**1-Introduction:**

Library Management System is designed to streamline the management of books, borrowing and returning operations while ensuring efficient data handling. This system integrates relational database (SQL) for structured data storage, NoSQL (MongoDB) for student feedback storage and a console based interface (CLI) through Python to allow users interact seamlessly with the system.

**2-System Requirements:  
  
2.1-Functional Requirements:**

* Manage books, students, borrowing records and librarians.
* Maintain book availability through triggers.
* Store book metadata in JSON format.
* Provide XML export for book borrowing records.
* Store student feedback using MongoDB.
* Implement a CLI for searching, borrowing and returning books.

**2.2-Technical Requirements:**

* Database: MySQL for relational data.
* NoSQL: MongoDB for non-relational student feedback data.
* Programming Language: Python for CLI
* Data Formats: XML for exports, JSON for metadata.

**3. Roadmap**

To ensure structured development, the project was completed in the following phases:

**Phase 1: Planning and Database Design**

* Analyze project requirements.
* Design the **Entity-Relationship Diagram (ERD)**.
* Define tables and relationships for books, students, borrowing, and librarians.

**Phase 2: SQL Database Implementation**

* Create the database schema with primary and foreign keys.
* Implement **triggers** to manage book availability.
* Develop a **stored procedure** to list overdue books.
* Test and optimize queries.

**Phase 3: JSON & XML Handling**

* Store book metadata (publisher, edition, summary) in **JSON**.
* Implement **XML export** for book borrowing records.
* Test JSON storage and XML export functionality.

**Phase 4: NoSQL Implementation**

* Set up **MongoDB** to store student feedback.
* Implement **CRUD operations** for book reviews.
* Ensure smooth integration with the relational database.

**Phase 5: Console-Based Interface Development**

* Develop a **CLI application** for searching, borrowing, and returning books.
* Connect CLI with **SQL (MySQL/SQL Server) and MongoDB**.
* Implement user input validation and error handling.

**Phase 6: Testing and Documentation**

* Conduct final testing and debugging.
* Prepare a **detailed report** documenting system implementation.
* Ensure database performance optimization.