



**UNIVERSITI MALAYSIA TERENGGANU**  
**FACULTY OF OCEAN ENGINEERING TECHNOLOGY &**  
**INFORMATICS**

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**CSM3114**  
**FRAMEWORK-BASED MOBILE APPLICATION**  
**DEVELOPMENT**

**FINAL REPORT (ASSIGNMENT 1)**  
**LOAN AND PENALTY APPLICATION**

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**PREPARED BY:**

NURSYAFIAH BINTI ZAHARI (S63265)

**PREPARED FOR:**

DR MOHAMAD NOR HASSAN

*[Bachelor of Computer Science (Mobile Computing) with Hons. ]*  
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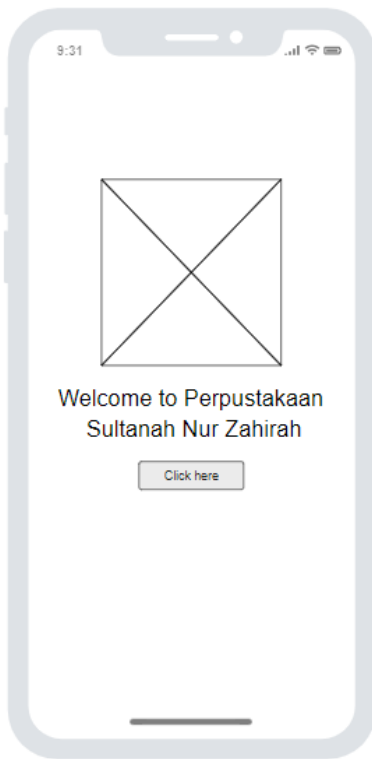
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## **1.0 Executive Summary of The Prototype**

The loan and penalty application prototype overview revolves around an innovative tool aimed at improving student library management. This innovative solution fulfills the critical need of tracking the status of books and efficiently identifying overdue books. By providing a seamless interface, this prototype provides students with an easy-to-use platform to monitor borrowed books and alert them to upcoming return deadlines and potential penalties. This feature helps users stay organized, encourages a proactive approach to book returns, and reduces the risk of penalties. This prototype is an important step towards a revolution in book management, meeting the demands of modern education for optimized processes and digital solutions. With an intuitive design and robust functionality, this prototype sets the stage for a comprehensive tool that will not only help students but also pave the way for efficient book management in all educational institutions.

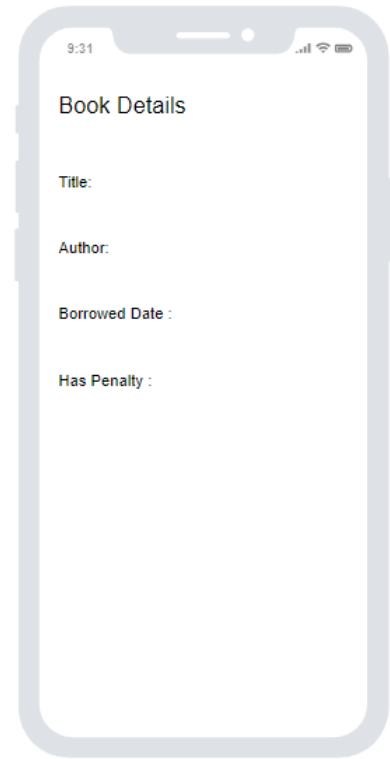
## 2.0 The Prototype Design



**Figure 1.1**



**Figure 1.2**



**Figure 1.3**

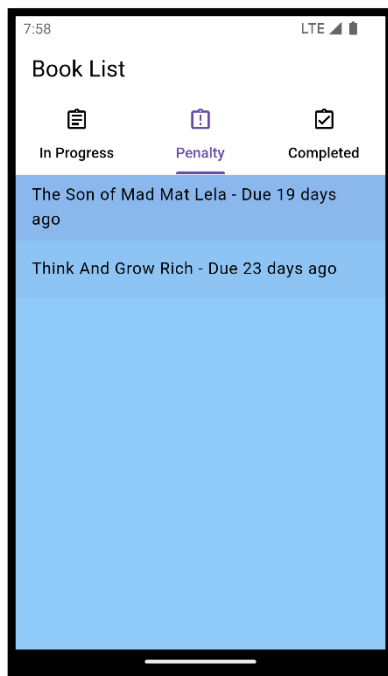
### 3.0 The UI for The Application with Explanation



**Figure 1**

#### Explanation for Figure 1:

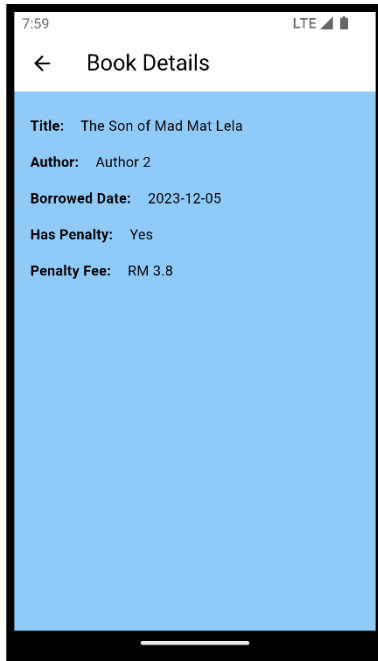
The first landing page in this prototype represents the application's home page. The user's primary action when first entering the interface is to click a clearly labeled button that says, "Click here." This button acts as a gateway that directs the user to a subsequent interface or section within the application. Its sole purpose is to ease the transition from the home page to the next interface. This conscious design choice aims to optimize the user experience through simple and intuitive operation, allowing seamless navigation to explore further features and content within the application.



**Figure 2**

#### Explanation for Figure 2:

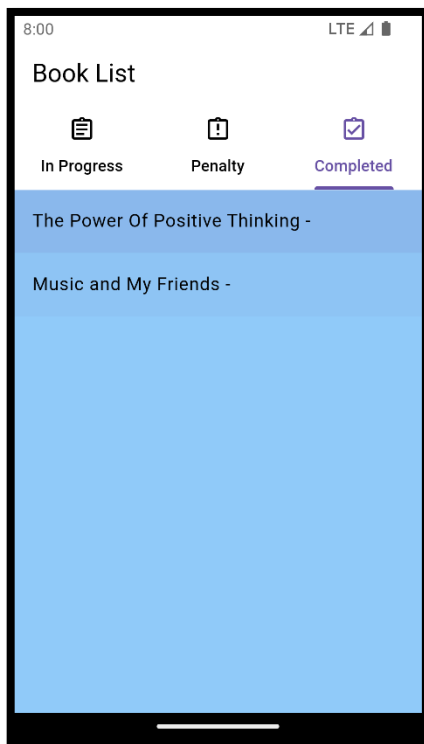
Based on Figure 2, this interface has three different functions: in progress, penalty, and completion. Each of these functions corresponds to a list of books that the student has borrowed. The "In Progress" area displays books currently borrowed by students that are not yet due. Conversely, the 'Penalties' and 'Completed' sections allow you to categorize books based on whether a penalty is applied for overdue return and whether the loan process was successfully completed by the student, respectively.



**Figure 3**

**Explanation for Figure 3:**

Based on Figure 3, this widget displays details about the borrowed book, including information such as the borrowing date. The book in question will be listed in the penalty section to indicate that the student has not yet returned it after the due date has passed. Therefore, the widget will also display the associated fees that the student will have to pay if the book is returned later.



**Figure 4**

**Explanation for Figure 4:**

Figure 4 shows a comprehensive compilation of books listed in the Completed section. This refers to books that have been returned by students, in other words, books for which the borrowing process has been completed. This section serves as a repository for entire books that have been successfully borrowed and subsequently returned, marking the completion of the borrowing cycle for these titles. The presence of these books in the Completed section ensures that students are complying with lending policies and returning books on time, resulting in a smooth completion of the lending transaction.

## **4.0 Potential commercial value and the pricing of the prototype**

### **4.1 Potential commercial**

This application has great potential commercial value due to its multiple benefits and usefulness in the educational field. First, it provides a streamlined and efficient system for managing library resources, streamlining the loan and return process for both students and librarians. This efficiency directly translates into time savings and increased productivity, creating a positive environment for educational institutions looking to improve operational efficiency. Additionally, the application's ability to track borrowing patterns and fines not only facilitates better book management, but also provides valuable insights into student behavior and preferences, allowing institutions to fine-tune the reading habits of their communities.

Furthermore, the application's capacity to handle penalties and overdue fines creates a revenue stream for institutions, thereby potentially bolstering their financial outlook. By automating fee calculations and ensuring transparent processes for students, it encourages timely book returns while generating income through penalty collections. Additionally, this platform has scalability potential; its adaptability to accommodate larger libraries or multiple educational institutions can broaden its market reach. Such scalability opens avenues for licensing or subscription-based models, enabling institutions of varying sizes to benefit from their comprehensive library management solutions.

Beyond the educational sector, the application's robust features may also cater to public libraries or corporate entities seeking efficient resource management systems. Its potential for customization, allowing tailoring to specific organizational needs, enhances its marketability and appeals to a broader customer base. Leveraging the application's data analytics capabilities could even lead to partnerships or collaborations with publishing houses, offering insights into book popularity trends, or influencing future publications.

Overall, this application encapsulates significant commercial value by streamlining library operations, offering revenue-generating possibilities through penalty management, scalability for diverse markets, and potential collaborations within the broader literary ecosystem, positioning it as an asset for educational institutions and beyond.

## 4.2 The Pricing of The Prototype

Determining the pricing structure for this prototype involves a strategic assessment of its inherent value proposition and the potential commercial landscape it aims to navigate. Given its multifaceted benefits within educational and library management spheres, a tiered pricing model seems prudent. The initial tier could cater to smaller educational institutions or libraries, offering a basic package encompassing essential functionalities like book tracking, borrowing management, and overdue notifications. This entry-level tier ensures affordability for institutions with limited budgets while still providing fundamental features crucial for efficient library operations.

The mid-tier pricing could be tailored for medium-sized educational institutions, encompassing more advanced features such as detailed analytics on borrowing patterns, penalty management, and customizable interfaces to align with the institution's branding. This tier would cater to institutions seeking enhanced functionalities and deeper insights into their library operations, thereby justifying a slightly higher pricing structure.

The top-tier, designed for larger educational institutions or library networks, could offer comprehensive solutions, including scalability options for multiple campuses, API integrations with existing systems, and specialized support services. This premium tier ensures that larger institutions with more extensive libraries benefit from a robust, all-inclusive package, justifying a higher price point based on the enhanced scope and scale of services provided.

The pricing strategy should also consider the application's potential for generating revenue, particularly through penalty management. Aligning pricing tiers with the potential monetary value institutions could derive from penalty collections might justify a higher pricing bracket, as the application directly contributes to revenue generation by streamlining penalty calculations and collections.

In essence, the pricing strategy should be comprehensive, reflecting the diverse needs of potential customers while aligning with the application's value proposition, revenue-generating capabilities, and scalability. A tiered approach ensures accessibility for institutions of varying sizes while justifying the pricing tiers based on the array of features and benefits each tier provides.



## 5.0 Lesson Learned

- i. ***Data Management is Key:*** Effective data structuring and management are crucial. Using classes like ``Book`` and employing methods for data filtering and categorization helped organize and handle book-related information systematically.
- ii. ***Widget Modularity and Reusability:*** Leveraging Flutter widgets enhanced UI consistency and maintainability. Widgets such as ``ListView.builder``, ``TabBar``, and ``ListTile`` offered dynamic and reusable components for displaying book details.
- iii. ***Date and Time Handling:*** Working with dates required meticulous attention. Managing borrowed dates, penalties, and return dates involved using `DateTime` functions effectively for accurate calculations.
- iv. ***Adaptability and Learning:*** Constantly adapting to new challenges and learning from them was crucial. Exploring new Flutter features and widgets expanded the toolkit and broadened the understanding of building versatile and efficient applications.

These lessons underscore the significance of robust data handling, modular UI design, adaptability, and continuous learning throughout the application development process.

## 6.0 Conclusion

Developing the loan and penalty application has been a rewarding journey, offering invaluable insights into various facets of software development. Through this project, it became evident that meticulous planning and clear data structuring are fundamental for robust application design. The focus on date management and error handling underscored the importance of precise calculations and null safety considerations. Crafting dynamic and reusable UI components reiterated the significance of modular design for user-centric experiences. This assignment served as a testament to the iterative nature of development, emphasizing the need for adaptability and continuous learning. Overall, this project provided a comprehensive understanding of the complexities and nuances involved in creating practical and efficient software solutions.

## 7.0 References

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### Application

1. Expense application
2. Shopping list application