Software Requirements Specification (SRS)

For

The Parliamentary voting system

Prepared by	:	Group 2
Team Members	:	TG/2024/2095 KHM Hasaranga (Leader)
		TG/2024/2096 NVS Himansana
		TG/2024/2081 RMKT Bandara
		TG/2024/2082 WDP Kaveesha
Date	:	2025.08.09

1. Introduction

1.1 Purpose

This Software Requirements Specification (SRS) document defines the requirements for developing a Sri Lankan Parliamentary Voting System simulation using the C programming language. The system simulates the electoral process from voter registration to final result declaration, implementing Sri Lanka's proportional representation system with preferential voting.

1.2 Scope

The system covers the complete electoral workflow, including :

- Voter and candidate registration
- Nomination acceptance and validation
- Electronic polling with preferential voting
- District-level proportional representation counting
- Result publication

What is included :

- 196 district seats allocation using proportional representation
- 5% threshold implementation
- Bonus seat allocation to highest-vote party per district
- Up to 3 preferential votes per voter
- Role-based access control (Admin, RO, PO, Voter,)
- 29 National List seat
- Database storage (uses text files only)

1.3 Overview

The system implements Sri Lanka's current electoral system based on the 1978 Constitution and subsequent amendments, specifically the proportional representation system with the Largest Remainder (Hare Quota) method for seat allocation.

Users: Election Admin, Returning Officer (RO), Presiding Officer (PO), Voter, Candidate, Party Agent

2. General Description

2.1 Product Functions

- User Management: Role-based authentication and authorization
- Electoral Setup: District, party, and candidate registration
- Voter Registration: Citizen eligibility validation and registration
- Nomination Process: Party nomination submission and RO approval
- Polling Operations: Electronic ballot casting with preferences
- Vote Counting: Automated PR calculation with preference tallying
- Result Publication: Comprehensive result generation and audit reports

2.1 User Community

- Election Administrator:
    - System configuration and final result declaration
    - Publishing the notice of election
    - Administrating the nomination process

- Returning Officers (RO): District-level election management
- Presiding Officers (PO): Polling station operations
- Voters: Ballot casting with preferential voting
- Candidates: Registration and nomination participation
- Party Agents/Observers: Read-only access to processes and results

3. Functional Requirements

FR-V1: Voter Registration Process

- registration form collecting: NIC, full name, DOB, citizenship status, district, Password
- Real-time age validation (18+ years on registration date)
- Citizenship verification (Sri Lankan citizens only)

FR-M3: Candidate Registry

- registration form collecting: NIC, full name, DOB, citizenship status, district, Party, Password
- Unique candidate numbers auto-assigned after nomination acceptance by RO
- Check eligibility (Candidate NIC must be on the nomination list)
- Validation of candidate eligibility criteria
- Linking candidates to specific party nominations

FR-M1: District Registry

- Maintain districts.txt with district codes, names, and seat allocations
- Support for all 22 electoral districts
- Seat count based on latest electoral boundary delimitation
- Read-only access for users

FR-M2: Party Registry

- parties.txt containing party codes, full names, and symbols
- Unique party code validation

FR-V2: Eligibility Validation

- Age verification: minimum 18 years on qualifying date
- Citizenship check: valid Sri Lankan citizenship required
- Criminal record check: exclusion for specified offenses

FR-V3: Data Integrity

- Unique NIC number validation
- Duplicate registration prevention
- Cross-district registration checking
- Data format validation and sanitization

FR-N1: Nomination Submission

- Party/independent group submits one list per district
- Candidate consent verification for each nominee

FR-N2: Returning Officer Approval

- RO review and accept/reject nominations
- Public display of accepted nomination lists

FR-P1: Poll Management

- PO opens/closes polling for designated stations

FR-C1: Vote Counting - District Level

- RO imports all station ballot files for the district
- Checksum verification for each ballot file

FR-C2: Party Vote Totals and Threshold

- Calculate total valid votes per party in the district
- Apply 5% threshold: exclude parties below 5% of total valid votes
- Recalculate eligible vote totals excluding rejected parties

FR-C3: Bonus Seat Allocation

- Identify the party with the highest vote count in the district
- Award one bonus seat to the highest-vote party

FR-C4: Proportional Seat Allocation - Largest Remainder Method

- Calculate Hare Quota: quota = eligible_votes / (total_seats - 1)
- Initial seat allocation: floor(party_votes / quota)
- Calculate remainders: party_votes - (initial_seats × quota)
- Distribute remaining seats by largest remainders
- Final seat calculation: initial + remainder_seats + bonus (if applicable)

FR-R1: Result Declaration

- Admin authority to declare final results
- Result file locking to prevent post-declaration changes
- Official declaration timestamp recording

4. Non-Functional Attributes

- **Usability:** Menu-driven interface with numbered choices.
- **Reliability:** Each vote stored immediately in text file to avoid data loss.
- **Security**
- **Compatibility**
- **Maintainability**

5. User Interface Requirements

Role-Specific Interfaces

   Admin Interface:

     1. System Configuration Management
     2. District and Party Registry
     3. Final Result Declaration
     4. System Audit and Monitoring

   Returning Officer Interface:
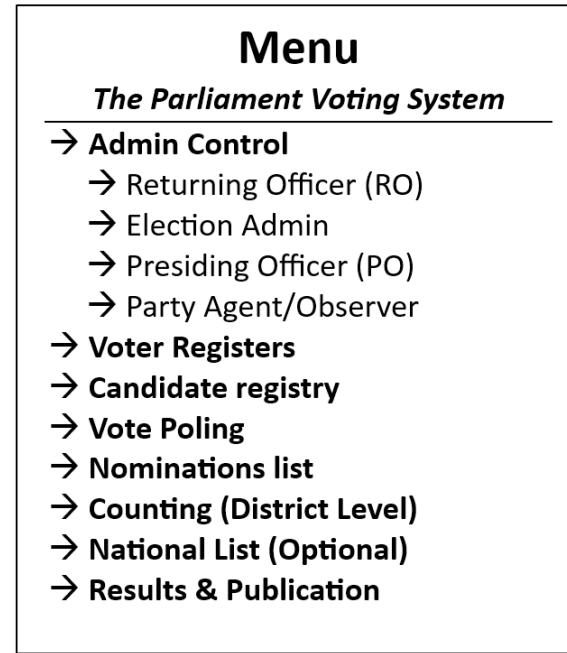
     1. Nomination Review and Approval
     2. Candidate Registration Management
     3. Ballot Import and Validation
     4. District Vote Counting Operations
     5. District Result Generation and Publication

   Presiding Officer Interface:

     1. Polling Station Management
     2. Voter Authentication and Ballot Access
     3. Station Report Generation

   Voter Interface:

     1. Secure Login and Authentication
     2. Ballot Casting with Party Selection
     3. Preferential Vote Selection (up to 3)
     4. Vote Confirmation and Submission
     5. Receipt Generation

Menu

The Parliament Voting System

→ **Admin Control**
   → Returning Officer (RO)
   → Election Admin
   → Presiding Officer (PO)
   → Party Agent/Observer
→ **Voter Registers**
→ **Candidate registry**
→ **Vote Poling**
→ **Nominations list**
→ **Counting (District Level)**
→ **National List (Optional)**
→ **Results & Publication**

6. Export file Structure

voters.txt
nic|full_name|dob(YYYY-MM-DD)|citizen(Y/N)|district|login_id|password_hash|has_voted
(0/1) 200012345678|K.Fernando|2000-05-02|Y|COL|kfernando||0

candidates.txt
party_code|cand_no|cand_id|full_name NPP|13|NPP-COL-001|A. Perera
NPP|21|NPP-COL-002|B. Silva

parties.txt
 # party_code|name|symbol
NPP|National People's Power|Compass
UNP|United National Party|Elephant
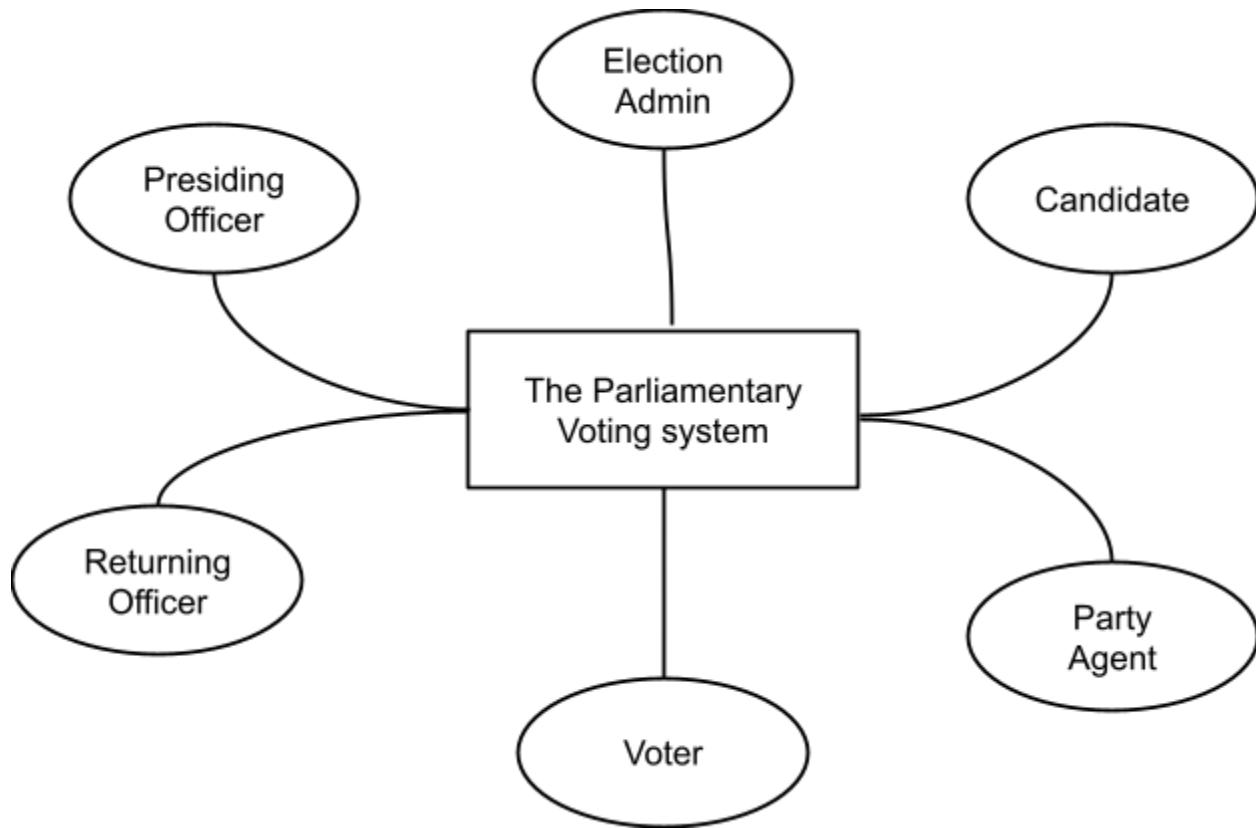
districts.txt
 # district_code|name|total_seats
COL|Colombo|18
GAM|Gampaha|19

 # ballot_id|party_code|pref1|pref2|pref3
B0000001|NPP|13|21|07
B0000002|UNP|05|02|00

 # party_code|votes|eligible(0/1)|initial_seats|remainder|final_seats|bonus(0/1)
NPP|345678|1|5|0.78|6|1

6. Diagram ER

7. Resourcers :

- Software Parliament of Sri Lanka
  (https://beta.parliament.lk/en/learn/the-system-of-elections-in-sri-lanka/franchise)

- Specification Requirements - Example of SRS by JoinToIT
  (https://jointoit.com/blog/software-requirements-specification-srs-exemplar-and-guide-for-2023/)

- Numbers.lk
  (https://numbers.lk/analysis/general-election-sri-lanka--electoral-system-explained?lang=si)

END