

Overview of our project:

Our group decided to make a program that helps student cook and find recipes easier. As college students, we understand how difficult it is to cook with very little time and ingredients. Therefore, we decided to make a program that searches for recipes and prints “best match” recipes to make cooking simpler for students like us.

Data Structures (Why&How):

The data structure that we used for this project was a hash table. We decided to use several hash tables within our project. We thought that using hash tables would be the most effective data structures to use because it can be fast without worrying how many recipes we have. Also, searching hash tables would be much faster and more efficient if we were to use a link list or other data structures. Furthermore, the order in which the recipe was placed within the data structure was not particularly important to us, so by using hash tables, we can store a large amount of recipes and access them quickly. We have four hash tables: byName, byIngredient, byMeal, byDiff. These four are all hash tables with the same data within it, but they are arranged differently for our convenience. Here are charts of what each hash table looks like.

byDiff Hash Table

1	⇒	Salad	Quesadilla	Salad
2	⇒	Pancakes	Muffin	Tacos
3	⇒	Steak	Breakfast Burrito	Grilled Chicken

byIngredient Hash Table

Flour	⇒	Muffin	Pancake	Waffle
Egg	⇒	Omelette	Scrambled Eggs	Boiled Egg
Milk	⇒	Ice Cream	Cereal & Milk	Latte

byMeal Hash Table

Breakfast	⇒	Muffin	Pancakes	Breakfast Burrito
Lunch	⇒	Sandwich	Quesadilla	Salad
Dinner	⇒	Steak	Pizza	Grilled Chicken

byName Hash Table

BLT	⇒	Scrambled Eggs	Pancake	Waffle
Tuna	⇒	Omelette	Salad	Boiled Egg
Sandwich	⇒	Ice Cream	Cereal & Milk	Latte

****The recipes in the hashtable diagrams are not accurate to what we actually have in our code. They are just examples of how they are set up.**

We have four different hash functions to make the searching easier.

byName: We use byName to store all of the recipes in an unordered fashion. This is simply what we use to search for a recipe by name and not by meal type, ingredients, or difficulty.

byIngredient: We use byIngredient to make each hash a “main ingredient”. Each recipe with that main ingredient will be stored in the link list for that hash. This is helpful for when the user wants to search for recipes with the ingredient that they have on hand. Once the user inputs that ingredient, it will print the link list of recipes that chains to the appropriate hash.

byMeal: This hash table is stored in a way that each hash is a meal type (ie. breakfast, lunch, dinner). This is for when the user wants to search recipes by meal type. Once that user input is entered in, the program will print recipes that are associated with that meal type.

byDiff: We have each recipe rated by a difficulty ranking of 1-3 (1 being the hardest and 3 being the easiest). Then, the hash table stores the recipe. Each hash is a difficulty level. Then recipes with that difficulties are chained, so if the user is only looking for easy recipes, that link list will be printed out.

References (if any):

The other data structure that we use is a link list to chain the data to be stored into the hash tables. The reference that I used for this project is just the precious code for hash tables I have done. This includes the starter package for the midterm preparation and assignment 7, an assignment that we have done in the past. I also referred to stack overflow to recall how to write data in at the end of a file for our add recipe menu option.

Link: <https://stackoverflow.com/questions/6932409/writing-a-string-to-the-end-of-a-file-c>

Result /Sample Outputs:

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=====Main Menu=====
1. Print list of recipe
2. Search by name of the recipe
3. Search by ingredient on hand
4. Search by meal type (breakfast, lunch, dinner)
5. Print Best Match by Difficulty
6. Print Best Match by Meal
7. Add your own recipe
8. ReadMe :)
9. Quit

Select a Numerical Option
6
What meal are you eating? (Breakfast/Lunch/Dinner)
lunch
Best Match #1

Recipe Name: deviled eggs
Ingredients:
1.) hard boiled eggs
2.) egg yolk
3.) mayonnaise
Cook Time: 25 minutes
Difficulty: Level 2
Meal Type: lunch

Best Match #2

Recipe Name: macaroni salad
Ingredients:
1.) macaroni

=====Main Menu=====
1. Print list of recipe
2. Search by name of the recipe
3. Search by ingredient on hand
4. Search by meal type (breakfast, lunch, dinner)
5. Print Best Match by Difficulty
6. Print Best Match by Meal
7. Add your own recipe
8. ReadMe :)
9. Quit

Select a Numerical Option
2
What recipe would you like to make?
tuna salad
Here is how to make tuna salad
Difficulty: 1
Ingredients:
1.) canned tuna
2.) mayonnaise
3.) onion
Cooking Time: 20

=====Main Menu=====
1. Print list of recipe
2. Search by name of the recipe
3. Search by ingredient on hand
4. Search by meal type (breakfast, lunch, dinner)
5. Print Best Match by Difficulty
6. Print Best Match by Meal
7. Add your own recipe
8. ReadMe :)
9. Quit

Select a Numerical Option
4
What meal type would you like (Breakfast/Lunch/Dinner)
Breakfast
Here are recipes that you can make for breakfast:
omelet
blueberry muffin
breakfast bagelwich
pancakes
smoothie bowl
lox bagel
french toast
skillet
hash browns
toast
avocado toast
scrambled egg
waffle
crepe
grilled cheese
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