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**a) Project Description: GYM Management System**

The objective of this database project is to design and implement a comprehensive Gym Management System. This system aims to streamline and automate various aspects of gym operations, including member management, workout plans, equipment maintenance, financial transactions, and staff management.

**b) Scope**

**Included:**

1. **Member Management:**
   * Inclusion of personal information for gym members, such as name, gender, age, contact details, and birthdate.
   * Membership plans definition and association of members with specific plans.
   * Tracking membership start and end dates for effective membership management.
2. **Financial Transactions:**
   * Recording and tracking all financial transactions related to membership payments, sales, and other financial activities.
   * Detailed descriptions for each transaction to enhance financial analysis.
3. **Staff Management:**
   * Comprehensive management of staff information, including personal details and salary information.
   * Differentiation of staff roles, including personal trainers and instructors.
4. **Equipment and Maintenance:**
   * Description of gym equipment, including name and condition.
   * Tracking maintenance activities with recorded costs and descriptions.
5. **Sales and Products:**
   * Management of product details available for sale, including type, brand, price, and quantity in stock.
   * Recording sales transactions and linking them to specific products.
6. **Workouts and Classes:**
   * Definition of various workout routines and association with specific equipment.
   * Management of classes conducted by instructors, including class names, maximum participants, and class schedules.
7. **Attendance Tracking:**
   * Recording member attendance for gym classes, providing insights into member participation.
8. **Body Measurements:**
   * Monitoring the progress of members by recording body measurements, including height, weight, and BMI.
9. **Class Reservations:**
   * Members' ability to book classes and the tracking of these reservations.

**Excluded:**

1. **Medical Information:**
   * The system does not include detailed medical information about members.
2. **Nutritional Information:**
   * Nutritional aspects and dietary information are not covered in scope.

**Processes Supported:**

* Member registration and management.
* Financial transactions recording and tracking.
* Staff management and salary payments.
* Equipment and maintenance tracking.
* Product sales and inventory management.
* Workout and class management.
* Attendance tracking for classes.
* Body measurements recording for members.
* Online booking and scheduling.

**Processes Not Supported:**

* Health information.
* Detailed nutritional planning.

**c) Data and Requirements Analysis for the Gym Management System:**

**Data Analysis:**

1. **Personnel Data:**
   * The "Person" table stores personal information about individuals.
   * Fields include Social Security Number (Ssn), FirstName, LastName, Gender, BirthDate, Age, City, District, and PhoneNumber.
2. **Membership Plans:**
   * The "MembershipPlan" table defines various membership plans.
   * Contains PlanID, PlanName, Description, PlanFee, and PlanDuration.
3. **Workouts and Equipment:**
   * The "Workout" table contains details about different workout routines.
   * The "Equipment" table manages information about gym equipment.
   * "Workout\_Equipment" table connects workouts with the required equipment.
4. **Financial Transactions:**
   * The "FinancialTransaction" table records financial transactions.
   * Fields include TransactionID, TransactionType, TransactionDate, Amount, and Description.
5. **Maintenance:**
   * The "Maintenance" table tracks maintenance activities for equipment.
   * Contains MaintenanceID, EquipmentID (foreign key), TransactionID (foreign key), MaintenanceDate, Description, and Cost.
6. **Sales:**
   * The "Sale" table records sales transactions.
   * Fields include SaleID, Ssn (foreign key to Person), TransactionID (foreign key), SaleDate, and TotalAmount.
7. **Staff and Salary:**
   * The "Staff" table manages information about staff members.
   * Contains StaffID, Ssn (foreign key to Person), and SalaryAmount.
   * "SalaryPayment" table records salary payments to staff.
8. **Trainers and Instructors:**
   * "PersonalTrainer" and "Instructor" tables store information about trainers and instructors.
   * "PersonalTrainer" includes PTID, StaffID (foreign key to Staff), and Specialization.
   * "Instructor" includes InsID, StaffID (foreign key to Staff).
9. **Members and Memberships:**
   * "Member" table contains MemberID, Ssn (foreign key to Person), PlanID (foreign key to MembershipPlan), PTID (foreign key to PersonalTrainer), MembershipStartDate, MembershipEndDate, and RemainingTime.
   * "MembershipPayment" table records payments made by members.
10. **Body Measurements:**
    * "BodyMeasurement" table tracks body measurements of members.
    * Contains MeasurementID, MemberID (foreign key to Member), MeasurementDate, Height, Weight, and BMI.
11. **Products and Product Sales:**
    * "Product" table stores information about products available for sale.
    * Contains ProductType, Brand, Price, and QuantityInStock.
    * "Product\_Sale" table records product sales.
12. **Member Workouts and Classes:**
    * "Member\_Workout" table manages the relationship between members and their workout routines.
    * "Class" table describes gym classes, including ClassID, InsID (foreign key to Instructor), ClassName, MaxParticipants, ClassStart, and ClassEnd.
    * "Attendance" table records attendance of members in gym classes.

**Requirements Analysis:**

1. **Membership Management:**
   * Develop functionality to manage memberships, including plan creation, modification, and cancellation.
2. **Workout and Equipment Management:**
   * Create, update, and delete functionalities for workouts and equipment.
3. **Financial Transaction Handling:**
   * Implement a robust system for handling financial transactions, including membership payments, equipment maintenance costs, and product sales.
4. **Staff Management:**
   * Develop features for adding, updating, and removing staff members, as well as managing their salaries.
5. **Personal Trainer and Instructor Management:**
   * Implement features for managing personal trainers and instructors, assigning them to members or classes.
6. **Member Management:**
   * Develop functionalities to manage member information, track membership status, and handle member-specific operations.
7. **Attendance Tracking:**
   * Implement a system to track member attendance in classes.
8. **Product Management:**
   * Create, update, and delete functionalities for products, and track product sales.
9. **Reporting and Analytics:**
   * Implement reporting features to track financial performance, member engagement, and overall business analytics.

**d) GYM Management System Database Diagram:**

