DBMS Lab Assignment 2: Gram Panchayat Management System

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Entity-Relationship Diagram and Table Schema

Entity Sets

Citizen	(<u>Aadhar_no</u>, first_name, last_name, date_of_birth, phone_number, age, caste)
Census_data	(<u>census_id</u>, year, population, demographics, description)
Environmental_data	(<u>report_env_id</u>, issue_type, description, report_date, rainfall, groundwater_level, pollution_data)
Asset	(<u>asset_id</u>, type, value, location, name)
Expenditure	(<u>expenditure_id</u>, amount, expenditure_date, purpose, category, payment_mode, financial_year)
Income	(<u>income_id</u>, amount, income_date, source, financial_year)
Tax	(<u>tax_id</u>, amount, payment_date, status, payment_mode, financial_year, <u>citizen_id</u>)
Service	(<u>service_id</u>, type, status, request_date)
Welfare_Scheme	(<u>scheme_id</u>, name, description, start_date, end_date)
Agricultural_data	(<u>report_agri_id</u>, crop_type, area, yield, report_date, <u>citizen_id</u>)
Panchayat_committee	(<u>committee_id</u>, name, purpose)
Panchayat_member	(<u>member_id</u>, first_name, last_name, role, contact)

Relationship Sets

Reports	(<u>citizen_id</u>, <u>report_id</u>)
Benefits	(<u>scheme_id</u>, <u>citizen_id</u>)
Requests	(<u>service_id</u>, <u>citizen_id</u>)
Pays	(<u>tax_id</u>, <u>citizen_id</u>)
Earns	(<u>income_id</u>, <u>citizen_id</u>)
Incurs	(<u>expenditure_id</u>, <u>citizen_id</u>)
Owns	(<u>asset_id</u>, <u>citizen_id</u>)
Submits	(<u>citizen_id</u>, <u>report_id</u>)
Includes	(<u>census_id</u>, <u>citizen_id</u>)
Belongs	(<u>committee_id</u>, <u>member_id</u>)
Oversees	(<u>committee_id</u>, . . . , <u>census_id</u>)

Aggregation

Oversees: The "Oversees" relationship aggregates multiple activities and entities under the supervision of the Panchayat Committee. This relationship consolidates various aspects such as agricultural reports, environmental reports, taxes, services, welfare schemes, and census data of citizens. Aggregating these relationships simplifies the representation of complex interdependencies, ensuring efficient management and accountability by the Panchayat Committee.

Table Schema Explanation

Households Table

```
1  CREATE TABLE households (
2      household_id INTEGER PRIMARY KEY,
3      address VARCHAR(200) NOT NULL,
4      number_of_members INTEGER NOT NULL,
5      income INTEGER
6  );
```

- **Households Table**: Stores details about households such as address, number of members, and income.

Citizens Table

```
1  CREATE TABLE citizens (
2      citizen_id INTEGER PRIMARY KEY,
3      aadhar_no VARCHAR(200) UNIQUE NOT NULL,
4      first_name VARCHAR(200) NOT NULL,
5      last_name VARCHAR(200) NOT NULL,
6      date_of_birth DATE NOT NULL,
7      phone_number VARCHAR(200),
8      age INTEGER,
9      caste VARCHAR(200),
10     gender VARCHAR(200) NOT NULL,
11     household_id INTEGER NOT NULL,
12     FOREIGN KEY (household_id) REFERENCES households(household_id),
13     educational_qualification VARCHAR(200),
14     occupation VARCHAR(200),
15     marital_status VARCHAR(200)
16 );
```

- **Citizens Table**: Stores information about citizens, including personal details, household references, and more.

Land Records Table

```
1  CREATE TABLE land_records (
2      land_id INTEGER PRIMARY KEY,
3      citizen_id INTEGER,
4      FOREIGN KEY (citizen_id) REFERENCES citizens(citizen_id),
5      area_acres DECIMAL NOT NULL,
6      crop_type VARCHAR(200)
7  );
```

- **Land Records Table**: Tracks land owned by citizens, including area in acres and crop type.

Panchayat Employees Table

```
1
2  create table panchayat_employees (
3      employee_id INTEGER PRIMARY KEY,
4      citizen_id INTEGER,
5      FOREIGN KEY (citizen_id) REFERENCES citizens(citizen_id),
6      role VARCHAR(200)
7  );
8
9  ALTER TABLE panchayat_employees
10 ADD COLUMN household_id INTEGER;
11
12 UPDATE panchayat_employees pe
13 SET household_id = h.household_id
14 FROM households h
15 WHERE pe.employee_id = h.household_id;
16 );
```

- **Panchayat Employees Table**: Stores information about employees working for the panchayat, linked to citizens.

Assets Table

```
1  CREATE TABLE assets (
2      asset_id INTEGER PRIMARY KEY,
3      type VARCHAR(200) NOT NULL,
4      household_id INTEGER,
5      FOREIGN KEY (household_id) REFERENCES households(household_id),
6      value DECIMAL NOT NULL,
7      location VARCHAR(200),
8      name VARCHAR(200),
9      installation_date DATE
10 );
```

- **Assets Table**: Records assets owned by households, including type, value, and installation date.

Welfare Schemes Table

```
1  CREATE TABLE welfare_schemes (
2      scheme_id INTEGER PRIMARY KEY,
3      name VARCHAR(200) NOT NULL,
4      description VARCHAR(200),
5      eligibility VARCHAR(200),
6      benefits VARCHAR(200),
7      start_date DATE,
8      end_date DATE
9  );
```

- **Welfare Schemes Table**: Stores details about welfare schemes, including eligibility and benefits.

Scheme Enrollments Table

```
1  CREATE TABLE scheme_enrollments (
2      enrollment_id INTEGER PRIMARY KEY,
3      citizen_id INTEGER,
4      FOREIGN KEY (citizen_id) REFERENCES citizens(citizen_id),
5      scheme_id INTEGER,
6      FOREIGN KEY (scheme_id) REFERENCES welfare_schemes(scheme_id),
7      enrollment_date DATE NOT NULL
8  );
```

- **Scheme Enrollments Table**: Tracks which citizens are enrolled in which welfare schemes.

Vaccinations Table

```
1  CREATE TABLE vaccinations (
2      vaccination_id INTEGER PRIMARY KEY,
3      citizen_id INTEGER,
4      FOREIGN KEY (citizen_id) REFERENCES citizens(citizen_id),
5      vaccine_type VARCHAR(200) NOT NULL,
6      date DATE NOT NULL
7  );
```

- **Vaccinations Table**: Tracks vaccinations received by citizens, including the vaccine type and date.

Census Data Table

```
1  CREATE TABLE census_data (
2      census_id INTEGER PRIMARY KEY,
3      household_id INTEGER,
4      FOREIGN KEY (household_id) REFERENCES households(household_id),
5      citizen_id INTEGER,
6      FOREIGN KEY (citizen_id) REFERENCES citizens(citizen_id),
7      year INTEGER NOT NULL,
8      population INTEGER NOT NULL,
9      demographics VARCHAR(200),
```

```
10      description VARCHAR(200),
11      event_type VARCHAR(200),
12      event_date DATE
13  );
```

- **Census Data Table**: Stores census information, including population and demographic details for each year.

Tax Table

```
1  CREATE TABLE tax(
2      tax_id INTEGER PRIMARY KEY,
3      amount DECIMAL NOT NULL,
4      payment_date DATE NOT NULL,
5      status VARCHAR(200),
6      payment_mode VARCHAR(200),
7      financial_year VARCHAR(200),
8      citizen_id INTEGER,
9      FOREIGN KEY (citizen_id) REFERENCES citizens(citizen_id)
10  );
```

- **Tax Table**: Tracks tax payments made by citizens, including amount, status, and financial year.

Income Table

```
1  CREATE TABLE income(
2      income_id INTEGER PRIMARY KEY,
3      citizen_id INTEGER,
4      FOREIGN KEY (citizen_id) REFERENCES citizens(citizen_id),
5      amount DECIMAL NOT NULL,
6      income_date DATE NOT NULL,
7      source VARCHAR(200),
8      financial_year VARCHAR(200)
9  );
```

- **Income Table**: Records income details of citizens, including amount, source, and financial year.

Expenditure Table

```sql
CREATE TABLE expenditure (
    expenditure_id INTEGER PRIMARY KEY,
    citizen_id INTEGER,
    FOREIGN KEY (citizen_id) REFERENCES citizens(citizen_id),
    amount DECIMAL NOT NULL,
    expenditure_date DATE NOT NULL,
    purpose VARCHAR(200),
    category VARCHAR(200),
    payment_mode VARCHAR(200),
    financial_year VARCHAR(200)
);
```

- **Expenditure Table**: Tracks citizens' expenditures, including amount, purpose, and financial year.

Service Table

```sql
CREATE TABLE service (
    service_id INTEGER PRIMARY KEY,
    name VARCHAR(200) NOT NULL,
    description VARCHAR(200),
    type VARCHAR(200) NOT NULL,
    status VARCHAR(200),
    request_date DATE
);
```

- **Service Table**: Stores information about various services available, including type, description, and request date.

Service Requests Table

```sql
CREATE TABLE service_requests (
    request_id INTEGER PRIMARY KEY,
    citizen_id INTEGER,
    FOREIGN KEY (citizen_id) REFERENCES citizens(citizen_id),
    service_id INTEGER,
    FOREIGN KEY (service_id) REFERENCES service(service_id),
    request_date DATE NOT NULL,
    status VARCHAR(200)
);
```

- **Service Requests Table**: Tracks requests made by citizens for services, including request status.

Data Population Queries

Households Data Insertion

```sql
1  INSERT INTO households (household_id, address, number_of_members, income) VALUES
2  (1, '123 Main Street, Phulera Village, District Rajasthan', 4, 75000),
3  (2, '45 Gandhi Road, Phulera Village, District Rajasthan', 3, 50000),
4  (3, '78 Nehru Colony, Phulera Village, District Rajasthan', 5, 100000),
5  (4, '22 Shastri Nagar, Phulera Village, District Rajasthan', 2, 60000),
6  (5, '56 Tilak Street, Phulera Village, District Rajasthan', 6, 85000),
7  (6, '11 Subhash Chowk, Phulera Village, District Rajasthan', 3, 45000),
8  (7, '33 Azad Lane, Phulera Village, District Rajasthan', 4, 70000),
9  (8, '89 Patel Marg, Phulera Village, District Rajasthan', 5, 95000);
```

Update Household Data

```sql
1  UPDATE households
2  SET number_of_members = LEAST(number_of_members, 4);
```

Citizens Data Insertion

```sql
1  INSERT INTO citizens (
2      citizen_id, aadhar_no, first_name, last_name, date_of_birth,
3      phone_number, age, caste, gender, household_id,
4      educational_qualification, occupation, marital_status
5  ) VALUES
6  (1, '123456789012', 'Ramesh', 'Kumar', '1980-05-15', '9876543210', 43, 'General', 'Male', 1,
        'Graduate', 'Farmer', 'Married'),
7  (2, '234567890123', 'Priya', 'Singh', '2005-03-20', '8765432109', 18, 'OBC', 'Female', 1, '
       12th', 'Student', 'Unmarried'),
8  (3, '345678901234', 'Amit', 'Patel', '1990-11-10', '7654321098', 33, 'SC', 'Male', 2, '10th'
       , 'Worker', 'Married'),
9  (4, '456789012345', 'Sunita', 'Gupta', '2016-07-25', '6543210987', 9, 'General', 'Female',
       3, 'Graduate', 'Teacher', 'Married'),
10 (5, '567890123456', 'Rajesh', 'Sharma', '1975-12-05', '5432109876', 48, 'ST', 'Male', 4, '12
       th', 'Driver', 'Married'),
11 (6, '678901234567', 'Neha', 'Verma', '2024-09-18', '4321098765', 2, 'OBC', 'Female', 5, '
       Graduate', 'Software Engineer', 'Unmarried'),
12 (7, '789012345678', 'Vikram', 'Singh', '1995-06-30', '3210987654', 28, 'General', 'Male', 6,
        'Diploma', 'Technician', 'Unmarried'),
13 (8, '890123456789', 'Meera', 'Devi', '1970-02-14', '2109876543', 53, 'SC', 'Female', 7, '10
       th', 'Homemaker', 'Married');
```

Land Records Data Insertion

```sql
1  INSERT INTO land_records (land_id, citizen_id, area_acres, crop_type) VALUES
2  (1, 1, 2.5, 'Rice'),
3  (2, 3, 1.0, 'Wheat'),
4  (3, 4, 1.5, 'Sugarcane'),
5  (4, 5, 0.8, 'Maize'),
6  (5, 6, 0.5, 'Vegetables');
```

Panchayat Employees Data Insertion

```sql
1  INSERT INTO panchayat_employees (employee_id, citizen_id, role) VALUES
2  (1, 1, 'Sarpanch'),
3  (2, 4, 'Secretary'),
4  (3, 3, 'Village Coordinator');
5
6  UPDATE panchayat_employees pe
7  SET household_id = h.household_id
```

```
8 FROM households h
9 WHERE pe.employee_id = h.household_id;
```

Assets Data Insertion

```
1 INSERT INTO assets (asset_id, type, household_id, value, location, name, installation_date)
      VALUES
2 (1, 'Street Light', 1, 50000, 'Main Road', 'Street Light 1', '2024-01-15'),
3 (2, 'Water Pump', 2, 75000, 'Community Well', 'Village Water Pump', '2023-11-20'),
4 (3, 'Community Hall', 3, 500000, 'Village Center', 'Gram Panchayat Hall', '2022-05-10'),
5 (4, 'Electricity Transformer', 4, 200000, 'Village Outskirts', 'Power Distribution Unit', '
      2023-07-30'),
6 (5, 'Public Toilet', 5, 100000, 'Market Area', 'Community Sanitation Facility', '2023-09-25'
      );
```

Welfare Schemes Data Insertion

```
1 INSERT INTO welfare_schemes (scheme_id, name, description, eligibility, benefits, start_date
      , end_date) VALUES
2 (1, 'Pradhan Mantri Awas Yojana', 'Housing for All', 'Below Poverty Line Families', 'Free
      Housing', '2022-01-01', '2024-12-31'),
3 (2, 'PM Kisan Samman Nidhi', 'Direct Income Support to Farmers', 'Small and Marginal Farmers
      ', 'Financial Assistance    6000  /Year', '2019-02-24', NULL),
4 (3, 'National Social Assistance Programme', 'Social Security for Elderly', 'Senior Citizens,
       Widows', 'Pension and Financial Support', '2020-04-01', NULL),
5 (4, 'Mid-Day Meal Scheme', 'School Nutrition Programme', 'School Children (6-14 years)', '
      Free Nutritious Meal', '2021-06-15', NULL),
6 (5, 'Pradhan Mantri Matru Vandana Yojana', 'Maternity Benefit Programme', 'Pregnant and
      Lactating Women', 'Cash Incentive    5000 ', '2017-09-01', NULL);
```

Scheme Enrollments Data Insertion

```
1 INSERT INTO scheme_enrollments (enrollment_id, citizen_id, scheme_id, enrollment_date)
      VALUES
2 (1, 1, 1, '2022-06-15'),
3 (2, 3, 2, '2022-07-20'),
4 (3, 4, 3, '2022-08-10'),
5 (4, 2, 4, '2022-09-05'),
6 (5, 5, 5, '2022-10-12');
```

Vaccinations Data Insertion

```
1 INSERT INTO vaccinations (vaccination_id, citizen_id, vaccine_type, date) VALUES
2 (1, 2, 'COVID-19', '2024-01-15'),
3 (2, 3, 'Polio', '2024-02-20'),
4 (3, 4, 'Hepatitis B', '2023-11-10'),
5 (4, 5, 'Tetanus', '2023-12-05'),
6 (5, 6, 'MMR', '2024-03-01');
```

Census Data Insertion

```
1 INSERT INTO census_data (
2    census_id, household_id, citizen_id, year, population,
3    demographics, description, event_type, event_date
4 ) VALUES
5 (1, 1, 1, 2023, 4, 'Rural Family', 'Household Census Data', 'Population Survey', '2023-03-15
      '),
6 (2, 2, 3, 2023, 3, 'Working Class Family', 'Household Census Data', 'Population Survey', '
      2023-03-16'),
```

```
7  (3, 3, 4, 2023, 4, 'Middle−Income Family', 'Household Census Data', 'Population Survey', '
      2023−03−17'),
8  (4, 4, 5, 2023, 2, 'Small Family', 'Household Census Data', 'Population Survey', '2023−03−18
      '),
9  (5, 5, 6, 2023, 3, 'Young Professional Family', 'Household Census Data', 'Population Survey'
      , '2023−03−19');
```

Tax Data Insertion

```
1  INSERT INTO tax (tax_id, amount, payment_date, status, payment_mode, financial_year,
      citizen_id)
2  VALUES
3  (1, 5000.00, '2023−03−15', 'Paid', 'Online', '2023−2024', 1),
4  (2, 3000.00, '2023−04−10', 'Pending', 'Cash', '2023−2024', 2),
5  (3, 7000.00, '2023−05−05', 'Paid', 'Card', '2023−2024', 3),
6  (4, 4000.00, '2023−06−20', 'Paid', 'UPI', '2023−2024', 4),
7  (5, 6000.00, '2023−07−25', 'Pending', 'Cheque', '2023−2024', 5);
```

SQL Queries and Corresponding Tasks

Task A: Show names of all citizens who hold more than 1 acre of land

```
1  SELECT c.first_name, c.last_name
2  FROM citizens c
3  JOIN land_records l ON c.citizen_id = l.citizen_id
4  WHERE l.area_acres > 1;
```

Task B: Show names of all girls who study in school with household income less than 1 Lakh per year

```
1  SELECT c.first_name, c.last_name
2  FROM citizens c
3  JOIN households h ON c.household_id = h.household_id
4  WHERE c.gender = 'Female'
5    AND c.occupation = 'Student'
6    AND h.income < 100000;
```

Task C: How many acres of land cultivate rice

```
1  SELECT SUM(l.area_acres) AS total_rice_acres
2  FROM land_records l
3  WHERE l.crop_type = 'Rice';
```

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

```
1  SELECT COUNT(*) AS total_citizens
2  FROM citizens
3  WHERE date_of_birth > '2000−01−01'
4    AND educational_qualification = '10th class';
```

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

```
1  SELECT c.first_name, c.last_name
2  FROM citizens c
3  JOIN panchayat_employees p ON c.citizen_id = p.citizen_id
4  JOIN land_records l ON c.citizen_id = l.citizen_id
5  WHERE l.area_acres > 1;
```

Task F: Name of the household members of Panchayat Pradhan

```
1  SELECT c.first_name, c.last_name
2  FROM citizens c
3  WHERE c.household_id = (
4      SELECT p.household_id
5      FROM panchayat_employees p
6      JOIN citizens pc ON p.citizen_id = pc.citizen_id
7      WHERE p.role = 'Sarpanch'
8  );
```

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

```sql
1  SELECT COUNT(*) AS total_street_lights
2  FROM assets
3  WHERE type = 'Street Light'
4    AND location = 'Phulera'
5    AND EXTRACT(YEAR FROM installation_date) = 2024;
```

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

```sql
1  SELECT COUNT(*) AS total_vaccinations
2  FROM vaccinations v
3  JOIN citizens c ON v.citizen_id = c.citizen_id
4  WHERE EXTRACT(YEAR FROM v.date) = 2024
5    AND c.educational_qualification = '10th class'
6    AND c.age <= 18;
```

Task I: Total number of births of boy children in the year 2024

```sql
1  SELECT COUNT(*) AS total_boy_births
2  FROM citizens c
3  WHERE gender = 'Male'
4    AND EXTRACT(YEAR FROM c.date_of_birth) = 2024;
```

Task J: Number of citizens who belong to the household of at least one panchayat employee

```sql
1  SELECT COUNT(DISTINCT c.citizen_id) AS total_citizens
2  FROM citizens c
3  WHERE c.household_id IN (
4      SELECT DISTINCT p.household_id
5      FROM panchayat_employees p
6      JOIN citizens pc ON p.citizen_id = pc.citizen_id
7  );
```