ADDIS ABEBA INSTITUTE OF TECHNOLOGY

SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING

Database Management System project

GROUP-2 Phase-1 and phase 2 Report

Title: voters' Registration

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Submitted to: Mr. Tesfamikael

Part one: Conceptual design

INTRODUCTION

How and why did we come up with this idea?

We sat down one day trying to discuss and bring an idea for our database project. We had around three candidates for the project which were not sufficiently good. And when all of a sudden, a member of our group said that he needs to take his national election voting card and that he has to vote and that we should to, and that every vote matters. And there was it, our new idea. We decided to store the election data on a database. This wined us over for two main reasons, the first and the most important one being its impact relating to the current worldwide pandemic, COVID-19, through reducing contact with paperwork. The other and second reason being, Simplicity in storing, managing, accessing, analyzing and exporting election data.

General description

Our database receives and Stores the Ethiopian National Election Data. It has 9(nine) entities with their corresponding attributes.

Detailed description

- **Entities**

1) **Citizen**: the MAIN entity which houses the entirety of the data holding within it the other entities with the sufficient information of the voter required for saving a voice.

2) **Address**: houses the location of the voter answering the question "where is the whereabouts of the voter?" Or "where does the voter live?". The primary key here is Address ID (Add. ID) and exists in the Citizen entity.

3) **Voting Center**: houses the details of the voting center's location and its unique ID. The primary key here is Voting Center ID (Vot. ID) and also exists in the Citizen entity.

4) **Criminal Status**: houses the criminal status of the voter. The primary key here is Criminal Status ID (Crim. ID) and also exists in the Citizen entity.

5) **Educational Level**: houses the educational status of the voter. The primary key here is EducationalLevel ID (Edu. ID) and also exists in the Citizen entity.

6) **Job Description**: houses the occupational status of the voter. The primary key here is JobDescription ID (Job ID) and also exists in the Citizen entity.

7) **Candidates**: houses the information of election candidates. The primary key here is Candidates ID (Cand. ID) and also exists in the Citizen entity.

8) **Additional Information**: houses information such as email address and phone number. The primary key here is Email Address (Email Add.) and also exists in the Citizen entity.

9) **Voting Status**: houses the voter's voting information, where and when they've voted and their registration ID. The primary key here is Voter ID and also exists in the Citizen entity.

Entity: citizen

One of the entities for voters' registration database system is citizen the one who can register to vote. o Attributes: The entity citizen has attributes that are used to define the citizen . citizen's attributes are license ID, first name, middle name, last name, sex, age, birth date, birth place and citizen choice.

-SSN: it contains the identification number of the citizen. It is the primary key of the attributes.

- first name: it contain the name of the citizen and it is simple attribute.

-middle name: it contains the father name of the citizen and it is a simple attribute.

-last name: it contain the grandfather's name of citizen and it is a simple attribute.

- **Sex**: it indicates us that the citizen is either male or female and it is simple attribute.
- **Birth date**: holds the citizen date of birth and it is composite attribute composed of Data, Month and Year.

Entity: Additional information

The second entity of our database system is" Additional information" which contains additional information about the citizen.

Attributes: The entity Additional has attributes that are used to give more information about the citizen. Additional information's attributes are email address and phone number. The phone number is the primary key. Phone No: This is a simple attribute it holds the phone number of the citizen. Email address: this is also a simple attribute that holds the email address of the citizen.

Relations

The entity Additional information has one to one relation with the entity citizen.

Entity: Job description **this one entity that uses us in the database system that tells us the job position of the citizen it contains the attributes:**

- Job Id: this attribute contains the identification number of the citizen in his work place and this is a simple attribute.

- Company name: it is a simple attribute that contain the name of the company of the citizen.

- Position: it is a simple attribute that tells the working level of the citizen

Relation

This entity has a relation with the citizen and one citzen can have zero job description or many job descriptions.

Entity: candidates

This is one of the entities that tells us candidates that going to be elected by the citizen

Attributes: The entity candidates have attributes that are used to give more information about the candidate. Additional information's attributes are candidate id, candidate name and candidate logo.

Candidate ID: this is a simple attribute that contains the ID number of the candidate. This is the primary key of the attribute.

Candidate name: it is the name of the party that going to be elected by the citizen. It is a simple attribute.

Candidate logo: it is the unique logo or identification item of the candidate. It is a simple attribute.

Relation

This entity has one to one relation with the entity citizen .

Entity: voting status

This entity contains the voting status of citizen

-Attributes: The entity voting status have attributes that are used to give more information about the voting status of the citizen it contains the attributes:

-voters' ID: it is a simple attribute that contain the id number of voters' and it is a primary key.

-Registration date: it contains the date of the registration and it is composite attribute composed of Data, Month and Year. -Registration number: it holds the date of the registration of the voters' (citizen). It is a simple attribute.

- Candidate name: is the name of the candidate party. It is a simple attribute.

Relation

This voting status has a relation with citizen and in tis relation one citizen can one voting status .

Entity: Address

one of the entity of our database system it holds the living address of the citizen(voters')

-Attributes: The entity address has attributes that are used to give more information about the voting voter it contains the attributes:

-Address id: it is the address number of the address of the voters'. It is a simple attribute.

And this primary key of the attribute.

-Region: it holds the living region of the voters'. This is a simple attribute.

- Sub city: it holds the sub city of the voters'. it is the simple attribute

- **Wereda:** it holds the wereda number of the voter. It is a simple attribute.

- House number: it holds the house number of the voters'. It is a simple attribute

Entity: voting center

One of the entities for voters' registration database system is voting which tells where the voters' will vote.

The voting center entity contain the attribute

-voting center Id: it holds the id number of the voting center and it is a simple attribute.

-voting center name: it holds the name of the center. It is a simple attribute.

Entity: Educational level

This is one of the entities of the voters' registration database system.

The educational level entity contains the attributes:

-ID: This contains the educational certificate id number. It is simple attribute.

- Description: this contains the educational descriptions or status of the voters'.

-School name: contains the name of the school of voters'. It is a simple attribute.

Entity: criminal status

This is one of the entities of the voters' registration database system.

-Attributes: The entity criminal status has attributes that are used to give more information about the voters' criminal status it contains the attributes:

- Crime ID: is the id number crime. This is a simple attribute.

-crime type: is the attribute that holds the type of the crime.

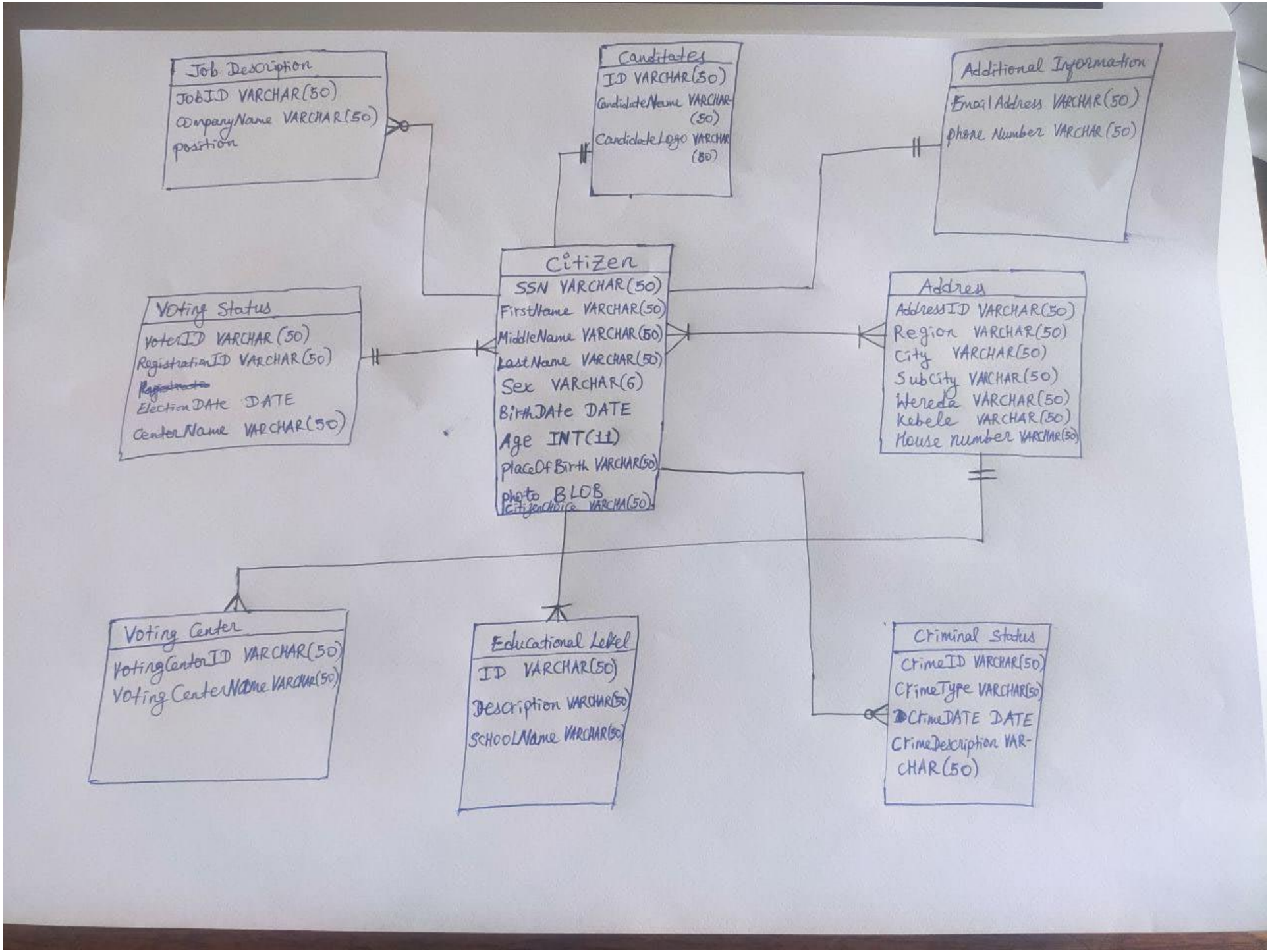
It is a simple attribute.

-crime date: it holds the date of the crime has recorded. It is a composite attribute is holds date, month and year.

Relation

One citizen can have one or many criminal status .

The next page show as the overall ER diagram for our design.


Job Description
JobID VARCHAR(50)
CompanyName VARCHAR(50)
position
Candidates
ID VARCHAR(50)
CandidateName VARCHAR(50)
CandidateLogo VARCHAR(50)
Additional Information
Email Address VARCHAR(50)
phone Number VARCHAR(50)
Citizen
SSN VARCHAR(50)
FirstName VARCHAR(50)
MiddleName VARCHAR(50)
LastName VARCHAR(50)
Sex VARCHAR(6)
BirthDate DATE
Age INT(11)
placeOfBirth VARCHAR(50)
photo BLOB
CitizenChoice VARCHA(50)
Voting Status
VoterID VARCHAR(50)
RegistrationID VARCHAR(50)
ElectionDate DATE
CenterName VARCHAR(50)
Address
AddressID VARCHAR(50)
Region VARCHAR(50)
City VARCHAR(50)
SubCity VARCHAR(50)
Wereda VARCHAR(50)
Kebele VARCHAR(50)
House number VARCHAR(50)
Voting Center
VotingCenterID VARCHAR(50)
VotingCenterName VARCHAR(50)
Educational Level
ID VARCHAR(50)
Description VARCHAR(50)
SCHOOLName VARCHAR(50)
Criminal Status
CrimeID VARCHAR(50)
CrimeType VARCHAR(50)
CrimeDATE DATE
CrimeDescription VARCHAR(50)

Part two: # Logical Design

2.1 ER to Relational Model Mapping

CITIZEN

SSN	First Name	Middle Name	Last Name	Sex	Birthday	Age	Place of Birth	Photo	Edu. ID	Crim. ID	Vot. ID	Add. ID	Job ID	Can. ID	Email ID	Citizen choice

ADDRESS

Add. ID	Region	City	Sub-City	Woreda	Kebele	House No.

VOTING CENTER

Vot. ID	Voting Center Name	Address ID

CRIMINAL STATUS

Crim. ID	Crime Type	Crime Date	Crime Description

EDUCATIONAL LEVEL

Edu. ID	Description	School Name

JOB DESCRIPTION

Job ID	Company Name	Positon

CANDIDATES

Cand. ID	Candidate Name	Candidate Logo

ADDITIONAL INFORMATION

Email Add.	Phone Number

VOTING STATUS

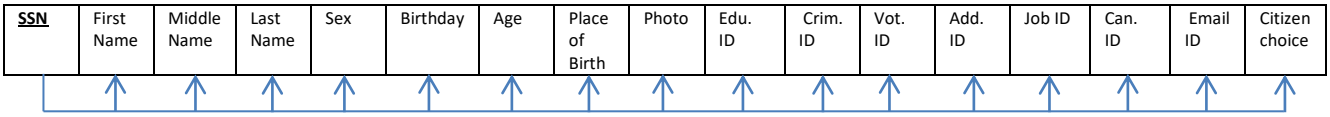
Voter ID	Registration ID	Election Date	Center Name

2.2 List of Functional Dependencies

CITIZEN : In the citizen relation the primary key (SSN) determines every other entity so this will be our only functional dependency since there are no other dependencies, thus the closure of SSN will be: {SSN} + = {SSN, First

Name, Middle name, Last name, sex, birthday , Age, place of birth, photo, edu.ID, crim.ID, Add. ID, Vot. ID, Job ID, Can. ID, Email ID, Citizen Choice}= citizen

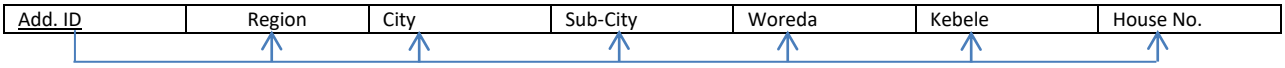
CITIZEN



ADDRESS

ADDRESS : In the address relation the primary key (Add. ID) determines every other entity so this will be our only functional dependency since there are no other dependencies, thus the closure of Add.ID will be: {Add.ID} + = {Add.ID, region, city, subcity, wereda, kebele, House No.}= ADDRESS

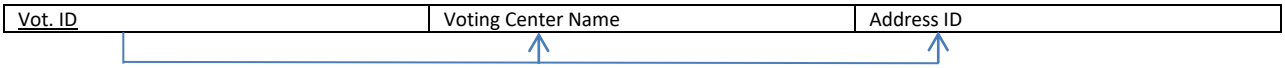
ADDRESS



VOTING CENTER

VOTING CENTER: In the voting center relation the primary key (vot.ID) determines every other entity so this will be our only functional dependency since there are no other dependencies, thus the closure of vot.ID will be: {vot.ID} + = {vot.ID, voting center Name, Address ID}= **VOTING CENTER**

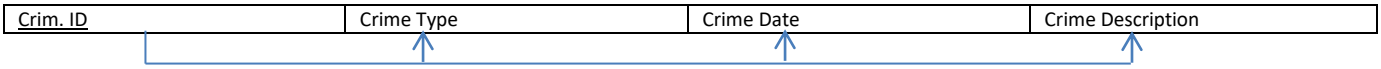
VOTING CENTER



CRIMINAL STATUS

CRIMINAL STATUS: In the criminal status the primary key (crim.ID) determines every other entity so this will be our only functional dependency since there are no other dependencies, thus the closure of crim.ID will be: { crim.ID } + = { crim.ID,crime type, crime date, crime description }= CRIMINAL STATUS

CRIMINAL STATUS



EDUCATIONAL LEVEL

EDUCATIONAL LAEVEL: In the criminal status the primary key (Edu. ID) determines every other entity so this will be our only functional dependency since there are no other dependencies, thus the closure of Edu. ID will be: { edu.ID } + = { edu.ID, Description , School name }= EDUCATIONAL LEVEL

EDUCATIONAL LEVEL

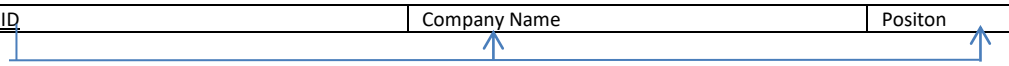
Edu. ID	Description	School Name

JOB DESCRIPTION

JOB DESCRIPTION: In the job description the primary key (Job. ID) determines every other entity so this will be our only functional dependency since there are no other dependencies, thus the closure of Job ID will be: { edu.ID } + = { Job ID, company name, position }= JOB DESCRIPTION

JOB DESCRIPTION

Job ID	Company Name	Positon

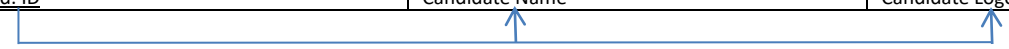


CANDIDATES

CANDIDATES: In the job description the primary key (cand. ID) determines every other entity so this will be our only functional dependency since there are no other dependencies, thus the closure of Job ID will be: { cand. ID } + = { cand. ID, candidate Name, candidate Logo}= CANDIDATES

CANDIDATES

Cand. ID	Candidate Name	Candidate Logo

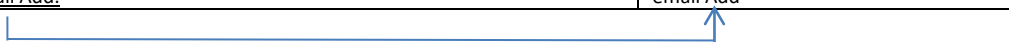


ADDITIONAL INFORMATION

ADDITIONAL INFORMATION: In the **ADDITIONAL INFORMATION** the primary key (email Add.) determines the other entity so this will be our only functional dependency since there are no other dependencies, thus the closure of email Add will be: { email Add } + = { email Add, email Add }= **ADDITIONAL INFORMATION**

ADDITIONAL INFORMATION

Email Add.	email Add

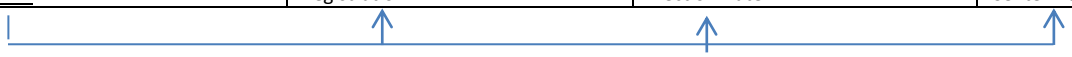


VOTING STATUS

VOTING STATUS: In the voting status the primary key (voter ID.) determines the other entity so this will be our only functional dependency since there are no other dependencies, thus the closure of voter ID will be: { voter ID } + = { voter ID, Registration ID, Election Date, center Name}= **VOTING STATUS**

VOTING STATUS

Voter ID	Registration ID	Election Date	Center Name



2.2 Normalization

CITIZEN: in this relation the all attribute are determine by the SNN which is the super key of the relation. Therefore by the rule of BCNF normalization it is already normalized.

ADDRESS: in this relation the all attributes are determine by Address ID which is the super key of the relation there according to the BCNF normalization rule it is already normalized.

VOTING CENTER: in this relation the attribute vot.ID voting center name and Address ID are depend on the super key "vot.ID" or the super key vot.ID determine all the other attribute and since the vot.ID is the super key by BCNF rule it is normalized.

CRIMINAL STATUS

In this relation as we see in the above the attributes are depends on only the super key therefore it is normalized by the rule of BCNF.

- And for the relation **Educational Level ,Job Description, Candidates, Additional Information and Voting Status** **all the attributes in each relation are depends on the superkey of the attributes or the attributes of the relations are determine by the super key of the relation so according to the BCNF rule there are already normalized**

End