Module Code & Module Title

CS4051NP Fundmental Of Computing

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1. Introduction

This course work is about the equipment renting system. It is made with the flowchart, algorithm, pseudo code, and data structure.

Technology is evolving at a much faster rate than in the past, so we are updating our equipment rental system to keep up. As we all know, in the past, people would collect the data of rented and returned equipment in the bill collected copy. And to see the data of a specific person, we must search all of the collected bill copies to see whether or not he had rented or returned equipment within the time limit, and whether or not he/she had paid the fine for the respected equipment. Such records were difficult to find in the collected bill copies.

As in this time and period there are many advance technology are bring introduce. We have to go along with it as environment and situation are demanding it. As for the demanding equipment management system is made. This equipment management system provides the information about the equipment which are available and about the person who rented and returned the equipment's. Not only has that it also provided the information about the equipment whether or not the rented equipment's are returned in the given period of time if not the customer should pay the fine for the delay day.

The main focus of this course work is to find students' understanding and capability, in this course work students are to make equipment renting system where a person he/she is to rent or return the equipment and weather the rented equipment's are returned in the given period of time if he/she doesn't then they have to pay the fine for the returned equipment's delay. The following technologies are used to construct the renting system.

1.2. Visual Studio Code

VS Code is another name for the IDE Visual Studio Code. Visual Studio Code's main functionality, a lightning-fast source code editor, makes it perfect for regular use. With its extensive language support and tools like syntax highlighting, bracket matching, autoindentation, box selection, snippets, and more, Visual Studio Code makes it simple for you to get up and running quickly. With the use of minor modifications, smart keyboard shortcuts, and just plain blocks of text, you can navigate your code with ease. I used this IDE to create the Python code for the community-contributed keyboard shortcut mappings for my coursework. Tools with deeper code understanding are needed for serious coding (Visual Studio Code , 2023).

2. Discussion and Analysis

2.1. Algorithm

An algorithm is a method for running programmes step by step and in a certain order to produce the desired results. It develops simple language that makes programmes and their execution procedures simpler to comprehend (UpGrad, 2020).

The algorithm of this program is:-

Step 1: Start

Step 2: Choose a given number from 1 to 4

Step 3: If choose 1 display items

Step 4: If choose 2 display items and goto renting process i.e step 4.1

Step 4.1: Enter customer name, customer address, customer contact, serial number, quantity, duration

Step 4.2: Initialize varible item and call find_item_by_serial_number function and pass item_list and serial_number

Step 4.3: If item is none print message item not found

Step 4.4: If quantity is equal to user input quantity print message out of stock

Step 4.5: Calculate grand total with vat

Step 4.6: Store customer name, customer address, customer contact, serial number, quantity, duration, grand totol in invoice

Step 4.7: Updated the quantity

Step 4.8: Write invoice

Step 4.9: Display rented successful

Step 4.10: Print Invoice

```
Step 5:  if choose 3 goto returning process i.e step 5.1
    Step 5.1: Enter customer name, serial number, quantity
    Step 5.2: Initialize varible item and call find_item_by_serial_number function and Pass the item_list and serial number
    Step 5.3: If item is none print message item not found
    Step 5.4: Enter rental duration
    Step 5.5: Calculate total amount
    Step 5.7: Updated the quantity
    Step 5.8: Write invoice
    Step 5.9: Display return successful
    Step 5.10: Print Invoice
Step 6: If choose 4  end program
Step 7: Else display validation message
Step 8: Exit
```

2.2. Flowchart

Flowchart is a graphical representation of steps in a sequential order which is used to present the flow of process of program.

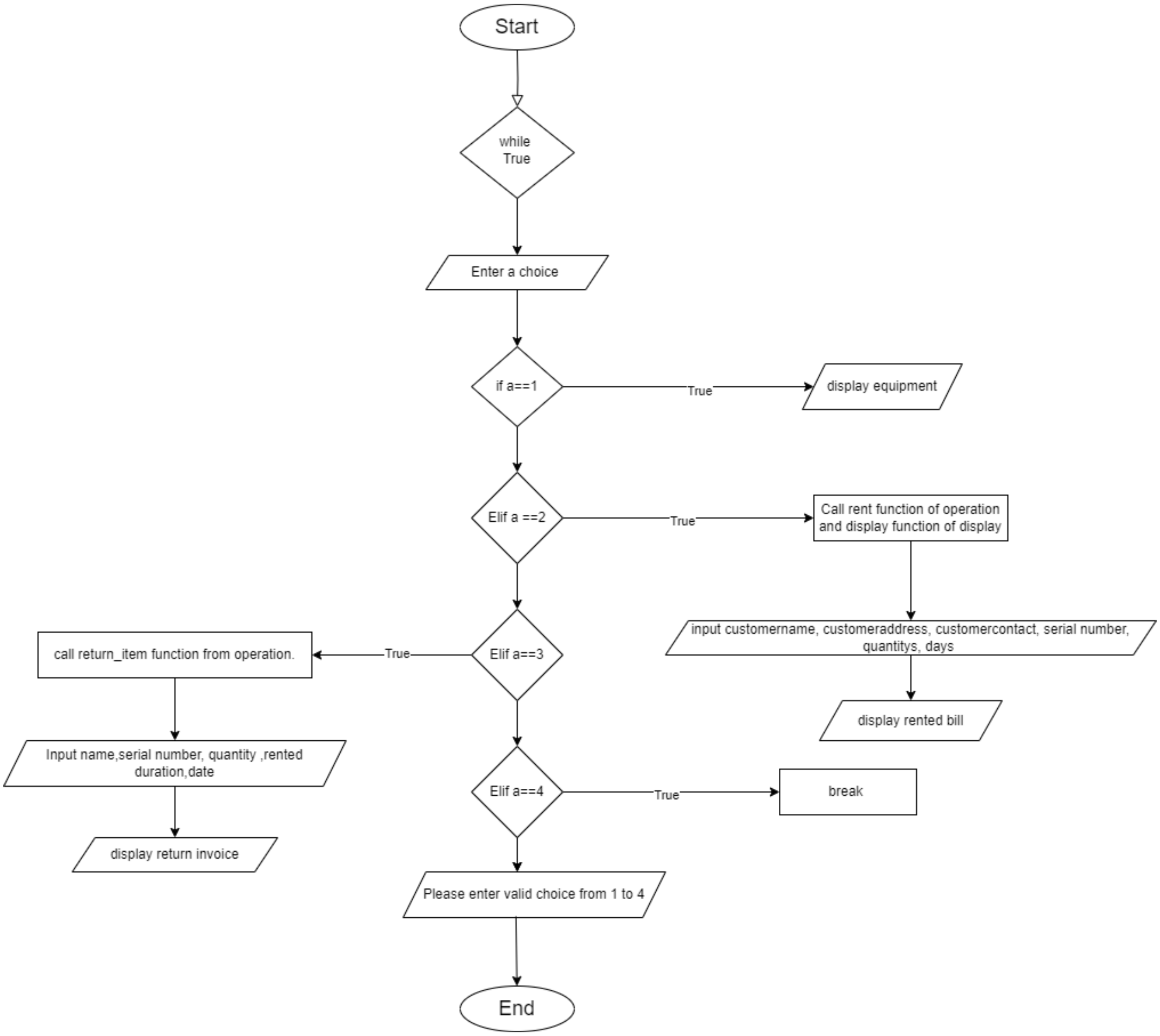

Start
while True
Enter a choice
if a==1
True
display equipment
Elif a ==2
True
Call rent function of operation and display function of display
input customername, customeraddress, customercontact, serial number, quantitys, days
display rented bill
Elif a==3
True
call return_item function from operation.
Input name,serial number, quantity ,rented duration,date
display return invoice
Elif a==4
True
break
Please enter valid choice from 1 to 4
End

Figure 1: Flowchart

2.3. PseudoCode

PseudoCode of Display.py

```
CREATE function display_table and pass item_list in parameter
    print (+----+----------------------+----------+-----------------+-----------+)
    print (|SN | Equipment Name |   Brand │Price (5 days) │Quantity │ )
    print (+----+----------------------+----------+-----------------+-----------+)
    FOR each item in item_list:
        Print( serial number left-aligned within 4 spaces, name (up to 35
        characters) left-aligned within 35 spaces, brand (up to 20 characters) left-
        aligned within 20 spaces, price right-aligned within 12 spaces, quantity right-
        aligned within 8 spaces)
    End For loop
    print (:-----+----------------------+---------+------------------+------------+)
    End For loop
    End Function
```

PseudoCode of Write.py

```
CREATE function write_bill and pass filename, item_list in parameter
        OPEN a file name file_name in write mode
        START FOR LOOP
         FOR each item in item_list:
            CREATE variable line = f"{item['serial_number']},
         {item['name']},{item['brand']},${item['price']}, {item ['quantity']}\n"
            WRITE line in a file
            END FOR LOOP
```

PseudoCode of Main.py

```
IMPORT display
IMPORT operation
IMPORT read
DECLEAR a function main()
    CREATE item_list which read data from items.txt using read_item function
    CREATE banner variable that contain banner
    PRINT banner
  While True:
        PRINT enter 1 for display items
        PRINT enter 2 for rent items
        PRINT enter 3 for return items
        PRINT enter 4 for quit
        TRY
            CREATE variable a for user input
            IF a == 1:
                Call display_table function with item_list as argument

            ELIF a == 2:
                Call display_table function with item_list as argument
                Call rent function from operation and pass parameter
                item_list
            ELIF a == 3:
                Call return_item function from operation and pass
                Parameter item_list
            ELIF a == 4:
                Print message "Thank you for trusting bot rental
                service"
                BREAK

            ELSE:

                Print message "Please enter valid choose from 1 to 4"


        EXCEPT Valueerror:
                Print message"Please input as suggested"
Main()
```

PseudoCode of Read.py

```
    CREATE function read_item and pass filename in parameter
            CREATE a item_list as a list
            OPEN a file named file_name in read mode
                FOR each line in file:
                    CREATE a data variable that Split the line by comma
                    and space to get pieces of data
                    CREATE a dictionary item that
                    SET'serial_number' key to the integer value of data[0]
                    SET 'name' key to data[1]
                    SET 'brand' key to data[2]
                    Replace '$' from data[3] and convert it to a floating-
                    point    value, set as 'price' key
                    SET 'quantity' key to the integer value of data[4]

                    ADD the item dictionary to the end of items_

                    list
                End FOR
            RETURN the item_ list
```

PseudoCode of Operation.py

```
IMPORT datetime
IMPORT write
CREATE function rent and pass item_list in parameter
    CREATE customer name variable which ask user for name
    CREATE customer address variable which ask user for address
    CREATE customer contact with integer data type variable which ask user for number
    CREATE serial_number variable which Ask the user for the serial   number of item
    CREATE quantity variable with integer data type which ask user for quantity
    CREATE duration variable with integer data type
    CREATE item variable  and call find_item_by_serial_number function
    IF item is None then
        Print serial number doesn't exists
        RETURN
    IF item quantity ==0 then
        Print out of stock
        RETURN
    CREATE total_amount variable that store item[price] * quantity * duration
    CREATE vat variable that store round(.13 * total_amount)
    CREATE grand_total variable that store total_amount + vat
    CREATE rentdate variable that store variable
    CREATE invoice variable that store bill details and create bill using f String
    Decrease item quantity by use input quantity
    Update the item_list file using write_bill function of write class
    CREATE bill variable that open in write mode and generate rented bill
    Print message"Rented successful"
    Print invoice

Create function return_equipment and pass filename, item_list, in parameter
    CREATE customer name variable which ask user for name
    CREATE serial_number variable which Ask the user for the serial   number of item to return
    CREATE renturn_date that stores date
    CREATE item and call find_item_by_serial_number function
    IF item is None then
        Print messag " serial number doesn't"
        Return
    CREATE rental_duartion variable with integer data type
    CREATE fine variable and store 20
    CREATE rental variable with integer data type
    STORE the date in yyyy,mm,dd variable
    CREATE  a variable rentaldate that store date
    CREATE a variable slow and store day
    IF slow<= rental_duration then
        Day =0
    ELSE
        Day= slow-rental_duration
    CREATE a variable fine that store fine_amt * amt
    CREATE a variable d that store rental_duration/5 as a int
    If rental_duartion /5 remainder =0 then
        d=0+d
    else
        d=1+d
    CREATE a variable total_amount that calculate price of item * rental_duration+ rental duration
    CREATE vat variable that store round(.13 * total_amount)
    CREATE grand_total variable that store total_amount + vat + fine
    CREATE invoice variable that store bill details and create bill using f String
    Increase item quantity by use input quantity
    Update the item_list file using write_bill function of write class
     CREATE bill variable that open in write mode and generate rented bill
    (replace spaces with underscores)
    Print "Item return successfully !"
    Print invoice
```

```
Create function find_item_by_serial_number and pass item_list, serial_number in parameter
        FOR item in item_List
                IF serial_number of item  matches the given serial_number then
                Return item
         Return None
```

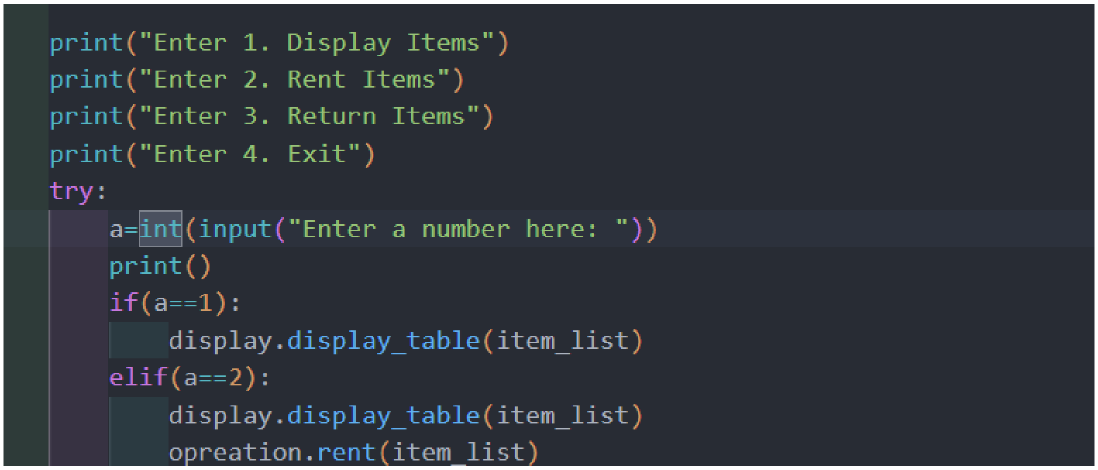
2.4. Data Structure

A data structure is an important tool for any coder. It is used to store data in memory in an organised manner while the programme is running. It explains the relationship between data and the logical operators that are applied to it. It is divided into two categories: primitive and non-primitive data types.

The data types which are used in this course are both primitive and non-primitive data types which are: -

1) Integer

It is a numerical data types which holds the positive and negative numbers which does not hold any decimal points. Such as 1, -3, 100 etc. In this course work it is used to get user input .

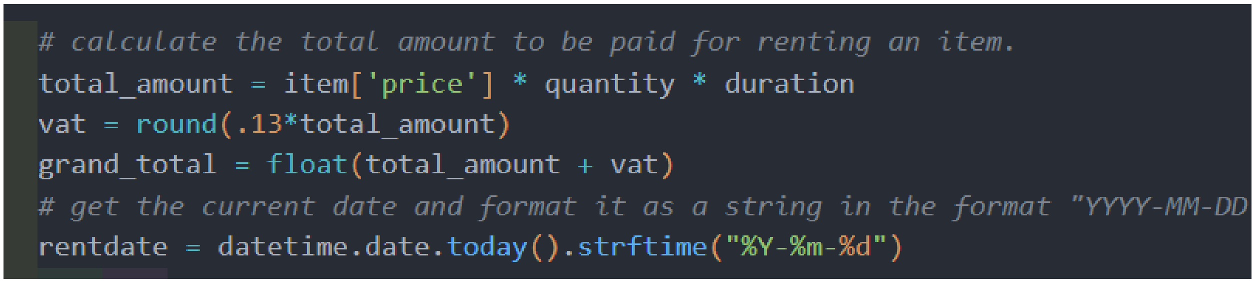


```
print("Enter 1. Display Items")
print("Enter 2. Rent Items")
print("Enter 3. Return Items")
print("Enter 4. Exit")
try:
    a=int(input("Enter a number here: "))
    print()
    if(a==1):
        display.display_table(item_list)
    elif(a==2):
        display.display_table(item_list)
        opreation.rent(item_list)
```

Figure 2: Integer Data Type

2) Float

It is also a numerical data types but it holds the decimals numbers or rational numbers. In this course work it holds the value of grand total of rented item as shown in below

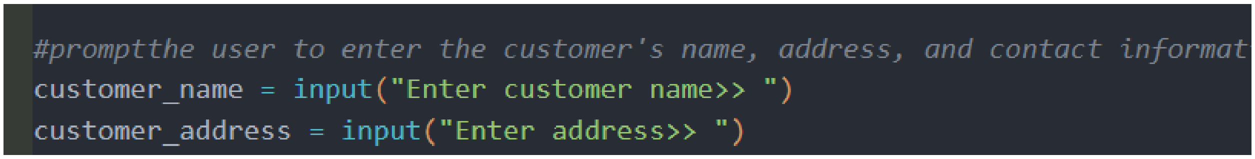


```
# calculate the total amount to be paid for renting an item.
total_amount = item['price'] * quantity * duration
vat = round(.13*total_amount)
grand_total = float(total_amount + vat)
# get the current date and format it as a string in the format "YYYY-MM-DD
rentdate = datetime.date.today().strftime("%Y-%m-%d")
```

Figure 3: Float Data Type

3) String

It is a collection if alphabetical word, which is used to create a single or multiple lines of world. In this course work it stores the decision of the user as shown in below

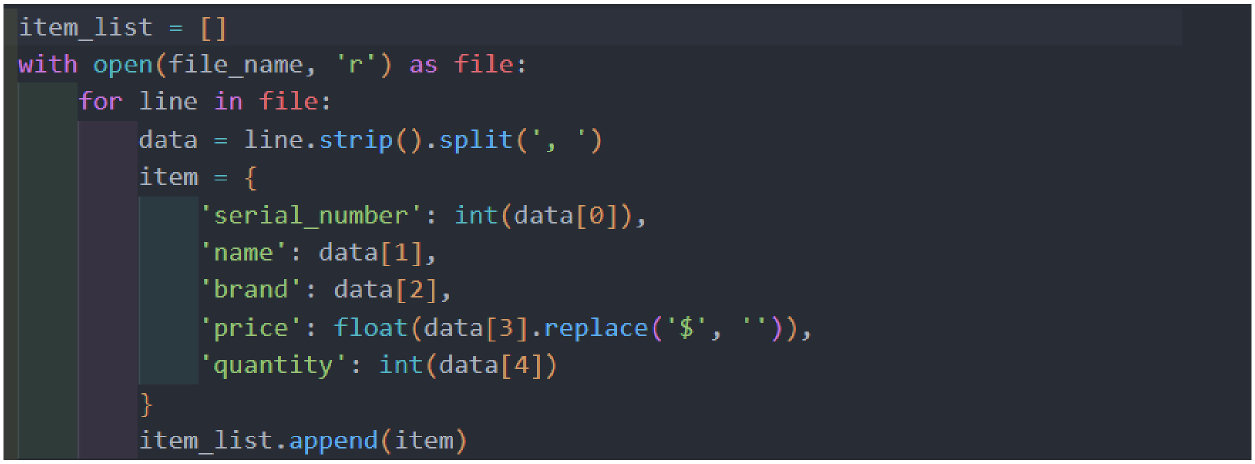


```
#promptthe user to enter the customer's name, address, and contact informat
customer_name = input("Enter customer name>> ")
customer_address = input("Enter address>> ")
```

Figure 4: String Data Type

4) List

It is a non-primitive data type, it is versatile data structure which is written as a list of comma-separated elements enclosed with in square brackets. In this course work it is used to items.



```
item_list = []
with open(file_name, 'r') as file:
    for line in file:
        data = line.strip().split(', ')
        item = {
            'serial_number': int(data[0]),
            'name': data[1],
            'brand': data[2],
            'price': float(data[3].replace('$', '')),
            'quantity': int(data[4])
        }
        item_list.append(item)
```

Figure 5: List Data type

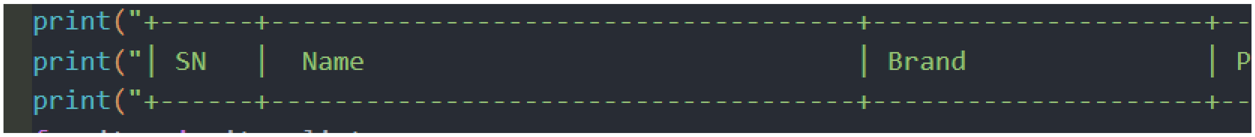
3. Program

i) Display.py

In this module it show items in a table format

Function use in display module are:

print(): - this function is used to print the given output.



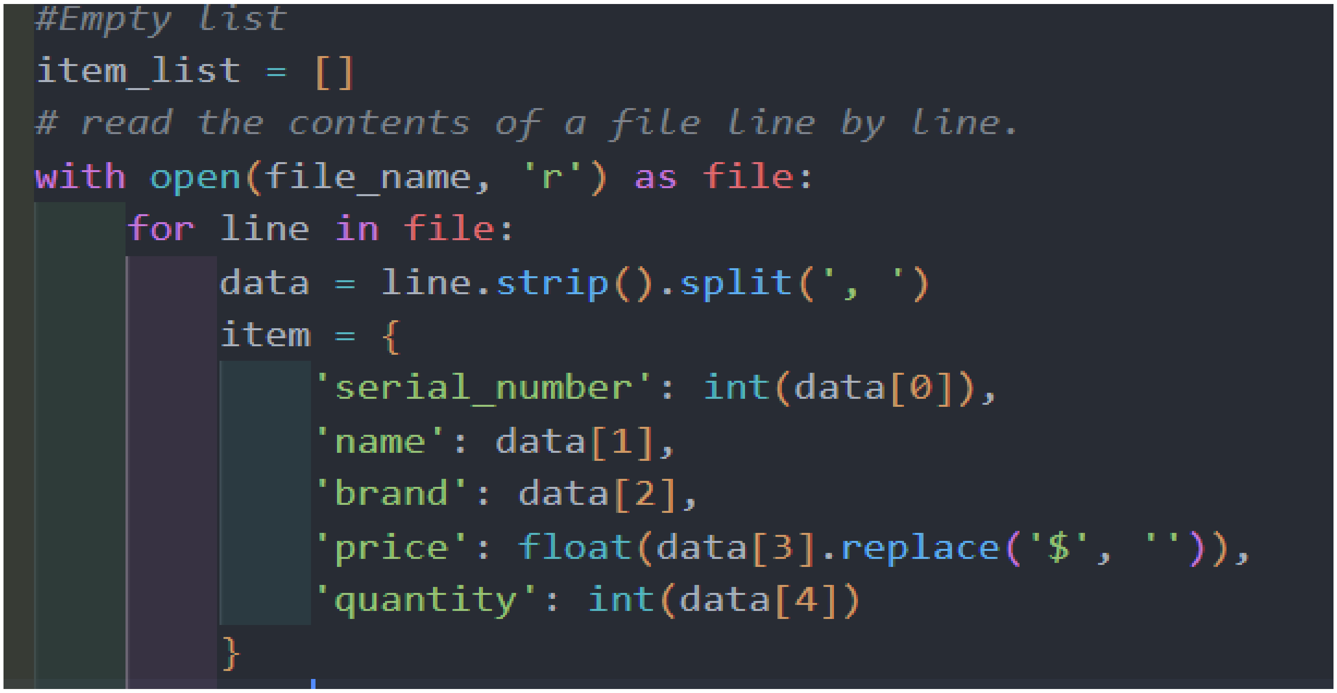
```
print("+------+-------------------------------------+---------------------+--
print("| SN   |  Name                               | Brand               | P
print("+------+-------------------------------------+---------------------+--
```

Figure 6: Print Function

ii) Read.py

In this module the function read_item read the content of file and add item in item_list dictionary

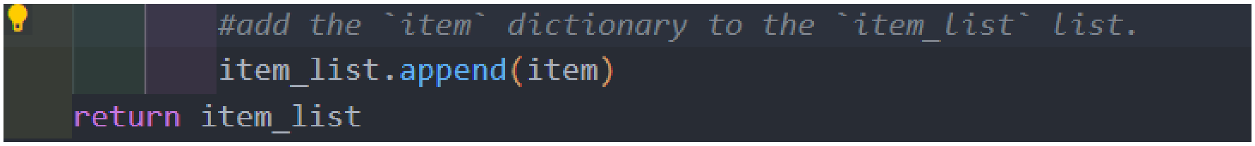
read(): - this function is used to read the file.



```
#Empty list
item_list = []
# read the contents of a file line by line.
with open(file_name, 'r') as file:
    for line in file:
        data = line.strip().split(', ')
        item = {
            'serial_number': int(data[0]),
            'name': data[1],
            'brand': data[2],
            'price': float(data[3].replace('$', '')),
            'quantity': int(data[4])
        }
```

Figure 7: Read Function

append(): - this function is used to add elements to list.

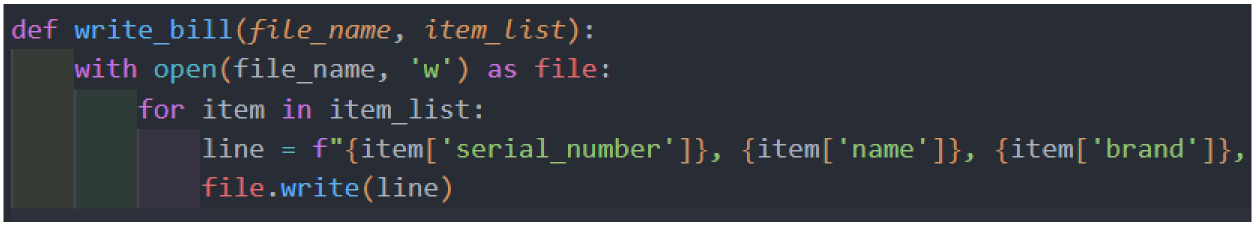


```
            #add the `item` dictionary to the `item_list` list.
            item_list.append(item)
    return item_list
```

Figure 8: Append Function

iii) Write.py

write(): this function is used to write bill.

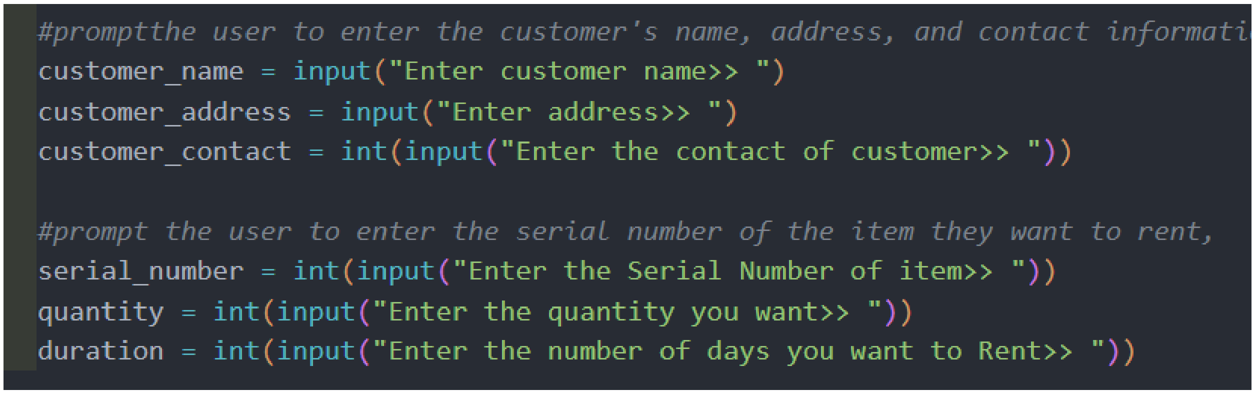


```
def write_bill(file_name, item_list):
    with open(file_name, 'w') as file:
        for item in item_list:
            line = f"{item['serial_number']}, {item['name']}, {item['brand']},
            file.write(line)
```

Figure 9: Write function

iv) Operation.py

input():- this function takes user input

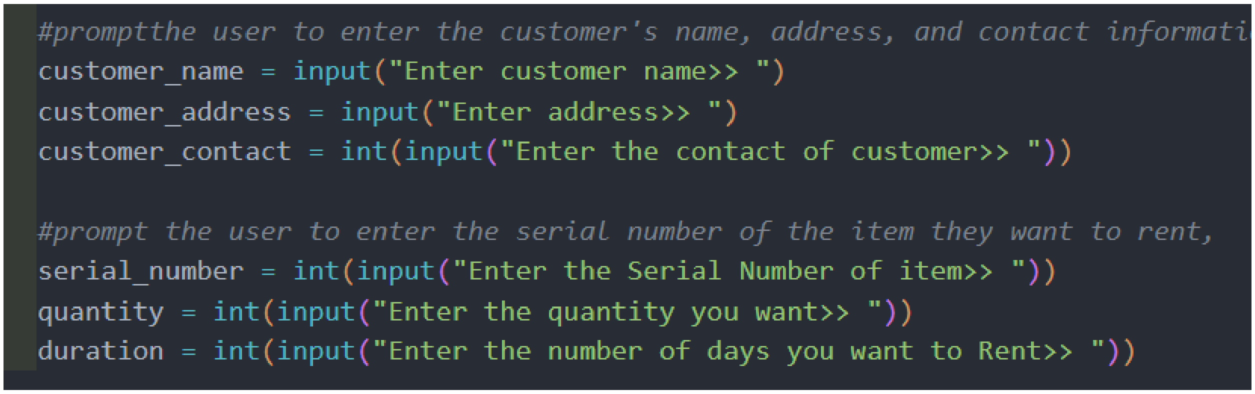


```
    #promptthe user to enter the customer's name, address, and contact informati
    customer_name = input("Enter customer name>> ")
    customer_address = input("Enter address>> ")
    customer_contact = int(input("Enter the contact of customer>> "))

    #prompt the user to enter the serial number of the item they want to rent,
    serial_number = int(input("Enter the Serial Number of item>> "))
    quantity = int(input("Enter the quantity you want>> "))
    duration = int(input("Enter the number of days you want to Rent>> "))
```

Figure 10: Input Function

int(): - this function is used to take integer number.

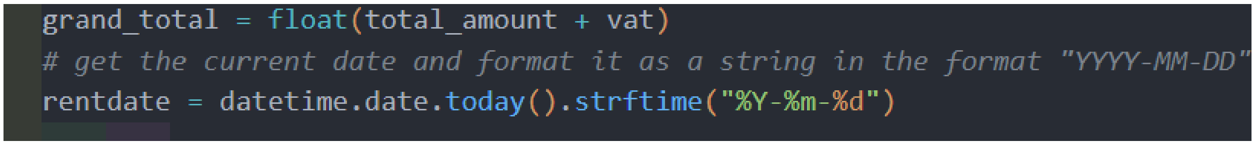


```
#promptthe user to enter the customer's name, address, and contact informati
customer_name = input("Enter customer name>> ")
customer_address = input("Enter address>> ")
customer_contact = int(input("Enter the contact of customer>> "))

#prompt the user to enter the serial number of the item they want to rent,
serial_number = int(input("Enter the Serial Number of item>> "))
quantity = int(input("Enter the quantity you want>> "))
duration = int(input("Enter the number of days you want to Rent>> "))
```

Figure 11: Int Function

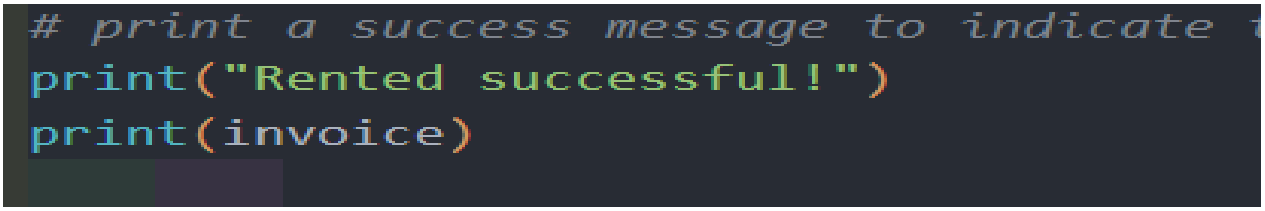
float(): - this function is used to take float number.



```
grand_total = float(total_amount + vat)
# get the current date and format it as a string in the format "YYYY-MM-DD"
rentdate = datetime.date.today().strftime("%Y-%m-%d")
```

Figure 12: Float Function

print() : - this function is used to print the standard output



```
# print a success message to indicate
print("Rented successful!")
print(invoice)
```

Figure 13: Print Function

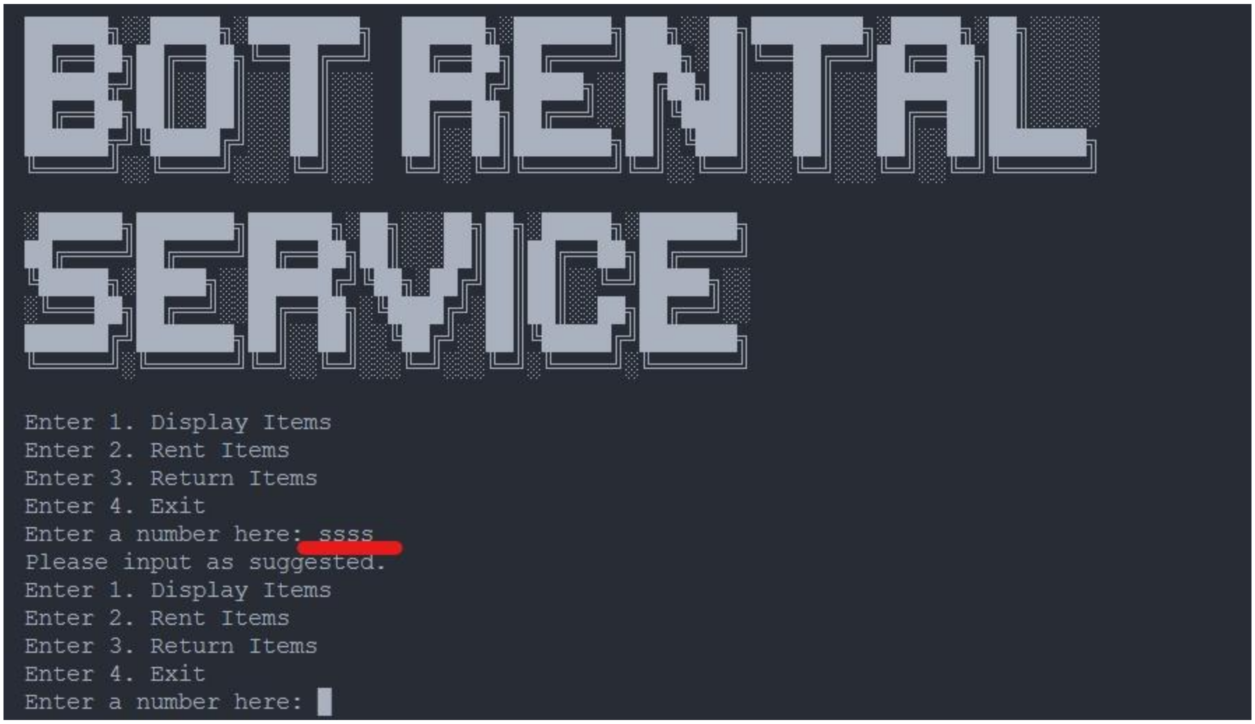
4. Testing

Testing is a crucial component of a program since it allows a programmer or developer to see if their program is working properly or not. If it isn't, it allows the developer to identify the problem and fix it.

Test 1:

Table 1: Test 1 table

Objectives	To check whether it can handle exceptions or not
Action	Entering invalid input
Expected Output	It should be able to handle any sum of input of user
Actual Output	The program was able to handle even the wrong input of use
conclusion	The program runs in its flow until user closes it



```
Enter 1. Display Items
Enter 2. Rent Items
Enter 3. Return Items
Enter 4. Exit
Enter a number here: ssss
Please input as suggested.
Enter 1. Display Items
Enter 2. Rent Items
Enter 3. Return Items
Enter 4. Exit
Enter a number here: 
```

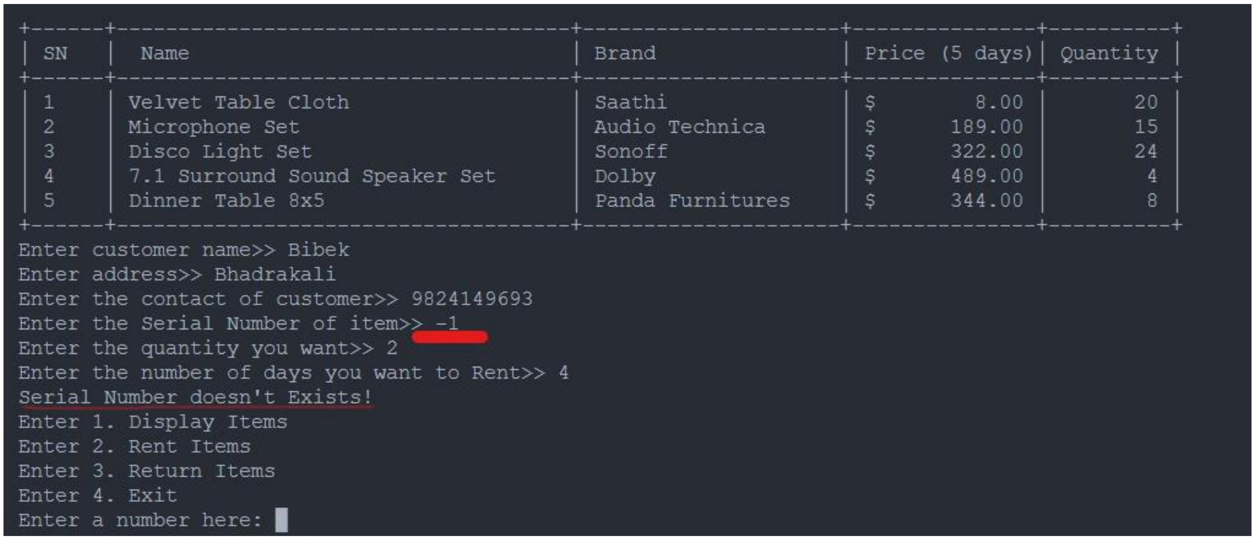
Figure 14: Figure of Test 1:

Test 2

Test of Rent:

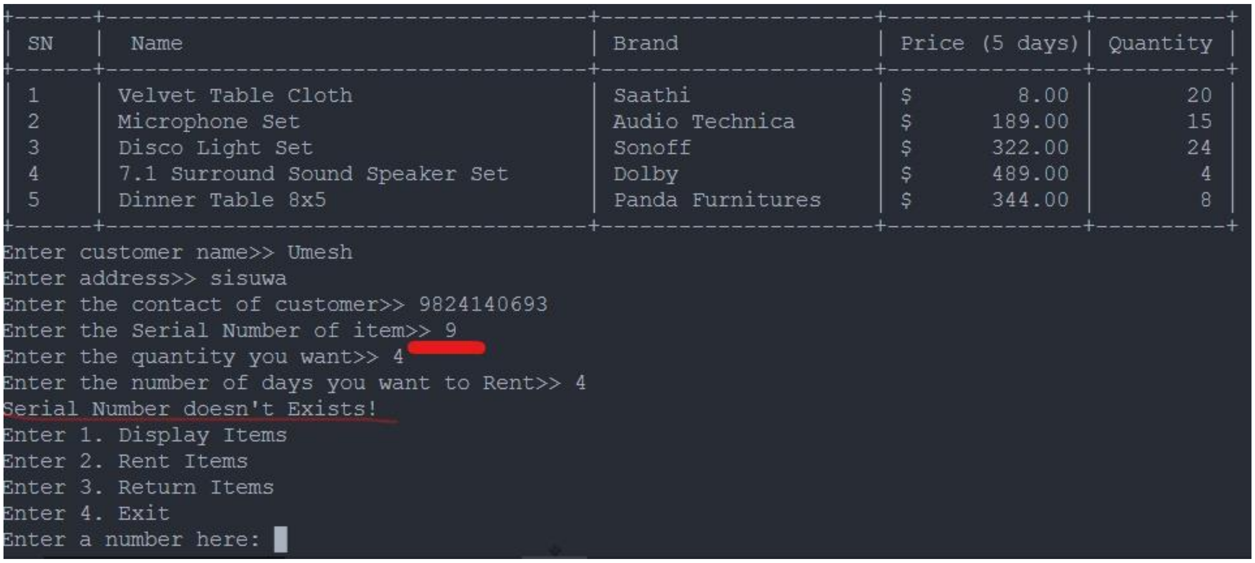
Table 2:Test table of rent item

Objectives	To check whether it can accept negative value or non existing value
Action	Providing negative and non exsting value on rent
Expected Output	Program should display error message
Actual Output	Display error message
conclusion	Test successful



```
+------+-------------------------------------+---------------------+---------------+----------+
| SN   |  Name                               | Brand               | Price (5 days)| Quantity |
+------+-------------------------------------+---------------------+---------------+----------+
| 1    | Velvet Table Cloth                  | Saathi              | $        8.00 |       20 |
| 2    | Microphone Set                      | Audio Technica      | $      189.00 |       15 |
| 3    | Disco Light Set                     | Sonoff              | $      322.00 |       24 |
| 4    | 7.1 Surround Sound Speaker Set      | Dolby               | $      489.00 |        4 |
| 5    | Dinner Table 8x5                    | Panda Furnitures    | $      344.00 |        8 |
+------+-------------------------------------+---------------------+---------------+----------+
Enter customer name>> Bibek
Enter address>> Bhadrakali
Enter the contact of customer>> 9824149693
Enter the Serial Number of item>> -1
Enter the quantity you want>> 2
Enter the number of days you want to Rent>> 4
Serial Number doesn't Exists!
Enter 1. Display Items
Enter 2. Rent Items
Enter 3. Return Items
Enter 4. Exit
Enter a number here:
```

Figure 15: Enter negative value



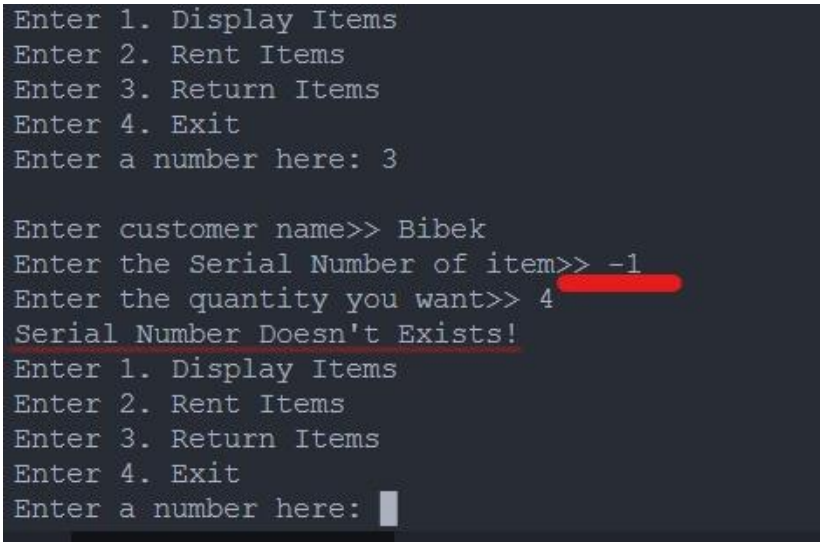
```
+------+------------------------------------+--------------------+---------------+----------+
| SN   |  Name                              | Brand              | Price (5 days)| Quantity |
+------+------------------------------------+--------------------+---------------+----------+
| 1    | Velvet Table Cloth                 | Saathi             | $        8.00 |       20 |
| 2    | Microphone Set                     | Audio Technica     | $      189.00 |       15 |
| 3    | Disco Light Set                    | Sonoff             | $      322.00 |       24 |
| 4    | 7.1 Surround Sound Speaker Set     | Dolby              | $      489.00 |        4 |
| 5    | Dinner Table 8x5                   | Panda Furnitures   | $      344.00 |        8 |
+------+------------------------------------+--------------------+---------------+----------+
Enter customer name>> Umesh
Enter address>> sisuwa
Enter the contact of customer>> 9824140693
Enter the Serial Number of item>> 9
Enter the quantity you want>> 4
Enter the number of days you want to Rent>> 4
Serial Number doesn't Exists!
Enter 1. Display Items
Enter 2. Rent Items
Enter 3. Return Items
Enter 4. Exit
Enter a number here:
```

Figure 16: Entering non existing value

Test of Return

Table 3: Test table of return item

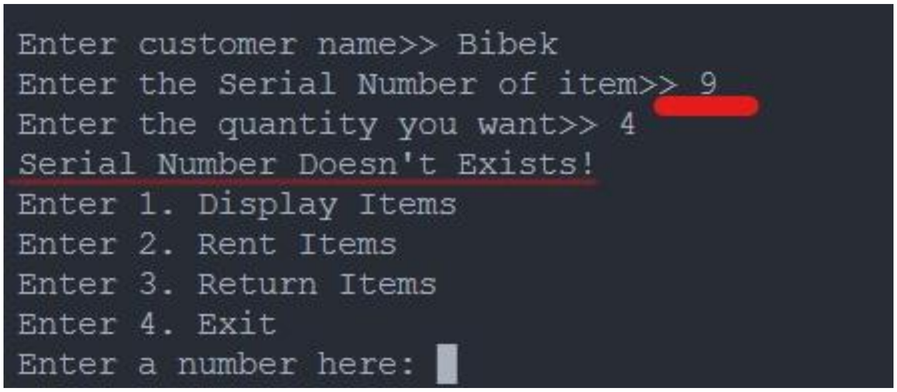
Objectives	To check whether it can accept negative value or non existing value
Action	Providing negative and non exsting value on return
Expected Output	Program should display error message
Actual Output	Display error message
conclusion	Test successful



```
Enter 1. Display Items
Enter 2. Rent Items
Enter 3. Return Items
Enter 4. Exit
Enter a number here: 3

Enter customer name>> Bibek
Enter the Serial Number of item>> -1
Enter the quantity you want>> 4
Serial Number Doesn't Exists!
Enter 1. Display Items
Enter 2. Rent Items
Enter 3. Return Items
Enter 4. Exit
Enter a number here:
```

Figure 17: Entering negative value in return items



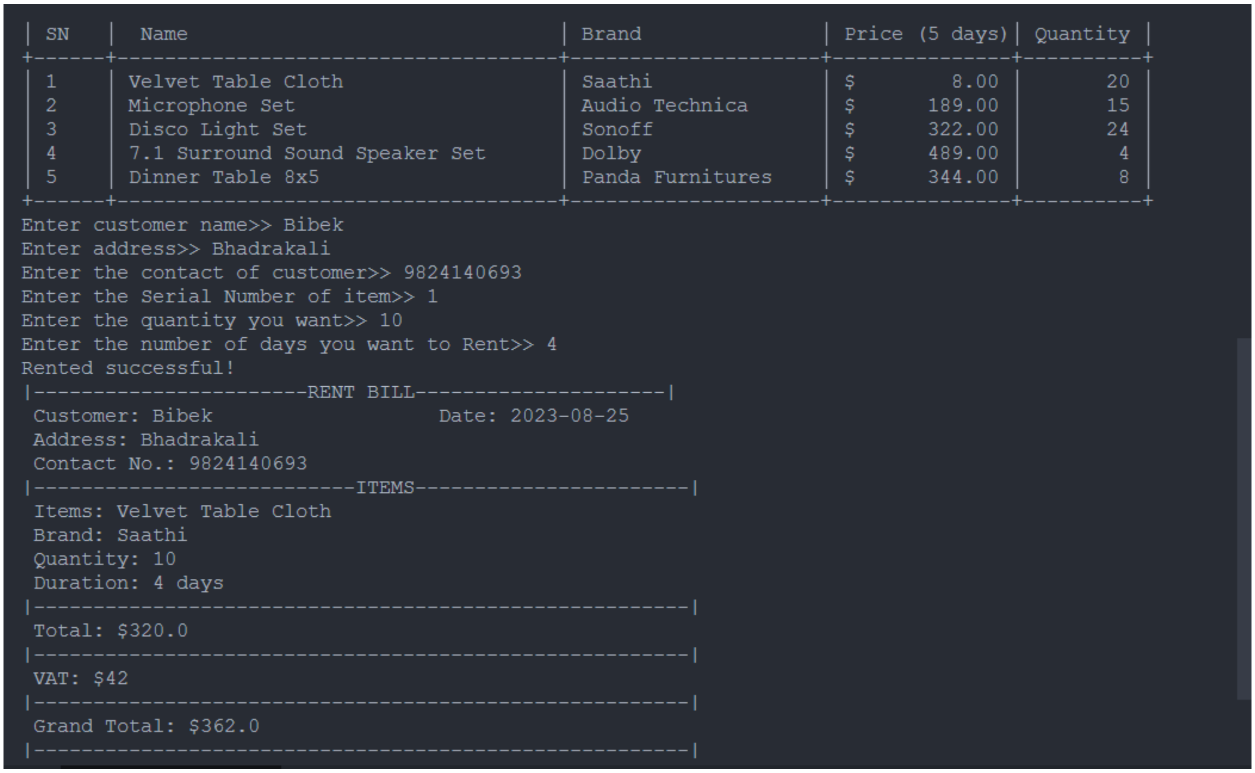
```
Enter customer name>> Bibek
Enter the Serial Number of item>> 9
Enter the quantity you want>> 4
Serial Number Doesn't Exists!
Enter 1. Display Items
Enter 2. Rent Items
Enter 3. Return Items
Enter 4. Exit
Enter a number here:
```

Figure 18: Entering non existing value on return item

Test 3

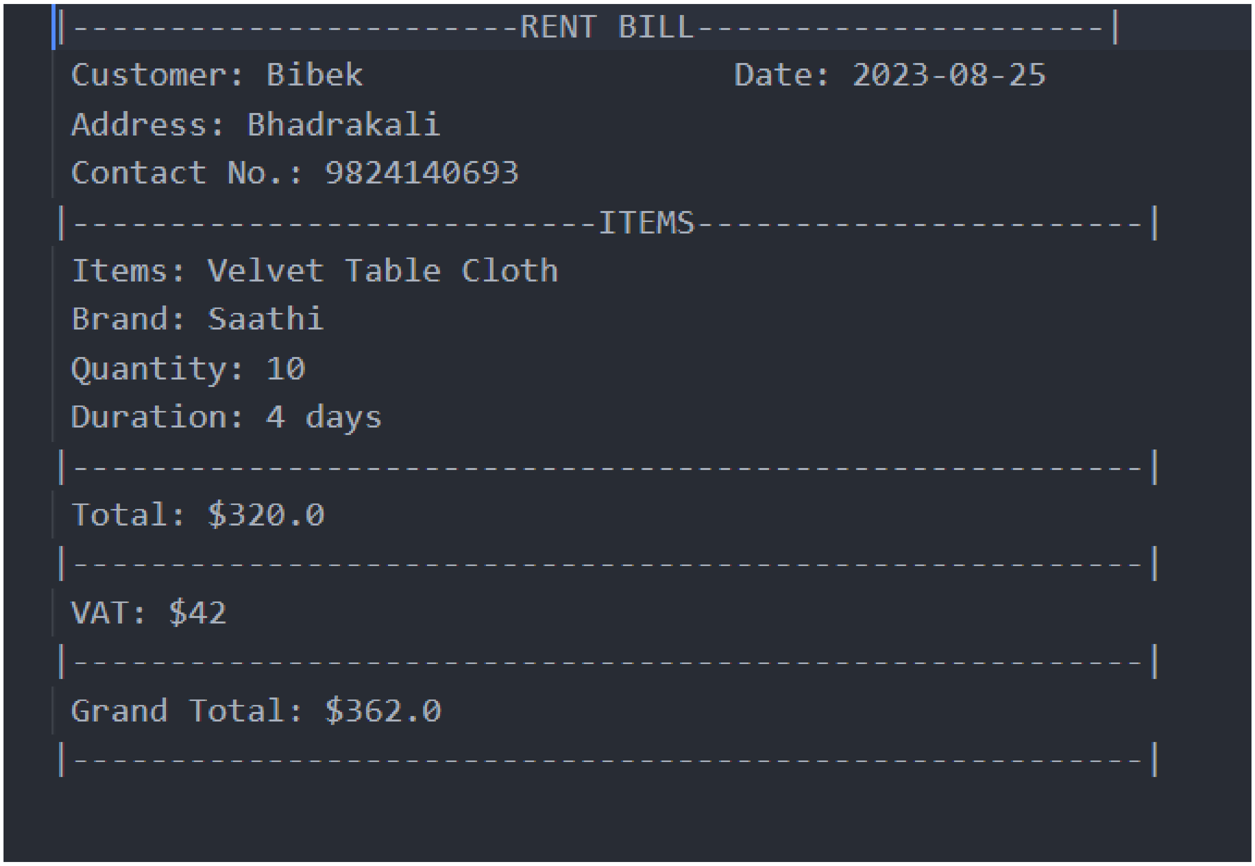
Table 4: Test 3 table of rent bill

Objectives	To rent the available item and show the bill generated in text file and shell.
Action	Run the renting process and enter all the entered values
Expected Output	The program should run smoothly and generate bill in text file and display in shell
Actual Output	The program run smoothly and generate bill in text file and display in shell
conclusion	Test successful



```
| SN   |  Name                              | Brand               | Price (5 days)| Quantity |
+------+------------------------------------+---------------------+---------------+----------+
| 1    | Velvet Table Cloth                 | Saathi              | $        8.00 |       20 |
| 2    | Microphone Set                     | Audio Technica      | $      189.00 |       15 |
| 3    | Disco Light Set                    | Sonoff              | $      322.00 |       24 |
| 4    | 7.1 Surround Sound Speaker Set     | Dolby               | $      489.00 |        4 |
| 5    | Dinner Table 8x5                   | Panda Furnitures    | $      344.00 |        8 |
+------+------------------------------------+---------------------+---------------+----------+
Enter customer name>> Bibek
Enter address>> Bhadrakali
Enter the contact of customer>> 9824140693
Enter the Serial Number of item>> 1
Enter the quantity you want>> 10
Enter the number of days you want to Rent>> 4
Rented successful!
|-----------------------RENT BILL---------------------|
 Customer: Bibek                  Date: 2023-08-25
 Address: Bhadrakali
 Contact No.: 9824140693
|---------------------------ITEMS-----------------------|
 Items: Velvet Table Cloth
 Brand: Saathi
 Quantity: 10
 Duration: 4 days
|-------------------------------------------------------|
 Total: $320.0
|-------------------------------------------------------|
 VAT: $42
|-------------------------------------------------------|
 Grand Total: $362.0
|-------------------------------------------------------|
```

Figure 19: Rent bill shown on shell



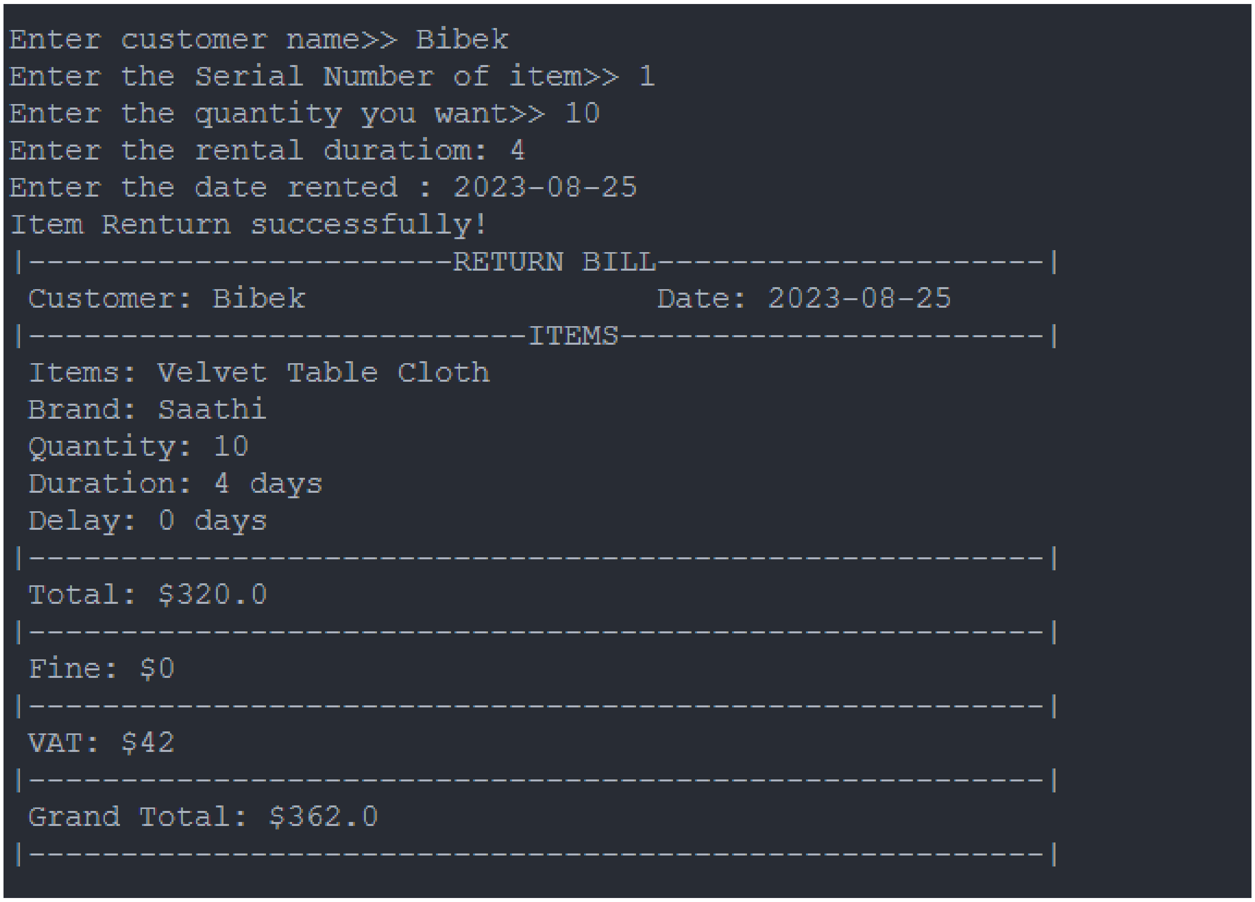
```
|-----------------------RENT BILL---------------------|
 Customer: Bibek                   Date: 2023-08-25
 Address: Bhadrakali
 Contact No.: 9824140693
|---------------------------ITEMS-----------------------|
 Items: Velvet Table Cloth
 Brand: Saathi
 Quantity: 10
 Duration: 4 days
|-------------------------------------------------------|
 Total: $320.0
|-------------------------------------------------------|
 VAT: $42
|-------------------------------------------------------|
 Grand Total: $362.0
|-------------------------------------------------------|
```

Figure 20: Rented Bill

Test 4

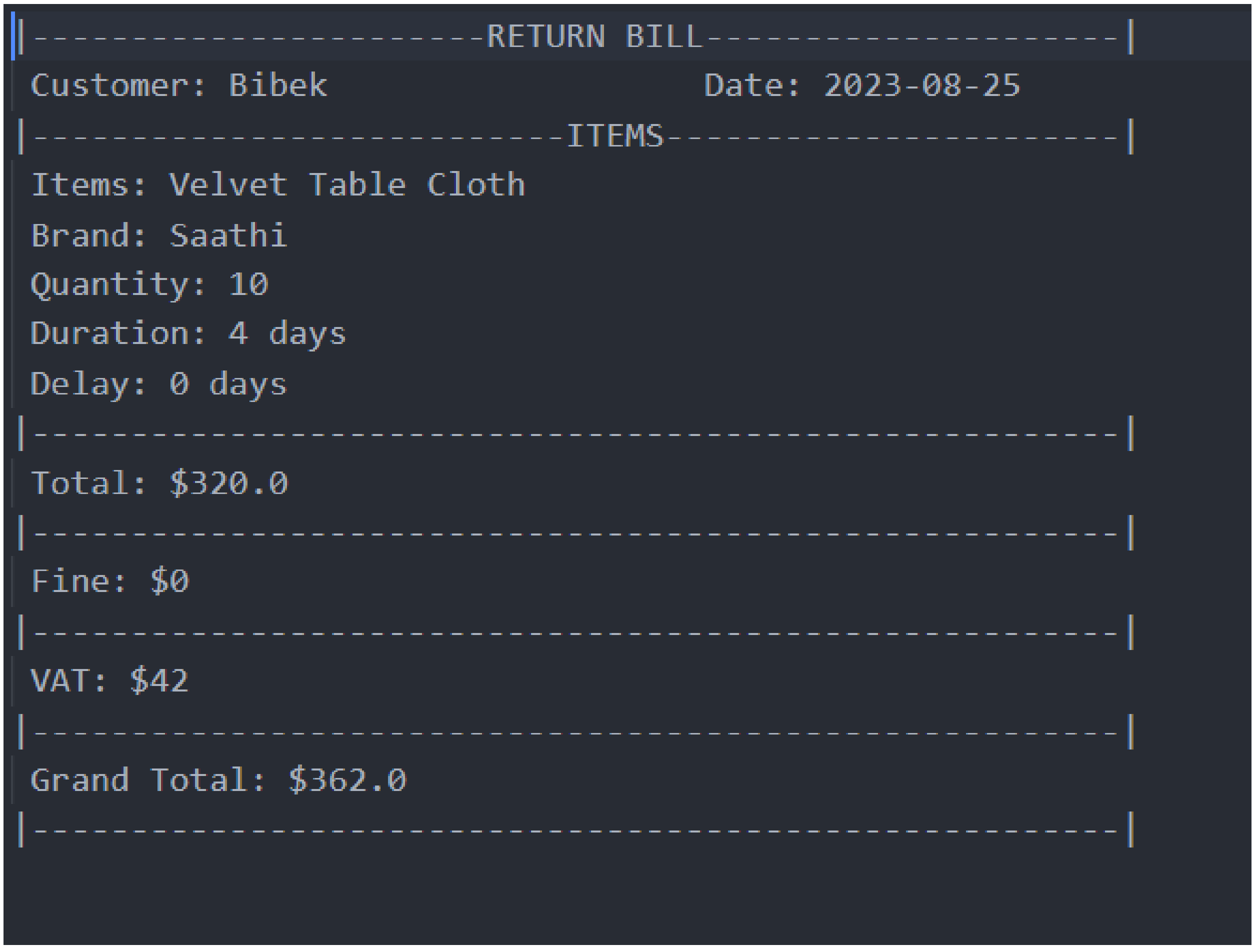
Table 5: Test 4 table

Objectives	To rent the a rented item and show the return bill generated in text file and shell.
Action	Run the returning process and enter all the entered values
Expected Output	The program should run smoothly and generate return bill bill in text file and display in shell
Actual Output	The program run smoothly and generate return bill in text file and display in shell
conclusion	Test successful



```
Enter customer name>> Bibek
Enter the Serial Number of item>> 1
Enter the quantity you want>> 10
Enter the rental duratiom: 4
Enter the date rented : 2023-08-25
Item Renturn successfully!
|-----------------------RETURN BILL---------------------|
 Customer: Bibek                   Date: 2023-08-25
|---------------------------ITEMS-----------------------|
 Items: Velvet Table Cloth
 Brand: Saathi
 Quantity: 10
 Duration: 4 days
 Delay: 0 days
|-------------------------------------------------------|
 Total: $320.0
|-------------------------------------------------------|
 Fine: $0
|-------------------------------------------------------|
 VAT: $42
|-------------------------------------------------------|
 Grand Total: $362.0
|-------------------------------------------------------|
```

Figure 21: Return bill shown on shell



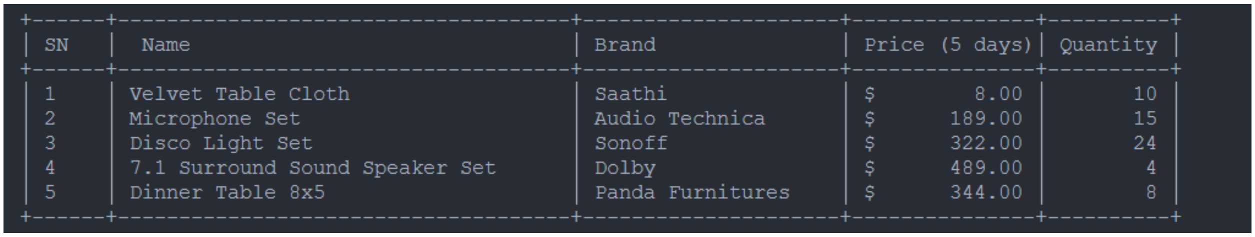
```
|-----------------------RETURN BILL---------------------|
 Customer: Bibek                   Date: 2023-08-25
|---------------------------ITEMS-----------------------|
 Items: Velvet Table Cloth
 Brand: Saathi
 Quantity: 10
 Duration: 4 days
 Delay: 0 days
|-------------------------------------------------------|
 Total: $320.0
|-------------------------------------------------------|
 Fine: $0
|-------------------------------------------------------|
 VAT: $42
|-------------------------------------------------------|
 Grand Total: $362.0
|-------------------------------------------------------|
```

Figure 22: Returned Bill

Test 5

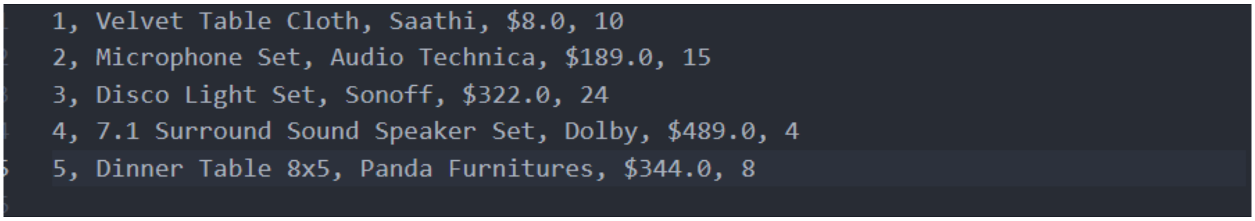
Table 6: Table of test 5

Objectives	Updated quantity according to return and rent
Action	Run the renting and returning process successfully
Expected Output	The quantity should be updated accordingly to quantity rented and returned
Actual Output	The quantity should be updated accordingly to quantity rented and returned
Conclusion	Test successful



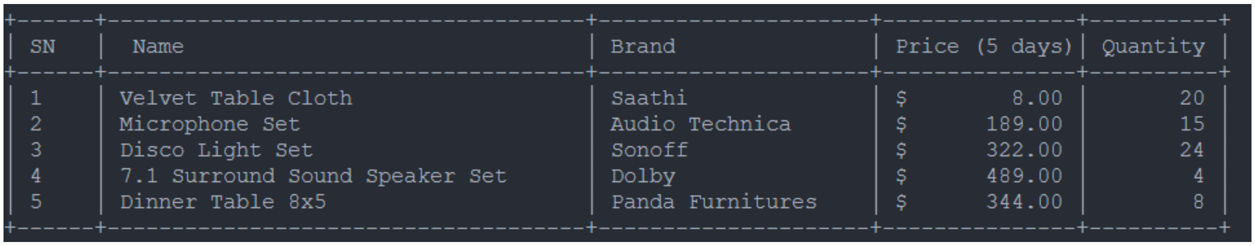
```
+------+-----------------------------------+--------------------+--------------+----------+
| SN   |  Name                             | Brand              | Price (5 days)| Quantity |
+------+-----------------------------------+--------------------+--------------+----------+
| 1    | Velvet Table Cloth                | Saathi             | $       8.00 |       10 |
| 2    | Microphone Set                    | Audio Technica     | $     189.00 |       15 |
| 3    | Disco Light Set                   | Sonoff             | $     322.00 |       24 |
| 4    | 7.1 Surround Sound Speaker Set    | Dolby              | $     489.00 |        4 |
| 5    | Dinner Table 8x5                  | Panda Furnitures   | $     344.00 |        8 |
+------+-----------------------------------+--------------------+--------------+----------+
```

Figure 23: After renting equipment



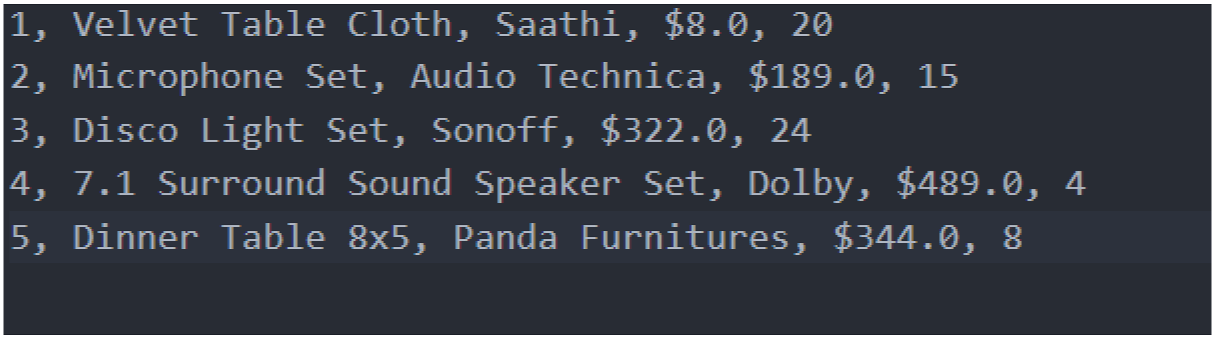
```
1, Velvet Table Cloth, Saathi, $8.0, 10
2, Microphone Set, Audio Technica, $189.0, 15
3, Disco Light Set, Sonoff, $322.0, 24
4, 7.1 Surround Sound Speaker Set, Dolby, $489.0, 4
5, Dinner Table 8x5, Panda Furnitures, $344.0, 8
```

Figure 24: Updated txt after renting item



```
+------+-----------------------------------+--------------------+--------------+----------+
| SN   |  Name                             | Brand              | Price (5 days)| Quantity |
+------+-----------------------------------+--------------------+--------------+----------+
| 1    | Velvet Table Cloth                | Saathi             | $       8.00 |       20 |
| 2    | Microphone Set                    | Audio Technica     | $     189.00 |       15 |
| 3    | Disco Light Set                   | Sonoff             | $     322.00 |       24 |
| 4    | 7.1 Surround Sound Speaker Set    | Dolby              | $     489.00 |        4 |
| 5    | Dinner Table 8x5                  | Panda Furnitures   | $     344.00 |        8 |
+------+-----------------------------------+--------------------+--------------+----------+
```

Figure 25: After returning items



```
1, Velvet Table Cloth, Saathi, $8.0, 20
2, Microphone Set, Audio Technica, $189.0, 15
3, Disco Light Set, Sonoff, $322.0, 24
4, 7.1 Surround Sound Speaker Set, Dolby, $489.0, 4
5, Dinner Table 8x5, Panda Furnitures, $344.0, 8
```

Figure 26: After returning item txt updated file

5. Conclusion

This course work is accomplished with numerous errors and corrections, as well as assistance and guidance.The module leader's assistance. There were several parts of this course that confused me, therefore the module leader provided pointers and support to help me understand to complete this course works. I also conducted extensive study to accomplish this course task on the subject of algorithms, flowcharts, pseudocode, and so on.

This course work helped me comprehend the program lot better while also learning more about Python, its built-in functions, comments, while and for loops, if/else conditions, and many other things. This course work was finished with the help and support of the module leader and hard work; during the course work completion, there was enthusiasm and thrill to finish the course work on time and to do better.

The coursework's major goal and objective is to create a system that will assist with create a billing system that is automated. We can print it on paper and give it to the appropriate person. Python is being used by customers. It is also intended to assess the student's general understanding of the module.It was a test to see if we could use suitable datatypes and functions to make the system work function properly. We can create any system like this if we have the information. The key goal was to understand how a system operates as well as its overall use and functionality of python is a language.

6. Bibliography

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[Accessed 21 Aug 2023].

7. Appendix

Display.py

```
def display_table(item_list):
    print("+------+-----------------------------------+--------------------+--------------+----------+")
    print("│ SN   │  Name                              │ Brand              │ Price (5 days)│ Quantity
│")
    print("+------+-----------------------------------+--------------------+--------------+----------+")
    for item in item_list:
        print("│ {:<4} │ {:<35} │ {:<20}│ ${:>12.2f} │ {:>8} │".format(
            item['serial_number'], item['name'][:35], item['brand'][:20],
            item['price'], item['quantity']))
    print("+------+-----------------------------------+--------------------+--------------+----------+")
```

Read.py

```
#The function reads the contents of a file.
def read_item(file_name):
    #Empty list
    item_list = []
    # read the contents of a file line by line.
    with open(file_name, 'r') as file:
        for line in file:
            data = line.strip().split(', ')
            item = {
                'serial_number': int(data[0]),
                'name': data[1],
                'brand': data[2],
                'price': float(data[3].replace('$', '')),
                'quantity': int(data[4])
            }
            #add the `item` dictionary to the `item_list` list.
            item_list.append(item)
    return item_list
```

Write.py

```
#Creatw write bill function
def write_bill(file_name, item_list):

    with open(file_name, 'w') as file:
        for item in item_list:
            line = f"{item['serial_number']}, {item['name']}, {item['brand']}, ${item['price']}, {item['quantity']}\n"
            file.write(line)
```

Operation.py

```
import datetime
from datetime import date
import write


def rent(item_list):

    #promptthe user to enter the customer's name, address, and contact information.
    customer_name = input("Enter customer name>> ")
    customer_address = input("Enter address>> ")
    customer_contact = int(input("Enter the contact of customer>> "))

    #prompt the user to enter the serial number of the item they want to rent,
    serial_number = int(input("Enter the Serial Number of item>> "))
    quantity = int(input("Enter the quantity you want>> "))
    duration = int(input("Enter the number of days you want to Rent>> "))

    # call the `find_item_by_serial_number` function and passing the `item_list` and `serial_number` as
    # arguments and find the item in the `item_list` that matches the given `serial_number` and assign it to the variable `item`.
    item = find_item_by_serial_number(item_list, serial_number)

    #check if the variable `item` is `None` then the item with the given serial number was not found in the `item_list` and it prints "Items not found!" and returns from the function.
    # handle the case when the user enters an invalid serial number for an item.
    if item is None:
        print("Serial Number doesn't Exists!")
        return

    # check if the quantity of the item in stock is equal to the quantity requested by the user
    # If they are equal
    if item['quantity'] == 0:
        print("Out of stock!")
        return

    # calculate the total amount to be paid for renting an item.
    total_amount = item['price'] * quantity * duration
    vat = round(.13*total_amount)
```

```
grand_total = float(total_amount + vat)
# get the current date and format it as a string in the format "YYYY-MM-DD"
rentdate = datetime.date.today().strftime("%Y-%m-%d")

#Bill of rented Items
invoice = f"|------------------------RENT BILL----------------------|\n" \
        f" Customer: {customer_name}                  Date: {rentdate}\n" \
        f" Address: {customer_address}\n" \
        f" Contact No.: {customer_contact}\n" \
        f"|-----------------------------ITEMS------------------------|\n" \
        f" Items: {item['name']}\n" \
        f" Brand: {item['brand']}\n" \
        f" Quantity: {quantity}\n" \
        f" Duration: {duration} days\n" \
        f"|----------------------------------------------------------|\n" \
        f" Total: ${total_amount}\n" \
        f"|----------------------------------------------------------|\n" \
        f" VAT: ${vat}\n"\
        f"|----------------------------------------------------------|\n" \
        f" Grand Total: ${grand_total}\n" \
        f"|----------------------------------------------------------|\n" \

#Decrease the quantity of the rented item from the total quantity available in the item list.
item['quantity'] -= quantity
write.write_bill("items.txt", item_list)

#creating a file name for the rental bill based on the customer's name
bill = f"{customer_name.replace(' ', '_')}_rental_bill.txt"
```

```
    with open(bill, 'w') as file:
        file.write(invoice)


    # print a success message to indicate that the rental process was completed successfully.
    print("Rented successful!")
    print(invoice)



#Create function rent_item
def return_item(item_list):


    #prompt the user to enter the customer's name, the serial number of the item they
    # want to rent, and the quantity of the item they want to rent.
    customer_name = input("Enter customer name>> ")
    serial_number = int(input("Enter the Serial Number of item>> "))
    quantity = int(input("Enter the quantity you want>> "))
    return_date = datetime.date.today().strftime("%Y-%m-%d")


    item = find_item_by_serial_number(item_list, serial_number)


    #check if the variable `item` is `None` then the item with the given serial number was not found in the `item_list` and it prints "Items not found!" and returns from the function.
    # handle the case when the user enters an invalid serial number for an item.
    if item is None:
        print("Serial Number Doesn't Exists!")
        return
```

```
rental_duration =  int(input("Enter the rental duratiom: "))
fine_amt = 20
rental= input("Enter the date rented : ").split('-')
yyyy,mm,dd=[int(item) for item in rental]
rentalDate=date(yyyy,mm,dd)
slow = (datetime.date.today() - rentalDate).days

# check if the number of days the item was rented is less than or equal to therental duration
if slow<=rental_duration:
    day=0
else:
    day=slow-rental_duration

# calculating the fine amount for returning the rented item late.
fine = fine_amt * day*quantity



# calculating the number of weeks (d) that the item was rented for.
d=int(rental_duration/5)

if rental_duration %5 ==0:
    d +=0
else:
    d +=1



# calculate the total amount to be paid for renting an item.
total_amount = item['price'] * quantity * rental_duration
```

```
vat = round(.13*total_amount)

grand_total = float(total_amount + vat + fine)

#Bill of rented Items

invoice = f"|----------------------RETURN BILL--------------------|\n" \
        f" Customer: {customer_name}                    Date: {return_date}\n" \
        f"|--------------------------ITEMS----------------------|\n" \
        f" Items: {item['name']}\n" \
        f" Brand: {item['brand']}\n" \
        f" Quantity: {quantity}\n" \
        f" Duration: {rental_duration} days\n" \
        f" Delay: {day} days\n" \
        f"|---------------------------------------------------------|\n" \
        f" Total: ${total_amount}\n" \
        f"|---------------------------------------------------------|\n" \
        f" Fine: ${fine}\n" \
        f"|---------------------------------------------------------|\n" \
        f" VAT: ${vat}\n"\
        f"|---------------------------------------------------------|\n" \
        f" Grand Total: ${grand_total}\n" \
        f"|---------------------------------------------------------|\n" \


#Increase the quantity of the rented item from the total quantity available in the item list.

item['quantity'] += quantity

write.write_bill("items.txt", item_list)
```

```
    #creating a file name for the return  bill based on the customer's name
    bill = f"{customer_name.replace(' ', '_')}_return_bill.txt"
    with open(bill, 'w') as file:
        file.write(invoice)


    # print a success message to indicate that the rental process was completed successfully.
    print("Item Renturn successfully!")
    print(invoice)


#The function finds an item in a list based on its serial number.
def find_item_by_serial_number(item_list, serial_number):
    # iterated over each item in the `item_list` and checking if the `serial_number` of the item matches the given `serial_number`.
    for item in item_list:
        if item['serial_number'] == serial_number:
            return item
    return None
```