Assignment 3 – CIMP Library System

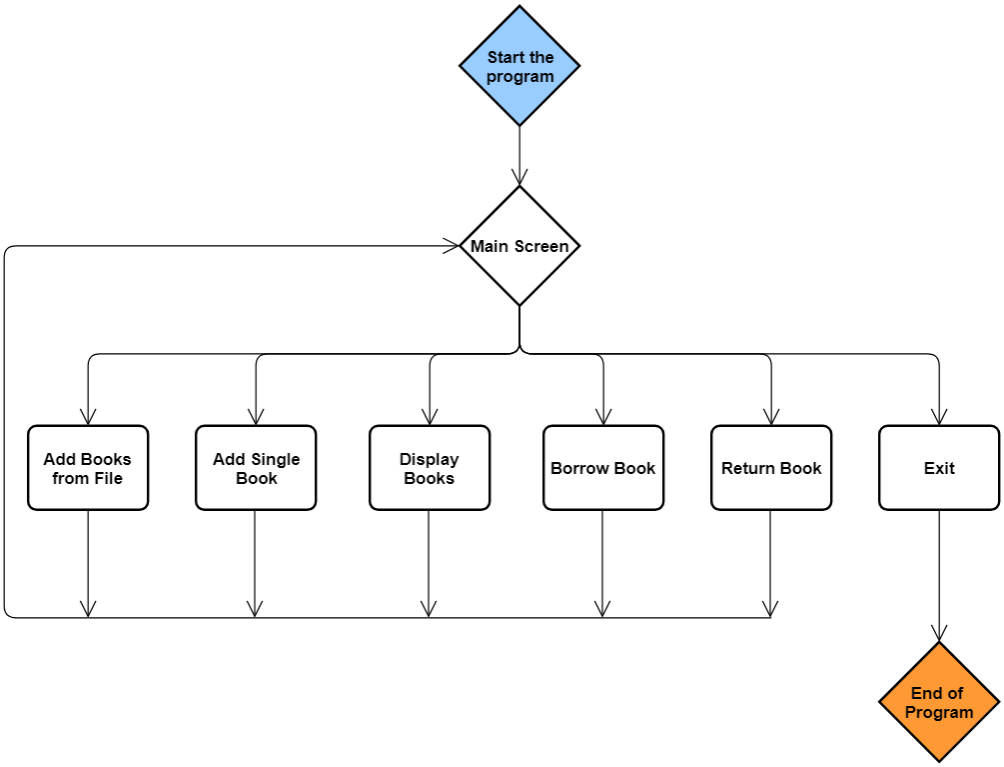
1. General Info

CIMP wants to have its own library and would need a library system to help manage the books. CIMP will only have history, novel and non-fiction books. Each student may borrow the books and the program would know who currently has it. The system is main used by the CIMP librarian. So assume students will not be able to use the system and randomly return books when in fact they didn't.

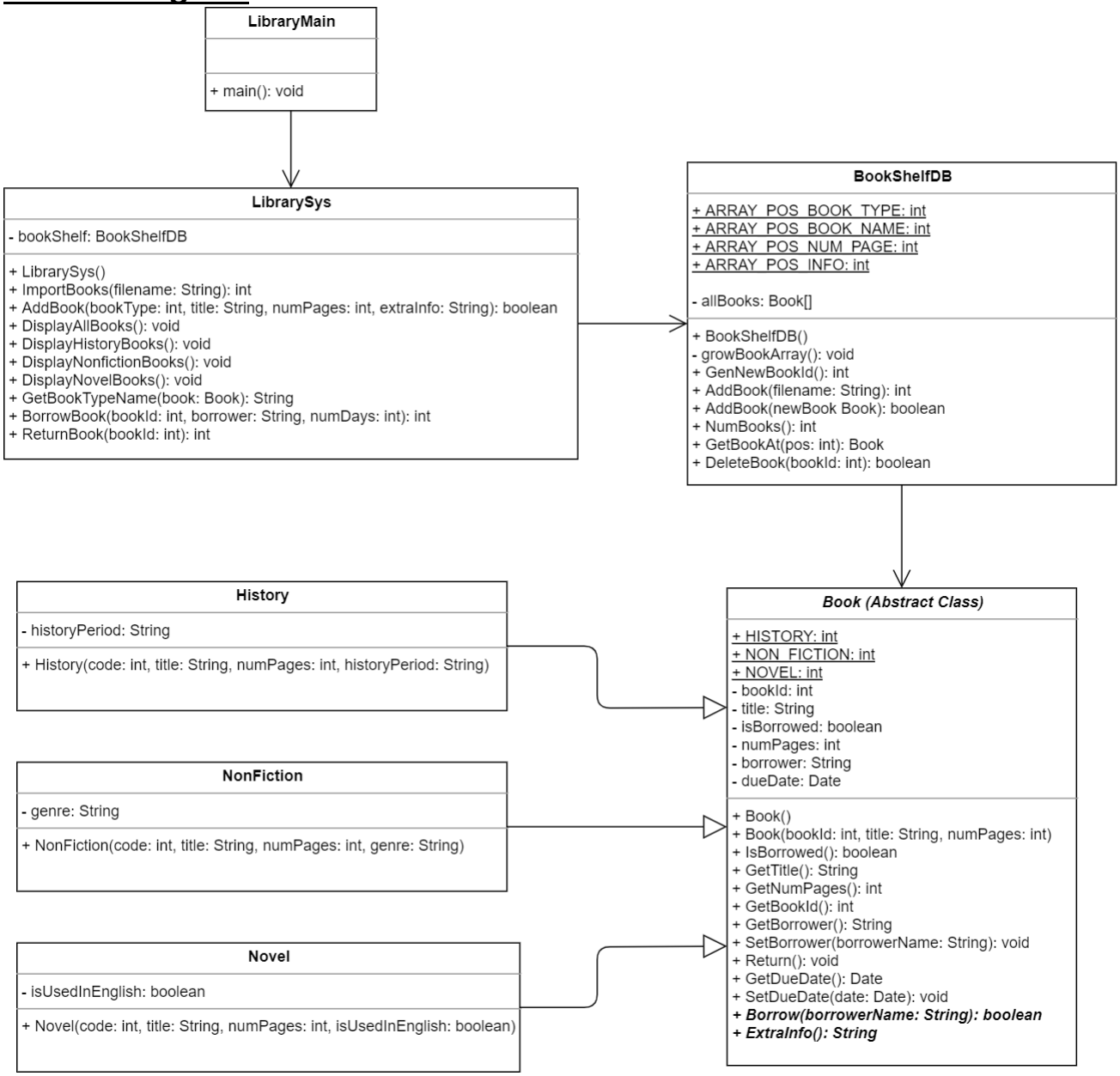
Here are the basic functions of the program:

- Allows user to import books information from a **textfile**.
- Allows user to add a single book into the system manually.
- Display books in the system. There are only 3 types of books in the system. It may filter the display:
    - Display all books
    - Display history only
    - Display non-fiction only
    - Display novel only
- Allows user to borrow a book
- Allows user to return a book.
- Exit (leave the program)

2. Program Flow



3. UML Diagram



4. The interface

a) The main screen

```
========================================
|       CIMP LIBRARY SYSTEM            |
========================================
1. Add Books from File
2. Add Single Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option:
```

b) Add book from a textfile

```
====================================
|        CIMP LIBRARY SYSTEM       |
====================================
1. Add Books from File
2. Add Single Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 1
Added 7 to the system from BookList.txt
```

c) Add a single book. It will ask for the **book type** (History, Non-Fiction or Novel), **Title**, **Page Number**, and **Extra Info** specific to the book type. There's more information on the extra info for each book type at the book of this document.

```
====================================
|       CIMP LIBRARY SYSTEM        |
====================================
1. Add Books from File
2. Add Single Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 2

====================================
|         Add Single Books         |
====================================
Book Type
1. History
2. Non Fiction
3. Novel
Enter Book Type: 1
Enter Book Title: Malaysia History
Enter Book Number of Pages: 123
Enter Book History Period: Modern
Successfully added the book 'Malaysia History'
```

d) Display all the books in the system. The book that we just added previously (Malaysia History) is also here.

```
================================
|       CIMP LIBRARY SYSTEM      |
================================
1. Add Books from File
2. Add Single Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 3

================================
|          Display Book        |
================================
Books to display
1. All
2. History only
3. Non Fiction Only
4. Novel Only
Enter Display Option: 1

  Book ID      Book Type                                Title    Num Page      Extra Info                Borrower     Due Date
=============================================================================================================================
     1249        History                      History of CIMP         100       Millenium
     1934    Non Fiction            Basketball and Kevin Wong         200          Sports
     1222          Novel                    The Great Gatsby         300            true
     1737          Novel          Harry Potter, The ICS Prince         400           false
     1681    Non Fiction       Why Michael Jordan is the best         500          Sports
     1770          Novel                  Lord of the Flies         625            true
     1384        History              Guns, Germs, and Steels         700     13000 years
     1208        History                      Malaysia History         123          Modern
```

e) You can also display a specific type of book (To filter the display). When you select History only, "**Extra Info**" column in the table will also change to "**Period**" because this is specific to History books.

```
===================================
|       CIMP LIBRARY SYSTEM       |
===================================
1. Add Books from File
2. Add Single Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 3

===================================
|          Display Book           |
===================================
Books to display
1. All
2. History only
3. Non Fiction Only
4. Novel Only
Enter Display Option: 2

  Book ID      Book Type                                Title   Num Page          Period                Borrower     Due Date
=================================================================================================================================
     1249        History                      History of CIMP        100       Millenium
     1384        History                Guns, Germs, and Steels      700     13000 years
     1208        History                     Malaysia History        123          Modern
```

f) You can borrow books by indicating the Book Id

```
  Book ID      Book Type                                Title   Num Page      Extra Info                Borrower     Due Date
=================================================================================================================================
     1541        History                     Malaysia History        123          Modern
     1846        History                      History of CIMP        100       Millenium
     1329    Non Fiction             Basketball and Kevin Wong       200          Sports
     1546          Novel                     The Great Gatsby        300            true
     1920          Novel           Harry Potter, The ICS Prince      400           false
     1564    Non Fiction          Why Michael Jordan is the best     500          Sports
     1189          Novel                    Lord of the Flies        625            true
     1881        History                Guns, Germs, and Steels      700     13000 years
     1615        History                                Kevin        123            2020

===================================
|       CIMP LIBRARY SYSTEM       |
===================================
1. Add Books from File
2. Add Single Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 4

===================================
|          Borrow Books           |
===================================
Enter book ID to borrow: 1541
Enter borrower's name: Kevin Wong
Enter number of days to borrow: 10

Successfully borrow book.
```

After borrowing, the table will show the info

```
===================================
|          Display Book           |
===================================
Books to display
1. All
2. History only
3. Non Fiction Only
4. Novel Only
Enter Display Option: 1

  Book ID      Book Type                                Title   Num Page      Extra Info                Borrower     Due Date
=================================================================================================================================
     1541        History                     Malaysia History        123          Modern              Kevin Wong   2021-03-26
     1846        History                      History of CIMP        100       Millenium
     1329    Non Fiction             Basketball and Kevin Wong       200          Sports
     1546          Novel                     The Great Gatsby        300            true
     1920          Novel           Harry Potter, The ICS Prince      400           false
     1564    Non Fiction          Why Michael Jordan is the best     500          Sports
     1189          Novel                    Lord of the Flies        625            true
     1881        History                Guns, Germs, and Steels      700     13000 years
     1615        History                                Kevin        123            2020
```

g) You can also return books and if it is a success the borrower's name will be disappeared in the table.

```
 Book ID     Book Type                           Title   Num Page     Extra Info            Borrower    Due Date
==================================================================================================================
    1541       History                Malaysia History        123         Modern          Kevin Wong  2021-03-26
    1846       History                 History of CIMP        100      Millenium
    1329   Non Fiction        Basketball and Kevin Wong        200         Sports
    1546         Novel                The Great Gatsby        300           true
    1920         Novel         Harry Potter, The ICS Prince        400          false
    1564   Non Fiction     Why Michael Jordan is the best        500         Sports
    1189         Novel              Lord of the Flies        625           true
    1881       History          Guns, Germs, and Steels        700    13000 years
    1615       History                           Kevin        123           2020

===================================
|       CIMP LIBRARY SYSTEM       |
===================================
1. Add Books from File
2. Add Single Book
3. Display Books
4. Borrow Book
5. Return Book
6. Exit
Choose an option: 5

===================================
|          Return Books           |
===================================
Enter book ID to return: 1541

Successfully return book.
```

```
 Book ID     Book Type                           Title   Num Page     Extra Info            Borrower    Due Date
==================================================================================================================
    1541       History                Malaysia History        123         Modern
    1846       History                 History of CIMP        100      Millenium
    1329   Non Fiction        Basketball and Kevin Wong        200         Sports
    1546         Novel                The Great Gatsby        300           true
    1920         Novel         Harry Potter, The ICS Prince        400          false
    1564   Non Fiction     Why Michael Jordan is the best        500         Sports
    1189         Novel              Lord of the Flies        625           true
    1881       History          Guns, Germs, and Steels        700    13000 years
    1615       History                           Kevin        123           2020
```

5. Book Information

Each book has the following information

- bookId- The book ID that CIMP uses to keep track of all the books. The Book ID is randomly generated.
- Title of the book
- Number of pages
- Extra Info - Each type of book has their own special info:
    - History contains the time **period** of the book
    - Non Fiction contains the **genre** of the book
    - Novel contains info if the book is being **used by English** classes or not

6. Import Textfile

When the user wants to import a batch of book information from a textfile, the filename must be **BookList.txt**.

Each row represents a book, with each book having 4 piece of information.

- Book Type (0 = History, 1 = Non-Fiction, 2 = Novel)
- Title of the book
- Number of pages
- Extra information (This is specific to the type of books. Each type has their own special info)

Each piece of information on a particular book is separated by a **":"** key

```
0:History of CIMP:100:Millenium
1:Basketball and Kevin Wong:200:Sports
2:The Great Gatsby:300:true
```

A dummy **BookList.txt** will be provided for you to test your program. However, you may create your own and perform further testing.

7. Borrow Books & Calculate the Due Date

Users will enter how many days they wants to borrow a book, and the system will check and keep track of the due date for the books being borrowed. Each type of book has their own due date calculation:

Book Type	Due Date Rules
History	May borrow only up to 10 days.
Non-Fiction	If the book has less than 500 pages, then it may borrow only up to 5 days. If the book has more than or equals to 500 pages, then it may borrow only up to 15 days
Novel	If the book is for English classes, then it may borrow only up to 30 days. If the book is **not** for English classes, then it may borrow only up to x days, where: $x = \lceil (Number\ of\ Pages\ /\ 20)\ x\ 1.25 \rceil$ ***Note**: The ⌈ ⌉ bracket means rounding up the decimals.*

Note:	Add days to a specific date. https://www.mkyong.com/java/java-how-to-add-days-to-current-date/

8. Error Checking

- When booking and returning a book, your program must check if the book exists and warn users appropriately.
- When selecting options, your program must check if they are valid and warn users appropriately
- *Note*: If the program expects a particular data type, assume the user will enter the correct datatype.
    - Example: If the option is expecting an int, the user will always enter an int. Will not enter double or String.

9. Requirements

- Program must follow the program flow chart. Make sure you implement your program by using methods and classes.
- Each class must be in its separate file to improve readability and maintainability.
- Do not create extra classes, public methods or instance variables. However you may create Helper methods, or Global Constant variables.
- May only create public methods to help displaying in LibraryMain class to act as a helper method for the main().
- Do not use anything that's not taught in class. (*Eg: ArrayList, LinkedList, 2D-Array, etc.*)
- Use the **`BookShelfDB`** class to help you access the data. Read the documentation to help you understand how to use each method in it. The code is provided, but it is not necessary to understand what is happening in each of the method. Just understand the method header is enough.
- Must complete all the methods in the template use them throughout the program. May create helper methods only.
- Program must follow the UML diagram.
- **`Date`** class is used, for more information please refer to the following links:
    - http://tutorials.jenkov.com/java-date-time/parsing-formatting-dates.html
    - https://www.tutorialspoint.com/java/java_date_time.htm
    - https://docs.oracle.com/javase/7/docs/api/java/util/Date.html

10. Provided Templates and Files to Submit

Provided Template Classes	**Files to Submit**:	**Files NOT to Submit**:
● **`BookShelfDB.java`** – Contains full functionality (DO NOT CHANGE ANYTHING TO THIS FILE) ● **`LibraryMain.java`** ● **`LibrarySys.java`** ● **`Book.java`** ● **`History.java`** ● **`NonFiction.java`** ● **`Novel.java`** ● **`BookList.txt`**	● **`LibraryMain.java`** ● **`LibrarySys.java`** ● **`Book.java`** ● **`History.java`** ● **`NonFiction.java`** ● **`Novel.java`**	● **`BookShelfDB.java`** ● **`BookList.txt`** ● Any **`.class`** or **`.java~`**

Note:

- Aim for the following number of lines in your program. My sample program has:
  - There are **974 lines** of code in all of my files (including **`BookShelfDB.java`**).
  - There are **438 lines** of code in the templates.
  - So you only have to write **536 lines** of code
  - Do not stress yourself with 536 lines of code. That's just my benchmark.
- Working with friends is highly encouraged, and may share ideas. But no sharing of code. There are programs that can check the program's similarity, and I can see who are copying programs.

11. Rubric

Rubric (Checklist) for Knowledge

	Mark
KNOWLEDGE	
☐ Uses objects correctly ☐ Program loops correctly ☐ Program ends the game correctly ☐ Program prints table/grid correctly ☐ Program enters different option screen	/5

Rubric for Application, Thinking and Communication

Items	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Mark**
APPLICATION					
Import Books from textfile	Minimal functions work as intended	Some functions work as intended	Most functions work as intended	All functions work as intended	
Add a single Book manually	Minimal functions work as intended	Some functions work as intended	Most functions work as intended	All functions work as intended	
Display all Books	Minimal functions work as intended	Some functions work as intended	Most functions work as intended	All functions work as intended	
Display specific Book	Minimal functions work as intended	Some functions work as intended	Most functions work as intended	All functions work as intended	
Borrow a Book	Minimal functions work as intended	Some functions work as intended	Most functions work as intended	All functions work as intended	
Return a Book	Minimal functions work as intended	Some functions work as intended	Most functions work as intended	All functions work as intended	
Error handling and displaying appropriate messages	Have error checking is in minimal places and displays little appropriate message	Have error checking is in some places and displays some appropriate message	Have error checking is in most places and displays mostly appropriate message	Have error checking is in all places and displays all appropriate message	/28

THINKING					
Classes and Objects implementation	Minimal classes are relevant structures. Constructors and Methods are not relevant.	Some classes are relevant structures. Constructors and Methods are somewhat relevant.	Most classes are relevant structures. Constructors and Methods are mostly relevant.	All classes are relevant structures. Constructors and Methods are all relevant.	
Used static, final, and final static correctly	Minimal variables are used correctly.	Some variables are used correctly.	Most variables are used correctly.	All variables are used correctly.	
Program modularization (Creating helper methods)	Minimum required methods are modularized and efficiently used	Some required methods are modularized and efficiently used	Most required methods are modularized and efficiently used	All required methods are modularized and efficiently used	
Applied Inheritance	Minimum classes are inherited correctly.	Some classes are inherited correctly.	Most classes are inherited correctly.	All classes are inherited correctly.	
Applied Encapsulation	Minimum data are encapsulated correctly.	Some data are encapsulated correctly.	Most data are encapsulated correctly.	All data are encapsulated correctly.	
Polymorphism usage	Used polymorphism incorrectly	Used polymorphism somewhat correctly	Used polymorphism mostly correctly	Used polymorphism correctly	
Followed UML Diagram	Minimum structures follow the UML diagram	Some structures follow the UML diagram	Most structures follow the UML diagram	All structures follow the UML diagram	/28

COMMUNICATION					
Variables/Methods Naming	Minimal variable names are clear and easy to understand	Some variable names are clear and easy to understand	Most variable names are clear and easy to understand	All variable names are clear and easy to understand	
Use of comments	Minimal amount of comments was used	Some amount of comments was used	Acceptable amount of comments was used	Extensive amount of comments was used	
User Interface (Prompts & Instructions)	Difficult to understand the program, and minimal user prompts	Somewhat able to understand the program, and some user prompts	Somewhat easy to understand the program, and good user prompts	Easy to understand the program, and excellent user prompts	
Code Indentation	Indentations are minimal and readability is low	Indentations are somewhat correct and readability is average	Indentations are mostly correct and readability is mostly high	Indentations are all correct and readability is high	/16
TOTAL					