
# WOLKITE UNIVERSITY

## COLLEGE OF COMPUTING AND INFORMATICS

## DEPARTMENT OF INFORMATION TECHNOLOGY

## PROJECT TITLE: E_LEARNING SYSTEM FOR ATLAS BUSINESS AND TECHNOLOGY COLLEGE

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**Monday, 04 Jan 2021**

# Declaration

This is to declare that this project work which is done under the supervision of Mr. Amanuel Tamrat and having the title E-learning system for Atlas business and Technology College is the sole contribution of Hewan Birku, Genet Kassaw and Ushacho Ushula. No part of the project work has been reproduced illegally (copy and paste) which can be considered as Plagiarism. All referenced parts have been used to argue the idea and have been cited properly. We will be responsible and liable for any consequence if the violation of this declaration is proven.

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Monday, 04 Jan 2021

# Approval Form of Advisors and Examiners

This is to confirm that the project report entitled E-learning system for Atlas business and technology college submitted to Wolkite University, College of Computing and Informatics department of Information Technology in partial fulfillment of the requirement for the award of the degree of Bachelor of Science in Information Technology is an original work carried out by Hewan, Genet, and Ushacho is approved for submission

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# Acknowledgement

We should thank God for giving me strength to complete my graduate studies. We would like to express my gratitude to my advisor, Mr. Amanuel. Tamrat, for his professional support and encouragement throughout this project. Our efforts would not have been successful without my advisor useful inputs, helpful comments, insightful comments and most of all his patience with we from the beginning to the end of the project documentation work. We would also like to thank all the persons who give the require information about E-learning system when we asked them.

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# List of abbreviations

**BR:** Business Rule

**CSS:** Cascade Style Sheet

**DB:** Database

**E-Learning:** Electronic Learning

**GUI:** Graphical User Interface

**HTML:** Hyper Text Markup Language

**ID:** Identification

**PHP:** Hyper Text Preprocessor

**TVET:** Technical and vocational education and training

**UC:** Use Case

**UI:** User Interface

**WKU:** Wolkite University

**XAMP:** Platform Apache MySQL Perl PHP

# Abstract

Outcome based E-learning is important in today's development of the economic sector. Young people and technologies should be ready for a country to fit in the dynamically complex Learning/training and working environment. This implies more work should be carried out to meet present and future needs of skilled and well trained man power as per the need of the various training and education fields and the requirement of the labor market.

The purpose of this work was to conduct a study on design and implementation of a web-based E-Learning support system for Atlas business and Technology College. The design and implementation of a prototype system was done in accordance with the identified functional and non-functional requirements.

# CHAPTER ONE

## 1. Introduction

### 1.1 Background

Atlas University is a private institution that was founded in 2010 in Ethiopia.it has a total undergraduate enrollment of 7034, its setting is sub urban, and the campus size is 1180 across.it utilizes a quarter based academic calendar. The college is available in day, night, weekend and distance program. The college give services in Masters of business administration and M.S.C degree in accounting and finance with in the master's program and in degree level the college gives services in Accounting and finance, Management and Computer science and also in TVET(level 1-4) it gives services with in the areas of Accounting, Human resource management, Library science, Administrative office management and secretary science , Information technology, Purchasing, Marketing management, Garment and house holding service.

The technological progress of network and computer provide the teaching a new carrier, i.e., E-learning, which becomes a new approach for enterprises, educational institutions and governments to know with. E-learning is commonly referred to the intentional use of networked information and communications technology in teaching and learning. The globalization trend and commercialization of E-learning will become an import educational reform in 21st century, and it also becomes an import issue in research field. E-Learning is the delivery of a learning, training or education program by electronic means. E-learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, education or learning material.
E-learning is the computer and network-enabled transfer of skills and knowledge. E-learning applications and processes include Web-based learning, computer-based learning, virtual education opportunities and digital collaboration. Content is delivered via the Internet.

Now a day's web applications are becoming more popular in different public institutions and private companies. Web applications are more popular as it is developed in a user friendly manner and the users find it more familiar compared to another types of applications. It operates on most

commonly used technologies. It is from this standpoint that we are going to develop a web application E-learning for Atlas College.

### 1.2 Statement of problem

The Atlas University currently face many problems because they are using manual system. Some problems are:-

**Lack of good performance and accuracy on the distribution of modules: -** After students are being registered, the registration unit sends the name list of students to the material production and distribution unit in order to duplicate modules according to the number of students registered. The administrative unit takes the modules and distributes it to the students and branches. The problem here is that while distributing modules there may be the unbalance of modules and the number of student found in that branch. In distributing to the individual there may be the lack of modules to students.

**Problems in giving exams and assessments: -** Since the learners are from different areas there is situation where all candidates are not able to attend the exam at the same time. They need special time to give exams and correct the exam. The proposed project solves this problem by uploading exams on website and the students can take their exams at their home or where they can access the internet within limited time.

**Problems with showing the exam result and grade: -** In distance educations, it known that learners are from different areas. After the instructor/ teacher corrects the exam, the instructor that corrects the exam sends the result of the students to the registrar unit and the registrar unit sends the copy of the result to the administrative unit. Because of this students go to office and see their results at the administrative unit office one by one. The problem here is that students may come at different time, and this is difficult to the administrative unit to show the results in different time.

## 1.3 Objectives of the project

### 1.3.1 General objective

The general objective of this project is to develop a Web Based E-learning for Atlas University Continuity and Distance Education System.

### 1.3.2 Specific objectives

The specific objectives of the project are to:

- Develop web-based system which provides learning service online that will be used to reduce wastage of time and energy.
- To provide course material on time and with different media types (audio, video and text).
- To provide upcoming events (urgent notice, etc.)
- To provide online exam
- To enable students to have the option to select learning materials that meets their level of knowledge and interest
- To develop some security improvement to protect student's info from unauthorized persons.
- To enable students to submit their assignment online.

## 1.4 Feasibility study

### 1.4.1 Technical feasibility

The system will be develop by object oriented system development architecture and techniques [1]. And the team tried to use any methodologies at hand and developing the system with fair practices. The total aggregated effort now makes the system to be technically feasible, since the company has sufficient computer hard ware and software facilities.

### 1.4.2 Operational feasibility

The proposed E-learning system for Atlas business and technology is operationally feasible because it is simple to access and all operations will be performed easily because we give training after completing the implementation and the system will have attractive user interface.

### 1.4.3 Economic feasibility

The project that we are going to develop is economically feasible than the manual work, although Developing e-learning is more expensive than preparing classroom materials and training the trainers, especially if multimedia or highly interactive methods are used, the delivery costs for e-learning (including costs of web servers and technical support) are considerably lower than those for classroom facilities, instructor time, participants' travel and job time lost to attend classroom sessions. This refers to the benefits of outcomes we are deriving from the product as compared to the total cost we are spending for developing the product.

## 1.5 Scope and limitation of the project

### 1.5.1 Scope of the project

The proposed project implements the manual existing system to centralized and automated system for one specific office.

- Prepared module uploading.
- Provide course materials online that students can access it everywhere, at all time.
- Providing online Assignment for students.
- Show course result for students online without going to their instructors.
- Students submit their assignment online
- Student registration
- Examination is online
- Store and manage the distance learner information and data.

1.5.2 Limitation of this project

The project will be limited on developing a web based E-learning system for Atlas business and Technology College. The project that we will do can't generate the schedule and it can't include video conferencing and live stream, since our proposed system corrects the exam by itself. Because of the pattern of the exam don't support subjective, scripture and image the exam pattern is limited to objective question only. If the E-Learning audience lacks self-discipline, it is unlikely that they will be motivated to self-study.

## 1.6 Significance of Project

After implementing this project, it gives so many uses for the Atlas College. Among from this some of them are reduce wastage of the college resource, making course grade showing process simple, minimize work overload of the employee and Providing full access of course material in different format for students.

## 1.7 Beneficiaries of the project

The target beneficiary of the project will be Atlas business and Technology College, Atlas business and technology college student and Atlas business and technology college teacher and also the newly proposed system has a benefit for the Administrative Unit, instructors and Student.

**Student**

- Easily access their result on time
- Enable to access the full information
- Enable students to download the resource
- Enable to attach comments, questions, suggestions, assignment and etc.

**Instructors**

- Easily upload the course material
- Enable to provide assignment for the student simply by uploading

**Administrative Unit**

- Simply to manages system account
- Enable to create account
- Enable to change account
- Updating new information

## 1.8 Methodology of the project

### 1.8.1 Data Collection tools and techniques

For the collection of data we used observation, interview and document review methods.

**Interview:** To gather more real information about the Atlas business and technology college existing activity we interview employer of the organization and we get lots of information about how they work in manually.

**Observation:** Through this method we gather information by observing different E-learning sites and also we observe the current Atlas college manual work.

**Document analysis:** For more information about E-learning system we refer relevant documents and previous printed documents related to E-learning system.

### 1.8.2 Development Tools and technology

Developing Atlas college E-learning system needs a number of tools that makes the process easy and fast. These development tools are hardware tools and software tools both collaboratively work to achieve specific goals. Here are some development tools:-

**Hardware tools**

- Laptops for writing and executing our project.
- Flash disk for moving data from one computer to other

**Software tools**

- Web browser ( Google chrome)
- Operating system of window10 to develop the system.
- Adobe Photoshop: for editing images and icons for the interface of the system.
- We will use XAMP because it's a free open source mainly consisting of the Apache server, MySQL database and interpreters for scripts written in the PHP.
- We will use Notepad++ to write and compile our code.
- html, Java script, xml
- Since CSS can create a style sheet, we will use this in order to simplify our work.

# CHAPTER TWO

## 2. Description of the existing system

## 2.1 Introduction of existing system

In this chapter we are going to describes Overview of the existing system that are forwarded by us to solve those problems by developing e-learning system. The current system that we have observed is faced a lot of problems, due to this reason we analyze those problems to provide some alternative solutions.

Currently the Atlas business and technology college teaching and learning activity is manual and physical contact based which is time, economical and labor consumer. Even if the college gives a distance learning, such students take their module from the instructor by coming physically and also any work such as assignment, project and the like that was given by the instructor in order to do is submit to the instructor through manually and contact the instructor physically this existing activity wastes more time of the instructor as well as the students and the student wastes money for transportation and the like.

## 2.2 Role players in the existing system

The players are entities or actors who participate in the teaching learning activity of the Atlas business and Technology College. In the existing Atlas business and Technology College there are three players namely the Academic unit, instructor and the students these actors interact with each other to fulfill the required tasks. The function of such players are:-

**Academic dean:** Is one of the actor in the college who assign instructors for the course and Control teaching-learning process by manage the instructor, section and the students results by a means of instructors.

**Instructor:** Is the actor who distribute modules for students, giving and receiving assignments, give examination, Show course results including assignment, quizzes and examination results for student.

**Student:** Also one of the actors who involved in the activity of taking modules or any materials which is given by the instructors, submitting assignments, view their grade from the instructors.

## 2.3 Function of the existing system

In current system registering curriculum, assigning instructor for course, managing those instructors and sections are performed manually by the Academic dean and distributing modules or course materials, giving assignments, quizzes, exams, projects and showing such results for the students are performed manually or physically by the instructor. And also in current system the students get their learning materials, taking exams, quizzes, submitting assignment, projects and they get their results in a physical or face to face way.

## 2.4 Draw back of the existing system

Atlas business and technology college current teaching and learning process is face to face, even if they gives a distance education there is no e-learning system. Since the college has lots of department and each department needs their own different material to teach. However, full filling every material in hard copy to each department is not easy, it is very hard and affects the college economy. Since instructors provide these modules to their student this activity takes a lot of time to distribute and it needs human power.

The other problem is for students. As teaching and learning system is face to face students must attend the class and contact their instructor to learn, take exam, and submit assignment. The other thing is economical problem. When we think about the Ethiopian economy it is very hard to get enough money from their parents. So, it is better to improve their economy by doing some job. This current activity of the Atlas business and Technology College leads their student to waste time, money and effort in always going back to their instructor to submit assignments and to view the result of course including quizzes, tests and assignments.

## 2.5 Business rule

This part specifies and gives understanding of activities which are being done in the existing system in terms of business rule.

**BR1**: The Academic dean first register the curriculum then assign instructor for the course, gives unique identification card for the students and also controls the overall teaching learning processes.

**BR2:** The instructor distribute learning material to each student and also give assignment, quizzes, exam and projects in order to accomplish the course.

**BR3:** The student receive module from the instructor and take assignment, quizzes, exam and projects from the instructor and finally they submit such work to the instructor then they get their result or grade from the instructor.

# CHAPTER THREE

## 3. Proposed system

After analyzing the current system and identifying all the problems occurred during over all the learning processes of the college, the project team has decided to develop web based E-learning system for Atlas business and Technology College. New system will solve the problem and limitation of the current system seen above. After developing the new system it is fully flagged online at anytime, anywhere. The proposed system will use the major functionality of the existing system and able to advance in accordance with speed, performance and efficiency with respect to current system using new technologies.

### 3.1 Requirement specification

In requirement specification there are two main ideas defined or explained functional requirement (what things are performed by the system that we developing) and non-functional (what are system aspects). So, it consist two parts: - Functional Requirement and Nonfunctional Requirement

3.1.1 Functional Requirement

Functional requirement explains and describes what things are performed by the system. Describe user tasks that the system needs to support. Generally it's the interaction between the system and the users or functionality we will get from this system. Functional requirements also capture the intended behavior of the system. This behavior may be expressed as services. The following are some functionality of new system:-

**Course material uploading:**-enables the instructors to login to the system and upload Course materials.

**Course material downloading**:-enables the students to login to the system and download Course materials.

**Viewing course result**:-enables the students to login to the system and view their course results including quizzes, tests, assignments and final examination.

**Entering course result**:-enables the instructors to login to the system and post course result for students.

**Taking assignments**:-enables the student to take assignments online.

**Submitting assignments**:-enabling students to submit assignment online.

**Manage accounts:-**enables **Academic Dean** to create/activate/deactivate accounts for the registrar officer, Instructors and the students.

**Forum:-**enable the students and their instructors to talk about their fields of study.

The next diagram shows the general function requirement of the system.

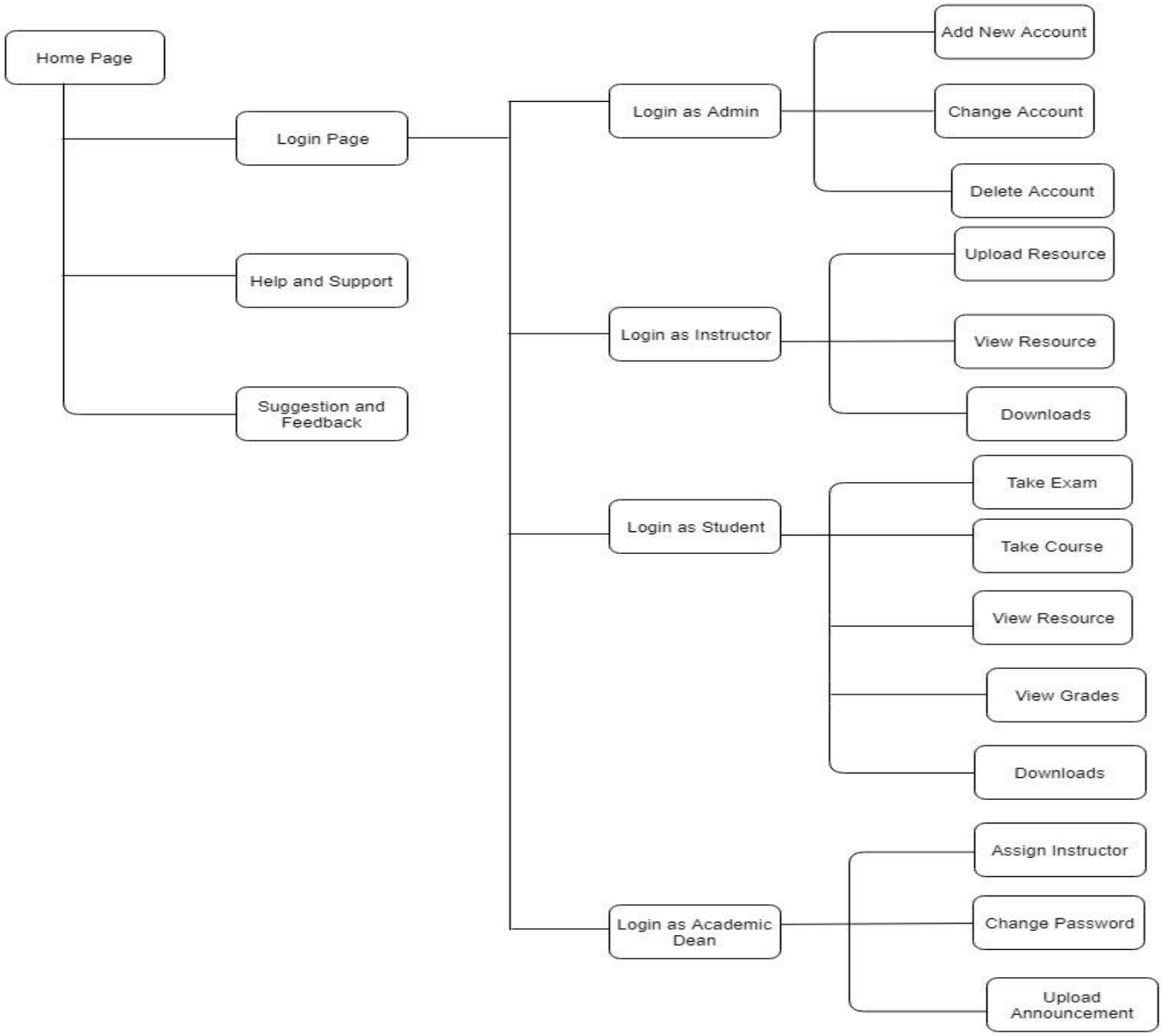



Figure 3. 1 functional requirement

### 3.1.2 Non-functional requirements

Non-Functional requirement explains and describes the user visible aspects of the system. Constraints on the services or functions offered by the system are constraints of timing, the development process; standards, etc. are things we have to focus on developing new systems to achieve its functionality.

Non-functional requirements are requirements which specify criteria that can be used to judge the operation of a system. This is contrasted with functional requirements that specify behavior or functions [2]. The new E-Learning system for Atlas business and Technology College has the following Non-Functional Requirements to achieve its functionality.

**Usability:** mean the system is user-friendly which is easy to learn, use, input data interpret outputs of system or component and operate. The User interface for this system will be simple and clear. The E-Learning services are easy to gain and use i.e. the service doesn't require expert. To say system is usable or user friendly we need to develop:

- Well-formed graphical user interfaces
- Well-structured user manuals
- Check for validation and display error messages
- Help facilities for users

**Performance:** Since it is a web based system, it runs on any system capable of running a Web browser. Although clients run on PC, the server should be powerful which is handling request even high traffic time.

**Availability:** The system must be available whenever it is needed by the user. The aim of this project is to give a service at any time and any place learning with self. Therefore, the system must be available all the time (if there is a connection).

**Security:** The system will be built with security methods. Since user has a user name and password in order to be the authorized user. Therefore the system will assures that any invalid user is not allowed to access it so that there is permissible information flow regarding to who can do what.

**Portability:** The system is machine and software system independent. It can run to different target platforms. It not affected by type or required hardware or software.

**Documentation content:** The system contains the required documents needed to implement the project.

# CHAPTER FOUR

## 4. System Analysis

In this chapter we will deal with the proposed system by using **use case** diagrams, use case description, object model, dynamic model (sequence diagrams and activity diagrams). After identifying the actors and the use case of our new system, the use cases are developed and textual descriptions are depicted based on the use case. Next the sequence diagram will be depicted based on the use cases which are developed for the newly proposed system. Activities will be represented by activity diagram. Precondition, post condition and flow of event will be cover under this chapter.

### 4.1 System Model

To develop this project, we have used object oriented system analysis models. From object oriented system analysis method, we have use different system models such as use case models, object models, dynamic models, that describe the problem to be solved and as system models represented by graphically they are more understandable than more detailed natural language description of the system requirement.

#### 4.1.1 Use Case Model

Use case model is composed of a use case diagram and the accompanying documentation describing the use cases, actors, and associations. Use case diagram is created to visualize interactions between systems with the external environment. Also a use case model is the representation of the system intended functions and its environment. The functionalities are specified by the use case and the actor specified for the environment.

**Use case:** It's the identification and representation of a sequence of actions that the user (Actors) takes for a system to get particular target. It can be identified and represented by ellipses with a respective descriptive name.

An actor is a person that plays a role in one or more interactions with the system. The purpose of actor identification is to identify all of the participants that interact with the system. An actor has a role in that interacting with the system. The actors that interact with the proposed system are:-

- System admin
- Academic Dean
- Student
- Instructor

**Use-case identification**

Identifying the activities that are mainly performed on the proposed system is the basic thing in analyzing a new system. The following use cases have been identified from the system specification.

- Login
- Account
- Course material
- Course result
- Exam
- Assign Instructor
- Register course/curriculum
- Give feedback
- Forum

4.1.1.1 Use case diagram

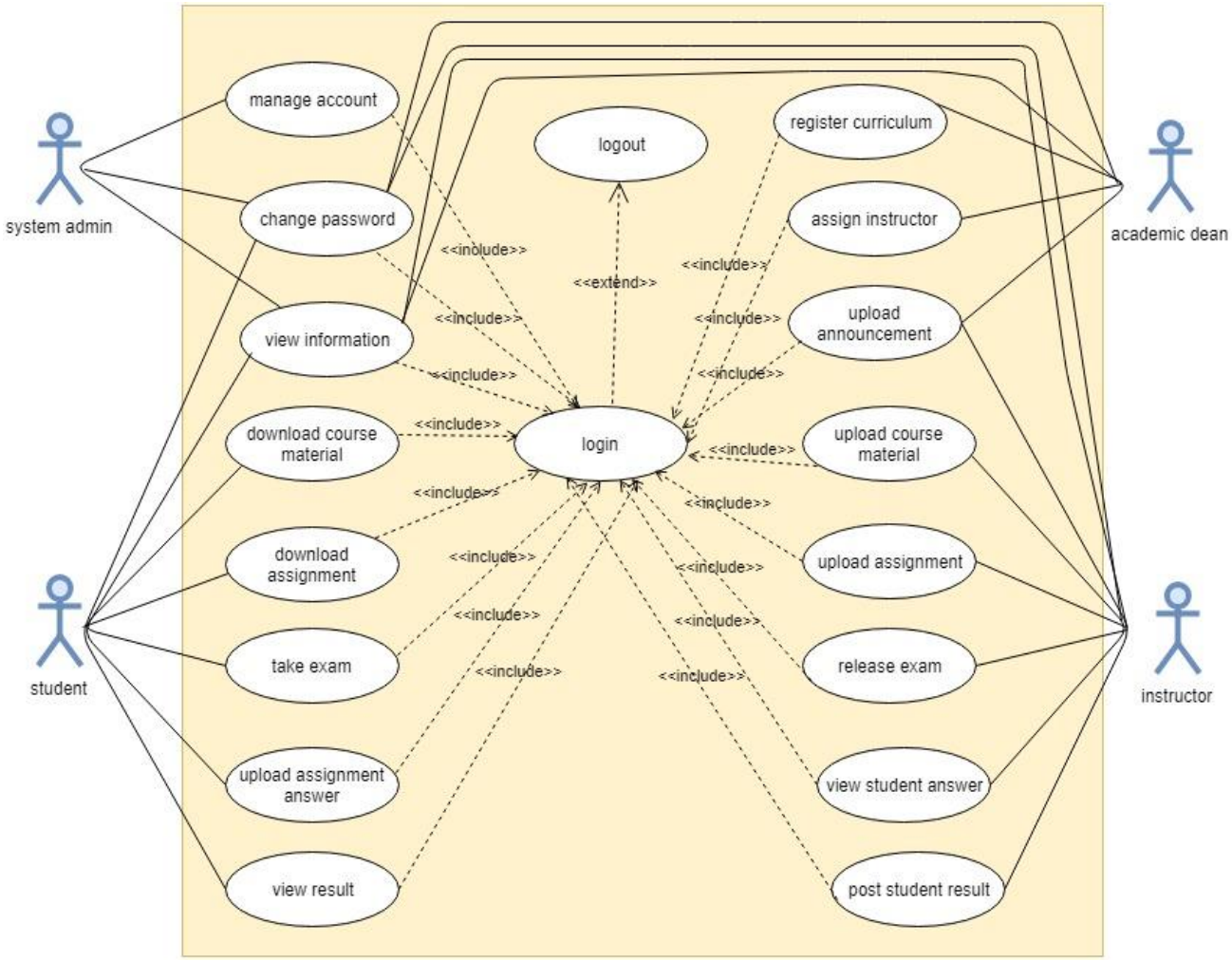



Figure 4. 1 General use case diagram

4.1.1.2 Use Case Description

In this section we explains in detail the general flow of use case diagrams. Each table contains the use case name, use case ID, pre-condition, post-condition, alternative flow that the actor initiates and interacts with the use case, and flow of event that show the interaction between the actor and the use case which enable the user to easily understand the functions of the proposed system. We describe a total of seven use cases such as the login, account, exam, course result, course material, assign instructor and curriculum registry know every activity of such use case is stated below.

Table 4. 1 Description of login use case

| Use Case Name | Login |
|---|---|
| Identifier | UC1 |
| Description | To authenticate the user |
| Actor | System admin, Academic-Dean, Instructor and student |
| Pre-condition | The user should have an account. |
| Post-condition | The authenticated user gets the appropriate page. User gets access to the system according to their predefined system privilege and<br>Finally the user can logout or turn off the page. |
| Flow of events step | Step1: Select the login link<br>Step2: The system displays the login form<br>Step3: Fill user name and password<br>Step4: system validates user name and password.<br>Step5: The system displays the appropriate page. |
| Alternative Flow | If user name and password are incorrect Return bake to step 2 in flow event |

Table 4. 2 Description of manage user account use case

| | |
|---|---|
| Use case name | user account |
| Identifier | UC2 |
| Description | The System admin create, update and delete account for Academic dean, Instructor and student |
| Actor | System Admin |
| Pre-condition | System admin should have to enter a valid user name and password in order to create, update and delete user account |
| Post-condition | If the system admin update, create and delete user account correctly, successfully message will be displayed and<br>Finally logout from the page. |
| Flow of event step | Step 1.System admin should have to choose account item<br>Step 2. Then click on the selected account item.<br>Step 3.the System admin should have to create, update and delete the user's account. |
| Alternative flow | If the system admin do not fills the needed information for updating, deleting and creating account then it returns back to step 2 in flow event |

Table 4. 3 Description of view course result use case

| Use case name | Course result |
|---|---|
| Identifier | UC3 |
| Description | The students can view the result of the course including quizzes, tests and assignments posted by the instructor. |
| Actor | Student |
| Pre-condition | 1. There should be posted result by instructor.<br>2. Student should have to enter a valid user name and password in order to view course result. |
| Post-condition | 1. The result of the course will be displayed successfully<br>2. Finally logout from the page. |
| Flow of event step | Step 1: Student clicks on view course result link.<br>Step 2: Then student fills course code.<br>Step 3: Then click on view button. |
| Alternative flow | If the student fills incorrect course code the student check step 2. |

Table 4. 4 Description of take exam use case

| | |
|---|---|
| Use case name | Exam |
| Identifier | UC4 |
| Description | The student takes the exam which is released by their instructor |
| Actor | Student, Instructor |
| Pre-condition | The Instructor and student has already activated authenticate user functionality and they must be in their official page in order to release the exam and take the exam and<br>The exam expires based on that the instructor assign time. |
| Post-condition | The exam and the result of the exam is stored in the database |
| Flow of event step | 1. The instructor click the exam link from their department official page.<br>2. Instructor release the exam and assign the expiry time of the exam.<br>3. The student clicks the exam link from their department official page.<br>2. The student clicks on the course that wants to take exam.<br>3. The student clicks on the exam link.<br>4. The student selects the chapter and enters his pass key.<br>5. The student answers the questions and click ok. |
| Alternative flow | The user views the message and closes the page. |

Table 4. 5 Description of curriculum registry use case

| | |
|---|---|
| Use case name | Curriculum registry |
| Identifier | UC5 |
| Description | The academic dean register the curriculum |
| Actor | Academic dean |
| Pre-condition | Academic dean should have to enter a valid user name and password in order to register curriculum. |
| Post-condition | The register curriculum stored in the database. |
| Flow of event step | Step 1.The academic dean must be in their official page<br>Step 2.Then click on curriculum registry link<br>Step 4.The academic dean fill the curriculum registry form<br>Step 3.Register the curriculum |
| Alternative flow | If the academic register curriculum in incorrectly must back to step 4 in flow event step 4 and fill the form again. |

Table 4. 6 Description of assign instructor use case

| | |
|---|---|
| Use case name | Assign Instructor |
| Identifier | UC6 |
| Description | The academic dean assign instructor to course |
| Actor | Academic dean |
| Pre-condition | Academic dean should have to enter a valid user name and password in order to assign instructor for course. |
| Post-condition | Assign instructor for course successfully message display |
| Flow of event step | Step 1.The academic dean must be in their official page<br>Step 2.Then click on assign instructor link<br>Step 4.Then the academic dean assign instructor to course. |
| Alternative flow | If the assignment of instructor is incorrect then back to step 4 in alternative flow step |

Table 4. 7 Description of course material use case

| Use case name | Course material |
|---|---|
| Identifier | UC7 |
| Description | This process can be performed by instructor as well as by student. An instructor uploads course material and assignment questions for student and download assignment answer of the student also the Student downloads the assignment questions and after completion their assignment upload their assignment answer. |
| Actor | Instructor, Student |
| Pre-condition | There should be uploaded material and assignment questions for the student to download and<br>There should be uploaded assignment answer for instructor to download. |
| Post-condition | The course material uploaded and downloaded successfully. |
| Flow of event step | Step 1: The instructor and the student must be in their official page.<br>Step 2: Click on upload course material link to upload and click on download course material link to download.<br>Step 3: Upload and download course material. |
| Alternative flow | If submission date has been passed the student cannot upload the assignment. |

4.1.1.3 Use case Scenario

This describes a particular sequence of activities within a use case. Flow of event Describes how and when use case starts and ends.

1. Scenario name: **Login.** Someone wants to login into the system

A. The person that wants to login the system must enter username and password

B. Then the person selects the login button,

C. If the person has valid account the system display user page else display error message.

2. Scenario name: **upload material**. Instructor wants to upload material into the system

A. First the Instructor must login into the system and

B. If the Instructor has valid account system displays instructor page

C. Then Instructor select upload menu and the system display browse from the storage device

D. Instructor click upload button, then the system display course material is uploaded.

3. Scenario name: **forum**. Firstly Mr. X and Mr. Y must login into the system then system display forum page then Mr. X and Mr. Y then can send and view message.

4. Scenario name: Download course material.

First the student must login into the system and the system displays student pages then the student select download course material button and the system display course material are downloaded successfully.

5. Scenario name: **Manage account**. First system admin must login into the system and the system display admin page then the system admin selects one of the listed links, for example, if he wants to create a new account, click to create account link and system displays create account form then the system admin fill correctly needed information and then the system displays account successfully created message.

## 4.2 Object Model

In this section, discussed an overview of object model, especially class diagram. The class diagram is a static diagram. It represents the static view of an application, it describes the attributes and operations of a class and also the constraints imposed on the system. The class diagrams are widely used in the modeling of object oriented systems because they are UML diagrams which can be mapped directly with object oriented languages [2].

### 4.2.1 Class Diagram

Class diagrams describe the system in terms of objects, classes, attributes, operations, and their association. In this section we are going to deal with the relationship between objects and what task is done Class for class diagram: academic dean, account, course, student, system admin, course material, assignment, instructor and announcement.

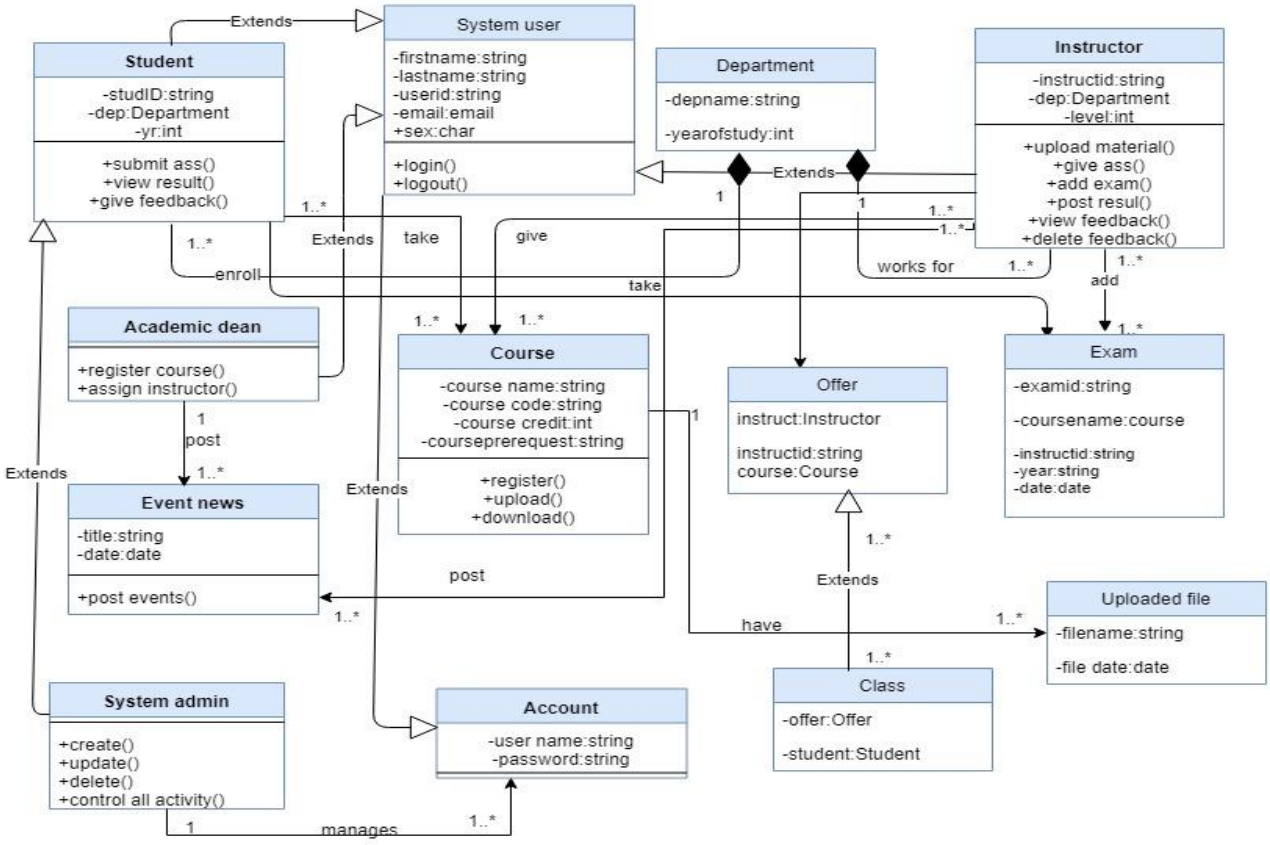



Figure 4. 2 Class diagram

4.2.2 Data Dictionary

In this section mention attributes, data type, data size, caption and constraints on the identified entities or classes by using tabular form.

Data dictionary table show academic dean, student, instructor, system admin, department, course, assignment, upload file and exam information.

Table 4. 8 Data dictionary table for system admin

| No | Field name | Field type | Field size | Constraint |
|---|---|---|---|---|
| 1 | Admin-id | varchar | 15 | Primary key |
| 2 | Admin-name | Varchar | 23 | Not null |
| 3 | Admin-email | Varchar | 70 | Not null |
| 4 | Admin-password | Varchar | 45 | Not null |

Table 4. 9 Data dictionary table for academic dean

| No | Field name | Field type | Field size | Constraint |
|---|---|---|---|---|
| 1 | Dean-id | varchar | 15 | Primary key |
| 2 | Dean -name | Varchar | 23 | Not null |
| 3 | Dean-email | Varchar | 70 | Not null |
| 4 | Dean-password | Varchar | 45 | Not null |

Table 4. 10 Data dictionary table for student

| No | Field name | Field type | Field size | constraint |
|---|---|---|---|---|
| 1 | Student-id | Varchar | 15 | Primary key |
| 2 | First-name | varchar | 23 | Not null |
| 3 | Last-name | varchar | 23 | Not null |
| 4 | User-name | varchar | 23 | Not null |
| 5 | Email | varchar | 70 | Not null |
| 6 | Password | varchar | 45 | Not null |
| 7 | Department | varchar | 55 | Not null |
| 8 | Year-of-study | Int | 13 | Not null |

Table 4. 11 Data dictionary table for instructor

| No | Field name | Field type | Field size | constraint |
|---|---|---|---|---|
| 1 | Instructor-id | Varchar | 15 | Primary key |
| 2 | First-name | varchar | 23 | Not null |
| 3 | Last-name | varchar | 23 | Not null |
| 4 | User-name | varchar | 23 | Not null |
| 5 | Email | varchar | 70 | Not null |
| 6 | Password | varchar | 45 | Not null |
| 7 | Department | varchar | 55 | Not null |
| 8 | level | varchar | 13 | Not null |

Table 4. 12 Data dictionary table for department

| No | Field name | Field type | Field size | constraint |
|---|---|---|---|---|
| 1 | Department-id | varchar | 50 | Primary key |
| 2 | Department-name | varchar | 50 | Not null |
| 3 | Year-of-study | Int | 23 | Not null |

Table 4. 13 Data dictionary table for course

| No | Field name | Field type | Field size | Constraint |
|---|---|---|---|---|
| 1 | Course-code | varchar | 50 | Primary-key |
| 2 | Course-name | varchar | 50 | Not null |
| 3 | Course-prerequisite | varchar | 50 | Not null |
| 4 | Course-credit | Int | 15 | Not null |

Table 4. 14 Data dictionary table for assignment

| No | Field name | Field type | Field size | Constraint |
|---|---|---|---|---|
| 1 | Assignment-id | varchar | 50 | Primary key |
| 2 | Course-code | varchar | 50 | Foreign key |
| 3 | Instructor-id | varchar | 50 | Foreign key |
| 4 | Course-title | varchar | 50 | Not null |
| 5 | Assignment-file | varchar | 120 | Not null |

Table 4. 15 Data dictionary table for exam

| No | Field name | Field type | Field size | Constraint |
|---|---|---|---|---|
| 1 | Exam-id | varchar | 50 | Primary key |
| 2 | Course-code | varchar | 50 | Foreign key |
| 3 | Instructor-id | varchar | 50 | Foreign key |
| 4 | Exam-title | varchar | 50 | Not null |
| 5 | Exam-file | varchar | 120 | Not null |

Table 4. 16 Data dictionary table for upload file

| No | Field name | Field type | Field size | Constraint |
|---|---|---|---|---|
| 1 | Upload-id | varchar | 50 | Primary key |
| 2 | File-name | varchar | 50 | Not null |
| 3 | File-date | date | 50 | Not null |

### 4.3 Dynamic Model

The dynamic model represents the time–dependent aspects of a system. It is concerned with the temporal changes in the states of the objects in a system. In this section we describe the behavior of the object model, in terms of sequence and activity diagrams.

4.3.1 Sequence Diagram

Sequence diagrams are used to depict graphically how objects interact with each other via messages in the execution of a use case or operation. They illustrate how the operations are performed between objects and in what sequence. A virtual course delivery system sequence diagram is an interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence chart, this sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the system. In this section we have a total of seven sequence diagrams such as, create account, login, curriculum registry, post exam, upload material, post result and logout in order to deal what steps we follow to do some activities.

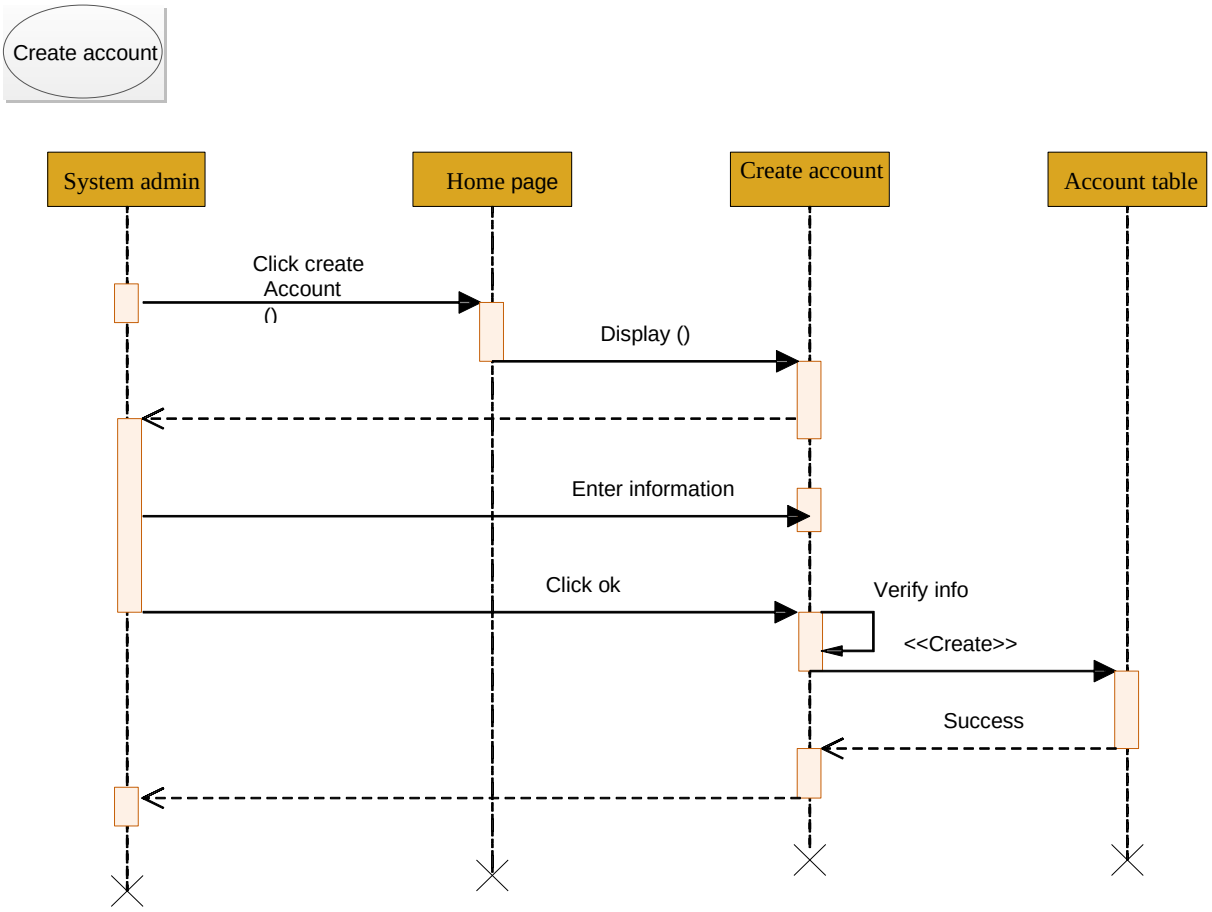



Figure 4. 3 Create account sequence diagram

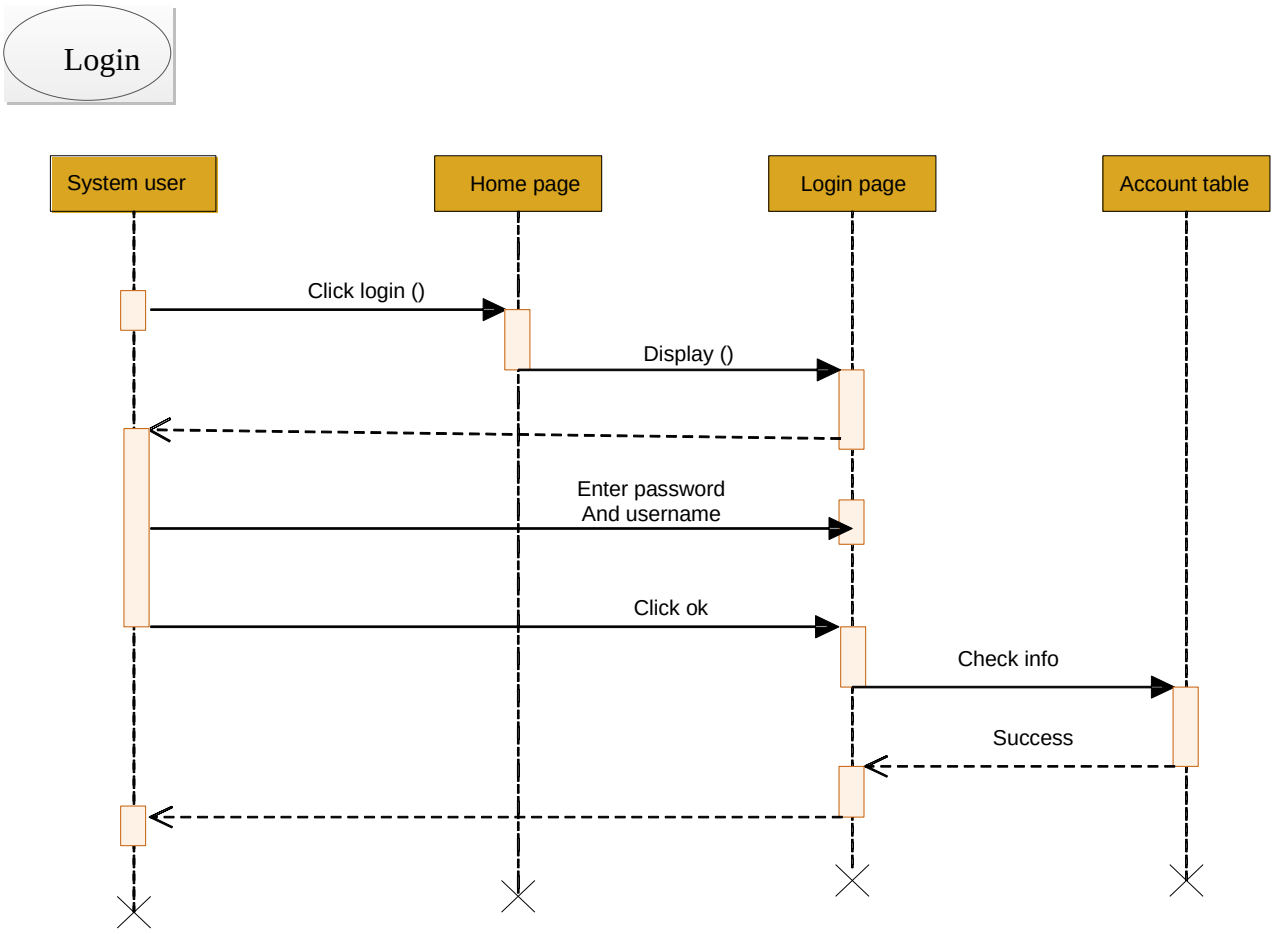



Figure 4. 4 Login sequence diagram

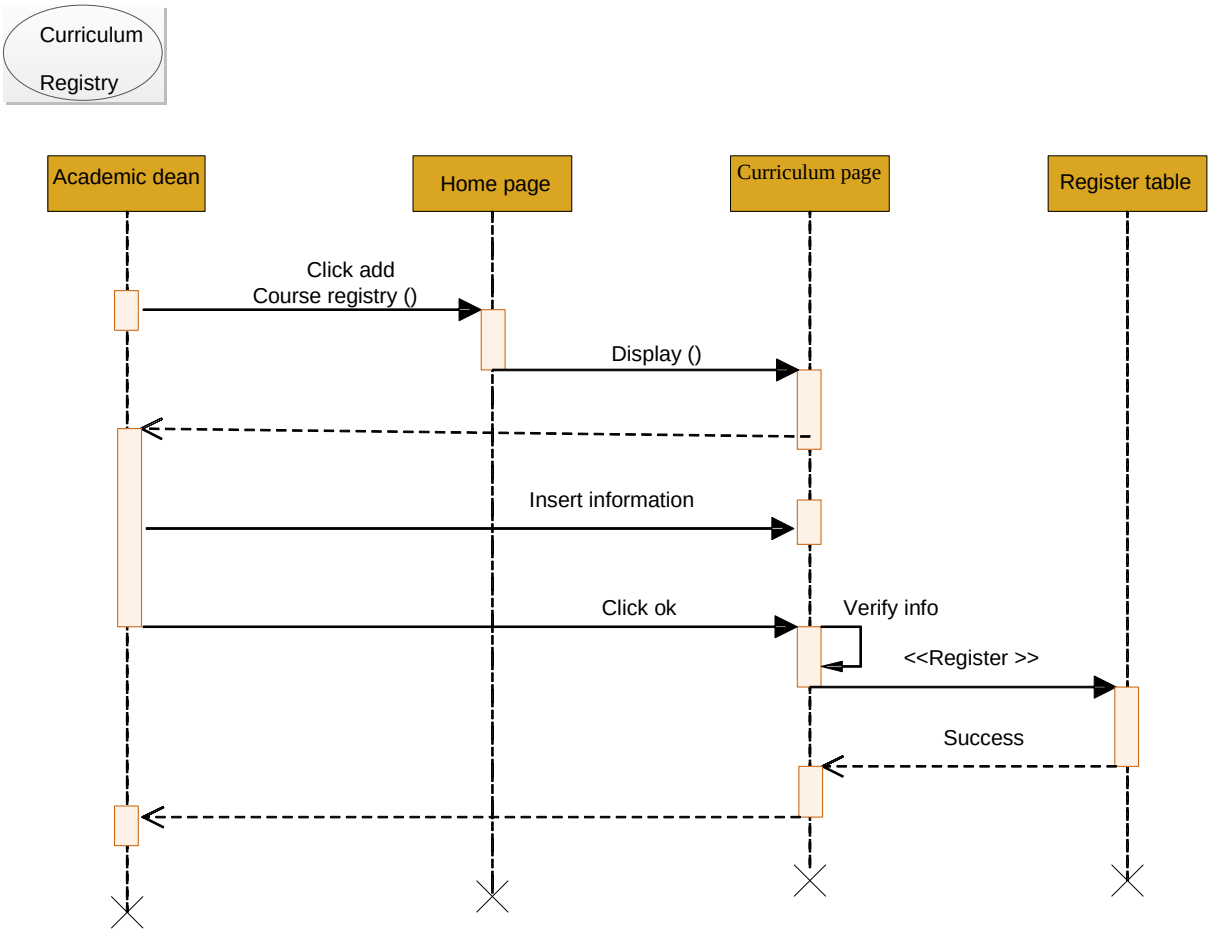



Figure 4. 5 Curriculum registry sequence diagram

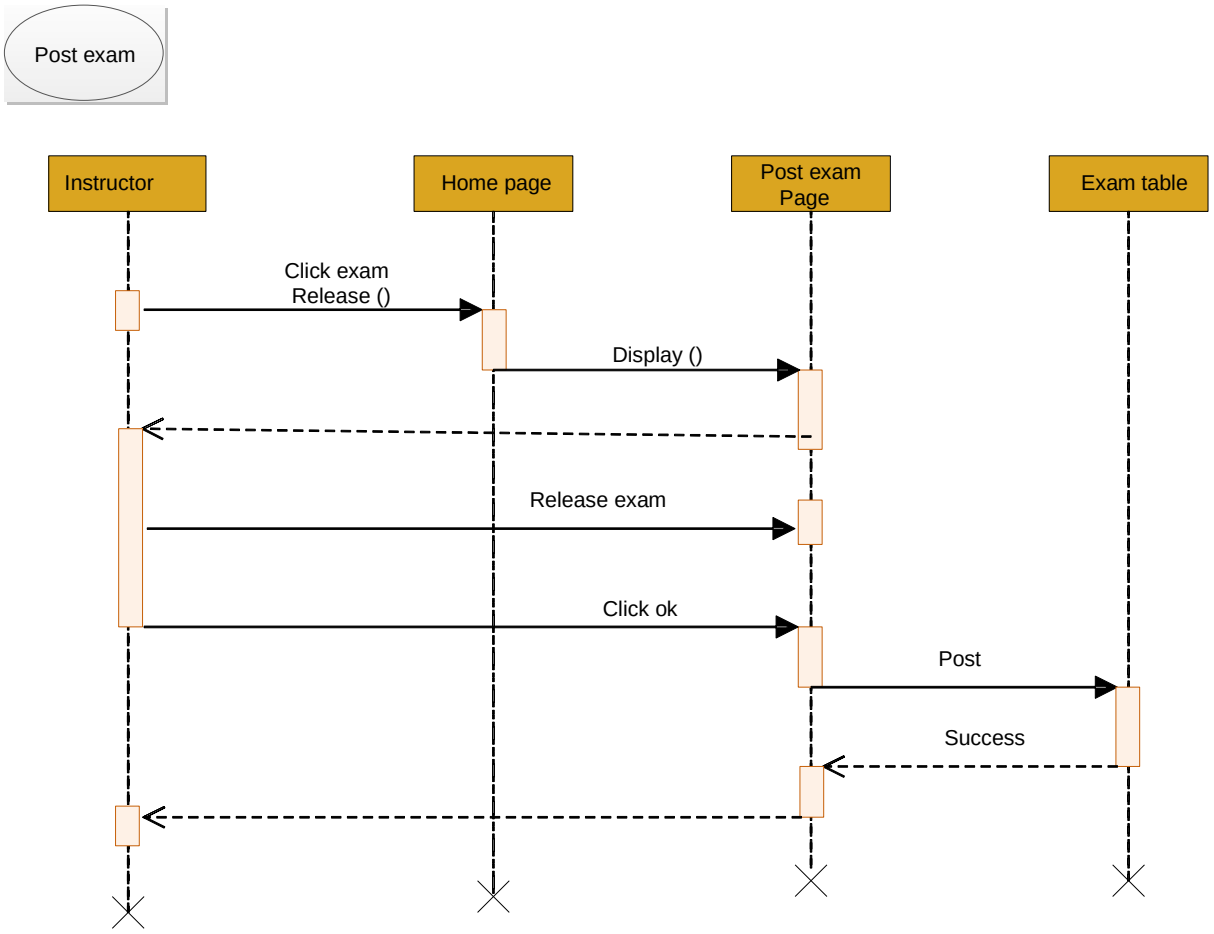



Figure 4. 6 Post exam sequence diagram

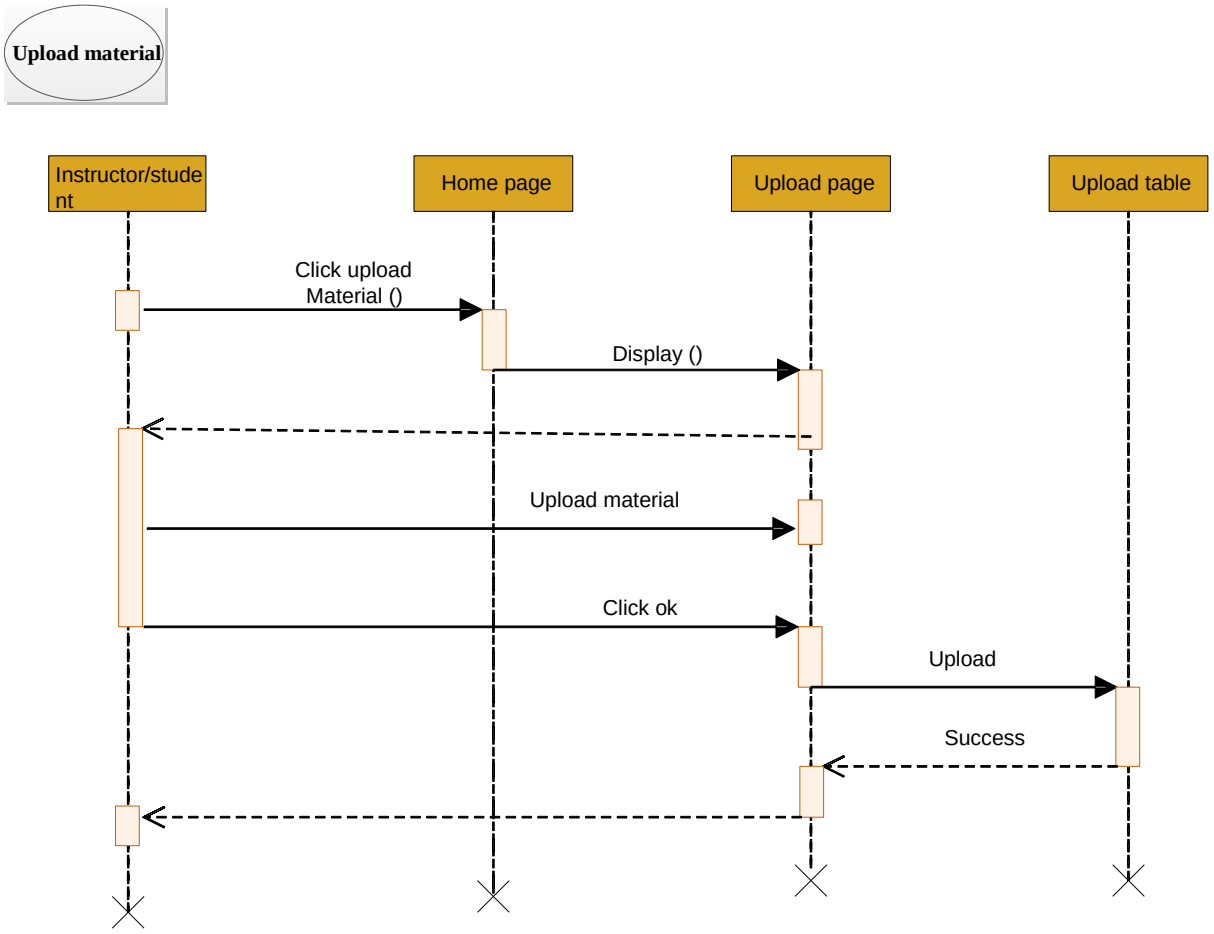



Figure 4. 7 Upload material sequence diagram

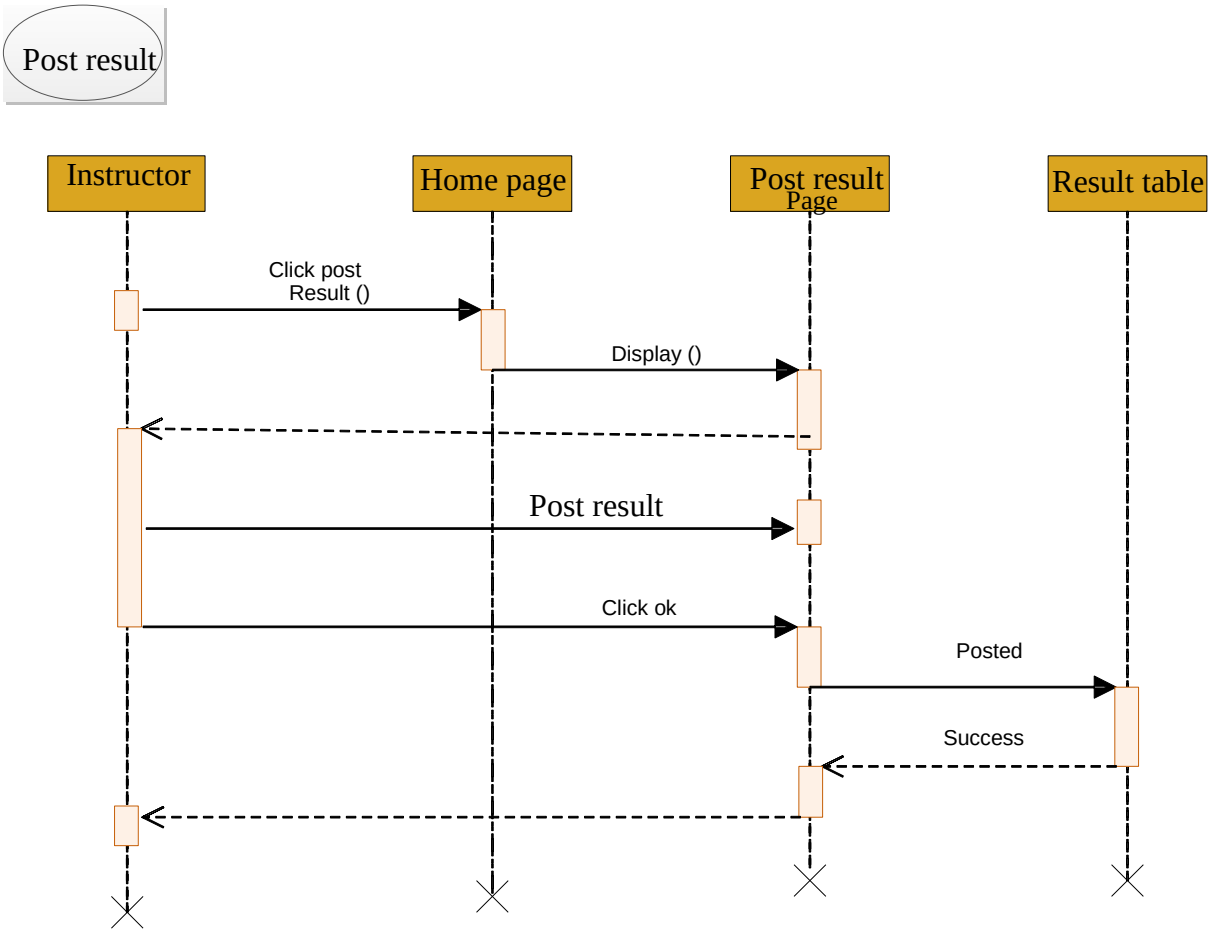



Figure 4. 8 Post result sequence diagram

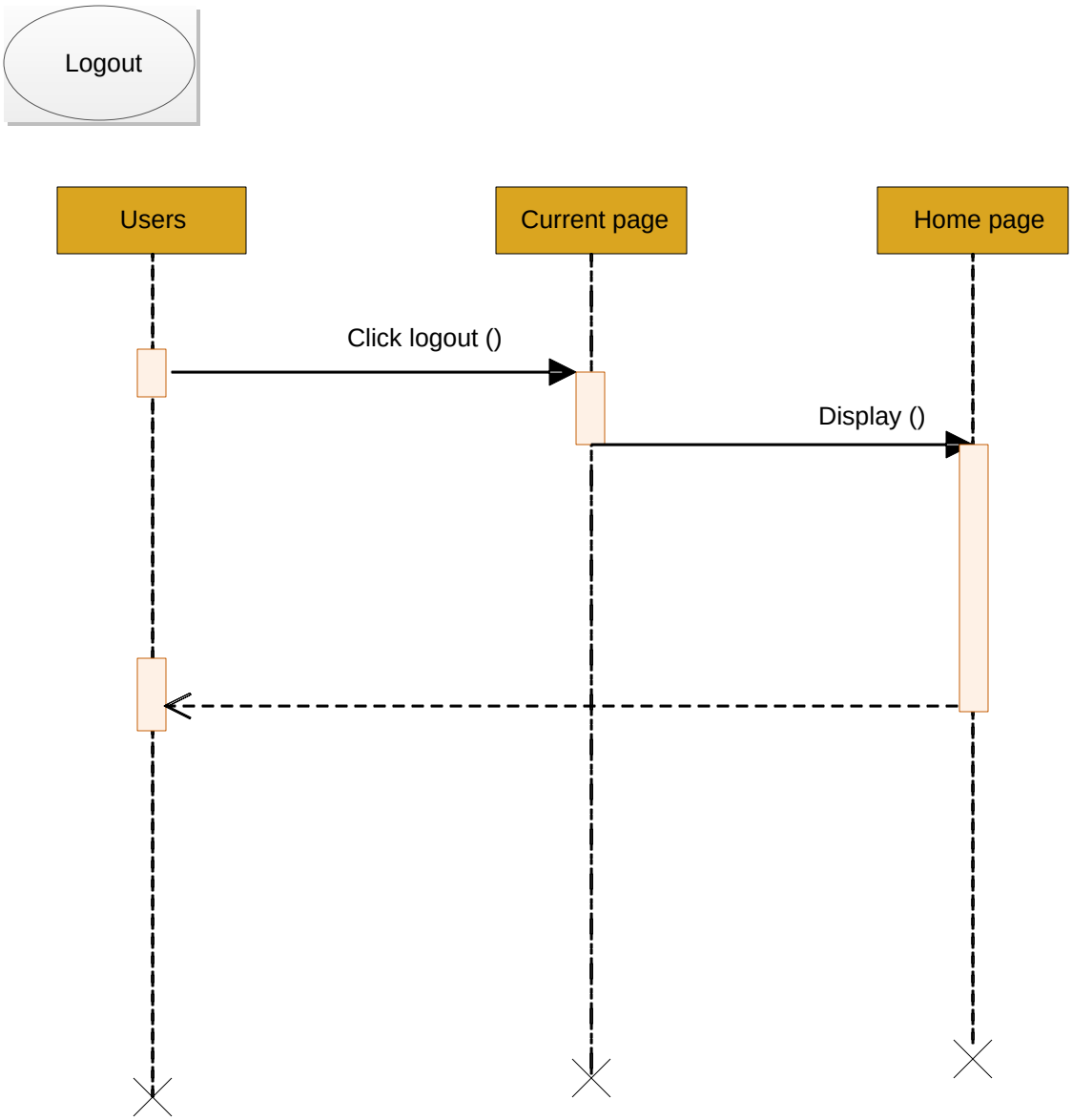



Figure 4. 9 Logout sequence diagram

4.3.2 Activity diagram

Activity diagram is basically a flow chart to represent the flow form one activity to another activity. The activity can be described as an operation of the system. The control flow is drawn from one operation to another. The following figure such as create account, login, update account, uploading, download, post exam, take exam and logout activity diagrams are specified in the new system of Atlas business and Technology College E-learning system.

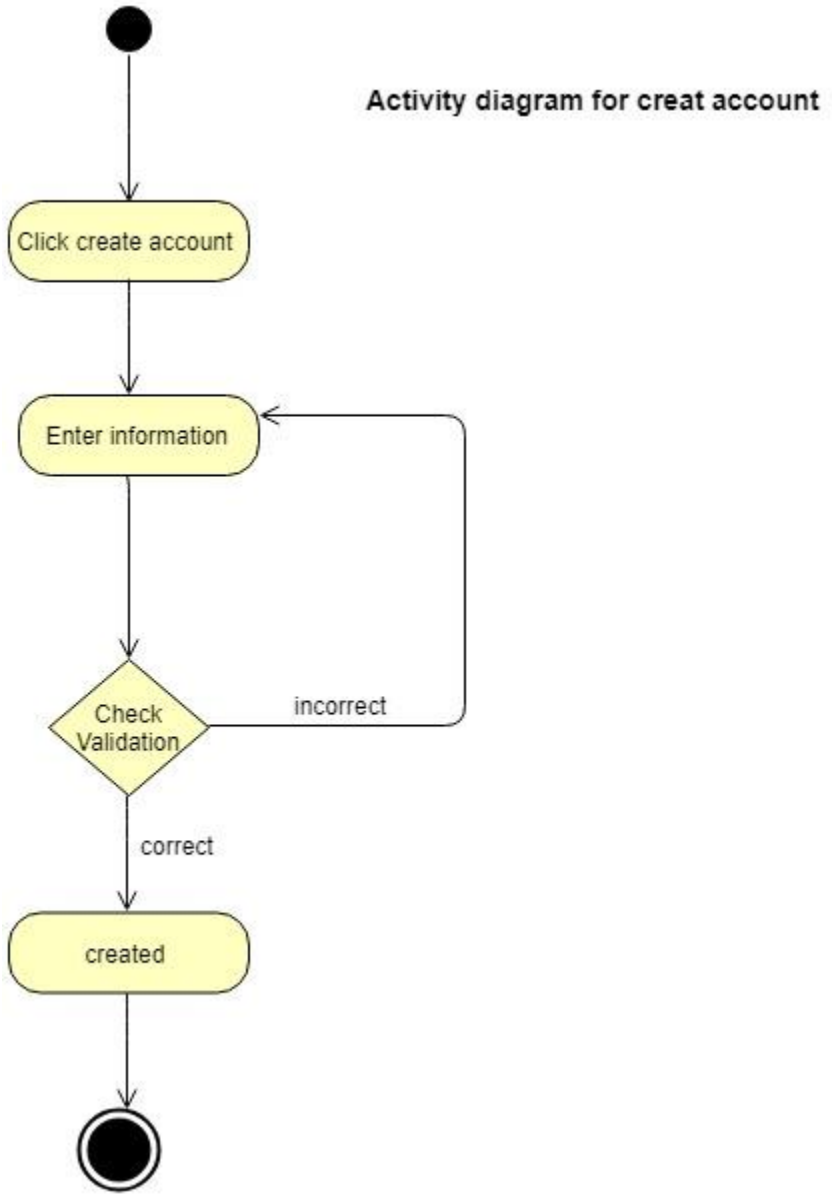



Figure 4. 10 Activity diagram for create account

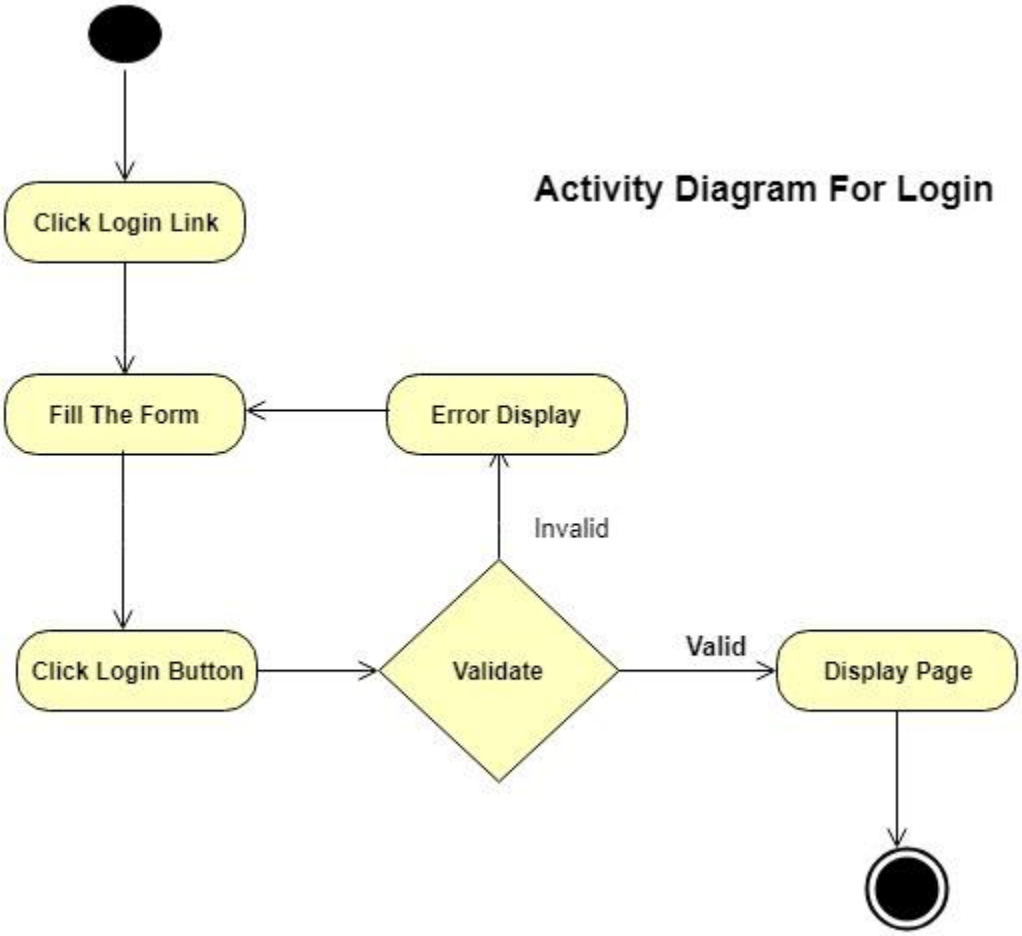



Figure 4. 11 Activity diagram for login

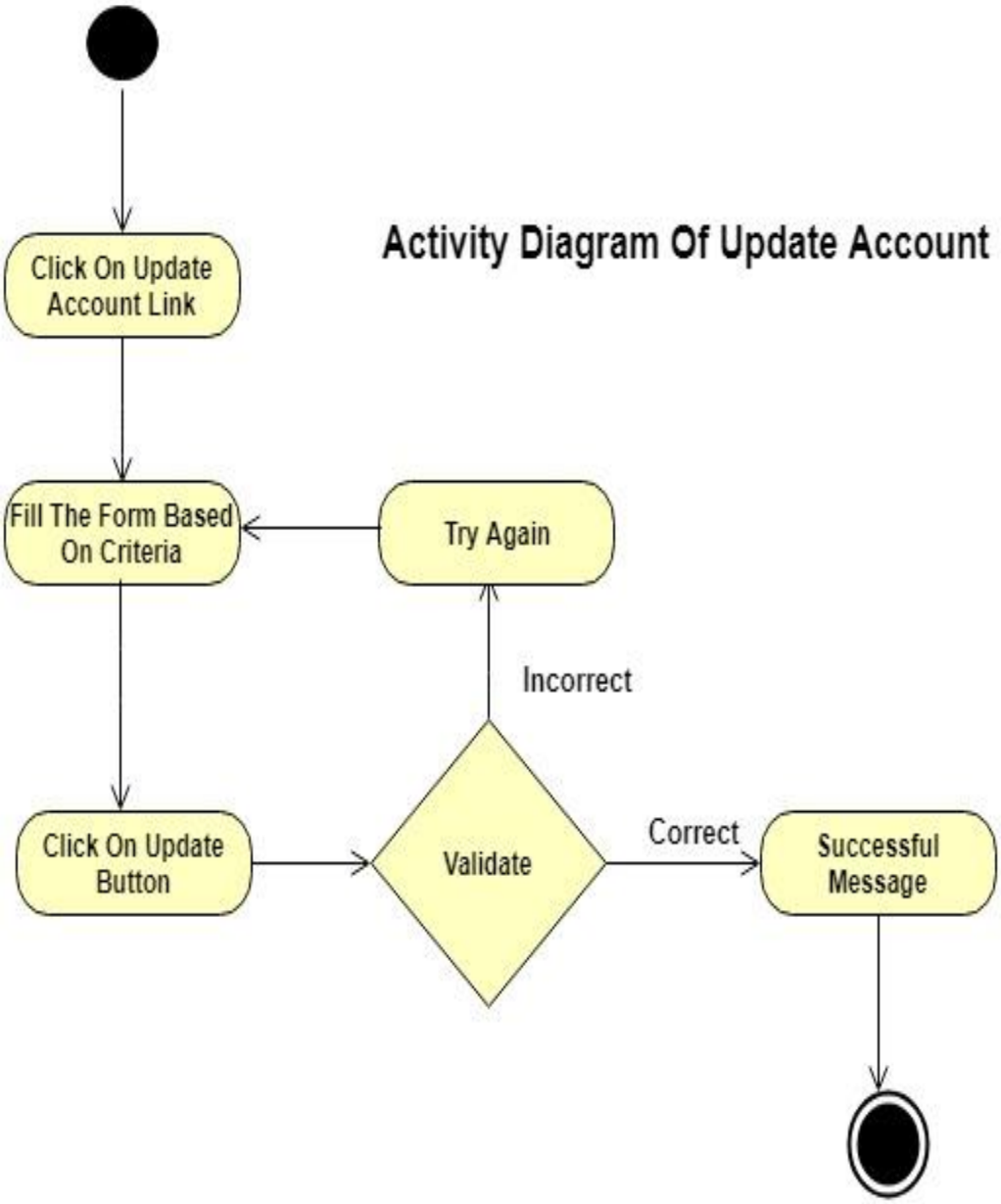



Figure 4. 12 Activity diagram for update account

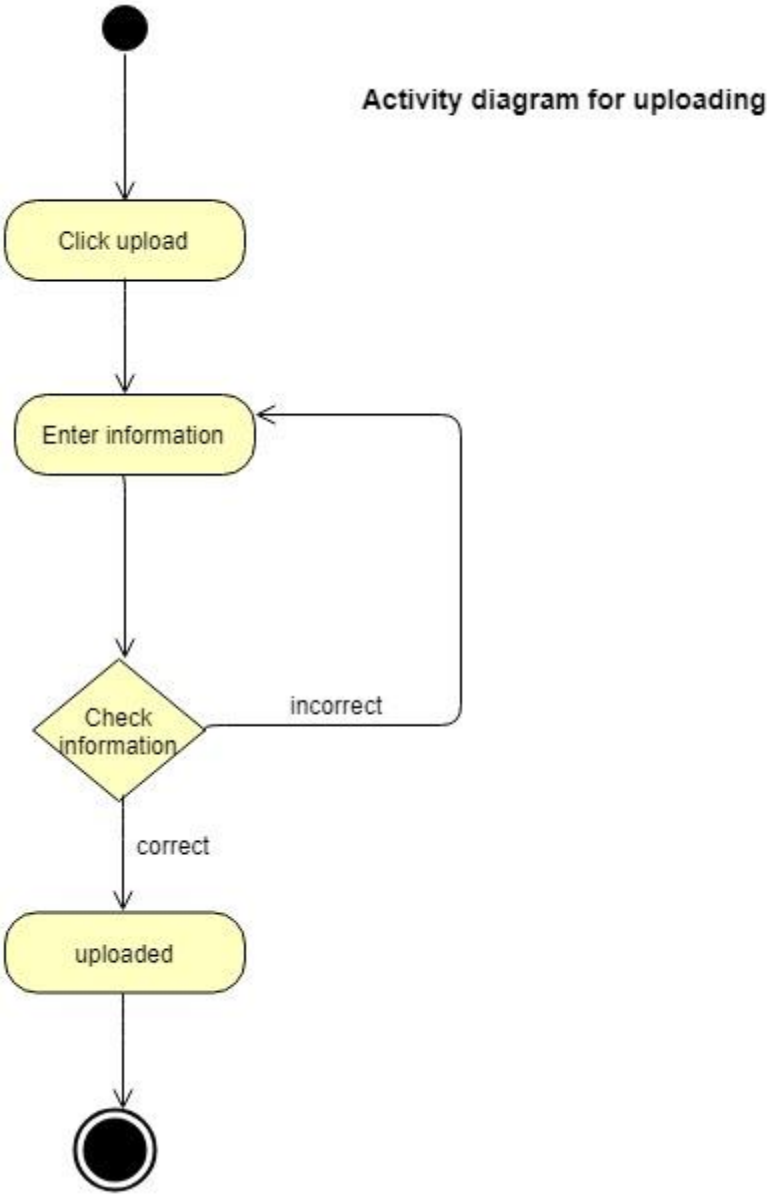



Figure 4. 13  Activity diagram for uploading

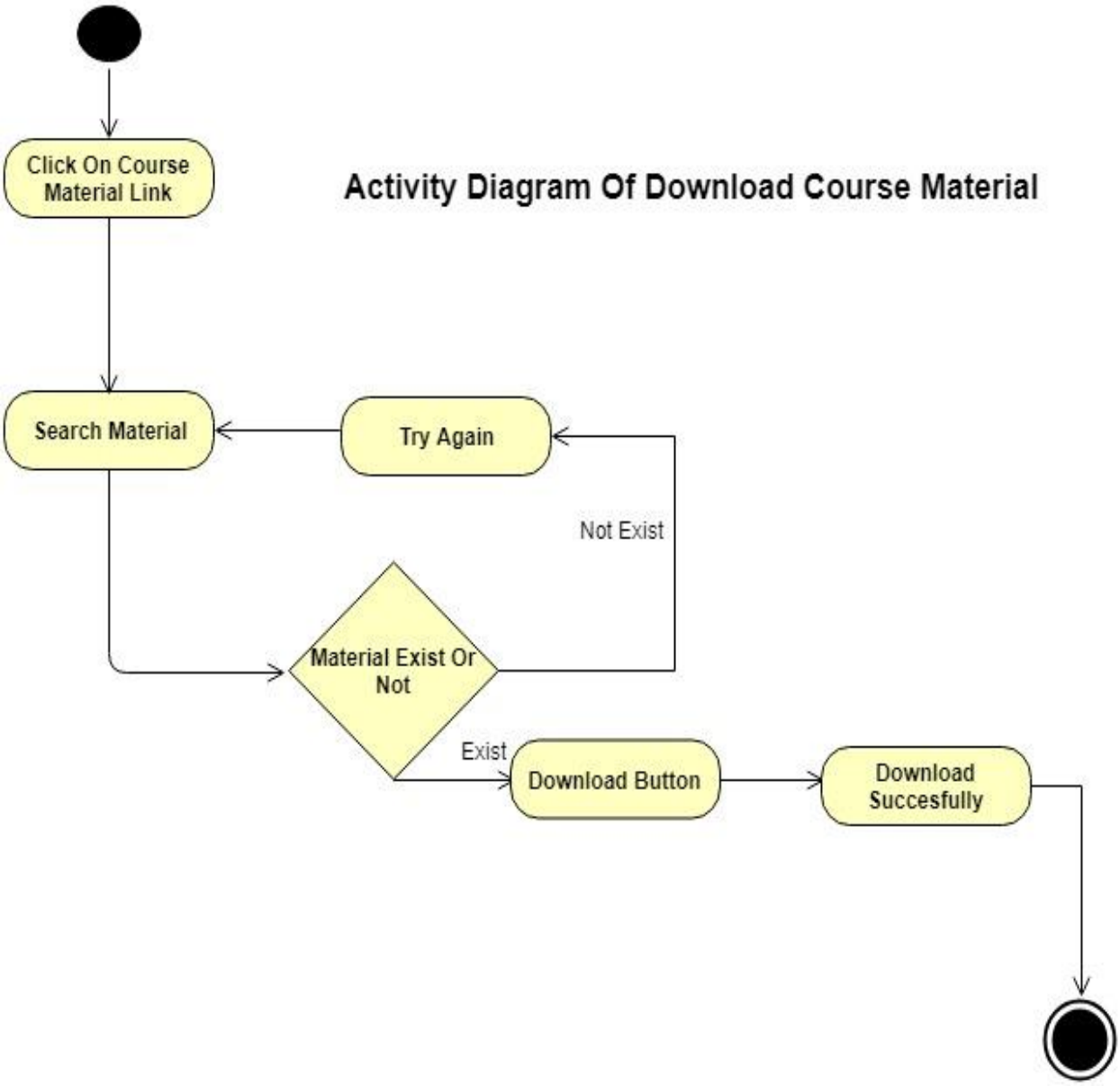



Figure 4. 14 Activity diagram of download

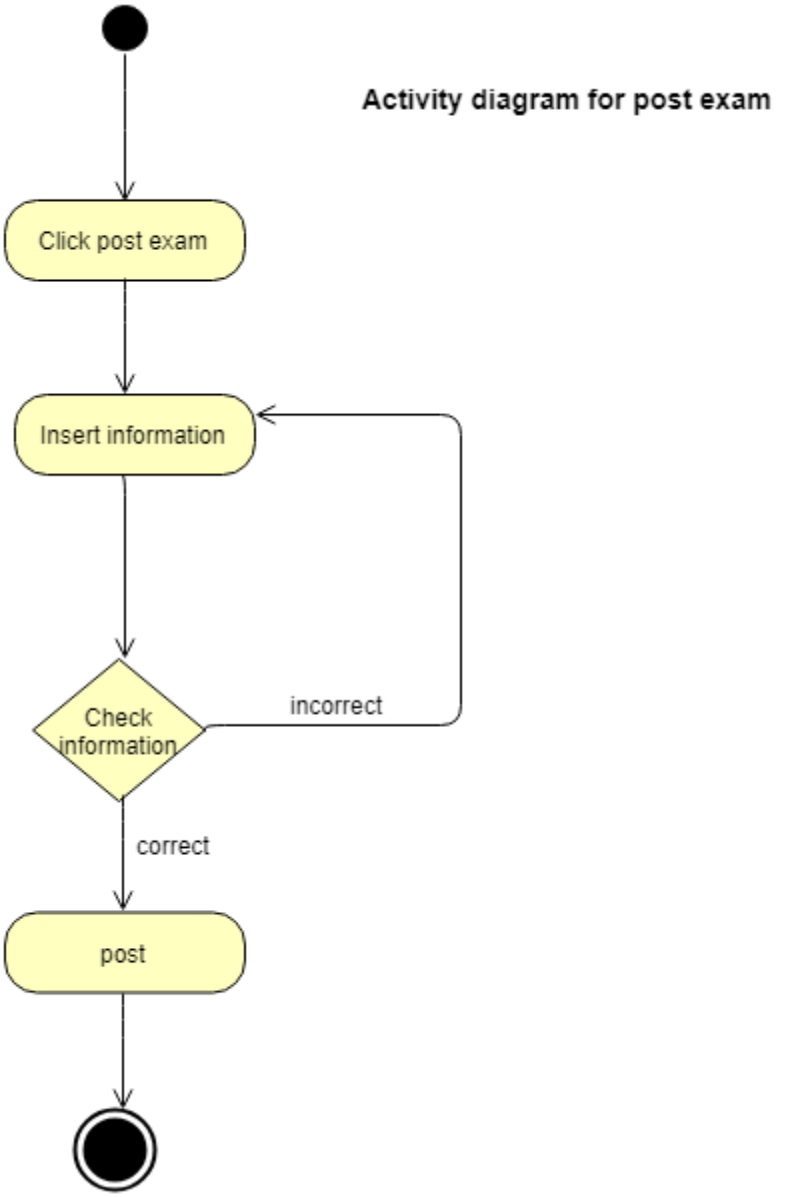



Figure 4. 15 Activity diagram of post exam

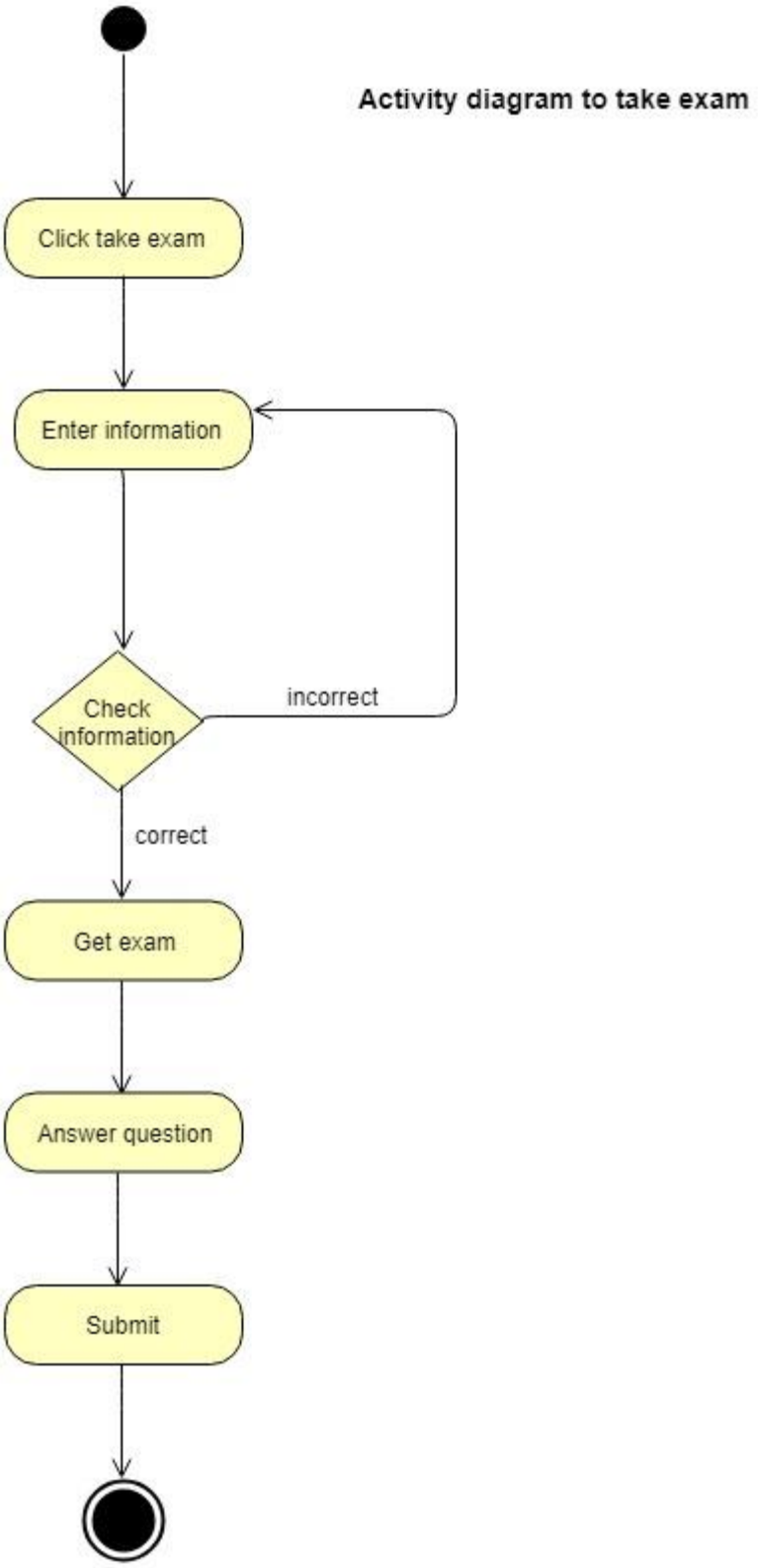



Figure 4. 16 Activity diagram of taking exam

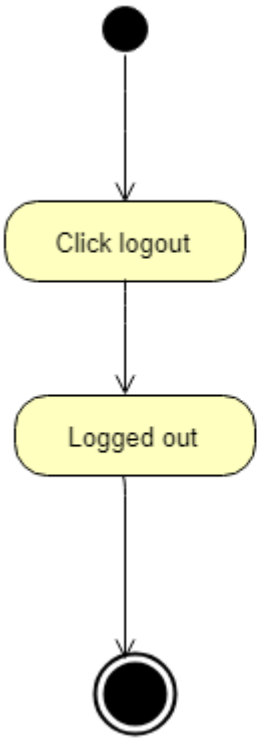



Figure 4. 17 Activity diagram for logout

4.3.3 State Chart Diagram

A diagram that captures the behavior of an object by specifying the sequence of states it goes through during its lifetime in response to events; together with the responses to those events describe changes in state in a procedure also called state chart diagram or state machine diagram. In this section we show the login, create account and upload material state chart diagram.

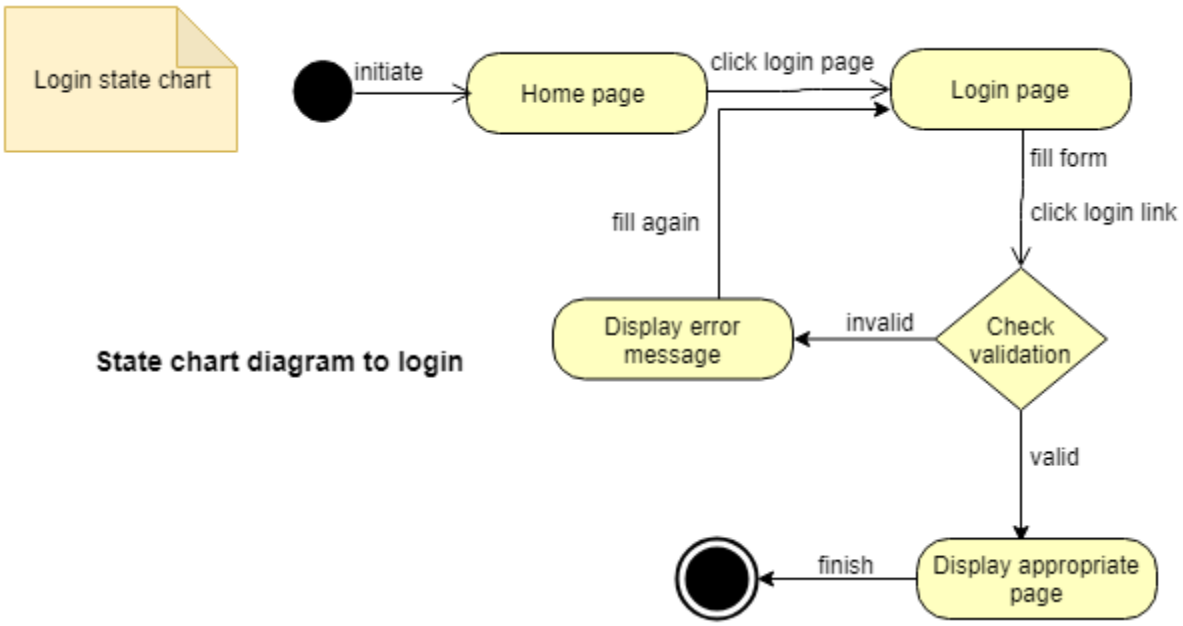



Figure 4. 18 State chart diagram for login

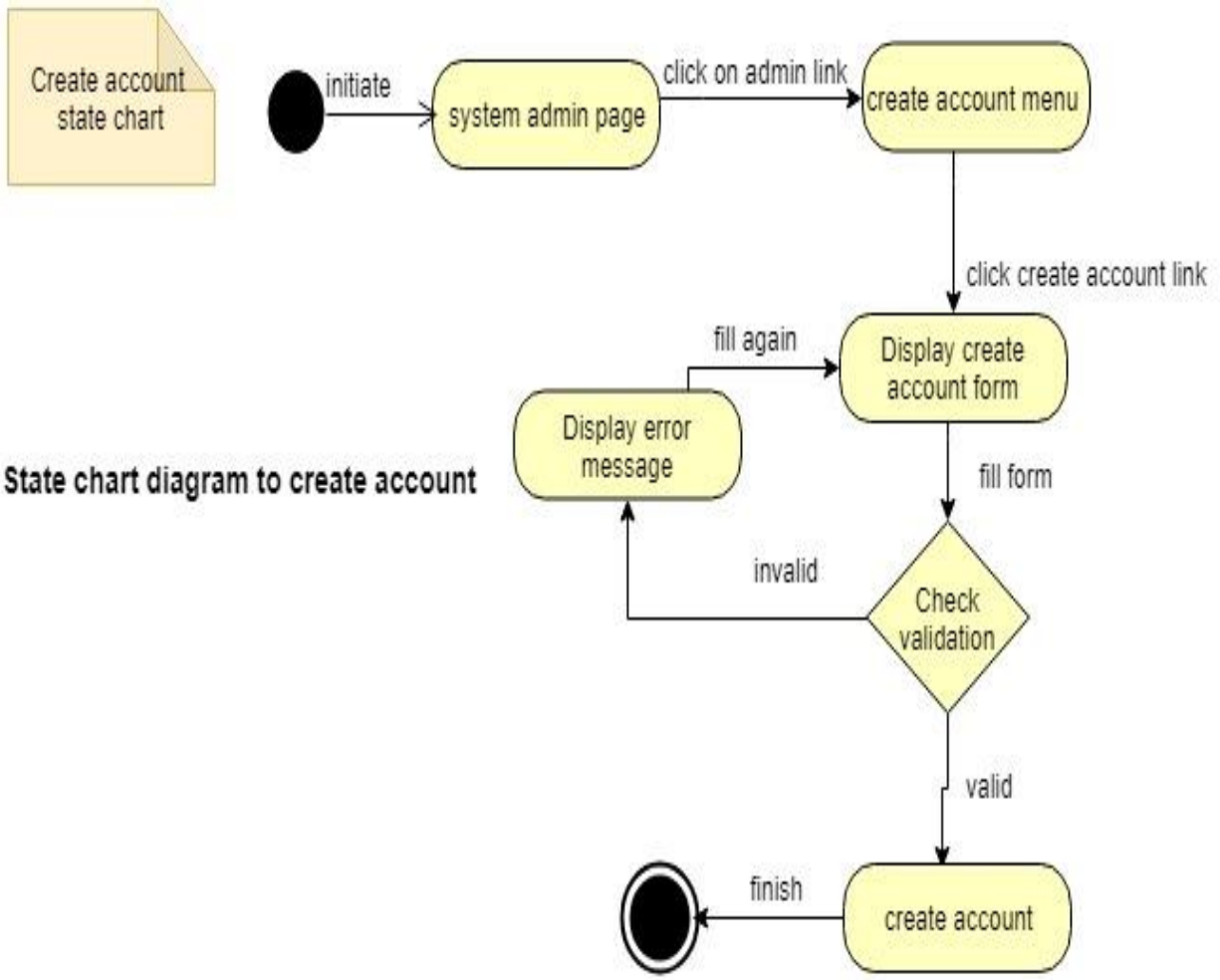
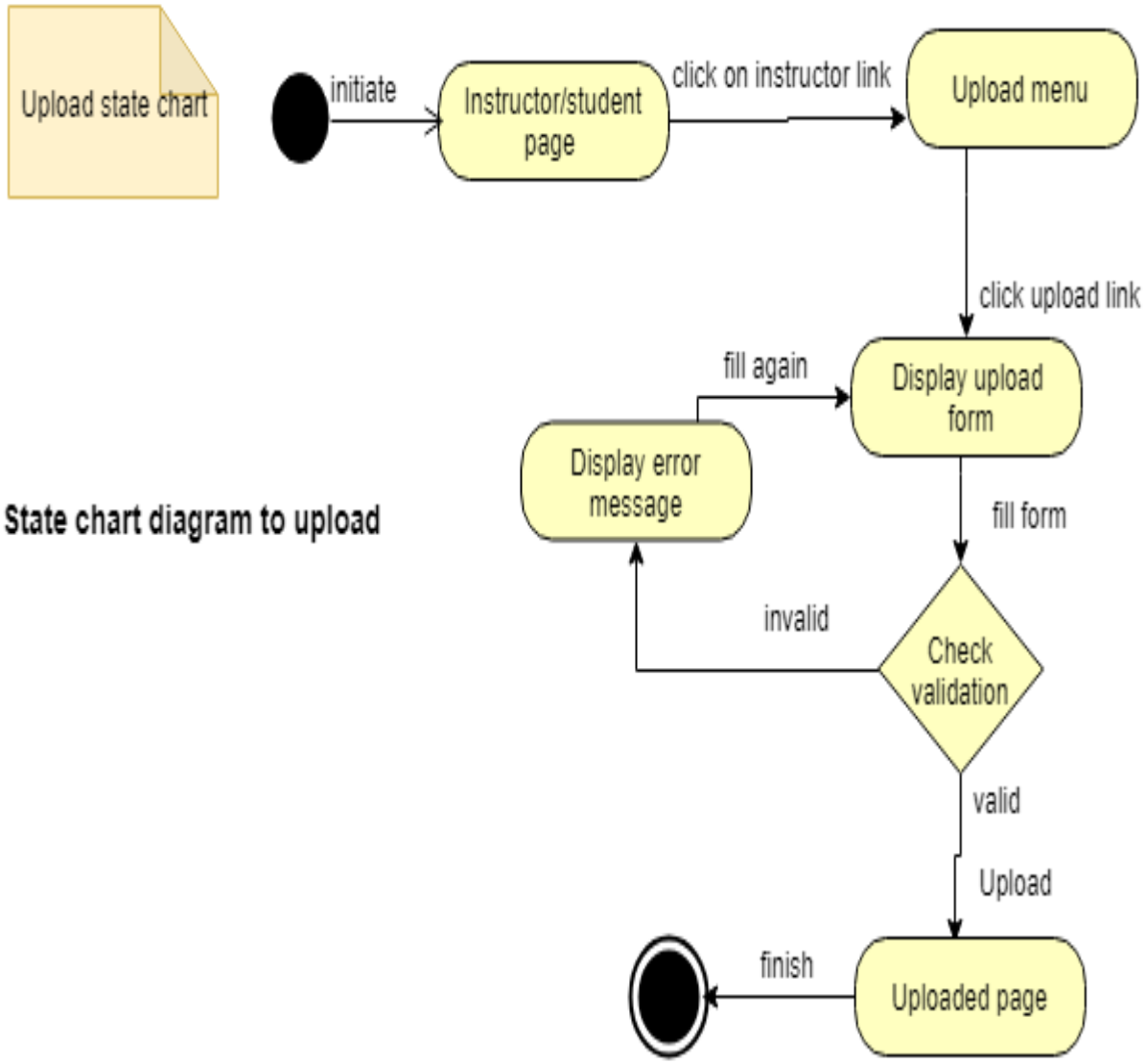



Figure 4. 19 State chart diagram for create account




**State chart diagram to upload**

Figure 4. 20 State chart diagram for upload

# CHAPTER FIVE

## 5. System Design

System design is the transformation of the analysis model into a system design model. 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 functional and non-functional requirements and analysis models defined in the previous Chapter. Consequently, the design goals, architecture, subsystem decomposition, persistent data management of the new system have been identified, designed and presented in this section.

### 5.1 Design Goals

The design goals are derived from non-functional requirements that means non-functional requirement is the description of the feature characteristics and attribute of the system as well as any constraints that may limit the boundary of the proposed solution. The objectives of design are to model the system with high quality. They describe the qualities of the system. These goals consider the following criteria.

5.1.1 Performance Criteria

**Responsive time:** The system should provide as fast response as possible. In order to minimize the time it takes to provide response, stored procedure is used in the database and middle-tier processing code is made as efficient as possible.

**Throughput:** The system should be able to support a number of users at a time using the available bandwidth of the system. The SQL server DBMS used in the system development supports a number of user concurrent accesses of the database without consistency problem.

5.1.2 Maintenance Criteria

**Modifiability:** the system should be easily extensible to the need of the Atlas business and Technology College and to add new functionalities to the system. The system is built from several independent classes which can be used as a standalone application or replaced by other classes.

This makes the system easy to change the existing functionality or add new ones when the need arises.

5.1.3 End User Criteria

**Utility:** The system must address the possible functional requirement of the system users. Consequently, all the functional requirements identified in the preceding chapter have been implemented in the system.

Usability: The system should be user friendly, and easy to learn and use. Moreover the general Atlas business and technology college page have been made accessible all together from a single main window in a wizard form for ease of usability.

5.1.4 Dependability Criteria

**Robustness:** ability to survive invalid user input is assured during data input, updating and deletion of data by providing some information about the error and then the system resets itself to the previous safe state.

**Reliability:** in order to maintain the difference between specified and observed system behavior we try to test it as much as possible.

**Availability:** the system should be available for any legitimate users as long as the service provider is available or it is not shut down by the system administrator.

**Security:** the system does not allow non-authorized users using a form based authentication.

## 5.2 Current System Architecture

The current system is not designed and there is no software architecture for the current software of this project is not existed and the users are using the manual way to get the information.

### 5.3 Proposed System Architecture

At a high level, the architecture of an application defines how different parts of the system are organized and logically separated yet ensuring that they work together. The architecture used for the system is three tiers: client tier, middle/web tier and the data tier as illustrated in the next figure Such an architecture is one of the most commonly used types of architecture for web-based applications as it provides greater application scalability, high flexibility, high efficiency, lower maintenance, and better reusability of components.

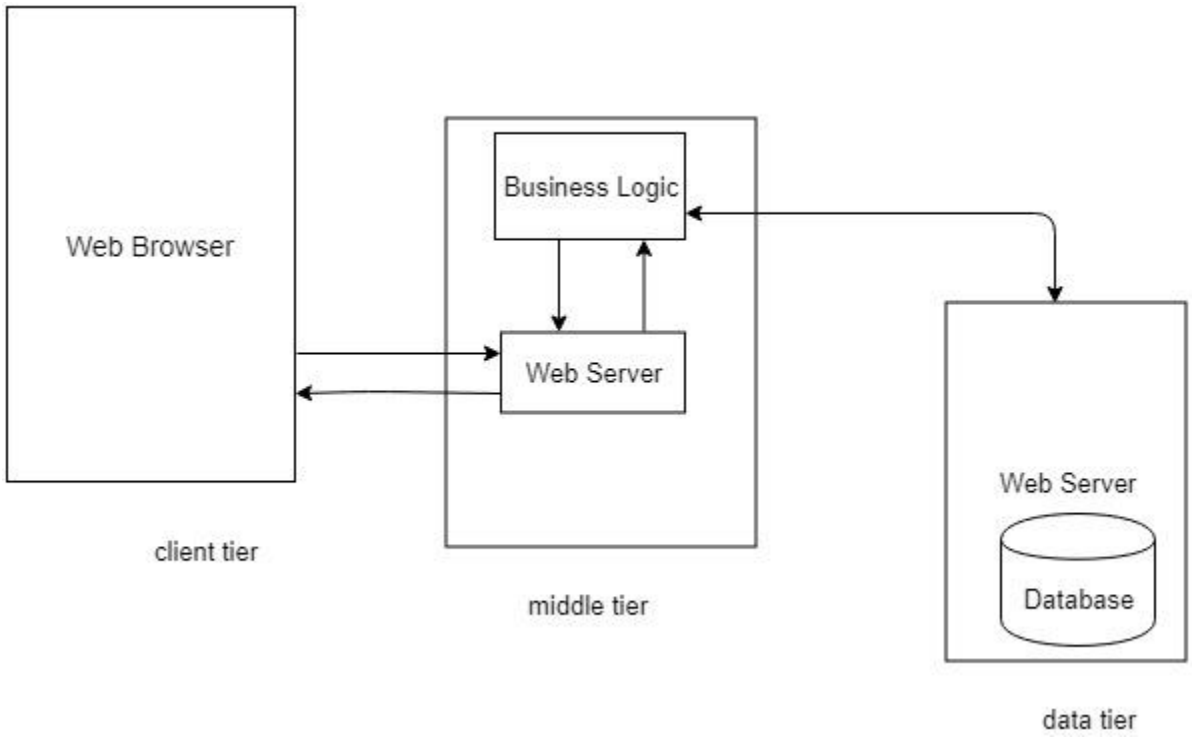



Figure 5. 1 Architecture of the Atlas College E-learning Support System

The client tier is the application's user interface containing data entry forms, report access links and client side application that are running on the web browser of the user machine. The student, the instructor and the administrator and other users of the system interact directly with the application through this user interface. It interacts with the web/application server to make requests and to retrieve data from the database. It then displays to the user the data retrieved from the server.

The middle tier contains two parts of the E-learning application, i.e., the web server (application server) and the business logic. The web server handles all HTTP requests coming from the client machines. The requests could be a request for adding new records, displaying existing records, or a request for report generation and others. It is also the web server which manages the responses that is forwarded to the client machines. The business logic component is responsible for handling all the core functionalities of the system such as input validation, access and retrieval of any data required by the client. When the data is submitted from the client machines, first it will be handled by the functions of the web server and then transferred to the business logic for processing. Again, the business logic processes the data and sends it either to the database or back to the web server, this is determined by the type of service required.

The data tier layer is concerned with the data storage and persistence issues. It is implemented using XAMP SQL Server database. The database can either be stored on the web server itself or on a different machine; however it needs to be easily accessible by the web server.

### 5.3.1 Subsystem Decomposition

In order to reduce the complexity of the system analysis (application domain) tasks of the system we have identified smaller parts called classes in chapter four, similarly, to reduce the complexity of the system design (solution domain) we decompose the system into simpler parts, called subsystems, which are made of a number of solution domain classes. Each subsystem can be represented as a directory containing all the files implementing the subsystem with a set of related operations that share common purpose so as to provide service to other subsystem. The following figure shows the subsystem decomposition of the system. The subsystems of proposed Atlas business and technology college E-learning are:-

**Manage account subsystem:** in this subsystem managing of information regard to account and perform.

- Create an account
- Delete an account
- Update account

**Course material sub system:** This subsystem allows for managing course information and performs this operation.

- Upload material
- Download course material
- Delete unnecessary course material
- Add course

**Forum subsystem:** This subsystem allows for managing chats and performs the following operation.

- Send message
- View message
- Send response
- View response

**Assign instructor subsystem:** This subsystem allows for managing and assigning course or instructor and perform.

- Assign course with the instructor

**Exam subsystem:** this subsystem allows for giving exam and taking for the exam.

**Event or news subsystem:** this subsystem enables the academic dean as well as the student in order to announcing news or events.

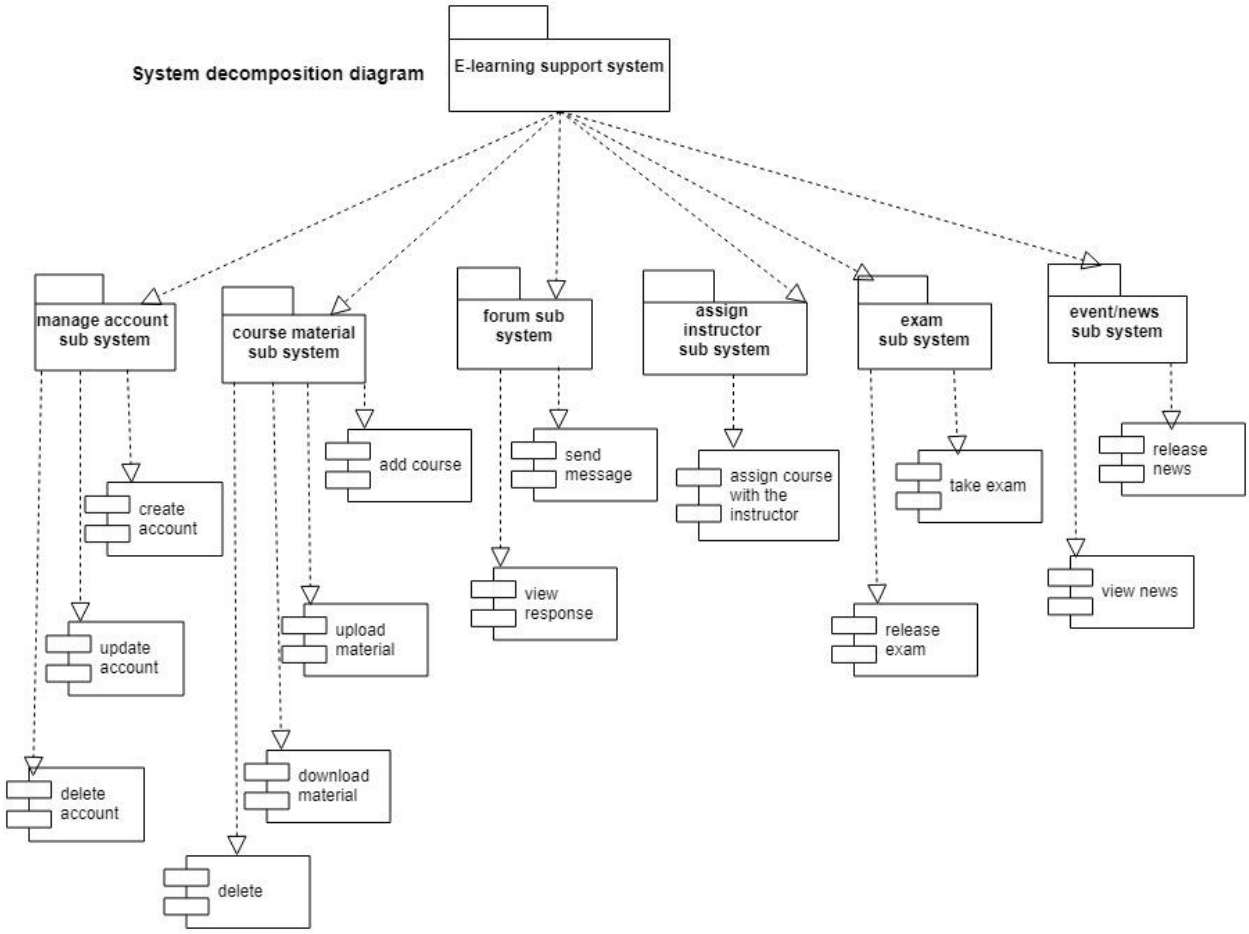



Figure 5. 2 System decomposition diagram

5.3.2 Hardware/Software Mapping/deployment diagram

Deployment diagrams are used for describing the hardware components where software components are deployed. Component diagrams and deployment diagrams are closely related. The subsystems (components) of Atlas business and technology college E-learning support system identified in the preceding section are mapped onto the web and server node. Component diagrams are used to describe the components and deployment diagrams shows how they are deployed in hardware.

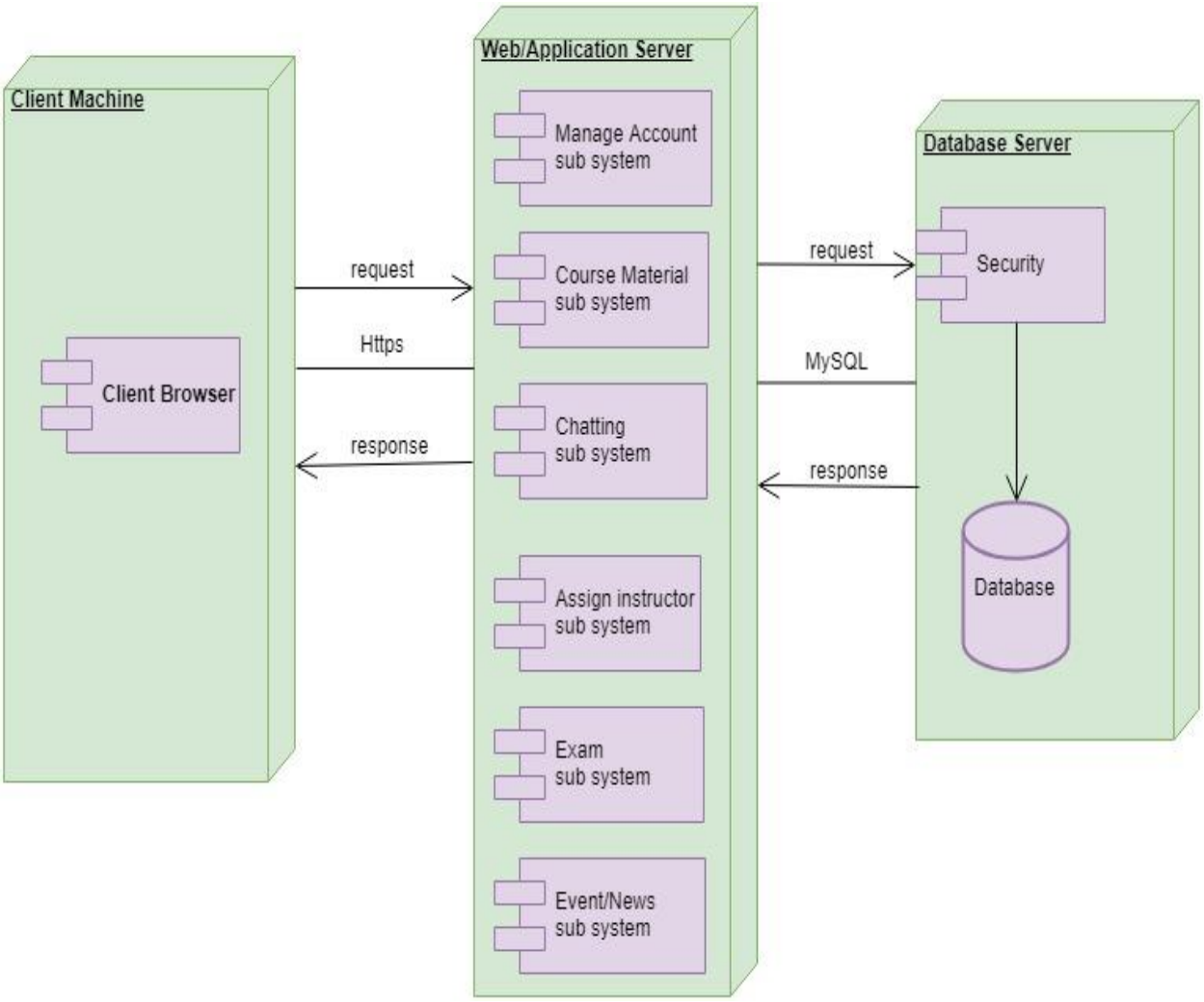



Figure 5. 3 Deployment diagram

5.3.3 Persistent Data Management

Persistent data management deals with how the persistent data are stored and managed. Information related to student, instructor, learning material and other related information are persistent data and hence stored on a database management system. Moreover, storing data in a database enables the system to perform complex queries on large data sets. In order to store data persistently in a database those class objects identified in the class diagram e-learning are mapped into tables and the attributes into fields to the respective tables. The tables of the system with their respective fields and the relationships that exist between the tables are illustrated in the following figure.

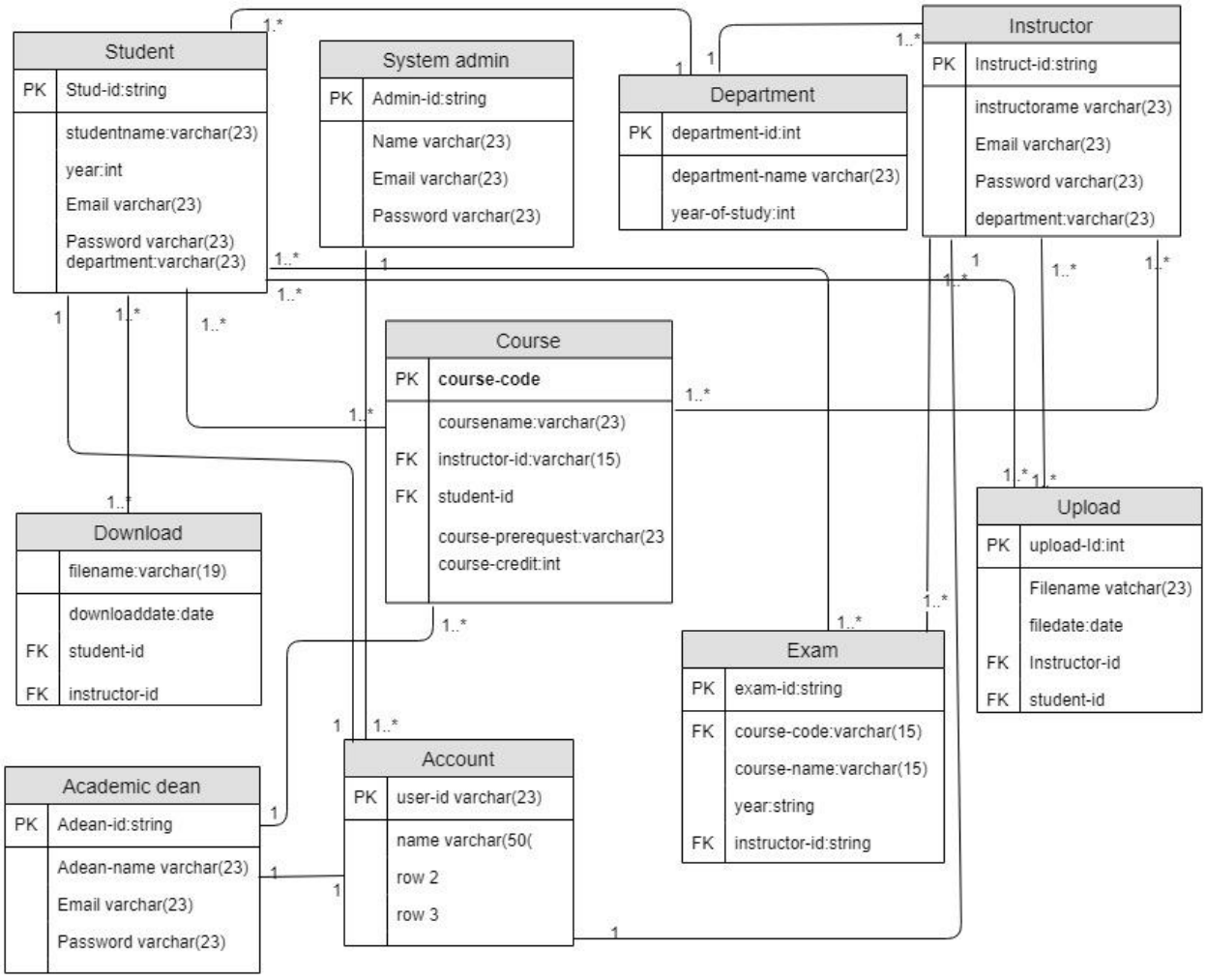



Figure 5. 4 Persistent diagram

### 5.3.4 Access Control and Security

Access control and security describes the user model of the system in terms of access matrix. There are different users in Atlas business and technology use this system and having different level of accessing this system. Accordingly, to the following access control list is given to the system. Each column name specifies the class whose functions are to be protected and the rows specify users whose access is to be controlled. If there are operations (of the class specified in the corresponding column) in a given cell (column and row intersect) then the user in that given row is said to be given access to these operations.

Table 5. 1 Access control and security table

| Actor | Confirm and control or operation | Account |
|---|---|---|
| Admin | Update()<br>create()<br>Delete() | Create User Account()<br>Delete account()<br>Update account() |
| Academic Dean | Assign Instructor()<br>Upload announcement()<br>Delete feedback() | Login() |
| Instructor | Upload material to student()<br>Release exam to student()<br>Delete feedback() | Login() |
| Student | Take exam()<br>Download material()<br>Give feedback() | Login() |

For the safety of proposed system, we will provide a privileged account for all the users of the new system. Every user uses a secure system to access, because any user who is not a student of Atlas College can't download the resources as well as other things in the system. Therefore, in order to keep secure proposed system for an authorized user the system provides;

- User account
- Password

### 5.4 Packages

In this section we have to organize and decomposes functionally related subsystem into packages and specifying the dependency between packages and expected usage of the packages by using UML package diagram as follows:-

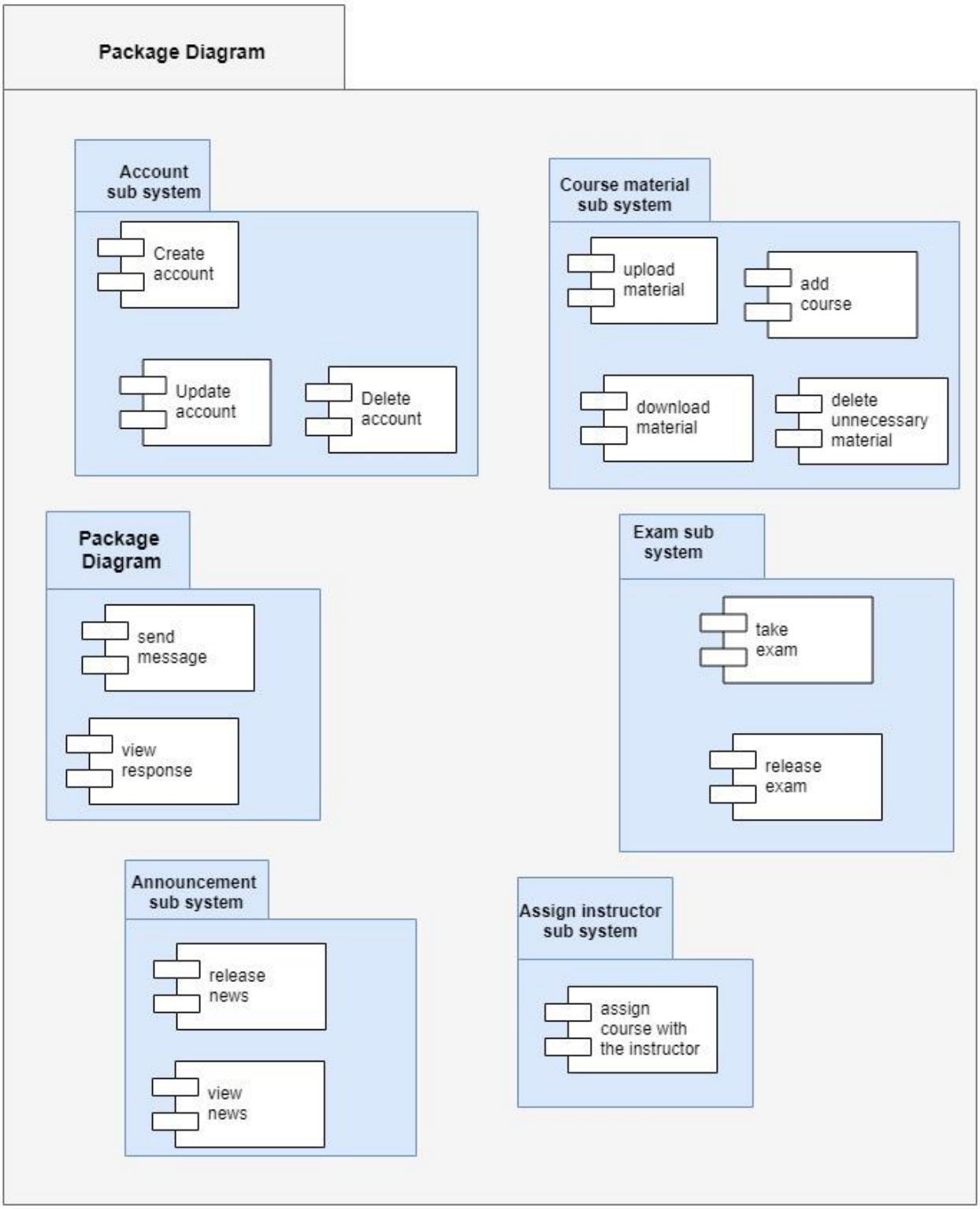



Figure 5. 5 Package diagram

## 5.5 User Interface Design

User interface design is the overall process of designing how a user will be able to interact with a system and this is the design of the new system interface. In this system users will communicate with it through the user interface in this section we show the home page, login and create account page. The home page appears as the site on which the system is deployed is opened. This form contains some links which lead it to the concerned page, and if the user has an account he/she will directly go to concerned page by entering their username and password.

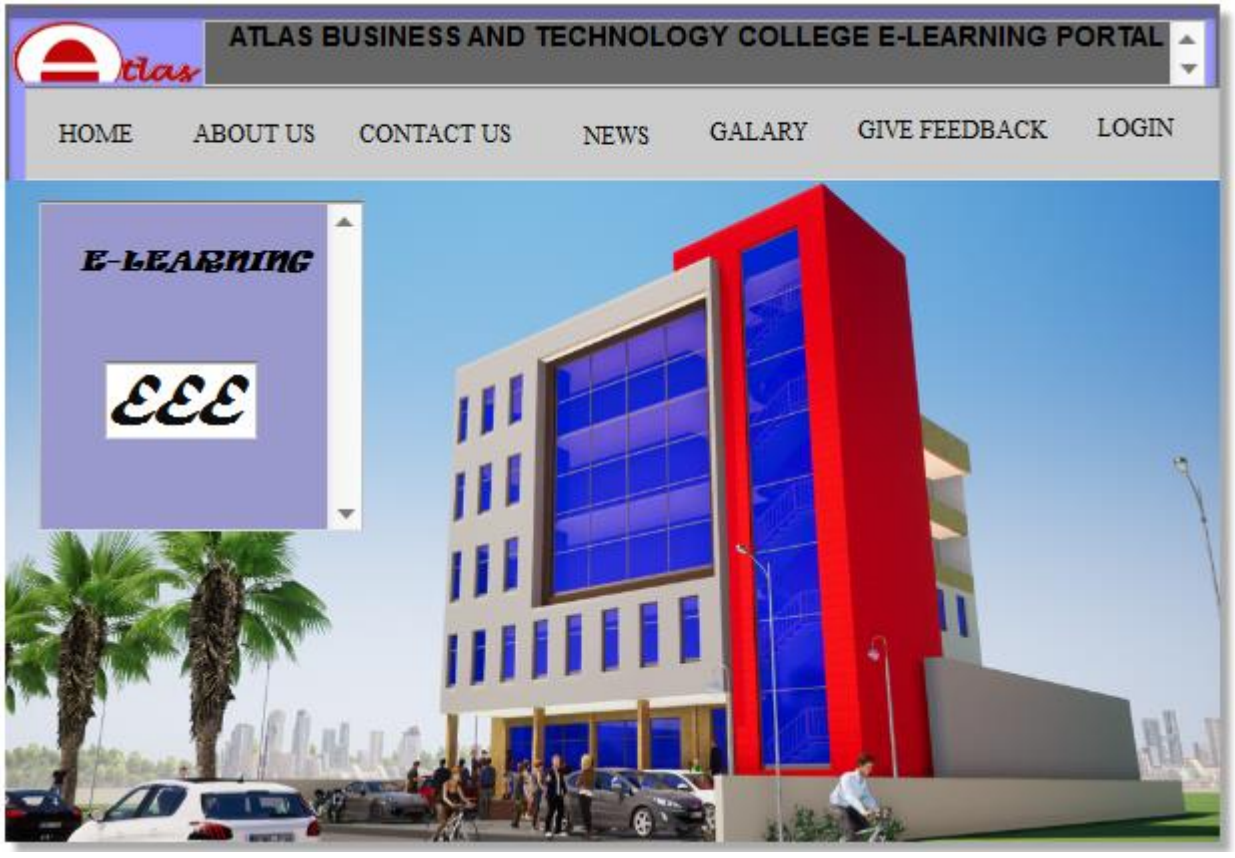



Figure 5. 6 Home page

**Log In form:** this form found immediately following the home page, when user clicks on LOGIN link. Home page appears as the site on which the system is deployed is opened. As one user click login there is chose of account type were it is Admin, Academic Dean, Instructor and Student. All have their own password. Those forms appeared using password and user name will not accessible by other persons except for those who have privilege. This is one login example of Admin.


Figure 5. 7 Login form

**Create Account:** This is creating account page in this page the Admin create accounts for the user (academic Dean, instructor, and Student).the account is identified by their type of responsibility.

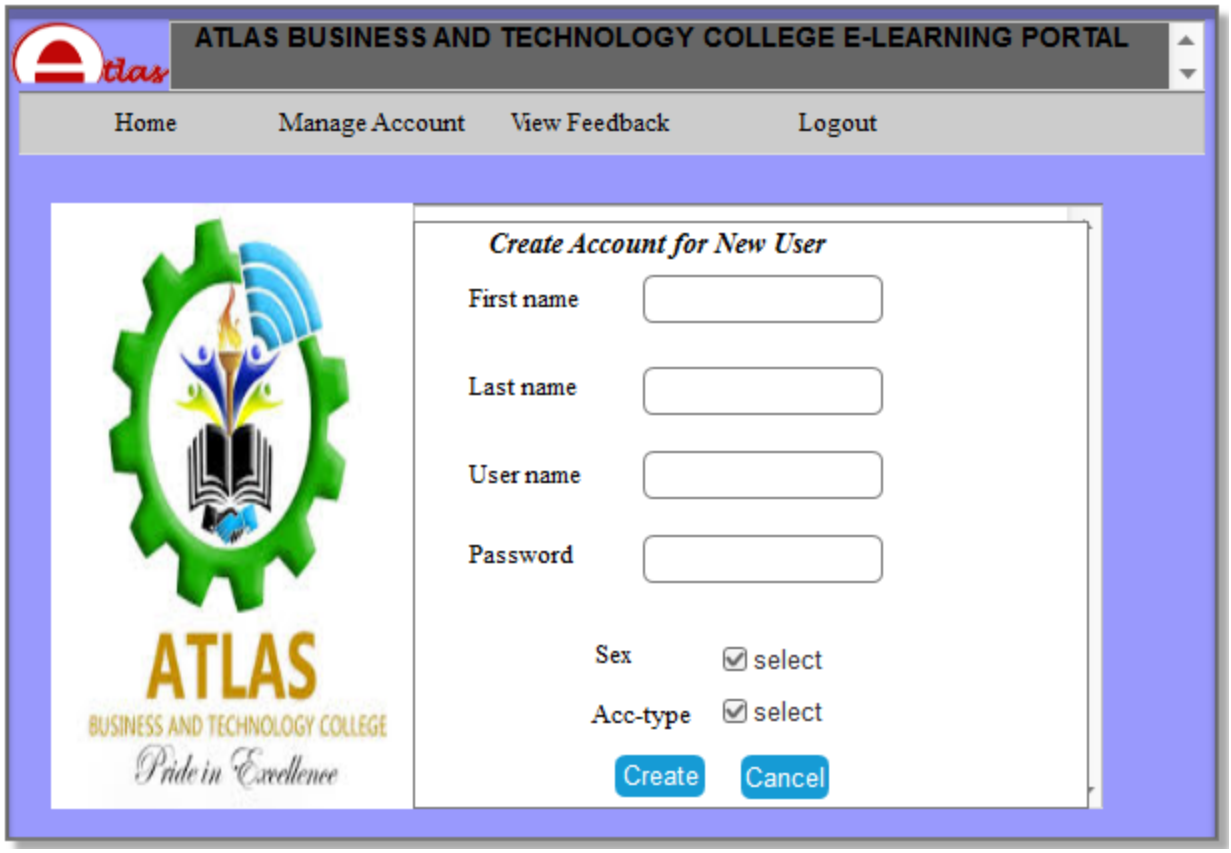



Figure 5. 8 Create account form

# CHAPTER SIX

## 6. IMPLEMENTATION AND TESTING

This phase consists of implementing the requirements and design into code We used latest and simple technologies to implement this project such as PHP for script and HTML and Bootstrap to implement the beautiful interfaces and MySQL server for the database. the interfaces designed based on the use cases and the database based on our class diagram that has been designed.

### 6.1. Implementation of the Database

We use MySQL for the database implementation.

Sample code

Database: `elearning`

- Table structure for table `tbl_users_account`

```
CREATE TABLE `tbl_users_account` (
  `id` int(11) NOT NULL,
  `user_id` int(11) NOT NULL,
  `username` varchar(500) NOT NULL,
  `password` varchar(500) NOT NULL,
  `role` int(11) NOT NULL,
  `status` tinyint(4) NOT NULL DEFAULT '1',
  `created_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP,
  `updated_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Table structure for table `tbl_departments`

```
CREATE TABLE `tbl_departments` (
  `id` int(11) NOT NULL,
  `dept_name` varchar(500) NOT NULL,
  `status` int(11) NOT NULL DEFAULT '1',
  `created_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP,
  `updated_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Table structure for table `tbl_students`

```
CREATE TABLE `tbl_students` (
  `id` int(11) NOT NULL,
  `stud_id` varchar(500) NOT NULL,
  `firstname` varchar(5000) NOT NULL,
  `lastname` varchar(5000) NOT NULL,
  `gender` varchar(50) NOT NULL,
  `phone` varchar(110) NOT NULL,
  `dept_id` varchar(100) DEFAULT NULL,
  `year` int(11) NOT NULL,
  `registered_date` int(11) NOT NULL,
  `status` int(11) NOT NULL DEFAULT '1',
  `created_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP,
```

```
  `updated_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

Table structure for table `tbl_employees`
CREATE TABLE `tbl_employees` (
  `id` int(11) NOT NULL,
  `emp_id` varchar(500) NOT NULL,
  `firstname` varchar(500) NOT NULL,
  `lastname` varchar(500) NOT NULL,
  `gender` varchar(50) NOT NULL,
  `tel` varchar(500) NOT NULL,
  `address` varchar(500) NOT NULL,
  `dept_id` int(11) NOT NULL,
  `status` int(11) NOT NULL DEFAULT '1',
  `created_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP,
  `updated_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

Table structure for table `tbl_announcement`
CREATE TABLE `tbl_announcement` (
  `id` int(11) NOT NULL,
```

```
  `title` varchar(500) NOT NULL,
  `body` varchar(5000) NOT NULL,
  `status` int(11) NOT NULL DEFAULT '1',
  `created_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP,
  `updated_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Table structure for table `tbl_assignment`

```
CREATE TABLE `tbl_assignment` (
  `id` int(11) NOT NULL,
  `uploaded_by` int(11) NOT NULL,
  `dept_id` int(11) NOT NULL,
  `assignment` varchar(500) NOT NULL,
  `file_type` varchar(100) NOT NULL,
  `status` int(11) NOT NULL DEFAULT '1',
  `created_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP,
  `updated_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Table structure for table `tbl_curriculum`

```
CREATE TABLE `tbl_curriculum` (
  `id` int(11) NOT NULL,
  `course_code` varchar(100) NOT NULL,
  `course_name` varchar(100) NOT NULL,
  `crhr` int(11) NOT NULL,
  `dept_id` int(11) NOT NULL,
  `year` int(11) NOT NULL,
  `semester` int(11) NOT NULL,
  `status` int(11) NOT NULL DEFAULT '1',
  `created_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP,
  `updated_at` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

### 6.2. Configuration of the Application Server

We use XAMPP application server because XAMPP is simple and lightweight. Apache distribution is extremely easy to create a local web server for testing and deployment purposes. Everything you needed is to set up a web server-server application (Apache), database (MYSQL) and scripting language (PHP). XAMPP works on different operating systems.

### 6.3. Configuration of Application Security

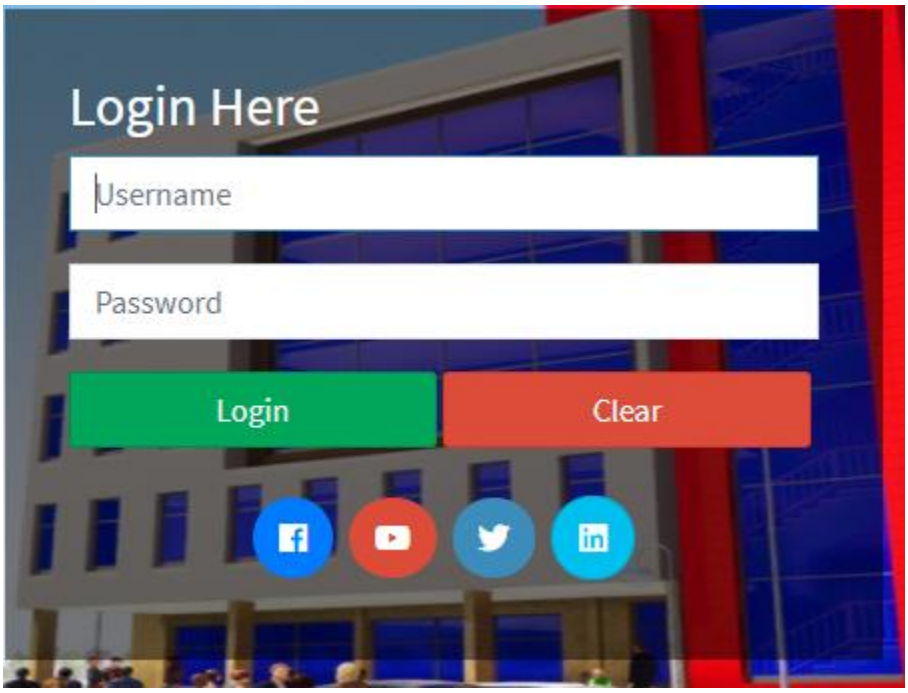
The eLearning system that we develop for Atlas business and technology college validates all the input by returning error message and suggesting to try again when invalid input occur. We implement encryption for user password when the system admin creates a user account or when the user changes their password the system encrypts the password. In the system we implement

session to store temporarily username and password of user's to login to the system to redirect to their specified page.

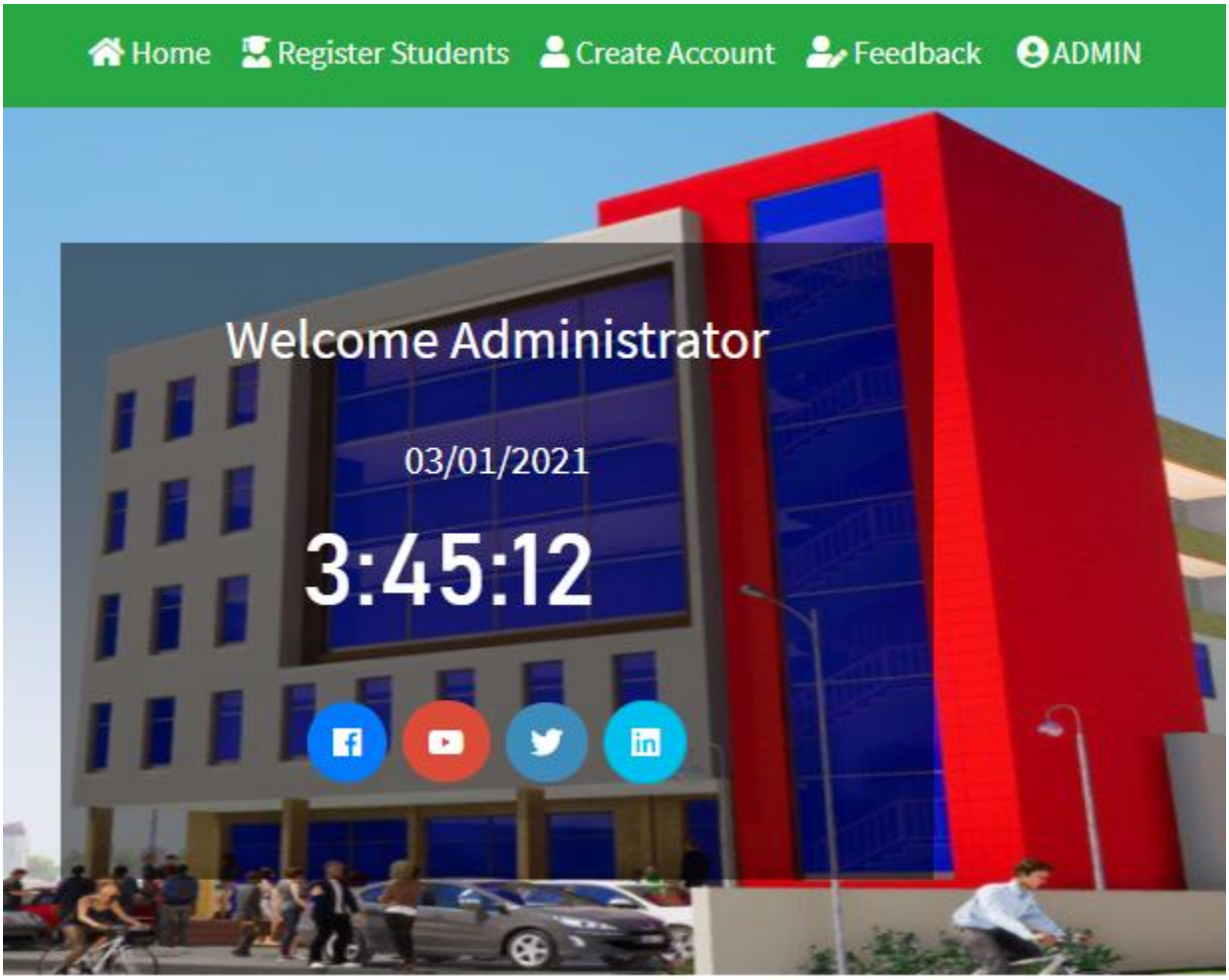
### 6.4. Implementation of User Interface

We built the system with a user interface they should match and satisfy the skills and expectations of its users. There are many human factors we have considered before designing an effective interface. It is natural that users make mistakes when they use new interface and things like alarms or messages might panic the user and will become the reason for more mistakes. The system has consistent user interface when navigating through the pages.

**1.Login page**



**2.Admin Home page**




## 6.5. Testing

Developing software is a complex process. No matter how hard we try to eliminate all faults simply by going through the phases of requirements, design and implementation, however through good practice we can make sure that most series fault does not occur in the first place. In addition, we need a separate testing phase with the goal of elimination all remaining faults before release.

### 6.5.1. Testing Tools and Environment

In our unit testing phase VSCodeUserSetup-x64-1.43.0, Google Chrome and XAMPP are used.

### 6.5.2. Unit Testing

It is done at the source or code level for language-specific programming errors such as bad syntax, logic errors or to test particular functions or code modules. The unit test cases shall be designed to test the validity of the program's correctness. It is a way of testing each of the system functionality independently. Accordingly, we have tested each one of the systems activities and the rest accompanying activities independently using different user input, different login mechanisms and any technique of fault finding so that an incorrect functioning of the activities was corrected at the right time.

### 6.5.3. Integration Testing

We have the specific permissions related to each user type (authorization) and authentication mechanism. Our integration testing procedure is given below.

- Firstly, we will create users who have role types namely student instructor admin and head.
- Then we will login with the user name and password of each user. This tests whether the authentication mechanism works correctly.
- Then we will also try some wrong user name and/or wrong password. We expect an error message by trying this case.

# CHAPTER SEVEN

## 7. CONCLUSION AND RECOMMENDATION

### 7.1. Conclusion

The development and advancement of computer technology makes computers to be a part of everyday human life activities. Education is an area where the human is involved in a day-to-day activity of his life. It is an area which requires due attention, for it deals with behavioral, attitude and skill changes. The same is true for the use of computer in education. This project has enabled the delivery of learning materials to be efficient and it has also achieved interactivity among students and instructors. This project is going to develop using the PHP web technology. This technology choice has enabled the work to have portability, extendibility and security. The portability enables the work to be deployed on a given platform. The extendibility can be expressed as features for the work to tolerate the future expansions on the area. The security features of the PHP language can be incorporated to the level of requirement in need. The system that we have tried to develop is not the whole system of the Atlas business and technology college. but we have tried to automate some sub systems and functionalities. But the online examination can't be automated because of the time limitation. Therefore, others who are interested to develop on this e-learning system of the college can get some initial idea about the system will improve the system.

### 7.2. Recommendation

According to scope of our project the team tries to develop this E-learning system. Due to time limitation, we can't do all the tasks that are needed in the system so to enhance the performance and functionality of the system our team believes that this system should be fully operationally by adding some functionality that are not included in the system. We recommend that the online examination and further work should be done on the system in order to make the system fully functional like official website.

# References

[1] M. Hamid, "The feasibility of E-learning implementation," the electronic jornal of E-learning, Iran University.

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