

# Electoral Database Software (EDS)

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## *Software Requirement Specification*

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# 1. Database Specification

## 1.1 Schema Description

The following are the schemas:

1. Voter = (voterid, partno, name, acno, age, gender, DOB, DOI, DOA, address, emailid, phoneno, PIC, PICtype, PICno, caste)
2. Constituency = (acno, acname, population)
3. Address = (house, street, PIN, PO, town, district, state)
4. Relation = (voterid, relationvoterid, relation, relationname)
5. Candidate = (voterid, candidateid, ac\_participate, type, partyid)
6. Party = (partyid, partyname, symbol, type)
7. Election = (electionid, year)
8. Statistics = (electionid, partyid, STvotes, SCvotes, OBCvotes, GENvotes, Femalevotes, Malevotes)

Now we have the following dependencies:

- a. voterid → partno, acno, name, age, gender, DOB, DOI, DOA, address, emailid, phoneno, PIC, PICtype, PICno, caste
- b. PICno → PICtype, PIC
- c. partno → acno
- d. PIN → PO, Dist, Town, State
- e. relationvoterid, voterid → relation, relationname
- f. relationvoterid → relationname
- g. acno → acname, population
- h. candidateid → voterid, ac\_participate, type, partyid
- i. partyid → partyname, symbol, type
- j. electionid → year
- k. electionid, partyid → STvotes, SCvotes, OBCvotes, GENvotes, Femalevotes, Malevotes

Obviously the above schema is not in BCNF. We can have a BCNF dependency preserving decomposition of the above schema in the following ways:

Steps...

- i) Decompose Voter into Voter = (voterid, partno, name, age, acno, DOB, DOI, DOA, emailid, phoneno, caste, address, PIC) and Identity = (PIC, PICtype, PICno)
- ii) We further decompose Voter into Voter and Address as Voter = (voterid, partno, ..., house, street, PIN) and Address = (house, street, PIN, PO, town, state, district)
- iii) We decompose Voter again into Voter (voterid, partno, name, age, ...) , Polling = (partno, acno), and Constituency = (acno, acname, population)

- iv) We drop the functional dependency relationvoterid -> relationname as it is redundant.
- v) We have the schema Relation = (voterid, relationvoterid, relation). The rest remain the same.

So we get the following decomposition:

1. Voter = (voterid, name, age, gender, DOB, DOI, DOA, emailid, phoneno, partno, PICno, houseno, street, PIN, caste)
2. Identity = (PICno, PICtype, PIC)
3. Polling = (partno, acno)
4. Constituency = (acno, acname, population)
5. Address = (houseno, street, PIN, PO, town, district, state)
6. Candidate = (candidateid, voterid, ac\_participate, type, partyid)
7. Party = (partyid, partyname, symbol, type)
8. Election = (electionid, year)
9. Statistics = (electionid, partyid, STvotes, SCvotes, OBCvotes, GENvotes, Femalevotes, Malevotes)
10. Relation = (voterid, relationvoterid, relation)

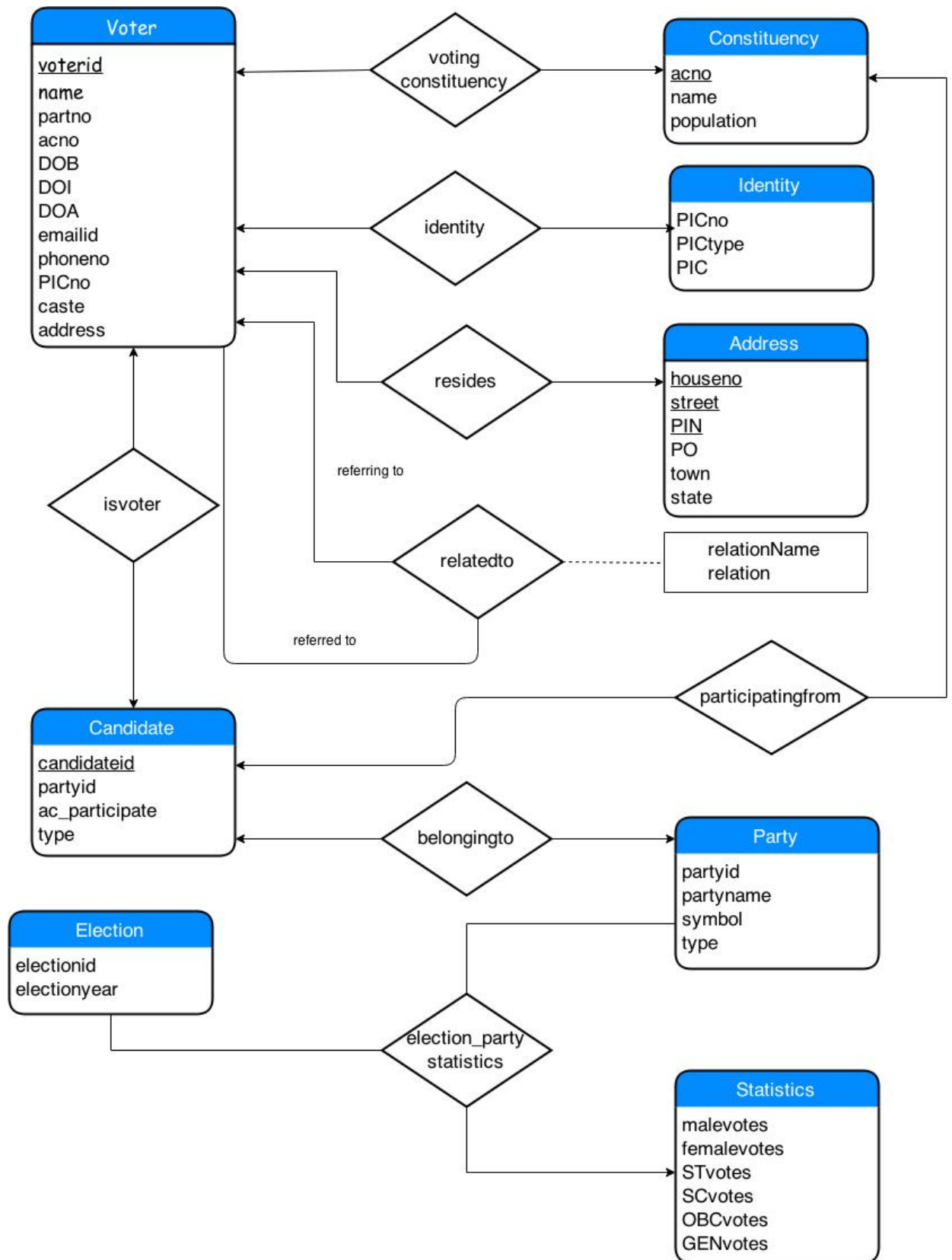
The primary keys are the underlined attributes. This is in BCNF and is dependency preserving

## 1.2 Entity Relationship Model

The entities are shown in rounded rectangles and relationships in diamond boxes.

An arrow represents a one to one relationship

A line represents a many to one relationship.



### 1.3 Constraints on Attributes

There are certain value constraints on the attributes:

1. caste can be of the following types: SC, ST, OBC, GEN
2. type of the candidate can be MLA, or MP
3. data will be filled by us and we are assuming that the population per constituency will roughly be the same.
4. Gender will be either male or female.
5. There will be several foreign key constraints such as:
  - a. Voter.partno -> Polling.partno
  - b. Voter.house, Voter.street, Voter.PIN -> Address.house, Address.street, Address.PIN
  - c. Voter.PICno -> Identity.PICno
  - d. Relation.voterid -> Voter.voterid and Relation.voterid -> Voter.voterid
  - e. Candidate.voterid -> Voter.voterid, and many (they are actually intuitive)
6. We have a non null constraints on all of the attributes except for the attributes in the Statistics schema as data may not be available for that particular election.
7. The PIC type is a blob type and is not null.
8. Relation can be only from the following: Father, Mother, Brother, Sister, Spouse

### 1.4 Table to be made exactly

The mysql tables to be made are the follows:

1. Voter

ATTRIBUTE	TYPE	KEY/ CONSTRAINT
Voterid	Text	Primary Key
Name	Text	Non Null
Age	Number	Non Null, >18 years
Gender	Text	Non Null, Female/ Male
DOB	Date	Non Null
DOI	Date	Non Null
DOA	Date	---
emailID	Text	---
Phoneno	Number	---
PICno	Text	Non Null , Unique
Houseno	Number	Non Null, (Foreign Key to Address(Houseno))
Street No	Text	Non Null, (Foreign Key to

		Address(Street No))
PIN	Number	Non Null, (Foreign Key to Address(Houseno))
Caste	Text	In ("GEN", "OBC", "SC", "ST")
Part no	Text	Non Null , Foreign Key to Polling (Part No)

## 2. Identity

ATTRIBUTE	TYPE	KEY/ CONSTRAINT
PICno	Text	Primary key (Foreign Key to Voter(PICno))
PICtype	Text	In ("BIRTH", "PAN", "DRIVING", "AADHAR")
PIC	Image (blob)	Non Null

## 3. Address

ATTRIBUTE	TYPE	KEY / CONSTRAINT
Houseno	Number	Primary Key
Street No	Text	Primary Key
PIN	Number	Primary Key Like " _ _ _ _ _ _ _ " (7 characters long)
PO	Text	Non Null
Town	Text	Non Null
District	Text	Non Null
State	Text	Non Null

## 4. Polling

ATTRIBUTE	TYPE	KEY / CONSTRAINT
Partno	Text	Primary key
Acno	Text	Non null, Foreign key to Constituency (Acno)

## 5. Constituency

ATTRIBUTE	TYPE	KEY / CONSTRAINT
Acno	Text	Primary Key
Acname	Text	Non Null
Population	Number	---

## 6. Election

ATTRIBUTE	TYPE	KEY / CONSTRAINT
Id	Text	Primary
Year	Number	Non null

## 7. Candidate

ATTRIBUTE	TYPE	KEY / CONSTRAINT
Candidateid	Text	Primary key

Voterid	Text	Non Null, Foreign Key to Voter (Voterid)
AC_participate	Text	Non Null, foreign key to Constituency (Acno)
Type	Text	In ("MLA","MP")
PartyId	Text	---, Foreign key to Party(partyid)

#### 8. Statistics

ATTRIBUTE	TYPE	KEY / CONSTRAINT
Electionid	Text	Primary Key, Foreign Key to Election(Electionid)
PartyId	Text	Primary Key, Foreign key to Party(PartyId)
STvotes	Number	---
SCVotes	Number	---
OBCVotes	Number	---
GENvotes	Number	---
FemaleVotes	Number	---
MaleVotes	Number	---

#### 9. Party

ATTRIBUTE	TYPE	KEY / CONSTRAINT
PartyId	Text	Primary Key
PartyName	Text	Non Null
Symbol	Image (blob)	Non Null
Type	Text	In ("National","Regional")

#### 10. Relation

ATTRIBUTE	TYPE	KEY / CONSTRAINT
Voterid	Text	Primary Key
Relationvoterid	Text	Non Null, Foreign Key to Voter (voterid)
Relation	Text	In ("Father", "Mother", "Brother", "Sister", "Spouse")

## 2. Sub Modules

Our program will contain of the following classes:

1. Voter Class
2. Candidate Class



3. Election Commissioner Class
4. Election Class
5. Query Class
6. Database Class

The Voter Class is a parent class of the Candidate Class, that in turn acts as a parent class to Election Commissioner Class. The Election Commissioner class is a singleton class and contains privileged functions that can access database data with the highest access rights. We have modeled this relationship with the underlying assumption that every candidate is a voter, or in other words has the same power and privileges as a voter.

The Database class is just a helper class that is used to connect with the back end data. It will have iterator implementations corresponding to different queries. The Query class is what contains functions for different queries that the voter, candidate and the Election Commissioner can ask. The Election Class is simple class that just acts as a container of statistics data.

### 3. Queries

The Application queries that the Voter can ask:

1. Insertion in Voter Table with system generated voter id.
2. Querying in Constituency, Polling and Address Table to give suggestions to voter (candidate) while he is filling up his enrollment form.
3. Voter may ask to view his filled information at some later point of time such as Date of Issue, Photo Identity Card Details, Polling Booth and Constituency information assigned to him etc.
4. In case the Voter wants to access information of other voters he or she should be barred. However he should be able to see controlled information of the candidates of his constituency (controlled here means that the data he or she views is restricted). This access rights should be decided at the database level while querying the database.
5. The voter should be able to see his application status. This requires a query into the database of Voters.

The Candidates have the same powers as the voters. In addition they have the following queries that they can perform:

1. He or she can query the number of voters in the constituency he or she is applying his or her candidacy.

2. He or she can query all the party related information from the database so that he can apply for the right party.
3. He or she should be cross-examined with party supplied list of candidates by using appropriate query
4. He or she can see the town/region wise distribution of voters.
5. He or she should be able to see the data of past elections

The Election Commissioner has unrestricted access to database but as such we are here mentioning only the major actions that the EC needs to undertake that requires database access:

1. The EC needs to validate the details of the voter before inserting his record into the database and notifying him or her about the approval.
2. The EC can query and change the application status of voter, candidate and party.
3. The EC can query statistical voter distribution, candidate distribution and party distribution throughout the constituencies.
4. The EC can add, remove or update the constituencies present in a parliamentary constituency.
5. The EC can deem a party national or regional by querying party distribution.
6. The EC can generate the voter id card via software after appropriate verification.
7. The EC can anytime delete the record of any voter, candidate or party.

The Party can have the following queries:

1. The party can update its contesting candidate list within a fixed deadline set by EC.
2. The party can query the voter distribution throughout all constituencies.
3. The party can see all details it has given at the time of its registration.