National University
Of Computer and Emerging Sciences

Project Milestone 1: Relational Model

Presented to

Sir, Majid Hussain

In partial fulfillment
of the requirements for the course of

DATABASE SYSTEMS

By:

Hafsa Imtiaz (22i - 0959)
Areen Zainab (22i - 1115)
Aoun Jee (22i - 1052)
Section H

Assumptions:

- DietPlan, DietMeal, Diet_Meal:
    - It has been assumed that each Diet Plan will have multiple meals, and meals can be used in numerous diet plans - hence, a M:N relationship exists between them.
- User, Member, Trainer, Admin, GymOwner:
    - The User relation acts as a superclass for the Member, Trainer, Admin, and GymOwner relations. It contains the information that all child entities share.
    - Moreover, UserID is inherited by each child entity but it has been renamed to be easier to understand in this relational model
    - The Admin and Gym_Owner entities may be implemented as Views, nevertheless they are represented here!
- WorkoutPlan, WorkoutSchedule, Schedule_Excercise:
    - It has been assumed that each Workout Plan has multiple scheduled days, leading to a 1:M relationship with the WorkoutSchedule entity that stores the planned workout for each day of the plan!
    - Each workout day has multiple planned activities, leading to an M:N relationship with the Exercise entity - modeled as Schedule_Exercise.
- Member and Gym:
    - It has been assumed that a member can only belong to one gym at a time!
    - Each gym operates on a monthly payment basis and the price depends on the membership type.
- Gym, Machines:
    - Within this database, it is assumed that each gym offers multiple machines for members - with different numbers of each machine. Hence there is a M:N relationship between the Gym and the Machine entity.
- Administration Abilities:
    - The gym owners can add, remove, and disable members and trainers - as can the admin users. These powers have not been added or shown as relationships or entities - they will be implemented separately!

Unnormalized Relations (based on ERD):

DietPlan(DPlanID, PlanName, Type, Goal, Description, CreationDate, CreatorID*, Status);

Meal(MealID, Name, Description, MealType, Fat, Carbs, Proteins, Fibre, Calories, Allergens);

Diet_Meal(DPlanID*, MealID*);

User(UserID, Role, LName, FName, Password, DoB, Gender, Email, PhoneNo,

Address);

Admin(AdminID*);

AccountLogs(LogID, AccountType , Reason , Action , DateTime , AdminID*);

Trainer(TrainerID*, Years, Specialization, Qualifications);

Member(MemID*, Payment, height, status, goal, weight, Allergens, DPlanID*, WPlanID*, MembershipType , Start_Date , End_Date , Amount , GymID*);

GymOwner(OwnerID*, License, JoinDate);

Gym_Employment(Status , endDate , startDate , Salary , GymID*, TrainerID*);

Trainer_Feedback(MemID*, TrainerID*, Rating, Date, Time, Comment);

Training_Session(SessID, MemID*, TrainerID*, Duration, Date, Time, Description);

WorkoutPlan(WPlanID, PlanName, Description, Status, Goal, Difficulty, CreatedDate, CreatorID*);

WorkOutSchedule(WPlanID*, Day, MuscleGroup);

Exercise(ExcerciseName, EDescrip, Difficulty, MachineName*);

Machine(MachineName, Price);

Schedule_Excercise(PlanID*, Day, ExcerciseName, Sets, Reps, Rest_Interval);

Gym(GymID , GymName , PhoneNo , Address , OwnerID*);

Gym_Equipment(MachineCount , GymID* , MachineName*);

Gym_Review(Comments , Date/Time , Rating , GymID*, MemberID*);

1st Normal Form:

- Member(Allergens), Meal(Allergens), Trainer(Qualification), and Trainer(Specialization) are multivalued attributes that have been broken into their tables.
    - **Trainer_Specialization**(TrainerID*, Specialization);
    - **Trainer_Qualification**(TrainerID*, Qualification);
    - **Meal_Allergens**(MealID*, AllergenName);
    - **Member_Allergy**(MemID*, Allergens);

User(UserID, Role, LName, FName, Password, DoB, Gender, Email, PhoneNo, Address);

Trainer(TrainerID*, Years);

Trainer_Specialization(TrainerID*, Specialization);

Trainer_Qualification(TrainerID*, Qualification);

Trainer_Feedback(MemID*, TrainerID*, Rating, Date, Time, Comment);

Training_Session(SessID, MemID*, TrainerID*, Duration, Date, Time, Description);

Plan(DPlanID, PlanName, Type, Goal, Description, CreationDate, CreatorID*, Status);

DietMeal(MealID, Name, Description, MealType, Fat, Carbs, Proteins, Fibre, Calories);

Meal_Allergens(MealID*, AllergenName);

Diet_Meal(DPlanID*, MealID*);

Member(MemID*, Payment, height, status, goal, weight, DPlanID*, WPlanID*, MembershipType , Start_Date , End_Date , Amount , GymID*);

Member_Allergy(MemID*, Allergens);

WorkoutPlan(WPlanID, PlanName, Description, Status, Goal, Difficulty, CreatedDate, CreatorID*);

WorkOutSchedule(WPlanID*, Day, MuscleGroup);

Exercise(ExerciseName, EDescrip, Difficulty, MachineName*);

Machine(MachineName, Price);

Schedule_Exercise(PlanID*, Day, ExerciseName, Sets, Reps, Rest_Interval);

GymOwner(OwnerID*, License, JoinDate);

Gym_Employment(Status , endDate , startDate , Salary , GymID*, TrainerID*);

Gym(GymID , GymName , PhoneNo , Address, OwnerID*);

Gym_Equipment(MachineCount , GymID* , MachineName*);

Gym_Review(Comments , Date/Time , Rating , GymID*, MemberID*);

Admin(AdminID*);

AccountLogs(LogID, AccountType , Reason , Action , Date, Time , AdminID*);

2nd Normal Form:

- All tables are now in both the 1st-Normal Form, and the 2nd-Normal Form

User(UserID, Role, LName, FName, Password, DoB, Gender, Email, PhoneNo, Address);

Trainer(TrainerID*, Years);

Trainer_Specializations(TrainerID*, Specialization);

Trainer_Qualifications(TrainerID*, Qualification);

Trainer_Feedback(MemID*, TrainerID*, Rating, Date, Time, Comment);

Training_Session(SessID, MemID*, TrainerID*, Duration, Date, Time, Description);

DietPlan(DPlanID, PlanName, Type, Goal, Description, CreationDate, CreatorID*, Status);

Meal(MealID, Name, Description, MealType, Fat, Carbs, Proteins, Fibre, Calories);

Meal_Allergens(MealID*, AllergenName);

Diet_Meal(DPlanID*, MealID*);

Member(MemID*, Payment, height, status, goal, weight, DPlanID*, WPlanID*, MembershipType , Start_Date , End_Date , GymID*);

Member_Allergy(MemID*, Allergens);

WorkoutPlan(WPlanID, PlanName, Description, Status, Goal, Difficulty, CreatedDate, CreatorID*);

WorkOutSchedule(WPlanID*, Day, MuscleGroup);

Exercise(ExerciseName, EDescrip, Difficulty, MachineName*);

Machine(MachineName, Price);

Schedule_Exercise(PlanID*, Day, ExerciseName, Sets, Reps, Rest_Interval);

GymOwner(OwnerID*, License, JoinDate);

Gym_Employment(GymID*, TrainerID*, Status , endDate , startDate , Salary);

Gym(GymID , GymName , PhoneNo , Address , OwnerID*);

Gym_Equipment(GymID*, MachineName*, MachineCount);

Gym_Review(GymID*, MemberID*, Comments , Date, Time , Rating);

Admin(AdminID*);

AccountLogs(LogID, AccountType , Reason , Action , Date, Time , AdminID*);

3rd Normal Form:

- Removing Transitive Dependencies created two more tables:
    - **Credentials:** Email can be used to determine the password: transitive dependency.
        - **Credentials**(Email, Password);
    - **Gym_Membership:** The MembershipType can be identified via GymID and the Payment of membership depends on the MembershipType - transitive dependency.
        - **Gym_Membership**(GymID*, MembershipType, Payment);

Credentials(Email, Password);

User(UserID, Role, LName, FName, DoB, Gender, PhoneNo, Address, Email*);

Trainer(TrainerID*, Years);

Trainer_Specializations(TrainerID*, Specialization);

Trainer_Qualifications(TrainerID*, Qualification);

Trainer_Feedback(MemID*, TrainerID*, Rating, Date, Time, Comment);

Training_Session(SessID, MemID*, TrainerID*, Duration, Date, Time, Description);

DietPlan(DPlanID, PlanName, Type, Goal, Description, CreationDate, CreatorID*, Share_Status);

Meal(MealID, Name, Description, MealType, Fat, Carbs, Proteins, Fibre, Calories);

Meal_Allergens(MealID*, AllergenName);

Diet_Meal(DPlanID*, MealID*);

Member(MemID*, Height, Account_Status, Goal, Weight, DPlanID*, WPlanID*, MembershipType* , Start_Date , End_Date , GymID*);

Gym_Membership(GymID*, MembershipType, Payment);

Member_Allergy(MemID*, Allergens);

WorkoutPlan(WPlanID, PlanName, Description, Share_Status, Goal, Difficulty, CreatedDate, CreatorID*);

WorkOutSchedule(WPlanID*, Day, MuscleGroup);

Exercise(ExerciseName, EDescrip, Difficulty, MachineName*);

Machine(MachineName, Price);

Schedule_Exercise(PlanID*, Day, ExerciseName, Sets, Reps, Rest_Interval);

GymOwner(OwnerID*, License, JoinDate);

Gym_Employment(GymID*, TrainerID*, Status , endDate , startDate , Salary);

Gym(GymID , GymName , PhoneNo , Address, OwnerID*);

Gym_Equipment(GymID*, MachineName*, MachineCount);

Gym_Review(GymID*, MemberID*, Comments, Date, Time , Rating);

Admin(AdminID*);

AccountLogs(LogID, AccountType, Action, Reason, Date, Time , AdminID*);