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Abstract

This report includes the algorithms and steps for creating ABC supermarket's Point of Sales system, including registering customers with ID, name, birth date, telephone number, and address and placing orders for registered ID with order ID, Branch code, Date, Item name, quantity, unit price, and total amount. Also, view daily sales of a given branch, display customer details of a given customer ID, and display order details of a customer. Additionally, this report includes test cases used to test the program, including screenshots showing positive and negative results.

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Chapter 1. Introduction

In today's digital world, automated data processing has become essential for big companies, especially for supermarkets that handle many customer data every day. To address this problem, ABC supermarket requested a point-of-sales system to manage their sales.

This project was developed using Python 3.x, aims to register new customers with an ID, name, birth date, telephone number, and address and place orders for registered customers with order ID, Branch code, date, item name, quantity, unit price, and total amount. Also, view the daily sales amount of a given branch, view the details of a given customer, and display the order details of a given customer ID. This report discusses algorithms, test cases, and the results of the Python project.

Chapter 2. Assumptions

- ABC Supermarket's point of sale system is only eligible for adults who are 18 years or older.
- Can not enter addresses longer than 50 characters when registering to the system.
- Can not register customers with the same customer ID
- Can register unlimited customers
- Can not place orders with the same order ID
- Can only enter positive prices when placing orders
- The currency is LKR (Rs.)
- **Only if there are multiple customers registered**, at the end of the customer details figure, ask to view another customer's details.
- One customer ID can only place orders with one Order ID with a maximum of 3 items.
- Customer details and order details are displayed vertically.
- In Figure 6 (Order details), this system also displays the unit price of each item.

Chapter 3. Algorithm

3.1. Main Algorithm

This is the complete step-by-step algorithm approach for creating the ABC Supermarket point of sales system.

1. Start

2. Variable Initialization for store data
- To store the user's choice, create a variable called choice.
- To store customer IDs, create a list called register.
- To store customer details, create a list called customer.
- To store order IDs, create a list called orders.
- To store order details, create a list called order_details.

3. Display ABC supermarket and Main menu with 6 options.
- [Option 01] – Register a new customer
- [Option 02] – Place an order
- [Option 03] – View Sales.
- [Option 04] – Customer Details
- [Option 05] – Order details.
- [Option 06] – Exit.

4. If the user does not input 1 or 2 or 3 or 4 or 5 or 6, display an error message saying invalid input; please input a number between 0 and 7

5. If the user inputs 1 (Register a new customer)

5.1. Display title Register a new customer
5.2. Display input to enter customer ID
5.2.1. Take the user input, ignoring spaces and capitalizing all the English characters
5.2.2. If the taken input is not equal to four characters or the first character is not equal to 'C' or the input is not a number or the ID is already registered, repeat steps 5.2 to 5.2.2 until input is equal to 4 character and first character is equal to 'C' and ID is not in register list.
5.3. Display input to enter customer Name
5.3.1. If the name's characters are greater than 20 or the user enters just spaces or the input is empty, repeat steps 5.3 to 5.3.1 until name is less than 20 characters and user inputs are not spaces and input is not empty
5.4. Display input to enter Birth Date

5.4.1. If the birthdate is not a number or the date format is wrong, repeat steps 5.4 to 5.4.1 until the entered number and date are in the right format.

5.4.2. If the user's age is less than 18, redirect to the main menu.

5.5. Display input to enter customer phone number

5.5.1. If the phone number does not have 10 digits, repeat steps 5.5 to 5.5.1 until the user inputs a valid phone number

5.6. Display input to enter customer address

5.6.1. If the customer address's characters are greater than 50 or the user inputs just spaces or the address is empty, repeat steps 5.6 to 5.6.1 until the address is less than 50 characters and not just spaces and the address is not empty.

5.7. Display input asking to save the customer details

5.7.1. If the user inputs yes store the customer ID in the register list and store customer details as a list in the customer list

5.7.2. If the user inputs no, display customer not registered and redirect to the main menu

5.7.3. If the user inputs something else, repeat steps 5.7 to 5.7.3 until the user inputs yes or no

6. If the user inputs 2 (Place an Order)

6.1. Display title Place an order

6.2. If the register list is empty, display an error message saying no customers are registered and redirect to the main menu

6.3. If the register list is not empty, display input to enter customer ID

6.3.1. If the customer ID is invalid or not registered, repeat steps 6.3 to 6.3.1 until the user inputs a valid and registered customer ID

6.3.2. If there is an order placed by that customer ID, display an error message saying the maximum order limit reached and redirect to the main menu.

6.4. Display the input to enter the order ID

6.4.1. If the order ID is not valid or the order ID is already in the orders list, display an error message saying invalid order ID and repeat steps 6.4 to 6.4.1 until the order ID is valid and the order ID is not already registered.

6.5. Display input to enter branch code

6.5.1. If the branch code is not valid, display an error message and repeat steps 6.5 to 6.5.1 until the branch code is valid

6.6. Display input to enter order date

6.6.1. If the order date is not in the right format, repeat steps 6.6 to 6.6.1 until the order date is in the right format

6.7. Create temporary lists to store item names, quantities, unit_prices, and totals

6.8. Display input to enter Item name

6.8.1. If the input is empty or just spaces, repeat steps 6.8 to 6.8.1 until the user enters an item name

6.9. Store item name in items list

6.10. Display input to enter quantity

6.10.1. If the input is not a number, repeat steps 6.9 to 6.9.1 until the user enters a number

6.11. Store quantity in quantities list

6.12. Display input to enter unit price

6.12.1. If the input is not a number, repeat steps 6.10 to 6.10.1 until the user enters a number

6.13. If quantity and unit price both are numbers, store unit price in the unit_prices list and calculate the total using formula 'total = quantity x unit_price' and store that total in the totals list

6.14. Display input asking do you want to add more items

6.14.1. If the user does not input yes or no, display an error message and repeat steps 6.14 to 6.14.1 until the user inputs yes or no

6.14.2. If the user inputs yes, repeat steps 6.8 to 6.14.2 until 3 items are added

6.14.3. If 3 items are added or the user inputs no display total amount

6.15. Display input asking do you want to save the order details.

6.15.1. If the user does not input yes or no, display an error message and repeat 6.15 to 6.15.1 until the user inputs yes or no

6.15.2. If the user inputs yes, save the order ID inside the orders list and the order ID, ID, branch code, order date, items list, quantities list, unit prices list, and totals list inside the order details list as a list

6.15.3. If the user inputs no display order not placed and redirect to the main menu

7. If the user inputs 3 (View Sales)

7.1. Display title view sales

7.2. If the order_details list is empty, display no sales to display, and redirect to the main menu

7.3. Else display branch codes

7.4. Display input to enter branch code

7.4.1. If the branch code is not valid, repeat steps 7.4 to 7.4.1 until the user inputs a valid branch code

7.5. Display input to enter date

7.5.1. If the date is not in the right format or the user enters month, date, and year not as numbers, repeat steps 7.5 to 7.5.1 until the user enters a valid date

7.6. If there are any orders in that branch on that date, add all the totals and display the total

7.7. If there are no orders, display total sales as zero

7.8. Display input asking to want to view sales for another date

7.8.1. If the user does not input yes or no, repeat steps 7.8 to 7.8.1 until the user inputs yes or no

7.8.2. If the user inputs yes, repeat steps 7.6 to 7.7

7.8.3. If the user inputs no, redirect to the main menu

8. If the user inputs 4 (Customer Details)

8.1. Display the title customer details
8.2. If there are not any customers registered, display an error message saying no customers registered and redirect to the main menu
8.3. If there are customers registered
8.3.1. Display input to enter customer ID
8.3.1.1. Check if the customer ID is valid or not; if not valid, repeat steps 8.3.1 to 8.3.1.1 until user inputs a valid customer ID
8.3.2. Display name, birthdate, phone number (contact), and address with the customer ID that is stored in the customer list

9. If the user inputs 5 (Order details)

9.1. Display title Order Details
9.2. If there are no items in the order_details list, display an error message saying Error: No orders to display and redirect to the main menu
9.3. If there are items in the order_details list
9.3.1. Display input to enter customer ID
9.3.1.1. If the user inputs an invalid customer ID, display please enter registered ID repeat steps 9.3.1 to 9.3.1.1 until the user inputs a registered customer ID
9.3.2. Display order ID, branch code, order date, item names, unit prices, each item's total and grand total amount in LKR (Rs.) that is stored in the order_details list.

10. If the user inputs 6 (Exit)

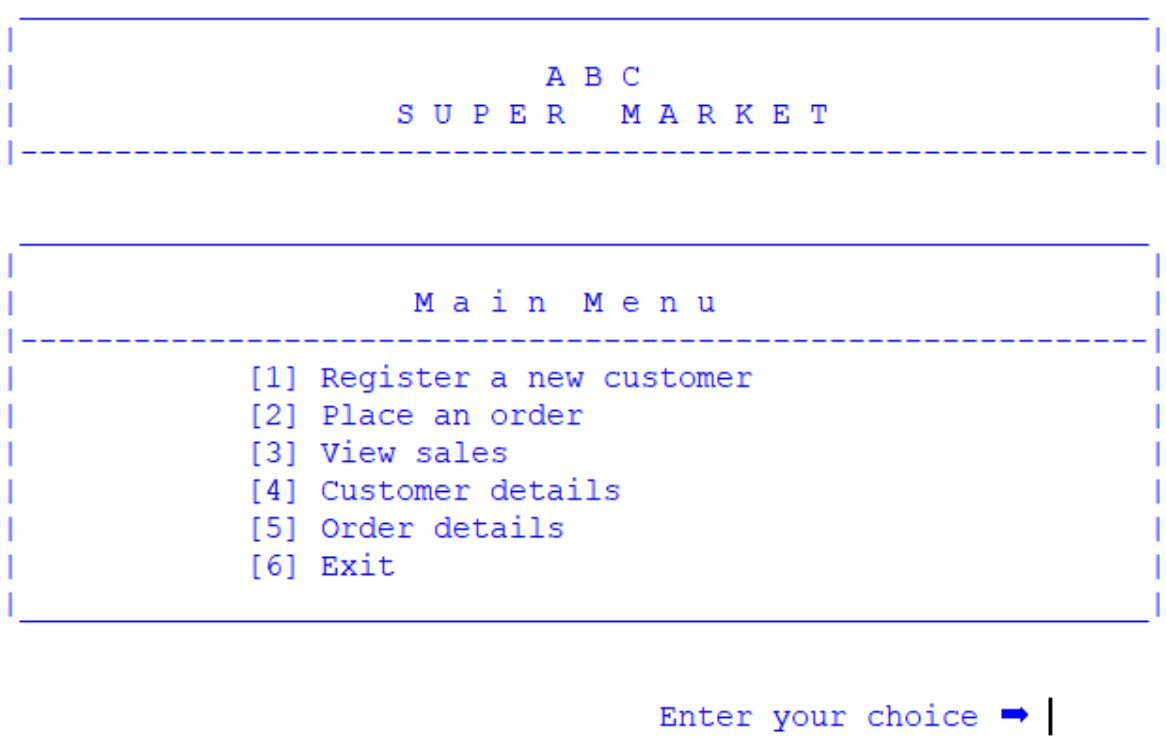
10.1. Display input asking Are you sure you want to exit?
10.1.1. If the user inputs yes
10.1.1.1. Display Thank you for using ABC supermarket and exit from the point of sales system.
10.1.2. If the user inputs no
10.1.2.1. Redirect to the main menu
10.1.3. If the user inputs something else
10.1.3.1. Display invalid input Please enter yes or no and repeat steps 10.1 to 10.1.3.1 until the user inputs yes or no.

11. Stop

Chapter 4. Test Cases and Results

4.1. Figure 01

When the program is executed, it automatically displays the main menu with the options 1 to 6, in order register a new customer, place an order, view sales, customer details, order details, exit and, also it ask user to enter a choice (Only work with between 0 and 7 numbers).

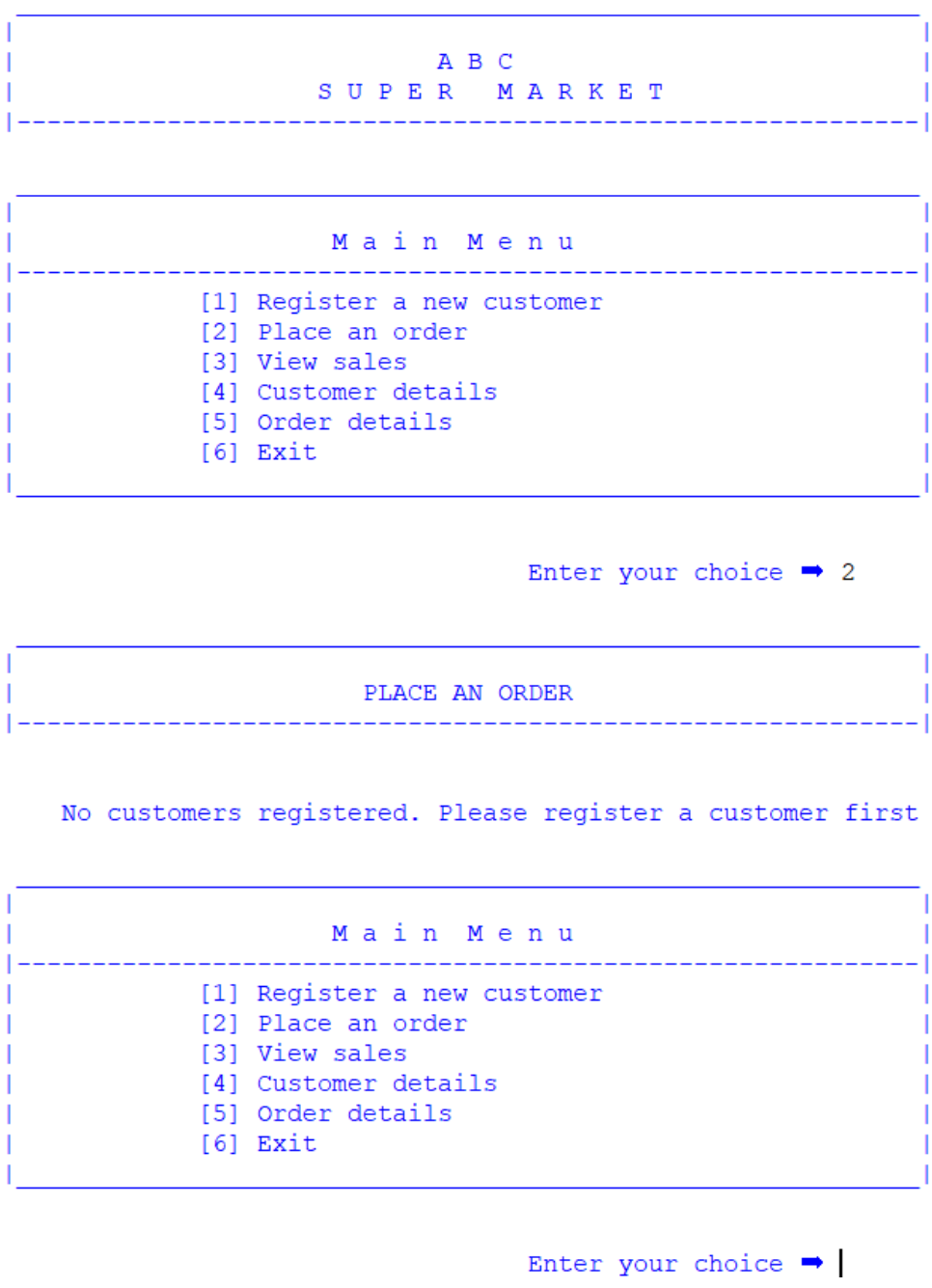


[1] - Figure 01

Figure 01 – Test Case 01

Figure	Input	Expected Output	Actual Output	Result
01	2	Display No customers registered. Please register a customer first and redirect to the main menu	Display No customers registered. Please register a customer first and redirect to the main menu	Pass

Table 1 [Figure 01 - Test Case 01]

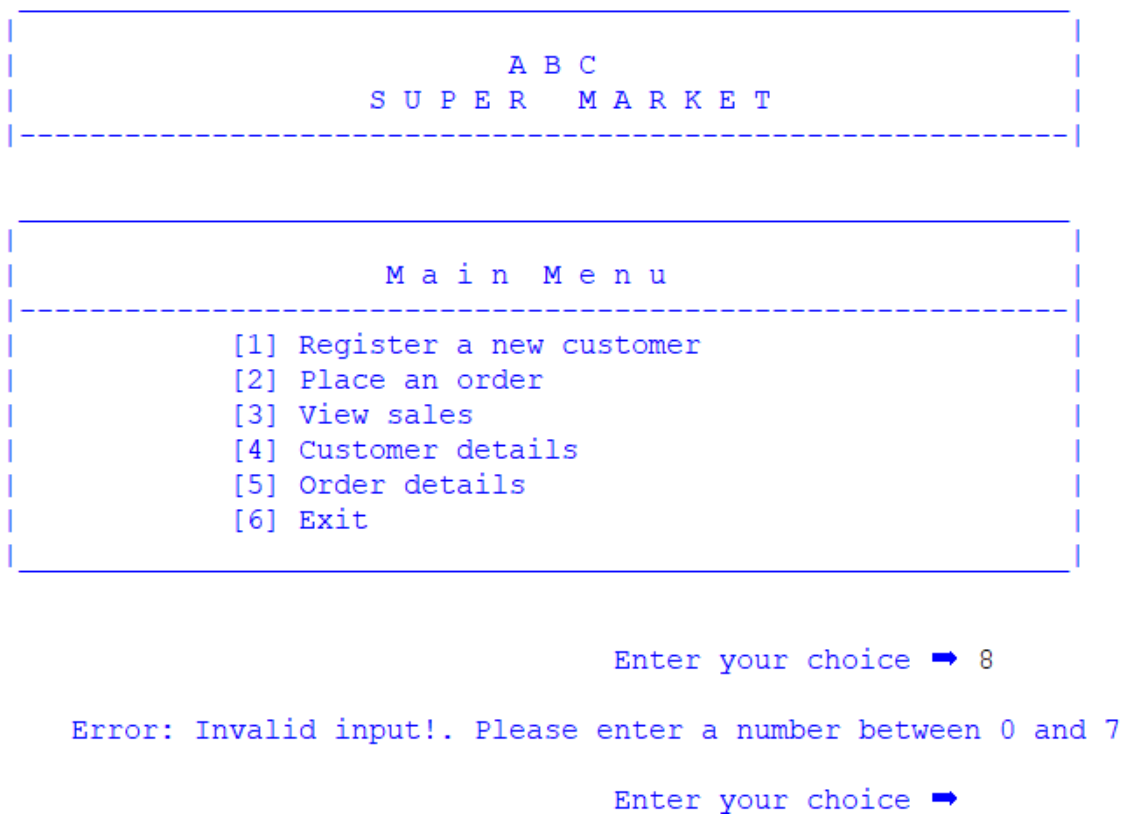


[2] - Figure 01 - Test Case - 01

Figure 01 – Test Case 02

Figure	Input	Expected Output	Actual Output	Result
01	8	Display an error message saying Error: Invalid input! Please enter a number between 0 and 7	Display an error message saying Error: Invalid input! Please enter a number between 0 and 7	Pass

Table 2 [Figure 01 - Test Case 02]

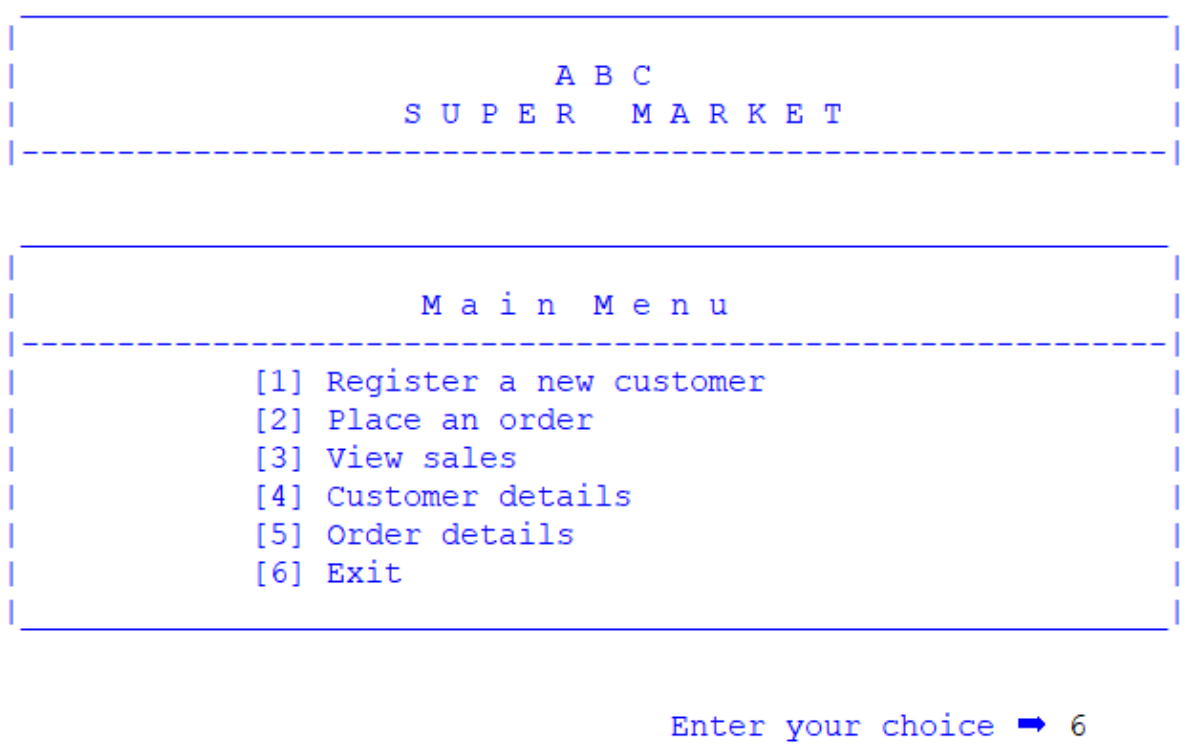


[3] - Figure 01 - Test Case - 02

Figure 01 – Test Case 03

Figure	Input	Expected Output	Actual Output	Result
01	6	Display input asking Are you sure you want to exit	Display input asking Are you sure you want to exit	Pass

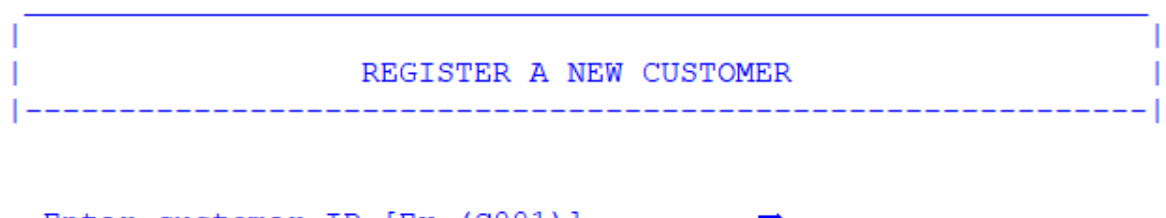
Table 3 [Figure 01 - Test Case 03]



[4] - Figure 01 - Test Case 03

4.2. Figure 02

When the user inputs choice as number one, it displays the Register a New Customer Figure, one by one including inputs to enter the customer ID, customer name, birth date, telephone number, and the customer address.

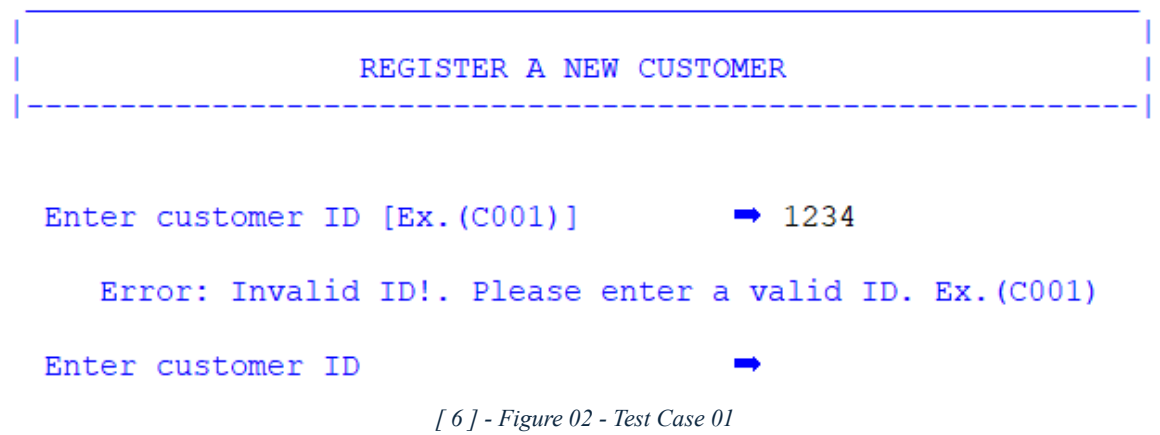


[5] - Figure 02

Figure 02 – Test Case 01

Figure	Input	Expected Output	Actual Output	Result
02	1234	Display an error message saying Error: Invalid ID!. Please enter a valid ID. Ex. (C001) and display input to enter customer ID until user inputs a valid ID	Display an error message saying Error: Invalid ID!. Please enter a valid ID. Ex. (C001) and display input to enter customer ID until user inputs a valid ID	Pass

Table 4 [Figure 02 - Test Case 01]

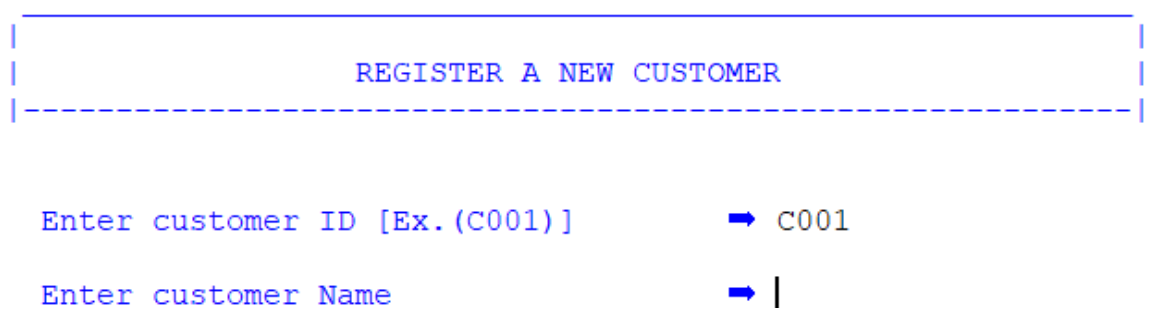


[6] - Figure 02 - Test Case 01

Figure 02 – Test Case 02

Figure	Input	Expected Output	Actual Output	Result
02	C001	Display input to enter customer name	Display input to enter customer name	Pass

Table 5 [Figure 02 - Test Case 02]

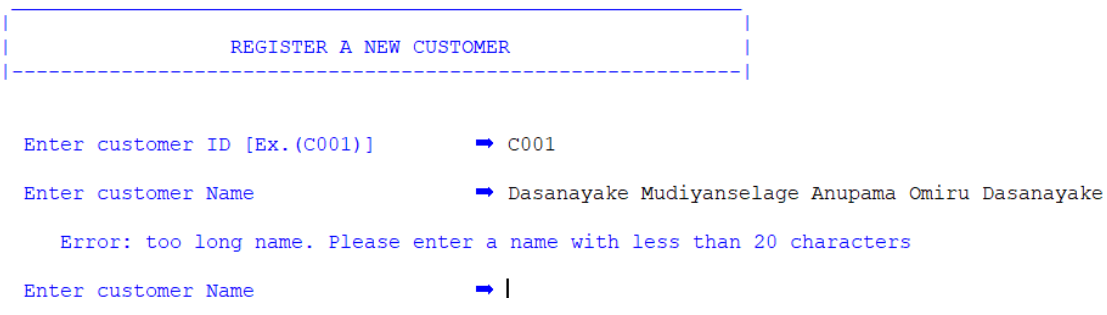


[7] - Figure 02 - Test Case 02

Figure 02 – Test Case 03

Figure	Input	Expected Output	Actual Output	Result
02	Dasanayake Mudiyanselage Anupama Omiru Dasanayake	Display an error message saying Error: too long name. Please enter a name with less than 20 characters And display input to enter name again	Display an error message saying Error: too long name. Please enter a name with less than 20 characters And display input to enter name again	Pass

Table 6 [Figure 02 - Test Case 03]

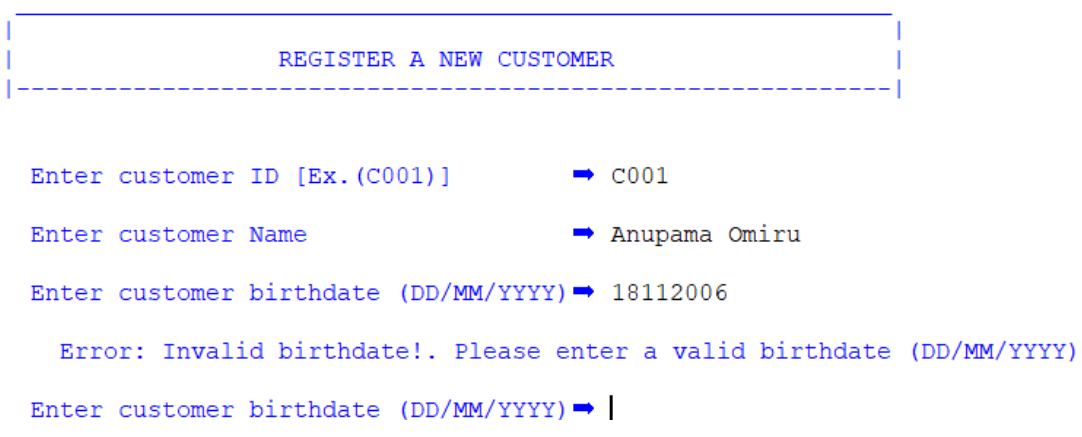


[8] - Figure 01 - Test Case 03

Figure 02 – Test Case 04

Figure	Input	Expected Output	Actual Output	Result
02	18112006	Display an error message saying Error: Invalid birthdate! Please enter a valid birthdate (DD/MM/YYYY) And display input to enter the birth date until the user inputs a valid birth date.	Display an error message saying Error: Invalid birthdate! Please enter a valid birthdate (DD/MM/YYYY) And display input to enter the birth date until the user inputs a valid birth date.	Pass

Table 7 [Figure 02 - Test Case 04]

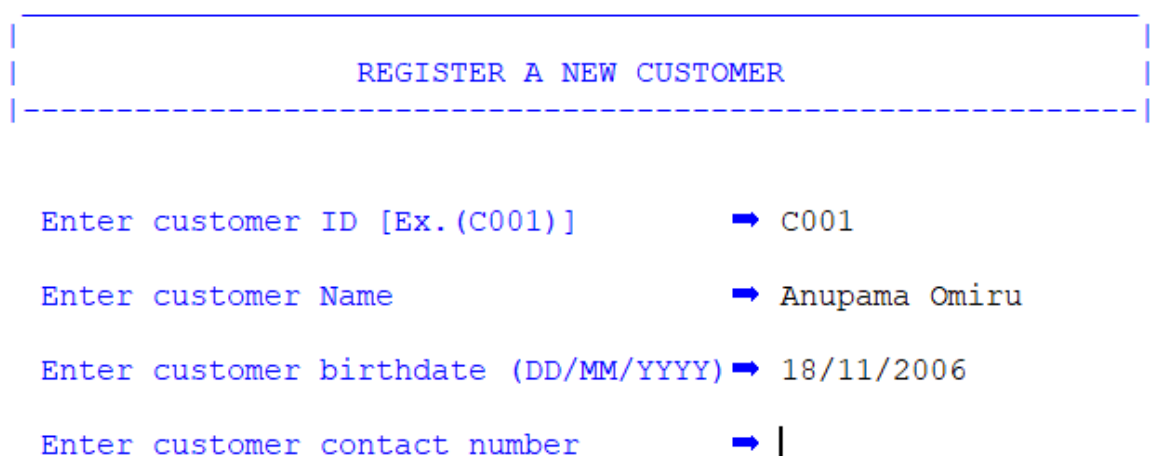


[9] - Figure 02 - Test Case 04

Figure 02 – Test Case 05

Figure	Input	Expected Output	Actual Output	Result
02	18/11/2006	Display input to enter customer contact number	Display input to enter customer contact number	Pass

Table 8 [Figure 02 - Test case 05]

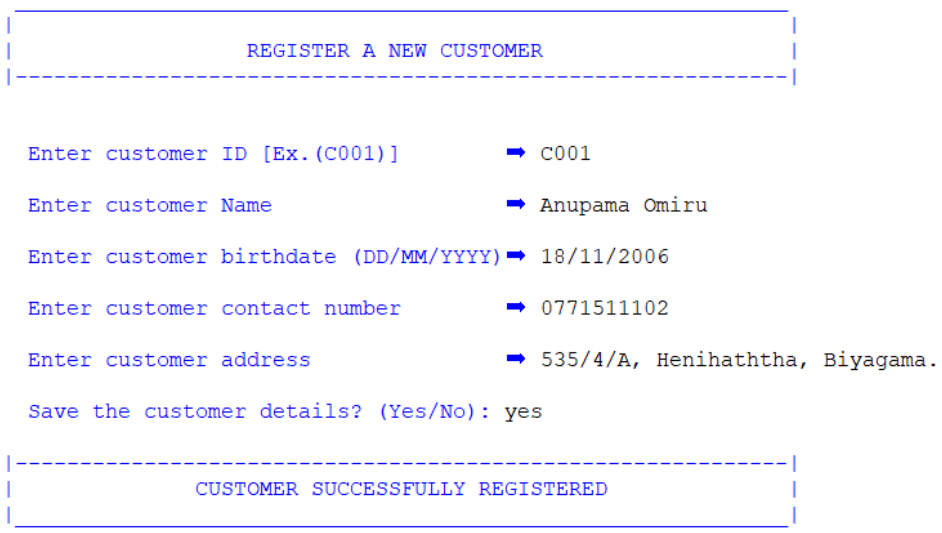


[10] - Figure 02 - Test Case 05

Figure 02 – Test Case 06

Figure	Input	Expected Output	Actual Output	Result
02	yes	Display customer successfully registered	Display customer successfully registered	Pass

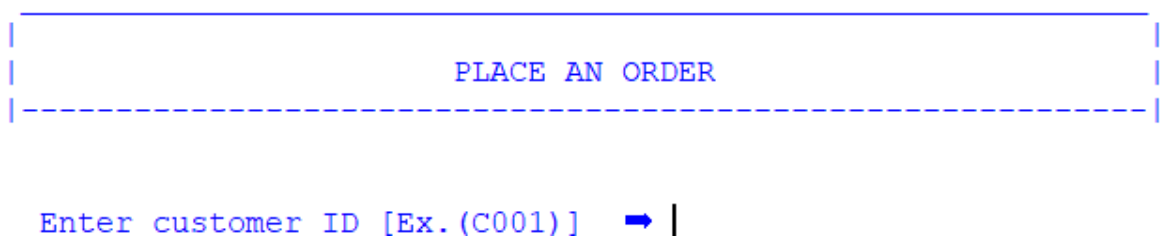
Table 9 [Figure 02 - Test Case 06]



[11] - Figure 02 - Test Case 06

4.3. Figure 03

Figure 03 only works if there are registered customers stored in the list. When the user inputs choice number two, it displays the Place an Order Figure, including inputs to enter the customer ID, order ID, Branch code, date, item name, quantity, and unit price one by one. This figure can also place a maximum of three items and display the total amount in LKR(Rs.)

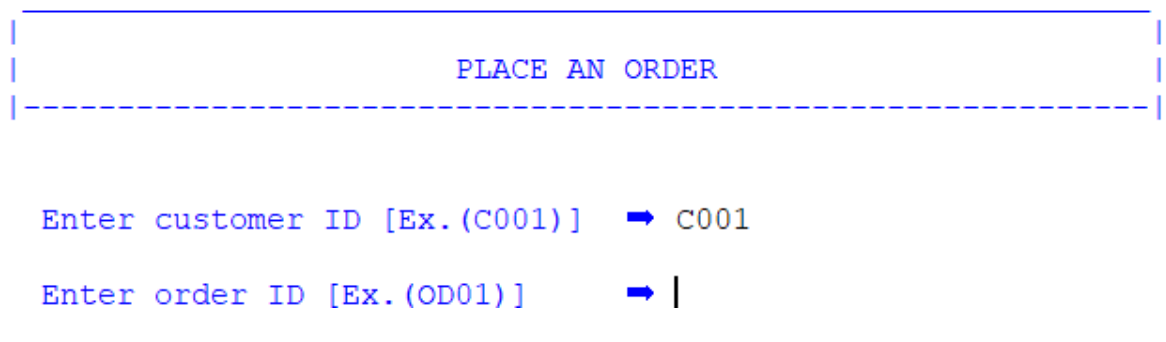


[12] - Figure 03

Figure 03 – Test Case 01

Figure	Input	Expected Output	Actual Output	Result
03	C001	Display input to enter order ID	Display input to enter order ID	Pass

Table 10 [Figure 03 - Test Case 01]

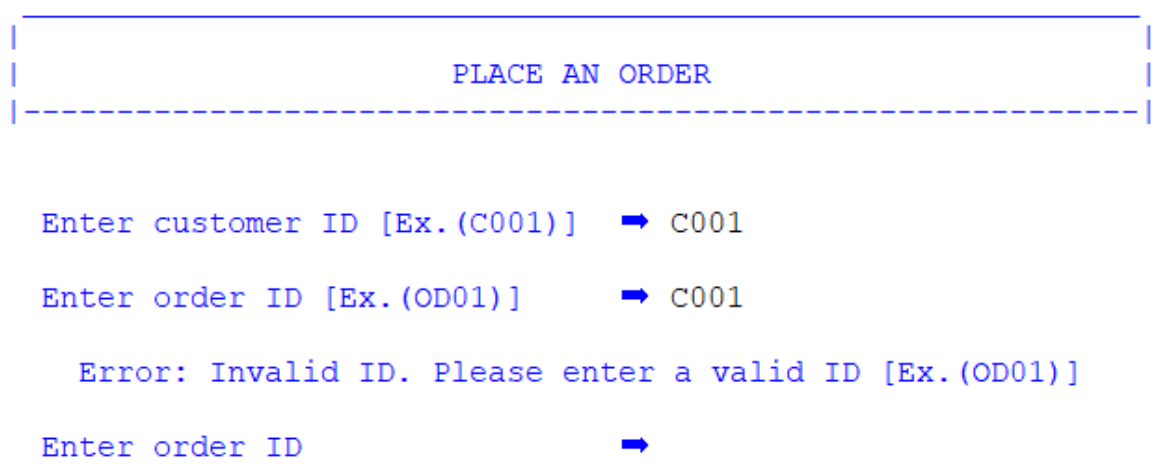


[13] - Figure 03 - Test Case 01

Figure 03 - Test Case 02

Figure	Input	Expected Output	Actual Output	Result
03	C001	Display error message Error: Invalid ID. Please enter a valid ID [Ex.(OD01)]	Display error message Error: Invalid ID. Please enter a valid ID [Ex.(OD01)]	Pass

Table 11 [Figure 03 - Test Case 02]



[14] - Figure 03 - Test Case 02

Figure 03 – Test Case 03

Figure	Input	Expected Output	Actual Output	Result
03	Yes (to add more items)	Display input to enter second item name	Display input to enter second item name	Pass

Table 12 [Figure 03 - Test Case 03]

```
 ____________________________________________________________
|                                                            |
|                       PLACE AN ORDER                       |
|____________________________________________________________|


  Enter customer ID [Ex.(C001)]   ➡ C001

  Enter order ID [Ex.(OD01)]      ➡ C001

    Error: Invalid ID. Please enter a valid ID [Ex.(OD01)]

  Enter order ID                  ➡ OD01

------------------------------------------------------------
              B R A N C H  -  C O R D S
------------------------------------------------------------

             ____________________________
            |                            |
            |    Colombo      -   B001   |
            |    Nugegoda     -   B002   |
            |    Piliyandala  -   B003   |
            |    Gampaha      -   B004   |
            |____________________________|

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


  Enter branch code               ➡ B001

  Enter order date (DD/MM/YYYY)   ➡ 30/03/2025

  Enter item name                 ➡ Laptop

  Enter quantity                  ➡ 2

  Enter unit price                ➡ 100000

  Do you want to add more items? (Yes/No): yes

  Enter item name                 ➡ |
```

[15] - Figure 03 - Test Case 03

Figure 03 - Test Case 04

Figure	Input	Expected Output	Actual Output	Result
03	Yes (to save order details)	Display order placed successfully	Display order placed successfully	Pass

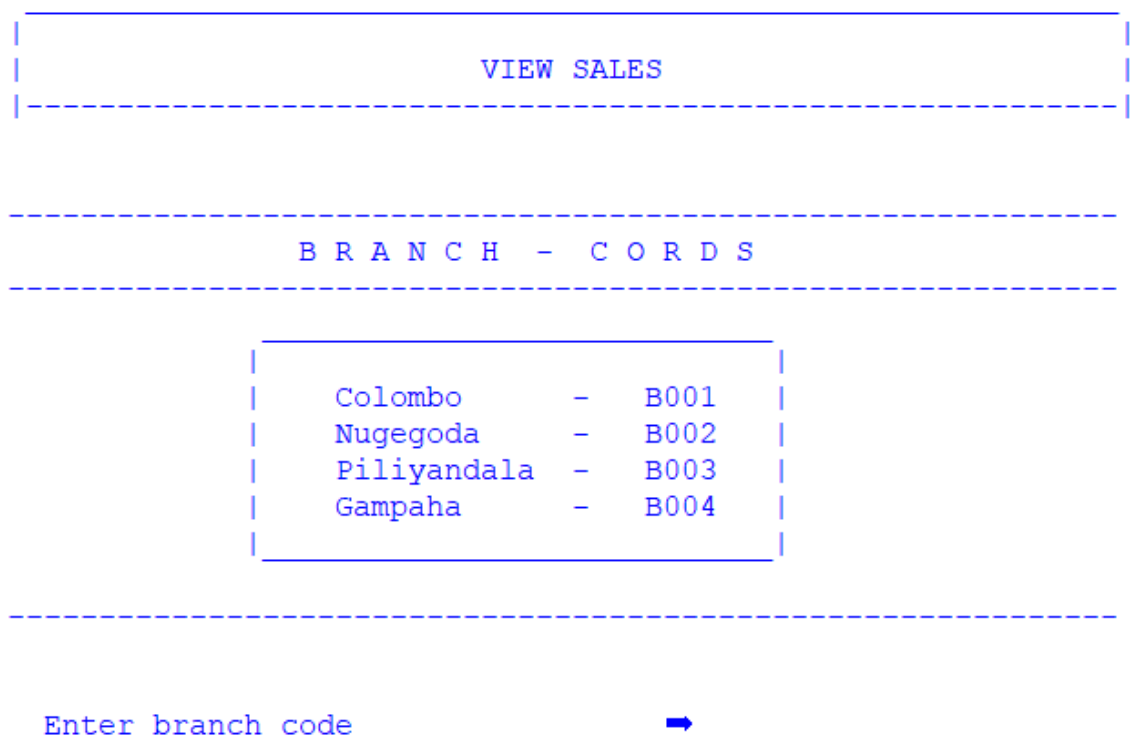
Table 13 [Figure 03 - Test Case 04]

```
Enter branch code              ➡ B001
Enter order date (DD/MM/YYYY)  ➡ 30/03/2025
Enter item name                ➡ Laptop
Enter quantity                 ➡ 2
Enter unit price               ➡ 100000
Do you want to add more items? (Yes/No): yes
Enter item name                ➡ Mouse
Enter quantity                 ➡ 1
Enter unit price               ➡ 5000
Do you want to add more items? (Yes/No): yes
Enter item name                ➡ Phone
Enter quantity                 ➡ 1
Enter unit price               ➡ 80000
  Maximum limit reached
|------------------------------------------------------------|
|    Branch: B001    Date: 30/03/2025
|------------------------------------------------------------|
|                                                            |
|    TOTAL PRICE = Rs.285000.0
|____________________________________________________________|
  Do you want to save the order details? (Yes/No): yes
|------------------------------------------------------------|
|                                                            |
|                ORDER PLACED SUCCESSFULLY                   |
|____________________________________________________________|
```

[16] - Figure 03 - Test Case 04

4.4. Figure 04

Figure four only works if there are items inside the order_details list. When the user inputs choice number 3, it displays the View Sales Figure with branch cords, including inputs to enter the branch code and the date. If there are any orders in that branch on that date, it will show the total amount and display the input again, asking to view another date in the same branch.

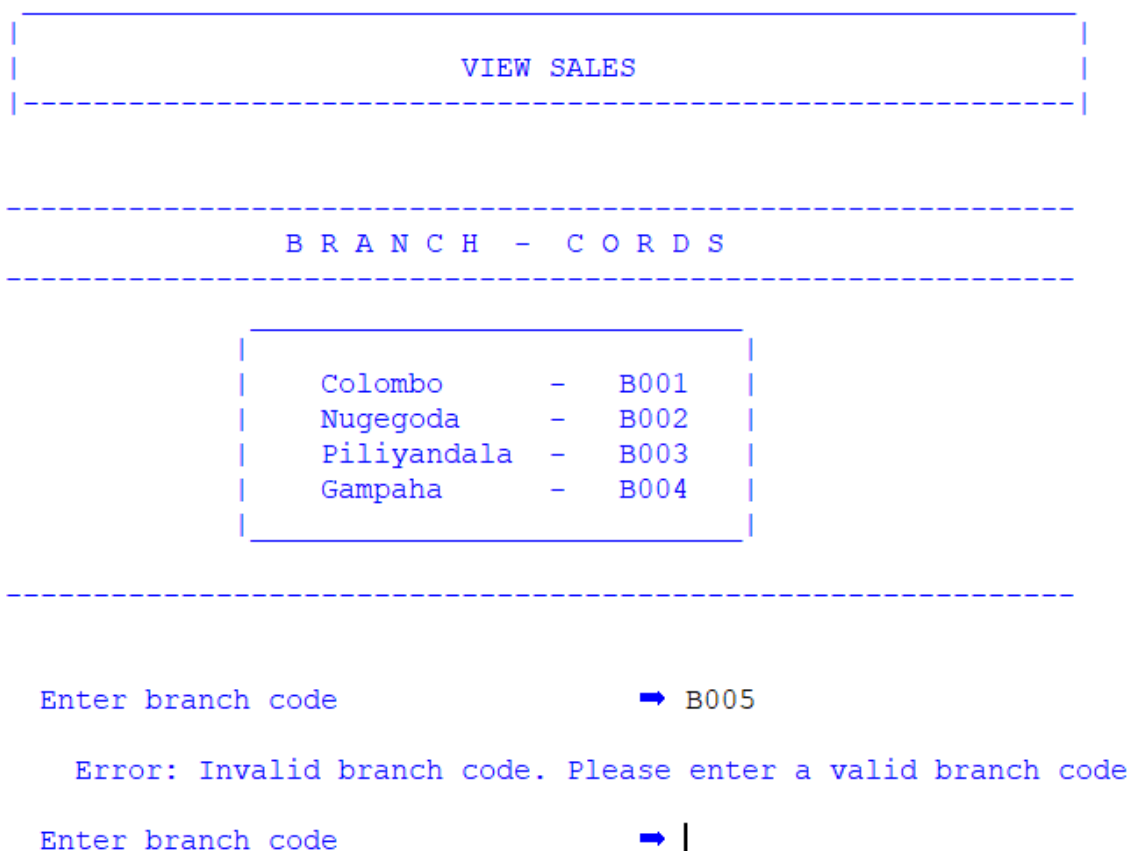


[17] - Figure 04

Figure 04 – Test Case 01

Figure	Input	Expected Output	Actual Output	Result
04	B005	Display an error message saying Invalid branch code. Please enter a valid branch code	Display an error message saying Invalid branch code. Please enter a valid branch code	Pass

Table 14 [Figure 04 - Test Case 01]

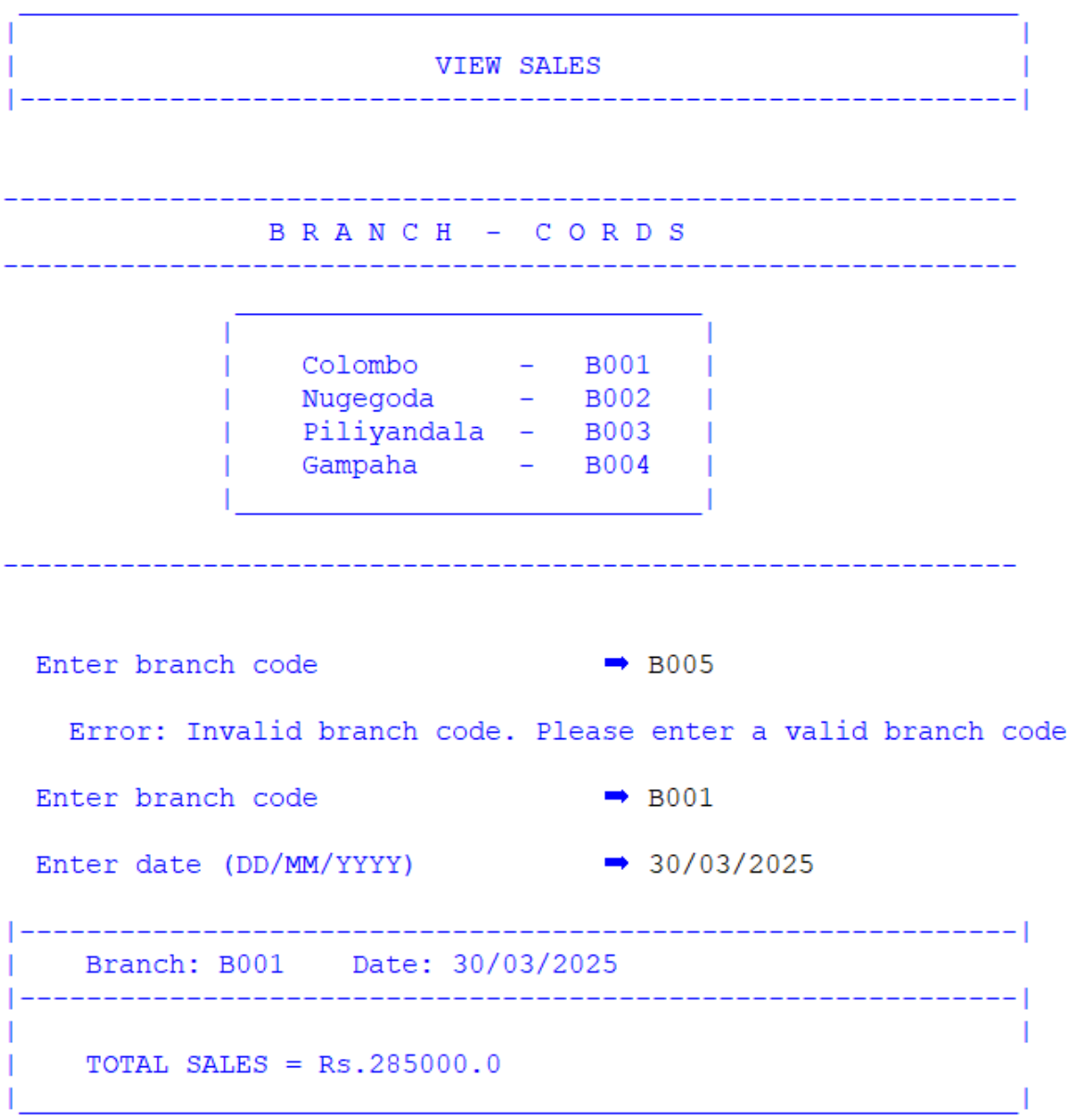


[18] - Figure 04 - Test Case 01

Figure 04 - Test Case 02

Figure	Input	Expected Output	Actual Output	Result
04	30/03/2025 (to Date)	Display the total sales amount and display input asking do you want to view another date	Display the total sales amount and display input asking do you want to view another date	Pass

Table 15 [Figure 04 - Test Case 02]

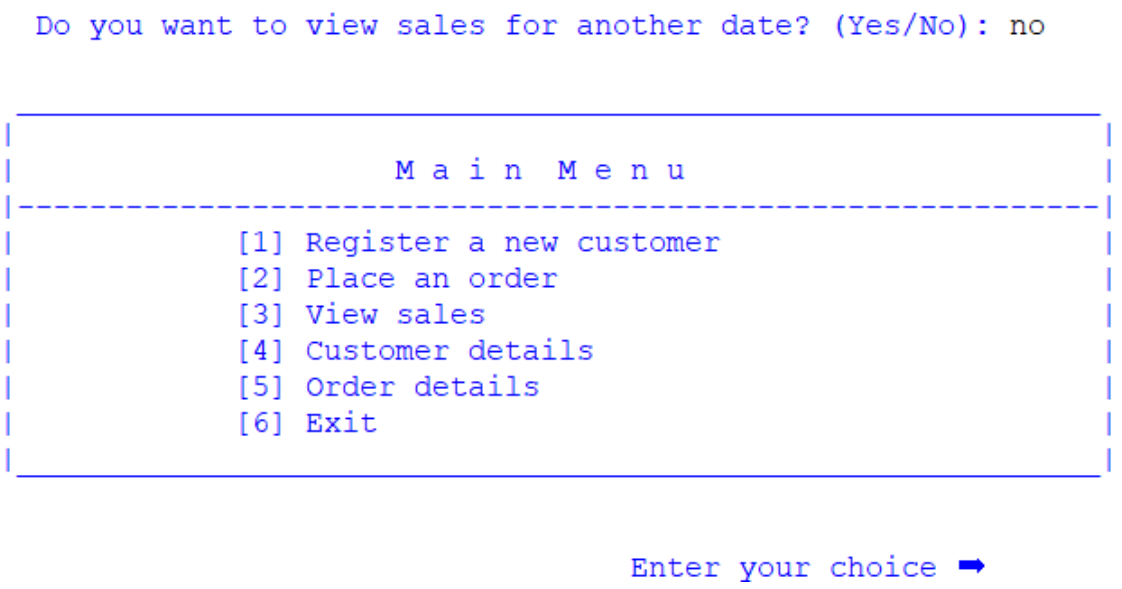


[19] - Figure 04 - Test Case 02

Figure 04 - Test Case 03

Figure	Input	Expected Output	Actual Output	Result
04	No (to view another date)	Display the main menu	Display the main menu	Pass

Table 16 [Figure 04 - Test Case 03]

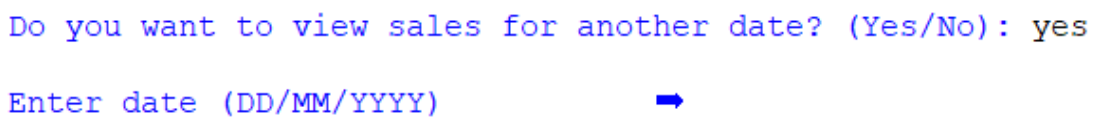


[20] - Figure 04 - Test Case 03

Figure 04 - Test Case 04

Figure	Input	Expected Output	Actual Output	Result
04	Yes (to view another date)	Display input to enter another date	Display input to enter another date	Pass

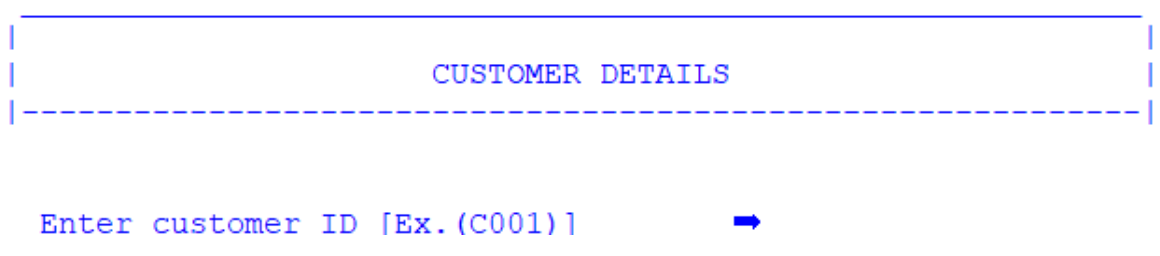
Table 17 [Figure 04 - Test Case 04]



[21] - Figure 04 - Test Case 04

4.5. Figure 05

Figure four only works if there are items inside the customer list that store customer details. When the user inputs choice number 4, it displays the Customer Details Figure and prompts the input to enter the customer ID. It will show the customer details, including name, birthdate, contact number, and address, one by one. After that, display the input again, asking to view another customer's details, **only if there is more than one customer registered.**

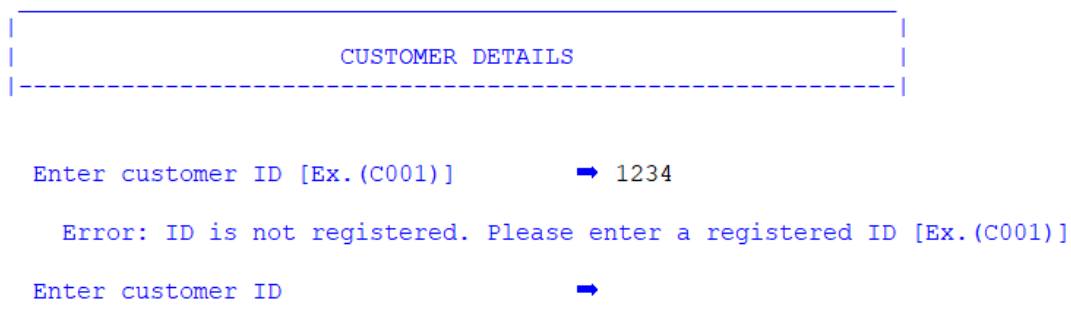


[22] - Figure 05

Figure 05 – Test Case 01

Figure	Input	Expected Output	Actual Output	Result
05	1234	Display an error message saying Error: ID is not registered. Please enter a registered ID [Ex.(C001)]	Display an error message saying Error: ID is not registered. Please enter a registered ID [Ex.(C001)]	Pass

Table 18 [Figure 05 - Test Case 01]

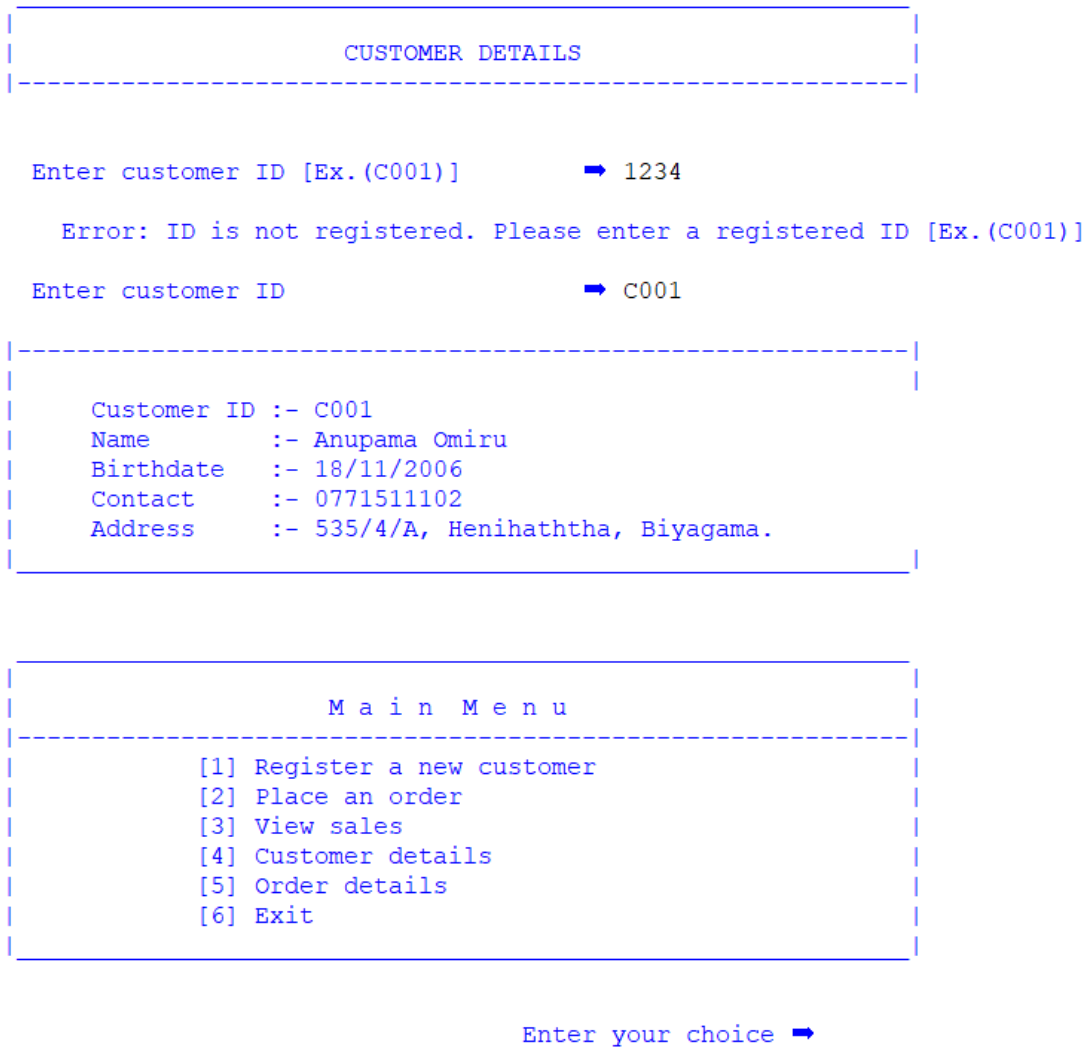


[23] - Figure 05 - Test Case 01

Figure 05 – Test Case 02

Figure	Input	Expected Output	Actual Output	Result
05	C001	Display customer details and display main menu if there is only one customer registered	Display customer details and display main menu if there is only one customer registered	Pass

Table 19 [Figure 05 - Test Case 02]

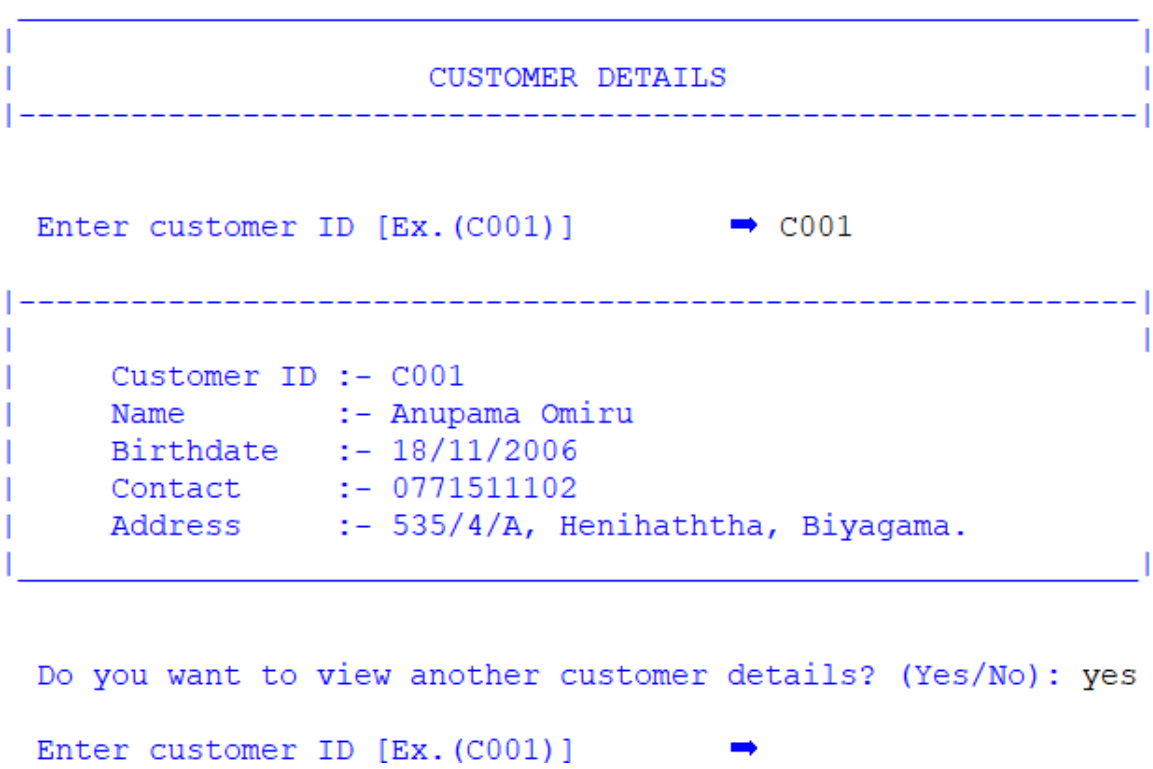


[24] - Figure 05 - Test Case - 02

Figure 05 - Test Case 03

Figure	Input	Expected Output	Actual Output	Result
05	Yes (if only there are multiple customers registered, another customer ID input will display)	Display input to enter customer ID	Display input to enter customer ID	Pass

Table 20 [Figure 05 - Test Case 03]

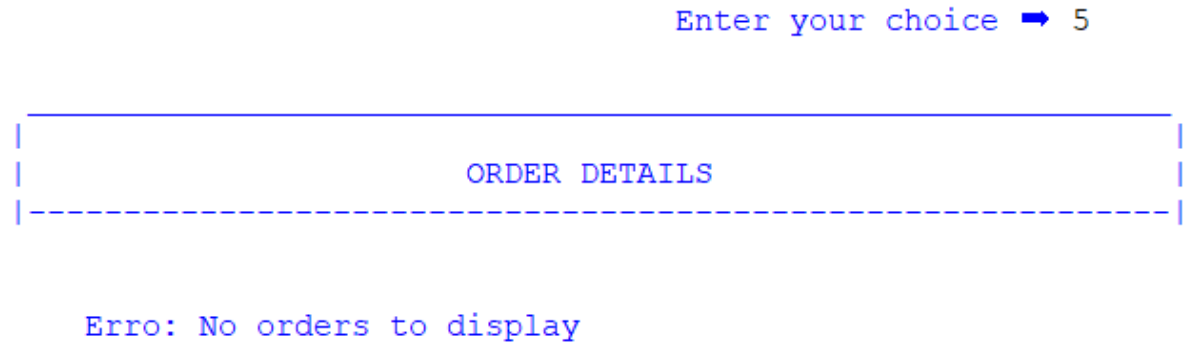


[25] - Figure 05 - Test Case 03

4.6. Figure 06

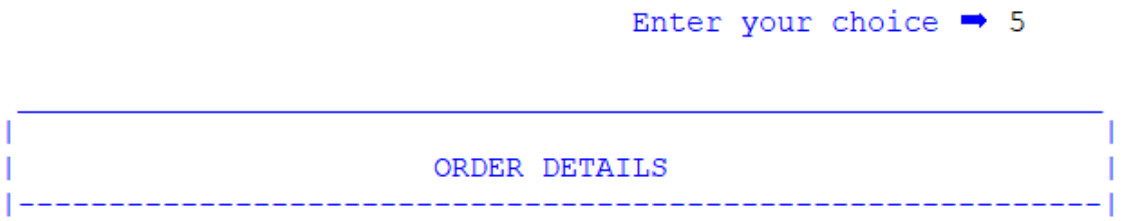
Figure four only works if there are items inside the order_details list. When the user inputs choice number 5, it displays the Order Details Figure and displays the input to enter the customer ID. If there are any orders placed, it will show the order details, including name, order ID, branch, order date, items with quantity and each item's unit prices, and the total amount. After that, display the input again, asking to view another order details.

If there are No Orders Placed



[26] - Figure 06 - If No Orders Placed

If there are Orders Placed

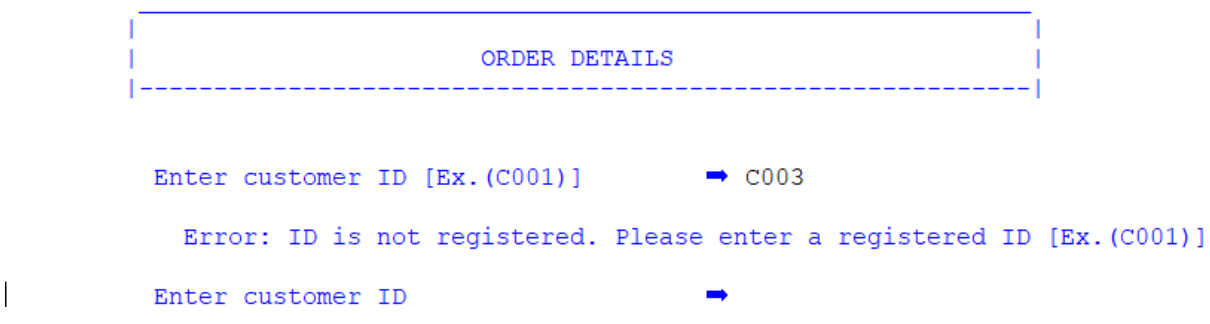


[27] - Figure 06 - If there are Orders Placed

Figure 06 – Test Case 01

Figure	Input	Expected Output	Actual Output	Result
06	C003	Display an error message saying Error: ID is not registered. Please enter a registered ID [Ex.(C001)]	Display an error message saying Error: ID is not registered. Please enter a registered ID [Ex.(C001)]	Pass

Table 21 [Figure 06 - Test Case 01]



[28] - Figure 06 - Test Case 01

Figure 06 – Test Case 02

Figure	Input	Expected Output	Actual Output	Result
06	C001	Display all the order details and display input asking do you want to view another order details	Display all the order details and display input asking do you want to view another order details	Pass

Table 22 [Figure 06 - Test Case 02]

```
 ____________________________________________________________
|                                                            |
|                       ORDER DETAILS                        |
|------------------------------------------------------------|


  Enter customer ID [Ex.(C001)]        ➡ C003

    Error: ID is not registered. Please enter a registered ID [Ex.(C001)]

  Enter customer ID                    ➡ C001

|------------------------------------------------------------|
|     Customer ID  :- C001 | Name :- Anupama Omiru
|------------------------------------------------------------|
|                                                            |
|     Order ID     :- OD01
|
|     Branch       :- B001
|
|     Order Date   :- 30/03/2025
|
|------------------------------------------------------------|
      Items        :-

        Laptop = Rs.100000
        Laptop  x  2  =  Rs.200000.0

        Phone = Rs.80000
        Phone  x  1  =  Rs.80000.0

        Mouse = Rs.5000
        Mouse  x  1  =  Rs.5000.0

|------------------------------------------------------------|
|                                                            |
|     TOTAL AMOUNT    =    Rs.285000.0
|____________________________________________________________|


  Do you want to view another order details? (Yes/No):
```

[29] - Figure 06 - Test Case 02

Figure 06 – Test Cace 03

Figure	Input	Expected Output	Actual Output	Result
06	Yes (To view another order details)	Display input to enter customer ID	Display input to enter customer ID	Pass

Table 23 [Figure 06 - Test Case 03]

```
Do you want to view another order details? (Yes/No): yes

Enter customer ID [Ex.(C001)]        ➡
```

[30] - Figure 06 - Test Case 03

Figure 06 – Test Case 04

Figure	Input	Expected Output	Actual Output	Result
06	No (To view another order details)	Display main menu	Display main menu	Pass

Table 24 [Figure 06 - Test Case 04]

```
Do you want to view another order details? (Yes/No): no

 ____________________________________________________________
|                                                            |
|                      M a i n  M e n u                      |
|------------------------------------------------------------|
|              [1] Register a new customer                   |
|              [2] Place an order                            |
|              [3] View sales                                |
|              [4] Customer details                          |
|              [5] Order details                             |
|              [6] Exit                                      |
|____________________________________________________________|


                                    Enter your choice ➡
```

[31] - Figure 06 - Test Case 04

Conclusion

In summary, this project successfully developed a Point of Sales system for ABC Supermarket using Python 3.x. The system efficiently manages customer registrations, order placements, and sales calculations, and also this system can view registered customers' details and placed orders' details.

Key functionalities include:

- Customer registration
- Order Management
- Sales calculations
- View details of registered customers and placed orders

This system has age restrictions for customers and format requirements for inputs, ensuring better customer service. Test cases were executed for each figure to confirm that the system's functionalities are accurate and perform well.