

TrueVote – Project Abstract

Objectives:

TrueVote is a secure, user-friendly electronic voting application built with C++/Qt and cryptographic primitives to modernize and safeguard small-scale elections.

It emphasizes integrity, privacy, and auditability by combining SHA-256 password hashing, file-based data storage, and a simple graphical user interface.

System Architecture:

1. Presentation Layer (Qt GUI)

Main Menu: Entry point offering "Admin Login," "Vote," and "Exit" options.

Admin Workflow:

- Authentication: Static credentials ("admin"/"admin123") gate access to the Admin Panel.
- Admin Panel Features:
 - Register Voter: Prompt for Voter ID, name, and password; stores SHA-256 hash in data/voters.csv.
 - Register Candidate: Prompt for Candidate ID and name; appends to data/candidates.csv.
 - Start/Close Poll: Toggles voting availability via an in-memory flag.
 - View Results: Tallies votes from data/votes.log, displays counts per candidate, and writes summary to data/result.txt.
 - Clear Logs: Empties vote and result files, resetting the system.

Voter Workflow:

- Authentication: Verifies Voter ID and SHA-256-hashed password against voters.csv. Rejects repeat voting by scanning votes.log.
- Casting Vote: Presents a dropdown of registered candidates; records "VoterID,CandidateID,Timestamp" in votes.log.

Data Layer (File System):

- voters.csv — stores VoterID,Name,SHA256(Password)
- candidates.csv — stores CandidateID,Name
- votes.log — sequential entries of VoterID,CandidateID,YYYY-MM-DD hh:mm:ss
- result.txt — human-readable tally of final vote counts

Security & Integrity:

- Password Hashing: All voter passwords are hashed with SHA-256 before storage or comparison.
- Single-Vote Enforcement: The system scans votes.log on each login to prevent duplicate voting.
- Immutable Audit Trail: Vote entries are append-only; admins cannot retroactively modify cast votes.

Usability & Deployment:

- Cross-platform Qt application with minimal dependencies.
- Intuitive dialogs (QInputDialog, QMessageBox) guide users through operations.
- Data folder (./data) auto-created on first run; files human-readable for audits.

Conclusion:

TrueVote delivers a lightweight, yet robust, e-voting solution ideal for small organizations, clubs, or student elections.

By leveraging file-based persistence, cryptographic hashing, and a clear UI, it balances security with ease of use.

Administrators can manage voters and candidates, control poll state, and obtain verifiable results; voters enjoy straightforward authentication and casting processes.

Future enhancements may include database integration, digital signatures, and networked result aggregation to scale for larger constituencies.