Gym Membership Management System

# Name : Alhassan Ahmed

# 1) Problem Statement & Objectives

Running a gym involves orchestrating many moving parts: new sign‑ups, renewals, trainer scheduling, class rosters, and attendance. Many gyms still use spreadsheets or paper forms, which leads to data duplication, errors, and slow reporting. Management lacks fast answers to questions like:  
- Who are our active vs. inactive members?  
- Which membership types are most popular and profitable?  
- Which classes and time slots have the highest demand?  
- Which trainers drive the most attendance and engagement?  
- How does attendance vary by day-of-week and season?  
  
Objective: Build a centralized relational database with clean schema and integrity constraints to support (a) daily operations (CRUD for members, trainers, classes, attendance) and (b) analytics (SQL reports, Excel/Power BI pivots) that guide staffing, scheduling, and marketing.  
  
Success Criteria:  
- End-to-end ER model and normalized schema in SQL Server.  
- Data quality enforced via keys, checks, and foreign keys.  
- A reproducible set of SQL queries and summary reports (e.g., top trainers, class popularity, monthly membership mix, attendance by weekday).

# 2) Dataset & Assumptions

- Core entities: Members, Trainers, Classes, Attendance.  
- Grain: One row per member/trainer/class/attendance.  
- Surrogate integer IDs for stable joins.  
- Membership types: Monthly, Quarterly, Yearly.  
- Designed to scale up to tens of thousands of attendance records.

# 3) Database Design (ERD & Normalization)

Relationships:  
- Trainer → Classes (1‑to‑many)  
- Members ↔ Classes via Attendance (many‑to‑many)  
  
Tables:  
- Members(member\_id, full\_name, age, gender, phone, email, join\_date, membership\_type, is\_active)  
- Trainers(trainer\_id, full\_name, specialization, phone, email)  
- Classes(class\_id, class\_name, schedule\_time, trainer\_id)  
- Attendance(attendance\_id, member\_id, class\_id, attendance\_date)

# 4) Analytics Queries (Examples)

A) Active vs inactive members by membership type  
B) Top 5 trainers by attendance  
C) Class popularity (last 90 days)  
D) Attendance by weekday  
E) Cohort: renewal propensity by attendance frequency

# 5) Main Insights

- Monthly plans dominate sign‑ups, but Quarterly members renew more.  
- Few trainers drive most attendance.  
- High‑energy classes and evening Yoga are most popular.  
- Attendance peaks on Mondays and Wednesdays.  
- High-frequency members renew more often.

# 6) Future Enhancements

- Mobile app check‑in.  
- Renewal reminders via SMS/Email.  
- Add payments and revenue analytics.  
- Predictive churn models.

# Conclusion

This project delivers a normalized SQL Server database for gym operations with analytics queries to support business decisions. It improves efficiency, reporting speed, and provides a foundation for BI dashboards and predictive models.