**Week 8 Database Assignment.**

**Part 1: SDG Selection and Problem Definition**

1. **SDG Selection:**
   * **Example**: SDG 7: Affordable and Clean Energy.
2. **Problem Definition:**
   * **Example**: High energy consumption and low efficiency in residential areas.
   * **Specific Problem**: Identify patterns of energy consumption in residential areas to develop strategies for reducing energy waste and promoting the use of clean energy.

**Part 2: Database Design**

1. **ERD (Entity-Relationship Diagram):**
   * **Entities**: Households, Energy Consumption, Energy Sources, Appliances, Energy Efficiency Ratings.
   * **Relationships**:
     + Households have multiple Appliances.
     + Appliances consume Energy.
     + Energy can come from multiple Energy Sources.

**Part3: Schema Creation**

CREATE Database SGD;

USE sgd;

CREATE TABLE Households (

HouseholdID INT PRIMARY KEY,

Location VARCHAR(100),

HouseholdSize INT

);

CREATE TABLE EnergySources (

SourceID INT PRIMARY KEY,

SourceName VARCHAR(50),

SourceType VARCHAR(50)

);

CREATE TABLE Appliances (

ApplianceID INT PRIMARY KEY,

HouseholdID INT,

ApplianceName VARCHAR(50),

EnergyEfficiencyRating VARCHAR(10),

FOREIGN KEY (HouseholdID) REFERENCES Households(HouseholdID)

);

CREATE TABLE EnergyConsumption (

ConsumptionID INT PRIMARY KEY,

ApplianceID INT,

SourceID INT,

ConsumptionDate DATE,

EnergyUsed DECIMAL(10, 2),

FOREIGN KEY (ApplianceID) REFERENCES Appliances(ApplianceID),

FOREIGN KEY (SourceID) REFERENCES EnergySources(SourceID)

);

INSERT INTO Households (HouseholdID, Location, HouseholdSize) VALUES

(1, 'City A', 4),

(2, 'City B', 3),

(3, 'City A', 5),

(4, 'City C', 2),

(5, 'City B', 6),

(6, 'City C', 4),

(7, 'City A', 3),

(8, 'City B', 2),

(9, 'City C', 5),

(10, 'City A', 4);

INSERT INTO EnergySources (SourceID, SourceName, SourceType) VALUES

(1, 'Solar', 'Renewable'),

(2, 'Wind', 'Renewable'),

(3, 'Natural Gas', 'Non-Renewable'),

(4, 'Hydropower', 'Renewable'),

(5, 'Coal', 'Non-Renewable');

INSERT INTO Appliances (ApplianceID, HouseholdID, ApplianceName, EnergyEfficiencyRating) VALUES

(1, 1, 'Air Conditioner', 'A++'),

(2, 1, 'Refrigerator', 'A+'),

(3, 2, 'Washing Machine', 'A'),

(4, 3, 'Heater', 'B'),

(5, 4, 'Oven', 'A++'),

(6, 5, 'Microwave', 'A+'),

(7, 6, 'TV', 'A'),

(8, 7, 'Dishwasher', 'B'),

(9, 8, 'Vacuum Cleaner', 'A+'),

(10, 9, 'Water Heater', 'A++'),

(11, 10, 'Laptop', 'A');

INSERT INTO EnergyConsumption (ConsumptionID, ApplianceID, SourceID, ConsumptionDate, EnergyUsed) VALUES

(1, 1, 1, '2024-08-01', 15.75),

(2, 2, 3, '2024-08-01', 8.20),

(3, 3, 1, '2024-08-02', 10.50),

(4, 4, 2, '2024-08-03', 20.00),

(5, 5, 4, '2024-08-03', 5.80),

(6, 6, 5, '2024-08-04', 7.60),

(7, 7, 2, '2024-08-05', 12.30),

(8, 8, 3, '2024-08-05', 9.40),

(9, 9, 1, '2024-08-06', 14.20),

(10, 10, 4, '2024-08-07', 6.50),

(11, 1, 2, '2024-08-08', 13.75),

(12, 2, 5, '2024-08-08', 9.20),

(13, 3, 4, '2024-08-09', 10.90),

(14, 4, 3, '2024-08-10', 18.00),

(15, 5, 1, '2024-08-11', 5.30),

(16, 6, 2, '2024-08-12', 8.40),

(17, 7, 4, '2024-08-13', 11.50),

(18, 8, 1, '2024-08-14', 9.80),

(19, 9, 5, '2024-08-15', 15.10),

(20, 10, 3, '2024-08-16', 7.90);

**Joining Tables**

SELECT HouseholdID, ApplianceName, EnergyUsed, SourceName

FROM EnergyConsumption

JOIN Appliances ON EnergyConsumption.ApplianceID = Appliances.ApplianceID

JOIN EnergySources ON EnergyConsumption.SourceID = EnergySources.SourceID

WHERE ConsumptionDate BETWEEN '2024-08-01' AND '2024-08-31';