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CSC 330 – Object Oriented Programming
Project #01 – Library Systems Information - Phase 2 (Design Specification)
Due Date: 04/17/2019

Design Specifications(Updated)

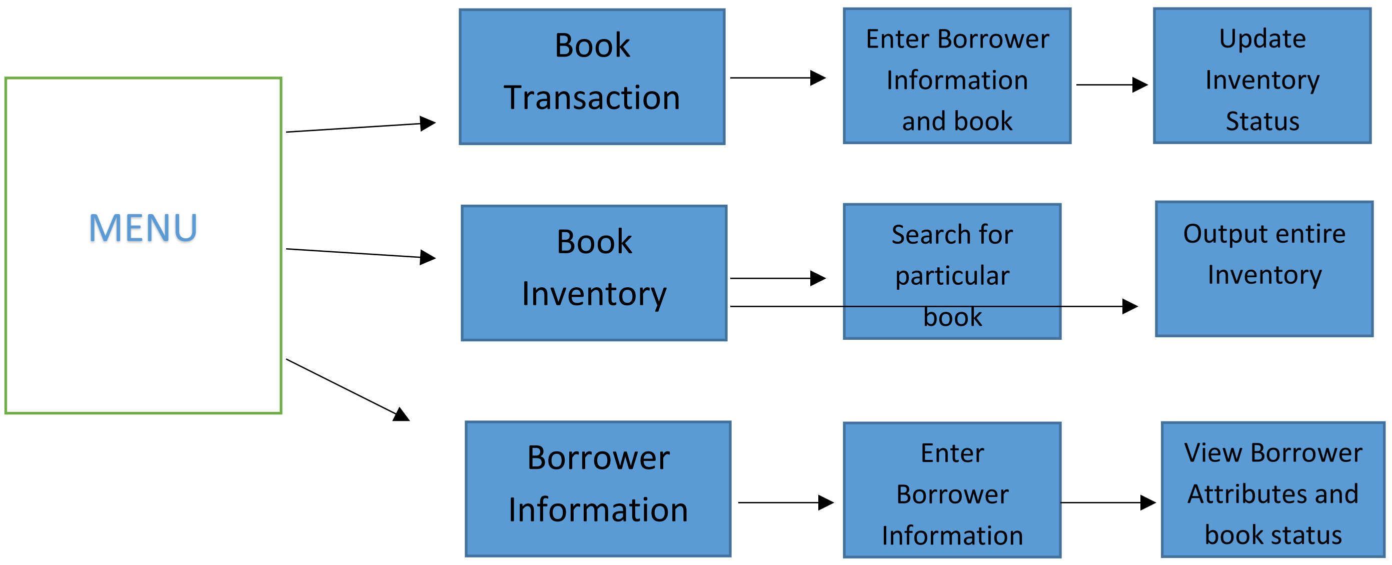
System: The goal with the creation of the library systems information is to allow the library to have a more efficient way of keeping track of their books when lending them out. From a designer standpoint, our system would allow many different features to be utilized by the librarian. The system would allow the storage of the complete book inventory, withdrawal or return multiple books, store the locations of particular books, check the availability of a books, keep track of due dates, fines per day overdue, circulation periods, and store book prices. Every borrower will also have their personal information stored in the system, along with a tracker for any fees they might owe. A well written, easy to use menu will also be implemented that would allow the librarian to utilize the system with ease.

The system architecture will be written in C++, and is comprised of many different subsystems:

- Book Information System: Stores all book information
- Borrower Information System: Stores all personal information, and books they currently hold.
- Book Inventory System: Used to store the book inventory and borrower list
- Menu System: Utilized to output all information with easy to use menu

Combining these 4 sub-systems will make up the main Library System.

System Utilization: Provided below is a diagram of the behavior of the library system, there are several sub-sections in the menu included for the utilization of the system.


MENU
Book Transaction
Enter Borrower Information and book
Update Inventory Status
Book Inventory
Search for particular book
Output entire Inventory
Borrower Information
Enter Borrower Information
View Borrower Attributes and book status

The design of this system starts you off at the main menu, which provides you with 3 possible choices. The first choice allows you to check in or withdraw books for the borrower depending on the borrower's choice, the second option allows you to search for a specific book, or view the entire inventory both per request of the borrow, and the final option allows you to view borrower information, whether it be an individual borrower or all of them. 2 of the options, which are return/withdraw books, and borrower information will require to ask for the borrowers I.D in order to proceed. When the program is initially loaded, all customer data and book data is loaded into memory via 2 excel data files, so it can be utilized in the system. Every time a new person signs up at the library, they get added to the customer list. When a book is returned or borrowed, the system automatically updates the inventory data, along with the borrower data.

Classes: The classes that are utilized in this program are book information, borrower information, menu, date and book inventory. The date class will store the day, month, and year along with methods to change the date, compare 2 dates, or increase the date. The book information class will store book attributes, such as title, author, publisher, due date, publishing date book I.D, etc. Along with the attributes, this class will utilize an advanced class feature in C++ called composition to store Date objects for the due date and publishing date. This class has a purpose of storing information that can be utilized by other classes to perform functions. The borrower information class will store person attributes, such as name, phone number, I.D number, etc. Along with the attributes, this class will also utilize composition, along with the STL library. This will be done as one of the private members will be a vector of objects of the book class, in order to store the current book/books the borrower has. This class stores information that can be utilized or changed by other classes. The book inventory system will store the complete inventory of books, and borrower list in the library utilizing composition once again by having a vector of book objects, and vector of borrower objects. On top of that it will also include methods to change inventory status, return/withdraw books, search for books, search for borrowers, and output each vector. The final class which is the menu class will provide an interface for the librarian to manipulate the system, as it will provide information from all the other classes, in order to perform certain operations.

Class BookInformation

Data Members:	Functions:
Title	Get/set Title
Author	Get/set Author
Subject	Get/set Subject
Call Number	Get/set Call Number
Publisher	Get/set Publisher
Publishing Date	Get/set Publishing Date
Location	Get/set Location
Status	Get/set Status
Due Date	Get/set Due Date
Fine Per Day	Get/set Fine
Circulation Period	Get/set Circulation
Due Date	Get/set Due Date

The title, author, subject, publisher, publishing date, ID, status, cost of book, fine per day and location would be set when the program starts, while the other data members would be set when a book is taken out.

Class BorrowerInformation

Data Members:	Functions:
Name	Get/set Name
Address	Get/set Address
Phone Number	Get/set Phone Number
ID	Get/set ID
Vector of Book Information Class	Get/set Book Information Class
Fee Balance	Get/set Fee Balance

The name, address, phone number, ID, book and fee balance will all be initialized when data is imported or every time a new customer is added.

Class LibraryInventory

Data Members:	Functions:
Vector of Class Book Information Vector of Class Book Information	Set BookInformation Set BorrowerList Change Inventory Status for return/withdraw Search Book Inventory Search Borrower List Return Book Withdraw Book Add Borrower to List Output entire Inventory Print Entire Borrower List

The vector of books will be initialized when the program starts as the data will be read from a file, and the quantity will be updated accordingly.

Class Menu

Data Members:	Functions:
Class BorrowerInformation Class BookInventory	Get/set BorrowerInformation Get/set BookInventory Print Menu Print Sub Menus for Book return, Book checkout, book inventory, person info

This class will have the library inventory class at its disposable to perform the operations in its functions.

Class Date

Data Members:	Functions:
Day	Get/set Day
Month	Get/set Month
Year	Get/set Year
	Get/set Date
	Increase date
	Difference between 2 dates

The date will be set every time the class that contains this class calls the mutator method, based on the method that is being performed