Gym Membership Management System

Objective:

- Create a gym membership management application to add, update, and track members' attendance and membership plans.
- Implement inheritance for different membership types, collections for tracking attendance, and JDBC for storing member information.

Step-by-Step Problem Breakdown:

1. **Core Classes**:
    - Define **Member**, **MembershipPlan**, and **Attendance** classes.
2. **Inheritance and Polymorphism**:
    - Different membership types (e.g., **Basic**, **Premium**) with unique pricing.
3. **Encapsulation and Abstraction**:
    - Use interfaces for membership operations.
4. **Collections**:
    - Use ArrayList for managing memberships and attendance.
5. **Core Functionalities**:
    - Add members, view attendance, and update membership.
6. **Exception Handling**:
    - Handle invalid memberships and incorrect attendance records.
7. **File Handling**:
    - Store member data.
8. **JDBC**:
    - Manage memberships in a database.
9. **User Interface**:
    - Provide options for adding members, tracking attendance, and updating memberships.

Database Structure for Gym Membership Management System

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1. Table: Members

Stores information about gym members.

Column Name	Data Type	Description
member_id	INT (Primary Key)	Unique identifier for each member.
first_name	VARCHAR(50)	First name of the member.
last_name	VARCHAR(50)	Last name of the member.
email	VARCHAR(100)	Email address of the member.
phone_number	VARCHAR(20)	Phone number of the member.
address	TEXT	Address of the member.
membership_type	VARCHAR(50)	Type of membership (e.g., "Basic", "Premium").
join_date	DATE	Date when the member joined the gym.
membership_expiry	DATE	Date when the membership expires.

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2. Table: MembershipPlans

Stores details of various membership plans offered by the gym.

Column Name	Data Type	Description
plan_id	INT (Primary Key)	Unique identifier for each membership plan.
plan_name	VARCHAR(50)	Name of the plan (e.g., "Basic", "Premium").
monthly_fee	DECIMAL(10,2)	Monthly fee for the plan.
duration_months	INT	Duration in months for the plan.
features	TEXT	Description of the plan features.

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3. Table: Attendance

Stores the attendance records of members.

Column Name	Data Type	Description
attendance_id	INT (Primary Key)	Unique identifier for each attendance record.
member_id	INT (Foreign Key)	References member_id in the Members table.
attendance_date	DATE	Date of the attendance record.
check_in_time	TIME	Check-in time of the member for the session.
check_out_time	TIME	Check-out time of the member from the session.

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4. Table: Payments

Stores payment records for membership renewals and updates.

Column Name	Data Type	Description
payment_id	INT (Primary Key)	Unique identifier for each payment.
member_id	INT (Foreign Key)	References member_id in the Members table.
payment_date	DATE	Date of payment.
payment_amount	DECIMAL(10,2)	Amount paid for the membership.
payment_method	VARCHAR(50)	Payment method (e.g., "Credit Card", "Cash", "Bank Transfer").
payment_status	VARCHAR(20)	Payment status (e.g., "Completed", "Pending").

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5. Table: MembershipType

Stores the types of memberships available, such as "Basic", "Premium", etc.

Column Name	Data Type	Description
membership_type_id	INT (Primary Key)	Unique identifier for each membership type.
membership_name	VARCHAR(50)	Name of the membership type (e.g., "Basic", "Premium").

Column Name	Data Type	Description
pricing	DECIMAL(10,2)	Pricing for the membership type.
duration_months	INT	Duration in months for the membership.
plan_id	INT (Foreign Key)	References plan_id in the MembershipPlans table.