Assignment 5

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Subject: Software Analysis and Design

📌 Problem Statement (FitVerse Fitness App)

"Design a fitness tracking application where Users can register, log workouts, track nutrition and sleep, set goals, and interact with trainers or community members. The system provides workout plans, diet plans, and health insights. Trainers can upload workout tutorials, and the app keeps track of user progress."

📊 Classes & Their Attributes/Methods

1. User (abstract)

- userID, name, email, password, age, weight, height

- +login(), +logout(), +updateProfile()

2. Customer (inherits User)

- fitnessLevel, goals

- +logWorkout(), +trackNutrition(), +viewProgress()

3. Trainer (inherits User)

- specialization, certifications

- +createWorkoutPlan(), +uploadTutorials(), +trackClientProgress()

4. WorkoutPlan

- planID, type, duration, difficulty

- +assignToUser()

5. DietPlan

- dietID, calories, proteins, carbs, fats

- +assignToUser()

6. WorkoutLog

- logID, date, exerciseName, reps, sets, caloriesBurned

7. NutritionLog

- logID, date, foodName, calories, macros

8. SleepLog

- logID, date, hoursSlept, quality

- +analyzeSleepPattern()

9. Goal

- goalID, goalType (WeightLoss, MuscleGain, Endurance), targetValue, deadline

10. Community

- postID, content, likes, comments

- +addPost(), +commentPost()

📌 Relationships

- **User → WorkoutPlan/DietPlan** : Association (1 User ↔ 0..* Plans)

- **User → WorkoutLog/NutritionLog/SleepLog** : Association (1 User ↔ * Logs)

- **User → Goal** : Association (1 User ↔ * Goals)

- **Trainer → WorkoutPlan** : Association (1 Trainer ↔ * Plans)

- **Community ↔ User** : Association (* Users can make * Posts)

- **Inheritance** : Customer, Trainer ← User

📌 Multiplicity

- A **Customer** can have 0..* WorkoutLogs, 0..* NutritionLogs, 0..* SleepLogs.

- A **Trainer** can create 1..* WorkoutPlans.

- A **User** can have 0..* Goals.

- A **WorkoutPlan/DietPlan** can be assigned to 1..* Users.

- A **Community Post** is created by 1 User, but each User can create 0..* Posts.

📌 Roles & Interfaces

- **Role: Customer** → Consumes services (tracks fitness).

- **Role: Trainer** → Provides services (plans & tutorials).

- **Interface (optional if teacher expects)**

  - Trackable (for WorkoutLog, NutritionLog, SleepLog) → +addEntry(), +viewReport()