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Course: CS 210

Project: Corner Grocer – Project Three

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For Project Three of CS 210, I developed a C++ console application for the Corner Grocer that analyzes item purchases throughout the day. The program processes a text file containing a chronological list of items bought by customers and builds a frequency map that tracks how many times each item appears. To accomplish this, I implemented an object-oriented design using a single class named GroceryTracker, which encapsulates all item frequency logic. The class includes private data members and public methods to manage item tracking, frequency lookup, list output, histogram generation, and file writing. The primary data structure I used was std::map<std::string, int> due to its efficiency in storing and retrieving key-value pairs. This structure allowed quick counting and updating of each grocery item's occurrence in the list.

At the start of the program, the input file CS210_Project_Three_Input_File.txt is loaded, and a backup file named frequency.dat is generated automatically. This backup file stores the item names and their frequencies without requiring user interaction. From there, the program displays a user-facing menu with four options. The first option allows the user to input the name of an item and returns how many times it was purchased that day. The second option prints the entire list of items with their corresponding frequencies. The third option displays a histogram of all items, where each item is followed by a number of asterisks representing its frequency. The fourth option safely exits the program.

To ensure a robust and user-friendly experience, I included input validation for the menu. If the user inputs a non-integer or an invalid choice, the program gracefully handles the error by

clearing the input and prompting again. This prevents potential crashes and keeps the interface smooth. In terms of coding standards, I followed best practices by using descriptive variable names such as itemFrequencyMap, tracker, and method names like PrintHistogram. I maintained consistent indentation and spacing throughout the code and added inline comments explaining the purpose of each method and critical section of the logic. This ensures that the code is easy to read, maintain, and expand upon if the program grows in the future.

Overall, this project demonstrates my ability to design a modular and maintainable C++ program using real-world problem-solving skills. It also shows my growing familiarity with file I/O operations, map-based data structures, input validation, and professional programming techniques. I believe this solution reflects a well-rounded application of course concepts and a high standard of quality in both functionality and presentation. A screenshot of the running program showcasing the menu and at least two of the features (such as the search and histogram) is included below to support this documentation.

```
======= Corner Grocer Item Tracker =======
1. Look up an item's frequency
2. Print all item frequencies
3. Print frequency histogram
4. Exit program
=========================================
Enter your choice (1-4): 1
Enter the item name: eggs

Frequency of eggs: 0
```

```
======= Corner Grocer Item Tracker =======
1. Look up an item's frequency
2. Print all item frequencies
3. Print frequency histogram
4. Exit program
=========================================
Enter your choice (1-4): 2

Frequency of All Items:
Item           Frequency
------------------------
Apples         4
Beets          3
Broccoli       7
Cantaloupe     2
Cauliflower    6
Celery         6
Cranberries    10
Cucumbers      9
Garlic         8
Limes          1
Onions         4
Peaches        5
Pears          1
Peas           8
Potatoes       5
Pumpkins       2
Radishes       3
Spinach        5
Yams           5
Zucchini       10
```

```
======= Corner Grocer Item Tracker =======
1. Look up an item's frequency
2. Print all item frequencies
3. Print frequency histogram
4. Exit program
========================================
Enter your choice (1-4): 3

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