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I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a marks of zero will be awarded.

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1. Introduction

1.1. Brief introduction about the project

This project contains an application that is used for maintaining library book information in a text file. Application reads the text file and display all the books that are available for borrowing. With each transaction (borrowing) a note is generated for the borrower and is also written in a file. The stock of the book is also updated after each transaction. For example, if the library has a stock of 5 books of Rich Dad Poor Dad, then when a user borrows a book then the number of stocks of book is updated to 4 with generating a note file while for returning the book, a note file is generated, and the quantity of the book returned is also increased by 1.

A note is generated for each transaction when a person borrows a book which contains the name of borrower, the name of book borrowed, the date and time of issue and total amount to be paid for borrowing. When a person borrows multiple books then all the borrowed book is written in a note and total amount is added for all the borrowed books. When a person returns a book to the library, a note is generated with name of borrower, name of book, date, and time of return and if a person is late in returning the book, a fine of $1 of charged on daily basic which is also written in the generated file. The lending period for any book is 10 days.

1.2. Goals and Objectives

The goal and objective of an application is creating a working library management system to maintain library book information using text files to store details of books and billing information such as borrow of book and return of book. The name of book borrowed, name of borrower, and date and time with other useful information to be stored in the note. The detail and quantity of books should be also updated after each transaction that is either borrowing of book or returning of book. To keep the record of borrower, if he or she has borrowed the more than the lending period then a fine of $1 to be charged on daily basis.

2. Discussion and Analysis

2.1. Algorithm

An algorithm is a procedure of solving a problem based on conduction a sequence of specified actions. An algorithm means a small procedure to solves a recurrent problem. Algorithm is widely used though out all areas of IT (information technology). (TechTarget Contributor, 2019)

Algorithm for Library Management System is given below:

```
STEP 1: Print Welcome to Library Management System
STEP 2: Read Text File and store Dictionary in bookDetailDict
STEP 3: ansNum = Input 1,2 or 3
STEP 4: IF ansNum = 1:
                bookID = Input Book ID to Borrow
                GO TO STEP 5
            ELSE
                GO TO STEP 10
STEP 5: IF quantity of book = 0:
                Print Book is Not Available
                available = false
        ELSE:
                Print Book is Available
                available = true
STEP 6: IF available = true:
                nameOfUser = input Name of Borrower
                Print Price of Book and Date and Time of Borrow
            ELSE:
                GO TO STEP 3
STEP 7: Update Text File for Borrow and Read the Text File
STEP 8: borrowedAnother = Input if this person bought another book (y for yes)
STEP 9: IF borrowedAnother = y:
            bookID = Input Book ID and check for Available
      ELSE:
            Print Customer Borrow Details
            Genetate Customer Borrow Detail in Note
            GO TO STEP 3
STEP 10: if available = true:
            Print Total Price of Book
            GO TO STEP 7
      ELSE:
            Print Book is Not Available
            GO TO STEP 7
STEP 11: IF ansNum  =  2:
            bookID = Input Book ID to borrow
            Print You will Return Book Now
            nameOfUser = Input Name of Borrower
            days = Input Number of Days Book Has Been Returned
            calculateFine = Calculate the Fine
            Print Date and Time of Return
      ELSE:
            GO TO STEP
STEP 12: Update Text Field for Return and Read the File
STEP 13: BorrowedAnother = Input if this person bought another book (y for yes)
STEP 14: IF borrowedAnother = y:
            bookID = Input Book ID to Borrow
            days = Input Number of Days Book Has Been Returned
            GO TO STEP 12
       ELSE:
            Print Customer Borrow Detail
            Generate Customer Borrow Detail in Note
```

```
                GO TO STEP 3
STEP 15: IF ansNum = 3:
                GO TO STEP 16
           ELSE:
                Print Error Invalid Input Message
                GO TO STEP 3
STEP 16: Print Thank you for using Library Management System
STEP 17: STOP
```

2.2. Flowchart

A flowchart is a diagram that depicts a process, system or computer algorithm which is widely used in multiple fields to document, study, plan, improve and communicate often complex processes in clear, Easy-to-understand diagrams. Flowchart uses different shapes like rectangles, ovals, diamonds, etc. (Lucidchart, n.d.)

Flowchart for Library Management System is given below:

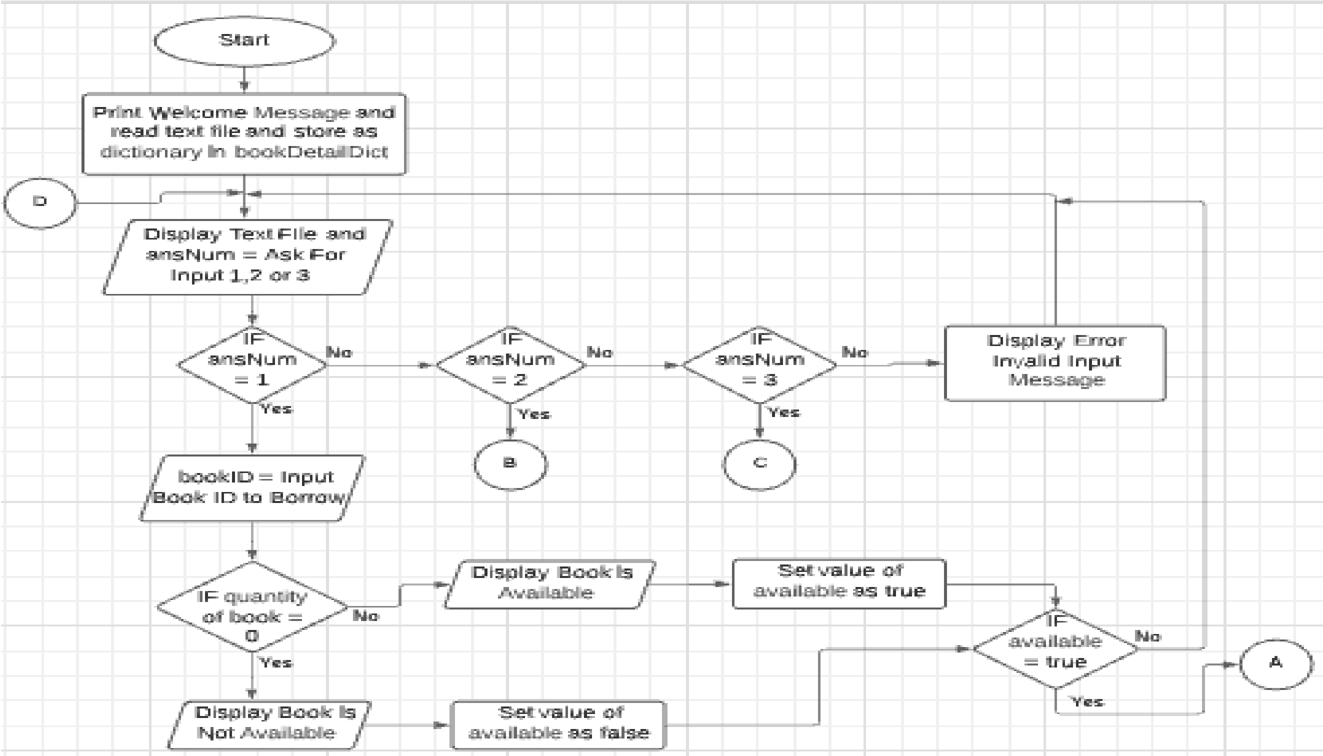

Start
Print Welcome Message and read text file and store as dictionary in bookDetailDict
D
Display Text File and ansNum = Ask For Input 1,2 or 3
IF ansNum = 1
No
Yes
IF ansNum = 2
No
Yes
IF ansNum = 3
No
Yes
Display Error Invalid Input Message
B
C
bookID = Input Book ID to Borrow
IF quantity of book = 0
No
Yes
Display Book is Available
Set value of available as true
IF available = true
No
Yes
A
Display Book is Not Available
Set value of available as false

Figure 1: Library Management System Flowchart Part 1

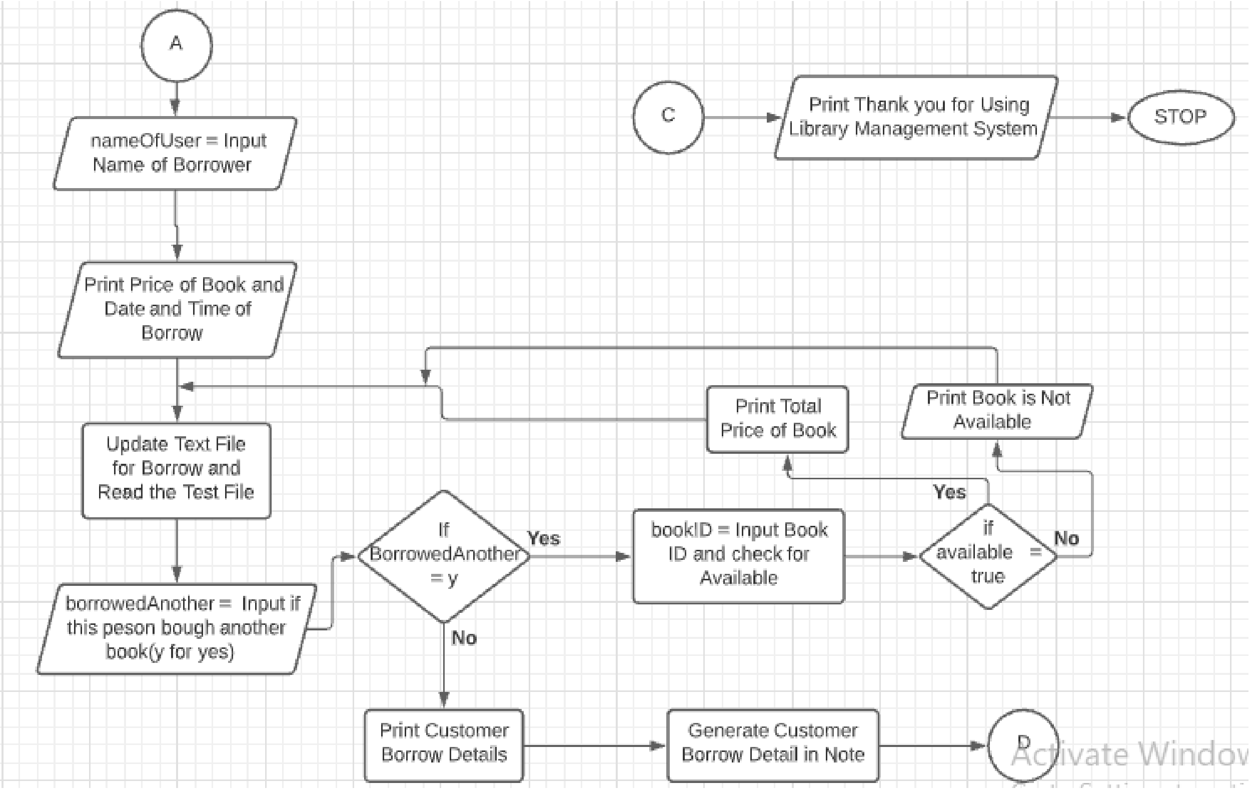

A
nameOfUser = Input Name of Borrower
Print Price of Book and Date and Time of Borrow
Update Text File for Borrow and Read the Test File
borrowedAnother = Input if this peson bough another book(y for yes)
If BorrowedAnother = y
Yes
No
bookID = Input Book ID and check for Available
if available = true
Yes
No
Print Total Price of Book
Print Book is Not Available
Print Customer Borrow Details
Generate Customer Borrow Detail in Note
D
C
Print Thank you for Using Library Management System
STOP

Figure 2: Library Management System Flowchart Part 2

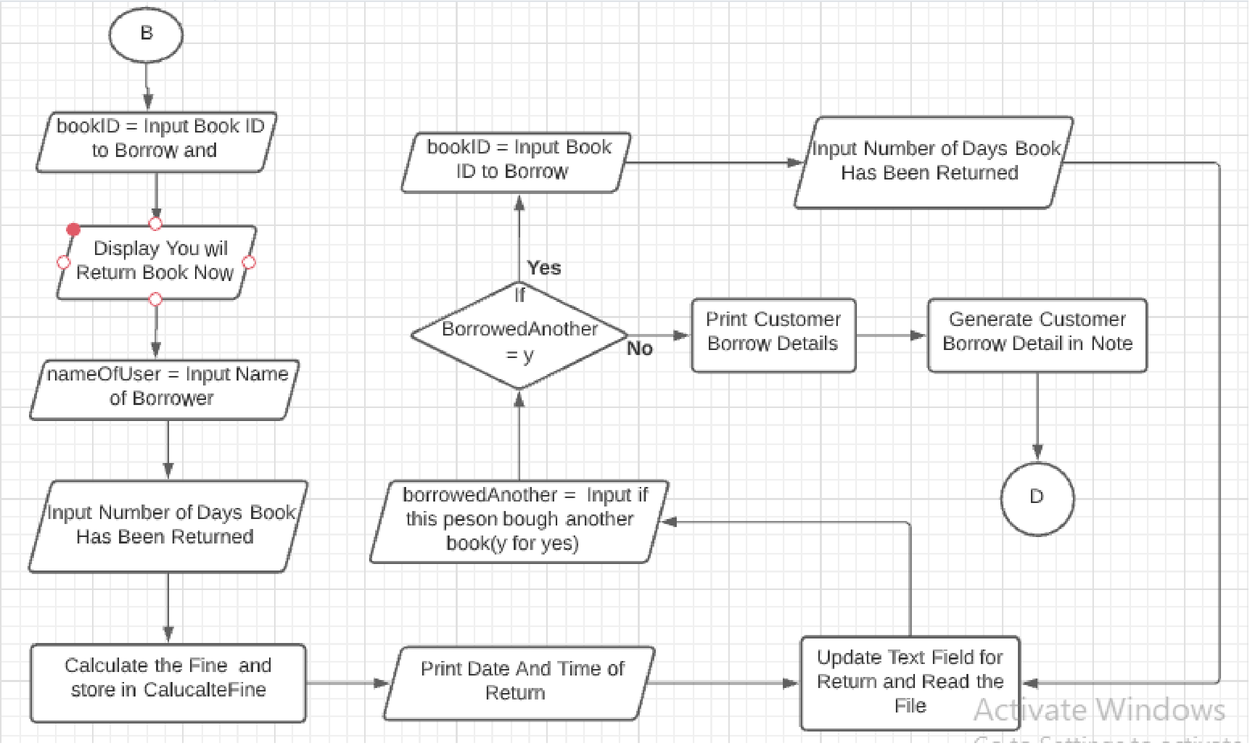

B
bookID = Input Book ID to Borrow and
Display You wil Return Book Now
nameOfUser = Input Name of Borrower
Input Number of Days Book Has Been Returned
Calculate the Fine and store in CalucalteFine
Print Date And Time of Return
Update Text Field for Return and Read the File
borrowedAnother = Input if this peson bough another book(y for yes)
If BorrowedAnother = y
Yes
No
bookID = Input Book ID to Borrow
Input Number of Days Book Has Been Returned
Print Customer Borrow Details
Generate Customer Borrow Detail in Note
D

Figure 3: Library Management System Flowchart Part 3

2.3. Pseudocode

Pseudocode is an informal way of programming description that does not require any strict programming language. Pseudocode is not an actual programming language so it cannot be compiled into an executable program. It is created using simple English language syntaxes to write code for programs before it is converted into a specific programming language. It helps to identity top level flow errors and understand the programming data flows that the final program is going to use.

Pseudocode for Library Management System is given below:

```
MAIN MODULE
    IMPORT functions
    PRINT "Hello and Welcome to Library Management System"
    INITIALIZE ansNum as 0
    IF ansNum is O then
        WHILE ansNum is not 0
            CALL function printBookDetailDIct () FROM functions
            SET ansNum as userInput () FROM functions
            CALL function checkUserInput (ansNum) From functions
        END WHILE
    END IF
    PRINT "Thank you for using out Library Management System"

FUNCTIONS MODULE
    FROM datetime IMPORT datetime
    IMPORT os
    DEFINE function readTxtFile ()
        OPEN BookDetails.txt as Read Mode
        INITIALIZE I is 1
        FOR each line in File:
            **REPLACE** “\n” WITH “”
            **SPLIT** with “,” in bookDetailDict [i]
            **INCREASE** value of i by 1
        **END FOR**
        **RETURN** bookDetailDict
        **CLOSE** File
    **DEFINE** function printBookDetailDict ():
        **PRINT** Book Detail Title
        **OPEN** BookDetails.txt in Read Mode
        **INITIALIZE** i is 1
        **FOR** each line in file:
            **REPLACE** “/n” with “”
            **SPLIT** with “,” in each line
            **PRINT** Book Detail Information with Proper Space
        **END FOR**
        **CLOSE File**
    **DEFINE** function tryCatchError ():
        **PRINT** “Please Provide Valid Input Only”
    **DEFINE** function userInput ():
        **INITIALIZE** check is “notTure”
        **WHILE** check is not “True”
            **PRINT** “ENTER 1, 2 or 3”
            **TRY**:
                **INPUT** “Enter a Value” and **SET** as ansNum
                **SET** value of check as “True”
            **END TRY**
            **EXCEPT**:
                **CALL** function tryCatchError ()
            **END EXCEPT**
        **END WHILE**
        **RETURN** ansNum
```

```
DEFINE function checkUserInput (ansNum):
    IF ansNum is 1
        CALL function checkBookID (ansNum) and SET value in
        bookID
        CALL function borrowBook (bookID) and SET value in
        available
        IF available = “true”
            CALL function userNameBorrow (bookID, ansNum)
        END IF
    END IF
    ELSE IF ansNum is 2
        CALL function checkBookID (ansNum) and SET value in
        bookID
        CALL function returnBook ()
        CALL function userNameReturn (bookID, ansNum)
    END IF
    ELSE IF ansNum is 3
        EXIT
    END IF
    ELSE IF
        CALL function invalidInput ()
    END IF
DEFINE function borrowBook (bookID):
    CALL bookDetailDict [bookID] and SET value in dictValue
    SET value of dictValue [2] in bookQuantity
    IF bookQuantity is 0
        PRINT “Book is Not Available”
        SET value of available as “false”
    END IF
    ELSE IF
        PRINT “Book is Available”
```

```
            SET value of available as “true”
        END IF
    DEFINE function checkBookID (ansNum):
        IF ansNum is 1
            SET value of check as “notTrue”
            WHILE check is not “True”:
                TRY
                    INPUT “Book ID to Borrow” and SET value in
                    bookID
                    SET value of check as “True”
                END TRY
                EXCEPT
                    CALL function tryCatchError ()
                END EXCEPT
            END WHILE
        END IF
        IF ansNum is 2
            SET value of check as “notTrue”
            WHILE check is not “True”:
                TRY
                    INPUT “Book ID to Return” and SET value in
                    bookID
                    SET value of check as “True”
                END TRY
                EXCEPT
                    CALL function tryCatchError ()
                END EXCEPT
            END WHILE
        END IF
        WHILE bookID <= 0 OR bookID > (length of bookDetailDict)
            PRINT “Please Provide Valid Book ID”
            CALL function printBookDetailDict ()
            IF ansNum is 1
                INPUT " Enter Book ID to Borrow" and SET value in
                bookID
            END IF
            IF ansNum is 2
                INPUT " Enter Book ID to Return" and SET value in
                bookID
            END IF
        END WHILE
        RETURN bookID
    DEFINE function userNameBorrow (bookID, ansNum):
        INPUT "Name of Borrower" and SET value in nameOfUser
        SET value of bookPrice
        SET value of dt_string
        PRINT "Price of Book and Date and Time of Borrow"
        CALL function updateTxtFile (bookID, ansNum)
        CALL function borrowAnother ("y", nameOfUser, dt_string,
        bookPrice, bookID, ansNum)
    DEFINE function userNameReturn (bookID, ansNum)
        INPUT "Name of Borrower" and SET value in nameOfUser
        CALL function bookFine (0) and SET value in calculateFine
        PRINT "Date and Time of Return"
        CALL function updateTxtFile (bookID, ansNum)
        CALL function returnAnother ("y", nameOfUser, dt_string, bookID,
        calculateFine, ansNum)
    DEFINE function borrowAnother(borrowedAnother, customerName,
    dateTime, bookPrice, bookID, ansNum)
        INITIALIZE totalPrice as 0 and booksBorrowed as [ ]
        ADD bookID to booksBorrowed
        WHILE borrowedAnother is "y" or borrowedAnother is "Y"
```

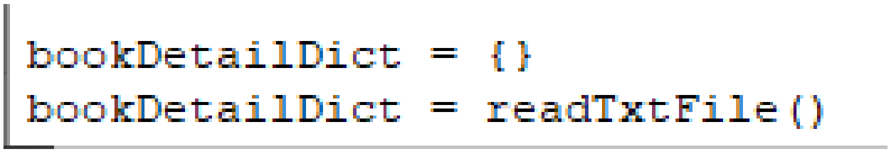
```
            CALL function converBookPrice and ADD in totalPrice
            CALL function printBookDetailDict ()
            INPUT “Borrowed Another Book” and SET value in borrowedAnother
            IF borrowedAnother is “y” or borrowedAnother is “Y”
                CALL function checkBookID (ansNum) and SET value in bookID
                CALL function borrowBook (bookID) and SET value in isAvailable
                IF isAvailable is “true”
                    SET value of Book Price in bookPrice
                    PRINT “ Price of Book”
                    CALL function updateTxtFile (bookID, ansNum)
                END IF
            END IF
        END WHILE
        CALL function customerBorrowDetail(customerName, totalPrice, dateTime, booksBorrowed)
        CALL function billingBorrowCustomerDetail(customerName, totalPrice, dateTime, booksBorrowed)
    DEFINE function bookFine (totalFine):
        SET value of check as “notTrue”
        WHILE check is not “True”
            TRY
                INPUT “Days book has been Returned” ans SET value in days
                SET value of check as “True”
            END TRY
            EXCEPT:
                CALL function tryCatchError()
            END EXCEPT
        END WHILE
        IF days > 10:
            SET value of fine as (days – 10 ) * 1
            ADD value of totalFine and SET value in totalFine
        END IF
        RETURN totalFine
    DEFINE function returnAnother(returnedAnother, customerName,
    dateTime, bookID, calculateFine, ansNum):
        INITIALIZE booksReturned as [ ]
        ADD bookID in booksReturned
        WHILE returnedAnother is “y” OR returnedAnother is “Y”
            CALL function printBookDetailDict ()
            INPUT “Return Another book” and SET value in
            returnedAnother
            IF returnedAnother is “y” OR returnedAnother is “Y”
                CALL function checkBookID (ansNum) and SET
                value in bookID
                ADD bookID in booksReturned
                CALL function bookIFIne(valculateFine) and SET
                value in calculateFine
                CALL function updateTxtFile (bookID, ansNum)
            END IF
        END WHILE
        CALL function customerReturnDetail(customerName, dateTime,
        booksReturned, calculateFine)
        CALL function billingReturnCustomerDetail(customerName,
        dateTime, booksReturned, calculateFine)
    DEFINE function updateQuantity (bookID, ansNum):
        SET value of dictValue FROM bookDetailDict [bookID]
        IF ansNum is 1
            SET value of dictValue [2] as dictValue [2]  - 1
        END IF
        ELSE IF ansNum is 2
            SET value of dictValue [2] as dictValue [2]  + 1
        END IF
    DEFINE function updateTxtFile (bookID, ansNum):
        CALL function updateQuantity (bookID, ansNum)
        UPDATE textfile BookDetails.txt
    DEFINE function convertBookPrice (bookPrice):
        REPLCE “$” with “” in price
        CONVERT string to float
        RETURN price
    DEFINE function customerBorrowDetail (customerName, totalPrice, dateTime, booksBorrowed):
        PRINT “Customer Borrow Details”
        PRINT “Name of Customer”, ”Total Price”, “Date and Time of Borrow”, “Books Borrowed List”
    DEFINE function customerReturnDetail (customerName, dateTime, booksReturned, totalPrice):
        PRINT “Customer Return Details”
        PRINT “Name of Customer”, “Date and Time of Return”
        IF totalPrice is not 0
            PRINT “Late fine for Book”
        END IF
        PRINT “Book Detail List”
    DEFINE function billingBorrowCustomerDetail (customerName, totalPrice, dateTime, booksBorrowed)
        OPEN file ( customerName + time) in MODE write
        WRITE “Name of Customer”
        WRITE “Total Price of Borrow”
        WRITE “Date and Time of Borrow”
        WRITE "Books Borrowed List"
    DEFINE function billingReturnCustomerDetail (customerName, dateTime,
    booksReturned, totalPrice)
        OPEN file ( customerName + time) in MODE write
        WRITE "Name of Customer"
        WRITE "Date and Time of Borrow"
        IF totalPrice is 0
            WRITE " There is No Late Fine"
        END IF
        ELSE IF totalPrice is not 0
            WRITE " Late Fine for Book"
        END IF
        WRITE "Books Borrowed List"
    DEFINE returnBook():
        PRINT "You will now Return the Book"
    DEFINE invalidInput ():
        PRINT "Invalid Input, provide Valid Input"
    INITIALIZE bookDetailDict as {}
    CALL Function readTxtFile () and SET value in bookDetaiilDict
```

2.4. Data Structure

There are many data structured present in python. Some of the Data Structure present in python are:

- **Dictionary**

  Dictionary can be easily added or removed which does not have defined order. It is an unordered collection of key-value pairs.

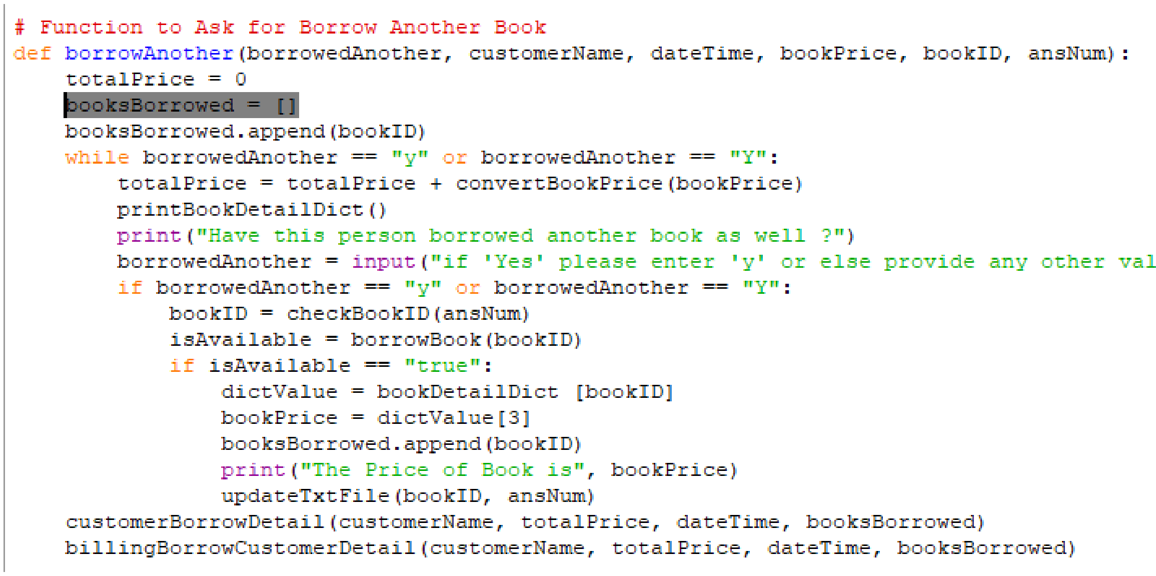


```
bookDetailDict = {}
bookDetailDict = readTxtFile()
```

Figure 4: Dictionary Data Structure

- **Lists**

List are ordered sequence of information which contains same type of element and is denoted by square [ ] brackets.

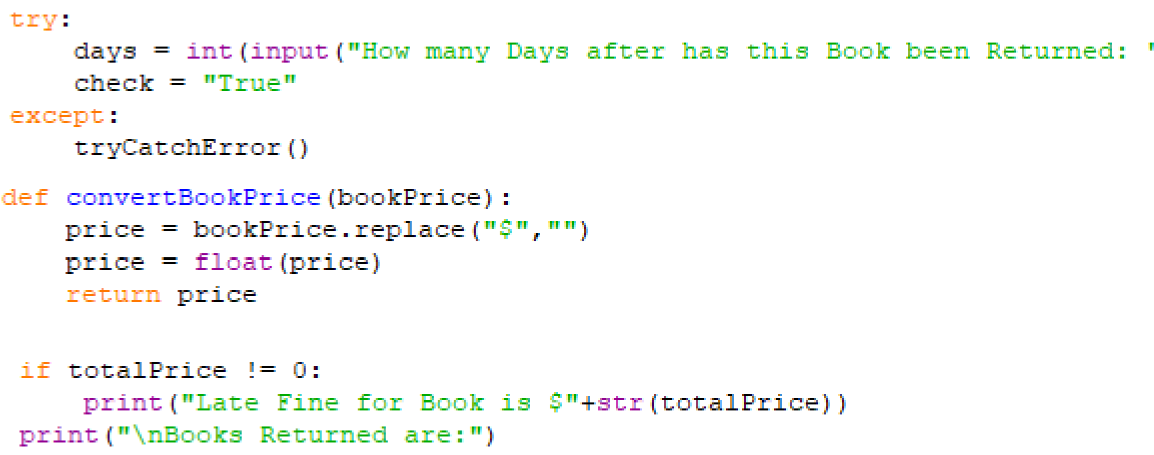


```
# Function to Ask for Borrow Another Book
def borrowAnother(borrowedAnother, customerName, dateTime, bookPrice, bookID, ansNum):
    totalPrice = 0
    booksBorrowed = []
    booksBorrowed.append(bookID)
    while borrowedAnother == "y" or borrowedAnother == "Y":
        totalPrice = totalPrice + convertBookPrice(bookPrice)
        printBookDetailDict()
        print("Have this person borrowed another book as well ?")
        borrowedAnother = input("if 'Yes' please enter 'y' or else provide any other val
        if borrowedAnother == "y" or borrowedAnother == "Y":
            bookID = checkBookID(ansNum)
            isAvailable = borrowBook(bookID)
            if isAvailable == "true":
                dictValue = bookDetailDict [bookID]
                bookPrice = dictValue[3]
                booksBorrowed.append(bookID)
                print("The Price of Book is", bookPrice)
                updateTxtFile(bookID, ansNum)
    customerBorrowDetail(customerName, totalPrice, dateTime, booksBorrowed)
    billingBorrowCustomerDetail(customerName, totalPrice, dateTime, booksBorrowed)
```

Figure 5: List Data Structure

- **String, int and float Data type**

Other data type used in program are int (covert to integer), float (convert to float), str(convert to string).



```
try:
    days = int(input("How many Days after has this Book been Returned: '
    check = "True"
except:
    tryCatchError()
```

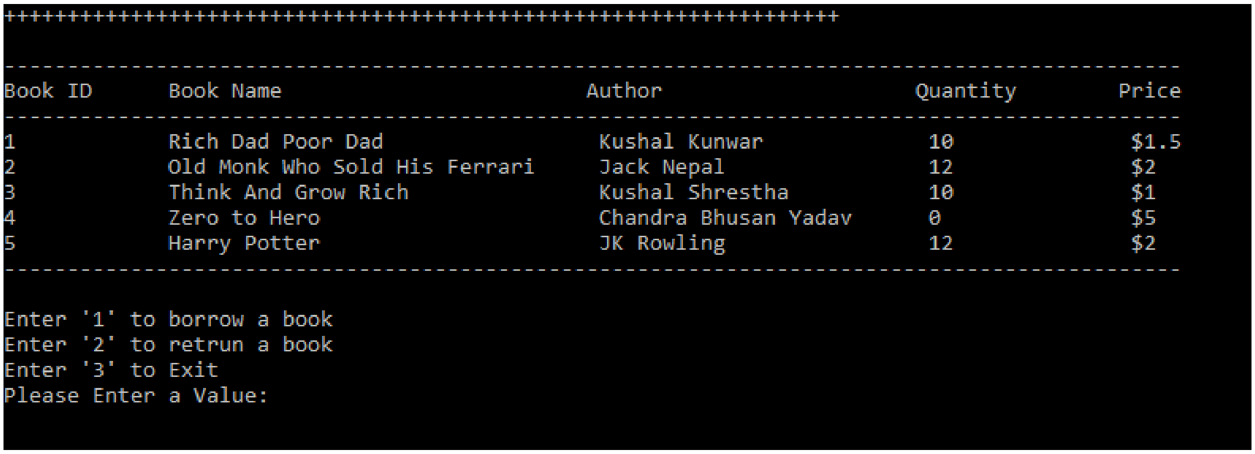
```
def convertBookPrice(bookPrice):
    price = bookPrice.replace("$","")
    price = float(price)
    return price
```

```
if totalPrice != 0:
    print("Late Fine for Book is $"+str(totalPrice))
print("\nBooks Returned are:")
```

Figure 6: int, float and string converter data type

3. Program

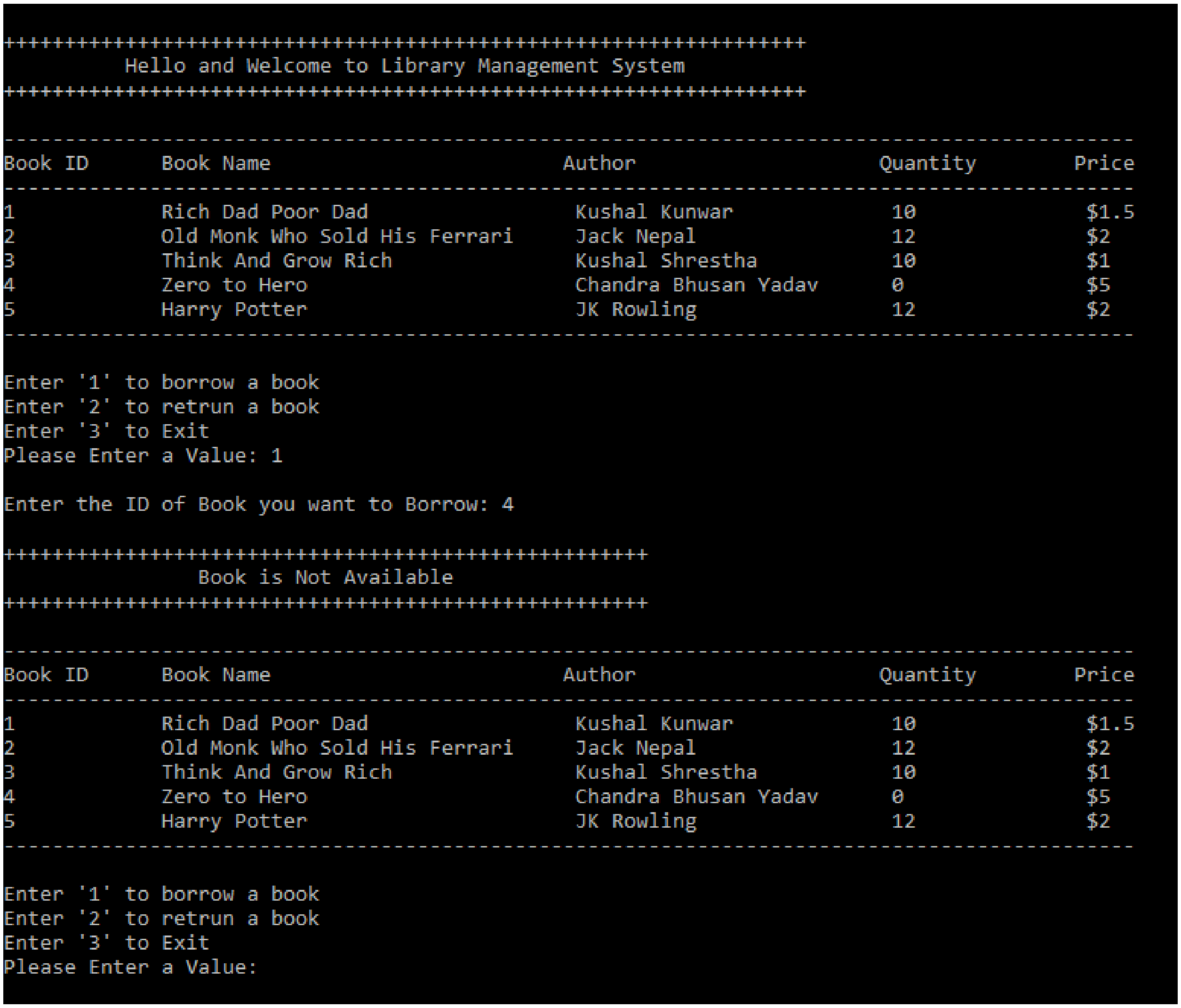
First, the program is opened in command prompt. Book Details is printed in screen and user is asked to input 1,2 or 3. If 1 is entered, program for borrowing book is runed , if 2 is entered, program for returning book is runed whereas when 3 is entered, the program is Executed.



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                         Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                  Kushal Kunwar              10              $1.5
2            Old Monk Who Sold His Ferrari      Jack Nepal                 12              $2
3            Think And Grow Rich                Kushal Shrestha            10              $1
4            Zero to Hero                       Chandra Bhusan Yadav       0               $5
5            Harry Potter                       JK Rowling                 12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value:
```

Figure 7: Input 1,2 or 3 in shell

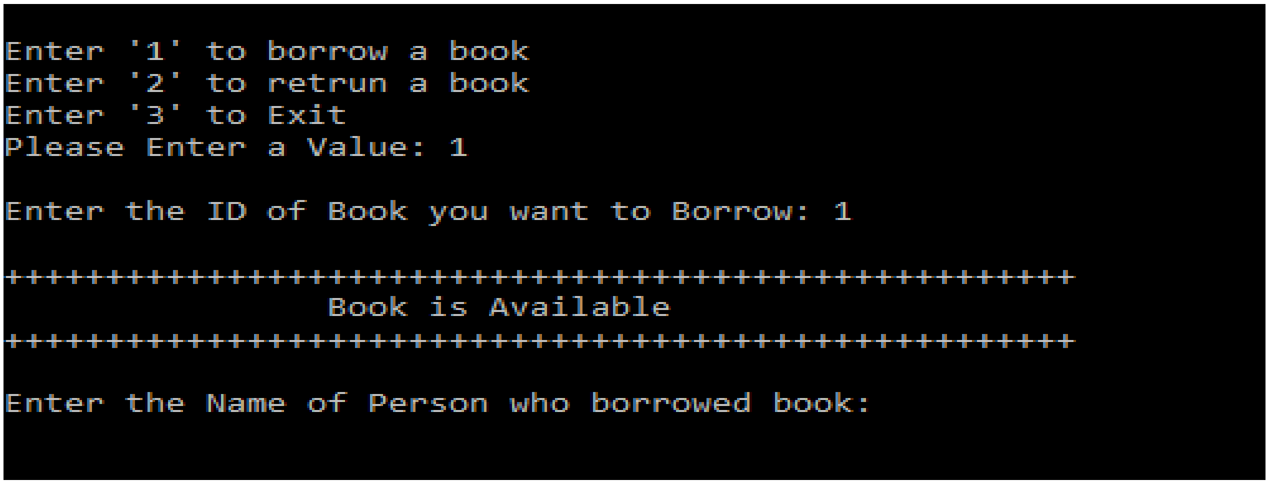
When Enter a Value is Asked to user, 1 is Entered for Borrowing a Book. Each book is assigned with a unique Book ID which can be used for borrowing and returning of book. When 1 is entered, Book ID is asked to user for borrow process. Book is Available or Book is Not Available for Borrow is Displayed in the Screen. The Quantity of Book ID is checked before allotting a book for Available. If Quantity of book is greater than 0 then Book is Available for borrow whereas if Quantity of book is 0 then Book is Not Available for borrow. For example, Book ID 4 for Zero to Hero Book has 0 quantity so if user inputs 4 when Book ID is asked for borrow then Book is Not Available is Displayed and is return to Starting Menu for Borrow, Return and Exit.



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
          Hello and Welcome to Library Management System
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar             10              $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                12              $2
3            Think And Grow Rich               Kushal Shrestha           10              $1
4            Zero to Hero                      Chandra Bhusan Yadav      0               $5
5            Harry Potter                      JK Rowling                12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: 1

Enter the ID of Book you want to Borrow: 4

+++++++++++++++++++++++++++++++++++++++++++++++++++++
                Book is Not Available
+++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar             10              $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                12              $2
3            Think And Grow Rich               Kushal Shrestha           10              $1
4            Zero to Hero                      Chandra Bhusan Yadav      0               $5
5            Harry Potter                      JK Rowling                12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value:
```

Figure 8: Input 1, Input Book ID and Check for Book Available

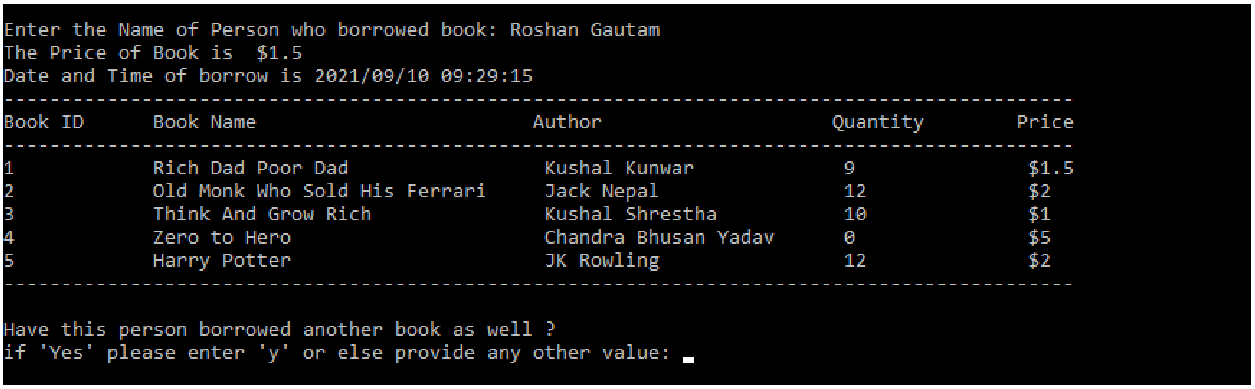
IF 1 is Entered, Rich Dad Poor Dad book is now allotted for borrow. First, Quantity of Book ID is checked if quantity is not 0. When Book ID 1 quantity is checked, and quantity is not 0 then it is available for Borrow.



```
Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: 1

Enter the ID of Book you want to Borrow: 1

+++++++++++++++++++++++++++++++++++++++++++++++++++++
                Book is Available
+++++++++++++++++++++++++++++++++++++++++++++++++++++

Enter the Name of Person who borrowed book:
```

Figure 9: Input 1, Input Book ID and Check for Book Available

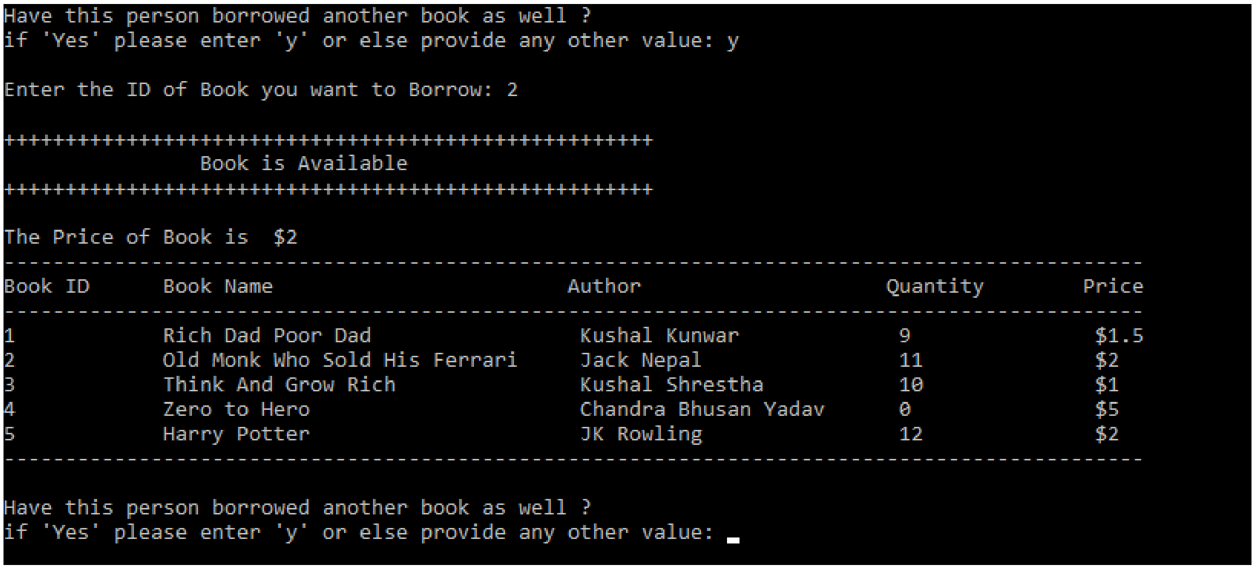
After Book is Available for Borrow, Name of Person to borrow book is asked to the user. When name of user is entered, it is stored to create a text file Name with unique number. Name of user is also displayed in customer detail bill and Customer detail note.



```
Enter the Name of Person who borrowed book: Roshan Gautam
The Price of Book is  $1.5
Date and Time of borrow is 2021/09/10 09:29:15
---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar             9               $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                12              $2
3            Think And Grow Rich               Kushal Shrestha           10              $1
4            Zero to Hero                      Chandra Bhusan Yadav      0               $5
5            Harry Potter                      JK Rowling                12              $2
---------------------------------------------------------------------------------------------

Have this person borrowed another book as well ?
if 'Yes' please enter 'y' or else provide any other value:
```

Figure 10: Input Name of Borrower

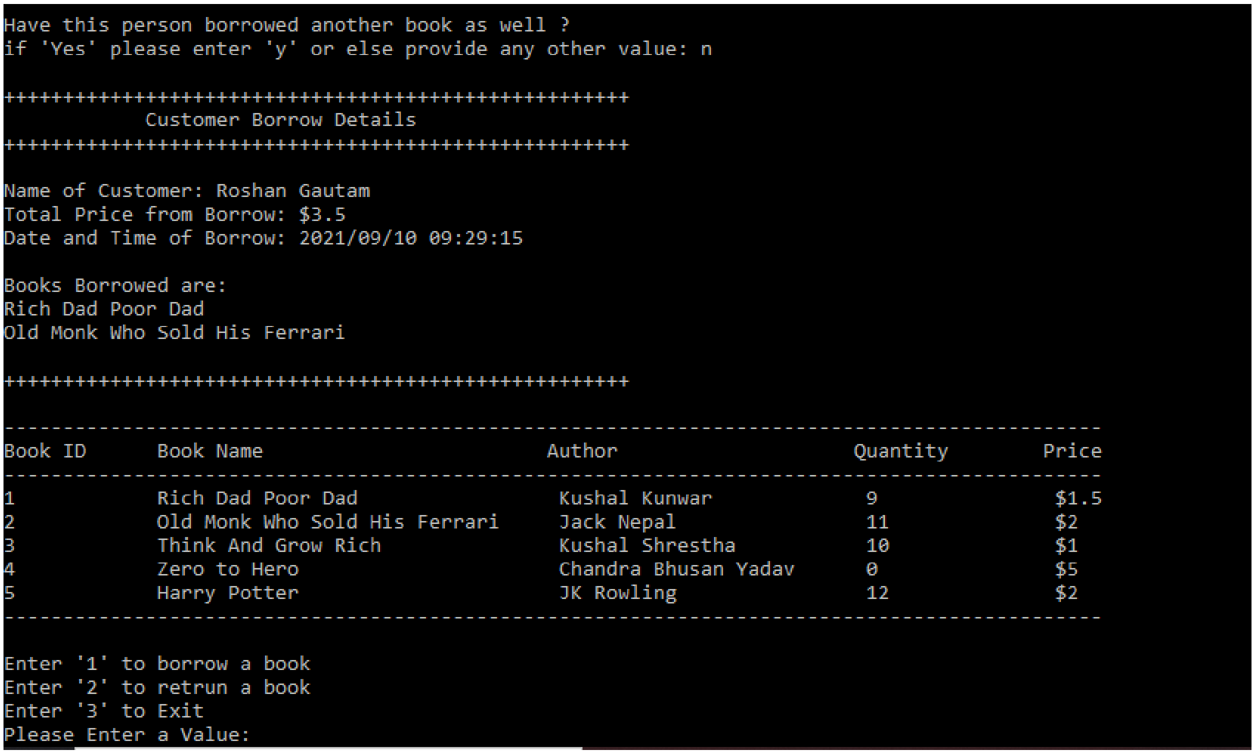
The price of Book and Date and Time of borrow is displayed in the screen and stored properly to display in Customer billing detail and noted in customer billing notes as well. The program then asks user if this person has borrowed more books, if y is entered then program continue forward whereas if any other variable is entered then Customer Bill Detail is printed. When y is entered, Book ID is asked to input to user and price of book is displayed.



```
Have this person borrowed another book as well ?
if 'Yes' please enter 'y' or else provide any other value: y

Enter the ID of Book you want to Borrow: 2

+++++++++++++++++++++++++++++++++++++++++++++++++++++
                Book is Available
+++++++++++++++++++++++++++++++++++++++++++++++++++++

The Price of Book is  $2
---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar             9               $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                11              $2
3            Think And Grow Rich               Kushal Shrestha           10              $1
4            Zero to Hero                      Chandra Bhusan Yadav      0               $5
5            Harry Potter                      JK Rowling                12              $2
---------------------------------------------------------------------------------------------

Have this person borrowed another book as well ?
if 'Yes' please enter 'y' or else provide any other value: _
```

Figure 11: Loop to Borrow More Book

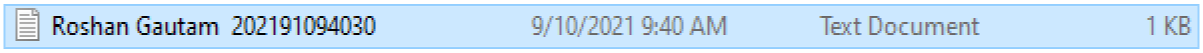
A loop is created for borrow another book process until user inputs other variable then y. when any other variable is inputted then Customer billing Detail is Displayed which consists of Customer Name, Total Price from Borrow, Date and Time of Borrow and List of books that are borrowed by the user.



```
Have this person borrowed another book as well ?
if 'Yes' please enter 'y' or else provide any other value: n

+++++++++++++++++++++++++++++++++++++++++++++++++++++
            Customer Borrow Details
+++++++++++++++++++++++++++++++++++++++++++++++++++++

Name of Customer: Roshan Gautam
Total Price from Borrow: $3.5
Date and Time of Borrow: 2021/09/10 09:29:15

Books Borrowed are:
Rich Dad Poor Dad
Old Monk Who Sold His Ferrari

+++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar             9               $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                11              $2
3            Think And Grow Rich               Kushal Shrestha           10              $1
4            Zero to Hero                      Chandra Bhusan Yadav      0               $5
5            Harry Potter                      JK Rowling                12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value:
```

Figure 12: Display Customer Borrow Details

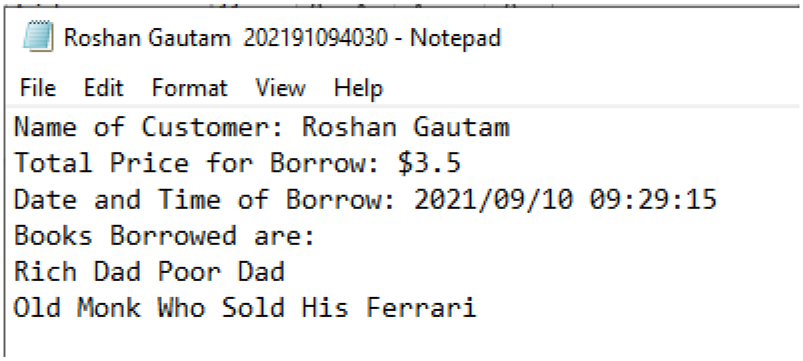
Also, a text file is generated with the same billing detail as Customer Borrow Details having file name of Borrower and Unique digit Number that consists of Date and Time as Unique number.



```
Roshan Gautam  202191094030        9/10/2021 9:40 AM        Text Document        1 KB
```

Figure 13: Creating a Text File

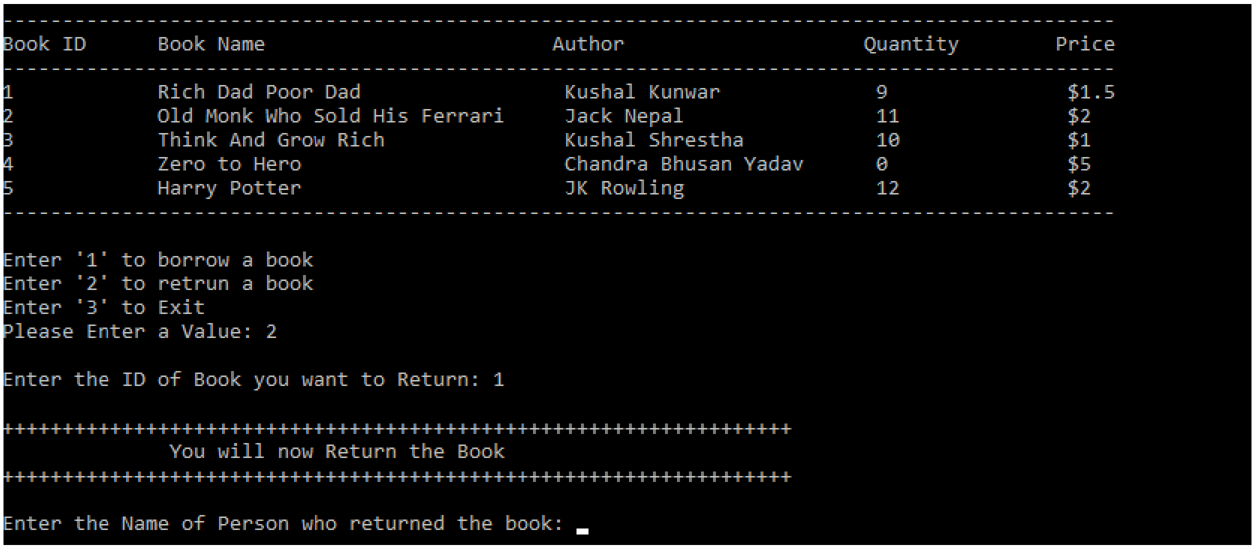
This file consists of same detail that is printed in the Customer Borrow Details. Name of Customer, Total price of borrow, Date and Time of Borrow, and List of Books that are borrowed is noted.



```
Name of Customer: Roshan Gautam
Total Price for Borrow: $3.5
Date and Time of Borrow: 2021/09/10 09:29:15
Books Borrowed are:
Rich Dad Poor Dad
Old Monk Who Sold His Ferrari
```

Figure 14: Customer Borrow Detail in Text File

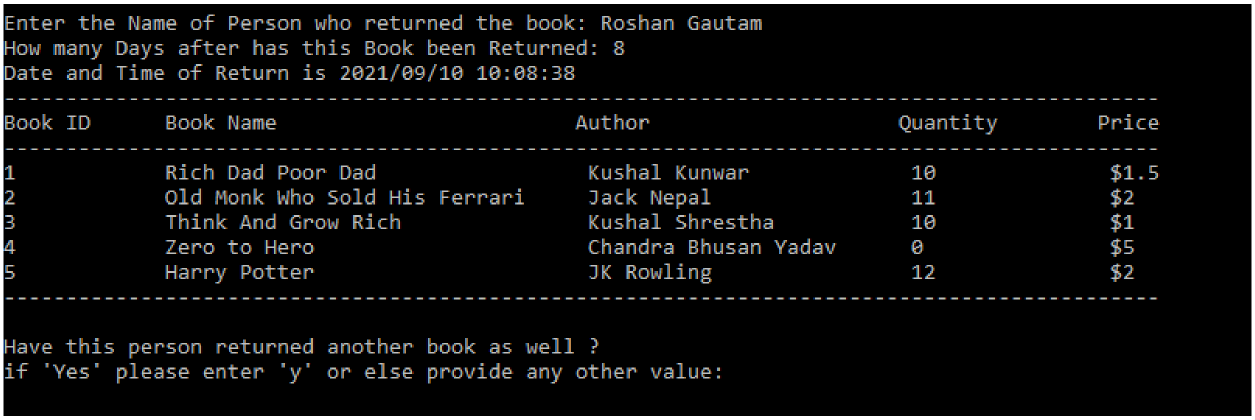
Again, the program ends and Input 1, 2 or 3 is Displayed for Another Borrower or Returning Process. After Completion of Borrowing process, 2 is inputted to view returning process. When 2 is inputted, book ID of book is asked to user same as in borrowing process and also after inputting book ID, you will return book is printed and name of borrower who had borrowed book for returning is asked.



```
-----------------------------------------------------------------------------------------
Book ID      Book Name                         Author                    Quantity        Price
-----------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                  Kushal Kunwar             9               $1.5
2            Old Monk Who Sold His Ferrari      Jack Nepal                11              $2
3            Think And Grow Rich                Kushal Shrestha           10              $1
4            Zero to Hero                       Chandra Bhusan Yadav      0               $5
5            Harry Potter                       JK Rowling                12              $2
-----------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: 2

Enter the ID of Book you want to Return: 1

+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
              You will now Return the Book
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Enter the Name of Person who returned the book:
```

Figure 15: Input 2 for Return, Enter Book ID to Return

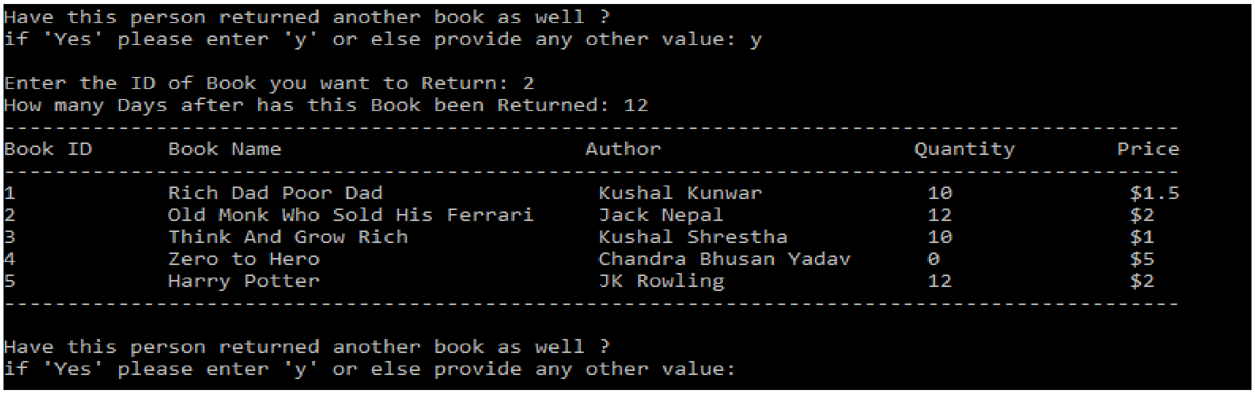
When Name of Person is inputted, Number of days the book has been returned after is asked to the user. The leasing period for book is 10 days so if the inputted days is greater than 10 days than $1 fine is charged in daily basis. Date and time of Return is displayed in the screen.



```
Enter the Name of Person who returned the book: Roshan Gautam
How many Days after has this Book been Returned: 8
Date and Time of Return is 2021/09/10 10:08:38
-----------------------------------------------------------------------------------------
Book ID      Book Name                         Author                    Quantity        Price
-----------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                  Kushal Kunwar             10              $1.5
2            Old Monk Who Sold His Ferrari      Jack Nepal                11              $2
3            Think And Grow Rich                Kushal Shrestha           10              $1
4            Zero to Hero                       Chandra Bhusan Yadav      0               $5
5            Harry Potter                       JK Rowling                12              $2
-----------------------------------------------------------------------------------------

Have this person returned another book as well ?
if 'Yes' please enter 'y' or else provide any other value:
```

Figure 16: Input Name of Person and Number of Days Book is Returned

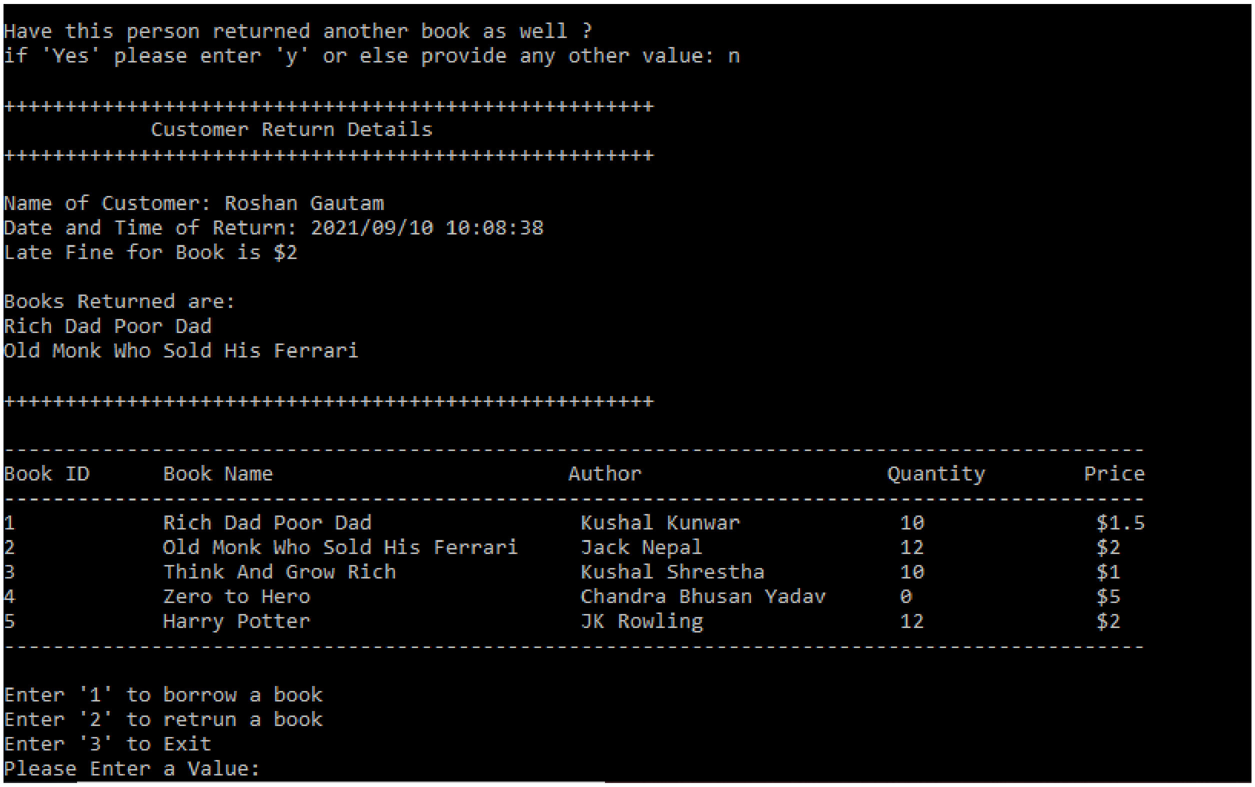
Then, a loop is created to input y if this person is returning more books. When y is inputted, Book ID and number of days the book has been returned is asked. Since number of days book has been returned is 12, a fine of $1 is charged for 2 days that is $2.



```
Have this person returned another book as well ?
if 'Yes' please enter 'y' or else provide any other value: y

Enter the ID of Book you want to Return: 2
How many Days after has this Book been Returned: 12
-----------------------------------------------------------------------------------------------
Book ID      Book Name                         Author                     Quantity        Price
-----------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                  Kushal Kunwar              10              $1.5
2            Old Monk Who Sold His Ferrari      Jack Nepal                 12              $2
3            Think And Grow Rich                Kushal Shrestha            10              $1
4            Zero to Hero                       Chandra Bhusan Yadav       0               $5
5            Harry Potter                       JK Rowling                 12              $2
-----------------------------------------------------------------------------------------------

Have this person returned another book as well ?
if 'Yes' please enter 'y' or else provide any other value:
```

Figure 17: Inputting y for Returning more Book

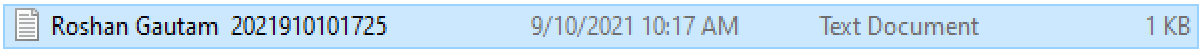
When variable except y is inputted, customer returning detail is displayed in the screen. The Customer Return Details Consists of Name of Customer, Date, and time of return, late fine if there is any fine available, List of Book that has been returned. Since, the program is finished, an Input 1,2 or 3 is displayed for further borrow or returning process.



```
Have this person returned another book as well ?
if 'Yes' please enter 'y' or else provide any other value: n

+++++++++++++++++++++++++++++++++++++++++++++++++++++
            Customer Return Details
+++++++++++++++++++++++++++++++++++++++++++++++++++++

Name of Customer: Roshan Gautam
Date and Time of Return: 2021/09/10 10:08:38
Late Fine for Book is $2

Books Returned are:
Rich Dad Poor Dad
Old Monk Who Sold His Ferrari

+++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                         Author                     Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                  Kushal Kunwar              10              $1.5
2            Old Monk Who Sold His Ferrari      Jack Nepal                 12              $2
3            Think And Grow Rich                Kushal Shrestha            10              $1
4            Zero to Hero                       Chandra Bhusan Yadav       0               $5
5            Harry Potter                       JK Rowling                 12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value:
```

Figure 18: Input n to exit loop and Display Customer Return Detail

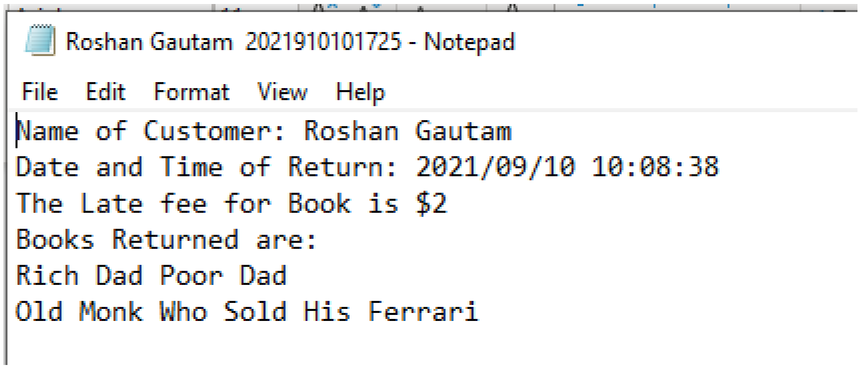
Also, a text file is generated with the same billing detail as Customer Return Details having file name of Borrower and Unique digit Number that consists of Date and Time as Unique number.



```
Roshan Gautam  2021910101725          9/10/2021 10:17 AM          Text Document          1 KB
```

Figure 19: Creating a Text File

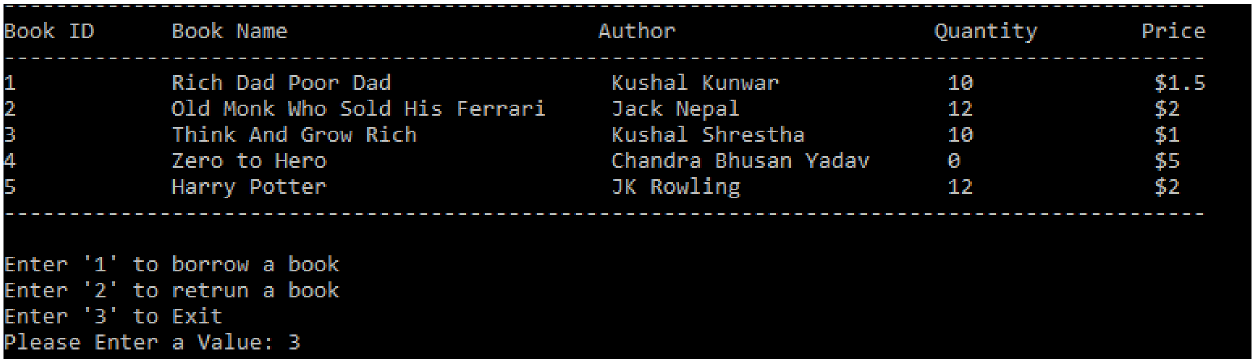
This file consists of same detail that is printed in the Customer Return Details. Name of Customer, Total Late Fine for Returning, Date and Time of Borrow, and List of Books that are returned is noted.


Roshan Gautam 2021910101725 - Notepad
File Edit Format View Help

```
Name of Customer: Roshan Gautam
Date and Time of Return: 2021/09/10 10:08:38
The Late fee for Book is $2
Books Returned are:
Rich Dad Poor Dad
Old Monk Who Sold His Ferrari
```

Figure 20: Customer Return Detail in Text File

At the End, when user is asked to input 1, 2 or 3 and 3 is inputted in the program then the program exits.



```
---------------------------------------------------------------------------------------------
Book ID       Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1             Rich Dad Poor Dad                 Kushal Kunwar              10              $1.5
2             Old Monk Who Sold His Ferrari     Jack Nepal                 12              $2
3             Think And Grow Rich               Kushal Shrestha            10              $1
4             Zero to Hero                      Chandra Bhusan Yadav       0               $5
5             Harry Potter                      JK Rowling                 12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: 3
```

Figure 21: Input 3 for Exiting a Program

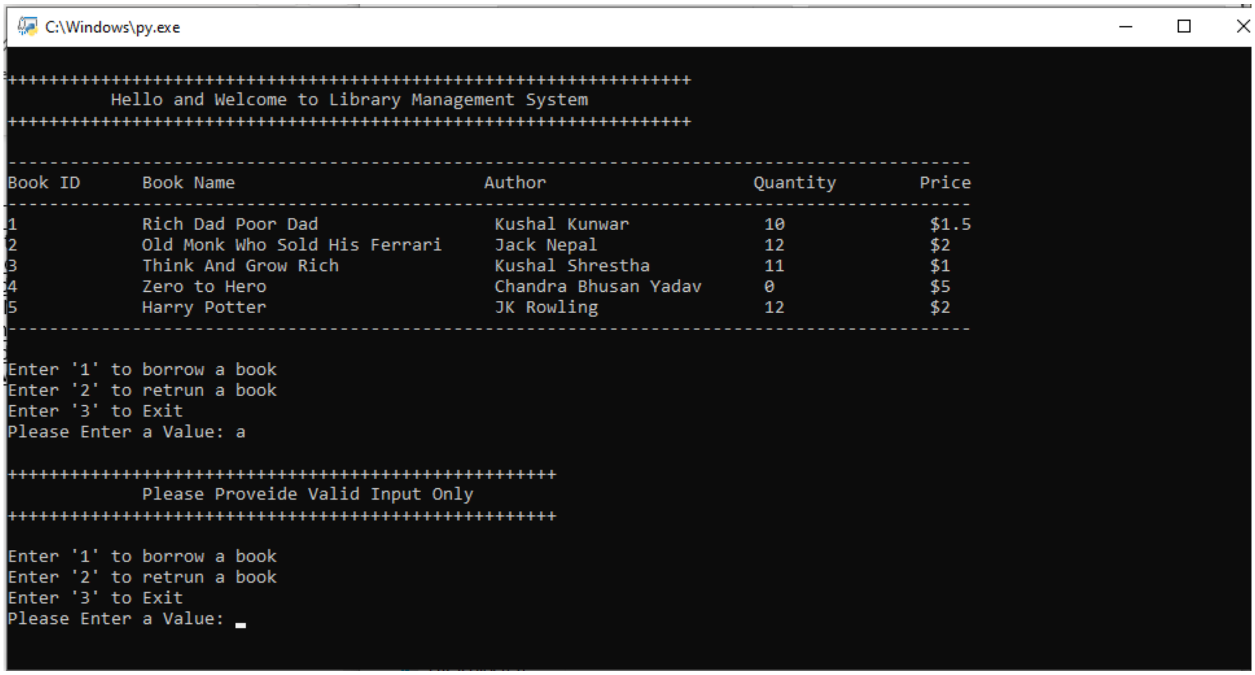
4. Testing

4.1. Showing implementation of try, except

Test Number	1
Objective	To show the implementation of try, except for error handling
Action	An invalid input is inputted in the program
Expected Result	An Error Message is displayed when an invalid input is inputted.
Actual Result	An invalid error message was displayed
Conclusion	The test is successful.

Table 1: Testing Table 1

OUTPUT:



C:\Windows\py.exe

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
          Hello and Welcome to Library Management System
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar             10              $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                12              $2
3            Think And Grow Rich               Kushal Shrestha           11              $1
4            Zero to Hero                      Chandra Bhusan Yadav      0               $5
5            Harry Potter                      JK Rowling                12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: a

+++++++++++++++++++++++++++++++++++++++++++++++++++++
             Please Proveide Valid Input Only
+++++++++++++++++++++++++++++++++++++++++++++++++++++

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: _
```

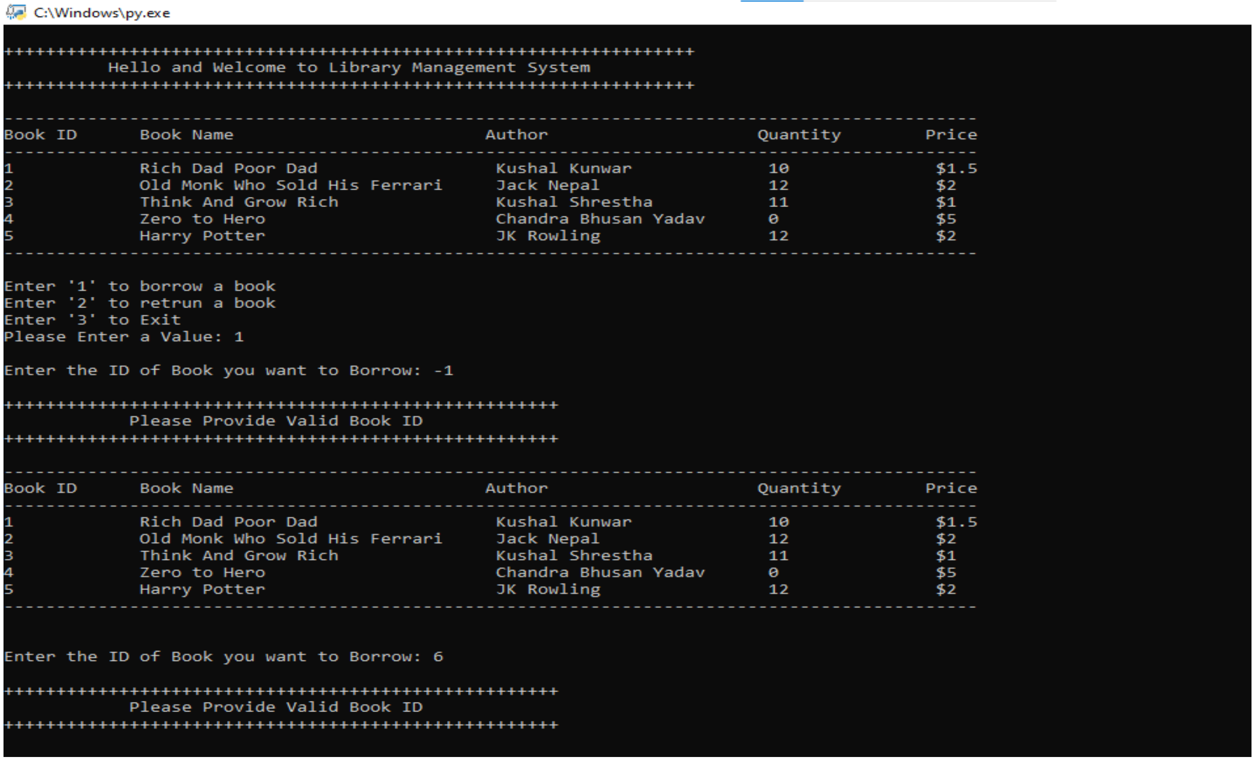
Figure 22: Try, Except Testing Figure

4.2. Selecting borrow and return option

Test Number	2
Objective	To input negative value and non-existing value as input in borrow and return option
Action	1) A negative value and non-existing value are inputted in borrow option 2) A negative value and non-existing value are inputted in return option
Expected Result	An error Message “Please Provide Valid Book ID” is to be Displayed for both borrow and return option.
Actual Result	An error message “Please Provide Valid Book ID” is displayed for both borrow and return option
Conclusion	The Test is Successful

Table 2: Testing Table 2

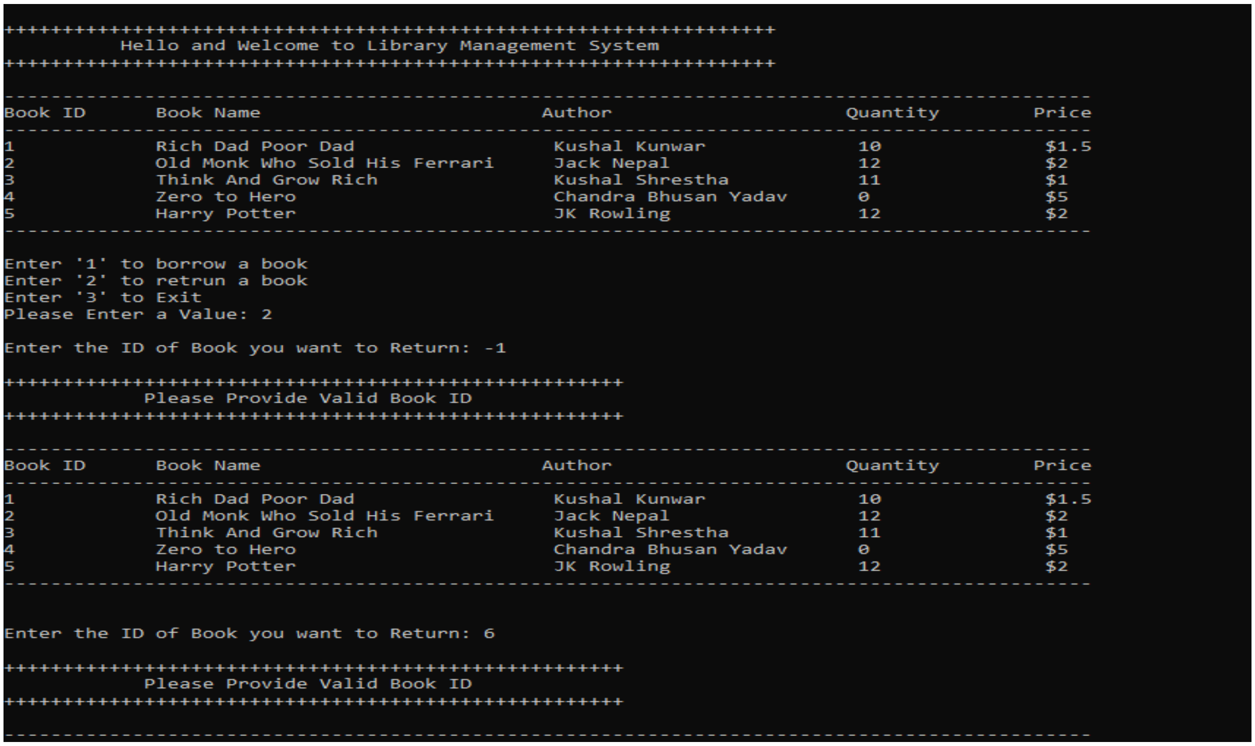
OUTPUT:



C:\Windows\py.exe

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
          Hello and Welcome to Library Management System
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar             10              $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                12              $2
3            Think And Grow Rich               Kushal Shrestha           11              $1
4            Zero to Hero                      Chandra Bhusan Yadav      0               $5
5            Harry Potter                      JK Rowling                12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: 1

Enter the ID of Book you want to Borrow: -1

+++++++++++++++++++++++++++++++++++++++++++++++++++++
            Please Provide Valid Book ID
+++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar             10              $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                12              $2
3            Think And Grow Rich               Kushal Shrestha           11              $1
4            Zero to Hero                      Chandra Bhusan Yadav      0               $5
5            Harry Potter                      JK Rowling                12              $2
---------------------------------------------------------------------------------------------


Enter the ID of Book you want to Borrow: 6

+++++++++++++++++++++++++++++++++++++++++++++++++++++
            Please Provide Valid Book ID
+++++++++++++++++++++++++++++++++++++++++++++++++++++
```

Figure 23: Borrowing Testing with negative value and non-existing value Figure



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
          Hello and Welcome to Library Management System
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar             10              $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                12              $2
3            Think And Grow Rich               Kushal Shrestha           11              $1
4            Zero to Hero                      Chandra Bhusan Yadav      0               $5
5            Harry Potter                      JK Rowling                12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: 2

Enter the ID of Book you want to Return: -1

+++++++++++++++++++++++++++++++++++++++++++++++++++++
            Please Provide Valid Book ID
+++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar             10              $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                12              $2
3            Think And Grow Rich               Kushal Shrestha           11              $1
4            Zero to Hero                      Chandra Bhusan Yadav      0               $5
5            Harry Potter                      JK Rowling                12              $2
---------------------------------------------------------------------------------------------


Enter the ID of Book you want to Return: 6

+++++++++++++++++++++++++++++++++++++++++++++++++++++
            Please Provide Valid Book ID
+++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
```

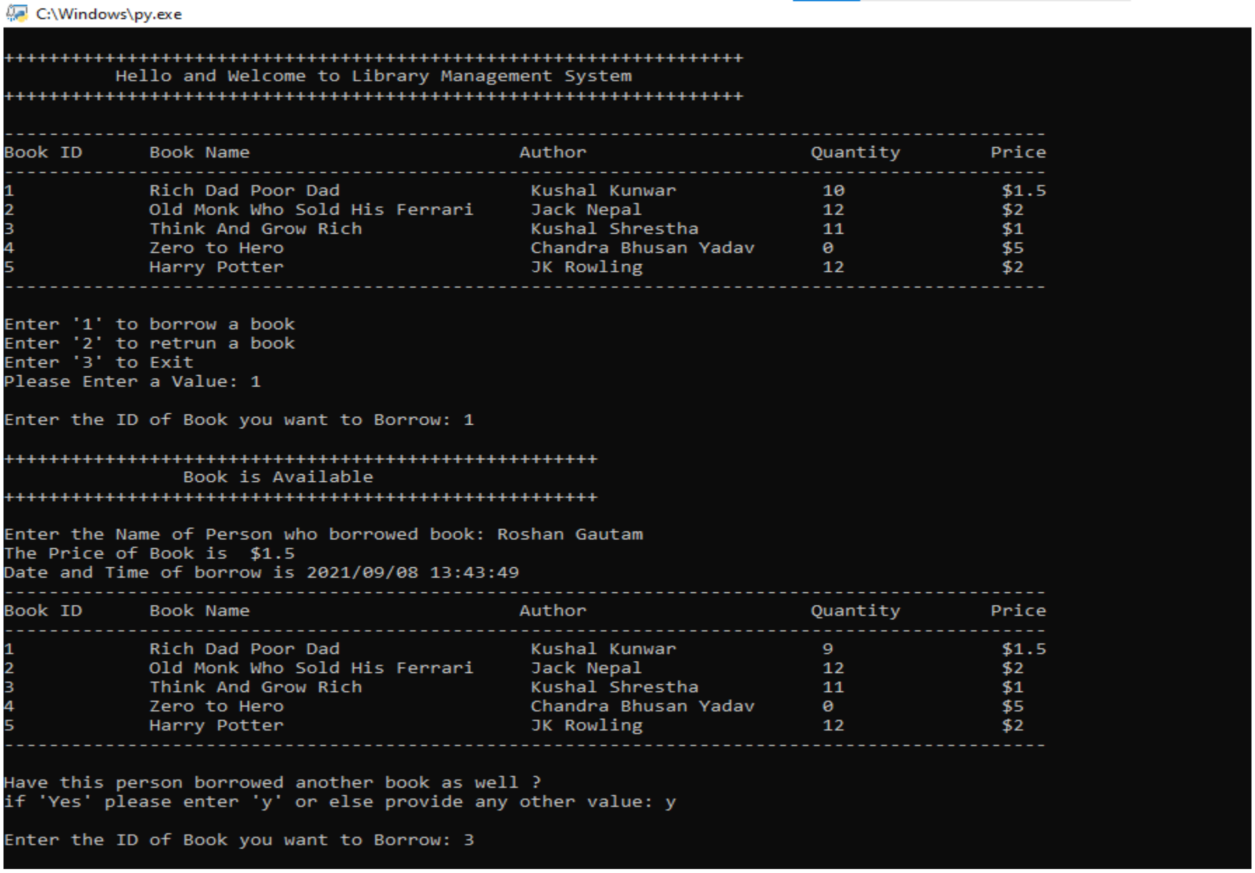
Figure 24: Returning Testing with negative value and non-existing value Figure

4.3. File Generation of Borrow

Test Number	3
Objective	To show the complete borrow process and display customer detail in shell as well as generate and display the borrow note in txt file
Action	➔ First, 1 is inputted in the value for borrow. ➔ When book is available, the name of Person was inputted ➔ Again, y is inputted for have this person borrowed another book and ID of book to be borrowed was inputted ➔ Again, n is inputted as there is no more book to borrow
Expected Result	➔ When 1 is inputted, the program is supposed to run for borrowing book and ID of book to borrow is to be asked to user ➔ After entering the Book ID, the name of borrower is supposed to asked. ➔ The price of book and date and time of borrow is displayed ➔ Again, does this person borrowed more book needs to be asked, and when y is inputted, the book ID is asked to the user. ➔ When any input other than y is inputted then, the customer borrow details needs to be displayed in the screen ➔ The customer borrow detail is supposed to be noted in the text file with borrower name and unique numeric digits
Actual Result	➔ When 1 is inputted, the program for borrowing book and ID of book to borrow is asked to user ➔ After entering the Book ID, the name of borrower is asked. ➔ The price of book and date and time of borrow is displayed ➔ Again, does this person borrowed more book is asked, and when y is inputted, the book ID is asked to the user. ➔ When any input other than y is inputted then, the customer borrow details is displayed in the screen ➔ The customer borrow detail is noted in the text file with borrower name and unique numeric digits
Conclusion	The test is Successful

Table 3: Testing Table 3

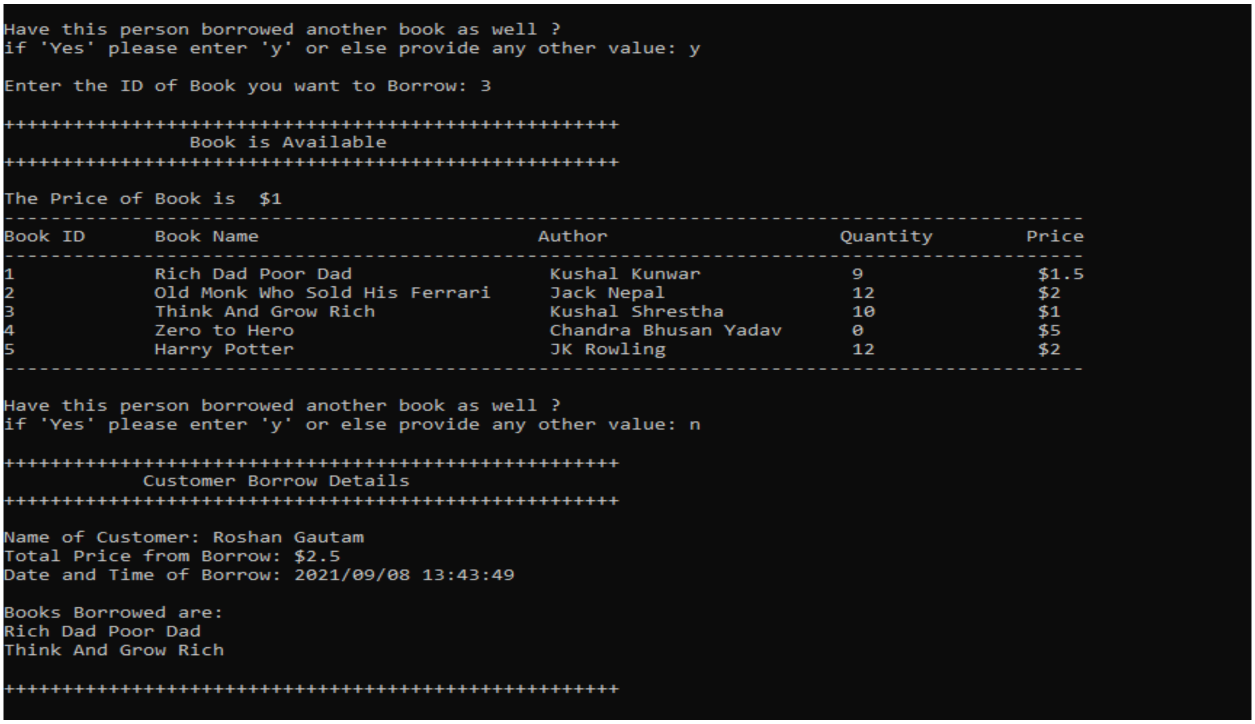
OUTPUT:



C:\Windows\py.exe

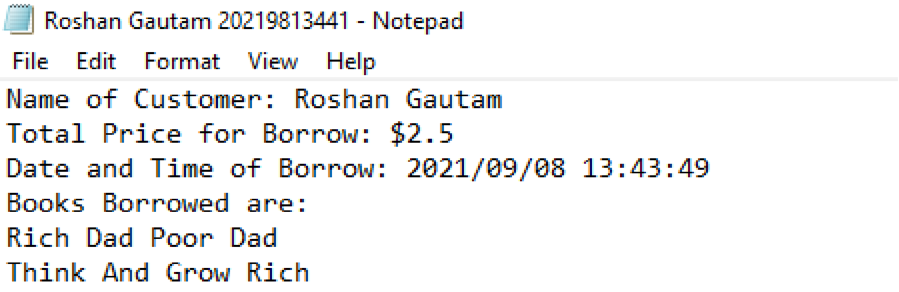
```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
          Hello and Welcome to Library Management System
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar              10              $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                 12              $2
3            Think And Grow Rich               Kushal Shrestha            11              $1
4            Zero to Hero                      Chandra Bhusan Yadav       0               $5
5            Harry Potter                      JK Rowling                 12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: 1

Enter the ID of Book you want to Borrow: 1

+++++++++++++++++++++++++++++++++++++++++++++++++++++
                Book is Available
+++++++++++++++++++++++++++++++++++++++++++++++++++++

Enter the Name of Person who borrowed book: Roshan Gautam
The Price of Book is  $1.5
Date and Time of borrow is 2021/09/08 13:43:49
---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar              9               $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                 12              $2
3            Think And Grow Rich               Kushal Shrestha            11              $1
4            Zero to Hero                      Chandra Bhusan Yadav       0               $5
5            Harry Potter                      JK Rowling                 12              $2
---------------------------------------------------------------------------------------------

Have this person borrowed another book as well ?
if 'Yes' please enter 'y' or else provide any other value: y

Enter the ID of Book you want to Borrow: 3
```

Figure 25: Customer Borrow Process Detail Part 1



```
Have this person borrowed another book as well ?
if 'Yes' please enter 'y' or else provide any other value: y

Enter the ID of Book you want to Borrow: 3

+++++++++++++++++++++++++++++++++++++++++++++++++++++
                Book is Available
+++++++++++++++++++++++++++++++++++++++++++++++++++++

The Price of Book is  $1
---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar              9               $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                 12              $2
3            Think And Grow Rich               Kushal Shrestha            10              $1
4            Zero to Hero                      Chandra Bhusan Yadav       0               $5
5            Harry Potter                      JK Rowling                 12              $2
---------------------------------------------------------------------------------------------

Have this person borrowed another book as well ?
if 'Yes' please enter 'y' or else provide any other value: n

+++++++++++++++++++++++++++++++++++++++++++++++++++++
            Customer Borrow Details
+++++++++++++++++++++++++++++++++++++++++++++++++++++

Name of Customer: Roshan Gautam
Total Price from Borrow: $2.5
Date and Time of Borrow: 2021/09/08 13:43:49

Books Borrowed are:
Rich Dad Poor Dad
Think And Grow Rich

+++++++++++++++++++++++++++++++++++++++++++++++++++++
```

Figure 26: Customer Borrow Process Detail Part 2


Roshan Gautam 20219813441 - Notepad
File Edit Format View Help

```
Name of Customer: Roshan Gautam
Total Price for Borrow: $2.5
Date and Time of Borrow: 2021/09/08 13:43:49
Books Borrowed are:
Rich Dad Poor Dad
Think And Grow Rich
```

Figure 27: Generated Borrow Text File

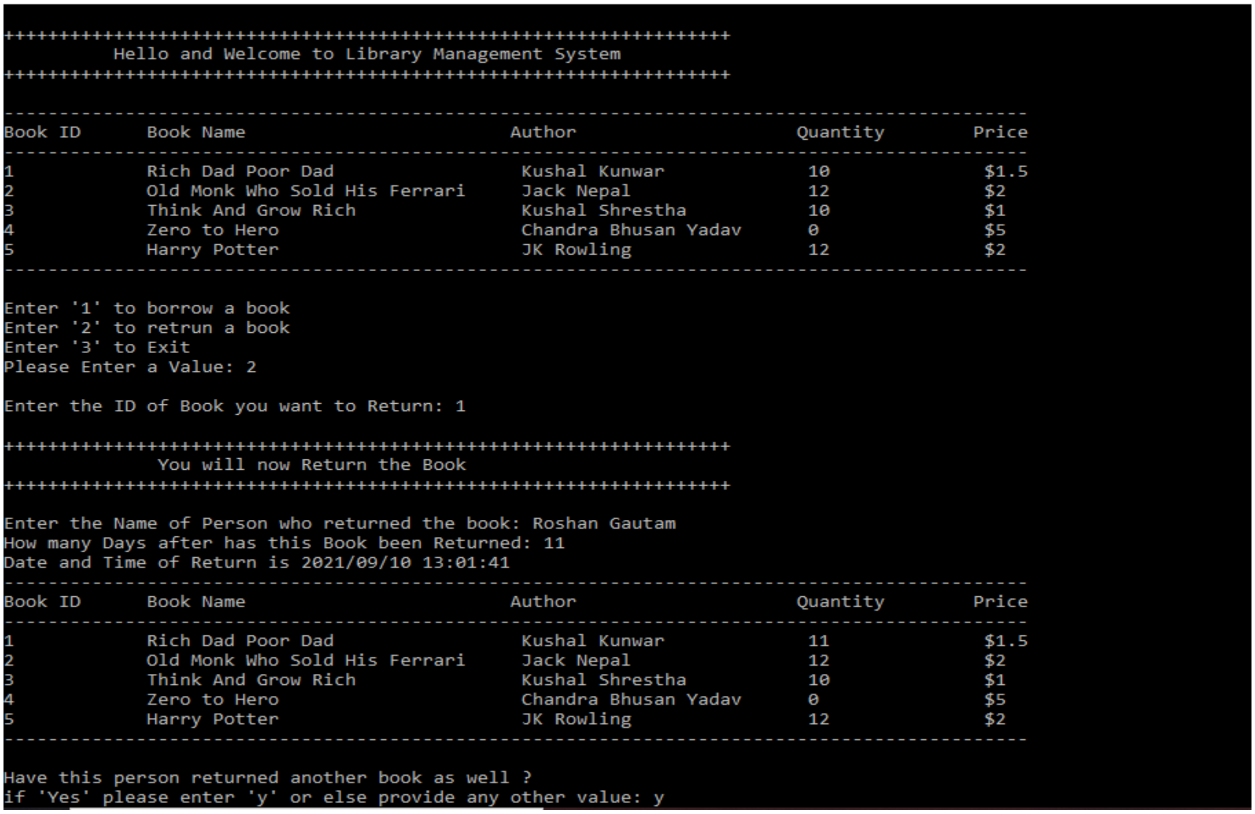
4.4. File Generation of Return

Test Number	4
Objective	To show the complete return process and display customer detail in shell as well as generate and display the borrow note in txt file
Action	➔ First, 2 is inputted in the value for return. ➔ When book is available for return, the name of Person was inputted ➔ Number of days after the book has been returned is inputted ➔ Again, y is inputted for have this person returned another book and ID of book to be returned was inputted with number of days the book was borrowed for. ➔ Again, n is inputted as there is no more book to borrow
Expected Result	➔ When 2 is inputted, the program is supposed to run for returning book and ID of book to return is to be asked to user ➔ After entering the Book ID, the name of borrower is supposed to asked. ➔ Number of days the book was returned needs to be asked to user. ➔ The date and time of borrow is displayed ➔ Again, does this person borrowed more book needs to be asked, and when y is inputted, the book ID is asked to the user and number of days book was returned is also to be asked. ➔ When any input other than y is inputted then, the customer return details needs to be displayed in the

	screen ➔ The customer return detail is supposed to be noted in the text file with borrower name and unique numeric digits
Actual Result	➔ When 2 is inputted, the program is run for returning book and ID of book to return is asked to user ➔ After entering the Book ID, the name of borrower is asked. ➔ Number of days the book was returned is asked to user. ➔ The date and time of borrow is displayed ➔ Again, does this person borrowed more book is asked, and when y is inputted, the book ID is asked to the user and number of days book was returned is also to be asked. ➔ When any input other than y is inputted then, the customer return details is displayed in the screen ➔ The customer return detail is noted in the text file with borrower name and unique numeric digits
Conclusion	The test is Successful

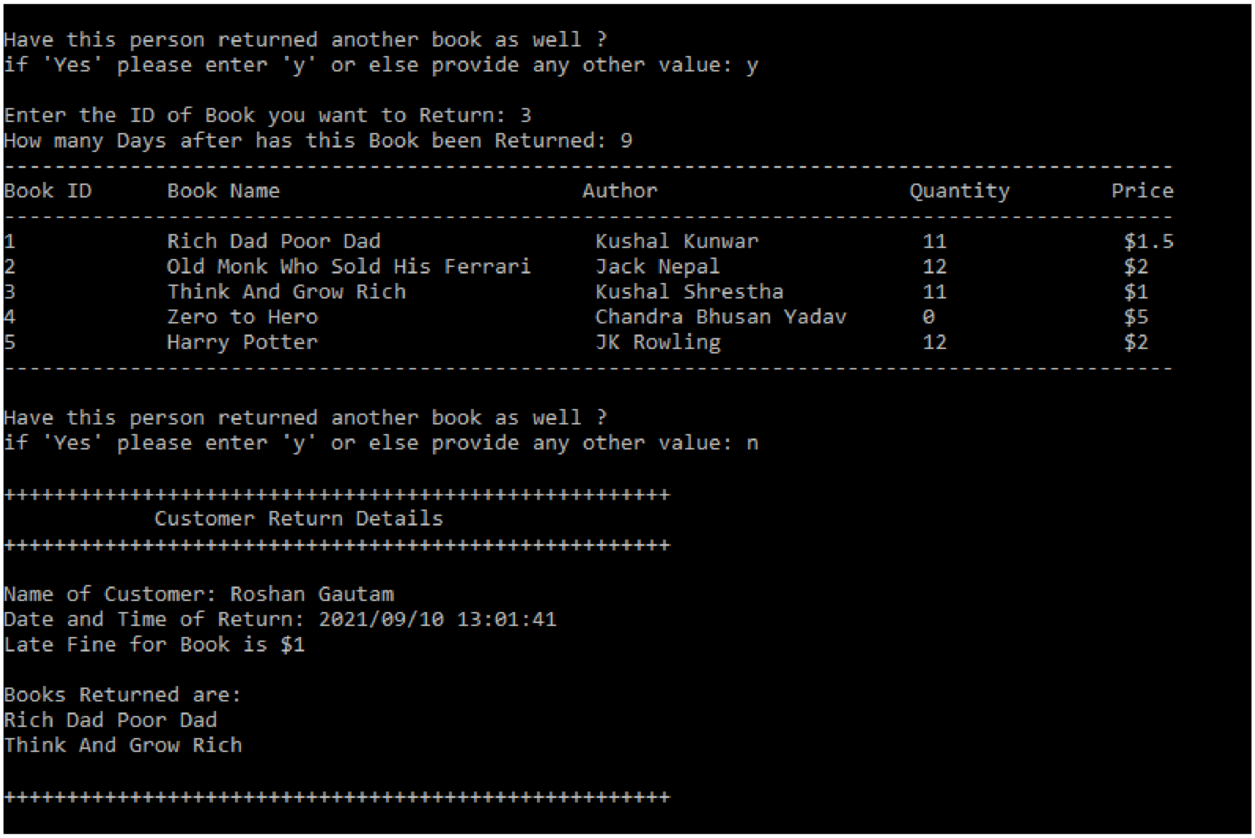
Table 4: Testing Table 4

OUTPUT:



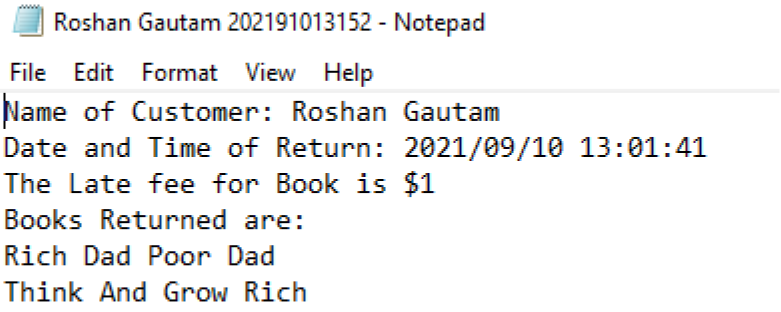
```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
          Hello and Welcome to Library Management System
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                         Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                  Kushal Kunwar             10              $1.5
2            Old Monk Who Sold His Ferrari      Jack Nepal                12              $2
3            Think And Grow Rich                Kushal Shrestha           10              $1
4            Zero to Hero                       Chandra Bhusan Yadav      0               $5
5            Harry Potter                       JK Rowling                12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: 2

Enter the ID of Book you want to Return: 1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
              You will now Return the Book
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Enter the Name of Person who returned the book: Roshan Gautam
How many Days after has this Book been Returned: 11
Date and Time of Return is 2021/09/10 13:01:41
---------------------------------------------------------------------------------------------
Book ID      Book Name                         Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                  Kushal Kunwar             11              $1.5
2            Old Monk Who Sold His Ferrari      Jack Nepal                12              $2
3            Think And Grow Rich                Kushal Shrestha           10              $1
4            Zero to Hero                       Chandra Bhusan Yadav      0               $5
5            Harry Potter                       JK Rowling                12              $2
---------------------------------------------------------------------------------------------

Have this person returned another book as well ?
if 'Yes' please enter 'y' or else provide any other value: y
```

Figure 28: Customer Return Process Detail Part 1



```
Have this person returned another book as well ?
if 'Yes' please enter 'y' or else provide any other value: y

Enter the ID of Book you want to Return: 3
How many Days after has this Book been Returned: 9
---------------------------------------------------------------------------------------------
Book ID      Book Name                         Author                    Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                  Kushal Kunwar              11              $1.5
2            Old Monk Who Sold His Ferrari      Jack Nepal                 12              $2
3            Think And Grow Rich                Kushal Shrestha            11              $1
4            Zero to Hero                       Chandra Bhusan Yadav       0               $5
5            Harry Potter                       JK Rowling                 12              $2
---------------------------------------------------------------------------------------------

Have this person returned another book as well ?
if 'Yes' please enter 'y' or else provide any other value: n

+++++++++++++++++++++++++++++++++++++++++++++++++++++
            Customer Return Details
+++++++++++++++++++++++++++++++++++++++++++++++++++++

Name of Customer: Roshan Gautam
Date and Time of Return: 2021/09/10 13:01:41
Late Fine for Book is $1

Books Returned are:
Rich Dad Poor Dad
Think And Grow Rich

+++++++++++++++++++++++++++++++++++++++++++++++++++++
```

Figure 29: Customer Return Process Detail Part 2



Roshan Gautam 202191013152 - Notepad
File Edit Format View Help

```
Name of Customer: Roshan Gautam
Date and Time of Return: 2021/09/10 13:01:41
The Late fee for Book is $1
Books Returned are:
Rich Dad Poor Dad
Think And Grow Rich
```

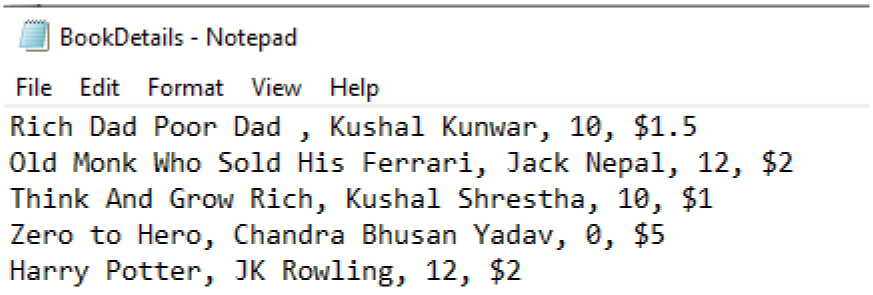
Figure 30: Generated Return Text File

4.5. Showing the Updated Stock

Test Number	5
Objective	To show quantity being deducted while borrowing the book and to show the quantity being added while returning the book
Action	➔ Book ID to be borrowed is inputted in the input book id section ➔ Name of the person who borrowed book is inputted ➔ For Returning Book, Number of days after the book has been returned is entered ➔ N is inputted for More borrow books
Expected Result	The quantity of book should be changed, Quantity of book should decrease for borrowing book whereas Quantity of book should be increased for returning book
Actual Result	The quantity of book is successfully changed. For borrowing, quantity of book is decreased whereas for returning, quantity of book is increased
Conclusion	The test is Successful

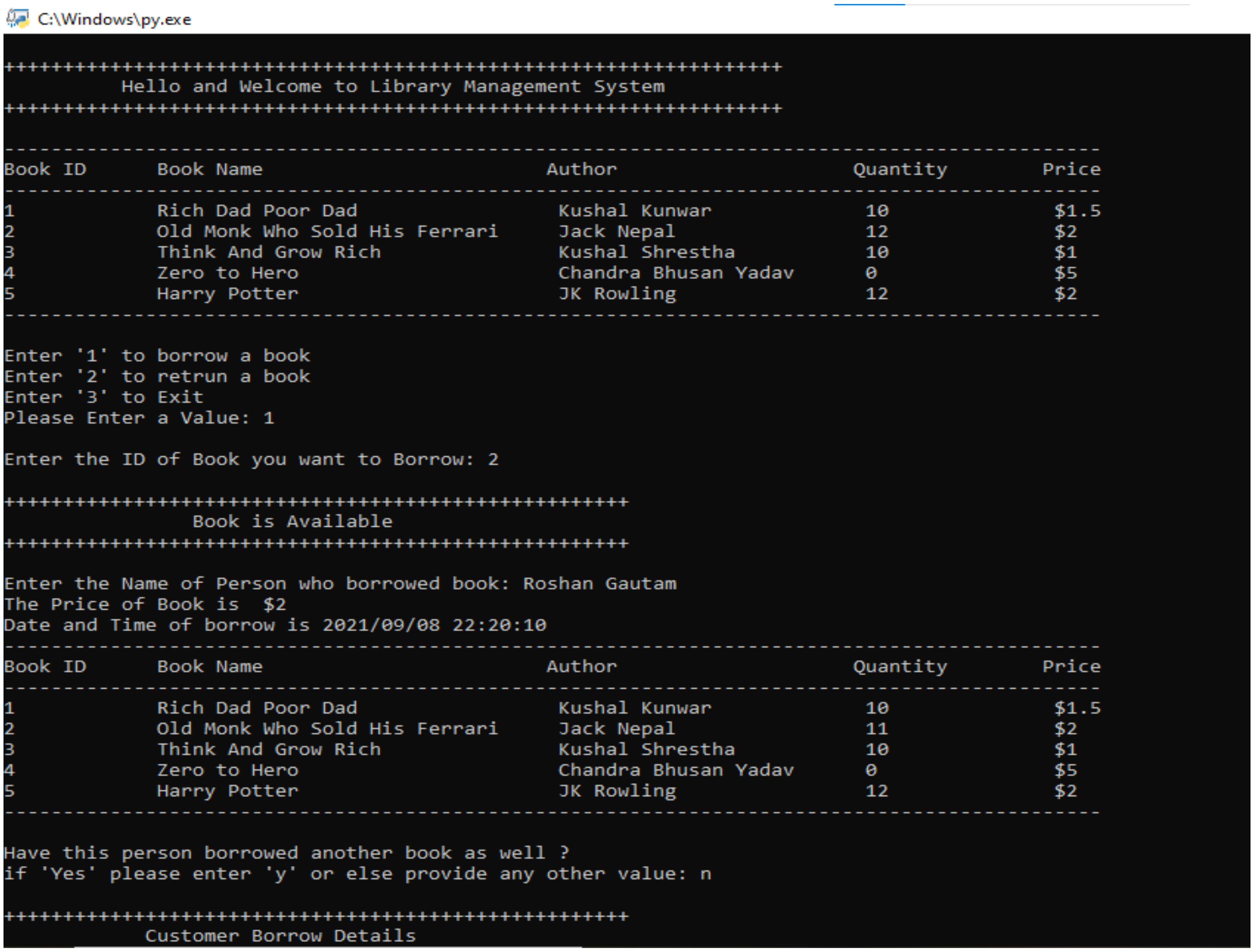
Table 5: Testing Table 5

OUTPUT:



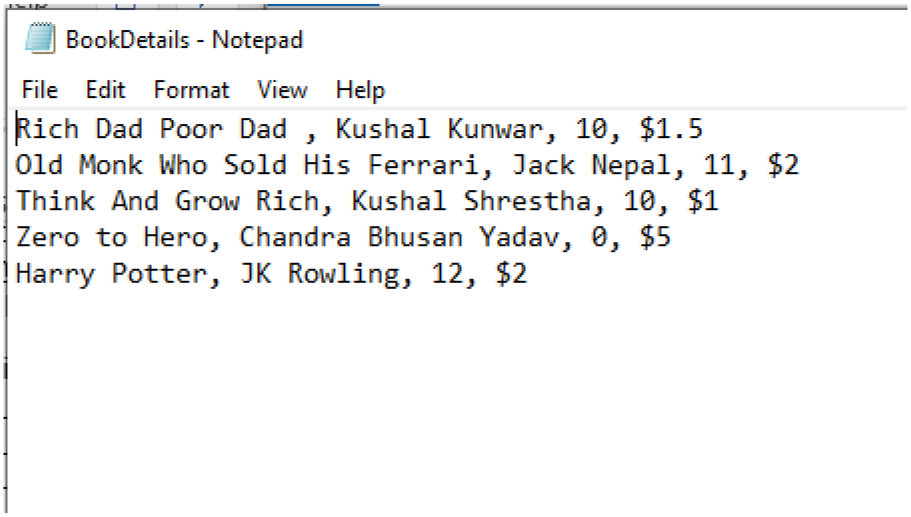
```
Rich Dad Poor Dad , Kushal Kunwar, 10, $1.5
Old Monk Who Sold His Ferrari, Jack Nepal, 12, $2
Think And Grow Rich, Kushal Shrestha, 10, $1
Zero to Hero, Chandra Bhusan Yadav, 0, $5
Harry Potter, JK Rowling, 12, $2
```

Figure 31: Text File Before Updating



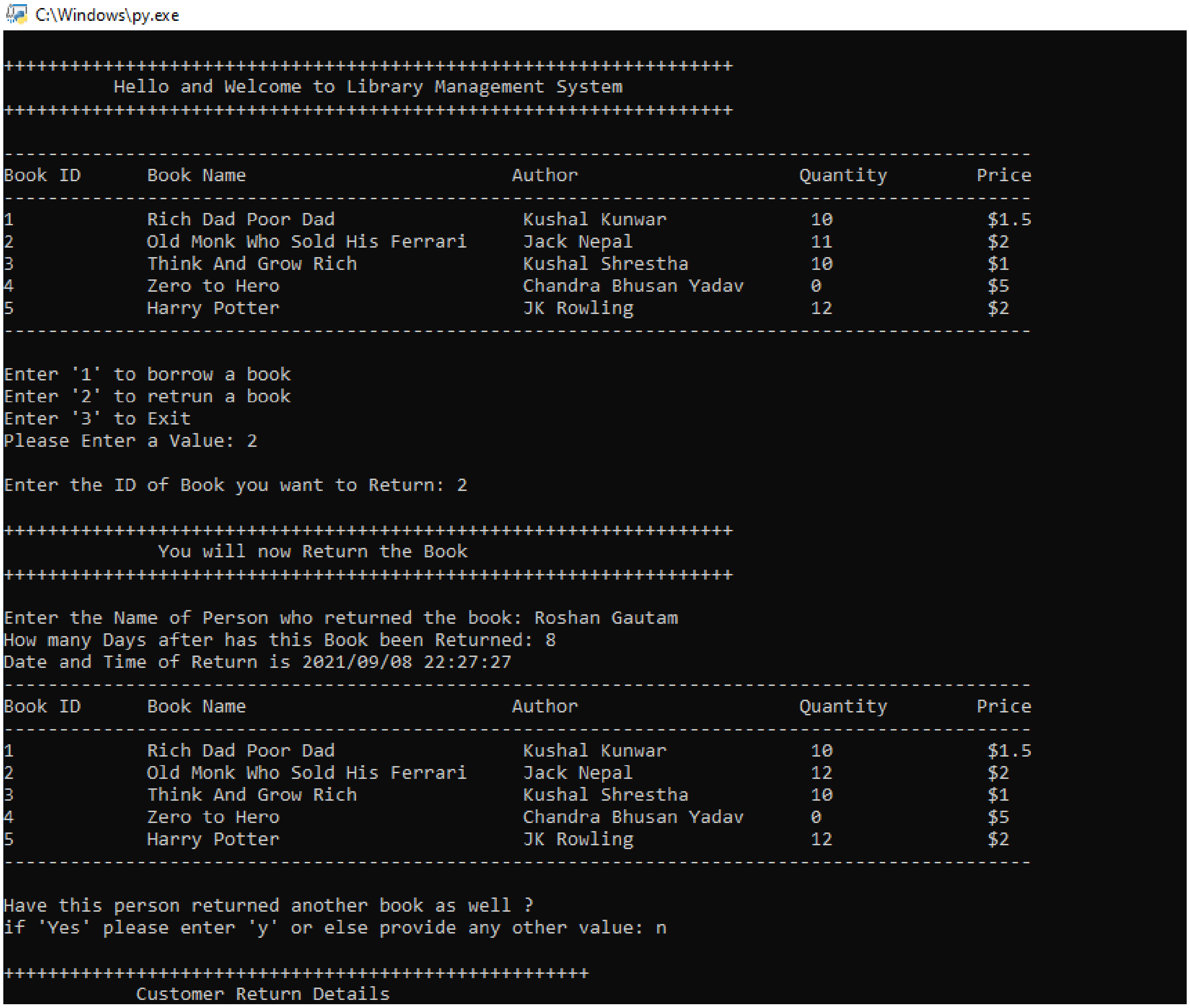
```
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
          Hello and Welcome to Library Management System
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

----------------------------------------------------------------------------------------------
Book ID       Book Name                        Author                    Quantity        Price
----------------------------------------------------------------------------------------------
1             Rich Dad Poor Dad                 Kushal Kunwar             10              $1.5
2             Old Monk Who Sold His Ferrari     Jack Nepal                12              $2
3             Think And Grow Rich               Kushal Shrestha           10              $1
4             Zero to Hero                      Chandra Bhusan Yadav      0               $5
5             Harry Potter                      JK Rowling                12              $2
----------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: 1

Enter the ID of Book you want to Borrow: 2

+++++++++++++++++++++++++++++++++++++++++++++++++++++
                Book is Available
+++++++++++++++++++++++++++++++++++++++++++++++++++++

Enter the Name of Person who borrowed book: Roshan Gautam
The Price of Book is  $2
Date and Time of borrow is 2021/09/08 22:20:10
----------------------------------------------------------------------------------------------
Book ID       Book Name                        Author                    Quantity        Price
----------------------------------------------------------------------------------------------
1             Rich Dad Poor Dad                 Kushal Kunwar             10              $1.5
2             Old Monk Who Sold His Ferrari     Jack Nepal                11              $2
3             Think And Grow Rich               Kushal Shrestha           10              $1
4             Zero to Hero                      Chandra Bhusan Yadav      0               $5
5             Harry Potter                      JK Rowling                12              $2
----------------------------------------------------------------------------------------------

Have this person borrowed another book as well ?
if 'Yes' please enter 'y' or else provide any other value: n

+++++++++++++++++++++++++++++++++++++++++++++++++++++
            Customer Borrow Details
```

Figure 32: Borrowing Books for Updating Text File



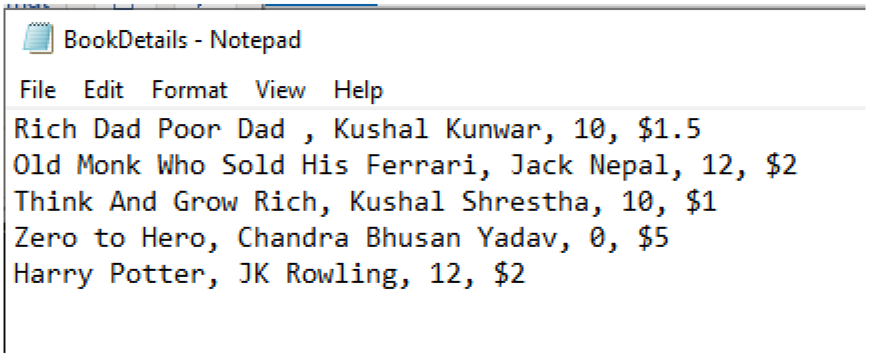
```
Rich Dad Poor Dad , Kushal Kunwar, 10, $1.5
Old Monk Who Sold His Ferrari, Jack Nepal, 11, $2
Think And Grow Rich, Kushal Shrestha, 10, $1
Zero to Hero, Chandra Bhusan Yadav, 0, $5
Harry Potter, JK Rowling, 12, $2
```

Figure 33: Updated Text File After Borrowing



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
          Hello and Welcome to Library Management System
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                     Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar              10              $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                 11              $2
3            Think And Grow Rich               Kushal Shrestha            10              $1
4            Zero to Hero                      Chandra Bhusan Yadav       0               $5
5            Harry Potter                      JK Rowling                 12              $2
---------------------------------------------------------------------------------------------

Enter '1' to borrow a book
Enter '2' to retrun a book
Enter '3' to Exit
Please Enter a Value: 2

Enter the ID of Book you want to Return: 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
              You will now Return the Book
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Enter the Name of Person who returned the book: Roshan Gautam
How many Days after has this Book been Returned: 8
Date and Time of Return is 2021/09/08 22:27:27
---------------------------------------------------------------------------------------------
Book ID      Book Name                        Author                     Quantity        Price
---------------------------------------------------------------------------------------------
1            Rich Dad Poor Dad                 Kushal Kunwar              10              $1.5
2            Old Monk Who Sold His Ferrari     Jack Nepal                 12              $2
3            Think And Grow Rich               Kushal Shrestha            10              $1
4            Zero to Hero                      Chandra Bhusan Yadav       0               $5
5            Harry Potter                      JK Rowling                 12              $2
---------------------------------------------------------------------------------------------

Have this person returned another book as well ?
if 'Yes' please enter 'y' or else provide any other value: n

+++++++++++++++++++++++++++++++++++++++++++++++++++++
            Customer Return Details
```

Figure 34: Returning Books for Updating Text File



```
Rich Dad Poor Dad , Kushal Kunwar, 10, $1.5
Old Monk Who Sold His Ferrari, Jack Nepal, 12, $2
Think And Grow Rich, Kushal Shrestha, 10, $1
Zero to Hero, Chandra Bhusan Yadav, 0, $5
Harry Potter, JK Rowling, 12, $2
```

Figure 35: Updated Text File After Returning Book

5. Conclusion

This program is developed for library management system which stores borrower details and returning details in note file. All the book detail is stored in a note file which is updated every time a transaction is made. A note is generated for borrower and returning book which contains name of borrower, name of book, date, and time of borrow and returning, and other required information. A fine of $1 is charged on daily basic for late return of books which is also written in generated file, the lending period for any book is 10 days.

This program helps to automate the library management system which automatically stores all the user information in the note file. This program helps to reduce any error that could occur by human error. A note is generated when a book is borrowed or returned to the library which stores all the required information and quantity of book is also updated after each transaction which create an ease to maintain library system.

6. Reference

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Available at: https://whatis.techtarget.com/definition/algorithm
[Accessed 10 09 2020].

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Available at: https://www.lucidchart.com/pages/what-is-a-flowchart-tutorial
[Accessed 10 09 2021].

TechTarget Contributor, 2019. *algorithm.* [Online]
Available at: https://whatis.techtarget.com/definition/algorithm
[Accessed 10 09 2020].

8. Appendix

MAIN MODULE

```
import functions

#Starting Execution Point
print
("\n+++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++++++++")
print("          Hello and Welcome to Library Management System")
print
("+++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++++++\n")

ansNum = 0
# Creating a Loop for User until 3 is Inputed
if ansNum == 0:
    while ansNum != 3:
        functions.printBookDetailDict()
        ansNum = functions.userInput()
        functions.checkUserInput(ansNum)
```

```
print("\n+++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++++++++++++")
print("          Thank you for using out Lbirary Management System")
print("++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++")
```

FUNCTIONS MODULE

```
from datetime import datetime
import os

# Function to Read TextFile BookDetails
def readTxtFile():
    file = open("BookDetails.txt","r")
    i = 1
    for line in file:
        line = line.replace("\n","")
        bookDetailDict[i] = line.split(",")
        i = i + 1
    return bookDetailDict
    file.close()

# Function to Print Complete Details In GUI
def printBookDetailDict():
    print("--------------------------------------------------------------------------------------
------")
    print("{:<12} {:<32} {:<25} {:<15} {:<15}".format('Book ID','Book
Name','Author','Quantity','Price'))
    print("--------------------------------------------------------------------------------------
------")
```

```
    file = open("BookDetails.txt","r")
    i = 1
    for line in file:
        line = line.replace("\n","")
        line = line.split(",")
        bookID = i
        bookName = line[0]
        author = line[1]
        quantity = line[2]
        price = line [3]
        i = i + 1
        print("{:<12} {:<32} {:<25} {:<15} {:<15}".format(bookID, bookName,
author, quantity, price))
    print("----------------------------------------------------------------------------------
------\n")
    file.close()

# Function to Call for Try Catch Error
def tryCatchError():
    print
("\n++++++++++++++++++++++++++++++++++++++++++++++++++++"
)
    print("             Please Proveide Valid Input Only")
    print
("++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
)

# Function that Ask User for Input 1,2,3
def userInput():
    check = "notTrue"
    while check != "True":
        print ("Enter '1' to borrow a book")
        print ("Enter '2' to retrun a book")
        print ("Enter '3' to Exit")
        try:
            ansNum = int(input("Please Enter a Value: "))
            check = "True"
        except:
            tryCatchError()
    return ansNum

# Function to Check if User Input is 1,2 or 3
def checkUserInput(ansNum):
    if ansNum == 1:
        bookID = checkBookID(ansNum)
        available = borrowBook(bookID)
        if available == "true":
            userNameBorrow(bookID, ansNum)
    elif ansNum == 2:
        bookID = checkBookID(ansNum)
        returnBook()
        userNameReturn(bookID, ansNum)
    elif ansNum == 3:
        exit
    else :
        invalidInput()

#Call Function when User Input 1
def borrowBook(bookID):
    dictValue = bookDetailDict[bookID]
    bookQuantity = int(dictValue[2])
    if bookQuantity == 0:
        print
("\n++++++++++++++++++++++++++++++++++++++++++++++++++++++++"
)
        print("               Book is Not Available")
        print
("++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
)
        available = "false"
    else:
        print
("\n++++++++++++++++++++++++++++++++++++++++++++++++++++++++"
)
        print("               Book is Available")
        print
("++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
)
        available = "true"
    return available


#To check User Input For BookID
def checkBookID(ansNum):
    if ansNum == 1:
        check = "notTrue"
        while check != "True":
            try:
                bookID = int(input("\nEnter the ID of Book you want to Borrow:
"))
                check = "True"
            except:
                tryCatchError()
    elif ansNum == 2:
        check = "notTrue"
        while check != "True":
            try:
                bookID = int(input("\nEnter the ID of Book you want to Return:
"))
                check = "True"
            except:
                tryCatchError()

    while bookID <= 0 or bookID > (len(bookDetailDict)):
        print
("\n+++++++++++++++++++++++++++++++++++++++++++++++++++++"
)
        print("            Please Provide Valid Book ID")
        print
("+++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
)
        printBookDetailDict()
        if ansNum == 1:
            bookID = int(input("\nEnter the ID of Book you want to Borrow: "))
        elif ansNum == 2:
            bookID = int(input("\nEnter the ID of Book you want to Return: "))
    return bookID

#Function to Ask Name of User and Display Price and Time
def userNameBorrow(bookID, ansNum):
    nameOfUser = input("Enter the Name of Person who borrowed book: ")
    dictValue = bookDetailDict[bookID]
    bookPrice = dictValue[3]
    dateTime = datetime.now()
    dt_string = dateTime.strftime("%Y/%m/%d %H:%M:%S")
    print("The Price of Book is", bookPrice)
    print("Date and Time of borrow is",dt_string)
    updateTxtFile(bookID, ansNum)
    borrowAnother("y", nameOfUser, dt_string, bookPrice, bookID,
ansNum)

#Function to Ask Name of User to Return the Name
def userNameReturn(bookID, ansNum):
    nameOfUser = input("Enter the Name of Person who returned the book:
")
    calculateFine = bookFine(0)
    dictValue = bookDetailDict[bookID]
    dateTime = datetime.now()
    dt_string = dateTime.strftime("%Y/%m/%d %H:%M:%S")
    print("Date and Time of Return is",dt_string)
    updateTxtFile(bookID, ansNum)
    returnAnother("y", nameOfUser, dt_string, bookID, calculateFine,
ansNum)

# Function to Ask for Borrow Another Book
def borrowAnother(borrowedAnother, customerName, dateTime,
bookPrice, bookID, ansNum):
    totalPrice = 0
    booksBorrowed = []
    booksBorrowed.append(bookID)
    while borrowedAnother == "y" or borrowedAnother == "Y":
        totalPrice = totalPrice + convertBookPrice(bookPrice)
        printBookDetailDict()
        print("Have this person borrowed another book as well ?")
        borrowedAnother = input("if 'Yes' please enter 'y' or else provide any
other value: ")
        if borrowedAnother == "y" or borrowedAnother == "Y":
            bookID = checkBookID(ansNum)
            isAvailable = borrowBook(bookID)
            if isAvailable == "true":
                dictValue = bookDetailDict [bookID]
                bookPrice = dictValue[3]
                booksBorrowed.append(bookID)
                print("The Price of Book is", bookPrice)
                updateTxtFile(bookID, ansNum)
    customerBorrowDetail(customerName, totalPrice, dateTime,
booksBorrowed)
    billingBorrowCustomerDetail(customerName, totalPrice, dateTime,
booksBorrowed)

# Function to Calculate Days of Return
def bookFine(totalFine):
    check = "notTrue"
    while check != "True":
        try:
            days = int(input("How many Days after has this Book been
Returned: "))
            check = "True"
        except:
            tryCatchError()
    if days > 10:
        totalDay = days - 10
        fine = totalDay * 1
        totalFine = totalFine + fine
    return totalFine
```

```
# Function to Ask for Return Another Book
def returnAnother(returnedAnother, customerName, dateTime, bookID,
calculateFine, ansNum):
    booksReturned = []
    booksReturned.append(bookID)
    while returnedAnother == "y" or returnAnother == "Y":
        printBookDetailDict()
        print("Have this person returned another book as well ?")
        returnedAnother = input("if 'Yes' please enter 'y' or else provide any
other value: ")
        if returnedAnother == "y" or returnedAnother == "Y":
            bookID = checkBookID(ansNum)
            dictValue = bookDetailDict [bookID]
            booksReturned.append(bookID)
            calculateFine = bookFine(calculateFine)
            updateTxtFile(bookID, ansNum)
    customerReturnDetail(customerName, dateTime, booksReturned,
calculateFine)
    billingReturnCustomerDetail(customerName, dateTime,
booksReturned, calculateFine)

# Function to Update Quantity
def updateQuantity(bookID, ansNum):
    dictValue = bookDetailDict[bookID]
    if ansNum == 1:
        dictValue[2] = str(int(dictValue[2])-1)
    elif ansNum == 2:
        dictValue[2] = str(int(dictValue[2])+1)

# Function to Change and Write Quantity in Text
```

```
def updateTxtFile(bookID, ansNum):
    updateQuantity(bookID, ansNum)
    tempFile = open("TempBookDetailsDict.txt","w")
    i = 1
    while (i <= len(bookDetailDict)):
        bookDetail = bookDetailDict[i]
        tempFile.write(str(bookDetail)+"\n")
        i = i + 1
    tempFile.close()

    fileRead = open("TempBookDetailsDict.txt","r")
    fileWrite = open("TempBookDetail.txt","w")
    for line in fileRead:
        line = line.replace("[","")
        line = line.replace("]","")
        line = line.replace("'","")
        line = line.replace("  "," ")
        fileWrite.write(str(line))
    fileRead.close()
    fileWrite.close()
    os.remove("TempBookDetailsDict.txt")
    os.remove("BookDetails.txt")
    os.rename(r'TempBookDetail.txt',r'BookDetails.txt')

#Function to Convert Book price to Float
def convertBookPrice(bookPrice):
    price = bookPrice.replace("$","")
    price = float(price)
    return price

#Function to Print Customer Borrow Details
```

```
def customerBorrowDetail(customerName, totalPrice, dateTime,
booksBorrowed):
    print
("\n++++++++++++++++++++++++++++++++++++++++++++++++++++++++++"
)
    print("            Customer Borrow Details")
    print
("++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
)

    print("Name of Customer:", customerName)
    print("Total Price from Borrow:","$"+ str(totalPrice))
    print("Date and Time of Borrow:",dateTime)
    print("\nBooks Borrowed are:")
    for books in booksBorrowed:
        dictValue = bookDetailDict [books]
        bookName = dictValue [0]
        print(bookName)
    print
("\n++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\
n")

# Function to Print Customer Return Details
def customerReturnDetail(customerName, dateTime, booksReturned,
totalPrice):
    print
("\n++++++++++++++++++++++++++++++++++++++++++++++++++++++++++"
)
    print("            Customer Return Details")
    print
("+++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
)

    print("Name of Customer:", customerName)
    print("Date and Time of Return:",dateTime)
    if totalPrice != 0:
        print("Late Fine for Book is $"+str(totalPrice))
    print("\nBooks Returned are:")
    for books in booksReturned:
        dictValue = bookDetailDict [books]
        bookName = dictValue [0]
        print(bookName)
    print
("\n+++++++++++++++++++++++++++++++++++++++++++++++++++++\
n")

# Function to Create Bill Detail of Customer
def billingBorrowCustomerDetail(customerName, totalPrice, dateTime,
booksBorrowed):
    year = str(datetime.now().year)
    month = str(datetime.now().month)
    day = str(datetime.now().day)
    hour = str(datetime.now().hour)
    minute = str(datetime.now().minute)
    second = str(datetime.now().second)
    time = year + month + day + hour + minute + second
    billCustomer = open(customerName + " " + time + ".txt","w")
    billCustomer.write("Name of Customer: " + customerName + "\n")
    billCustomer.write("Total Price for Borrow: " + "$" + str(totalPrice) + "\n")
    billCustomer.write("Date and Time of Borrow: "+ dateTime + "\n")
    billCustomer.write("Books Borrowed are:"+ "\n")
    for books in booksBorrowed:
        dictValue = bookDetailDict [books]
        bookName = dictValue [0]
        billCustomer.write (bookName + "\n")

# Function to Create Return Bill Detail of Customer
def billingReturnCustomerDetail(customerName, dateTime,
booksReturned, totalPrice):
    year = str(datetime.now().year)
    month = str(datetime.now().month)
    day = str(datetime.now().day)
    hour = str(datetime.now().hour)
    minute = str(datetime.now().minute)
    second = str(datetime.now().second)
    time = year + month + day + hour + minute + second
    billCustomer = open(customerName + " " + time + ".txt","w")
    billCustomer.write("Name of Customer: " + customerName + "\n")
    billCustomer.write("Date and Time of Return: "+ dateTime + "\n")
    if totalPrice == 0:
        billCustomer.write("There is No Late Fee\n")
    elif totalPrice != 0:
        billCustomer.write("The Late fee for Book is $"+str(totalPrice)+"\n")
    billCustomer.write("Books Returned are:"+ "\n")
    for books in booksReturned:
        dictValue = bookDetailDict [books]
        bookName = dictValue [0]
        billCustomer.write (bookName + "\n")

#Call Function when User Input 2
def returnBook():
```

```
print("\n++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++")
    print("               You will now Return the Book")

print("+++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++++++++++\n")


# Function to Call when user Input is Invalid
def invalidInput():

print("\n++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++")
    print("                        Ivalid Input!!!")
    print("              Please provide value as 1, 2 or 3.")

print("+++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++++++++++\n")

bookDetailDict = {}
bookDetailDict = readTxtFile()
```