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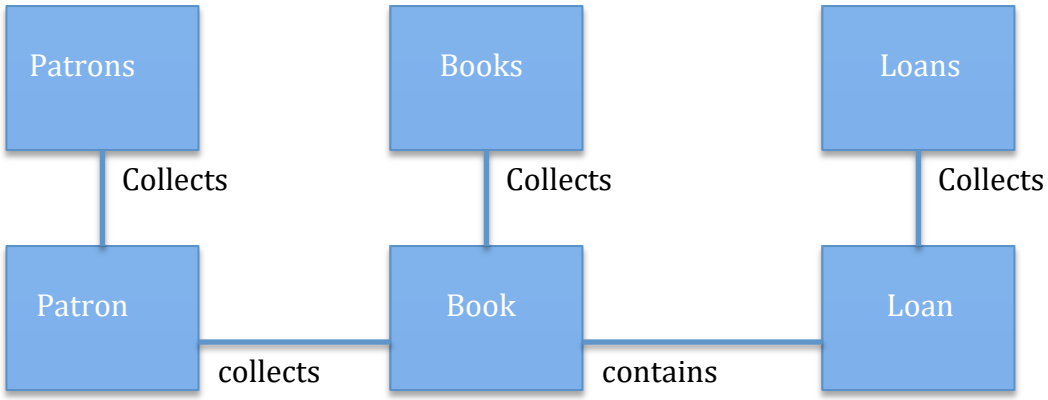
# Homework 4

CSCE 1040
Section 001

# Manage Loans Design Program

***Class Relationships***




***Class Contents***

| Patron | Book | Loan |
|---|---|---|
| ID Number (int) | Author (string) | Book ID (int) |
| Name (string) | Title (string) | Patron ID (int) |
| Fine Balance (double) | ISBN Number (string) | Loan ID (int) recheck(bool) |
| Current # of books out (int) | Library ID Number (int) | Due date and time (string) |
| | Cost (double) | Current status (int to enum) |
| | Current Status (int to enum) | |

| Patrons | Books | Loans |
| --- | --- | --- |
| Print a list of all patrons | Print a list of all books | Check in/out a book |
| Patronlist (vector) | Booklist (vector) | List all overdue |
| Add Patron | Add Book | List all books for patron |
| Edit Patron | Edit Book | Update loan status |
| Delete Patron | Find/Search Book | Re-check a book |
| Find Patron | Delete Book | Edit a loan |
| Print details for one Patron | Print details for one Book | Report lost |

***Inheritance relationships:***

A Book is a Library Item

An Audio CD is a Library Item

A DVD is a Library Item

Therefore, Book, Audio CD, and DVD are all subclasses of Library Item

***Function Pseudo Code***

Add Patron

Prompt user for ID
Prompt user for name
Create Patron Object
Populate Patron Object
Add object to collection

Edit Patron

Replace specified Patron object instance variables with new values

Delete Patron

Delete the Patron object in the list using erase() method

Find Patron

Use for loop to iterate through the list
Return the Patron object with matching ID

Print Patrons

Use for loop to iterate through the list

For each iteration, print out all the instance variables of the ith Patron object with Print Specific Patron method

Print Specific Patron

Print all instance variables of the specific Patron

payFines

Add the fine to the Patron's fines based on the days overdue

Add Book

Prompt user for name
Prompt user for title
Prompt user for ISBN number
Prompt for ID
Prompt for cost
Prompt for current status
Convert the int currentStatus value to respective enum value
Create Book object
Populate Book object
Add object to collection

Edit Book

Replace specified Book object instance variables with new values

Delete Book

Delete the Patron object in the list using erase() method

Find Book

Use for loop to iterate through the list
Return the Book object with matching ID

Print Books

Use for loop to iterate through the list
For each iteration, print out all the instance variables of the Book object with Print Specific Book method

Print Specific Book

Print all instance variables of the specific Book

Check out book

Prompt for Book ID
Prompt for Patron ID
Prompt for Loan ID

Use findPatron method to access the Patron object
Check if there are any overdue books or if the patron has 6 books
    If either condition is true, patron cannot check out a book
Use findBook method to access the Book object
Check the book's current status if it is out, repair, or lost
    If either condition is true, patron cannot check out this book
        If lost, use reportLost method

If both checks are passed
    use editBook method to update the book info
    use editPatron method to update the patron info
    Create a Loan object
    Populate Loan object
    Add Loan object to collection

<u>Check in book</u>

Prompt for Book ID
Prompt for Patron ID
Prompt for Loan ID
Use findBook method to access the Book object
Check if the Book is overdue with currentStatus
    If it is overdue, use the payFine method to charge the
    Patron a fine
    Update the book info with editBook
Use findPatron method to access the Patron object
    Update the patron info with editPatron

Delete the Loan object from the list using erase() method

<u>List all Overdue Books</u>

Use a for loop to iterate through the loanlist
For each iteration, check if the Loan object is overdue with
currentStatus
    If overdue, use findPatron method to access the Patron
    object
    Print out the Patron object's info with print Specific Patron
    method
    Print out the book info with print specific book method

<u>List all Books for Patron</u>

Prompt for Patron ID
Use a for loop to iterate through the loanlist
For each iteration, check if the Loan object's Patron ID matches
user input
    If true, print out the book info with print Specific Book
method

Update loan status based on System Clock

If clock passes 10 days since book was loaned change currentStatus to overdue with edit Loan method

Re-check a book

Use a for loop to iterate through the loanlist
If the book ID matches the book ID of a Loan object
    Check if the recheck variable is already true
        If true, book cannot be rechecked
        If false, change recheck to true and edit the loan using the edit Loan method
    Terminate loop because book has been found

Edit a Loan

Replace specified Loan object instance variables with new values

Report Lost

Use the find Patron method to access the Patron object
For each iteration, check if the patron ID from the Loan of the missing book matches the Patron ID of the Patron object
    If true, use the find Book method to access the Book object
        Add the cost of the book to the Patron's fines
        Terminate loop because patron has been found

Find Loan

Use for loop to iterate through the list
Return the Loan object with matching ID

Output file (for loans, books, and patrons)

Iterate through vector, fout the info for each iteration

Input file (for loans, books, and patrons

Check if file exists already
    If exists, fin the object info and add to vector