Science, Engineering & Education, 10, (1), 2025, 131-134

Development of an Information System for Library Management

Deniz Chaush, Habibe Eminova *

"Otets Paisii" Secondary School, 12 Otets Paisii St., Kardzhali, Bulgaria

Received 15 May 2025, Accepted 30 June 2025
DOI: 10.59957/see.v10.i1.2025.18

ABSTRACT

This article is about turning a traditional library into a digital system, based on a needs assessment of librarians. Traditional libraries have various problems. It is hard to get the books properly sorted and to know which of them are available or borrowed. Looking for information on paper cards takes a long time. It also makes it difficult to keep track of what is checked out. An information system was developed in order to get these problems sorted out. This system keeps all the data in one central place, which makes it easy to add, edit or manage entries about books and customers. Accordingly, librarians can find and update information instantaneously. This makes their work much easier and faster.

Keywords: Visual Studio, C#, Windows Form Application, MS SQL Server.

INTRODUCTION

A library is a repository of resources that provides users access to diverse materials, fostering learning and encouraging multifaceted perspectives. As an intellectual core of educational institutions plays a fundamental role in enriching knowledge and cultivating cultural and spiritual awareness among students [1].

However, libraries nowadays face major problems. These problems come from using outdated, analog ways of working. These methods are inefficient and slow. In traditional libraries members of staff do every job by hand. For instance, they register new users manually. They also write down when books are checked out and checked in. They calculate fines and collect payments using paper. All information is kept in paper records, which makes it hard to find information and also causes mistakes. Moreover, updating these records takes a lot of time and workload. It is difficult to keep track of which books are borrowed and by whom. Finding books that have been lost is also a big challenge.

These problems indicate that the way library's function must be changed. They need to start using digital technology and automation. One appropriate solution is a library management system. This is a special computer tool that can solve these problems. A library management system makes searching for books easy and fast [2].

The main goal of this system is to improve

**Correspondence to: Habibe Eminova, Otets Paisii Secondary School, 12 Otets Paisii St., Kardzhali, Bulgaria, e-mail: habi_83@abv.bg*

library routines, making the most important processes faster and more efficient. It also helps to manage the library in a contemporary way. The system facilitates the work of librarians in their important tasks. It records data automatically and reduces the number of errors. It also allows librarians to find information quickly and easily. For storing and managing all data, the system uses an MS SQL Server database. Fig. 1 shows the way users interact with the system.

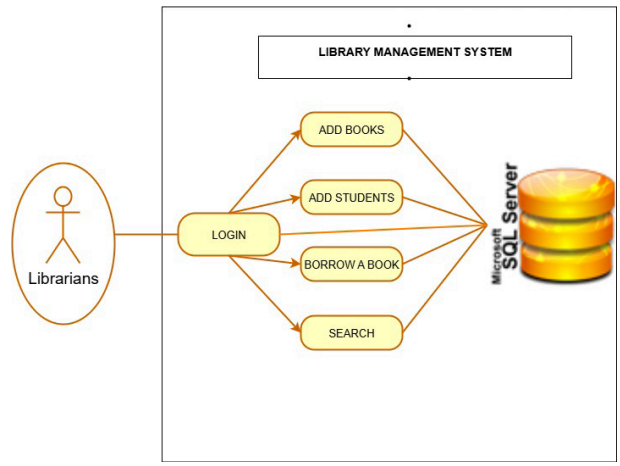

Fig. 1. User-system interaction.

EXPERIMENTAL

The system was implemented in Visual Studio using the C# programming language and a database in the MS SQL Server environment [3]. The C# language provides a powerful tool for database operations, as well as exceptional handling and user interface management [4]. The graphical user interface (GUI) of the system was developed using Windows Forms, facilitating user interaction [5]. The forms are designed for ease of use and include various controls such as text fields, buttons, menus, and tables for visualizing data entries. The database created in the MS SQL Server environment is relational and contains information about books, students, and borrowed books. Fig. 2 shows the ER diagram representing the library management system database, which consists of three tables: “Books”, “Students”, and “Borrow_Book”. The “Books” table includes an “image” column where book covers are stored. The “Borrow_Book” table contains a “Return_date” column. To automate the process of setting the return due date, a default constraint named [DF_ReturnDate] was added to this column. This constraint automatically populates the “Return_date” with a value equal to the current date plus 30 days whenever a new book loan record is created, using the following SQL command:

ALTER TABLE [Borrow_Book] ADD CONSTRAINT [DF_ReturnDate] DEFAULT (DATEADD(day, 30, GETDATE())) FOR [Return_date]

Fig. 2. ER model of database.

Currently, the database includes three main tables, which are sufficient for the core functionalities of library management. In the future, additional tables can be added to extend the system’s functionality, such as generating reports, searching for books by categories, and more.

Users access the system by entering a username and password. This login process is completed by clicking the “Login” button. If the credentials are correct, the system displays the main navigation form. This interface is shown in Fig. 3.

The main form of the system provides a clear

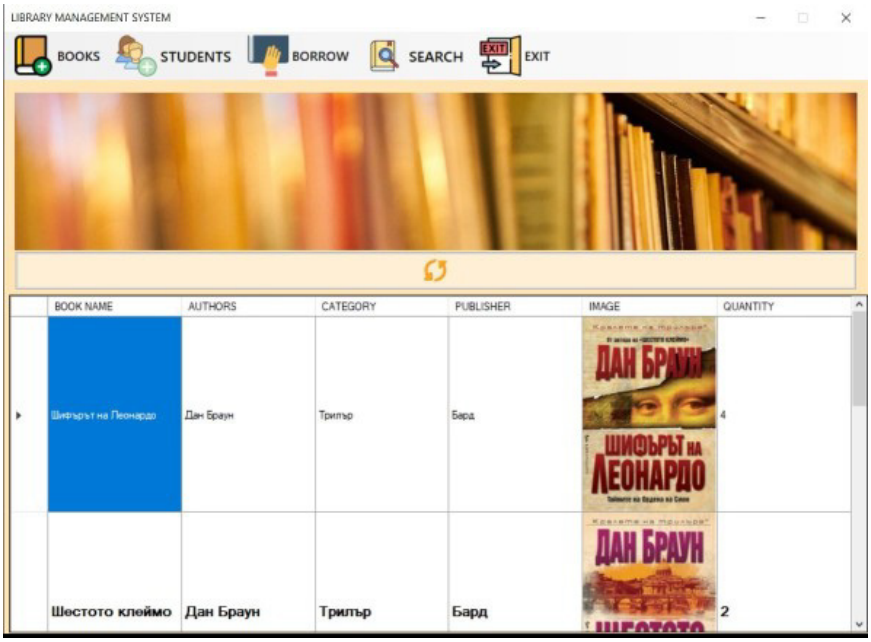

Fig. 3. Main navigation form.

Fig. 4. From add new book.

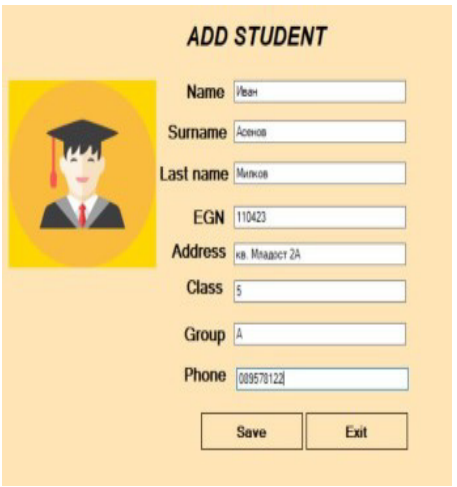

Fig. 5. Form adds new student.

and functional interface designed to streamline library tasks. It includes the following controls:

- A table with the list of the books available: This section shows all books that are not currently borrowed and are ready to be rented.
- A “Refresh” button: This button updates the list of books to show the current availability status.
- A menu with several options:
  - books: This option allows librarians to add new books to the system. The interface for this action is shown in Fig. 4.
  - students: This feature enables the registration of new library users. The form used for this purpose is displayed in Fig. 5.
  - borrow: This option is used to record the borrowing of a book by a student. The corresponding form is presented in Fig. 6.
  - search: This function allows users to search for books to view or edit their details.

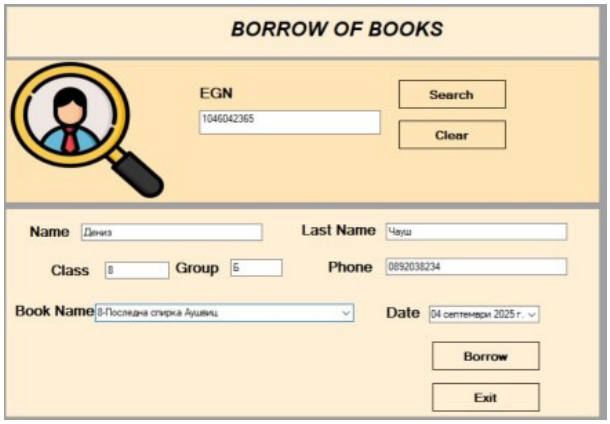

Fig. 6. Form for borrowing book.

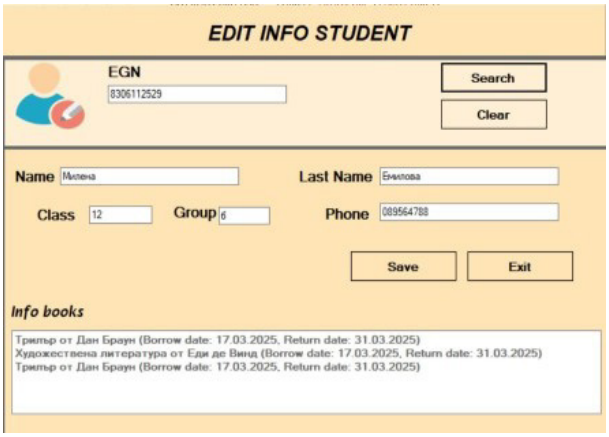

Fig. 7. Form edits student info.

It also supports searching for students to review their borrowing history or update their information in Fig. 7.

This layout ensures that all essential functions are easily accessible, while supporting efficient library management.

CONCLUSIONS

The new computer system automates most of the daily library tasks. This automation saves a significant amount of time for the staff. It also eliminates the chance of human error in managing the library's collection. This system was developed using strong, modern technologies. The C# programming language provides a reliable foundation for the software. The MS SQL Server database manages all the information safely and efficiently, and together these technologies guarantee that the system performs flawlessly. They also ensure that the data is secure and that the system is easy to maintain. The choice of Windows Forms for the interface makes the system straightforward to use. Furthermore, this technology allows for new features to be added easily in the future. This means the library can grow and adapt its system as new needs arise.

REFERENCES

1. A.P. Shanmugam, A. Ramalakshmi, G. Sasthri, S. Baalachandran, Library Management System, Journal of Xi'an University of Architecture and Technology, Volume XII, Issue XI, pp. 743-753, ISSN No: 1006-7930, 2020.
2. F.T. Olabode, O.A. Abosede, Influence of Library Management System In Managing Library Information Resources by Librarians in Ekiti State Tertiary Institutions, University Library, AfeBabalola University, Ado-Ekiti, Ekiti State, Nigeria.
3. Microsoft® SQL Server® Notes for Professionals book, GoalKicker.com. Available: https://books.goalkicker.com/MicrosoftSQLServerBook/
4. Introduction to C# Windows Forms Applications, GeeksforGeeks, 2023. Available: https://www.geeksforgeeks.org/introduction-to-c-sharp-windows-forms-applications/
5. S. Nakov et al., Programming for .NET Framework, 2004-2006, (in Bulgarian). Available: https://www.devbg.org/dotnetbook/Nakov-Programming-.NET-Framework-Book-Volume-2-ver-1.03.pdf