Specification Analysis

To fill the specifications, we created two base classes, the book class and the module class. Derived from the book class is the inventory book class. Derived from the module class are the three main modules, the cashier, report and database, these are what largely fill the specifications.
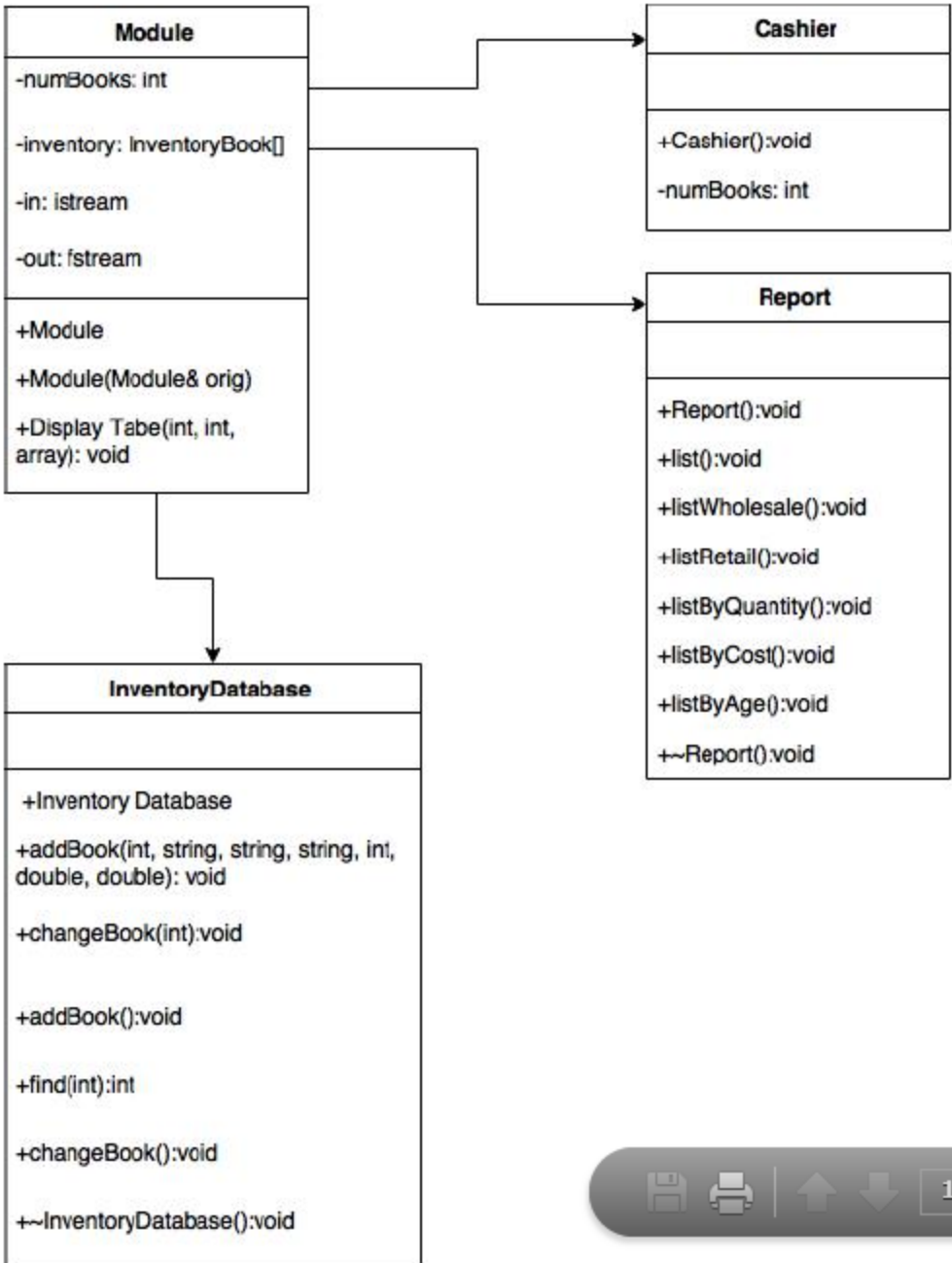
The cashier acts as a cash register by asking the user to enter the isbn numbers of the books being sold followed by a negative number. The module then does all of the work of calculating total cost and sales tax. It also subtracts the bought books from the database.
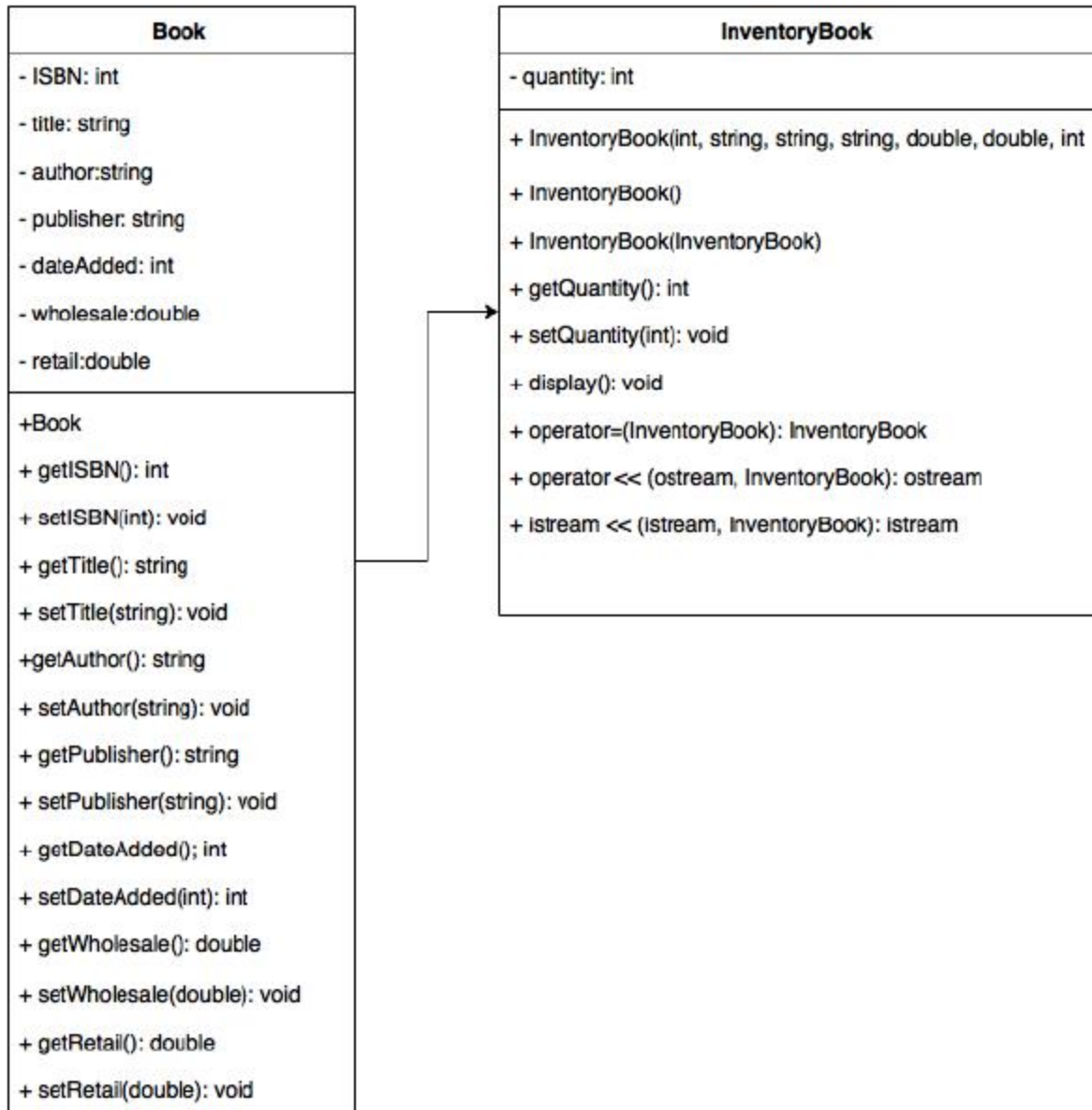
The inventory database module allows users to access the inventory. The inventory holds data on the books' isbn, title, author publisher, date added, quantity, wholesale cost and retail price. The inventory database module allows the user to select from a menu the operations of lookup, add, delete and change.

The report module has a menu where the user can choose between several different types of reports. These include listing by wholesale, retail, quantity, cost or age. When the user selects one, the titles of the books will be displayed in order along with their requested information.

The main screen will live in the main function of the project, with a menu allowing the user to select from a list of modules. When selected, the program will create an instance of the requested module.

UML

Module

-numBooks: int

-inventory: InventoryBook[]

-in: istream

-out: fstream

+Module

+Module(Module& orig)

+Display Tabe(int, int, array): void

Cashier

+Cashier():void

-numBooks: int

Report

+Report():void

+list():void

+listWholesale():void

+listRetail():void

+listByQuantity():void

+listByCost():void

+listByAge():void

+~Report():void

InventoryDatabase

+Inventory Database

+addBook(int, string, string, string, int, double, double): void

+changeBook(int):void

+addBook():void

+find(int):int

+changeBook():void

+~InventoryDatabase():void

Book
- ISBN: int
- title: string
- author:string
- publisher: string
- dateAdded: int
- wholesale:double
- retail:double
+Book
+ getISBN(): int
+ setISBN(int): void
+ getTitle(): string
+ setTitle(string): void
+getAuthor(): string
+ setAuthor(string): void
+ getPublisher(): string
+ setPublisher(string): void
+ getDateAdded(); int
+ setDateAdded(int): int
+ getWholesale(): double
+ setWholesale(double): void
+ getRetail(): double
+ setRetail(double): void

InventoryBook
- quantity: int
+ InventoryBook(int, string, string, string, double, double, int
+ InventoryBook()
+ InventoryBook(InventoryBook)
+ getQuantity(): int
+ setQuantity(int): void
+ display(): void
+ operator=(InventoryBook): InventoryBook
+ operator << (ostream, InventoryBook): ostream
+ istream << (istream, InventoryBook): istream

Pseudocode

InventoryDatabase.h: this program includes the class definintion of the InventoryDatabase

Description: This file declares all of the methods and data members of the class

Psuedocode

   Public members of the class are the functions deleteBook, changeBook, lookup and addBook

   There are no private members

InventoryDatabase.cpp: this program includes the class implementation of the InventoryDatabase class

Description: This file implements all of the methods and data members of the class

Psuedocode

        Add book function:

                The add book function takes no arguments

                It has private variables for isbn, title, author, publisher, date quantity and price

                It prompts the user to enter all of the data:isbn, title, author, publisher, quantity, wholesale cost and retial price

                In an array holding all of the inventory, the first empty book is has its values set to the entered values, time is set to the current time with

                The program the prints out the data for the book added

        Change book function:

                The program prompts the user to enter the isbn for the book she wants to add

                The program performs a linear search to find that book in the array

                When the book is found, the program promts the user to enter the new title, author, publisher, quantity, wholesale, and price

                The elements of the book are then set to fit the entered values

        Delete:

                The program prompts the user to enter the isbn of the book she wishes to delete

                The program performs a linear search to find the book

                If the book is found, shift all of the elements in the array up one, essentially squeezing out the deleted book

                Decrement the number of books variable

        Constructer:

                When this program is called from main, it gives the user a menu to choose an operation

Book.h: this program includes the class definintion of the Book class

Description: This file declares all of the methods and data members of the class

Psuedocode

Public members of the class are getters and setters for all of the private data elements

The private data elements are: isbn, title, author, publisher, date added, wholesale price and retial price

Book.cpp: this program includes the class implementation of the book class

Description: This file implements all of the methods and data members of the class

Psuedocode

Empty constructer, copy construcet and destructer

InventoryBook.h: this program includes the class definintion of the Book class

Description: This file declares all of the methods and data members of the class

Psuedocode

Public members of the class are the constructer, copy constructer, get function for the quantity and set function for the quantity

There is also a public assignment operator

This copies the values in a book on the right side of a equals sign to the book on the left of the equals sign

There is also a friend function overloading the << symbol

This accets a data stream and a reference to a book and prints all of the values from the object to the stream

There is also a friend function overloading the >> symbol

This accets a data stream and a reference to a book and reads all of the values from the object from the stream

InventoryBook.cpp: this program includes the class implementation of the inventory book class

Description: This file implements all of the methods and data members of the class

Psuedocode

There is a constructer that takes the isbn, author, publisher, time, quantity, price and cost and creates an object with those parameters

There is also a constructer with no arguments that sets all of the values to 0

Cashier.h: this program includes the class definintion of the cashier

Description: This file declares all of the methods and data members of the class

Psuedocode

The class has a public constructer and destructer

The class has a private value for sales tax, total, number of books as well as data structures to hold purchased book title, price and isbn

There is also a function for buying books

Cashier.cpp: this program includes the class implementation of the Cashier class

Description: This file implements all of the methods and data members of the class

Psuedocode

Buy Book function

This function accepts the isbn of the book to be sold

The program performs a linear search, searching through each book to find the one with the right isbn

If the book is found and the quantity is greater than 0, reduce the quantity by one and add the books cost to the total cost parameter

Also add the isbn, price and title of the book to the data structures holding these values

Constructer

When this program is called from the main, it tells the user to enter is isbn numbers of the books being sold, followed by a negative number to end

Then it prints the user's receipt with the isbn number, title and cost of the books bought

The program then prints the subtotal

The program then calculates the tax by multiplying the total cost by .08 and adds this to the subtotal

The program then prints the cost with tax

Report.h: this program includes the class definintion of the report module

Description: This file declares all of the methods and data members of the class

Psuedocode

This class has public functions for listing by wholesale, retail, quantity, cost or age.

There is also a function to print the entire inventory

Report.cpp: this program includes the class implementation of the report class

Description: This file implements all of the methods and data members of the class

Psuedocode

Inventory list

In a for loop that repeats for each book in the inventory, this function repeats the following

Use the display function to display each book

Retail Value

Use the sort by element function to sort by retail

Read the sorted books into arrays to be displayed

Use the t chart function to display the book titles and retail

Quantity

Use the sort by element function to sort by quantity

Read the sorted books into arrays to be displayed

Use the t chart function to display the book titles and quantity

Cost

Use the sort by element function to sort by cost

Read the sorted books into arrays to be displayed

Use the t chart function to display the book titles and cost

Age

Use the sort by element function to sort by age

Read the sorted books into arrays to be displayed

Use the t chart function to display the book titles and age

Constructer

Display a meun allowing the user to list elements by, inventory, wholesale, retial, quantity, cost or age, as well as a quit option

A switch takes the user input and calls the relevant function

Module.h: this program includes the class definintion of the module class

Description: This file declares all of the methods and data members of the class

Psuedocode

The class has protected members for number of books, an array of inventory books called inventory and input and output streams

The class also has a public constructer, functions for sorting by element and a function for displaying a table

Module.cpp: this program includes the class implementation of the module class

Description: This file implements all of the methods and data members of the class

Psuedocode

Constructer

An inventory book called book is created along with an input stream

The program reads the number of books from a file and creates an array of books that has twice that length

The program then reads the books from the file into the array and closes the file

Sort by element function

The function takes an argument for which element of the class to sort by

Repeat the following for each book in the array: Depending on the element the program is to sort by, if the element is less than some minimum value set that element to be the minimum value. Then move this minimum value to the start of the array

Display table function

This function accepts parameters for number of rows, number of column and a string of elements

The function then formats the output and puts it in a rectangular table

Destructor:

When the object is to not be used anymore the following actions take place
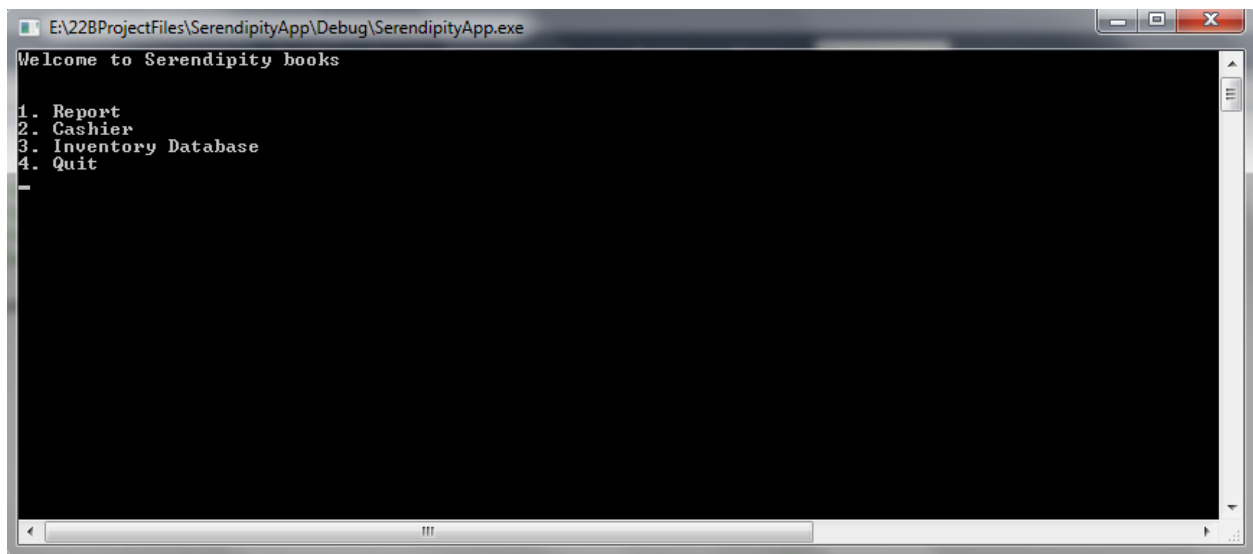
All of the elements of the inventory array are printed to a file

The file is closed

The inventory array is deleted

Screenshots

Main

Report

```
1
1. Inventory List
2. Inventory Wholesale Value
3. Inventory Retail Value
4. List By Quantity
5. List By Cost
6. List By Age
7. End
```



```
2. Inventory Wholesale Value
3. Inventory Retail Value
4. List By Quantity
5. List By Cost
6. List By Age
7. End
2
------------------------------------------------------------------------------
|The Cat Who Could Read Backwards        |3            |
|The Cat Who Ate Danish Modern           |3            |
|The Cat Who Turned On and Off           |3            |
|The Cat Who Saw Red                     |3            |
|The Cat Who Played Brahms               |3            |
|The Cat Who Played Post Office          |3            |
|The Cat Who Knew Shakespeare            |3            |
|The Cat Who Sniffed Glue                |3            |
|The Fault in Our Stars                  |15           |
|Artemis Fowl                            |15           |
|Artemis Fowl: The Arctic Incedent       |15           |
|Artemis Fowl: The Eternity Code         |15           |
|Artemis Fowl: The Opal Deception        |15           |
|Artemis Fowl: The Lost Colony           |15           |
|Artemis Fowl: The Time Paradox          |15           |
|Artemis Fowl: The Atlantic Complex      |15           |
|Artemis Fowl: The Last Guardian         |15           |
|Harry Potter and the Prisoner of Azkaban|15           |
|Harry Potter and the Deathly Hallows    |15           |
```

Cashier

```
                    Jurassic Park                  24.99                    394588
Subtotal: 24.99
Total with tax: 26.9892
Press any key to return to main menu

1. Report
2. Cashier
3. Inventory Database
4. Quit
2
Enter the ISBN numbers of the books being purchased
 (Enter a negative number to end)
:394588

:156858

:-1
Receipt
                          Title                  Price                      ISBN
                    Jurassic Park                24.99                    394588
                    Steal This Book              61.67                    156858
Subtotal: 86.66
Total with tax: 93.5928
Press any key to return to main menu
```

45 ||747581088

Inventory Database

```
3
1.Lookup
2.Add
3.Delete
4.Change
5.End_
```

```
5.End1
Enter the ISBN of the book you want to lookup515144088

-----------------------------------------
|The Cat Who Could Read Backwards|
-----------------------------------------
|Lilian Jackson Braun|
-----------------------------------------
|E. P. Dutton    |
-----------------------------------------
|515144088       |
-----------------------------------------
|1273            |
-----------------------------------------
|7.00            |
-----------------------------------------
|3.00            |
-----------------------------------------
|Sun May 31 12:27:10 2015
|
-----------------------------------------

1.Lookup
2.Add
3.Delete
4.Change
5.End
```

```
1.Lookup
2.Add
3.Delete
4.Change
5.End2
Enter ISBN:8800719
Enter title:Soup Alive
Enter author:Eleanor Rosenast
Enter Publisher:Woodridge
Enter quantity:200
Enter wholesale cost:10.00
Enter retail price15.00
Added

-----------------------------------------
|Soup Alive      |
-----------------------------------------
|Eleanor Rosenast|
-----------------------------------------
|Woodridge       |
-----------------------------------------
|8800719         |
-----------------------------------------
|200             |
-----------------------------------------
|15.00           |
-----------------------------------------
|10.00           |
-----------------------------------------
|Thu Jun 18 09:09:56 2015
|
-----------------------------------------

1.Lookup
2.Add
3.Delete
4.Change
5.EndE
```

```
Welcome to Serendipity books


1. Report
2. Cashier
3. Inventory Database
4. Quit
3
1.Lookup
2.Add
3.Delete
4.Change
5.End3
Enter the isbn number of the book you would like to delete: 515144088
Book successfully deleted
1.Lookup
2.Add
3.Delete
4.Change
5.End_
```

```
2. Cashier
3. Inventory Database
4. Quit
3
1.Lookup
2.Add
3.Delete
4.Change
5.End4
Enter the ISBN of the book you would like to change515087122
---------------------------------------
!The Cat Who Ate Danish Modern!
---------------------------------------
!Lilian Jackson Braun!
---------------------------------------
!E. P. Dutton    !
---------------------------------------
!515087122      !
---------------------------------------
!1689           !
---------------------------------------
!7.00           !
---------------------------------------
!3.00           !
---------------------------------------
!Sun May 31 12:27:10 2015
!
---------------------------------------
Enter new title:The Cat Who Ate Danish Modern
Enter new author:Lilian Braun
Enter new Publisher:E. P. Dutton
Enter new quantity:250
Enter new wholesale cost:15
Enter new retail price20
1.Lookup
2.Add
3.Delete
4.Change
5.End_
```