COMP3005 Final Project Report

Health and Fitness Club Management System

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Conceptual Design:

Requirements:

Members:

1. Register their profiles
   Dashboard:
   → Tracks exercise routines
   → Tracks fitness achievements
   → Tracks health statistics.

2. Manage their profiles
3. Set personal fitness goals and input health metrics
4. Schedule, reschedule, or cancel personal training sessions with certified trainers
5. Register for group fitness classes, workshops, and other events
6. Receive timely reminders for their sessions.

Trainers:

1. Manage their schedules
2. View member profiles
3. Input progress notes after each training session.

Administrative staff:

1. Features to oversee club resources effectively:
   → Managing room bookings
   → Monitoring fitness equipment maintenance
   → Updating class schedules

   → Oversee billing, process payments for membership fees and personal training sessions and other services,..
   → Monitor club activities for quality assurance

Loyalty program: (unique selling point)
Transaction:
→ Earns members loyalty points
→ Redeemed for future services.

Conceptual design explanation of the database:

Entities: 10 tables

Member, Trainer, and Administrative Staff
Training Session
Event
Fitness Goal
Billing
Loyalty Program
Equipment
Room

Assumptions: (Cardinalities & Participation)
Below is the description of some important (not all) relationships based on my assumption.

Explanations:
I have chosen to design my database system as above to increase the clarity of the design and maintain the simplicity of the system with many relations. The 3 main users of the system would have relations with their corresponding needs. Staff manages the profiles of the trainers and the members.

Members can have relationships with Personal Training Sessions, Events, Personal Fitness Goals, Billings, and Loyalty Programs. There are multiple loyalty programs available but members are only able to choose 1 and stick with it.
Personal Training Sessions are managed by Trainers and can have multiple Members attending.
Events can be managed by Administrative Staff and can have multiple Members attending.
Billing is associated with a Member. Loyalty Programs can have multiple Members enrolled.
Administrative Staff manages Equipment, Rooms, Events, and Billings.

1 Member can schedule MANY Personal Training Sessions.
Each Personal Training Session can have N Members.

1 Member can attend MANY Events (classes, workshops and others).
Each Event can have N Members.

1 Member can set MANY Personal Fitness Goals.
Each Personal Fitness Goal can only have 1 Member.

1 Member can only have 1 Billing
Each Billing can only belong to 1 Member.

1 Member can only choose 1 Loyalty Program.

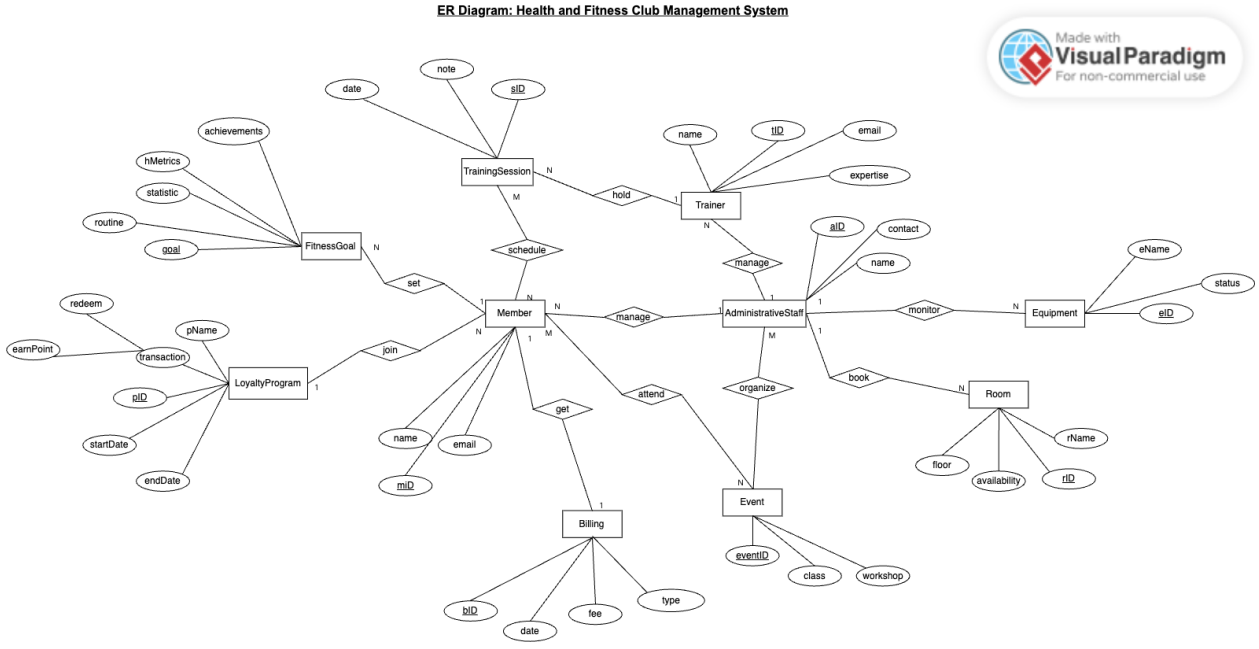
Each Loyalty Program can have MANY Members.

1 Trainer can manage MANY Personal Training Sessions
Each Personal Training Session can only have 1 Trainer.
(assuming each session is runned by 1 trainer only)

1 Administrative Staff can manage MANY Equipment.
Each Equipment can is managed by 1 Administration Staff.
1 Administrative Staff can book MANY Rooms.
Each Room can only be booked by 1 Administration Staff.

ER-diagram: Reporting trial and error cases when redesign/reformat the database

The initial design of the system has no reference to any of the other entities but only through the relationship of entities. Hence, all attributes already directly relate to the primary key. Hence, the tables are already in 2NF. Hence, there is no apparent transitive dependencies in 3NF as well.



Reduction to Relation Schemas:

Database Structure:

Member(mID PK, name, email)
AdministrativeStaff(aID PK, name, contact)

Trainer(tID PK, name, email, expertise)
TrainingSession(sID PK, note, date)
FitnessGoal(goal PK, routine, hMetrics, achievements)
LoyaltyProgram(pID PK, pName, redeem, earnPoint, startDate, endDate)
Billing(bID PK, date, fee, type)
Event(eventID PK, class, workshop)
Room(rID PK, rName, floor, availability)
Equipment(eID PK, eName, status, day)

Normalization of Relation Schemas:

Database Schema Diagram:

Implementation:

Bonus Features:

GitHub Repository: https://github.com/HoaKatie/HealthAndFitnessSystem