

Lab worksheet 3: Object Oriented Concepts

1. Imagine you are building a library system using Java to manage books and other library items. The system will involve the creation of classes for **BorrowableItems**, **Book**, **Person**, and **Student**. These classes will help you showcase OOP principles.

Create an abstract class called **BorrowableItems** with an abstract method **displayInfo()**.

Create a class named **Book** as a subclass of the **BorrowableItems** class with the following private attributes:

- **title** (String)
- **author** (String)
- **ISBN** (String)
- **available** (boolean)

Provide public getter and setter methods for these attributes.

Include a constructor to initialize the attributes.

Implement the **displayInfo()** method that displays information about the book.

Create a **Person** class with the following private attribute:

- **name** (String).

Create a constructor to set the **name**.

Create a **Student** class that inherits from the **Person** class.

Create a **Library** class with the following private attribute:

- **BorrowableItemsList** (Array or another suitable data structure to store **BorrowableItems** objects)

Implement methods to:

- Add library items to the collection.
- Check out library items (mark them as available or unavailable).
- List all available library items in the library.
- Display information about the library, including the number of available items.

Create instances of the **Book** class representing library books. Use the following book information:

- Title: "Seena Maragatham", Author: "Sujatha Thilaka", ISBN: "9789553023975"
- Title: "Nuramakadya Bauthika Nuladanayakshanamaala", Author: "Seynamasasekaka", ISBN: "9789553548721"
- Title: "Island of a Thousand Mirrors", Author: "Nayomi Munaweera", ISBN: "9781616953623"

Lab worksheet 3: Object Oriented Concepts

Create an instance of the **Library** class to manage the library system.

Add the created books to the library's collection using the **addLibraryItem** method of the **Library** class. For each book, call **addLibraryItem** to include them in the library's inventory.

Display information about the library, including the total number of items, by calling the **displayLibraryInfo** method.

List all available library items in the library using the **listAvailableItems** method of the **Library** class.

Demonstrate the process of checking out a library item by calling the **checkoutItem** method. For example, check out the book with the title "Island of a Thousand Mirrors" by setting its availability to false.

List available items in the library again using the **listAvailableItems** method. Observe that the book you checked out is now marked as unavailable.