

Library Management System

Classes

Library class

The class that represents the library object. Its attributes are Name (str), Address (str), Items (dict), Members (dict).

Methods

Apart from the constructor, there are the methods that set up the library by parsing the csv files and converting the information to the items, members and borrowing information: create_transaction_info(), parse_file(), create_members(), create_items(). For the library's items there are several methods to search for, borrow, return, add, edit and delete items: search_items(), borrow_item(), return_item(), add_item(), edit_item and delete_item(). For the library's members there are several methods to add, edit and delete members: add_member(), edit_member() and delete_member(). There are methods to update the external files based on library's information: update_members_csv(), update_items_csv() and update_borrow_csv(). Lastly, the __str__ method was overwritten to print the name, address, number of items and members.

Members class

The class that represents the library's members. Its attributes are member_id (str), l_name (str), f_name (str), dob (str), street (str), city (str), items (dict) and fine (float).

Methods

The __str__ method was overwritten to print the first and last name with the Member ID in parentheses.

Items class

The class that represents the library's items. Its attributes are item_id (str), title (str), type (str), available (Boolean)

Methods

The __str__ method was overwritten to print the title, item id, type and whether it's available.

Book class

The subclass that represents book items. Its attributes are ID, title, l_name, f_name, year of publication.

Methods

The __str__ method was overwritten to print title, item ID, author names, yof and whether its available.

Article class

The subclass that represents book items. Its attributes are ID, title, l_name, f_name, journal, year of publication.

Methods

The __str__ method was overwritten to print title, item ID, journal, author names, yof and whether its available.

Digital media class

The subclass that represents book items. Its attributes are ID, title, l_name, f_name, year of publication.

Methods

The __str__ method was overwritten to print title, item ID, director names, yof and whether its available.

Main function

In the main function, the library is instantiated. After which, the command line menu is created in a while true loop and try block. The user's input corresponds to the correct functions being called.

User manual

To use the library system, run the code and the command line menu will be displayed with the following options:

1. Browse items
2. Check availability
3. Add, edit or remove a member
4. Add, edit or remove an item
5. Return an item
6. Check a member's fine
7. Quit program

Make sure you input the correct numbers or options. If you make a mistake, it is no problem you will return to the command line menu. With every menu item, you will be instructed on how to achieve your task or how to exit if needed. You will return to the menu, until you quit the program through the menu.

Additional features

The following additional features were implemented:

- CSV files were used as the external management files.
- A fine System was implemented as part of the library system. The moment a member borrowed an item, the expected-return-date was calculated (1 month after borrowing). When the item is returned, it's determined whether the member was late. If so the fine is calculated with 0,25 euros per day late. This amount is added to the member's fine variable.
- Maximum amount of items. When a member wants to borrow an item, the system checks how many items the member has borrowed already. If that number is bigger than 10, the member is not allowed to borrow a new item.
- Datetime library. In order to keep track of borrow and return dates and calculate fines, the datetime library was used. The following 2 articles helped me implement it:
<https://www.programiz.com/python-programming/datetime/current-datetime>
<https://www.programiz.com/python-programming/datetime/strptime>. As part of the datetime library, timedelta was used to determine the date a month from today based on these links:
<https://stackoverflow.com/questions/35066588/is-there-a-simple-way-to-increment-a-datetime-object-one-month-in-python> <https://www.geeksforgeeks.org/python-datetime-timedelta-function/>

Difficulties

First of all, in the beginning of coding the system I got confused with the design of the system. It was unclear to me where which methods should reside. In the end I decided to incorporate most methods in the library class. This was done because that's where these behaviours take place. Additionally, it took me a bit of time to figure out how to use csv readers and writers and how to edit csv files through python. It ended up being quite straightforward. However, the updating of the external csv files was harder. I thought it was possible to simply add entries to the csv file. I did not manage to figure out how to do that, instead I decided to rewrite the external files based on the items, members and borrow info stored in the library object. In this way, whenever something changes, you can simply call the corresponding update csv method to keep the external files up to date. Lastly, I had difficulty implementing datetime library. It especially took me some time to figure out how to calculate the difference between 2 dates and add specific amount of time to the current date.

GitHub version control

The following link is my repo for this CA: [fkadir/CMPU4060-CA \(github.com\)](https://github.com/fkadir/CMPU4060-CA).

Summary

Date	Message
16 April 2022	started continuous assignment: implemented library, items, members class & main with 2 command line features
19 April 2022	CA: aggregated member & item classes + methods, created book & article subclasses
19 April 2022	included more methods for adding, editing and removing instances, improved availability of items and included overdue item function
20 April 2022	implemented CSV updating, add/edit/delete of item and member instances and all new features are added to the command line menu
22 April 2022	restructured code, added update borrowing.csv function, improved layout and comments, fully functional command line menu, achieved correct and additional features + layout and comments
28 April 2022	moved main (static) methods to library class, tested functionality of command line menu and improved it, added check fine feature to command line menu, implemented searching by author and filter by category
8 May 2022	implemented timedelta in borrow_items function, expanded csv files, repeated code testing, added references code, evaluated progress of assignment
12 May 2022	added docstrings, comments and double checking the code