Data Structures and Algorithms

Assignment Three

Due Monday 23 May 2016

Please ensure that relevant files (excluding bytecode) are submitted in the correct assignment folder on AUT online by midnight on the due date. Only classes from the Java standard library may be used for this assignment. Please note that marks are allocated for program design and readability as well as correctness.

The purpose of this assignment is to develop a menu driven graphical user interface that can be used to read, edit, and save collections of books as XML documents that adhere to the XML schema `books.xsd` (available on AUT online). The class `Book.java` (available on AUT online) will be used to hold each book while in memory. The graphical user interface will allow the collection of books to be presented as a list of isbn codes, selecting any isbn code should display an edit panel for the appropriate book. The file `ComputerBooks.xml` (available on AUT online) can be used to test the application

Questions:

1. Finish Writing the class called `BookSet` that extends `AbstractSet` and which holds a collection of books in a hash map (with isbn codes as keys) maintained in the order in which books (vahave been added to the collection. The comments in the file should help explain the methods in more detail. There should be three constructors, one of which obtains the collection from an XML `Document` object holding the collection in a parsed DOM tree (this constructor should be tested with a suitable `main` method). The other constructors take in another collection of books and another which is a default.

   The inner class called `ISBNListModel` that extends `AbstractListModel` provides implementations of the methods `getElementAt` and `getSize`. An `ISBNListModel` holds an appropriate `Collection` of the isbn codes for all the books in ascending order. The field `isbnListModel` should remain `null` until the first time `getISBNListModel` is called, after which the field is kept up to date with modifications to the set. This class does not need to be changed.

BookSet
-booksMap : LinkedHashMap<String, Book> -isbnListModel : ISBNListModel -description : String
+BookSet() +BookSet(books : Collection<? extends Book>) +BookSet(document : Document) +add(book : Book) : boolean +remove(o : Object) : boolean +iterator() : Iterator<Book> +size() : int +clear() : void +getBook(isbn : String) : Book +getISBNListModel() : ListModel +getDescription() : String +setDescription(description : String) : void +main(args : String[])

(30 marks)

2. Prepare a GUI panel called `BooksGUI` with suitable options in a file menu for opening and saving a collection of books as an XML file, and options in an edit menu for adding books to and removing them from the collection. The GUI should contain an editable text field holding a description of the books and a split pane holding two GUI components. The left component should hold a `JList` of isbn codes for the collection sorted in ascending order. Selecting an isbn code in the list should display the appropriate book in the book panel on the right side of the split panel (The `Book` class has a method which displays the Book as a GUI. **(20 marks)**