Corner Grocer Grocery-Tracking Program: Design and Functionality

CS-210: Programming Languages

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Overview:

The Corner Grocer Grocery-Tracking Program analyzes a daily purchase log and computes the frequency of each item purchased. The program is menu-driven and supports searching for a single item's frequency, printing all item frequencies, displaying a histogram of frequencies, and exiting the program.

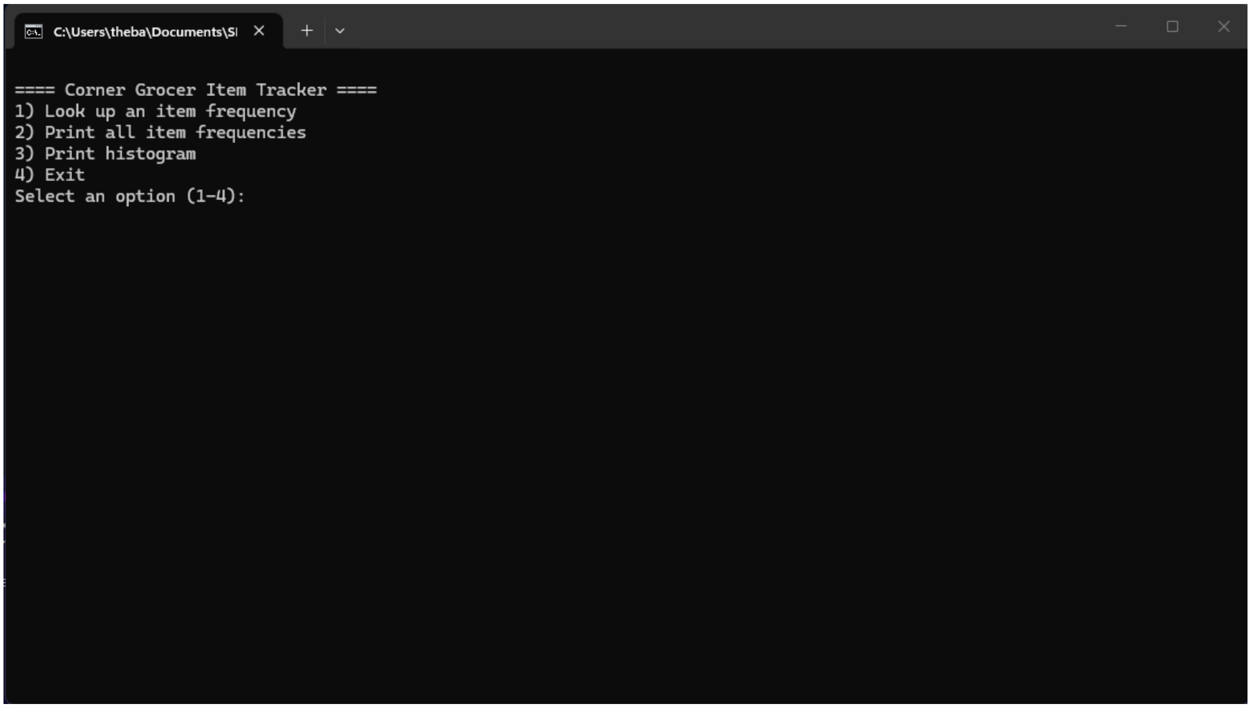
Design Approach

To keep the program readable and maintainable, the solution separates responsibilities into two parts:

- **main.cpp** handles user interaction (menu display, input validation, and calling program features).
- A GroceryTracker class (public/private sections) contains business logic, including file processing, counting, output formatting, and backup file creation.

The program stores item frequencies using a std::map<std::string, int>, where each key is an item name and the value is the number of purchases. This structure supports efficient lookups for the search feature and predictable, alphabetical output when printing all frequencies.

Core Functionality (Menu Options)

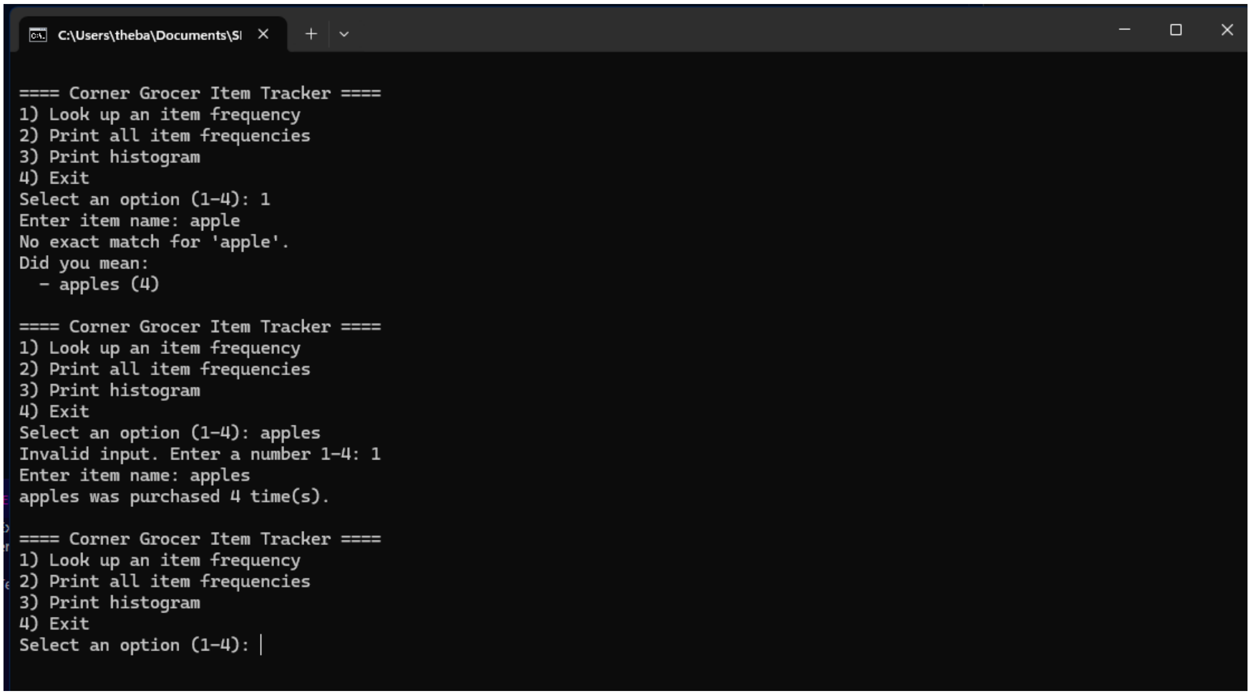


```
==== Corner Grocer Item Tracker ====
1) Look up an item frequency
2) Print all item frequencies
3) Print histogram
4) Exit
Select an option (1-4):
```

Figure 1: Menu displayed

Option 1: Look up an item frequency

The program prompts the user for an item name and returns the number of times it appears in the input file. Item matching is case-insensitive because inputs are normalized (trimmed and lowercased). If the item is not found, the program provides a simple suggestion feature that checks plural/singular forms by adding or removing a trailing “s” (for example, “apple” suggests “apples”).

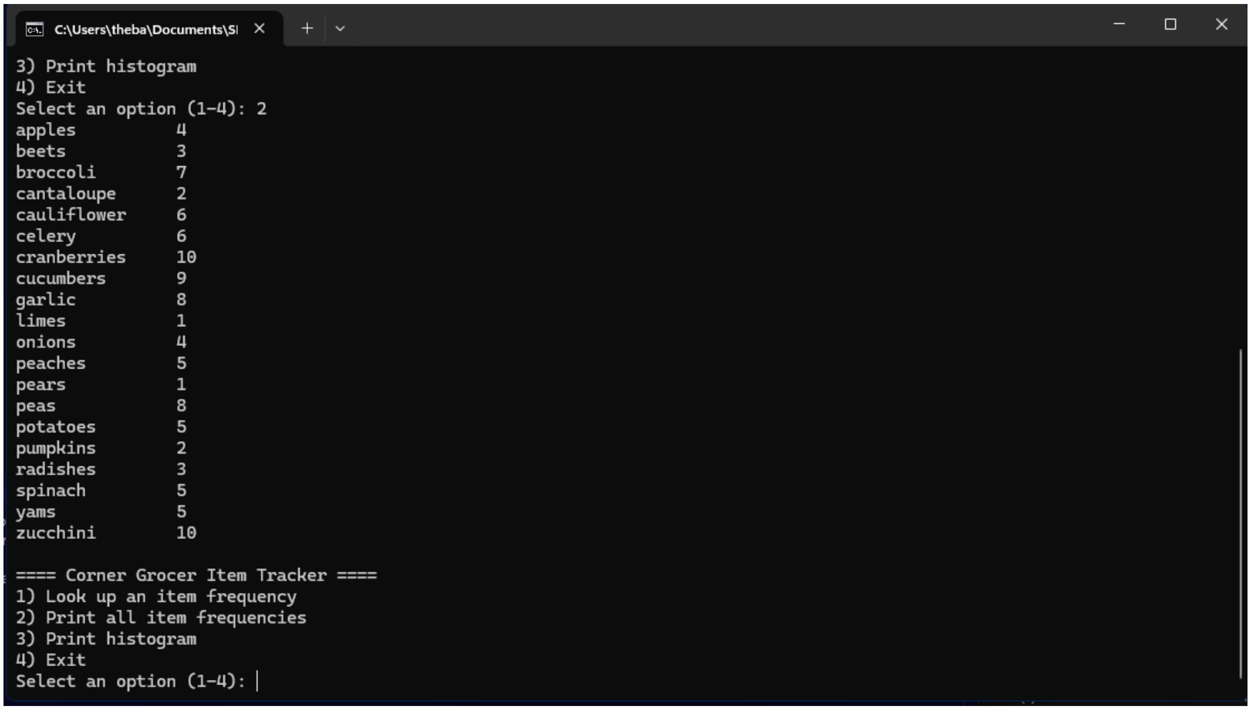


```
==== Corner Grocer Item Tracker ====
1) Look up an item frequency
2) Print all item frequencies
3) Print histogram
4) Exit
Select an option (1-4): 1
Enter item name: apple
No exact match for 'apple'.
Did you mean:
  - apples (4)

==== Corner Grocer Item Tracker ====
1) Look up an item frequency
2) Print all item frequencies
3) Print histogram
4) Exit
Select an option (1-4): apples
Invalid input. Enter a number 1-4: 1
Enter item name: apples
apples was purchased 4 time(s).

==== Corner Grocer Item Tracker ====
1) Look up an item frequency
2) Print all item frequencies
3) Print histogram
4) Exit
Select an option (1-4):
```

Figure 2: Look up item frequency

Option 2: Print all item frequencies

The program prints every item from the input file paired with its purchase frequency (e.g., apples 4). Output is generated by iterating through the map of counts.

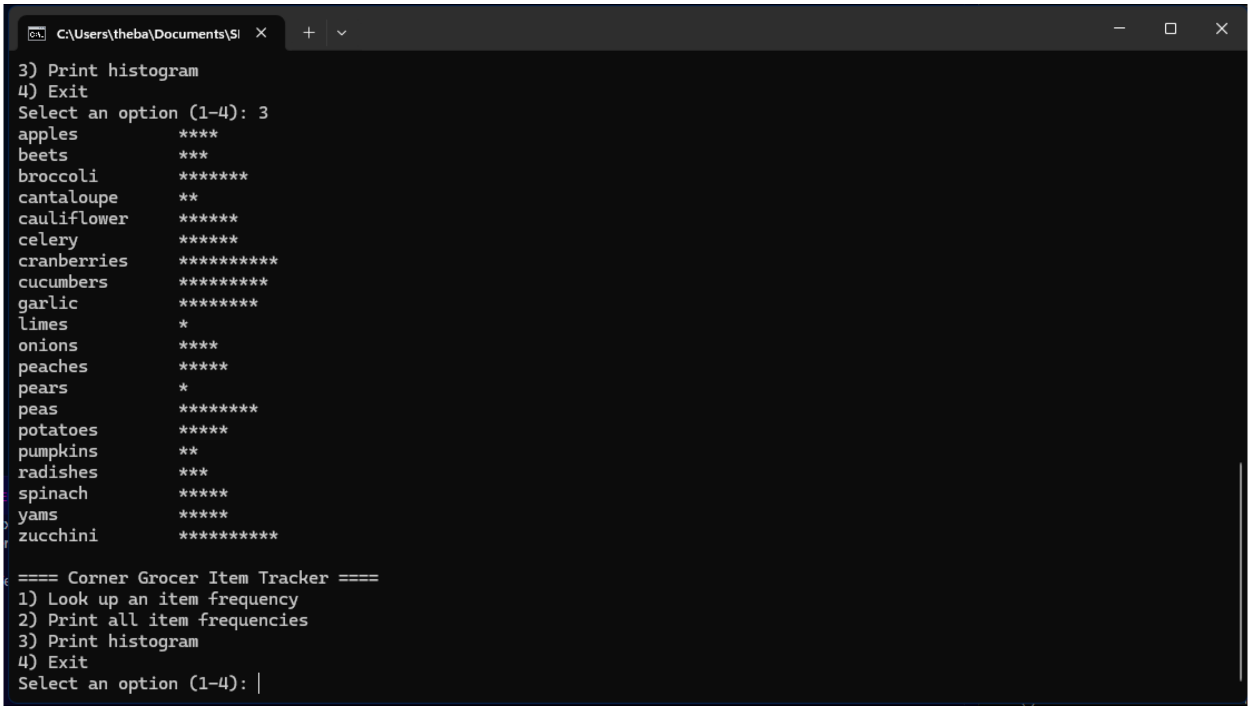


```
3) Print histogram
4) Exit
Select an option (1-4): 2
apples          4
beets           3
broccoli        7
cantaloupe      2
cauliflower     6
celery          6
cranberries     10
cucumbers       9
garlic          8
limes           1
onions          4
peaches         5
pears           1
peas            8
potatoes        5
pumpkins        2
radishes        3
spinach         5
yams            5
zucchini        10

==== Corner Grocer Item Tracker ====
1) Look up an item frequency
2) Print all item frequencies
3) Print histogram
4) Exit
Select an option (1-4): |
```

Figure 3: Full frequency list

Option 3: Print histogram

The program prints a text-based histogram where each item is followed by a number of asterisks (*) equal to its frequency (e.g., apples ****). This provides a quick visual representation of relative purchase volume.



```
3) Print histogram
4) Exit
Select an option (1-4): 3
apples          ****
beets           ***
broccoli        *******
cantaloupe      **
cauliflower     ******
celery          ******
cranberries     **********
cucumbers       *********
garlic          ********
limes           *
onions          ****
peaches         *****
pears           *
peas            ********
potatoes        *****
pumpkins        **
radishes        ***
spinach         *****
yams            *****
zucchini        **********

==== Corner Grocer Item Tracker ====
1) Look up an item frequency
2) Print all item frequencies
3) Print histogram
4) Exit
Select an option (1-4): |
```

Figure 4: Print histogram

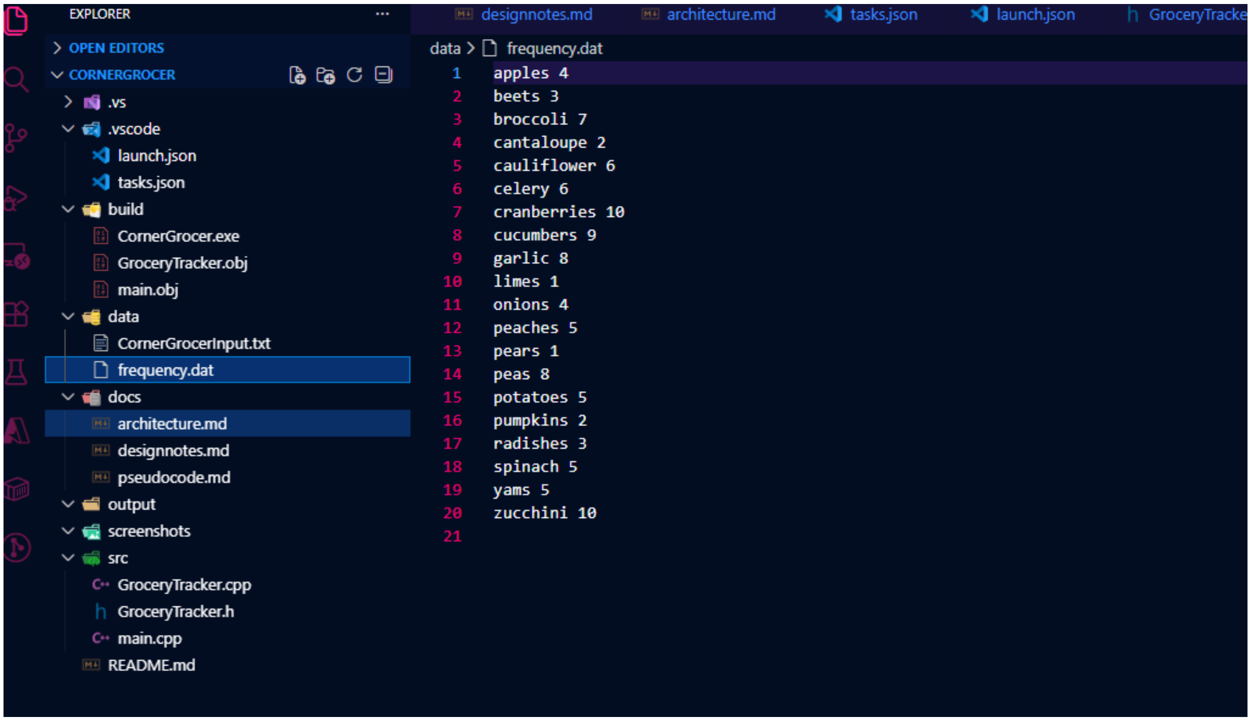
Option 4: Exit

The program exits cleanly when the user selects option 4.

Backup File Creation (frequency.dat)

At program startup, the system automatically creates frequency.dat without user intervention.

The backup file contains the same item-frequency pairs produced by the counting logic and serves as a stored snapshot of the computed totals.



```
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

```

Figure 5: Frequency.dat

Input Validation and Error Handling

Menu selection input is validated to prevent invalid choices and to handle non-numeric input gracefully. File I/O includes error checks to ensure the input file can be opened and the backup file can be created.

Summary

This project reinforces core C++ skills, including class design, use of standard library containers, file I/O, and input validation. It demonstrates separation of concerns by isolating user interaction from data-processing logic. The Corner Grocer Item Frequency Tracker converts raw purchase records into frequency reports and a histogram, providing a clear example of how structured code can turn transactional data into actionable business insights.