**Database Systems Project Part I : Modeling**

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**Project Title:** Personalized Nutrition Recommendation System - MoodBite

#### **Overview**

The MoodBite database is designed to manage data for a platform that tracks user moods, dietary preferences, health goals, and meal planning. It includes various entities such as users, recipes, ingredients, mood tags, and health-related analytics.

#### **Key Features**

1. **User Data**: Tracks user profiles, including dietary preferences, and health goals.
2. **Recipes and Ingredients**: Manages recipes, including detailed nutritional breakdowns and associated ingredients.
3. **Mood Tracking**: Links moods to recipes and tracks user mood entries for personalized recommendations.
4. **Meal Planning**: Enables personalized meal planning based on user preferences and health goals.
5. **Analytics**: Tracks recipe popularity, user interactions, and recommendation effectiveness for future integration of machine learning prediction and recommendations model.
6. **Shopping List**: Helps users create shopping lists based on selected recipes.

### **Entities, Their Attributes and Purpose**

1. **Users**
   * **Purpose**: Represents individuals using the application, serving as the central entity linking various user-specific data.
   * **Attributes**: user\_id, username, email, password.
   * **Relationships**: Has one UserProfile. Associated with multiple MoodTracking, DietaryPreferences, MealPlans, RecipePreferences, and HealthGoals.
2. **UserProfiles**
   * **Purpose**: Stores personal details and physical metrics of users for personalized recommendations and tracking.
   * **Attributes**: profile\_id, user\_id, age, gender, height, weight, activity\_level.
   * **Relationships**: Belongs to a single User.
3. **MoodTags**
   * **Purpose**: Defines mood categories for tracking and recipe recommendations based on mood.
   * **Attributes**: id, name, description.
   * **Relationships**: Linked to multiple Recipes. Associated with MoodTracking entries.
4. **Recipes**
   * **Purpose**: Stores information about recipes, including metadata, dietary labels, and associated mood tags.
   * **Attributes**:  
     recipe\_id, name, recipe\_link, ingredients, mood\_tag\_id, image\_link, summary, cuisines, dish\_type, instruction\_steps, spoonacular\_score, servings, price\_per\_serving, caloric\_breakdown, DietLabels, vegetarian, vegan, gluten\_free.
   * **Relationships**: Linked to MoodTags. Used in MealPlans, RecipePreferences, RecipeRatings, RecipeAnalytics, and Nutrition.
5. **Ingredients**
   * **Purpose**: Represents individual ingredients for shopping list creation and recipe components.
   * **Attributes**: ingredient\_id, name.
   * **Relationships**: Used in ShoppingList.
6. **MealPlans**
   * **Purpose**: Manages user-specific meal plans by linking recipes to users and defining meal types.
   * **Attributes**: meal\_plan\_id, user\_id, meal\_type, recipe\_id, servings.
   * **Relationships**: Links Users to Recipes.
7. **DietaryPreferences**
   * **Purpose**: Stores user-specific dietary preferences and restrictions for personalized suggestions.
   * **Attributes**: preference\_id, user\_id, diet\_type, restrictions.
   * **Relationships**: Belongs to a User.
8. **Nutrition**
   * **Purpose**: Provides nutritional details for each recipe to support dietary analysis and health tracking.
   * **Attributes**: recipe\_id, calories, fat, protein, carbs, fiber, sugar, sodium.
   * **Relationships**: Linked to a Recipe.
9. **ShoppingList**
   * **Purpose**: Organizes ingredients required by users for recipes, supporting meal preparation.
   * **Attributes**: shopping\_list\_id, user\_id, ingredient\_id, quantity.
   * **Relationships**: Links Users to Ingredients.
10. **HealthGoals**
    * **Purpose**: Tracks user health objectives such as caloric intake and macronutrient targets for fitness goals.
    * **Attributes**: goal\_id, user\_id, goal\_type, target\_calories, target\_protein, target\_carbs, target\_fat.
    * **Relationships**: Belongs to a User.
11. **MoodTracking**
    * **Purpose**: Records user moods over time for analyzing trends and improving recipe recommendations.
    * **Attributes**: mood\_entry\_id, user\_id, date, mood\_tag\_id, energy\_level, stress\_level.
    * **Relationships**: Links Users to MoodTags.
12. **Analytics Tables**
    * **Purpose**:
      + **RecipeAnalytics**: Tracks views and favorites for recipes.
      + **RecommendationAnalytics**: Tracks user interactions with recipe recommendations.
      + **RecipePreferences**: Tracks user-specific preferences for recipes.
13. **NutritionTracking**
    * **Purpose**: Logs daily nutritional intake for users to monitor health and dietary balance.
    * **Attributes**: tracking\_id, user\_id, date, total\_calories, total\_protein, total\_carbs, total\_fat.
    * **Relationships**: Belongs to a User.

#### **ER Diagram Representation**

The ER diagram can be represented with the following relationships:

* Users → UserProfiles (1:1)
* Users → MoodTracking (1:N)
* Users → DietaryPreferences (1:N)
* Users → MealPlans (1:N)
* Users → RecipePreferences (1:N)
* Users → HealthGoals (1:N)
* Recipes → Nutrition (1:1)
* Recipes → MoodTags (N:1)
* Recipes → RecipeAnalytics (1:1)
* Recipes → MealPlans (N:1)
* Recipes → RecommendationAnalytics (N:1)
* Recipes → RecipePreferences (N:1)
* Ingredients → ShoppingList (1:N)
* MoodTags → MoodTracking (1:N)

