Object-Oriented Programming and Design - Monsoon 2023

Assignment 2 – Classes and Objects

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This assignment carries a total of 80 marks. There are three questions, carrying 50, 15 and 15 marks respectively.

1. Suppose you are creating a data structure to maintain the content of the library of our institute. The library has different types of items, such as books, magazines, newspapers and electronic items, such as journal articles and ebooks. Each of these items can be issued to some users, but the rules of issue can vary. The physical items need to be returned within a fixed duration of time, whereas electronic items need not be returned. However, a record of the lending of these items is still retained. The period of lending also depends on the type of user – students typically get an item borrowed for a term of one month, whereas faculty get it for a term of six months.

   All items are assigned an identifier. The physical items are arranged in the sequence of their identifiers. Note that it is essential for the physical items to be arranged in sequence of identifiers so that any user who makes a request can see its location instantly.

   Write a program that takes as input: (i) a csv file that contains a list of items, with additional relevant details (refer to the file to understand its format), (ii) allows users to borrow the items, (iii) ensures that users can see the location of each item by giving its title, or other details such as author names and ISBN. Note that it is essential to note down the date when users make such a request. You may assume that all items are returned on the due date, (iv) allow registration of new users, including by obtaining the type of user, (v) allow easier purchase of new books by using the same details.

2. Now assume that there is a special type of borrowing called borrowing on loan, where the library can request other nearby libraries to check if an item is available with them. Such items are typically lent to the users with 7 days of delay, and a record of the location of borrowing is kept, so that it can be duly returned. Assume that IIIT-Delhi's library has such agreements with the other state university's libraries, and ensure that such borrowings (and returns) are allowed. Re-implement (ii) and (iii) above with the above facility, as a separate branch.

3. Now, assume that subscribing the institute keeps track of the requests, and determines every year which journal to subscribe based on the given budget. Re-implement 1(ii) again while integrating the above request.

What and How To Submit

- The C++ program sources. Classes and inheritance must be used wherever appropriate.
- `Makefile` to compile the sources and generate the running binary for the shell. The Makefile should generate two versions of the binary – one for debugging and another for optimized execution.
- A readme text file, explaining the commands needed to build the file, and the format of the input files. If code is copied from anywhere else (not that copying from any other student is plagiarism, but using textbook or open-source code is allowed), that should be mentioned here.
- At least 4 significant commits on a **private** github repository, with proper descriptions of the commits. You may have as many commits as you wish.
- At least 3 branches on github, one of them called main.
- Checks on user input for validity is compulsory.
- Make the assigned TA the admin of the github repository, **and** submit the same code in zipped form on Google Classroom by the due date.

Late Submission Policy

- -0.25 per hour for the first 96 hours.
- Submissions beyond 4 days of delay would only be accepted with official leaves of absence.