VoteX – Campaign Compass

Analysing Pitfalls, Identifying dependencies and applying Normalization techniques in Database

---

Sanjay Ponnambalam N

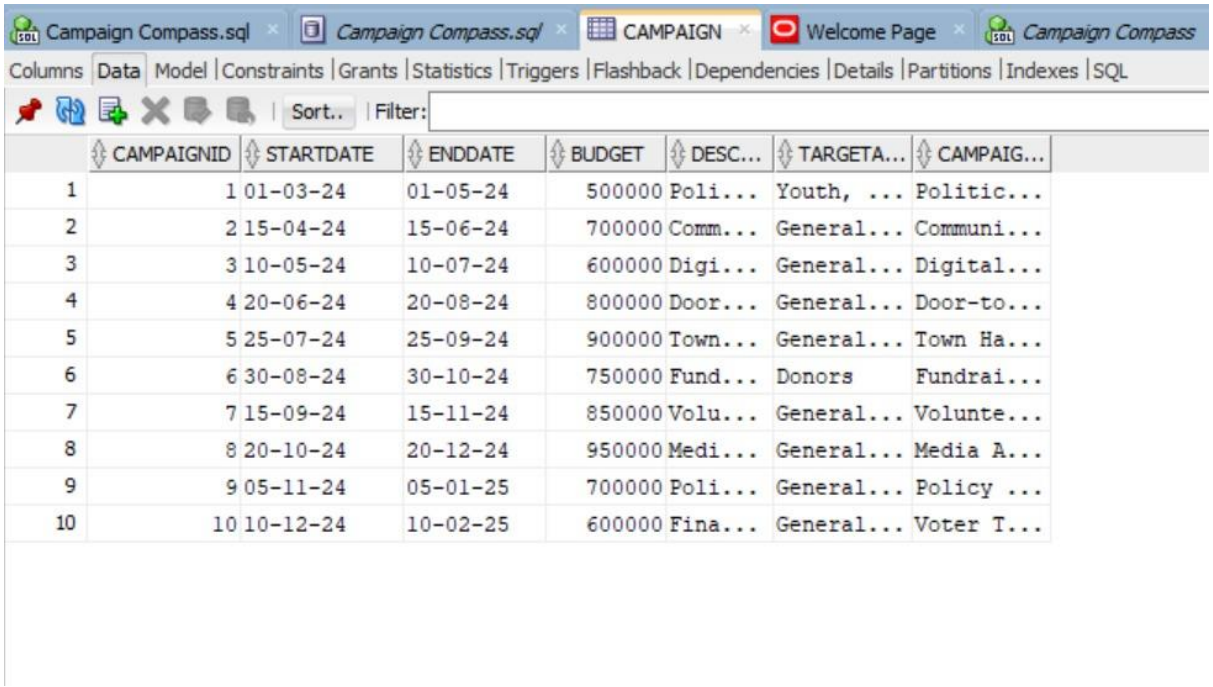
RA2211026010136

Y1 – B. Tech CSE – AI & ML

Kirushakkarasu KT

RA2211026010134

Y1 – B. Tech CSE – AI & ML

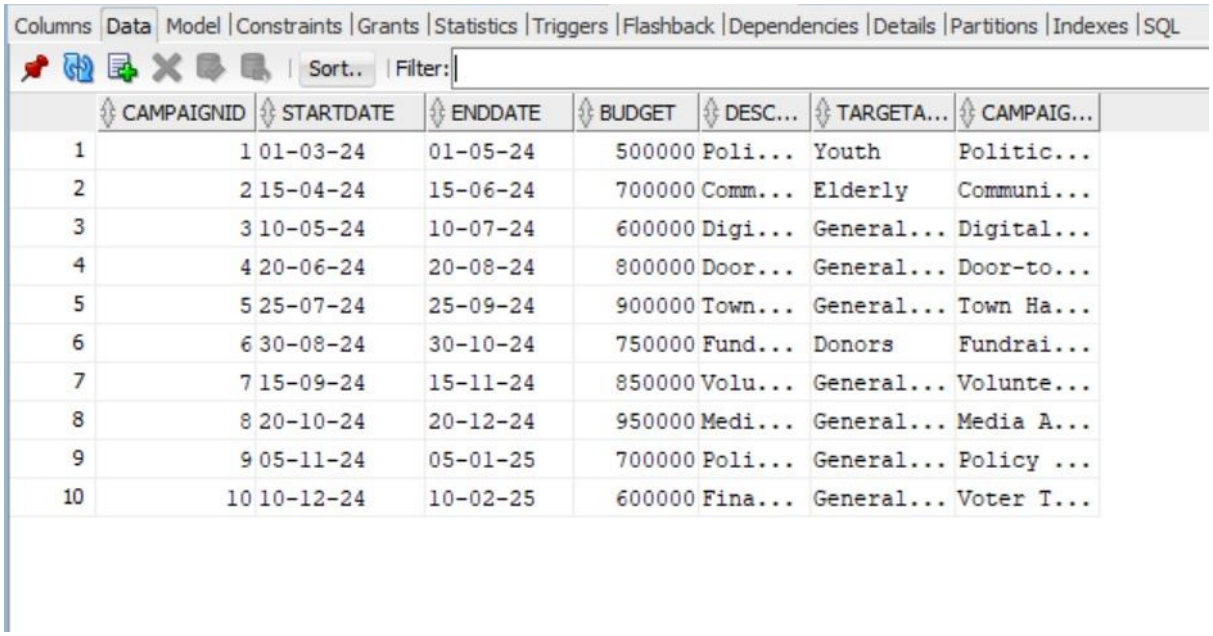


	CAMPAIGNID	STARTDATE	ENDDATE	BUDGET	DESC...	TARGETA...	CAMPAIG...
1	1	01-03-24	01-05-24	500000	Poli...	Youth, ...	Politic...
2	2	15-04-24	15-06-24	700000	Comm...	General...	Communi...
3	3	10-05-24	10-07-24	600000	Digi...	General...	Digital...
4	4	20-06-24	20-08-24	800000	Door...	General...	Door-to...
5	5	25-07-24	25-09-24	900000	Town...	General...	Town Ha...
6	6	30-08-24	30-10-24	750000	Fund...	Donors	Fundrai...
7	7	15-09-24	15-11-24	850000	Volu...	General...	Volunte...
8	8	20-10-24	20-12-24	950000	Medi...	General...	Media A...
9	9	05-11-24	05-01-25	700000	Poli...	General...	Policy ...
10	10	10-12-24	10-02-25	600000	Fina...	General...	Voter T...

First Normal Form (1NF):

No multivalued attributes or repeating groups.

All attributes are atomic.



Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	CAMPAIGNID	STARTDATE	ENDDATE	BUDGET	DESC...	TARGETA...	CAMPAIG...
1	1	01-03-24	01-05-24	500000	Poli...	Youth	Politic...
2	2	15-04-24	15-06-24	700000	Comm...	Elderly	Communi...
3	3	10-05-24	10-07-24	600000	Digi...	General...	Digital...
4	4	20-06-24	20-08-24	800000	Door...	General...	Door-to...
5	5	25-07-24	25-09-24	900000	Town...	General...	Town Ha...
6	6	30-08-24	30-10-24	750000	Fund...	Donors	Fundrai...
7	7	15-09-24	15-11-24	850000	Volu...	General...	Volunte...
8	8	20-10-24	20-12-24	950000	Medi...	General...	Media A...
9	9	05-11-24	05-01-25	700000	Poli...	General...	Policy ...
10	10	10-12-24	10-02-25	600000	Fina...	General...	Voter T...

Functional Dependency:

(CampaignID, CampaignName) → StartDate, EndDate, Budget, Description, TargetAudience

Closure attributes:

{CampaignID, CampaignName}+ ={CampaignID, CampaignName, StartDate, EndDate, Budget, Description, TargetAudience}

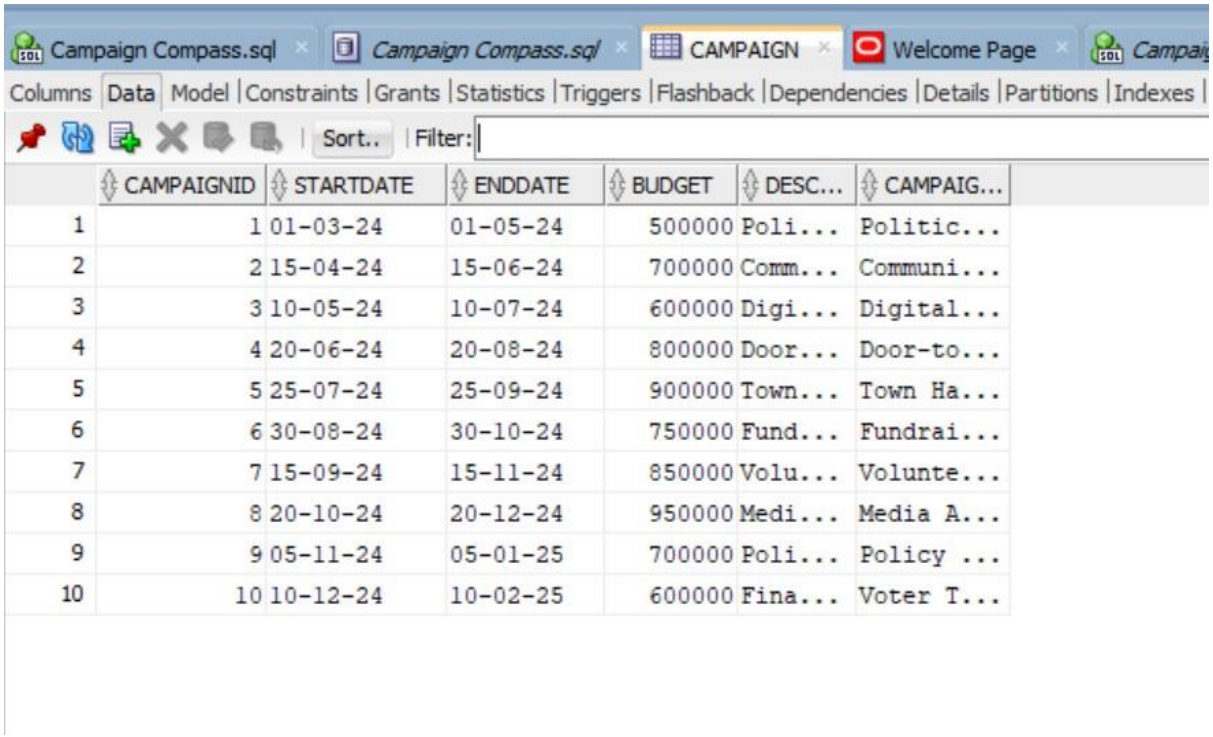
Candidate Key: (CampaignID, CampaignName)

Second Normal Form (2NF):

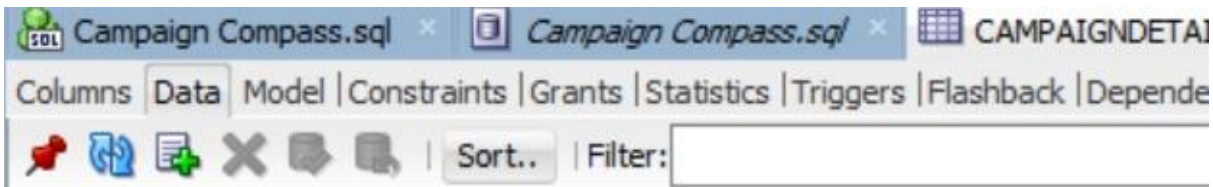
Decomposed Relations:

R1(CampaignID, CampaignName, StartDate, EndDate, Budget, Description)

R2(CampaignID, CampaignName, TargetAudience)



	CAMPAIGNID	STARTDATE	ENDDATE	BUDGET	DESC...	CAMPAIG...
1	1	01-03-24	01-05-24	500000	Poli...	Politic...
2	2	15-04-24	15-06-24	700000	Comm...	Communi...
3	3	10-05-24	10-07-24	600000	Digi...	Digital...
4	4	20-06-24	20-08-24	800000	Door...	Door-to...
5	5	25-07-24	25-09-24	900000	Town...	Town Ha...
6	6	30-08-24	30-10-24	750000	Fund...	Fundrai...
7	7	15-09-24	15-11-24	850000	Volu...	Volunte...
8	8	20-10-24	20-12-24	950000	Medi...	Media A...
9	9	05-11-24	05-01-25	700000	Poli...	Policy ...
10	10	10-12-24	10-02-25	600000	Fina...	Voter T...



	CAMPAIGNID	CAMPAIGNNAME	TARGETAUDIENCE
1	1	Political Rally	Youth
2	2	Community Outreach	General Public
3	3	Digital Media Campaign	Youth
4	4	Door-to-Door Canvassing	General Public
5	5	Town Hall Meetings	General Public
6	6	Fundraising Events	Donors
7	7	Volunteer Recruitment	General Public
8	8	Media Advertising	General Public
9	9	Policy Speeches	General Public
10	10	Voter Turnout Push	General Public

Functional Dependency:

CampaignID → CampaignName, StartDate, EndDate, Budget, Description

CampaignName → TargetAudience

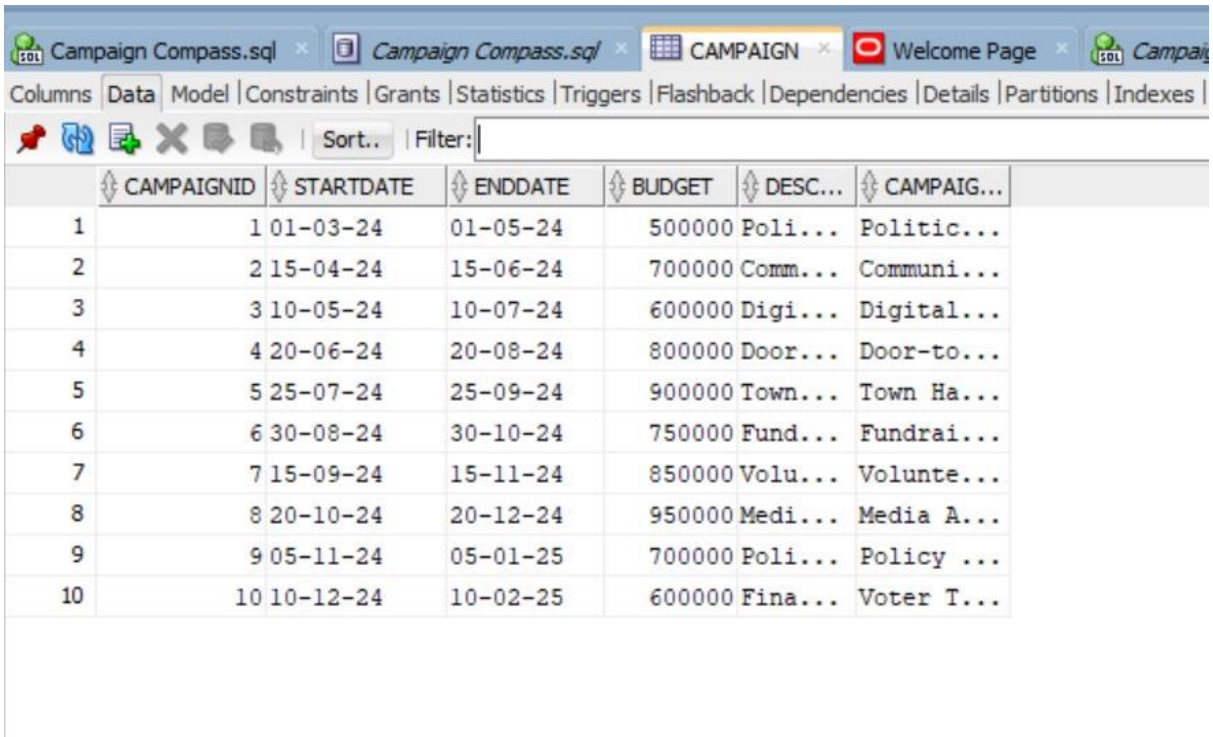
Closure attributes:

{CampaignID, CampaignName}+ ={CampaignID, CampaignName, StartDate, EndDate, Budget, Description}

Candidate keys:{CampaignID,CampaignName}

Third Normal Form:

considering this table which satisfied 2NF,



	CAMPAIGNID	STARTDATE	ENDDATE	BUDGET	DESC...	CAMPAIG...
1	1	01-03-24	01-05-24	500000	Poli...	Politic...
2	2	15-04-24	15-06-24	700000	Comm...	Communi...
3	3	10-05-24	10-07-24	600000	Digi...	Digital...
4	4	20-06-24	20-08-24	800000	Door...	Door-to...
5	5	25-07-24	25-09-24	900000	Town...	Town Ha...
6	6	30-08-24	30-10-24	750000	Fund...	Fundrai...
7	7	15-09-24	15-11-24	850000	Volu...	Volunte...
8	8	20-10-24	20-12-24	950000	Medi...	Media A...
9	9	05-11-24	05-01-25	700000	Poli...	Policy ...
10	10	10-12-24	10-02-25	600000	Fina...	Voter T...

Functional Dependency:

CampaignID, CampaignName → StartDate, EndDate, Budget, Description

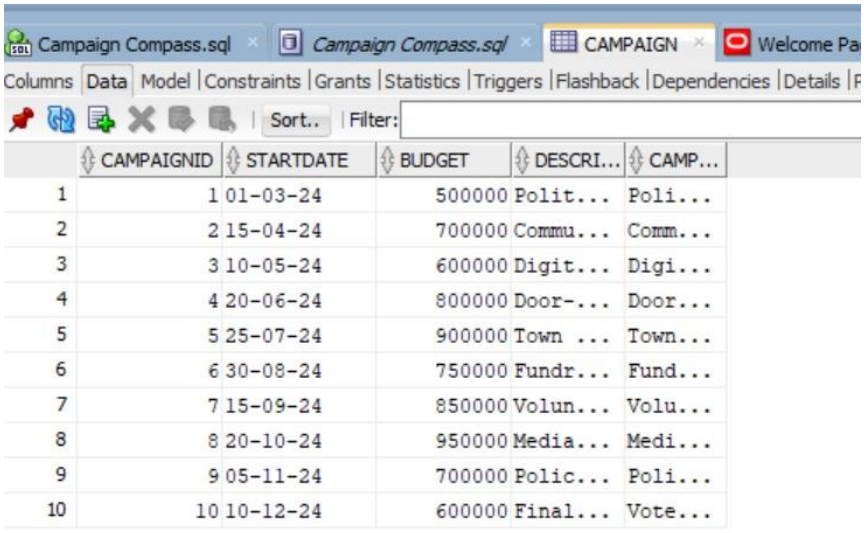
StartDate → EndDate

CampaingID -> Enddate

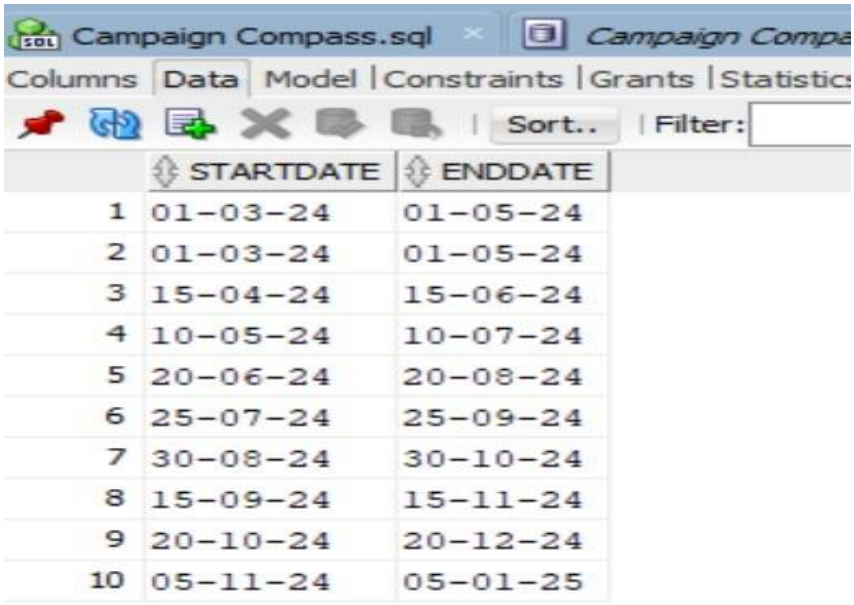
Decomposing the table :

R1(CampaignID, CampaignName, StartDate, Budget, Description)

R2(StartDate, EndDate)



	CAMPAIGNID	STARTDATE	BUDGET	DESCRI...	CAMP...
1	1	01-03-24	500000	Polit...	Poli...
2	2	15-04-24	700000	Commu...	Comm...
3	3	10-05-24	600000	Digit...	Digi...
4	4	20-06-24	800000	Door-...	Door...
5	5	25-07-24	900000	Town ...	Town...
6	6	30-08-24	750000	Fundr...	Fund...
7	7	15-09-24	850000	Volun...	Volu...
8	8	20-10-24	950000	Media...	Medi...
9	9	05-11-24	700000	Polic...	Poli...
10	10	10-12-24	600000	Final...	Vote...



	STARTDATE	ENDDATE
1	01-03-24	01-05-24
2	01-03-24	01-05-24
3	15-04-24	15-06-24
4	10-05-24	10-07-24
5	20-06-24	20-08-24
6	25-07-24	25-09-24
7	30-08-24	30-10-24
8	15-09-24	15-11-24
9	20-10-24	20-12-24
10	05-11-24	05-01-25

Candidate Key:

{CampaignID,CampaignName}

Closure Attributes

{CampaignID, CampaignName}+ ={CampaignID, CampaignName, StartDate, Budget, Description}

{StartDate}+ ={StartDate, EndDate}

BCNF : Super keys

Functional dependency:

CampaignID, CampaignName → StartDate, Budget, Description

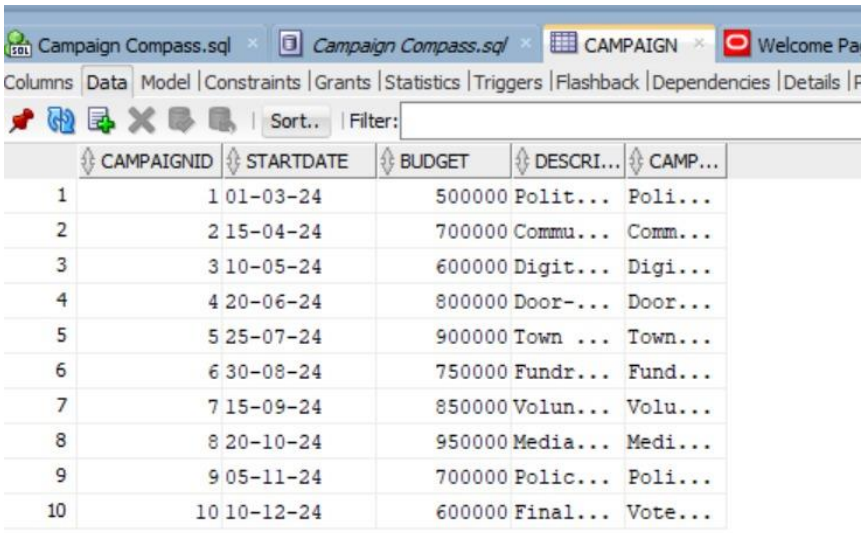
Closure:

{CampaignID}+ ={CampaignID, StartDate, Budget, Description}

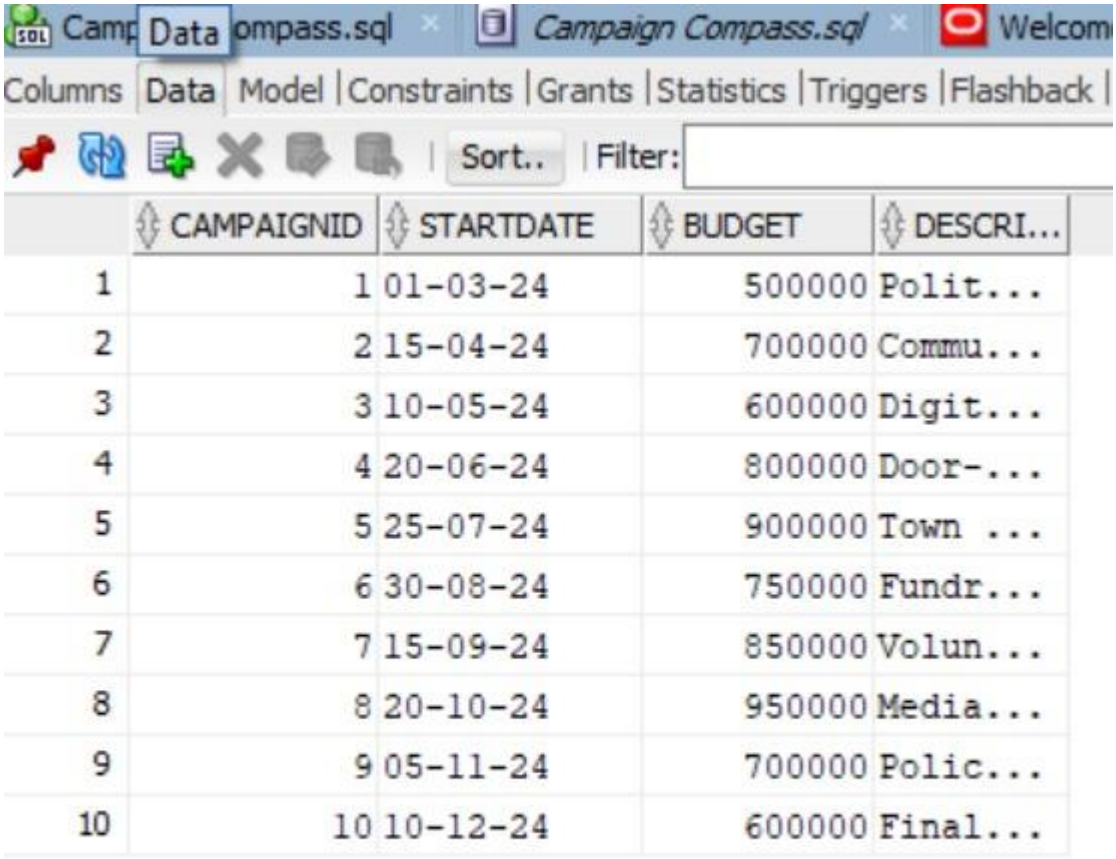
{CampaignID, CampaignName}+ ={CampaignID, CampaignName}

super keys:{CampaignID, CampaignName}

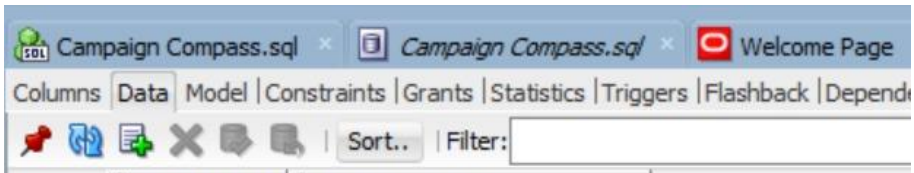
Consider this table,



	CAMPAIGNID	STARTDATE	BUDGET	DESCRI...	CAMP...
1	1	01-03-24	500000	Polit...	Poli...
2	2	15-04-24	700000	Commu...	Comm...
3	3	10-05-24	600000	Digit...	Digi...
4	4	20-06-24	800000	Door-...	Door...
5	5	25-07-24	900000	Town ...	Town...
6	6	30-08-24	750000	Fundr...	Fund...
7	7	15-09-24	850000	Volun...	Volu...
8	8	20-10-24	950000	Media...	Medi...
9	9	05-11-24	700000	Polic...	Poli...
10	10	10-12-24	600000	Final...	Vote...



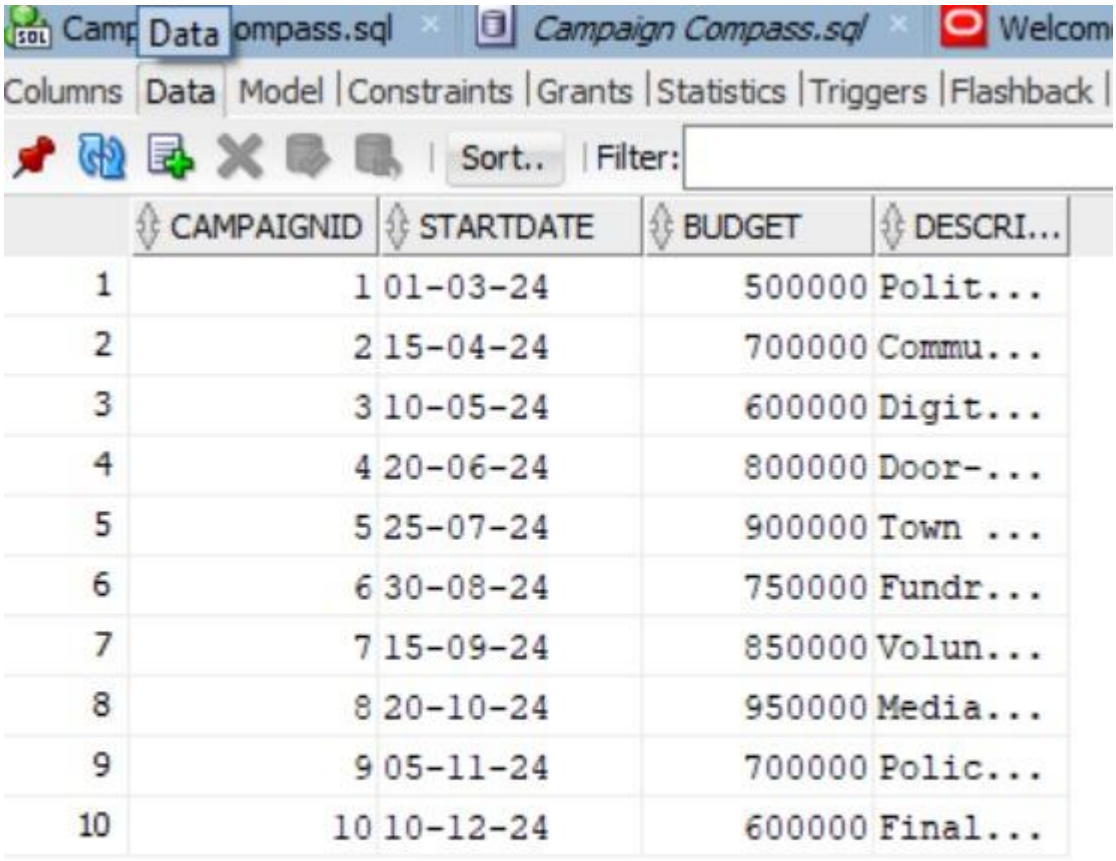
	CAMPAIGNID	STARTDATE	BUDGET	DESCRI...
1	1	01-03-24	500000	Polit...
2	2	15-04-24	700000	Commu...
3	3	10-05-24	600000	Digit...
4	4	20-06-24	800000	Door-...
5	5	25-07-24	900000	Town ...
6	6	30-08-24	750000	Fundr...
7	7	15-09-24	850000	Volun...
8	8	20-10-24	950000	Media...
9	9	05-11-24	700000	Polic...
10	10	10-12-24	600000	Final...



	CAMPAIGNID	CAMPAIGNNAME
1	1	Political Rally
2	2	Community Outreach
3	3	Digital Media Campaign
4	4	Door-to-Door Canvassing
5	5	Town Hall Meetings
6	6	Fundraising Events
7	7	Volunteer Recruitment
8	8	Media Advertising
9	9	Policy Speeches
10	10	Voter Turnout Push

Fourth Normal Form(4NF): NO Multivalued dependency

Consider this table,



	CAMPAIGNID	STARTDATE	BUDGET	DESCRI...
1	1	01-03-24	500000	Polit...
2	2	15-04-24	700000	Commu...
3	3	10-05-24	600000	Digit...
4	4	20-06-24	800000	Door-...
5	5	25-07-24	900000	Town ...
6	6	30-08-24	750000	Fundr...
7	7	15-09-24	850000	Volun...
8	8	20-10-24	950000	Media...
9	9	05-11-24	700000	Polic...
10	10	10-12-24	600000	Final...

MVD: {CampaignID} ->> {StartDate}

Functional Dependency:

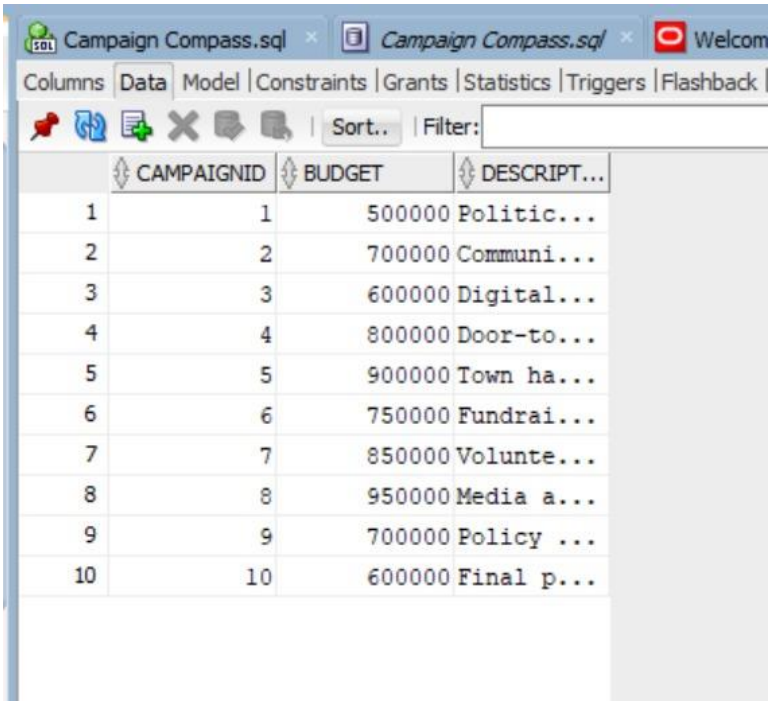
CampaignID -> (StartDate, Budget, Description)

Candidate Key: {CampaignID}

Closure Attributes: {CampaignID}+ = {CampaignID, StartDate, Budget, Description

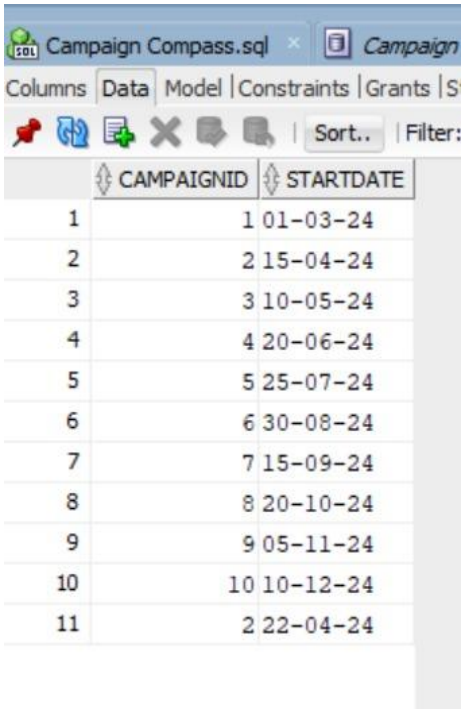
Decomposing the table

R1(CampaignID, Budget, Description)



	CAMPAIGNID	BUDGET	DESCRIPT...
1	1	500000	Politic...
2	2	700000	Communi...
3	3	600000	Digital...
4	4	800000	Door-to...
5	5	900000	Town ha...
6	6	750000	Fundrai...
7	7	850000	Volunte...
8	8	950000	Media a...
9	9	700000	Policy ...
10	10	600000	Final p...

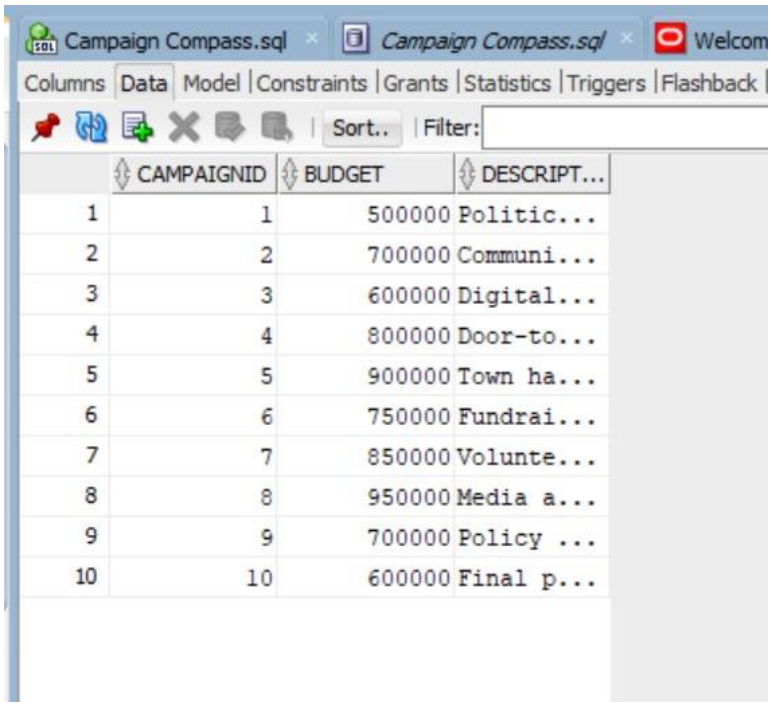
R2(CampaignID, StartDate)



	CAMPAIGNID	STARTDATE
1	1	01-03-24
2	2	15-04-24
3	3	10-05-24
4	4	20-06-24
5	5	25-07-24
6	6	30-08-24
7	7	15-09-24
8	8	20-10-24
9	9	05-11-24
10	10	10-12-24
11	2	22-04-24

Fifth Normal Form 5NF : No Join dependency

Consider this table,



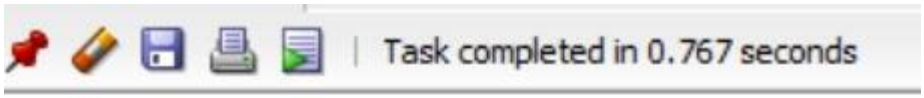
	CAMPAIGNID	BUDGET	DESCRIPT...
1	1	500000	Politic...
2	2	700000	Communi...
3	3	600000	Digital...
4	4	800000	Door-to...
5	5	900000	Town ha...
6	6	750000	Fundrai...
7	7	850000	Volunte...
8	8	950000	Media a...
9	9	700000	Policy ...
10	10	600000	Final p...

Functional Dependency:

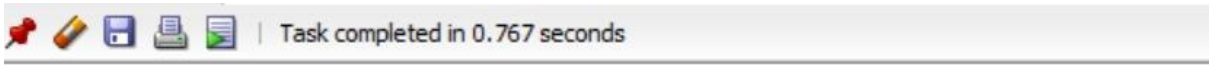
CampaignID -> Budget, Description

Candidate Key: {CampaignID}

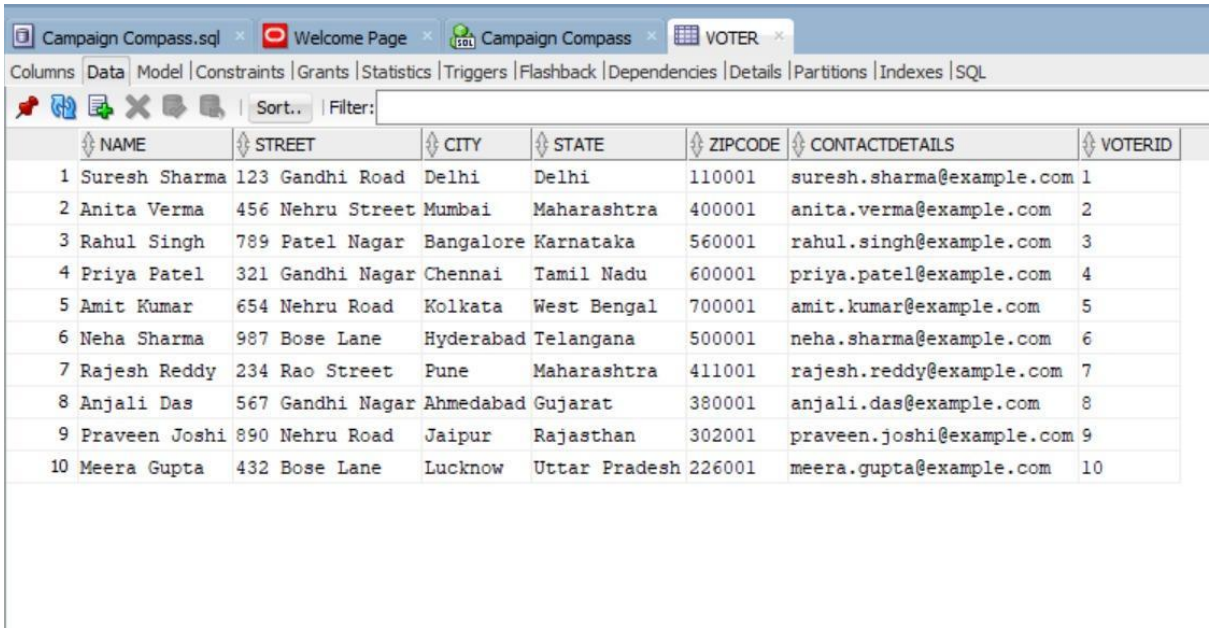
Closure Attributes: {CampaignID}+ = {CampaignID, Budget, Description}



CAMPAIGNID	BUDGET
1	500000
2	700000
3	600000
4	800000
5	900000
6	750000
7	850000
8	950000
9	700000
10	600000



CAMPAIGNID	DESCRIPTION
1	Political rally for the upcoming elections
2	Community outreach program to engage voters
3	Digital media campaign targeting youth voters
4	Door-to-door canvassing in local neighborhoods
5	Town hall meetings to address citizen concerns
6	Fundraising events to support campaign initiatives
7	Volunteer recruitment drives for grassroots efforts
8	Media advertising blitz to increase candidate visibility
9	Policy speeches and debates to showcase candidate platform
10	Final push for voter turnout on election day



	NAME	STREET	CITY	STATE	ZIPCODE	CONTACTDETAILS	VOTERID
1	Suresh Sharma	123 Gandhi Road	Delhi	Delhi	110001	suresh.sharma@example.com	1
2	Anita Verma	456 Nehru Street	Mumbai	Maharashtra	400001	anita.verma@example.com	2
3	Rahul Singh	789 Patel Nagar	Bangalore	Karnataka	560001	rahul.singh@example.com	3
4	Priya Patel	321 Gandhi Nagar	Chennai	Tamil Nadu	600001	priya.patel@example.com	4
5	Amit Kumar	654 Nehru Road	Kolkata	West Bengal	700001	amit.kumar@example.com	5
6	Neha Sharma	987 Bose Lane	Hyderabad	Telangana	500001	neha.sharma@example.com	6
7	Rajesh Reddy	234 Rao Street	Pune	Maharashtra	411001	rajesh.reddy@example.com	7
8	Anjali Das	567 Gandhi Nagar	Ahmedabad	Gujarat	380001	anjali.das@example.com	8
9	Praveen Joshi	890 Nehru Road	Jaipur	Rajasthan	302001	praveen.joshi@example.com	9
10	Meera Gupta	432 Bose Lane	Lucknow	Uttar Pradesh	226001	meera.gupta@example.com	10

1NF (First Normal Form):

The table is already in 1NF as each attribute contains atomic values, and there are no repeating groups.

2NF (Second Normal Form):

All attributes must be functionally dependent on the whole primary key.

ID -> Name
ID -> Street, City, State, Zip Code
ID -> Contact Details
ID -> Voter ID
Voter ID -> ID

$(ID, Voter\ ID)^+$ = Name, Street, City, State, Zip Code, Contact Details, Voter ID

Candidate Keys = ID, Voter ID

Non prime attributes are fully functionally dependent on the candidate key, so no partial dependency.

The table is already in 2NF since all non-prime attributes are fully functionally dependent on the Candidate ID (primary key).

3NF (Third Normal Form):

ID→Name

ID→Street, City, State, Zip Code

ID→Street, City, State, Zip Code

ID→Contact DetailsID→Contact Details

ID→Voter IDID→Voter ID

Voter ID→ID

Voter ID→ID - This dependency indicates a transitive dependency from Voter ID to ID, which implies that Voter IDis functionally determining ID. This dependency suggests a violation of 3NF.

To put it in 3NF, we can decompose the relation to remove the transitive dependency:

Relation 1:

ID→Name, Street, City, State, Zip Code, Contact Details

Relation 2

ID→Voter ID

Now, both relations satisfy 3NF.

Address Table:

Address_ID	Street	City	State	Zip Code
1	123 Gandhi Road	Delhi	Delhi	110001
2	456 Nehru Street	Mumbai	Maharashtra	400001
3	789 Patel Nagar	Bangalore	Karnataka	560001
4	321 Gandhi Nagar	Chennai	Tamil Nadu	600001
5	654 Nehru Road	Kolkata	West Bengal	700001
6	987 Bose Lane	Hyderabad	Telangana	500001
7	890 Nehru Road	Pune	Maharashtra	411001
8	567 Gandhi Nagar	Ahmedabad	Gujarat	380001
9	234 Rao Street	Jaipur	Rajasthan	302001
10	432 Bose Lane	Lucknow	Uttar Pradesh	226001

Individuals Table (Updated):

ID	Name	Address_ID	Contact Details	Voter ID
1	Suresh Sharma	1	suresh.sharma@example.com	1
2	Anita Verma	2	anita.verma@example.com	2
3	Rahul Singh	3	rahul.singh@example.com	3
4	Priya Patel	4	priya.patel@example.com	4
5	Amit Kumar	5	amit.kumar@example.com	5
6	Neha Sharma	6	neha.sharma@example.com	6
7	Rajesh Reddy	7	rajesh.reddy@example.com	7
8	Anjali Das	8	anjali.das@example.com	8
9	Praveen Joshi	9	praveen.joshi@example.com	9
10	Meera Gupta	10	meera.gupta@example.com	10

BCNF (Boyce-Codd Normal Form):

For every functional dependency (X → Y), X must be a superkey.

The table is already in BCNF as all dependencies satisfy the condition.

VoterID -> Name

VoterID -> Street, City, State, Zip Code

VoterID -> Contact Details

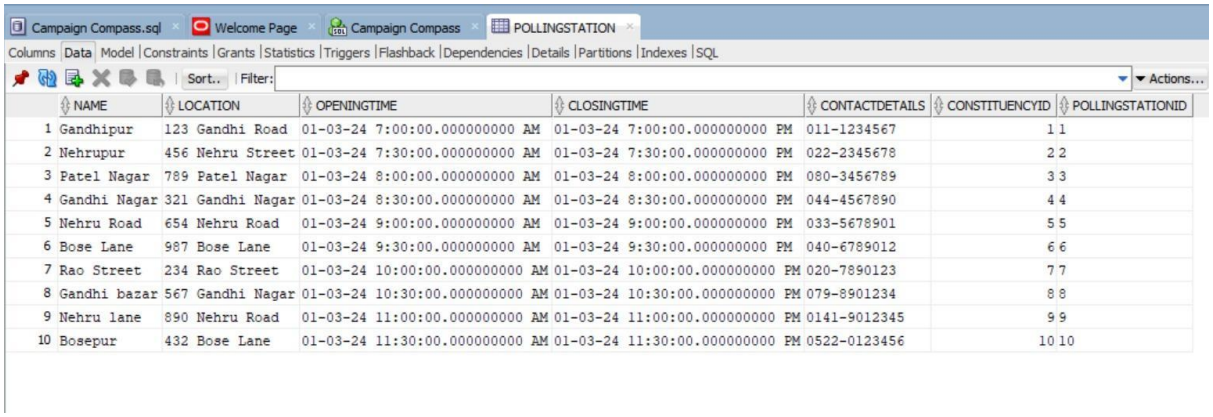
the super keys is {Voter ID}, each uniquely identifying individuals.Both super keys determine all attributes. This table is already in BCNF.

4NF (Fourth Normal Form):

- No multi-valued dependencies exist.
- The table is in 4NF as there are no multi-valued dependencies.

5NF (Fifth Normal Form):

- Decomposition into smaller tables to reduce redundancy while preserving dependencies.
- Since the table is already in BCNF and 4NF, no further decomposition is necessary to achieve 5NF.



	NAME	LOCATION	OPENINGTIME	CLOSINGTIME	CONTACTDETAILS	CONSTITUENCYID	POLLINGSTATIONID
1	Gandhipur	123 Gandhi Road	01-03-24 7:00:00.000000000 AM	01-03-24 7:00:00.000000000 PM	011-1234567	1	1
2	Nehrupur	456 Nehru Street	01-03-24 7:30:00.000000000 AM	01-03-24 7:30:00.000000000 PM	022-2345678	2	2
3	Patel Nagar	789 Patel Nagar	01-03-24 8:00:00.000000000 AM	01-03-24 8:00:00.000000000 PM	080-3456789	3	3
4	Gandhi Nagar	321 Gandhi Nagar	01-03-24 8:30:00.000000000 AM	01-03-24 8:30:00.000000000 PM	044-4567890	4	4
5	Nehru Road	654 Nehru Road	01-03-24 9:00:00.000000000 AM	01-03-24 9:00:00.000000000 PM	033-5678901	5	5
6	Bose Lane	987 Bose Lane	01-03-24 9:30:00.000000000 AM	01-03-24 9:30:00.000000000 PM	040-6789012	6	6
7	Rao Street	234 Rao Street	01-03-24 10:00:00.000000000 AM	01-03-24 10:00:00.000000000 PM	020-7890123	7	7
8	Gandhi bazar	567 Gandhi Nagar	01-03-24 10:30:00.000000000 AM	01-03-24 10:30:00.000000000 PM	079-8901234	8	8
9	Nehru lane	890 Nehru Road	01-03-24 11:00:00.000000000 AM	01-03-24 11:00:00.000000000 PM	0141-9012345	9	9
10	Bosepur	432 Bose Lane	01-03-24 11:30:00.000000000 AM	01-03-24 11:30:00.000000000 PM	0522-0123456	10	10

1NF (First Normal Form):

The table is already in 1NF, as each cell contains a single atomic value, and there are no repeating groups.

2NF (Second Normal Form):

PollingStationID → Name, Location, OpeningTime, ClosingTime, ContactDetails, ConstituencyID

Name, Location, OpeningTime, ClosingTime, ContactDetails, ConstituencyID → PollingStationID

ConstituencyID → Name, Location, OpeningTime, ClosingTime, ContactDetails

Candidate key = pollingStationID

Non prime attributes are fully functionally dependent on the candidate key, so no partial dependency.

3NF (Third Normal Form):

PollingStationID → Name, Location, OpeningTime, ClosingTime, ContactDetails, ConstituencyID

Name, Location, OpeningTime, ClosingTime, ContactDetails, ConstituencyID → PollingStationID

ConstituencyID → Name, Location, OpeningTime, ClosingTime, ContactDetails

Since all the dependencies are already based on candidate keys and all attributes are prime, there is no transitive dependency. Hence, the relation is already in 3NF.

BCNF (Boyce-Codd Normal Form):

The table is not in BCNF because there's a non-trivial functional dependency:

PollingStationID → ConstituencyID

Here, PollingStationID is not a superkey since it doesn't uniquely determine all other attributes. ConstituencyID is functionally dependent on PollingStationID but not on the entire primary key.

To bring the table to BCNF, we need to decompose it to ensure that each determinant is a superkey. We can achieve this by splitting the table into two:

Table 1: PollingStationDetails

PollingStationID	Name	Location	OpeningTime	ClosingTime	ContactDetails
1	Bose Lane	6 Bose Lane	7:00:00 AM	7:00:00 PM	011-1234567
2	Nehru Road	654 Nehru Road	7:30:00 AM	7:30:00 PM	022-2345678
3	Bose Lane	987 Bose Lane	8:00:00 AM	8:00:00 PM	080-3456789
4	Rao Street	7 Rao Street	8:30:00 AM	8:30:00 PM	044-4567890
5	Rao Street	234 Rao Street	9:00:00 AM	9:00:00 PM	033-5678901
6	Gandhi bazar	567 Gandhi Nagar	9:30:00 AM	9:30:00 PM	040-6789012
7	Nehru lane	9 Nehru lane	10:00:00 AM	10:00:00 PM	020-7890123
8	Bosepur	10 Bosepur	10:30:00 AM	10:30:00 PM	079-8901234
9	Nehru Road	890 Nehru Road	11:00:00 AM	11:00:00 PM	0141-9012345
10	Bose Lane	432 Bose Lane	11:30:00 AM	11:30:00 PM	0522-0123456

Table 2: PollingStationConstituency

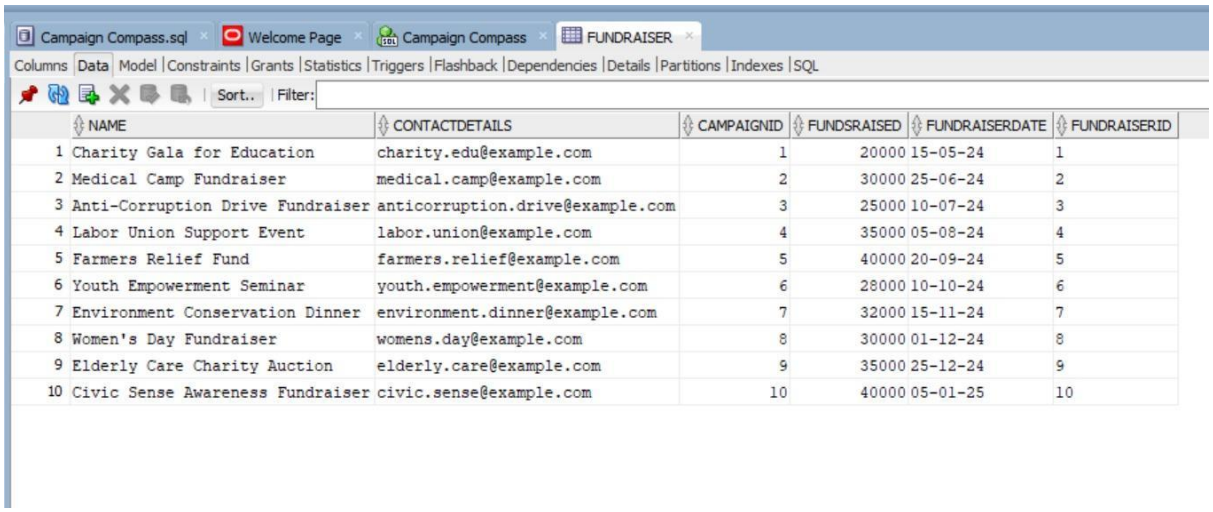
PollingStationID	ConstituencyID
1	8
2	9
3	10
4	11
5	12
6	13
7	14
8	15
9	16
10	17

Now, both tables satisfy BCNF, and all functional dependencies are preserved without any violations.

4NF (Fourth Normal Form) and 5NF (Fifth Normal Form):

Since BCNF already guarantees that there are no non-trivial dependencies, the tables are automatically in 4NF and 5NF as well.

This completes the normalization process up to BCNF and ensures that the tables are in 1NF, 2NF, 3NF, BCNF, 4NF, and 5NF. Let me know if you need further assistance!



	NAME	CONTACTDETAILS	CAMPAIGNID	FUNDSRAISED	FUNDRAISERDATE	FUNDRAISERID
1	Charity Gala for Education	charity.edu@example.com	1	20000	15-05-24	1
2	Medical Camp Fundraiser	medical.camp@example.com	2	30000	25-06-24	2
3	Anti-Corruption Drive Fundraiser	anticorruption.drive@example.com	3	25000	10-07-24	3
4	Labor Union Support Event	labor.union@example.com	4	35000	05-08-24	4
5	Farmers Relief Fund	farmers.relief@example.com	5	40000	20-09-24	5
6	Youth Empowerment Seminar	youth.empowerment@example.com	6	28000	10-10-24	6
7	Environment Conservation Dinner	environment.dinner@example.com	7	32000	15-11-24	7
8	Women's Day Fundraiser	womens.day@example.com	8	30000	01-12-24	8
9	Elderly Care Charity Auction	elderly.care@example.com	9	35000	25-12-24	9
10	Civic Sense Awareness Fundraiser	civic.sense@example.com	10	40000	05-01-25	10

1NF (First Normal Form):

Ensure that each attribute contains atomic values.

The table is already in 1NF since each cell contains a single value.

2NF (Second Normal Form):

CAMPAIGNID → NAME, CONTACTDETAILS

FUNDRAISERID → FUNDSRAISED, FUNDRAISERDATE

CAMPAIGNID → FUNDRAISERID

FUNDRAISERID → CAMPAIGN ID

$(CAMPAIGNID)^+$ = { CAMPAIGNID, NAME, CONTACTDETAILS, FUNDRAISERID, FUNDSRAISED,FUNDRAISERDATE}

Candidate key = CAMPAIGNID

Non prime attributes are fully functionally dependent on the candidate key, so no partial dependency.

3NF (Third Normal Form):

-The table must be in 2NF

-No transitive dependencies should exist.

> CAMPAIGNID→FUNDRAISERID - This dependency suggests a transitivdependency from CAMPAIGNIDCAMPAIGNID to FUNDRAISERIDFUNDRAISERID, which implies that CAMPAIGNIDCAMPAIGNID is functionally determining FUNDRAISERIDFUNDRAISERID. This dependency violates 3NF.FUNDRAISERID→CAMPAIGNIDFUNDRAISERID→CAMPAIGNID - Similarly, this dependency suggests a transitive dependency from FUNDRAISERIDFUNDRAISERID to CAMPAIGNIDCAMPAIGNID, violating 3NF.

In our table, there's a transitive dependency between `CAMPAIGNID` and `CONTACTDETAILS`. To resolve this, we need to separate `CONTACTDETAILS` into its own table where `CAMPAIGNID` is the primary key.

CAMPAIGNID	CONTACTDETAILS
1	charity.edu@example.com
2	medical.camp@example.com
3	anticorruption.drive@example.com
4	labor.union@example.com
5	farmers.relief@example.com
6	youth.empowerment@example.com
7	environment.dinner@example.com
8	womens.day@example.com
9	elderly.care@example.com
10	civic.sense@example.com

And the original table without `CONTACTDETAILS` will have `CAMPAIGNID` as the primary key.

CAMPAIGNID	NAME	FUNDSRAISED	FUNDRAISERDATE	FUNDRAISERID
1	Charity Gala for Education	20000	15-05-24	1
2	Medical Camp Fundraiser	30000	25-06-24	2
3	Anti-Corruption Drive	25000	10-07-24	3
4	Labor Union Support Event	35000	05-08-24	4
5	Farmers Relief Fund	40000	20-09-24	5
6	Youth Empowerment Seminar	28000	10-10-24	6
7	Environment Conservation	32000	15-11-24	7
8	Women's Day Fundraiser	30000	01-12-24	8
9	Elderly Care Charity Auction	35000	25-12-24	9
10	Civic Sense Awareness Fundraiser	40000	05-01-25	10

This resolves the transitive dependency issue and ensures the table is in 3NF.

BCNF (Boyce-Codd Normal Form), 4NF, and 5NF:

The table must be in 3NF.

CAMPAIGNID → NAME, CONTACTDETAILS

FUNDRAISERID → FUNDSRAISED, FUNDRAISERDATE

CAMPAIGNID → FUNDRAISERID

FUNDRAISERID → CAMPAIGN ID

the super key is {CampaignID}, as it uniquely identifies each campaign.

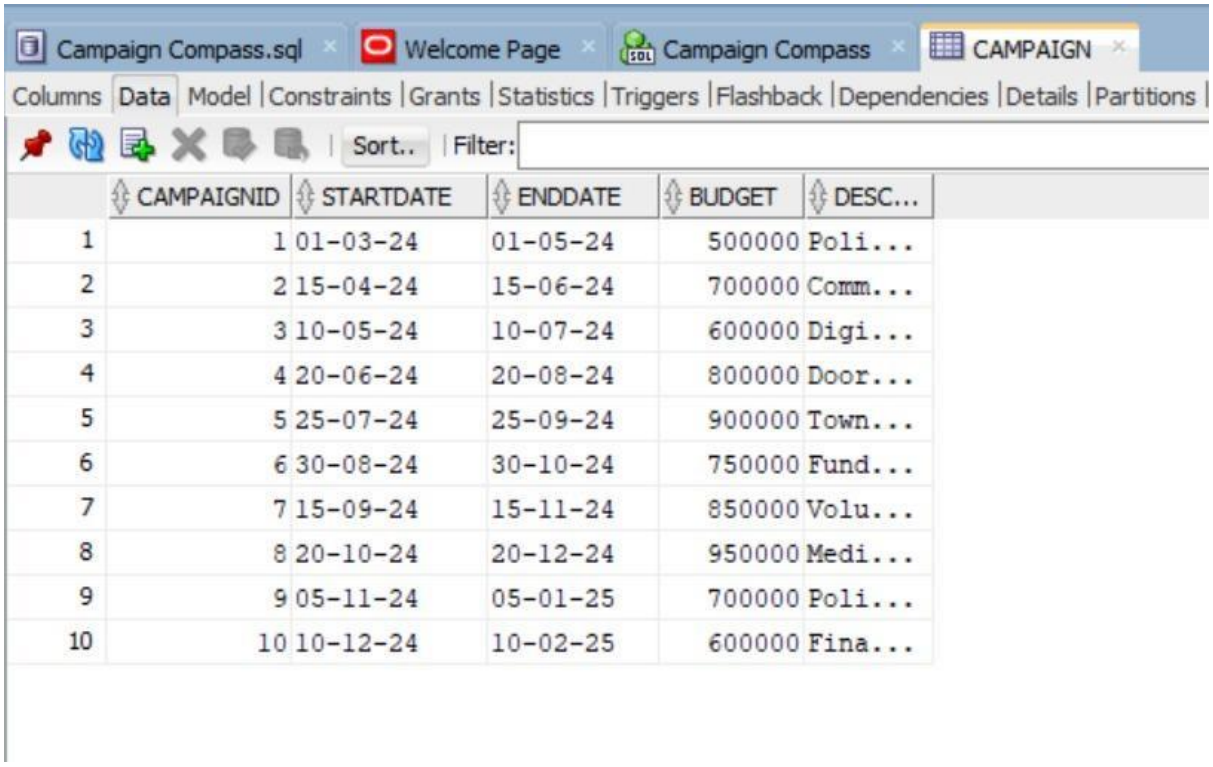
The candidate key determines all other attributes, and there are no non-trivial functional dependencies where the determinant is not a super key. Hence, this table is already in BCNF.

There should be no multi-valued dependencies.

There should be no join dependencies.

Since the table is now in 3NF and doesn't have any multi-valued or join dependencies, it automatically satisfies BCNF, 4NF, and 5NF.

So, after the normalization process, the table is now in BCNF, 4NF, and 5NF.



	CAMPAIGNID	STARTDATE	ENDDATE	BUDGET	DESC...
1	1	01-03-24	01-05-24	500000	Poli...
2	2	15-04-24	15-06-24	700000	Comm...
3	3	10-05-24	10-07-24	600000	Digi...
4	4	20-06-24	20-08-24	800000	Door...
5	5	25-07-24	25-09-24	900000	Town...
6	6	30-08-24	30-10-24	750000	Fund...
7	7	15-09-24	15-11-24	850000	Volu...
8	8	20-10-24	20-12-24	950000	Medi...
9	9	05-11-24	05-01-25	700000	Poli...
10	10	10-12-24	10-02-25	600000	Fina...

1NF (First Normal Form):

- Ensure that each attribute contains atomic values.
- The table is already in 1NF since each cell contains a single value.

2NF (Second Normal Form):

Campaignid → {startdate, enddate, budget, description}

(campaignid, startdate, enddate, budget, description) $^{+}$ = { campaignid , startdate, enddate, budget, description}

(campaignid)$^{+}$ = { campaignid , startdate, enddate, budget, description}

Candidate key = campaignid

Non prime attributes are fully functionally dependent on the candidate key, so no partial dependency.

3NF (Third Normal Form):

- The table must be in 2NF.
- No transitive dependencies should exist.
- Again, since there are no transitive dependencies (non-prime attributes depending on other non-prime attributes), the table is already in 3NF**.**

BCNF

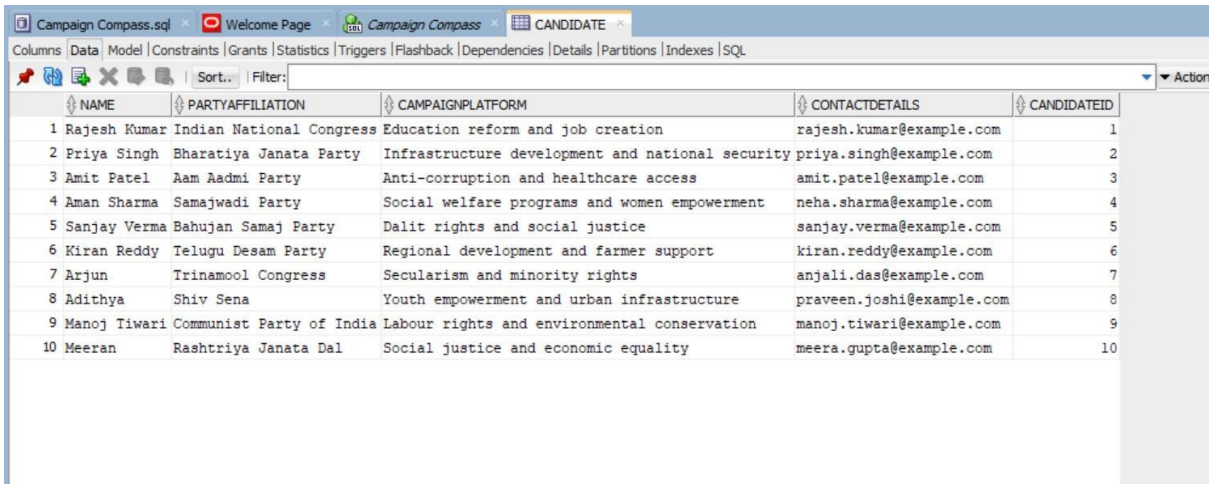
- Campaignid → {startdate, enddate, budget, description}
- Super key: campaignid
- The Super key determines all other attributes, and there are no non-trivial functional dependencies where the determinant is not a super key. Hence, this table is already in BCNF.

4NF (Fourth Normal Form):

- The table must be in 3NF.
- There should be no multi-valued dependencies.
- Since there are no multi-valued dependencies, the table remains in 3NF and automatically satisfies 4NF.

5NF (Fifth Normal Form):

- The table must be in 4NF.
- There should be no join dependencies.
- There are no join dependencies present in the table, so it remains in 4NF and also satisfies 5NF.



	NAME	PARTYAFFILIATION	CAMPAIGNPLATFORM	CONTACTDETAILS	CANDIDATEID
1	Rajesh Kumar	Indian National Congress	Education reform and job creation	rajesh.kumar@example.com	1
2	Priya Singh	Bharatiya Janata Party	Infrastructure development and national security	priya.singh@example.com	2
3	Amit Patel	Aam Aadmi Party	Anti-corruption and healthcare access	amit.patel@example.com	3
4	Aman Sharma	Samajwadi Party	Social welfare programs and women empowerment	neha.sharma@example.com	4
5	Sanjay Verma	Bahujan Samaj Party	Dalit rights and social justice	sanjay.verma@example.com	5
6	Kiran Reddy	Telugu Desam Party	Regional development and farmer support	kiran.reddy@example.com	6
7	Arjun	Trinamool Congress	Secularism and minority rights	anjali.das@example.com	7
8	Adithya	Shiv Sena	Youth empowerment and urban infrastructure	praveen.joshi@example.com	8
9	Manoj Tiwari	Communist Party of India	Labour rights and environmental conservation	manoj.tiwari@example.com	9
10	Meeran	Rashtriya Janata Dal	Social justice and economic equality	meera.gupta@example.com	10

1NF (First Normal Form):

Ensure that each attribute contains atomic values. The table is already in 1NF since each cell contains a single value.

2NF (Second Normal Form):

Candidate ID → Candidate Name, Party Affiliation, Campaign Platform, Contact Email

Candidate Name → Party Affiliation, Campaign Platform, Contact Email

Party Affiliation → Campaign Platform

Candidate ID → Contact Email

(Candidate ID, Candidate Name, Party Affiliation, Campaign Platform, Contact Email)$^{+}$ = { Candidate ID, Candidate Name, Party Affiliation, Campaign Platform, Contact Email }

(Candidate ID)$^{+}$ = { Candidate ID, Candidate Name, Party Affiliation, Campaign Platform, Contact Email }

Candidate key = Candidate ID

Non prime attributes are fully functionally dependent on the candidate key, so no partial dependency.

BCNF

Candidate ID → Candidate Name, Party Affiliation, Campaign Platform, Contact

Candidate Name → Party Affiliation, Campaign Platform, Contact Email

Party Affiliation → Campaign Platform

Candidate ID → Contact Email

the super key is also {Candidate ID}, as it uniquely identifies each candidate.

The candidate key determines all other attributes, and there are no non-trivial functional dependencies where the determinant is not a super key. Hence, this table is already in BCNF.

3NF (Third Normal Form):

The table must be in 2NF. No transitive dependencies should exist. Again, since there are no transitive dependencies (non-prime attributes depending on other non-prime attributes), the table is already in 3NF.

4NF (Fourth Normal Form):

The table must be in 3NF. There should be no multi-valued dependencies. Since there are no multi-valued dependencies, the table remains in 3NF and automatically satisfies 4NF.

5NF (Fifth Normal Form):

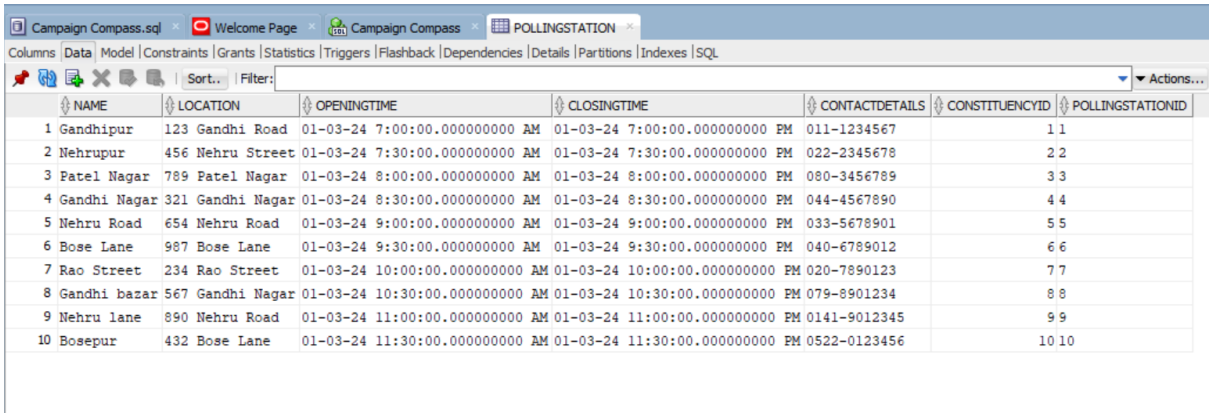
The table must be in 4NF. There should be no join dependencies. There are no join dependencies present in the table, so it remains in 4NF and also satisfies 5NF.

PITFALLS

Pitfalls involves identifying potential problems or shortcomings within the database structure or design that could lead to inefficiencies, data inconsistencies, or difficulties in maintenance. In our VoteX database, we've tried to identify and rectify those pitfalls

1. **Data Redundancy :** To handle this pitfall we've used foreign keys in tables. Foreign keys reduce data redundancy by linking tables in a relational database, and by allowing a foreign key in one table to point to a primary key in another table. In our database,

    a. Constituency ID (in Constituency table) acts as a Foreign key in the Polling station table which would help in reducing redundant data by simply having a Foreign key acting as a pointer to the constituencyID (Primary key of Constituency table).



Campaign Compass.sql | Welcome Page | Campaign Compass | POLLINGSTATION

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. Filter: Actions...

	NAME	LOCATION	OPENINGTIME	CLOSINGTIME	CONTACTDETAILS	CONSTITUENCYID	POLLINGSTATIONID
1	Gandhipur	123 Gandhi Road	01-03-24 7:00:00.000000000 AM	01-03-24 7:00:00.000000000 PM	011-1234567	1	1
2	Nehrupur	456 Nehru Street	01-03-24 7:30:00.000000000 AM	01-03-24 7:30:00.000000000 PM	022-2345678	2	2
3	Patel Nagar	789 Patel Nagar	01-03-24 8:00:00.000000000 AM	01-03-24 8:00:00.000000000 PM	080-3456789	3	3
4	Gandhi Nagar	321 Gandhi Nagar	01-03-24 8:30:00.000000000 AM	01-03-24 8:30:00.000000000 PM	044-4567890	4	4
5	Nehru Road	654 Nehru Road	01-03-24 9:00:00.000000000 AM	01-03-24 9:00:00.000000000 PM	033-5678901	5	5
6	Bose Lane	987 Bose Lane	01-03-24 9:30:00.000000000 AM	01-03-24 9:30:00.000000000 PM	040-6789012	6	6
7	Rao Street	234 Rao Street	01-03-24 10:00:00.000000000 AM	01-03-24 10:00:00.000000000 PM	020-7890123	7	7
8	Gandhi bazar	567 Gandhi Nagar	01-03-24 10:30:00.000000000 AM	01-03-24 10:30:00.000000000 PM	079-8901234	8	8
9	Nehru lane	890 Nehru Road	01-03-24 11:00:00.000000000 AM	01-03-24 11:00:00.000000000 PM	0141-9012345	9	9
10	Bosepur	432 Bose Lane	01-03-24 11:30:00.000000000 AM	01-03-24 11:30:00.000000000 PM	0522-0123456	10	10

b. CampaignID (in Campaign table) acts as a Foreign key in the Event table which would help in reducing redundant data by simply having a Foreign key acting as a pointer to the CampaignID (Primary key of Campaign table).

Campaign Compass.sql | Welcome Page | Campaign Compass | EVENT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	NAME	EVENTDATE	LOCATION	CAMPAIGNID	EVENTID
1	Election Campaign Rally	01-04-24	Shivaji Park, Mumbai	1	1
2	Health Camp	15-05-24	Ramlila Maidan, Delhi	2	2
3	Education Awareness Drive	20-06-24	Sabarmati Riverfront, Ahmedabad	3	3
4	Labour Union Meeting	10-07-24	Esplanade, Kolkata	4	4
5	Farmers Protest March	25-08-24	Majestic Circle, Bangalore	5	5
6	Youth Employment Seminar	30-09-24	Tank Bund, Hyderabad	6	6
7	Environmental Clean-up Drive	15-10-24	Marina Beach, Chennai	7	7
8	Women Empowerment Conference	20-11-24	Fort Kochi, Kochi	8	8
9	Street Play on Civic Sense	05-12-24	FC Road, Pune	9	9
10	Elderly Care Workshop	10-01-25	Hawa Mahal, Jaipur	10	10

c. Similarly, CampaignID (in Campaign table) acts as a Foreign key in the Fundraiser table which would help in reducing redundant data by simply having a Foreign key acting as a pointer to the CampaignID (Primary key of Campaign table).

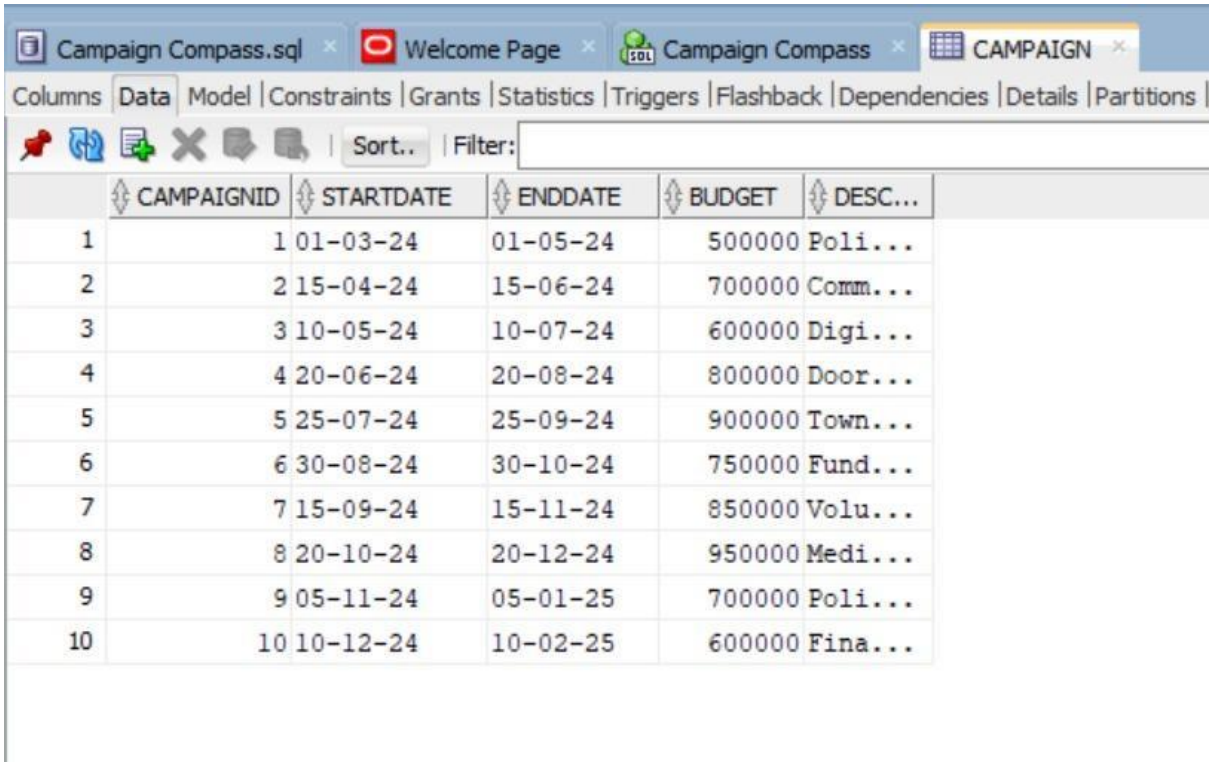
Campaign Compass.sql | Welcome Page | Campaign Compass | FUNDRAISER

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	NAME	CONTACTDETAILS	CAMPAIGNID	FUNDSRAISED	FUNDRAISERDATE	FUNDRAISERID
1	Charity Gala for Education	charity.edu@example.com	1	20000	15-05-24	1
2	Medical Camp Fundraiser	medical.camp@example.com	2	30000	25-06-24	2
3	Anti-Corruption Drive Fundraiser	anticorruption.drive@example.com	3	25000	10-07-24	3
4	Labor Union Support Event	labor.union@example.com	4	35000	05-08-24	4
5	Farmers Relief Fund	farmers.relief@example.com	5	40000	20-09-24	5
6	Youth Empowerment Seminar	youth.empowerment@example.com	6	28000	10-10-24	6
7	Environment Conservation Dinner	environment.dinner@example.com	7	32000	15-11-24	7
8	Women's Day Fundraiser	womens.day@example.com	8	30000	01-12-24	8
9	Elderly Care Charity Auction	elderly.care@example.com	9	35000	25-12-24	9
10	Civic Sense Awareness Fundraiser	civic.sense@example.com	10	40000	05-01-25	10

ALL TABLES



	CAMPAIGNID	STARTDATE	ENDDATE	BUDGET	DESC...
1	1	01-03-24	01-05-24	500000	Poli...
2	2	15-04-24	15-06-24	700000	Comm...
3	3	10-05-24	10-07-24	600000	Digi...
4	4	20-06-24	20-08-24	800000	Door...
5	5	25-07-24	25-09-24	900000	Town...
6	6	30-08-24	30-10-24	750000	Fund...
7	7	15-09-24	15-11-24	850000	Volu...
8	8	20-10-24	20-12-24	950000	Medi...
9	9	05-11-24	05-01-25	700000	Poli...
10	10	10-12-24	10-02-25	600000	Fina...

Functional Dependencies Identification:

- Candidate ID → {Candidate Name, Party Affiliation, Campaign Platform, Contact Email}

Candidate Key Identification:

- Candidate ID is a candidate key as it uniquely identifies all other attributes in the table.

Closure of Candidate ID (Candidate ID+):

- Candidate ID+ = {Candidate ID, Candidate Name, Party Affiliation, Campaign Platform, Contact Email}

1NF (First Normal Form):

- The table is already in 1NF since each attribute contains atomic values.

Partial Dependency Identification:

- There are no partial dependencies since all non-prime attributes are fully functionally dependent on the candidate key (Candidate ID).

2NF (Second Normal Form):

- Since there are no partial dependencies, the table is already in 2NF.

Transitive Dependency Identification:

- There are no transitive dependencies since there are no non-prime attributes that depend on other non-prime attributes.

3NF (Third Normal Form):

- The table is already in 3NF since there are no transitive dependencies.

BCNF (Boyce-Codd Normal Form):

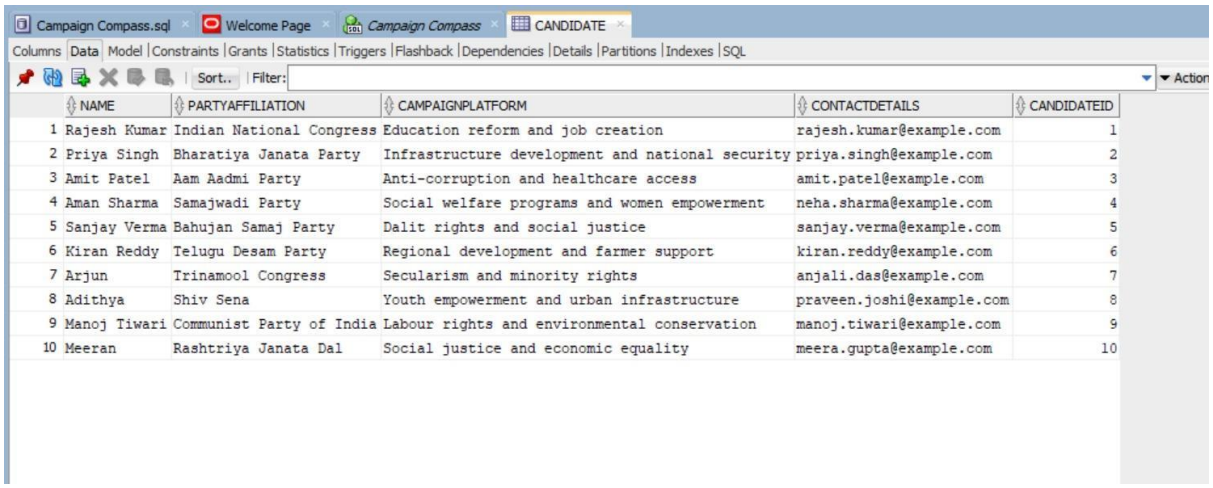
- The table is already in BCNF since there are no non-trivial functional dependencies on a super key.

4NF (Fourth Normal Form):

- There are no multi-valued dependencies, so no further decomposition is needed to achieve 4NF.

5NF (Fifth Normal Form):

- Since the table is already in BCNF, it is also in 5NF.



	NAME	PARTYAFFILIATION	CAMPAIGNPLATFORM	CONTACTDETAILS	CANDIDATEID
1	Rajesh Kumar	Indian National Congress	Education reform and job creation	rajesh.kumar@example.com	1
2	Priya Singh	Bharatiya Janata Party	Infrastructure development and national security	priya.singh@example.com	2
3	Amit Patel	Aam Aadmi Party	Anti-corruption and healthcare access	amit.patel@example.com	3
4	Aman Sharma	Samajwadi Party	Social welfare programs and women empowerment	neha.sharma@example.com	4
5	Sanjay Verma	Bahujan Samaj Party	Dalit rights and social justice	sanjay.verma@example.com	5
6	Kiran Reddy	Telugu Desam Party	Regional development and farmer support	kiran.reddy@example.com	6
7	Arjun	Trinamool Congress	Secularism and minority rights	anjali.das@example.com	7
8	Adithya	Shiv Sena	Youth empowerment and urban infrastructure	praveen.joshi@example.com	8
9	Manoj Tiwari	Communist Party of India	Labour rights and environmental conservation	manoj.tiwari@example.com	9
10	Meeran	Rashtriya Janata Dal	Social justice and economic equality	meera.gupta@example.com	10

1. **Candidate ID → Candidate Name, Party Affiliation, Campaign Platform, Contact Email**
2. **Candidate Name → Party Affiliation, Campaign Platform, Contact Email**
3. **Party Affiliation → Campaign Platform**
4. **Candidate ID → Contact Email**

1NF (First Normal Form): Ensure that each attribute contains atomic values. The table is already in 1NF since each cell contains a single value.

Candidate Key Identification: To identify the candidate key, we consider the functional dependencies (FDs) and determine the minimal set of attributes that uniquely identify each tuple. In our case, the **FD is: CANDIDATEID → {Candidate Name, Party Affiliation, Campaign Platform,**

Contact Email}. The CANDIDATEID uniquely determines all other attributes. Thus, CANDIDATEID is the candidate key.

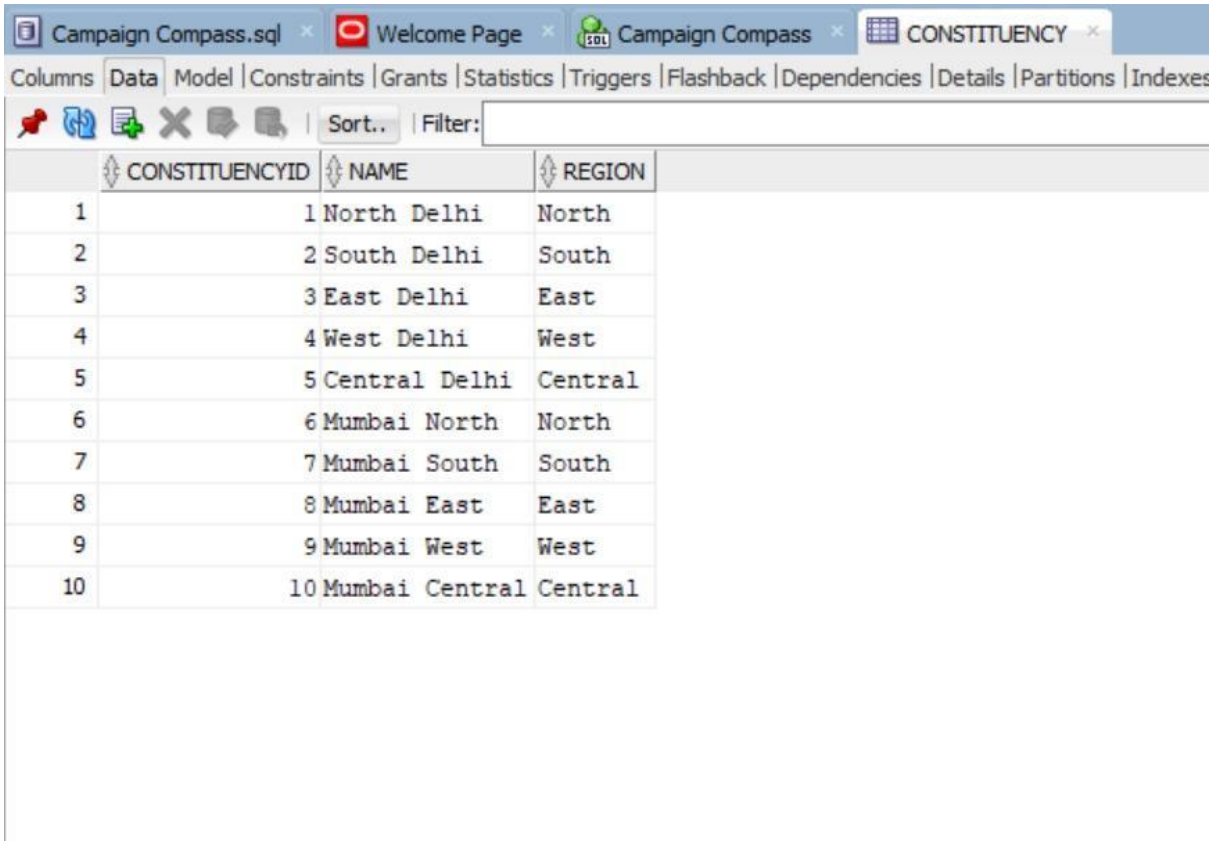
Partial Dependency Identification: Partial dependency occurs when a non-prime attribute is functionally dependent on only a portion of the candidate key. We examine each non-prime attribute to see if it is fully dependent on the entire candidate key. In our table, **all non-prime attributes (Candidate Name, Party Affiliation, Campaign Platform, Contact Email) are fully dependent on the candidate key CANDIDATEID. Therefore, there are no partial dependencies in this table.**

2NF (Second Normal Form): The table must be in 1NF. No non-prime attribute should be dependent on only a portion of the candidate key. Since the table has only one candidate key (CANDIDATEID), and all non-key attributes are fully functionally dependent on it, the table is already in 2NF.

3NF (Third Normal Form): The table must be in 2NF. No transitive dependencies should exist. Again, since there are no transitive dependencies (non-prime attributes depending on other non-prime attributes), the table is already in 3NF.

4NF (Fourth Normal Form): The table must be in 3NF. There should be no multi-valued dependencies. Since there are no multi-valued dependencies, the table remains in 3NF and automatically satisfies 4NF.

5NF (Fifth Normal Form): The table must be in 4NF. There should be no join dependencies. There are no join dependencies present in the table, so it remains in 4NF and also satisfies 5NF.



	CONSTITUENCYID	NAME	REGION
1	1	North Delhi	North
2	2	South Delhi	South
3	3	East Delhi	East
4	4	West Delhi	West
5	5	Central Delhi	Central
6	6	Mumbai North	North
7	7	Mumbai South	South
8	8	Mumbai East	East
9	9	Mumbai West	West
10	10	Mumbai Central	Central

1NF (First Normal Form):

- Ensure that each attribute contains atomic values.
    - The table is already in 1NF since each cell contains a single value.

Candidate Key Identification:

- To identify the candidate key, we consider the functional dependencies (FDs) and determine the minimal set of attributes that uniquely identify each tuple.
    - In our case**, the FD is: ConstituencyID → {Location, Region}.**
    - The ConstituencyID uniquely determines all other attributes. Thus, ConstituencyID is the candidate key.

Partial Dependency Identification:

- Partial dependency occurs when a non-prime attribute is functionally dependent on only a portion of the candidate key.
    - We examine each non-prime attribute to see if it is fully dependent on the entire candidate key.
    - In our table, all non-prime attributes (Location, Region) are fully dependent on the candidate key ConstituencyID.
    - Therefore, there are no partial dependencies in this table.

2NF (Second Normal Form):

- The table must be in 1NF.
- No non-prime attribute should be dependent on only a portion of the candidate key.
- Since the table has only one candidate key (ConstituencyID), and all non-key attributes are fully functionally dependent on it, the table is already in 2NF.

3NF (Third Normal Form):

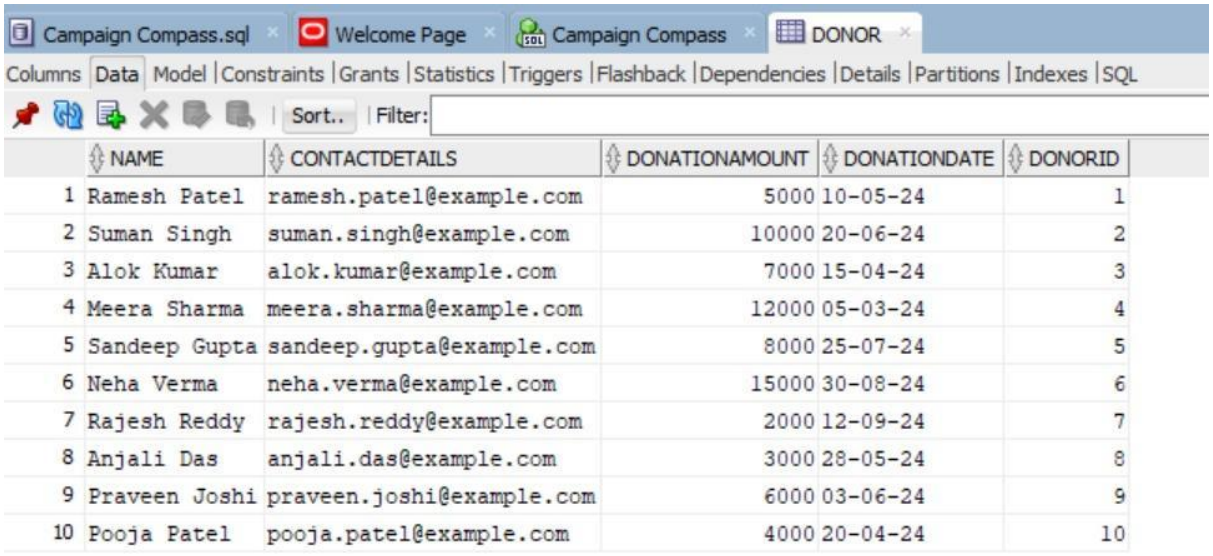
- The table must be in 2NF.
- No transitive dependencies should exist.
- Again, since there are no transitive dependencies (non-prime attributes depending on other non-prime attributes), the table is already in 3NF.

4NF (Fourth Normal Form):

- The table must be in 3NF.
- There should be no multi-valued dependencies.
- Since there are no multi-valued dependencies, the table remains in 3NF and automatically satisfies 4NF.

5NF (Fifth Normal Form):

- The table must be in 4NF.
- There should be no join dependencies.
- There are no join dependencies present in the table, so it remains in 4NF and also satisfies 5NF.



	NAME	CONTACTDETAILS	DONATIONAMOUNT	DONATIONDATE	DONORID
1	Ramesh Patel	ramesh.patel@example.com	5000	10-05-24	1
2	Suman Singh	suman.singh@example.com	10000	20-06-24	2
3	Alok Kumar	alok.kumar@example.com	7000	15-04-24	3
4	Meera Sharma	meera.sharma@example.com	12000	05-03-24	4
5	Sandeep Gupta	sandeep.gupta@example.com	8000	25-07-24	5
6	Neha Verma	neha.verma@example.com	15000	30-08-24	6
7	Rajesh Reddy	rajesh.reddy@example.com	2000	12-09-24	7
8	Anjali Das	anjali.das@example.com	3000	28-05-24	8
9	Praveen Joshi	praveen.joshi@example.com	6000	03-06-24	9
10	Pooja Patel	pooja.patel@example.com	4000	20-04-24	10

1. **Donor ID -> Name, Contact Details**
2. **Donor ID, Donation Date -> Donation Amount**
3. **Donor ID -> Donation Date**

1NF (First Normal Form):

In 1NF, each attribute must contain atomic values, meaning no attribute should have multiple values.

The given table is already in 1NF because each cell contains a single value.

2NF (Second Normal Form):

In 2NF, a table is in 2NF if it is in 1NF and no non-prime attribute is dependent on any proper subset of any candidate key.

The table is already in 2NF because each non-prime attribute (Name, Contact Details, Donation Amount, Donation Date) is fully functionally dependent on the candidate key (Donor ID).

3NF (Third Normal Form):

In 3NF, a table is in 3NF if it is in 2NF and no transitive dependencies exist.

The table is already in 3NF because there are no transitive dependencies.

BCNF (Boyce-Codd Normal Form):

A table is in BCNF if, for every one of its non-trivial functional dependencies X → Y, X is a superkey.

The table is already in BCNF because each functional dependency has a superkey on its left-hand side.

4NF (Fourth Normal Form):

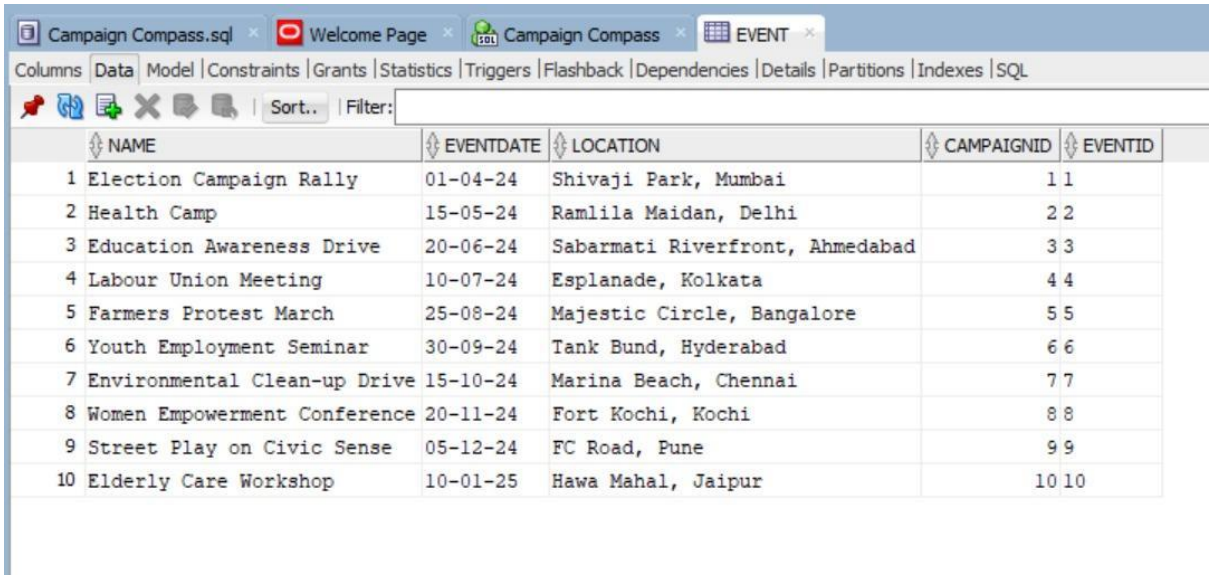
A table is in 4NF if it is in BCNF and has no multi-valued dependencies.

The table is already in 4NF as there are no multi-valued dependencies.

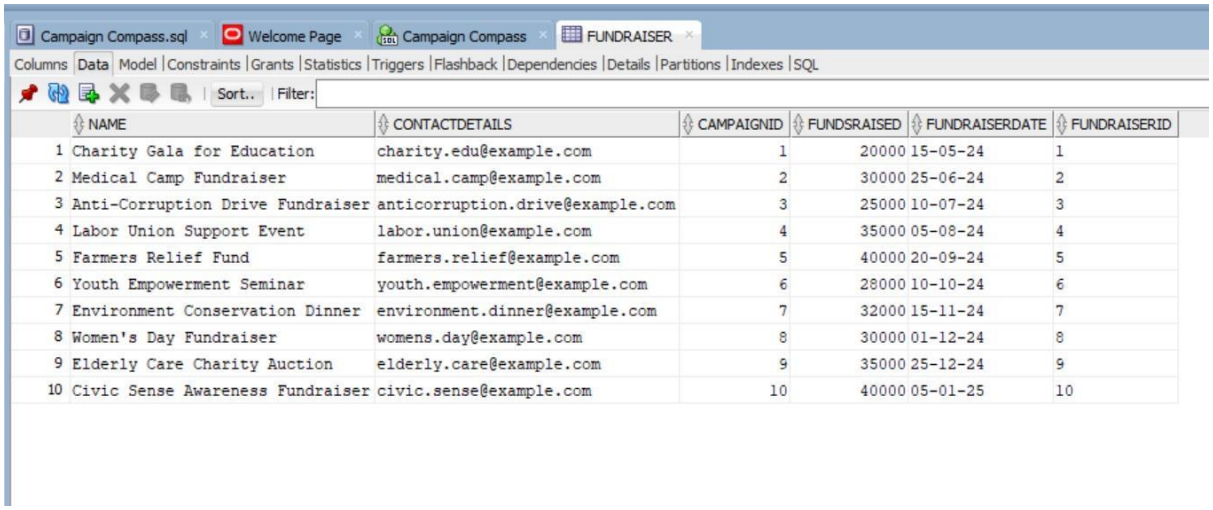
5NF (Fifth Normal Form):

A table is in 5NF if it is in 4NF and it cannot be decomposed into smaller tables without loss of dependencies.

The table is already in 5NF as it meets the criteria of 4NF and cannot be further decomposed without losing dependencies.



	NAME	EVENTDATE	LOCATION	CAMPAIGNID	EVENTID
1	Election Campaign Rally	01-04-24	Shivaji Park, Mumbai	1	1
2	Health Camp	15-05-24	Ramlila Maidan, Delhi	2	2
3	Education Awareness Drive	20-06-24	Sabarmati Riverfront, Ahmedabad	3	3
4	Labour Union Meeting	10-07-24	Esplanade, Kolkata	4	4
5	Farmers Protest March	25-08-24	Majestic Circle, Bangalore	5	5
6	Youth Employment Seminar	30-09-24	Tank Bund, Hyderabad	6	6
7	Environmental Clean-up Drive	15-10-24	Marina Beach, Chennai	7	7
8	Women Empowerment Conference	20-11-24	Fort Kochi, Kochi	8	8
9	Street Play on Civic Sense	05-12-24	FC Road, Pune	9	9
10	Elderly Care Workshop	10-01-25	Hawa Mahal, Jaipur	10	10



	NAME	CONTACTDETAILS	CAMPAIGNID	FUNDSRAISED	FUNDRAISERDATE	FUNDRAISERID
1	Charity Gala for Education	charity.edu@example.com	1	20000	15-05-24	1
2	Medical Camp Fundraiser	medical.camp@example.com	2	30000	25-06-24	2
3	Anti-Corruption Drive Fundraiser	anticorruption.drive@example.com	3	25000	10-07-24	3
4	Labor Union Support Event	labor.union@example.com	4	35000	05-08-24	4
5	Farmers Relief Fund	farmers.relief@example.com	5	40000	20-09-24	5
6	Youth Empowerment Seminar	youth.empowerment@example.com	6	28000	10-10-24	6
7	Environment Conservation Dinner	environment.dinner@example.com	7	32000	15-11-24	7
8	Women's Day Fundraiser	womens.day@example.com	8	30000	01-12-24	8
9	Elderly Care Charity Auction	elderly.care@example.com	9	35000	25-12-24	9
10	Civic Sense Awareness Fundraiser	civic.sense@example.com	10	40000	05-01-25	10

1. **CAMPAIGNID → NAME, CONTACTDETAILS**:
2. **FUNDRAISERID → FUNDSRAISED, FUNDRAISERDATE**:.
3. **CAMPAIGNID → FUNDRAISERID**:
4. **FUNDRAISERID → CAMPAIGN ID**:

1NF (First Normal Form):

- Ensure that each attribute contains atomic values.
- The table is already in 1NF since each cell contains a single value.

2NF (Second Normal Form):

- The table must be in 1NF.
- No non-prime attribute should be dependent on only a portion of the candidate key.

In our case, the candidate key seems to be **CAMPAIGNID**. So, let's check if there are any partial dependencies:

- **NAME**, **CONTACTDETAILS**, **FUNDSRAISED**, **FUNDRAISERDATE**, and **FUNDRAISERID** are all fully dependent on the **CAMPAIGNID**.
- There are no partial dependencies. Thus, the table is in 2NF.

3NF (Third Normal Form):

- The table must be in 2NF.
- No transitive dependencies should exist.

In our table, there's a transitive dependency between **CAMPAIGNID** and **CONTACTDETAILS**. To resolve this, we need to separate **CONTACTDETAILS** into its own table where **CAMPAIGNID** is the primary key.

New Table for CONTACTDETAILS:

CAMPAIGNID	CONTACTDETAILS
1	charity.edu@example.com
2	medical.camp@example.com
3	anticorruption.drive@example.com
4	labor.union@example.com
5	farmers.relief@example.com
6	youth.empowerment@example.com
7	environment.dinner@example.com
8	womens.day@example.com
9	elderly.care@example.com
10	civic.sense@example.com

And the original table without **CONTACTDETAILS** will have **CAMPAIGNID** as the primary key.

Original Table:

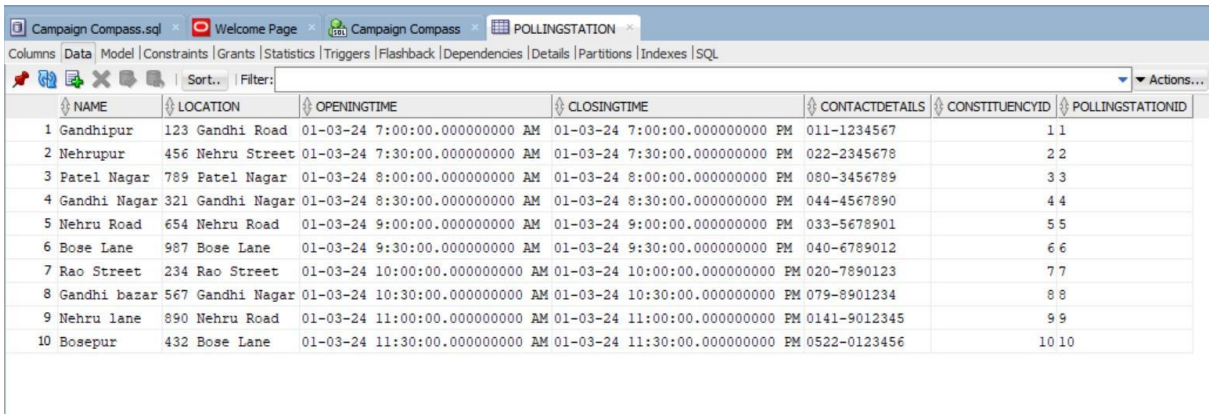
CAMPAIGNID	NAME	FUNDSRAISED	FUNDRAISERDATE	FUNDRAISERID
1	Charity Gala for Education	20000	15-05-24	1
2	Medical Camp Fundraiser	30000	25-06-24	2
3	Anti-Corruption Drive	25000	10-07-24	3
4	Labor Union Support Event	35000	05-08-24	4
5	Farmers Relief Fund	40000	20-09-24	5
6	Youth Empowerment Seminar	28000	10-10-24	6
7	Environment Conservation	32000	15-11-24	7
8	Women's Day Fundraiser	30000	01-12-24	8
9	Elderly Care Charity Auction	35000	25-12-24	9
10	Civic Sense Awareness Fundraiser	40000	05-01-25	10

This resolves the transitive dependency issue and ensures the table is in 3NF.

BCNF (Boyce-Codd Normal Form), 4NF, and 5NF:

- The table must be in 3NF.
- There should be no multi-valued dependencies.
- There should be no join dependencies.

Since the table is now in 3NF and doesn't have any multi-valued or join dependencies, it automatically satisfies BCNF, 4NF, and 5NF.



Campaign Compass.sql | Welcome Page | Campaign Compass | POLLINGSTATION

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter: | Actions...

	NAME	LOCATION	OPENINGTIME	CLOSINGTIME	CONTACTDETAILS	CONSTITUENCYID	POLLINGSTATIONID
1	Gandhipur	123 Gandhi Road	01-03-24 7:00:00.000000000 AM	01-03-24 7:00:00.000000000 PM	011-1234567	1	1
2	Nehrupur	456 Nehru Street	01-03-24 7:30:00.000000000 AM	01-03-24 7:30:00.000000000 PM	022-2345678	2	2
3	Patel Nagar	789 Patel Nagar	01-03-24 8:00:00.000000000 AM	01-03-24 8:00:00.000000000 PM	080-3456789	3	3
4	Gandhi Nagar	321 Gandhi Nagar	01-03-24 8:30:00.000000000 AM	01-03-24 8:30:00.000000000 PM	044-4567890	4	4
5	Nehru Road	654 Nehru Road	01-03-24 9:00:00.000000000 AM	01-03-24 9:00:00.000000000 PM	033-5678901	5	5
6	Bose Lane	987 Bose Lane	01-03-24 9:30:00.000000000 AM	01-03-24 9:30:00.000000000 PM	040-6789012	6	6
7	Rao Street	234 Rao Street	01-03-24 10:00:00.000000000 AM	01-03-24 10:00:00.000000000 PM	020-7890123	7	7
8	Gandhi bazar	567 Gandhi Nagar	01-03-24 10:30:00.000000000 AM	01-03-24 10:30:00.000000000 PM	079-8901234	8	8
9	Nehru lane	890 Nehru Road	01-03-24 11:00:00.000000000 AM	01-03-24 11:00:00.000000000 PM	0141-9012345	9	9
10	Bosepur	432 Bose Lane	01-03-24 11:30:00.000000000 AM	01-03-24 11:30:00.000000000 PM	0522-0123456	10	10

Campaign Compass.sql | Welcome Page | Campaign Compass | VOTER

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	NAME	STREET	CITY	STATE	ZIPCODE	CONTACTDETAILS	VOTERID
1	Suresh Sharma	123 Gandhi Road	Delhi	Delhi	110001	suresh.sharma@example.com	1
2	Anita Verma	456 Nehru Street	Mumbai	Maharashtra	400001	anita.verma@example.com	2
3	Rahul Singh	789 Patel Nagar	Bangalore	Karnataka	560001	rahul.singh@example.com	3
4	Priya Patel	321 Gandhi Nagar	Chennai	Tamil Nadu	600001	priya.patel@example.com	4
5	Amit Kumar	654 Nehru Road	Kolkata	West Bengal	700001	amit.kumar@example.com	5
6	Neha Sharma	987 Bose Lane	Hyderabad	Telangana	500001	neha.sharma@example.com	6
7	Rajesh Reddy	234 Rao Street	Pune	Maharashtra	411001	rajesh.reddy@example.com	7
8	Anjali Das	567 Gandhi Nagar	Ahmedabad	Gujarat	380001	anjali.das@example.com	8
9	Praveen Joshi	890 Nehru Road	Jaipur	Rajasthan	302001	praveen.joshi@example.com	9
10	Meera Gupta	432 Bose Lane	Lucknow	Uttar Pradesh	226001	meera.gupta@example.com	10