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PUNE LAVASA CAMPUS

The Hub of Analytics

BUSINESS DATA MANAGEMENT

LIBRARY MANAGEMENT SYSTEM

CIA-4

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LIBRARY MANAGEMENT SYSTEM

INTRODUCTION:

The objective of this project is to create a robust database structure for a library management system. The database structure will ensure that library operations run smoothly by providing an organized and efficient way to store, manage, and retrieve information about books, members, borrowings, and other related entities. The aim is to optimize the library management system, resulting in a seamless experience for both librarians and library users.

Explanation of each entity in a library management system:

- Library: This entity represents a library and includes attributes such as Library_ID, Library_Name, Location, and Contact_Number.

- Books: This entity represents books in the library and includes attributes such as Book_ID, Book_Price, Book_Title, and Book_Status.

- Author: This entity represents the authors of the books in the library and includes attributes such as Author_ID, Author_Name, Author_Subject, and Contact_Number.

- Publisher: This entity represents the publishers of the books in the library and includes attributes such as Publisher_ID, Publisher_Name, Contact_Number, and Email.

- Vendor: This entity represents the vendors who supply books to the library and includes attributes such as Vendor_ID, Vendor_Name, Contact_Number, and Address.

- Member: This entity represents the library members and includes attributes such as Member_ID, Member_Name, Contact_Number, Email, Address, and Date_of_Joining.

- Admin: This entity represents the library administrators and includes attributes such as Admin_ID, Admin_Name, Contact_Number, Email, and Password.

- Employee: This entity represents the employees of the library and includes attributes such as Employee_ID, Employee_Name, and Contact_Number.

- Borrowing: This entity represents the borrowing of books by library members and includes attributes such as Borrow_ID, Member_ID, Book_ID, Borrow_Date, Due_Date, and Return_Date.

- Fine: This entity represents the fines imposed on library members for late returns or other reasons and includes attributes such as Fine_ID, Borrow_ID, Member_ID, Fine_Amount, and Payment_Date.

CONCLUSION:

In this project, we have created a robust database structure for a library management system. The database structure includes various entities such as Library, Books, Author, Publisher, Vendor, Member, Admin, Employee, Borrowing, and Fine, with their respective attributes.

To optimize the library management system, we have written several SQL queries that retrieve specific data from the database. These queries address various problem statements, such as retrieving books that are available, library IDs that contain a certain digit and letter, sorting members and employees by their ID, counting the number of borrowing records, calculating the total and average fine amounts, and retrieving the percentage of vendors and members grouped by their address.

We have used various SQL operations such as SELECT, FROM, WHERE, LIKE, ORDER BY, ASC, DESC, COUNT, GROUP BY, UNION ALL, and LIMIT to retrieve the desired data. Additionally, we have used various SQL joins such as INNER JOIN to retrieve data from multiple tables.

The SQL queries have been written in a top-bottom approach, where each query starts with the SELECT statement, followed by the FROM and WHERE statements (if applicable), and ends with ORDER BY, GROUP BY, UNION ALL, or LIMIT statements (if applicable). We have also visualized the query.

Overall, the database structure and the SQL queries presented in this project aim to optimize the library management system and provide a seamless experience for both librarians and library users.