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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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Introduction

Python is one of the most popular high level language and it is used in this project to create the program provided by the question. The program is done in the software provided by the Python which is called IDLE. In this given project, the program is used to store the records of book and where the book is imported from the txt file and added to the python file. In this project, error handling is used in this module which is done by using try and except method, which is used whenever the person provides the input that is not the criteria provided by the question. It gives the message to the person to input the correct input. Function file_open is used to open the txt file and function dictionary_write is used to write the txt file after borrowed by a consumer. After the person borrows any book then the txt file is updated and the txt file is again updated if the person returns the book. A note is generated if a person takes any book, this note is generated for every particular person including their name. And the note is also generated if the person returns the book and updates the existing txt file.

Goals and objective of this project:

- This project helps to update the books present in the library.
- This project helps to print the books taken by the person.
- This project helps to print the total price of the books taken by the person.
- This project helps to update the books after taken by the person and updates too after returned by the person.

Discussion and Analysis

The program is separated into two modules which displays the inventory, ask the person to input the value and displays the message book is available if the book is available in the library and enables the person to borrow the book and enlists the book taken by the person and creates the txt file having his name that consists the name of the person, books borrowed by the person and total amount to be paid for borrowing the book. When a person returns the book to the library the id of the book is taken by the person and a note is generated that contains the name of the returner, name of the book, date and time of the return. If the person exceeds more than 10 days to return the book amount of fine is added and written to the note.

In the first module, multiple functions are defined in order to open the txt file that consists of number of book present in the library including their price. In this module, the user is asked to input the integer value if he/she wants to borrow the book or return the book or exit from the library. If the user inputs 1 the user is allowed to borrow the book and can borrow the book from the library. If the user inputs 2 then the user can return the book borrowed from the library and if the user inputs 3 then the user can exit from the library.

In the second module, the functions created in the first module are called and the task are performed.

The software used for the completion of this project are:

1. Python:

   Python is a powerful, object-oriented, high level dynamic programming language created by Guido van Rossum in 1991. This program has an easy to use syntax and is quite easy to learn comparing to other programming language. It is freely available software. Python is an important programming tool where we

can write all the programs, build data from this software. Finally, the two modules are executed from this tool to acquire the result as assigned in the coursework. This software played an important role to complete this project.

2. Draw.io:

Draw.io is a diagramming software that helps to draw variety of software which includes of flowchart.

3. Microsoft word:

Microsoft word is a popular word processor developed by Microsoft Company. This tool is used to process the word and to documentation the project. This tool is easy to use and to create all the different types of document. This software has many simple and useful features which makes our project work easier. In this tool I had written all the programs and it also helps to change simple file into pdf file.

4. Sniping tool:

Sniping tool is friendly screenshot software. This tool is very useful and from this tool, you can simply select the area that you want to capture. This software is used to take screenshots of anything and save it as different formats.

Algorithm

The step by step analysis of the program are as follows:

Step 1: The main module begins by defining the project.
Step 2: An input is asked to input the value as 1, 2 and 3.
Step 3: If the user inputs 1, the user enters the borrow section to borrow the book.
Step 4: An input is asked the user to enter the Id of the book that he/she wants to borrow.
Step 5: An input is asked to input the name of the borrower.
Step 6: An input is asked if the borrower wants to borrow another book else prints the bill and goes to step 2.
Step 7: If the user inputs 2, the user enter the returns the return section to return the book.
Step 8: An input is asked to input the name of the returner.
Step 9: An input is asked to input the Id of the book that the returner wants to return.
Step 10: An input is asked if the returner wants to return the book else print the bill and goes to step 2.
Step 11: If the user inputs 3, the program is ended.

Flowchart

Flowchart of the functions used in this module are:

- Function file_open:

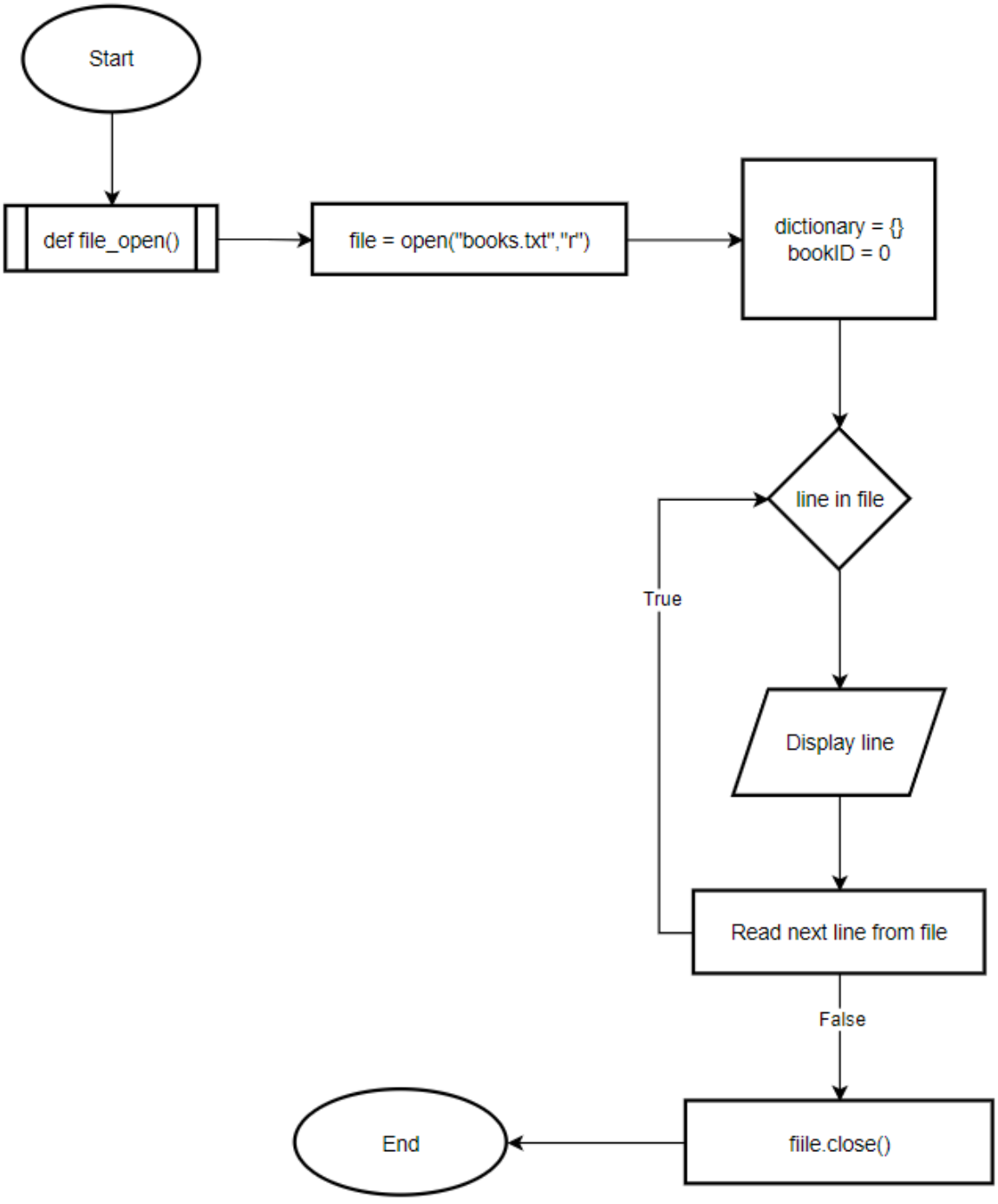

Figure 1: Flowchart of function file_open

- Function dictionary_books:

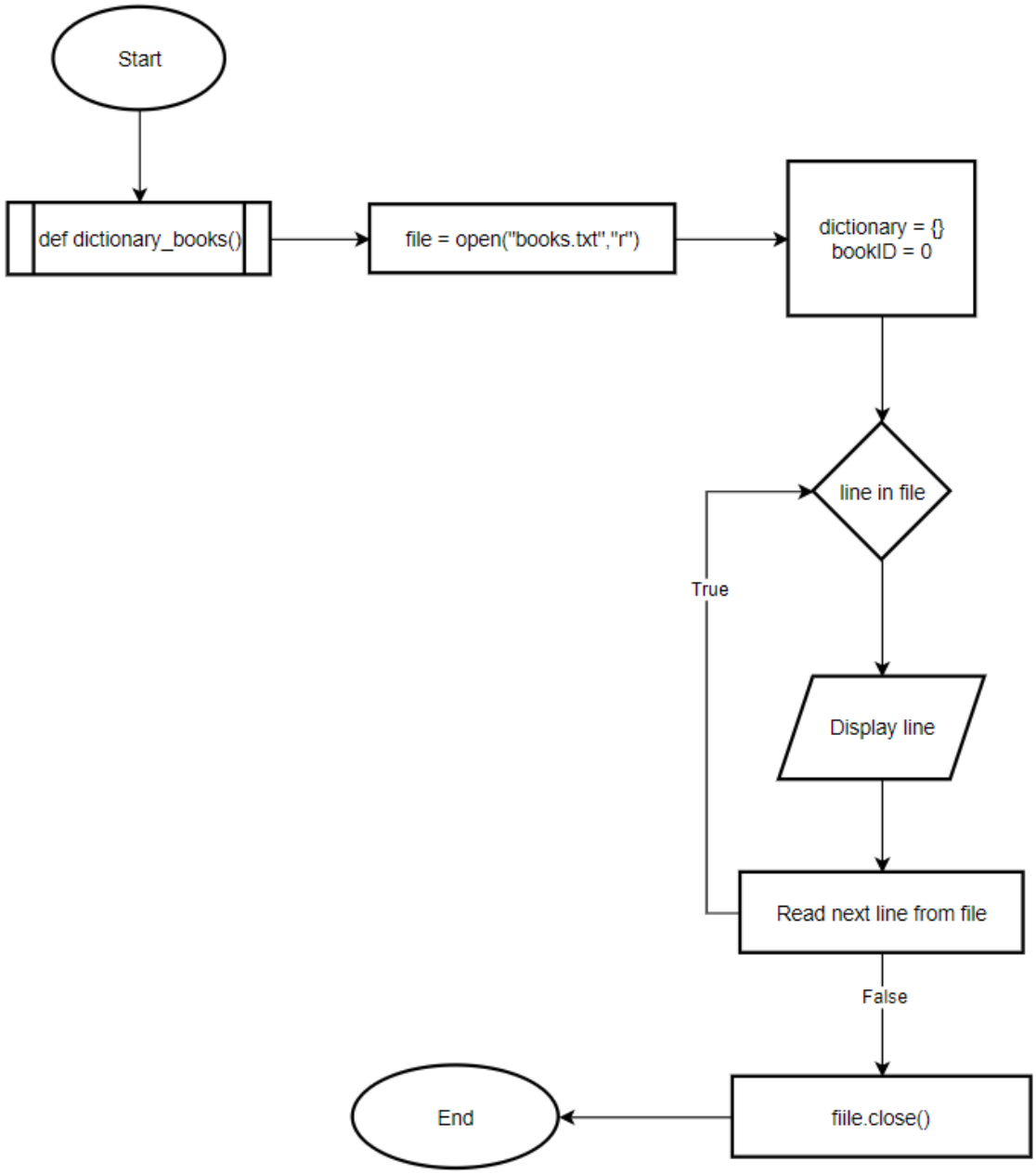

Figure 2: Flowchart of function dictionary_books

- Function dictionary_write:

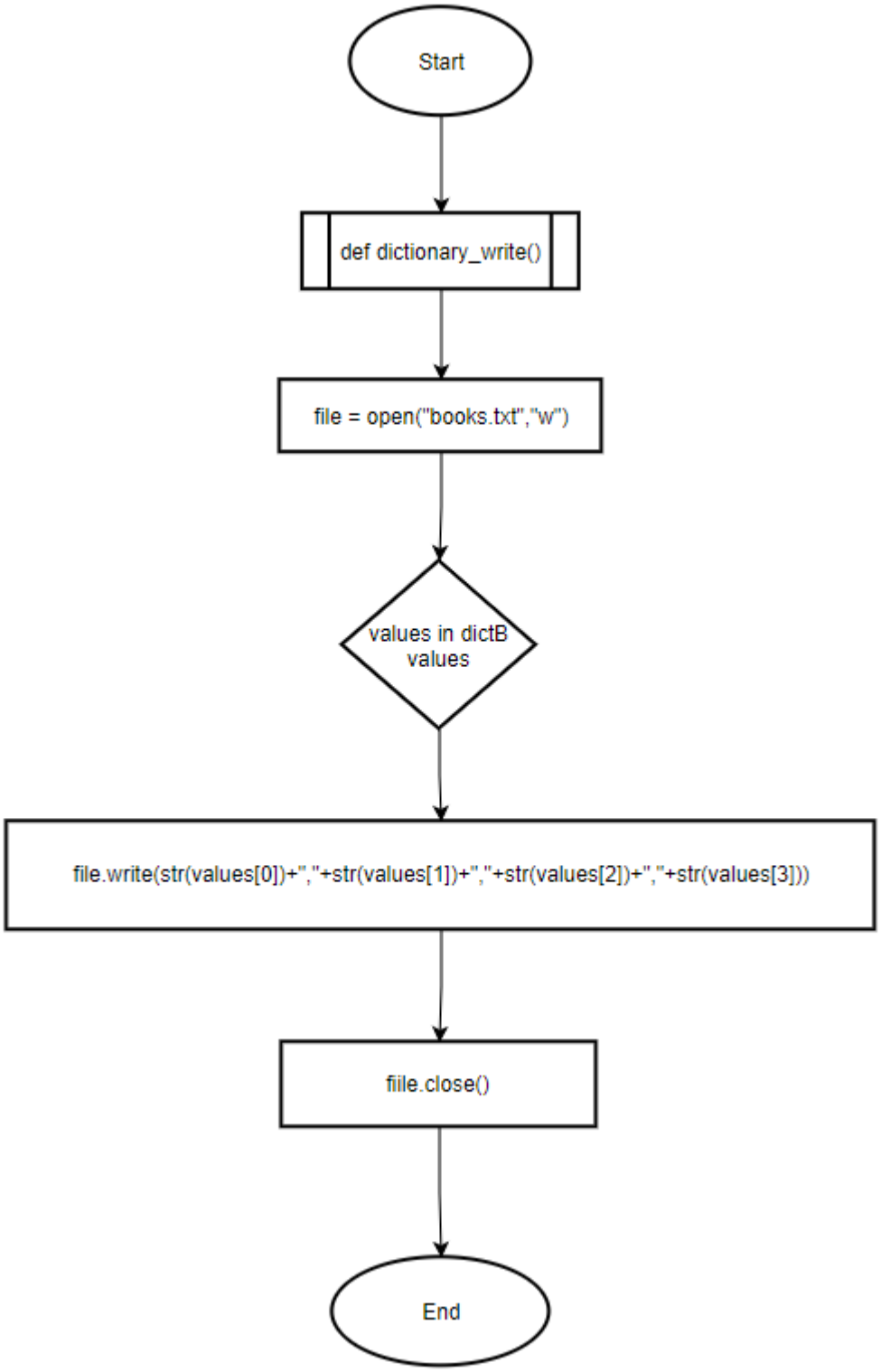

Figure 3: Flowchart of function dictionary_write

- Function bill():

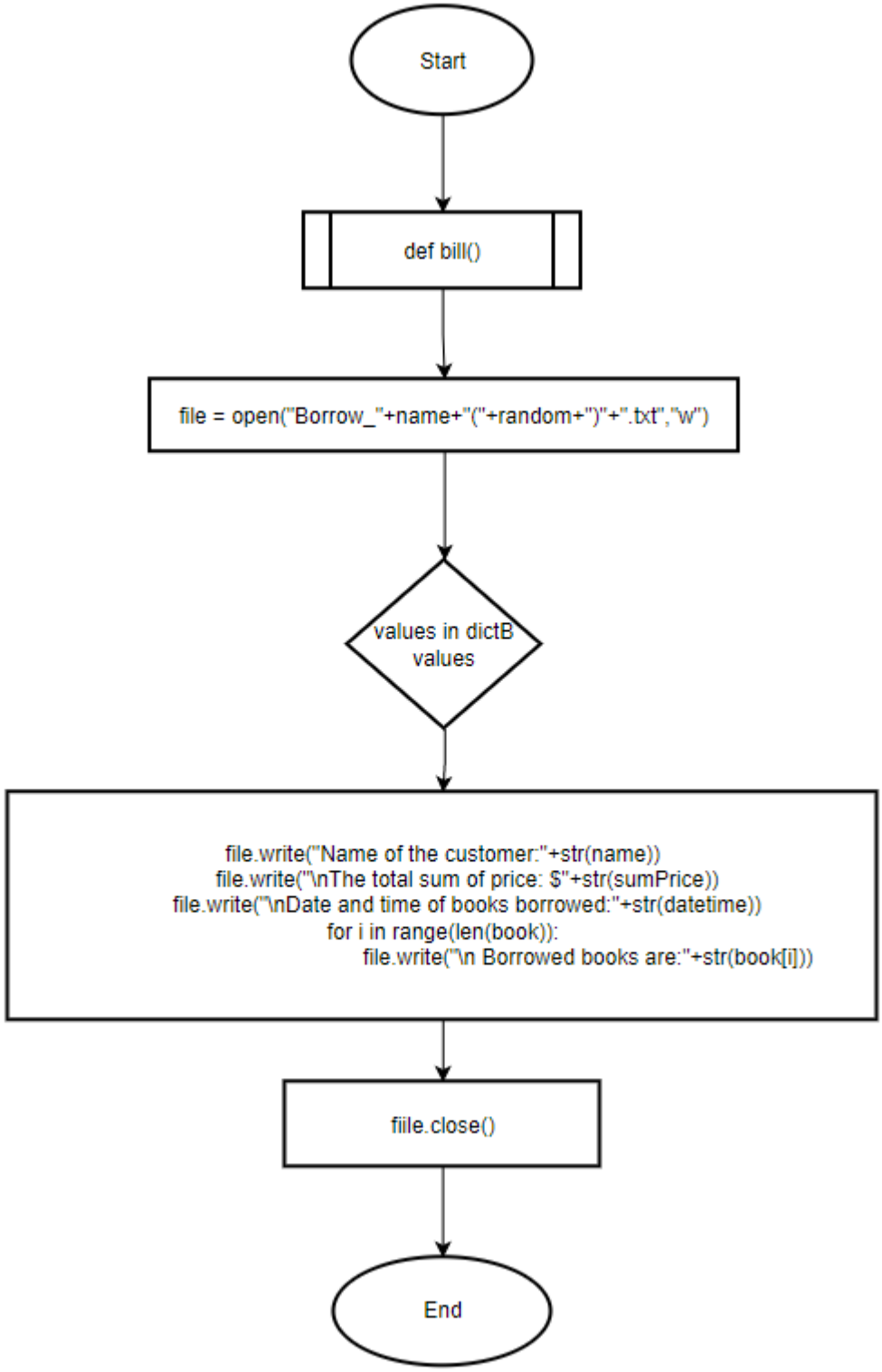

Figure 4: Flowchart of function bill

- Function r_write:

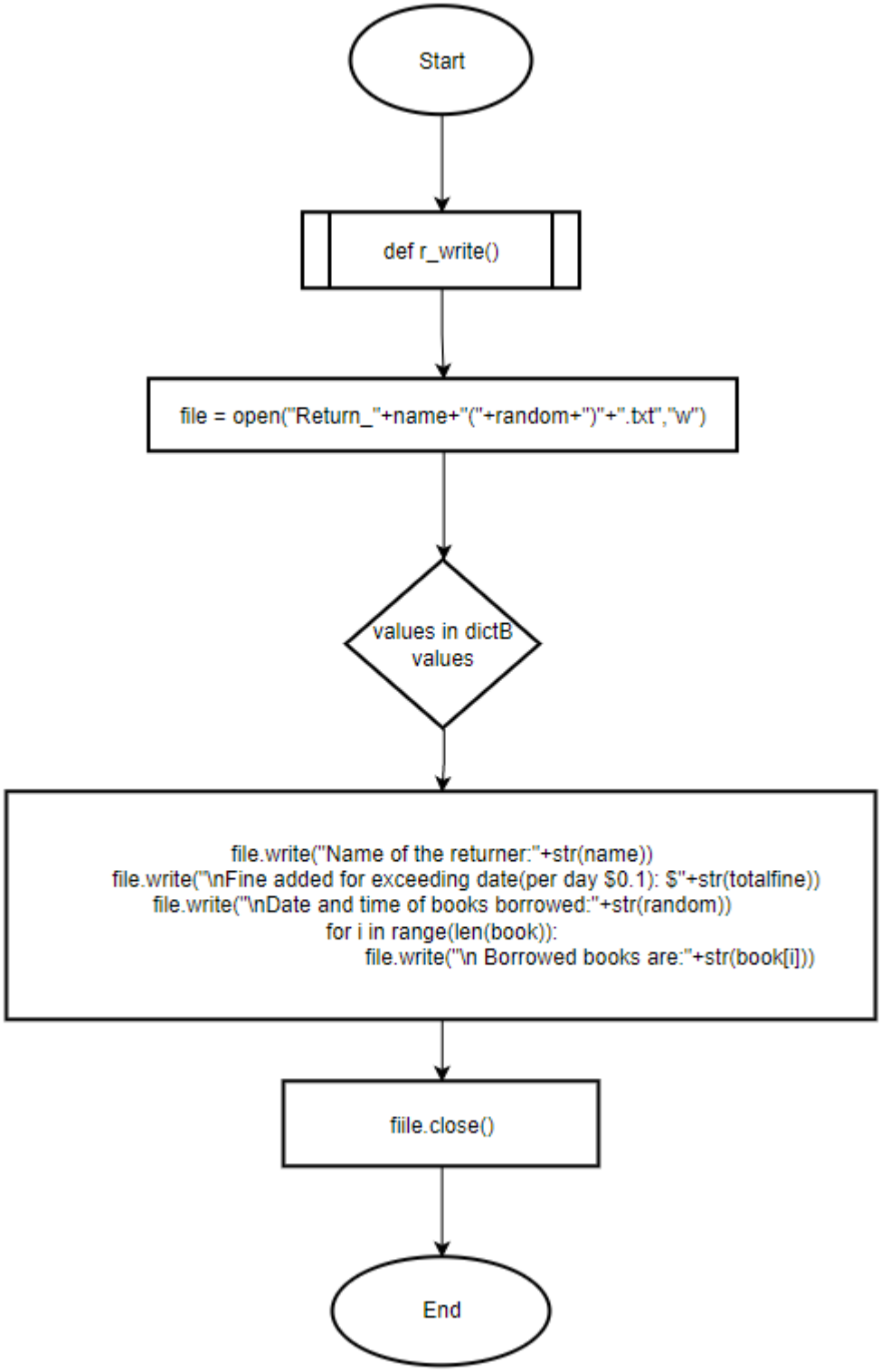

Figure 5: Flowchart of function r_write

Flowchart of the main program is;

- Main program:

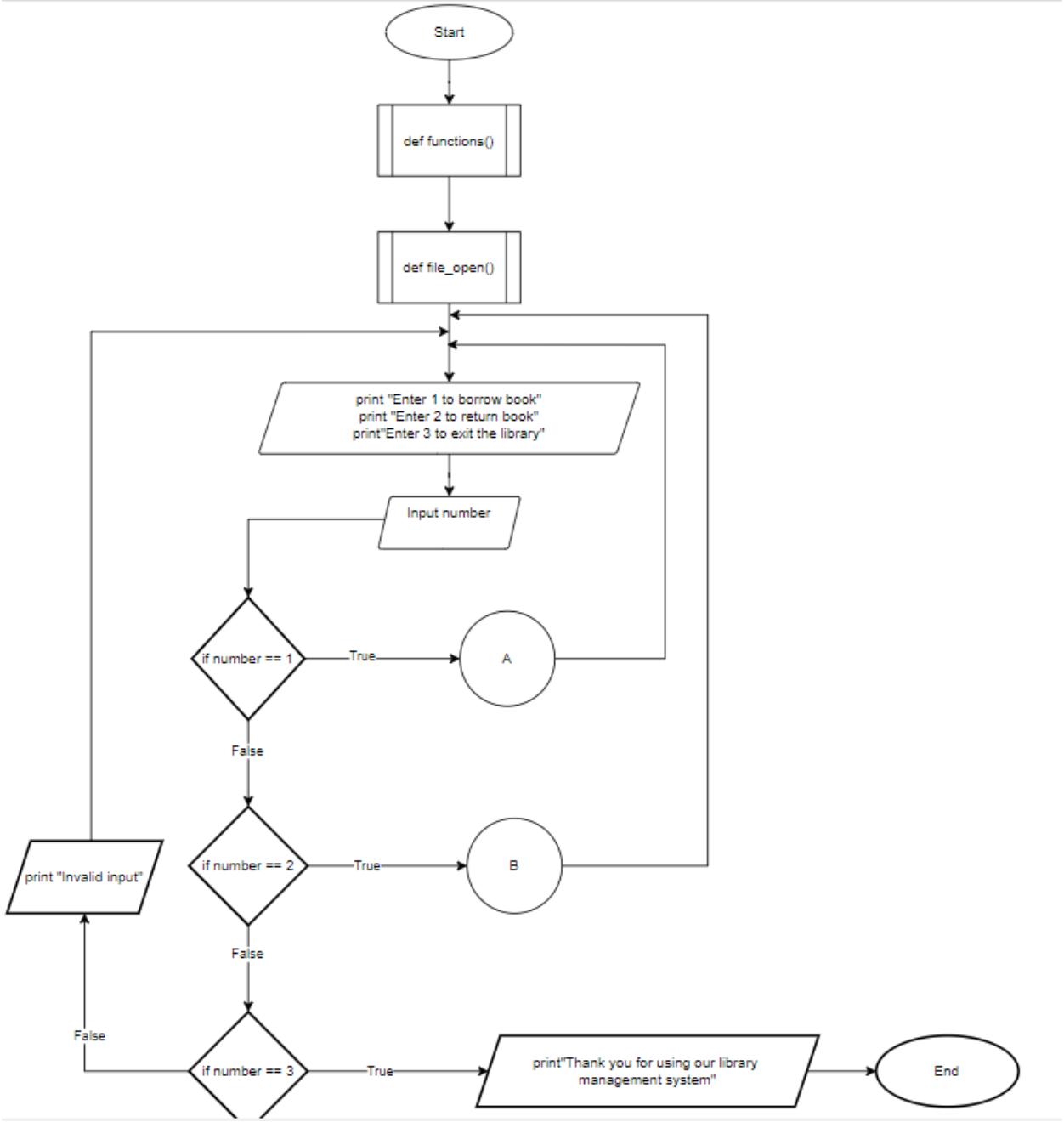

Figure 6: Flowchart of Main program

- Connector A of main program:

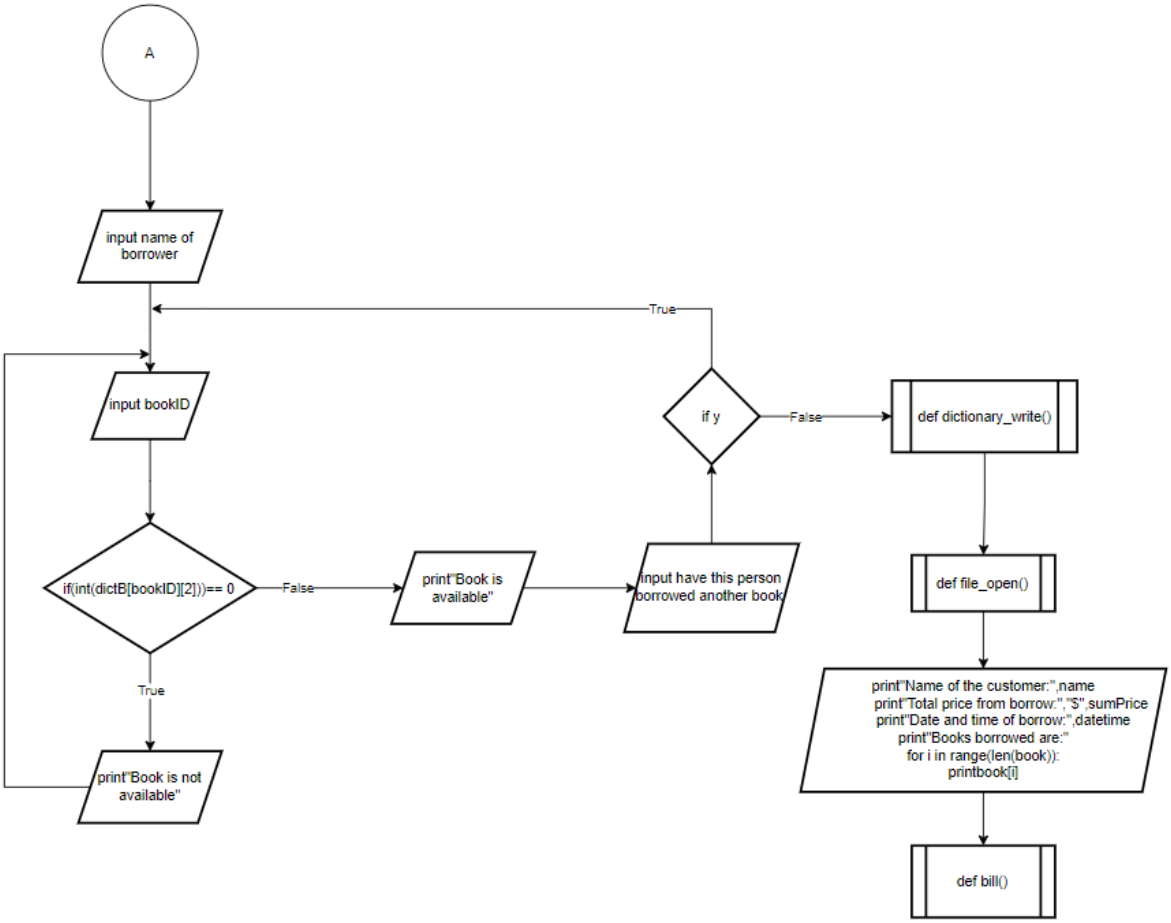

Figure 7: Flowchart of connector A of main program

- Connector B of main program:

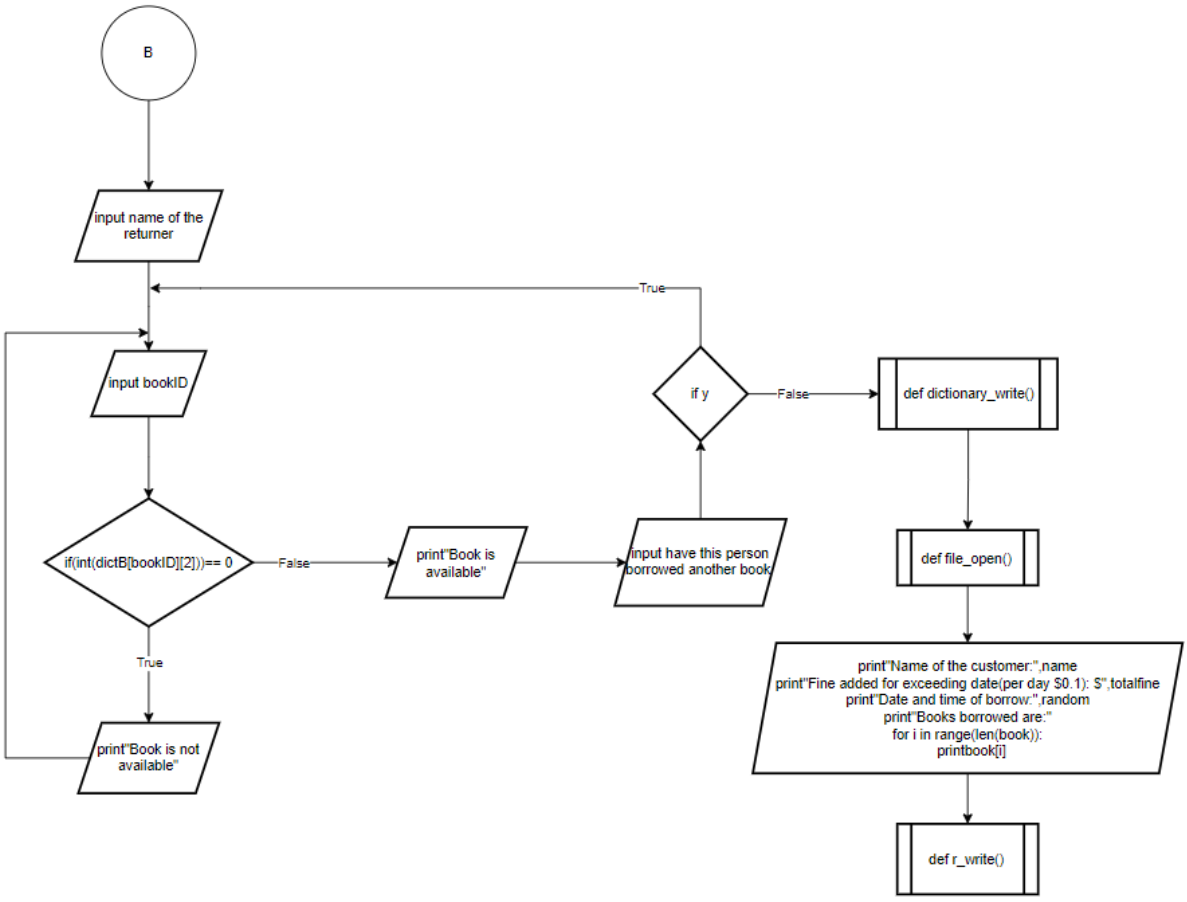

Figure 8: Flowchart of connector B of main program

Pseudo code

- Pseudocode for functions module:

  DEFINE function functions

  DEFINE function file_open

```
        Open (“books.txt”,”r”)
        DO FOR line in file:
            bookID equals to bookID + 1
            line equals to line.replace("$","")
            line equals to line.replace("\n","")
            dictionary [bookID] equals to line.split(',')
            line equals to line.replace(",", " \t")
            Display bookID, "\t", line
        END FOR
        close file

    DEFINE function dictionary_books
        Open (“books.txt”, “r”)
        DO FOR line in file:
            bookID equals to bookID + 1
            line equals to line.replace("$","")
            line equals to line.replace("\n","")
            dictionary [bookID] equals to line.split(',')
        END FOR
        Close file

    DEFINE function dictionary_write
        open (“books.txt”, “w”)
        DO FOR values in dictB.values:
            write(str(values[0])+","+str(values[1])+","+str(values[2])+","+str(v
        alues[3]))
            write("\n")
        END FOR
        Close file

    DEFINE function bill
```

```
        Import datetime
        second equals to str(datetime.datetime.now().second)
        micro equals to str(datetime.datetime.now().microsecond)
        open (“Borrow_”+name+“(“+random+”)”+”.txt”,”w”)
        write (“Name of the customer:”+str(name))
        write("\nThe total sum of price: $"+str(sumPrice))
        write("\nDate and time of books borrowed:"+str(datetime))
        DO FOR i in range(len(book)):
            Write("\n Borrowed books are:"+str(book[i]))
        END FOR
        Close file
DEFINE function bill
        Import datetime
        second equals to str(datetime.datetime.now().second)
        micro equals to str(datetime.datetime.now().microsecond)
        open (“Return_”+name+“(“+random+”)”+”.txt”,”w”)
        write (“Name of the customer:”+str(name))
        write("\nThe total sum of price: $"+str(sumPrice))
        write("\nDate and time of books returned:"+str(datetime))
        DO FOR i in range(len(book)):
            Write("\n Returned books are:"+str(book[i]))
        END FOR
        Close file



DO WHILE equals to False:
        Try:
            Input val
            DO WHILE equals to True:
                Call function file_open
```

IF val is equal to 1:
Display (“You will now borrow book”)
DO WHILE equals to True:
Input bookID
dictB equals to function dictionary_books
input bookID
IF [bookID][2]) equals to 0
Display (“book is not available”)
ELSE
Display (“book is available”)
END WHILE
Input name
Display price
Import datetime
Display datetime
Total equals to list the values of price
sumPrice equals to sum(total)
Call function dictionary_write

Display (“library after borrow is:”)

Call function file_open
DO WHILE equals to True
Input another
IF another equals to y
Input bookID

IF [bookID][2]) equals to 0
Display (“book is not available”)

Display (name)
Display (sumPrice)
Display (datetime)
DO FOR i in range(len(book))
Display (book[i])
Break
ELSE
Display (“Book is available”)
Total equals to list of price
sumPrice equals to sum(total)
Call function dictionary_write
Display (“Library after borrow is:”)
Call function file_open
ELSE
END WHILE
Display (“Customer borrow details”)
Display (name)
Display (sumPrice)
Display (datetime)
DO FOR I in range(len(book))
Display (book[i])
Call function bill

IF val equals to 2

Display (“You will now return book”)

Input name

DO WHILE equals to True

Input bookID

IF bookID equals to 1 or 2 or 3 or 4 or 5

Display (“Book is returned”)

Import datetime

Call function dictionary_write

Display (“Library after return of a book is:”)

Call function file_open

END WHILE

ELSE

Display (“Please provide a valid book Id”)

DO WHILE equals to True

Input another

IF another equals to y

Input bookID

IF bookID equals to 1 or 2 or 3 or 4 or 5

Display (“Book is returned”)

Call function dictionary_write

Call function file_open

ELSE

Display (“Library after return of book is:”)

Call function file_open

ELSE

Try

Input fine

Except

Display (“please enter an integer value”)

IF fine > 10

Fineamt equals to (fine-10)*0.10

Totalfine = sum(finelist)

ELSE

totallist = 0

END WHILE

Display (“Costumer return details”)

Display (name)

Display (totalfine)

Display (datetime)

DO FOR i in range(len(book))

Display (book[i])

Call function r_write

IF val equals to 3

END WHILE

Display (“Thank you for using our library management system”)

ELSE

Display (“Please provide values as 1, 2 or 3”)

```
            Break
    EXCEPT
            Display ("Please enter a valid input")
```

Data Structures

The data structures are the building blocks of programming in this project. The primitive data types that are used in this project such as string, integers, float, and Boolean are used in this project. Now, strings are used in this project to write the name of the borrower and returner and also for asking user if he/she wants to borrow more books and return more books. The string data type are used so that the user could understand the question provided by the programmer and make it easier for the user to do borrow and return process easily. The integer data type is used in order for book ID, quantity of book and amount of the books placed, also it provides user a good idea to record the data of borrow and return of books made by a person. And the float data type is used in calculation of total number of books borrowed by the person price and fine added to the person amount if he/she delays to return the book in certain time interval. And Boolean data type is used in error handling and loop process because boolean datatype has two constant values i.e. True or False.

The collective data structures used in this project are dictionary and 2d lists. Dictionary data structures are used in this project, so that it could hold the inventory and are used to call out the books present in the library with the ID of the book asked by the user. 2d llist makes the data present in dictionary more reliable and the user can visualize its data more properly and can select the usable book from the data provided in the dictionary.

Program

The project is done in two modules and one module consists of functions and another module calls the functions from the first module.

The functions present in the first module are:

I. Function file_open:

```
                ..................................................................... ,
def file_open():
    print("-------------------------------------------------------------------------
    print("Book ID " + " Book-Name \t"  + " Author \t" + "Quantity    " + "Price($)"
    print("-------------------------------------------------------------------------
    dictionary ={}
    file = open("books.txt","r")
    bookID = 0

    for line in file:
        bookID = bookID + 1
        line = line.replace("$","")
        line = line.replace("\n","")
        dictionary [bookID] = line.split(',')
        line = line.replace(",", " \t")

        print(bookID, "\t", line)

    print("\n-------------------------------------------------------------------------

    file.close()

file_open()
```

Figure 9: Coding of function file_open

This function opens the books.txt file that consists of number of books present in the library.

II. Function dictionary_write

```
def dictionary_write():
    file = open("books.txt","w")
    for values in dictB.values():
        file.write(str(values[0])+","+str(values[1])+","+str(values[2])+","+str(val
        file.write("\n")

    file.close()
```

Figure 10: Coding of function dictionary_write

This function updates the value of library and the quantity of books are updated according the user borrow and returns the book.

III. Function bill

```
def bill():
    import datetime
    second = str(datetime.datetime.now().second)
    micro = str(datetime.datetime.now().microsecond)
    random= second + micro
    file = open("Borrow_"+name+"("+random+")"+".txt","w")
    file.write("Name of the customer:"+str(name))
    file.write("\nThe total sum of price: $"+str(sumPrice))
    file.write("\nDate and time of books borrowed:"+str(datetime))
    for i in range(len(book)):
        file.write("\n Borrowed books are:"+str(book[i]))
    file.close()
```

Figure 11: Coding of function bill

This function writes the borrow details of the borrower that consists of name of the borrower, date and time of borrow, total price of the borrow and name of the books borrowed.

IV. Function r_write

```
def r_write():
    import datetime
    second = str(datetime.datetime.now().second)
    micro = str(datetime.datetime.now().microsecond)
    random= second + micro
    file = open("Return_"+name+"("+random+")"+".txt","w")
    file.write("Name of the returner:"+str(name))
    file.write("\nFine added for exceeding date(per day $0.1): $"+str(totalfine))
    file.write("\nDate and time of books returned:"+str(random))
    for i in range(len(book)):
        file.write("\n Returned books are:"+str(book[i]))
    file.close()
```

Figure 12: Coding of function r_write

This functions writes the return details of the returner that consists of name of the returner, date and time of the return, name of the books

returned and fine added to the returner if he delays to return the books in the certain amount of time.

V. Function functions

```
def functions():

    def dictionary_books():
        file = open("books.txt","r")
        dictionarybooks={}
        bookID = 0
        for line in file:
            bookID = bookID+1
            line = line.replace("$","")
            line = line.replace("\n","")
            dictionarybooks[bookID] = line.split(",")

        file.close()
        return dictionarybooks



    def dictionary_write():
        file = open("books.txt","w")
        for values in dictB.values():
            file.write(str(values[0])+","+str(values[1])+","+str(values[2])+","+str(values[3])
            file.write("\n")

        file.close()

    def bill():
        import datetime
        second = str(datetime.datetime.now().second)
        micro = str(datetime.datetime.now().microsecond)
        random= second + micro
        file = open("Borrow_"+name+"("+random+")"+".txt","w")
        file.write("Name of the customer:"+str(name))
        file.write("\nThe total sum of price: $"+str(sumPrice))
        file.write("\nDate and time of books borrowed:"+str(datetime))
        for i in range(len(book)):
            file.write("\n Borrowed books are:"+str(book[i]))
        file.close()
```

Figure 13: Coding of function functions part 1

```
def r_write():
    import datetime
    second = str(datetime.datetime.now().second)
    micro = str(datetime.datetime.now().microsecond)
    random= second + micro
    file = open("Return_"+name+"("+random+")"+".txt","w")
    file.write("Name of the returner:"+str(name))
    file.write("\nFine added for exceeding date(per day $0.1): $"+str(totalfine))
    file.write("\nDate and time of books returned:"+str(random))
    for i in range(len(book)):
        file.write("\n Returned books are:"+str(book[i]))
    file.close()

print("++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
      "\t\t Hello and welcome to my library management \n"
      "++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++")
def file_open():
    print("-------------------------------------------------------------------------------------")
    print("Book ID " + " Book-Name \t"  + " Author \t" + "Quantity    " + "Price($)" )
    print("-------------------------------------------------------------------------------------")
    dictionary ={}
    file = open("books.txt","r")
    bookID = 0

    for line in file:
        bookID = bookID + 1
        line = line.replace("$","")
        line = line.replace("\n","")
        dictionary [bookID] = line.split(',')
        line = line.replace(",", " \t")

        print(bookID, "\t", line)

    print("\n-------------------------------------------------------------------------------------")

    file.close()
```

Figure 14: Coding of function functions part 2

```
correctInput = False

while correctInput == False:

    try:
        loop = True
        while loop == True:
            file_open()
            print("Enter 1 to borrow a book")
            print("Enter 2 to return a book")
            print("Enter 3 to exit")

            val = int(input("Please enter a value:"))

            if val == 1:
                print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                      "\t\tYou will now borrow book!!\n"
                      "+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++")

                price=[]
                book=[]

                Bloop = True

                while Bloop == True:

                    bookID = int(input("Enter the ID of the book:"))
                    dictB = dictionary_books()

                    while bookID<=0 or bookID>len(dictB):
                        bookID= int(input("Enter the ID of the book: "))
                    if(int(dictB[bookID][2])) == 0:
                        print("+++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                              "\t\t Book is not available!!\n"
                              "+++++++++++++++++++++++++++++++++++++++++++++++++++\n")

                    else:
                        print("+++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                              "\t\t Book is available!!\n"
                              "+++++++++++++++++++++++++++++++++++++++++++++++++++\n")
                        Bloop=False

                        name = input("Enter the name of the borrower:")
                        price.append(dictB[bookID][3])

                        book.append(dictB[bookID][0])
```

Figure 15: Coding of function functions part3

```
print("The price of the book is ",(dictB[bookID][3]))
import datetime
datetime = str(datetime.datetime.now())

print("Date and time of borrow is ",datetime)
total = list(map(float,price))
sumPrice = sum(total)

(dictB[bookID][2])= int((dictB[bookID][2]))-1


dictionary_write()

print("\n"
    "Library after borrow is: ")
file_open()

Aloop = True
while Aloop == True:
    another=input("Have this person borrowed another book as well?\n"
                  "If 'Yes' please enter 'Y' or else provide any other value:")
    if another == "Y" or another == "y":

        bookID = int(input("Enter the ID of the book:"))

        while bookID<=0 or bookID>len(dictB):
            bookID= int(input("Enter the ID of the book: "))

        if(int(dictB[bookID][2]))==0:

            print("+++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                "\t\t Book is not available!!\n"
                "+++++++++++++++++++++++++++++++++++++++++++++++++++\n")
            print("\n")
            print ("Name of the customer: ",name)
            print ("Total price : ","$",sumPrice)
            print ("Date and time of borrow: ", datetime)
            print ("Books borrowed are: ")
            for i in range(len(book)):
                print(book[i])
            break
        else:
            print("+++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                    "\t\t Book is available!!\n"
                    "+++++++++++++++++++++++++++++++++++++++++++++++++++\n")
            price.append(dictB[bookID][3])
            book.append(dictB[bookID][0])
```

Figure 16: Coding of function functions part 4

```
                    book.append(dictB[bookID][0])
                    total = list(map(float,price))
                    sumPrice = sum(total)
                    dictB[bookID][2] = int(dictB[bookID][2]) - 1
                    dictionary_write()
                    print("\n"
                        "Library after borrow is: ")
                    file_open()

                else:
                    Aloop = False
                    print("++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                          "\t\t Customer Borrow Details\n"
                          "++++++++++++++++++++++++++++++++++++++++++++++++++++++++")

                    print("Name of the customer:",name)
                    print("Total price from borrow:","$",sumPrice)
                    print("Date and time of borrow:",datetime)
                    print("Books borrowed are:")
                    for i in range(len(book)):
                        print(book[i])
                    print("\n\n++++++++++++++++++++++++++++++++++++++++++++++++++++++")
                    bill()



if val == 2:
    print("++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
          "\t\tYou will now return the book!!\n"
          "++++++++++++++++++++++++++++++++++++++++++++++++++++++")

    name = input("Enter the name of the borrower:")
    book=[]
    Cloop = True

    while Cloop == True:

        bookID = int(input("Enter the ID of the book you want to return:"))
        dictB = dictionary_books()

        while bookID<=0 or bookID>len(dictB):
            bookID= int(input("Enter the ID of the book you want to return: "))
        if bookID == 1 or bookID == 2 or bookID == 3 or bookID == 4 or bookID == 5:
            print("\n"
                  "++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                    "\t \t Book is returned!!\n"
```

Figure 17: Coding of function functions part 5

```
                  "+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
            book.append(dictB[bookID][0])

            dictB[bookID][2] = int(dictB[bookID][2]) + 1
            import datetime
            datetime = datetime.datetime.now()

            dictionary_write()
            print("\n"
                    "Library after return of book is: ")
            file_open()

            Cloop = False
        else:

            print("+++++++++++++++++++++++++++++++++++++++++++++\n"
                    "\t\tPlease provide a valid Book ID!!\n"
                    "+++++++++++++++++++++++++++++++++++++++++++++")

    Dloop = True
    while Dloop == True:

        another=input("Have this person borrowed another book as well?\n"
                        "If 'Yes' please enter 'Y' or else provide any other value:")
        if another == "Y" or another == "y":

            bookID = int(input("Enter the ID of the book:"))

            while bookID<=0 or bookID>len(dictB):
                bookID= int(input("Enter the ID of the book: "))
            if bookID == 1 or bookID == 2 or bookID == 3 or bookID == 4 or bookID == 5:
                print("\n"
                        "+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          "\t \t Book is returned!!\n"
                             "+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

                dictB[bookID][2] = int(dictB[bookID][2]) + 1

                dictionary_write()
                file_open()

            else:
                print("\n"
                        "Library after return of book is: ")

                file_open()
```

Figure 18: Coding of function functions part 6

```
            else:
                try:
                    fine = int(input("Enter the number of days you have borrowed the bool
                except:
                    print("++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++-
                          "\t\tPlease enter an integer value!!!!\n"
                          "++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++-

                fineamt = 0
                finelist=[]
                if fine > 10:
                    fineamt = (fine - 10)*0.10
                    finelist.append(fineamt)
                    totalfine = sum(finelist)

                else:
                    totalfine=0

                Dloop = False
                print("++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                             "\t\t Customer return Details\n"
                             "++++++++++++++++++++++++++++++++++++++++++++++++++++++++++")

                print("Name of the customer:",name)
                print("Fine added for exceeding date(per day $0.1): $",totalfine)
                print("Date and time of borrow:",datetime)
                print("Books borrowed are:")
                for i in range(len(book)):
                    print(book[i])
                print("\n\n++++++++++++++++++++++++++++++++++++++++++++++++++++++")
                r_write()


    if val == 3:
        loop = False

        print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
            "\t\tThank you For using our Library management system\n"
              "+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++")
    else:
        print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
              "\t\tPlease provide value as 1, 2 or 3!!!\n"
              "+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++")



                      "++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++'
          correctInput =True
          break
      except:
          print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
              "\t\tplease enter a valid input!!\n"
                "+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++")

functions()
```

Figure 19: Coding of function functions part 7

The code of second module is:

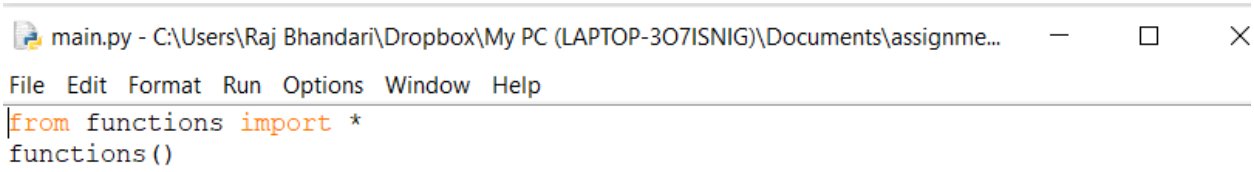

Figure 20: Coding of main module

In this module the first module function is called on the main module.

The output of this project are shown as below and step by step analysis of program is shown below:

Step 1:

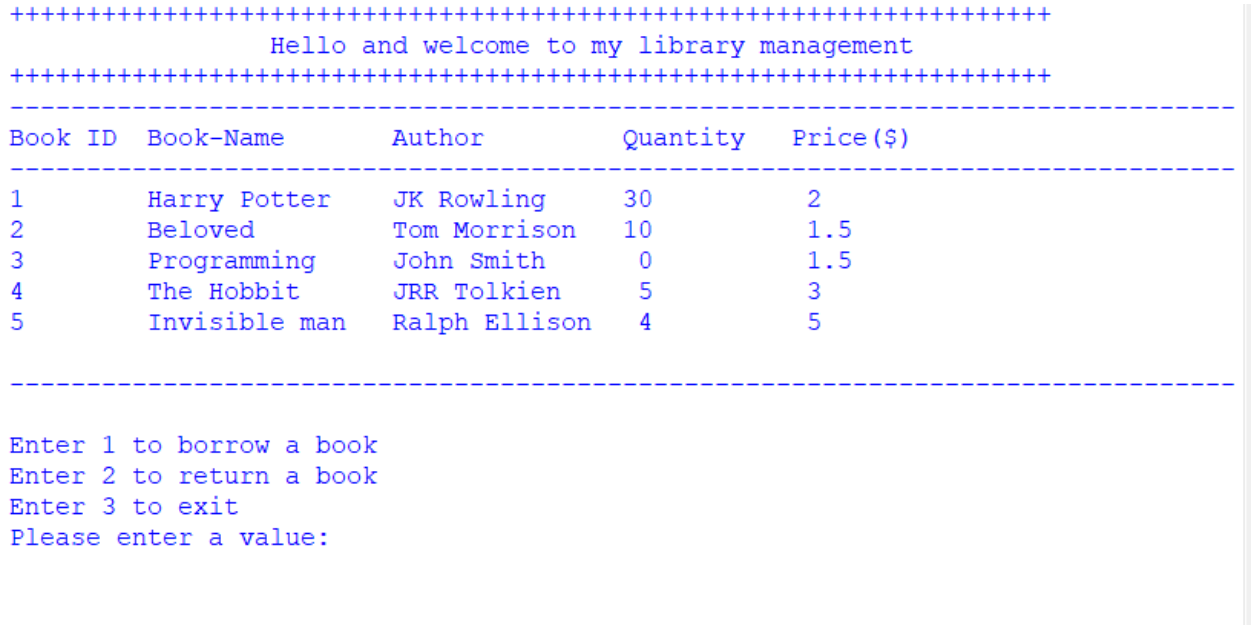

Figure 21: Running of code part1

In this step, the program starts by displaying the book present in the library showing their name, authors, quantity and price and then the program asks the user to input value to borrow the bool or to return the book or to exit from the library.

Step 2:

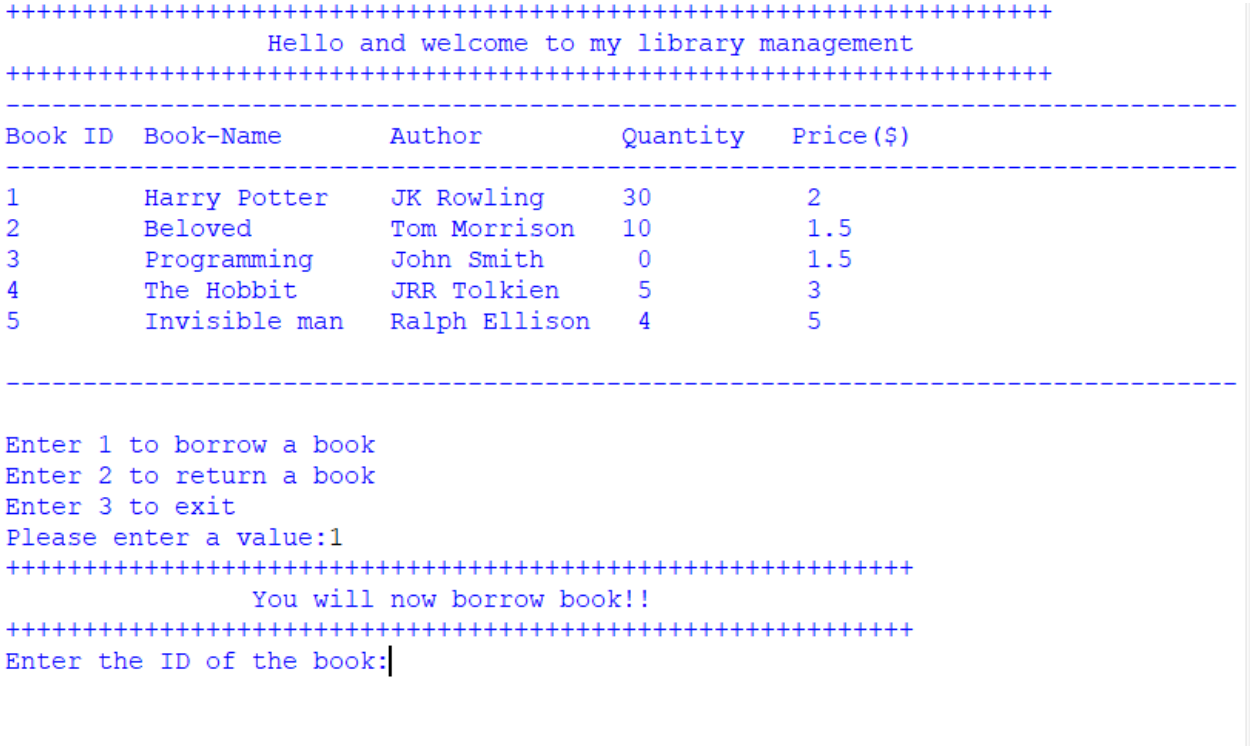

Figure 22: Running of code part 2

In this step, when the user inputs the value 1 the user enters the borrow section where a person can borrow the book from the library and the user is asked to enter the book ID which he intends to borrow.

Step 3:

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                Hello and welcome to my library management
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:1
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
               You will now borrow book!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Enter the ID of the book:1
++++++++++++++++++++++++++++++++++++++++++++++++
                Book is available!!
++++++++++++++++++++++++++++++++++++++++++++++++

Enter the name of the borrower:
```

Figure 23: Running of code part 3

In this step, when the user inputs the id of the book the message is popped by saying that the book is available in the library and the user is asked to input the name of the borrower.

Step 4:

```
Enter the ID of the book:1
++++++++++++++++++++++++++++++++++++++++++++++++++
                Book is available!!
++++++++++++++++++++++++++++++++++++++++++++++++++

Enter the name of the borrower:Ram
The price of the book is $     2
Date and time of borrow is  2021-09-09 21:16:34.817562

Library after borrow is:
--------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
--------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     29          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Would you like to borrow another book as well?
If 'Yes' please enter 'Y' or else provide any other value:
```

Figure 24: Running of code part 4

In this step, when the user inputs the name of the borrower the user is asked if the person would like to borrow another book or not. If the user enters y or Y the borrower can borrow another and else the process can stop.

Step 5:

```
Enter the name of the borrower:Ram
The price of the book is $     2
Date and time of borrow is  2021-09-09 21:16:34.817562

Library after borrow is:
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     29          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Would you like to borrow another book as well?
If 'Yes' please enter 'Y' or else provide any other value:y
Enter the ID of the book:
```

Figure 25: Running of code part 5

In this step, when the user input y the borrower can borrow another book and is asked to input the id of another book that he wants to borrow.

Step 6:

```
Would you like to borrow another book as well?
If 'Yes' please enter 'Y' or else provide any other value:y
Enter the ID of the book:2
++++++++++++++++++++++++++++++++++++++++++++++++++
                Book is available!!
++++++++++++++++++++++++++++++++++++++++++++++++++


Library after borrow is:
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     29          2
2        Beloved         Tom Morrison   9           1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Would you like to borrow another book as well?
If 'Yes' please enter 'Y' or else provide any other value:
```

Figure 26: Running of code part 6

In this step, when the user input another Id of the book, book in the dictionary is deduced as the book is being borrowed and again the user is asked if the borrower wants to borrow another book or not.

Step 7:

```
Would you like to borrow another book as well?
If 'Yes' please enter 'Y' or else provide any other value:n
++++++++++++++++++++++++++++++++++++++++++++++++++++++
                 Customer Borrow Details
++++++++++++++++++++++++++++++++++++++++++++++++++++++
Name of the customer: Ram
Total price from borrow: $ 3.5
Date and time of borrow: 2021-09-09 21:16:34.817562
Books borrowed are:
Harry Potter
Beloved


++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
               Please provide value as 1, 2 or 3!!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     29          2
2        Beloved         Tom Morrison   9           1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:
```

Figure 27: Running of code part 7

In this step, when the user inputs the value other than y or Y the bill is generated consisting the name of the customer, total price of borrow, date and time of borrow and the names of book that borrower borrowed. And the program is again in the starting phase where user can enter value to borrow the book, return the book and exit from the library.

Step 8:

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                Please provide value as 1, 2 or 3!!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
--------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
--------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     29          2
2        Beloved         Tom Morrison   9           1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:2
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                You will now return the book!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Enter the name of the borrower:
```

Figure 28: Running of code part 8

In this step, when the user inputs value the user enters the return section where the borrower can return the book. And the name of the borrower is asked to the user to input.

Step 9:

```
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     29          2
2        Beloved         Tom Morrison   9           1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien    5           3
5        Invisible man   Ralph Ellison  4           5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:2
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                You will now return the book!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Enter the name of the borrower:Ram
Enter the ID of the book you want to return:
```

Figure 29: Running of code part 9

In this step, when the user inputs the name of the person and the user is asked to enter the Id of the book that the person wants to return.

Step 10:

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                You will now return the book!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Enter the name of the borrower:Ram
Enter the ID of the book you want to return:1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++
                 Book is returned!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++


Library after return of book is:
--------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
--------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   9           1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien    5           3
5        Invisible man   Ralph Ellison  4           5

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

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

Figure 30: Running of code part 10

In this step, when the user inputs the id of the book that the person intends to return the user is asked if the person had borrowed another book or not.

Step 11:

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                You will now return the book!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Enter the name of the borrower:Ram
Enter the ID of the book you want to return:1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++
                 Book is returned!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++


Library after return of book is:
--------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
--------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   9           1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Have this person borrowed another book as well?
If 'Yes' please enter 'Y' or else provide any other value:y
Enter the ID of the book:
```

Figure 31: Running of code part 11

In this step, when the user inputs the value y, the user is asked to input the Id of the book that the person wants to return.

Step 12:

```
Have this person borrowed another book as well?
If 'Yes' please enter 'Y' or else provide any other value:y
Enter the ID of the book:2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++
                Book is returned!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++

--------------------------------------------------------------------------------
Book ID  Book-Name       Author          Quantity   Price($)
--------------------------------------------------------------------------------
1        Harry Potter    JK Rowling      30          2
2        Beloved         Tom Morrison    10          1.5
3        Programming     John Smith       0          1.5
4        The Hobbit      JRR Tolkien      5          3
5        Invisible man   Ralph Ellison    4          5

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

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

Figure 32: Running of code part 12

In this step, the user is asked again if the person wants to return another book as well or not.

Step 13:

```
Have this person borrowed another book as well?
If 'Yes' please enter 'Y' or else provide any other value:y
Enter the ID of the book:2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++
                Book is returned!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++

--------------------------------------------------------------------------------
Book ID  Book-Name       Author          Quantity   Price($)
--------------------------------------------------------------------------------
1        Harry Potter    JK Rowling      30          2
2        Beloved         Tom Morrison    10          1.5
3        Programming     John Smith       0          1.5
4        The Hobbit      JRR Tolkien      5          3
5        Invisible man   Ralph Ellison    4          5

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

Have this person borrowed another book as well?
If 'Yes' please enter 'Y' or else provide any other value:n
Enter the number of days you have borrowed the book:
```

Figure 33: Running of code part 13

In this step, when the person intends to stop returning the book the user is asked the number of days that he/she had borrowed the book. If the person exceeds more than 10 days in returning of book he/she will be fined by certain amount of money.

Step 14:

```
Have this person borrowed another book as well?
If 'Yes' please enter 'Y' or else provide any other value:n
Enter the number of days you have borrowed the book:11
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                 Customer return Details
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Name of the customer: Ram
Fine added for exceeding date(per day $0.1): $ 0.1
Date and time of return: 2021-09-09 21:44:53.428770
Books returned are:
Harry Potter
Beloved


++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
               Please provide value as 1, 2 or 3!!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
------------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:
```

Figure 34: Running of code part 14

In this step, when the user inputs the days exceeding more than 10 days certain amount of fine is added. And the details of customer is displayed including the name of the returner, fane added, date and time of return and the name of the book that he/she has returned.

Step 15:

```
--------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
--------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:3
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                Thank you For using our Library management system
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
>>>
```

Figure 35: Running of code part 15

In this step, when the user inputs the value 3 the user can exit from the library management system.

Testing

Test 1:

```
>>>
= RESTART: C:\Users\Raj Bhandari\Dropbox\My PC (LAPTOP-3O7ISNIG)\Documents\assig
nment\Information System\SEM 2\Course work\cw\functions.py
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                Hello and welcome to my library management
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
--------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
--------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:adsada
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
               please enter a valid input!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
--------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
--------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:
```

Figure 36: Testing 1

Objective	If the user inputs the string variable in place of integer variable an error message is displayed.
Action	An error message is displayed “Please provide a valid input” when the user inputs string variable.
Expected Result	The error message will be displayed and the program will again run.
Actual Result	The error message was displayed and the program was again run.
Conclusion	Test was successful

Table 1: Test 1 table

Test 2:

```
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:-1
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
               Please provide value as 1, 2 or 3!!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:
```

Figure 37: Testing 2 part 1

```
Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:4
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                Please provide value as 1, 2 or 3!!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
--------------------------------------------------------------------------------
Book ID  Book-Name       Author          Quantity   Price($)
--------------------------------------------------------------------------------
1        Harry Potter    JK Rowling      30          2
2        Beloved         Tom Morrison    10          1.5
3        Programming     John Smith       0          1.5
4        The Hobbit      JRR Tolkien      5          3
5        Invisible man   Ralph Ellison    4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:
```

Figure 38: Testing 2 part 2

Objective	If the user inputs the negative or non-existed value as input an error message is displayed.
Action	An error message is displayed “Please provide as 1, 2 or 3” when the user inputs negative or non-existed value.
Expected Result	The error message will be displayed and the program will again run.
Actual Result	The error message was displayed and the program was again run.
Conclusion	Test was successful

Table 2: Test 2 table

Test 3:

```
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:1
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                You will now borrow book!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Enter the ID of the book:1
++++++++++++++++++++++++++++++++++++++++++++++++++
                 Book is available!!
++++++++++++++++++++++++++++++++++++++++++++++++++

Enter the name of the borrower:Raj
The price of the book is $     2
Date and time of borrow is  2021-09-09 22:16:58.926856

Library after borrow is:
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     29          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien     5          3
5        Invisible man   Ralph Ellison   4          5

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

Would you like to borrow another book as well?
```

Figure 39: Testing 3 part 1

```
If 'Yes' please enter 'Y' or else provide any other value:y
Enter the ID of the book:4
++++++++++++++++++++++++++++++++++++++++++++++++++++
                Book is available!!
++++++++++++++++++++++++++++++++++++++++++++++++++++


Library after borrow is:
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     29          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien    4           3
5        Invisible man   Ralph Ellison   4          5

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

Would you like to borrow another book as well?
If 'Yes' please enter 'Y' or else provide any other value:n
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                Customer Borrow Details
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Name of the customer: Raj
Total price from borrow: $ 5.0
Date and time of borrow: 2021-09-09 22:16:58.926856
Books borrowed are:
Harry Potter
The Hobbit


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

Figure 40: Testing 3 part 2

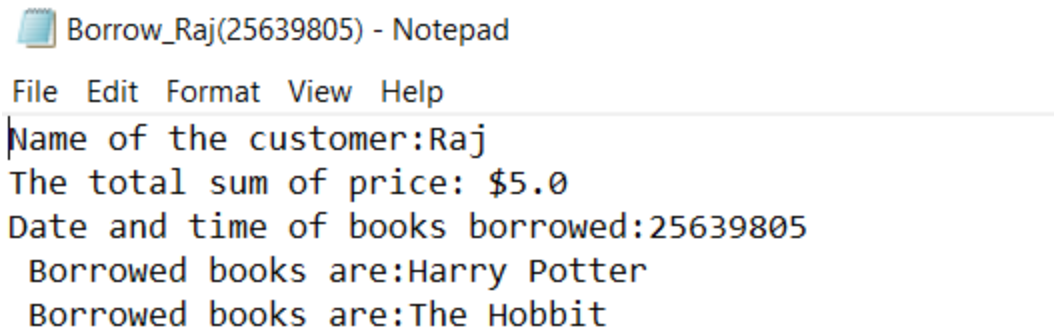

Figure 41: Testing 3 part 3

Objective	If the user inputs the all the values in the borrow process the output shown in the program is written in the text file.
Action	When the program is run successfully the printed output is written in the text file.
Expected Result	The output printed in the program will be written in the text file.
Actual Result	The output printed in the program was written in the text file.
Conclusion	Test was successful

Table 3: Test 3 table

Test 4:

```
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     29          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien    4           3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:2
++++++++++++++++++++++++++++++++++++++++++++++++++++++
                You will now return the book!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++
Enter the name of the borrower:Raj
Enter the ID of the book you want to return:1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++
                 Book is returned!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++


Library after return of book is:
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien    4           3
5        Invisible man   Ralph Ellison   4          5

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

Figure 42: Testing 4 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 the book:4

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++
                Book is returned!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++

--------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
--------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien    5           3
5        Invisible man   Ralph Ellison   4          5

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

Have this person borrowed another book as well?
If 'Yes' please enter 'Y' or else provide any other value:n
Enter the number of days you have borrowed the book:11
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                Customer return Details
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Name of the customer: Raj
Fine added for exceeding date(per day $0.1): $ 0.1
Date and time of return: 2021-09-09 23:31:58.084927
Books returned are:
Harry Potter
The Hobbit
```

Figure 43: Testing 4 part 2

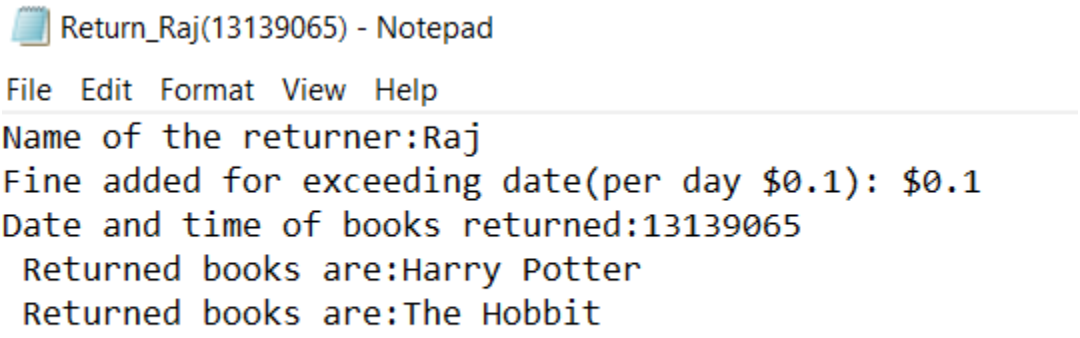

Figure 44: Testing 4 part3

Objective	If the user inputs the all the values in the return process the output shown in the program is written in the text file.
Action	When the program is run successfully the printed output is written in the text file.
Expected Result	The output printed in the program will be written in the text file.
Actual Result	The output printed in the program was written in the text file.
Conclusion	Test was successful

Table 4: Test 4 table

Test 5:

```
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien    5           3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:1
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                You will now borrow book!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Enter the ID of the book:1
++++++++++++++++++++++++++++++++++++++++++++++++
                 Book is available!!
++++++++++++++++++++++++++++++++++++++++++++++++

Enter the name of the borrower:Raj
The price of the book is $     2
Date and time of borrow is  2021-09-09 23:37:58.408850

Library after borrow is:
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     29          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien    5           3
5        Invisible man   Ralph Ellison   4          5

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

Figure 45: Testing 5 part 1

```
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     29          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien    5           3
5        Invisible man   Ralph Ellison   4          5

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

Enter 1 to borrow a book
Enter 2 to return a book
Enter 3 to exit
Please enter a value:2
++++++++++++++++++++++++++++++++++++++++++++++++++++
                You will now return the book!!
++++++++++++++++++++++++++++++++++++++++++++++++++++
Enter the name of the borrower:Raj
Enter the ID of the book you want to return:1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++
                 Book is returned!!
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++


Library after return of book is:
-------------------------------------------------------------------------------
Book ID  Book-Name       Author         Quantity   Price($)
-------------------------------------------------------------------------------
1        Harry Potter    JK Rowling     30          2
2        Beloved         Tom Morrison   10          1.5
3        Programming     John Smith      0          1.5
4        The Hobbit      JRR Tolkien    5           3
5        Invisible man   Ralph Ellison   4          5

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

Figure 46: Testing 5 part 2

Objective	If the user inputs the all the values in the return process the output shown in the program is written in the text file.
Action	When the program is run successfully the printed output is written in the text file.
Expected Result	The output printed in the program will be written in the text file.

Actual Result	The output printed in the program was written in the text file.
Conclusion	Test was successful

Table 5: Test 5 table

Conclusion

All the assigned tasks in the coursework was finally completed through much trial and errors. The task assigned in the coursework were not difficult. It required lots of hard work and research. For completion of a single step a lots of effort was given. At beginning, a lot of time was provided for the research of necessary data was given. Then, the coding of programming in different module was started. In the next step, algorithm and pseudocode of the program was written and flowchart was drawn. And at last, the written program was tested to ensure that it had no bugs and errors and delivered the accurate result. Finally, after completion of all the assigned tasks, submission was done.

This project not only taught about the contents of coursework but also taught us about the punctuality and also provided us with knowledge on various topics of python which could be useful for future use and also this project provided us with necessary tips to become a good programmer. While being involved in this project, knowledge on built in functions, use of error handling, concept of various modules, the read and write operation and as well as it also gave us knowledge on process of importing data from a module to another. Knowledge on algorithm, flowchart, and pseudocode was obtained while doing the documentation. And, all this learning and hard work will help us to achieve our aims and objectives of becoming a good programmer. Due to this project, experience on creation of library management system gave us the clear concept of software used in a library. Taking everything in to consideration even though the coursework took days and night of hard work and labour, the feeling of joy after the completion of coursework was worth it.

Even though the main object of this project is completion and submission of coursework, it also has various purposes. This project could be very useful for commercial organization to manage their stock and track records of their sales as well as for people who are curious on working of the program. Even though, the project is completed, there is still more room for improvement.

Appendix

Module 1:

```
def functions():

    def dictionary_books():
        file = open("books.txt","r")
        dictionarybooks={}
        bookID = 0
        for line in file:
            bookID = bookID+1
            line = line.replace("$","")
            line = line.replace("\n","")
            dictionarybooks[bookID] = line.split(",")

        file.close()
        return dictionarybooks



    def dictionary_write():
        file = open("books.txt","w")
        for values in dictB.values():
            file.write(str(values[0])+","+str(values[1])+","+str(values[2])+","+str(values[3]))
            file.write("\n")

        file.close()

    def bill():
        import datetime
        second = str(datetime.datetime.now().second)
        micro = str(datetime.datetime.now().microsecond)
        random= second + micro
        file = open("Borrow_"+name+"("+random+")"+".txt","w")
        file.write("Name of the customer:"+str(name))
        file.write("\nThe total sum of price: $"+str(sumPrice))
```

```
        file.write("\nDate and time of books borrowed:"+str(random))
        for i in range(len(book)):
            file.write("\n Borrowed books are:"+str(book[i]))
        file.close()

    def r_write():
        import datetime
        second = str(datetime.datetime.now().second)
        micro = str(datetime.datetime.now().microsecond)
        random= second + micro
        file = open("Return_"+name+"("+random+")"+".txt","w")
        file.write("Name of the returner:"+str(name))
        file.write("\nFine added for exceeding date(per day $0.1): $"+str(totalfine))
        file.write("\nDate and time of books returned:"+str(random))
        for i in range(len(book)):
            file.write("\n Returned books are:"+str(book[i]))
        file.close()


print("++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++\n"
            "\t\t Hello and welcome to my library management \n"

"++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++")
    def file_open():
        print("-------------------------------------------------------------------------------")
        print("Book ID " + " Book-Name \t"  + " Author \t" + "Quantity   " + "Price($)" )
        print("-------------------------------------------------------------------------------")
        dictionary ={}
        file = open("books.txt","r")
        bookID = 0

        for line in file:
            bookID = bookID + 1
            line = line.replace("$","")
            line = line.replace("\n","")
            dictionary [bookID] = line.split(',')
            line = line.replace(",", " \t")

            print(bookID, "\t", line)

        print("\n-------------------------------------------------------------------------------\n")

        file.close()
```

```
    correctInput = False

    while correctInput == False:

        try:
            loop = True
            while loop == True:
                file_open()
                print("Enter 1 to borrow a book")
                print("Enter 2 to return a book")
                print("Enter 3 to exit")

                val = int(input("Please enter a value:"))

                if val == 1:

print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                    "\t\tYou will now borrow book!!\n"

"+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++")

                    price=[]
                    book=[]

                    Bloop = True

                    while Bloop == True:

                        bookID = int(input("Enter the ID of the book:"))
                        dictB = dictionary_books()

                        while bookID<=0 or bookID>len(dictB):
                            bookID= int(input("Enter the ID of the book: "))
                        if(int(dictB[bookID][2])) == 0:

print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                            "\t\t Book is not available!!\n"

"+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n")

                        else:

print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                            "\t\t Book is available!!\n"
```

```
"++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n")
                    Bloop=False

                    name = input("Enter the name of the borrower:")
                    price.append(dictB[bookID][3])

                    book.append(dictB[bookID][0])
                    print("The price of the book is $",(dictB[bookID][3]))
                    import datetime
                    datetime = str(datetime.datetime.now())

                    print("Date and time of borrow is ",datetime)
                    total = list(map(float,price))
                    sumPrice = sum(total)

                    (dictB[bookID][2])= int((dictB[bookID][2]))-1


                    dictionary_write()

                    print("\n"
                       "Library after borrow is: ")
                    file_open()

                    Aloop = True
                    while Aloop == True:
                       another=input("Would you like to borrow another book as well?\n"
                                     "If 'Yes' please enter 'Y' or else provide any other value:")
                       if another == "Y" or another == "y":

                          bookID = int(input("Enter the ID of the book:"))

                          while bookID<=0 or bookID>len(dictB):
                             bookID= int(input("Enter the ID of the book: "))

                          if(int(dictB[bookID][2]))==0:


print("++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                               "\t\t Book is not available!!\n"

"++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n")
                               print("\n")
                               print ("Name of the customer: ",name)
                               print ("Total price : ","$",sumPrice)
```

```
                        print ("Date and time of borrow: ", datetime)
                        print ("Books borrowed are: ")
                        for i in range(len(book)):
                            print(book[i])
                        break
                    else:

print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                            "\t\t Book is available!!\n"

"+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n")
                        price.append(dictB[bookID][3])
                        book.append(dictB[bookID][0])
                        total = list(map(float,price))
                        sumPrice = sum(total)
                        dictB[bookID][2] = int(dictB[bookID][2]) - 1
                        dictionary_write()
                        print("\n"
                            "Library after borrow is: ")
                        file_open()

                    else:
                        Aloop = False

print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                            "\t\t Customer Borrow Details\n"

"+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++")

                        print("Name of the customer:",name)
                        print("Total price from borrow:","$",sumPrice)
                        print("Date and time of borrow:",datetime)
                        print("Books borrowed are:")
                        for i in range(len(book)):
                            print(book[i])

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



            if val == 2:

print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                    "\t\tYou will now return the book!!\n"
```

```
"++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++")

            name = input("Enter the name of the borrower:")
            book=[]
            Cloop = True

            while Cloop == True:

                bookID = int(input("Enter the ID of the book you want to return:"))
                dictB = dictionary_books()

                while bookID<=0 or bookID>len(dictB):
                    bookID= int(input("Enter the ID of the book you want to return: "))
                if bookID == 1 or bookID == 2 or bookID == 3 or bookID == 4 or bookID
== 5:
                    print("\n"

"++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                        "\t \t Book is returned!!\n"

"++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n")
                    book.append(dictB[bookID][0])

                    dictB[bookID][2] = int(dictB[bookID][2]) + 1
                    import datetime
                    datetime = datetime.datetime.now()

                    dictionary_write()
                    print("\n"
                          "Library after return of book is: ")
                    file_open()

                    Cloop = False
                else:

                    print("+++++++++++++++++++++++++++++++++++++++++++++\n"
                          "\t\tPlease provide a valid Book ID!!\n"
                          "+++++++++++++++++++++++++++++++++++++++++++++")

            Dloop = True
            while Dloop == True:

                another=input("Have this person borrowed another book as well?\n"
```

```
                        "If 'Yes' please enter 'Y' or else provide any other value:")
                if another == "Y" or another == "y":

                    bookID = int(input("Enter the ID of the book:"))

                    while bookID<=0 or bookID>len(dictB):
                        bookID= int(input("Enter the ID of the book: "))
                    if bookID == 1 or bookID == 2 or bookID == 3 or bookID == 4 or
bookID == 5:
                        print("\n"

"++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++\n"
                            "\t \t Book is returned!!\n"

"++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++\n")

                        dictB[bookID][2] = int(dictB[bookID][2]) + 1

                        dictionary_write()
                        file_open()

                    else:
                        print("\n"
                              "Library after return of book is: ")

                        file_open()
                else:
                    try:
                        fine = int(input("Enter the number of days you have borrowed the
book:"))
                    except:

print("++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++\n"
                              "\t\tPlease enter an integer value!!!!\n"

"++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
")

                    fineamt = 0
                    finelist=[]
                    if fine > 10:
                        fineamt = (fine - 10)*0.10
                        finelist.append(fineamt)
```

```
                    totalfine = sum(finelist)

                else:
                    totalfine=0

                Dloop = False
                book.append(dictB[bookID][0])

print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                        "\t\t Customer return Details\n"

"+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++")

                print("Name of the customer:",name)
                print("Fine added for exceeding date(per day $0.1): $",totalfine)
                print("Date and time of return:",datetime)
                print("Books returned are:")
                for i in range(len(book)):
                    print(book[i])

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


        if val == 3:
            loop = False


print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                "\t\tThank you For using our Library management system\n"

"+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
")
        else:

print("+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++\n"
                "\t\tPlease provide value as 1, 2 or 3!!!\n"

"+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
")
        correctInput =True
        break
    except:
```

```
print("++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++\n"
            "\t\tplease enter a valid input!!\n"

"++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
")

functions()
```

Module 2:

```
from functions import *
functions()
```