Group Report on Library Management System for Horizon Campus

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IT12032 System Analysis and Design

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INTRODUCTION

The goal of Horizon Campus's Library Management System is to digitize and expedite library functions like cataloguing, managing student records, and loaning and returning books. Understanding how users—students, librarians, and administrators—interact with the data—such as book details, member information, and transaction records—that the system processes is essential to its development. Data Flow Diagrams (DFD) and Entity Relationship Diagrams (ERD) are two commonly used modelling approaches that we will employ to visualize and verify the efficiency and functioning of the system.

Data Flow Diagram (DFD): By illustrating the data flow between external entities, processes, data stores, and the system itself, the DFD assists in disassembling the system into more manageable parts. The DFD will map how students use the Horizon Campus LMS to check out or return books, how librarians handle the inventory, and how administrative data flows for record-keeping and reporting. Context Diagrams and Level 0 DFDs will be used to illustrate the general and intricate data flow of the system, respectively.

Entity Relationship Diagram (ERD): By representing the important entities (like books, students, and transactions) and their connections inside the system, the ERD focusses on the database design. This design will guarantee that the LMS's data storage is properly organized, providing the framework for effective record maintenance, changes, and enquiries.

The system's data architecture is well modelled and its operations are well specified thanks to the joint application of DFD and ERD. These schematics serve as a guide for the ultimate creation of a stable and expandable Horizon Campus library management system.

MEETING DETAILS

We met the librarian of Horizon campus, Mrs. Ganga Delpitiya, on 2nd of September 2024 at 13:03 p.m. We asked some questions for our final report of System Analysis and Design about the library system of our university, and those questions are,

1. What are the functions of the library?
2. How are these functions processed?
3. Are you having a programmatic system?
4. How is this system going?
5. Are you going to add new features for this system in the future?
6. What are the challenges you're facing these days?
7. What are the weaknesses you have identified in this system?
8. How are you going to overcome this?

REQUIREMENT GATHERING TECHNIQUES

Requirement gathering is one of the most vital steps in developing the Library Management System for Horizon Campus. This helps us to understand the user needs and assure the workings of the system as expected. Here we used Discussion and Interview to collect requirements.

Discussion

We arrange a meeting with the key stakeholders like the head librarian, IT staff, and the users.

We discuss overtly with them, what they would expect from the new system, problems they are facing with the current setup, and functionalities they want to see.

Let every person present his ideas. This may lead to generating new suggestions.

Good: It is used because, It enhances openness of communication.

It brings on board needs of many users at the same time.

It creates a platform where people collaborate, hence the ideas flow openly.

Interview

An interview is a more formal technique whereby we can ask specific questions from various stakeholders in order to garner detailed information.

We schedule one-on-one sessions with the key users: the librarian, staff, and/or students. We can ask direct questions: "What are your challenges with the present system?" or "What features will help you in making your work easy?" The answers will enlighten us about user requirements, pain points, and expectations in detail.

We use it because it allows for personalized feedback.

We can ask follow-up questions for deeper insights.

It will help us understand specific needs that might not come up in a group discussion.

Both techniques are effective for the collection of correct and comprehensive requirements. This shall facilitate the developers of the system to design the Library Management System to meet the needs at Horizon Campus.

FUNTIONAL REQUIREMENT

- **User Registration and Management:** The possibility to enroll and control different users' groups (workers, teachers, and students).
- **Managing the book catalogue:** creating, modifying and deleting books as well as searching for a particular book in the library.
- **Book Issue and Return Management:** This comprises of managing user issued books and returns, The user may charge fees from users in case of overdue returns.
- **Reservation System:** Enables customers to request books that are out on circulation at the moment.
- **Inventory Management:** Monitor the copies that are in stock and be able to account for any that becomes torn or is lost.
- **Reporting:** Ensure that records are offered on the usage of the library and the number of books borrowed, books which are late, etc.

NON FUNTIONAL REQUIREMENT

- **Usability:** Undergraduates, postgraduates, tutors and Librarians should find it easy to impute data and retrieve information from the system by virtue of hard buttons found on the interface.

- **Achievement:** The process of making multiple transactions should be possible in the system that is to be developed, especially at the times when the demand is expected to be high, for instance at the start and end of semesters.

- **Safety:** Make pertinent system features to be used only by the specified user type; students and librarians by incorporating password protected access known as user authentication. But ensure that data such as transaction history, students' records, and the likes are secured through encryption.

- **Scalability:** When the number of users and size of library's book stock is increasing, the system must be ready for both.

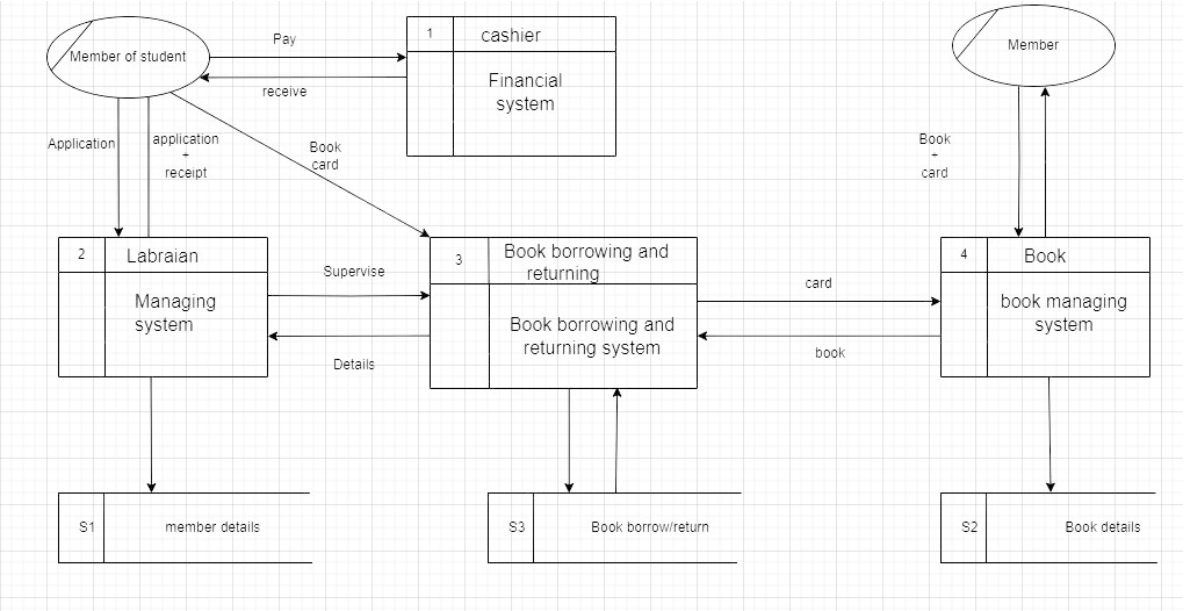
- **Accessible:** For students to go ahead and use the online resources, particularly the book reservation system, the system has to be live all over the time with minimal times of being offline.

- **Sustainability:** The case with relevant updates and regular maintenance should also be achievable without disrupting the functionality of the current run of the system.

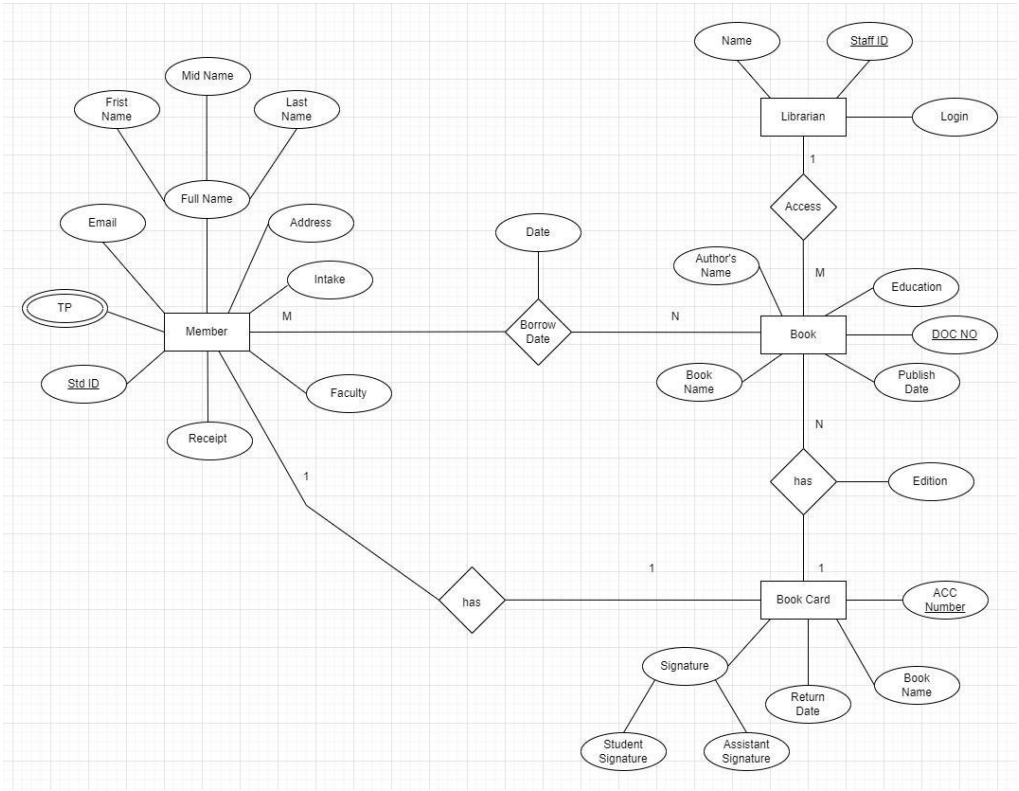
- **Restore and Backup:** Its necessary to back up the data on daily basis to prevent data loss when a system malfunction occurs.

VISUAL DIAGRAMS

Data Flow Diagram (DFD)



Entity Relationship Diagram (ERD



CONCLUSION

In conclusion, the utilization of Data Flow Diagrams (DFD) and Entity Relationship Diagrams (ERD) throughout the creation of the Horizon Campus Library Management System has yielded a systematic and lucid method for comprehending the system's data and functional features.

We were able to see how information moves between various players and procedures thanks to the DFD, which made sure that all crucial interactions—like checking out and returning books—were recorded and made as efficient as possible. We were able to address both high-level and detailed views of the system's operation by decomposing the system into a Context Diagram and a more thorough Level 0 DFD. This improved coordination and communication among stakeholders.

Conversely, the ERD aided in organizing the data storage within the system by defining important entities such as students, books, and transactions, as well as the connections between them. This guarantees the database design's efficiency and scalability, enabling seamless operations, simple information retrieval, and the potential for future growth.

When used in tandem, these resources have given rise to a strong platform for the creation of a reliable and intuitive library management system, which will raise the standard of library operations at Horizon Campus. We've made sure the system is well-designed, user-friendly, and able to satisfy the needs of administrators, librarians, and students by utilizing both DFD and ERD.