GaBasa: A Windows Desktop–Based Library Management System Using C# .NET WinForms for UMTC Visayan Campus Library

A PROJECT DOCUMENTATION FOR IT 13
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CHAPTER 1
INTRODUCTION

Project Description

GaBasa is a Windows desktop–based Library Management System developed using C# .NET WinForms, designed specifically for the UMTC Visayan Campus Library. This system aims to automate and streamline library operations, including cataloging, member management, circulation of books, fine calculation, and reporting.

Traditional library management relies heavily on manual processes, which are often time-consuming and prone to errors. GaBasa addresses these challenges by providing a centralized, efficient, and user-friendly platform that improves workflow, ensures accurate record-keeping, and enhances the overall library experience for librarians, staff, and members.

The system also incorporates role-based access control, allowing different types of users — Librarians, Library Staff, and Members — to access only the modules relevant to their responsibilities. By leveraging object-oriented programming principles, clean software architecture, and modern Windows desktop technology, GaBasa provides a practical and robust solution for managing library resources effectively.

Objectives

This section presents the goals of the *GaBasa: Library Management System* project. It outlines the general objective, which describes the overall aim of the system, and the specific objectives, which detail the measurable tasks and functionalities the system is intended to achieve.

General Objectives

To develop a functional Windows desktop Library Management System that automates library operations and supports role-based access and operations for librarians, staff, and members.

Specific Objectives

Specifically, this project aims to:

Librarian

a. Manage all user accounts, including registration, updating, and monitoring of Librarians, Staff, and Members.

b. Oversee all library resources, including adding, editing, and deleting books and other materials.

c. Approve or override borrowing limits and waive fines as needed.

d. Generate detailed reports on circulation, member activity, inventory, and library performance.

e. Configure system settings and maintain overall library workflow.

Library Staff

f. Register and update library members and monitor their borrowing activities.

g. Manage book copies, catalog updates, and basic resource tracking.

h. Process borrowing, returning, and renewal of books.

i. Monitor fines, reservations, and overdue items.

Library Member

j. Search and view the library catalog.

k. Borrow, return, and renew books (within allowed limits).

l. Reserve books and monitor reservation status.

m. View fines, borrowing history, and personal account details.

Scope and Limitations

This section presents the scope and limitations of the *GaBasa: Library Management System*. It outlines the specific features, modules, and functionalities that the system covers, as well as the boundaries of its use, including constraints related to platform, hardware, and system capabilities.

Scope

GaBasa: A Windows Desktop–Based Library Management System using C# .NET WinForms for UMTC Visayan Campus Library, is designed to streamline essential library operations, including cataloging, member management, book borrowing and returning, fine calculation, reservation tracking, and report generation.

The system will include a Member Management module that allows librarians and staff to register, update, and monitor members, including different member types and privileges. The Cataloging module will enable adding, editing, and searching books and other library resources, with support for multiple copies and copy status tracking. The Circulation module will automate borrowing, returning, and renewal processes, while the Fine and Reservation modules ensure accurate tracking of overdue, lost, or reserved items. Additionally, the system will provide reports and dashboards to summarize library activities and performance metrics.

Limitations

The system's limitations, however, specify what it will not cover. It is restricted to desktop use and does not support web or mobile deployment. Online payment processing is simulated and not connected to actual payment gateways. Barcode scanning support is limited to compatible hardware. The system manages only internal library data and does not integrate with external library systems. Advanced analytics beyond basic reporting, such as predictive borrowing trends or AI recommendations, are not included. These limitations ensure that the project remains focused on providing a practical, efficient, and fully functional desktop solution for the day-to-day operations of the UMTC Visayan Campus Library.

Core Features

This section presents the main features of the GaBasa: Library Management System. Each feature highlights the specific modules and functionalities included in the system.

a. **User Management Module**

Allows administrators to manage user accounts, assign roles, and control access levels for Librarians, Library Staff, and Members.

b. **Member Management**

Supports registration, updating, and monitoring of library members, including managing different member types, privileges, and statuses.

c. **Cataloging of Books and Resources**

Enables adding, editing, and searching of books and other library materials, including management of multiple copies and copy statuses.

d. **Circulation Module (Borrow, Return, Renewal)**

Automates the process of borrowing, returning, and renewing library resources while checking member eligibility and updating book availability.

e. **Fine and Penalty Management**

Calculates fines for overdue, lost, or damaged items, tracks penalties, and allows authorized users to process payments or apply waivers.

f. **Reservation System**

Allows members to reserve books that are currently unavailable and notifies staff for efficient management of reserved items.

g. **Inventory Management**

Provides tools for monitoring the status and location of library resources, verifying stock, and updating book information as needed.

h. **Advanced Search Functionality**

Supports searching by title, author, ISBN, category, or other criteria, with filters to quickly locate specific library resources.

i. **Reporting and Analytics Dashboard**

Generates detailed reports and visual summaries of circulation, member activity, inventory, and library performance metrics.

Technologies Used

GaBasa: Library Management System, is developed using:

The system was developed using C# as the programming language, leveraging the .NET Framework WinForms for building a Windows desktop application with a graphical user interface. SQL Server was used as the database management system to store and manage all library data securely and efficiently. The development environment is Microsoft Visual Studio, which provides tools for coding, debugging, and testing. GitHub was employed for version control, enabling proper tracking of changes and collaborative development.

CHAPTER 2
SYSTEMS DESIGN

UML Class Diagram

This section presents the UML Class Diagram used to implement the domain entities and behaviors of the GaBasa: Library Management System.

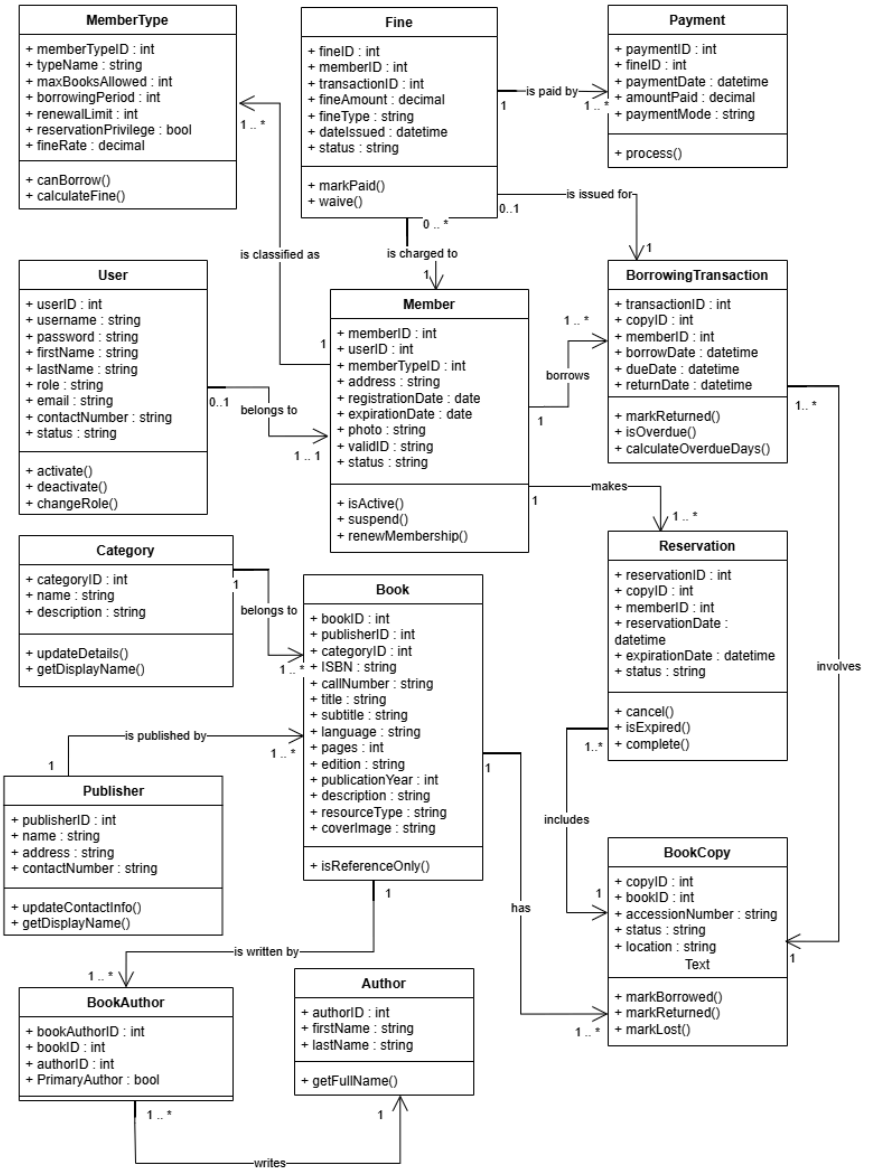

***Figure 2.1** UML Class Diagram*

Figure 2.11 shows the UML Class Diagram for GaBasa. It illustrates the system's main classes, their attributes, methods, and relationships, reflecting the core structure of the software components.

Use Case Diagram

This section summarizes the main user interactions by showing which actors use which system functions.

***Figure 2.2** UML Diagram (Use Case)*

Figure 2.2 shows the Use Case Diagram of GaBasa. The diagram highlights how different actors interact with the system to perform specific tasks.

Entity Relationship Diagram (ERD)

This section documents the normalized relational view of the data and the key referential links used in the implementation.

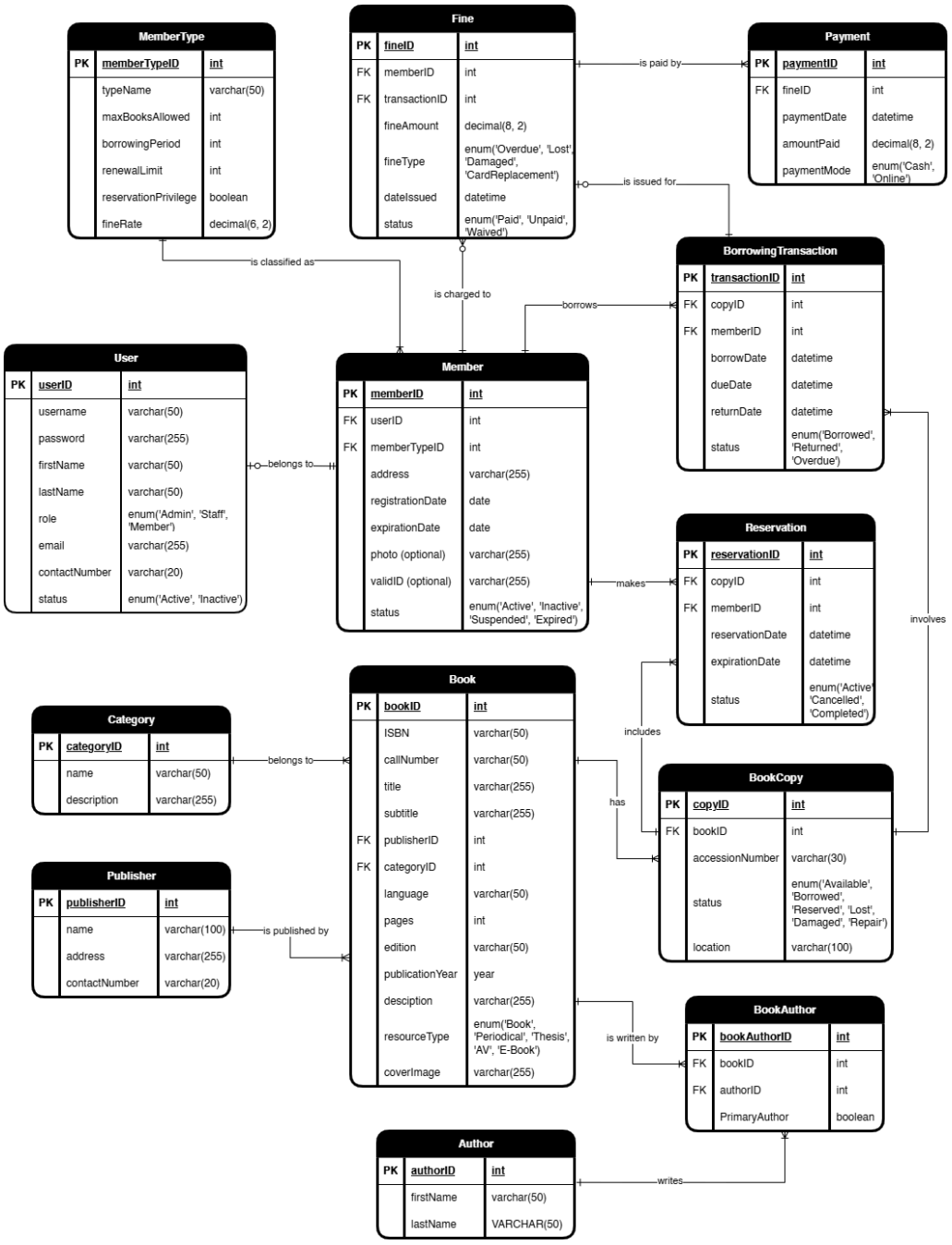

Figure 2.3 *Entity Relationship Diagram*

Figure 2.16 shows the ERD of GaBasa. It shows the normalized entities, keys, and relationships forming the system's database schema.