

Credit Card II Project, Fall 2025

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1 Task A: Find the maximum monthly total across all categories; draw a chart for a selected category

1. Create a file named `monthly_category_total_chart.cpp`. The input file is a yearly credit card report containing up to 12 months and no more than 20 categories.
2. In the program, prompt the user to enter the name of an input file.
3. Read the file.
4. Identify and sort all categories alphabetically.
5. Find the maximum monthly total across ***all*** categories.
6. Display all categories alphabetically and prompt the user to choose one.
7. Display a chart of asterisks representing the monthly totals of the selected category.

1.1 Example of Task A

Create a file named `spending.csv` with the following contents. On Mac/Linux, you can use VS Code, TextEdit, Vim, or Emacs. On Windows, you can use VS Code, Notepad, Notepad++, or Vim. The file `spending.csv` should contain only one column of double-precision numbers.

```
1 Date,Description,Category,Amount
2 01/16/2024,Con Edison,Utilities,91.35
3 02/14/2024,National Grid,Utilities,32.75
4 03/17/2024,Macy's,Shopping,109.3
5 03/19/2024,Taxi,Travel,71.37
```

```
6 03/24/2024,Marshalls,Shopping,98.76
7 03/30/2024,National Grid,Utilities,10.93
8 03/31/2024,MTA,Travel,20.38
9 05/25/2024,Macy's,Shopping,32.87
10 06/15/2024,Macy's,Shopping,55.49
11 08/21/2024,Banana Republic,Shopping,59.85
12 08/25/2024,National Grid,Utilities,27.16
```

The file has three categories, listed in alphabetical order.

```
1 Shopping
2 Travel
3 Utilities
```

Here is a monthly total for each category based on the above data.

| Month | Shopping | Travel | Utilities |
|-------|--------------------------|-------------------------|-----------|
| 1 | 0 | 0 | 91.35 |
| 2 | 0 | 0 | 32.75 |
| 3 | $109.3 + 98.76 = 208.06$ | $71.37 + 20.38 = 91.75$ | 10.93 |
| 4 | 0 | 0 | 0 |
| 5 | 32.87 | 0 | 0 |
| 6 | 55.49 | 0 | 0 |
| 7 | 0 | 0 | 0 |
| 8 | 59.85 | 0 | 27.16 |
| 9 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 |

Explanation:

1. On 3/17/2024, we spent 109.30 on shopping, and on 3/24/2024, another 98.76 on shopping. Therefore, the total spent on shopping in March 2024 is $109.30 + 98.76 = 208.06$.
2. Similarly, on 3/19/2024, we spent 71.37 on travel and on 3/31/2024, another 20.38 on travel. Therefore, the total spent on travel in March 2024 is $71.37 + 20.38 = 91.75$.

March 2024 Spending Summary

| Shopping | | Travel | | Utilities | |
|------------|--------|------------|--------|------------|--------|
| Date | Amount | Date | Amount | Date | Amount |
| 03/17/2024 | 109.30 | 03/19/2024 | 71.37 | 03/30/2024 | 10.93 |
| 03/24/2024 | 98.76 | 03/31/2024 | 20.38 | Total | 10.93 |
| Total | 208.06 | Total | 91.75 | | |

Here is a sample output for the above `spending.csv`.

```
1 Enter a file name: spending.csv (with return key)
2 select one of the following categories
3 0.Shopping
```

```

4 1.Travel
5 2.Utilities
6 choose a number in [0, 2]: 0 (with return key)
7 max monthly total across all categories = 208.06
8 MONTH  Shopping TOTAL
9 Jan          0.00
10 Feb         0.00
11 Mar         208.06 *****
12 Apr         0.00
13 May         32.87 *****
14 Jun         55.49 *****
15 Jul         0.00
16 Aug         59.85 *****
17 Sep         0.00
18 Oct         0.00
19 Nov         0.00
20 Dec         0.00

```

another sample input/output:

```

1 Enter a file name: spending.csv (with return key)
2 select one of the following categories
3 0.Shopping
4 1.Travel
5 2.Utilities
6 choose a number in [0, 2]: 1 (with return key)
7 max monthly total across all categories = 208.06
8 MONTH  Travel TOTAL
9 Jan          0.00
10 Feb         0.00
11 Mar         91.75 *****
12 Apr         0.00
13 May         0.00
14 Jun         0.00
15 Jul         0.00
16 Aug         0.00
17 Sep         0.00
18 Oct         0.00
19 Nov         0.00
20 Dec         0.00

```

yet another sample input/output:

```

1 Enter a file name: spending.csv (with return key)
2 select one of the following categories
3 0.Shopping
4 1.Travel
5 2.Utilities

```

```

6 choose a number in [0, 2]: 2 (with return key)
7 max monthly total across all categories = 208.06
8 Jan          91.35 *****
9 Feb          32.75 *****
10 Mar         10.93 **
11 Apr          0.00
12 May          0.00
13 Jun          0.00
14 Jul          0.00
15 Aug         27.16 *****
16 Sep          0.00
17 Oct          0.00
18 Nov          0.00
19 Dec          0.00

```

1.2 Number of Asterisks

1. MAX_NUM_ASTS is assumed to be 40.
2. The number of asterisks representing the maximum monthly total across *all* categories is MAX_NUM_ASTS.
3. In the above `spending.csv`, the maximum monthly total across all categories is 208.06 (as seen in Shopping in March) and is represented by 40 asterisks.
4. For any other monthly total, the number of asterisks is calculated as

$$(\text{monthly_total} / \text{max_monthly_total_across_all_categories}) * \text{MAX_NUM_ASTS}.$$

The decimal part should be truncated.

Example: In the above `spending.csv`, the maximum monthly total across all category is 208.06. In May 2024, the total spending in Shopping is 32.87. The number of asterisks is calculated by $(32.87 / 208.06) * 40 = 6.31$. After **truncating** decimals, this results in 6 asterisks in Shopping in May 2024.

1.3 Submission of Task A

Submit `monthly_category_total_chart.cpp` to gradescope. Note that the grading script uses random double numbers to test. As a result, your output will be different in each running.