

LIBRARY MANAGEMENT SYSTEM TECHNICAL DOCUMENTATION

This documentation is written to complete the final assignment of the Object Oriented Programming taught by Ir. Galih Wasis Wicaksono, S.kom. M.Cs.



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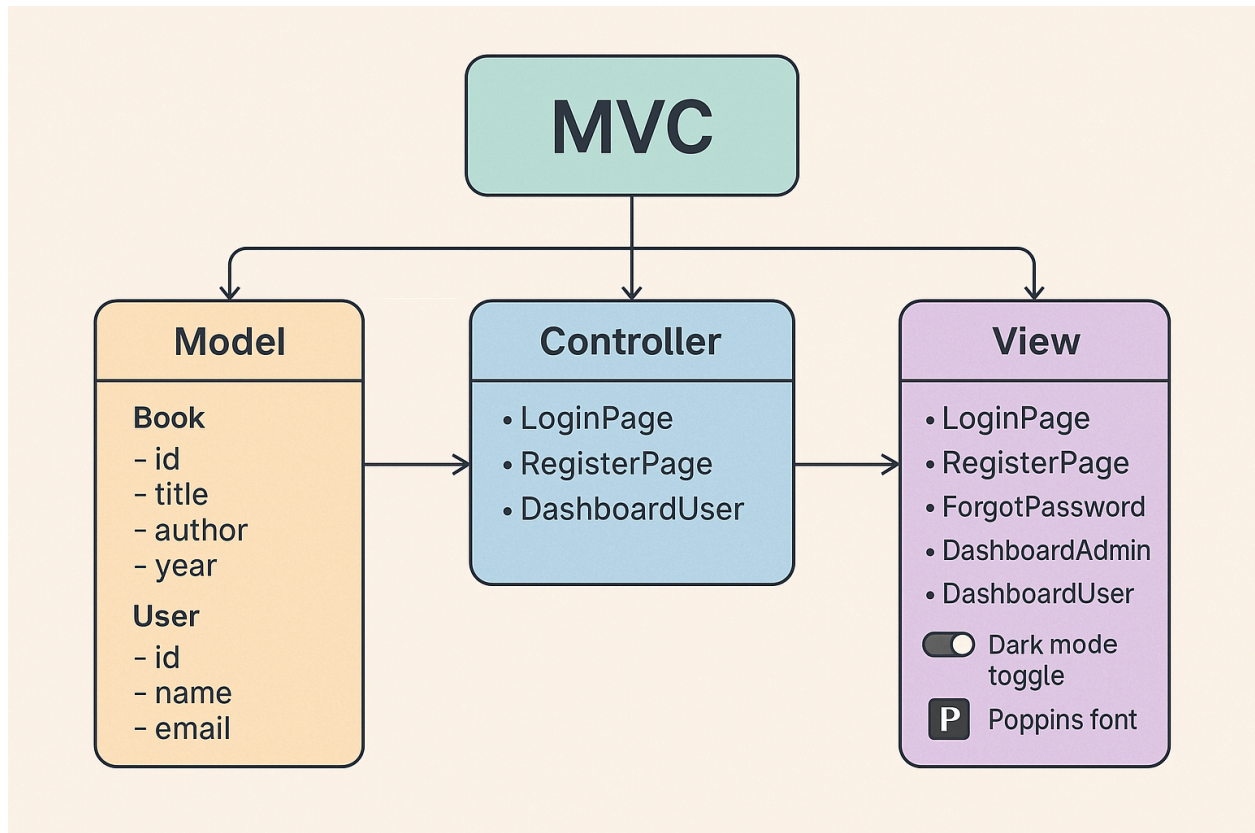
Roles & Responsibilities:

- Lead Developer: Razky Ganendya Capriawan (202410370110382)
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System Overview

The Library Management System is built using the Model-View-Controller (MVC) architectural pattern, providing a web-based platform for managing books, users, and library operations. The system supports both administrative and user functionalities with role-based access control.

Architecture



MVC Pattern Implementation

The system follows a strict separation of concerns through the MVC pattern:

- **Model:** Handles data persistence and business logic

- **View:** Manages user interface and presentation layer
- **Controller:** Processes user input and coordinates between Model and View

Data Models

Book Model

- id: Unique identifier for each book
- title: Book title
- author: Book author name
- year: Publication year

User Model

- id: Unique user identifier
- name: User's full name
- email: User's email address (used for authentication)

Controller Components

The system implements several controller modules to handle different aspects of the application:

Authentication Controllers

- **LoginPage**: Handles user authentication and session management
- **RegisterPage**: Manages new user registration process
- **DashboardUser**: Controls user-specific dashboard functionality

Page Controllers

Each controller manages the flow between models and their corresponding views, ensuring proper data validation and business rule enforcement.

View Components

The view layer provides different interfaces based on user roles and system functions:

Authentication Views

- **LoginPage**: User login interface
- **RegisterPage**: New user registration form
- **ForgotPassword**: Password recovery interface

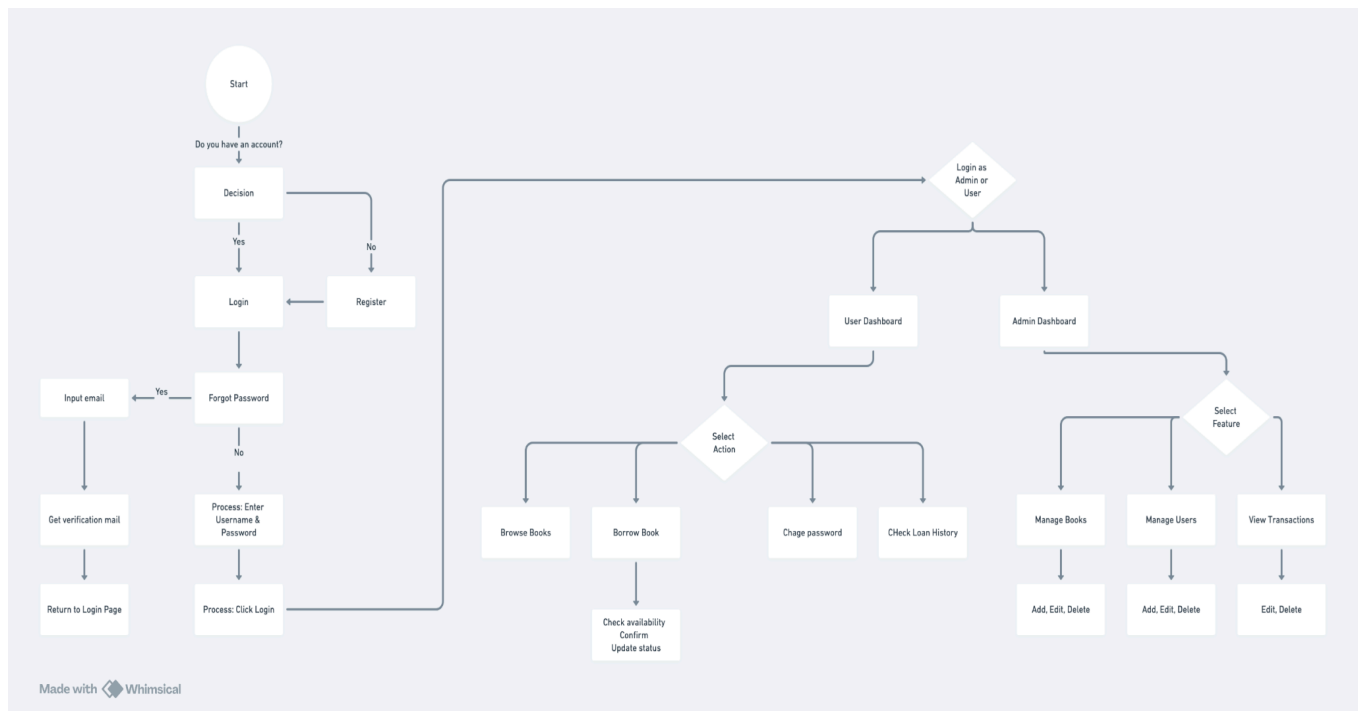
Dashboard Views

- **DashboardAdmin:** Administrative control panel
- **DashboardUser:** User-specific dashboard

UI Features

- **Dark Mode Toggle:** Theme switching functionality
- **Poppins Font:** Consistent typography across the application

User Flow and System Processes



1. Initial Access Flow

Start → Account Decision

- New users are prompted to decide if they have an existing account
- **Yes:** Directed to Login process
- **No:** Directed to Registration process

2. Authentication Process

Login Flow

Login → Input Email →

└─ Valid Email → Process Username & Password → Click Login → Dashboard Access

└─ Invalid Email → Forgot Password → Verification Email → Return to Login

Registration Flow

Register → Enter User Details → Account Creation → Login Process

3. Dashboard Access Control

After successful authentication, users are directed to role-appropriate dashboards:

Login Success → Role Detection →

└─ Admin Role → Admin Dashboard

└─ User Role → User Dashboard

4. Administrative Functions

Admin Dashboard Features:

- **Manage Books:** Add, Edit, Delete book records
- **Manage Users:** Add, Edit, Delete user accounts
- **View Transactions:** Monitor borrowing/return activities

5. User Functions

User Dashboard Features:

- **Browse Books:** Search and view available books
- **Borrow Book:** Request book borrowing with availability check
- **Change Password:** Update account credentials
- **Check Loan History:** View personal borrowing history

6. Book Management Workflow

Browse Books → Select Book → Check Availability →

└─ Available → Confirm Borrowing → Update Status

└─ Unavailable → Display Unavailable Message

System Features

Core Functionality

1. **User Management:** Registration, authentication, and profile management
2. **Book Catalog:** Comprehensive book database with search capabilities
3. **Borrowing System:** Book checkout and return tracking
4. **Administrative Tools:** System management and reporting
5. **Security:** Role-based access control and session management

Technical Features

1. **Responsive Design:** Optimized for various device sizes
2. **Theme Support:** Dark/light mode toggle
3. **Email Integration:** Password recovery and notifications
4. **Data Validation:** Input validation and error handling
5. **Session Management:** Secure user session handling

Security Implementation

Authentication Security

- Email-based user identification
- Secure password handling
- Session-based authentication
- Password recovery via email verification

Access Control

- Role-based permissions (Admin/User)
- Protected dashboard access
- Function-level authorization checks

Data Flow Architecture

1. **User Input:** Views capture user interactions
2. **Controller Processing:** Controllers validate input and apply business rules
3. **Model Operations:** Models handle data persistence and retrieval
4. **Response Generation:** Controllers prepare data for view presentation
5. **View Rendering:** Views display processed information to users

System States and Transitions

The system maintains several key states:

- **Unauthenticated:** Initial state, access to login/register only
- **Authenticated User:** Access to user dashboard and functions
- **Authenticated Admin:** Full system access including administrative functions
- **Password Recovery:** Temporary state during password reset process

Integration Points

Email System

- Password recovery notifications
- Account verification emails
- System notifications

Database Layer

- Book inventory management
- User account storage

- Transaction history logging
- System configuration data

Error Handling and Recovery

The system implements comprehensive error handling:

- **Authentication Errors:** Invalid credentials, account lockouts
- **Data Validation Errors:** Invalid input formats, missing required fields
- **System Errors:** Database connectivity, server errors
- **Recovery Mechanisms:** Password reset, account recovery options

This documentation provides a comprehensive overview of the Library Management System's architecture, functionality, and operational flow based on the MVC pattern and user workflow diagrams.