

Corner Grocer Item-Tracking Program: Design and Functionality

Program Design

The Corner Grocer item-tracking program is designed as a C++ console application built around an object-oriented approach. The core of the program is the CornerGrocer class, which encapsulates all the necessary data and functionality, promoting a clean and modular structure.

The primary data structure chosen for this project is `std::map<std::string, int>` for its efficiency in storing and retrieving key-value pairs. In this context, the grocery item's name (a `std::string`) serves as the unique key, and the number of times it has been purchased (an `int`) is its value. The map automatically handles unique entries and provides fast lookups, which is ideal for searching for specific items and iterating through the entire list.

The program's flow is controlled by a `run()` method within the CornerGrocer class. Upon instantiation, the class constructor immediately attempts to read data from the input file and then creates a backup file (`frequency.dat`). This ensures that the essential data loading and backup operations are completed before any user interaction. The `run()` method then enters a loop, presenting a menu to the user and processing their input until they choose to exit. Input validation is included to ensure that the user can only select valid menu options, preventing runtime errors.

Program Functionality

The program provides a simple, menu-driven interface to analyze grocery purchase data.

1. **Data Loading and Backup:** When the program starts, it reads the input text file and iterates through each item in the file, populating the `std::map` by incrementing the count for each item encountered. Once the data is loaded into memory, the program immediately creates a `frequency.dat` file. This file serves as a persistent backup of the calculated frequencies, storing each item and its corresponding count on a new line.
2. **Menu Option 1: Look Up Item Frequency:** This option allows the user to search for a single grocery item. The program prompts for an item name, and upon receiving input, it searches the map for that key. If the item is found, it displays the item's name and its purchase count. If not, it informs the user that the item was not found.

```
=====
                        Corner Grocer Menu
=====
1. Look up the frequency of a specific item
2. Print the frequency of all items
3. Print a histogram of item frequencies
4. Exit
=====
Enter your choice: 1
Enter the item you wish to look for: Apples
Frequency of Apples: 4
```

3. **Menu Option 2 - Print All Frequencies:** This option provides a complete summary of all items purchased. It iterates through the entire map and prints each item name followed by its total purchase frequency in a readable list.

```

1 Apples 4
2 Beets 3
3 Broccoli 7
4 Cantaloupe 2
5 Cauliflower 6
6 Celery 6
7 Cranberries 10
8 Cucumbers 9
9 Garlic 8
10 Limes 1
11 Onions 4
12 Peaches 5
13 Pears 1
14 Peas 8
15 Potatoes 5
16 Pumpkins 2
17 Radishes 3
18 Spinach 5
19 Yams 5
20 Zucchini 10
21

```

4. **Menu Option 3: Print Histogram:** This option prints a text-based histogram. It iterates through the map, and for each item, then prints the name followed by a number of asterisks (*) equal to its purchase frequency. This offers a quick, at-a-glance comparison of item popularities.

```

--- Item Frequency Histogram ---
Apples ****
Beets ***
Broccoli *****
Cantaloupe **
Cauliflower *****
Celery *****
Cranberries *****
Cucumbers *****
Garlic *****
Limes *
Onions ****
Peaches *****
Pears *
Peas *****
Potatoes *****
Pumpkins **
Radishes ***
Spinach *****
Yams *****
Zucchini *****
-----

```

5. **Menu Option 4: Exit:** This option terminates the program loop and ends the application.