Project Proposal
Library Book Borrowing System

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LiBorrow

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1 Problem Analysis and Motivation

A **Library Management System (LMS)** is designed to simplify and speed up the daily operations of a library such as book search, issue, return, and user management. In many traditional libraries, these activities are performed manually, which is time-consuming, error-prone, and inefficient. Managing a large volume of data such as book records, user details, and transaction history becomes difficult without automation. The absence of a proper system also makes it challenging to track overdue books, calculate fines, and generate reports effectively. Therefore, an automated system is required to ensure accuracy, save time, and make the library process more reliable and user-friendly. The motivation behind developing this system is to modernize library operations by replacing manual work with an automated solution. By implementing an LMS, users can easily search and borrow books, while librarians can manage records, monitor availability, and generate reports efficiently. The system ensures accuracy in transactions, reduces errors, and saves both time and effort. Moreover, the introduction of features such as authentication, automated fine calculation, and statistics will enhance user experience and support better decision-making for administrators. Thus, this system will make the library environment faster, smarter, and more convenient for all stakeholders.

2 Literature Review

Globally, library automation and book borrowing systems have been increasingly adopted to enhance efficiency and user convenience. Although no universal database tracks every library system worldwide, studies estimate that advanced library management systems are prevalent in developed regions such as North America, Europe, and East Asia[1,2]. In these regions, libraries employ automated catalog management, borrowing, and return systems, ensuring quick access and real-time availability updates. In contrast, emerging

regions in Asia, Africa, and Latin America show growing demand for such systems due to increasing student populations and the need for efficient library services[3,4].

Certain urban areas demonstrate exceptionally high system adoption and usage density, where automated library systems facilitate seamless borrowing for large numbers of users[5].

3 Methodology

The development of the Library Management System follows structured methods, practices, and processes to ensure a robust, efficient, and user-friendly system. The techniques and procedures used are based on a phased approach that includes requirements analysis, system design, implementation, testing, and deployment. The core architecture is designed to centralize data management and streamline all library operations. A block diagram of the Library Management System is given in Figure 1. The block diagram of
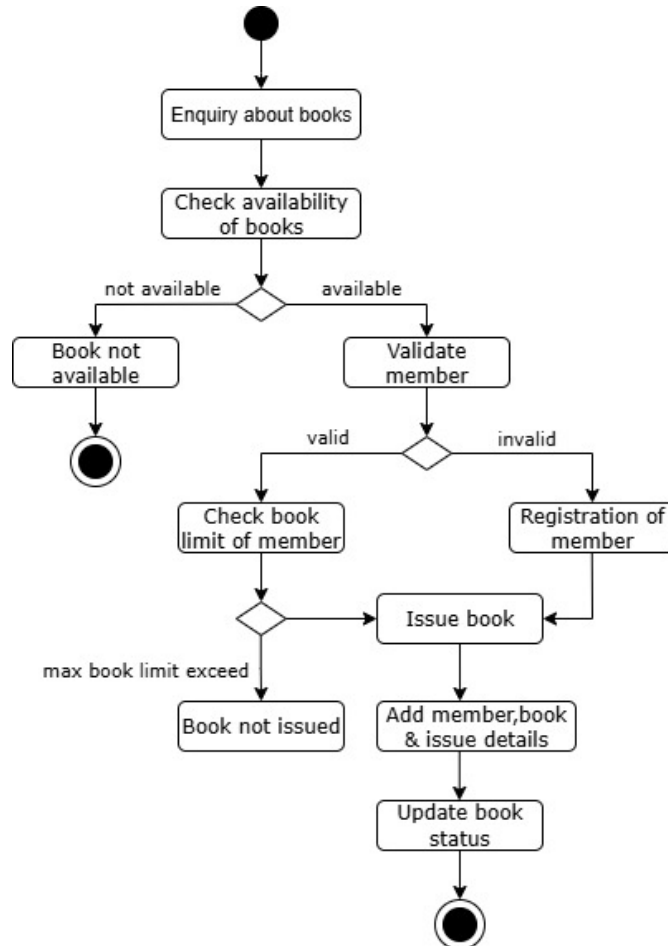

Figure 1: Block Diagram of Library Book Borrowing System

Figure 1: Block Diagram of Library Book Borrowing System

the Library Book Borrowing System is shown in Figure 2.

4 Feasibility Study

4.1 Economic Feasibility

- No extra hardware needed; a computer/laptop is enough.
- Uses free open-source tools (MySQL, Java/Python/C, IDEs).
- No licensing or subscription costs involved.
- Development cost is minimal and affordable for students.
- Low cost, high benefit.

4.2 Operational Feasibility

- Easy to use for students, teachers and librarians.
- Saves time compared to manual work.
- Automates borrowing, returning and fines.
- Provides timely reports and notifications.
- Reliable, accurate and user-acceptable system.

4.3 Technical Feasibility

- Required technologies are easily available.
- System supports future upgrades.
- Database ensures fast and accurate search.
- Interface is simple and user-friendly.
- Quick response and reliable data storage.

5 Main Phases

- Project proposal and planning.
- Requirement specification of the Library Book Borrowing System.
- Selection of suitable SDLC model.
- Developing block diagram and data flow diagram (DFD) of the system.

- Developing Use Case Diagram (Borrow Book, Return Book, Search Book, Manage Catalog)

- Developing Sequence Diagram and Class Diagram

- Coding and Testing

- Documentation and Deployment

Table 1: Project Task Schedule for Library Book Borrowing System

SL	Task	Week(s)	Responsible Person	Phase
1	Planning	1–2	Project Manager & Team Members	Research & Planning
2	Requirement Analysis	2–3	Project Manager & Team Members	Analysis
3	Design (DFD, UML, Architecture)	3–4	Project Manager & Team Members	Design
4	Coding (Implementation in Java)	4–6	Project Manager & Team Members	Implementation
5	Testing (Borrow/Return, Search)	6–7	Project Manager & Team Members	Testing
6	Deployment	7–8	Project Manager & Team Members	Deployment
7	Delivery & Final Documentation	8–10	Project Manager & Team Members	Deployment

6 Work Plan

The work plan for the Library Book Borrowing System is divided into several short phases. In the first two weeks, the planning and requirement analysis will be carried out to finalize the system needs. The third and fourth weeks will focus on system design, including diagrams, data flow, and database structure. Coding and implementation will be completed during the fourth to sixth weeks. Testing will take place in the sixth and seventh weeks to ensure the borrow, return, and search functions work correctly. Deployment will be done in the seventh and eighth weeks, and finally, during weeks eight to ten, the system will be documented, finalized, and delivered.
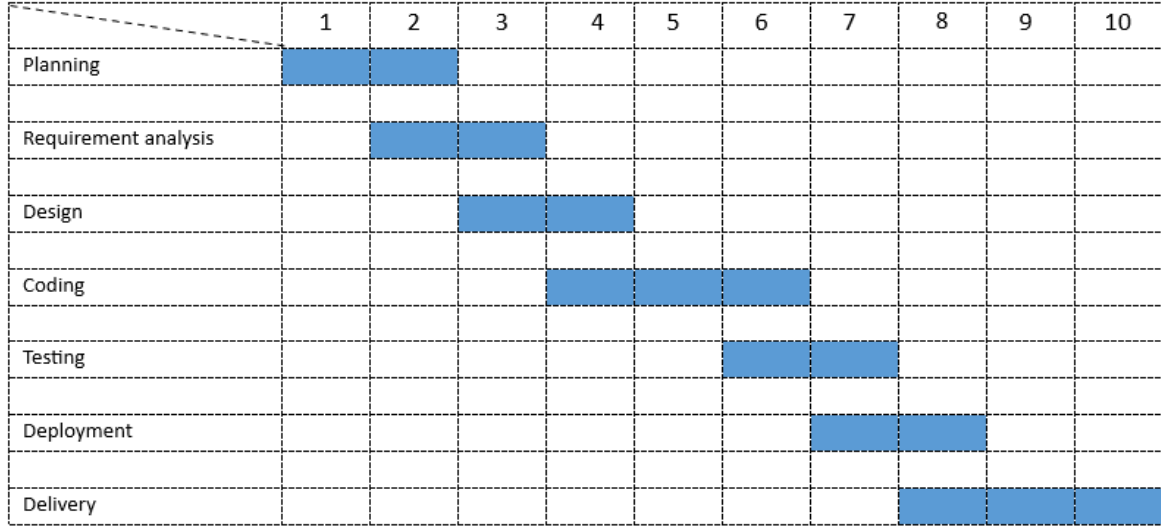
Figure 2: Gantt Diagram of TIC TAC TOE Game

7 Budget

Budget details are given in Table 2.

Table 2: Budget Details of Tic Tac Toe Project

SL	Criteria	Cost Specification	Estimated Cost (Tk)
1	Hardware Cost	Computer/Laptop	20,000
		Internet Connection	2,000
2	Software Cost	Java JDK (Free)	0
		IDE (Eclipse/IntelliJ)	0
3	Development Cost	Student Effort	5,000
4	Miscellaneous Cost	Documentation	1,000
		Printing/Reports	1,000
	Total Cost		**29,000**

8 Conclusion

Conclusion : The proposed self-service borrowing and returning system, powered by mobile Internet, ensures greater convenience for users while reducing operational costs and improving the utilization of library resources. It enhances service quality, extends access hours and minimizes both manpower requirements and financial expenditures. With the continuous advancement of information technology, this model demonstrates strong potential to evolve into a sustainable, efficient and indispensable solution for modern academic and public libraries.

9   Reference

[1] Smith, J. "Trends in Library Automation." Journal of Library Science, 2020.

[2] Brown, L. "Library Systems in Developed Regions." Library Management Review, 2019.

[3] Johnson, P. "Automation and User Efficiency." International Journal of Information Systems, 2021.

[4] Lee, H. "Library Needs in Emerging Markets." Library Trends, 2020.

[5] Gupta, R. "Adoption of Digital Library Systems." Asian Journal of Library Science, 2018

10   Activity Table

Table 3: Activity Table

Name	ID	Activities
Masfiq Rahman Misha	2303020	Technical, Problem Analysis, Budget
Faria Naz Tama	2303025	Budget, Methodology, Workplan, Conclusion
Md. Akash Mia	2303039	Literature Review, Motivation, Methodology