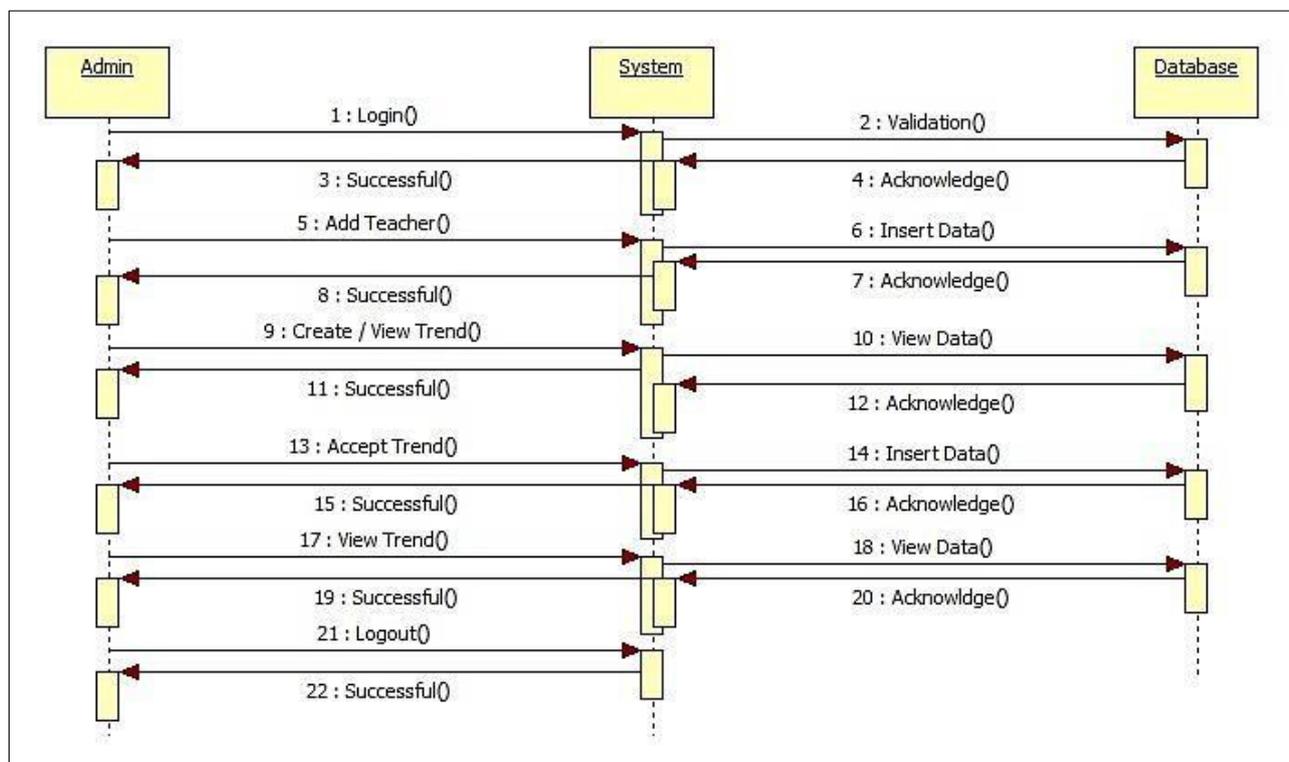


Fig. Sequence Diagram of Lecturer

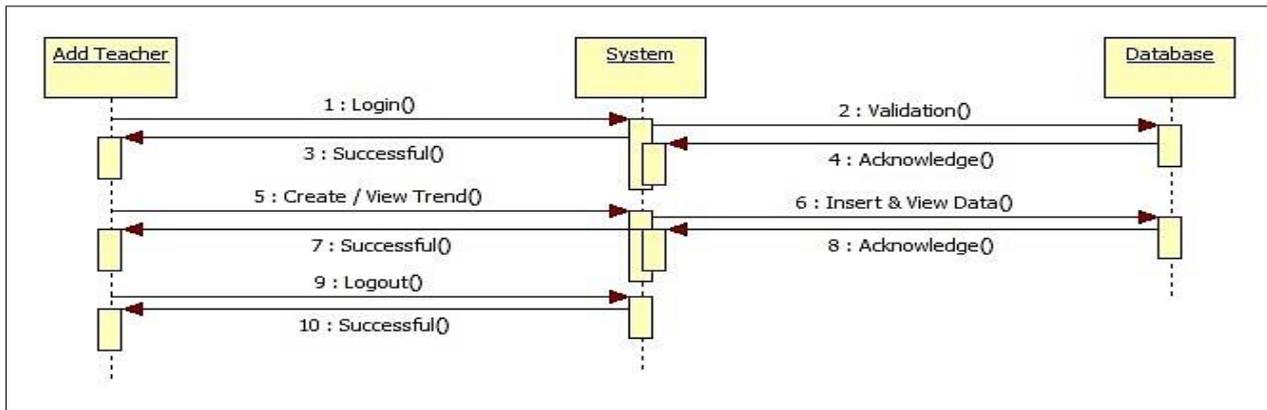


Fig. Sequence Diagram of Student

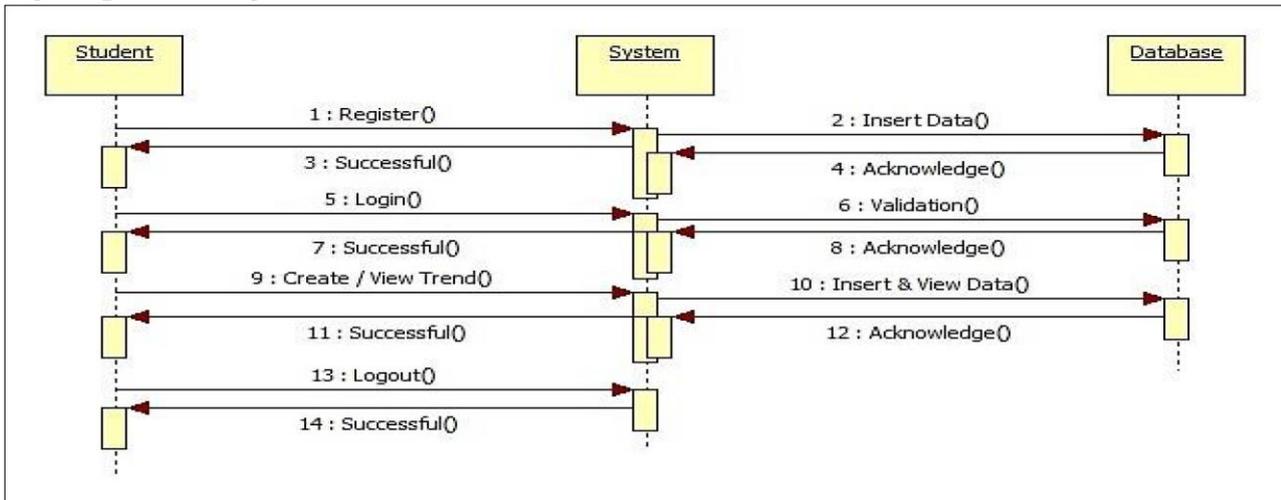
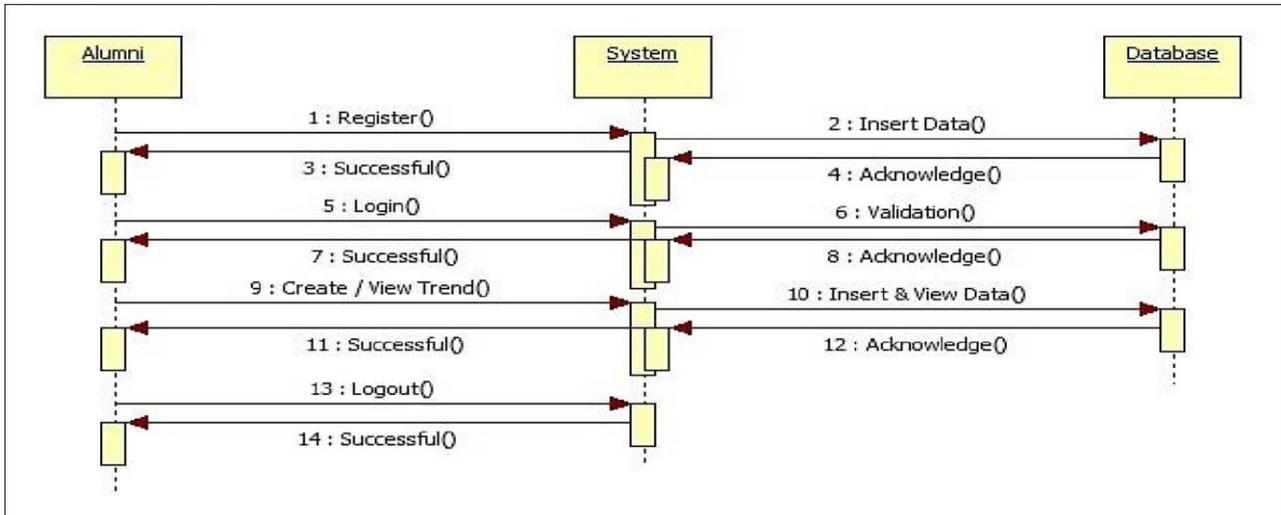


Fig. Sequence Diagram of Alumni



Activity Diagram

Fig. Activity Diagram of Admin

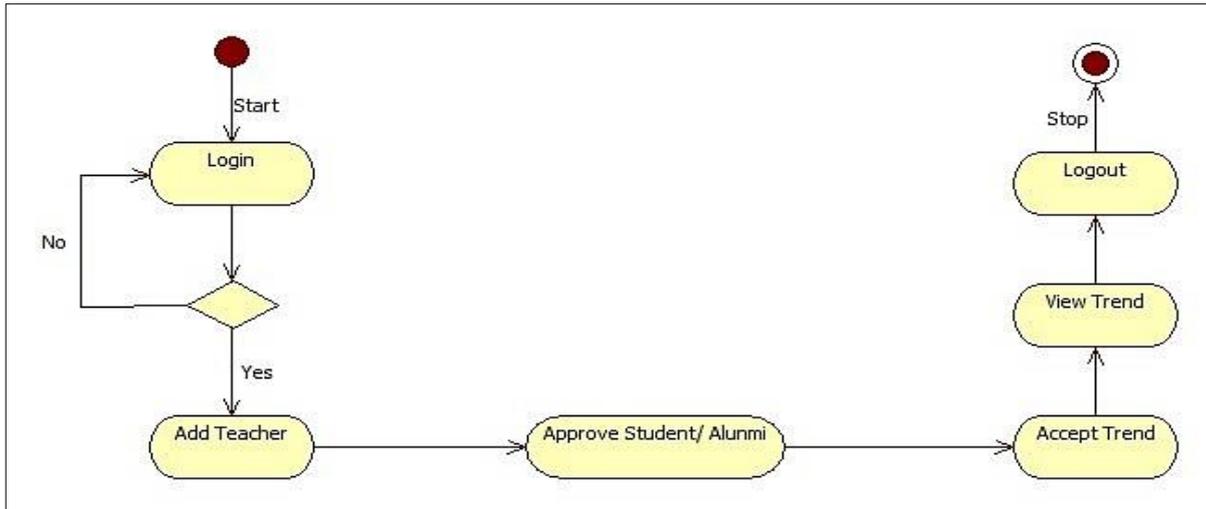


Fig. Activity Diagram of Lecturer

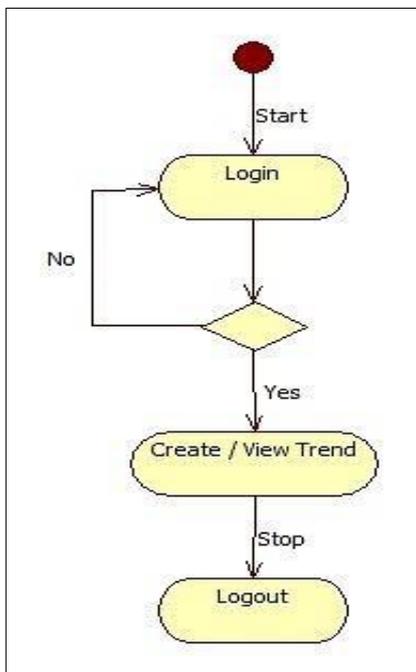


Fig. Activity Diagram of Student

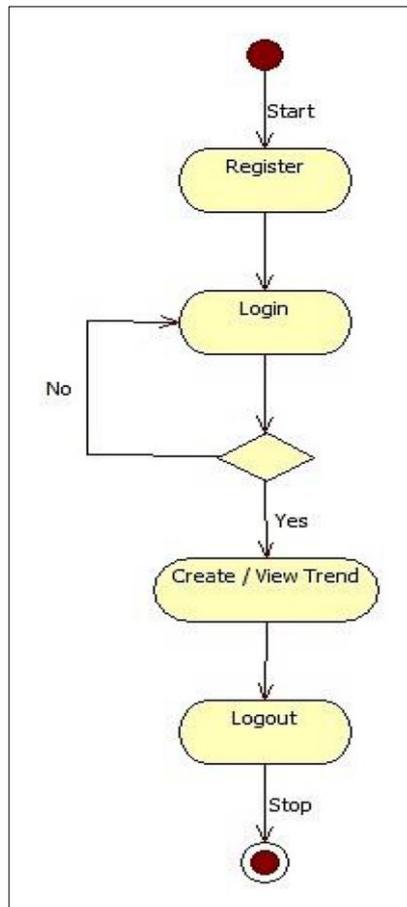
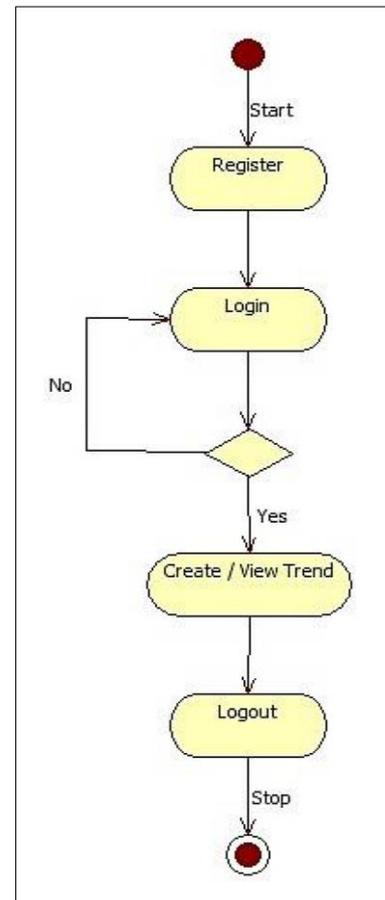


Fig. Activity Diagram of Alumni



Flow Diagram

A data flow diagram is graphical tool used to describe and analyze movement of data through a system. These are the central tool and the basis from which the other components are developed. The transformation of data from input to output, through processed, may be described logically and independently of physical components associated with the system. These are known as the logical data flow diagrams. The physical data flow diagrams show the actual implements and movement of data between people, departments and workstations. A full description of a system actually consists of a set of data flow diagrams. Using two familiar notations Yourdon, Gane and Sarson notation develops the data flow diagrams. Each component in a DFD is labelled with a descriptive name. Process is further identified with a number that will be used for identification purpose. The development of DFD's is done in several levels. Each process in lower level diagrams can be broken down into a more detailed DFD in the next level. The lop-level diagram is often called context diagram. It consists a single process bit, which plays vital role in studying the current system. The process in the context level diagram is exploded into other process at the first level DFD. The idea behind the explosion of a process into more process is that understanding at one level of detail is exploded into greater detail at the next level. This is done until further explosion is necessary and an adequate amount of detail is described for analyst to understand the process.

Larry Constantine first developed the DFD as a way of expressing system requirements in a graphical from, this led to the modular design.

A DFD is also known as a "bubble Chart" has the purpose of clarifying system requirements and identifying major transformations that will become programs in system design. So, it is the starting point of the design to the lowest level of detail. A DFD consists of a series of bubbles joined by data flows in the system.

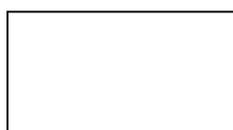
DFD Symbols:

In the DFD, there are four symbols

- i. A square defines a source(originator) or destination of system data
- ii. An arrow identifies data flow. It is the pipeline through which the information flows
- iii. A circle or a bubble represents a process that transforms incoming data flow into outgoing data flows.
- iv. An open rectangle is a data store, data at rest or a temporary repository of data



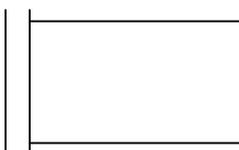
Process that transforms data flow



Source or Destination of data



Data flow



Data Store

Constructing a DFD:

Several rules of thumb are used in drawing DFD's:

- i. Process should be named and numbered for an easy reference. Each name should be representative of the process.
- ii. The direction of flow is from top to bottom and from left to right. Data traditionally flow from source to the destination although they may flow back to the source. One way to indicate this is to draw long flow line back to a source. An alternative way is to repeat the source symbol as a destination. Since it is used more than once in the DFD it is marked with a short diagonal.
- iii. When a process is exploded into lower level details, they are numbered.
- iv. The names of data stores and destinations are written in capital letters. Process and dataflow names have the first letter of each word capitalized

A DFD typically shows the minimum contents of data store. Each data store should contain all the data elements that flow in and out.

Questionnaires should contain all the data elements that flow in and out. Missing interfaces redundancies and like is then accounted for often through interviews.

- a. *Silent Features of DFD's*
 - i. The DFD shows flow of data, not of control loops and decision are controlled considerations do not appear on a DFD.
 - ii. The DFD does not indicate the time factor involved in any process whether the data flows take place daily, weekly, monthly or yearly.
- iii. The sequence of events is not brought out on the DFD.
- b. *Types of Data Flow Diagrams*
 - i. Current Physical
 - ii. Current Logical
 - iii. New Logical
 - iv. New Physical
- c. *Current Physical:*

In Current Physical DFD process label include the name of people or their positions or the names of computer systems that might provide some of the overall system-processing label includes an identification of the technology used to process the data. Similarly, data flows and data stores are often labelled with the names of the actual physical media on which data are stored such as file folders, computer files, business forms or computer tapes.

- d. *Current Logical:*

The physical aspects at the system are removed as much as possible so that the current system is reduced to its essence to the data and the processors that transform them regardless of actual physical form.

- e. *New Logical:*

This is exactly like a current logical model if the user were completely happy with the user were completely happy with the functionality of the current system but had problems with how it was implemented typically through the new logical model will differ from current logical model while having additional functions, absolute function removal and inefficient flows recognized.

- f. *New Physical:*

The new physical represents only the physical implementation of the new system.

- g. *Rules Governing the DFD'S*

Process

- i. No process can have only outputs.
- ii. No process can have only inputs. If an object has only inputs than it must be a sink.
- iii. A process has a verb phrase label.

h. *Data Store*

- i. Data cannot move directly from one data store to another data store, a process must move data.
- ii. Data cannot move directly from an outside source to a data store, a process, which receives, must move data from the source and place the data into data store
- iii. A data store has a noun phrase label.

i. *Source or Sink*

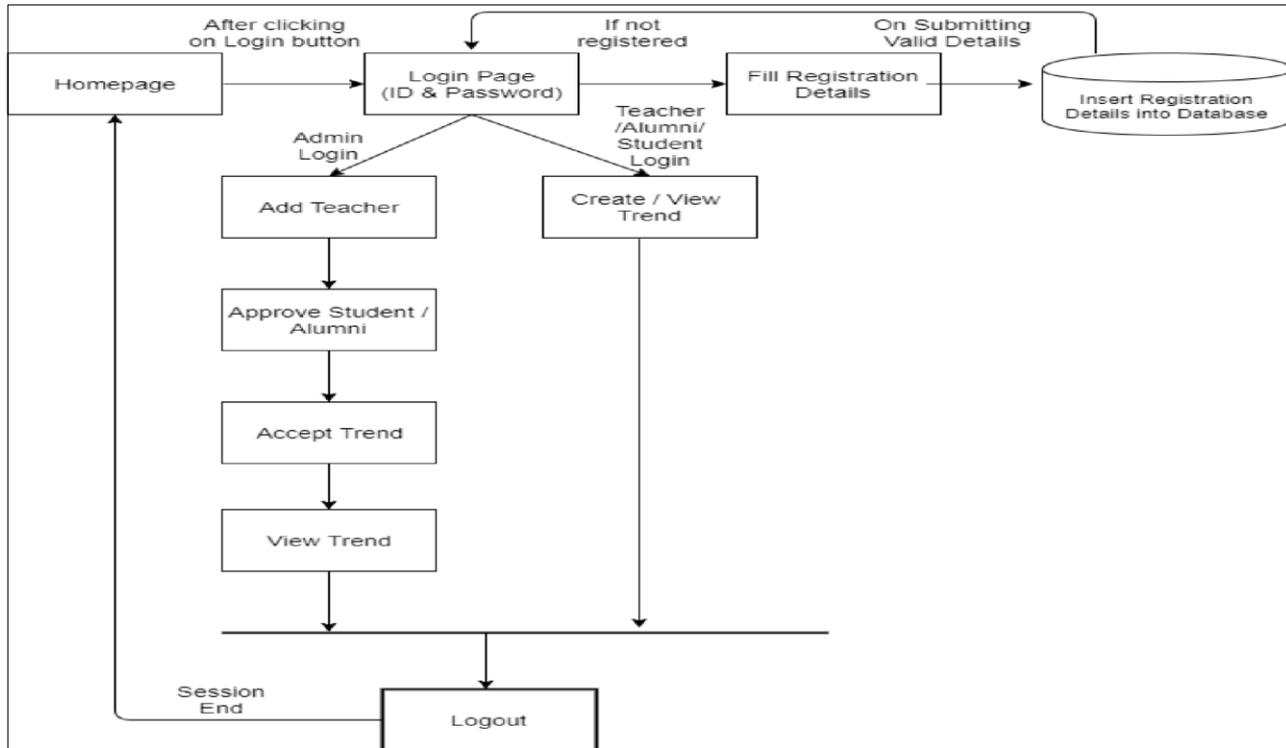
The origin and /or destination of data.

- i. Data cannot move direly from a source to sink it must be moved by a process
- ii. A source and /or sink has a noun phrase land

j. *Data Flow*

- i. A Data Flow has only one direction of flow between symbols. It may flow in both directions between a process and a data store to show a read before an update. The later it usually indicated however by two separate arrows since these happen at different type.
- ii. A join in DFD means that exactly the same data comes from any of two or more different processes data store or sink to a common location.
- iii. A data flow cannot go directly back to the same process it leads. There must be at least one other process that handles the data flow produce some other data flow returns the original data into the begining process.
- iv. A Data flow to a data store means update (delete or change).
- v. A data Flow from a data store means retrieve or use.

System Architecture



3.2.3. Context diagram

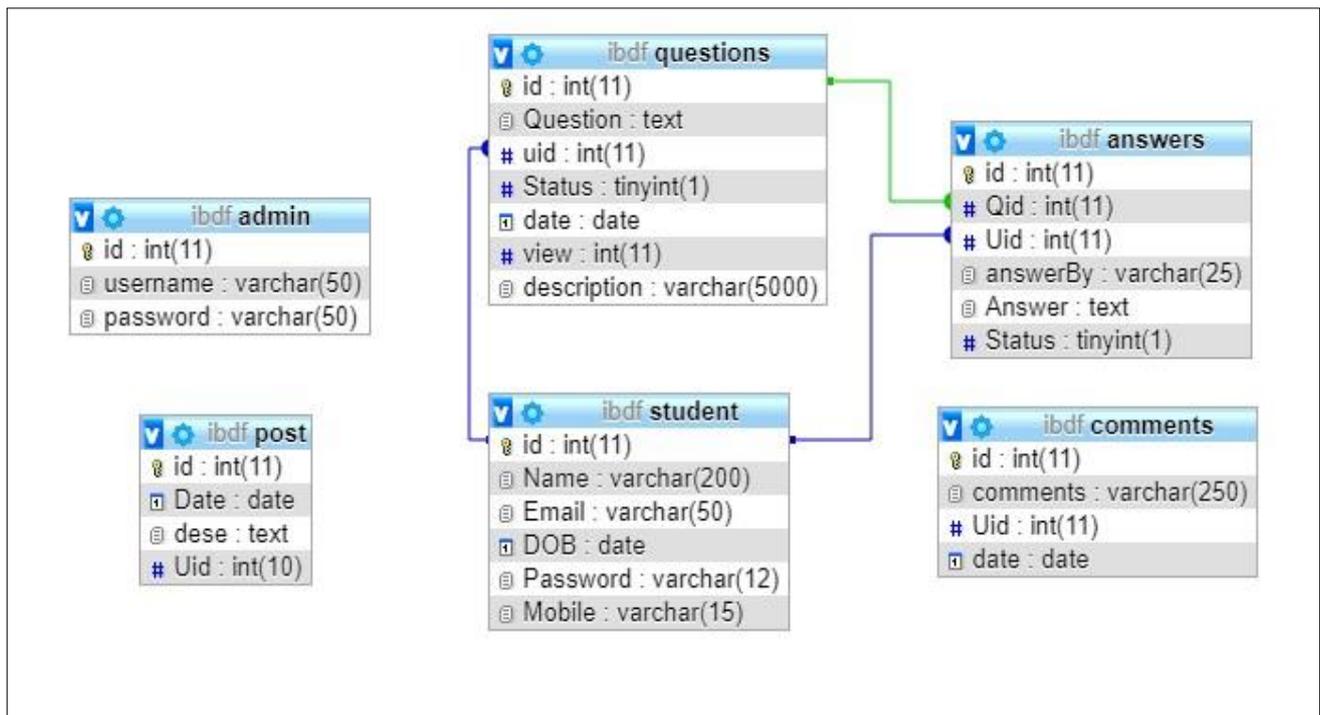


Fig. EER Diagram

3.2.4. System Software Level architectural design

System Architecture

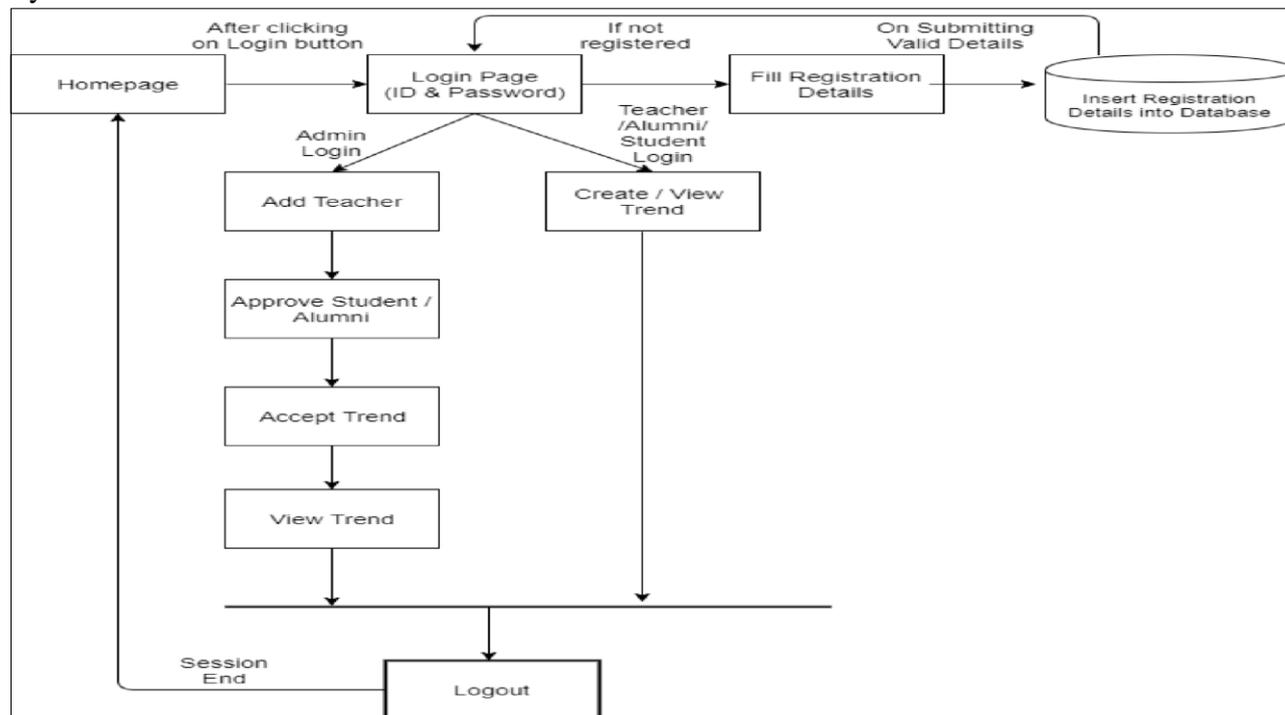


Fig. Algorithm A

3.2.5. Modular design of the system function

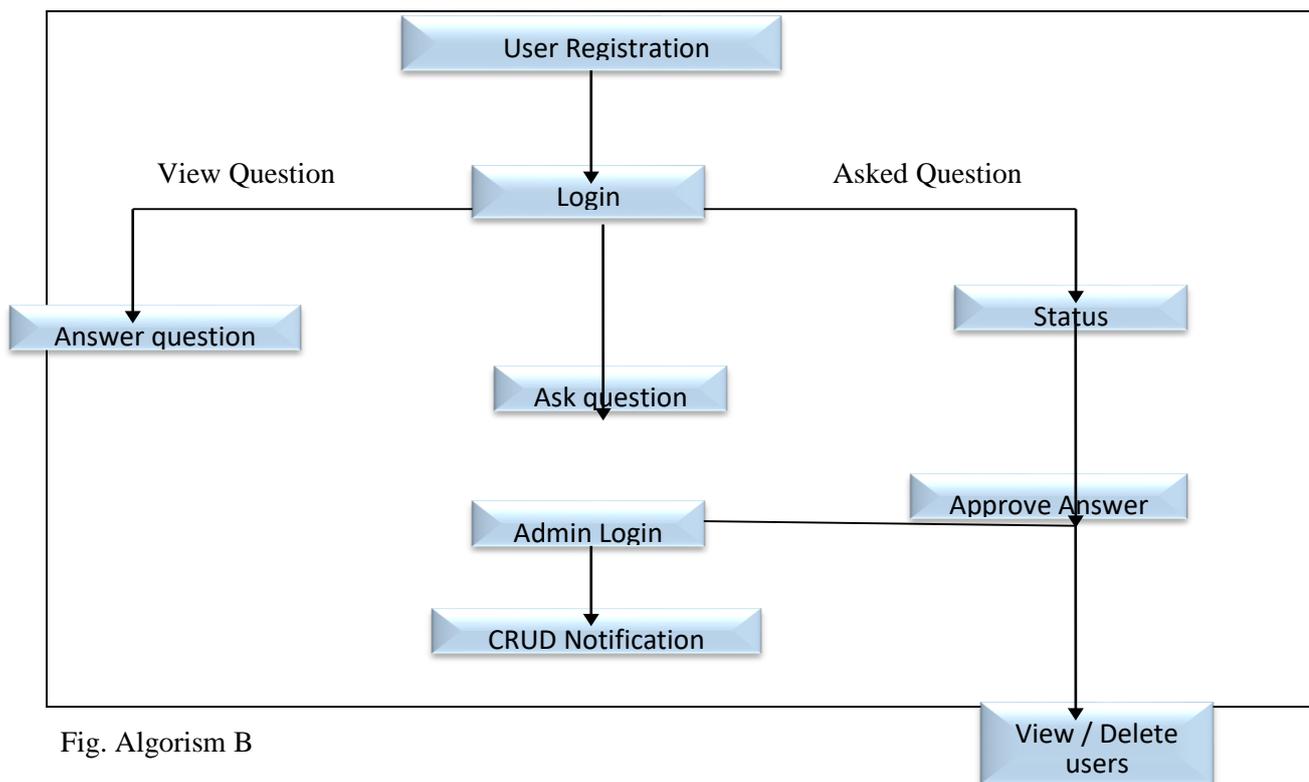
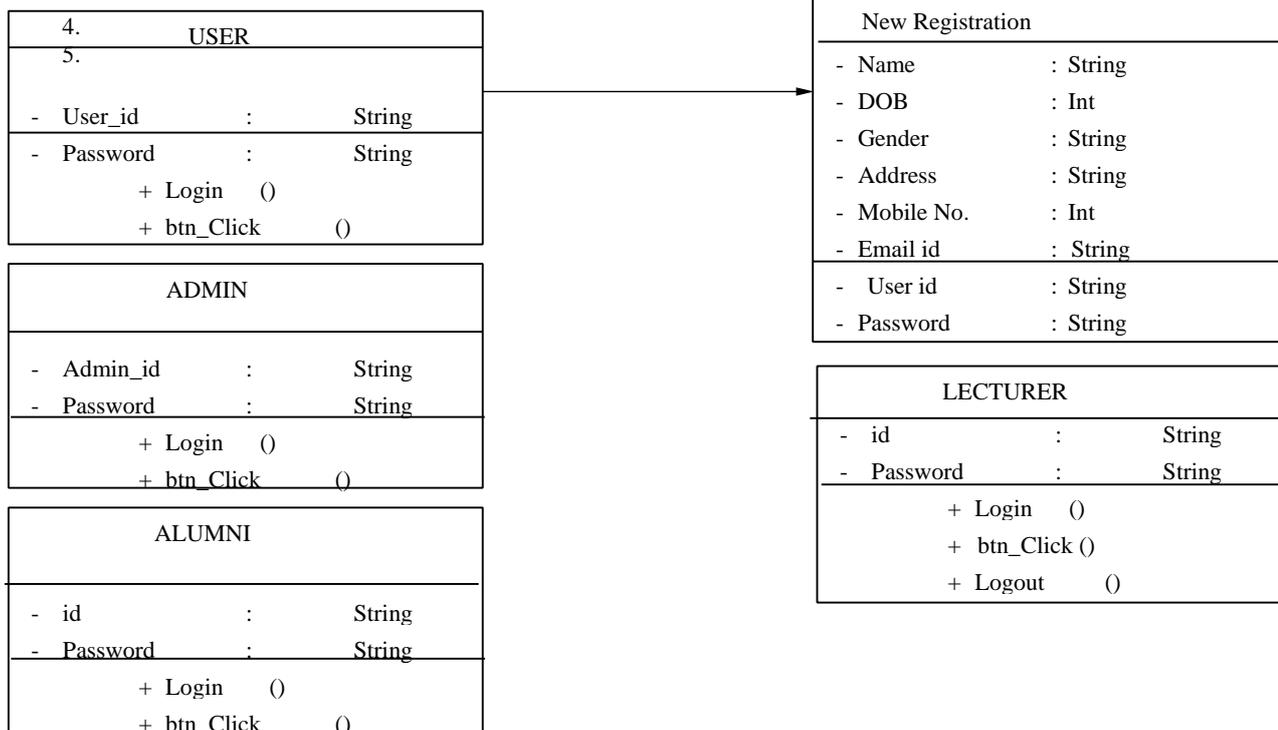


Fig. Algorithm B

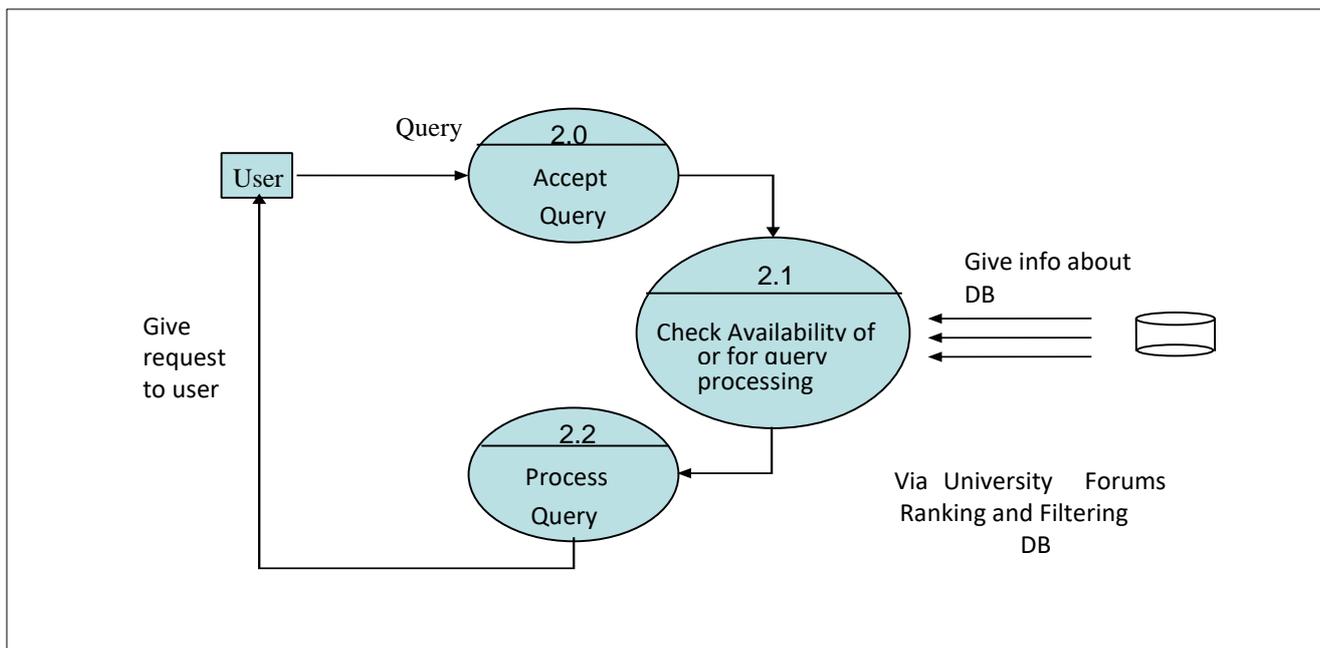
3.2.6. System Class Diagram

Class Diagram

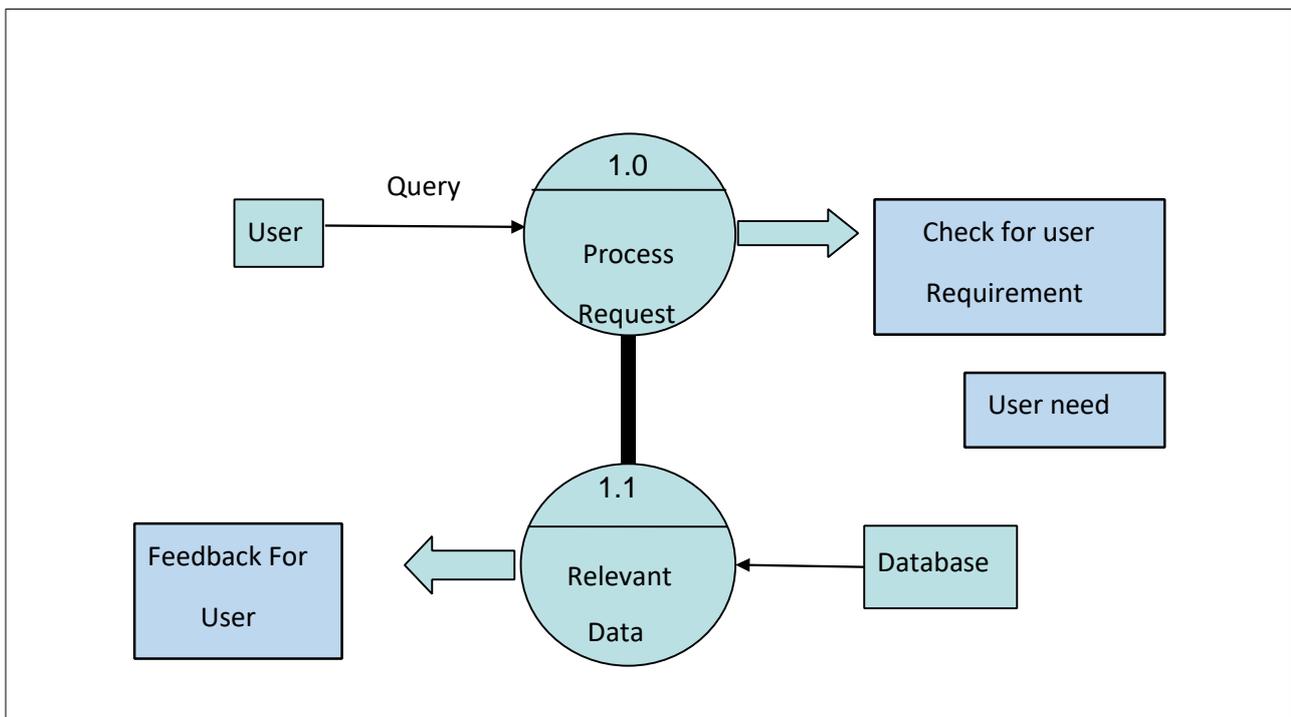
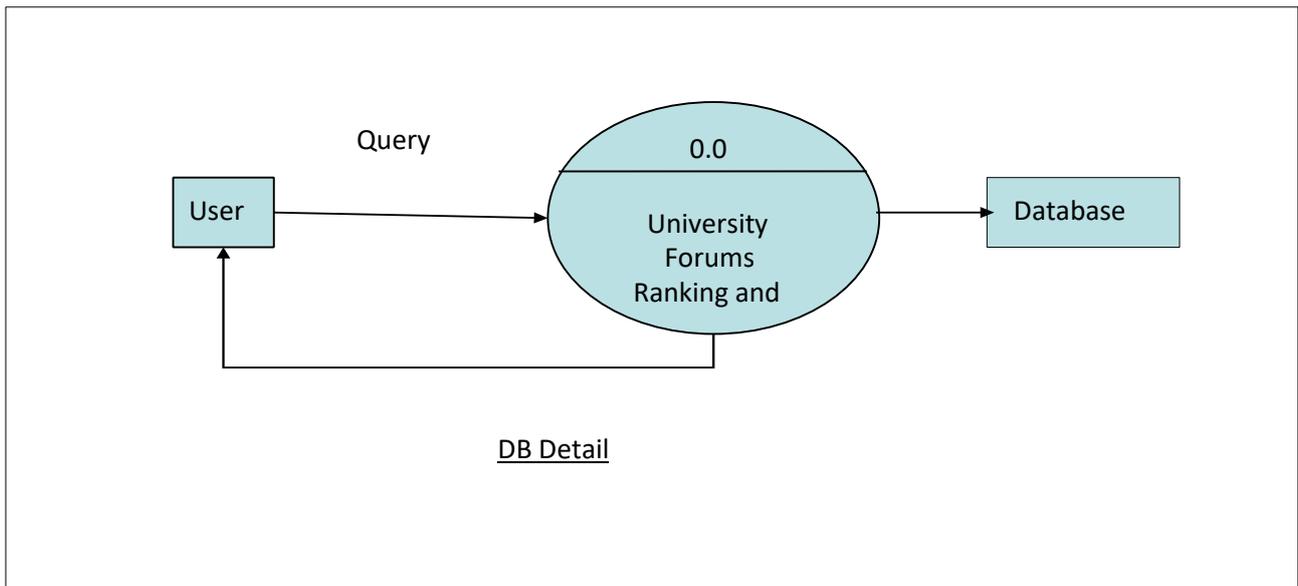


5.1.1. System Data Model Design

Data Flow Diagrams



Level 1 DFD



Level 2 DFD: Prediction

Introduction to PHP

Hypertext Pre-processor is a general-purpose programming language originally designed for web-based systems, and a proved beyond doubt that it is so far the most appropriate language for web related Systems since its creation in 1994 by *Rasmus Lerdorf*. The PHP reference implementation is now being produced by the famous PHP Group.

A quick introduction and summary of many aspects of the PHP language is given below. Although this overview is not intended to be an exhaustive examination of PHP, it is comprehensive enough for you to get started building non-trivial web applications with PHP.

1. Some Basics

A. PHP is a scripting language – it gets interpreted instead of being compiled like C++ and Java.

B. Unlike JavaScript which is executed by the web browser, all PHP code is executed on the web server.

C. The syntax is very similar to Perl and C. Variables are case sensitive, function names are not, and Statements must be terminated with a semicolon.

D. PHP code should be placed between `<?code?>` or `<?php code?>` tags. The second method is preferred so your scripts are XML compatible. There is no limitation as to where PHP code can be inserted.

E. To see information about how PHP is configured, version information, and the settings of all environment variables (e.g., `HTTP_USER_AGENT` and `QUERY_STRING`), call the `phpinfo()` function in any script.

F. The `php.ini` file is the main configuration file for PHP. It can be edited by the system administrator to change any of the configuration settings. A change to this file requires the web server be restarted since the file is only read once

when the web server starts up. (The `phpinfo()` function reports the location of `php.ini` on the server.)

G. It's a good idea to turn on error and warning output when developing codes so that one does not misuse PHP syntax in unintended ways. The following lines of code at the top of the script are placed so that errors will be reported in the rendered web page:

- 1) `ini_set('display_errors', '1');`
- 2) `error_reporting(E_ALL | E_STRICT);`
- 3) One need to note that if the `php.ini` file already has these settings, you don't need to use these lines of code.
- 4) Comments

The three following styles are legal:

`# Perl style single line comment`

`// Single line comment`

`/* Multiple line comments */`

2. Variables and Data Types

i. Always starts with \$ and letter or underscore. Can be composed of numbers, underscores, and letters.

`$my_var = 10;`

`$a_2nd_var = "bison";` ii. *Data types*: integers, doubles (numbers with a decimal point), boolean (true or false), NULL, strings, arrays, objects, and resources (like database connections). Variables do not have to be declared and neither do their data types.

iii. *Variables* have a default value (0, empty string, false, or empty array) if they aren't initialized before trying to use them. It's always good practice to initialize all variables rather than relying on the default initialization value. If you try to use a variable before setting it to a value, strict error-reporting setting will give you an "Undefined variable" warning.

iv. All *variables* have local scope (i.e., they are accessible only within the function or block in which they are initialized). Global variables may

only be accessed within a function by using the global keyword.

```
$x = "test"; function display () {global $x; echo $x; }
```

v. *Constants* are defined using `define` and by convention are usually named in ALL CAPITALS.

```
define ("PI", 3.14); define ("HEADING", "

# 


```

```
$area = PI * $radius * $radius; print (HEADING);
```

vi. *Operators*

A. Assignment

1. = += -= /= *= %= ++ -- - like most programming languages.

2. .= - string concatenation operator (see strings section).

B. Arithmetic

1. + - * / % - like most programming languages.

C. Comparison

1. == != < > <= >= - like most programming languages. Also <> is the same as !=.

2. === - true if arguments are equal and the same data type.

3. !== - true if arguments are not equal or they are not of the same data type.

D. Logical

1. && || ! - like most programming languages (&& and || short-circuit)

2. and or - like && and || but have lower precedence than && and ||.

3. xor - true if either (but not both) of its arguments are true.

vii. *Input/Output*

A. Print and echo are used to print to the browser. `echo "Go Bisons"; echo ("Go Bisons"); // same thing print ("Go Bisons"); // same thing`

B. Print can only accept one argument, and echo can accept any number of arguments. Print returns a value that indicates if the print statement succeeded.

C. Variables are interpolated inside of strings unless single quotes are used. `$a = "guts"; echo "You have $a."; // prints "You have guts." echo 'You have $a.'; // prints "You have $a."`

D. Escape sequences: `\n` (newline), `\r` (carriage-return), `\t` (tab), `\$` (\$), `\"` ("), `\\` (\) `echo "a\\b\\tc\\$d"; // prints "a\b c$d" echo 'a\\b\\tc\\$d'; // prints "a\b\tc\$d". Only \\ is converted.`

E. `printf` works like C's counter-part.

```
$title = "X-Men"; $amount = 54.235; printf("The movie <b>%s</b> made %2.2f million.", $title, $amount);
```

```
// prints "The movie <b>X-Men</b> made 54.23 million."
```

F. PHP typically does not run from the command-line, but input from the keyboard can be accessed using the `fopen` function with `"php://stdin"`. See the file I/O section for more information.

G. Output shortcut from within HTML:

```
Hello, <b><?= $name ?></b> is the same as Hello, <b><?php echo $name ?></b>
```

Control Structures

A. Choice structures 1) `if ($x > 0)`

```
$y = 5; // { } not required for only one statement
```

2) `if ($a) { // tests if $a is true or non-zero or a non-empty string print($b);`

```
$b++;  
} else print($c);
```

3) `if ($a > $b) print "a is bigger than b"; elseif ($a == $b) // use "elseif" or "else if" print "a is equal to b"; else print "a is smaller than b";`

4) `switch ($vehicle_type) { // works for integers, floats, or strings case "car": $car++; break; case "truck": $truck++; break; case "suv": $suv++; break; default: $other++;`

```
}
```

B. Looping structures

```
1. while ($n < 10) { print (" $n
");
$n++;
}
```

```
2. do { print("$n ");
$n++;
} while ($n < 10);
```

```
3. for ($n = 1; $n < 10; $n++) print("$n ");
```

```
4. for each ($myarray $item)
print("$item "); ix. Arrays
```

A. Summary of all array functions in the PHP core:

<http://www.php.net/manual/en/ref.array.php>

B. Arrays can have any size and contain any type of value. No danger of going beyond array bounds.

```
$my_array[0] = 25;
$my_array[1] = "Bisons";
```

C. PHP arrays are associative arrays which allow element values to be stored in relation to a key value rather than a strict linear index order.

```
$capitals ["CO"] = "Denver";
$capitals ["AR"] = "Little Rock";
```

D. Initialize an array:

```
$colors = array ("red", "green", "blue");
Print ("The 2nd color is $colors [1]."); // prints
green
$capitals = array ("CO" => "Denver", "AR" =>
"Little Rock"); print("$capitals[CO]"); // prints
Denver, no quotes around key inside ""
```

E. Print contents of an array for debugging:

```
print_r($colors); produces:
```

```
Array
(
[0]=> red
[1]=> green
[2]=> blue
)
```

```
print_r($capitals); produces:
Array
```

```
(
[CO] => Denver
[AR] => Little Rock
)
```

F. Pull values out of an array:

```
$colors = array("red", "green", "blue"); list($c1,
$c2) = $colors;
print("$c1 and $c2"); // prints "red and green"
```

G. Delete from an array:

```
unset($colors[1]); // $colors now contains red and
blue at indexes 0 and 2.
```

H. Extracting array keys and values:

```
$states = array_keys($capitals); // $states is
("CO", "AR")
$cities = array_values($capitals); // $cities is
("Denver", "Little Rock")
```

I. Iterating through an array:

```
$heroes = array('Spider-Man', 'Hulk',
'Wolverine'); foreach ($heroes as $name)
print("$name<br />"); // prints all three in order
foreach ($capitals as $state => $city)
print("$city is the capital of $state.<br />");
```

J. Treat an array like a stack:

```
array_push($heroes, 'Iron Man'); // Pushed onto
end of array $heroes[] = 'Captain America'; //
Same thing as array_push
$h = array_pop($heroes); // Pops off last element
(Iron Man)
```

K. Size of an array:

```
$num_items = count($heroes); // returns 3
```

L. Sort an array:

```
sort($heroes); // Heroes are now in alphabetical
order (lowest to highest) rsort($heroes); //
Reverse alphabetical order (highest to lowest)
```

x. *Functions*

A. PHP pre-defined functions are documented at <http://www.php.net/manual/en/funcref.php>

B. Functions may be declared anywhere in the source code (i.e., they do not need to be defined before they are called as C++ requires).

C. Function names are case-insensitive, though it is usually good form to call functions as they appear in their declaration.

D. Defining and calling

1. General form:

```
function func_name($param_1, $param_2, ...,
    $param_n) {
// code
return $retval; // optional: can return a scalar or an
    array }
```

2. Call: `$result = func_name($arg1, $arg2, ..., $argn)`; E. Parameter passing and returning values:

1. Arguments may be passed by value (default) or by reference (using `&`). Default argument values can also be used which must be initialized in the parameter list.

Variable-length argument lists are also supported but are not covered here.

```
// Pass by value function sum($a, $b) { return $a
    + $b;
}
```

```
// Pass by reference function swap(&$a, &$b) {
$temp = $a;
$a = $b;
$b = $temp;
}
```

```
// Default arguments must be on right side
function say_greeting($name,
    $greeting="Hello") { print "$greeting,
    $name!";
} say_greeting("Susan"); // Hello, Susan!
say_greeting("Rita", "Hola"); // Hola, Rita!
```

2. Passing an array by value and by reference // Pass by value function `sum_array($values)` {
`$sum = 0; foreach ($values as $num) $sum += $num; return $sum;`
}

```
$nums = array(1, 2, 3); print "Sum of array = " .
    sum_array($nums); // 6 // Pass by reference
function randomize(&$nums) { for ($i = 0; $i
    < 10; $i++) $nums[$i] = rand(0, 100); // 0-100
} $n = array(); randomize($n); // Place 10 random
    nums in $n
```

3. Return an array

```
// Return an array list($pi, $euler, $phi) =
    special_nums(); function special_nums() {
    return array(3.142, 2.718, 1.618);
}
```

xi. Strings

A. Concatenation

```
$full_name = $first_name . " " . $last_name; //
    results in "Bob Smith"
```

B. Some PHP string functions. View the complete list at

<http://www.php.net/manual/en/ref.strings.php>.

`int strlen($str)` Returns string length.

`int strcmp($str1, $str2)`

Returns `< 0` if `str1` is less than `str2`; `> 0` if `str1` is greater than `str2`, and `0` if they are equal. (`strcasecmp` for case-insensitive comparison.) The

`< > ==` operators can also be used if both arguments are strings. `strcmp` is useful if an argument may not be a string and has to be converted into one. `string strstr($text, $search)` Returns first occurrence of `$search` in `$text`, `FALSE` if not found. (`stristr` for caseinsensitive search.)

`string str_replace($find, $replace, $text)`

Replaces all occurrences of `$find` with `$replace` in `$text`. `string chop($str)` Removes all white space at end of string.

`string ltrim($str)` Removes all white space at beginning of string.

`string trim($str)` Removes all white space at beginning and end of string.

xii. Regular Expressions

A. Regular expressions are patterns that can be used to match text in a string. They can be used, for example, to determine if a string contains a legal

email address or phone number. PHP regular expressions are implemented very similarly in other programming languages. For a complete reference,

<http://us2.php.net/manual/en/ref.pcre.php>

B. The examples here use Perl regular expressions which require forward slashes (“/”) around the pattern.

C. Matching patterns

1. Find the given pattern anywhere in the string if (preg_match("/ard/", "Harding"))

echo "Matches"; else echo "No match"; 2. Special symbols

\d any digit (0-9)

\s any white space (space, tab, EOL)

\w any word char (a-z, A-Z, 0-9, _)

. any character except EOL

[abc] a, b, or c

[^a-z] not any char between a and z

{3} match only three of these ? match zero or one character

* match zero or more characters

+ match one or more characters ^abc match at the beginning of the string abc\$ match at the end of the string

3. Email address example

```
$email = 'first_name.last_name@domain.Com';
```

```
$regexp = "/^[w.]+@[w.]+[a-z]{2,4}$/i"; // i switch for case-insensitive match if (preg_match($regexp, $email)) echo "Match email";
```

```
4. Remembering matched patterns if (preg_match('/(d\d):(d\d) (am|pm)/', '03:15 pm', $matches)) { echo "Hour: $matches[1]\n"; // 03 echo "Min: $matches[2]\n"; // 15 echo "Ending: $matches[3]\n"; // pm }
```

```
5. Match all occurrences preg_match_all('/.ar/', 'the car was far from the bar', $matches); print_r($matches[0]); // Prints car, far, bar
```

D. Replacing patterns

1. Simple replacement

```
$new = preg_replace('/hard/', 'easy', 'this is hard!'); // Returns "this is easy!"
```

2. Replacement with remembered matches

```
// Convert MM/DD/YYYY to YYYY-MM-DD (must escape / in regex)
```

```
$date = preg_replace("/(\d\d)/(\d\d)/(\d\d\d\d)/", "$3-$1-$2", "08/15/2008");
```

E. Array processing

1. Split string into an array

```
$names = 'Fred, Erin, Alex, Sunshine';
```

```
$names_array = preg_split('/[, ]+/', $names); //
```

```
Returns one name in each slot
```

2. Find all items in an array that match a regex

```
// Returns only Erin and Alex
```

```
$starts_with_vowel = preg_grep('/^[aeiou]/i', $names_array);
```

xiii. Exception Handling

A. PHP uses exception (error) handling much like C++, Java, and many other HLLs.

```
function divide($x, $y) { if ($y == 0) throw new Exception('Division by zero.');
```

```
else return $x / $y; } try { echo divide(5, 2) . "\n"; // Prints 2.5 echo divide(4, 0) . "\n"; // Causes exception to be thrown
```

```
} catch (Exception $e) { echo 'Caught exception: ', $e->getMessage(), "\n"; }
```

B. Exceptions that are not caught cause the script to fail with a fatal error.

C. Other information about the exception like the line number and the file name in which the exception occurred is also available. See

<http://us.php.net/manual/en/language.exception.s.php>

xiv. File I/O

- A. PHP can access any file that is stored on the web server, as long as it has the proper permissions.
- B. HTTP, FTP, and STD read/write can also be used with file functions.

C. See

<http://www.php.net/manual/en/ref.filesystem.php> for functions that set file permissions, copy and delete files, access file modification times, and a lot more. D. Open file with fopen, close with fclose. File open modes:

1. "r" – Read from existing file.
 2. "r+" – Read and write to already existing file.
 3. "w" – Write to file, creating the file if it doesn't already exist, erasing it if it does.
 4. "w+" – Write and read, creating the file if it doesn't already exist, erasing it if it does.
 5. "a" – Append to end of file whether it exists or not.
 6. "a+" – Append to end of file, doubling file contents if you read the file in as a string, edit it, and write it back to the file.
- E. Reading from a file. File must have proper read permissions. If file is not owned by "nobody", it must have world read permissions.

1. Read entire file:

```
$fd = fopen("myfile.txt", "r") or die("Can't open  
myfile.txt for reading.");
```

```
$entire_file = fread($fd, filesize("myfile.txt"));  
print $entire_file; fclose($fd);
```

*The die operator is useful for halting executing of a PHP script and giving an error message. You may also call exit which does the same thing.

2. Read line by line: while (!feof(\$fd)) {

```
$line = fgets($fd, 4096); // 4096 is the max bytes  
per line print "$line<br />";
```

```
}
```

- F. Writing to a file. The directory containing the file to be written must have at least world execute and write permissions. Default owner of a created file will be "nobody".

```
$fd = fopen("myfile.txt", "w") or die("Can't write to  
myfile.txt."); fwrite($fd, "This is output.");  
fclose($fd);
```

xv. Importing Scripts and HTML Files

- A. A file containing HTML and/or PHP code can be imported into another PHP script by using the require statement. If the file being included cannot be found, the script halts with a fatal error. heading.php

```
<h3>Date: <?php $today = date("D M d Y"); echo  
$today; ?></h3>
```

The code above can be used in a PHP script like this (assuming it resides in the same directory):

```
<?php require 'heading.php'; // Prints Date: Fri Aug  
29 2008?>
```

- B. They include statement does the same thing, but the script does not produce a fatal error if the included file is not found.

- C. The require_once and include_once statements do the same thing as require and include, but they will not reload a file that has already been included.

xvi. Web Form Input

- A. Data from web forms can be accessed using the superglobal arrays \$_GET and \$_POST.

- B. \$_GET: for accessing data in the query string – the key=value pairs that appear in the URL after the "?" character. All values are unescaped (+ is converted to space, etc.).

Example:

```
http://www.example.com/myscript.php?custname=  
Bob+Smith&custage=21
```

```
$name = $_GET["custname"]; // $name is "Bob  
Smith"
```

```
$age = $_GET["custage"]; // $age is 21
```

- C. \$_POST: for accessing posted for data from standard input (values are unescaped).

Example

```
custname=Bob+Smith&custage=21
```

```
$name = $_POST["custname"]; // $name is "Bob  
Smith"
```

STDIN:

```
$age = $_POST["custage"]; // $age is 21
```

D. It's always a good idea to use `isset` to check if the variable exists in `$_POST` and `$_GET` before accessing to avoid PHP warnings: `if (!isset($_POST["custname"]) || trim($_POST["custname"]) == "") echo "The customer's name was left blank.";`

E. Shortcut to accessing variables in `$_GET` and `$_POST`: `extract` puts all key/value pairs in identically named variables. Warning: collisions occur between identically named variables.

```
extract($_POST);          if (isset($custname))
    echo "Hello, $custname!";
```

xvii. *Maintaining State*

A. To keep track of data between HTTP requests, data can be stored in cookies using the `$_COOKIE` array, or it can be stored on the web server via session variables in the `$_SESSION` array.

B. `setcookie()` and `session_start()` functions below must be called before any other output is produced unless `output_buffering` is turned on in `php.ini`.

C. `$_COOKIE` – for accessing HTTP cookies which are stored on the client and are transmitted back to the web server in every HTTP request.

a) By default, cookies expire with the session. Closing the browser (not just the tab) ends the session.

```
setcookie("age", "21");
```

b) Cookies can be given expiration dates so they persist even after the browser is closed:

```
// Cookie expires in 24 hours
```

```
setcookie("name", "Betty", time() + 60 * 60 * 24);
```

c) Getting the value of a cookie:

```
echo $_COOKIE["name"]; // Print contents of
name cookie
```

Note that `$_COOKIE` will not have values set from `setcookie()` until the php script is requested after a call to `setcookie`.

d) Deleting a cookie:

```
setcookie("name", FALSE);
```

e) Warning: Since cookies are stored on the client, they should not be used to store sensitive data.

D. `$_SESSION` – for accessing session variables which are stored on the web server. Variables are associated with a unique session ID which is stored in a cookie or passed in the URL if cookies are disabled. This technique is ideal for storing sensitive data since the data is not stored on the client.

i. Create a session (and a session ID) if one doesn't already exist:

```
session_start();
```

ii. If you are curious what the session ID looks like: `echo session_id();`

iii. Set a session variable that is stored on the web server and tied to the user's session ID:

```
$_SESSION ["name"] = "Betty"; iv. Get the value
of a session variable that is tied to the user's
session ID:
```

```
$auto = $_SESSION ["name"];
```

v. Session variables are cleared when the browser is closed or when destroying the session explicitly: `session_destroy();`

xviii. *Uploading Files*

A. Files may be uploaded to the web server from the browser by using a specially-encoded form and the

`$_FILES` superglobal array.

```
<form method="POST" action="upload.php"
    enctype="multipart/form-data">
```

```
<!-- max files size in bytes -->
```

```
<input type="hidden" name="MAX_FILE_SIZE"
    value="5000000" />
```

```
<input type="file" name="myfile" /><br />
```

```
<input type="submit" value="Submit" />
```

```
</form>
```

When submitted to `upload.php`, the `$_FILES` array contains an entry for each file uploaded. `print_r($_FILES);` produces

Array

(

```
[myfile] => Array
(
  [name] => archive-3.png Name of file on client
  [type] => image/png File's MIME type as
  determined by file extension
  [tmp_name] => /tmp/phpUajj5s Temporary path of
  file stored on the server
  [error] => 0 Number indicating an error (0 means
  no error)
  [size] => 131377 Size of file in bytes
)
```

You must copy the file from the temporary location (`$_FILES['myfile']['tmp_name']`) to a more permanent location if you wish to store the file contents for later use. A complete function that does this and more can be obtained from <http://frankmccown.blogspot.com/2009/04/upload-image-in-php.html>.

xix. Database Access - MySQL

- PHP supports most popular databases including MySQL, Oracle, MS Access, SQL Server, SQLite, etc.
- Many PHP developers use MySQL (<http://www.mysql.com/>) because of its cost (free in most cases) and durability.
- Detailed guide to MySQL Improved Extension (MySQLi) at <http://www.php.net/manual/en/book.mysqli.php>
- You must first connect to the MySQL server and select your database before executing any database operations:

```
// Create a mysqli object which connects and selects
mysqli = new mysqli($hostname, $username,
  $password, $db_name);
// Output error info if there was a connection
  problem if ($mysqli->connect_errno)
die("Failed to connect to MySQL: ($mysqli-
  >connect_errno) $mysqli->connect_error");
```

e. CRUD database operations:

1. Query the database – Using the SELECT statement

```
$sql = "SELECT ID, Name FROM Students
  WHERE GPA >= 2.0";
$result = mysqli->query($sql) or die("Error
  $mysqli->errno $mysqli->error " .
  "<br>SQL = $sql<br>");
```

```
// Loop through all rows returned by the query while
  ($row = $result->fetch_row())
```

```
echo "ID is $row[0] and name is $row[1]<br />\n";
```

```
// Same thing as above while loop but using an
  associative array while ($row = $result-
  >fetch_assoc()) echo "ID=$row[ID]
  name=$row[Name]<br />\n";
```

```
// Test to see if a single row is returned or not
```

```
$sql = "SELECT Name FROM Students WHERE
  ID = 123"; $result = $mysqli->query($sql) or
  die($mysqli->error);
```

```
if ($mysqli->num_rows == 0) echo "Student not
  found.";
```

```
else {
  $row = $result->mysqli_fetch_assoc(); echo "Hello,
  $row[Name]!";
}
```

2. Insert a new record into the database – Using the INSERT statement

```
$sql = "INSERT INTO Students VALUES (789,
  'Jane', 2.5);
```

```
$mysqli->query($sql) or die($mysqli->error);
$rows_inserted = $mysqli->affected_rows; //
  Should return 1 echo "Successfully inserted
  $rows_inserted row.";
```

```
// See if duplicate ID was inserted
```

```
$sql = "INSERT INTO Students VALUES (789,
  'Jane', 2.5); if ($mysqli->query($sql)) echo
  "Inserted Jane"; elseif ($mysqli->errno == 1062)
  echo "Insert failed because ID 789 already exists";
else die("Error $mysqli->errno $mysqli-
  >error<br>SQL = $sql<br>");
```

3. Update a record(s) in the database – Using the UPDATE statement

```
$sql = "UPDATE Students SET GPA=3.1 WHERE ID = 123";
```

```
$mysqli->query($sql) or die($mysqli->error);
```

```
$rows_updated = $mysqli->affected_rows; //
```

```
Should return 1 echo "Successfully updated $rows_updated row.";
```

Note: `$mysqli->affected_rows` will return 0 if no rows match the WHERE clause.

4. Delete a record(s) from the database – Using the DELETE statement

```
$sql = "DELETE FROM Students WHERE GPA < 2.0";
```

```
$mysqli->query($sql) or die($mysqli->error);
```

```
$rows_deleted = $mysqli->affected_rows; echo "Successfully deleted $rows_deleted row(s).";
```

5.1.2. User Interface Design

Fig. User Interface 1



Note: `$mysqli->affected_rows` will return 0 if no rows match the WHERE clause.

f. Several characters like NUL (ASCII 0), `\n`, `\r`, `\`, `'`, `"`, and Ctl-Z can cause problems in a SQL statement and need to be escaped. `$name = $_POST["name"];`
`// "Ed O'Reily"`

```
$name = $mysqli->real_escape_string($name); // Returns "Ed O\'Reily"
```

```
$sql = "INSERT INTO Students VALUES (999, '$name', 3.1)";
```

Fig. User Interface 2

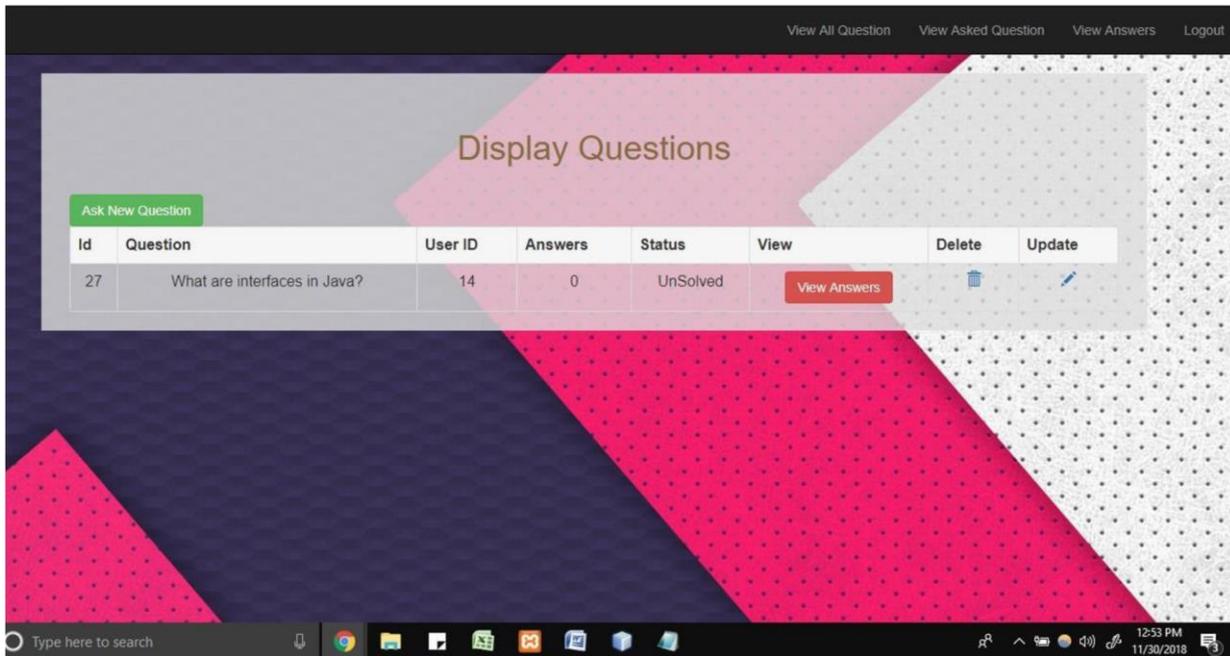
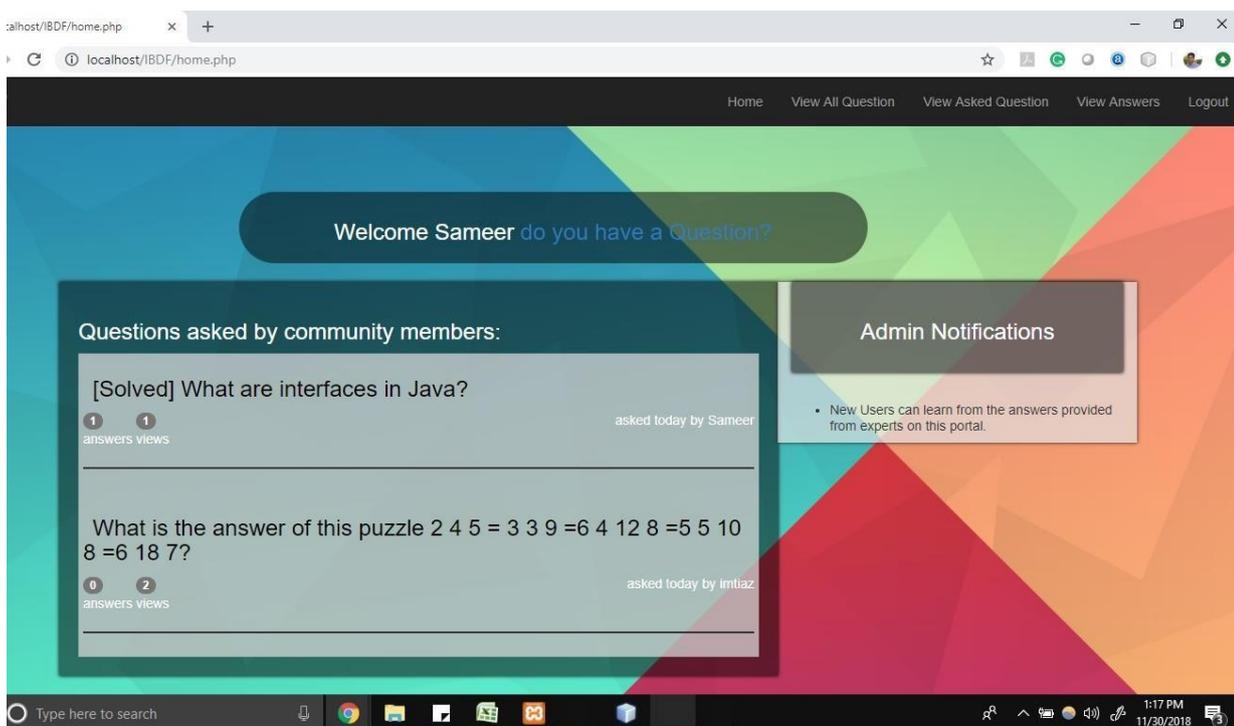


Fig. User Interface 3.



5.1.3. Summary

The user interface is one attraction point that lures many users to online forums, therefore the above projected interface has room for improvement as

software development is an ongoing process. I commit to put in all my effort on top of what has been put in so far for the betterment of it.

4. CHAPTER: FOUR RESULTS

4.1. Introduction

Feasibility Report

Feasibility Study is a high-level capsule version of the entire process intended to answer a number of questions like: What is the problem? Is there any feasible solution to the given problem? Is the problem even worth solving? Feasibility study is conducted once the problem clearly understood. Feasibility study is necessary to determine that the proposed system is Feasible by considering the technical, Operational, and Economical factors. By having a detailed feasibility study the management will have a clear-cut view of the proposed system. The following feasibilities are considered for the project in order to ensure that the project is variable and it does not have any major obstructions. Feasibility study encompasses the following things:

- i. Technical Feasibility
- ii. Economic Feasibility
- iii. Operational Feasibility

In this phase, I studied the feasibility of all proposed systems, and pick the best feasible solution for the problem. The feasibility is studied based on three main factors as follows.

4.2. Baseline Study Results

i. Technical Feasibility

In this step, I verified whether the proposed systems are technically feasible or not. i.e., all the technologies required to develop the system are available readily or not. Technical Feasibility determines whether the organization has the technology and skills necessary to carry out the project and how this should be obtained. The system can be feasible because of the following grounds:

- a. All necessary technology exists to develop the system.
- b. This system is too flexible and it can be expanded further.
- c. This system can give guarantees of accuracy, ease of use, reliability and the data security.

- d. This system can give instant response to inquire.

The project is technically feasible because, all the technology needed for the project is readily available.

Operating System : Windows 7 or higher
Languages : PHP (Hypertext Preprocessor)

Database System : My SQL 5.6

Documentation Tool : MS - Word 2013 *ii.*

Economic Feasibility

Economically, this project is completely feasible because it requires no extra financial investment and with respect to time, it's completely possible to complete this project in 6 months.

In this step, I verify which proposal is more economical and compare the financial benefits of the new system with the investment. The new system is economically feasible only when the financial benefits are more than the investments and expenditure. Economic Feasibility determines whether the project goal can be within the resource limits allocated to it or not. It must determine whether it is worthwhile to process with the entire project or whether the benefits obtained from the new system are not worth the costs. Financial benefits must be equal or exceed the costs. In this issue, consider:

- a. The cost to conduct a full system investigation.
- b. The cost of for the class of application being considered.
- c. The development tools.
- d. The cost of maintenance etc...

The project is economically feasible because the cost of development is very minimal when compared to financial benefits of the application.

iii. Operational Feasibility

In this step, I verify different operational factors of the proposed systems like man-power, time etc., whichever solution uses less operational resources,

is the best operationally feasible solution. The solution should also be operationally possible to implement. Operational Feasibility determines if the proposed system satisfied user objectives could be fitted into the current system operation.

- a. The methods of processing and presentation are completely accepted by the clients since they can meet all user requirements.
- b. The clients have been involved in the planning and development of the system.
- c. The proposed system will not cause any problem under any circumstances.

The project is operationally feasible because the time requirements and personnel requirements are satisfied.

4.3. System Testing, Results and Discussion

Levels of Testing

In order to uncover the errors, present in different phases there is a concept in the levels of testing. The basic levels of testing are:

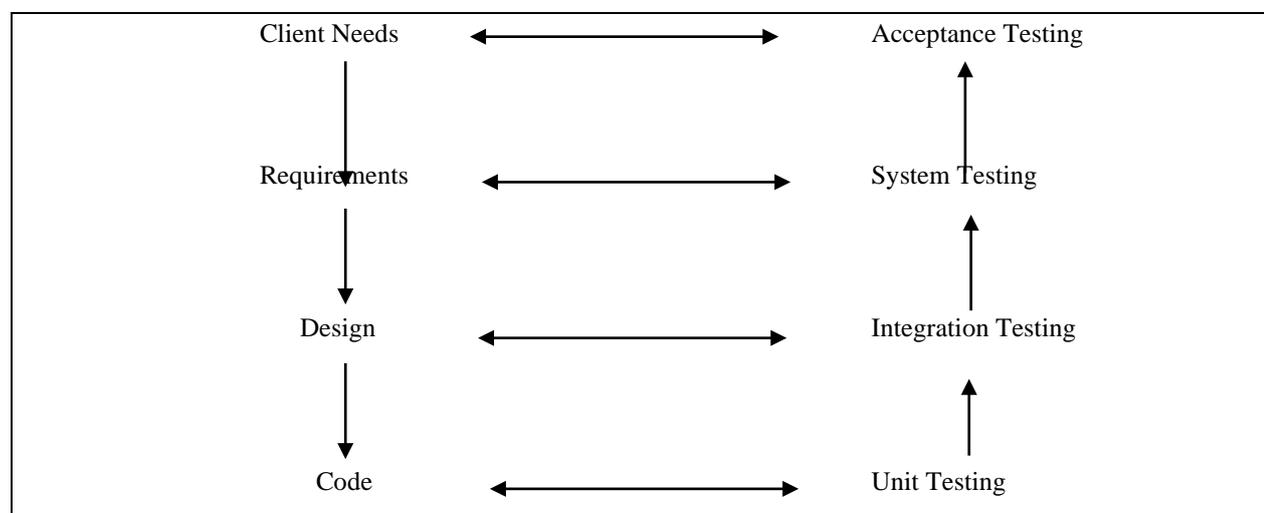


Fig. Testing Levels

As the project is on bit large scale, testing is always needed to make it successful. If each component work properly in all respect and gives desired output for all kind of inputs then project is said to be successful. So, the conclusion is-to make the project successful, it needs to be tested.

The testing done here was System Testing checking whether the user requirements were satisfied. The code for the new system has been written completely using PHP as the coding language, Notepad++ as the interface for front-end designing. The new system has been tested well with the help of the users and all the applications have been verified from every nook and corner of the user.

Although some applications were found to be erroneous these applications have been corrected before being implemented. The flow of the forms has been found to be very much in accordance with the actual flow of data.

A series of testing is done for the proposed system before the system is ready for the user acceptance testing.

The steps involved in Testing are:

a. Unit Testing

Unit testing focuses verification efforts on the smallest unit of the software design, the module. This is also known as “Module Testing”. The modules are tested separately. This testing carried out during programming stage itself. In this testing each module is found to be working satisfactorily as regards to the expected output from the module.

b. Integration Testing

Data can be grossed across an interface; one module can have adverse effects on another. Integration testing is systematic testing for construction the program structure while at the same time conducting tests to uncover errors associated with in the interface. The objective is to take unit tested modules and build a program structure. All the modules are combined and tested as a whole. Here correction is difficult because the isolation of cause is complicated by the vast expense of the entire program. Thus, in the integration testing step, all the errors uncovered are corrected for the text testing steps.

c. System testing

System testing is the stage of implementation that is aimed at ensuring that the system works accurately and efficiently for live operation commences. Testing is vital to the success of the system. System testing makes a logical assumption that if all the parts of the system are correct, then goal will be successfully achieved.

d. Validation Testing

At the conclusion of integration testing software is completely assembled as a package, interfacing errors have been uncovered and corrected and a final series of software tests begins, validation test

begins. Validation test can be defined in many ways. But the simple definition is that validation succeeds when the software function in a manner that can reasonably be expected by the customer. After validation test has been conducted one of two possible conditions exists.

One is the function or performance characteristics confirm to specifications and are accepted and the other is deviation from specification is uncovered and a deficiency list is created. Proposed system under consideration has been tested by using validation testing and found to be working satisfactorily.

e. Output Testing

After performing validation testing, the next step is output testing of the proposed system since no system could be useful if it does not produce the required output in the specified format. Asking the users about the format required by them tests the outputs generated by the system under consideration. Here the output format is considered in two ways, one is on the screen and other is the printed format. The output format on the screen is found to be correct as the format was designed in the system designed phase according to the user needs.

For the hard copy also, the output comes as the specified requirements by the users. Hence output testing does not result any corrections in the system.

f. User Acceptance Testing

User acceptance of a system is the key factor of the success of any system. The system under study is tested for the user acceptance by constantly keeping in touch with the prospective system users at the time of developing and making changes wherever required.

4.4. System Implementation Results

Project Implementation Technology

The Project is loaded in Visual WAMP Server & Notepad++. I used that software for Design and coding of the project. Created and maintained all

databases into My SQL 5.6, in order to create tables, write query for store data or record of project.

a. Hardware Requirement:

- i. i3 Processor Based Computer or higher
- ii. Memory: 1 GB RAM
- iii. Hard Drive: 50 GB
- iv. Monitor
- v. Internet Connection

b. Software Requirement:

- i. Windows 7 or higher
- ii. WAMP Server
- iii. Notepad++
- iv. My SQL 5.6

4.5. Summary

Test Cases

User Login/Registration: To begin with login, user need to register by filling up basic registration details. There are multiple fields in registration page and every field has to fill by user. User cannot use character in the login id field.

Admin Login: - Admin login id and password are kept compulsory fields, and if the admin id or password doesn't match then it will show an error message.

Validation Criteria

- a. In each form, no field which is not null able should be left blank.
- b. All numeric fields should be checked for non-numeric values. Similarly, text fields like names should not contain any numeric characters.
- c. All primary keys should be automatically generated to prevent the user from entering any existing key.
- d. Use of error handling for each Save, Edit, delete and other important operations.
- e. Whenever the user Tabs out or Enter from a text box, the data should be validated and if it is invalid, focus should again be sent to the text box with proper message.

5. CHAPTER FIVE: DISCUSSION AND CONCLUSION

Introduction

Having looked at the main purpose of online discussion forums and the benefits it will have on all the stake holders involved, it is important to think through why a forum is the most appropriate tool to help you reach your student learning goals. Having all the participants fully involved in the discussions, should attract some level of effort from the implementers, the following includes measurer to ensure full participation is attained;

- a. Build in motivation for students to participate. Simply setting up a forum is not enough to get the conversation moving. Consider making participation part of the section or course grade, or devising an alternate method of motivating students to participate. For example, offering a forum as a way of preparing students for an assignment or exam may provide motivation to participate even when the forum doesn't count as part of the students' grade.
- b. Make a plan for grading. Be clear with students from the beginning about how and whether you will calculate forum use into students' grades. Making forum participation part of the grade or offering it as an extra credit option can provide needed motivation for students to participate. Though grading a forum can also be confusing and time consuming; Make sure that you devise a grading strategy ahead of time that is both clear to the students and realistic for you. Think carefully about whether you will grade on quality or quantity of student posts or both. Devise a strategy for locating each student's posts within the forum that will not take too long.
- c. Choose a specific task and give explicit instructions. If you tell your students to "discuss" class material on the forum, the discussion is likely to fall flat. In order to make the most of the forum, give students a specific task you would like them to complete in the forum, along with explicit instructions about

your expectations for completing that task. Share the learning goals with your students. Communicate to students what you hope they will take away from the forum participation and why the forum is the best tool to help them accomplish the goals you have set out for them. Students are likely to be more invested

Discussion

Generally online discussion forums offer students a structured opportunity to interact with each other online around exam time. For the purpose of reviewing for the exam students posted questions they have about course material, and other students could answer them in the online forum. By using an online discussion, it will encourage, collaborate and to give students a structured opportunity to work together to find the answers to questions that they were having difficulty with. This activity would also have another desired benefit — it would help students to practice writing and explaining concepts prior to doing so on the exam. Online forums can be used for many purposes, such as helping students to review material prior to an assignment or exam, engaging students in discussion of course material before coming to class, and reflecting on material that they have read or worked with outside of class. For instance; Our *University (Information and Communication University)* has systems that allows graduating students to share their views on research with their lecturers, a very good development. Hence, this will be more accommodating as it includes the former student on board for boarder knowledge views.

Web-based online discussion if well-structured, they can be an effective way to bolster student learning outside of class. Discussion forums are one of the key ways of promoting peer interaction and collaborative learning in this form of education. *Miyazoe and Anderson (2010)* suggest that constructivism and knowledge building, involving reflective and collaborative learning, and supported

by platform, are crucial for a quality online learning environment. A combination of the unit's educational design and the tutor's facilitation forms the basis of the learning environment, so a focused, present and proactive lecturer is important to facilitating positive learning experiences. In this sense, the lecturer models the kinds of communication principles, interaction protocols, and commitment to students that sets the ground for the teaching-learning contract.

The baseline Study

The reference point of the whole system project is the milestone achievement that is to be achieved if the system implementation is done as stated in the methodologies so far outlined. This can be of utmost value once all the stakeholders team up and rigidly follow out lined methods, system requirements, while considering the outcome it will bring to the well-being of the students, lecturers, and alumnus. Besides; the baseline study is also affirmed by numerous scholars like (Richardson & Ice, 2010) and evaluation (Cheng, Paré, Collimore & Joordens, 2011) in *Discussion forum interaction* that; two key challenges that has recently been addressed in recent research is first; ensuring participation in the forum; and second, ensuring quality discussion in the forum. Educationalists need to scaffold student motivation by being explicit about expectations and ground rules for online discussion forums, for this sets the framework for interaction, peer collaboration and dialogue. Accordingly, a number of researchers point out the need for higher order learning tasks that promote critical thinking. Hou (2011), also alluded to that in a mixed method study in a cohort of 32

Information Management students, found that role playing and problem-solving were effective strategies to ensure student interaction. Zydney, deNoyelles and Seo (2012) tested an online protocol with one cluster of tertiary students and more open questions with another cluster. This

surely confirms the importance of the full participation in the forum in order to achieve the intended system objectives.

Use of technology

Overview of Technologies Used

My choice of the right of technology to apply in respect to any web-based system as clearly discussed in the summary of *Chapter of Three*, PHP has proved to be the right programming language if not the best despite it started out as a small open source project. It has convincingly involved more and more people as they kept founding out how useful it was and still it is. *Rasmus Lerdorf* unleashed the first version of PHP way back in 1994 as earlier stated. In summary, 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, its Syntax is C-Like.

Common uses of PHP:

- PHP performs system functions, i.e. from files on a system it can create, open, read, write, and close them. The other uses of PHP are:
- PHP can handle forms, i.e. gather data from files, save data to a file, thru email you can send data, return data to the user.

- You add, delete and modify elements within your database thru PHP.
- Access cookies variables and set cookies.
- Using PHP, you can restrict users to access some pages of your website.
- It can encrypt data.

Five important characteristics make PHP's practical nature possible:

- Simplicity
- Efficiency
- Security
- Flexibility
- Familiarity

Environment Setup

In order to develop and run PHP Web pages, three vital components need to be installed on your computer system. *Web Server* - PHP will work with virtually all *Web Server* software, including Microsoft's Internet Information Server (IIS) but then most often used is freely available Apache Server. *Database* - PHP will work with virtually all database software, including Oracle and Sybase but most commonly used is freely available *MySQL database*. *PHP Parser* - In order to process PHP script instructions, a parser must be installed to generate HTML output that can be sent to the *Web Browser*.

Syntax Overview

Escaping to PHP

The PHP parsing engine needs a way to differentiate PHP code from other elements in the page.

The mechanism for doing so is known as 'escaping to PHP.' There are four ways to do this:

Canonical PHP tags

The most universally effective PHP tag style is:

```
<?php...?>
```

If you use this style, you can be positive that your tags will always be correctly interpreted.

Short-open (SGML-style) tags

Short or short-open tags look like this:

```
<?...?>
```

Short tags are, as one might expect, the shortest option, one of two things must be done to enable PHP to recognize the tags: Choose the --enable-short-tags configuration option when you're building PHP. Set the short open tag setting in your php.ini file to on. This option must be disabled to parse XML with PHP because the same syntax is used for XML tags.

ASP-style tags

ASP-style tags mimic the tags used by Active Server Pages to delineate code blocks. ASP-style tags look like this: `<%...%>`

To use ASP-style tags, you will need to set the configuration option in your php.ini file.

HTML script tags

HTML script tags look like this:

```
script language="PHP">...</script>
```

The main way to store information in the middle of a PHP program is by using a variable.

Here are the most important things to know about variables in PHP. All variables in PHP are denoted with a leading dollar sign (\$). The value of a variable is the value of its most recent assignment. Variables are assigned with the = operator, with the variable on the left-hand side and the expression to be evaluated on the right. Variables can, but do not need, to be declared before assignment. Variables in PHP do not have intrinsic types - a variable does not know in advance whether it will be used to store a number or a string of characters. Variables used before they are assigned have default values. PHP does a good job of automatically converting types from one to another when necessary. PHP variables are Perl-like and it has a total of eight data types used to construct variables: also discussed in details in *Chapter Three* during the system implementation. The variables discussed in chapter three comprise of *simple types*, *arrays* and *objects* are compound - the compound types can package up other arbitrary values of arbitrary type, whereas the simple types cannot.

Development of the system as a solution

The system will above offer great advantages in the area of e-learning due to its flexibility it affords to all participants, addition;

- a. E learning and discussions in particular, can support learning that is not always tutor/Lecturer centred, your role will be important, especially as an online community begins to develop.
- b. A group of students can become a community of participants who begin to grow in their understandings of course material and individual contributions to the knowledge construction process.
- c. Very flexible and more convenient system for users.
- d. Managing all thread/post, replies and like from users with proper well-structured flow.

Comparison with other similar works

Features

- i. *Load Balancing:*
Since the system will be available only the admin logs in the amount of load on server will be limited to time period of admin access.
- ii. *Easy Accessibility:*
Records can be easily accessed and store and other information respectively.
- iii. *User Friendly:*
The Website will be giving a very user-friendly approach for all user.
- iv. *Efficient and reliable:*
Maintaining the all secured and database on the server which will be accessible according the user requirement without any maintenance cost will be a very efficient as compared to storing all the customer data on the spreadsheet or in physically in the record books.
- v. *Easy maintenance:*
University Forums Ranking and Filtering is design as easy way. So, maintenance is also easy.

Possible applications

a. WAMP Server

WAMP is a Windows OS based program that installs and configures Apache web server, MySQL database server, PHP scripting language, phpMyAdmin (to manage MySQL database's), and SQLite Manager (to manage SQLite database's). WAMP is designed to offer an easy way to install Apache, PHP and MySQL package with an easy to use installation program instead of having to install and configure everything yourself. WAMP is so easy because once it is installed it is ready to go. You don't have to do any additional configuring or tweaking of any configuration files to get it running. There are usually two reasons why someone chooses to install WAMP. They are looking to install WAMP for development purposes or to run their own server.

Wamp Server Contains

PHP Admin

Allows you to change or add users and for making new databases phpMyAdmin is a free software tool written in PHP, intended to handle the administration of MySQL over the World Wide Web. phpMyAdmin supports a wide range of operations with MySQL. The most frequently used operations are supported by the user interface (managing databases, tables, fields, relations, indexes, users, permissions, etc.), while you still have the ability to directly execute any SQL statement.

Features

Intuitive web interface

1. Support for most MySQL features:

- i. Browse and drop databases, tables, views, fields and indexes.
- ii. Create, copy, drop, rename and alter databases, tables, fields and indexes.
- iii. Maintenance server, databases and tables, with proposals on server configuration.
- iv. Execute, edit and bookmark any SQL-statement, even batch-queries.

v. Manage MySQL users and privileges

vi. Manage stored procedures and triggers.

2. Import data from CSV and SQL

- i. Export data to various formats: CSV, SQL, XML, PDF, ISO/IEC 26300 - OpenDocument Text and Spreadsheet, Word, L^AT_EX and others
- ii. Administering multiple servers
- iii. Creating PDF graphics of your database layout
- iv. Creating complex queries using Query-by-example (QBE)
- v. Searching globally in a database or a subset of it
- vi. Transforming stored data into any format using a set of predefined functions, like displaying BLOB-data as image or download-link
- vii. And much more.

Using WAMP as a Development Server

You can use WAMP to develop and test websites locally on their own computer instead of having to get a web hosting account to develop with. Most people will be using WAMP for development purposes such as learning how to create websites with HTML, PHP, and MySQL.

Using WAMP as a Production Server

WARNING: WAMP was designed to be a testing and development server, not an actual production server. WAMP does not come with any real security in place so it offers no protection from any kind of attack. Any 10-year-old with access to the internet can easily hack your WAMP server.

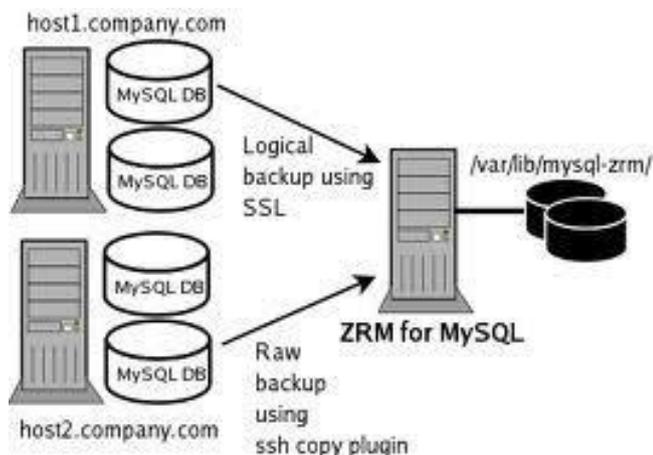
If your website(s) have highly sensitive data (such as credit card numbers, social security numbers, user ids, passwords, etc.), you need to take this in consideration before you put this information online. Unless you are an experienced system administrator and can configure WAMP to be more secure, you should never use WAMP for a production server.

SQL Server and Database System



Fig. MySQL logo

SQL Server is a relational database management system from [Microsoft](#) that's designed for the enterprise environment. SQL Server runs on T-SQL (Transact -SQL), a set of programming [extensions](#) from [Sybase](#) and Microsoft that add several features to standard SQL, including transaction control, exception and error handling, row processing, and declared variables.



Generically, any database management system (DBMS) that can respond to queries from client machines formatted in the SQL language. When capitalized, the term generally refers to either of two database management products from Sybase and Microsoft. Both companies offer client-server DBMS products called SQL Server.

MySQL Configuration

To begin MySQL installation, first download latest version of Essentials as an MSI package.

During MySQL installation, select *typical* installation and use default configuration values except for Sign-Up where you probably want to

select *Skip Sign-Up*. When Setup Wizard is completed, make sure the option *Configure the MySQL Server now* is set. For MySQL Server Instance Configuration, select *Standard Configuration*. Next, you *must* set option *Include Bin Directory in Windows PATH*. This setting is *crucial*, otherwise a required library, libMySQL.dll, will not be found later during Apache start up.

Finally, enter a proper root password. There is no need to neither enable remote root access nor create an Anonymous Account.

Please inspect messages during MySQL start-up and verify that MySQL has been started successfully. Then, you must reboot the system. Otherwise, the required library libMySQL.dll will not be found during Apache start-up when Apache is trying to load Apache's PHP module and Apache will, perhaps a bit confusingly, complain that it is unable to load the PHP's MySQL library, php_mysql.dll. Therefore, it is necessary to reboot the system at this stage and then continue to PHP configuration.

Standard forum for general use

In this forum type, students will see the message of Thread in a separate space above the discussion field, in which a user will see the information such as the title of the discussion (which means the forum's title), its author, the replies, likes and the date of the last post.

PHP Configuration

PHP for Windows must be installed from the zip package, *not* using the installer because the installer does not work correctly when setting up the configuration files. Download the latest Windows binary version from the 5.x release series.

Create folder C:\Program Files\PHP5 and unzip the downloaded package there. Then, in folder C:\Program Files\PHP5 you need to copy the file php.ini-recommended as php.ini and make two changes into the php.ini file. Change extension_dir to:

```
extension_dir = "C:/Program Files/PHP5/ext/"
```

And also uncomment the following line:

```
Extension=php_mysql.dll
```

That is all what is needed for PHP configuration. Additionally, however, if you wish to run PHP from the command line it would be useful to add its installation directory to Windows PATH but for WAMP to operate it is not required. After Apache is installed and configured, also PHP configuration can be tested.

7.2.6. Summary

In summary, I have talked a lot about WAMP server in the discussion above, nevertheless, the researcher found out that due to different types of Operating system software on the market. PHP has another developing environment besides WAMP server. The following are the three developing environments;

a) LAMP

Is an archetypal model of web service stacks, named as an acronym of the names of its original four open source components; Linux Operating System, the Apache HTTP server, MySQL relational management system, and the PHP programming language.

b) MAMP

This is the solution pack stack composed of free and open source software running with proprietary commercial software, to run dynamic web sites on Mac OS

c) XAMPP

Is the most popular PHP development environment XAMPP is completely free, easy to install Apache distribution containing MariaDB, PHP, and Perl. The XAMPP open source package has been setup to be incredibly easy to install and to use.

2. 7.3. Conclusion

This project “*University Web-Based Discussion Forum*” is developed using Notepad++ based on Php language. The Development of this system took a lot of efforts to organise. I think this system will provide a lot of satisfaction. Though every task is

never said to be perfect in this development field even more improvement may be possible in this application. I learned so many things and gained a lot of knowledge about development field. With an inspiration from my able supervisors.

I will live to remember for the rest of life.

Future works

This definitely has ignited some interest in system development world that I had earlier left for others as specialty. I commit to venture on another important project research that will hopefully beneficial many if not the nation of some sectors of the cyber space. Besides; that will definitely help my next academic in devours.

6. ACKNOWLEDGEMENT

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