

WOLKITE UNIVERSITY

COLLEGE OF COMPUTING AND INFORMATICS

DEPARTMENT OF INFORMATION TECHNOLOGY

PROJECT TITLE: - WEB BASED VOTING SYSTEM FOR WKU STUDENT UNION

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DECLARATION

This is to certify that Saron Eyasu, Sella Dawit, and Yoseph Ergana are the sole contributors to the project work, which is being completed under the direction of **Mr. Zelalem Tiruneh(MSC)** and is titled Web Based Voting System For WKU Student Union.Nothing from the project has been copied or pasted without permission, which is considered plagiarism.

All cited sources have been used to support the thesis and have been correctly cited.

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APPROVAL FORM

This is to confirm that the project report entitled **Web Based Voting System For WKU Student Union** submitted to Wolkite University, College of Computing and Informatics Department of Information Technology by: Saron Eyasu, Sella Dawit and Yoseph Ergana is approved for submission.

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LIST OF ABBREVIATIONS AND ACRONYMS

NO	ABBREVATION	DESCRIPTION
1	SU	Student Union
2	SUV	Student Union Voting
3	SUVS	Student Union Voting system
4	WKU	Wolkite University
5	GUI	Graphical User Interface
6	HTML	Hypertext Markup Language
7	CSS	Cascading Style Sheets
8	SQL	Structural Query Language
9	MVC	Modal view controller
10	UID	Unique id number
11	EC	Election Committee
12	UVID	Unique voter id
13	CP	Chairperson
14	UI	User Interface
15	BR	Business Rule
16	CRUD	Create read update delete

ABSTRACT

On our University, manual voting systems have been in use for a long time.Nevertheless, for a variety of reasons, students on our campus are unable to participate in the voting.Online voting systems are required to replace manual voting systems in order to address these issues.

The long-term objective of this project is to significantly reduce the workload for the election committee, as well as to secure data, improve results accuracy, and do away with stakeholder involvement in the collection and counting of votes.

If they choose an online voting system, voters can use the technology to cast their ballots in any field location.

CHAPTER ONE

1. Introduction

Student Union (SU) is a central part of higher institution of learning, serving as an interface between the students and the management in the administration of the university. Voting at university level is a formal process by which Voters (students) vote their representative during election to lead them.

The University has its own Student Union (SU). SU is the most important and crucial things to request the proper academic question of students to the respective author and improve student facility problems of them like academic case, food, dormitory problem and to maximize one country wisdom and peaceful infrastructure voting your representative is the major one. To provide peaceful voting in time we would like to design Web Based Voting System For WKU Student Union. Security and privacy are the main concerns for voting. From that point of view, this proposed system works jointly with the existing student e-learning platform to pull students ID information in order to allow every student to login and vote their president and other representatives. The main purpose of this system is to allow every student to vote their president directly without the interference of any third party, which there is in the current system.

1.1. Background of the Organization

Wolkite University (WKU) is one of the third generation higher institutions that have been founded in 2012 G.C. 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 G.C 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.

1.2 Statement of Problem

The existing system of the WKU student union is using manual election system and distributed information about election process by manual system such as write a collection of sheets paper and to post on to different place on boards and on block of walls. The existing system is using a manual registration of candidate, election committee and voters(student) or recording and traditional counting (i.e. the main tools of selecting, recording the students vote by using pen, pencil, with hard paper, cards, shelf and so on).

The existence system has a number of problems in the working procedure for the university and students. These problems are: -

- ✓ **Does not allow all students to vote directly**
- ✓ **Lack of security:** Poor security system because one can get easily the document and change whatever they want, lost of information etc. The manual election systems is not secure. For example when election process occur, the students who gives voting may be forced by election committees that gives service in station.
- ✓ **Time and resource consumption:** WKU student union by using such manual election system time and materials are wasted. For example to record voters information and to give candidate cards the Student union need to organize the committee that implement these mission, the committees who give these service until the elections is over will waste a lot of their time. And the Election board pays out money to these committees in order to succeed the election successfully.
- ✓ **It is difficult to keep our interest**: All candidates' information is not placed separately.
- ✓ **Too much paper work:** since the voting system is manual the process involves much paper work and paper to storage which is difficult as paper become bulky with the student size.
- ✓ **Loss of registration:** The name of the voter is registered on the paper, since it is manual and the paper can be lost and it takes to register again.
- ✓ **Duplication of work**: There are repetitions of works in the existing system. This duplication of works leads to losing many resources.
- ✓ **Difficult to keep the student's interest**: because the system is manual the candidate information is not fairly verified to the student.

1.3. Objective of the project

1.3.1. General objective

The main objective of the project is developing an Web based voting system that can automate the current paper based voting system of Wolkite University student union.

1.3.2 Specific objectives

The Specific objective of the project are :

- ✓ To Study and understand the existing voting process.
- ✓ To Design the proposed system including the system architecture.
- ✓ To Develop/Implement a prototype election/voting system.
- ✓ To Evaluate and recommend deployment strategies for the proposed system.
- ✓ To select the appropriate development tools for the system.
- ✓ To maintain and keeps all the information of all the candidates and voters.
- ✓ To identify and analyse the problem with current system and functional and nonfunctional requirement of new system.
- ✓ To develop more secured system to ensure voting fairness and a good interface to make it easy to use.
- ✓ To manage accounts for the user.

1.4. Feasibility Analysis

Feasibility analysis is a high-level capsule version of the entire system analysis and design process.

The objective is to determine quickly and at the minimum expense how to solve the problem and to determine how the problem is solved. The system has to be tested for feasibility in the following ways.

1.4.1. Technical Feasibility

The proposed system is technically feasible as:

- ➢ Technically it is possible to access one server by electronic devices if the user has access privilege.
- ➢ The requirements for the proposed system were easily obtained from the existing system.
- ➢ This project is practically applicable with in the current technology.

1.4.2. Operational feasibility

The project is operationally feasible because:

➢ The WKU student union supports this project.

➢ The system would reduce the needed time and manpower to give service.

1.4.3. Economic feasibility

The existing system is manual, this means all the works are done in paper and pen by hand, so it is much costly and difficult to use, to operate and it is also time consuming. Therefore, this automated voting system is much feasible in costing time and effort too as compare with manual system. Economic feasibility addresses the following things: -

➢ Tangible benefit

- ✓ It Increase speed of activities and cost reduction.
- ✓ It Remedy error occurrence
- ✓ It simplifies managing process.

➢ Intangible benefit

- ✓ It diminishes the work load of the employee
- ✓ Initiate employee moral Effectiveness of work flow.

1.5. Scope and Limitation of the Project

1.5.1. Scope of the project

The WKU student's union has a lot of tasks to accomplish. The scope of this project is only on developing online voting/election system for WKU student Union. The system contains modules like:

- User registration module
- Cast vote, vote counting and result display module
- Setting starting and ending date for both registration and voting
- Generate report and Feedback

1.5.2. Limitation of the project

Limitation of the project defines what the newly proposed system is not going to perform and not cover.

- Our system cannot help any **blind voter** those wants to vote their representatives by sound synthesizer.

1.6 Significance of the project

The Significance of this project is for the Voters, candidates and Administrator.

For Voters

- ✓ Save the time of the Voters.
- ✓ It provides equal information through online for all voters (students) and Information available at time.
- ✓ It gives private online election process.
- ✓ The system able to allow the voters to get fair voting.
- ✓ Enable the voter to see their result of voting as soon as the election is completed.
- ✓ Enable the voter to get every information about the candidate and also orientation on the voting system online

For Candidates

- ✓ Improve time of the candidates.
- ✓ Distinguish the candidate by their specific information
- ✓ Enable the candidate to provide their information online to the voter

For Administrator

- ✓ Enable the administrator to update, delete and edit information about the voter and candidate simply.
- ✓ Working load reduced. This means the administrator is confused in existing so many paper work, but in proposed all these many paper work is changed to computerized work and administrator do not confused with many works
- ✓ Improve time and resource expenditure of the university that exposed to election.
- ✓ It provides security for the data.
- ✓ Many tasks are automated.
- ✓ Enable the removal of duplicated data.

1.7. Beneficiary of the Project

Developers: - the developers may earn experience from this project for their next carrier.

Student Union: - this system provides an Easy and efficient way of handling vote that takes only a minute to vote and counts to display the result. So, by using this the SUV improved and become satisfactory.

Students (voter): - the service that is given by using this system satisfy the students by enabling them to vote directly.

Election committee: - the system automates the traditional way of handling voting system which will decrease the work load on them.

1.8. Methodology

In order to accomplish this project on time and within the cost, we followed different procedures which are described below.

1.8.1 Data collection Tools and techniques

To do this project the team will use this methods to gather data:-

Observation: will be important to look and examine the current manual working system of the Student union.

Document analysis: to get more information related to our project we will analysis different documents available in the offices.

Interview: will help us to gather required data for the project by interviewing different Students.

Internet: will help us to see the available sample projects on the internet.

1.8.2 System analysis and design

In this project we will use object oriented methodology among other several methods because it is efficiency, easy management & cost effective.

System analysis is the detailed evaluation of a particular system to identify areas for improvements and make any enhancements if necessary. The ultimate target of the system is to have a fully operational system in place which provides efficiency and reliability to the Student union.

It helps to minimize errors which reduce future requirements. System analysis allows for better management through changing the software to suit the user need. In the system design phase, it shows the full interaction of the user and administrator with the environment using use case diagrams .this use case is used to reflect the behavior of each object in the environment.

1.8.3 System Development Model

In this project we will use Rapid Application Development or RAD. Rapid Application Development means an adaptive software development model based on

prototyping and quick feedback with less emphasis on specific planning. With rapid application development, developers can quickly make multiple iterations and updates to the software without starting from scratch.

This helps ensure that the final outcome is more quality-focused and aligns with the end users' requirements. One of the major advantages of rapid application development is that you can change the design, add functionality, and keep reiterating as frequently as possible without having to start from scratch each time.

The reason why we chose RAD(Rapid Application Development) is

1. Measurable Progress and Reduced Development Time.
2. Faster Code Generation.
3. Easy Modification Through Compartmentalization of System Components.
4. Rapid, Constant User Feedback.
5. Early Systems Integration.

1.8.4 System Testing Methodology

Unit testing

Using unit testing 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. In this level of testing process,

we would test as. Sample Tests

- ➢ Check whether the return type of functions is correct.
- ➢ Check how the sub procedures or functions are called correctly.
- ➢ Check if the correct output is produced for different inputs.
- ➢ Check the efficiency of the code with respect to the memory and CPU time.

Integration testing

In this level of testing, we would examine how the different procedures work together to achieve the goal of the subsystem. The type of integration testing that we have followed is bottom up. So, we integrate each component from single functionality (individual interface) to the main function incrementally. Sample Tests:

- ➢ Check the interaction between individual functionality which performs the specific tasks.
- ➢ Evaluate the functionality of the subsystem after combination all individual functionality.

➢ Identify the Independence of each subsystem with other subsystems.

System testing

In this phase of testing focused on testing how properly the subsystem work together to achieve the desired goals.

System development tools

Visual studio IDE for coding assistance to developers, rigorous testing that can be done inside the platform, support for team collaboration, and a variety of customization options.

1.8.5 Development tools and technology

1.8.5.1 Front end technologies

- ✓ **Hypertext Markup language (HTML):-** It is used to structure a web page and its content. Bootstrap is an open source and free framework for developing responsive using CSS, HTML, and JS.
- ✓ **JavaScript:-** is a programming language used for more interactive elements like drop-down menus, forms and modal windows.
- ✓ **Bootstrap:-** is an open source toolkit, one can customize it according to their project's requirement. Bootstrap is provided with built-in components which are used in accumulating responsive websites by a smart drag and drop facility. Bootstrap is widely used to design faster and simpler websites.

1.8.5.2 Back end technologies

- ✓ **PHP (recursive acronym for PHP: Hypertext Preprocessor):-** is a Widely-used open source general-purpose scripting language that is especially suited for web development and can be embedded into HTML.
- ✓ **Laravel:** a php framework.
- ✓ **MySQL:-** is an Oracle-backed open source relational database management system (RDBMS) based on Structured Query Language (SQL).
- ✓ **XAMPP**: - It is a cross-platform web server, which helps developers to create and test their programs on a local server.

1.8.5.3 Documentation and modeling tool

Documentation tools

- ✓ MS word 2019: We use for the purpose of writing documentation.

- ✓ Microsoft PowerPoint 2019: We use for making presentation.

Modeling Tools

- ✓ Adobe Photoshop (CS5): - used to edit photos.
- ✓ Draw.io: we use to draw use case diagrams, pie charts etc

Deployment Environment

For deployment environment we must have

- ✓ Desktop and personal computer
- ✓ Internet Connection
- ✓ Storage devices like hard disk, flash disk

1.9 Budget and Time Schedule of the Project

Table 1.1 Budget Schedule of the Project

No.	Items	Quantity	Unit Price in birr	
1	Removable flash disk	2	300.00	
2	Desktop	1	15,000.00	
3	PC	1	25,000.00	
4	Paper	1 pack	500.00	
5	Pencil	4	50.00	
6	Printing	-	190.00	
Total			41,140	

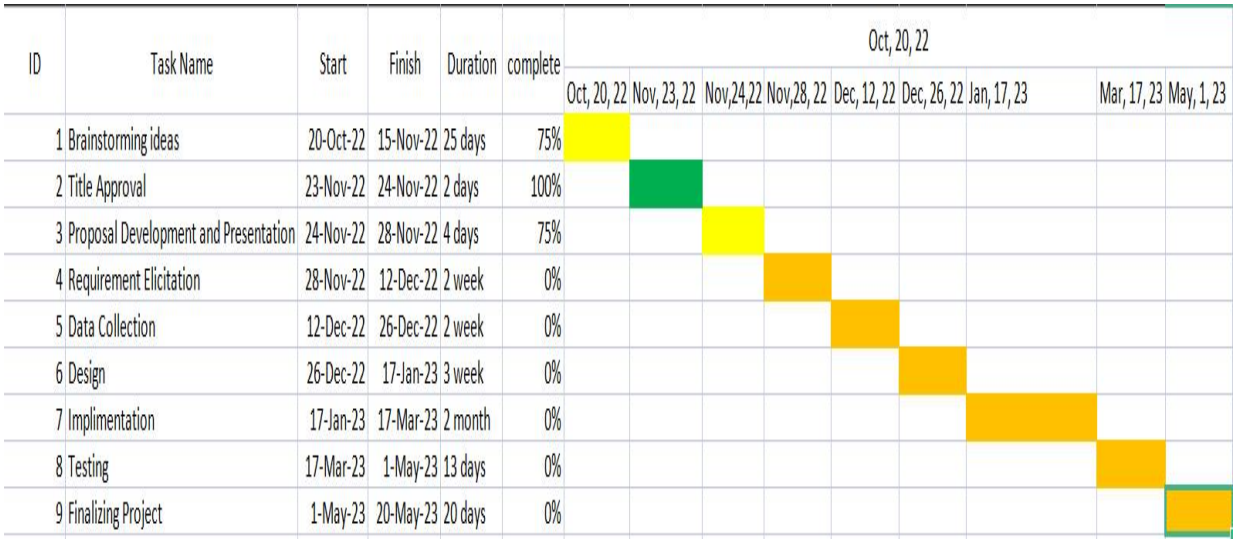


Figure 1.1 Time Schedule of the Project

1.10 Team Composition

Table 1.2 team composition

Name of members	**Roll and responsibility**
Saron Eyasu	Requirement elicitation and analysis
Sella Dawit	Proposed system design
Yoseph Ergana	Proposed system implement and testing

CHAPTER TWO

2. DESCRIPTION OF THE EXISTING SYSTEM

2.1. Introduction of Existing System

The daily operations of Wolkite University are managed by both manual and automated methods.

SIMS, CFMS (cafeteria), E-learning, CISCO, SPMS (student placement), and WKU website are a few of the automated systems at the university.

The voting system for the Wolkite University Student Union is one of the systems that must be operated manually.

This implies that it requires a lot of human labor, resources, and time, is less secure, and requires file cabinets to hold all materials and information.

Additionally, students use paper to obtain information, submit requests, and provide comments. And also only the class representatives are permitted to vote because all university students are unable to elect their president directly.

Students who wish to participate in the present system must first pass an admission exam, which will be assessed by the election committee and the student dean.The 15 students who received the highest scores out of the test-takers will be chosen.

Following that, applicants for the positions of student president, vice president, and clerk will be assessed using the following criteria, which will be expressed as a percentage of the overall total.

- ✓ Certificate 3%
- ✓ Exam candidates take mostly it takes from 10%.
- ✓ Strategic planning and operational planning 15%.
- ✓ Defense before organization management and election committee 22%.

Following the evaluation, eight students will compete for the right to represent their class in the final voting, which will determine who receives the remaining 50% of the vote.

Each voter receives the candidate's emblem and name on paper before casting their vote, and they will select the candidate according to their own interests.

The election committee will combine the votes each voter cast for a specific candidate with the candidates' 50% from the other method after the voting session is over before declaring a winner.

2.2. Users of Existing System

Voters: According to Wolkite University regulations, voters are regular students who serve as class representatives in the institution. They are registered at the time of the election and cast their ballots for the student union president on the election day.

Candidates: Are also regular students those who took and passed the evaluation out of 50%.

Election committee: Student election committee members are chosen to oversee elections when voting is taking place. Their responsibilities are listed as follows:-

- ➢ Register the candidates which fulfil the criteria.
- ➢ Coordinates and manage voting and co-workers.
- ➢ Count the votes.
- ➢ Report the result of the voting to student.

Election senate(administrator): that oversee the general voting process and are composed of student deans and members of parlama

2.3. Major Functions of the Existing System

Some of the major functionalities are listed below:

Registration

- ➢ **Election committee:**Registered by the election administrator from Parlama members who meet the requirements and have prior expertise.
- ➢ **Candidates registration**: The election committee registers candidates from parliament members who meet the requirements.
- ➢ **Voter registration**: Voters are students chosen to serve as representatives by their class.They will be registered at the time of voting and will cast their ballots at the student union on election day.

Announcement and result

- ➢ **Announce candidate and election day:** the election committee and the election administrator post the news that announce the student and voting day, the registration day and the day when the voting will end.

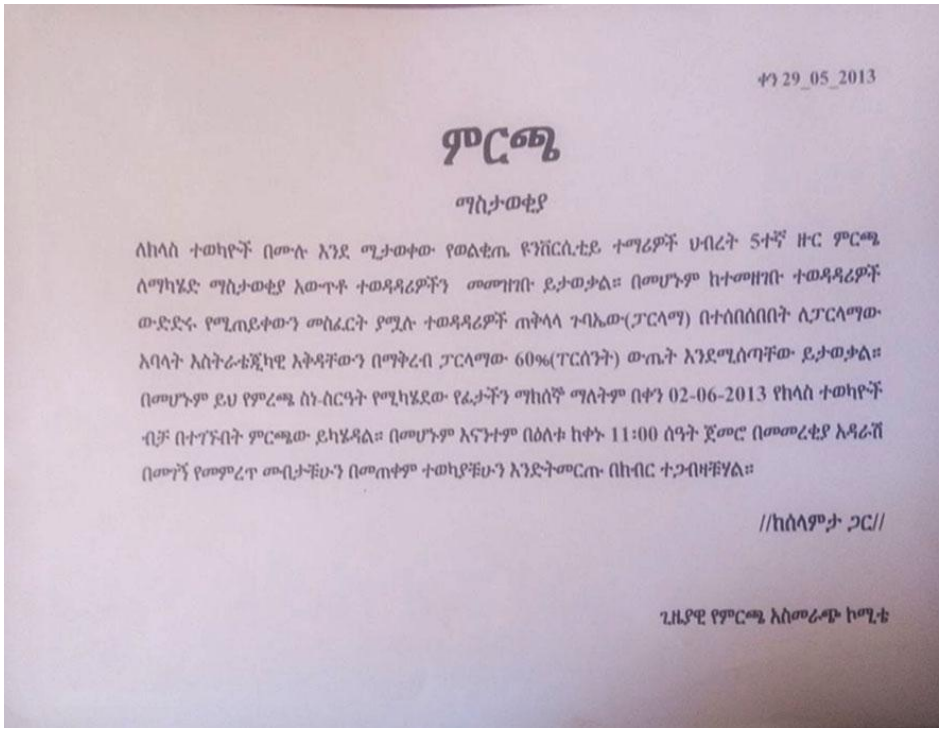
➢ **Post the result**: after vote is counted the election committee announce, the candidate with the highest vote as President, second winner selected as vice president and the third selected as clerk.

Cast vote

➢ The voter who were registered to vote were cast vote on the day of voting by going to station that voting will be held.

2.4. Forms and Other Documents of the Existing System

There were a number of forms and documents which were used by the existing system. The forms were used during the period of the voting process. The uses of these forms were to assure the voting process. In addition to this, these forms are used to increase easy to count vote result. Some of the forms were illustrated below.



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ለከላስ ተወካዮች በሙሉ እንደ ሚታወቀው የወልቂጤ ዩንቨርሲቲይ ተማሪዎች ህብረት 5ተኛ ዙር ምርጫ ለማካሄድ ማስታወቂያ አውጥቶ ተወዳዳሪዎችን መመዝገቡ ይታወቃል። በመሆኑም ከተመዘገቡ ተወዳዳሪዎች ውድድሩ የሚጠይቀውን መስፈርት ያሟሉ ተወዳዳሪዎች ጠቅላላ ጉባኤው(ፓርላማ) በተሰበሰበበት ሊፓርላማው አባላት እስትራቴጂካዊ እቅዳቸውን በማቅረብ ፓርላማው 60%(ፐርሰንት) ውጤት እንደሚሰጣቸው ይታወቃል። በመሆኑም ይህ የምረጫ ስነ-ስርዓት የሚካሄደው የፊታችን ማክሰኞ ማለትም በቀን 02-06-2013 የከላስ ተወካዮች ብቻ በተገኙበት ምርጫው ይካሄዳል። በመሆኑም እናንተም በዕለቱ ከቀኑ 11:00 ሰዓት ጀመሮ በመመረቂያ አዳራሽ በመገኘ የመምረጥ መብታቹሁን በመጠቀም ተወካያቹሁን እንድትመርጡ በክብር ተጋብዛቹሃል።

//ከሰላምታ ጋር//

ጊዜያዊ የምርጫ አስመራጭ ኮሚቴ

Figure 2-1 Announcement for voting



Figure 2-2 Announcement for voting

ተ.ቁ /R.N	ሙሉ ስመ /full name	ፕሮቶኮል (5%) Protocol (5%)	የአቀራረብና ገለጻ ብቃት (15%) presentation skill(15%)	በራስ መተማመን (5%)/ CONFIDENCE (5%)	የንድፈ ሃሳብ ይዘት (20%) stratagic plan containt(20%)	ጥያቄ የመመለስ አቅም (10%) Capability of answering(10%)	የጊዜ አጠቃቀም (5%) time management (5%)	አጠቃላይ ድምር (60%) /total (60%)
1.	ክንፈሚካኤል ዱላ / Kinfemichael dula	5	15	5	20	10	5	60
2.	ሚካኤል ያቦነሸ / Michael Yaboneshe	5	12	5	20	8	5	55
3.	አሸናፊ መታፈርያ /Ashenafi metaferia	4	12	5	18	9	5	53
4.	ምትኩ ገብረ /Metiku gebera	4	10	4	15	10	5	48
5.	አብይ ኩምሳ /Abiy kumesa	4	13	4	20	10	3	54
6.	አመቱራህማን ባህረዲን / Ameturaheman bahredine	5	15	5	18	10	4	57

Figure 2-3 Candidate evaluation form

R.N	Name	protocol (3)	Why you want to be president? (1)	Case1 (3)	Your Weakness and strength? (1)	Case 2 (3)	Cost sharing value (1)	Confidence (1)
1.	Ameturaheman	1	1	0.5	1	0.5	0.7	1
2.	Mickael	2	1	2	1	1	1	1
3.	Kinefe	3	1	1.5	1	2	1	1
4.	metiku	2	0.5	0.5	0.5	0.5	1	1
5.	Abiy	3	1	0.5	0.5	0.5	0.7	1
6.	ashenafi	3	0.5	0.5	0.5	1	1	1

Figure 2-4 Candidate evaluation form

2.5. Drawbacks of the Existing System

Although it appears that the current system is simple to use, as society shifts to a more service-oriented model, it appears to be quite time consuming and not ideal for a user with high aspirations.

Such manual operations may be problematic if a counting error occurs that a manual system is unable to detect. They may also be time-consuming when registering users, displaying voting results, receiving feedback, managing and archiving voting-related materials, and having candidates introduce themselves in person.

The current system suffers from the following flaws.

2.5.1 Time consuming

Voting manually involves several steps, including casting a ballot, providing feedback, and displaying the results. Such type of manual operations that listed above

- ➢ They take long time to announce the result of voting to student
- ➢ They struggle with voting delays because they can't organize numerous voters at once.

Generally, the response time of the existing system is slow due to the above reasons.

2.5.2 Inflexible

Voters must wait in line in order to cast their ballots because there is a large crowd present.On the same ballot box, more than one voter cannot cast votes at once.

2.5.3 Searching problem

An extremely time-consuming and laborious task is searching for a certain user's record in a massive fat register.This is so that the managers can seek a certain record out of hundreds or even thousands of entries by going through all the records.

2.5.4 Lack of information

The provision of information to all voters equally is lacking in the current WKU student union election voting process. Because most students do not have the practice of reading notices or obtaining information from boards, information is currently distributed in various locations on boards and on blocks of walls.

2.5.5 Economic problem

The current system has costs with generating physical archives, photocopying, faxing, managing and archiving documents in physical environments, and purchasing writing supplies like pens, paper, and numerous employers, among others.

2.5.6 Lack of Efficiency

When errors occur or adjustments are required, the action must be repeated rather than being updated.As a result, work productivity is low.

2.5.7 Lack of security

Voter fraud and cheating, a weak security system because to the ease with which one may obtain documents and make changes, and data loss.

2.6. Business Rules of the Existing System

A system must conform to an operational principle or policy known as a business rule. It frequently has bearing on concerns with access control, financial calculations, or organizational operating rules and principles.

As a result, the following business principles apply to the current system.

BR1: To vote as voter in Wolkite university

- ➢ The voter must be a regular student in the university

BR2: One student can participate as candidate if they fulfil the following criteria

- ➢ A class representative or a former executive officer of the union
- ➢ The candidate GPA must be 2.75 and above
- ➢ The candidate should listen and speaks Amharic.
- ➢ The candidate must be 2nd or above year student that at least has 2 more years left.
- ➢ The student must be without any disciplinary case or ethical violations.

BR3: The voter must come to the office to register on the registration day.

BR4: The voter must come in the given schedule to register and cast vote.

BR5: The voter can only vote one candidate that he/she want on the day of voting.

BR6: The election committee is required to list all of the candidates, count the votes after a 50% turnout, add the results with the other criteria with 50% turnout, and then announce the results.

BR7: The administrator should manage the overall voting.

BR8: The result must be posted to student after election.

CHAPTER THREE

3. PROPOSED SYSTEM

The proposed system was created to address the issue with the current system.In order to fix the issues and adapt the manual system to an online voting system, the Wolkite University Student Union voting system will be converted from its current manual form to an automated form as follows:

Administrator - By publishing news on the website, invite Parlama students to join the election committee.Register voters and candidates for the election committee who have the most expertise and the best performance among the candidates who have registered, and announce for the university society (student).Then explain to the members of the election committee what to do, how to do it, and how to share the job (orientation).

Chairperson: - This chairperson has a one-month or less-than-two-month work period, as decided following the meeting.

They advertise the time that the vote will be held for the university society by posting it on their website and inviting students to participate who meet the qualifications for a candidate. They then give the candidate an entrance exam out of 10%, accept their certificate out of 3%, and lastly defense out of 22.

If anyone has a complaint, request, or criticism regarding the election, accept it and respond to it.

Following that, the winner candidate for the university society's will be announced. The EC will post the results for the user after voting is complete.

Candidate: This actor has the chairperson's approval and is a university student who ran for student representative office.The student must register with the system in order to run for office. They can put their detailed information for election on the system.

Voters/students: These actors will be regular university students who had applied to vote for their representatives in the existing election system. By meeting the requirements, they were granted registration.The voter is only able to read the data; no modifications can be made to the database by the voter.

Voters will be able to read the candidate's information, the election results, and cast their ballots using the system after it is announced.

3.1. Functional Requirements

Functional requirements were the essential building blocks of requirements since they explain and specify how the system interacts with users or the environment in general. The system's capabilities are determined by its functional requirements, which also affect its inputs, behavior, and output.The suggested method clearly outlines the objective of the student union's online voting system as well as the actions necessary to achieve it.The criteria provided a clear understanding of the system's purpose and scope, which would be useful for developing the system in an efficient manner. The proposed system meets the following functionalities: -

- ✓ Login the user and redirect him/her to their perspective landing page based on their role
- ✓ Register: The system shall allow register candidates, chairperson and voter.
- ✓ Post announcement: - The system shall provide proper features like candidate information, election date, registration date, end date, election result and comments or questions for all visitors by chairperson or administrator.
- ✓ Manage user: - the administrator can create, delete and update the account to the chairperson, candidate and delete account of voter from database after election
- ✓ Cast vote:- the system shall allow using user friendly and dynamically interactive online election system.
- ✓ View result: The system shall allow visitors to view posted information after election is completed.
- ✓ Approve chairperson the system allows administrator to approve chairperson of the campus.
- ✓ Approve candidate: The system allows chairperson can approve students that participate in the election as a candidate
- ✓ Evaluate: - chairperson can evaluate the candidate and fill the value of candidate that he gets from test, certificate, strategic plan and defence from 50%.
- ✓ Feedback: The system allows give feedback to union committee in different aspects.

- ✓ Generates Report: The system allows generate Reports of the election based on the candidate and voter by administrator.
- ✓ Logout: The system shall allow administrator, election committee and voters can logout to the system
- ✓ View notice: all user of the system were capable to see the notice that released on the system in announcement form.

3.2. Nonfunctional Requirements

The user-visible components of the system that are not directly related to the system but whose presence benefits the system are referred to as non-functional requirements. A technical requirement that a system must meet has to do with performance, security, and reliability concerns, among other things.

3.2.1. User Interface and Human Factors

The interface of the proposed system is simple to understand, easy to use with user-friendly interface and users of the system can easily use and perform their task. Everything stems from knowing our users, including understanding their goals, skills, preferences, and tendencies. Once we know about our user, we consider the following list when designing our interface:

- ✓ Keep the interface simple. The best interfaces are almost invisible to the user. They avoid unnecessary elements and are clear in the language they use on labels and in messaging.
- ✓ Create consistency and use common UI elements. By using common element in our UI, users feel more comfortable and are able to get things done more quickly, layout and design throughout the site to help facilitate efficiency.
- ✓ Strategically use color and texture.
- ✓ By carefully thinking about and anticipating the goals people bring to our site, we create defaults in order to reduce the burden on the user

3.2.2. Hardware Consideration

The Software product to be developed should run on existing computers and smartphones because we will develop it to be compatible on any device. Our student union voting system can run in any modern hardware devices.

3.2.3. Security Issues

The system is much secured. The administrator is the only one who is authorized to create an account for the chairperson, candidate and voter, that way nobody can access the system without the authorized person. Passwords will not be visible therefore it cannot be accessed by anyone else because the passwords will be encrypted by encryption algorithm(SHA512).

- ✓ In order to avoid brute force attack, the system allows password trial to 3 attempts. If the attempt is not successful, the user account is locked and it will only be activated by the administrator and election committee.
- ✓ All field entries will be sanitized before any of them reach the database. By using the express sanitizer, we can filter all entries and check for malicious content.
- ✓ User password shouldn't be less than 8 characteristics to prevent social engineering attacks

3.2.4. Performance Consideration

The web-based system should have easy and efficient code manipulation and have clear database. SQL database also gives us a high rate of performance since it enables us to use reusable components, it renders a lot faster. Thus, the response time should be very small i.e. not more than 2.5 seconds.

3.2.5. Error Handling and Validation

In order to address errors, the system would validate user inputs.

It manages and displays errors in an approachable manner without wearing out the user.We use a JavaScript validator on the client side to fix this problem.To lessen the loading, we employ front-end validation.

3.2.6. Portability

The system can be browsed on different browser such as opera browser, chrome, internet explorer versions and Mozilla fire fox.

3.2.7. Backup and Recovery

We used a well-planned backup and recovery strategy that helps to protect our databases against data loss caused by a variety of failures. As our system we use another local storage by creating account on cloud on Mega site for storing the backups. When data failure is caused as we get easy.

3.2.8. Documentation

Our system Student union voting system has well defined document which helps to easily maintain the system. We would also prepare short and precise help file on how to use the system for the system users. It would have a helping guide for the user of the system. It shows the process of how they would have to use.

CHAPTER FOUR

4. SYSTEM ANALYSIS

System analysis is decomposing a system into its component pieces for the purpose of studying how well those component parts work and interact to accomplish their purpose of studying a system or its parts in order to identify its objectives. It is a problem-solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish its purpose. Analysis model contains three models: functional, object and dynamic models. The functional model can be described by use case diagrams. Class diagrams describe the object model. Dynamic model can also be described in terms of sequence, state chart and activity diagrams. For the sake of this project, we've used use cases, sequence diagrams, activity diagrams, state diagrams, and class diagrams to explain the analytical model in terms of the functional model, object model, and dynamic models.

4.1. System Model

The use case models below are used to describe the abstract models of our system, with each use case model presenting how the abstract models of the system are developed.

Different system models, such as use case models, object models, and dynamic models, can be used to represent our system. Because these models are represented graphically, they are easier to grasp more in-depth than natural language descriptions of the system requirements.

4.1.1. Use Case Model

The essential components and procedures that make up our system are defined using the Use Case Model (use case diagram, use case description, and use case scenario).

The components of the functional system are captured by this use case model.

Use case models are really an excellent approach to storyboard flows with users, establish the system requirements being modeled, and assist in writing the scenarios afterwards used in testing because they are basic by nature.

4.1.1.1. Use Case Diagram

Use case diagrams are employed to record the system's functional needs.It has to do with how well the system works or what services it offers.It is best to take into account the following factors while drawing a use case diagram.

- Use case - which is the functionality of the system which directly interacts with the user
- Actor - anything which interacts with the system.
- A relationship between the use case.

Our system has four actors that are listed below

- Voter
- Chairperson of Election committee
- Candidate
- Administrator

All have their own particular role.

- Voter can:

✓ Login into the system and log out from the system
✓ Cast the vote.
✓ Edit their profile
✓ View result.
✓ Give feedback.
✓ View notice and view candidate

- Chairperson of Election committee

✓ The Chairperson can log in into the system and log out from the system
✓ Capture his face.
✓ Recognize his face
✓ Chairperson can post announcement
✓ Chairperson can approve candidate
✓ Chairperson can post result
✓ Chairperson can evaluate the candidate.
✓ Chairperson can receive complain(feedback).
✓ Chairperson can edit profile

- Administrator

✓ The administrator can log in into the system and log out from the system
✓ Capture his face.

- ✓ Recognize his face
- ✓ The administrator can manage all user.
- ✓ The administrator can approve election committee.
- ✓ The administrator can generate report.
- ✓ The administrator can post result.
- ✓ The administrator can post announcement
  - ➢ Candidate
- ✓ Candidate can view result
- ✓ Candidate can register online
- ✓ Give feedback.
- ✓ View notice

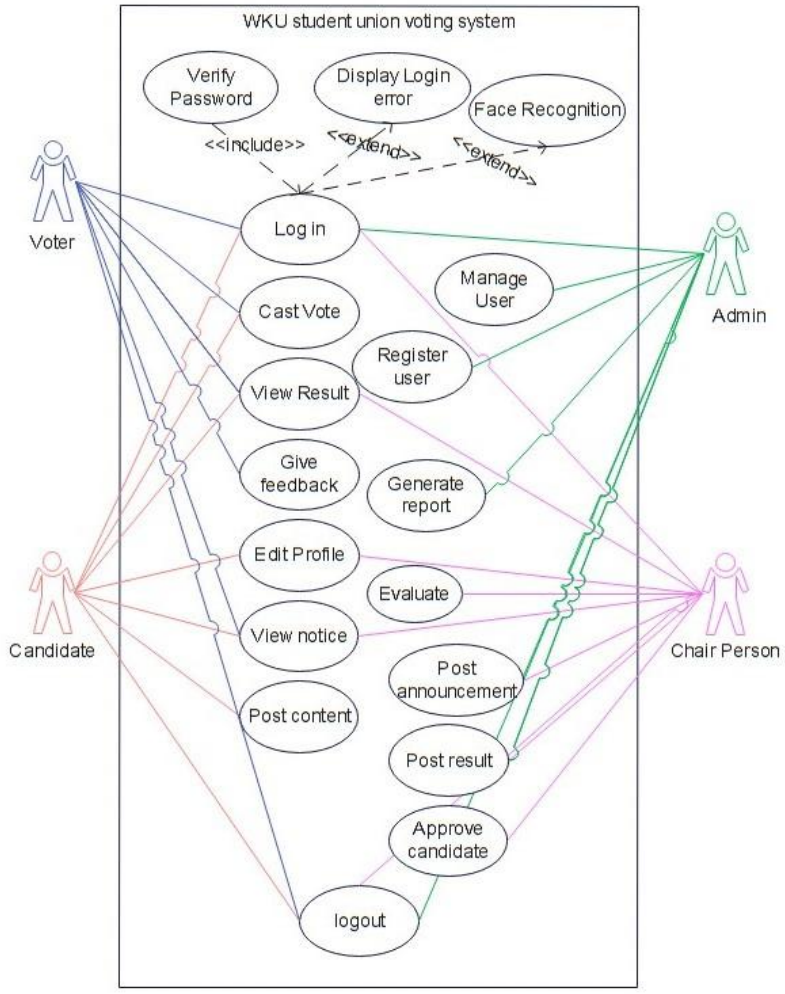


Figure 4-1 WKU SU voting system use case diagram

4.1.1.2. Use Case Description

The use case description is used to detail description of the use case what and how the use case works in order to perform user and system functionality. In this project, we discussed detail use case description as shown table 4.1 to table 4.15 below.

Table 4-1Use case description for login

Use case ID	UC-01
Use case Name	**Login**
Description	This describes how the users log into the system
Actor	Voter, chairperson, Administrator and candidate
Precondition:	Users should be registered before.
Normal flow	1. The user clicks on the login button on the Home Page. 2. The System display login page. 3. User fills the username and password and then click on (login) button 4. The System validates entered value. 5. If the user has account. 6. The System display account page (logged in UI). 7. End use case.
Alternative flow	4.1.user enters invalid username and password i. The System displays messages that contain “field cannot be empty or you entered wrong username or password” would be displayed. ii. user will return to number 3.
Post condition	The user would have access to his account.

Table 4-2 Use case description for Evaluate

Use case ID	UC-02
Use case Name	**Evaluate**
Description	This describes how chairperson would evaluate the candidate and fill the other result of candidate like test, certificate, on the system.
Actor	Chairperson
Precondition:	The candidate should have registered before and take the entrance

	exam.
Normal flow	1. chairperson login to the system 2. chairperson click the link on evaluate 3. select the candidate to be evaluated 4. fill the result on the provided form. 5. Then click OK button 6. Use case ends.
Alternative flow	5.1 if chairperson filled incorrectly the system displays “Invalid input” 5.2 repeat from normal flow number 4.
Post condition	The message “Evaluation Successful” is displayed.

Table 4-3 Use case description for Registering Chairperson

Use case ID	UC-03
Use case Name	**Register chairperson**
Description	To register the chairperson of election committee for elections purpose.
Actor	Administrator
Precondition:	Must login first
Normal flow	1. The administrator looks for category(voter,candidate,Chairperson) 2. Click Chairperson 3. Fill username, password and photo for recognition 4. Click save 5. Use case ends
Alternative flow	3.1 If password is less than 8 characters, display “Password should be at least 8 characters” 3.2 Return to number 3
Post condition	The message “Registration Successful” is displayed.

Table 4-4 Use case description for Approving Candidate

Use case ID	UC-04
Use case Name	**Approve Candidate**

Description	This describes how chairperson would approve a candidate
Actor	Chairperson
Precondition:	Must login first
Normal flow	1. The chairperson looks for candidates with the highest score out of 50% from the candidate list. 2. Click on approve 3. A prompt will appear with message “Approve ‘candidate name’ as a candidate?” with yes and no button. 4. if yes, display “Candidate Approved” message 5. Use case ends.
Alternative flow	2.1 if approved candidates are 8 the system will display “Maximum number of candidates.” and return to 1. 3.2 If no, return to number 1
Post condition	Candidate will be approved

Table 4-5 Use case description for Cast Vote

Use case ID	UC-05
Use case Name	**Cast Vote**
Description	This describes how the voter casts a vote to a candidate.
Actor	Voter
Precondition:	The voter should login first.
Normal flow	1. The voter clicks on candidate displayed at the voter home page. 2. The voter clicks the vote button. 3. If the voter hasn’t vote before the System prompts “are you sure “message with yes and no button. 3.1 If the user selects the (yes) button, the system increments the candidate sound by one and change the status of voter to voted 4. Then the system will prompt a message “Vote was Successful”. 5. Use case ends.
Alternative flow	2.1 If the voter has voted before the system will prompt a message ”You have already voted” and return to number 1. 3.1 If the voter selected ‘No’ the system will return to number 1
Post condition	The voter will vote his/hers desired candidate.

Table 4-6 Use case description for Logout

Use case ID	UC-06
Use case Name	**Logout**
Description	This describes how the users logout of the system
Actor	Voter, chairperson, Administrator and candidate
Precondition:	Users must be logged in .
Normal flow	1. The user goes to their home page. 2. Click the menu on the top right corner of the website. 3. Scroll to logout. 4. Click logout. 5. A prompt will appear asking “Are you sure you want to logout?” with yes/no button. 6. Click yes. 7. Use case ends.
Alternative flow	5.1 If the user clicks no, the it will return to menu.
Post condition	The user logs out.

Table 4-7 Use case description for Viewing result

Use case ID	UC-07
Use case Name	**Viewing results**
Description	This describes how the users views result on the website.
Actor	Voter, chairperson and candidate
Precondition:	Users must be logged in .
Normal flow	1. The user goes to the home page. 2. The user goes to the navigation bar and click on “view result”. 3. If the election time has ended, then it will direct him/her to a page where results are posted. 4. Use case ends.
Alternative flow	3.1 If the election time hasn’t ended then a prompt will display “Election still in progress”.
Post condition	The user views result.

Table 4-9 Use case description for Update user

Use case ID	UC-09
Use case Name	**Update user**
Description	This describes how the administrator updates a user on the database.
Actor	Administrator.
Precondition:	Administrator must be logged in .
Normal flow	1. The administrator searches for a specific user. 2. If the user exists in the database, the user's information will popup with edit and delete options. 3. Click on edit. 4. The administrator edits the user information. 5. Click save. 6. Use case ends.
Alternative flow	Nothing.
Post condition	A user information will be updated.

Table 4-10 Use case description for Post result

Use case ID	UC-10
Use case Name	**Post result**
Description	After election is finished chairperson and administrator can release the election result to the student community in the university.
Actor	Administrator and chairperson.
Precondition:	Both must be logged in .
Normal flow	1. Goes to the home page. 2. Click on results button. 3. Click on 'Enable View Result' button. 4. If the election time ended the system will enable the viewing of result to the users. 5. Use case ends.
Alternative flow	4.1 If the election is still in progress, the system will prompt a message "Election in progress".

Post condition	Result will be posted.

4.2. Object Model

An object model is a logical interface, software or system that is modeled through the use of object-oriented techniques. It enables the creation of an architectural software or system model prior to development or programming. In our system we use object model 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 structure diagram that describes the structure by showing the system's class their attributes, operations (or methods), and the relationships among the classes. so, in WKU SU voting system there would be class that makes the system like voter, candidate, Chairperson, Admin etc. The class diagram with its corresponding objects would be present in the following diagram.

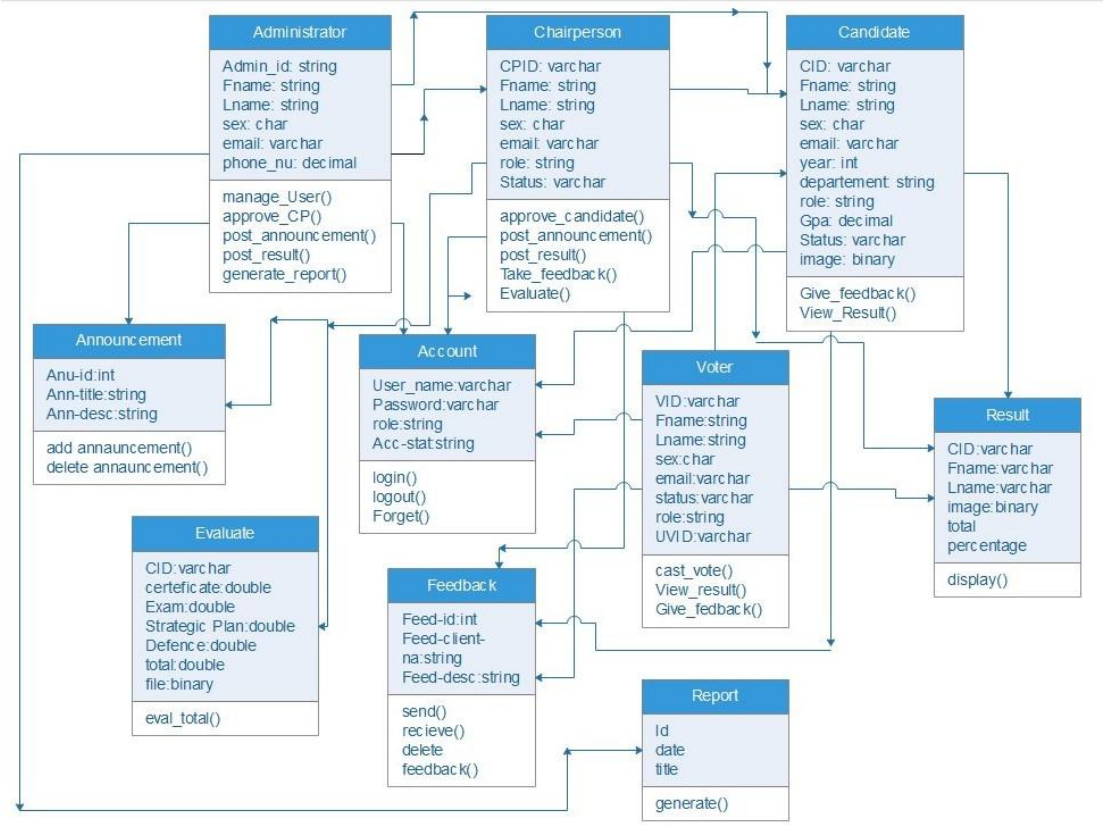


Figure 4-6 Class diagram

4.2.2. Data Dictionary

A data dictionary is a file or a set of files that contains a database's metadata. The data dictionary contains records about other objects in the database, such as data ownership, data relationships to other objects, and other data. In our WKU SU voting system the following table describe data dictionary. The tables below show data dictionary of our system.

Table 4-11 Administrator class data dictionary

Table Name Administrator **Primary key: Admi_ID** **Description: used to put list of information that related with administrator**				
Attributes	**Data type**	**Data Size**	**Constraint**	**Description**
Admi_ID	varcahr	30	Primary key	Unique identification for Administrator.
First name	String	30	Not Null	Name of the administrator.
Last name	String	30	Not Null	Last name of the administrator.
email	String	30	Not Null	Email of the administrator for username .
Phone_number	double	15	Not Null	Phone number the administrator.

Table 4-12 Feedback class data dictionary

Table Name Feedback **Primary key: Feed_id** **Description: used to put list of information that related with feedback**				
Attributes	**Data type**	**Data Size**	**Constraint**	**Description**
Feed_id	int	30	Primary key	Unique identification for feedback.
Client-id	varchar	30	Foreign key	The id of person who send the feedback to election committee .
Feedback client name	String	30	Not Null	The person who give feedback.
Feedback description	String	-	Not Null	Description of the feedback content (idea or subject that user write to the chairperson).

Table 4-13 Chairperson class data dictionary

Table Name chairperson **Primary key:** Cp_id **Description: used to put list of information that related with chairperson of election committee**				
Attributes	**Data type**	**Data Size**	**Constraint**	**Description**
Cp_id	varcahr	30	Primary key	Unique identification for election committee.
First name	String	30	Not Null	The name of election committee.
Last name	String	30	Not Null	Last name of the election committee.

email	String	30	Not Null	Email of the election committee for username .
Sex	char	2	-	The sex of the election committee.
Year	int	-	Not Null	Year of student stay in the university.
Status	varchar		Default: unproved	The time they register they are unproved by default up to administrator approve them.
Roll	varchar	30	Not Null	The role he selects election committee from the list.
Password	varchar	30	Not Null	EC password used to login.
Admin_id	varchar	30	Foreign key	Used to know who approve them.

Table 4-14 candidate class data dictionary

Table Name Candidate **Primary key:** Candidate_id **Description: used to put list of information that related with candidate**				
Attributes	**Data type**	**Data Size**	**Constraint**	**Description**
Candidate_id	varcahr	30	Primary key	Unique identification for election committee.
First name	String	30	Not Null	The name of election Candidate.
Last name	String	30	Not Null	Last name of the Candidate.
email	String	30	Not Null	Email of the Candidate for username .
Sex	char	2	-	The sex of the Candidate.
Year	int	-	Not Null	Year of student stay in the university.
Department	String	30	Not Null	Department of the student
Status	varchar		Default: unproved	The time they register they are unproved by default up to administrator approve them.
Roll	varchar	30	Not Null	The role he selects election committee from the list.
Gpa	decimal		Not null	The grade of the candidate.
Password	varchar	30	Not Null	EC password used to login.
Cp_id	varchar	30	Foreign key	Its foreign key it comes from the chairperson class used to know who approved them
Count	int	-	Increment by one	When a voter vote a candidate, it will increment by one

Table 4-15 voter class data dictionary

Table Name voter **Primary key:** voter_id **Description: used to put list of information that related with voter**				
Attributes	**Data type**	**Data Size**	**Constraint**	**Description**
voter_id	varcahr	30	Primary key	Unique identification for voter.
First name	String	30	Not Null	The name of election voter.
Last name	String	30	Not Null	Last name of the voter.
email	String	30	Not Null	Email of the voter for username .
Sex	char	2	-	The sex of the voter.
Status	varchar		Default: Not voted	The time they register they did not vote by default up to the cast the vote
Department	String	30	Not Null	Department of the student
Password	varchar	30	Not Null	Voter password used to login.
Candidate_id	varchar	30	Foreign key	Its foreign key it comes from the chairperson class used to know who approved them

Table 4-16 Announcement class data dictionary

Table Name Announcement **Primary key: Announcement_id** **Description: used to put list of information that related with feedback**				
Attributes	**Data type**	**Data Size**	**Constraint**	**Description**
Announcement_id	int	30	Primary key	Unique identification for Announcement.
Announcement title	String	30	Not Null	Title of Announcement.
Announcement description	String	300	Not Null	Description of the Announcement content.

Table 4-17 Evaluate class data dictionary

Table Name voter **Primary key:** **Description: used to put list of information that related with voter**				
Attributes	**Data type**	**Data Size**	**Constraint**	**Description**
Candidate_id	varchar	30	Foreign key	Unique identification for candidate evaluated.
Cp_id	varchar	30	Foreign key	Unique identification for chairperson who evaluate the candidate.
certificate	double	-	Not Null	Certificate of candidate.
Exam	double	30	Not Null	Score of candidates from take exam.
Strategic Plan	double	30	Not Null	Value given to candidate depend on its strategic plan.
Defence	double	30	-	Value of one candidate it gets from Defence.

file	binary	-	-	File of candidate can be uploaded in one pdf.

Table 4-18 Account class data dictionary

Table Name Account **Primary key: -** **Description:** the user of the system used to access the system by using their username and password				
Attributes	**Data type**	**Data Size**	**Constraint**	**Description**
Username	varchar	30	Not Null	Username for login user use.
Password	varchar	30	Not Null	Password of user.
Role	varchar	30	Not Null	Role of user.
Acc-status	varchar	30	Default:active	Users are **active** by default until he/she tries wrong password 3 times, status: **inactive**.

4.3. Dynamic Model

A dynamic model represents the behaviour of an object over time. It is used where the object's behaviour is best described as a set of states that occur in a defined sequence. In our system we use sequence diagram, activity diagram and State diagram.

4.3.1. Sequence Diagram

A 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. A 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 scenario so in WKU SU voting system website there would be different process to do specific actions and we include some sequence diagrams to handle these interactions.

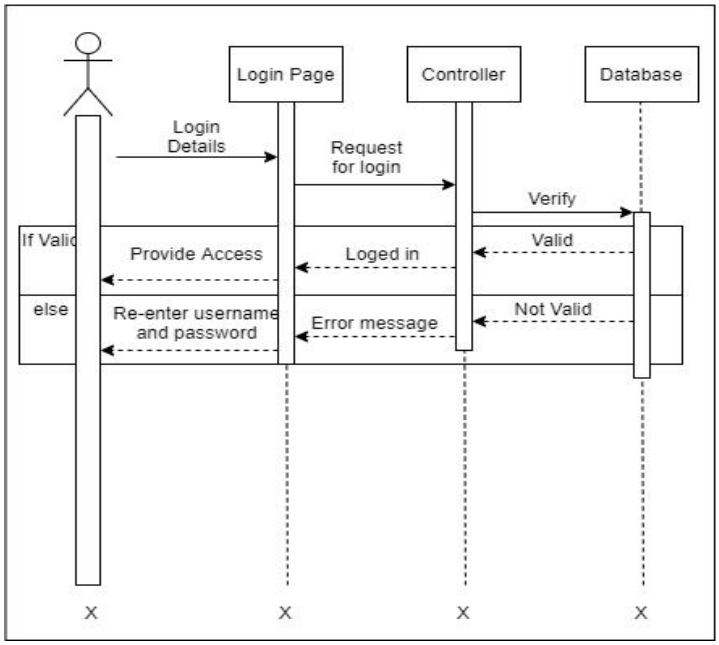


Figure 4-7 Login sequence diagram

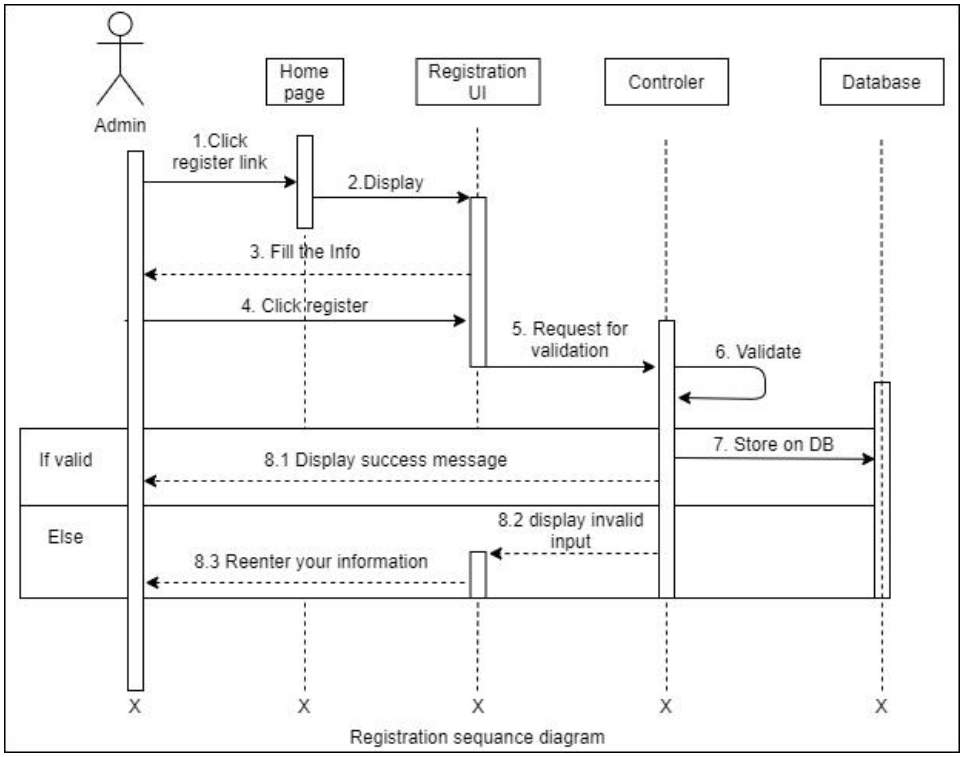


Figure 4-8 Registration sequence diagram

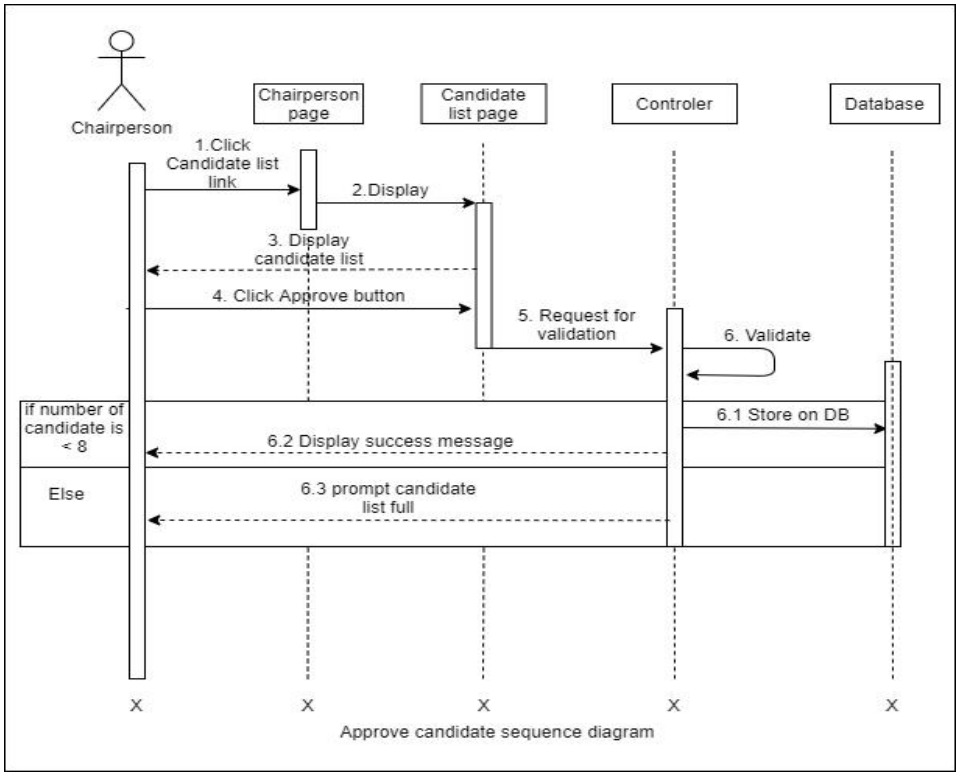


Figure 4-9 Approve Candidate sequence diagram

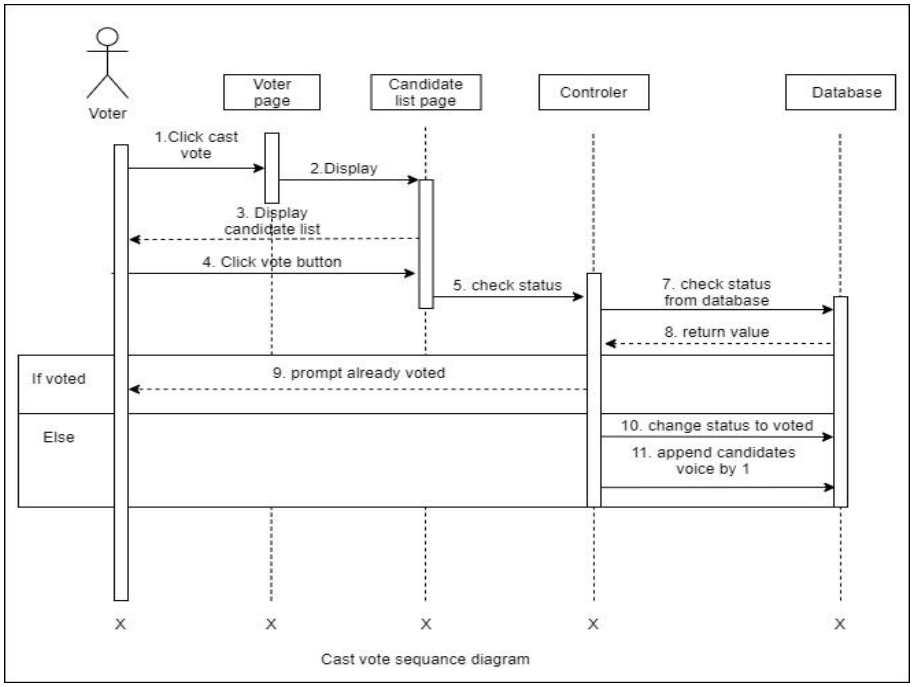


Figure 4-10 Cast vote sequence diagram

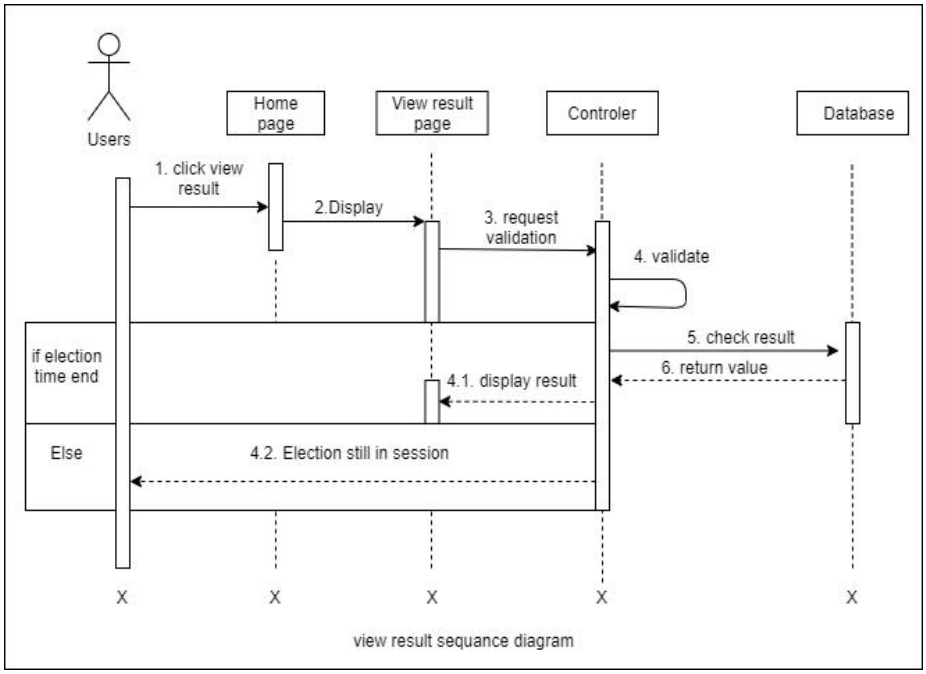


Figure 4-11 View result sequence diagram

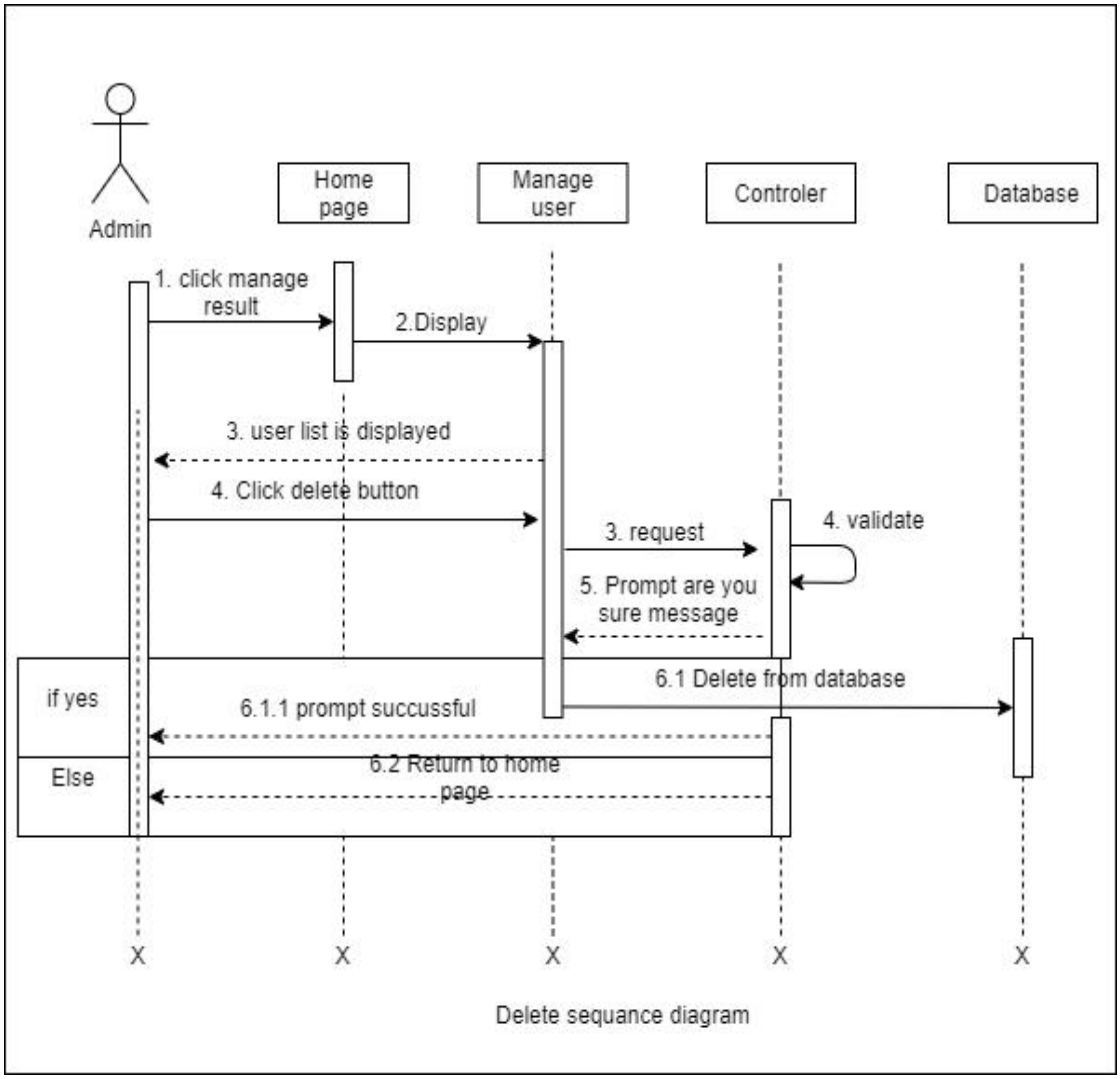


Figure 4-12 Delete sequence diagram

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 in order to perform many tasks there should be one or more activity to be done.

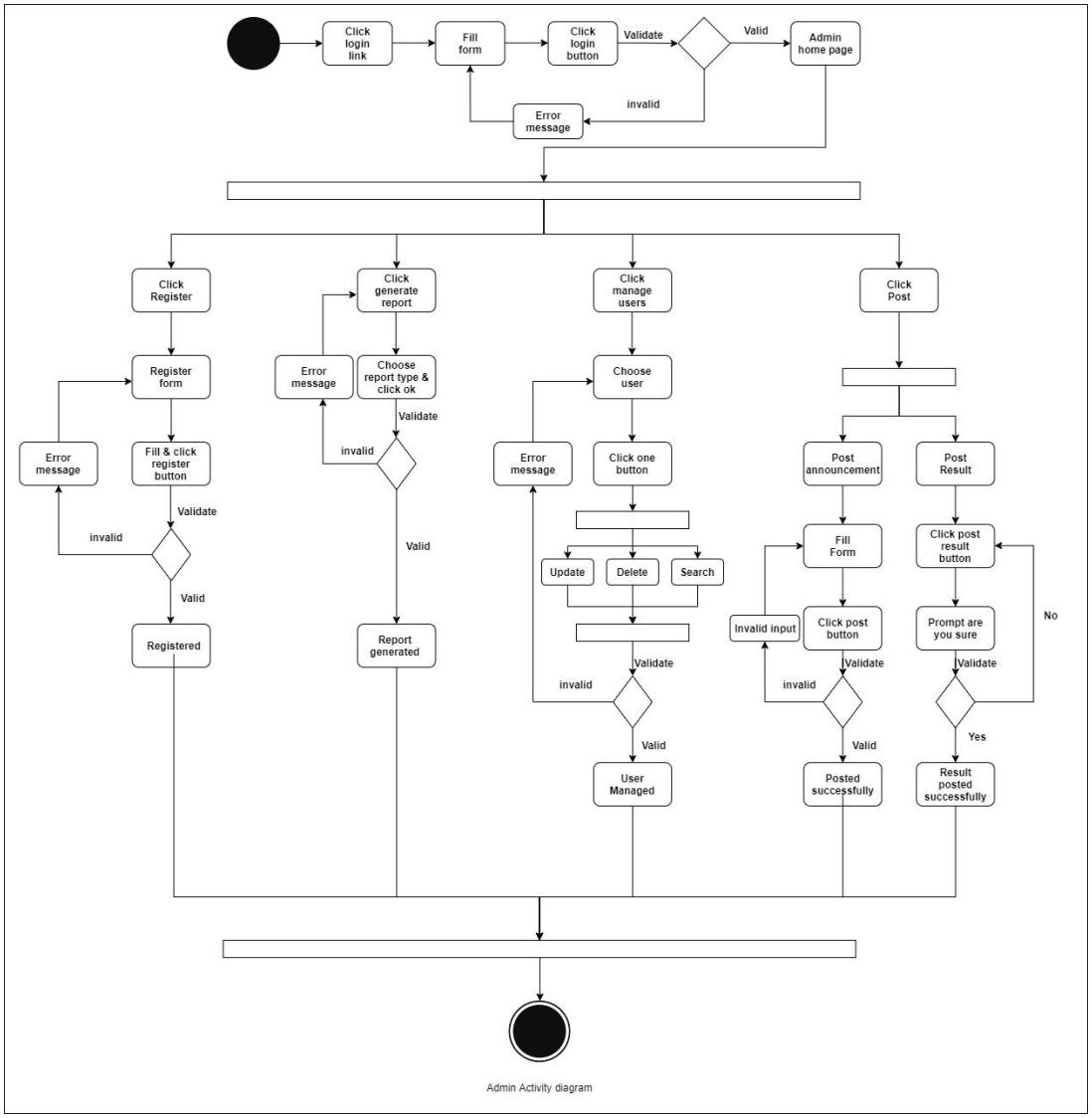


Figure 4-13 Admin Activity diagram

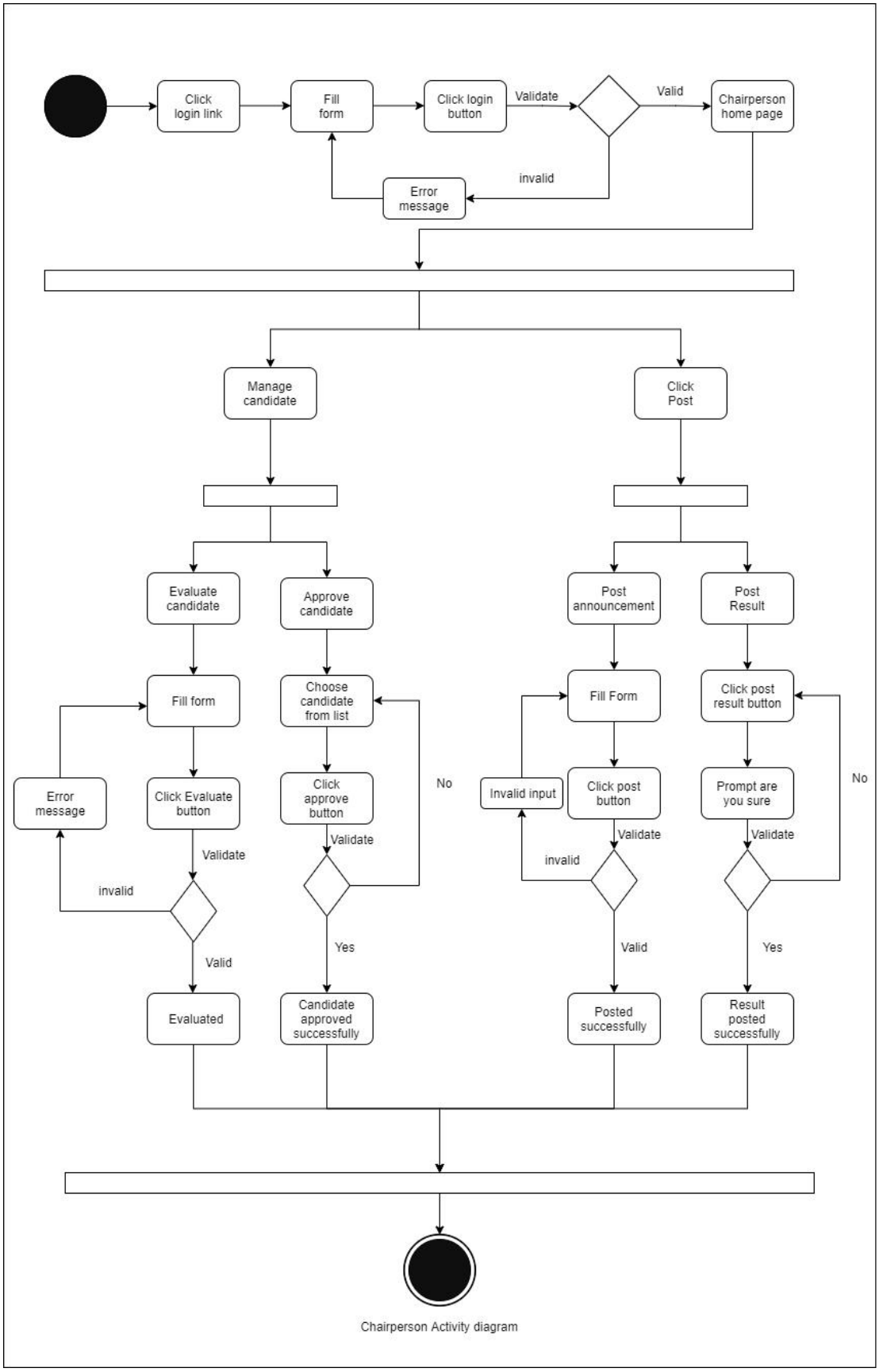


Figure 4-14 Chairperson Activity diagram

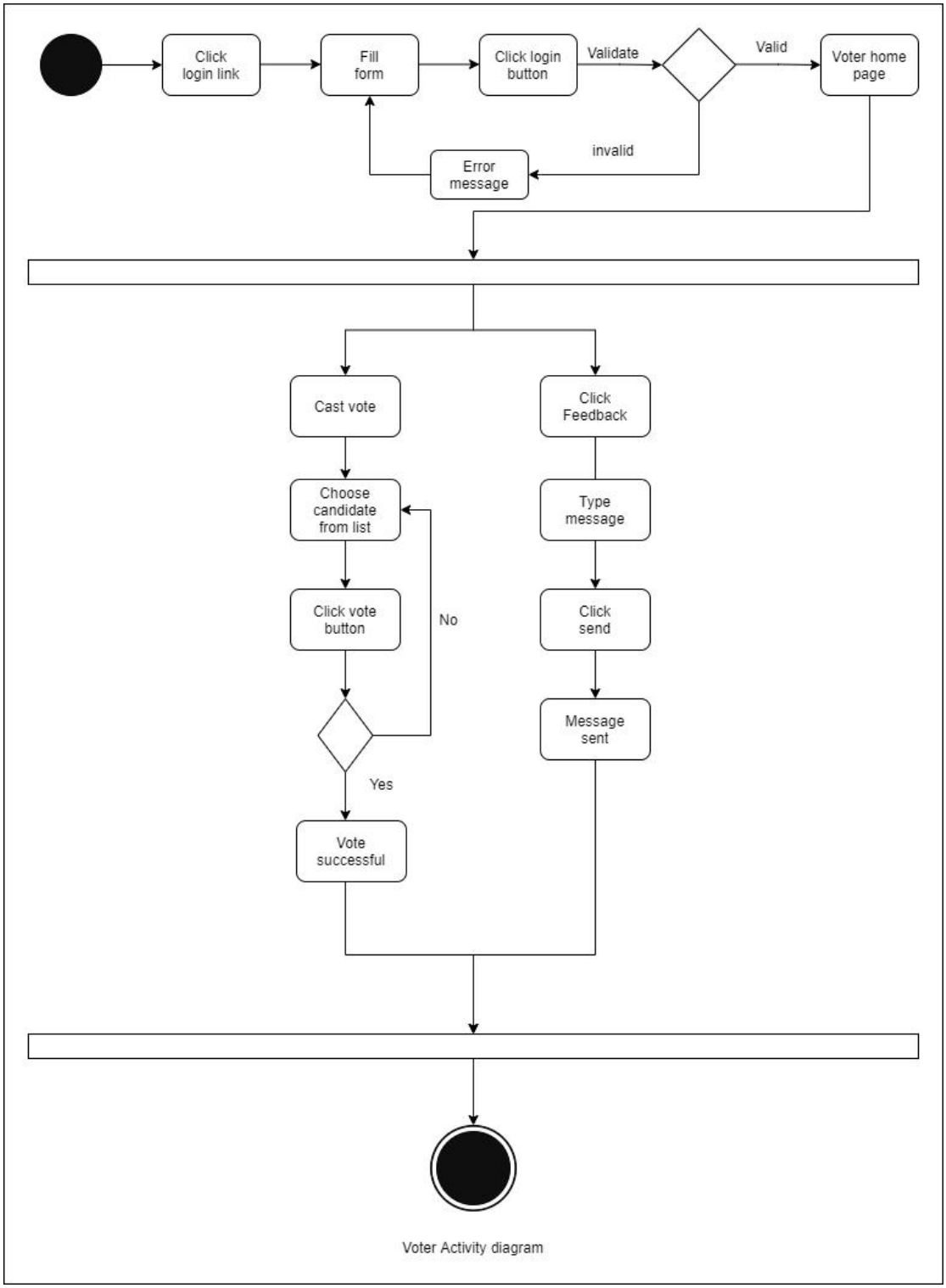


Figure 4-15 Voter Activity diagram

4.3.3. State Chart Diagram

State chart diagram describes the flow of control from one state to another state. States are defined as a condition in which an object exists and it changes when some event is triggered. So, the most important purpose of State chart diagram is to model life time of an object from creation to termination whenever performing different

activities there would be some states that are included in activities so in our project WKU SU voting system we have listed below some states that can be covered during the user interacts with the system. Figures below describe the state diagram of our system.

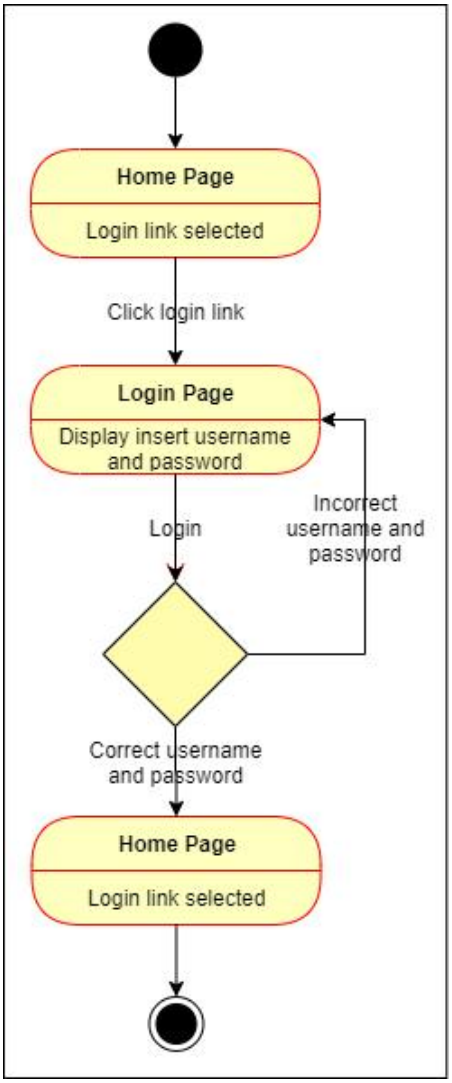


Figure 4-16 Login state chart diagram

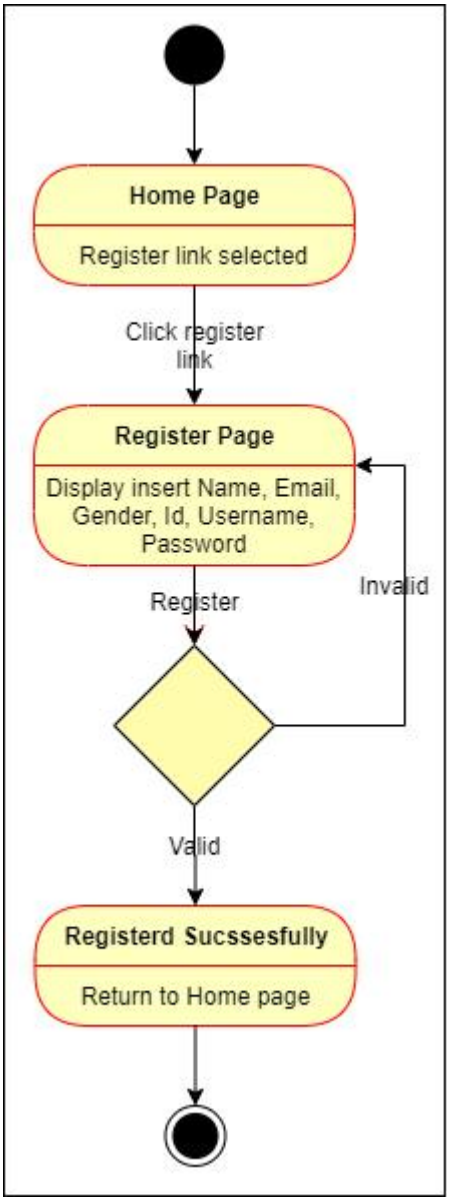


Figure 4-17 Registration state chart diagram

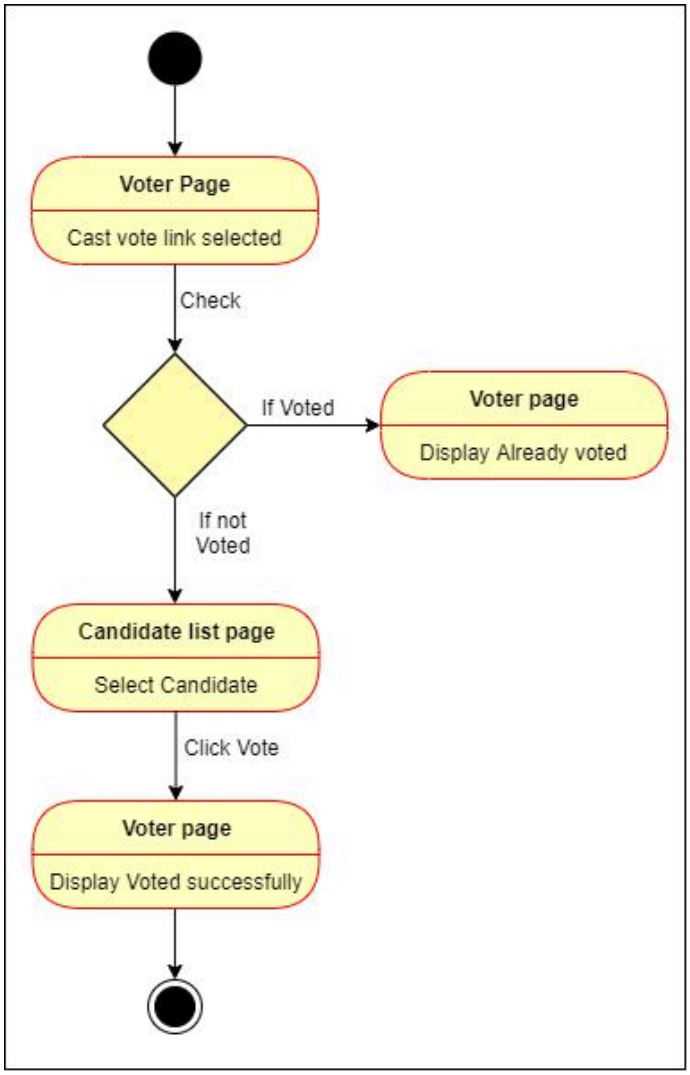


Figure 4-18 Cast vote state chart diagram

CHAPTER FIVE

5. SYSTEM DESIGN

System design is the transformation of the analysis model into a system design model. Design is process of describing, organizing, and structuring system components at architectural design level and detailed design level. WKU SU voting system design overview is proposed as a solution for the current existing system problem. Our proposed system is divided into different categories in order to the complexity of system when we providing a solution for the specific problem.

5.1 Design Goals

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. The design goal is derived from the non-functional requirements of the system, which were stated in chapter three of this document. They describe on what the system should focus on. This includes:

✓ **User interface:** The user interface of the system should be easy to use by each user of the system with little training. Our interfaces will contain different buttons which guides the users on what they need to click and fill form to enter to their pages in order to do what they want. So, the system's interface will be easy to go through. We will also use different icons, buttons, frames and colors to make the interface more attractive. The interface can also show where users are going to click.

✓ **Security:** Our system will be secured based on unique voter Id to cast vote, and username and password for some user activity. Nobody can access the system without the authorized person Normal users are not allowed to edit any information that is displayed in each page and also information that is stored in the web database. So only users that have account can login to the system using his/her username and password. So, we can ensure that our system is definitely secured.

✓ **Fault tolerance:** The system will be able to give response (error message) when the user enters incorrect input. If the user enters incorrect data like username, password and other invalid inputs, then the system displays error message that inform

the user to enter the correct data, to do so, we apply validation to our system using java script.

✓ **Assumptions and dependencies:** Since we are going to develop a new website, it is highly dependent on the existence of web server application software, and on persistent database management (DBMS). End-users need to have only basic knowledge on how to use computer application, and they need to know English language since our system is going to be developed by it.

✓ **End user Criteria:** Usability is the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. From the end users' perspective, the system should be designed in such a way that it is easy to learn and use efficiently.

5.2. Current System Architecture

The current system of wolkite university student union voting system is manual due to this it has no architecture.

5.3. Proposed System Architecture

Our proposed system will be consisting of 3-tier architecture, as architecture pattern we will use model, view and controller (MVC), 3-tier architecture namely presentation layer, business logic layer(application), and data layer. The presentation layer is client layer and top most layer of the application. This is the layer we see when we use this system. It is the interface to our system which takes information from the user. The main functionality of this layer is to communicate with the application layer. This layer passes the information which given in terms of keyboard action and mouse click to the application layer.

MVC architecture pattern separates application into three components such as model, view and controller

Model: Model represents shape of the data and business logic. It maintains the data of the application. Model objects retrieve and store model state in a database. Model is a data and business logic.

View: View is a user interface. View display data using model to the user and also enables them to modify the data. View is a User Interface.

Controller: Controller handles the user request. Typically, user interact with View, which in-turn raises appropriate URL request, this request will be handled by a

controller. The controller renders the appropriate view with the model data as a response.

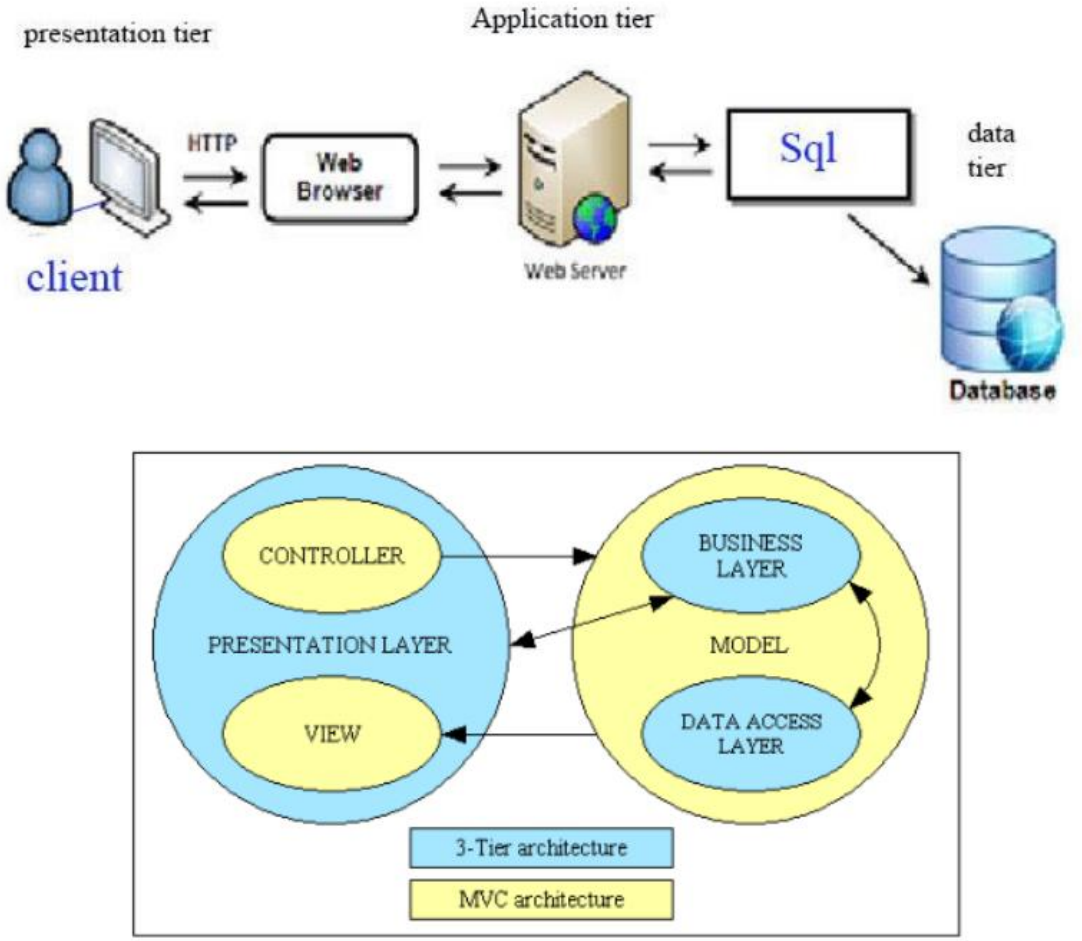


Figure 5-1 Proposed System Architecture

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. The goal of the system decomposition is to reduce the complexity of design model and to distribute the class of the system in to large scale and cohesive components. Components are generally units of computation or data stores in the system. A component has a name, which is generally chosen to represent the role of component or the function it performs. The different components of a system are likely to interact while the system is in operation to provide the service expected of the system.in our system the following sub component is available.

➢ Administrator subsystem-- responsible for handling action that administrator performs.

- ✓ Login
- ✓ Manage User.
- ✓ Approve chairperson.
- ✓ Generate report.
- ✓ Post result.
- ✓ Post announcement

➢ Voter subsystem-- responsible for handling action that voter performs.

- ✓ Login
- ✓ Cast vote.
- ✓ View result.
- ✓ Feedback

➢ Chairperson

- ✓ Login
- ✓ Approve candidate.
- ✓ Feedback
- ✓ Evaluate
- ✓ Post result.
- ✓ Post announcement

➢ Candidate

- ✓ View result
- ✓ Give Feedback.
- ✓ Post content

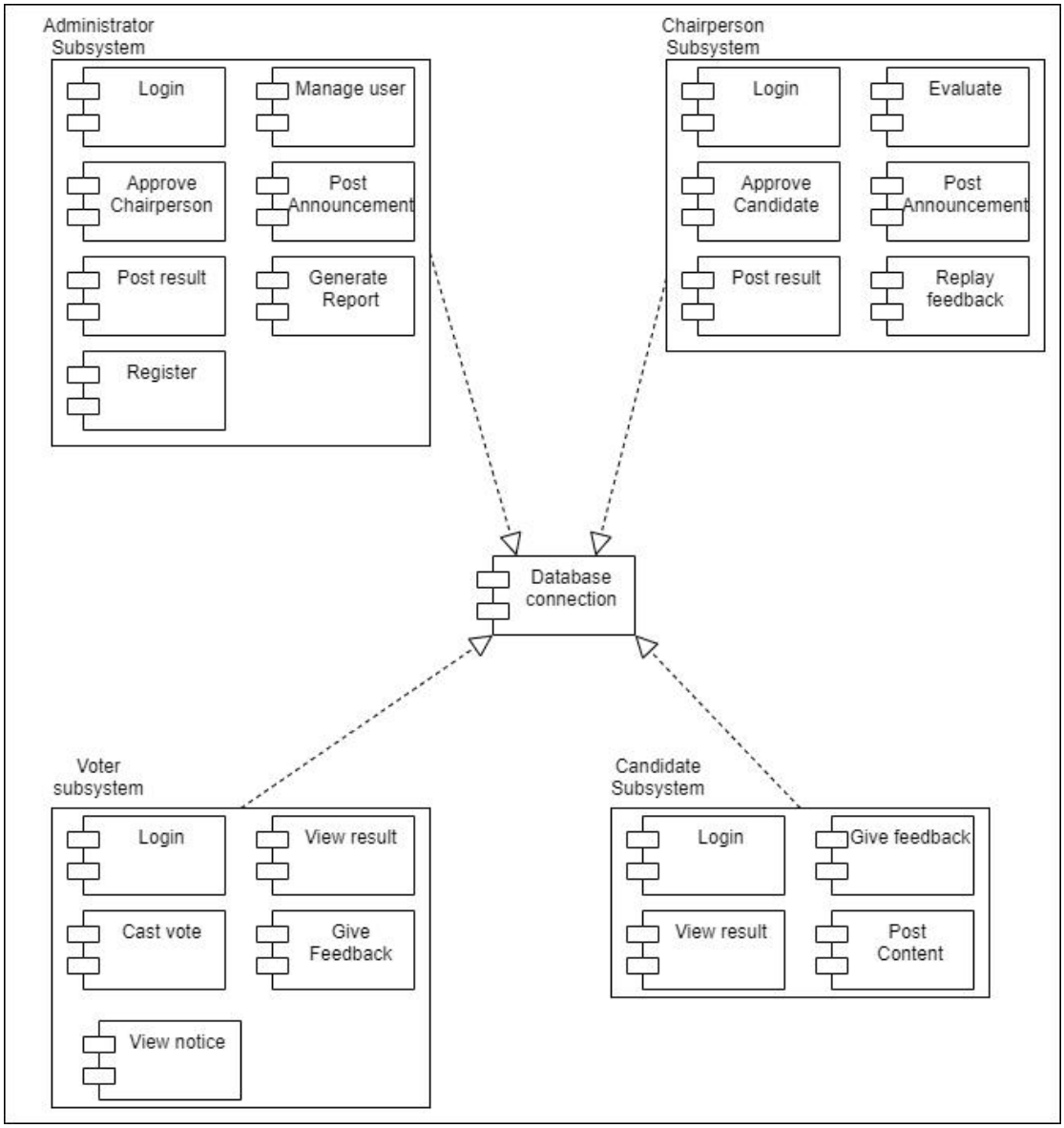


Figure 5-2 Subsystem decomposition

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, the deployment diagrams shows the hardware for our system, the software that is installed on that hardware, and the middleware Administrator. It is used to connect the disparate machines to one another. We want to create a deployment diagram for our website that is deployed to several machines. It also shows how the software and the hardware components work together. Deployment diagram is used to show the hardware of the system, the software that is installed no the hardware and also the middleware that is used to connect the disparate machines to one another. It also shows how the software

and hardware components of the system work together. The figure 5.3 below shows the deployment diagram of our system

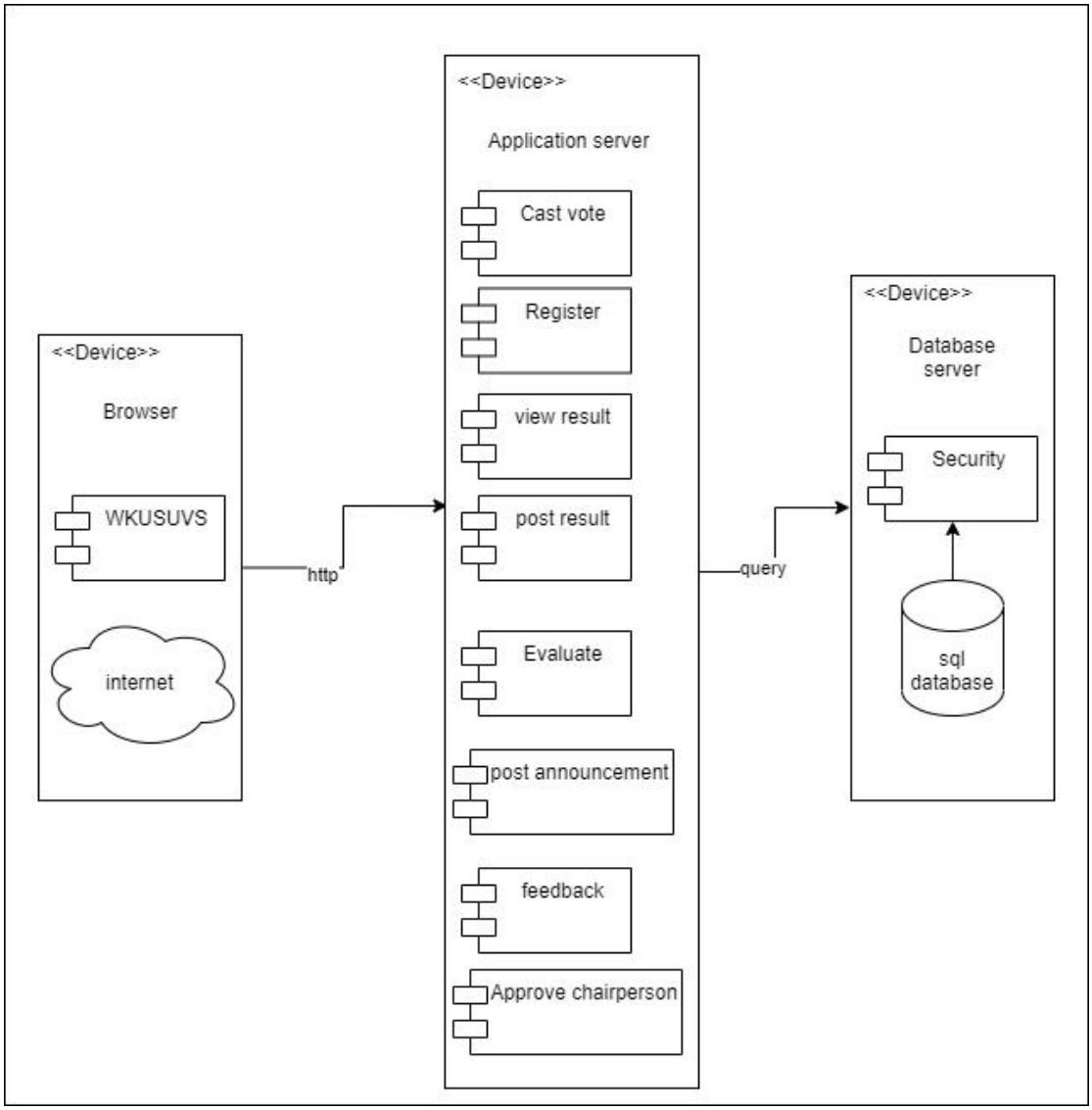


Figure 5-3 Deployment diagram

5.3.4. Detailed Class Diagram

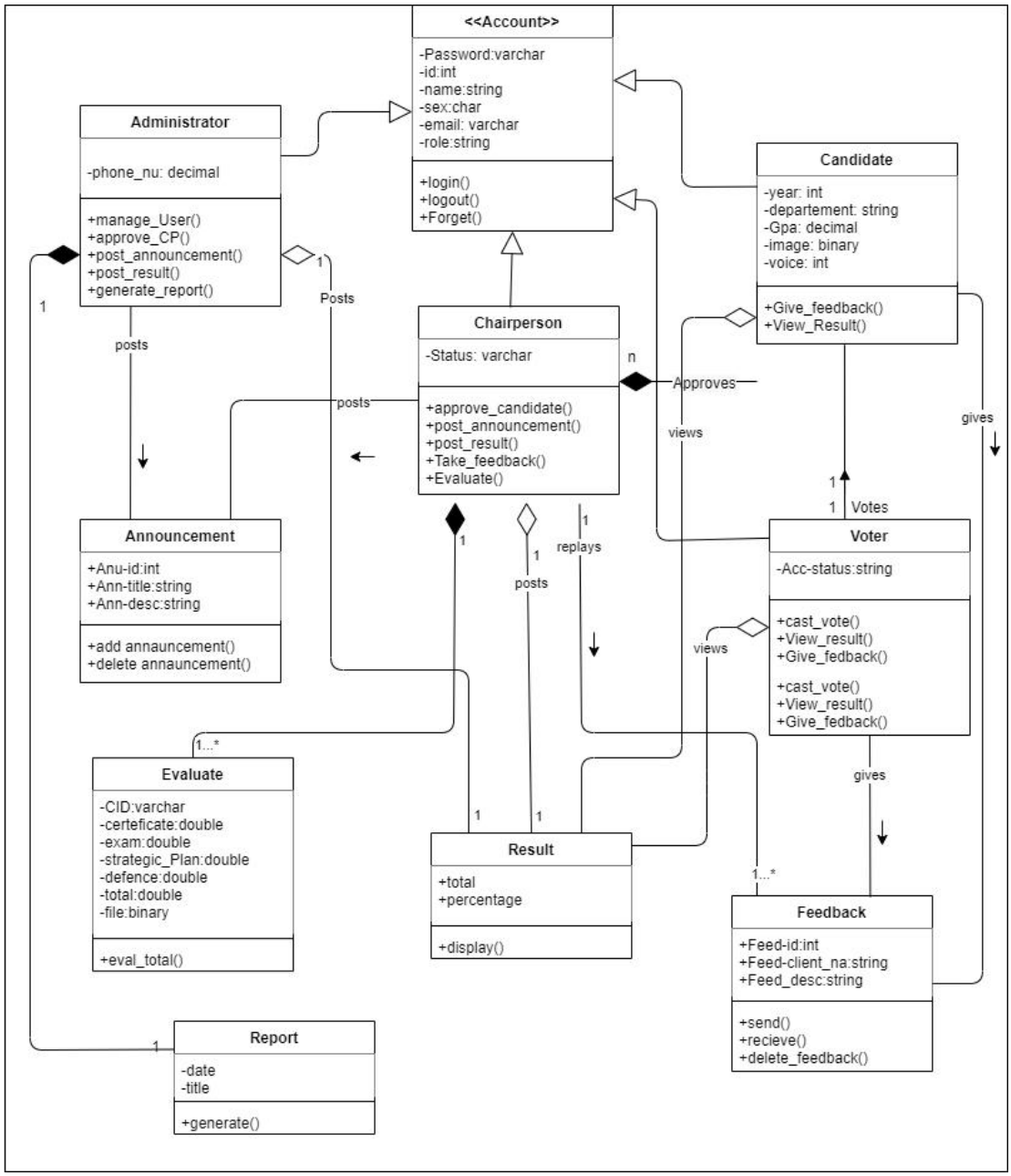


Figure 5-4 Detailed class diagram

Table 5-1 Detail class table

Class name	Attribute	Attribute type	Visibility	Methods	Return type	Visibility
Administrator	Admi_ID	String	-	login()	void	+
	Fname	String	-	manage_User ()	void	+
	Lname	String	-	approve_CP ()	void	+
	email	varchar	-	post_announcement()	void	+
	sex	char	-	post_result()	void	+

	Phone_number	decimal	-	generate_report()	void	+
	password	varchar	-			
Chair person	CPID	varchar	-	login()	void	+
	Fname	String	-	approve_candidat()	void	+
	Lname	String	-	post_announceme()	void	+
	Email	varchar	-	post_result()	void	+
	Sex	Char	-	Take_feedback()	void	+
	Year	int	-	Evaluate()	void	+
	Status	varchar	-	logout	void	+
	role	String	-			
	password	varchar	-			
	Admin-id	varchar	-			
Voter	VID	varchar	-	Login()	void	+
	Fname	string	-	Edit_profile()	void	+
	Lname	string	-	Cast_vote()	void	+
	Email	varchar	-	View_result()	void	+
	Sex	char	-	Give-Feedback()	void	+
	Status	string	-			
	role	varchar	-			
	password	varchar	-			
Candidate	CID	varchar	-			
	Fname	string	-			
	Lname	string	-			
	Email	varchar	-			
	Sex	char	-			
	Year	int	-			
	Gpa	decimal	-			
	Departme	string	-			
	Status	string	-			
	role	string	-			

	password	varchar	-			
Evaluate	CID	varchar	-	eval_total()	void	+
	Certificat	double	-			
	startegicPlan	double	-			
	Defence	double	-			
	Exam	double	-			
Announcement	Ann-id	int	-	Add_announc()	void	+
	Ann-Title	string	-	Delete_announce()	void	+
	Ann-desc	string	-			
Feedback	Feed-id	int	-	Add_feedback()	void	+
	Feedbac-Client-name	string	-	Delete_feedback()	void	+
	Feed-descr	string	-			
	Cand-id	int	-	Display()	void	+
	Fname	string	-			
	Lname	string	-			
	Image	binary	-			
	Total	decimal	-			
	Percentage	decimal	-			

5.3.5. Persistent Data Management

Persistence modeling is used to communicate the design of the database, usually the database to both the users and the developers. It is also used to describe the persistence data aspect of the system. The following tables indicate the persistence data management of the system.

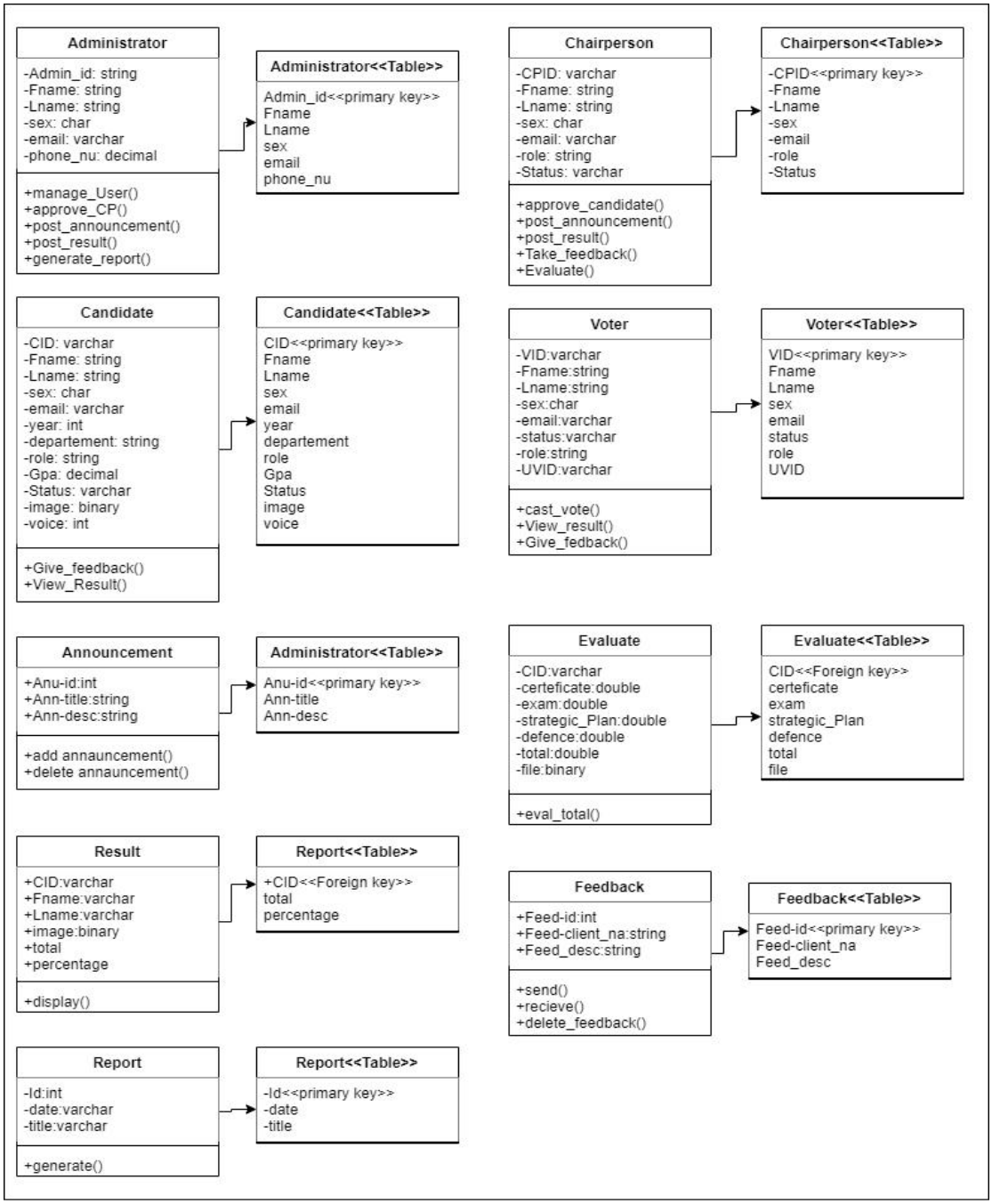


Figure 5-5 Persistent diagram

5.3.6. Access Control and Security

In our system, different actors have access to different information and data. Access control and security specifies what the user can access or what cannot perform by some users. This access control is verified by username and password. System admin represents an authenticated user. The proposed system follows multi user system. In multi user system, different actors have access to different functionality and data. Then it must be having: -

➢ Confidentiality: Only authorized person can see the information. Private data is kept private; personal privacy is respected.

➢ Integrity: There are limits on who can change the data in this system.

➢ Availability: The system is available at all times to authorized users

Actor	**Operation**				
	Register	**Account**	**Cast Vote**	**Post**	**View Result**
Administrator	CRUD	CRUD	-	CRUD	CRUD
Chairperson	U	RU	-	CRUD	CRUD
Candidate	-	-	-	R	R
Voter	-	-	C	R	R

5.4. Packages

Package is an organized and functionality-based set of related interfaces and classes. Packages organize classes that belong to the same category or provide similar functionality. In our system we category into database management package, report management package, cast vote management package, account management package, security management package.

Database management package is the database subsystem would be implemented by relational database management system which is used to store the persistent data.

Report management package consist class like generate report give, feedback and view feedback and see the status.

Cast vote management package It is a sub system that helps voter to bt able to cast vote and view result.

Account management package It is a subsystem that helps administrator to manage user account.

Security management package It is a subsystem that helps to secure the proposed system. The following diagram shows the package diagram of our system

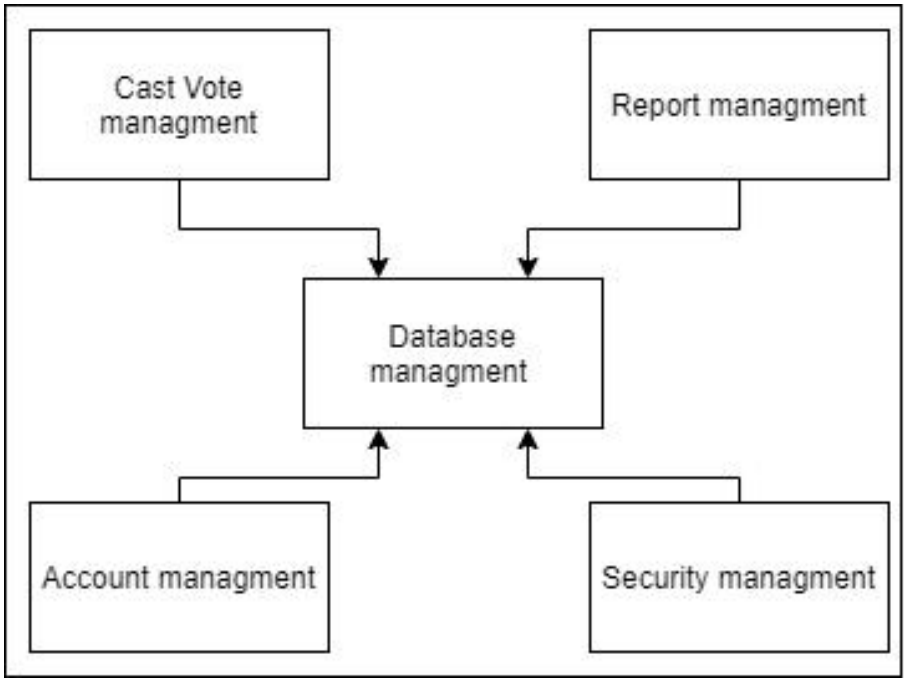


Figure 5-6 Package diagram

5.5. Algorithm Design

Algorithms are designed to show the flow of programs in the system. They are semantic driven rather than syntax driven. That means, the rule of syntax is not respected as other programming language but it has a complete meaning as that of syntax-based programming language. In addition, Algorithms show the flow and steps of logic in each function. This design part is important in the coding part of implementation. Some of the algorithms are listed below.

Example:

➢ Login

1. Home page displayed.
2. User click on login link
3. System display login page.
4. User enter their username and password.
5. If user username and password is correct, then
    - 5.1 If user is Chairperson, then system display Chairperson page.
    - 5.2 Else if user is Administrator, then system display Admin page.
    - 5.3 Else if user is voter then system display voter page.
    - 5.4 Else if user is candidate then system display candidate page.
6. Else username or password is not correct, then system display error message and re-display login page.

➢ Cast vote

1. Voter page displayed.
2. voter clicks on cast vote
3. system check his status
    3.1 if voter status is not voted,cast vote page is displayed, they vote one candidate
4. Successfully voted message is displayed.
5. Else if voter status is voted you already voted message is displayed.
4. Finally exit ()

5.6. User Interface Design

Describe the logical characteristics of each interface between the software product and the users. This may include sample screen images, any GUI standards or product family style guides that are to be followed, screen layout constraints, standard buttons and functions (e.g., help) that would appear on every screen, keyboard shortcuts, error message display standards, and so on. Define the software components for which a user interface is needed.

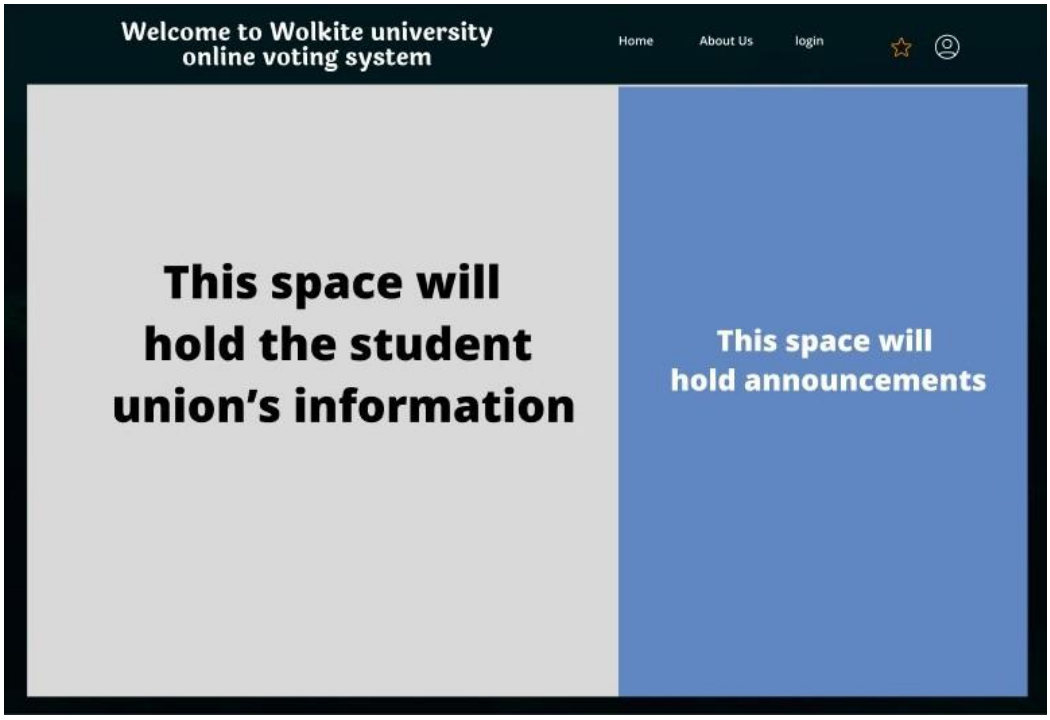


Figure 5-7 Home page UI

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