## COMP 131 Midterm Exam II, Fall 2007 (100 points total)

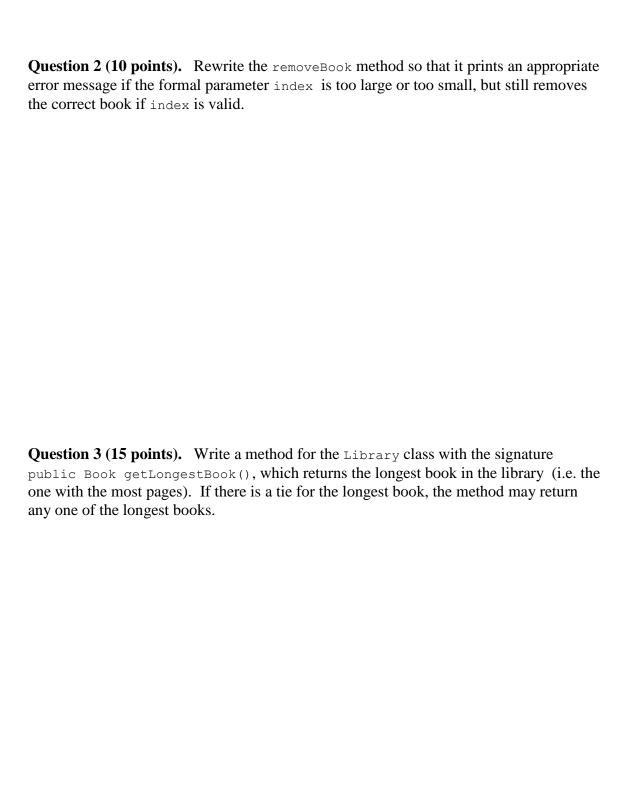
**Question 1 (15 points).** Consider the following class definitions (JavaDoc comments have been eliminated to save space):

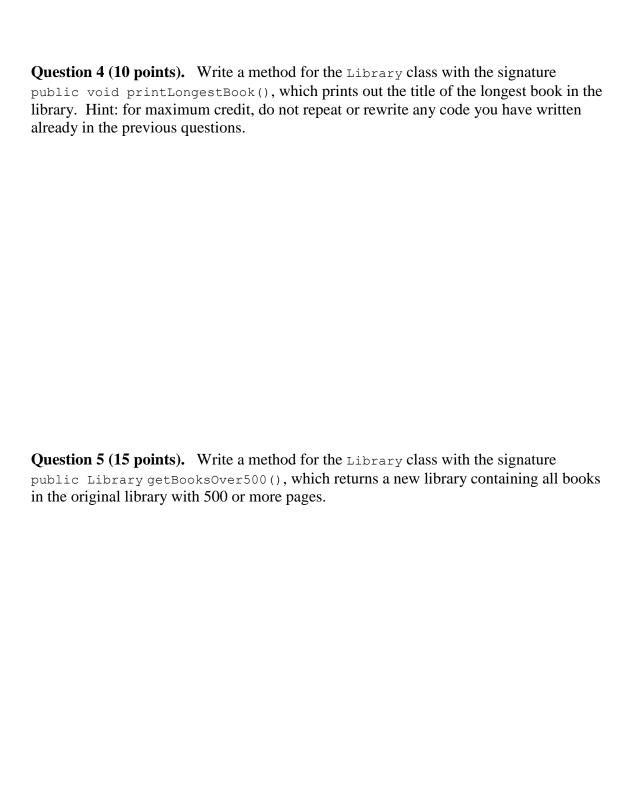
```
public class Book {
      private String title; // the book's title
      private int numPages; // the number of pages in the book
      public Book(String title, int numPages) {
            this.title = title;
            this.numPages = numPages;
      }
      public String getTitle() {
            return title;
      public int getNumPages() {
           return numPages;
}
import java.util.ArrayList;
public class Library {
      private String town; // the name of the town
                           // where this library is located
      private ArrayList<Book> books; // list of all books
                                     // contained in the library
      public Library(String town) {
            this.town = town;
            books = new ArrayList<Book>();
      public void addBook(Book book) {
            books.add(book);
      public void removeBook(int index) {
           books.remove(index);
}
```

Draw an object diagram for the object referred to by the variable myLibrary after the following snippet of code has been executed.

## (Question 1 continued)

```
Library myLibrary = new Library("Carlisle");
Book greatExpectations =
    new Book("Great Expectations", 577);
Book prideAndPrejudice =
    new Book("Pride and Prejudice", 322);
Book catInHat = new Book("The Cat in the Hat", 18);
Book websters = new Book("Webster's Dictionary", 759);
myLibrary.addBook(greatExpectations);
myLibrary.addBook(prideAndPrejudice);
myLibrary.addBook(catInHat);
myLibrary.addBook(websters);
myLibrary.removeBook(3);
myLibrary.removeBook(1);
```





**Question 6 (5 points).** Write a snippet of Java code that creates a local variable named greatGatsby, and stores in that variable a reference to a new Book object representing a 233-page book whose title is "The Great Gatsby".

**Question 7 (8 points).** Fill in the two missing Boolean expressions in the if statements of the following method of the Book class.

```
* Return true if book2 has the same title and
 * number of pages as the calling object,
 * otherwise return false.
public boolean equals(Book book2) {
      String title1 = this.getTitle();
      String title2 = book2.getTitle();
      int numPages1 = this.getNumPages();
      int numPages2 = book2.getNumPages();
      // first test whether the two titles are the same
            // next test if numbers of pages are the same
                 return true;
            } else {
               return false;
      } else {
          return false;
}
```

**Question 8 (10 points).** One definition of *composition* is "using objects as fields in other objects". Write 3-4 sentences explaining the advantages of using composition in software projects.

Question 9 (6 points). What output would be produced by the following snippet of code?

```
int value = 29;
while (value >= 14) {
         System.out.println(value);
        value = value - 5;
}
```

**Question 10 (6 points).** What output would be produced by the following snippet of code?

```
for (int i = 5; i < 25; i = 2 * i) {
    int j = i - 3;
    System.out.println(j);
}</pre>
```