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Project Report: GymRats Nutrition Bot

Team:

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1. Motivation

The **GymRats Nutrition Bot** was developed to provide users with an interactive and educational tool for fitness and nutrition. Many people struggle with maintaining a healthy lifestyle due to a lack of accessible guidance. This chatbot aims to:

- **Educate users** on nutrition, fitness, and healthy eating habits.
- **Engage users** with an interactive quiz to test their knowledge.
- **Personalize recommendations** based on user input (age, weight, height, goals).
- **Encourage healthy habits** by offering actionable diet and exercise plans.

This project was inspired by the growing need for **automated, accessible fitness guidance** in a world where misinformation about health is rampant.

2. Detailed Analysis & Design Choices

2.1 Core Features

1. **Interactive Quiz System**
    - Users select a topic (nutrition, sports, gym, mixed).
    - Questions are dynamically selected based on the topic.
    - Immediate feedback is provided after each answer.
2. **Personalized Fitness & Nutrition Plan**
    - Collects user data (name, age, height, weight, food preferences).
    - Calculates BMI and suggests weight loss/gain strategies.
    - Provides tailored exercise and diet recommendations.
3. **Natural Language Processing (Basic Input Handling)**
    - Uses **keyword matching** (e.g. "yes"/"no" detection).
    - Parses user responses to extract numerical data (e.g. height, weight).

2.2 Design Choices

- **Functional Programming (Scala):**
    - Uses **immutable data structures** (List, Set).
    - **Recursion** for input validation (e.g isReady()).
    - **Pattern matching** for topic selection (match cases).
- **User Experience (UX):**
    - **Emoji usage** for engagement (🎉 , 💪 , 🥗).
    - **Error handling** (e.g., invalid topic selection).
    - **Personalized responses** (e.g., addressing the user by name).

3. Implementation Details & Examples

3.1 Key Functions

a. Quiz System

1- selectQuizQuestions(topic: String)

- Returns a list of questions based on the topic.
- Example:

```
case "nutrition" => nutritionQuestions
case "sports" => sportsQuestions
```

2- presentQuizQuestion(question: (String, List[String], String))

- Displays the question, options, and checks the answer.
- Example:

```
println(question._1) // Prints the question
question._2.zipWithIndex.foreach { case (option, idx) =>
  println(s"${idx + 1}. $option")
}
```

b. Personalized Plan Generator

1-calculateBMI(height: Int, weight: Int)

Computes BMI using the formula:

```
weight / (heightInMeters * heightInMeters)
```

2-createPlan(goal: String, currentWeight: Int, targetWeight: Int)

Generates diet/exercise advice based on goal (lose/gain weight).

Example output:

```
- Daily Caloric Intake: Reduce by ~500 kcal/day (for weight loss)
- Exercise: Focus on cardio & HIIT 🏃
```

c. Input Handling

- parseInput(input: String)

  Normalizes input (lowercase, split into tokens).

Example:

```
"Yes, I'm ready!" → List("yes", "i'm", "ready")
```

4. Testing Strategy & Results

4.1 Testing Approach

- **Manual Testing:**
    - Tested **quiz logic** (correct/wrong answers).
    - Verified **BMI calculation accuracy**.
    - Checked **input parsing** (e.g "yes" → true).
- **Edge Cases:**
    - Empty input → Handled via recursion in isReady().
    - Invalid topic → Reprompts user.

4.2 Results

- **Quiz System:** Correctly tracks scores and provides feedback.
- **Personalized Plans:** Generates realistic diet/exercise advice.
- **Input Handling:** Robust against minor typos (e.g "YeS" → "yes").

5. Final Conclusions & Future Work

5.1 Successes

✓ **Engaging UX** (emojis, personalized responses).
✓ **Modular Design** (easy to extend with new quiz questions).
✓ **Functional & Readable** (Scala's pattern matching + recursion).

5.2 Future Improvements

- **Add a database** (store user profiles & progress).
- **Enhance NLP** (use a library like **Apache OpenNLP**).
- **Expand Quiz Topics** (e.g mental health, meal planning).
- **Mobile App Integration** (Scala.js or Kotlin Multiplatform).

Final Thoughts

The **GymRats Nutrition Bot** successfully combines **education, engagement, and personalization** in a simple yet effective chatbot. With further improvements, it could become a powerful tool for fitness enthusiasts!

Future Goal: Turn it into a **full-fledged health assistant** with AI-driven recommendations!