

Static Books

Suppose we have the following `Book` and `Library` classes.

```
class Book {
    public String title;
    public Library library;
    public static Book last = null;

    public Book(String name) {
        title = name;
        last = this;
        library = null;
    }

    public static String lastBookTitle() {
        return last.title;
    }

    public String getTitle() {
        return title;
    }
}

class Library {
    public Book[] books;
    public int index;
    public static int totalBooks = 0;

    public Library(int size) {
        books = new Book[size];
        index = 0;
    }

    public void addBook(Book book) {
        books[index] = book;
        index++;
        totalBooks++;
        book.library = this;
    }
}
```

- (a) For each modification below, determine whether the code of the `Library` and `Book` classes will compile or error if we **only** made that modification, i.e. treat each modification independently.
1. Change the `totalBooks` variable to **non static**
 2. Change the `lastBookTitle` method to **non static**
 3. Change the `addBook` method to **static**
 4. Change the `last` variable to **non static**
 5. Change the `library` variable to **static**

- (b) Using the `Book` and `Library` classes from before, write the output of the `main` method below. If a line errors, put the precise reason it errors and continue execution.

```
1  public class Main {
2      public static void main(String[] args) {
3          System.out.println(Library.totalBooks);           -----
4          System.out.println(Book.lastBookTitle());         -----
5          System.out.println(Book.getTitle());              -----
6
7          Book goneGirl = new Book("Gone Girl");
8          Book fightClub = new Book("Fight Club");
9
10         System.out.println(goneGirl.title);                -----
11         System.out.println(Book.lastBookTitle());          -----
12         System.out.println(fightClub.lastBookTitle());     -----
13         System.out.println(goneGirl.last.title);           -----
14
15         Library libraryA = new Library(1);
16         Library libraryB = new Library(2);
17         libraryA.addBook(goneGirl);
18
19         System.out.println(libraryA.index);                 -----
20         System.out.println(libraryA.totalBooks);            -----
21
22         libraryA.totalBooks = 0;
23         libraryB.addBook(fightClub);
24         libraryB.addBook(goneGirl);
25
26         System.out.println(libraryB.index);                 -----
27         System.out.println(Library.totalBooks);            -----
28         System.out.println(goneGirl.library.books[0].title); -----
29     }
30 }
```