School of Information Technology

ICT582 ASSIGNMENT CHECKLIST

Surname (Family Name): Moktan

Given Names: Ngawang Tashi

Student Number: 34959761

Tutor's Name: A S M Hassan

Tutorial group: Day Wednesday Start time 2:30 PM Venue 450.4.035 Group ID_____
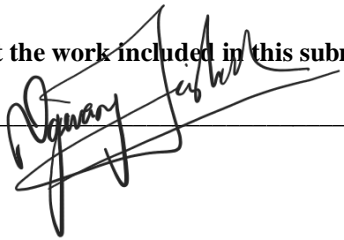
Assignment Due Date: 2024-06-01   **Date Submitted: 2024-06-01**

Your assignment should meet the following requirements. Please confirm this (by ticking boxes) before submitting your assignment.

- ✓ All details above are complete.
- ✓ The zip file contains the file `Assignment.pdf`. The documentation was prepared according to Documentation Requirements specified in Assignment's question sheet.
- ✓ The zip file includes the code for the three questions. The code for each question is stored under a separate directory named q1, q2 and q3 respectively.
- ✓ You understand that the zip file must be submitted to ICT582 Unit LMS.
- ✓ You have kept a copy of this assignment, including the zip file.

I declare that the work included in this submission is completed by myself independently.

Signature _____Date 2024-06-01

Contents

Solution Overview

A basic sales management system has been developed for Western Wholesales Pty. Ltd. The initial features of this system include adding new customers and their associated transactions, searching for customer and transaction details, viewing a customer's transaction history, and deleting customers and transactions. The system's design organizes related modules into separate files.

The solution necessitates the use of two data structures to store customer and transaction information, establishing a relationship between them. Python offers a variety of data structure options, including lists, dictionaries, and tuples.

For the sales management system's storage, I've opted to use two lists, each containing dictionaries as elements. A dictionary can hold elements in key-value pairs, making it ideal for this task. The methods available with a list and dictionary make operations like adding new records, searching, and deleting straightforward.

When a new customer or transaction is added, the user provides the information. To ensure the storage of valid data, a function validates the user's input. This function accepts parameters such as the input label, a Boolean indicating whether the input field is required, and the type of data required for the input.

The program can execute a search operation for customers and transactions based on partial data provided. Any search keyword given by the user is compared with the respective data store to retrieve the record containing the keyword. This feature employs nested loops and case conversion to make the search case insensitive.

The horizontal visual layout of the menu items is achieved using Python's f-string format, which offers various string formatting options.

Self-diagnosis and Evaluation for question 1:

Sl no	Requirement	Status
1	Loading customer and sales records from two CSV files and store them in a single data structure.	Fully Completed
2	Saving customers and sales record from memory.	Fully Completed

Test Evidence:

Feature 1: This feature loads the customers and sales record from csv file.

Testcase for loading customer csv file

Testcase for loading sales record.

```
M A I N    M E N U
--------------------------------------------------------------------------------------------------------------
1. Load customer records          2. Load sales Record          3. Save customer records to a CSV file
4. Save sales records to a CSV file   5. Add New Customer Record    6. Add New Sales Record
7. Search customer record         8. Search sales record         9. Search customers sales record
10. Delete sale record            11. Delete customer            12. Display Sales Graph
13. Display Sales Grapy By Customer   14. Display Sales Graph by Post
15. Quit
--------------------------------------------------------------------------------------------------------------

Enter your choice : 2

Type 'exit' to go back to Main Menu.
Enter sales file name    : sales.csv
........................................................................................................
........................................................................................................
........................................................................................................
........................................................................................................
........................................................................................................
........................................................................
 1000 out of 1000 transaction record(s) imported successfully from the csv file.

Type 'exit' to go back to Main Menu.
Enter sales file name    :


Type 'exit' to go back to Main Menu.
Enter customer file name      : |
```

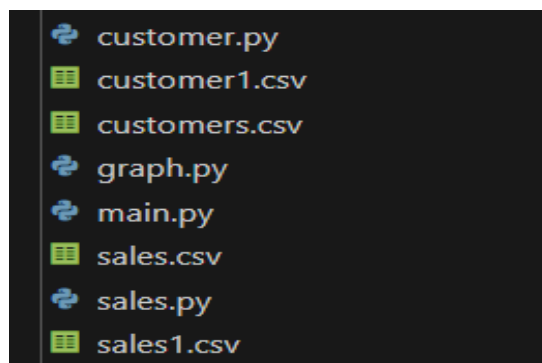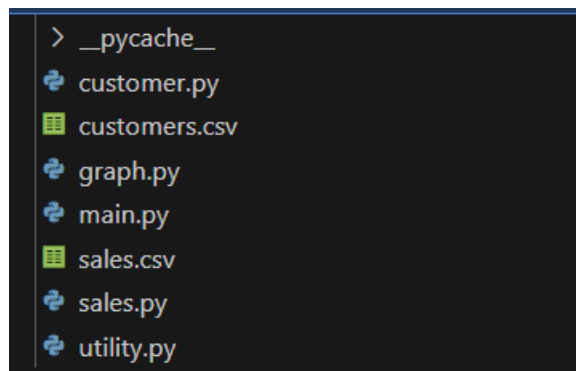Features 2: Saving customers and sales record.

Testcase for saving customer and sales record.

```
M A I N    M E N U
-------------------------------------------------------------------------------------------------
1. Load customer records          2. Load sales Record          3. Save customer records to a CSV file
4. Save sales records to a CSV file   5. Add New Customer Record    6. Add New Sales Record
7. Search customer record         8. Search sales record         9. Search customers sales record
10. Delete sale record            11. Delete customer            12. Display Sales Graph
13. Display Sales Grapy By Customer   14. Display Sales Graph by Post
15. Quit
-------------------------------------------------------------------------------------------------

Enter your choice : 3
Enter customer file name      : customer1.csv
Customer records saved to customer1.csv.

M A I N    M E N U
-------------------------------------------------------------------------------------------------
1. Load customer records          2. Load sales Record          3. Save customer records to a CSV file
4. Save sales records to a CSV file   5. Add New Customer Record    6. Add New Sales Record
7. Search customer record         8. Search sales record         9. Search customers sales record
10. Delete sale record            11. Delete customer            12. Display Sales Graph
13. Display Sales Grapy By Customer   14. Display Sales Graph by Post
15. Quit
-------------------------------------------------------------------------------------------------

Enter your choice : 4
Enter sales file name    : sales1.csv
Sales records saved to sales1.csv.
```

Above two image shows before and after funning the program to show that the feature meets the requirement.

Self-diagnosis and Evaluation for question 2:

Sl no	Requirement	Status
1	Adding new customer to data structure by getting customer name, postcode and phone number where: • Customer ID is autogenerated and unique • Customer Name is required. • Postcode and phone no is optional	Fully Completed
2	Add a new sales record for an existing customer. 1. First it checks the customer record for existing customer. 2. Transaction id is unique and autogenerated. 3. Date, category and value has to passed by user	Fully Completed
3	Search customers using a single search string. 1. Allow partial matches. 2. Compare search string to id, name, postcode, and phone number.	Fully Completed
4	Searching record. 1. Compare search string to date, customer id, category and value 2. Allow partial search	Fully Completed

5	Display all sales records from a customer using his/her customer id.	Fully Completed
6	Delete a sale record with a given transaction ID.	Fully Completed
7	Deleting customer record along with its sales record	Fully Completed
8	Quiting the program	Fully Completed

Test Evidence:

Feature 1: Adding new customers by getting the customer's name, postcode, and mobile number from the user.

```
Type 'exit' to go back to Main Menu.
Enter sales file name      : exit
_____
M A I N   M E N U
--------------------------------------------------------------------------------------
1. Load customer records        2. Load sales Record          3. Save customer records to a CSV file
4. Save sales records to a CSV file   5. Add New Customer Record      6. Add New Sales Record
7. Search customer record       8. Search sales record        9. Search customers sales record
10. Delete sale record          11. Delete customer           12. Display Sales Graph
13. Display Sales Grapy By Customer   14. Display Sales Graph by Post
15. Quit
_____

Enter your choice : 5
Please provide the following information.
Customer Name          : Ngawang
Postcode (optional)    :6010
Phone Number (optional) :0449177159\
Invalid input. Please try again.
Phone Number (optional) :1449177159
New customer ( Ngawang ) has been added with Customer ID: 100021
```

Feature 2: Add a new sales record for an existing customer.

```
M A I N    M E N U
------------------------------------------------------------------------------------------------------------
1. Load customer records              2. Load sales Record              3. Save customer records to a CSV file
4. Save sales records to a CSV file   5. Add New Customer Record        6. Add New Sales Record
7. Search customer record             8. Search sales record           9. Search customers sales record
10. Delete sale record               11. Delete customer              12. Display Sales Graph
13. Display Sales Grapy By Customer   14. Display Sales Graph by Post
15. Quit
------------------------------------------------------------------------------------------------------------

Enter your choice : 6
If you are not sure of Customer ID, type "help" to view the customer list.
Type 'exit' to go back to Main Menu.
Enter Customer ID to add transaction record: help
Customer ID: Name
        100000: Christine Salt
        100001: Brian Dombrowski
        100002: Alan Manlio
        100003: Sarah Sands
        100004: Albert Millard-Smith
        100005: Luke Jones
        100006: Joshua Russon
        100007: Chi St Jack
        100008: Nima Joshi
        100009: Mathew Dodani
        100010: John Badat
        100011: Lok Turner
        100012: Felicity Mcleod
        100013: Nima Ha
        100014: Lok Turner
        100015: En Ng
        100016: Shaquille Crawshaw
        100017: James Le
        100018: Michael Datta Roy
        100019: Rhys Johnson
        100020: Ross Walters
        100021: Ngawang
Type 'exit' to go back to Main Menu.
Enter Customer ID to add transaction record: 100021
Enter transactionn date [yyyy-mm-dd]  : 2024-06-01
Enter transactionn category           : furniture
Enter transactionn value              : 23.45
New transaction has been instertedsuccessfully.
```

Feature 3: Search customers using single search string.

```
M A I N    M E N U
---------------------------------------------------------------------------------------------------------
1. Load customer records          2. Load sales Record               3. Save customer records to a CSV file
4. Save sales records to a CSV file   5. Add New Customer Record      6. Add New Sales Record
7. Search customer record         8. Search sales record            9. Search customers sales record
10. Delete sale record            11. Delete customer               12. Display Sales Graph
13. Display Sales Grapy By Customer   14. Display Sales Graph by Post
15. Quit


Enter your choice : 7


Type 'exit' to go back to Main Menu.
Type in a keyword to search the customer record : Nima
Search Result


Customer ID Name                  Postcode   Mobile Number
100008      Nima Joshi              6151       041603272
100013      Nima Ha                 6120       049264165
```

Feature 4: Display the sale record single search string.

```
M A I N    M E N U
---------------------------------------------------------------------------------------------------------
1. Load customer records          2. Load sales Record               3. Save customer records to a CSV file
4. Save sales records to a CSV file   5. Add New Customer Record      6. Add New Sales Record
7. Search customer record         8. Search sales record            9. Search customers sales record
10. Delete sale record            11. Delete customer               12. Display Sales Graph
13. Display Sales Grapy By Customer   14. Display Sales Graph by Post
15. Quit


Enter your choice : 8

Type 'exit' to go back to Main Menu.
Type in a keyword to search the sales record : abc
Your search keyword did not match anything in the sales record. Please try again

Type 'exit' to go back to Main Menu.
Type in a keyword to search the sales record : computer equipment
Search Result

ID          Customer ID         Date Category               Value
100000000   100060       2020-01-01 computer equipment     1144.16
100000006   100160       2020-01-05 computer equipment     1947.72
100000021   100133       2020-01-26 computer equipment     5427.65
100000026   100188       2020-01-30 computer equipment     7192.51
100000027   100200       2020-01-31 computer equipment     1971.65
100000031   100083       2020-02-04 computer equipment     1524.01
100000034   100124       2020-02-05 computer equipment     2635.01
100000035   100199       2020-02-05 computer equipment     1951.76
100000037   100075       2020-02-06 computer equipment     4348.49
100000040   100072       2020-02-07 computer equipment     1871.44
100000041   100064       2020-02-09 computer equipment     501.43
100000044   100014       2020-02-11 computer equipment     4064.88
100000050   100179       2020-02-24 computer equipment     6038.9
100000063   100089       2020-03-09 computer equipment     1478.64
100000066   100097       2020-03-11 computer equipment     3749.62
100000067   100153       2020-03-13 computer equipment     3224.55
100000072   100122       2020-03-19 computer equipment     5191.67
100000075   100150       2020-03-22 computer equipment     3499.77
```

Feature 5: Displaying sale history record for existing customers:

```
M A I N   M E N U
--------------------------------------------------------------------------------------------------------
1. Load customer records            2. Load sales Record              3. Save customer records to a CSV file
4. Save sales records to a CSV file 5. Add New Customer Record        6. Add New Sales Record
7. Search customer record           8. Search sales record           9. Search customers sales record
10. Delete sale record              11. Delete customer              12. Display Sales Graph
13. Display Sales Grapy By Customer  14. Display Sales Graph by Post
15. Quit
_____

Enter your choice : 9

Type 'exit' to go back to Main Menu.
Type in a keyword to search the sales record : 100001
Search Result

ID          Customer ID        Date Category              Value
100000095   100001             2020-04-11 household appliances 2274.21
100000130   100001             2020-05-20 food              1493.83
100000363   100001             2021-02-01 household appliances 3539.27
100000556   100001             2021-08-27 alcohol and beverage 4015.03
100000636   100001             2021-12-06 food              4929.82
100000661   100001             2021-12-29 household appliances 3295.77

Type 'exit' to go back to Main Menu.
Type in a keyword to search the sales record : |
```

Feature 6: Deleting a sales transaction.

```
M A I N   M E N U
--------------------------------------------------------------------------------------------------------
1. Load customer records            2. Load sales Record              3. Save customer records to a CSV file
4. Save sales records to a CSV file 5. Add New Customer Record        6. Add New Sales Record
7. Search customer record           8. Search sales record           9. Search customers sales record
10. Delete sale record              11. Delete customer              12. Display Sales Graph
13. Display Sales Grapy By Customer  14. Display Sales Graph by Post
15. Quit
_____

Enter your choice : 10
Type "help" to view the transaction list.

Type 'exit' to go back to Main Menu.
Enter the Transaction ID to Delete : 100000363
You are about to delete following transaction:
{'trans_id': 100000363, 'customer_id': 100001, 'date': '2021-02-01', 'category': 'household appliances', 'value': '3539.27'}
Are you sure? yes for yes, anything else for no: y
Sales record has been deleted successfully.


Type 'exit' to go back to Main Menu.
Enter the Transaction ID to Delete : |
```

Feature 7: Deleting a customer record along with their sale record.

```
M A I N    M E N U
----------------------------------------------------------------------------------------------------------
1. Load customer records            2. Load sales Record              3. Save customer records to a CSV file
4. Save sales records to a CSV file 5. Add New Customer Record        6. Add New Sales Record
7. Search customer record           8. Search sales record           9. Search customers sales record
10. Delete sale record              11. Delete customer              12. Display Sales Graph
13. Display Sales Grapy By Customer  14. Display Sales Graph by Post
15. Quit
----------------------------------------------------------------------------------------------------------

Enter your choice : 11
If you are not sure of Customer ID, type "help" to view the customer list.

Type 'exit' to go back to Main Menu.
Enter the Customer ID to Delete  : 100001
You are about to delete following customer and sales details:
CUSTOMER INFORMATION
  Customer ID: 100001
        Name: Brian Dombrowski
    Postcode: 6195
Mobile Number: None
SALES HISTORY
ID     Date             Category
100000095 2020-04-11           household appliances
100000130 2020-05-20           food
100000556 2021-08-27           alcohol and beverage
100000636 2021-12-06           food
100000661 2021-12-29           household appliances
Are you sure? yes for YES, anything else for NO: y
Customer has been deleted successfully.


Type 'exit' to go back to Main Menu.
Enter the Customer ID to Delete  : |
```

Feature 8: Exiting the program.

```
M A I N    M E N U
----------------------------------------------------------------------------------------------------------
1. Load customer records            2. Load sales Record              3. Save customer records to a CSV file
4. Save sales records to a CSV file 5. Add New Customer Record        6. Add New Sales Record
7. Search customer record           8. Search sales record           9. Search customers sales record
10. Delete sale record              11. Delete customer              12. Display Sales Graph
13. Display Sales Grapy By Customer  14. Display Sales Graph by Post
15. Quit
----------------------------------------------------------------------------------------------------------

Enter your choice : 15
Exiting Program !!!
```

Display Sales Performance Graphically

Discussion of the solution

I've opted to use a structured array to store customer and transaction records. This choice is due to its ability to define the data type to be stored and the ease of accessing values through dictionary-like column names.
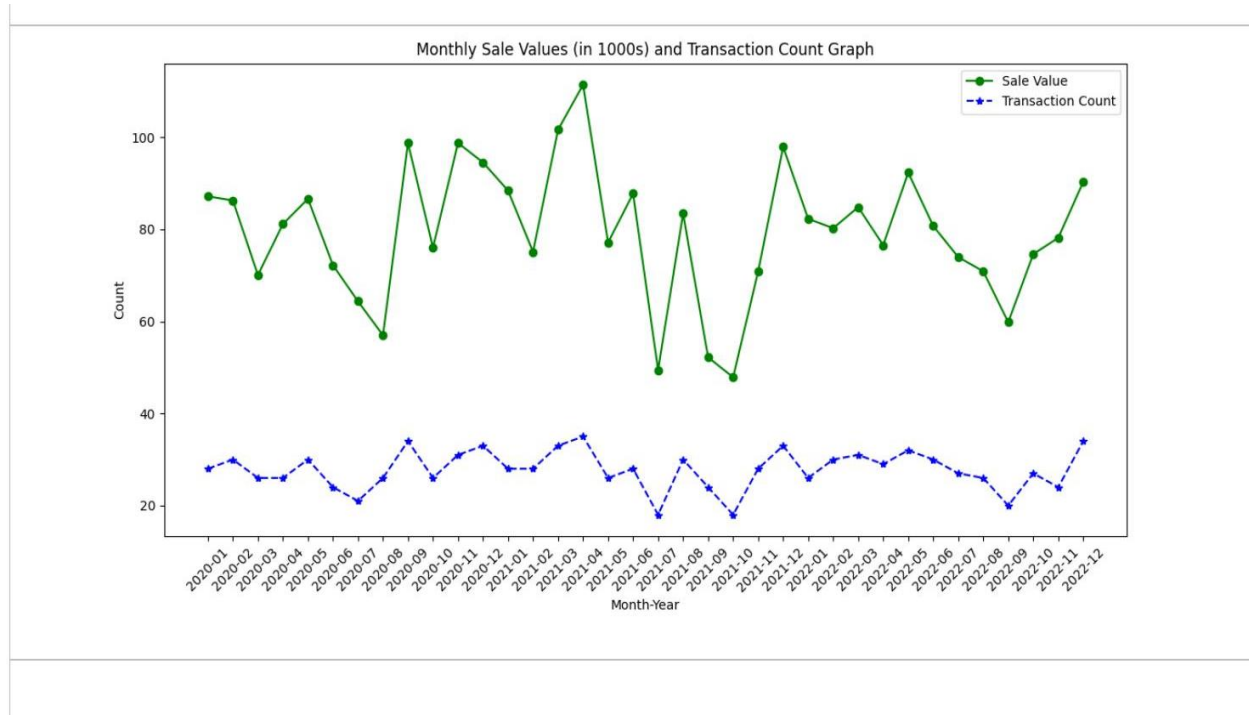
The visualization of sales and transaction counts is achieved using the matplotlib and numpy modules. Given that sales values are typically much higher than transaction counts, the program employs a function to scale down sales values by orders of 10, 100, or 1000, depending on the highest sales value.

When creating a graph, the transaction database is passed to a function (get_months), which extracts all unique years and months and returns an array. This array serves as the x-axis for the graph. The corresponding y-value is determined by passing the x to a function get_Y, which computes the sales values and transaction counts and returns a detail for plotting.
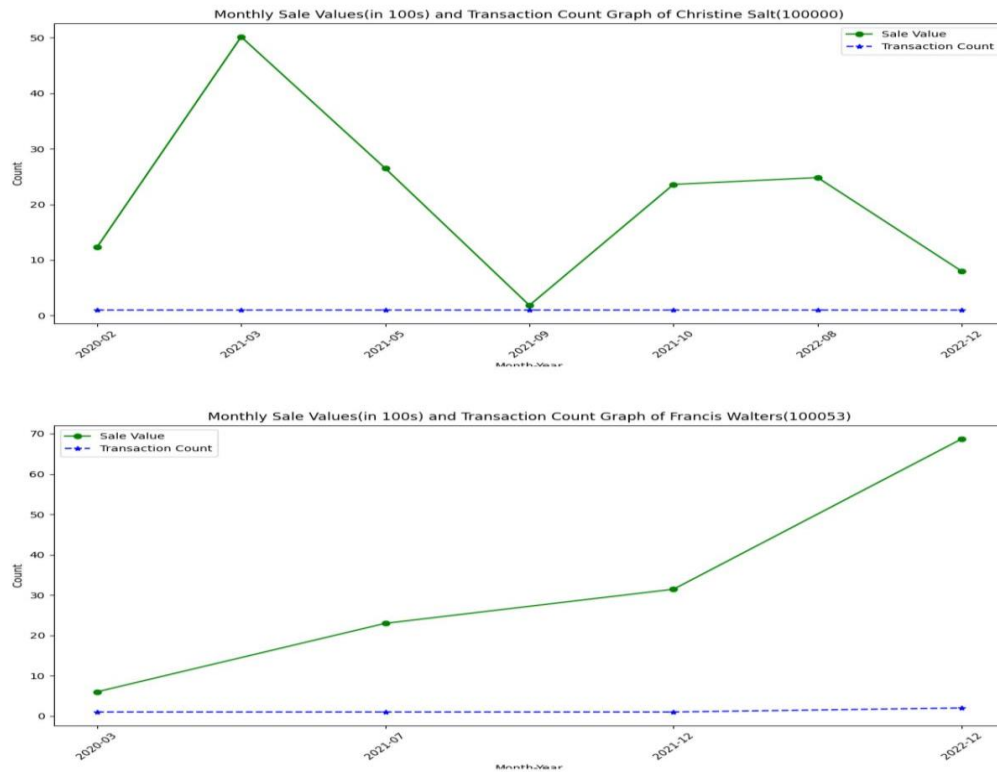
Self-diagnosis and Evaluation for question 3:

Sl no	Requirement	Status
1	Display the monthly sales values and transaction numbers with two-line graphs in one axis.	Fully Completed
2	For a specific customer, illustrate the monthly sales figures and the count of sales made by the customer, using two-line charts on the same axes.	Fully Completed
3	For a specified postcode, illustrate the monthly sales figures and the count of transactions made by customers in that postcode area, using two-line charts on the same axes.	Fully Completed

Features 1: Display the monthly sales values and transaction numbers with two-line graphs in one axis.

Features 2: Displaying monthly sales figures and the count of sales made by the customer, using two-line charts on the same axes.

Feature 3: Displaying the monthly sales figures and the count of transactions made by customers in that postcode area, using two-line charts on the same axes.