**ITP 150 Programming Project 2 Spring 2025**

**(100 Points)**

Programming Project 2 assesses your ability to do the following:

* Create and use Functions
* Use Python’s IO or CSV library to open a datafile for reading and to write to a file.
* Use Python’s list and dictionary data structures to process data.
* Apply algorithms for finding the minimum, maximum, count, and averages for numerical data within a list.

The YetAnotherMakeupCompany.csv file has 1891 rows of data representing details of wholesale sales of makeup over a period of 2 years beginning in 2022.

* The 1st column has a Transaction Number
* The 2nd column has the first name of the salesperson.
* The 3rd column has the Date of the sales transaction.
* The 4th column has the Product.
* The 5th column has the quantity sold in Bulk.
* The 6th column has the amount of the sales in Dollars.
* The 7th column has the Location which is either East, West, Midwest, or South.

We are going to analyze the data to determine the following

* Which salesperson had the highest sale amount for a single transaction.
* Which salesperson had the lowest sales amount for a single transaction.
* What was the average dollars sold for all transactions.

We will save the statistical information into a dictionary that is then written to a file.

This project is simple to do if we divide it into tasks. The tasks are described in general but do not specify every line of code that you must write. It is your responsibility as a student to analyze the project requirements and write Python code that is needed to meet the requirements.

**Task 1. Create a main() method** that initializes constants for menu choices and initializes an empty list (I will refer to it as the makeup list from this point on) that will store data that is read in from the YearAnotherMakeupCompany.csv file. Initialize an empty dictionary (I will refer to it as the makeup dictionary) that will store statistics that are calculated within the processing of the file.

Call a value returning function that will read the YearAnotherMakeupCompany.csv data file and save its contents in a two-dimensional list (makeup list) for further processing. The makeup list should be returned to the main() method. See Task 2 for more information on this function.

Start a loop that will control the running of the program until the user chooses 99 to quit.

Call a function that will display the menu to the user and accept their choice and validate it to make sure that it is either 1, 2, 3, 4, 5, 6, or 99, and then return the valid choice to the main menu. See Task 3 for more information about this function.

Within the main() menu, include a decision structure that will do the following:

If the user enters 1, a function will be called print the list.

If the user enters 2, a function will be called to determine which salesperson had the highest sale amount for a single transaction.

If the user enters 3, a function will be called to determine which salesperson had the lowest sale amount for a single transaction.

If the user enters 4, a function will be called to calculate the average dollars sold for all transactions.

If the user enters 5, a function will be called to save the descriptive statistics to a file.

**Task 2. Create a value returning function that will read the file** into the makeup\_list and return the makeup\_list to the main() method. Skip the row with the heading when you read in the file. Print out the number of rows within the makeup\_list to ensure that 1891 rows of data have been read in. (You can also print out the list to see if the data is there and then comment out the print line once you are sure that you are reading the file contents into the makeup\_list correctly.)

**Task 3. Create a value returning function that will display the menu** to the user and return a valid menu choice.

The menu choices that the user will see look like this:

--------------------------------------------------------------------

Please choose from the following menu:

Enter 1 to print the sales transactions.

Enter 2 to find salesperson with highest dollars for a transaction.

Enter 3 to find salesperson with lowest dollars for a transaction.

Enter 4 to display average dollars for all transactions.

Enter 5 to save the statistics.

Enter 99 to Quit.

--------------------------------------------------------------------

The user choice must be validated to ensure that it is an integer or either 1, 2, 3, 4, 5, 6, or 99. An invalid message is displayed to the user to let them know when they’ve entered an invalid menu choice. The menu is then displayed again to let the user see the menu choices. Once a valid choice is entered, it is returned to the main() method.

**Task 4. Create void function that will display the contents of the sales list and convert the numeric columns from strings to either integers or floats as needed.**

Use headings of Transaction, Name, Date, Product, Bulk, Dollars, Region as shown below.

Also, in these results, I am ONLY showing the first 5 rows and then the last 5 rows for brevity. (I don’t want you to have to read page after page of output in the project.) You will need to print all rows in your output and likely the buffer of your IDE will only show you the last hundred or so lines.

Transaction Name Date Product Bulk Dollars Region

1 Betsy 4/1/22 lip gloss 45 222.27 south

2 Hallagan 3/10/22 foundation 50 246.25 midwest

3 Ashley 2/25/23 lipstick 9 46.53 midwest

4 Hallagan 5/22/24 lip gloss 55 270.66 west

5 Zaret 6/17/22 lip gloss 43 211.58 midwest

….there are hundreds of rows omitted in the project instructions here but you can print all rows in your output.

1887 Ashley 2/14/23 foundation 36 177.95 east

1888 Colleen 11/5/23 lip gloss 46 227.46 west

1889 Zaret 1/15/22 lipstick 72 352.89 west

1890 Hallagan 11/3/24 eye liner 28 138.76 south

1891 Cristina 6/13/24 eye liner 54 266.47 midwest

In addition, within the same for loop, make the transaction column which is column 0 into an integer. Make the Bulk column which is column 4 into an integer. Make the Dollars column which is column 5 into a float.

**Task 5. Create a value returning function that will determine the salesperson with the highest sale in dollars and print it and save the results to a dictionary.**

Person with Highest Sale Highest Sale

Hallagan 466.23

Write the results in key:value pairs to a dictionary makeup\_stats that will be returned to the main method. Use “Person with Highest Sale” as a key and then the salesperson with the highest sale as its value. Use “Highest Sale” as a key and then the highest sale as its value.

Below show the results that will appear in the makeup\_stats dictionary which is eventually written to a file named makeup\_stats.csv.

Person with Highest Sale,Hallagan

Highest Sale,466.2317597

**Task 6. Create a value returning function that will determine the salesperson with the lowest sale in dollars and print it and save the results to a dictionary.**

Person with Lowest Sale Lowest Sale

Zaret 0.21

Write the results in key:value pairs to a dictionary makeup\_stats that will be returned to the main method. Use “Person with Lowest Sale” as a key and then the salesperson with the lowest sale as its value. Use “Lowest Sale” as a key and then the lowest sale as its value.

Below show the results for the lowest sale and the associated salesperson that will appear in the makeup\_stats dictionary which is eventually written to a file named makeup\_stats.csv.

Person with Lowest Sale,Zaret

Lowest Sale,0.208331085

(No shame Zaret because you’re hustling for every penny ☺. )

**Task 7. Create a value returning function that will calculate the average of the sales dollars and print them and save them to a dictionary.**

Average Sale 209.64

Write the result in key:value pairs to a dictionary makeup\_stats that will be returned to the main method. Use “Average Sale” as a key and then the average sale as its value.

Below shows the result for the average sale that will appear in the makeup\_stats dictionary which is eventually written to a file named makeup\_stats.csv.

Average Sale,209.64481761414797

**Task 8. Write the makeup\_stats dictionary to a makeup\_stats.csv file.**

I used Python’s CSV library to write the contents of the makeup\_stats dictionary to a makeup\_stats.csv file. When I open the makeup\_stats.csv file in a text editor or IDE, I see the following results. Depending on how you test your code, you may see the results appear in a different order which is fine. The point is that you have the stats from Tasks 4-7 written within the makeup\_stats dictionary which are then written to the makeup\_stats.csv file.

Person with Highest Sale,Hallagan

Highest Sale,466.2317597

Person with Lowest Sale,Zaret

Lowest Sale,0.208331085

Average Sale,209.64481761414797

To better your understanding of the project requirements, here is the **How The Program Should Run** section that shows test data in ***Red, Bolded, and Italicized***.

This system analyzes sales data for Yet Another Makeup Company.

There are 1891 rows within the sales list.

--------------------------------------------------------------------

Please choose from the following menu:

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Enter 3 to find salesperson with lowest dollars for a transaction.

Enter 4 to display average dollars for all transactions.

Enter 5 to save the statistics.

Enter 99 to Quit.

--------------------------------------------------------------------

***a***

Invalid. Please enter 1, 2, 3, 4, 5, 99 as a whole number.

--------------------------------------------------------------------

Please choose from the following menu:

Enter 1 to print the sales transactions.

Enter 2 to find salesperson with highest dollars for a transaction.

Enter 3 to find salesperson with lowest dollars for a transaction.

Enter 4 to display average dollars for all transactions.

Enter 5 to save the statistics.

Enter 99 to Quit.

--------------------------------------------------------------------

***1.5***

Invalid. Please enter 1, 2, 3, 4, 5, 99 as a whole number.

--------------------------------------------------------------------

Please choose from the following menu:

Enter 1 to print the sales transactions.

Enter 2 to find salesperson with highest dollars for a transaction.

Enter 3 to find salesperson with lowest dollars for a transaction.

Enter 4 to display average dollars for all transactions.

Enter 5 to save the statistics.

Enter 99 to Quit.

***--------------------------------------------------------------------***

***6***

Invalid. Please enter 1, 2, 3, 4, 5, 99.

--------------------------------------------------------------------

Please choose from the following menu:

Enter 1 to print the sales transactions.

Enter 2 to find salesperson with highest dollars for a transaction.

Enter 3 to find salesperson with lowest dollars for a transaction.

Enter 4 to display average dollars for all transactions.

Enter 5 to save the statistics.

Enter 99 to Quit.

--------------------------------------------------------------------

1

Transaction Name Date Product Bulk Dollars Region

1 Betsy 4/1/22 lip gloss 45 222.27 south

2 Hallagan 3/10/22 foundation 50 246.25 midwest

3 Ashley 2/25/23 lipstick 9 46.53 midwest

4 Hallagan 5/22/24 lip gloss 55 270.66 west

5 Zaret 6/17/22 lip gloss 43 211.58 midwest

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1891 Cristina 6/13/24 eye liner 54 266.47 midwest

--------------------------------------------------------------------

Please choose from the following menu:

Enter 1 to print the sales transactions.

Enter 2 to find salesperson with highest dollars for a transaction.

Enter 3 to find salesperson with lowest dollars for a transaction.

Enter 4 to display average dollars for all transactions.

Enter 5 to save the statistics.

Enter 99 to Quit.

--------------------------------------------------------------------

***2***

Person with Highest Sale Highest Sale

Hallagan 466.23

--------------------------------------------------------------------

Please choose from the following menu:

Enter 1 to print the sales transactions.

Enter 2 to find salesperson with highest dollars for a transaction.

Enter 3 to find salesperson with lowest dollars for a transaction.

Enter 4 to display average dollars for all transactions.

Enter 5 to save the statistics.

Enter 99 to Quit.

--------------------------------------------------------------------

***3***

Person with Lowest Sale Lowest Sale

Zaret 0.21

--------------------------------------------------------------------

Please choose from the following menu:

Enter 1 to print the sales transactions.

Enter 2 to find salesperson with highest dollars for a transaction.

Enter 3 to find salesperson with lowest dollars for a transaction.

Enter 4 to display average dollars for all transactions.

Enter 5 to save the statistics.

Enter 99 to Quit.

--------------------------------------------------------------------

***4***

Average Sale 209.64

--------------------------------------------------------------------

Please choose from the following menu:

Enter 1 to print the sales transactions.

Enter 2 to find salesperson with highest dollars for a transaction.

Enter 3 to find salesperson with lowest dollars for a transaction.

Enter 4 to display average dollars for all transactions.

Enter 5 to save the statistics.

Enter 99 to Quit.

--------------------------------------------------------------------

***5***

{'Person with Highest Sale': 'Hallagan', 'Highest Sale': 466.2317597, 'Person with Lowest Sale': 'Zaret', 'Lowest Sale': 0.208331085, 'Average Sale': 209.64481761414797}

The makeup\_stats\_file.csv has been updated.

--------------------------------------------------------------------

Please choose from the following menu:

Enter 1 to print the sales transactions.

Enter 2 to find salesperson with highest dollars for a transaction.

Enter 3 to find salesperson with lowest dollars for a transaction.

Enter 4 to display average dollars for all transactions.

Enter 5 to save the statistics.

Enter 99 to Quit.

--------------------------------------------------------------------

***99***

Appreciate your natural beauty :-)

**Please submit the makeup.py script for Programming Project 2. This is a comprehensive project that covers almost everything you’ve learned from Programming Lab 5 – Programming Lab 10.**