Smart Refrigerator System : SmartRefri Usage Guide

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Interfaces.h

```
// IngredientItem
struct IngredientItem {
    int id;
    string name;
    double quantity;
    int freshness;
    StorageType storageType;
};
```

```
// StorageType
enum StorageType {
    FRIDGE,
    FREEZER,
    PANTRY
};
```

'name' : means the name of ingredient

'quantity' : means the quantity of ingredient

> The ingredients may come in various shapes. Some exist as a single individual, such as apples and onions, and others require units when counting, such as ketchup or sesame seeds. In order to deal with these various units of ingredients in one type of data, we unified them into a double data type. And then we set the single quantity of things that can be counted as a single individual, like apples, as '1'. For example, half an apple is displayed as '0.5 apple'. For liquids, 500 milliliters are marked as 1 and for powder, 10 grams are marked as 1. In order to handle the quantity of ingredients, all units are integrated into one data type.

'freshness' : means the freshness of ingredient

> Since freshness represents the time left until the ingredient rot, we set the data type of freshness attribute as int.

'storageType' : means which storage the ingredients are in

Start

Briefing

```
WELCOME TO THE SMART REFRI SYSTEM.
Press ENTER to continue...
```

```
###################################################
#################### Briefing ####################
###################################################


### Baking powder * 2, and Butter * 7 have rotten, so were thrown away.

### Avocado * 3, Apple * 6, and Cream cheese * 7 are in dangerous status. Are you gonna dump them all, master?
(1) Yes (2) No
Answer :
```

The **Briefing** will inform you of <u>rotten ingredients with zero freshness</u> and <u>automatically dispose of them</u>.

It will then inform you of the <u>ingredients in danger (i.e., those that have less than 10 freshness</u>).
You can then choose to <u>throw away</u> these dangerous ingredients or <u>leave them</u> as they are.

If you decide to throw away the ingredients, our kind RefriSystem😇 will ask you if you should refill them with fresh ones.

Act – Eat

```
####################################################
####################### Act #######################
####################################################



### Are you gonna eat something, master?
(1) Yes (2) No
Answer : 
```

After Briefing, Refrisystem will ask you if you want to Eat.

```
####################################################
##################### Cook & Eat ###################
####################################################



### How do you do today, master?
(1) I'm very happy now. (2) I feel moody today. (3) I'm exhausted because of physical movement. (4) I'm just fine. (5) I'm me
ntally tired.
Answer :
```

Selecting 'Yes' will start the Cook & Eat sequence.
First, it will ask how you feel now and recommend food that suits it.

Cook & Eat

Chosen Mood?

Food Recommendation

```
### How do you do today, master?
(1) I'm very happy now. (2) I feel moody today. (3) I'm exhausted because of physical movement. (4) I'm just fine. (5) I'm mentally tired.
Answer : 4

### Oh, that's nice.

### Then, I recommend these foods.
```

If you choose how you feel now, food recommendations will begin.

```
### Here is the detailed info of TOP 3 recommended recipes
+------------------------+-------------------------+----------------------------+----------+
| NAME                   | TAGS                    | INGREDIENTS                | Makable? |
+------------------------+-------------------------+----------------------------+----------+
| Grilled Cheese Sandwich | Hot, Savory, Carbohydrate | 0.500 Bread, 0.100 Butter, ... | NO       |
| Denver Omelet          | Hot, Protein, Salty     | 0.500 Onion, 0.500 Bell pep... | NO       |
| Black Bean Veggie Burger | Hot, Vegan, Protein    | 1.000 Black bean, 1.000 Veg... | NO       |
+------------------------+-------------------------+----------------------------+----------+

### Please choose the food you want.
(1) Grilled Cheese Sandwich (2) Denver Omelet (3) Black Bean Veggie Burger (4) There's nothing I like.
Answer : 
```

First, it will suggest three kinds of foods.
You can choose one of these, or if you don't like them, you can choose (4) There's nothing I like to see other foods.

Description for Food Recommendation

Each food recipe has Tags indicating the characteristics of the food, and recommendations are mainly made through this tag.
There are 16 tags available :

> "Vegan", "Vegetarian", "Cold", "Hot", "Sweet", "Salty", "Spicy", "Sour", "Savory", "Fat", "Protein", "Carbohydrate", "Vitamin", "Mineral", "Healthy", "Premium"

RecipeRecommendation.cpp

```cpp
setMoodPreference ( new_moodPreference: {
        { x: "happy",  y: {"Healthy", "Cold", "Salty", "Sour", "Vitamin", "Mineral"}},  // preferred recipeTag when happy
        { x: "moody",  y: {"Premium", "Sweet", "Savory", "Fat", "Carbohydrate", "Vitamin", "Mineral"}},  // preferred recipeTag when moody
        { x: "exhausted",  y: {"Healthy", "Sweet", "Fat", "Protein", "Carbohydrate"}},  // preferred recipeTag when exhausted
        { x: "fine",  y: {"Healthy", "Premium", "Cold", "Hot", "Sweet", "Savory", "Protein", "Carbohydrate", "Mineral"}},  // preferred recipeTag when fine
        { x: "mentally_tired",  y: {"Premium", "Hot", "Spicy", "Fat", "Vitamin"}}  // preferred recipeTag when mentally_tired
});
setUserPreference ( new_userPreference: {
    // {"TagName", preferenceScore} : The higher the preferenceScore, the more the user prefers the tag
    { x: "Vegan",  y: 1}, { x: "Vegetarian",  y: 2},  // tags related to Dietary pattern
    { x: "Cold",  y: 3}, { x: "Hot",  y: 4}, { x: "Sweet",  y: 4}, { x: "Salty",  y: 3}, { x: "Spicy",  y: 5}, { x: "Sour",  y: 1}, { x: "Savory",  y: 4}, // tags related to Flavor
    { x: "Fat",  y: 4}, { x: "Protein",  y: 2}, { x: "Carbohydrate",  y: 3}, { x: "Vitamin",  y: 1}, { x: "Mineral",  y: 1}, // tags related to Nutrition
    { x: "Healthy",  y: 4}, { x: "Premium",  y: 5} // tags related to Miscellaneous
});
```

For food recommendations, the order of recommended foods is determined based on the following criteria.

1st Criteria – Makable? : It is the standard for whether you can make this dish with ingredients currently in the storage.
It's the first criteria, so the food you can cook now is at the top.

2nd Criteria – Mood : It recommends recipes with tags that correspond to the Mood of your choice first. (The correspondence is in 'setMoodPreference')

3rd Criteria – User Preference : It recommends foods with tags that users prefer first. (Preference score are in integer format;
the higher the weight, the more preferred it is, as you can see in 'setUserPreference'.)

4th Criteria – Shortage of Ingredients : The fewer ingredients you need more to cook your food, the more recommended.

Food Recommendation

Chosen Food?

Ingredient Check

```
### Please choose the food you want.
(1) Chicken Carbonara (2) Chicken Pot Pie (3) Matcha Green Tea Ice Cream (4) There's nothing I like.
Answer : 1

### Chicken Carbonara is chosen, But we need more of the following ingredients:
```

```
===================== Ingredient Status =====================
Spaghetti - now have 0.00, need 2.00, so NOT SUFFICIENT
Bacon - now have 6.00, need 1.00, so SUFFICIENT
Chicken - now have 5.00, need 1.00, so SUFFICIENT
Garlic - now have 1.00, need 0.10, so SUFFICIENT
Egg - now have 5.00, need 4.00, so SUFFICIENT
Parmesan cheese - now have 0.00, need 1.00, so NOT SUFFICIENT
Black pepper - now have 1.00, need 0.05, so SUFFICIENT

=================== Check Lack Ingredient ===================
Spaghetti * 2.00
Parmesan cheese * 1.00

### Shall we buy these ingredients and then cook now, master?
(1) Yes, please! (2) No, I wanna go back to the food list. (3) No, I wanna go back to home.
Answer : 
```

If you choose the food you want, Refrisystem will <u>let you know if there are enough ingredients</u> to make the food, and if there is not enough, <u>what ingredients are lacking</u>.

Here you can choose whether to <u>cook this food by purchasing insufficient ingredients</u> or <u>go back</u>.
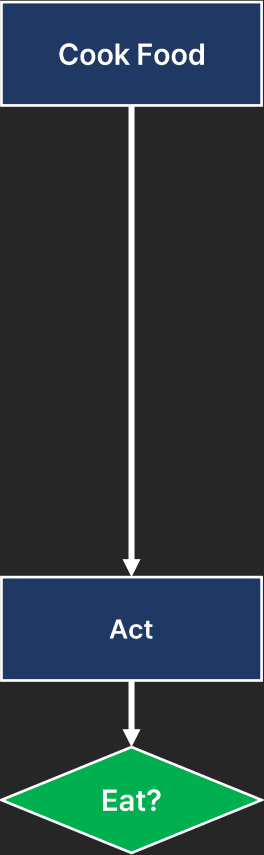
Cook Food

```
### Shall we buy these ingredients and then cook now, master?
(1) Yes, please! (2) No, I wanna go back to the food list. (3) No, I wanna go back to home.
Answer : 1

### All right! I'll prepare a perfect meal, master.

  _____       _____        _____      __  __      __      __  __      _____
 /\  ___\    /\  __ \     /\  __ \    /\ \/ /    /\ \    /\ "-.\ \    /\  ___\
 \ \ \____   \ \ \/\ \    \ \ \/\ \   \ \  _"-.  \ \ \   \ \ \-.  \   \ \ \____
  \ \_____\   \ \_____\    \ \_____\   \ \_\ \_\  \ \_\   \ \_\\"\_\   \ \_____\
   \/_____/    \/_____/     \/_____/    \/_/\/_/   \/_/    \/_/ \/_/    \/_____/
```

If you choose to cook, the Refrisystem will cook and prepare food for you.

Act

After cooking & eating, you will go back to the Act sequence.

Eat?
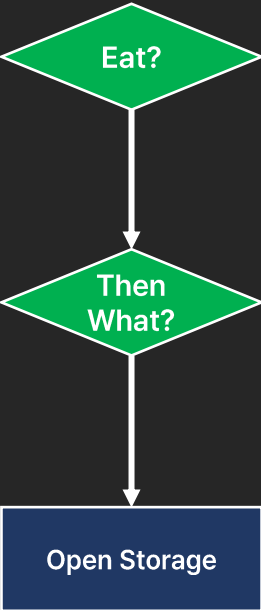
```
##################################################
###################### Act ######################
##################################################




### Are you gonna eat something, master?
(1) Yes (2) No
Answer : 2


### Then, what do you want to do, master?
(1) Open Storage (2) Manage Recipe (3) Exit Program
Answer :
```

Eat?

Then What?

Open Storage

If you choose not to eat, then you can manage Storage or manage Recipes. Also, you can quit program here.

Let us choose (1) Open Storage now.

```
##################################################
################# Manage Storage #################
##################################################

!ALERT! These ingredients are about to expire!

+----+---------+-------------+-----------+----------+
| ID | STORAGE | NAME        | FRESHNESS | QUANTITY |
+----+---------+-------------+-----------+----------+
| 1  | fridge  | Avocado     | 5         | 3.000000 |
| 2  | pantry  | Apple       | 5         | 6.000000 |
| 34 | fridge  | Cream cheese| 2         | 7.000000 |
+----+---------+-------------+-----------+----------+
```

```
Fridge
+----+-------------+-----------+----------+
| ID | NAME        | FRESHNESS | QUANTITY |
+----+-------------+-----------+----------+
| 1  | Avocado     | 5         | 3.000000 |
| 3  | Cabbage     | 71        | 4.000000 |
| 5  | Egg         | 17        | 1.000000 |
| 8  | Cheese      | 112       | 2.000000 |
| 10 | Almond milk | 50        | 4.000000 |
| 11 | Lemon       | 92        | 7.000000 |
| 14 | Beef        | 63        | 2.000000 |
| 15 | Basil       | 28        | 6.000000 |
| 16 | Blueberry   | 95        | 4.000000 |
| 17 | Bell pepper | 62        | 3.000000 |
| 21 | Caesar dressing | 89    | 2.000000 |
| 22 | Bacon       | 41        | 5.000000 |
| 24 | Carrot      | 12        | 8.000000 |
| 25 | Cream       | 51        | 3.000000 |
| 27 | Chicken     | 33        | 4.000000 |
| 29 | Cherry tomato | 20      | 7.000000 |
```

```
Pantry
+----+-------------+-----------+----------+
| ID | NAME        | FRESHNESS | QUANTITY |
+----+-------------+-----------+----------+
| 2  | Apple       | 5         | 6.000000 |
| 4  | Garlic      | 102       | 0.900000 |
| 6  | Baking soda | 73        | 8.000000 |
| 7  | Onion       | 25        | 3.000000 |
| 12 | Black pepper| 38        | 0.950000 |
| 13 | Baguette    | 77        | 8.000000 |
| 18 | Cinnamon    | 107       | 1.000000 |
| 19 | Bun         | 76        | 5.000000 |
| 20 | Bean        | 119       | 7.000000 |
| 23 | Brown sugar | 108       | 2.000000 |
| 26 | Bread       | 46        | 4.000000 |
| 28 | Banana      | 98        | 1.000000 |
| 30 | Clove       | 111       | 8.000000 |
| 31 | Cumin       | 24        | 2.000000 |
| 33 | Dough       | 15        | 3.000000 |
| 38 | Black bean  | 50        | 7.000000 |
```

```
Freezer
+----+-----------+-----------+----------+
| ID | NAME      | FRESHNESS | QUANTITY |
+----+-----------+-----------+----------+
| 9  | Beef bone | 47        | 5.000000 |
+----+-----------+-----------+----------+
```

Then, as if opening a refrigerator, a list of ingredients in each storage is printed in neat table.
You can also receive an alert of the list of ingredients in dangerous status.

Open Storage
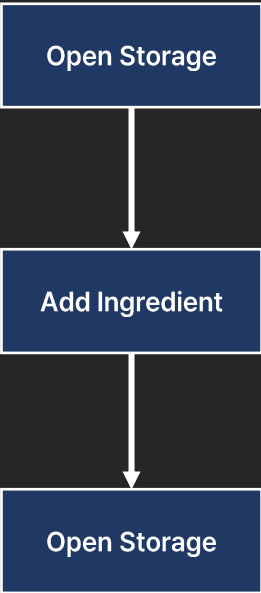
```
(1) Add Ingredient (2) Delete Ingredient (3) Back to Menu
Answer : 
```

Now you can choose what to do with the ingredients in the storage.

Add Ingredient

Open Storage

```
##################################################
################# Add Ingredient ##################
##################################################



### Ingredient Name
Enter your ingredient name : Enter your ingredient name : Pork loin

### Ingredient Quantity
Enter the quantity of ingredient Integer between 0 and 200: 1

### Storage type for the ingredient
Enter the type of storage to put the corresponding ingredient in. fridge / freezer / pantry: freezer

### Successfully added ingredient 'Pork loin' to the storage!
Press ENTER to continue...
```

To add ingredients, enter the name and number of ingredients, and the type of storage.

Storage Type can be 'fridge' / 'freezer' / 'pantry' .

After adding ingredients, you will automatically go back to the storage menu.

Adding ingredients or recipes manually can be tedious task, because it requires lots of inputs. So, we recommend that you use these functions that you add manually as an auxiliary feature, and use the Cook feature to supply and receive them whenever you need them.

Open Storage

```
(1) Add Ingredient (2) Delete Ingredient (3) Back to Menu
Answer : []
```

Now, let us <u>delete</u> some ingredients.

Remove Ingredient

Open Storage

```
##################################################
############### Remove Ingredient ###############
##################################################


### Ingredient Name
Enter the ingredient name to remove : Enter the ingredient name to remove : Umbrella
Ingredient 'Umbrella' is not in the storage!
Enter the ingredient name to remove : Apple

### Ingredient Quantity
Enter how much ingredient you want to remove Integer between 0 and 200: 1

### Successfully removed ingredient 'Apple' from the storage!
Press ENTER to continue...[]
```

To remove ingredients, enter the name and number of ingredients.

In the process of eliminating food ingredients, a unique algorithm is performed. (This algorithm is also used in the process of consuming food ingredients when making food.) After finding the name of the food ingredient, the "quantity" is reduced by the amount to be eliminated, which applies to all ingredients with the same name, and the less fresh ingredients are eliminated first.

For example, suppose there are two objects: <u>an apple with freshness of 30 and quantity of 1.5</u>, and <u>an apple with freshness of 10 and quantity of 5</u>. At this time, if the apple is removed by 6, the quantity of the apple with a lower freshness of 10 is all reduced and disappears, and the quantity of the apple with a freshness of 30 is reduced by 1 (-> 0.5).

Then What?
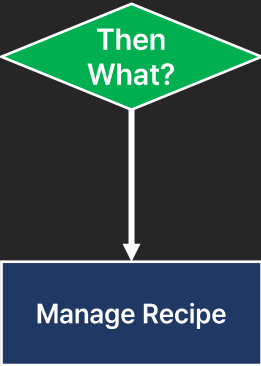
Manage Recipe

```
### Then, what do you want to do, master?
(1) Open Storage (2) Manage Recipe (3) Exit Program
Answer : 2


##################################################
################# Manage Recipe ###################
##################################################


+-----------------------------+---------------------+----------------------------+----------+
| NAME                        | TAGS                | INGREDIENTS                | Makable? |
+-----------------------------+---------------------+----------------------------+----------+
| Spicy Vegan Chili           | Vegan, Spicy, Hot, Protein,... | 1.000 Onion, 1.000 Bell pep... | NO       |
| Sweet Banana Pancakes       | Vegetarian, Sweet, Hot, Car... | 2.000 Banana, 2.000 Egg, 0.... | NO       |
| Refreshing Summer Gazpacho  | Vegan, Healthy, Cold, Vitam... | 2.000 Cucumber, 2.000 Bell ... | NO       |
| Savory Beef Stroganoff      | Hot, Savory, Protein, Fat, ... | 2.000 Beef, 0.500 Butter, 1... | NO       |
| Sweet Apple Crisp           | Vegetarian, Sweet, Hot, Car... | 6.000 Apple, 1.000 Sugar, 0... | NO       |
| Premium Lobster Bisque      | Premium, Hot, Savory, Prote... | 0.500 Butter, 2.000 Lobster... | NO       |
| Fluffy Japanese Pancakes    | Sweet, Hot, Carbohydrate       | 2.000 Egg, 0.500 Sugar, 0.5... | NO       |
| Vegan Avocado Toast         | Vegan, Healthy, Cold, Fat, ... | 2.000 Bread, 1.000 Avocado,... | NO       |
```

Let us choose (2) Manage Recipe now. Then the information of all recipes are printed.
Then you can choose what to do with the recipes.

```
| Denver Omelet               | Hot, Protein, Salty       | 0.500 Onion, 0.500 Bell pep... | NO       |
| Southwestern Burrito        | Hot, Protein, Salty       | 0.500 Rice, 0.500 Bean, 0.5... | NO       |
| Croissant French Toast      | Hot, Sweet, Savory        | 2.000 Croissants, 2.000 Egg... | NO       |
| PB&J Smoothie               | Sweet, Cold, Vegetarian   | 6.000 Strawberry, 0.750 Mil... | NO       |
| Pork cutlet curry with rice | Hot, Savory, Fat, Protein, ... | 2.000 Curry powder, 0.250 C... | NO       |
+-----------------------------+---------------------+----------------------------+----------+

(1) Add Recipe (2) Delete Recipe (3) Inspect Recipe (4) Back to Menu
```

Manage Recipe

Add Recipe

Manage Recipe

```
####################################################
#################### Add Recipe ####################
####################################################



### Recipe Name
Enter your recipe name : Enter your recipe name : Baked Potaotes

### Recipe Tags
Possible Tags: Vegan, Vegetarian, Cold, Hot, Sweet, Salty, Spicy, Sour, Savory, Fat, Protein, Carbohydrate, Vitamin, Mineral,
 Healthy, Premium
Enter recipe's tags ex) Sweet, Fat: Hot, Vegan, Carbohyrdate
'Carbohyrdate' is not in the list. Please try again.
Enter recipe's tags ex) Sweet, Fat: Hot, Vegan, Carbohydrate
```

To add recipe, enter the recipe name and the tags of it.

It automatically detects and warns of incorrect typos.

```
### Recipe Ingredients
Input an ingredient name and amount (-1 to finish): 1 Potato
Input an ingredient name and amount (-1 to finish): 0.1 Butter
Input an ingredient name and amount (-1 to finish): 0.1 Chive
Input an ingredient name and amount (-1 to finish): -1

### Recipe Steps
Step 1 (-1 to finish): Step 1 (-1 to finish): First, clean the potatoes and pierce them with a fork.
Step 2 (-1 to finish): Bake in the oven until they are soft.
Step 3 (-1 to finish): Serve the baked potatoes with butter and chives.
Step 4 (-1 to finish): -1

### Successfully added new recipe 'Baked Potaotes'!
Press ENTER to continue...
```

Then, enter the ingredients and steps needed to make the food.

Manage Recipe

Remove Recipe

Manage Recipe

```
####################################################
################# Remove Recipe ##################
####################################################


Enter the name of recipe you want to remove : Enter the name of recipe you want to remove : Baked Potaotes


### Successfully deleted recipe 'Baked Potaotes'!
Press ENTER to continue...
```

To remove recipe, enter the recipe name.

```
Enter the name of recipe you want to remove : we
The recipe name does not exists.
```

Manage Recipe

Inspect Recipe

Manage Recipe

```
(1) Add Recipe (2) Delete Recipe (3) Inspect Recipe (4) Back to Menu
Answer : 3


####################################################
################# Inspect Recipe #################
####################################################


Enter the name of recipe you want to inspect : Enter the name of recipe you want to inspect :
```

You might want to take a closer look at the recipes that you've written or that already exist.
In this case, select Inspect Recipe.

```
Enter the name of recipe you want to inspect : Enter the name of recipe you want to inspect : Banana Smoothie


### Recipe of Banana Smoothie

Tags : Cold, Sweet, Healthy,

Ingredients
Banana * 1.0
Yogurt * 1.0
Honey * 0.1

Steps
Step 1 : First, combine bananas, yogurt, and honey in a blender.
Step 2 : Blend until smooth.
Step 3 : Serve the banana smoothie immediately.

Press ENTER to continue...
```

After entering the recipe's name that you want to inspect, the detailed information of the recipe will printed.