DATABASE MANAGEMENT SYSTEM - CSA0593

ASSIGNMENT 2

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QUESTION:

Create a database for managing members, membership plans, payments, and renewals.

- Model tables for members, plans, payments, and renewals.

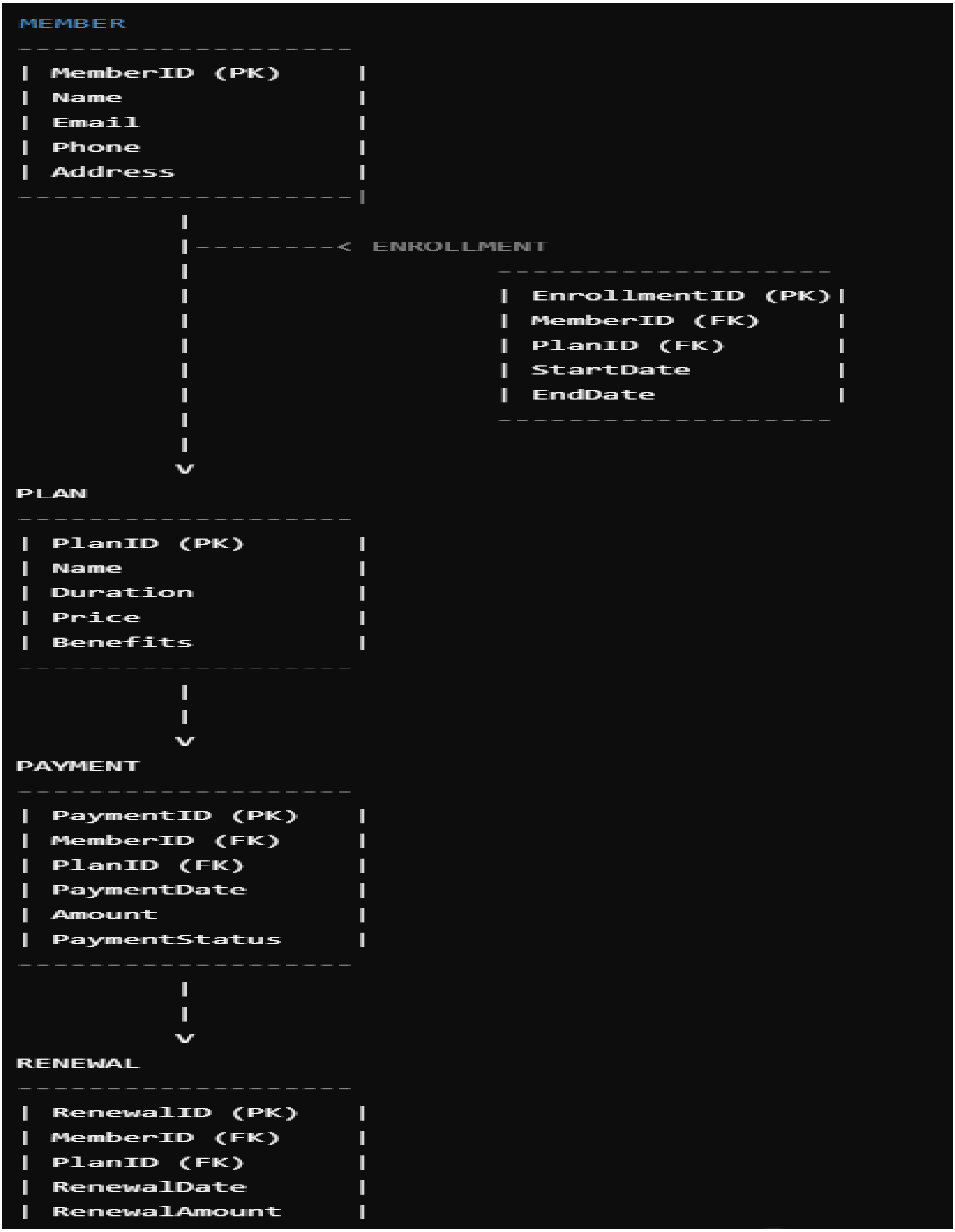
- Write stored procedures for enrolling and renewing memberships.

- Implement triggers to update membership status and payment records.

- Write SQL queries to analyze membership growth and payment trends.

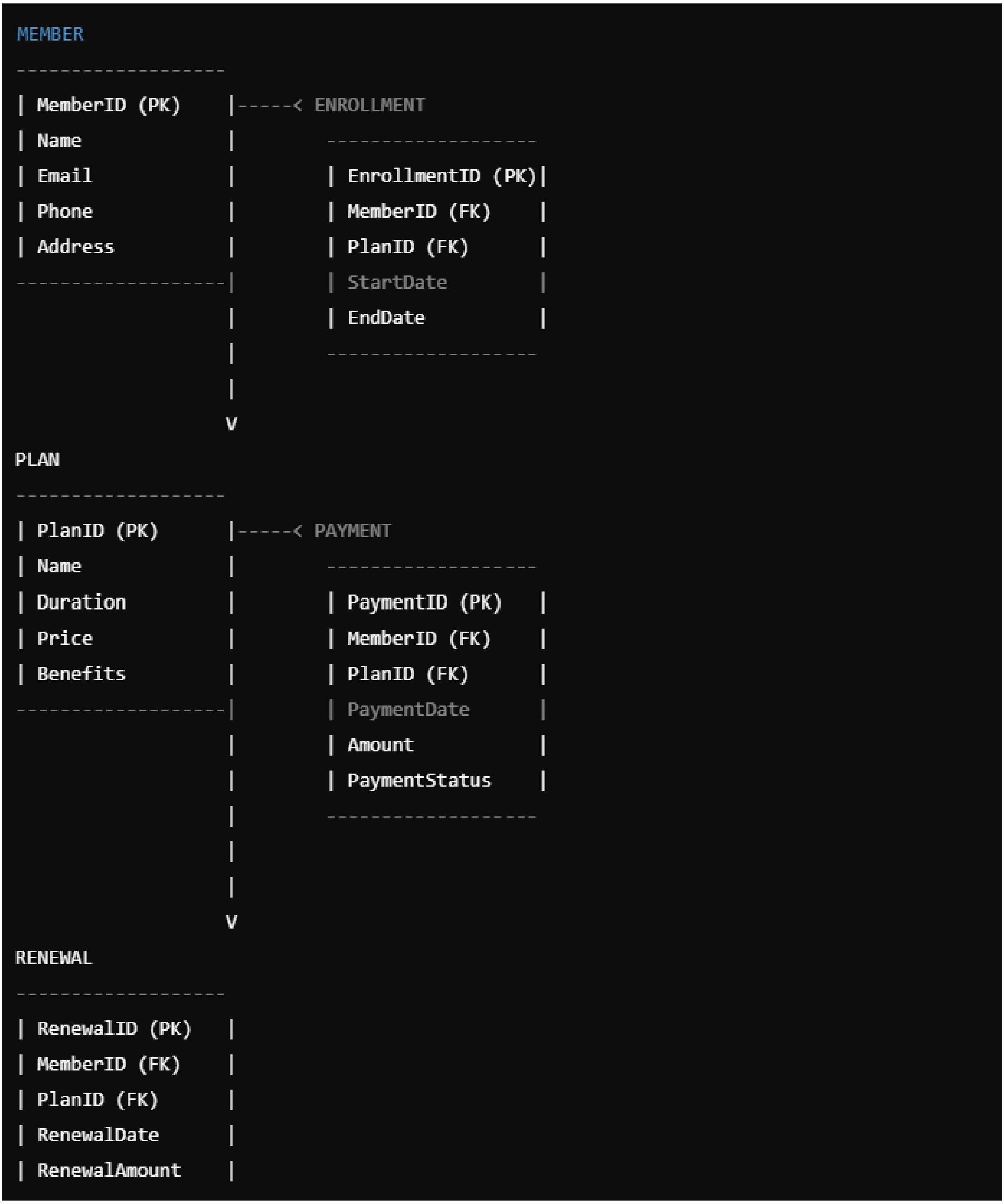
ANSWER:

CONCEPTUAL E.R.DIAGRAM:



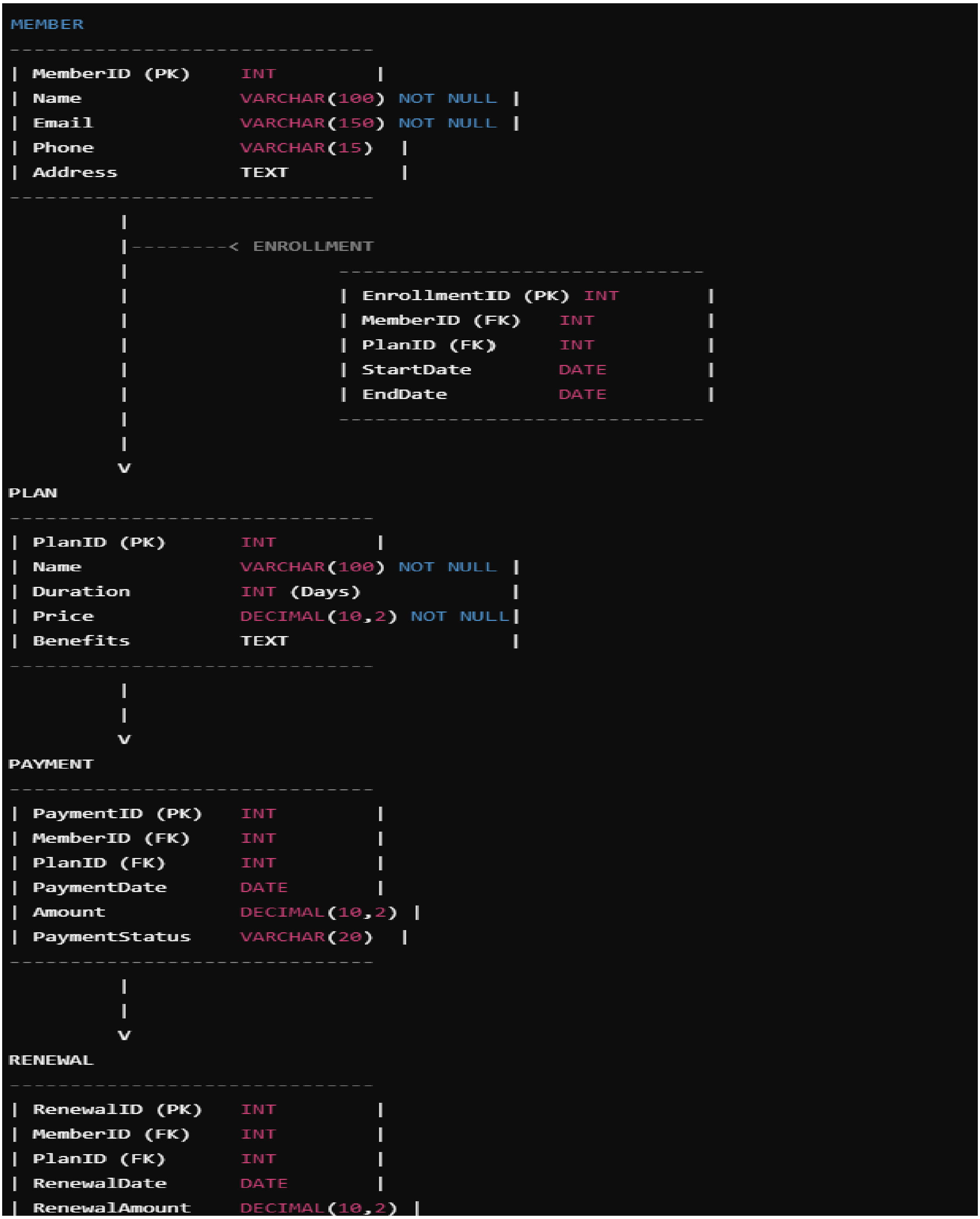
```
MEMBER
--------------------
| MemberID (PK)      |
| Name               |
| Email              |
| Phone              |
| Address            |
--------------------|
         |
         |--------<  ENROLLMENT
         |                  --------------------
         |                  | EnrollmentID (PK)|
         |                  | MemberID (FK)      |
         |                  | PlanID (FK)        |
         |                  | StartDate          |
         |                  | EndDate            |
         |                  --------------------
         |
         v
PLAN
--------------------
| PlanID (PK)        |
| Name               |
| Duration           |
| Price              |
| Benefits           |
--------------------
         |
         |
         v
PAYMENT
--------------------
| PaymentID (PK)     |
| MemberID (FK)      |
| PlanID (FK)        |
| PaymentDate        |
| Amount             |
| PaymentStatus      |
--------------------
         |
         |
         v
RENEWAL
--------------------
| RenewalID (PK)     |
| MemberID (FK)      |
| PlanID (FK)        |
| RenewalDate        |
| RenewalAmount      |
```

LOGICAL E.R DIAGRAM:



```
MEMBER
-------------------
| MemberID (PK)    |-----< ENROLLMENT
| Name             |        -------------------
| Email            |        | EnrollmentID (PK)|
| Phone            |        | MemberID (FK)    |
| Address          |        | PlanID (FK)      |
-------------------|        | StartDate        |
                   |        | EndDate          |
                   |        -------------------
                   |
                   V
PLAN
-------------------
| PlanID (PK)      |-----< PAYMENT
| Name             |        -------------------
| Duration         |        | PaymentID (PK)   |
| Price            |        | MemberID (FK)    |
| Benefits         |        | PlanID (FK)      |
-------------------|        | PaymentDate      |
                   |        | Amount           |
                   |        | PaymentStatus    |
                   |        -------------------
                   |
                   |
                   V
RENEWAL
-------------------
| RenewalID (PK)   |
| MemberID (FK)    |
| PlanID (FK)      |
| RenewalDate      |
| RenewalAmount    |
```

PHYSICAL E.R.DIAGRAM:



```
MEMBER
------------------------------
| MemberID (PK)    INT        |
| Name             VARCHAR(100) NOT NULL |
| Email            VARCHAR(150) NOT NULL |
| Phone            VARCHAR(15)  |
| Address          TEXT         |
------------------------------
         |
         |--------< ENROLLMENT
         |                 ------------------------------
         |                 | EnrollmentID (PK) INT       |
         |                 | MemberID (FK)   INT         |
         |                 | PlanID (FK)     INT         |
         |                 | StartDate       DATE        |
         |                 | EndDate         DATE        |
         |                 ------------------------------
         |
         v
PLAN
------------------------------
| PlanID (PK)      INT        |
| Name             VARCHAR(100) NOT NULL |
| Duration         INT (Days)            |
| Price            DECIMAL(10,2) NOT NULL|
| Benefits         TEXT                  |
------------------------------
         |
         |
         v
PAYMENT
------------------------------
| PaymentID (PK)   INT        |
| MemberID (FK)    INT        |
| PlanID (FK)      INT        |
| PaymentDate      DATE       |
| Amount           DECIMAL(10,2) |
| PaymentStatus    VARCHAR(20)  |
------------------------------
         |
         |
         v
RENEWAL
------------------------------
| RenewalID (PK)   INT        |
| MemberID (FK)    INT        |
| PlanID (FK)      INT        |
| RenewalDate      DATE       |
| RenewalAmount    DECIMAL(10,2) |
```

MYSQL STATEMENTS:

mysql

```
CREATE DATABASE MembershipDB;

USE MembershipDB;

CREATE TABLE Members (
  MemberID INT AUTO_INCREMENT PRIMARY KEY,
  FirstName VARCHAR(50),
  LastName VARCHAR(50),
  Email VARCHAR(100),
  Phone VARCHAR(20),
  Address VARCHAR(255)
);

CREATE TABLE MembershipPlans (
  PlanID INT AUTO_INCREMENT PRIMARY KEY,
  PlanName VARCHAR(100),
  PlanDescription VARCHAR(255),
  PlanDuration VARCHAR(20),
  PlanPrice DECIMAL(10, 2)
);

CREATE TABLE Payments (
  PaymentID INT AUTO_INCREMENT PRIMARY KEY,
  MemberID INT,
  PlanID INT,
  PaymentDate DATE,
  PaymentAmount DECIMAL(10, 2),
  PaymentMethod VARCHAR(50),
  FOREIGN KEY (MemberID) REFERENCES Members(MemberID),
  FOREIGN KEY (PlanID) REFERENCES MembershipPlans(PlanID)
);

CREATE TABLE Renewals (
  RenewalID INT AUTO_INCREMENT PRIMARY KEY,
  MemberID INT,
  PlanID INT,
  RenewalDate DATE,
  RenewalStatus VARCHAR(20),
  FOREIGN KEY (MemberID) REFERENCES Members(MemberID),
  FOREIGN KEY (PlanID) REFERENCES MembershipPlans(PlanID)
);
```

Stored Procedures:

```
mysql
DELIMITER //

CREATE PROCEDURE sp_EnrollMembership(
  IN memberID INT,
  IN planID INT,
  IN paymentDate DATE,
  IN paymentAmount DECIMAL(10, 2),
  IN paymentMethod VARCHAR(50)
)
BEGIN
  INSERT INTO Payments (MemberID, PlanID, PaymentDate, PaymentAmount, PaymentMethod)
  VALUES (memberID, planID, paymentDate, paymentAmount, paymentMethod);

  INSERT INTO Renewals (MemberID, PlanID, RenewalDate, RenewalStatus)
  VALUES (memberID, planID, DATE_ADD(paymentDate, INTERVAL 1 YEAR), 'Active');
END //

CREATE PROCEDURE sp_RenewMembership(
  IN renewalID INT,
  IN paymentDate DATE,
  IN paymentAmount DECIMAL(10, 2),
  IN paymentMethod VARCHAR(50)
)
BEGIN
  UPDATE Renewals
  SET RenewalDate = paymentDate, RenewalStatus = 'Active'
  WHERE RenewalID = renewalID;
  INSERT INTO Payments (MemberID, PlanID, PaymentDate, PaymentAmount, PaymentMethod)
  SELECT MemberID, PlanID, paymentDate, paymentAmount, paymentMethod
  FROM Renewals
  WHERE RenewalID = renewalID;
END //

DELIMITER ;
```

Triggers:

mysql

```
DELIMITER //

CREATE TRIGGER tr_UpdateMembershipStatus
AFTER UPDATE ON Renewals
FOR EACH ROW
BEGIN
  IF NEW.RenewalStatus = 'Inactive' THEN
    UPDATE Members
    SET MembershipStatus = 'Inactive'
    WHERE MemberID = NEW.MemberID;
  ELSEIF NEW.RenewalStatus = 'Active' THEN
    UPDATE Members
    SET MembershipStatus = 'Active'
    WHERE MemberID = NEW.MemberID;
  END IF;
END //

CREATE TRIGGER tr_UpdatePaymentRecords
AFTER INSERT ON Payments
FOR EACH ROW
BEGIN
  UPDATE Members
  SET LastPaymentDate = NEW.PaymentDate
  WHERE MemberID = NEW.MemberID;
END //

DELIMITER ;
```

SQL Queries for Analysis:

```
mysql
-- Membership Growth
SELECT
  YEAR(PaymentDate) AS Year,
  COUNT(DISTINCT MemberID) AS NewMembers
FROM
```

```
  Payments
GROUP BY
  YEAR(PaymentDate);

-- Payment Trends
SELECT
  PaymentMethod,
  SUM(PaymentAmount) AS TotalPayments
FROM
  Payments
GROUP BY
  PaymentMethod;

-- Membership Retention Rate
SELECT
  COUNT(DISTINCT MemberID) AS TotalMembers,
  SUM(CASE WHEN RenewalStatus = 'Active' THEN 1 ELSE 0 END) AS
RetainedMembers
FROM
  Renewals;
```

Conclusion:

This database design provides a comprehensive foundation for managing members, membership plans, payments, and renewals. The stored procedures simplify the enrollment and renewal processes, while the triggers ensure data consistency and accuracy. The SQL queries enable analysis of membership growth, payment trends, and retention rates.