Elections Management System

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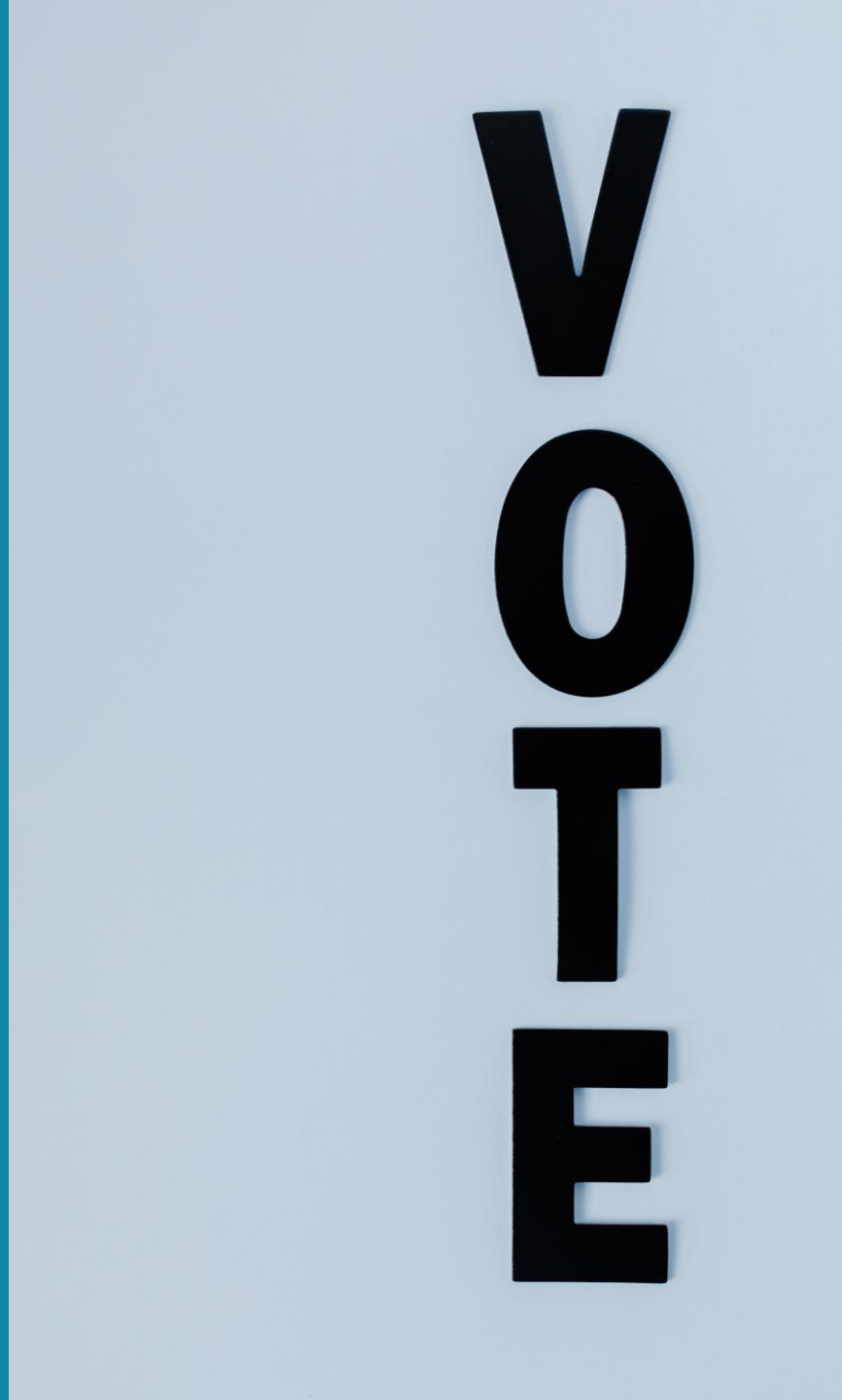


Agenda

- Project Plan
- Software Requirement Specification
- System Design
- System Testing

Project Plan

- Problem and Solution
- Feasibility and Risk Assessment

Problem

- The current election system adopted by GECOM is not automated.
- Votes are cast on poll paper.
- Validation and verification are administered manually.
- This method of operation makes it time consuming and raises the probability of invalid votes caused by human errors.

Solution

An Elections Management Software that is both simple and secure.

- The software undertakes extensive checks on the personal information(identification and medical documents) of prospective voters to identify if these persons are eligible to vote.
- When the system detects duplicate votes, it overwrites the primary vote and alerts the client.
- The system will examine a person's medical history to identify whether or not they are deceased so that administrators will be notified of voter fraud.
- The application's administrative nature allows for the authorized personnel to identify and declare abstentions.
- Given the appropriate permission from users (voters), the system will be able to access and secure the information provided.

Feasibility Report

Public Perception:

- The older population may not be as open to a new method of voting.
- The public may feel less informed since most of the voting process happens behind the scenes.

Environmental effects:

- Reduces carbon emissions since fewer people are commuting to polling stations

Resources needed:

- Less human resources are required as opposed to the traditional voting method.

Feasibility Report contd.

Financial Costs:

- Domain for website
- Salary for software developers
- Patent for the EMS
- Devices for developers
- Salaries for penetration testers
- Google Cloud Services

Legal Restrictions:

- In the Representation Of The People Act, part 1, section 3, subsection 1, it testifies that voting is done through a secret ballot. In part 5, section 38, subsection b, of the same act, a ballot is defined as a sheet of paper. These restrictions, if not changed, would invalidate any voting done on this application.

Risk Analysis

Security Concerns

- Security concerns may arise in terms of the data which has to be collected and processed for voting.
- There would be a 4 in 5 chance of a system being rigged at a general election as the rate of cybercrimes has risen drastically over the past five years.

Risk Reduction Strategies

- Penetration testers are implemented to test the voting system for vulnerabilities.
- The system will be executed on a private network to mitigate the occurrence of unauthorized access
- An incident response team will be readily available to effectively deal with each instance of the security breaches

Risk Analysis contd.

Data Collection

- Inaccurate data may be entered into the system by the users when logging in or during use.

Risk Reduction Strategy:

- Various validation checks are put in place to ensure that all the data entered by the user are accurate

Novices

- The elections management system is mainly implemented to move away from the traditional, paper-based method of voting to a more efficient, computer-based method.

Risk Reduction Strategy:

- To factor in persons who may not be very au fait with computerized systems, the system will be made user friendly where systematic beta testing will be done to ensure that it is so.

Risk Analysis contd.

Time Estimation

- The timeline for the creation of each phase of this system may extend due to unforeseen circumstances.

Risk Reduction Strategy

- A project schedule with strict deadlines is implemented to ensure that all phases are completed within a suitable time frame.
- By thoroughly planning the schedule and through constant tracking of events, the problem's likelihood of occurring is reduced.

Networking Issues

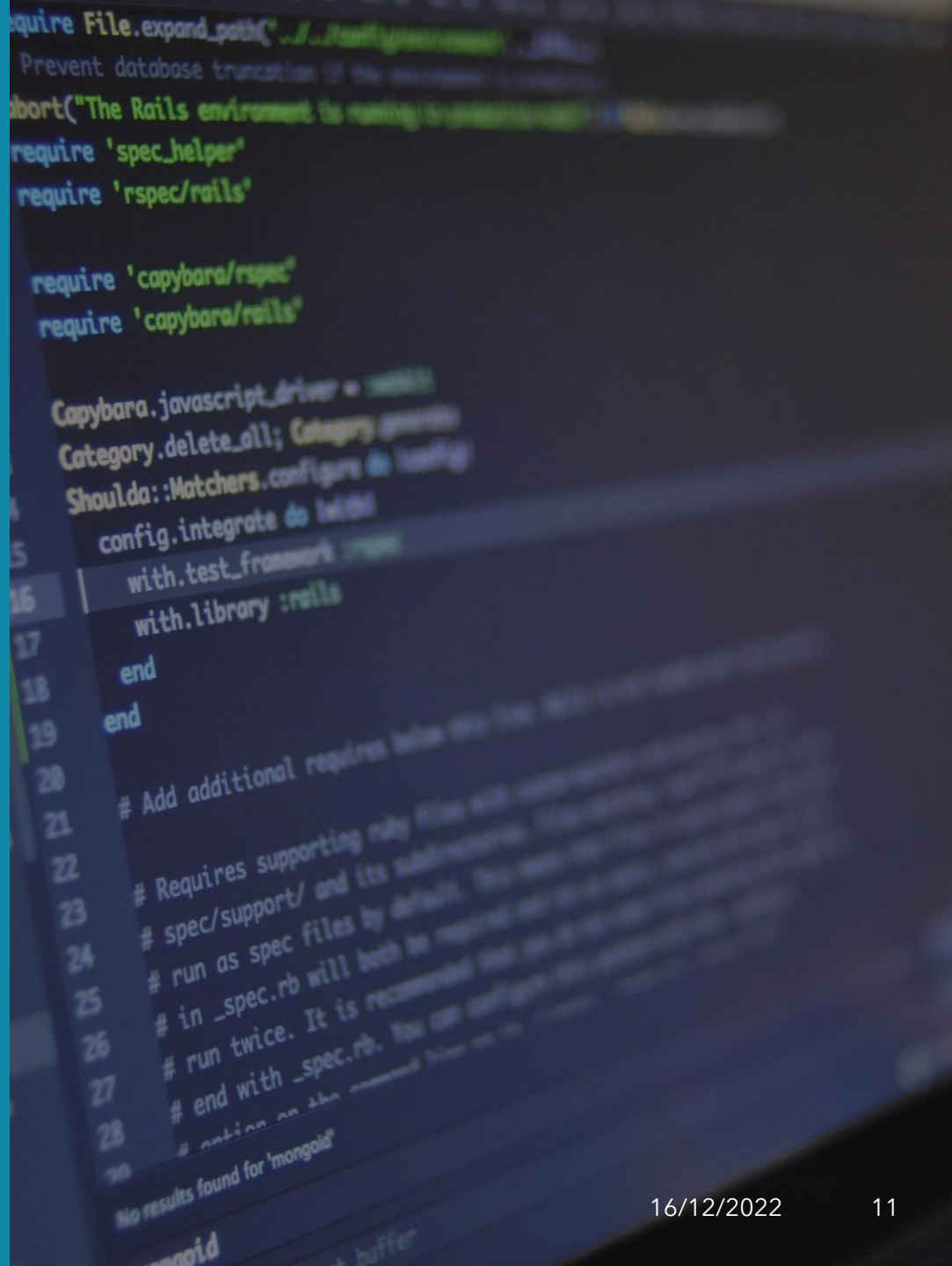
- A "system crash" is a frequent problem for many online systems with a 3.9/5 probability, where the system experiences a drastic pause or cease in its functionality This is due to traffic and other network-related issues which would disrupt the flow of the voting process.

Risk Reduction Strategy

- Equipment is kept in an accommodating environment.
- A team is assigned to calm the upset or worried voters, providing reassurance to them and
- Firewalls are used to block unwanted traffic

Software Requirements Specification

- Functional Requirements
- Non-functional Requirements



Functional Requirements

- The system should allow the user to create a new account if they don't already have one
- The system should authenticate user login using the two-step encryption login mechanism
- The system should allow the user to upload ID documents
- The system should compare the ID information with the information given by GECOM and the government to ensure there is no fraud
- The system should deny access to anyone who doesn't meet the voting criteria e.g under 18, has voted already, is not on the voters' list, or insufficient ID proof

Functional Requirements contd.

- The system should allow the user to access the home page and dashboard upon successful verification of ID
- The system should allow the user to cast votes and display election results upon entering the dashboard
- The system should allow the admin to make changes that would fix any unexpected events
- The system should allow the election authorities to generate results
- The system should allow the election authorities to publish results

Non-functional Requirements

Performance requirements:

- Workload and response time
- Platform and scalability

Safety requirements:

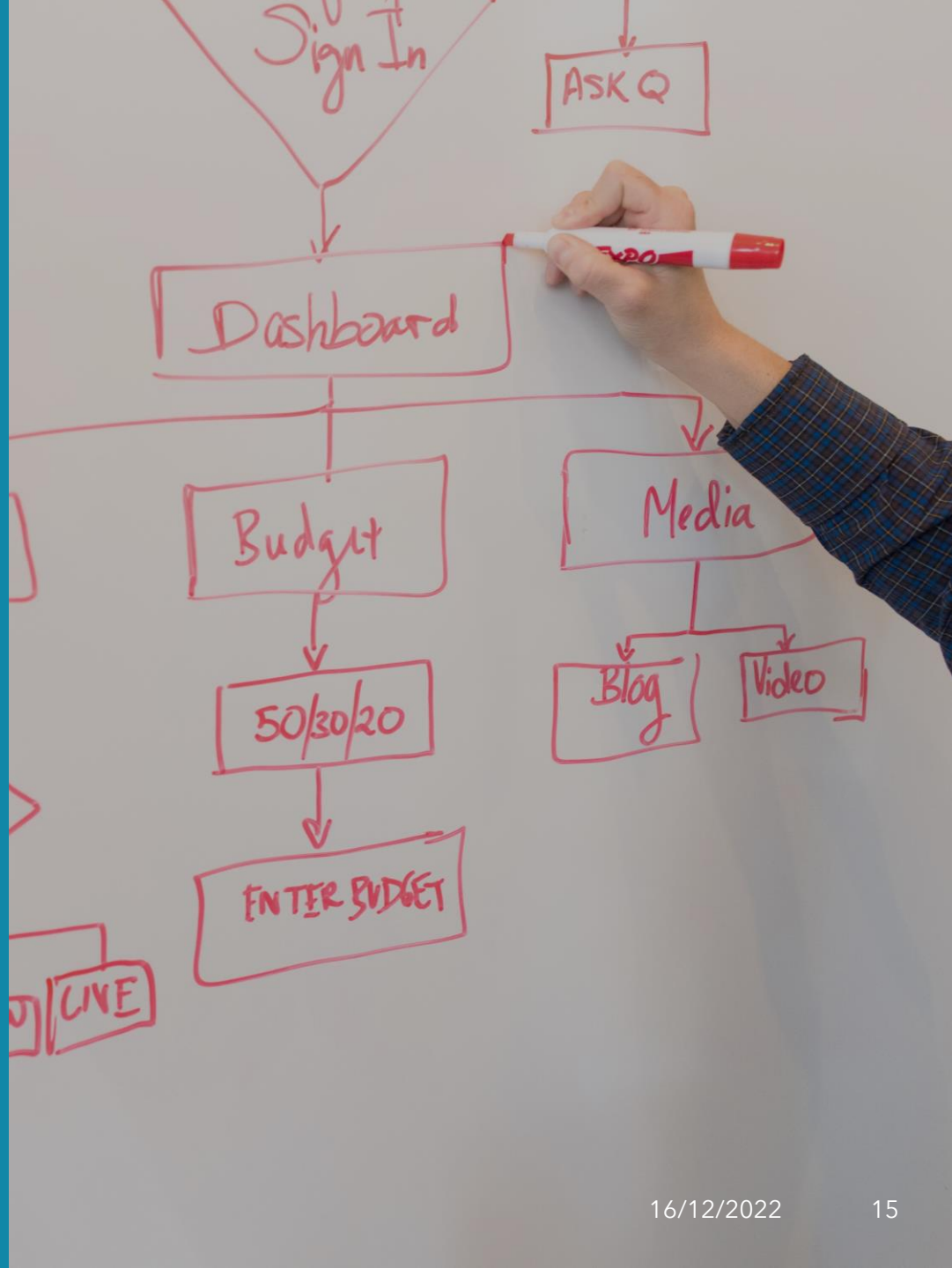
- Confidentiality
- Integrity

Software quality attribute:

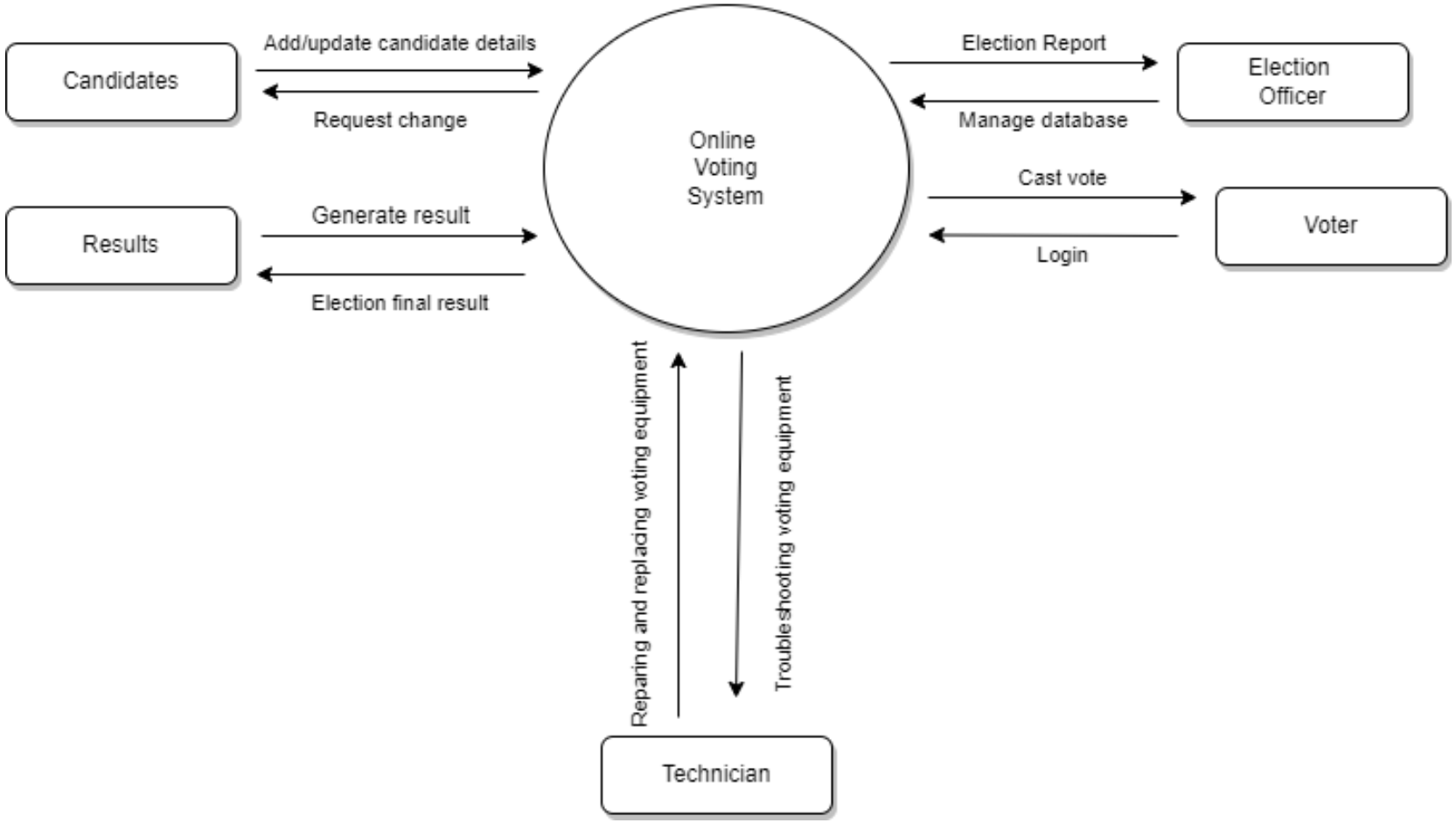
- Maintainability
- Usability
- Speed
- Portability
- Robustness

System Design

- Context Diagram
- Use Case Diagram
- Class Diagram
- System Architecture

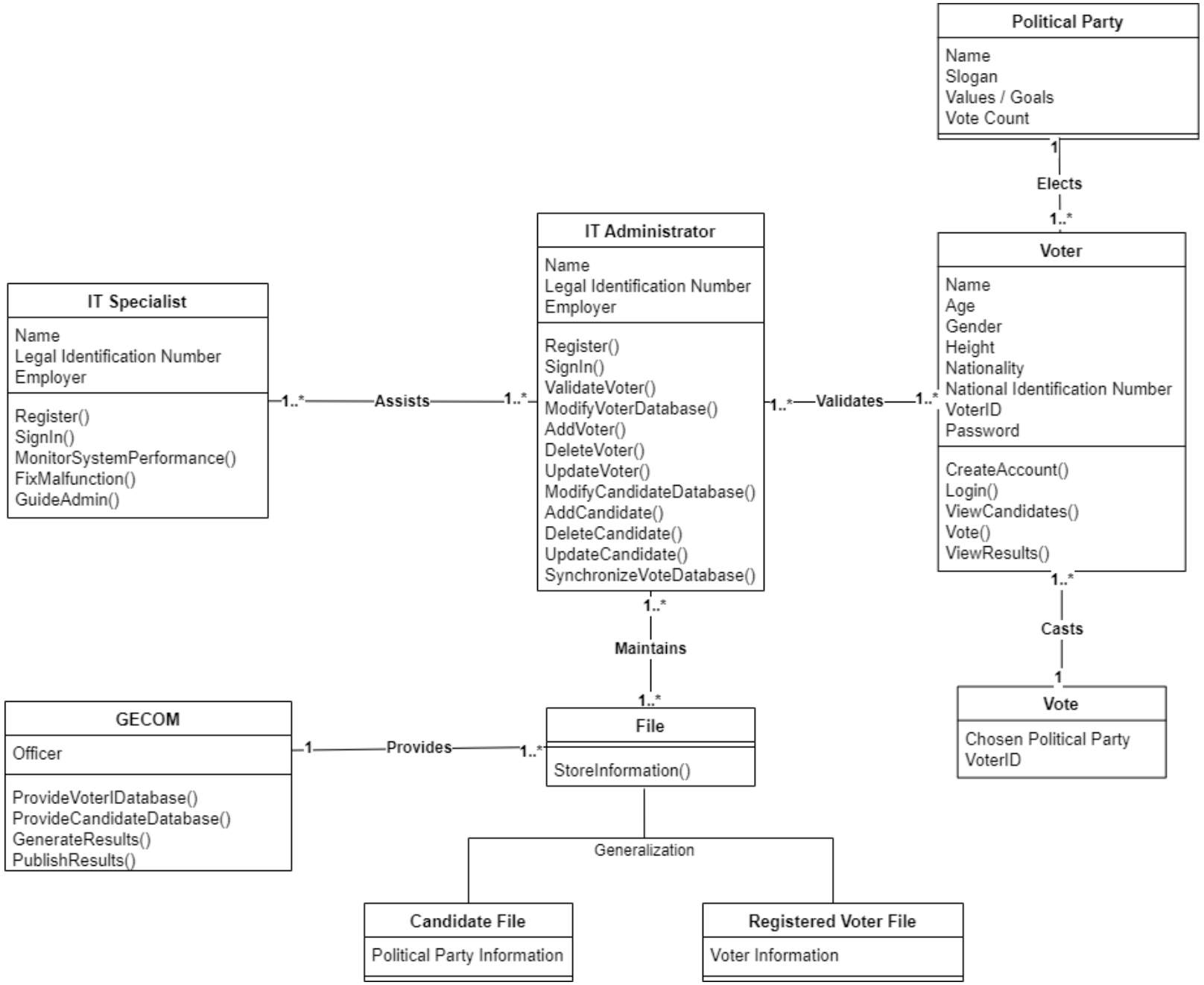


Context Diagram



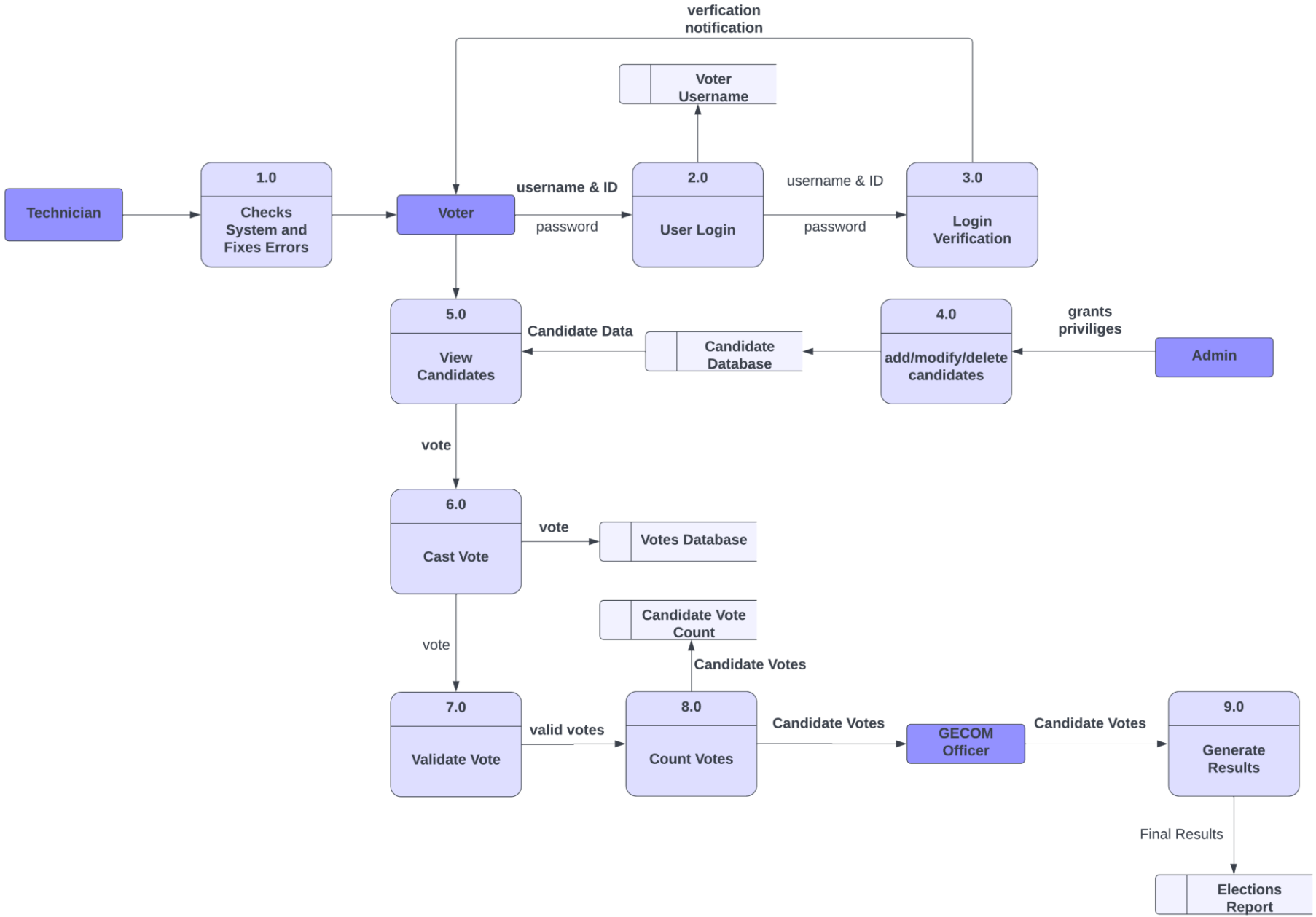
Use Case Diagram

Class Diagram



Data Flow Diagram

This diagram effectively shows how data is collected and processed throughout the system



System Testing

- Test Case Two (2) - TC_IU_2

TC_IU_2

Test case ID: TC_IU_2

Test priority: High

Test Title/Name: Deny Access to Invalid User

Test Summary: After deciding that the user is an invalid voter, the system must deny access to that user.

Pre-conditions: The system should be able to successfully accept user input into the respective registration fields.

The system should be able to allow users to successfully cast a vote.

TC_IU_2 contd.

Dependencies:

- System must have access to the voters list on GECOM's database which should be working without any issues or bugs.
- Function to compare user ID to ID in the GECOM voter's database to check eligibility must be ready and free of bugs or issues before testing.
- The system must be able to confirm votes casted and afterwards add the voters to a section of the database that contains persons who have already voted. (This serves to prevent double voting.)

TC_IU_2 contd. (Test Steps)

1. Information pertaining to the user's personal information is entered into the appropriate registration fields.
2. Information that indicates the user is underage is provided into the registration fields, and the system should be able to identify and highlight this issue.
3. Information indicating that a person does not exist on GECOM's voters' list is entered into the registration fields, and the system should be able to compare the information with GECOM's database and flag this problem.
4. Information suggesting that someone that has already voted is entered into the registration fields and the system should be able to compare this information with the database consisting of persons who have already voted.
5. Information is entered into the registration fields along with inadequate or no ID proof and the system should be able to detect and flag this issue.
6. The system notifies the IT administrator of each suspicious activity listed prior, and the administrator refuses access to those invalid users.

TC_IU_2 (Test Data)

Name	Jane1 Doe2
Age	146
Gender	Goose
Height	1094cm
Nationality	Atlantean
National ID Number	00000000000

Table 1. Showing voter information provided during registration

Figure 1. Showing scan of ID card provided by user

TC_IU_2 contd. (Expected Results)

When the user attempts to submit the above personal information:

1. The system should first compare it to the information on the Voters List.
2. The system should then flag the attempt as invalid and alert the IT Administrator.
3. The IT Administrator should examine the information provided and reject the account.
4. After the IT Administrator rejects the account, the system should present an error message to the user when they attempt to login with their voter ID.

Post Condition: The system should return to the login page, having notified the user of their rejection and deleting the information they submitted.

Thank you

Questions?