Deliverable 1: Project Description
Project Title: Limited Library Management System (LLMS)
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Date: 20 April 2025

1 : Scenario

The Limited Library Management System (LLMS) simulates the basic operations of an academic library of small size. It contains two types of users: Librarians and Students. Librarians can add, issue, and return books, and students can search the catalog and borrow/return books. The system maximizes book circulation by using an object-oriented model and data management for persistence using file I/O, and demonstrates basic software engineering principles like inheritance, polymorphism, interfaces, and exception handling.

2 : Design Paradigm (Functionalities)

- User management: Abstract User class with subclasses Student and Librarian
- Book types: Base Book class with Textbook and ReferenceBook as specialized types
- Search functionality: Implemented via Searchable interface
- Issuing & returning books: Library class manages issued records and catalog
- Data persistence: File I/O using a utility class LibraryIO
- Collections: Use of List, Map, and Set for data storage
- Sorting: Book implements Comparable; IssuedBookComparator provides custom sorting
- Stream : Used in catalog search and list filtering
- JUnit testing: Each class will have unit tests
- Version control: Project will be tracked with Git

3 : Expected Output

- Students can search, borrow, and return books
- Librarians can add new books, issue/return books, and view issued book logs
- Books can be searched by title or author
- System updates catalog and issue logs using files

4: Class Hierarchies

Hierarchie 1 : User

- User (abstract)
    - Student
    - Librarian

Hierarchie 2 : Book

- Book
    - TextBook
    - ReferneceBook

5 : Interface

- Interface: Searchable
- Method: search(query: String): List<Book>
- Purpose: To abstract and modularize catalog search logic.

6 : Runtime Polymorphism

- The interact() method in User is overridden in Student and Librarian

7 : Text File I/O

Handled by LibraryIO:

- loadCatalog(String filePath): List<Book>
- saveCatalog(String filePath): void
- saveIssued(String filePath): void

8 : Comparable and Comparator

- Book implements Comparable<Book>: Natural order by title or serial number
- IssuedBookComparator implements Comparator<IssuedBook>: Sorts by issue date or student

9 : What Will Be Done for Deliverable 2 (50%)

By Deliverable 2, the following components will be implemented:

- User, Student, Librarian classes with full constructors and JavaDoc
- Book, Textbook, ReferenceBook with fields and sorting logic
- Library class with core methods: addBook, issueBook, returnBook, viewCatalog, search
- Searchable interface
- IssuedBook, IssuedBookComparator
- Initial unit tests using JUnit
- Basic file read/write structure with dummy data
- Full Git repository setup with .gitignore, README.md, and /doc/Deliverable1.pdf

10 : UML Diagram