PROG 10004 – Programming Principles

Assignment 4: CRUD Application with Collections and Persistence

Gunjan Saraswat

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TOPIC: LIBRARY MANAGEMENT SYSTEM

PART 1: Program Structure

The program contains 4 modules each with multiple classes or functions.

1. Resource management: - This module contains the class ‘manager’. This class first of all, hosts an initializer which contains multiple field variables, accessors, mutators and then it contains the function ‘search()’ which searches the book either by Book ID or Book’s name, and then displays it to the user. Furthermore, it contains an ‘Edit()’ function which finds the book with the help of Book ID, and then uses the mutators to update the values of the attributes. The ‘delete()’ function removes the book from the collection of books.
2. Resources: - This module first inputs all the necessary modules and then creates a class object of the Data persistence module in order to use its incorporated functions. This module contains a class called ‘use\_resources’.

* list\_resources() function lists all the available books for the user with the help of the csv file and the DictReader function.
* check\_out() function issues the books by first searching for the book in the csv file with the help of user inputted book name and the DictReader function.
* returnbook() function enters the record into the csv file with the help of writerow() function.

PART II : Program Interactivity and logic

UserInteractivity = First of all, this file imports all the modules including the csv module. It contains a class called ‘Interaction’.

* + The ‘create()’ function makes a manager class object (class from Resource management), then it uses the ‘addbook()’ function of the same module to create another row of attributes in the nested collection of books. After entering the data into the collection, the function also enters the same data into the csv file.
  + The ‘Read()’ function asks the user to choose the attribute by which they want to search a book. With a mix of exceptional handling, various inbuilt functions of strings, and calling the ‘search()’ function with the help of the ‘manager’ class, this function is able to locate the book that the user is looking for.
  + ‘Edit()’ function takes the user input for all the new attributes that the current ones have to be changed to and then first, edits it in the collection made in the ‘Resource management module’ and then it edits the data in the csv file too.
  + The ‘delete()’ function takes the user input for the book name which has to be removed from the collection and then removes it in the csv file too.

This module further contains the \_main\_ module which contains ready test cases inputed into both the file and the collection. And then it contains a loop which gives user a choice to use any of the functions of the class. Lastly, it contains a separate functions which enables us to use the functions of another module called ‘Resources’.

PART III: EXCEPTION HANDLING

The program makes effective use of defensive programming techniques. The UI module has been made to be protected against any and all exceptions and shall ensure the data is saved before the program exists.

PART IV: DATA PERSISTANCE

Data Persistance: - This module imports pandas and csv module. First of all, it enters the header into the file. And then it contains the following functions:-

* enterdata() function incorporates the functionality of entering a new record into the file with help of ‘writerow()’ function.
* editdata() function incorporates the functionality of first, finding the record in the collection with the help of user inputted book ID and then editing that record with the help of pandas module.
* delete\_data() function incorporates the functionality of first, finding the record in the collection with the help of user inputted book name and then deleting that record with the help of pandas module (drop function).

In overall, efforts have been made to make the program robust and useful for in accordance with a real library management system.