# Library Management System

The Library Management System is a Java program that allows users to manage a library's collection of books, patrons, and loans. It provides functionality to add and remove books, add and remove patrons, check out and return books, and display information about the library's items and loans.

## Getting Started

These instructions will help you run the Library Management System on your local machine.

### Prerequisites

To run the program, you need to have Java Development Kit (JDK) and NetBeans 8.2 IDE installed on your machine.

### Running the Program

1. Clone or download the project to your local machine.
2. Open NetBeans 8.2 IDE and browse the file where you have clone the project.
3. Compile the Java source code by using IDE.
4. Run the program by clicking play button which is available in toolbars.
5. Follow the on-screen prompts to interact with the Library Management System.

## Usage

Upon running the program, you will be presented with a menu that allows you to perform various actions in the library management system. Here are the available options:

1. Add a book: Allows you to add a new book to the library's collection.
2. Remove a book: Allows you to remove a book from the library's collection.
3. Display all books: Displays information about all the books in the library.
4. Add a patron: Allows you to add a new patron to the library.
5. Remove a patron: Allows you to remove a patron from the library.
6. Display all patrons: Displays information about all the patrons in the library.
7. Check out a book: Allows you to check out a book from the library.
8. Return a book: Allows you to return a book to the library.
9. Display all checked out books: Displays information about all the books currently checked out.
10. Display all loans: Displays information about all the loans in the library.

0. Exit: Exits the program.

## Class Structure

The Library Management System code consists of the following classes:

* Library: Represents a library and contains lists of library items, patrons, and loans. Provides methods for managing library items and performing actions such as checking out and returning books.
* LibraryItem: An abstract class representing a library item. Contains a title attribute and defines methods for getting the title and displaying the item.
* Book: A subclass of `LibraryItem` representing a book. Contains additional attributes such as author, ISBN, total copies, and available copies. Implements methods specific to books, such as decreasing and increasing available copies.
* Patron: Represents a library patron. Contains attributes for the patron's name and ID.
* Loan: Represents a loan of a book by a patron. Contains references to a book and a patron.
* Main: The main class that contains the `main` method. It provides the user interface for interacting with the Library Management System.