Library Circulation Desk DBMS:

SYSTEM DESIGN DOCUMENT

Version 1.0:

Introduction:

This system design document is formulated to summarize the prospective system design for Library Circulation Desk Database Management System. The Library Circulation Desk DBMS assists the librarian in book check outs, book check ins, fines calculation, etc. The library can improve its capabilities in books management, books tracking, and fines reporting after successful completion of design, test and deploying the Library Circulation Desk DBMS. The system design document and its technical specifications which are to be listed should adhere to the library's standards and expectations.

Purpose:

The purpose of System Design Document is to yield a description for how the Library Circulation Desk DBMS will be built. Moreover, the System Design Document is created to ensure that the Library Circulation Desk DBMS meets the requirements specified as part of the MIS 6326.001 project requirements documentation. Additionally, the System Design Document gives a high-level description of the system architecture, including ER diagram, design decisions and assumptions.

System Overview:

The library might have faced significant challenges without a single window database management system. The proposed Library Circulation Desk DBMS makes use of the database concepts, oracle apex, AWS technology, basic and advanced SQL knowledge gathered from the curriculum to effectively resolve the challenges to which the library was exposed. The Library Circulation Desk DBMS is compliant with all the project requirement specifications. The Library Circulation Desk DBMS runs on top of AWS database which makes use of cloud architecture to fetch data from the database, thereby resulting in faster data transfer rate and quicker response time. It also makes use of Oracle Application Express which can be accessed via an URL making it effortless to share and easier to access. The Library Circulation Desk provides clear user interfaces which allows data entry, data update, real-time data tracking and report generation. The main benefit of the Library Circulation Desk includes creation of book check outs and thereby maintaining the status of all the books in a selected library branch.

System Architecture:

Hardware:

The Library Circulation Desk DBMS requires most commonly used hardware architecture which is prevalent across most of the libraries. The hardware components include:

- A PC/Laptop/Workstation.
    - Processor with Intel Pentium 4 or higher
    - RAM – 2GB or higher
- Access to wireless/wired network connection.

Software:

The design of Library Circulation Desk is based on the design of various components in which librarians will either feed or query for a specific data. So, the modifications which are made via data entry to an integrated database tracking data real-time must be designed as part of the software architecture. The requirements were classified into various tiny modules so that it becomes uncomplicated to understand various functionalities which are to be incorporated as part of the system.

The components which encompasses the software architecture include:

- A windows OS /Mac OS/ Linux OS based operating system.
- Oracle SQL developer which is hosted on an AWS server database for creating tables, loading data into APEX etc.
- Chrome/Firefox/IE/EDGE browser for opening the application on APEX.

Design Assumptions:

- ISBN10 is assumed to be the unique number with which a book can uniquely identified.
- The Search string in the Book Search text box provides the substring matching for Book name as well as for the author name.
- No Substring matching is available for ISBN, since it is assumed that the librarians enter the ISBN number in full while searching for a book.
- For a book Check out, the Checkout Date is always assumed to be the current date. There is no option to provide past date/future date for the checkout date.
- Similarly, for a book Check In, the Check In date is always assumed to be the current date.

Design Decisions:

- To perform Check In operation in UI, Combination of Book ID and Borrower ID is used instead of Loan ID, thus enabling us to check in using the combination of book id and borrower id.
- Fine status updates and fine details can be viewed and performed in the same page.
- Avoided use of Interactive grid for Book Search which enabled to incorporate an extra column called 'Availability Status'.
- Loading of 500 book check outs was generated based on random dates which are selected within a range with a repeated combination of book ids and borrower card numbers.

Database Design:

The primary significance of database design is to make sure that the updating of backend database happens based on the updates provided in the frontend. The design of the database can be effectively explained with the help of an ER diagram.