

Design a Library Management System

Overview:

- A Library Management System is a software built to handle the primary housekeeping functions of a library.
- A Library will rely on this system to manage asset collections as well as relationships with their members.
- This system will keep track of the books and their checkouts, as well as members subscriptions and profiles.
- Library management systems also involve maintaining the database for entering new books and recording books that have been borrowed with their respective due dates.

Entities:

We have three main actors in our system:

- Librarian: Responsible for adding and modifying books, book items, and users. The Librarian can also issue, reserve, and return book items.
- Member: All members can search the catalog, as well as check-out, reserve, renew, and return a book.
- System: Mainly responsible for sending notifications for overdue books, canceled reservations, etc.

Other entities:

- Library: The central part of the organization for which this software has been designed. It has attributes like 'Name' to distinguish it from any other libraries and 'Address' to describe its location.
- Book: The basic building block of the system. Every book will have ISBN, Title, Subject, Publishers, etc.
- Catalog: Catalogs contain list of books sorted on certain criteria.
 - Our system will support searching through four catalogs: Title, Author, Subject, and Publish-date.

Requirements:

- ✓ Any library member should be able to search books by their title, author, subject category and publication date.
- ✓ There could be more than one copy of a book, and library members should be able to check-out and reserve any copy. We will call each copy of a book, a book item.
- ✓ The system should be able to retrieve information like who took a particular book or what are the books checked-out by a specific library member.
- ✓ There should be a maximum limit (5) on how many books a member can check-out.
- ✓ There should be a maximum limit (10) on how many days a member can keep a book.
- ✓ The system should be able to collect fines for books returned after the due date.
- ✓ The system should be able to export reports to a .txt file (most reserved books, most active users, etc.)
- ✓ The system should keep track of each transaction in a log file (Date-Time-User-Transaction).

Design a Restaurant Management System

Overview:

A Restaurant Management System is a software built to handle all restaurant activities in an easy and safe manner. This System will give the Restaurant management power and flexibility to manage the entire system from a single portal. The system allows the manager to keep track of available tables in the system as well as the reservation of tables and bill generation.

Entities:

We have three main actors in our system:

- Receptionist: Mainly responsible for adding and modifying tables and their layout, and creating and canceling table reservations.
- Waiter: To take/modify orders. Manager: Mainly responsible for adding new workers and modifying the menu. Chef: To view and work on an order.
- Cashier: To generate checks and process payments.

Other entities:

- Restaurant: This class represents a restaurant. Each restaurant has registered employees.
- Branch: Each branch will have its own set of employees and menus.
- Menu: All branches will have their own menu.
- MenuSection and MenuItem: A menu has zero or more menu sections. Each menu section consists of zero or more menu items.
- Table and TableSeat: The basic building block of the system. Every table will have a unique identifier, maximum sitting capacity, etc. Each table will have multiple seats.
- Order: This class encapsulates the order placed by a customer.
- Meal: Each order will consist of separate meals for each table seat.
- Meal Item: Each Meal will consist of one or more meal items corresponding to a menu item.
- Account: We'll have different types of accounts in the system, one will be a receptionist to search and reserve tables and the other, the waiter will place orders in the system.
- Bill: Contains different bill-items for every meal item.

Requirements:

- ✓ The restaurant will have different branches.
- ✓ Each restaurant branch will have a menu.
- ✓ The menu will have different menu sections, containing different menu items.
- ✓ The waiter should be able to create an order for a table and add meals for each seat.
- ✓ Each meal can have multiple meal items. Each meal item corresponds to a menu item.
- ✓ The system should be able to retrieve information about tables currently available to seat walk-in customers.
- ✓ The system should support the reservation of tables.
- ✓ The receptionist should be able to search for available tables by date/time and reserve a table.
- ✓ The system should allow customers to cancel their reservation.
- ✓ The system should be able to send notifications whenever the reservation time is approaching.
- ✓ The customers should be able to pay their bills through credit card, check or cash.
- ✓ Each restaurant branch can have multiple seating arrangements of tables.
- ✓ The system should keep track of each transaction in a log file (Date-Time-User-Transaction).