DBMS Lab Assignment 2: SQL

Chandransh Singh **22CS30017**

Table Schema used:

Households :

```
CREATE TABLE household (
    household_id SERIAL PRIMARY KEY,
    address TEXT NOT NULL,
    income DECIMAL(10, 2) NOT NULL
);
```

Citizens :

```
CREATE TABLE citizen (
    citizen_ID INT PRIMARY KEY,
    name VARCHAR(100) NOT NULL,
    gender CHAR(1) NOT NULL,
    date_of_birth DATE NOT NULL,
    household_id INT,
    education_qualification VARCHAR(50),
    FOREIGN KEY (household_id) REFERENCES households(household_id)
);
```

Land_records :

```
CREATE TABLE land_record (
    land_id INT PRIMARY KEY,
    citizen_id INT,
    area_acres DECIMAL(10, 2) NOT NULL,
    crop_type TEXT NOT NULL,
    FOREIGN KEY (citizen_id) REFERENCES citizen(citizen_id)
);
```

Panchayat_employees :

```
CREATE TABLE panchayat_employee (
    employee_id INT PRIMARY KEY,
    citizen_id INT,
    role TEXT NOT NULL,
    FOREIGN KEY (citizen_id) REFERENCES citizen(citizen_id)
);
```

Assets :

```
CREATE TABLE asset (
    asset_id INT PRIMARY KEY,
    type TEXT NOT NULL,
    location TEXT NOT NULL,
    installation_date DATE NOT NULL
);
```

Welfare_schemes :

```
CREATE TABLE welfare_scheme (
    scheme_id INT PRIMARY KEY,
    name TEXT NOT NULL,
    description TEXT
);
```

Scheme_enrollment:

```
CREATE TABLE scheme_enrollment (
    enrollment_id INT PRIMARY KEY,
    citizen_id INT,
    scheme_id INT,
    enrollment_date DATE NOT NULL,
    FOREIGN KEY (citizen_id) REFERENCES citizen(citizen_id),
    FOREIGN KEY (scheme_id) REFERENCES welfare_scheme(scheme_id)
);
```

Vaccination:

```
CREATE TABLE vaccination (
    vaccination_id INT PRIMARY KEY,
    citizen_id INT,
    vaccine_type TEXT NOT NULL,
    date_administered DATE NOT NULL,
    FOREIGN KEY (citizen_id) REFERENCES citizen(citizen_id)
);
```

Census_data:

```
CREATE TABLE census_data (
    household_id INT,
    citizen_id INT,
    event_type TEXT NOT NULL,
    event_date DATE NOT NULL,
    FOREIGN KEY (household_id) REFERENCES household(household_id),
    FOREIGN KEY (citizen_id) REFERENCES citizen(citizen_id)
);
```

SQL commands and concepts used:

- Use of `SERIAL` to Create Auto-increment Column [source: Neon: PostgreSQL Tutorial]
- DDL (Table Management): `CREATE TABLE`, `DROP TABLE IF EXISTS`, and constraints (`PRIMARY KEY`, `FOREIGN KEY`) for defining and managing table structure and relationships.
- DML (Data Manipulation): `INSERT INTO` to add data, and queries with `SELECT` , `JOIN`, `WHERE`, and aggregates (`SUM`, `COUNT`) to retrieve and analyze data.
- Functions:
    - Row Operations: `ROW_NUMBER()` for sequential numbering, `FLOOR()` and `RANDOM()` for random data generation.
    - String Operations: `CONCAT()` and `||` to combine strings.
- Joins: `INNER JOIN` for combining related data across tables, including self-joins.
- Subqueries: Used in `WHERE` and `INSERT` to dynamically fetch data.
- Event Tracking: Recorded births, deaths, and other events in census_data with relevant filters.
- Filtering: Applied filters using `WHERE`, `IN`, `BETWEEN`, and logical operators (`AND`, `OR`) for precise data selection.

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1. Creating the tables

```
22CS30017> \dt
+--------+--------------------+-------+-----------+
| Schema | Name               | Type  | Owner     |
|--------+--------------------+-------+-----------/
| public | asset              | table | 22CS30017 |
| public | census_data        | table | 22CS30017 |
| public | citizen            | table | 22CS30017 |
| public | household          | table | 22CS30017 |
| public | land_record        | table | 22CS30017 |
| public | panchayat_employee | table | 22CS30017 |
| public | scheme_enrollment  | table | 22CS30017 |
| public | vaccination        | table | 22CS30017 |
| public | welfare_scheme     | table | 22CS30017 |
+--------+--------------------+-------+-----------+
```

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2. Inserting the data

> households table

```
22CS30017> table household;
+--------------+-------------------------------+-----------+
| household_id | address                       | income    |
|--------------+-------------------------------+-----------|
| 1            | 123, MG Road, Mumbai          | 95000.00  |
| 2            | 456, Park Street, Kolkata     | 125000.00 |
| 3            | 789, Brigade Road, Bangalore  | 75000.00  |
| 4            | 101, Anna Salai, Chennai      | 145000.00 |
| 5            | 202, Connaught Place, Delhi   | 82000.00  |
| 6            | 303, Banjara Hills, Hyderabad | 102500.00 |
| 7            | 404, Marine Drive, Kochi      | 98000.00  |
| 8            | 505, Law Garden, Ahmedabad    | 110000.00 |
| 9            | 606, Civil Lines, Jaipur      | 87000.00  |
| 10           | 707, Rajwada, Indore          | 130000.00 |
+--------------+-------------------------------+-----------+
SELECT 10
```

> citizens table

```
+------------+-------------+--------+---------------+--------------+--------------------------+
| citizen_id | name        | gender | date_of_birth | household_id | education_qualification  |
|------------+-------------+--------+---------------+--------------+--------------------------|
| 1          | Amit Sharma | M      | 1990-05-12    | 1            | Graduate                 |
| 2          | Priya Singh | F      | 2005-09-15    | 2            | 10th                     |
| 3          | Anjali Gupta| F      | 2010-11-25    | 3            | Primary                  |
| 4          | Rohit Verma | M      | 1998-01-20    | 4            | 12th                     |
| 5          | Sneha Patel | F      | 2012-03-05    | 5            | Primary                  |
| 6          | Vikram Rao  | M      | 1985-07-19    | 6            | Post-Graduate            |
| 7          | Pooja Mehta | F      | 2008-08-17    | 10           | 12th                     |
| 8          | Arjun Nair  | M      | 2000-12-30    | 8            | Secondary                |
| 9          | Kavya Iyer  | F      | 2003-04-14    | 9            | Graduate                 |
| 10         | Rohan Desai | M      | 2015-06-10    | 10           | Primary                  |
| 11         | Neha Singh  | F      | 1995-02-28    | 1            | Post-Graduate            |
| 12         | Rajesh Kumar| M      | 1980-10-05    | 2            | Graduate                 |
| 13         | Sunita Devi | F      | 1975-12-15    | 3            | Secondary                |
| 14         | Rahul Kumar | M      | 2002-05-12    | 1            | 10th                     |
| 15         | Meena Sharma| F      | 1965-06-05    | 5            | Graduate                 |
| 16         | Ramesh Patel| M      | 1960-07-19    | 6            | Secondary                |
| 17         | Geeta Rao   | F      | 1955-08-17    | 7            | Post-Graduate            |
| 18         | Rajesh Nair | M      | 1950-12-30    | 8            | Graduate                 |
| 19         | Kamini Iyer | F      | 1945-04-14    | 9            | Secondary                |
| 20         | Raj Desai   | M      | 1940-06-10    | 10           | Post-Graduate            |
| 21         | Vijay Singh | M      | 1970-04-20    | 4            | Post-Graduate            |
| 22         | Sita Devi   | F      | 2004-09-15    | 2            | 10th                     |
| 23         | Mohan Das   | M      | 2001-11-25    | 3            | 10th                     |
| 24         | Gita Verma  | F      | 1999-01-20    | 4            | 12th                     |
| 25         | Raj Patel   | M      | 2013-03-05    | 1            | Primary                  |
| 26         | Meena Rao   | F      | 1986-07-19    | 6            | Post-Graduate            |
| 27         | Ramesh Mehta| M      | 2009-08-17    | 7            | 10th                     |
| 28         | Geeta Nair  | F      | 2002-12-30    | 8            | Secondary                |
| 29         | Rajesh Iyer | M      | 2005-04-14    | 9            | Graduate                 |
| 30         | Kamal Desai | M      | 2016-06-10    | 10           | Primary                  |
| 31         | eheh        | M      | 2024-04-04    | 3            | Primary                  |
| 32         | Child 1     | M      | 2024-11-04    | 1            | Primary                  |
| 33         | Child 2     | M      | 2024-07-15    | 2            | Primary                  |
| 34         | Child 3     | F      | 2024-05-15    | 3            | Primary                  |
| 35         | Child 4     | M      | 2024-03-09    | 4            | Primary                  |
| 36         | Child 5     | M      | 2024-11-05    | 5            | Primary                  |
| 37         | Child 6     | M      | 2024-10-08    | 6            | Primary                  |
| 38         | Child 7     | M      | 2024-07-05    | 7            | Primary                  |
| 39         | Child 8     | F      | 2024-06-20    | 8            | Primary                  |
| 40         | Child 9     | F      | 2024-06-06    | 9            | Primary                  |
| 41         | Child 10    | M      | 2024-06-12    | 10           | Primary                  |
+------------+-------------+--------+---------------+--------------+--------------------------+
SELECT 41
```

> land records table

```
22CS30017> table land_record;
+---------+------------+------------+-----------+
| land_id | citizen_id | area_acres | crop_type |
|---------+------------+------------+-----------|
| 1       | 1          | 1.50       | Rice      |
| 2       | 2          | 0.80       | Wheat     |
| 3       | 3          | 2.00       | Cotton    |
| 4       | 4          | 0.50       | Rice      |
| 5       | 5          | 1.20       | Maize     |
| 6       | 6          | 1.80       | Rice      |
| 7       | 7          | 0.60       | Wheat     |
| 8       | 8          | 2.50       | Sugarcane |
| 9       | 9          | 1.00       | Rice      |
| 10      | 10         | 0.90       | Cotton    |
+---------+------------+------------+-----------+
SELECT 10
```

> panchayat_emplyees table

```
22CS30017> table panchayat_employee;
+-------------+------------+-------------------+
| employee_id | citizen_id | role              |
|-------------+------------+-------------------|
| 1           | 1          | Panchayat Pradhan |
| 2           | 2          | Secretary         |
| 3           | 6          | Member            |
| 4           | 8          | Treasurer         |
| 5           | 10         | Member            |
| 6           | 11         | Vice President    |
| 7           | 12         | Member            |
| 8           | 16         | Secretary         |
| 9           | 18         | Auditor           |
| 10          | 20         | Treasurer         |
| 11          | 21         | Clerk             |
| 12          | 22         | Supervisor        |
| 13          | 23         | Assistant         |
| 14          | 24         | Coordinator       |
| 15          | 25         | Advisor           |
+-------------+------------+-------------------+
SELECT 15
```

> Assets table

```
22CS30017> table asset;
+----------+--------------+-------------+-------------------+
| asset_id | type         | location    | installation_date |
|----------+--------------+-------------+-------------------|
| 1        | Street Light | Phulera     | 2024-01-15        |
| 2        | Street Light | Phulera     | 2024-02-20        |
| 3        | Water Pump   | XYZ Village | 2023-08-10        |
| 4        | Road         | ABC Village | 2022-09-05        |
| 5        | Street Light | Phulera     | 2024-03-18        |
| 6        | Water Pump   | XYZ Village | 2023-10-25        |
| 7        | Road         | ABC Village | 2022-11-30        |
| 8        | Street Light | Phulera     | 2024-04-15        |
| 9        | Water Pump   | XYZ Village | 2023-12-20        |
| 10       | Road         | ABC Village | 2023-01-25        |
| 11       | Street Light | XYZ Village | 2024-05-10        |
| 12       | Street Light | ABC Village | 2024-06-15        |
| 13       | Street Light | LMN Village | 2024-07-20        |
| 14       | Street Light | PQR Village | 2024-08-25        |
| 15       | Street Light | DEF Village | 2024-09-30        |
+----------+--------------+-------------+-------------------+
SELECT 15
```

> Welfare schemes table

```
22CS30017> table welfare_scheme;
+-----------+-------------+-----------------------------+
| scheme_id | name        | description                 |
|-----------+-------------+-----------------------------|
| 1         | MNREGA      | Employment Guarantee Scheme |
| 2         | PMAY        | Affordable Housing Scheme   |
| 3         | Midday Meal | School Lunch Program        |
| 4         | PMKSY       | Irrigation Scheme           |
| 5         | PMFBY       | Crop Insurance Scheme       |
+-----------+-------------+-----------------------------+
SELECT 5
```

> Scheme enrollment table

```
22CS30017> table scheme_enrollment;
+---------------+------------+-----------+-----------------+
| enrollment_id | citizen_id | scheme_id | enrollment_date |
|---------------+------------+-----------+-----------------|
| 1             | 2          | 1         | 2023-07-10      |
| 2             | 3          | 2         | 2024-01-15      |
| 3             | 4          | 3         | 2024-02-01      |
| 4             | 5          | 1         | 2024-03-20      |
| 5             | 6          | 2         | 2024-04-05      |
| 6             | 7          | 3         | 2024-05-10      |
| 7             | 8          | 1         | 2024-06-15      |
| 8             | 9          | 2         | 2024-07-20      |
| 9             | 10         | 3         | 2024-08-25      |
+---------------+------------+-----------+-----------------+
SELECT 9
```

> Vaccinations table

```
22CS30017> table vaccination;
+----------------+------------+--------------+-------------------+
| vaccination_id | citizen_id | vaccine_type | date_administered |
|----------------+------------+--------------+-------------------|
| 1              | 5          | Covid-19     | 2024-05-20        |
| 2              | 7          | Polio        | 2024-03-10        |
| 3              | 10         | Hepatitis    | 2024-06-15        |
| 4              | 1          | Covid-19     | 2024-07-20        |
| 5              | 3          | Polio        | 2024-08-10        |
| 6              | 31         | Polio        | 2024-06-06        |
+----------------+------------+--------------+-------------------+
SELECT 6
```

Output of the queries

A) Show names of all citizens who holds more than 1 acre of land

```
22CS30017> -- Show names of all citizens who holds more than 1 acre of land
 SELECT c.name
     FROM citizen c
         JOIN land_record l
             ON c.citizen_id = l.citizen_id
     WHERE l.area_acres > 1;
+--------------+
| name         |
|--------------|
| Amit Sharma  |
| Anjali Gupta |
| Sneha Patel  |
| Vikram Rao   |
| Arjun Nair   |
+--------------+
SELECT 5
```

B) Show name of all girls who study in school with household income less than 1 Lakh per year

```
22CS30017> -- Show name of all girls who study in school with household income less than 1 Lakh per year
 SELECT c.name
     FROM household h
         JOIN citizen c
             ON c.household_id = h.household_id
     WHERE h.income < 100000.00
         AND c.gender = 'F'
         AND c.education_qualification in ('Primary', 'Secondary', '10th', '12th');

+--------------+
| name         |
|--------------|
| Anjali Gupta |
| Sneha Patel  |
| Sunita Devi  |
| Kamini Iyer  |
| Child 3      |
| Child 9      |
+--------------+
SELECT 6
```

C) How many acres of land cultivate rice

```
22CS30017> -- How many acres of land cultivate rice
 SELECT sum(area_acres) as total_acres
     FROM land_record
     WHERE crop_type = 'Rice';

+-------------+
| total_acres |
|-------------|
| 4.80        |
+-------------+
SELECT 1
```

D) Number of citizens who are born after 1.1.2000 and have educational qualification of 10th class

```
22CS30017> -- Number of citizens who are born after 1.1.2000 and have educational qualification of 10th class
 SELECT count(citizen_id) as count
     FROM citizen
     WHERE date_of_birth > '2000-01-01'
         AND education_qualification = '10th';
+-------+
| count |
|-------|
| 5     |
+-------+
SELECT 1
```

E) Name of all employees of panchayat who also hold more than 1 acre land

```
22CS30017> -- Name of all employees of panchayat who also hold more than 1 acre land
 SELECT c.name
     FROM citizen c
         JOIN panchayat_employee pe
             ON c.citizen_id = pe.citizen_id
         JOIN land_record l
             ON c.citizen_id = l.citizen_id
     WHERE l.area_acres > 1;

+-------------+
| name        |
|-------------|
| Amit Sharma |
| Vikram Rao  |
| Arjun Nair  |
+-------------+
SELECT 3
```

F) Name of the household members of Panchayat Pradhan

```
22CS30017> -- Name of the household members of Panchayat Pradhan
 SELECT c.name
 FROM citizen c
 WHERE c.household_id = (
     SELECT ci.household_id
     FROM citizen ci
         JOIN panchayat_employee pe
             ON ci.citizen_id = pe.citizen_id
     WHERE pe.role = 'Panchayat Pradhan'
 );

+-------------+
| name        |
|-------------|
| Amit Sharma |
| Neha Singh  |
| Rahul Kumar |
| Raj Patel   |
| Child 1     |
+-------------+
SELECT 5
```

G) Total number of street light assets installed in a particular locality named Phulera that are installed in 2024

```
22CS30017> -- Total number of street light assets installed in a particular locality named Phulera that are installed in 2024
 SELECT count(asset_id) as count
     FROM asset
     WHERE location = 'Phulera'
         AND installation_date >= '2024-01-01'
         AND installation_date <= '2024-12-31'
         AND type = 'Street Light';
+-------+
| count |
|-------|
| 4     |
+-------+
SELECT 1
```

H) Number of vaccinations done in 2024 for the children of citizens whose educational qualification is class 10th

```
22CS30017> -- Number of vaccinations done in 2024 for the children of citizens whose educational qualification is class 10
 SELECT count(DISTINCT c.citizen_id) as count
     FROM citizen c
         -- Join household to get household details of the citizen
         JOIN household h ON c.household_id = h.household_id
         -- Join citizen again to get other members of the same household
         JOIN citizen c2 ON h.household_id = c2.household_id
         -- Join vaccination to get vaccination details of household members
         JOIN vaccination v ON c2.citizen_id = v.citizen_id
     WHERE c.education_qualification = '10th' -- Filter citizens with education qualification of class 10
         AND v.date_administered >= '2024-01-01' -- Filter vaccinations administered in 2024
         AND v.date_administered <= '2024-12-31'
         AND c2.date_of_birth > c.date_of_birth; -- Filter children of the citizens
+-------+
| count |
|-------|
| 1     |
+-------+
SELECT 1
```

I) Total number of births of boy child in the year 2024

```
22CS30017> -- Total number of births of boy child in the year 2024
 SELECT count(event_type) as count
     FROM census_data
     WHERE event_type = 'Birth'
         AND event_date >= '2024-01-01'
         AND event_date <= '2024-12-31';
+-------+
| count |
|-------|
| 11    |
+-------+
SELECT 1
```

J) Number of citizens who belong to the household of at least one panchayat employee.

```
22CS30017> -- Number of citizens who belong to the household of at least one panchayat employee
 SELECT count(citizen_id) as count
     FROM citizen
     WHERE household_id IN
         (
             SELECT household_id
                 FROM citizen
             WHERE citizen_id IN
                 (
                     SELECT citizen_id
                         FROM panchayat_employee
                 )
         );

+-------+
| count |
|-------|
| 31    |
+-------+
SELECT 1
```

Schemas for ER Diagram (from assignment 1)

Entities schema:

The schemas include:

1. Main entities:
    - Certificate
    - Citizen
    - Scheme
    - Panchayat
    - Panchayat_Member
    - Expenditure
    - Asset
    - Tax_Record
    - Income
    - Census_Data
    - Agricultural_Data
    - Environmental_Data
2. Relationship tables to handle many-to-many relationships:
    - Scheme_Implementation
    - Member_Panchayat_Service
    - Asset_Maintenance
    - Panchayat_Environmental_Data
    - Panchayat_Agricultural_Data
    - Panchayat_Census
3. Multivalued Attributes:
    - Separate tables for phone numbers and emails (Citizen_Phone, Citizen_Email, Panchayat_Phone, Panchayat_Email)

```
-- Citizen table
CREATE TABLE Citizen (
    Citizen_ID VARCHAR(50) PRIMARY KEY,
    Name VARCHAR(100),
    Gender VARCHAR(20),
    Date_of_birth DATE,
    Address TEXT,
    Occupation VARCHAR(100)
    -- Age is derived from Date_of_birth
);

-- Citizen_Phone table for multivalued phone numbers
CREATE TABLE Citizen_Phone (
    Citizen_ID VARCHAR(50),
    Phone_number VARCHAR(20),
    PRIMARY KEY (Citizen_ID, Phone_number),
    FOREIGN KEY (Citizen_ID) REFERENCES Citizen(Citizen_ID)
);
```

```
-- Citizen_Email table for multivalued emails
CREATE TABLE Citizen_Email (
    Citizen_ID VARCHAR(50),
    Email VARCHAR(100),
    PRIMARY KEY (Citizen_ID, Email),
    FOREIGN KEY (Citizen_ID) REFERENCES Citizen(Citizen_ID)
);

-- Panchayat table
CREATE TABLE Panchayat (
    Panchayat_ID VARCHAR(50) PRIMARY KEY,
    Address TEXT,
    Jurisdiction VARCHAR(100),
    Member_count INT
);

-- Panchayat_Phone table for multivalued phone numbers
CREATE TABLE Panchayat_Phone (
    Panchayat_ID VARCHAR(50),
    Phone_number VARCHAR(20),
    PRIMARY KEY (Panchayat_ID, Phone_number),
    FOREIGN KEY (Panchayat_ID) REFERENCES Panchayat(Panchayat_ID)
);

-- Panchayat_Email table for multivalued emails
CREATE TABLE Panchayat_Email (
    Panchayat_ID VARCHAR(50),
    Email VARCHAR(100),
    PRIMARY KEY (Panchayat_ID, Email),
    FOREIGN KEY (Panchayat_ID) REFERENCES Panchayat(Panchayat_ID)
);

-- Certificate table
CREATE TABLE Certificate (
    Certificate_ID VARCHAR(50) PRIMARY KEY,
    Citizen_ID VARCHAR(50),
    Certificate_type VARCHAR(100),
    Issue_date DATE,
    Expiry_date DATE,
    Certificate_status VARCHAR(50),
    FOREIGN KEY (Citizen_ID) REFERENCES Citizen(Citizen_ID)
);
```

```
-- Scheme table
CREATE TABLE Scheme (
    Scheme_ID VARCHAR(50) PRIMARY KEY,
    Name VARCHAR(100),
    Eligibility_criteria TEXT,
    Start_date DATE,
    End_date DATE,
    Beneficiaries_Count INT,
    Budget_Allocated DECIMAL(15,2),
    Implementation_Status VARCHAR(50),
    Description TEXT
);

-- Panchayat_Member table
CREATE TABLE Panchayat_Member (
    Member_ID VARCHAR(50) PRIMARY KEY,
    Citizen_ID VARCHAR(50),
    Role VARCHAR(100),
    Rank VARCHAR(50),
    Start_date DATE,
    Tenure INT,
    End_date DATE,
    FOREIGN KEY (Citizen_ID) REFERENCES Citizen(Citizen_ID)
);

-- Expenditure table
CREATE TABLE Expenditure (
    Expenditure_ID VARCHAR(50) PRIMARY KEY,
    Purpose VARCHAR(200),
    Amount DECIMAL(15,2),
    Date DATE,
    Description TEXT,
    Approved_by VARCHAR(50),
    Payment_method VARCHAR(50),
    Status VARCHAR(50),
    FOREIGN KEY (Approved_by) REFERENCES Panchayat_Member(Member_ID)
);

-- Asset table
CREATE TABLE Asset (
    Asset_ID VARCHAR(50) PRIMARY KEY,
    Asset_type VARCHAR(100),
    Location TEXT,
    Condition VARCHAR(50),
    Acquisition_date DATE,
    Value DECIMAL(15,2)
);
```

```
-- Tax_Record table
CREATE TABLE Tax_Record (
    Tax_ID VARCHAR(50) PRIMARY KEY,
    Citizen_ID VARCHAR(50),
    Tax_type VARCHAR(100),
    Amount DECIMAL(15,2),
    Due_date DATE,
    Tax_rate DECIMAL(5,2),
    Payment_date DATE,
    Payment_status VARCHAR(50),
    FOREIGN KEY (Citizen_ID) REFERENCES Citizen(Citizen_ID)
);

-- Income table
CREATE TABLE Income (
    Income_ID VARCHAR(50) PRIMARY KEY,
    Source VARCHAR(100),
    Amount DECIMAL(15,2),
    Date DATE,
    Type VARCHAR(50),
    Description TEXT
);


-- Census_Data table
CREATE TABLE Census_Data (
    Census_ID VARCHAR(50) PRIMARY KEY,
    Year INT,
    Population INT,
    Male_Count INT,
    Female_Count INT,
    Children_Count INT,
    Household_Count INT,
    Literacy_Rate DECIMAL(5,2),
    Unemployment_Rate DECIMAL(5,2)
);

-- Agricultural_Data table
CREATE TABLE Agricultural_Data (
    Plot_ID VARCHAR(50) PRIMARY KEY,
    Crop_type VARCHAR(100),
    Quality VARCHAR(50),
    Area DECIMAL(10,2),
    Yield DECIMAL(10,2),
    Details TEXT
);
```

```
-- Environmental_Data table
CREATE TABLE Environmental_Data (
    Environmental_ID VARCHAR(50) PRIMARY KEY,
    Category VARCHAR(100),
    Data_type VARCHAR(100),
    Date DATE,
    Location TEXT,
    Description TEXT
);


-- Relationship tables
CREATE TABLE Scheme_Implementation (
    Scheme_ID VARCHAR(50),
    Panchayat_ID VARCHAR(50),
    Implementation_date DATE,
    Status VARCHAR(50),
    PRIMARY KEY (Scheme_ID, Panchayat_ID),
    FOREIGN KEY (Scheme_ID) REFERENCES Scheme(Scheme_ID),
    FOREIGN KEY (Panchayat_ID) REFERENCES Panchayat(Panchayat_ID)
);

CREATE TABLE Member_Panchayat_Service (
    Member_ID VARCHAR(50),
    Panchayat_ID VARCHAR(50),
    Start_date DATE,
    End_date DATE,
    PRIMARY KEY (Member_ID, Panchayat_ID),
    FOREIGN KEY (Member_ID) REFERENCES Panchayat_Member(Member_ID),
    FOREIGN KEY (Panchayat_ID) REFERENCES Panchayat(Panchayat_ID)
);

CREATE TABLE Asset_Maintenance (
    Asset_ID VARCHAR(50),
    Expenditure_ID VARCHAR(50),
    Maintenance_date DATE,
    Description TEXT,
    PRIMARY KEY (Asset_ID, Expenditure_ID),
    FOREIGN KEY (Asset_ID) REFERENCES Asset(Asset_ID),
    FOREIGN KEY (Expenditure_ID) REFERENCES Expenditure(Expenditure_ID)
);

CREATE TABLE Panchayat_Environmental_Data (
    Panchayat_ID VARCHAR(50),
    Environmental_ID VARCHAR(50),
    Collection_date DATE,
    PRIMARY KEY (Panchayat_ID, Environmental_ID),
    FOREIGN KEY (Panchayat_ID) REFERENCES Panchayat(Panchayat_ID),
    FOREIGN KEY (Environmental_ID) REFERENCES Environmental_Data(Environmental_ID)
);
```

```
CREATE TABLE Panchayat_Agricultural_Data (
    Panchayat_ID VARCHAR(50),
    Plot_ID VARCHAR(50),
    Collection_date DATE,
    PRIMARY KEY (Panchayat_ID, Plot_ID),
    FOREIGN KEY (Panchayat_ID) REFERENCES Panchayat(Panchayat_ID),
    FOREIGN KEY (Plot_ID) REFERENCES Agricultural_Data(Plot_ID)
);

CREATE TABLE Panchayat_Census (
    Panchayat_ID VARCHAR(50),
    Census_ID VARCHAR(50),
    Survey_date DATE,
    PRIMARY KEY (Panchayat_ID, Census_ID),
    FOREIGN KEY (Panchayat_ID) REFERENCES Panchayat(Panchayat_ID),
    FOREIGN KEY (Census_ID) REFERENCES Census_Data(Census_ID)
);
```

Design choices for ER Diagram (from assignment 1)

Panchayat:

- Issues certificates
  - Many to one (one panchayat issues many certificates)
  - Partial participation
- Collects agricultural, environmental data and census data
  - Partial participation
  - Many to one
- Implements welfare schemes
  - Many schemes implemented by a panchayat (many to one)
  - Partial participation
- Income funds panchayat
  - All the income that panchayat gets belongs to a panchayat (total participation)
  - Many to one (may sources of income for a panchayat)

Assets:

- Assets maintenance requires expenditure
  - That is approved by panchayat members
    - Who serves in a panchayat

Tax_records:

- Contributes to income of panchayat

Citizen:

- Can hold position as Panchayat_member
  - Every panchayat member is a citizen (total participation of panchayat_member table)
  - Not all citizen is Panchayat_member (partial participation)
  - One - to - one relation between them
- Can own assets
  - Partial participation -
    - Not all citizens have an asset
    - Not all assets are owned by citizens only, it can be owned by others also like panchayat
  - Many-to-many relation -
    - Many assets can be owned by a citizen
    - Many citizens can collectively own an asset
- Pays taxes
  - Total participation of tax entity- every tax record is related to a citizen
  - Partial participation of citizen- not everyone comes in tax slab, children don't even earn to pay
  - One to many
    - Each tax record is related to a single person
    - A person may have multiple tax records
- Contributes to income
  - Citizen pays taxes, gives donations, charity that is income for panchayat
- Applies for certificate
  - Every certificate belongs to a citizen (total)
  - Many to one
    - A citizen can have multiple certificates like birth, marriage, aadhar, pan, death
    - A certificate belongs to a unique citizen
- Benefits from schemes
  - Partial participation
  - Many to many relation

Panchayat_member:

- Serves in panchayat
    - All panchayat member serves in a panchayat (total)
    - A panchayat member can serve in a single panchayat (many to one)
- Approves expenditure
    - Partial and many to many
        - Many members collectively approves a bill/expenditure
        - Many bills approved by a member
- Oversees the welfare schemes
    - Many to many relation
    - Partial participation