UNIVERSITY OF GONDAR

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**FACULITY OF IMFORMATICS**

**DEPARTMENT OF INFORMATION SYSTEMS**

**INSY**: INDUSTRIAL PROJECT

**project title:** DYNAMIC web based APPLICATION FOR GONDAR univrsity online learnig managemet system

**Submitted to:** Department of Information System, in partial fulfillment for the award of Degree of Bachelor Science in information system.

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/ /2017

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**Declaration**

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It is approved that this project has been written in compliance with formatting rules laid down by the university.

Acknowledgement

First of all, praise God, the almighty, merciful and adoring, for providing this prospect granting the facility to proceed successfully. The success and final outcome of this project required a lot of guidance and assistance from many people and the team extremely providential to have got this all along the completion of project documentation. Whatever the team has done is only due to such guidance and assistance and would not forget to thank them.

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# Acronyms

The project team did each activity with specified date Acronym

1. DB: Database
2. DBMS: Database Management System
3. ID: Identification Number.
4. My SQL: Structural Query Language
5. OODBMS: Object Oriented Database Management System
6. UI: User Interface
7. UML: Unified Modeling Language
8. UOG: University Of Gondar
9. FOI: Faculty Of Informatics
10. LMS: Learning Management System.
11. PHP: Hypertext Preprocessing.
12. UI: User Interface
13. UML **:**Unified Model Language
14. HTML: Hyper Text Markup Language

# Abstract

This project is a part of the industrial project for the fulfillment of bachelor degree in Information System. The project focuses on developing a web based application for university of Gondar learning management system. In this paper we try to describe how manual system will be change to the new computerized system. The current system, which was manual, faced with numerous problems like missing to record the entire daily task, tedious paper work, huge storage space and the like. The proposed system will be developed to overcome the problems of the manual system and to bring a better working environment. It will provide for users a simple and efficient way of university of Gondar learning management system. The users of this system access the service of the system. The project team is composed of four students; the project continues almost for four months. We will use the object oriented software development methodology to conduct this project, the programming language is PHP and HTML and the data repository is MySQL server. We hope the proposed system will bring a great change on the way currently learning management system.

# 

# CHAPTER ONE

## Introduction

A learning management system (LMS) is a software application or Web-based technology used to plan, implement, and assess a specific learning process. Typically, a learning management system provides an instructor with a way to create and deliver content, monitor student participation, and assess student performance. A learning management system may also provide students with the ability to use interactive features such as threaded discussions, [video conferencing](http://searchmobilecomputing.techtarget.com/definition/videoconference), and discussion forums [1]. University of Gondar uses manual learning management system. In this system the instructors give any learning materials manually. This kind of system has its own negative impact on the students and the instructors as a whole. The impacts include students are unable to get learning materials from the instructors easily and any time they want. Students are unable to get information easily from the department and the University College like exam schedule, semester (year) schedule, course tittles and other posted information. So, we are motivated to develop a new web based application that solves the current problem.

With the emerging need of digitized systems in every field of life since we are moving into a technology advanced era there is a need of time to have a system that can reduce and insure effective and efficient performance without needing any manual human efforts. We want to build software that makes things better, avoiding the all bad things and problems. Our software will provide online login system for students, online login system for department, online quizzes system, automated evaluation of quizzes, online assignment submissions, online record retrieval for students.

This process system is more easy and reliable to use than manual system. There is a security system with password in the system that the manual system never had and provides privacy to each student of their records and security of quizzes papers. There are different web forms and tables of SQL Server for every record. It provides also the feature to update the students about upcoming events which can be handled by the administration.

## Background

University of Gondar is one of the thirty-three Ethiopian universities; it was initially established in 1954 as a Public Health College and Training Center (PHC & TC). The basic reason for its initial establishment was the then prevailing health and related problems in and around Gondar. This marks the beginning today’s University of Gondar which still kept the legacy of its predecessors in standing for serving the surrounding community through its education, research and community services.

The university now has ten academic units namely the College of medicine and health Sciences, Faculty of Business and Economics, Faculty of Social Sciences and Humanities, College of Natural and Computational Sciences, Faculty of Veterinary Medicine, School of Law, Faculty of Agriculture, faculty of informatics, School of Technology and School of Education. Currently, the University offers about 57 undergraduate and 61 post graduates in the regular programs. In addition, extension, summer and distance programs are offered by most of the schools, faculties and the college. Recently, the university has launched two PhD programs; one in collaboration with Addis Continental Institute of Public Health. The lack of online learning management system in the university is serious of problem to manage the resources in the university.

## Statement of the problem

The project team mainly investigate some problems on the current operation, these are:

* Students are unable to get learning materials from the instructors easily and any time they want.
* It’s difficult to get exam result on time.
* It is so tedious to prepare and give handouts, worksheets and assignments to each student.
* It is time and resource consuming, there by diminishing much of the budget allocated for the departments.
* Information that delivered by instructors may be delay or lapse.
* Students not able to collaborate with the faculty effectively.
* Lack of privacy to each student of their records and security of quizzes papers.
* After submission of assignment and test papers it may be lost.
* During evaluation of assignment and exams it may occurs mistakes.

The problem discussed above reflects because of the absence or lack of computerized system. Hence it became necessary for online learning management system to eliminate the shortcoming of the manual system.

## Objective of the project

This project develops a new web based learning management system for UOG. And the project has the following general and specific objectives.

### General objective

The general objective of the project is to develop online learning management system for UOG.

### Specific objective

In order to achieve the general objective of the project the following specific objectives are formulated:-

* To Gathering requirements
* To know and study about the existing System work flow.
* To analysis the existing systems problem.
* Develop design model to use in learning management system
* Creating a user friendly environment for particular clients to react and use the system in good manner .
* Preparing test plan and conduct acceptance test
* Implement and testing of the proposed system
* Deploy the system and test it till it fits to the needs of the organization

## Scope of the project

The introducing system, learning management system, which is going to be implemented for University of Gondar will automate the operation of learning management system of the University.

Generally the scope of this project concerns with only online learning management system for University of Gondar. Tasks that can be includes in this project are

* Instructors can upload learning materials like assignment documents, handout, syllabus, video tutorials.
* Students download the assignment documents, complete it and then submit it online.
* Instructors prepare quiz online.
* The system can be marked online through automated marking system and display the result.
* Time and deadline for submission of assignment and quiz.
* This system consist messaging and discussion forum.
* Student exchange to offer more flexible, meaningful and globalized learning experience.
* The administrator register course and create student account.
* Student can edit their profile.
* Student can interact with the System in a Local Language.

## Limitation of the project

* The system is not integrated to other system like library system, human resource management system and finance and grading system.
* The system is accessible only in the campus compound because of using intranet network.
* This system is not applicable for distance learning students.
* Because of shortage of time the system doesn’t provide video conference.

## Significance of the project

The project has a lot of significant to the university society.

* Store data in reliability ways.
* The data consistency is applicable.
* Reduce the amount of resources that are wasted.
* Keep users information safely.
* Easy to search and retrieve of the required users data or information i.e. it saves time.
* Give work satisfaction for instructors as well as for students.
* Increases accuracy and availability.
* Reduce costs of coping handouts.

## Target beneficiaries of the system

This project provides many benefits for

1. **University**:-in manual there is loss of materials like paper, pen which is cost and needs more man power; the system reduces loss of costly materials and man power.
2. **Student**: - Information processing is very fast and delays can be avoided, it saves a lot of time and the students access the system anywhere and anytime in campus compound when they need. It improves the tiredness of students by avoiding the going to different stationeries’ to copy handouts.
3. **Instructor**: - It improves the tiredness of instructors by avoiding evaluation of tests and gives result.
4. **Developers of the project**:-It increases our knowledge and gained the skill how developing website and the project team are gets mental satisfaction from the project we developed.

## Feasibility study

What is the important of your system related to the existing working system, explained based on operationally, technically, economically and in Schedule feasibility.

### Technical Feasibility

Most of the technology need for the system has exists in the University of Gondar compound. And also the staff and other concerned bodies will have enough experience using this system. The system is developed by using technologically system development techniques such as PHP, Java script, CSS and MYSQL database which are currently available free to access. The developers select these software’s because we have enough capability to use those technologies to develop the project.

### Operational feasibility

Currently there is no existing system in the case of learning management system so this system will be implemented in University of Gondar as a pioneer of learning management system project. The system will provide adequate through put at desire time to the user and also give the need information in a timely usefully formatted way. The system also has security to gives access privilege providing account for an authorize person. This system provides help description to the user about how to use the system. The users friendly interact to the system interface and other technical modification on the system is done by the developers.

### Economic feasibility

As cost/benefit analysis, show the new system is developed using minimum coast and it give a lot of benefits such as advancing the services of the system, decreasing the work load of the users.

**Tangible cost**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Name | Quantity | Unit price in birr | Total |
| 1 | Purchase of flash disk (4GB) | 1 | 150.00 | 150.00 birr |
| 2 | Purchase of CD RW | 2 | 20.00 | 40.00 birr |
| 3 | Purchase of stationary paper  pen  pencil | 1.5 packet  20  5 | 100.00  3.00  1.50 | 150.00birr  60.00birr  7.50birr |
| 4 | Purchase of CD\_R | 4 | 5.00 | 20.00birr |
| 5 | Total estimate cost | - | - | 1027.50birr |

Table : Tangible cost

**Cost reduction**

To copy one chapter in single course it takes in minimum single paper takes 0.5 cent.

If one chapter have 20 page it takes=10 birr (0.5\*20)

If one course have 6 chapters it takes=60 birr (10\*6)

If one batch takes 6 course it takes= 360 birr (60\*6) in one semester

If one department have 4 batches the cost increasing to **1,440** birr in one semester for individual person.

In the proposed system the student download learning materials with in a second takes maximum 100 birr for all. So in the newly proposed system the cost that reduced by 95% because this system is web based (i.e. most of the material used in manual system was not used to give the course) and it is use for a long period of time.)

**Intangible** **benefit:** are benefits derived the creation of an information system that cannot be easily measured in money and consistency.

The intangible benefits of the new system are:

* Increase in accuracy of learning management system.
* Faster decision making by searching records from database.
* Increase security by providing authorized user can access.

### Schedule feasibility

A project will fail if it takes too long to be completed before it is useful. Our proposed system will be completed with the given time frame.

## Methodologies

### Data gathering methodology

During requirement analysis, data needed for the project will be gathered from various sources. During gathering and collecting necessary data and information needed for system analysis, the system use two major fact-finding techniques those are primary source and secondary source.

Primary sources are interview and observation. In secondary source the system obtain data from different document.

* **Interview**

We interview the students and instructors and the ICT center software office employees about existing system learning management system.

**Interview procedures**

* + 1. First we have decides which individuals would be most appropriate to interview.
    2. We have scheduled the interview and confirm the meeting time and date a day before conducting the interview
    3. We have critically looked as much as possible about the topic of our interview before conducting the interview.
    4. We have prepared all materials required for interview like notebooks, pencil or pen and audio recorder.
    5. Conduct the interview by fulfilling all criteria’s required for the interview.
    6. Examine the interview by preparing a summery, note cards, and /or outline of key points discussed in the interview that relevant to our topic.
    7. Finally we have determined its importance by analyzing the information obtained from interviews.

### Data modeling technique

The team members use Object Oriented Database Management System to develop their system because it is a system development approach encouraging and facilitating software components. The development models are the various processes or methodologies that are being selected for the development of the project depending on the project’s aims and goals. The project groups select **iterative** data model for these project because adviser can evaluate each phase to do the next phase and it is less cost as compared to other models. The requirement is known for the developers.

This project involves building a dynamic automated clearance management system for university of Gondar students. In order to achieve our project, an appropriate software design methodology **would be chosen iterative data model.**

Iterative development is a way of breaking down the software development of a large application into smaller chunks. In iterative development, feature code is designed, developed and tested in repeated cycles. Each iteration, additional features can be designed, developed and tested until there is a fully functional software application ready to be deployed to customers.

Typically iterative development is used in conjunction with incremental development in which a longer software development cycle is split into smaller segments that build upon each other.

We choose this iterative data model because of it:-

* Building and improving the product step by step.
* Can get the reliable user feedback.
* Less time is spent on documenting and more time is given for designing.
* Can only create a high-level design of the application before we actually begin to build.

### Analysis methodology

After gathering different information from stakeholders the project team will analyze requirements by using Unified Modeling Language models like use case diagram, sequence diagram and class diagram. Since [1]:-

* UML is a modeling language widely used to visualize the object oriented designs.
* UML makes it easy to visualize the software design.
* UML diagrams can be easily decoded and converted into most of the popular object oriented programming languages.

### Design methodology

The project team select object oriented approach to design the system because it has best feature than other approach.

**Reduced Maintenance:** The primary goal of object-oriented development is the assurance that the system will enjoy a longer life while having far smaller maintenance costs.

**Real-World Modeling:** Object-oriented systems tend to model the real world in a more complete fashion than do traditional methods.

**Improved Reliability and Flexibility:** Object-oriented system promise to be far more reliable than traditional systems, primarily because new behaviors can be "built" from existing objects.

## Programming tools and database

**Back-end**: The back end of this project used MYSQL, Apache and PHP because:

* It is more reliable.
* It is easy to use.
* It supports many operating systems

**Front end**: The Front end of this project used HTML, CSS and JavaScript because:-

* They can make effective design easily and substitute
* They use simple programming language
* They can be easily updated or changed

**Programming tools**

There are two types of programming tools. These are hardware tools and software tools.

### Hardware tools

This project used the following hardware tools.

* Laptop Computer: - used to develop the system.
* Flash Disk: - used to store and secure data as backup.
* CD/DVD: - used to store and secure data as backup.

### Software tools

Since, there are many software tools for developing any projects. This system or project uses listed below.

* Code lobster: - to write different codes of the projects. It is important because it support different languages like HTML, PHP, and JavaScript. It also used to run and test the project
* Html:-to display the web page.
* CSS: - for the formatting of the web site.
* JavaScript: - used for validation.
* XAMPP Server: -this software assists to create database or back end of the system, to run and test system application.
* Note Pad and Note pad++:-It used as reserve code to write this project.
* Microsoft Office window 2010:- used to write documentation part of this project.
* EDRAW Max: - used to design the diagram of the system or project.

## Project Cost

### Software development cost

For this particular project we will be using different software but the software’s are getting from the university.

|  |  |
| --- | --- |
| Software costs | |
| Software Description | Price |
| Microsoft office word 2010 | Free |
| Microsoft power point 2010 | Free |
| Microsoft SQL server | Free |
| A vast antivirus | Free |
| XAMPP | Free |
| Total | --- |

Table : Software cost

## Project schedule

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Activities** | Time schedule | | | | | | |
| **December** | **January** | **February** | **March** | **April** | **May** | **June** |
| Preparation of project proposal |  |  |  |  |  |  |  |
| Preparation of project analysis |  |  |  |  |  |  |  |
| Preparation of project design |  |  |  |  |  |  |  |
| Implementing |  |  |  |  |  |  |  |
| Testing and maintenance |  |  |  |  |  |  |  |

Table : Project schedule

## Work breakdown structure

The work breakdown structure is a view into the project which shows what work the project encompasses. It is a tool which helps to easily communicate the work and processes involved to execute the project. The Project Manager and project team use the work breakdown structure to develop the project schedule, resource requirements and costs.

|  |  |  |
| --- | --- | --- |
| **ID** | **Tasks** | **Responsibility** |
| 1 | Data Gathering And Project Proposal | All members |
| 2 | Data Gathering And System Analysis | All members |
| 3 | System & Object Design | All members |
| 4 | Implementation And Testing | All members |

Table : Work breakdown

Figure : Work breakdown structures

# CHAPTER TWO

# SYSTEM ANALYSIS

## Existing System Description

The current learning management system of University of Gondar is a labor-intensive system; the current system is time and resource consuming and inefficient. It tries to facilitate learning needs based on the regular way of teaching learning process, there are many methods that used in current learning management system that are.

* **Class room lecture**

This is one of the major ways that the current learning management system uses in order to simplify the learning teaching process. This class room lecture will be taking continuously throughout the given semester. In this way the Instructor (lecturer) and the students must come together to the lecture class with a specified time in order to attain the lecture.

This way of learning management system helps both the Instructor and students to give better interaction in learning process and based on the time that given for the semester so that the course can be completely covered. Though it is the main way to reach to our goal of managing a learning process, this method does not completely satisfy teaching learning goals that are.

* There is no other means of communication for the Instructor and students out of the class room so this will delay the ongoing process.
* In the class room the instructor cannot properly reach all the questions that are raised by the students because of limitation of time.
* The main problem of current system is if the Instructor or students are absent it will be difficult to continue the teaching learning process. Whenever such difficulties arise, it results is being unable to complete the course within specified time schedule, being unable for a timely submission of assignments, projects and so on.
* **Classroom tutorials**

This is an additional way of helping the students. It is the same as classroom lecture. But this one is not obligatory. It helps students to get the idea of the concepts deeply; that may be difficult to understand in only one class room lectures; using tutorial classes are more useful and it plays a great role with regard to affirmative action. But it also has its own drawbacks.

* It is must need that both the Instructor and the students meet in one class; this will be difficult if the Instructor is busy.
* It is time consuming and limited by time.
* **Handout**

This is another yet most important and frequently used way of forwarding learning process. This is a way in which the Instructor periodically gives additional learning materials gathered from many resources in printed form to each student for a particular chapter. In this way the Instructor will help the student to get the essential information in one handout.

But this process has also its own drawback regarding both the Instructors and the students and also the institute.

* It is so tedious for instructors’ to prepare and give handouts in the form of hard copy
* There will be a vast wastage at resource such as paper, toner, manpower and the like.
* It may lead the students to fully depend on the handout and they may never be initiated to refer more.

Fortunately all this problems can be minimized or vanished if an online learning management system website is fully deployed throughout the university.

* **Quiz and test**

This one is another method of facilitating learning process. The instructors give quiz and test to measure students how to understand the concept of the given course. The instructors give the quiz in one room or separate students based on their group and assigned one teacher to assist this process. But these methods have some impacts that are.

* There will be wastage of resource such as paper, toner, manpower and the like.
* During submission of the quiz or test assessment (result) the paper of the student will be lost.
* During evaluation of the quiz the instructor may make a mistake.
* The quiz is may not completed based on the given time taken because the instructor may give some additional minute for complete the quiz.
* **Notice Board**

This is the main way of activities between the department and their respective students. Whenever there is information which needs to be posted or delivered to the students. It will be written on a paper (printed on a paper) and it will be posted immediately on the notice board.

Information which will be posted includes:-

* Exam schedule
* Exam result
* Advisor/Advice call
* project / Assignment deadlines
* Emergency notices
* Time and place consuming
* More Some other department/ faculty/ Campus wide information.

Whenever such information is posted the students must see/ hear physically what is posted or essential information may be lost without satisfying their goals, chasing the students/ the department to dissatisfaction.

As mentioned above this method need to be updated periodically and must also be visited by the students continuously. Thus it is

* time consuming
* Resource consuming

### Problem of the existing system

* Students are unable to get learning materials from the instructors easily and any time they want.
* It’s difficult to get exam result on time.
* It is so tedious to prepare and give handouts, worksheets and assignments to each student.
* It is time and resource consuming, there by diminishing much of the budget allocated for the departments.
* Information that delivered by instructors may be delay or lapse.
* Students not able to collaborate with the faculty effectively.
* Lack of privacy to each student of their records and security of quizzes papers.
* After submission of assignment and test papers it may be lost.
* During evaluation of assignment and exams it may occurs mistakes.

## Requirement Gathering



### Requirement Gathering Methodologies

The system will be developed and implemented using methodologies that involve user friendly and interactive web based program building.

### Data collection method

When we collect the learning management information’s by using different method from different data source. These methods include interview and practical observation.

* **Practical observation:**

Even though interview and questionnaires are important to gather information, practical observation is simple and the group members physically observe information that cannot maintain from the interview or others and also it is important if they are unable to communicate with others because of the difficulties they have to the language.

* **Interview:**

The project team goals are to implement a new system and to overcome the drawbacks of the manual system. That’s way we have to go through an interview process which will give necessary information about the project requirement and help to solve a problems as well as fulfill in the user requirements. The team use interviews to collect information from individuals or from groups.

* **Document analysis**

To have detailed awareness about our project we use documents such as, industrial project paper that are done for four years. During the analysis of documents we gave a special consideration to those documents which can bring features to our system.

### Result Found

These team members have seen the manual system of learning management system. We used three data modelling technique to identify the problems of existing system which are interviewing, observation and document analysis. So we concluded that:-

* How the existing system is working.
* Background information about the organization.
* Drawback of the existing system

## Over view of the proposed system

During our observation and interview of users the project team observed certain problems from their manual based system. Because of this the project team proposed to solve the problem of the existing learning system by developing online learning management system. That means our proposed system will minimize the current problem and weakness of existing system by providing consolidated learning management system, the student can get their learning material only in one site. The proposed system will also provide easily resource controlling mechanism and create communication between instructors and students. The proposed system provides that student can get exam result on time, student can ask that raised from confusion by using this system discussion room, students can get reliable and accurate information.

The Learning Management System (LMS) provides functionality that can be used by faculty members and students to facilitate classroom and distance learning in a web-based environment.

Students can view and access their course schedules, course descriptions, Online Lectures, assignments, grades, quizzes and many other services. They can also complete online assignments and participate in grouped discussions, moderated discussions and live sessions.

As generally the proposed system will able to minimize the existing problems and resource consumption because the university clearance activities are based on manual system.

## Functional Requirement

This project is a description of activities and services that a system must provide. It is clear that the new system have to perform all the tasks done by the current system without changing the rules and regulation of the current manual system in cost effective way. Due to this fact the input, process and output of each subcomponent of the new system is the same as the existing system. The difference is that the execution time of the process became faster and tasks are executed electronically through computers in order to improve efficiency, capacity and flexibility of the system as compared to the current system in which tasks are executed manually.

In general, the new system is user friendly, which has interactive graphical user interface, which enables user of the system to perform tasks easily and effectively.

**Functional requirements for student**:

* Student can update his personal data.
* Student can upload the solution of any of his assignments before the deadline (If strict).
* Student will receive a message from the system after uploading the solution (accept or reject).
* Student gets feedback from the teacher.
* Student can see the information about the assignment (description and instruction, start-time, end time, motivation, how to download and upload the assignment and type of work: individually or as groups).
* Student can take quiz online.
* Student can get exam result in automatic mechanism.
* Student can raise their idea about a given question by using the system discussion forum.
* Student can communicate and ask question to instructors by using video chat system and the system store this communication in repository for preventing repetition of question.

**Functional requirements for teacher:**

* Instructor can add assignment information (description and instruction, start-time, end-time, motivation, how to download the assignment and upload it, type of work: individually or as groups).
* Instructor can upload a test script for testing the assignments for all students by using the generic interface.
* Instructor can see the assignments submitted by students. He can assess the students by browsing a report of the assignments and students.
* Instructor can manually send feedback, marks and notes to students.

## Non-functional Requirements

Non-functional requirement specifies how the system should behave or a non-functional requirement is a statement of how a system must behave, it is a constraint upon the systems behavior. It specifies all the remaining requirements not covered by the functional requirements. They specify criteria that judge the operation of a system, rather than specific behaviors.

Some of the non-functional requirement of this project is listed below.

* **User interface:** These requirements include the qualities of the system that are desirable from the users’ point of view. The new system will use windows type graphical user interface. This type of interface is easy to use for very little additional training and common to most computer users. The system will enable the users to use the system.
* **Usability:** the ease with which a user can learn to operate, prepare inputs for, and interpret outputs of system or component. The system should support ease of use that is it shouldn’t be complex to use. The user interface should be user friendly. Our system contends the help facility for user.
* **Availability:** The system will be available anywhere to its users, since it is web based.
* **Reusability:** The data and record that are saved to the database and shall be reused if needed.
* **Security consideration:** The system allows its user to perform their task only after login process. The user should be attended with the legible account and password otherwise they won’t be allowed. The authority to login to the system is only by the correct ID and password.
* **Good performance:** The system will be capable of carrying huge amount of data with one database.
* **Fast response time:** The system responses user request quickly to satisfy the user need.
* **System Modification & Maintainability:** The system can be maintained and modified for future use because the scope can be enlarged.
* **Error handling condition:** To reduce input fault, the system will: - Respond to error inputs by asking the user to re-enter data in the correct format.
* **Safety:** The database should be backed up in a reliable secondary storage media. This used to the user to recon problems or data loss problem occurred.

### User Interface an Human factor

The application we are developing is web based and which is for the students, it is not difficult to use it. We also use minimum amount of components on the interface so as to make easy to usage. They are only expected to know basic computer skill and since the application is working over the internet, the users should know at least how to use the internet and to navigate the browsers.

### Documentation

The System has well defined document which helps to easily maintain the system and the project team will also prepare short and precise help file on how to use the system for the system users. It will have a helping page to guide the user of the system and to show the process how they will have to use.

### Hardware consideration

The user of this application can use any computer having any browser. We use the most common database server MYSQL in software tools that is platform independent so that there is no hardware compatibility problem in using this application.

### Performance character

Since the system is going to be accessed by different users with different needs, it should be capable of handling and processing their queries quickly. Besides the software, Hardware will also be a great factor in the systems’ performance. Generally, the system should be able to handle many users and it will be responsive.

### Error handling and extreme conditions

The system is expected to handle errors encountered during run time. Errors could rise from users and from the system. Errors that occurred from the wrong doing of users will be handled by appropriate exception handling mechanisms. Generally, if an error occurs, the system will identify the error and notify the user so that he/she can take the appropriate corrections rather than terminating the system.

### Quality issue

When the clients are using this application, they may find something, which needs improvement and efficiency, or they may have their own appreciation about the application. So we will provide them with a page to fill it and from the feedback we collect, the system can be improved as they need.

### System modification

The System modification can be achieve easily because the system is going to be designed using an object oriented approach. If there is change on the process of clearance the system can be modified based on change criteria by the developers or any trained person that knows the code behind the system.

### Physical environment

The server must be put on a place that has high security room. And the client must put in the local area it must connect with server.

### Security issue

The system has login page it allow only the user who have privilege to access the system therefore the system can’t be accessed by unauthorized user. When the user want to access the LMS they sign up to the system and sign in to the system. Each system users can access the system based on their access right.

### Resource issue

**Server:** The minimum hardware requirement for MYSQL is-

* CPU: 32 bit or 64 bit
* Cores: AMD Dual-core processor C70
* Display resolution 1366x768(or lower is recommended)

**Client**

* RAM: 2GB or higher

## Business rule

Rule1: The ICT system admin administers the system

Rule2: Student must be registered.

Rule3: Instructor must be registered.

Rule4: The course must be registered.

Rule5: Student can change password once given but not username

Rule6: Instructor can change password once given but not username.

Rule7: The student must create their own account to use the system.

Rule8: The quiz is prepared and posted by instructor.

Rule9: The only organs that can upload are administrator and instructors.

Rule10: Instructor must give lecture in the class.

Rule11: The every user of the system cannot access without his privilege.

Rule12: The person who is non-user of this system cannot access except giving comment, View home page information.

## System model

### Scenario

**Scenario Name: S#1**

**Actor**: **Student**

**Flow of event:**

1. The student activates the system to login in to the system and then his/ her password and user name. The system check either the entered value is correct or not. If the value correct the system display the admin page, if not the system display the message like “user name and password are incorrect please try again!”
2. The student click on the profile link to modify users information properly, then submit, then the system check the validity of the entered value, if the value entered is valid then the system display the modification is done.
3. The student click on the submit form to submit assignment and project, then the system display the submit form then the student upload the assignments and project and submit, and the system display the conformation message to the student weather it is submitted or not.
4. The student click on the quiz forms to see if new quiz is uploaded and take quiz**.**
5. The student click on the discussion to raised their idea based on discussion topic that are posted by the instructor
6. **Scenario Name: S#2**

**Actor**: **Instructor**

**Flow of event:**

1. The instructor activates the system to login in to the system and then his/ her password and user name. The system check either the entered value is correct or not. If the value correct the system display the admin page, if not the system display the message like “the value you entered is incorrect please try again!”.
2. The instructor click on upload form to upload grade ,course related materials, and notice, and then the system display the form .then the instructor select year, semester, department and course ,then fill the form and submit .then the system display the confirmation message for instructor weather it is uploaded or not.
3. The instructor click on the quiz form prepare question and post the quizzes .after submission of quiz answer by student the result come. Then the system displays the form and then the instructor select department. Year, semester and course and then submit. Then the system display the conformation message for instructor weathers it is submitted or not.

**Scenario Name: S#3**

**Actor**: **Admin**

**Flow of event:**

1. The admin of the system activate the system to login in to the system and then his/ her password and user name. The system check either the entered value is correct or not. If the value correct the system display the admin page, if not the system display the message like “the value you entered is incorrect please try again!”
2. The admin register students, instructors and course based on their necessary information and give username and password to students and instructors. After this process the instructor and student can change password but cannot change username.
3. The admin click on the assign instructor window to assign instructor for course. Ask their interest, then give the course they want, if they are not interested, then the admin open assign instructor window, assign and check the maximum course give for one instructor.

## Use case model

In its simplest form, a use case can be described as a specific way of using the system from a user’s (actor’s) perspective and describes what the system does from the stand point of view. Use cases provide a means to capture system requirements, communicate with the end users and domain experts, and test the system. Use cases are best discovered by examining the actors and defining what the actor will be able to do with the system. So generally use case model divided in to two main categories namely Use case and Actor.

### Proposed system actor identification

An Actor in the learning management system specifies a role played by a user (system admin, instructors and students). The followings are a list of Actors in the Proposed System.

* **System admin:** is someone who checks student in formation of the respected office and updates the central database information and assigned privilege to other actors.
* **Instructors:** an employee of the institute who instructs or give lectures to students.
* **Student:** is someone who is legible in the institute to be lectured or instructed.

### Use cases

The following use cases have been identified from the system specification

* Manage account
* View module
* Submit assignment
* View course material
* Download materials
* Upload materials
* Take quiz
* Prepare quiz
* view result
* interact in forum
* manage database



Figure 1: Use case diagram for LMS

Figure 1. Use case of proposed learning management system

### Description of essential use case diagram

|  |  |
| --- | --- |
| Use case id | UC#1 |
| Use case name | Login |
| Participating actor | All system user |
| description | Any user who wants to access the system’s functionality must be Authenticated and Authorized and login to the system. |
| Entry condition | The user must be already register (the user must have user name, password and account type) |
| Flow of event | 1. The user open the system  2. The system display the login page  3. The user enter his/her identification (user type user name and password)  4. The user click on login button  5. The system takes the user to his/her page. |
| Alternative Flow of event | Step 5.1, If the identification is not correct the system display incorrect user type, user name and password try again message and the system display the login page. The system give chance to try again. |
| Exit condition | The system user logged in to the system |

Table : Login use case description

|  |  |
| --- | --- |
| Use case id | UC#2 |
| Use case name | Create user account |
| Participating actor | System admin |
| description | This use case helps the user when it is necessary to create new user account. |
| Entry condition | user login to the system |
| Flow of event | 1. User selects account from menu bar.  2. The system display user account form.  3. User fills all information and click create button.  4. The system create new user account  5. The system save the new account  6. The system display an acknowledgement successfully create the account |
| Alternative Flow of event | Step 3.1. If user enters wrong the system display message in order to correct wrong information.  Step 4.1. If users enters duplicate account the system display “information already exist” message. |
| Exit condition | A new user account is created |

Table : Create user account use case description

|  |  |
| --- | --- |
| Use case id | UC#3 |
| Use case name | Update user account |
| Participating actor | System admin |
| description | This use case helps the users when he/she wants to update his/her account. |
| Entry condition | User login to the system |
| Flow of event | 1. User selects account from menu bar.  2. The system display user account form.  3. User search account that he/she want to update.  4. The system display information of that account.  5. User makes necessary modification and click Update button.  6. The system asks for conformation.  7. User click ok button.  8. The system saves the change to that account.  9. The system displays an acknowledgement successfully updating the account. |
| Alternative Flow of event | Step 3.If the user account does not exist the system display “account not found” information. |
| Exit condition | Save the change to the account |

Table : Update user account use case description

|  |  |
| --- | --- |
| Use case id | UC#4 |
| Use case name | Change Password |
| Participating actor | All system user |
| description | This use case helps the user when it is necessary to change login password. |
| Entry condition | user login to the system |
| Flow of event | 1. User selects change password link.  2. The system display password change form.  3. User fills all information and click change button.  4. The system change the password and save the new password  5. The system display an acknowledgement of password change successfully |
| Alternative Flow of event | Step 3. If user enters wrong the system display message in order to correct wrong information.  Step 4. If users input does not exist in the database the system display the password does not exist message |
| Exit condition | Save the changed password |

Table : Change Password use case description

|  |  |
| --- | --- |
| Use case id | UC#5 |
| Use case name | Delete user account |
| Participating actor | System admin |
| description | This use case helps the user to delete user account if it is no more necessary. |
| Entry condition | The user login to the system, the account exists. |
| Flow of event | 1.Users select account from menu bar  2. The system display user account form.  3. Users search account who wants to delete.  4. The system display information of that account.  5. User click delete button.  6. The system deletes the account.  7. The system display an acknowledgement successfully deletes the account. |
| Alternative Flow of event | Step 3.If the user account does not exist the system display “account not found” information. |
| Exit condition | the account is deleted |

Table : Delete user account use case description

|  |  |
| --- | --- |
| Use case id | UC#6 |
| Use case name | Recover forgotten password |
| Participating actor | All system users recover forgotten password |
| Description | The system users may forget their password so this use case help to the system user to recover the forget password . |
| Entry condition | The user must be previously register |
| Flow of event | 1. The user click on forgotten password button  2. The system display forget password recover form  3. The user will enter all required information and click on display button.  4. The system retrieves the password and sends to user email and will display acknowledgment successfully retrieve the password. |
| Alternative Flow of event | Step 4.if the user failure required information the system display the message to fill all required information |
| Exit condition | The user knows their password |

Table : Recover forgotten password use case description

|  |  |
| --- | --- |
| Use case id | UC#10 |
| Use case name | upload quiz |
| Participating actor | Instructor |
| description | This use case helps for instructors to upload the generated questions with their time duration, and additional information about the quiz. |
| Entry condition | Instructor login to the system |
| Flow of event | 1. instructor select on upload quiz menu  2. The system display uploaded form.  3. Instructor searches the prepared exam from the database and click search button.  4. Instructor fills required information and click upload button.  5. The system displays an acknowledgement the information successfully uploaded. |
| Alternative Flow of event | Step 3.1 if the searched quiz does not found in the database the system display the message “the exam is not found”.  Step 4.1. If instructor enters wrong information the system display message in order to correct wrong information. |
| Exit condition | Quizzes are uploaded to the central database. |

Table : Upload course material use case description

|  |  |
| --- | --- |
| Use case id | UC#8 |
| Use case name | upload assignment |
| Participating actor | Instructor |
| description | This use case helps for instructors to upload the assignment for taking an assessment to student .uploaded information contain the deadline of the assignment ,type of assignment that are work with group or individual and so on. |
| Entry condition | Instructor login to the system |
| Flow of event | 1. instructor select on upload assignment Menu  2. The system display form for the use of upload assignment  3. Instructor fills required information and click upload button.  4. The system displays an acknowledgement the information successfully uploaded. |
| Alternative Flow of event | Step 3.1. If instructor enters wrong information the system display message in order to correct wrong information. |
| Exit condition | Assignments are uploaded to the central database. |

Table : Upload assignment use case description

|  |  |
| --- | --- |
| Use case id | UC#9 |
| Use case name | Prepare quiz |
| Participating actor | Instructor |
| description | This use case helps for instructors to prepare quiz questions. The question may be multiple choices, true/false, or matching. |
| Entry condition | Instructor login to the system |
| Flow of event | 1. instructor select on generate quiz Menu  2. The system display form that contains question types.  3. Instructor select question types and click submit button.  4. The system display the form used for prepare question.  5. Instructor fills required information and click save button.  6. The system displays an acknowledgement the information successfully saved. |
| Alternative Flow of event | Step 3.1 if instructor does not select any question type the system display select question type.  Step 5.1. If instructor enters wrong information the system display message in order to correct wrong information. |
| Exit condition | Questions are saved to the central database. |

Table : Prepare quiz use case description

|  |  |
| --- | --- |
| Use case id | UC#7 |
| Use case name | upload course Material |
| Participating actor | Instructor |
| description | This use case helps for instructors to upload course materials like handout, reference books, video tutorials and syllabus. |
| Entry condition | Instructor login to the system |
| Flow of event | 1. instructor select on upload course material Menu  2. The system display course material upload form  3. Instructor fills required information and click upload button.  4. The system displays an acknowledgement the information successfully uploaded. |
| Alternative Flow of event | Step 3.1. If instructor enters wrong information the system display message in order to correct wrong information. |
| Exit condition | Course materials are uploaded to the database. |

Table : Prepare quiz use case description

|  |  |
| --- | --- |
| Use case id | UC#11 |
| Use case name | Assignment submission |
| Participating actor | Student |
| description | This use case helps for student to submit a given assignment to instructors. Student post files for submission to the teacher. |
| Entry condition | Student login to the system |
| Flow of event | 1. Student Selects submit option.  2. System returns options to submit files.  3. Student selects upload files.  4. System returns form to select files, and visibility of those files to the teacher.  5. Student selects file(s) to upload, and visibility and other information about assignment and click submit button.  6The system displays an acknowledgement the information successfully uploaded. |
| Alternative Flow of event | Step 5.1. If student enters wrong information the system display message in order to correct wrong information. |
| Exit condition | The assignment is submitted to instructor. |

Table : Assignment submission use case description

|  |  |
| --- | --- |
| Use case id | UC#12 |
| Use case name | quiz submission |
| Participating actor | Student |
| description | This use case helps for student to solve the given question and submit it to evaluate him/her self |
| Entry condition | Student login to the system |
| Flow of event | 1. Student Selects take quiz option. 2. System returns the form that contain the question and submit button, 3. Student solves the given questions based on the given time and click submit button. 4. The system displays the mark that the student gets. 5. Student click in the preview button to view the correct answer, 6. The system displays the previous questions and its correct answer. |
| Alternative Flow of event | Step 3.1. If student enters wrong information the system display message in order to correct wrong information.  Step 3.2.if the time is end before the student complete the given questions, the system automatically submit the quiz. |
| Exit condition | The quiz is submitted to a database and the result of a given quiz is displayed automatically. |

Table : Quiz submission use case description

|  |  |
| --- | --- |
| Use case id | UC#13 |
| Use case name | Download material |
| Participating actor | Student |
| description | This use case helps for student to download the course materials that are uploaded by instructors. |
| Entry condition | Student login to the system, the document must be in the form of softcopy. |
| Flow of event | 1. Student Selects download option. 2. System returns the form that contain the document that are uploaded by instructor and download button, 3. Students select the materials and click the download button. 4. The system displays an acknowledgement the information successfully downloaded. |
| Alternative Flow of event | Step 3.1 if item not selected, the System display message download information not done. |
| Exit condition | The documents are downloaded. |

Table : Download materials use case description

|  |  |
| --- | --- |
| Use case id | UC#14 |
| Use case name | Interact in forum |
| Participating actor | Student and instructor |
| description | This use case helps for student to forward their idea based on raised questions. Student and instructors participates in this page . |
| Entry condition | Users logs to the system |
| Flow of event | 1. Users Selects forum option. 2. System returns the form that contain the information or question that are concluded in that page, 3. Users replay their idea or answer of question that are raised by other student or instructor. 4. The system displays the reply return to students and display acknowledgement the information successfully replay. |
| Alternative Flow of event | N/G. |
| Exit condition | The ideas are recorded in the discussion forum. |

Table : Interact in forum use case description

|  |  |
| --- | --- |
| Use case id | UC#15 |
| Use case name | Display grade |
| Participating actor | Instructor |
| description | This use case helps for instructors to display the grade of student in each course and the grade contains the continuous assessment result and final result of each subject. |
| Entry condition | Instructor logs to the system |
| Flow of event | 1. Instructor select grade menu. 2. System returns the form that contains the information for generating grade. 3. Instructor fills all necessary information and click display button. 4. System displays an acknowledgement the information successfully. |
| Alternative Flow of event | Step 3.1. If student enters wrong information the system display message in order to correct wrong information |
| Exit condition | The grade are stored in the database and displayed when the student want. |

Table : Interact in forum use case description

|  |  |
| --- | --- |
| Use case id | UC#16 |
| Use case name | View course information |
| Participating actor | Student |
| description | This use case helps for student to get information about course that means who deliver this course ,credit hour ,any reference that help, assessment mechanism of the course |
| Entry condition | Student login to the system |
| Flow of event | 1. Student select course info menu. 2. System displays all information of course. 3. Student view information’s that he/she want |
| Alternative Flow of event | .N/G |
| Exit condition | Students see information that he want. |

Table : View course information use case description

|  |  |
| --- | --- |
| Use case id | UC#17 |
| Use case name | Register course |
| Participating actor | System admin |
| description | This use case helps for the admin to register the available courses that are delivered to student and it contain quiz, assignment, and learning material in to the system. |
| Entry condition | System admin must login to the system |
| Flow of event | 1. Admin select course register link. 2. System returns the form that contains the information for registering course. 3. Admin fill all required information and click register button. 4. System display successful registered acknowledgment. |
| Alternative flow of event | * 1. If student enters wrong information the system display message in order to correct wrong information. |

Table : Register course use case description

## Activity Diagram

Activity diagram is another important diagram in UML to describe dynamic aspects of the system. Activity diagram is basically a flow chart to represent the flow from one activity to another activity. The activity can be described as an operation of the system [1].



Figure : Activity diagram for login



Figure : Activity diagram for change password



Figure : Activity diagram for create account



Figure : Activity diagram for prepare question



Figure : Activity diagram for submission quiz

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Figure : activity diagram for upload quiz



Figure : Activity diagram for upload material

## Object model

### Data dictionary

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Field name** | **Data type** | **Caption** | **null** | **key** | **Field size** |
| Stu\_Id | String | Student Identification number | No | Pk /key | 50 |
| F\_ name | Text | first name | No |  | 50 |
| L\_ name | Text | Last name | No |  | 50 |
| Age | Integer | Age | No |  | 50 |
| Password | String | Password | No |  | 50 |
| E- mail | String | Email address | No |  | 50 |
| Department | Text | Department | No |  | 50 |
| Year | Text | Year | No |  | 50 |

Table : Data dictionary for student

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Field name** | **Data type** | **Caption** | **null** | **key** | **Field size** |
| Ins \_id | String | Instructor identification number | No | Pk /key | 50 |
| F\_ name | Text | first name | No |  | 50 |
| L\_ name | Text | Last name | No |  | 50 |
| Password | String | Password | No |  | 50 |
| E- mail | String | Email address | No |  | 50 |
| Department | Text | Department | No |  | 50 |

Table : Data dictionary for instructor

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Field name** | **Data type** | **Caption** | **null** | **key** | **Field size** |
| id no | String | identification number | No | Pk /key | 50 |
| F\_ name | Text | first name | No |  | 50 |
| L\_ name | Text | Last name | No |  | 50 |
| Password | String | Password | No |  | 50 |
| E- mail | String | Email address | No |  | 50 |

Table : Data dictionary for system admin

### Class diagram

The class model shows static class objects in a system and the relationships between them. Two particularly important relationships are generalization and aggregation. Each class object on the diagram often shows the class name, its attributes and operations.

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Figure : Class diagram for learning management system

## Dynamic model

### Sequence diagram



Figure : Sequence diagram for change password



Figure : Sequence diagram for login



Figure : Sequence diagram for generate quiz



Figure : Sequence diagram for upload quiz



Figure : Sequence diagram for upload materials



Figure : Sequence diagram for taking quiz



Figure : Sequence diagram for register course



Figure : Sequence diagram for view course information

### State chart diagram



Figure : State diagram for login



Figure : State diagram for submission of quiz



Figure : State diagram for discussion forum



Figure : State diagram for upload material

## User interface



Figure : Home page for proposed system

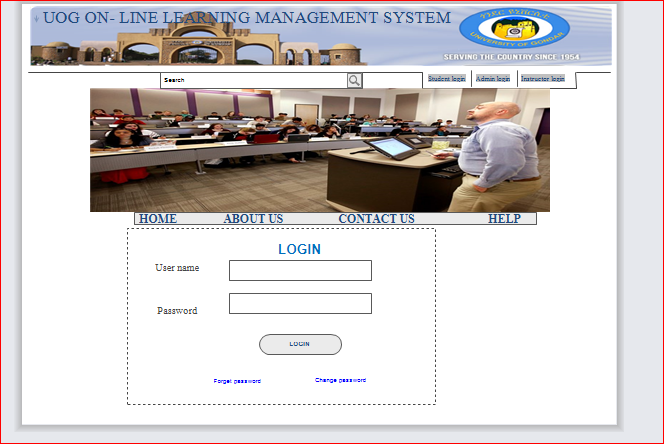


Figure : Login page for proposed system

# CHAPTER THREE

## Introduction

The purpose of designing is to show the direction how the web page is built and to obtain clear and enough information needed to drive the actual implementation of web page. It is based on understanding of the model. The web page built on system design also focuses on decomposing the system in to manageable parts

This design part of the project includes all object oriented diagrams including subsystem decomposition, proposed system architecture, component diagram and finally deployment diagram. This all diagram represent the requirement and on what way to solve the requirement of the proposed application in detail.

### Design Goals

**Design goals describe the qualities of the system that the developers should consider. These goals can be drawn from the non-functional requirements already discussed. The design goals can be generally grouped into five categories. These are: Performance criteria,** Error handling condition **criteria, Cost criteria, Maintenance criteria, and End user criteria.**

* **Performance: online learning management system should respond fast with high throughput, i.e. it should perform searching information, uploading and downloading materials, registration processing and taking quiz in a time less than a minute.**
* **Error handling condition: online learning management system should be robust (forceful) i.e. it should be able to carry on invalid user inputs, fault tolerant, reliable and available. The system shouldn’t allow non-authorized users to access students’ personal data or modify.**
* **Cost: online learning management system should be developed, deployed, administered and maintained with minimum cost possible.**
* **Maintenance**: **The system should be easily extensible to modify the uploading materials, add new functionality, portable to different platforms. The code for the system should be easily readable, understandable and should be easily mapped to specific requirements.**
* **End User Criteria**: **The system should have simple and understandable graphical user interface such as forms and buttons which have descriptive names. It should give reliable response for each user request at least before the session expires.**
* **Usability: Usability is the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. From the end users’ perspective the system should be designed in such a way that it is easy to learn and use, efficient and having few errors if any.**

## Current software architecture

The existing system of UOG learning management system is manual system and hence there is no existing software architecture that will be considered. As a result, we only describe the software architecture of the newly proposed system.

## Proposed software architecture

### Overview

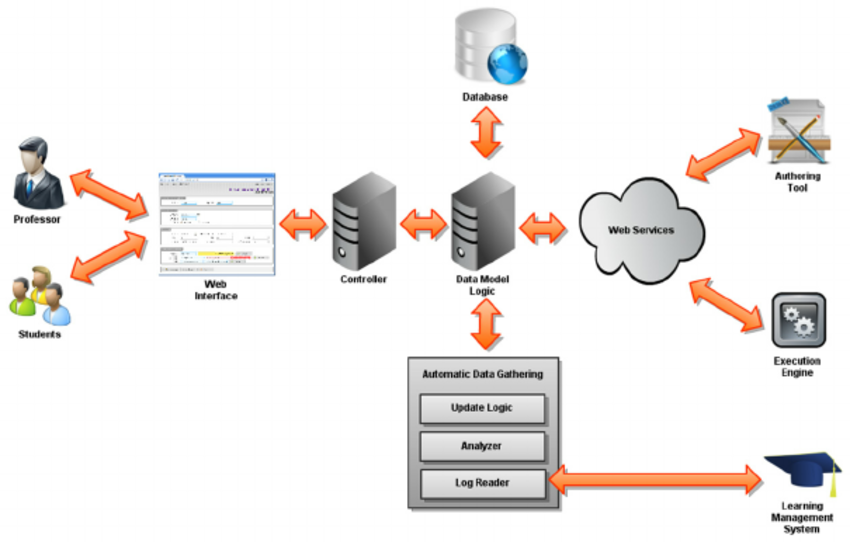


Figure : Software architecture for proposed system

Software architecture refers to the subsystem decomposition in terms of subsystem responsibilities, dependencies among subsystems, subsystem mapping to hardware, and Major policy decisions such as control flow, access control, and data storage.

The proposed system will have three tier client-server software architectures .A client i.e. the computer, which requests the resource, equipped with user interface (usually web browser for presentation purposes. the application server (also middleware), whose task it is to provide the requested resources but by calling on another server. the data server which provides the application server with the data it required.

### Subsystem decomposition

Subsystem decomposition describes the decomposition into subsystems and the responsibilities of each. During decomposition of the system we decompose our system in to individual unit that can be perform by one team member and one subsystem modification do not affect the other subsystem and each subsystem class are related with each other. Our system has the following sub system.

* **Quiz Management** **subsystems**, which facilitate the design and authoring of quizzes and tests, which are published on the WWW and taken on-line. They provide tools for test creation and their on-line delivery, automatic grading, results manipulation and report generation.
* **Communication management subsystem**
* **Course material management subsystem**
* **User administration subsystem**



Figure : Learning management system decomposition

## Component diagram

In this diagram components of the system will be energetic showing that there is relation among components, management of the system, database and operations performed on databases such security issue. This in some area shows which component or objects will be accessed by whom and what type of security infrastructures it is using. The diagram is simulated below.



Figure : Component diagram for proposed system

## Hardware/software mapping

In this system deployment mode is showing the hardware of the system, the software that is installed in the hardware and also the middleware that is used to connect the dissimilar machines to one and other. It also shows how the software and the hardware components work together.

The architecture of our system is a 3 tier Client/Server Architecture where a client can use Internet browsers to access the online learning management system provided by the system within compound of university using the Internet.



Figure : Deployment diagram for proposed system

## Persistent data management

The persistent data of learning management system are the data that are accessed by the users permanently in the database .out team member represent this persistent data in the form of object diagram.



Figure : Object diagram for proposed system

## Access control and security

The actors of the proposed system have their own privilege to access authorize information we describe it by using access control matrix.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Actors | Quiz Management | Course material management | Communication management system | User system administration |
| System admin | Manage all activity () |  |  | Create user account ()  Update user account()  Delete user account()  Change password()  Recover forget password |
| Instructor | Upload quiz ()  Generate question () | Upload course material ()  Upload Assignment ()  Update course material ()  Update Assignment ()  Delete course material ()  Delete Assignment () | Interact in discussion forum () | Change password ()  Recover forget password() |
| Student | Submit quiz ()  View result () | Download course material()  Download Assignment() | Interact in the discussion forum () | Change password ()  Recover forget password() |

Table : Table of access control and security

## Detailed Class Diagram



Figure : Detailed class diagram for proposed system

## Subsystem services

* **Quiz Management** **subsystems**, which facilitate the design and authoring of quizzes and tests, which are published on the WWW and taken on-line. They provide tools for test creation and their on-line delivery, automatic grading, results manipulation and report generation.
* **Communication management subsystem** which facilitatethe communication among instructors and students by designing discussion forum.
* **Course material management subsystem** which facilitatealmost all activities of learning management system that contains upload and download learning materials and assignments.
* **User administration subsystem** which facilitate and manage the user account including create account, change password, recovery password.

## Packages diagram

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Figure : Package diagram for proposed system