

Software Design Study and High-Level Design for JAMK Library System

1. Introduction

1.1 Purpose

This document presents a study of available tools for software design and a high-level design for the JAMK Library System, based on the requirements specified in the Software Requirements Specification (SRS).

1.2 Scope

The document covers:

- A study of software design tools.
- Selection of appropriate tools for JAMK Library System.
- High-level architectural design, including UML diagrams.
- Technology stack recommendations.

2. Study of Software Design Tools

2.1 UML and Architectural Design Tools

- **Enterprise Architect:** Comprehensive UML modeling and architectural design tool.
- **Lucidchart:** Cloud-based diagramming tool for UML and system design.
- **Microsoft Visio:** Widely used tool for creating UML diagrams and process flows.
- **Draw.io:** Free, web-based diagramming tool for flowcharts and UML.
- **StarUML:** Lightweight UML modeling tool.

2.2 Database Design Tools

- **MySQL Workbench:** Visual database design tool for MySQL.
- **Microsoft SQL Server Management Studio:** Database management and design tool.
- **pgAdmin:** PostgreSQL administration and design tool.

2.3 Code Generation and Development Tools

- **Visual Studio Code:** Code editing and debugging tool.
- **JetBrains IntelliJ IDEA:** IDE for Java development.
- **Postman:** API development and testing tool.

3. High-Level Design of JAMK Library System

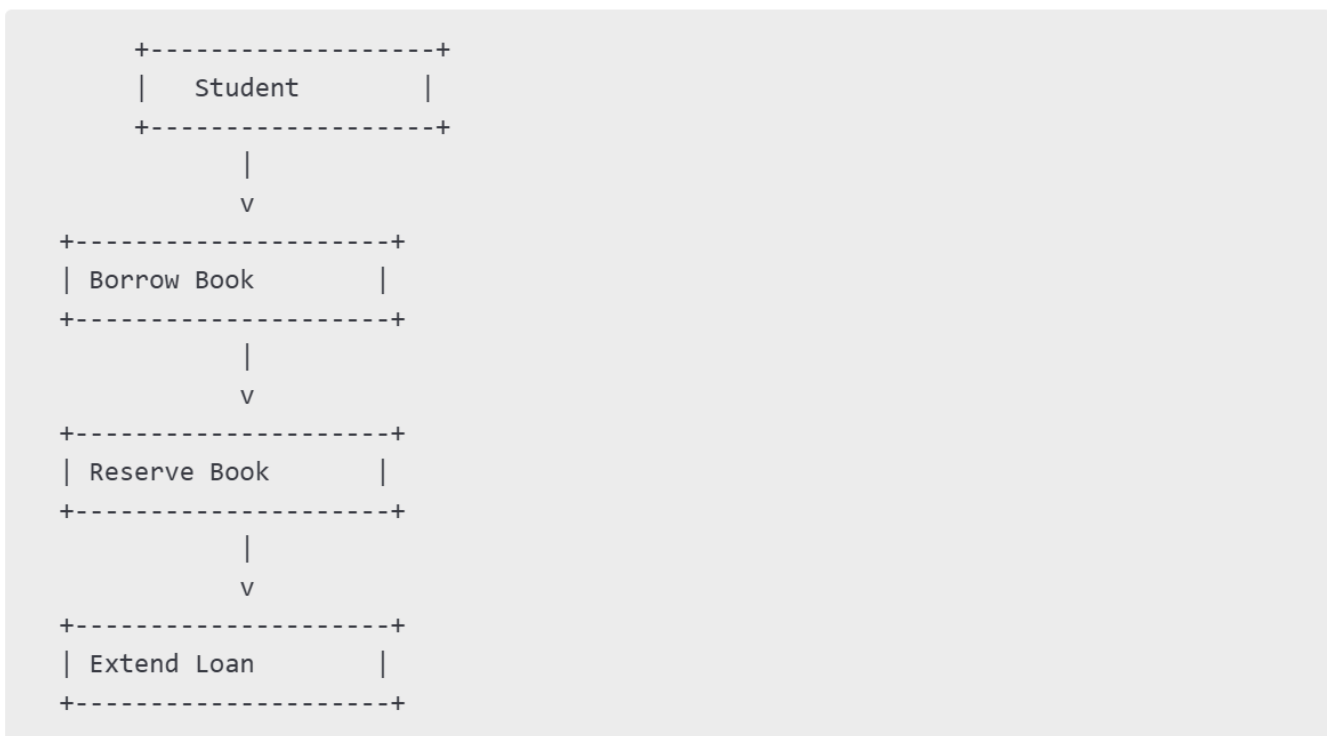
3.1 System Architecture

- **Frontend:** React.js (Web UI framework)
- **Backend:** Node.js with Express.js (RESTful API)
- **Database:** PostgreSQL (Relational database)
- **Authentication:** JAMK Authentication System (OAuth 2.0)
- **Hosting:** AWS or Azure

3.2 UML Diagrams

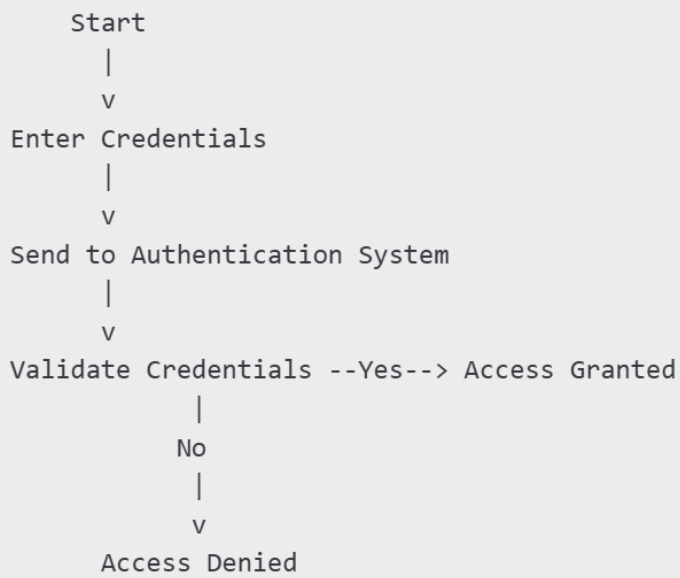
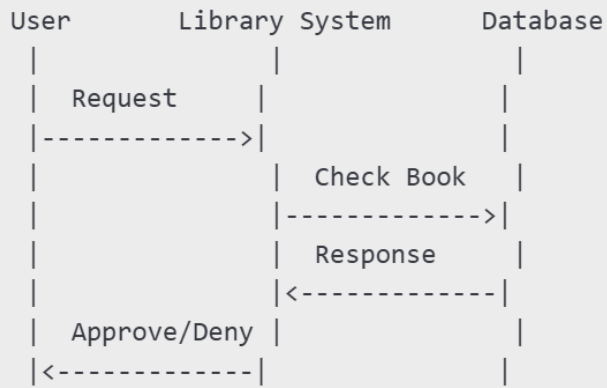
3.2.1 Use Case Diagram

- Actors: Students, Staff, Library Admins
- Use Cases: Borrow Book, Reserve Book, Extend Loan, Manage Inventory



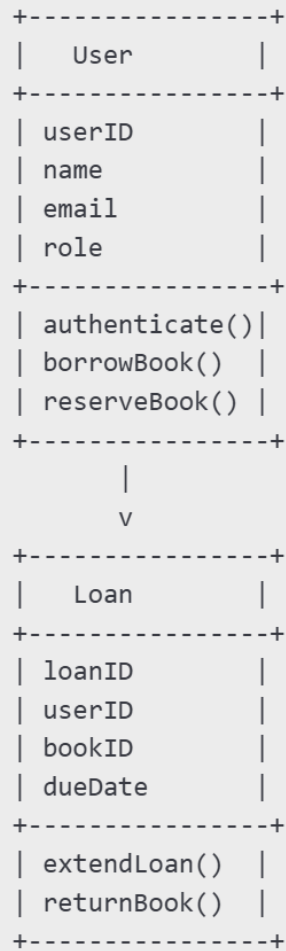
3.2.2 Sequence Diagram

- Sequence of interactions for book borrowing and returning.



3.2.3 Class Diagram

- Main entities: User, Book, Loan, Reservation, Admin



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3.3 Database Design

- **Tables:** Users, Books, Loans, Reservations
- **Relationships:** One-to-Many (User to Loans), Many-to-Many (Users to Books via Reservations)

4. Conclusion

The study identifies appropriate software design tools, defines a high-level system architecture, and presents UML diagrams for the JAMK Library System. The proposed solution ensures scalability, security, and usability.

5. References

- JAMK IT Security Policies
- GDPR Regulations

