ONLINE VOTING SYSTEM

CSE323.7: Operating System Design

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1. Abstract:

The project entitled "**Online Voting System**" aims at making the voting process easy in private environment. Presently voting is performed using ballot paper and the counting is performed by the persons, hence it consumes a lot of time. There can be possibility of invalid votes. All these make election a tedious task. In our proposed system voting and counting is done with the help of computer. It saves time, avoid error in counting and there will be no invalid votes. It makes the election process easy. This project is a cyber-voting technique. In this system, the voters who are pursuing in this private sector and the age is above 18 years of any gender can vote for the deserving candidate through online without going to polling booth. The voters can vote without any difficulty.

2. INTRODUCTION

2.1 Purpose and Scope:

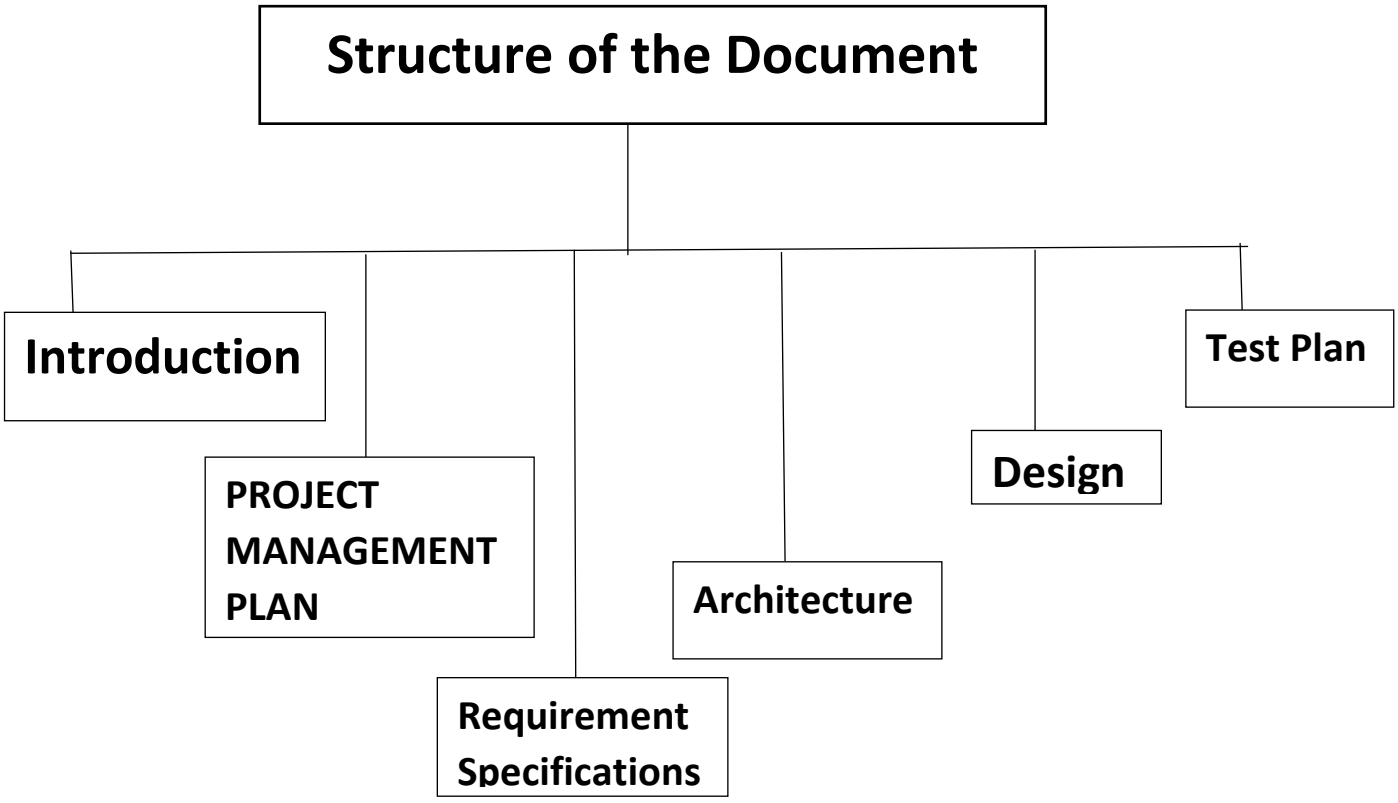
ONLINE VOTING SYSTEM is an online voting technique. In Online voting system a voter can use his or her voting right online without any difficulty. He/she has to be register for voting. After Registration they can go to voting page and vote. The online voting system is an electronic way of choosing leaders via a web driven application. The advantage of online voting you don't have to go physically there and they can have the choice of voting at their own free time and there is reduced congestion. It also minimizes on errors of vote counting. Internet voting system are appealing for several reasons such as People are getting used to work with computers to do all sort of things and they are quite used to of it and its convenient. Increasing number of voters as individuals will find it easier and more convenient to vote. The system can be used anytime and from anywhere by the Voters. No one can cast votes on behalf of others and multiple times. Saves time and reduces human intervention. The system is flexible and secured to be used.

2.2. Product Overview:

Project is related to Online Voting System. The project maintains one levels of users. Just for users/voters. The level of accuracy in the proposed system will be higher. All operation would be done correctly and it ensures that whatever information is coming from the center is accurate.

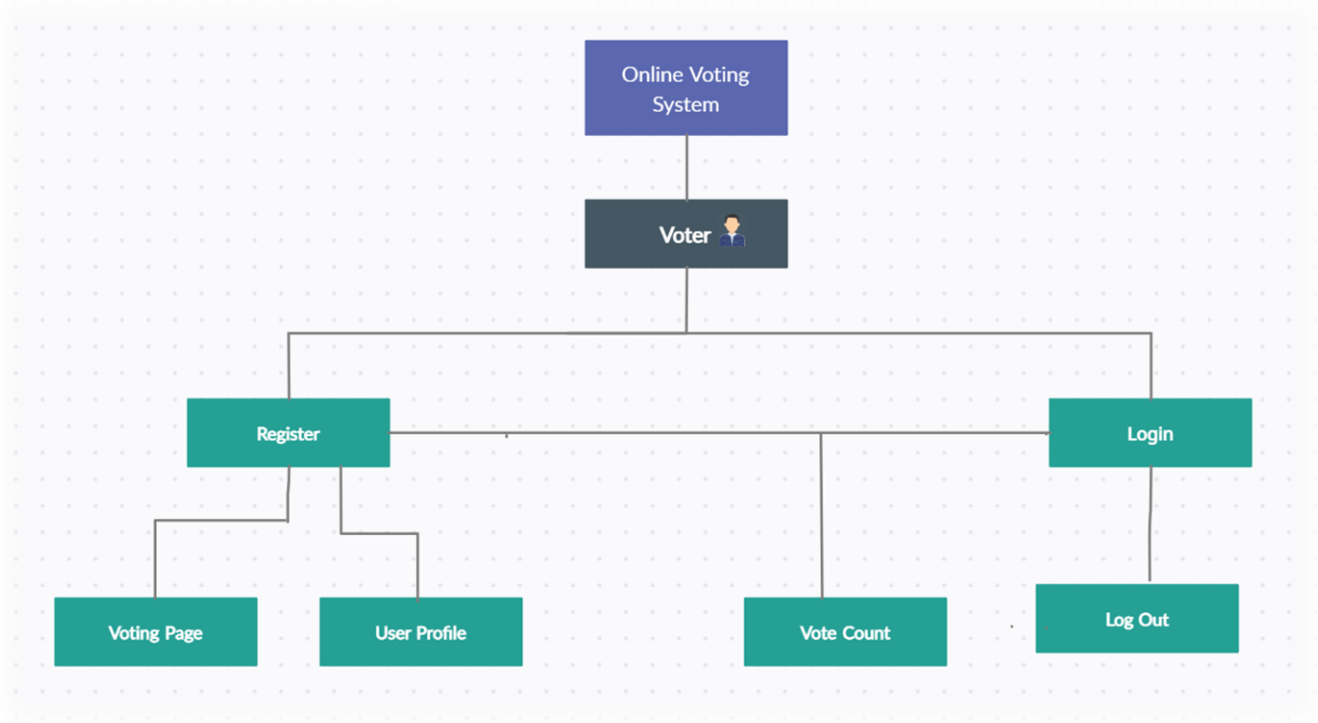
The system should be easy to operate and should be such that it can be developed within a short period of time and fit in the limited budget of the user. It will be providing online voting Management and Update user's profile. There will database to store all of the data as well.

2.3. Structure of the Document:

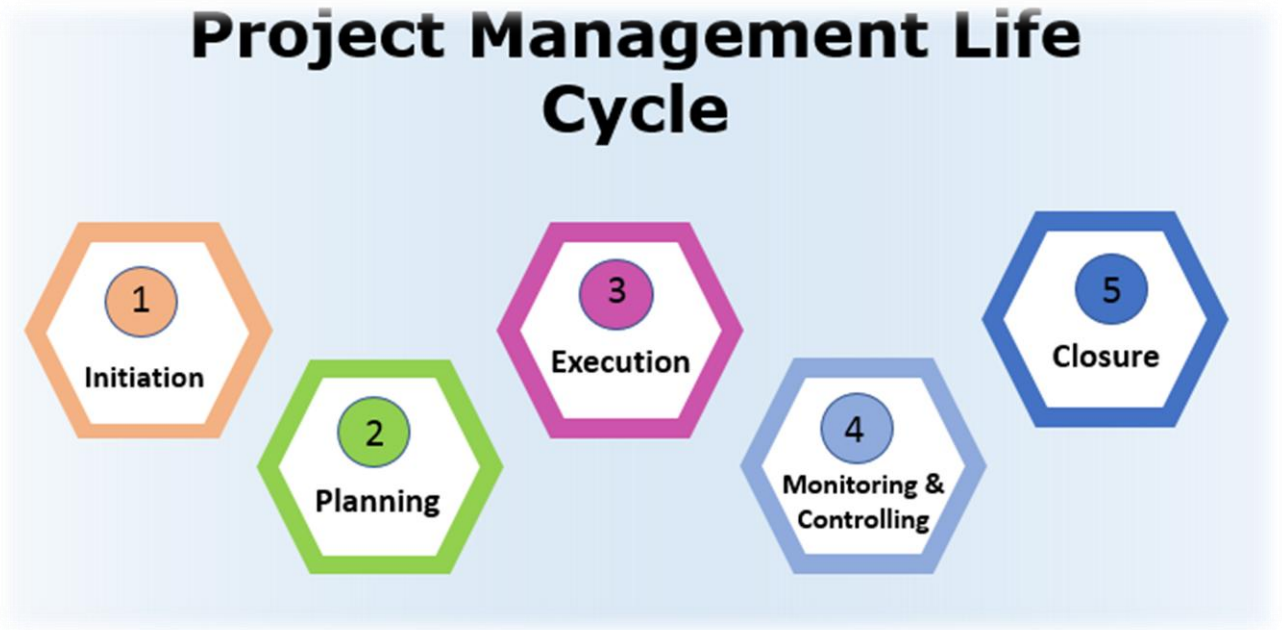


3. PROJECT MANAGEMENT PLAN

3.1. Project Organization:



3.2 Lifecycle Model Used:



3.3. Hardware and Software Resource Requirements:

Development Tool: Java

Database: SQLite

Server: Firebase

Hardware:

i7 Processor Based Computer

Memory: 8 GB RAM

Hard Drive: 150 GB

3.4. Impact of the project on individuals and organizations:

Online voting allows people in today's mobile and digitally advanced society to participate in the democratic process over the internet. The POLYAS online voting system offers the highest levels of transparency, control, security and efficiency of election processes. Online voting provides voters with a comfortable and secure voting experience and allow election organizers to save resources in planning their next election. In "**ONLINE VOTING SYSTEM"** a voter can use his\her voting right online without any difficulty.

3.5. Professional Standard:

This system will provide us with:

- **Security:**
  A secure voting machine means one that cannot be tampered with or manipulated. Security begins with requiring that systems accurately record votes as cast. Physical security of the equipment and ballots: Procedures that ensure that additional votes cannot be cast after the polls have closed or tampered with at any stage of the process, and that there is an auditable chain of custody.
- **Functionality:**

  Correctly registering and recording all votes cast. Permitting the voter to vote for any person, office or measure for which he or she has the right to vote. Permitting a voter to review his or her votes before casting them, and providing the opportunity to change or correct the ballot before it is cast and counted. Also, it eliminates the cost of ballots.
- **Privacy:**

  Voters have a right to a secret ballot and to cast their vote in private. This is necessary to protect voters from being coerced

or bribed into voting a certain way. In the context of a voting machine, this means that the system shouldn't provide a receipt or any way for another person to determine the contents of a voter's ballot.

- **Usability:**

  Casting a ballot should be easy for voters. This means that a voting machine should be as intuitive to use as possible and contain clear instructions regarding how to vote. The way that the ballot is designed and presented—on-screen or on paper—is also important. Ballot design and usability is an integral part of voting system design.

- **Accessibility:**

  By federal law, all people, including those with visual, physical or cognitive disabilities, must have the opportunity to independently cast their votes. Paper is not accessible for many people, either because of vision impairment or because pen and paper are hard to manipulate. As the population ages, the demand for adaptive systems with continue to grow. By federal law, voting systems must also have the ability to provide alternative language accessibility.

3.6. Monitoring, Reporting, and Controlling Mechanisms:

- **Development of Hardware and Software**:
  In the case of the development of new equipment, delays and modifications may occur because intermediate tests show non-compliance with requirements. Delays may increase costs of the technology and also can necessitate actions in other areas of election administration that produce additional costs.

- **Maintenance:**
  Hardware does occasionally malfunction or break down. The cost-benefit analysis. It should include projections of replacement costs, as well as costs of regular services and maintenance of the equipment. The lifespan of the electronic equipment is not indefinite and will depend upon the type of the equipment. Analyses should provide realistic projections of equipment lifespan.

- **Certification:**
  The certification process for electronic equipment and software is an additional cost, because it should be performed by an independent organization and not by the vendor or election authority.

- **Voter Education:**
  The cost of mounting widespread and effective voter education programs addressing the introduction and uses of electronic technologies must be taken into account.

- **Usability Testing:**
  Usability tests aim to determine if voters and polling officials can properly operate the equipment.

- **Voting Servers:**
  In other types of electronic voting, electronic votes are recorded and stored with an electronic voting unit at the polling stations. Votes are then transferred to counting computers, either by network or by transporting them in some type of memory storage device.

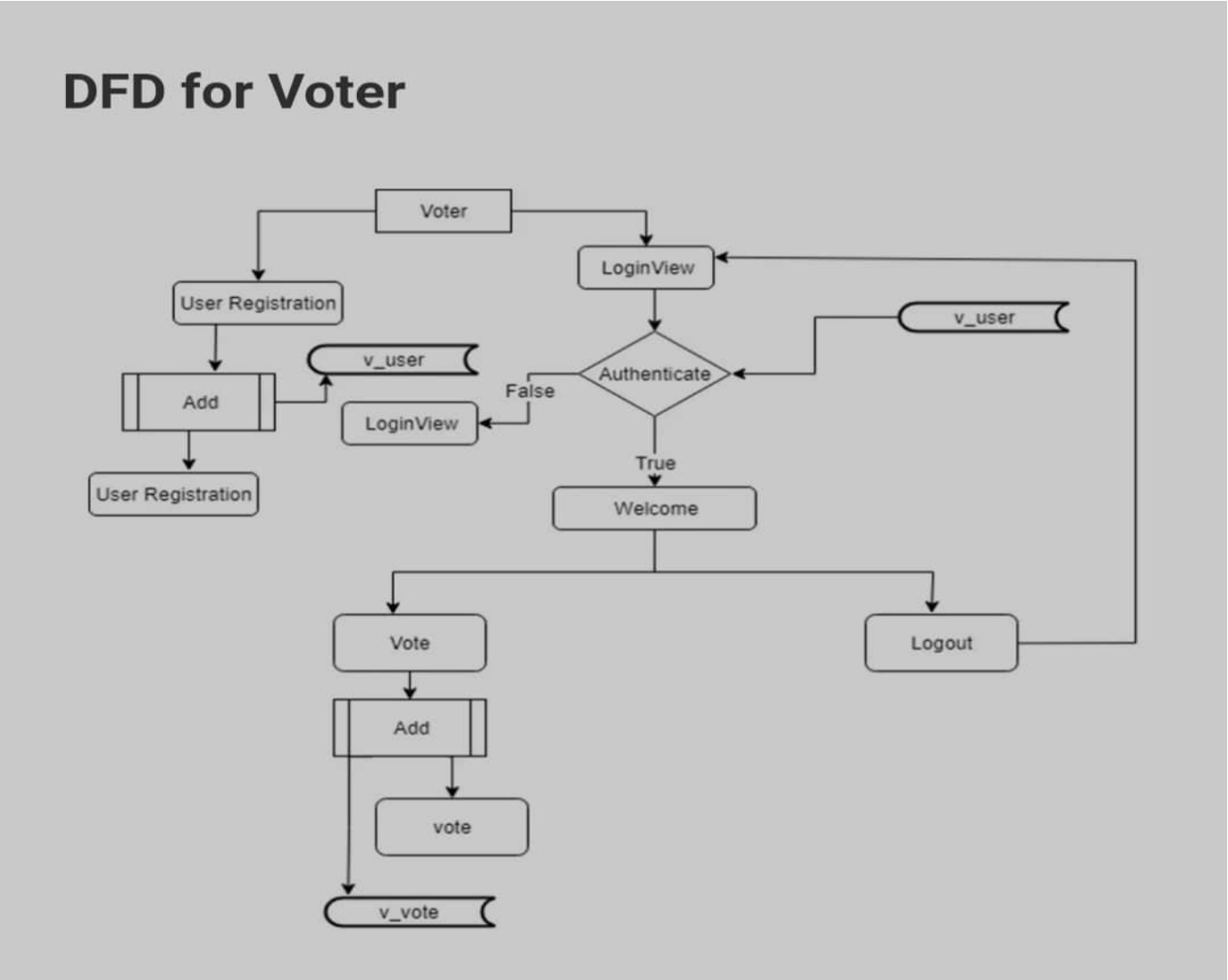
4. Requirement Specifications

4.1. Stakeholders for the system:

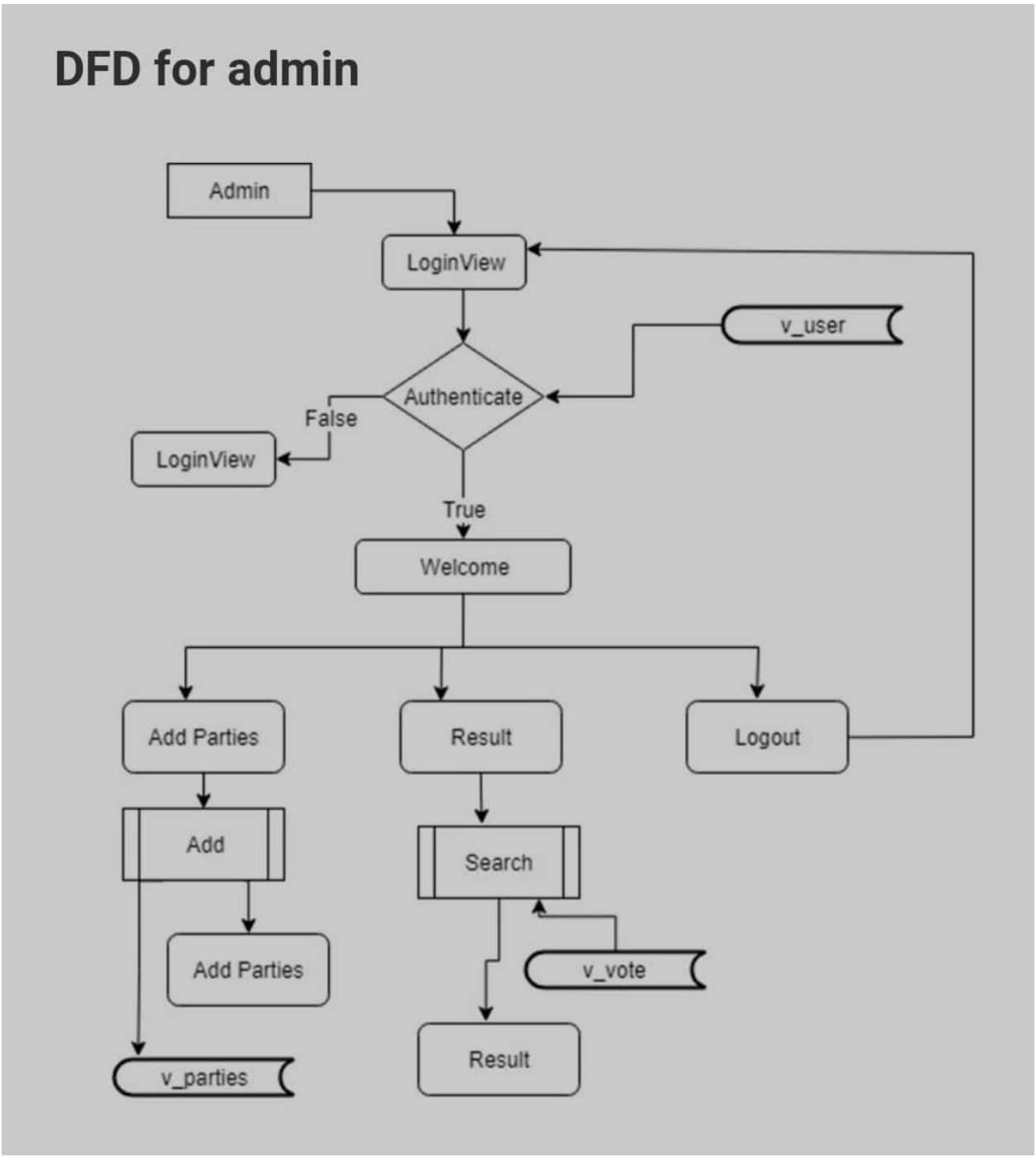
An election can only work if everybody can cast their vote. The election committee or election officer are confronted with the task of motivating as many voters as possible. This task requires a solid argument in favor of the importance of the election, based on the opportunity for voters to participate and to play an active role in shaping the organization into the future

- **Email or postal notifications:** Send out regular updates about the planning progress to all stakeholders – it is sufficient to keep it short yet informative.
- **Be reachable:** Clearly indicate in your updates how you can be contacted. Don't get tired of mentioning that this contact is always available to provide further information.

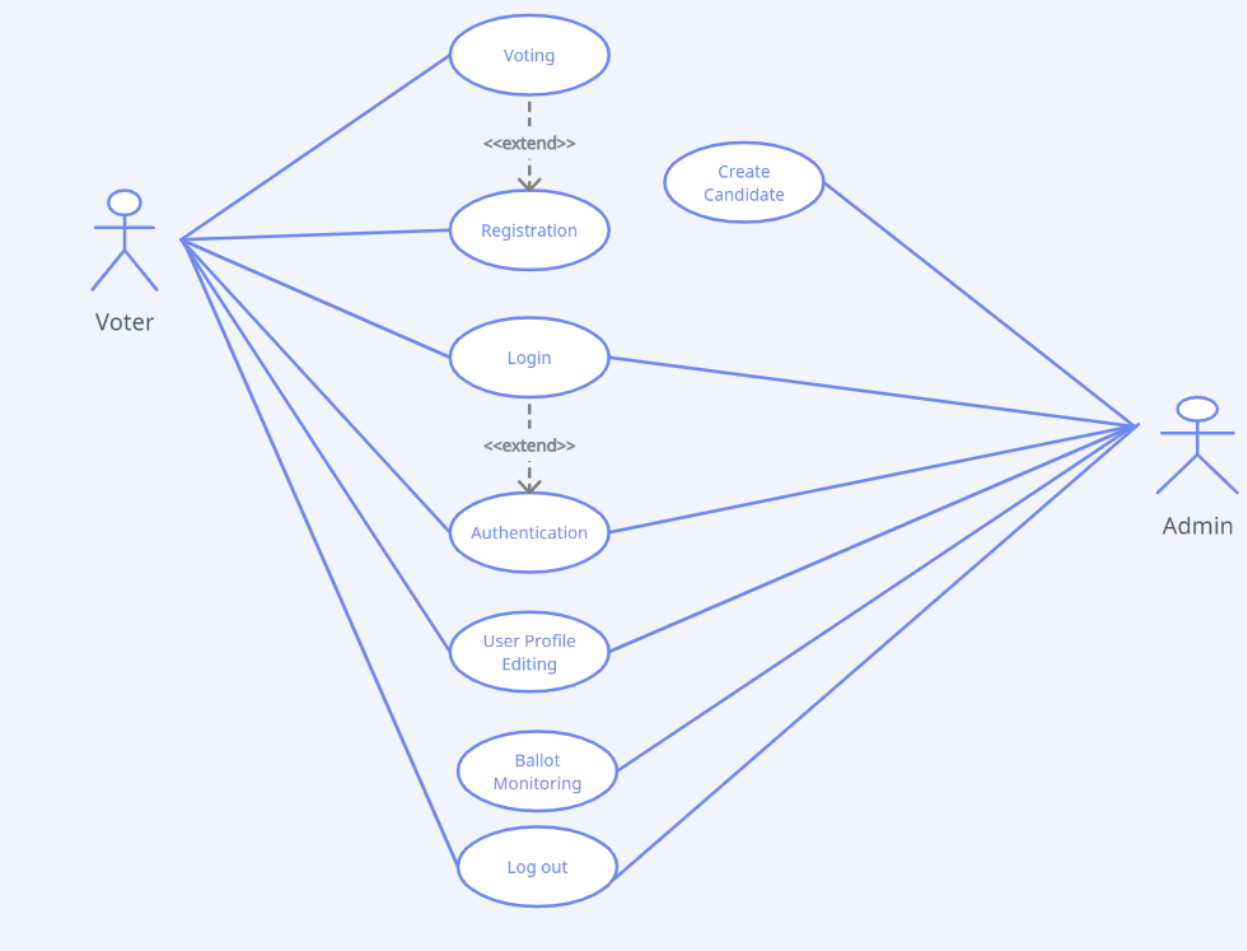
4.2. Use case model/state diagram:



DFD for admin



4.3. Graphic use case model:



4.4. Non-functional requirements:

1. 24 X 7 availability.
2. Better component design to get better performance at peak time.
3. Flexible service-based architecture will be highly desirable for future extension.

5. Architecture

5.1. Architectural style(s) used:

The architectural style used in this project is object-oriented architecture. Object-oriented architecture is one of the foremost architectures for producing software applications. Here, objects are the fundamental and foundational building blocks for the software application. The structure and behavior of software application can be represented through the use of multiple and interoperable objects. The components of the system encapsulate data, the operations that must be applied to manipulate the data, the various properties and the tasks in an optimized and organized manner. Communication and co-ordination between components are accomplished through well-defined interfaces.

5.2. Architectural model:

Object Modeling: Object modeling develops the static structure of the system regarding to objects. It recognizes the objects, relationship between the objects and the classes in which the objects are grouped.

Dynamic Modeling: Dynamic modeling is a way of explaining how single object responds to events. The aim of dynamic binding is to examine the behavior of the object regarding time and external changes.

Functional Modeling: Functional modeling is the last component of the object-oriented analysis. The functional model shows the processes executed in an object and how the data change when it moves between the methods.

5.3. Technology, software, and hardware used:

- **Software:**

SQLite Database:

SQLite Database is an open-source database provided in Android which is used to store data inside the user's device in the form of a Text file. We can perform so many operations on this data such as adding new data, updating, reading, and deleting this data. SQLite is a free source database that stores data in a text file on a device. Android comes in with built-in implementation of SQLite database. SQLite supports various relational database features. The file format is android.database.sqlite that contains the classes to manage the database information. It is widely deployed database engine and used by different browsers, embedded systems (such as mobile phones, tablets etc.) and operating systems. SQLite has also bindings to different programming languages. The several versions of SQLite database depend on the android versions. The SQLite database is used in the project to store the different data and the main purpose to

choose this database is because of compatibility and easy handling of information.

JAVA Programming Language:

JAVA was developed by James Gosling at Sun Microsystems Inc in the year 1995, later acquired by Oracle Corporation. Java makes writing, compiling, and debugging programming easy. It helps to create reusable code and modular programs. Java is a class-based, object-oriented programming language and is designed to have as few implementation dependencies as possible. A general-purpose programming language made for developers to write once run anywhere that is compiled Java code can run on all platforms that support Java. Java applications are compiled to byte code that can run on any Java Virtual Machine. The syntax of Java is similar to c/c++. Java Programming Language is an official language for Android apps Development. Java is a computer programming language that is class-based, concurrent and object-oriented developed by James Gosling in 1995 at Sun Microsystems and now owned by Oracle. Java was originally called OAK. Java is one of the most famous programming languages and in particularly use for client-server applications. The language derives from syntax of C++ and C. The latest version is Java 18 and **Java SE 11.0. 16.1** is the latest release of Java SE 11 Platform. It is also known as a high-level language. JAVA language is especially used in this project because it is efficient and provides more feasibility in the development of an application.

Android Studio:

Android Studio is an official I.D.E (Integrated Development Environment) for Android apps development which is based on

JetBrains' IntelliJ IDEA software. It was introduced on May 2013 at the Google I/O conference. Availability of android studio is free under the Apache License 2.0. Android studio offers more features like developer tools, powerful code editor, testing tools and frameworks etc. which enhance the productivity in the development of an Android application. It is available for Mac OS X, Windows and Linux and also replaced Eclipse Android Development Tool (ADT) which is used in early stages for android apps development. The official supportive programming language for android studio is JAVA. The current android studio version 2.2.2 is used in this project for the development of an android application.

SDK (Software Development Kit):

Fingerprint scanner SDK is advanced feature minutiae-based fingerprint recognition kit that allows developers to add fingerprint verification functionality into different applications. Each scanner device has different SDK's based on different operating system. Android SDK of SecuGen hamster plus device is used in this project. SDK functionality allows reading fingerprints from scanners and performing fingerprint verification. SDK contains fingerprint authentication algorithm for fingerprint Matching and for Fingerprint feature Extractor. The main purpose of SDK is to integrate the scanning device with the tablet and with application. Generally, the SDK is the most important software component for the project.

- **Hardware:**

The hardware components which are going to be used in the development of the system are select according to the requirements to get better result.

Device: Android operating system

SDK: Minimum SDK version 19

API: Android API 32

5.4. Rationale for your architectural style and model:

- Object-Oriented architecture maps the application to real world objects for making it more understandable.

- It is easy to maintain and improves the quality of the system due to program reuse.

- This architecture provides reusability through polymorphism and abstraction.

- It has ability to manage the errors during execution (Robustness). It has ability to extend new functionality and does not affect on the system. It improves testability through encapsulation.

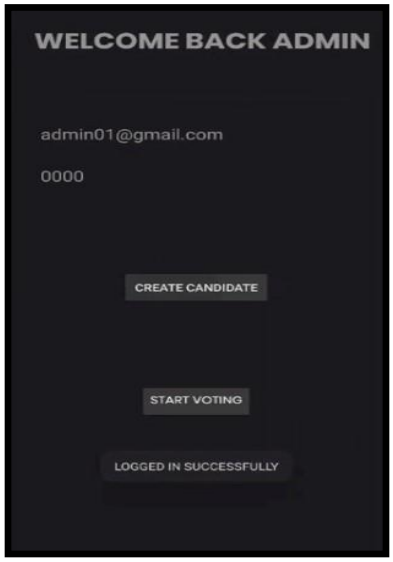
- Object-Oriented architecture reduces the development time and cost.

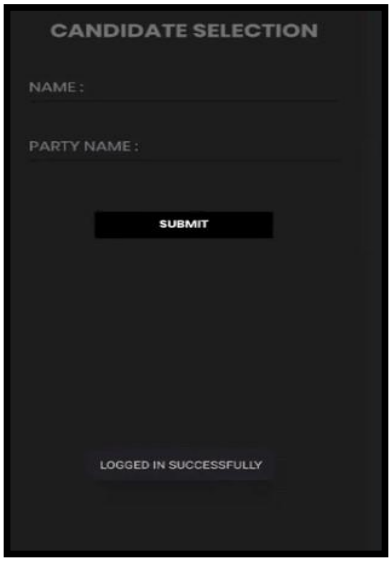
6. Design

6.1. GUI (Graphical User Interface) Design:

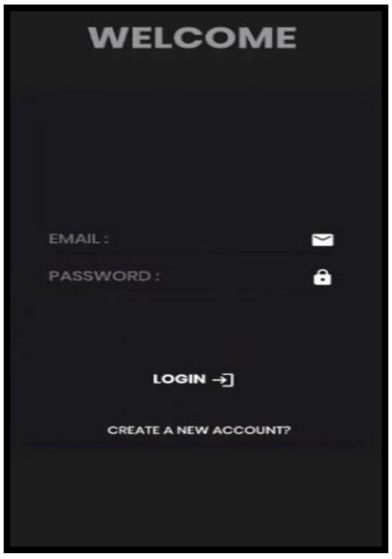
The graphical user interface (GUI) provides friendly front-end environment to make the voting process easier for the voter. The Android framework gives the flexibility for managing and declaring application's interface.

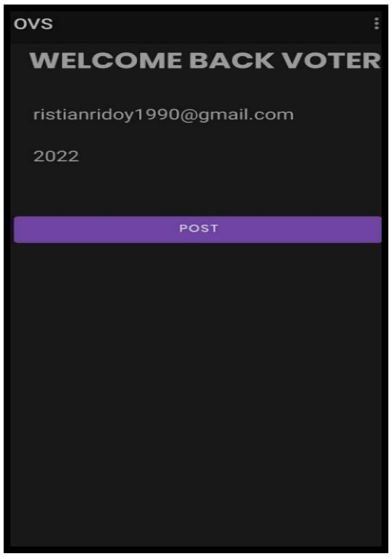
Admin UI:



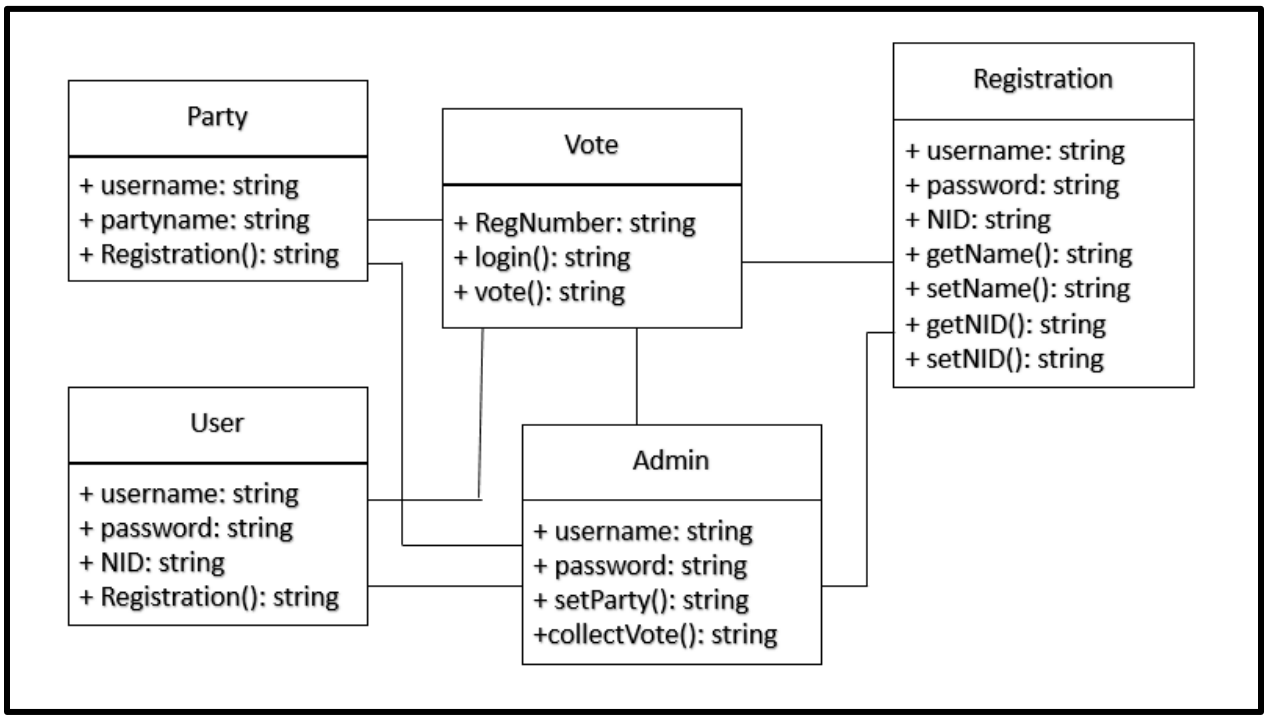


User UI:

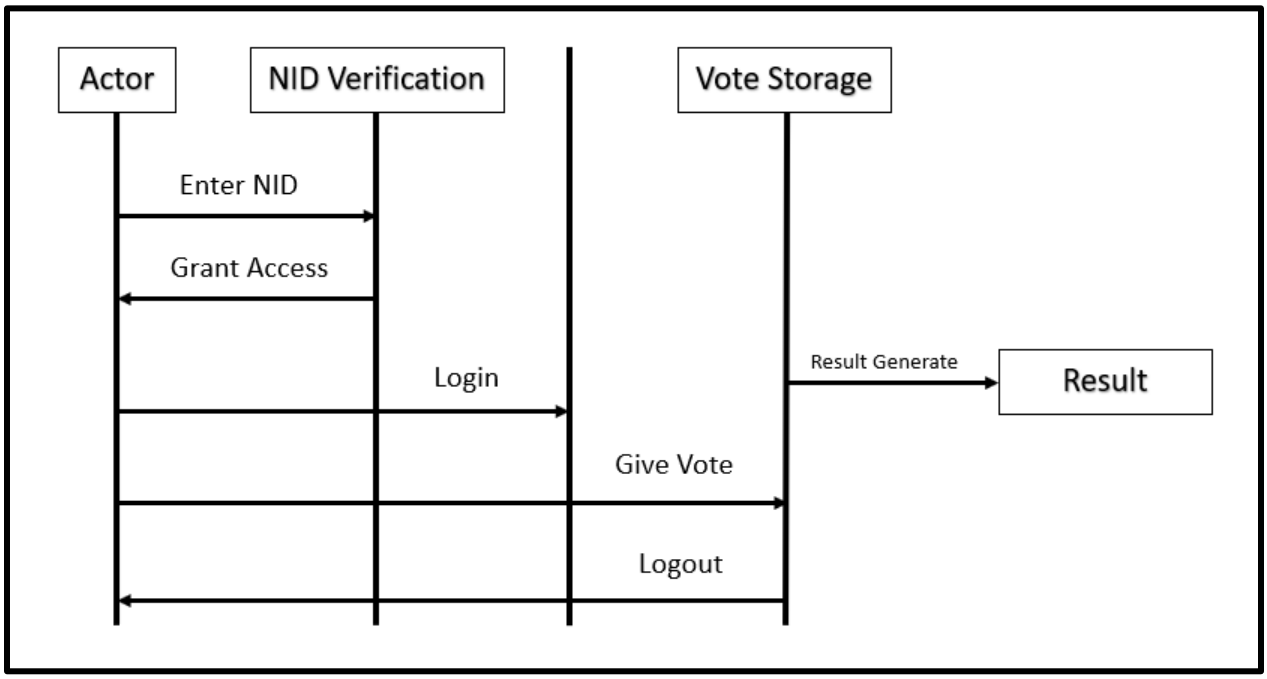




6.2. Static Model - Class Diagrams:



6.3. Dynamic Model – Sequence Diagrams:



7. Test Plan

Testing is the process of running a system with the intention of finding errors. Testing enhances the integrity of a system by detecting deviations in design and errors in the system.

7.1. Requirements based System Level Test Cases:

Unit Testing:

The first level of testing is called unit testing which is done during the development of the system. Unit testing is essential for verification of the code produced during the coding phase.

Functional Testing:

Functional testing happens in the source code, where the system is tested against functional requirements and specifications. It includes the identification of functions that software is supposed to do, data input and output. During functional testing, actual system usage is simulated. The idea is to come as close as possible to real system usage and create test conditions that are related to user requirements.

Usability Testing:

Usability testing combines testing for functionality as well as overall user experience. Usability testing involves ensuring all functions of the application will be examined. Run the test under the observation of experts. Analyze the results and improve the application.

Interface Testing:

Interface testing ensures that all interactions between the web server and application server interfaces are running smoothly.

This includes checking the communication processes as well as making sure that error messages are displayed correctly.

Compatibility Testing:

Compatibility testing ensures if the application is compatible with all browsers and devices. It checks Browser compatibility by making sure that the application is functioning correctly across the different browsers. It also checks if authentication requests are working as designed or not.

Performance Testing:

Performance testing includes testing the application under different internet speeds and how it behaves under normal and peak loads (load testing). Determine the breaking point of the application. Testing for resiliency is a crucial activity to find out how the application behaves under stress before the users do.

Security Testing:

Security testing makes sure that the application is protected against unauthorized access and harmful actions through viruses or other malicious software.

7.2. Techniques used for Test Generation:

1. Unit testing and Functional testing is performed by the programmer.

2. Usability testing is done by getting external testers (android studio).

3. Interface testing is performed by the team. By using the Systems Requirements document, the System Architectural Design and Detailed Design Documents as its sources.

4. Performance testing performed by getting external testers (android studio), putting under increasing amounts of stress until it ceases to function (stress testing).

8.Reference

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