

Fridge Finds

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Group Section

Study Description

We want to create an app to help users find recipes for ingredients they already have at home. This will help people save time, money, and connect with others. Users can input available ingredients, receive a recipe that adheres to any dietary restrictions, and connect with nearby users to share supplies. We will need to design data to represent and support users, ingredients, recipes, allergens, and item categories.

Analysis Plan

Our decision to develop this app was influenced by a wide range of factors. Food insecurity is among the most notable. Food insecurity occurs when individuals lack the resources necessary to guarantee that they can obtain enough food in ways that are acceptable to society (McIntyre, n.d.). Between 1997 to 2007 food insecurity oscillated between 10% to 12%, however, this number increased to 14% and 15% between 2008 to 2014 due to a recession. Despite this percentage normalizing (decreasing back to) 12.5% or approximately 42 million individuals in 2015, this recession demonstrated how food insecurity generally pervades amongst a vast number of low-income households- specifically households that are 185% below the poverty margin. Moreover, food insecurity also persists among people of color. To illustrate, 22% of black households and 19% of Hispanic households experience some form of food insecurity (Nazmi et al., 2018). The rates presented are twice that of non-hispanic white households, suggesting that in tandem with socioeconomic factors and structural racism, many non-white individuals will experience food insecurity with greater severity, which augments this issue (Odoms-Young & Bruce, 2018).

Food insecurity also leads individuals to make poor dietary restrictions that can be detrimental to their physical and mental health, leading to an overall decline in public health in addition to a lesser quality of life. Research also showed that amongst children, “food insecurity is associated with increased risks of some birth defects, anemia, lower nutrient intakes, cognitive problems, and aggression and anxiety. It is also associated with higher risks of being hospitalized and poorer general health, and with having asthma, behavioral problems, depression, suicide ideation, and worse oral health (Gundersen & Ziliak, 2015).” The adverse health effects witnessed among non-senior adults are an increased rate in the number of people with hypertension, hyperlipidemia, and diabetes. Adults also tend to experience depression and a lesser quality of sleep (Gundersen & Ziliak, 2015). The various health issues associated with food insecurity emphasize the importance of our app in solving an issue that continues to persist globally.

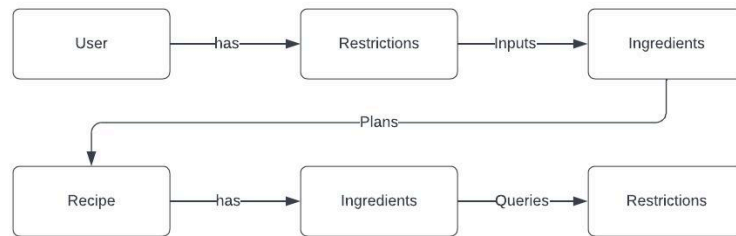
Food waste is yet another important justification for why we developed this app. Food waste occurs when food that is intended for human consumption is discarded or used inefficiently. Approximately 400 billion pounds of food are lost worldwide between the phases of harvest and retail sales, according to the Food and Agriculture Organization of the United Nations. An additional 17% is also lost between retailers and consumers (*Food Loss and Waste*, n.d.). As a result, around one-third of productive outputs end up in landfills. Food waste also wastes energy and “valuable functional molecules such as flavonoids, waxes, biopolymers or fatty acids (Ghosh et al., 2015).” these are frequently lost or underutilized when food waste is disposed of in landfills, converted into power, or used to make bioethanol or animal feed. This is

not only wasteful, but it also harms the health of the environment (Ghosh et al., 2015). Our aim with this application is to correct this issue and offer a solution to minimize the amount of waste created.

Both food insecurity and food waste remain prevalent global issues. To address these problems and provide a long-lasting solution we designed an app that will help consumers find recipes using things they already have at home.- thereby minimizing waste and providing nourishment and substance to those dealing with food insecurity. Furthermore, this app will be accessible to all, irrespective of their ethnic background or income, ensuring that everyone can benefit from its features. As a result, the health of individuals- mentally and physically- and the environment will vastly improve creating a long-lasting positive impact for all.

Data Flow Diagram

Figure A



Problem

The problem at hand was influenced by a myriad of factors, with the two most significant being food insecurity and food waste. Food insecurity impacts the lives of millions of people daily. This stems from people being unable to have access to the necessary resources to provide nourishment. Food insecurity leads individuals to make poor dietary decisions resulting in a negative impact on the quality of their physical and mental health and wellbeing. Moreover, food waste is another pressing concern. Large quantities of food are being lost and eventually harming the environment with its waste. It is imperative we collectively address these issues to prevent the health of the people and the environment from being negatively impacted.

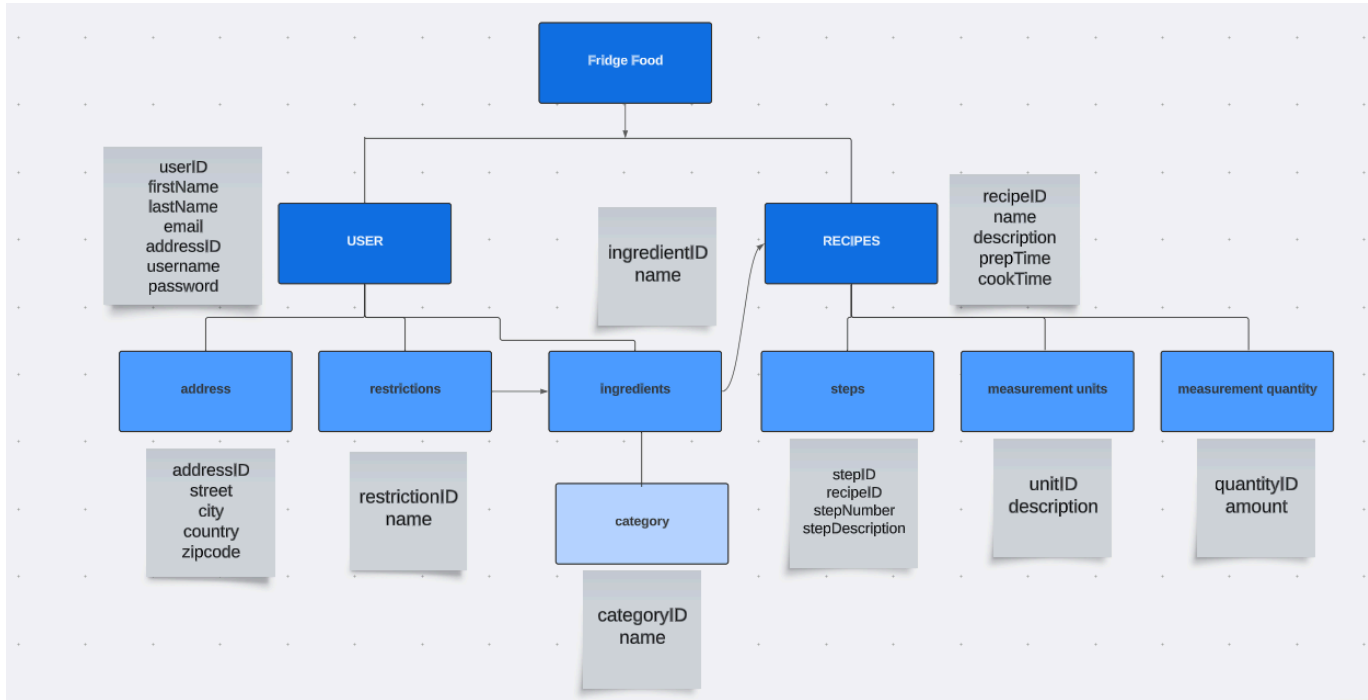
Solution

We propose an application that is able to take in a list of miscellaneous ingredients already available in someone's pantry and output the recipe for a dish someone can make with those ingredients. This application will enable users to make the most of their current resources without having to spend time or money fetching items from the store. Given more time and resources for future extensibility, the application will also have a social feature to bring people together to connect or share ingredients. Users

might be able to friend each other and schedule events to meet in their local neighborhood, encouraging connection and providing an ecological alternative to grocery shopping.

Hierarchy Diagram

Figure B



Normalization Table

Level 0

Figure C

Normalization Table - Level 0					
User	User ID	First Name	Last Name	Email	Credentials
Credentials ID	User ID	Username	Password	Address	Address ID
Street	City	State	Zip	Recipe	Recipe ID
Name	Description	Prep Time	Cook Time	Step	Step ID
Recipe ID	Step Number	Step Description	Ingredient	Ingredient ID	Ingredient Name
Restriction	Restriction ID	Restriction Name	Category	Category ID	Category Name
Measurement Unit	Measurement Unit ID	Measurement Unit Description	Measurement Quantity	Measurement Quantity ID	Measurement Quantity Amount

Level 1

Figure D

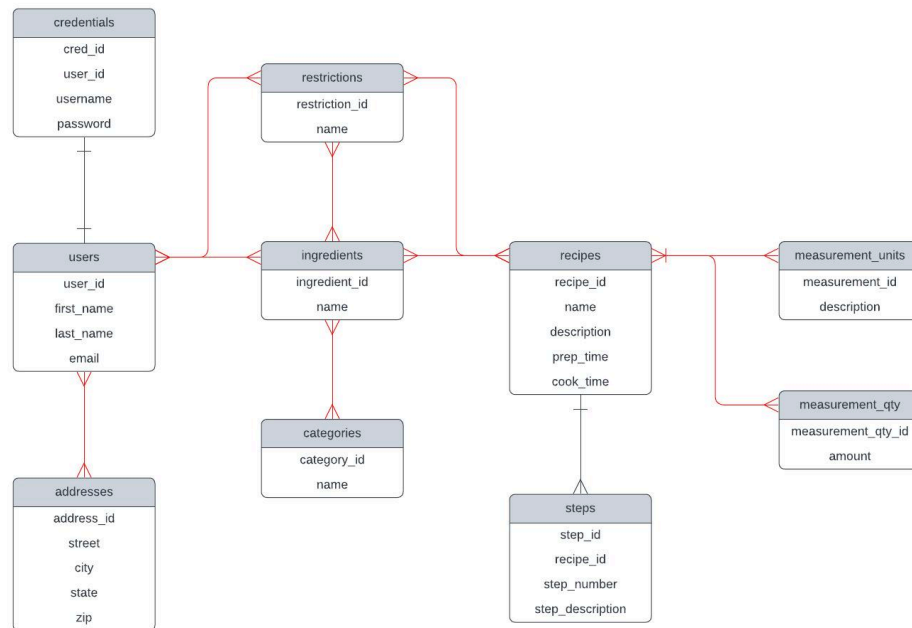
Normalization Table - Level 1					
User	User ID	First Name	Last Name	Email	Credentials
Credentials ID	User ID	Username	Password	Address	Address ID
Street	City	State	Zip	Recipe	Recipe ID
Name	Description	Prep Time	Cook Time	Step	Step ID
Recipe ID	Step Number	Step Description	Ingredient	Ingredient ID	Ingredient Name
Restriction	Restriction ID	Restriction Name	Category	Category ID	Category Name
Measurement Unit	Measurement Unit ID	Measurement Unit Description	Measurement Quantity	Measurement Quantity ID	Measurement Quantity Amount

Level 2

Figure E

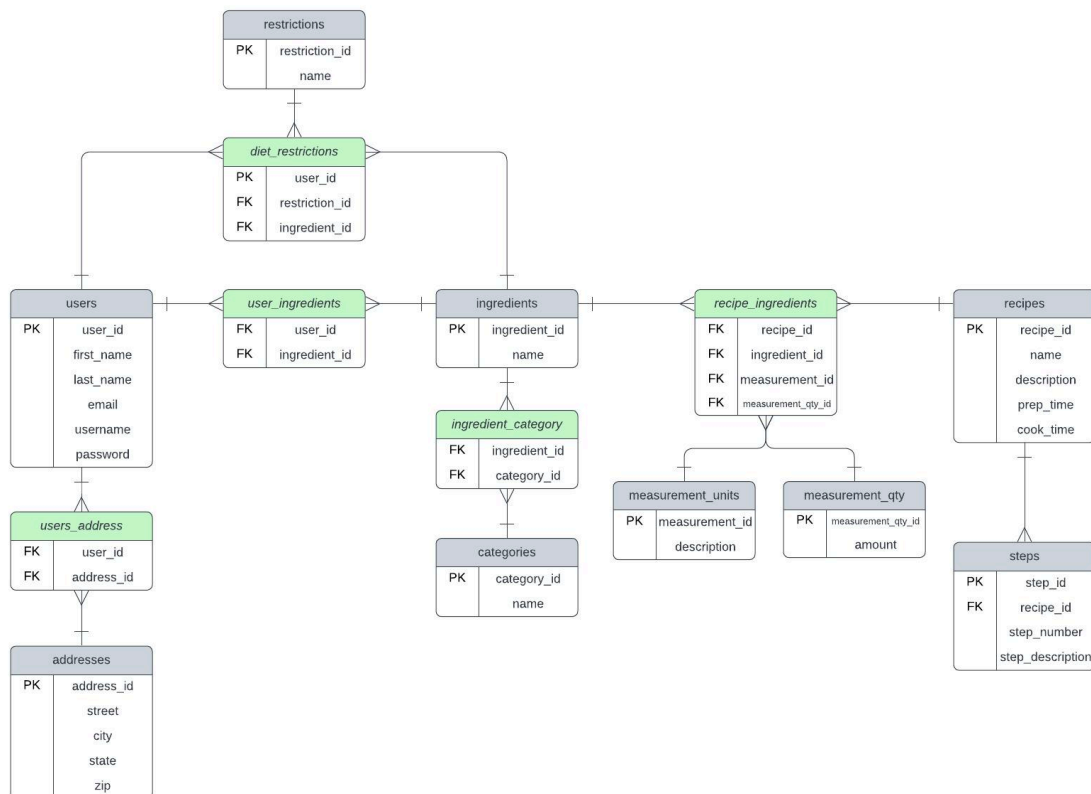
Normalization Table - Level 2			
User		Credentials	Address
User ID		Credentials ID	Address ID
First Name		User ID	Street
Last Name		Username	City
Email		Password	State
			Zip
Recipe		Steps	Ingredients
Recipe ID		Step ID	Ingredient ID
Name		Recipe ID	Ingredient Name
Description		Step Number	
Prep Time		Step Description	Measurement Units
Cook Time			Measurement ID
			Description
Restrictions		Categories	Measurement Quantity
Restriction ID		Category ID	Measurement Quantity ID
Name		Name	Amount

Figure F



Level 3

Figure G

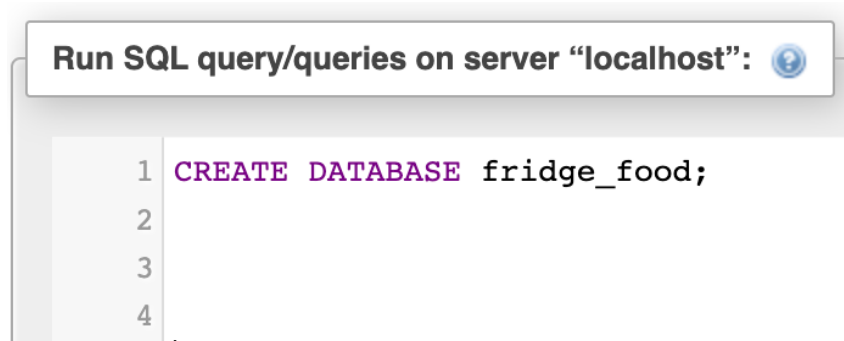


Database SQL

Building The Database

Below is the SQL to create the database with the name “fridge_food.”

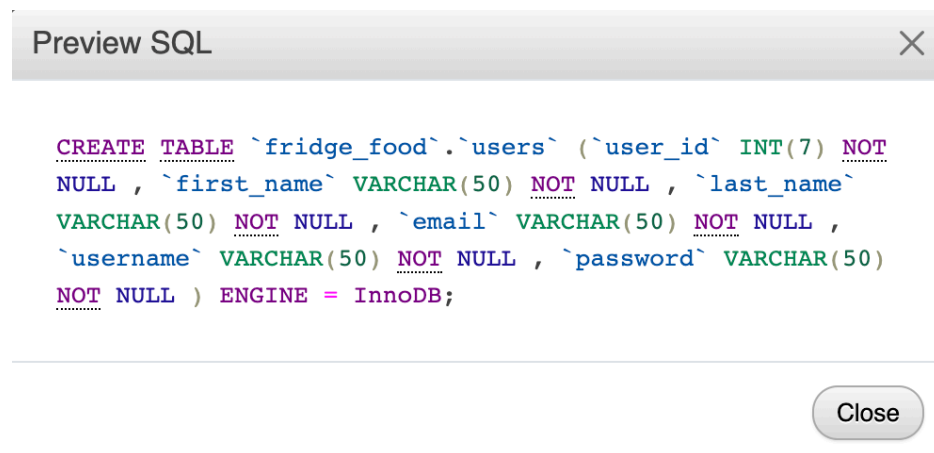
Figure H



Add One Table

Below is the SQL to add a table to the existing “fridge_food” database.

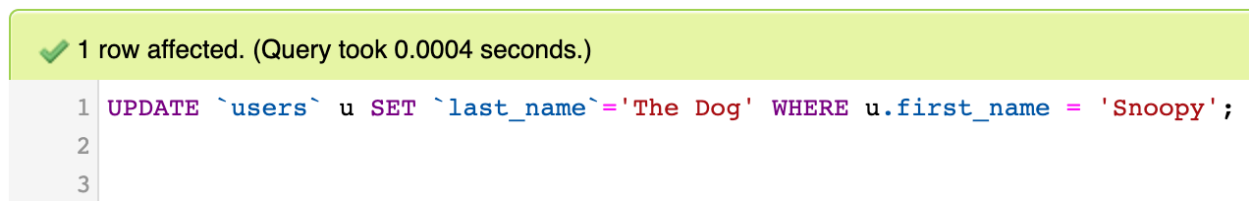
Figure I

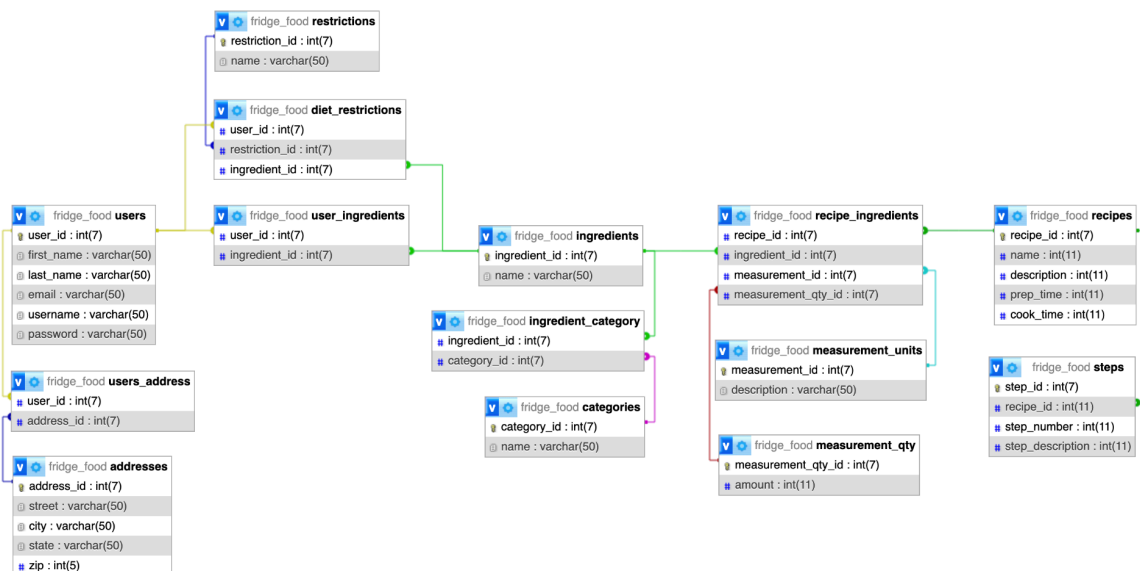


Update

Below is the SQL to update an existing data entry in the “users” table.

Figure J





Queries and Solutions

Query 1

Find all recipes that use a protein ingredient and the name of that protein.

Figure M

✓ Showing rows 0 - 4 (5 total, Query took 0.0007 seconds.)

```

1 SELECT r.name AS "Recipe Name",
2       r.description AS "Description",
3       i.name AS "Protein Ingredient"
4 FROM recipe_ingredients ri
5     LEFT JOIN recipes r ON ri.recipe_id = r.recipe_id
6     LEFT JOIN ingredients i ON ri.ingredient_id = i.ingredient_id
7     LEFT JOIN ingredient_category ic ON ic.ingredient_id = i.ingredient_id
8     LEFT JOIN categories c ON ic.category_id = c.category_id
9 WHERE c.name = "Protein";

```

☒ Enable foreign key checks

Go Cancel

☐ Profiling [[Edit inline](#)] [[Edit](#)] [[Explain SQL](#)] [[Create PHP code](#)] [[Refresh](#)]

☐ Show all | Number of rows: 25 Filter rows: Search this table

Extra options

Recipe Name	Description	Protein Ingredient
Lemon Chicken	Easy lemon chicken recipe that's perfect for a wee...	Chicken
Fried Rice	Quick and easy stir fry, customizable with any of ...	Beef
Fried Rice	Quick and easy stir fry, customizable with any of ...	Tofu
Almond Cookies	Buttery, sweet cookies similar to sugar cookies bu...	Egg
Fried Rice	Quick and easy stir fry, customizable with any of ...	Egg

Query 2

Find all the ingredients required for a spring salad and their respective categories.

Figure N

✓ Showing rows 0 - 4 (5 total, Query took 0.0007 seconds.)

```

1 SELECT r.name AS "Recipe Name",
2       i.name AS "Ingredient",
3       c.name AS "Category"
4 FROM recipe_ingredients ri
5     LEFT JOIN recipes r on r.recipe_id = ri.recipe_id
6     LEFT JOIN ingredients i on i.ingredient_id = ri.ingredient_id
7     LEFT JOIN ingredient_category ic ON ic.ingredient_id = i.ingredient_id
8     LEFT JOIN categories c ON ic.category_id = c.category_id
9 WHERE r.name = "Spring Salad";

```

☒ Enable foreign key checks

Go Cancel

☐ Profiling [[Edit inline](#)] [[Edit](#)]

☐ Show all | Number of rows: 25 Filter rows: Search this table

Extra options

Recipe Name	Ingredient	Category
Spring Salad	Lemon	Fruit
Spring Salad	Cherry Tomato	Fruit
Spring Salad	Asparagus	Vegetable
Spring Salad	Lettuce	Vegetable
Spring Salad	Oil	NULL

Query 3

Find a recipe that is both vegetarian and contains protein.

Figure O

Showing rows 0 - 0 (1 total, Query took 0.0005 seconds.)

```

1 SELECT r.name AS "Recipe Name"
2 FROM recipe_ingredients ri
3     LEFT JOIN recipes r on r.recipe_id = ri.recipe_id
4     LEFT JOIN ingredients i on i.ingredient_id = ri.ingredient_id
5     LEFT JOIN ingredient_category ic ON ic.ingredient_id = i.ingredient_id
6     LEFT JOIN categories c ON ic.category_id = c.category_id
7     LEFT JOIN diet_restrictions dr ON dr.ingredient_id = i.ingredient_id
8 WHERE c.name = "Protein" AND dr.restriction_id = "3";
    
```

☒ Enable foreign key checks

Go
 Cancel

☐ Profiling [[Edit inline](#)] [[Edit](#)] [[Explain SQL](#)] [[Create PHP code](#)] [[Refresh](#)]

☐ Show all | Number of rows: 25 ▼ Filter rows:

Extra options

Recipe Name

Fried Rice

Reflection

Moving forward in our database design, we appreciate that the recipe-step relationship could be a many-to-many relationship that needs to be resolved. For example, the step “Preheat oven to 350 degrees” could apply to multiple recipes and result in data duplication. We would resolve this step with another dependency table to identify which recipes relate to which steps.

References

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<https://doi.org/10.1097/fch.0000000000000183>