Malaysian-Japan International Institute of Technology

SECD2613-15 System Analysis Design

PROJECT P3

Lecturer Name: Dr. Saidatul Hamidah binti Abd Hamid

Name	Matric number
Salma Annis binti Abdul Rahman	A23MJ8005
Nur Uzma Umaira Binti Awang Harisfadillah	A23MJ8025
Muhammad Nabil Danish bin Ahmad Khir	A23MJ8007

Table of Contents

1 Overview of the Project

1.1 Executive Summary

The online voting system is built mainly to revolutionize the traditional voting process in the country by implementing a secure, efficient and transparent digital system. The project utilized the latest technology to authenticate voters' identity and eligibility via thumbprint and identification card to protect their data with extra security, distribute digital ballots, and tabulate results of the poll in real-time settings. This system will also address the prevalent issues of election fraud.

1.2 Background

Election fraudulent is an illegal activity that happens when manual elections are in used. Some of its common cases are double voting, ballot stuffing and tampering with calculation for result tabulation. To terminate these fraudulent election cases, a system where it’s completely digital is the only solution to stop unethical people from tampering with election results and processes. The Online Voting System is fully controlled by computers from authenticating user up to ballot creation and distribution until result tabulation. The system will be protected with a unique security system that won’t be defeated by any cyber threat.

1.3 Objectives

- To protect the voting integrity from being tampered by unresponsible organization
- To ensure transparency of election result for a fair outcome
- To protect the security of user data from being spread widely
- To make the system accessible and convenient to everyone around the globe.

2 Problem Statement

Conventional election systems are susceptible to fraud such as vote stuffing, double voting, and tampering with election results. The integrity of elections is in danger, and public confidence in democratic processes is being undermined by these dishonest practices. Furthermore, the manual nature of these systems frequently causes inefficiencies and delays in the tabulation of results and vote counting. A safe, transparent, and effective voting system is desperately needed to avoid these problems and simplify the election procedure.

To overcome these obstacles, the Online Voting System (OVS) offers an entirely digital platform for holding elections. To maintain vote authenticity, this system will generate and distribute digital ballots, ensure secure voter authentication through biometric and ID verification, and offer real-time result tabulation to improve transparency. Voting will become accessible and convenient for everyone,

regardless of location, with the adoption of OVS, which will also safeguard the confidentiality of voter data.

Key Challenges:

- Election Fraud: Eliminating double voting, ballot stuffing, and result tampering.
- Security: Ensuring the confidentiality and integrity of voter data.
- Transparency: Providing real-time, accurate election results to build public trust.
- Accessibility: Making the voting process convenient and accessible for all eligible voters.

The successful implementation of the Online Voting System will modernize the electoral process, making it more secure, transparent, and efficient while maintaining the highest standards of data protection and accessibility.

3 Proposed Solutions

In order to improve the electoral process and address the issues raised, the Online Voting System (OVS) will put the following fixes into practice:

1.0 Secure Voter Verification:

a. Biometric Verification: To make sure that every voter is individually recognized and verified, use thumbprint recognition technology. This stops the same person from casting more than one vote.

b. Identity Card Integration: Make sure that only eligible voters cast ballots by cross-referencing voter identities with official identification cards

2.0 Creation and Distribution of Digital Ballots:

a. Secure Ballot Creation: Create digital ballots that, following successful authentication, are distributed to voters using their individual user IDs in a secure manner.

b. Encryption from beginning to end: Use strong encryption techniques to safeguard the integrity of ballots during production, distribution, and submission, making it impossible for votes to be tampered with.

3.0 Real-Time Result Tabulation:

a. Automated Vote Counting: Utilize algorithms to count votes automatically as they are cast, minimizing the chance of manipulation and human error.

b. Transparent Reporting: Ensure that the voting process is transparent and that voters can follow the results of the election as they happen by providing real-time updates on the results through the OVS platform

4.0 Robust Security Measures:

a. Data encryption: To safeguard all sensitive voter data and communications, use advanced encryption standards (such as AES-256).

b. Intrusion Detection and Prevention: To identify and stop unwanted access attempts, use real-time network monitoring tools such as Snort.

5.0 User Convenience and Accessibility:

a. Multi-Platform Support: To accommodate a wide range of user preferences, make sure the OVS platform is available on computers, tablets, and smartphones.

b. User-Friendly Interface: Create a user interface that is simple to use and intuitive so that anyone, regardless of technical ability, can vote more easily.

c.

6.0 Comprehensive Training and Support:

a. Training Programs: Provide comprehensive training resources to teach voters and election administrators how to utilize the OVS, such as user manuals and video tutorials.

b. Technical Support: Assist users with any problems or inquiries they might have during the voting process by forming a specialized technical support team.

7.0 Compliance and Legal Adherence:

a. Legal Consultation: Make sure the OVS complies with all applicable national and international election laws, privacy standards, and data protection laws by working with legal professionals.

b. Open-minded Policies: To gain the trust of voters, make all policies and procedures pertaining to data handling, user privacy, and election integrity clearly understood.

4 Current Business Process/Workflow

a. Voters can login on the OVS using their IC number as included in the database. The system will then identify the voter's name, age, as well location of voting to generate the ballots for the voter.

b. Admins of the program can retrieve the total vote count concurrently as voters cast their votes. The system automatically calculates the number of votes more efficiently and accurately with little to no error.

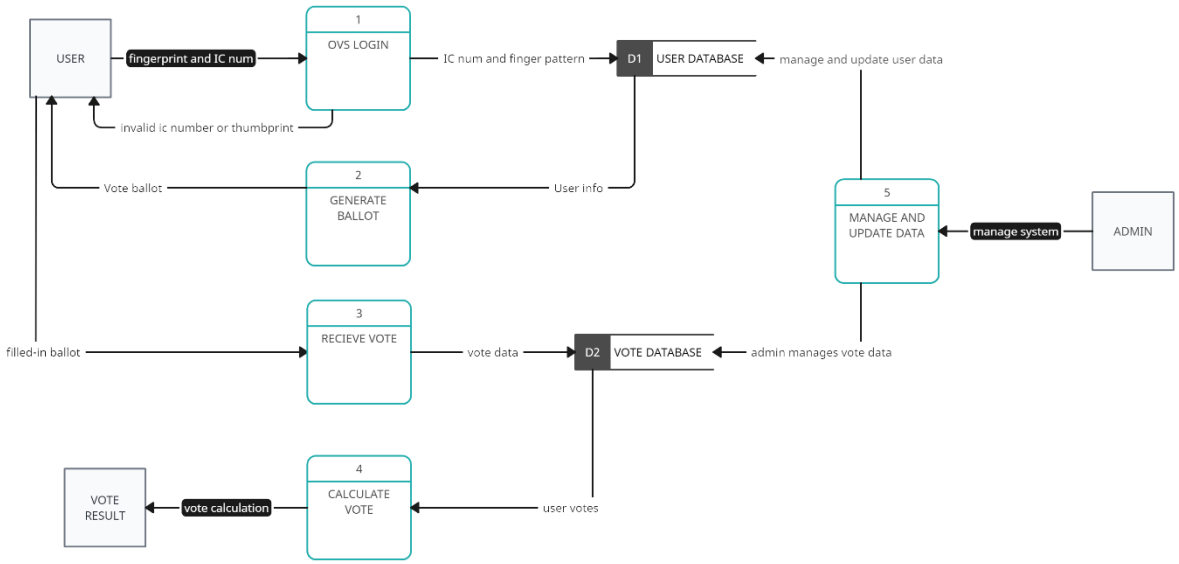
c. The OVS will prevent any fraudulent voting as the system will request authentication through the user's device and IC number. Voters are prohibited from voting twice and if caught for fraud, legal action will be taken.

d. Ghost votes can be prevented as the system won't allow the user to exit out of the system without an input.

e. The politicians competing for seats will not be allowed to vote. Entering their IC number will identify them as part of the election and will only display their electoral information.

f. The OVS will available on mobile platforms which increase the mobility of users to vote at anywhere they may be.

5 Logical DFD (AS-IS)

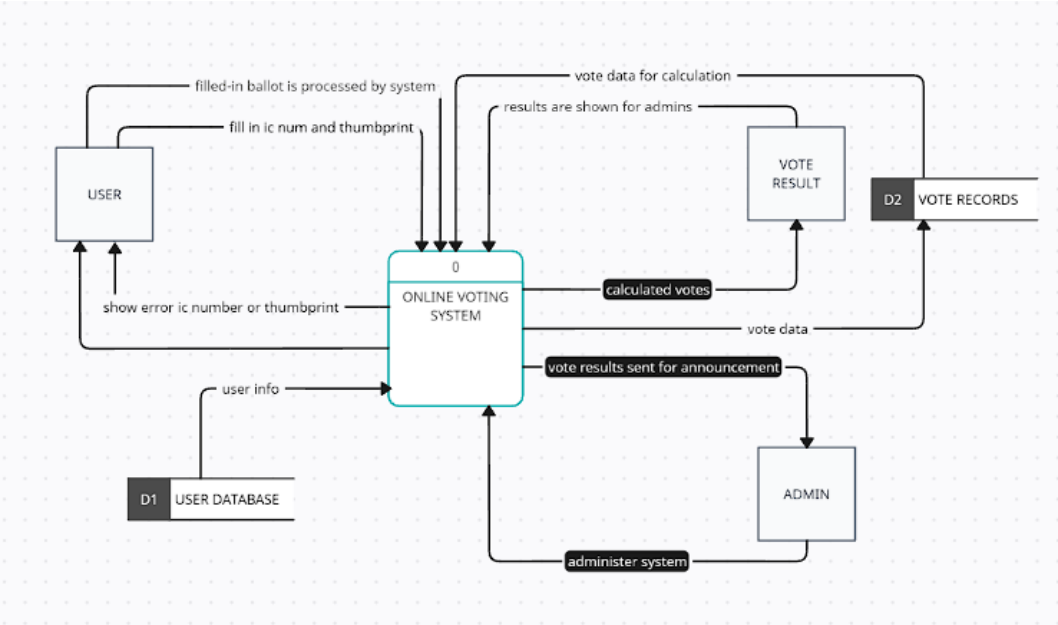


6 System Analysis and Specification

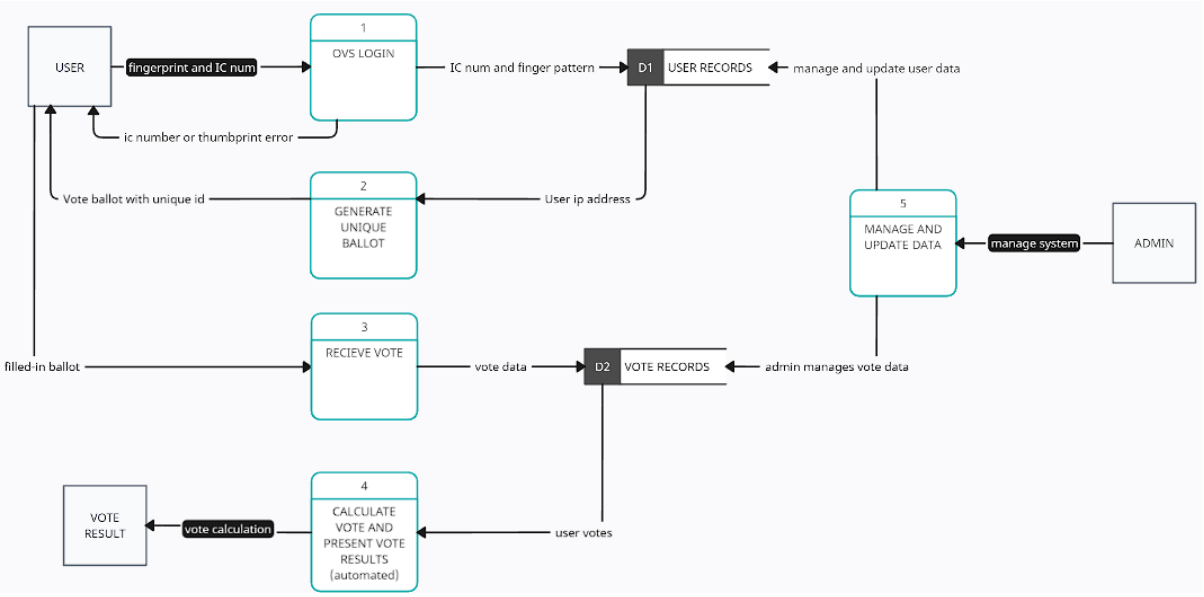
There are various methods used to identify the process and flow of the developing system. By creating data flow diagram, we are able to identify the requirements needed and the specifications for our system to function properly.

6.1 Logical DFD TO-BE system (Context Diagram, Diagram 0, Child)

6.1.1 Context diagram

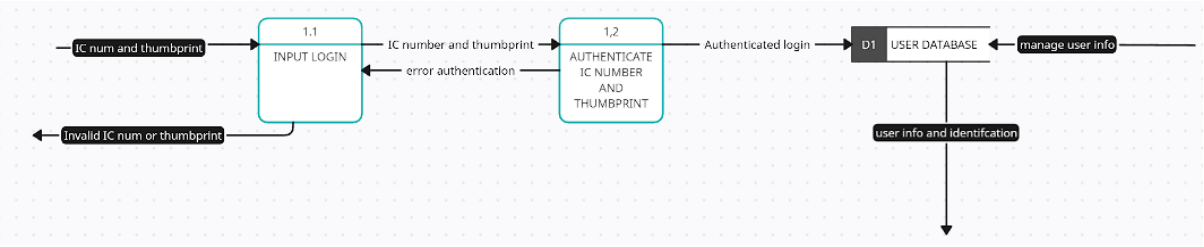


6.1.2 Diagram 0

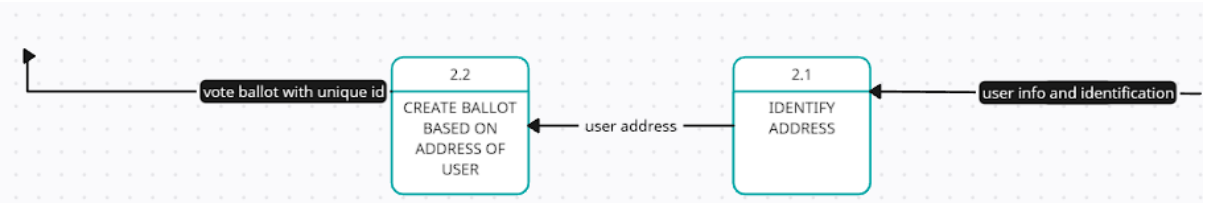


6.1.3 Child diagram

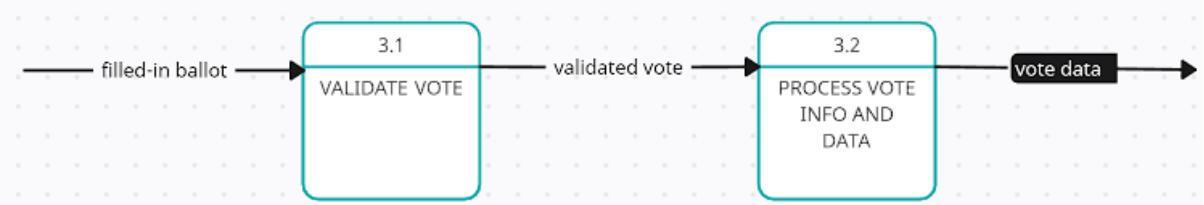
1. OVS login



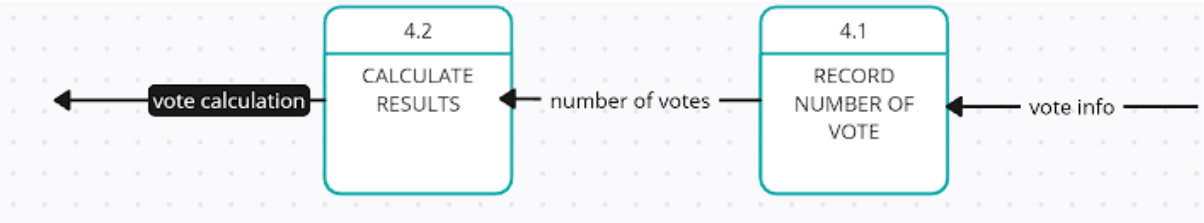
2. Generate ballot



3. Receive vote



4. Calculate vote



6.2 Process Specification (based on Logical DFD TO-BE)

6.2.1 Structured English

Start OVS module

Read user IC number and thumbprint

Repeat

If user IC number and thumbprint invalid

Print “IC number or thumbprint invalid, please try again or ask assistance from admins”

Else

Proceed to voting screen

END repeat

Read user address

Generate ballot

Print candidates based on user’s zone

Input user vote

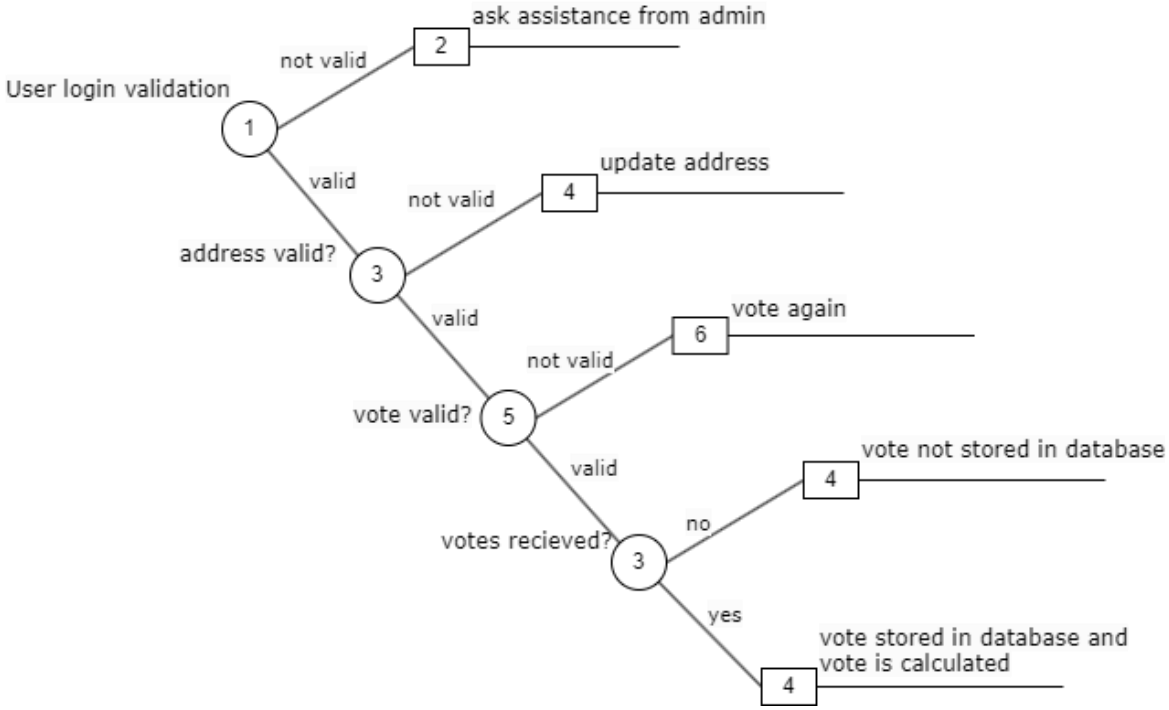
Store vote data in database

Calculate votes

Print vote calculation

End OVS module

6.2.2 Decision tree



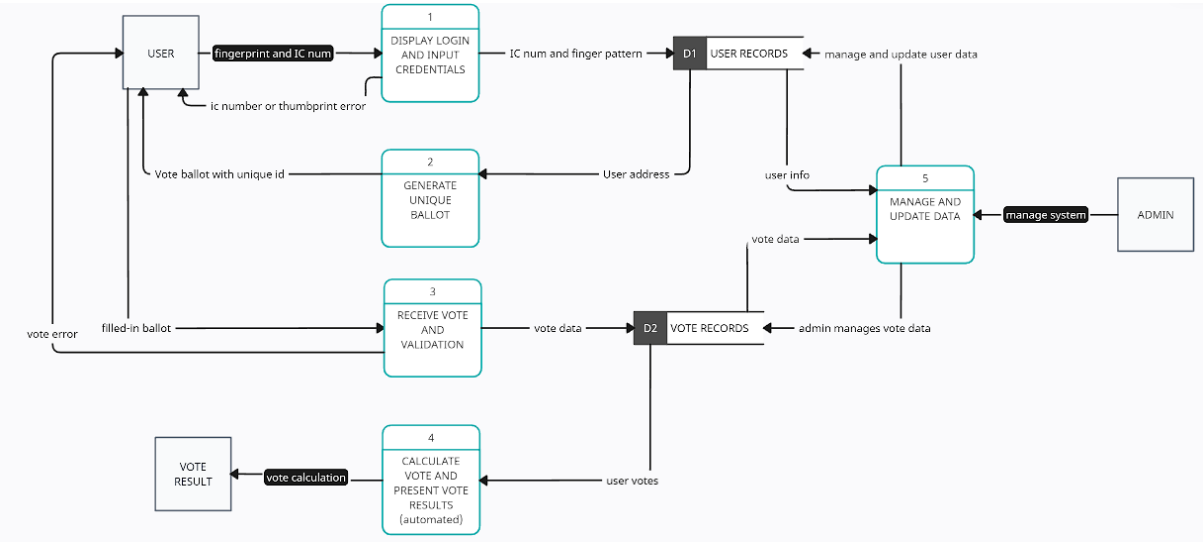
6.2.3 Decision table

Conditions and actions		Rules	
	1	2	3
Type of user	V	A	F
login	X	X	
manage user data		X	
User update address	X		
Ballot generation			X
User vote for candidate	X		
Store voting data in database			X
manage vote data		X	
calculate vote			X

7 Physical System Design

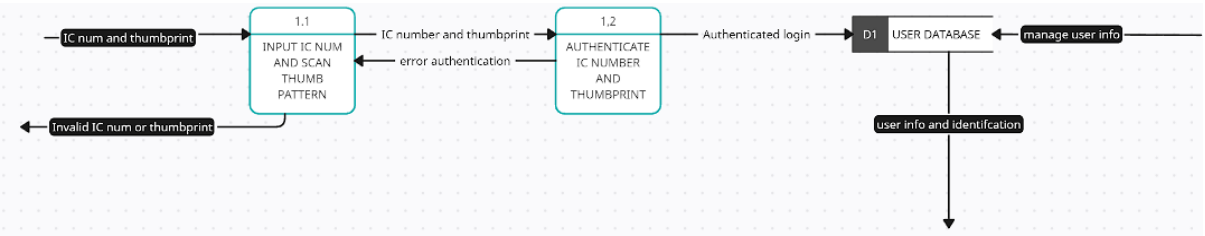
7.1 Physical DFD TO-BE system (Diagram 0, Child, Partitioning, CRUD Matrix, Event Response Table, Structure Chart, System Architecture)

7.1.1 Diagram 0

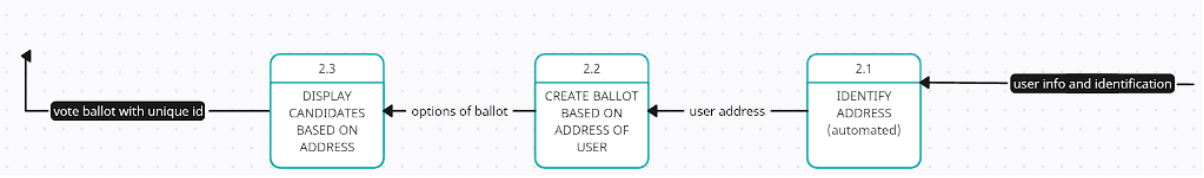


7.1.2 Child diagram

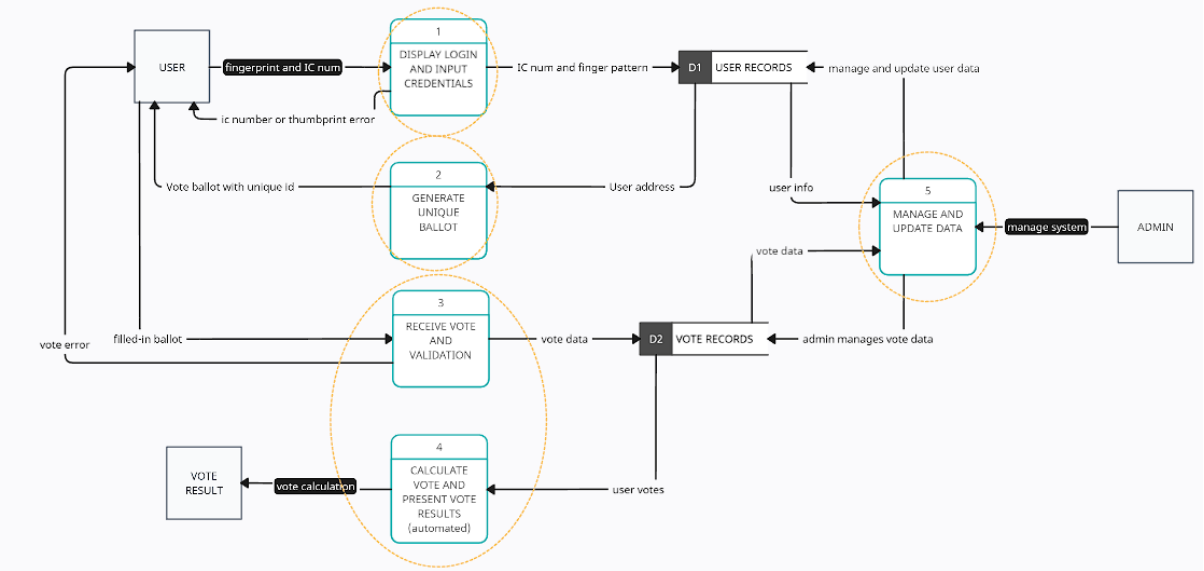
1. OVS login



2. Generate ballot



7.1.3 Partitioning



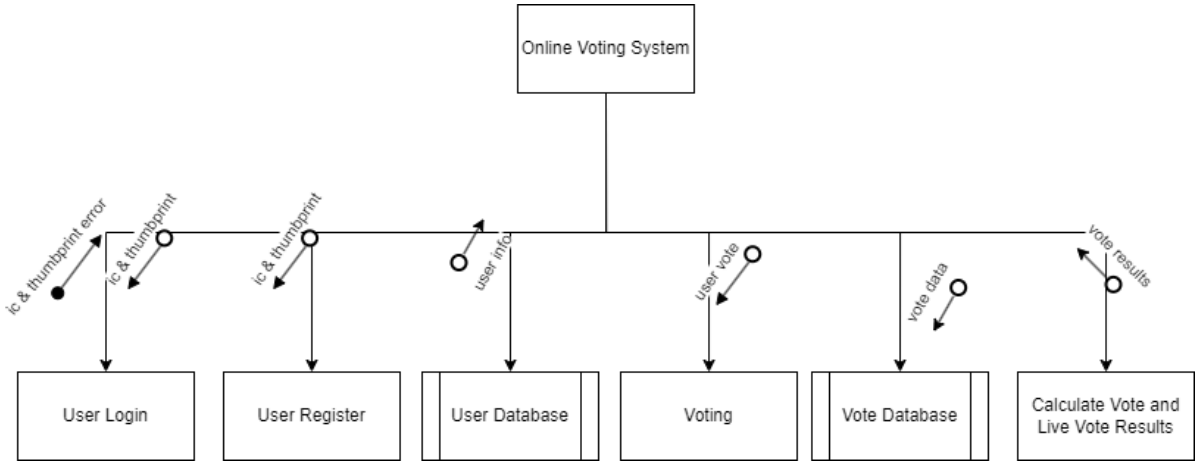
7.1.4 Crud matrix

activity	user	vote	vote result	admin
user log in	R			
user verification	U	RU		
ballot generation		CRUD		
fill in ballot	U	R		
vote validation		U	R	
vote calculation			RU	
live voting result			RU	R
store data				RU
manage system				U

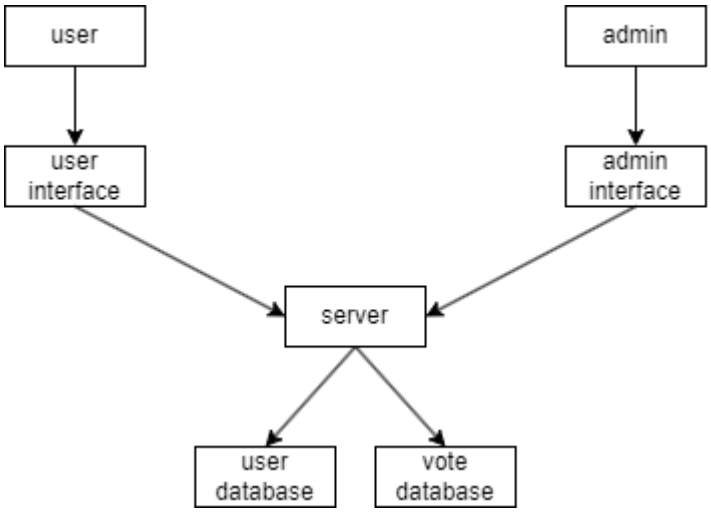
7.1.5 Event response table

Event	Source	Trigger	Activity	Response	Destination
User login	User	User clicks on the login on the main page and enters IC number and thumbprint	find user IC number and thumbprint via database	Voting screen	User
User fills in ballot	User	User clicks on the x mark for the candidate of their choosing	system creates ballot for candidate of choosing	await submission	User
User submit vote	User	User clicks on the submit button after voting	ballot is confirmed and validified by the system	Live voting screen	User
User opens live voting results	User	User clicks the on live voting button on the main page	votes are calculated and updated in real time. Data is kept in database	show voting statistics	User and Admin

7.1.6 Structure chart

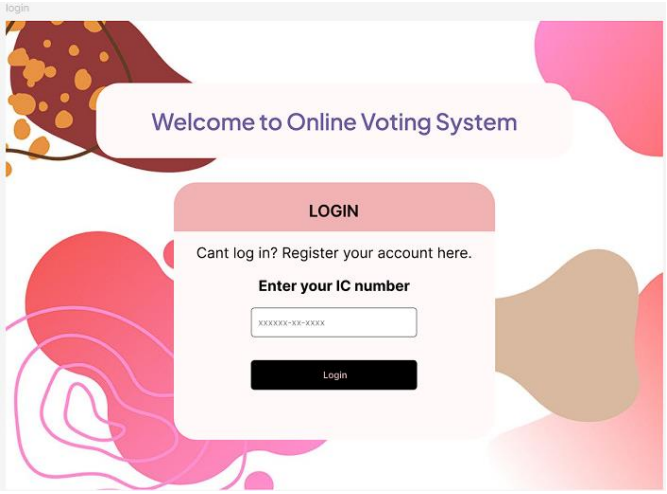


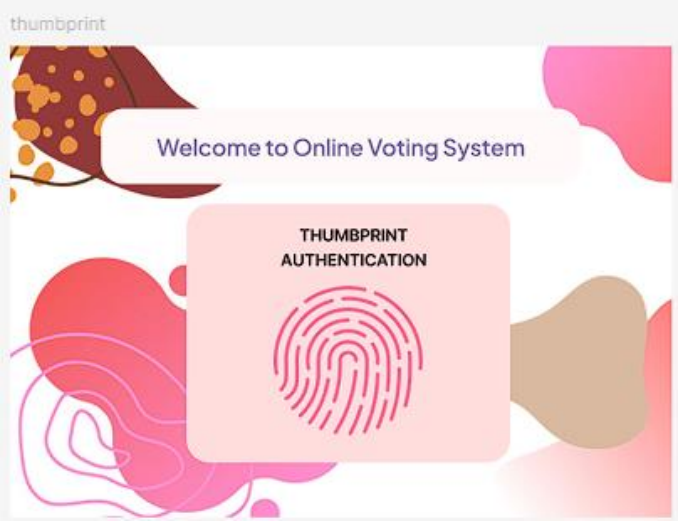
7.1.7 System architecture



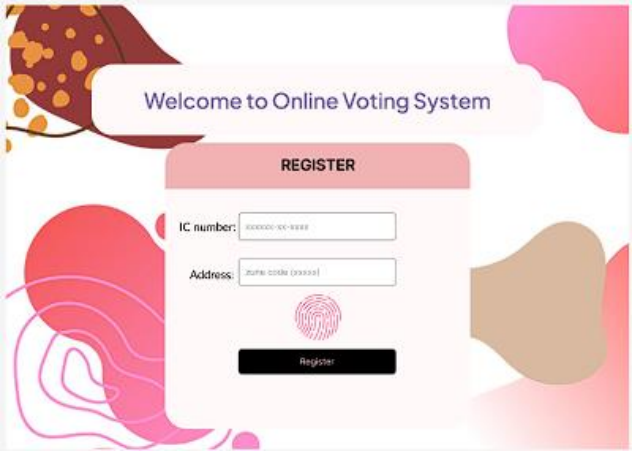
8 System Wireframe (Input Design, Output Design)

8.1 Input design

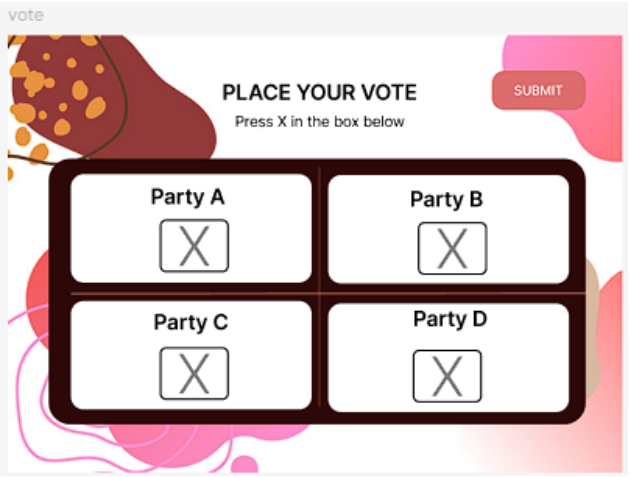




register

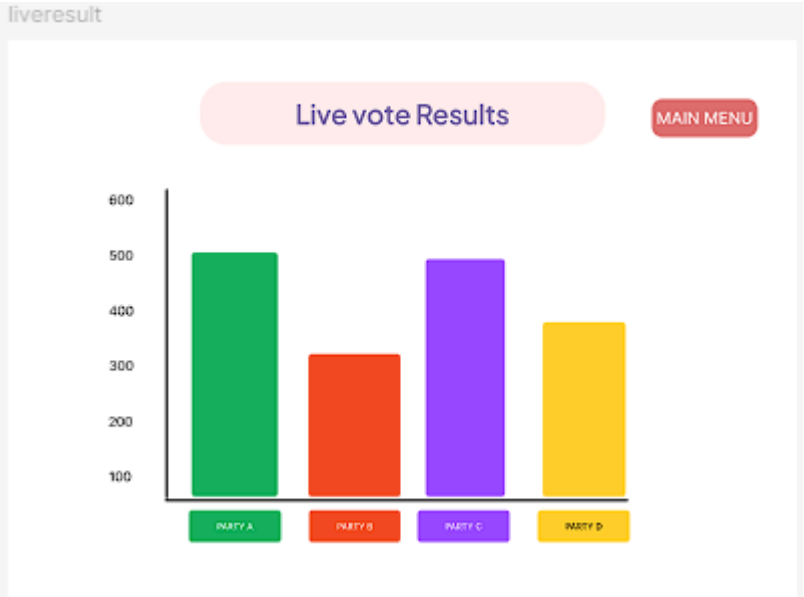


vote



8.2 Output design

liveresult



9 Summary of the proposed system.

To summarize, the online voting system can authentic the identity of the user, generate vote ballots, receive votes, validate them, store them in a database, and present the live voting updates. This can prove to be useful for both the user and administrator of the system as users are able to use the system on-the-go while administrators can monitor the vote data much more easily and efficiently with less errors. Administrators are able to receive accurate calculations of votes without risk of counting error in votes, or fraudulence. Overall, the online voting system can prove to be beneficial for both the users and voting orgranisations.