IT 206
Programming Assignment 4
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1) Classes needed to solve this problem and their purpose:

Data definition class – Library

This class will create the Library object as well as instantiate all of its variables. It will also aid the implementation class in accessing, mutating, and printing any info generated within the object. It will be used as an aggregator for LibraryItem and Librarian.

Data definition class – LibraryItem

This class will create the LibraryItem object as well as instantiate all of its variables. It will also aid the implementation class in accessing, mutating, and printing any info generated within the object. It will be used as an parent class for Book and DiscMedia.

Data definition class – Book

This class will create the Book object as well as instantiate all of its variables. This will be done by way of sending LibraryItem variables to the superclass LibraryItem with a super key and then setting additional variables specific to the Book subclass. It will also aid the implementation class in accessing, mutating, and printing any info generated within the object.

Data definition class – DiscMedia

This class will create the DiscMedia object as well as instantiate all of its variables. This will be done by way of sending LibraryItem variables to the superclass LibraryItem with a super key and then setting additional variables specific to the DiscMedia subclass. It will also aid the implementation class in accessing, mutating, and printing any info generated within the object.

Data definition class – Librarian

This class will create the Librarian object as well as instantiate all of its variables. It will also aid the implementation class in accessing, mutating, and printing any info generated within the object.

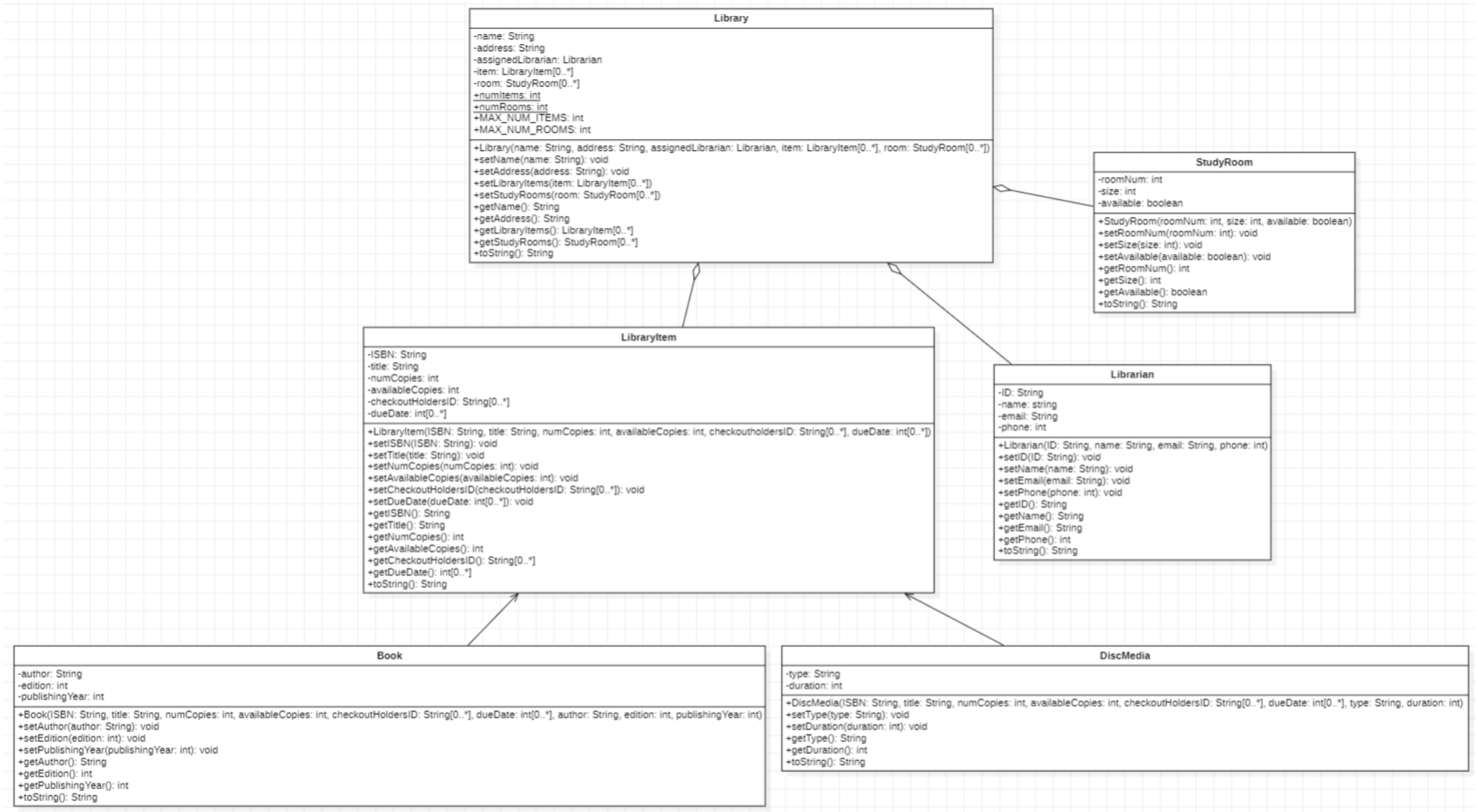
Data definition class – StudyRoom

This class will create the StudyRoom object as well as instantiate all of its variables. It will also aid the implementation class in accessing, mutating, and printing any info generated within the object.

Implementation class – CheckoutSystem

This class will prompt the user with a menu of choices including the option to add a library, add a librarian, add library items, add study rooms, search library items, checkout books, reserve study rooms, and print library information. It will also include methods related to each of these tasks that will communicate with the DDCs in order to manipulate items in the library.

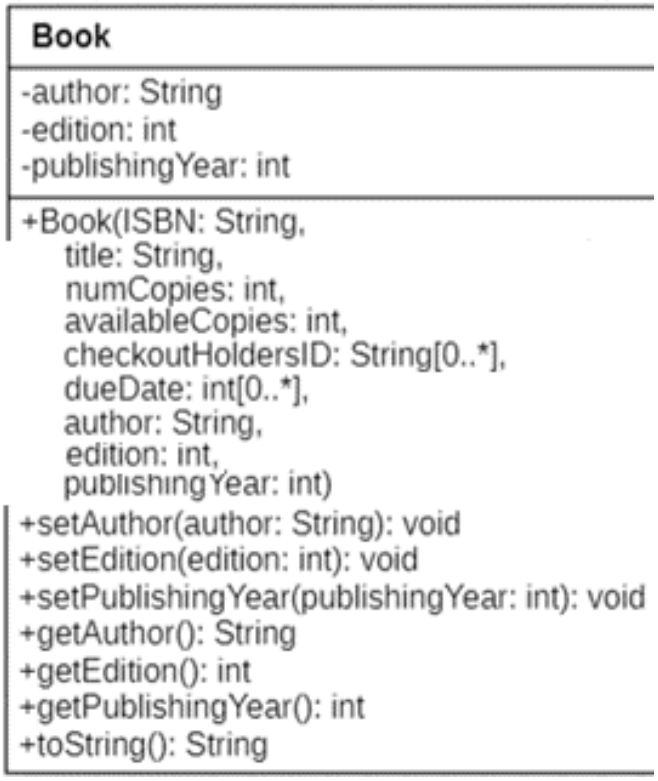
2) Data Definition Classes: UML diagram



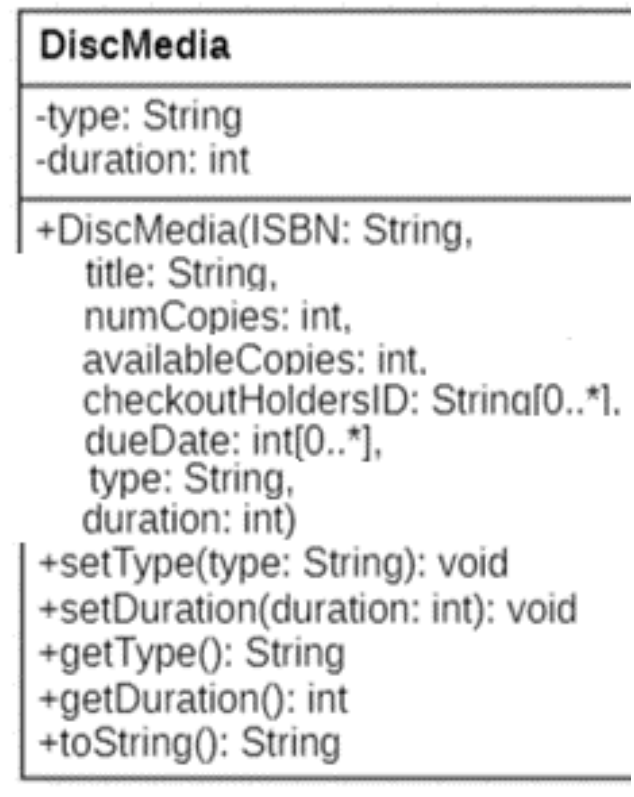
Classes:	*Descriptions:*
	Library's name Library's address Library's assigned librarian Items held within library inventory Study rooms located within library Number of items held within library inventory Number of study rooms located within library Maximum number of items held within library inventory Maximum number of study rooms within library Library object constructor which takes parameters of library's name, address, assigned librarian, items held within that library, and study rooms located within that library Sets library's name Sets library's address Sets library's items held within inventory Sets library's study rooms Returns library's name Returns library's address Returns library's items Returns library's study rooms Returns a summary of library information

This class aggregates from Library.

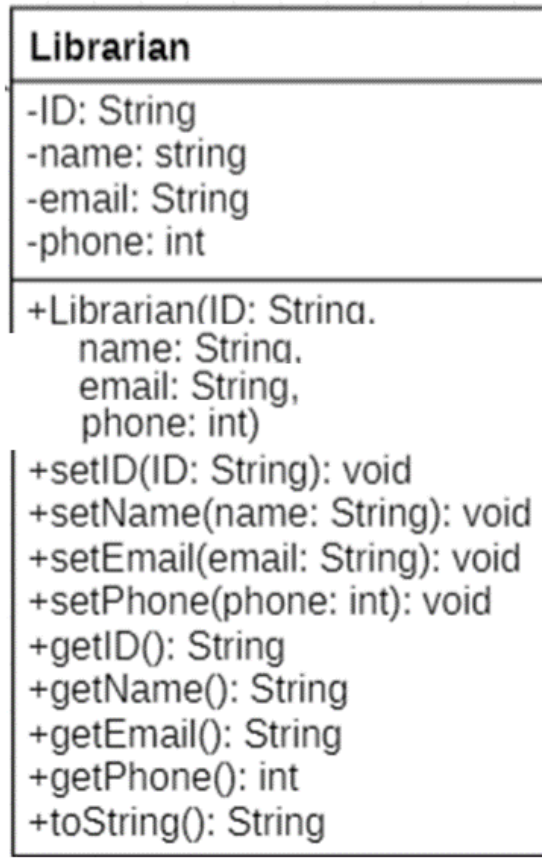
Item’s ISBN
Item’s title
Number of coies of item (total in inventory)
Number of available copies of item (not checked out)
ID numbers of people who have checked this item out
Item’s due dates (dates upon which checkout holders must return the item to the library)
Library item object constructor which takes parameters of item’s ISBN, title, number of total copies, number of available copies, ID numbers of people who have checked this item out, and their due dates
Sets item’s ISBN
Sets item’s title
Sets item’s total number of copies
Sets item’s number of available copies
Sets ID numbers of people who have checked this item out
Sets item’s due dates (dates upon which checkout holders must return the item to the library)
Returns item’s ISBN
Returns item’s title
Returns item’s total number of copies
Returns ID numbers of people who have checked this item out
Returns item’s due dates (dates upon which checkout holders must return the item to the library)
Returns a summary of the library item’s information



Book's author
Book's edition (example: 1st edition, 2nd edition, etc.)
Book's publishing year
Book object constructor which takes parameters of item's ISBN, title, number of total copies, number of available copies, ID numbers of people who have checked this item out, their due dates, book's author, edition, and publishing year (initial information is passed to the superclass: extends LibraryItem)
Sets book's author
Sets book's edition
Sets book's publishing year
Returns book's author
Returns book's edition
Returns book's publishing year
Returns a summary of book's information

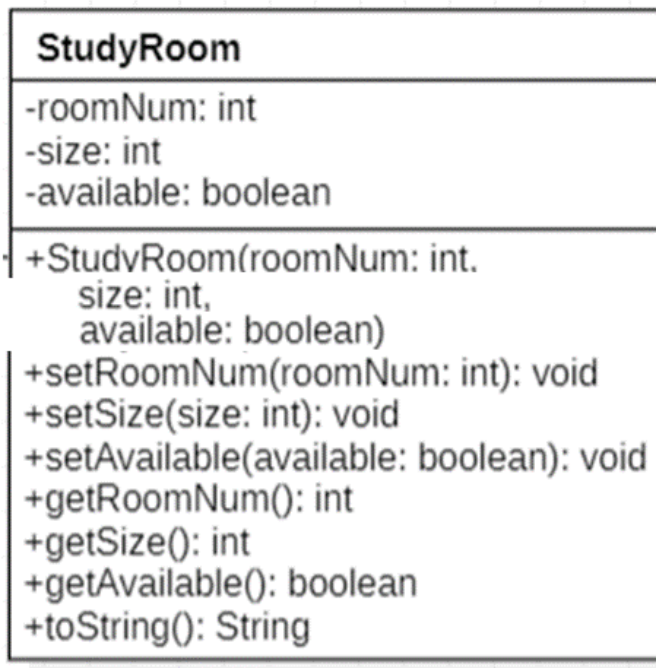


Disc media's type (CD, DVD, or BluRay)
Disc media's duration (in minutes)
Disc media object constructor which takes parameters of item's ISBN, title, number of total copies, number of available copies, ID numbers of people who have checked this item out, their due dates, disc media's type, and duration (initial information is passed to the superclass: extends LibraryItem)
Sets disc media's type
Sets disc media's duration
Returns disc media's type
Returns disc media's duration
Returns a summary of disc media's information



This class aggregates from Library.

Librarian's ID
Librarian's name
Librarian's email
Librarian's phone number
Librarian object constructor which takes parameters of the librarian's ID, name, email, and phone number
Sets librarian's ID
Sets librarian's name
Sets librarian's email
Sets librarian's phone number
Returns librarian's ID
Returns librarian's name
Returns librarian's email
Returns librarian's phone number
Returns a summary of librarian information



This class aggregates from Library.

Study room's number
Study room's size (number of participants allowed)
Study room's availability (available or reserved)
Study room object constructor which takes parameters of the room's number, maximum participant size, and availability
Sets room's number
Sets room's participant size
Sets room's availability
Returns room's number
Returns room's participant size
Returns room's availability
Returns a summary of study room information

3) Implementation Class: Methods and purposes

Method: main Purpose: The main method is used to access a menu for user input and to access other methods based on said user input. Inputs: optionChosen : int – The relevant number associated with a menu option. Return: void
Method: menu Purpose: This method prompts the user with a menu of options from which they can choose to add a library, add a librarian, add library items, add study rooms, search library items, checkout a book, reserve a study room, print library information, or quit the program. Depending on which option is chosen by the user, other methods are called to complete the user's request. Parameters: none Return: optionChosen : int – The relevant number associated with a menu option.
Method: createLibrary Purpose: This method allows the user to create a Library object via various inputs of all needed library information. Parameters: none Return: aLibrary : Library – The Library object created and populated from user input.
Method: createLibrarian Purpose: This method allows the user to create a Librarian object via various inputs of all needed librarian information. Parameters: none Return: aLibrarian : Librarian – The Librarian object created and populated from user input.
Method: createLibraryItem Purpose: This method allows the user to create a LibraryItem object via various inputs of all needed library item information. Parameters: none Return: aLibraryItem : LibraryItem – The LibraryItem object created and populated from user input.

Method: createStudyRoom
Purpose: This method allows the user to create a StudyRoom object via various inputs of all needed study room information.
Parameters: none
Return: aStudyRoom : StudyRoom – The StudyRoom object created and populated from user input.

Method: searchLibraryItem
Purpose: This method allows the user to search for a LibraryItem object via various inputs of search terms such as ISBN and title. If a search is specified as being for a book, search terms may also include author, edition, and publishing year. If a search is specified as being for a disc media, search terms may also include media type and duration. Once found, it will print all details of the searched item.
Parameters: none
Return: foundLibraryItem : LibraryItem – The LibraryItem object found based on search criteria.

Method: itemCheckout
Purpose: This method allows the user to checkout a book or disc media. This is done either by direct input of book/disc media details (ISBN, title) or through a search for a LibraryItem to select. The latter is done by calling the searchLibraryItem method. Once an item has been selected, its number of available copies will be decremeted, the checkout holder's ID will be placed within its respective array, and the item's due date will be placed within its respective array.
Parameters: none
Return: checkedOutItem : LibraryItem – The LibraryItem object which was checked out.

Method: reserveRoom
Purpose: This method allows the user to reserve a study room. This will be done either by direct input of study room details (room number) or by a search which will display available study rooms to choose from. Once a study room is reserved, its availability will change to reflect that reservation.
Parameters: none
Return: reservedRoom : StudyRoom – The StudyRoom object which was reserved.

Method: printLibraryInfo
Purpose: This method prints a string of library information including name, address, librarian details, total number of books, and total study rooms. The string output will also include a detailed list of library items and study rooms in the library.
Parameters: aLibrary : Library – The Library object created and populated from user input.
Return: void