

Team Members

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Group Number

Project Group 15

Project Title

No More Ramen

Project Step 2 Draft: Normalized Schema + DDL with Sample Data

a) Reviews

Feedback by the peer reviewer

[Rajan Patel](#)

hello,

This sounds like a fantastic idea!

Does the overview describe what problem is to be solved by a website with DB back end?

Yes! You have a really cool idea as students are always living off ramen and having a more nutritious better tasting meals/recipes would have been very helpful during my first undergraduate degree.

Does the overview list specific facts?

There are many facts listed, such as the intended audience (college students specifically in the Corvallis area), the amount of users that are targets (35,000), as well as price of ingredients that will need to be accounted for from the reference table.

Are at least four entities described and does each one represent a single idea to be stored as a list?

Yes, There are entities for users, recipes, ingredients, recipe ingredients, restrictions and units.

Does the outline of entity details describe the purpose of each, list attribute datatypes and constraints and describe relationships between entities?

Yes, The outline provides the attributes in each entity, the datatypes, and the relationship between entities.

Are 1:M relationships correctly formulated?

Yes, the 1:M relationships between RecipeRestrictions and Recipes, Ingredients and Units, Recipes and Users

Is there at least one M:M relationship?

Yes, there are multiple M:M relations such as between, Recipes and Restrictions, Ingredients and Recipes, and Recipes and Restrictions

Does the ERD present a logical view of the database?

Yes, the ERD diagram seemed easy to read

Is there consistency in:

- a) naming between overview and entity/attributes
 - Yes
- b) entities plural, attributes singular
 - Yes
- c) use of capitalization for naming?
 - There was no use of capitalization for naming attributes, however, snake case was used which to me still leads to readable names

Suggestions for Improvement:

Just a couple of things I noticed,

- is the created_time information in the Users table used elsewhere in the database? I am not sure if that would be something that's necessary to record if not utilized.
- The id and name variables are used multiple times for different tables, but it may help to specify them further so the "name" or "id" variable doesn't overlap with multiple tables.

-Rajan Patel

Actions based on the feedback

1. Removed unused `created_time` attribute for Users.
2. Rajan made a suggestion to give things that appear in most tables unique names such as ``ingredient_id`` in Ingredients rather than ``id`` to describe the primary key, and ``ingredient_name`` instead of ``name`` to describe the ingredient name. We decided not to apply this feedback because since attributes are tied to the table namespace, adding the name of the entity before the attribute names confers no benefit while making the entity schema less readable. In addition, reserving `entityname_attributename` nomenclature for attributes for foreign keys improves readability of entities as it helps draw distinctions between attributes that are local to that entity and attributes referenced from other tables. For example, consider the table Ingredients. In a database where ``id`` is always used to describe a local attribute, attributes such as ``unit_id`` can be easily understood as ``id`` from Units.

UPDATE: See the “Actions based on TA feedback” in this section.

Feedback by the peer reviewer

[Jennifer Um](#)

Review

Hi Teresita and Derek,

Great job, this is a cool concept!

- Does the overview describe what problem is to be solved by a website with DB back end?
 - Yes, this overview clearly describes the problem that will be solved (students have to budget for food, and cheaper food tends to be more austere)
- Does the overview list specific facts?
 - The overview lists specific numbers and facts relevant to the problem (ex: 35,000 members of the community). This can be supplemented by introducing the average budget for a college student.
- Are at least four entities described and does each one represent a single idea to be stored as a list?
 - Yes, there are at least four entities (Users, Recipes, Ingredients, Restrictions, Units).
- Does the outline of entity details describe the purpose of each, list attribute datatypes and constraints and describe relationships between entities?
 - Yes, the outline of entity details describe purpose, attribute datatypes and constraints, and relationships between entities clearly.
- Are 1:M relationships correctly formulated? Is there at least one M:M relationship? Does the ERD present a logical view of the database?
 - 1:M relationships are correctly formulated with foreign keys as needed. There is at least one M:M relationship (ex: Recipes : Restrictions). The ERD presents a logical view of the database.
- Is there consistency in a) naming between overview and entity/attributes b) entities plural, attributes singular c) use of capitalization for naming?
 - There is consistency in
 - (a) naming between overview and entity/attributes
 - (b) entities plural, attributes singular in the ERD
 - (c) use in capitalization for naming (uppercase in table name, lowercase in attributes)

Some feedback and considerations:

- Restrictions can be tied to Ingredients instead of Recipes. The User can also have an attribute of restrictions or ingredients to avoid. Then, if a User has a restriction, the program can filter out recipes by ingredients.
- Alternatively, restrictions potentially be a category table that contains the FDA's [list of major food allergies](#); in addition to an attribute for "meat" (if a user is vegan or vegetarian), as well as others.

Best,

Jenn

Actions based on the feedback

1. Changed the relationship between Restrictions and Ingredients to Restrictions and Recipes.
 - Consequently, the RecipeRestrictions table was removed and IngredientRestrictions was added in its place.
2. Made a note of using the [FDA's list](#) of major allergen groups for Restrictions.
 - Made a note of referring to Restrictions as a category table.

Actions based on TA feedback

Great work group 15! Your database design looks good so far. Here are some suggestions I have: - More descriptive names for your PK ids ex. userID, restrictionID - I suggest cleaning up your ERD so that there are fewer overlapping lines to help with readability

1. We changed our ERD to not have any overlapping relation lines to improve readability.
2. While we believe that our original design choice of naming the primary key of non-join entities as `id` is valid for the reason given above, both Rajan and our TA Katie highlighted our naming convention as an area for improvement. Therefore, we decided to make the changes that Rajan suggested (updated our database outline and ERD accordingly).

b) Project Outline and Database Outline - Updated Version

Project Overview:

Navigating the complexities of budgeting as a college student has always been a challenge. LivingCost reports that Corvallis, Oregon has an average cost of living of \$1983[1]. However, three of the most crucial groceries for college students, namely eggs (12 for \$3.74), rice (1 kg or 2.2 lb for \$3.51), and chicken breast (1 kg or 2.2 lb for \$11.1), are among the priciest items. Consequently, they often resort to austerity foods such as instant mac and cheese, ramen, oatmeal, etc. Our mission is to empower students with exciting meal options that promote both financial savviness and culinary satisfaction, enabling them to cut down expenses without compromising on their taste buds or health.

No longer do students need to rely on bland, inexpensive meals. No More Ramen is a web platform for crowd-sourcing budget-conscious and delicious recipes aimed at students in Corvallis (designed to serve ~35000 members of the OSU student body). Students will be able to share and find recipes within their budget, calculated based on the approximate price of ingredients. The website will utilize a database backend to record recipes, their authors, the ingredients used in the recipes, their costs, as well as special dietary restrictions. The cost calculation was designed with a manually curated reference table (2023 sources) in mind.

Database Outline:

- Users: records the details of the Users that will use the recipe website. Our primary target demographic is college students so we are assuming that most users are college students living in or near Oregon.
 - user_id: PK, INT, AUTO_INCREMENT, NOT NULL
 - first_name: VARCHAR(50), NOT NULL
 - last_name: VARCHAR(50), NOT NULL
 - email: VARCHAR(100), NOT NULL
 - Relationships:
 - 1:M relationship with Recipes. This relationship is nullable as recipes can be posted anonymously. A User can have one more or recipes, but a recipe cannot have more than one author.
 - Normalization: This table is already in 1NF as all fields are fully dependent on the primary key and there are no repeating groups.
- Recipes: records the details of the recipes written by users. Users will be able to see all recipes that are not filtered out by other options. Authors are not required as recipes can be written anonymously.
 - recipe_id: PK, INT, AUTO_INCREMENT, NOT NULL
 - author_id: FK Users.id, INT, NULL,
 - name: VARCHAR(100), NOT NULL
 - content: LONGTEXT
 - created_time: TIMESTAMP DEFAULT CURRENT_TIMESTAMP
 - Relationships:
 - 1:M relationship with Users.
 - M:N relationship with Ingredients (1:M with RecipeIngredients).
 - Normalization: This table is already in 1NF as all fields are fully dependent on the primary key and there are no repeating groups.
- RecipeIngredients: Junction table to facilitate the relationship between Recipes and Ingredients. This table also has the quantity of the ingredient used in the associated recipe, using the unit of measurement defined in the Ingredients table.
 - recipe_id: FK Recipes.id, NOT NULL, PK
 - ingredient_id: FK Ingredients.id, NOT NULL, PK
 - quantity: DOUBLE, NOT NULL
 - Relationships:
 - Intermediary in a M:N relationship between Recipes and Ingredients. A recipe can have many ingredients (but it must have

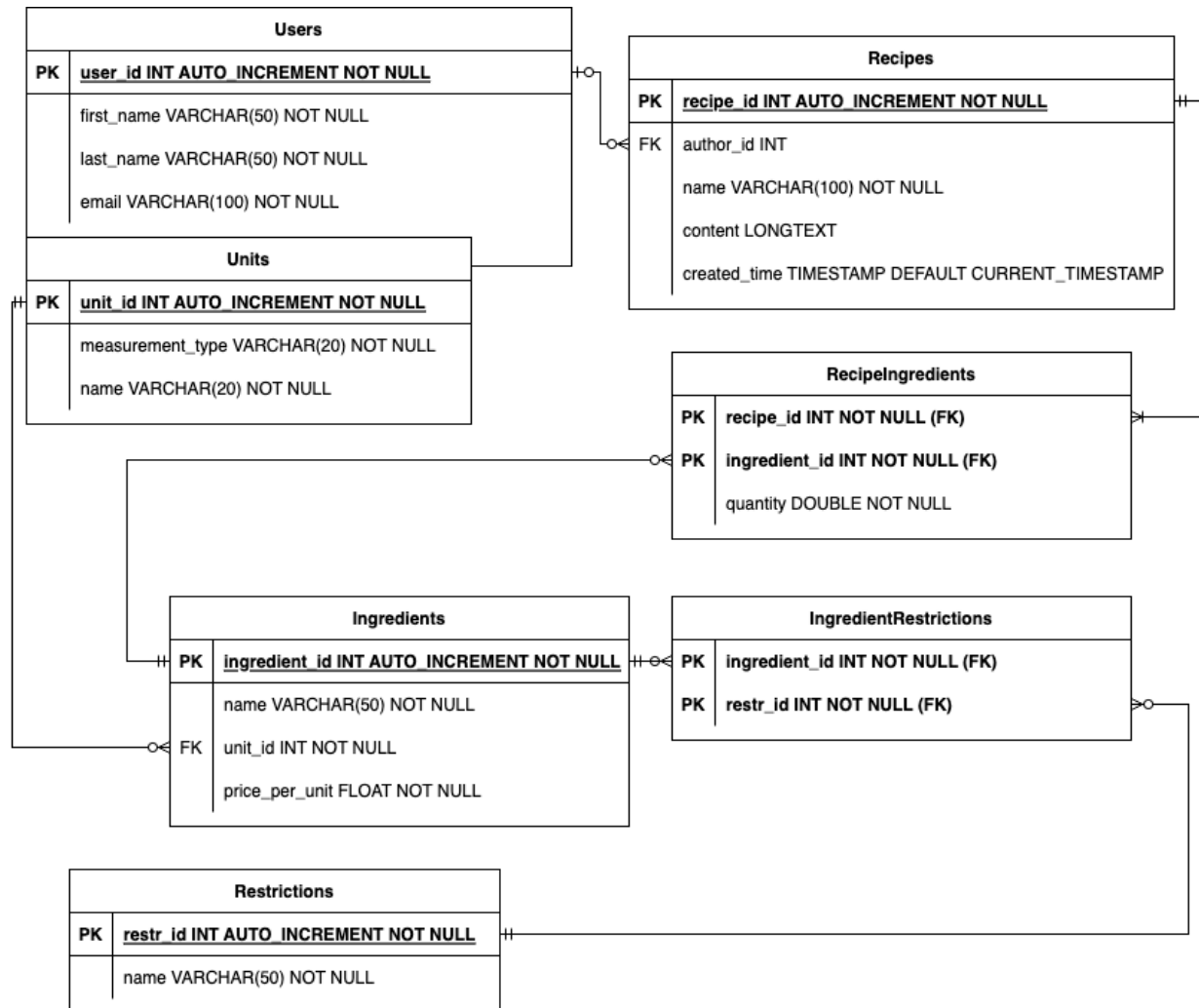
at least one ingredient or it's not much of a recipe) and the same ingredient can be used in multiple recipes.

- 1:M with Recipes, 1:M with Ingredients.
- Normalization: This table is already in 3NF as all fields are fully dependent on the primary key, there are no repeating groups, and there are no transitive dependencies. Quantity is not a transitive dependency in this case as it's a measure of how much of an ingredient is present in a given recipe, so it's unique specifically to that primary (composite) key.
- Ingredients: records the details of the Ingredients stored on the website. This table will be manually curated by the team to ensure accurate prices for the most common ingredients.
 - ingredient_id: INT, NOT NULL, AUTO_INCREMENT, PK
 - name: VARCHAR(50), NOT NULL
 - unit_id: FK unit_id, INT, NOT NULL
 - price_per_unit: FLOAT, NOT NULL
 - Relationships:
 - M:N relationship with Recipes (1:M with RecipeIngredients).
 - 1:M relationship with Units (an ingredient can have one unit).
 - M:N relationship with Restrictions (1:M with IngredientRestrictions).
 - Normalization: This table is already in 1NF as all fields are fully dependent on the primary key and there are no repeating groups.
- IngredientRestrictions: Junction table to facilitate the M:N relationship between Ingredients and Restrictions.
 - recipe_id: FK recipe.id, int, not NULL, PK
 - restr_id: FK restr.id, INT, NOT NULL, PK
 - Relationships:
 - Intermediary in a M:N relationship between Ingredients and Restrictions. An ingredient can have more than one dietary restriction warning, and there can be multiple ingredients that have the same dietary restriction.
 - 1:M relationship with Ingredients, 1:M with Restrictions.
 - Normalization: This table is already in 3NF as all fields are fully dependent on the primary key, there are no repeating groups, and there are no transitive dependencies (but also no non-primary keys).
- Restrictions: Category table to store the most common dietary restrictions used to filter out recipes incompatible with some users. We will use common dietary

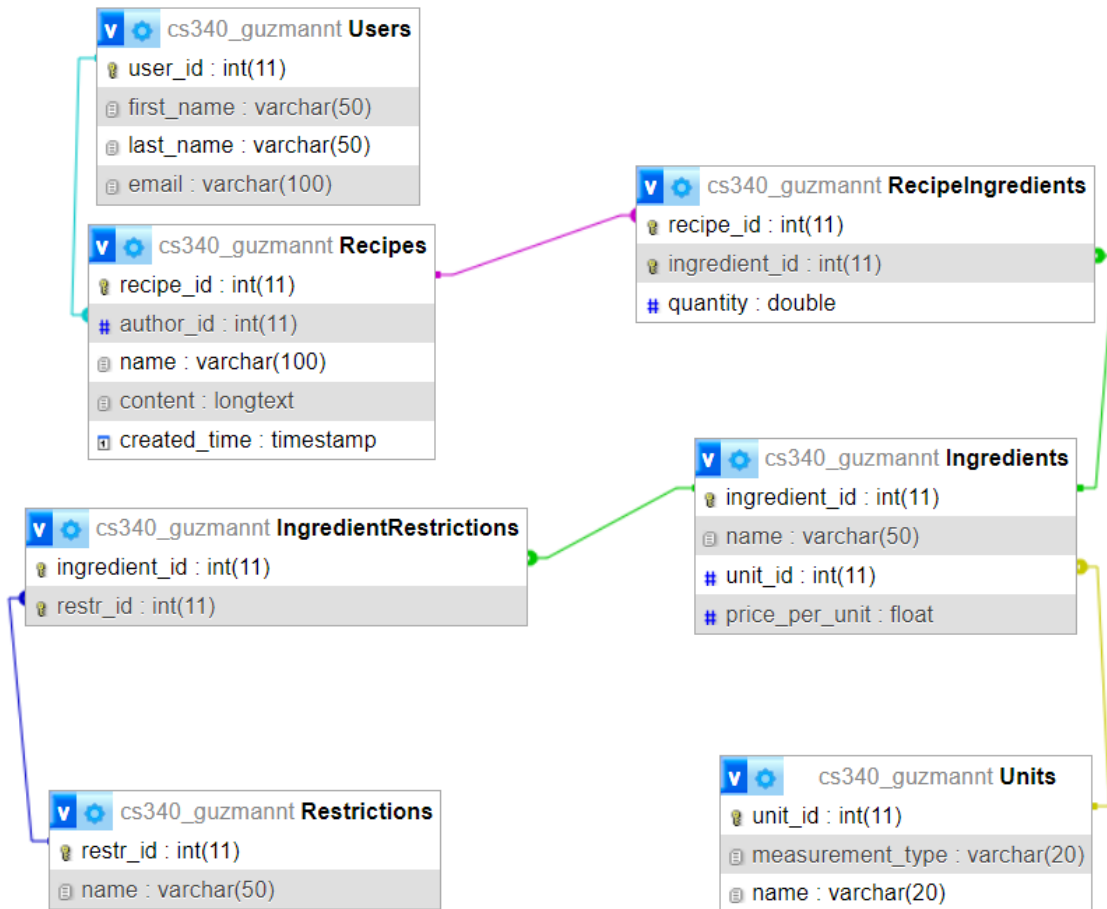
restrictions associated with lifestyle decisions and religion, as well as the FDA's list of major allergen groups.

- restr_id: INT, AUTO_INCREMENT, NOT NULL, PK
 - name: VARCHAR(50), NOT NULL
 - Relationships:
 - M:N relationship with Ingredients (1:M with IngredientRestrictions).
 - Normalization: This table is already in 1NF as all fields are fully dependent on the primary key and there are no repeating groups. Categories are stored in this table to avoid repeating groups in other tables.
- Units: Records types of units for each ingredient. This category table is used to differentiate between different units of measurements.
 - unit_id: INT, AUTO_INCREMENT, NOT NULL, PK
 - measurement_type: VARCHAR(20), NOT NULL (eg. weight, volume, etc.)
 - name: VARCHAR(20), NOT NULL (eg. lb, gal)
 - Relationships:
 - 1:M relationship with Ingredients (an ingredient can only have one unit of measurement, but a unit of measurement can be used for multiple ingredients.)
 - Normalization: This table is already in 1NF as all fields are fully dependent on the primary key and there are no repeating groups. Categories are stored in this table to avoid repeating groups in other tables.

c) Entity-Relationship Diagram:



d) Schema:



e) Sample Data

Users

| user_id | | first_name | last_name | email |
|---------|---|------------|-----------|------------------------|
| | 1 | John | Doe | john.doe@example.com |
| | 2 | Jane | Smith | jane.smith@example.com |
| | 3 | Tom | Brown | tom.brown@example.com |
| | 4 | Sarah | Lee | sarah.lee@example.com |

Recipes

| recipe_id | author_id | | name | content | created_time |
|-----------|-----------|------|----------------|-------------------------|---------------------|
| | 1 | 1 | Chocolate Cake | Preheat the oven... | 2022-04-01 12:30:00 |
| | 2 | 1 | Pizza | Make the pizza dough... | 2022-04-02 13:45:00 |
| | 3 | 2 | Brownies | Mix together butter... | 2022-04-03 11:15:00 |
| | 4 | 2 | Tacos | Cook the ground beef... | 2022-04-04 10:00:00 |
| | 10 | NULL | Pancakes | Mix together flour... | 2022-04-10 4:45:00 |

Ingredients

| ingredient_id | name | unit_id | price_per_unit |
|---------------|-----------|---------|----------------|
| 1 | Flour | 1 | 2.99 |
| 2 | Sugar | 1 | 1.99 |
| 3 | Salt | 1 | 0.99 |
| 4 | Pepper | 1 | 1.49 |
| 5 | Olive Oil | 6 | 5.99 |
| 6 | Cheese | 1 | 3.99 |
| 7 | Chicken | 2 | 7.99 |
| 8 | Beef | 2 | 9.99 |
| 9 | Carrots | 1 | 1.49 |
| 10 | Broccoli | 1 | 1.99 |

Units

| unit_id | measurement_type | name |
|---------|------------------|-------------|
| 1 | Weight | oz |
| 2 | Weight | lb |
| 3 | Volume | tsp |
| 4 | Volume | tbsp |
| 5 | Volume | cup |
| 6 | Volume | fluid ounce |
| 7 | Volume | quart |
| 8 | Volume | gallon |
| 9 | Length | inch |

Restrictions

| restr_id | name |
|----------|-------------------|
| 1 | Peanuts |
| 2 | Tree Nuts |
| 3 | Dairy |
| 4 | Eggs |
| 5 | Fish |
| 6 | Shellfish |
| 7 | Wheat |
| 8 | Soy |
| 9 | Gluten-Free |
| 10 | Vegetarian |
| 11 | Vegan |
| 12 | Kosher |
| 13 | Halal |
| 14 | Low Sodium |
| 15 | Low Fat |
| 16 | Low Carb |
| 17 | Diabetic-Friendly |
| 18 | Nut-Free |
| 19 | Lactose-Free |
| 20 | High Protein |

RecipeIngredients

| recipe_id | ingredient_id | quantity |
|-----------|---------------|----------|
| 1 | 1 | 2.5 |
| 1 | 2 | 1.5 |
| 1 | 3 | 0.25 |
| 2 | 1 | 3 |
| 2 | 4 | 2 |
| 2 | 5 | 0.5 |
| 3 | 1 | 2 |
| 3 | 2 | 1 |
| 3 | 6 | 1 |
| 4 | 7 | 1.5 |
| 4 | 8 | 1 |
| 5 | 1 | 2 |
| 5 | 2 | 1.5 |
| 5 | 6 | 1 |
| 6 | 2 | 2 |
| 6 | 9 | 2 |
| 7 | 10 | 1.5 |
| 7 | 6 | 1 |
| 8 | 7 | 1.5 |
| 8 | 9 | 2 |
| 9 | 8 | 1 |
| 9 | 6 | 1 |
| 10 | 1 | 1.5 |
| 10 | 2 | 1 |

IngredientRestrictions

| ingredient_id | restr_id |
|---------------|----------|
| 1 | 7 |
| 2 | 7 |
| 2 | 8 |
| 3 | 2 |
| 3 | 18 |
| 5 | 3 |
| 5 | 9 |
| 5 | 18 |
| 6 | 10 |
| 7 | 5 |
| 7 | 7 |
| 8 | 5 |
| 8 | 7 |
| 9 | 2 |
| 9 | 18 |
| 10 | 18 |
| 12 | 1 |
| 13 | 5 |
| 14 | 3 |
| 15 | 1 |
| 15 | 4 |
| 16 | 2 |
| 17 | 1 |
| 18 | 5 |
| 19 | 4 |