Fitia Project first deliverable draft (April 2024)

Yaxel Steven Morales Suarez- 20212020060

I. INTRODUCTION

In today's digital world, taking care of our health and wellness has become super important for many people. Technology gives us a giant hand to have a healthier lifestyle, offering apps and tools that help us to be fit and feel good about ourselves. And this is where "Fitia" comes in, our new app that promises to be your best ally on the road to a fitter and healthier life. Fitia" is like your personal trainer and nutritionist in your pocket. It offers you tailor-made exercise routines, meal plans that adapt to what you like and need, tracking of how you are progressing and a lot of useful tips to take better care of yourself. The idea is to give you everything you need to feel great, motivated and eager to move forward with your health and wellness goals.

Our app "Fitia" was born because we know that each person is unique and has their own goals and needs when it comes to health and fitness. We want you to feel supported and motivated at all times, and to enjoy using our app in a fun and easy way.in this document, we are going to tell you all about "Fitia". From who we are and how our app works, to how we have designed the database so that everything works in the best way. We will also explain some useful queries you can make with the information in the app, and we will give you some ideas on how to get data to test our database before we officially launch it.

II. PROJECT DESCRIPTION

Stakeholders:

End Users: Our key stakeholders are all those individuals who are committed to improving their health and wellness through regular exercise and a balanced diet. These users are looking for a personalized and practical solution to help them achieve their fitness goals, providing them with the tools and support they need to stay motivated and focused on their path to a healthier lifestyle.

Developers and administrators of the "Fitia" app: This group is in charge of designing, developing, maintaining and optimizing the "Fitia" platform. Their main objective is to ensure that the app works efficiently, securely and attractively for users, constantly incorporating new features and improvements based on the needs and feedback from the community.

Support and customer service staff: Our support and customer service team is dedicated to providing an exceptional user experience, offering fast and effective assistance with any query, problem or suggestion related to the app. Their mission is to ensure user satisfaction and trust, building strong and lasting relationships with our community.

Business Model:

"Fitia" presents itself as a comprehensive platform designed to offer its users a unique and personalized fitness and nutrition experience. The app combines exercise routines tailored to individual needs, personalized meal plans, real-time progress tracking and valuable health and wellness tips. All of this is offered through a monthly subscription that provides unlimited access to all of the app's premium features, ensuring a complete and enriching experience for users.

Tools to be used:

-Relational Database Management System: SQL or MySQL.
-Programming language: Python for data generation and queries.
-Faker library in Python to generate fictitious data.

III. LIST OF USER STORIES

User history	Description
1.As a user, I want to register in the app to access the customized functionalities.	Provide a simple and secure registration process
2. As a user, I want to create a profile with my personal information, health goals and preferences.	Allow users to personalize their experience and get recommendations according to their needs.

3. As a user, I want to receive personalized exercise routines and meal plans.	Offer recommendations based on the information provided by the user.
4. As a user, I want to track my progress and see statistics on my performance.	Display graphs and metrics that reflect user progress.
5. As a user, I want to receive health and wellness tips related to exercise and nutrition.	To provide useful and updated information to improve lifestyle.

.

IV. CONCEPTUAL MODEL

Entity-Relationship Model of Fitia:

Step 1. Identify the main entities:

-User
-Exercise Routine
-Eating Plan
-User Progress
-Health and Wellness Tips

2. Step identify the attributes of each entity:

User:

-ID_user (Unique Identifier).
-Name (Full name)
-Email (Email)
-Password (Encrypted Password)
-Date of Birth (Date of birth)
-Gender (Male, Female, Other)
-Health Goals (Description of personal goals)
-Preferences (Dietary preferences, dietary restrictions, etc.)

Exercise Routine:

-ID_routine (Unique Identifier).
-Name (Name of the routine)
-Type (Cardio, Strength, Flexibility, etc.)
-Duration (Estimated duration)
-Description (Detailed description)
-Level (Beginner, Intermediate, Advanced)

Food Plan:

-ID_plan (Unique Identifier)
-Name (Name of the plan)
-Type (Balanced Diet, Keto, Vegetarian, etc.)
-Description (Detailed description)
-Food list (List of recommended foods).

User Progress:

-ID_progress (Unique Identifier).
-User_ID (User's Identifier)
-Date (Date of registration)
-Weight (Registered weight)
-Measurements (Body measurements)
-Comments (Comments and remarks)

Health and Wellness Tips:

-ID_Council (Unique Identifier).
-Title (Title of the tip)
-Description (Detailed description)
-Date of publication (Date of publication)
-Category (Exercise, Nutrition, Wellness, etc.)

3. Step identify the relationships between entities:

-A user can have several exercise routines and meal plans.
-A meal plan can be associated with several users.
-User progress is related to the user and their exercise routine or meal plan.
-Health and wellness tips are provided for all users.

4. Step convert relationships into cardinalities:

-A user can have several exercise routines (1:N) and meal plans (1:N).
-A meal plan can be associated with several users (N:N).
-The user's progress is related to the user (1:N) and their exercise routine (1:N) or meal plan (1:N).
-Health and wellness tips are provided for all users (1:N).

5. Identify the functional dependencies and primary keys for each entity:

-User: Primary Key: User_ID.
-Exercise Routine: Primary key: Routine_ID
-Feeding Plan: Primary key: Plan_ID
-User Progress: Primary key: Progress_ID
-Health and Wellness Advice: Primary key: advice_id

6. Step Refine the design to ensure standardization and eliminate redundancies:

-Check for consistency and standardization of attributes across all entities.
-Eliminate redundant attributes and optimize the structure of the entities.

7. Define foreign keys to maintain referential integrity:

Establish foreign keys (User_ID, Routine_ID, Plan_ID) to maintain referential integrity between related entities.

8. Review and adjust design as necessary:

Perform periodic reviews of the ER model design, identify possible improvements and adjust according to project needs and requirements.

9 Step document the final entity-relationship model:

-Create an entity-relationship diagram that represents all entities, attributes, and relationships in the database in Draw.io or other.

10 Step Validate the model with stakeholders and make adjustments based on their feedback:

- Obtain feedback from stakeholders and make modifications to the model based on their suggestions in order to meet their needs.

V. RELATIONAL ALGEBRA QUERIES

1.Basic queries:

Selection (σ):

Get all users with a specific ID:
-σ User_ID='value'(User)

Get all 'Cardio' type exercise routines:
- σ Type='cardio'(Exercise_Routine)

Projection (π):

Select names and email addresses of all users:
- π Name, Email (User)

Select names and descriptions of all meal plans:
- πName, Description (Meal_Plan)

2. Combination Queries:

Cartesian Product (x):

Combine all users with all exercise routines:
-User *x* Exercise_Routine

Union (∪):

Retrieve all users and all meal plans:
- User∪Meal_Plan

Difference (-):

Retrieve users without an associated exercise routine:
- User−(User∩Exercise_Routine)

3. Grouping and Aggregation Queries:

Grouping (γ):

Count the number of exercise routines by type:
- γ Type; COUNT (ID_routine (Exercise_Routine)

Aggregation (Σ):

Calculate the average weight of users:
- Σ Weight (User_Progress) /COUNT(ID_user)

4. Join and Disjunction Queries:

Join (⋈):

Combine users with their progress:
- User⋈User_Progress

Disjunction (∨):

Retrieve users with an exercise routine of type 'Cardio' or 'Strength':
- σ Type= ' Cardio ' ∨Type= ' Strength ' (Exercise_Routine)

5. Division and Restriction Queries:

Division (÷):

Retrieve users who have completed all exercise routines:
- User÷Exercise_Routine

Restriction (γ):

Select users who have achieved a specific progress:
- γ ID_user;Progress(User_Progress)

VI. DATA SOURCES

Data Sources and Strategy for Generating a Test Database

-Free Data Sources: Websites such as Kaggle, UCI Machine Learning Repository, or any nutrition and exercise related repository.

-Strategy for Generating a Test Database: Use the Faker library in Python to generate dummy data that simulates users, exercise routines, meal plans, and user progress.

REFERENCES

[1] C. J. Date, "An Introduction to Database Systems", 8ª ed. Boston, MA: Addison-Wesley, 2004.

[2] A. Silberschatz, H. F. Korth y S. Sudarshan, "Conceptos de sistemas de bases de datos", 7ª ed., Nueva York, NY. Nueva York, NY: McGraw-Hill, 2020.

[3] Actas de la Conferencia Internacional ACM SIGMOD sobre Gestión de Datos, 2020.

[4] Actas de la Conferencia Internacional del IEEE sobre Ingeniería de Datos, 2020.

[5] W. H. Inmon, "Building the Data Warehouse", 4ª ed., John Wiley & Sons, 2005. John Wiley & Sons, 2005.

[6] Oracle Corporation, "Documentación de bases de datos Oracle", Oracle, 2020. [En línea]. Disponible: https://docs.oracle.com/database/122/nav/portal_booklist.htm

[7] Universidad Distrital Francisco José de Caldas, "Formato IEEE para Trabajos Escritos: Normas IEEE", Comunidad UDistrital, 23-Enero-2023. [En línea]. Disponible: https://comunidad.udistrital.edu.co/formatoieee/2023/01/23/formato-ieee-para-trabajos-escritos-normas-ieee/