**PHASE III**

**Project Title:** Digital Voting and Election Management System
**Phase:** Logical Data Model Design
**Objective:** Build a normalized database structure to ensure secure, efficient voting operations

**Main Goal:**

- Define core entities and attributes
- Establish clear relationships and constraints
- Support scalability, reliability, and auditability

**Entities:**

- Voters
- Candidates
- Elections
- Votes
- Results

**Entities and Attributes**

**Voters**

- Voter_ID (PK, INT, NOT NULL, UNIQUE)
- Full_Name (VARCHAR)
- National_ID (VARCHAR, UNIQUE)
- Eligibility_Status (BOOLEAN, NOT NULL)

**Candidates**

- Candidate_ID (PK, INT, NOT NULL, UNIQUE)
- Full_Name (VARCHAR)
- Election_ID (FK → Elections.Election_ID)
- Party (VARCHAR)

**Elections**

- Election_ID (PK, INT, NOT NULL, UNIQUE)
- Election_Type (VARCHAR)
- Date (DATE, NOT NULL)
- Status (VARCHAR CHECK IN ('Upcoming', 'Ongoing', 'Closed'))

**Votes**

- Vote_ID (PK, INT, NOT NULL, UNIQUE)
- Voter_ID (FK → Voters.Voter_ID)
- Candidate_ID (FK → Candidates.Candidate_ID)
- Election_ID (FK → Elections.Election_ID)
- Timestamp (DATETIME)

**Results**

- Result_ID (PK, INT, NOT NULL, UNIQUE)
- Candidate_ID (FK → Candidates.Candidate_ID)
- Election_ID (FK → Elections.Election_ID)
- Total_Votes (INT)

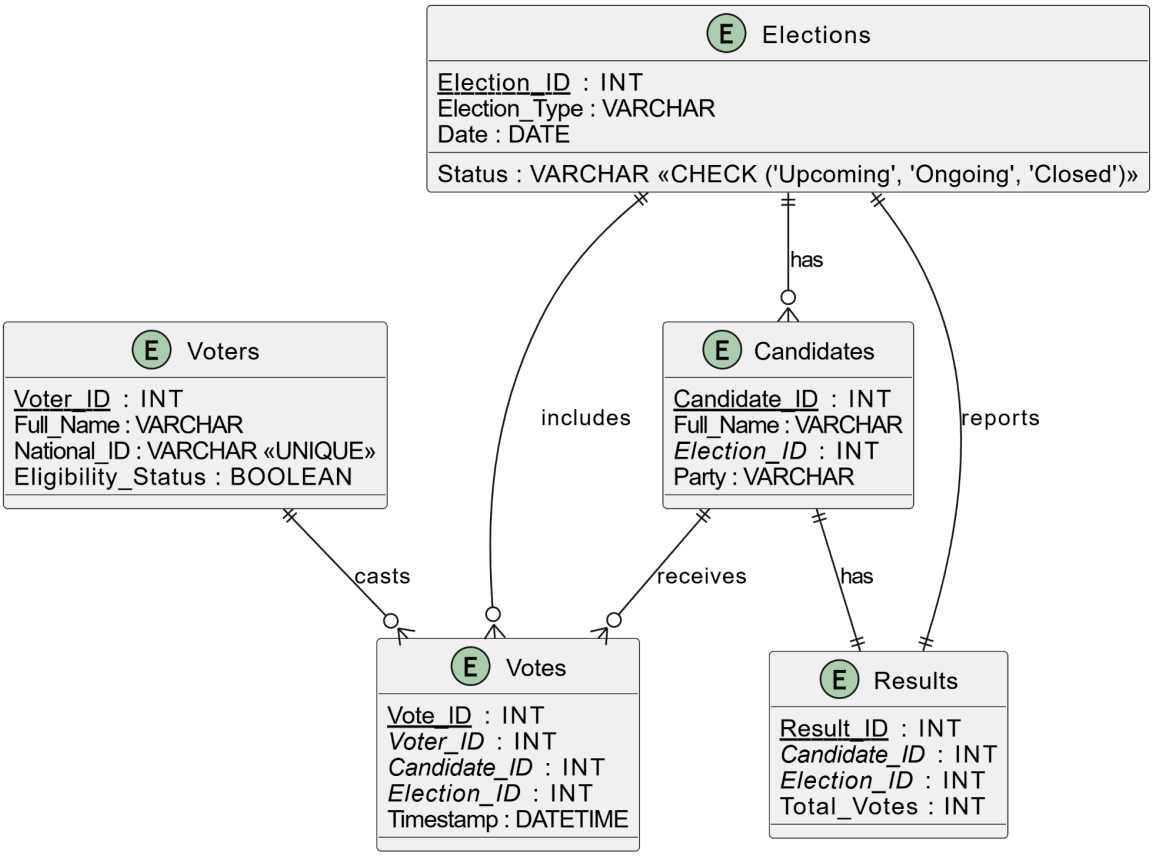
**Relationships and Constraints**

**One-to-Many Relationships:**

- One Election → Many Candidates
- One Election → Many Votes
- One Voter → One Vote per Election
- One Candidate → One Result per Election

**Constraints Overview:**

- Primary Keys: All IDs
- Foreign Keys: Candidate_ID, Voter_ID, Election_ID
- NOT NULL: All identifiers, vote timestamps, election dates
- UNIQUE: National_ID, all primary keys
- CHECK: Valid election statuses ('Upcoming', 'Ongoing', 'Closed')




**Benefits:**

- Prevents duplicate voting
- Enables real-time vote tracking
- Supports secure and auditable elections
- Ensures logical data integrity through constraints