

Aurelia Wang

CSCE 1040.001

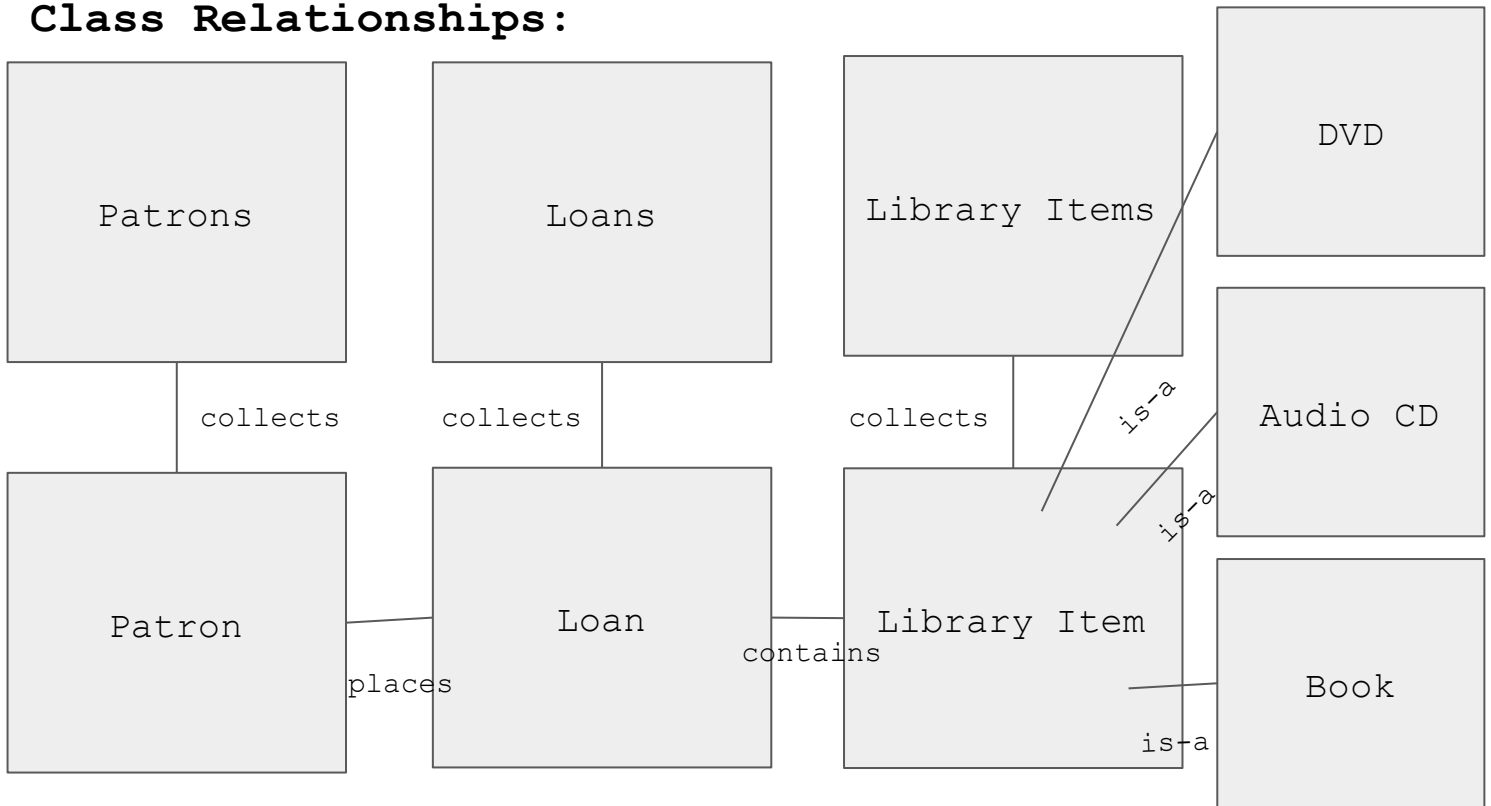
CSCE 1040 Homework 4

Design Document

CSCE 1040 Homework 4

Design Document

Class Relationships:



Class Contents:

<p>Patron</p> <p>Name (string) ID Number (int) Fine Balance (double) Number of Checked Out Books (int) Number of Overdue Books (int)</p> <p>Set/Get Name Set/Get ID Number Set/Get Fine Balance Set/Get Number of Checked Out Books</p>	<p>Loan</p> <p>Loan ID (int) Book ID (int) Patron ID (int) Due Date and Time (struct) Current Status (string) ReCheck Count (int)</p> <p>Set/Get Loan ID Set/Get Book ID Set/Get Patron ID Set/Get Due Date and Time Set/Get Current Status Set/Get ReCheck Count</p>	<p>Library Item</p> <p>ID (int) Cost (double) Status(enum) Loan Period (double)</p> <p>Set/Get ID Set/Get Cost Set/Get Status Set/Get Loan Period</p>
--	--	--

Book

Title(string)
Author(string)
ISBN (int)
Category(string)

Set/Get Title
Set/Get Author
Set/Get ISBN
Set/Get Category

Add Item
Edit Item
Delete Item
Find Item (by ID)
Print All Items
Print One Item
Print Item By ID
Load Items
Store Items

Audio CD

Artist (string)
Title (string)
Number of Tracks (int)
Release Date (struct)
Genre (string)

Set/Get Artist
Set/Get Title
Set/Get Number of Tracks
Set/Get Release Date
Set/Get Genre

Add Item
Edit Item
Delete Item
Find Item (by ID)
Print All Items
Print One Item
Print Item By ID
Load Items
Store Items

DVD

Title (string)
Category (string)
RunTime (double)
Studio (string)
Release Date
(struct)

Set/Get Title
Set/Get Category
Set/Get RunTime
Set/Get Studio
Set/Get Release
Date

Add Item
Edit Item
Delete Item
Find Item (by ID)
Print All Items
Print One Item
Print Item By ID
Load Items
Store Items

Loans

Check Out Book
Check In Book
List All Books for a
Particular Patron
Print List of
Overdue Books with
Patron Info
Update Loan Status
Based On System
Clock

Remove Loan
Re-Check Book
Edit Loan
Report Lost
Calculate Fines
Find Loan by Loan ID
Load Loans
Store Loans
loanList (vector)

Patrons

Add Patron
Edit Patron
Delete Patron
Find Patron (by
ID)
Print All Patrons
Print One Patron
Print Patron by ID
Pay Fines
Load Patrons
Store Patrons

Allow Borrow
Check Out

patronList
(vector)

Library Items

Add Item
Edit Item
Delete Item
Find Item (by ID)
Print All Items
Print One Item
Print Item By ID
Load Items
Store Items
Overloaded
Operator (<<)

isAvailable
CheckOut

itemList (pointer
vector)

Function Pseudo Code:

Patrons

Add Patron

```
Prompt user for name
Prompt user for ID number
Prompt user for fine balance
Prompt user for number of checked out books
Create Patron object
Populate Patron object
Add object to collection
```

Edit Patron

```
Prompt user for ID number of Patron to edit
Call Find Patron
While user is not done editing the Patron:
    Prompt user for the attribute to edit
    If not a proper input:
        Reprompt for the attribute
    Else:
        Edit the given attribute at index from Find
        Patron
        Update object in the collection
```

Delete Patron

```
Prompt user for ID number of Patron to delete
Call Find Patron
Remove Patron at that index from patronList
```

Find Patron (by ID)

```
Iterate through patronList collection:
    if match in ID return address of dereferenced
iterator
```

Find Patron (by ID)

Iterate through patronList collection:

 if match in ID return address of dereferenced
iterator

Print All Patrons

Iterate through patronList collection:

 Print all attributes of current Patron object

Print One Patron

Prompt user for ID number of Patron to print

Call PrintPatronByID

Pay Fines

Prompt user for ID number of Patron that is paying the fine

Prompt user for the amount they want to pay

Call Find Patron

Update Patron Fine Balance at that index by subtracting paid
amount from fine

Load Patrons

Open data file using macro

Loop through file:

 Read in information from data file and store in object

Store Patrons

Open data file using macro

Loop through file:

 Output formatted information into data file

Print Patron by ID:

```
Call Find Patron
If Patron is null
    Return to main
Else
    Print out information in neat way
```

Allow Borrow:

```
Iterate through Patron List:
    If patron ID matches Patron List:
        If number of overdue books is 0 and number of checked out
books is 5:
            Return true
        Else:
            Return false
```

Checkout

```
Iterate through patronList
If ID matches and if status of book is in, change to out
```

Loans

Check Out Book (pass in patronList and bookList)

Prompt user for the Patron ID of Patron who wants to check out a book

Prompt user for the Book ID of Book being checked out

Prompt user for Loan ID

If Patron has no overdue books and if their number of checked out books are 5 or less:

- Update Patron's number of checked out books

- Update Book's current status to Out

- Update Loan status to Normal

- Calculate due date and time and store

- Create Loan object

- Populate Loan object

- Add object to collection

Else:

- Print message saying that book cannot be checked out

Check In Book (pass in patronList and bookList)

Prompt user for the Patron ID of Patron who wants to check in a book

Prompt user for the Book ID of Book being checked in

Prompt user for Loan ID

Call Calculate Fines

If no fines are owed by the Patron:

- Update Patron's number of checked out books

- Update Book's current status to In

- Iterate through loanList:

 - If Loan ID given matches Loan ID in loanList:

 - Remove Loan at that index

Else print message saying that book cannot be checked in

List all Overdue (pass in patronList and bookList)

Iterate through loanList:

- If current status is overdue:

 - Get Book ID at that index

 - Iterate through bookList:

 - If Book ID in list matches Book ID to find:

 - Print Book attributes

List All Books for a Particular Patron (pass in bookList)

Prompt user for the Patron ID whose Books are to be listed

Iterate through loanList collection:

 If Patron ID in collection matches Patron ID given by user:

 Get Book ID at that index

 Iterate through bookList:

 If Book ID in list matches Book ID to find:

 Print out Book attributes

Print List of Overdue Books with Patron Info (pass in patronList and bookList)

Iterate through loanList:

 If current status is overdue:

 Get Patron ID and Book ID at that index

 Iterate through patronList:

 If Patron ID in list matches Patron ID to find:

 Print Patron attributes

 Iterate through bookList:

 If Book ID in list matches Book ID to find:

 Print Book attributes

Update Loan Status Based On System Clock (pass in patronList)

Prompt user for Patron ID that loan belongs to

Prompt user for Loan ID to update

If current time is after loan's due date and time:

 Update current status to Overdue

 Iterate through patronList:

 If Patron ID in list matches Patron ID to find:

 Increment Number of Overdue Books at found index

Re-Check Book

Prompt user for Patron ID that is renewing the book

Prompt user for Book ID to renew

Iterate through loanList:

 If both Patron ID and Book ID match a loan:

 Add 10 days to due date and time

 Update ReCheck Count by 1

 Else:

 Reprompt user for correct information

Call Update Loan Status Based On System Clock function

Edit Loan

Prompt user for loan ID of Loan to edit

Call Find Loan

While user is not done editing the Loan:

 Prompt user for the attribute to edit

 If not a proper input:

 Reprompt for the attribute

 Else:

 Edit the given attribute at index from Find Loan

 Update object in the collection

Report Lost (pass in patronList and bookList)

Prompt user for Loan ID that is being reported

Iterate through loanList:

 If loan ID match a loan in loanList:

 Update Current Status of book to Lost

 Assign Cost of Book to Fine Balance of Patron

 Else:

 Reprompt user for correct information

Calculate Fines (pass in patronList)

Prompt user for Loan ID that is being reported

Get current date and time

Get due date and time

Calculate fine with fine rate of \$.25 per 24 hours

Iterate through loanList:

 If loan ID match a loan in loanList:

 Get Patron ID at that index

 Iterate through patronList:

 If Patron ID in list matches Patron ID to find:

 Update Patron Fine Balance at index

Find Loan (by ID)

Iterate through loanList collection:

 If current loan object's ID matches ID to find:

 Return index

Return -1

Load Loans

Open data file

Loop through file:

 Read in information from data file and store in object

Store Loans

Open data file

Loop through file:

 Output formatted information into data file

Find Loan By Loan ID

Iterate through loanList:

 If ID matches iterator's ID:

 Return address of dereference iterator

Return nullptr

Remove Loan

Iterate through loanList

 If passed in Loan to delete matches iterator's Loan:

 Delete Loan at that position

Library Items

Add Item

Pass in Library Item pointer and push back
into itemList

Edit Item

Prompt user for library ID of Item to edit

Call Find Item

 Prompt user for the attribute to edit

 If not a proper input:

 Notify user

 Else:

 Call Edit item for the specific item

Delete Item

Prompt user for ID number of Book to delete

Call Find Item

If not found:

 Notify User

Else:

 Remove Item found using Find Item

Find Item (by ID)

Iterate through itemList collection:

 If current dereferenced iterator's id matches
id to find:

 Return dereferenced iterator

Return nullptr

Find Item Index (by ID)

Loop through itemList:

 If item list at index matches id to find:

 Return index

Print All Items

Iterate through itemList collection:

 print out item count and call print item by id (pass in id)

Print One Item

Prompt user for library ID of item to print

call print item my id (pass in id)

Load Items (virtual)

Open data file

Loop through file:

 Read in information from data file and store in object

Store Items (virtual)

Open data file

Loop through file:

 Output formatted information into data file

Print Item By ID:

Call Find Item

If empty return to main

Else Print out attributes in the Item that Find Item returns

isAvailable:

Iterate through itemList

If LibraryID matches itemID:

 If currentStatus of Item is In:

 Return true

 Else

 Return false

Checkout

Iterate through itemList

If ID matches and if status of item is in, change to out

Overloaded Operator (<<)

Add Item using AddItem
Return address of self

Library Item

Print Item (virtual)

Print ID
Print Cost
Print Loan Period
Call Get Current Status
Print Current Status

Edit Item (pure virtual)

Get Type (pure virtual)

Store Item To File (pure virtual)

Book

Print Item (override)

Call Library Item's Print Item
Print Author
Print Title
Print ISBN

Edit Item (override)

Print Menu
Ask user which attribute they would like to edit
Read in the new attribute
Use corresponding function to set new attribute

getType (override)

return BookType

Store Items (override)

Open data file

Loop through file:

Output formatted information into data file

Load Items

Open data file

Loop through file:

Read in information from data file and store in object

Create Item from UI

Prompt user for info about Book

Read into variables

Create Object and populate with info

Return Object

Audio CD

Print Item (override)

Call Library Item's Print Item

Print Artist

Print Title

Print Number of Tracks

Print Release Date

Print Genre

Edit Item (override)

Print Menu

Ask user which attribute they would like to edit

Read in the new attribute

Use corresponding function to set new attribute

getType (override)

return AudioCD Type

Store Items (override)

Open data file

Loop through file:

Output formatted information into data file

Load Items

Open data file

Loop through file:

Read in information from data file and store in object

Create Item from UI

Prompt user for info about Audio CD

Read into variables

Create Object and populate with info

Return Object

DVD

Print Item (override)

Call Library Item's Print Item

Print Title

Print Category

Print RunTime

Print Studio

Print Release Date

Edit Item (override)

Print Menu

Ask user which attribute they would like to edit

Read in the new attribute

Use corresponding function to set new attribute

getType (override)

return DVD Type

Store Items (override)

Open data file

Loop through file:

 Output formatted information into data file

Load Items

Open data file

Loop through file:

 Read in information from data file and store in object

Create Item from UI

Prompt user for info about DVD

Read into variables

Create Object and populate with info

Return Object