**DATA NORMALIZATION**

**CREATE** **TABLE** Projects(

ID **INT** **PRIMARY** **KEY** ,

**Name** **VARCHAR**(100),

Value **DECIMAL**(5,2),

StartDate **DATE**,

EndDate **DATE**

);

**CREATE** **TABLE** Employees(

ID **INT** **PRIMARY** **KEY** ,

FirstName **VARCHAR**(50),

LastName **VARCHAR**(50),

HourlyWage **DECIMAL**(5,2),

HireDate **DATE**

);

**CREATE** **TABLE** ProjectEmployees(

ID **INT** **PRIMARY** **KEY** ,

ProjectID **INT**,

EmployeeID **INT**,

Hours **DECIMAL**(5,2),

**CONSTRAINT** FK\_ProjectEmployees\_Projects **FOREIGN** **KEY** (ProjectID) **REFERENCES** Projects (ID),

**CONSTRAINT** FK\_ProjectEmployees\_Employees **FOREIGN** **KEY** (EmployeeID) **REFERENCES** Employees (ID)

);

**CREATE** **TABLE** JobOrders(

ID **INT** **PRIMARY** **KEY** ,

EmployeeID **INT**,

ProjectID **INT**,

Description **TEXT**,

OrderDateTime **VARCHAR**,

Quantity **INT**,

Price **DECIMAL**(5,2),

**CONSTRAINT** FK\_JobOrders\_Projects **FOREIGN** **KEY** (ProjectID) **REFERENCES** Projects (ID),

**CONSTRAINT** FK\_JobOrders\_Employees **FOREIGN** **KEY** (EmployeeID) **REFERENCES** Employees (ID)

);

**CREATE** **TABLE** Customers (

**Name** **VARCHAR**(100),

Industry **VARCHAR**(100),

Project1\_ID **INT**,

Project1\_Feedback **TEXT**,

Project2\_ID **INT**,

Project2\_Feedback **TEXT**,

ContactPersonID **INT**,

ContactPersonAndRole **VARCHAR**(255),

PhoneNumber **VARCHAR**(12),

Address **VARCHAR**(255),

City **VARCHAR**(255),

Zip **VARCHAR**(5)

);

**select** \* **from** customers c ;

--Customers table has not been designed in a proper way to support the normal forms

1NF:

The Customers **table** **in** the diagram violates **all** the three rules **of** the **first** normal form.

--We do not see any Primary Key in the table.

**ALTER** **TABLE** Customers

**ADD** ID **INT** **PRIMARY** **key**;

--Rename the original column from ContactPersonAndRole to ContactPerson.

**alter** **table** customers **rename** **column** "contactpersonandrole" **to** "contactperson";

--Add a new column for ContactPersonRole.

**ALTER** **TABLE** Customers

**ADD** ContactPersonRole **VARCHAR**(20);

--(Project1\_ID, Project1\_FeedBack) and (Project2\_ID, Project2\_Feedback). We need to get these removed from this table.

**ALTER** **TABLE** Customers **DROP** **COLUMN** Project1\_ID;

**ALTER** **TABLE** Customers **DROP** **COLUMN** Project1\_Feedback;

**ALTER** **TABLE** Customers **DROP** **COLUMN** Project2\_ID;

**ALTER** **TABLE** Customers **DROP** **COLUMN** Project2\_Feedback;

2NF:

--remove all these columns from the Customers table which do not relate to the primary key of the table directly

**ALTER** **TABLE** Customers **DROP** **COLUMN** ContactPerson;

**ALTER** **TABLE** Customers **DROP** **COLUMN** ContactPersonRole;

**ALTER** **TABLE** Customers **DROP** **COLUMN** PhoneNumber;

--we need to create a new table that'll store the data for the contact persons.

**CREATE** **TABLE** ContactPersons(

ID **INT** **PRIMARY** **KEY** ,

ContactPerson **VARCHAR**(100),

ContactPersonRole **VARCHAR**(20),

PhoneNumber **VARCHAR**(12)

);

--create a new table ContactPersons and relate it to the Customers table with a foreign key relation.

**ALTER** **TABLE** Customers

**ADD** **CONSTRAINT** FK\_Customers\_ContactPersons **FOREIGN** **KEY** (ContactPersonID)

**REFERENCES** ContactPersons(ID);

3NF:

--doesnot satisfy the third normal form, we need to remove the City from the Customers table and create a new table ZipCodes to store the Zip and City

**ALTER** **TABLE** Customers **DROP** **COLUMN** City;

**CREATE** **TABLE** ZipCodes(

ZipID **VARCHAR**(5) **PRIMARY** **KEY**,

City **VARCHAR**(255)

);

--table can be related to the Customers table via a foreign key relation

**ALTER** **TABLE** Customers

**ADD** **CONSTRAINT** FK\_Customers\_ZipCodes **FOREIGN** **KEY** (Zip)

**REFERENCES** ZipCodes(ZipID);

**CREATE** **TABLE** ProjectFeedback(

ID **INT** **PRIMARY** **KEY** ,

ProjectID **INT**,

CustomerID **INT**,

Feedback **TEXT**,

**CONSTRAINT** FK\_ProjectFeedbacks\_Projects **FOREIGN** **KEY** (ProjectID) **REFERENCES** Projects (ID),

**CONSTRAINT** FK\_ProjectFeedbacks\_Customers **FOREIGN** **KEY** (CustomerID) **REFERENCES** Customers (ID)

);