

WOLKITE UNIVERSITY

COLLEGE OF COMPUTING AND INFORMATICS

DEPARTMENT OF COMPUTER SCIENCE

TITLE: Online Examination System For Wolkite University

SUBMITED TO DEPARTMENT OF COMPUTER SCIENCE IN PARTIAL FULFILMENT OF THE REQUIRMENT FOR THE DEGREE OF BACHLER OF SCIENCE IN COMPUTER SCIENCE

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May 25,2021

DECLARATION

We hereby declare that this BSc final project is our original work and has not been presented for a degree in any other university, and all sources of material used for this Project have been duly acknowledged.

Name: _____Signature _____

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Name: _____Signature _____

This BSc final project has been submitted for defense with my approval as a project advisor.

Name: _____

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Date of Submission: _____

APPROVAL FORM

We, the members of the board of examiners of the final open defense by Kaleab Tilahun, Tofik Mohammed, Kaleyesus Endale, and Kalkidan Tsegaye have read and evaluated his/her final project entitled "**Online Examination System For Wolkite University**" and examined the candidates. This is, therefore, to certify that the project has been accepted in partial fulfillment of the requirement of the Degree of Computer Science.

Advisor	Signature	Date
Examiner 1	Signature	Date
Examiner 2	Signature	Date
Examiner 3	Signature	Date
Department Head	Signature	Date

ACKNOWLEDGEMENT

We want to appreciate the almighty of God for the gift of life, protection, Health, academic success and for giving us the strength to preparing the first-semester final project documentation. We want to also in a special way appreciate our Parents for the support and sponsorship of our education from initial to preparing the first-semester final project documentation, for care, patience, and love we pray the Almighty God grants them long life on earth to enjoy the fruit of their labor. We want to in a special way acknowledge our project advisor Mr. Kemal S. (MSc.) for his support in the realization of this project work. We appreciate all our friends and well-wishers whose name were not mentioned we say our Lord reward you all what you want.

LIST OF ABRIVATION

№	Abbreviation	Description
1	CSS	Cascading Style Sheet
2	GB	Gigabyte
3	HTML	Hyper text Markup Language
4	Md5	Message Digest Algorithm
5	MYSQL	Structure Query Language
6	№	Number
7	PC	Personal Computer
8	PHP	Hyper Text Pre Processor
9	RAM	Random Access Memory
10	SIMS	Student Information Management System
11	UML	Unified Modeling Language
12	WKU	Wolkite University

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ABSTRACT

Online Examination system is giving and taking of exam between students and Instructors through an internet. Our system is a web based, so user of our system can access the system by using a computer. In our online examination system department head registers students instructors and exam committees. After registration the department head post schedule of exams according to that schedule the instructor prepare and post exam then the exam committee approve the exam when approval is needed then student take it. Finally the system evaluate the exam and prepare a grade.

CHAPTER ONE

1.Introduction

Online examination is conducting a test online to measure the knowledge of the participants on a given topic. With online examination students can do the exam online, in their own time, with their own device, regardless of where they live. You only need a browser and an internet connection. It is traditionally that every student takes an exam in a classroom, because they are to sit there and have the teacher during the exam. This Online Examination System is to efficiently evaluate the examiner through a fully automated system that not only saves lot of time but also give fast results. It will solve all the paper works in the examination process usually spent by the teacher or instructor in reading and checking the answer one after the other. So, our proposed system will help to get the listed benefit for wolkite university.

1.1. Background of the Organization

Wolkite University (WKU) is one of the third-generation higher institutions that have been founded in 2012. It is established for the purpose of providing and promoting higher education learning, research, and outreach programs in the country to ensure the realization of the national vision of reaching the level of middle income countries by 2020. The University is located in the Southern Nation Nationalities Regional State, in Guraghe zone, 158 km southwest of the capital city, Addis Ababa, on the way to Jima. In November 2009 the late prime minister, his Excellency Mr. Meles Zenawi, laid the foundation stone of the University in a plain landscape which is quite ideal for academic pursuit. It is situated at Gubreye sub-city, 14 km away from Wolkite town, of the gubreye-butajira road. The major link road to the University is a direct route to Wolkite-Jimma, Wolkite-Hossana and wolkite-Butajira.

The University began its formal activities at Wolkite town with the appointment of the first president, Dr. Admasu Shibru, in February 2012, while other key officials of the University were appointed later. Source (www.wku.edu.et).

Wolkite university uses manual based examination system to evaluate the understanding of their students. And it leads to invest much budget for the examination and also it leads to error when evaluation and grading process.

The mission of our team is to develop online examination for wolkite university which reduce the cost for examination and gives error free result with in short period of time.

1.2. Statement of the problem

In Wolkite University the process of assessment of test and evaluating their scores after the test was done manually. When Testing and evaluating of exams manually it may not precise or make wrong. Additionally, the problems of the existing system are: -

Leads to human error- means results may not precise when calculation and evaluation done manually.

Consume more time - in existing system time are consumed in both Academic staff and student side. The problems that consume time on organization side are on distributing score of students, on checking answer sheet. On student side it consumes much time to sea their result.

Economic problem- In economic side there is a problem in both student and the university.

Universities spending of resource on buying paper, copy of paper, telephone calling to college to view information. Student also spent for paper and pen for the examination.

Labor - instructors spent much time and labor on evaluate the answer shit.

This proposed system (online examination system) solves the above problem. Because it is automated system. Generally, if the academic staff uses this system on the future it will solve their problem.

1.3. Objective of the Project

1.3.1. General Objective

The general objective of the proposed system is to change the examination system of Wolkite University from semi manual to automated system.

1.3.2. Specific Objective

To achieve the general objective, the following are specific objective of the project.

- Study and analyses the existing system.
- Design a system that consider the current situation and technology.
- Select and implement the selected algorithm.

- System proposition and development.
- Design and develop new database.
- Test and evaluate the proposed system.
- Deploy the final product of the project.

1.4. Feasibility Analysis

The feasibility study is used to indicate whether the system is feasible or not. It is an important phase in both the research and software development process. It enables the developer to have an assessment of the product being developed. It refers to the feasibility study of the product in terms of outcomes of the product, operational use and technical support required for implementing it.

1.4.1. Technical Feasibility

Technical feasibility is the measure of the practicality of the specific support and availability of technical resources and expertise to use the system. The proposed system is also easy to maintain and is very much adaptable for change. Our development team has the required knowledge to develop the functionalities of the system. So, the system will be technically feasible.

1.4.2. Operational Feasibility

Operational feasibility determines how the proposed system will satisfy the organizations need and it also offers secure, accurate and efficient system to the organization. Our proposed system performs all of its task in a user friendly manner. In which, any one with out advance technical background can use the system. So, our proposed system is operationally feasible.

1.4.3. Economic Feasibility

Economic feasibility is the measure of identifying the financial benefit and cost associated with the project being developed. The development of the system requires a minimum amount of coast and it reduce the cost of examination in operation. So, our proposed system is economically feasible.

1.5 Scope and Limitation of the Project

1.5.1 Scope of the Project

- Register students for different courses.

- Prepare exam
- Evaluate Students.
- Prepare grade.
- Authenticate users.
- Post exam and scheduling information's.

1.5.2. Limitation of the Project

- Visually impaired persons cannot access the system.
- Cannot handle descriptive questions (essays).

1.6. Significance of the Project

After the system will complete, the organization will get the significance from system are the following:-

Reduce cost-the system save cost for organization that spend on examination materials preparation and production.

Save time-for organization and student. On student side they view result automatically. On organization side it will be easy to evaluate students and searching students information..

Avoiding mistakes-human error will be avoided because the system will give correct answer and calculate result.

Reduce human power-human power that needed for duplication of paper will be reduced.

Independent of location-student who learns in any branch of University can take exam everywhere.

Performance-Students observe and view their results immediately after complete the exam.

1.7. Beneficiary of the System

The university is the most benefited from the system because it reduces the high cost which spent for the examination. The other beneficiary of the system is the instructors. On the system instructors do only preparing exam and give the answer for the system then the system evaluate

the exam. Students are the other beneficiary from the system because they can get error free result and they can see their result automatically.

1.8. Methodology of the Project

In order to accomplish this project on time and within the cost, we would follow different procedures which are describe bellow.

1.8.1. Data Collection Tools/Techniques

Data collection methodology is the way of gathering relevant data to study problems of the current system.

- **Interview:** It is a useful data collection technique that assist the team to assess the manual system by question and answer mode with instructors department heads and students.
- **Document analysis:** the team will reviewed document such as exams and some related previously done projects which is very important to develop our project.

1.8.2. System Analysis and Design

In this project, our team selected to use object oriented system development methodology for the design.

1.8.3. System Development Model

Iterative model: iterative process starts with a simple implementation of a small set of the software requirement and iteratively requirements and iteratively enhance the evolving versions until the complete system is implemented and ready to deployed.

1.8.4. Testing Methodology

Software tasting is evaluation of the software against requirement gather from users and system specification. So, our team will use to test the system by using types of testing like unit testing, system testing and integration testing.

- **Unit testing:** unit testing is done at the source code level for language specific programming error such as bad syntax, logic errors, or to test particular function or code error.

  Sample test

- Check whether the return type of function is correct.
- Check the correct output is produce for different inputs.
- Check efficiency of the code.

- **System testing**: the goal of system testing are to detect fault that can only be exposed by testing the entire integrated system or some major part of it.

  Sample test

  - Verify system completeness-based user's requirement.
  - Evaluating the functionality of the subsystem after a combination of individual subsystem whether it works correctly or not.
  - Check the coherence and coupling of each sub system.

- **Integration testing:** in this level of testing we will examine how the different procedure works together to achieve the goal of the sub system.

  Sample test

  - Check the interaction between individual functionality which performs the specific task.
  - Identify the independence of each subsystem with other subsystem.

1.8.5. Development Tools and Technologies

1.8.5.1. Front end Technique

The user interface is developed using HTML, CSS, JavaScript.

1.8.5.2. Back end Technique

We will use php and Xampp database to develop and manage the back end of the system.

1.8.5.3. Documentation and Modeling Tools

Software tools

Table 1. 1 Software Tools

Tools	Description
Microsoft Word	For documenting the corresponding deliverables associated with the project
Edraw Max	For designing unified modeling language (UML)

	diagrams.
Adobe Photoshop	For designing interactive user interface

Hardware tools

Table 1. 2 Hardware Tools

Tools	Description
Computer	For documentation and designing UML
Paper	For notes
Pen	To write a requirement
Printer	To print the document

CHAPTER TWO

2. Description Of The Existing System

2.1. Introduction Of The Existing System

Examination is an educational assessment intended to measure a test-taker's knowledge, skill, aptitude, physical fitness, or classification in many topics. A test may be administered verbally, on paper, on a computer, or in a predetermined area that requires a test taker to demonstrate or perform a set of skills. wolkite university's examination process is manual system which is an instructor prepare exam then he gives the exam for the students and students take the exam next to that the instructor evaluate the answer sheet and lastly he shows the exam paper for the students. In these chapter we will show detail about the existing system of wolkite university examination process by studying the users, major function. Draw back and the business rule of the existing examination system of wolkite university.

2.2 Users Of The Existing System

Users are persons who are an external agent to the system. Those persons are directly interacted to the system on the existing examination system of Wolkite University the main users are students, instructors, examiners and department heads.

Roles of users in existing system.

- **Students**:-students are the main users of the existing examination system of the Wolkite University they can do tanking exam and viewing their result when it is evaluated by the instructor.
- **Instructors**:- also instructors are the main users of the existing system they can do preparing exam, evaluating the exam paper and showing results of the students.
- **Examiners**:-they are users of the existing system they control the examination process in the class room.
- **Department Heads**:-they are one of user of the existing system their role is approving the exam contents when it is like final examination.

- **Exam committee**:- they are the user of the existing system their main function are approving the exam which prepared by instructors.

2.3 Major Function Of The Existing System

Many of the major functions that are being done in the current system are done manually. Only the grading system of the examination process are done through automated system known as SIMS (Student Information Management System).

Some Major Functions of the existing system of wolkite university examination system.

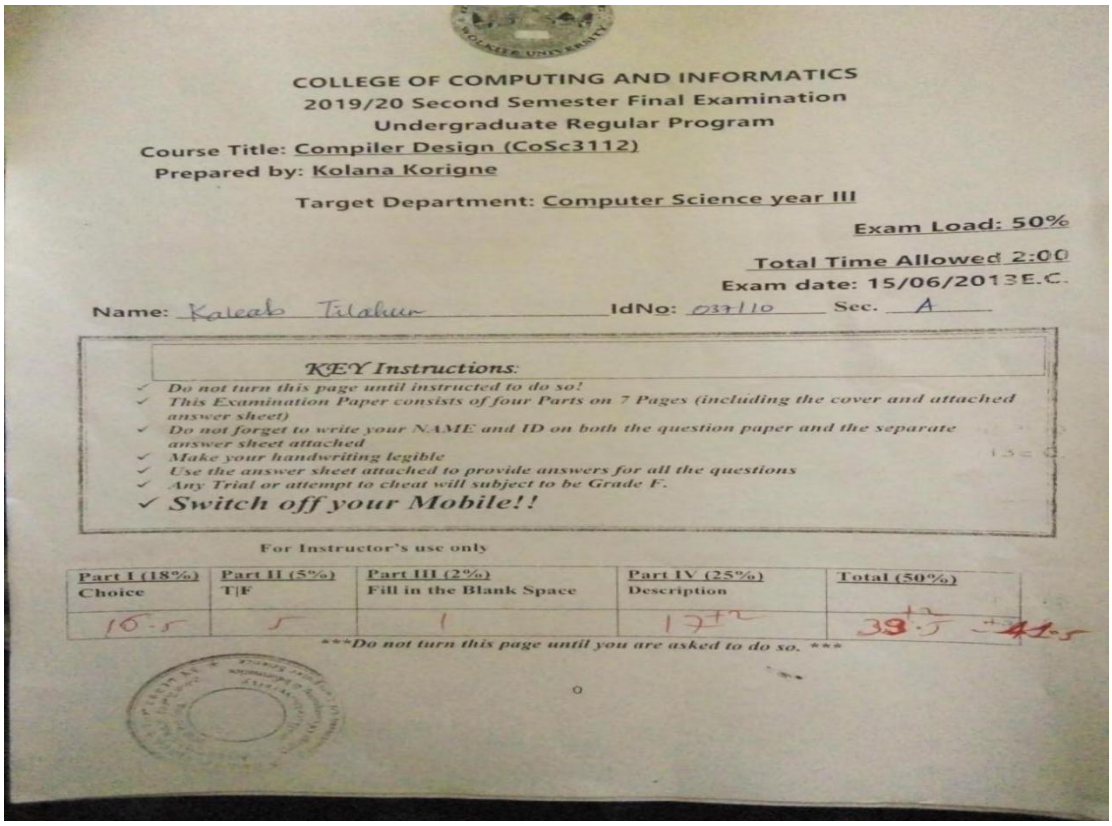
Table 2. 1 Major Function Of The Existing System

No	Action	Performer
1	Register Students	Registrar
2	Draft exams questions	Instructors
3	Approve exams	Exam Committee
4	Scheduling the examination date	Department Heads
5	Assign examiner	Department Heads
6	Take exam	Students
7	Control examination process	Examiner
8	Submit the examination paper	Students
9	Examine the exam paper	Instructors
10	Show result	Instructors
11	View result	Students
12	Submit result for SIMS	Instructors
13	Prepare grade	SIMS

2.4 Forms and Other Documents of The Existing System

In the current system they used different forms to manipulate different records associated with different activities. From those forms some are examination papers, mark lists and others.

Some sample forms associate with current systems are shown bellow.



COLLEGE OF COMPUTING AND INFORMATICS
2019/20 Second Semester Final Examination
Undergraduate Regular Program
Course Title: Compiler Design (CoSc3112)
Prepared by: Kolana Korigne
Target Department: Computer Science year III
Exam Load: 50%
Total Time Allowed 2:00
Exam date: 15/06/2013E.C.
Name: Kaleab Tilahun IdNo: 037/10 Sec. A

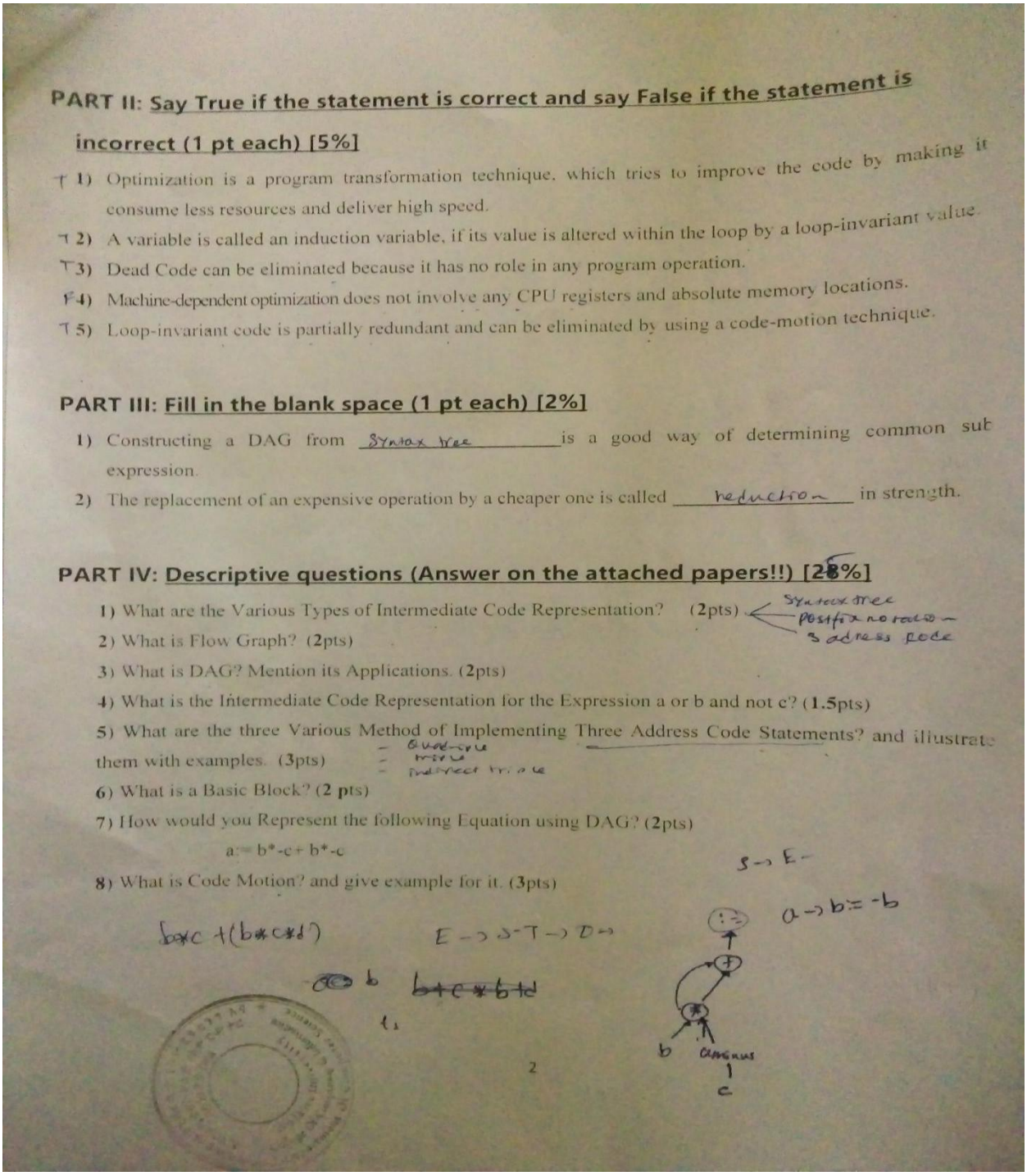
KEY Instructions:
- Do not turn this page until instructed to do so!
- This Examination Paper consists of four Parts on 7 Pages (including the cover and attached answer sheet)
- Do not forget to write your NAME and ID on both the question paper and the separate answer sheet attached
- Make your handwriting legible
- Use the answer sheet attached to provide answers for all the questions
- Any Trial or attempt to cheat will subject to be Grade F.
- Switch off your Mobile!!

For Instructor's use only

Part I (18%) Choice	Part II (5%) T|F	Part III (2%) Fill in the Blank Space	Part IV (25%) Description	Total (50%)
16.5	5	1	17	39.5

***Do not turn this page until you are asked to do so. ***

Figure 2. 1 Forms And Document Of The Existing System



PART II: Say True if the statement is correct and say False if the statement is incorrect (1 pt each) [5%]

T 1) Optimization is a program transformation technique, which tries to improve the code by making it consume less resources and deliver high speed.

T 2) A variable is called an induction variable, if its value is altered within the loop by a loop-invariant value.

T 3) Dead Code can be eliminated because it has no role in any program operation.

F 4) Machine-dependent optimization does not involve any CPU registers and absolute memory locations.

T 5) Loop-invariant code is partially redundant and can be eliminated by using a code-motion technique.

PART III: Fill in the blank space (1 pt each) [2%]

1) Constructing a DAG from Syntax tree is a good way of determining common sub expression.

2) The replacement of an expensive operation by a cheaper one is called reduction in strength.

PART IV: Descriptive questions (Answer on the attached papers!!) [28%]

1) What are the Various Types of Intermediate Code Representation? (2pts)

2) What is Flow Graph? (2pts)

3) What is DAG? Mention its Applications. (2pts)

4) What is the Intermediate Code Representation for the Expression a or b and not c? (1.5pts)

5) What are the three Various Method of Implementing Three Address Code Statements? and illustrate them with examples. (3pts)

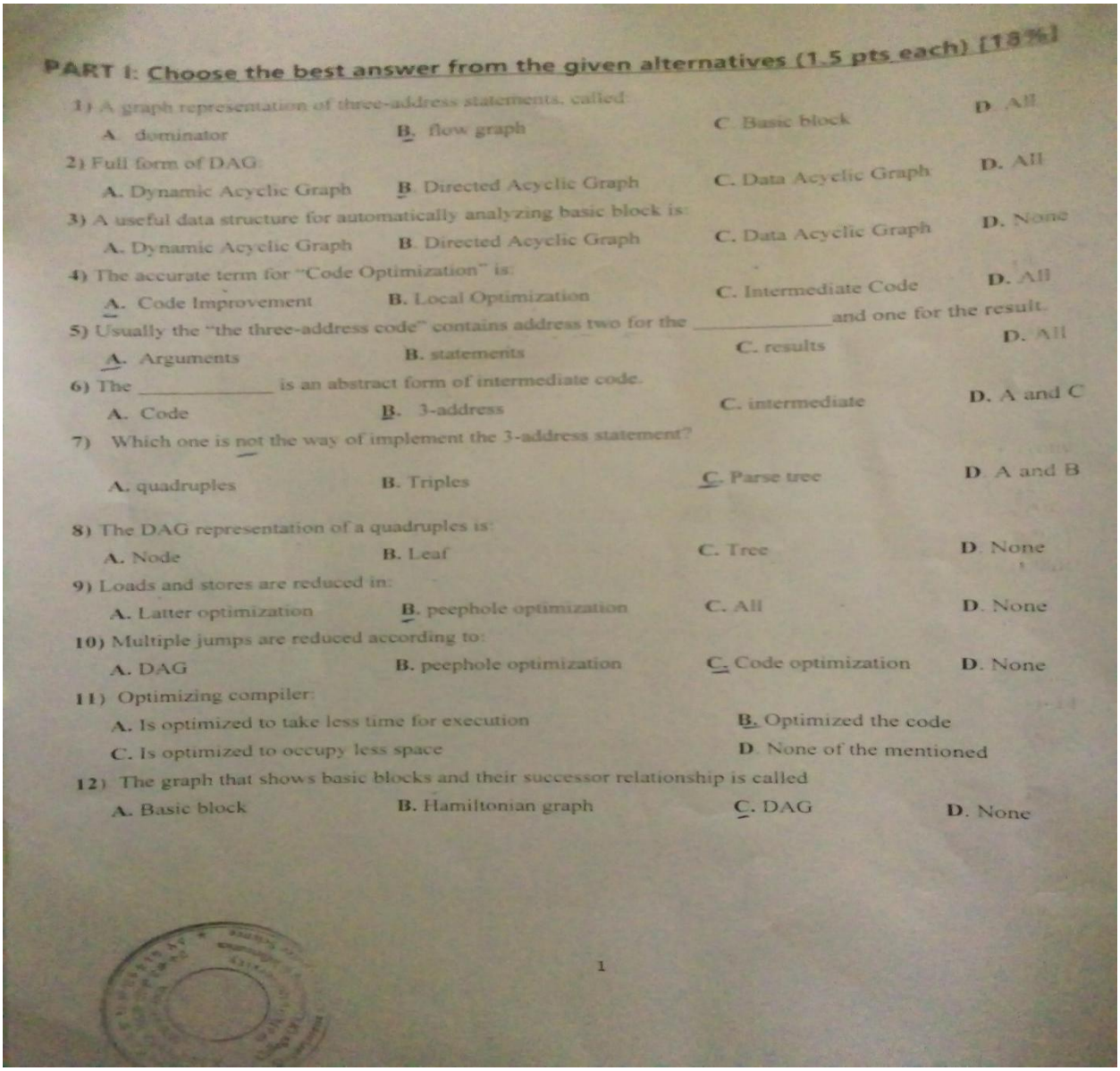
6) What is a Basic Block? (2 pts)

7) How would you Represent the following Equation using DAG? (2pts)

a:= b*-c+ b*-c

8) What is Code Motion? and give example for it. (3pts)

Figure 2. 2 Forms And Document Of The Existing System



PART I: Choose the best answer from the given alternatives (1.5 pts each) [18%]

1) A graph representation of three-address statements, called:
A. dominator B. flow graph C. Basic block D. All

2) Full form of DAG:
A. Dynamic Acyclic Graph B. Directed Acyclic Graph C. Data Acyclic Graph D. All

3) A useful data structure for automatically analyzing basic block is:
A. Dynamic Acyclic Graph B. Directed Acyclic Graph C. Data Acyclic Graph D. None

4) The accurate term for "Code Optimization" is:
A. Code Improvement B. Local Optimization C. Intermediate Code D. All

5) Usually the "the three-address code" contains address two for the _____and one for the result.
A. Arguments B. statements C. results D. All

6) The _____ is an abstract form of intermediate code.
A. Code B. 3-address C. intermediate D. A and C

7) Which one is not the way of implement the 3-address statement?
A. quadruples B. Triples C. Parse tree D. A and B

8) The DAG representation of a quadruples is:
A. Node B. Leaf C. Tree D. None

9) Loads and stores are reduced in:
A. Latter optimization B. peephole optimization C. All D. None

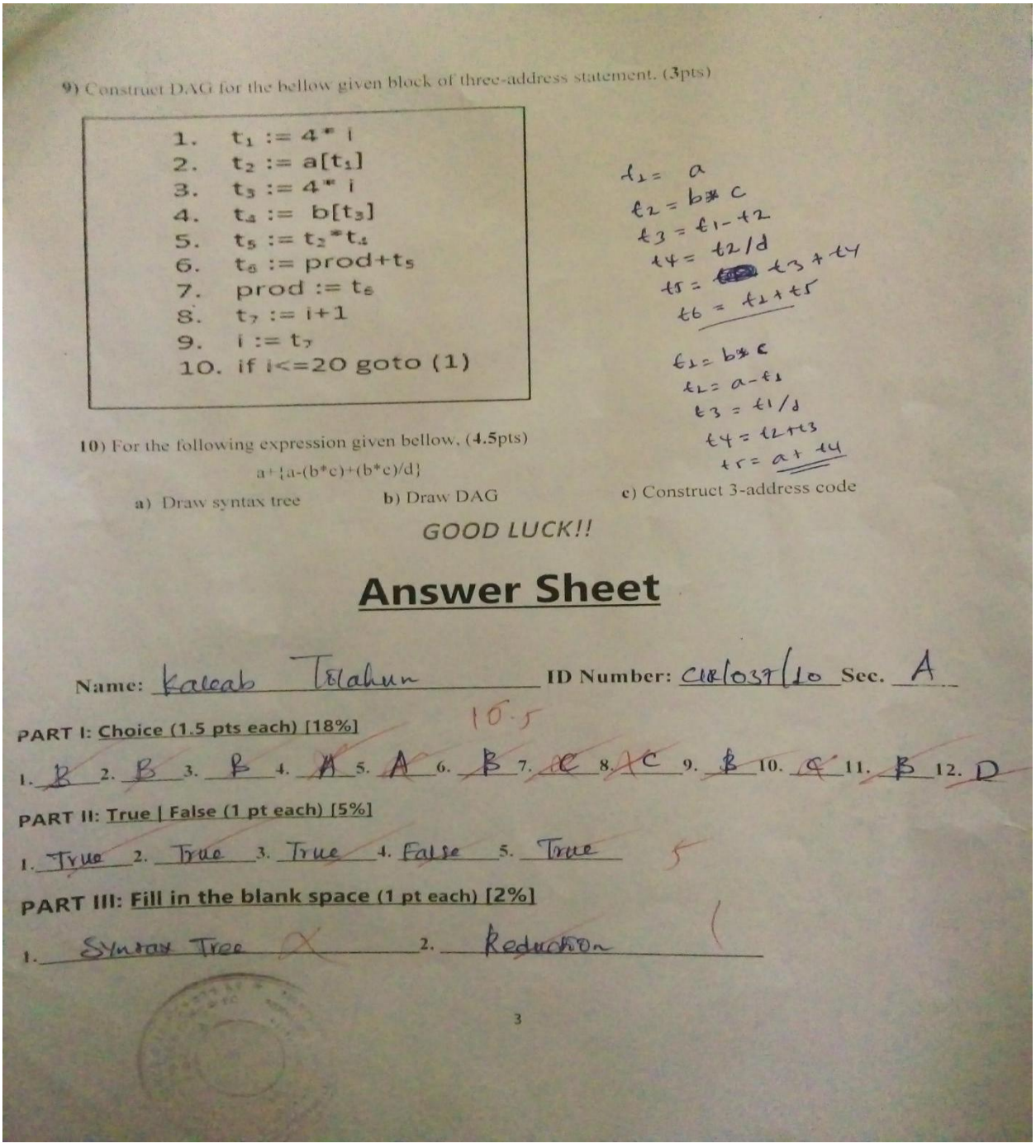
10) Multiple jumps are reduced according to:
A. DAG B. peephole optimization C. Code optimization D. None

11) Optimizing compiler:
A. Is optimized to take less time for execution B. Optimized the code
C. Is optimized to occupy less space D. None of the mentioned

12) The graph that shows basic blocks and their successor relationship is called
A. Basic block B. Hamiltonian graph C. DAG D. None

1

Figur 2. 3 Forms And Document Of The Existing System



9) Construct DAG for the bellow given block of three-address statement. (3pts)

1. $t_1 := 4 * i$
2. $t_2 := a[t_1]$
3. $t_3 := 4 * i$
4. $t_4 := b[t_3]$
5. $t_5 := t_2 * t_4$
6. $t_6 := prod + t_5$
7. $prod := t_6$
8. $t_7 := i + 1$
9. $i := t_7$
10. if i<=20 goto (1)

$t_1 = a$
$t_2 = b * c$
$t_3 = t_1 - t_2$
$t_4 = t_2 / d$
$t_5 = t_3 + t_4$
$t_6 = t_1 + t_5$

10) For the following expression given bellow, (4.5pts)

a+{a-(b*c)+(b*c)/d}

a) Draw syntax tree b) Draw DAG c) Construct 3-address code

$t_1 = b * c$
$t_2 = a - t_1$
$t_3 = t_1 / d$
$t_4 = t_2 + t_3$
$t_5 = a + t_4$

GOOD LUCK!!

Answer Sheet

Name: Kaleab Tolahun ID Number: CIR/0337/10 Sec. A

10.5

PART I: Choice (1.5 pts each) [18%]

1. B 2. B 3. B 4. A 5. A 6. B 7. C 8. C 9. B 10. C 11. B 12. D

PART II: True | False (1 pt each) [5%]

1. True 2. True 3. True 4. False 5. True

5

PART III: Fill in the blank space (1 pt each) [2%]

1. Syntax Tree 2. Reduction

3

Figur 2. 4 Forms And Document Of The Existing System

2.5 Draw back Of the Existing System

- It needs more time for evaluation:- because in the existing system evaluation process is not healed by an automated system it needs much time for evaluation.
- It consumes much resources:- the existing system needs much resources like paper printer and soon for question paper preparation.
- It is not error free:- error may be occurred when evaluation process.
- It is not secured:- exam paper can be stolen from the office.

2.6 Business Rule Of The Existing System

A business rule is an operating principle or a policy of the system must satisfy. Wolkite university examination system governess and control the work flow by the following business rule.

- Student must register for the course.
- Department head must add the students for different section of the course.
- Instructors must draft exams questions.
- Exam committee must approve the exam.
- Students must take the exam and submit it for the examiner.
- Instructors must evaluate the exam paper and show the result for students.
- SIMS prepare grade.

CHAPTER THREE

3. PROPOSED SYSTEM

3.1. Functional Requirement of the Proposed System

Functional Requirement describes the interaction between the system and its environment. It also describes what the system can do as well as input and output of the system. The proposed system is expected to provide all online examination system services and functionalities. Like online registration, online exam taking and Evaluation system.

Our system will be able to perform the following components:

- Register Users
- Manage User account
- Examination taking and giving
- News preparation and delivery
- Exam evaluation

3.1.1 Register User

This component works on registering users like department head, student, instructor and exam committee to the system in this component administrator is the main actor which register the department head then the department head register other users of the system.

In this component there are a function which is Register User().

3.1.2. Manage User Account

This component works on managing users account like granting privilege for user , de authorizing user account, updating user account, Editing user account and deleting user account.

On this component the main actors are department head and administrators there are functions like de authorize account(), edit account(), delete account and update account().

3.1.3. Examination

This component works on giving, taking exam, approving exam and controlling exam . The main actors in this components are students, instructors and exam committees. on this component there are functions like take exam(),prepare exam(),post exam(),approve exam() and record video().

3.1.4. News

This component is an information provider component which helps department heads and instructors to provide information. On this component the basic functions are post exam() and view exam().

3.1.5. Evaluation

On this component an exam which is provided for the students will be evaluated and results will be delivered for the students. On this component the basic functions are evaluate exam() , show result() and view result().

3.2. Non Functional Requirements

Non functional requirement describe the user visible aspect of the system that are not directly related to the system and not designated as functionality of the system and it mainly deals with the additional quality of the system.

3.2.1. User Interface And Human Factors

The user interface of our proposed system is simple to understand, easy to use and works with a user friendly manner. We consider the following list when designing our interface.

- Keep the interface simple
- Be purpose full in page layout
- Strategically use color and texture

3.2.2 Hardware Consideration

The system that to be developed should run on the existing standard computers. And the system will be portable that can run in any types of computer that currently available in the market.

3.2.3 Security Issue

The system is much secured and only authorized persons can access the system by using their username and password. The password with which users are provided will protect them from potential threats, who could jeopardizing their responsibility. We will use Md5 encryption algorithm so as to encrypt our users password so our system is safe from an authorized persons, Our system protects any confidential information of the all users of the system. Also our system contains a video camera which helps to protect the examination process from cheating it provides access for the instructors to see what the students are doing during the examination period.

3.2.4 Performance Consideration

as we know online examination system can be accessed by many users at a time so our system should be capable of handling and processing many queries at a given time quickly. generally, the system should be responsibly fast in order to access the required information and its load time shall not take longer times.

3.2.5 Error Handling And Validation

The system will check the user input to send error free information for the systems database. And it shows the users error in user friendly manner. We will handle this errors by using some java script techniques.

3.2.6 Quality Issue

The system will minimize crash during its run time, since many users can use the system at a time.

3.2.7 Backup And Recovery

The system include a secondary database which contains the copy of the original database used for recovery purpose when a problem is occurred on the systems original database.

3.2.8 Physical Environment

The system will be installed in a safe place to solve some security concerns and the server will be installed in a cool and dry place to protect overheating the backup database.

3.2.9 Resource Issue

The system needs resource that have high processor speed and memory mainly for the server. It enables the system to provide the required service in efficient and effective manner.

3.2.10 Documentation

Our system will have a well defined document which helps to maintain the system. We will also prepare a short and precise helping guide for the system users which helps users how to use the system.

CHAPTER FOUR

4.SYSTEM ANALYSIS

System analysis is a problem solving technique that improve the system and ensure that all components of the system works efficiently to accomplished its purpose. It is mainly conducted for the purpose of studying a system or its part In order to identify its objectives. System analysis model contains three models the dynamic model, functional model and the object models. For this project we have described the analysis in terms of dynamic models using(sequence diagram,activity diagram and state chart diagrams), functional model by using (use case diagram) and object models by using (class diagram).

4.1. SYSTEM MODEL

System model is the graphical representation that describe business process, the trouble to be solved and the system that is to be urbanized.

We use the following use case models to describe the abstract model of our system.

4.1.1. USE CASE MODEL

Use case modes use case diagram, use case description and use case scenario are used to define the basic elements and process of our system.

4.1.1.1. USE CASE DIAGRAM

A use case diagram is a graphical representation of the interaction among the elements and the system. It describes how a system interact with outside actors.

In this system we have identified both actors who is any thing that interact with the system and use cases which is the functionality of the system that directly interact with the system.

Actors

- Administrators
- Instructors
- Department Heads
- Exam committee

- Students

The system has five actors and those actors perform an action that are specified to a particular role.

- **Administrator**

An administrator is an actor who can perform the following tasks

- ✓ Log in into the system and Log out from the system
- ✓

- **Instructor**

An Instructor is an actor who can perform the following tasks.

- ✓ Log in into the system and Log out from the system
- ✓ Manage Exam
- ✓ Post Information
- ✓ View Recorded Videos

- **Department Head**

A Department Head is an actor who can perform the following tasks in the system.

- ✓ Log in into the system and Log out from the system
- ✓ Manage Instructor
- ✓ Manage Exam committee
- ✓ Post Information
- ✓ Manage Student

- **Exam Committee**

An exam committee is an actor who can perform the following tasks in the system

- ✓ Log in into the system and Log out from the system

✓ Approve exam.

➢ **Student**

A student is an actor who an perform the following tasks in the system.

✓ Log in into the system and Log out from the system

✓ Take Exam

✓ View Result

✓ View information

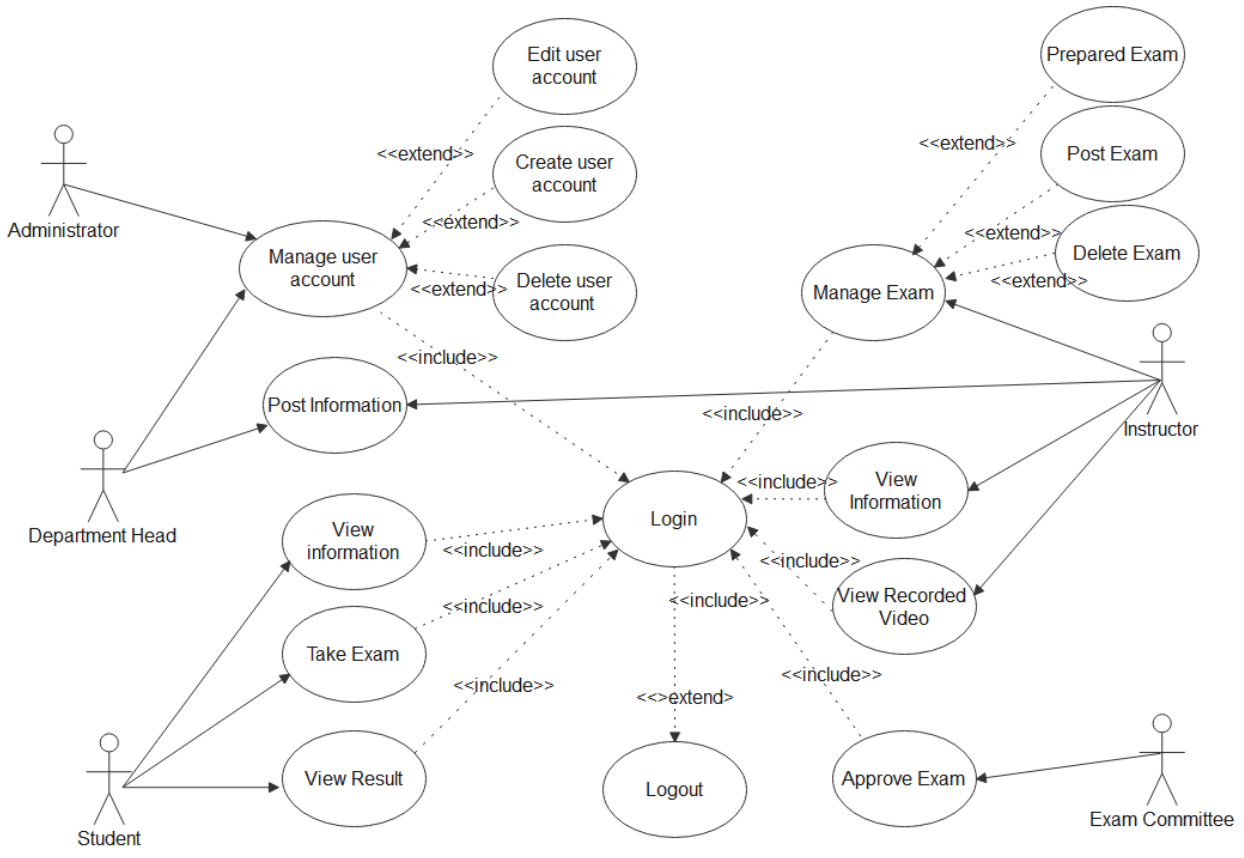


Figure 4. 1 General Use Case Diagram

4.1.1.2. USE CASE DESCRIPTION

The use case description used to describe the overall process of each use case in the system in order to perform its specific task.

Table 4. 1 Log in Use Case Description

Use Case Name	Log In
Use Case Number	001
Description	A user enter to the system
Actor	Administrator, instructor,department head,student
Precondition	User must be registered
Normal flow	1. User clicks the Log In link on the Home page. 2. The system displays the login page 3. The user enters his user name and password in the specified place and clicks the log in button 4. The system validate the users user name and password 5. The system displays the users personal home page 6. End of use case
Alternative flow	4. User enters wrong user name and password . 4.1 The system displays wrong user name and password message or field can not be empty message.
Post condition	The user will have an access of using his personal home page

Table 4. 2 Log Out Use Case Description

Use Case Name	Log Out
Use Case Number	002
Description	The user exit from the personal home page
Actor	Administrator,Instructor,Exam committee Student ,Department Head
Precondition	Log in in to the system
Normal flow	1.The user click the log out button on his personal home page 2.The system exit the user from his personal home page and sands him to the landing page of the system. 3.end of use case
Alternative flow	Noting
Post condition	The user exit from his personal home page

Table 4. 3 Manage Department Head Use Case Description

Use Case Name	Manage Department Head Account
Use Case Number	003
Description	Controlling Department Head Account
Actor	Administrator

Precondition	The user to manage the department head he must be an administrator.
Normal Flow	1. If the Administrator selects create department head account link on the manage department head page. 1.1. The system displays register form 1.2. User fill the registration form and click the create button. 1.3. The system validate the input value 1.4. The system will display success fully created message. 1.5. End of use case. 2. If the Administrator selects the delete Department Heads link on the manage department head page. 2.1. The system displays search Department head button 2.2. The administrator enter the department heads unique id and clicks the search button. 2.3. The system displays the department head information and delete button 2.4. The administrator clicks the delete button. 2.5. The system delete department head and display success fully deleted message.
Alternative flow	➢ In case of create department head

	If the user inputs wrong information in the registration form the system displays wrong input message. ➢ In case of delete department head If the administrator inputs unknown identification number the system displays no data found message.
Post Condition	Data will be inserted in to database, data deleted from the database

Table 4. 4 Manage Instructor Use Case Description

Use Case Name	Manage instructor Account
Use Case Number	004
Description	Control instructor
Actor	Department head
Precondition	The user to manage an instructor he must be a department head .
Normal flow	1. If the department head selects create instructor Account link on the manage instructor Account page. 1.1. The system displays register form 1.2. User fill the registration form and click the create button. 1.3. The system validate the input value 1.4. The system will display success fully created message.

	1.5. End of use case. 2. If the department head selects the delete instructor link on the manage instructor Account page. 2.1 The system displays search instructor button 2.2. The department head enter the instructors unique id and clicks the search button. 2.3. The system displays the instructors information and delete button 2.4. The department head clicks the delete button. 2.5. The system delete instructors and display success fully deleted message.
Alternate flow	➢ In case of create instructors If the department head inputs wrong information in the registration form the system displays invalid input message. ➢ In case of delete instructor If the instructor inputs unknown identification number the system displays no data found message.
Post condition	Data will be inserted in to database, data deleted from the database

Table 4. 5 Manage Exam Use Case Description

Use Case Name	Manage exam
Use Case Number	005
Description	Control exam

Actor	Instructor
Precondition	To manage examination the user must be instructor and log in to his personal home page.
Normal flow	1. If the instructor selects prepare exam link on the manage exam page 1.1. The system displays question form page. 1.2. The instructor selects question format. 1.3. The instructor inputs exam questions 1.4. The instructor give value for each questions and click submit button. 1.5. The system validate the input values 1.6. End of Use Case 2. If the instructor selects post exam link on the manage exam page 2.1. The instructor select exam 2.2. The instructor click post exam button. 2.3. End of use case.
Alternative flow	If the instructor inputs an invalid input the system displays an invalid input message.
Post condition	Exam posted for student

Table 4. 6 Post Information Use Case Description

Use Case Name	Post information
Use Case Number	006
Description	An instructor and department heads can post exam information and scheduling on the landing page.
Actor	Department head, instructor
Precondition	To post exam scheduling ➢ User must be log in to department head home page and a system must display post scheduling page. To post exam information ➢ User must be log in to instructors home page and a system must displays post exam information page.
Normal flow	1. The user clicks on post information button 2. System displays post information page 3. The user input the information on the post information page 4. the user click post information button 5. The system displays the information on the specified place.

Alternative flow	Nothing
Post condition	Information will be posted for the users

Table 4. 7 Approve Exam Use Case Description

Use Case Name	Approve exam
Use Case Number	007
Description	Final exam will be approved by exam committee before posted for students.
Actor	Exam committee
Precondition	The system must be display the final exam for the user who log in in exam committee home page
Normal flow	1. User log in to exam committee home page 2. User click approve exam link 3. System displayed the final exam 4. User checked the exam and clicks the approve button 5. Use case end
Alternative flow	4.1 if the user does not satisfied by the exam 4.1.1 the user click unsatisfied button
Post condition	Exam status will be approved or unsatisfied

Table 4. 8 Take Exam Use Case Description

Use Case Name	Take exam
Use Case Number	008
Description	Exam will be taken by student
Actor	Student
Precondition	Student must be log in by unique user name and password and system must display the exam
Normal flow	1. Student must log in into his personal home page 2. Student clicks on take exam link in his personal home page 3. System displays exam lists 4. Student select the exam 5. The system displays the exam 6. Student fill all questions 7. Student click submit button 8. Use case end
Alternative flow	6.1 if the user does not fill all questions the system displays all question must be fill message
Post condition	Exam taken by student

Table 4. 9 View Result Use Case Description

Use Case Name	View result
Use Case Number	009
Description	Exam result will be viewed
Actor	Student
Precondition	System must display the exam result
Normal flow	1. Student must log in in to his personal home page 2. Student clicks view result link in his personal home page 3. System displays his result 4. End of Use Case
Alternative flow	Nothing
Post condition	Exam viewed by student

Table 4. 10 View Information Use Case Description

Use Case Name	View information
Use Case Number	010
Description	Information viewed by user
Actor	Student, Instructor
Precondition	Information must be posted

Normal flow	1. User must click view information button on the Landing page 2. System displayed the information 3. User view the information 4. Use case end
Alternative flow	Nothing
Post condition	Information viewed

Table 4. 11 Manage Exam Committee Use Case Description

Use Case Name	Manage exam committee account
Use Case Number	011
Description	Control exam committee
Actor	Department Head
Precondition	The user to manage an exam committee he must be a department head .
Normal flow	1. If the Department Head selects create Exam committee click create exam committee link on the manage exam committee page 1.1. The system displays registration form 1.2. User fill the registration form and click the create button.

	1.3. The system validate the input value 1.4. The system will display success fully created message. 1.5. End of use case. 2. If the Department Head selects the delete exam committee link on the manage exam committee page. 2.1. The system displays search exam committee button 2.2. The administrator enter the exam committee unique id and clicks the search button. 2.3. The system displays the exam committee information and delete button 2.4. The administrator clicks the delete button. 2.5. The system delete department head and display success fully deleted message. 2.6. End of use case
Alternative flow	➢ In case of create exam committee If the user inputs wrong information in the registration form the system displays wrong input message. ➢ In case of delete exam committee If the department head inputs unknown

	identification number the system displays no data found message.
Post condition	Exam committee will be managed

4.1.1.3 USE CASE SCENARIO

A Use Case scenario is a real world example of how one or more user interact with the system . it describes the steps and action which occurs during the interaction. Use case scenario is a very detailed indicates how some one works with the user interface.

Scenario name : Log In

Participating Actor: Mr. kaleab

Normal flow of events

- Mr. Kaleab click on log in link on the landing page
- The system displays the log in page
- Mr. Kaleab fill the username and password and click the log in button
- The system validates the input
- Mr. Kaleab can have access to his account
- End of Use Case

Alternative flow

- If Mr. kaleab inputs wrong information the system displays “wrong information massage”.

Scenario Name take Exam

Scenario Name : Creating Department Head

Participating Actor: Mr. Tofic

Initial assumption: Mr. Tofic loged in to the system as administrator and the system displayed his personal home page.

Normal flow of event

- Mr. Tofic click create department head link on the manage department head page.
- The system displayed registration page
- Mr. Tofic fill necessary information's that the system requires and click on the register button.
- The system validate the information’s entered by Mr. Tofic and Register the Department Head and displays successfully registered message.
- The system displays Mr. Tofic’s personal home page
- Use case end

Alternative flow of event

- If Mr. Tofic entered invalid information the system displays wrong information message.

Scenario Name: Take Exam

Participant Actor: Mr. Kaleyesus

Initial Assumption: Mr. Kaleyesus loged in to the system and the system displayed his personal home page.

- Mr. Kaleyesus clicks take exam link in his personalhome page
- The system displays exam question.
- Mr. Kaleyesus gives answer for all questions.
- The system checks every questions are answered and displays Exam successfully taken message.
- The system displays Mr. Kaleyesuse’s personal home page.
- Use case end

Alternative event flow

- If Mr. Kaleyesus does not give answer for all questions the system displays fill every question message.

4.2. Object Model

An object model refers to a visual representation of software or systems' objects, attributes, actions and relationship. It enables the creation of an architectural software or system model prior to the development or programming. In our system we use types of object models like class diagram and data dictionary.

4.2.1. Class Diagram

In software engineering, a class diagram in the unified modeling language (UML) is a type of static diagram that describes the structure of a system by showing the system's classes, their attributes, operations or methods, and relationships among objects.

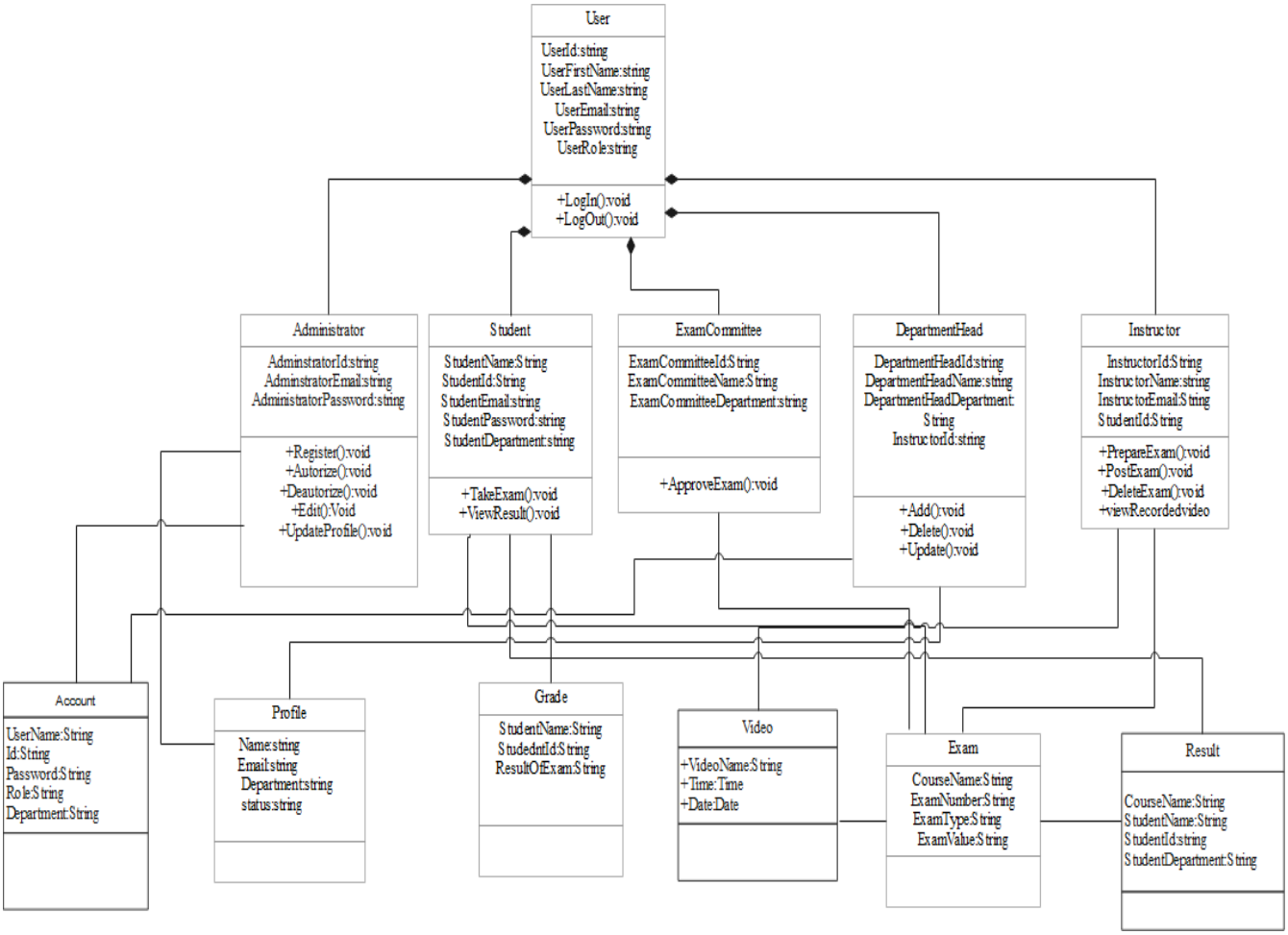


Figure 4. 2 Class Diagram

4.2.2. Data Dictionary

A data dictionary is a file or a set of file that includes a databases metadata. A data dictionary hold records about other objects in the database,such as data ownership, data relationships to other objects and other data. The data dictionary is an essential component of any relational database. In our system we use the following tables to describe the data dictionary of the system.

Table Name: Student List

Primary Key: Student Id

Description: Used to store list of students

Table 4. 12 Student List Data Dictionary

Attributes	Data Type	Data size	Constraint	Description
Student Id	String	40	Primary key	Unique identification of each students
StudentName	String	40	Not null	Name of student
StudentSex	String	10	Not null	Sex of student
StudentDepartment	String	40	Not null	Name of students department
RegisteredCourses	String	10	Not null	Name of student registered courses
CourseMark	Double	10	Not null	Mark of student in exam
InstructorName	String	40	Foreign key	Name of students instructor

Table Name:Instructor List

Primary key:Instructor Id

Description:Used to store Lists of Instructors

Table 4. 13 Instructor Data Dictionary

Attribute	Data Type	Data Size	Constraint	Description
InstructorName	String	40	Not null	Name of Instructor
InstructorId	String	40	Primary key	Unique Id of Instructor
InstructorSex	String	10	Not null	Sex of the Instructor
Educational status	String	40	Not null	Educational Status of the Instructor
Department	String	40	Not null	Department of the Instructor
Course name	String	40	Not null	Course name which the instructor gives

Table Name: Users List

Primary Key:User Id

Description: Used to Store Users account information

Table 4. 14 Account Data Dictionary

Attribute	Data Type	Data Size	Constraint	Description
User Full Name	String	40	Not null	Name of the user
User Id	String	30	Primary key	Unique identification of user
User Department	String	30	Not null	Department of the user
User Role	String	30	Not null	Role of the user

Username	String	40	Primary key	Unique username
Password	String	40	Not null	Password of user

.

Table Name: Answer List

Primary key:course Code

Description: a table used to store lists of answers

Table 4. 15 Answer List Data Dictionary

Attribute	Data Type	Data Size	Constraint	Description
Exam Name	String	40	Not null	Exam name used to identify between different exams
Course Code	String	30	Primary key	Unique code of the exam
Instructor Name	String	30	Not null	Name of answer provider
Answers	String	300	Not null	Answer for questions

Table Name: Question List

Primary key:course Code

Description: a table used to store lists of questions

Table 4. 16 Question List Data Dictionary

Attribute	Data Type	Data Size	Constraint	Description
Exam Name	String	40	Not null	Exam name used to identify between different exams
Course Code	String	30	Primary key	Unique code of the exam

Instructor Name	String	30	Not null	Name of answer provider
Questions	String	300000	Not null	Full questions with instruction

Table Name: Video List

Primary key:Student Id

Description: a table used to store lists of Video which recorded during exam

Table 4. 17 Video List Data Dictionary

Attribute	Data Type	Data Size	Constraint	Description
Student Id	String	40	Primary key	Student Unique id to identify the video
Video		1000000	Not null	The recorded video
Date	Date	30	Not null	Date of video recorded
Time	Time	30	Not null	Time of video recorded

4.3. Dynamic Model

Dynamic model describes those aspect of the system that are concerned with time and sequencing of the operations. It is used to specify and implement the control aspect of In our system we use sequence diagram,state chart diagram and activity diagram to study the dynamic nature of the system.

4.3.1. Sequence Diagram

UML sequence diagrams are interaction diagrams that deals how operations are carried out. They capture the interaction between objects in the context of a collaboration. sequence diagrams are a time focus and they show the order of the interaction visually by using the vertical axis of the diagram to represent time what messages are sent and when. In our system there are so many

processes to do specific actions so we include some sequence diagrams to handle this interactions.

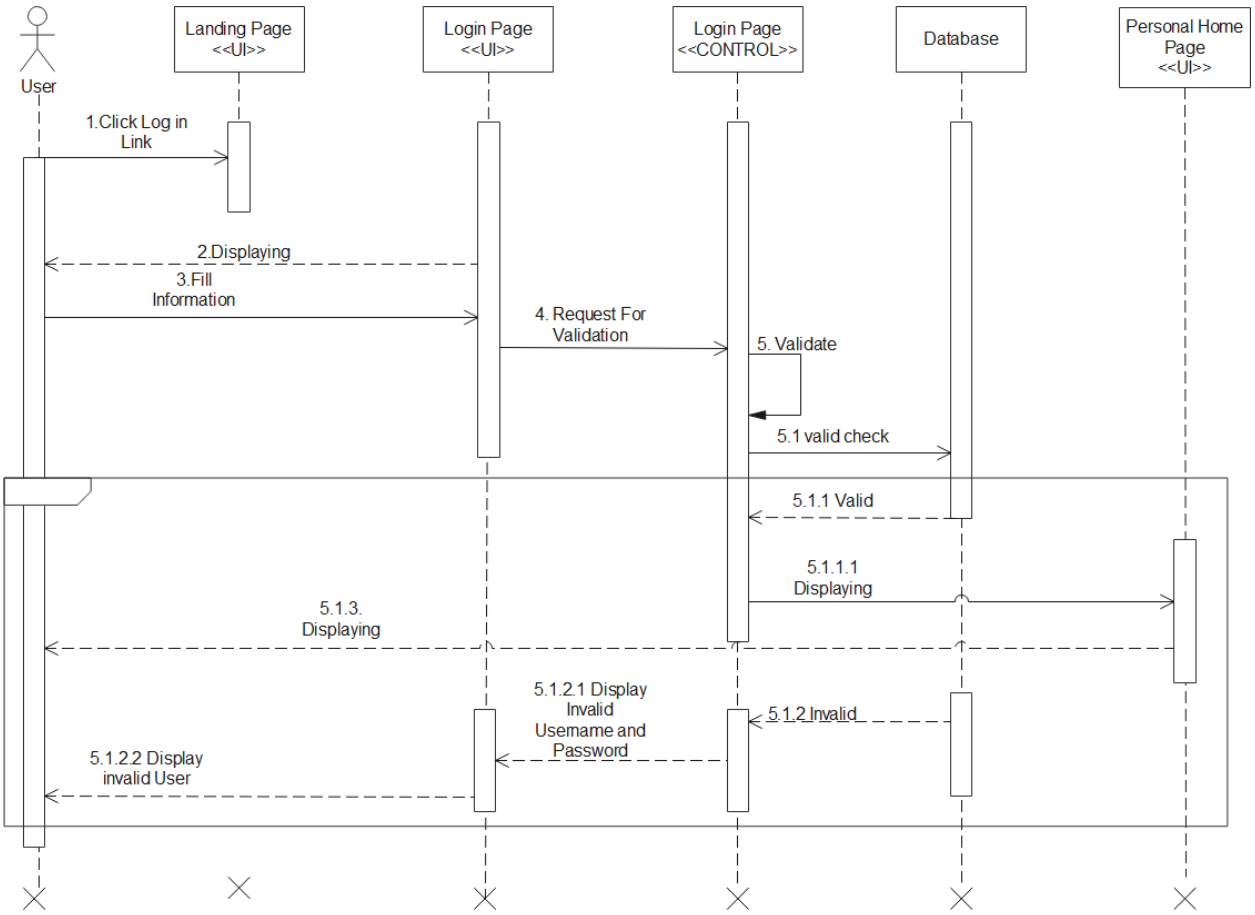


Figure 4. 3 Log In Sequence Diagram

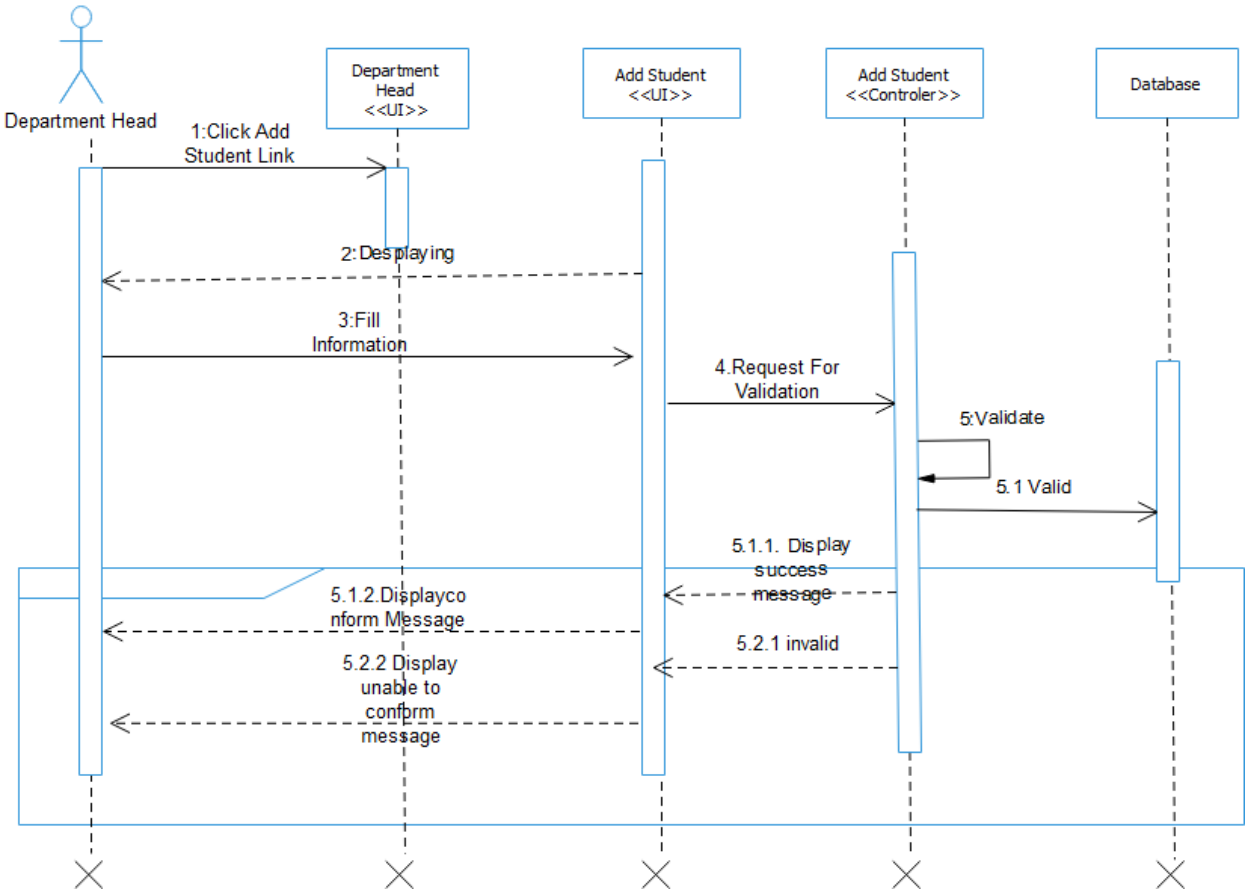


Figure 4. 4 Create Student Sequence Diagram

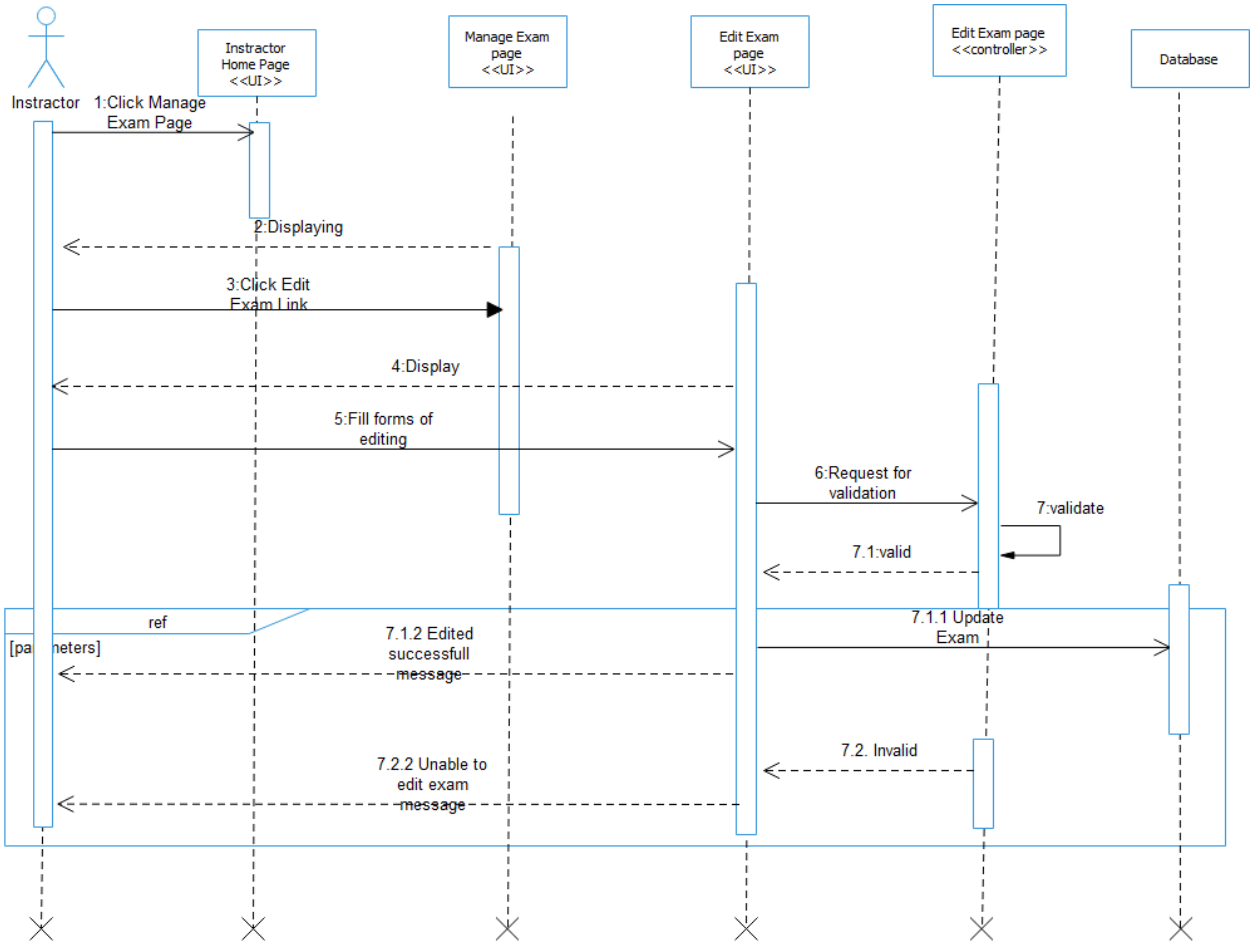


Figure 4. 5 Edit Exam Sequence Diagram

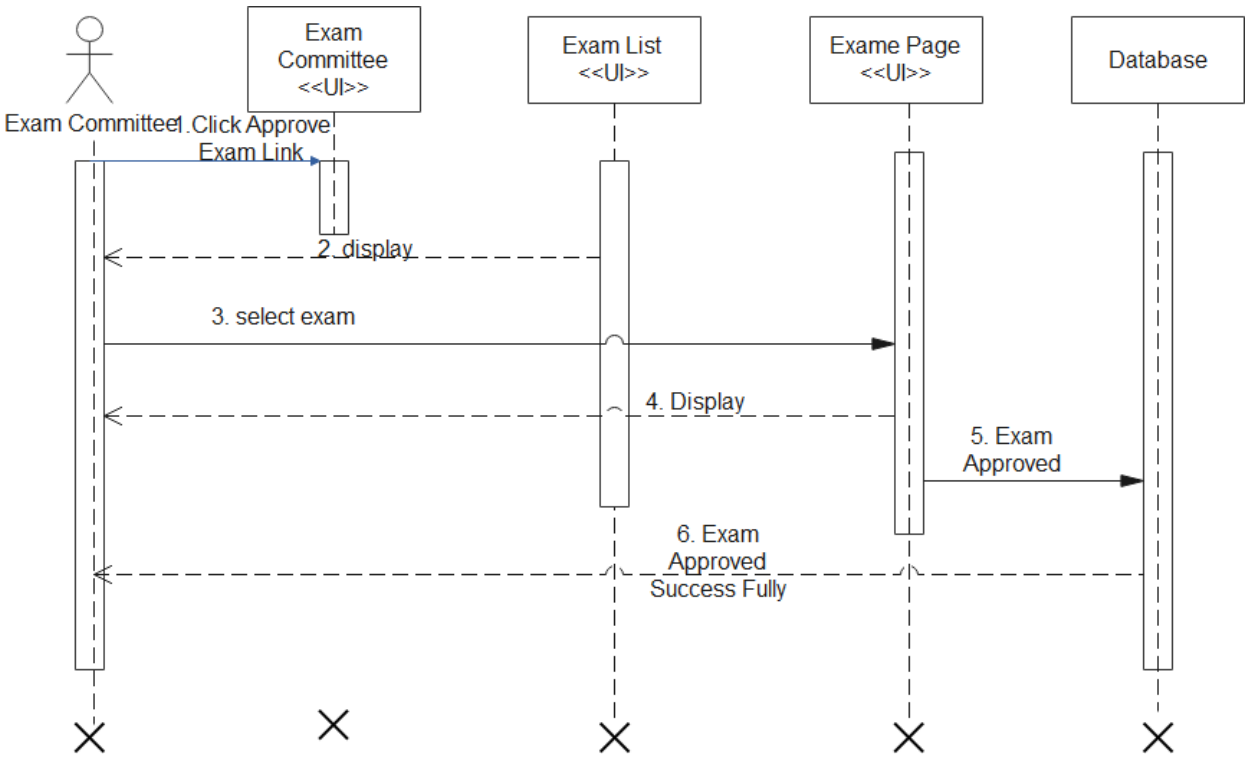


Figure 4. 6 Approved Exam Sequence Diagram

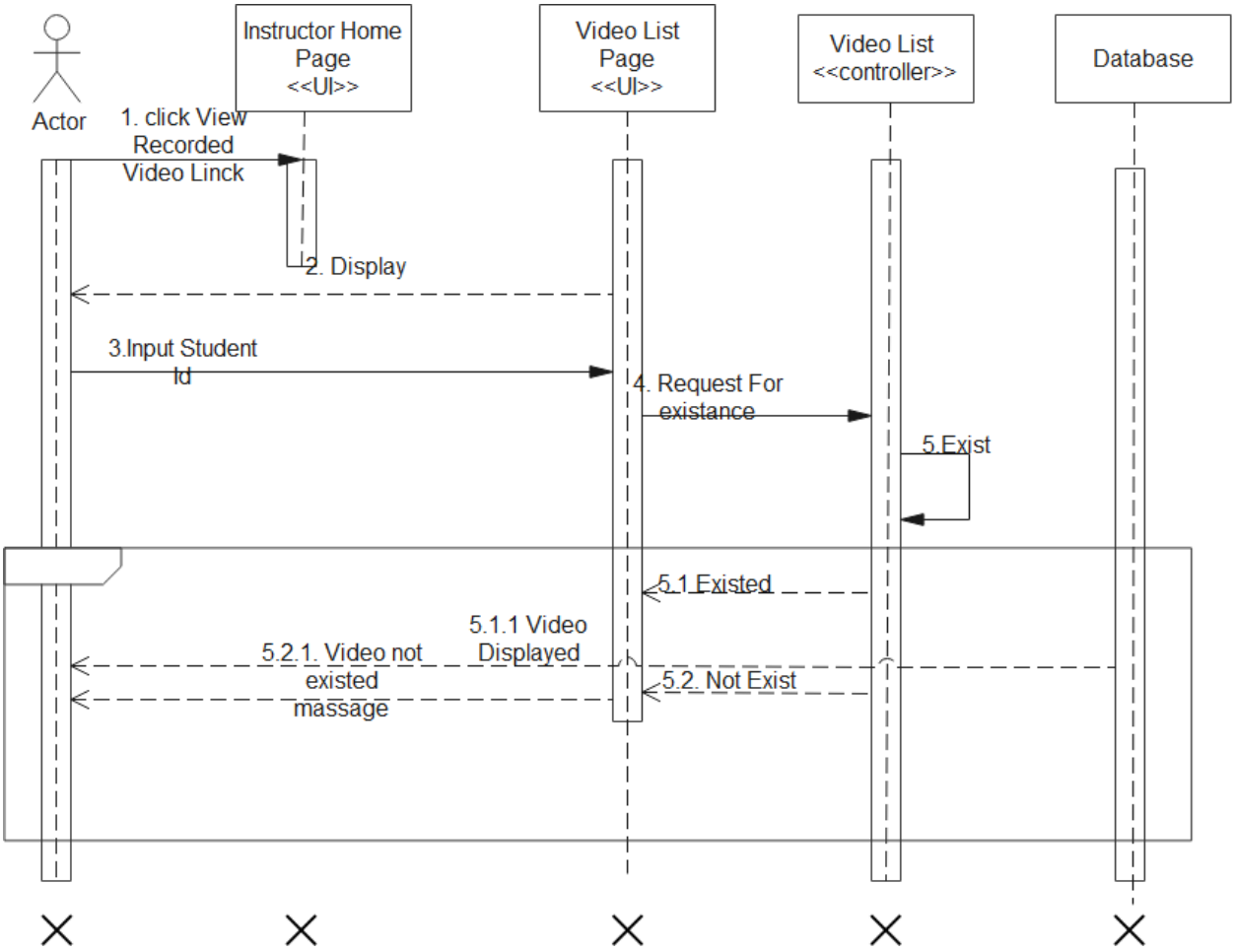


Figure 4. 7 View Recorded Video Sequence Diagram

4.3.2. Activity Diagram

Activity diagram is an important behavior in UML diagram to describe the dynamic aspects of the system. It is essentially an advanced version of flow chart that modeling the flow from chart that modeling the flow from one activity to another activity.

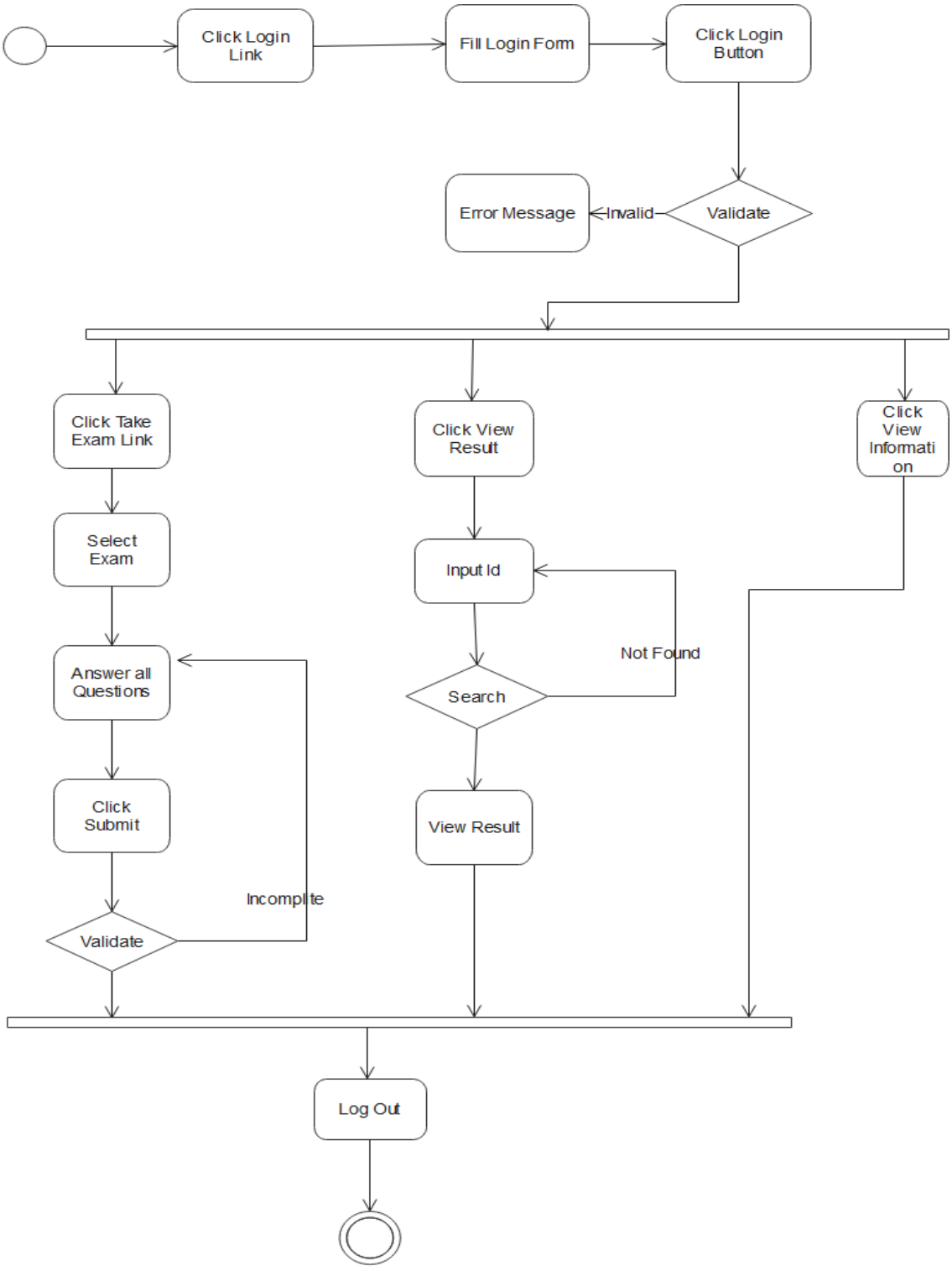


Figure 4. 8 Student Side Activity Diagram.

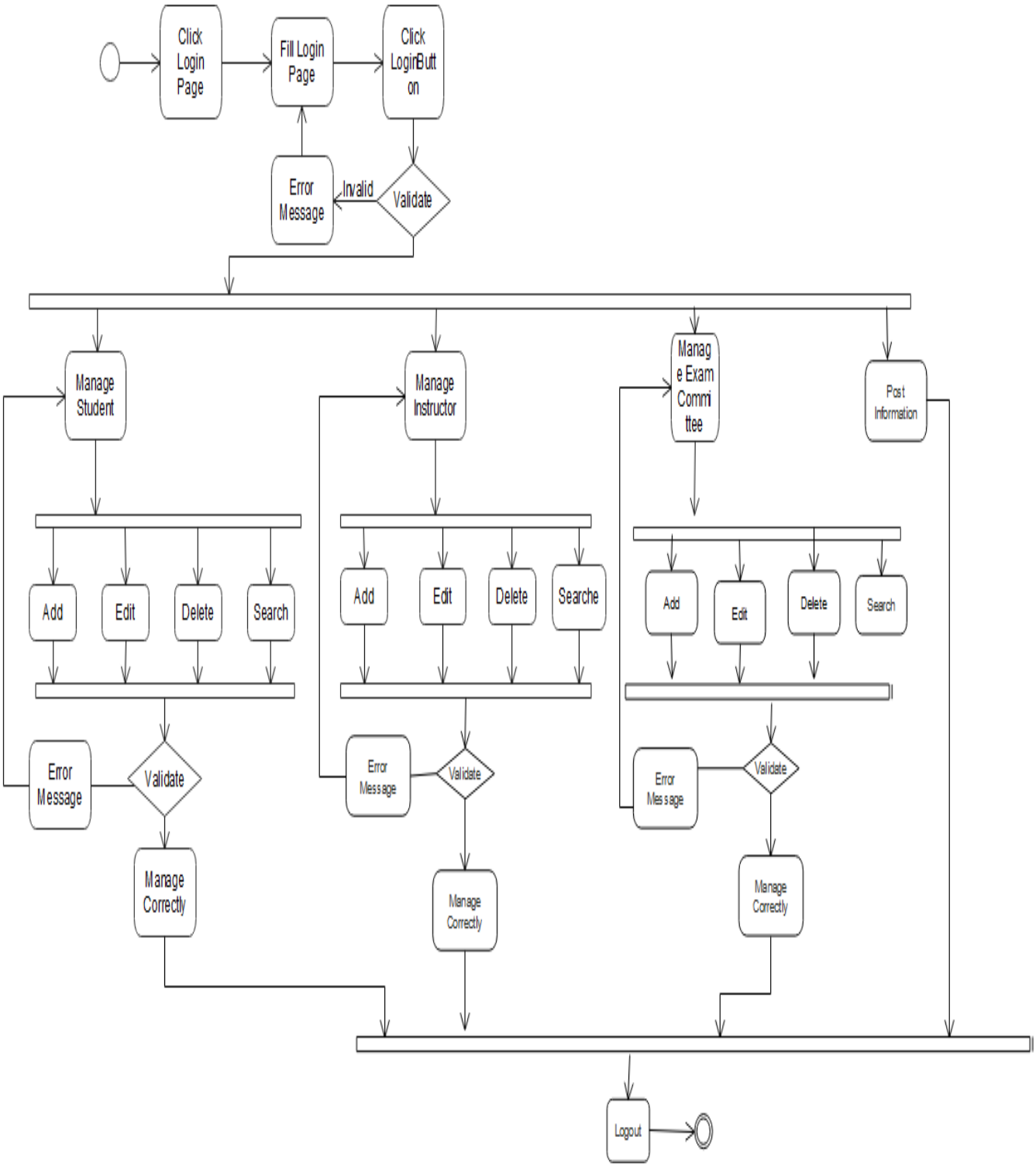


Figure 4. 9 Department Head Side Activity Diagram

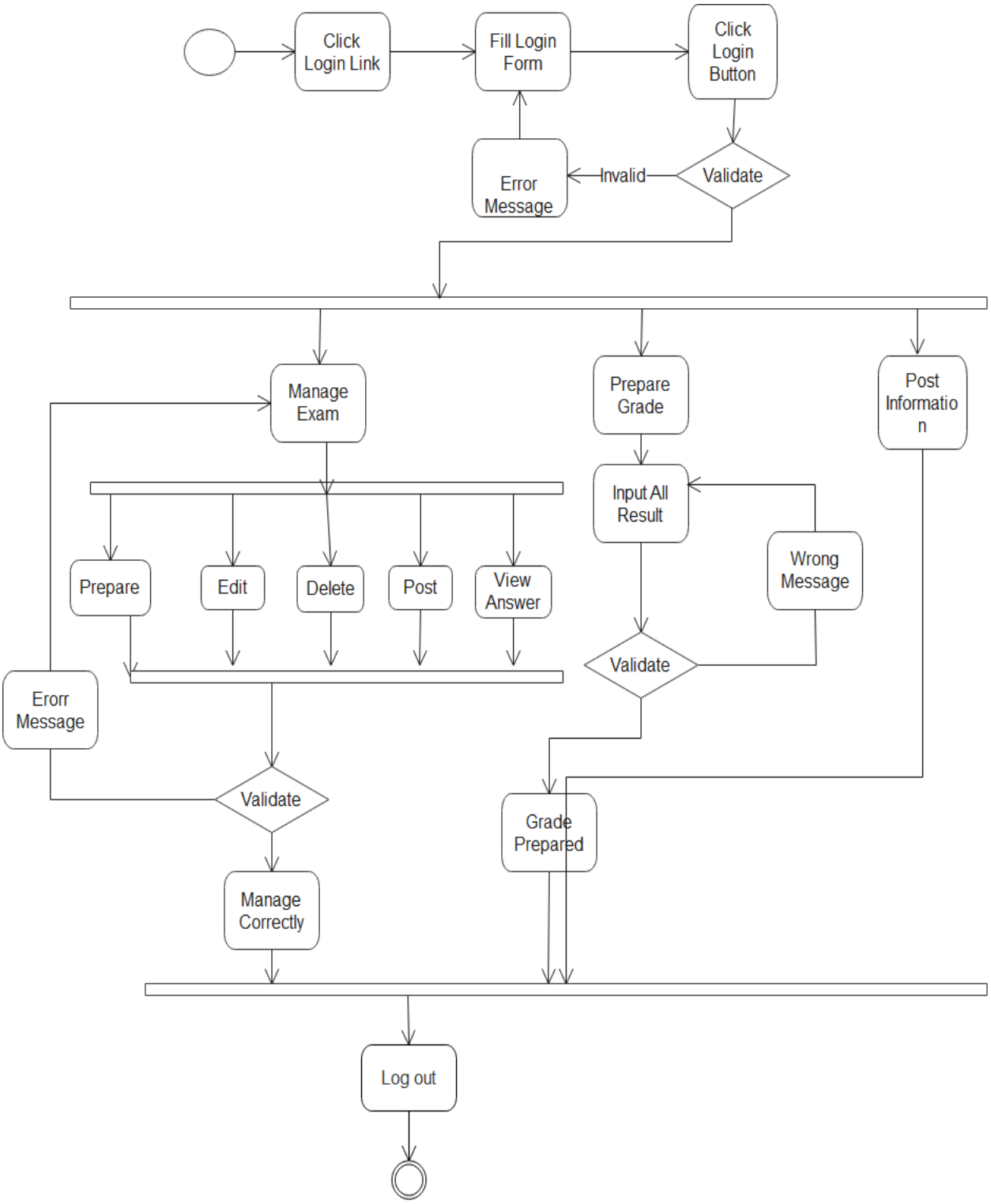


Figure 4. 10 Instructor Side Activity Diagram

4.3.3. State chart diagram

A state chart diagram shows the behavior of class in response to external stimuli. Specifically a state chart diagram describes the behavior of a single object in response to a serious of events in a system. In our system we have listed some state chart diagrams that can be covered during user interact with the system.

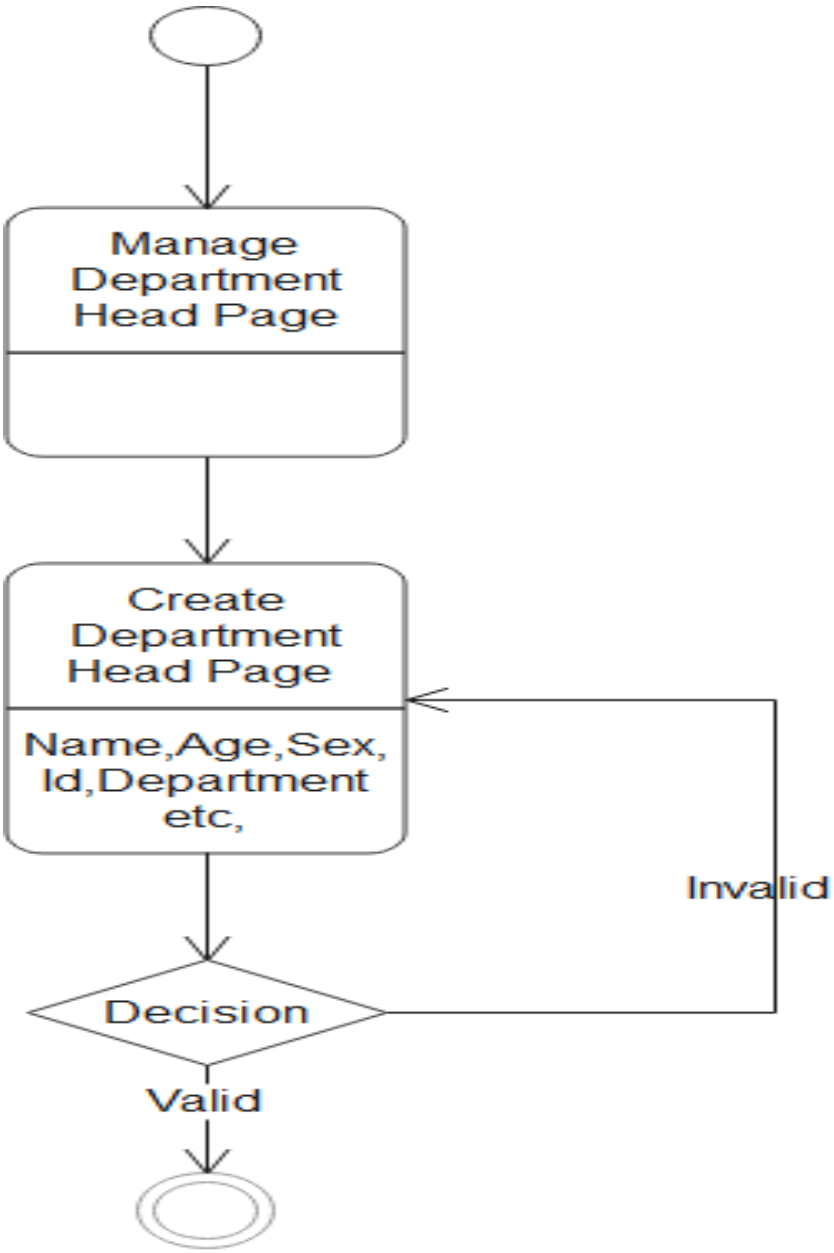


Figure 4. 11 Create Department Head State Chart Diagram

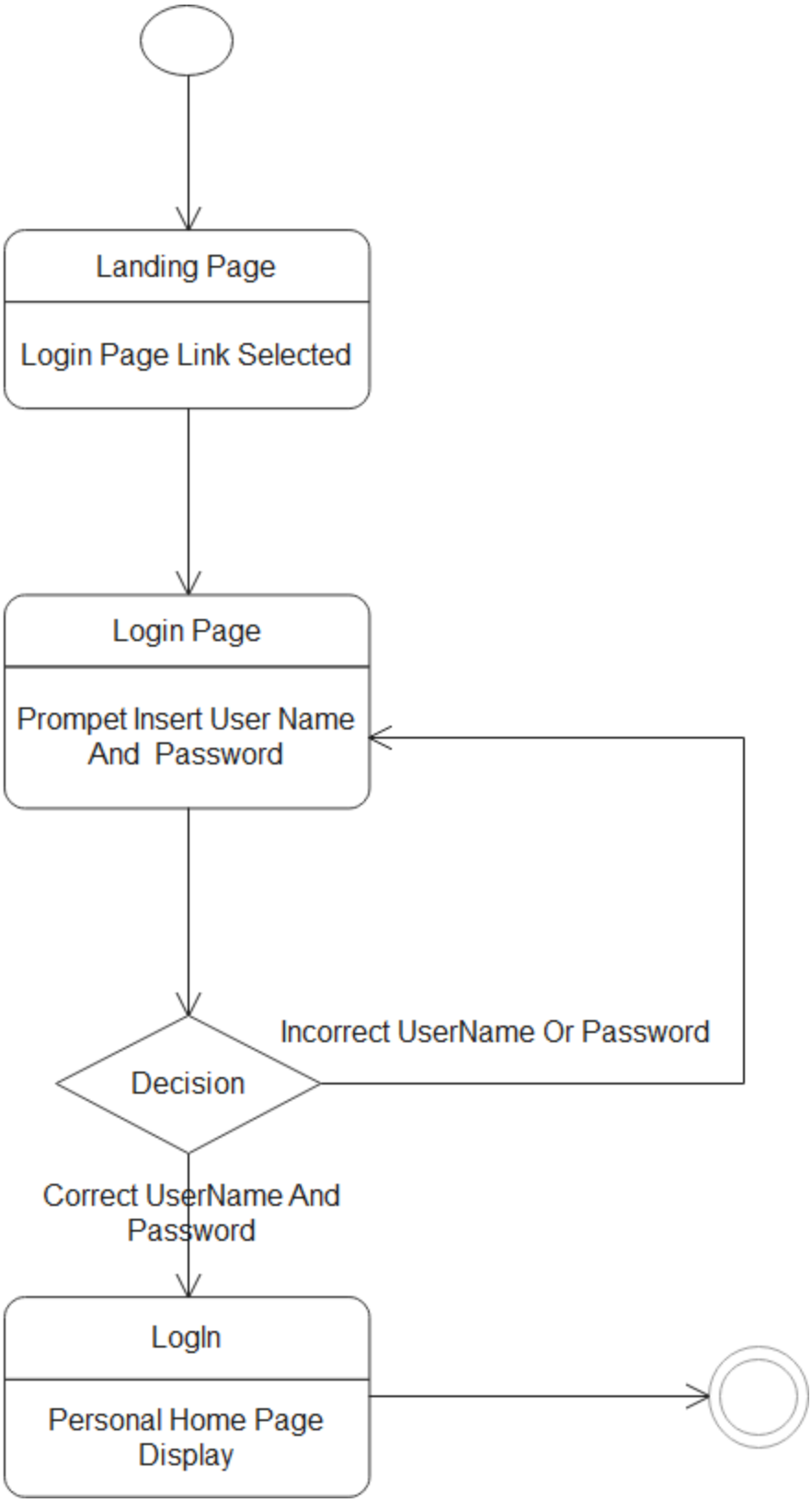


Figure 4. 12 Log In State Chart Diagram

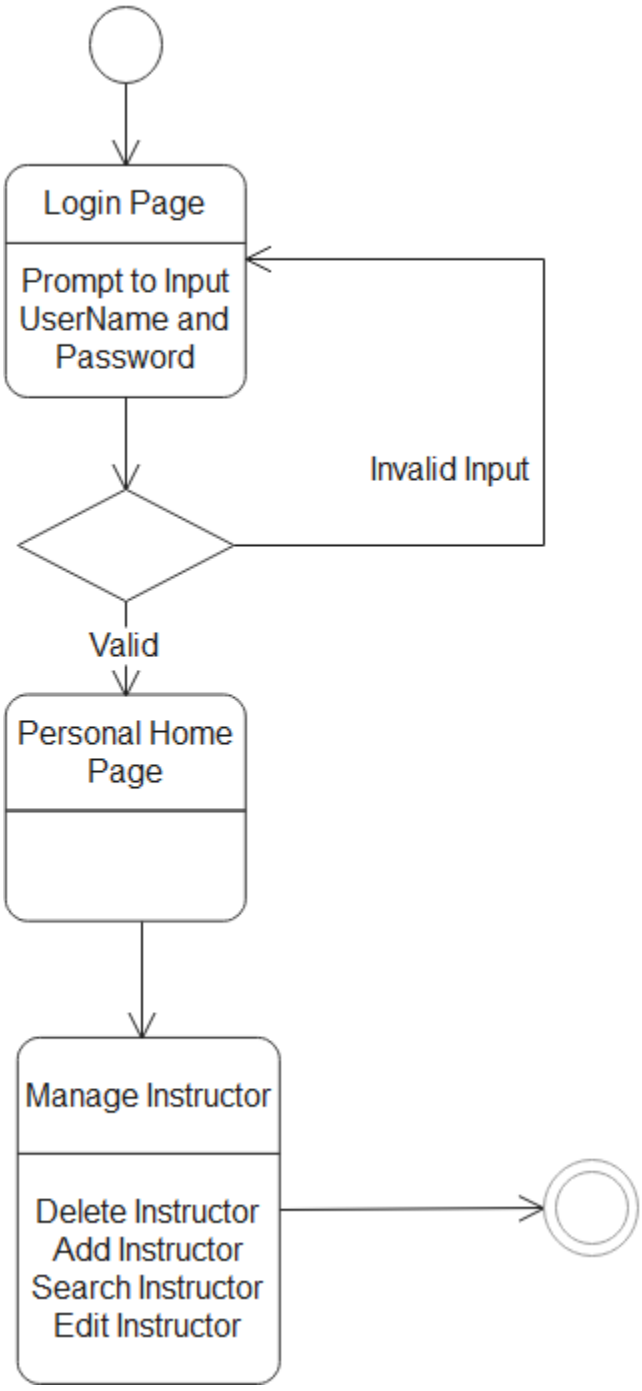


Figure 4. 13 Manage Instructor State Chart Diagram

CHAPTER 5

5.SYSTEM DESIGN

System design is the transformation of the analysis model into a system design model. Up to now we were in the problem domain. System design is the first part to get into the solution domain in a software development. This chapter focuses on transforming the analysis model into the design model that takes into account the non-functional requirements and constraints described in the problem statement and requirement analysis sections discussed earlier.

The purpose of designing is to show the direction how the system is built and to obtain clear and enough information needed to drive the actual implementation of the system. It is based on understanding of the model the software built on. The objectives of design are to model the system with high quality. Implementing of high-quality system depend on the nature of design created by the designer. If one wants to change to the system after it has been put in to operation depends on the quality of the system design. So, if the system is design effetely, it will be easy to make changes to it.

Specifically, the purposes of the system are: -

- ✓ To ensure security in the system by using different security mechanisms
- ✓ To make the data organized and centralized implementing a database system
- ✓ To increase the flexibility of the proposed system l
- ✓ To specify how the system do some tasks for the user

5.1 DESIGN GOAL

Design goal are design work of what on feature going to implement. the design goals are derived from nonfunctional requirements. The Design Goals specify the qualities of the system that should be achieved and addressed during the design of the system mention of design goal:

5.1.1.Dependability

Our system is handling sensitive data of the university, high emphasis given with regards to

security. The proposed system should achieve the following dependability characteristics:

- **Security**: the system should be secured .
- **Reliability**: the information provided by the system is as reliable as it is presented on the web page interface, and this is maintained by the persistent database.
- **Robustness**: Since the system is a web-based system that mainly uses a menu driven access there would not be an input problem by the user side.

5.1.2. Performance and portability

Our system has best performance. It has fast speed when any user is using it in order to do privileged thing, also it has good responsiveness and stability.This leads to user satisfaction in our system because they will not annoy and get bothered when using our system rather they will do what they want .

5.1.3. Maintainability

In time of failure or need modification the system needs to be maintained. To be maintainable the system should meet the following maintenance criteria.

- Modifiability: - If in the system, some functionality requires to be modified, this modification must be done specifically to that function or page without affecting the overall system organization.
- Extensibility: - If it is needed to add new functionality to the system, this must be achieved by only making a separate page and integrate this page with the existing system

5.2.Current System Architecture

Currently no any system architecture found in our university related to online examination system so that we cannot able to model the structure, behavior and more views.

5.3.Proposed System Architecture

proposed system is consisting of 3-tier architecture namely presentation layer, business logic

layer, and data layer. The presentation layer is client layer and topmost layer of the application. This is the layer we see when we use this system. This layer passes the information which given in terms of keyboard action and mouse click to the application layer. Example when user want to login into the system first see two text box and login button to enter ID and password and click on login. Business logic layer it is application layer which interacts with data layer and sends information retrieved from database toward to presentation layer.it act as the mediator between presentation layer and data layer. From above example once, the user clicks on login button application layer interact with the database and send information towards to presentation layer. The third one is data layer which used to store data entered by the user. In general client of our system use browser to access the system using the internet.

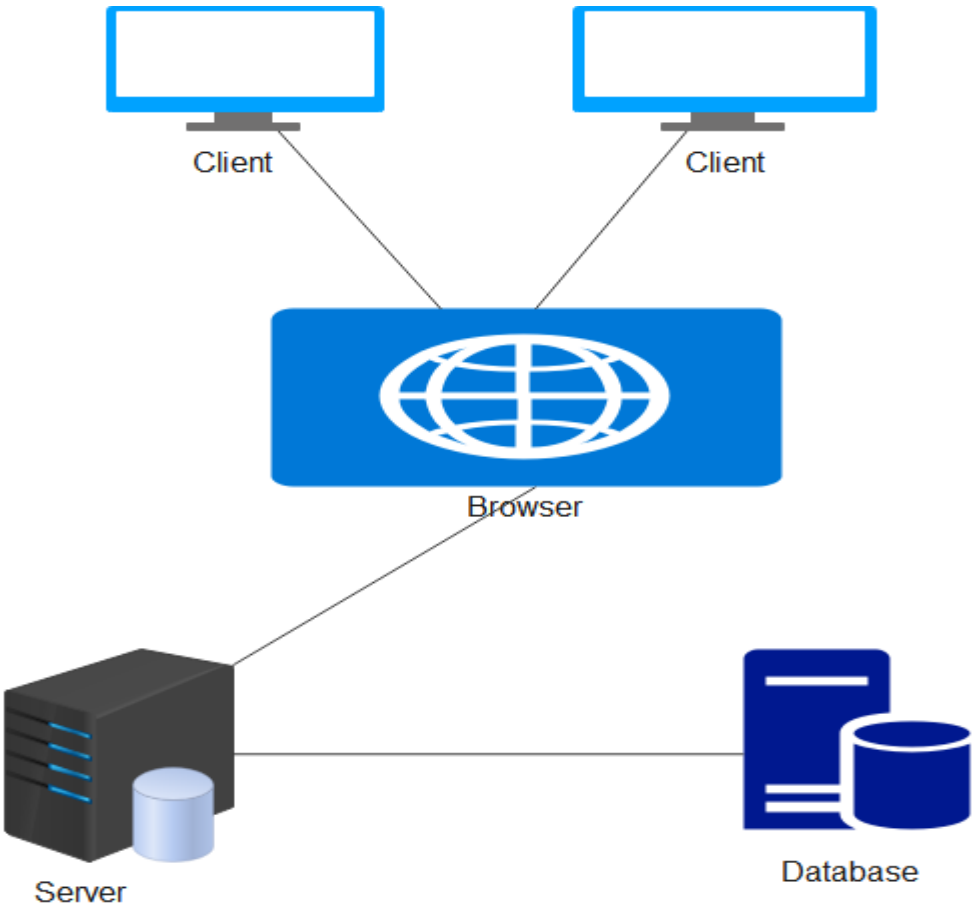


Figure 5. 1 Proposed System Architecture

5.3.1. Subsystem Decomposition and Description

Subsystem decomposition is the process of dividing the system in to manageable subsystems from the analysis model of the proposed system. A subsystem is a single, predefined operating environment through which the system coordinates the work flow and resource use. The goal of the subsystem decomposition is to reduce the complexity of design model and to distribute the class of the system in to large scale and cohesive subsystems. We have depicted our system subsystems below using table and figure.

Table 5. 1 Subsystem Decomposition and Description

Subsystem	**Activity**
Manage	➢ Login ➢ Manage department head ➢ Manage Student ➢ Manage Instructor ➢ Manage Exam ➢ Manage Exam Committee ➢ Logout
Exam	➢ Login ➢ Prepare Exam ➢ Edit Exam ➢ Post Exam ➢ Delete Exam ➢ Take Exam

	➢ Logout
User	➢ Login ➢ Create user ➢ View user ➢ Store user information ➢ Logout
Result	➢ Login ➢ Prepare result ➢ View result ➢ Logout
Security	➢ Block User ➢ Capture user

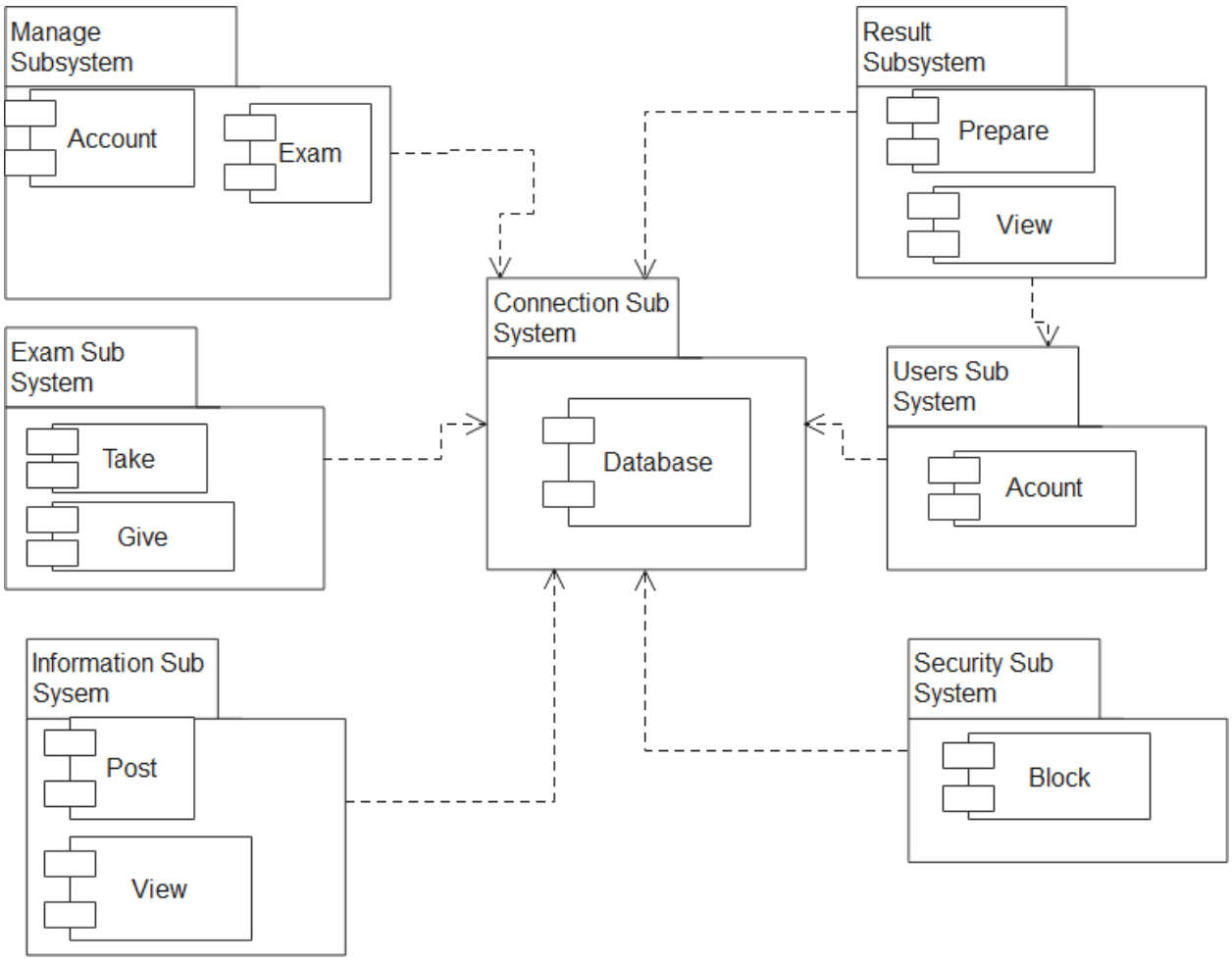


Figure 5. 2 Sub System Decomposition And Description

5.3.2. Hardware/Software Mapping

Deployment diagram depicts a static view of the run-time configuration of processing nodes and the components that run on those nodes. In other words, deployment diagrams show the hardware for your system, the software that is installed on that hardware, and the middleware used to connect the disparate machines to one another. Deployment diagram created for applications that are deployed to several machines. It also shows how the software and the hardware components work together. Deployment diagram used to show the hardware of the system, the software that is installed in the hardware and also the middleware that is used to connect the disparate machines to one and other. The figure below shows the deployment diagram of our system.

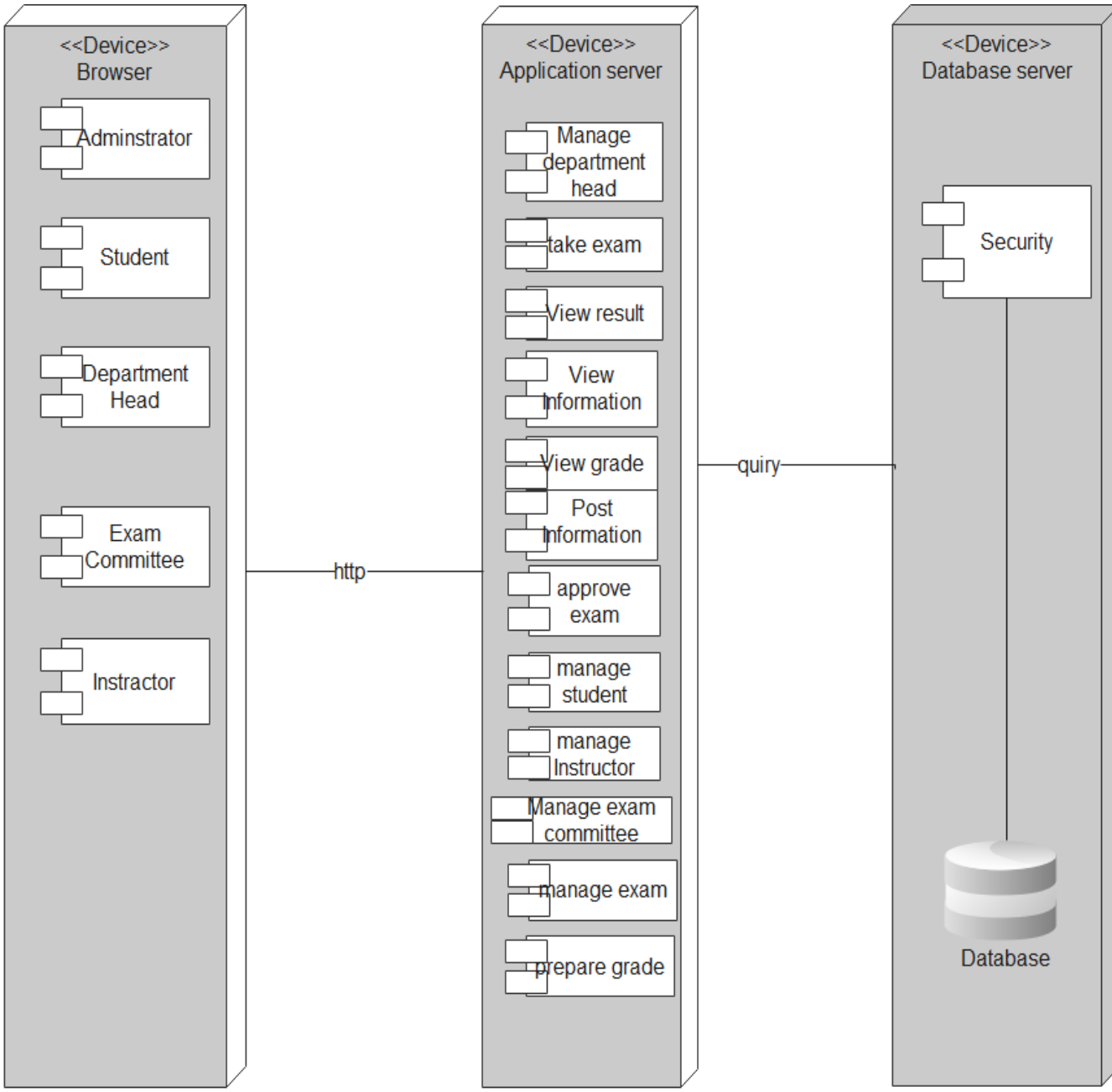


Figure 5. 3 Deployment Diagram.

5.3.3. Detailed Class Diagram

In object oriented system Analysis, Real world concepts are modeled into objects. Conceptual modeling hereby allows us to model these concepts which later involve in to a full-fledged class models. A class is a set of objects that share a common structure and a common behavior (the same attributes, operations, relationships and semantics).A class is an abstraction of real world

items. When these items exist in the real world they are instance of the class and are referred to as objects and an object can be any person, place, and concepts or user interfaces. Classes are represented by rectangles with three sections. These are:

- ✓ The top section is the name of the class.
- ✓ The middle section contains the attributes which store information about an item
- ✓ The bottom section contains the methods that show what are done on object or class.

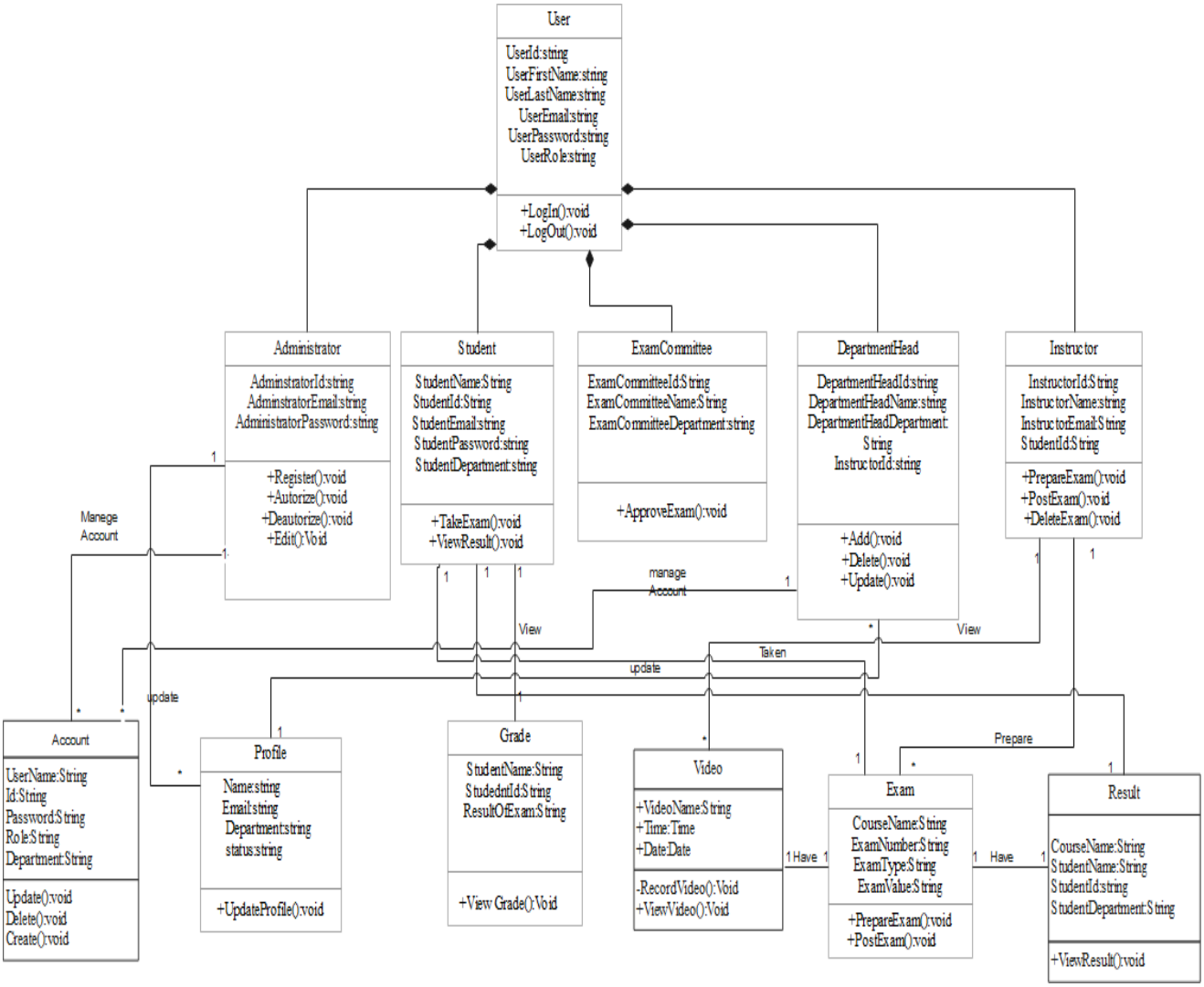


Figure 5. 4 Detailed Class Diagram

5.3.4. Persistent Data Management

Persistence of our object can be achieved by relational database since it used as machine to make object persistent. It describes the persistent data aspect of software system. Our system includes the basic table that handles the data of system implemented using MySQL server.

Mapping class and relational table

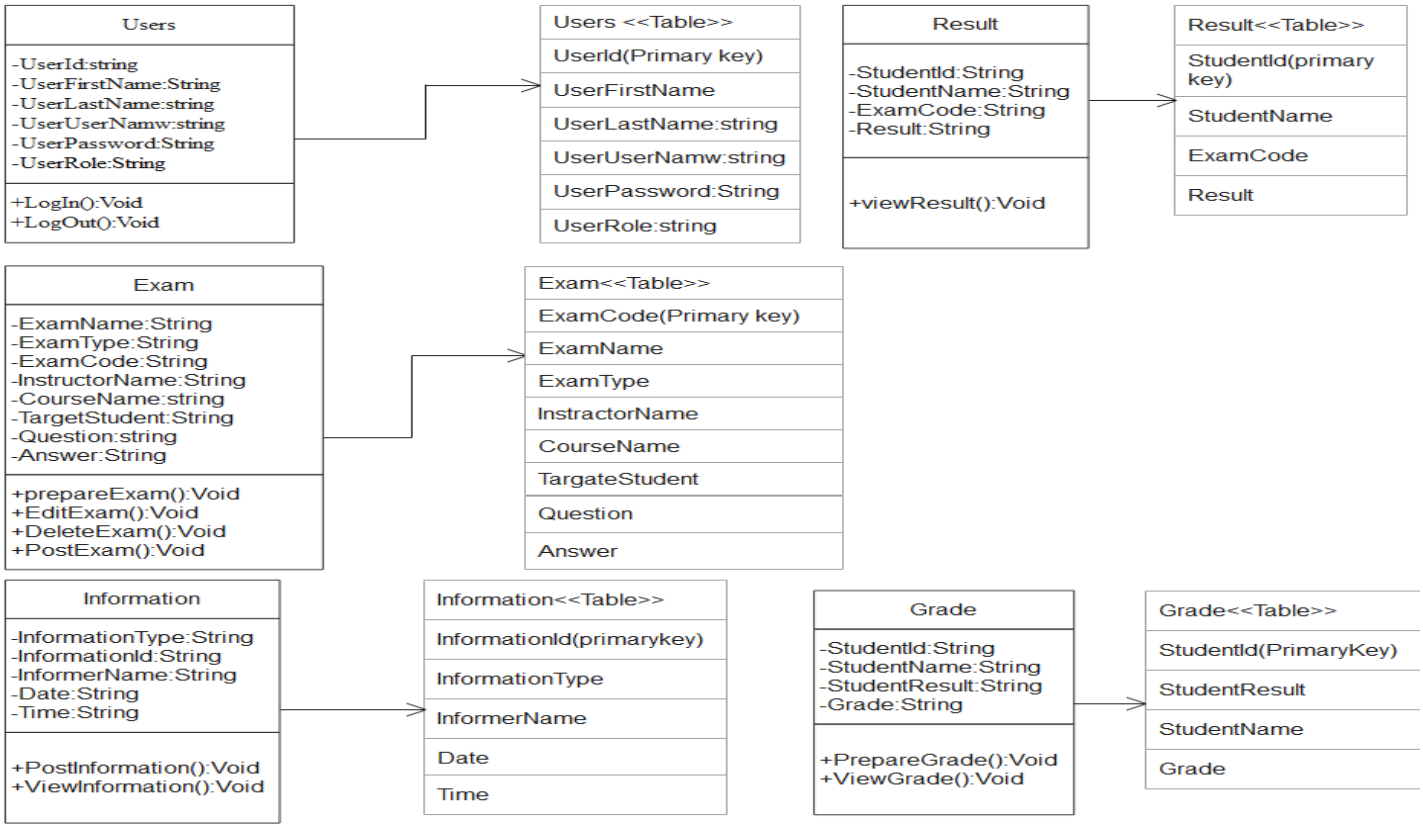


Figure 5. 5 Persistence Data Management

5.3.5. Access Control and Security

In our system only authenticated user can access our system and only permitted user can use our system. Access control and security specifies what the user can access or what cannot perform by some users. This access control is verified by ID and password. System administrator represents an authenticated user. The proposed system follows multi user system. In multi user system, different actors have access to different functionality and data.

Table 5. 2 Access Control

Actors	**Operations**				
	Account	Information	Exam	Result	Grade
Department Head	-Create -Edit -Delete	-Post		-------	-View
Instructor	------	-Post -View	-Create -Edit -Delete	-View	
Student	------	-View		-View	-View
Administrator	-Create -Edit -Delete	--------	------	-----	--------
Exam committee	-----	-------	-Approve	------	------

5.4. Packages

Package is an organized and functionality based set of related interface and classes. Package organizes classes that belong to the same category. In our system we categorized package in to Manage Package, Exam Package, Result Package, Users Package and Information Package.

Manage Package: help us to manage users and exam by creating editing deleting and granting users status.

Exam Package: help us to give and take exam.

Users Package: helps us to manage interaction between different users.

Information Package : helps us to post and view information between student, instructors and Department Heads.

The following diagram shows the package diagram of our system

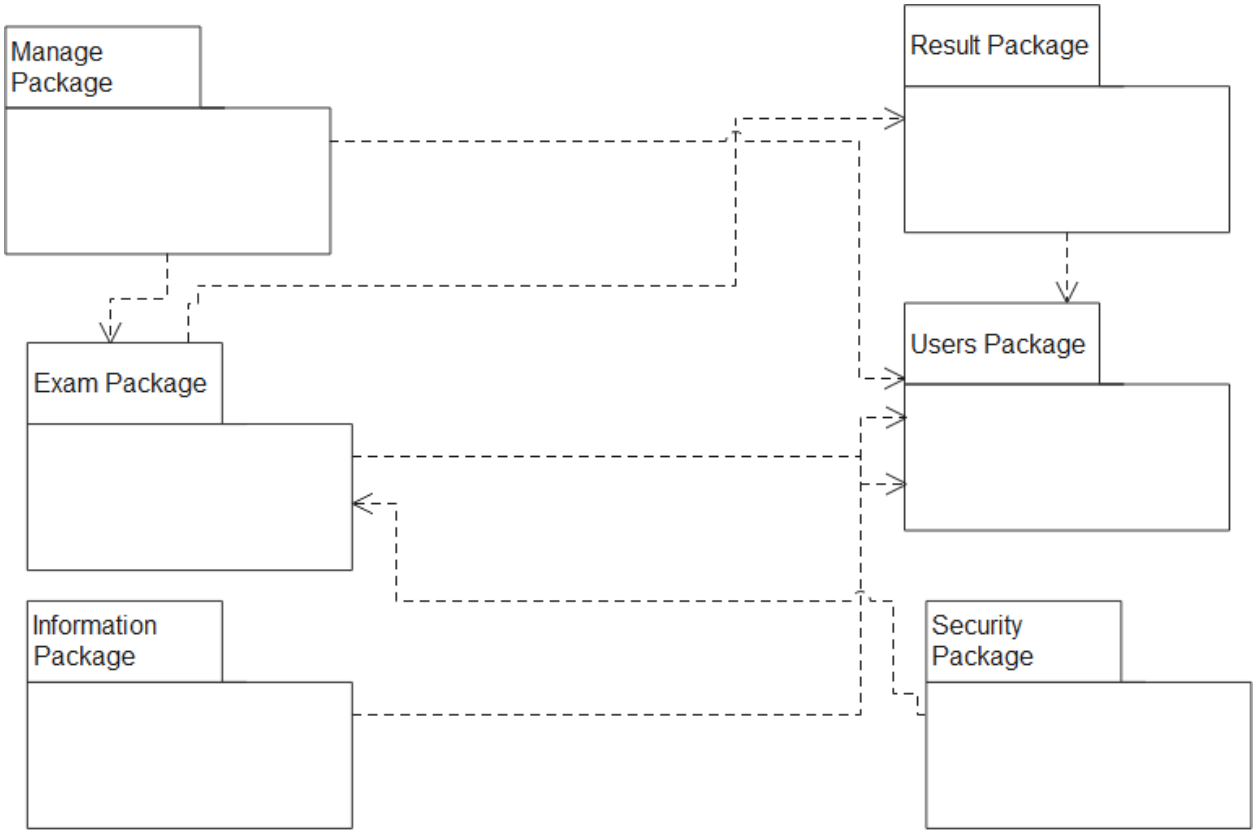


Figure 5. 6 Package

5.5. Algorithm Design

An algorithm is a procedure or formula for solving a problem, based on conducting a sequence of specified actions. It is a step by step process carried out to solve the given problem.

Algorithm design for login

1. Go to login page

2. Fill out the fields, send them to data base by clicking Login button, and check it. If the fields is correct, go to step 4. If not, to step 3

3. Show error Message

4. If user is administrator, Then the system display admin page

5. Else if user is instructor, then the system display instructor page

6.Else if user is department head, then the system display department head page

7.Else if user is exam committee, then the system display exam committee page

8.Else the system display student page.

9. End

5.6. User Interface Design

The goal of user interface design is to make the user interaction simple and efficient in terms of accomplishing user's goal. So in our project we have design a user interface that makes user friendly interaction between a user and the system.

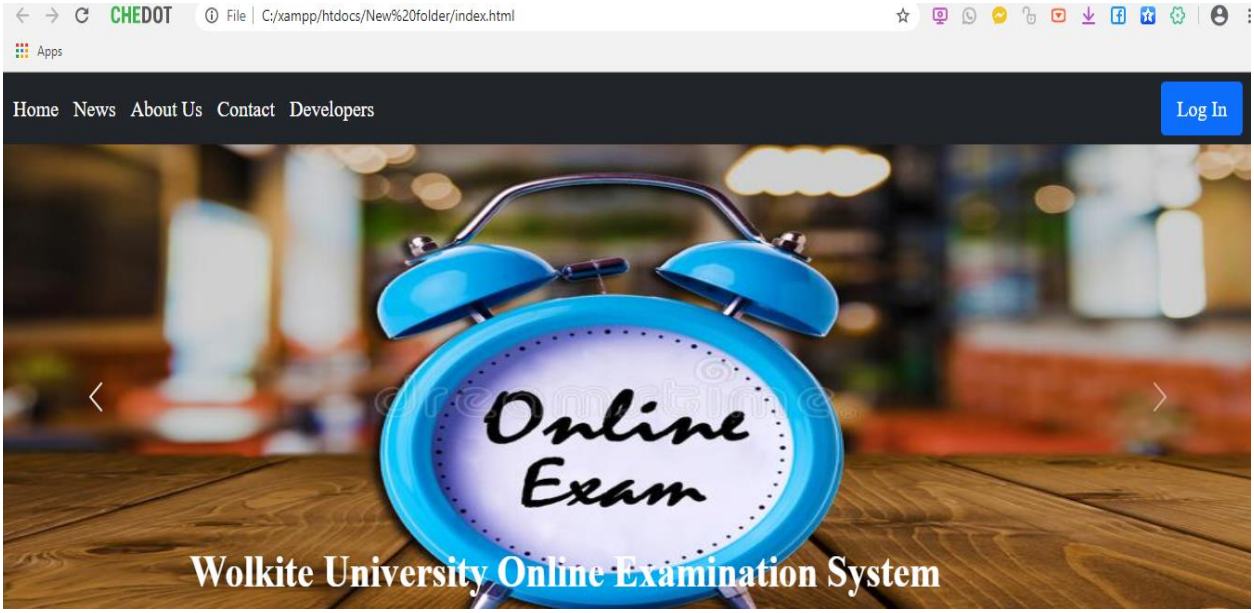


Figure 5. 7 Landing Page User Interface

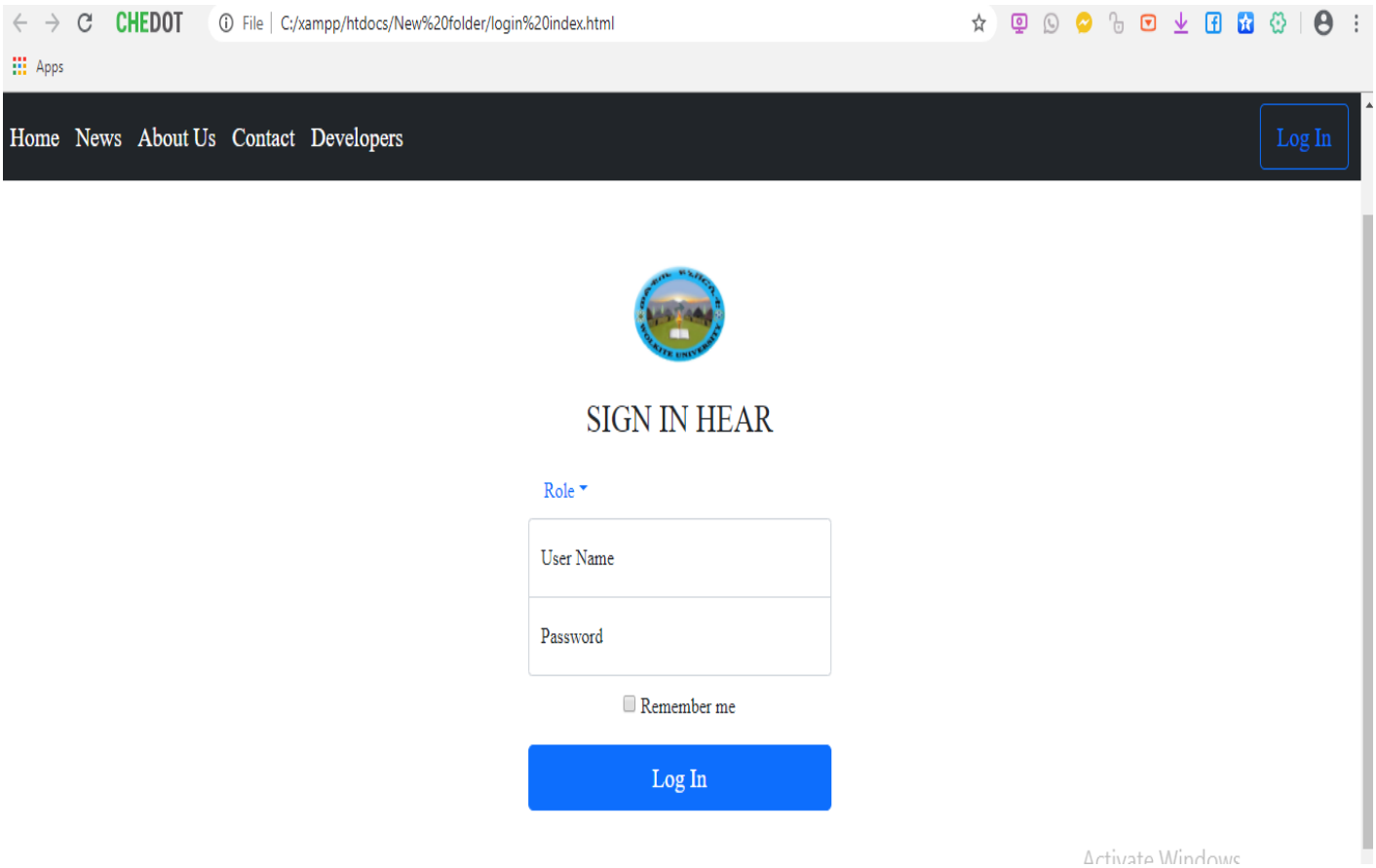


Figure 5. 8 Log In Page User Interface.

Reference

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