

# Complex Engineering Problem 1

## Restaurant Management System

In a bustling city, a quaint restaurant is in need of a reliable management system to streamline its operations. The restaurant management system, developed in C programming, is designed to handle various tasks seamlessly. The core entities include **menu items, orders, and inventory**.

- The menu items, each possessing a unique identifier, name, and price, are stored in a structured data format.
- Admin **can insert, delete, and update any item's** name or price.
- Customers are greeted with a user-friendly interface that allows them to peruse the menu, displaying an array of dishes along with their corresponding prices.
- Upon deciding their culinary desires, customers can effortlessly place orders.
- The system enables patrons to select menu items, specify quantities, and calculates the total cost of their orders. There may be option for discount for the students.
- As orders are placed, a unique identifier is assigned, and the details, including items, quantities, and total price, are stored for future reference using **file handling** in C programming.
- To ensure smooth financial transactions, the system provides functionality for processing payments.
- Once a payment is successfully completed, the inventory is updated accordingly.
- For the restaurant staff, the system offers a convenient way to view all placed orders.
- A comprehensive list displays order details, providing insights into items ordered, quantities, and total prices.
- This feature aids in efficient order fulfillment and helps maintain a clear record of customer transactions.

This scenario sets the stage for an efficient and organized restaurant, where customers can enjoy a delightful dining experience while the staff manages orders, inventory, and transactions with ease.

## Complex Engineering Problem 2

### Medical Store Management System

In response to the needs of a local pharmacy for modernization, you're tasked with crafting a sophisticated digital solution to streamline their operations. This solution will consist of two key components:

- An admin panel for internal management
- A customer interface for external interaction
- In the admin panel, authorized staff can **add, delete, and update** medicine information like name and price.
- They can also check inventory status and perform **searches**.
- For customers, they can browse medicines, search for specific ones, and add them to their cart.
- The system will calculate the total price, including taxes, and allow customers to finalize their purchase.
- To ensure smooth financial transactions, the system provides functionality for processing payments.
- Once a payment is successfully completed, the inventory is updated accordingly.
- All medicine information as well as customer information will be stored securely using file handling, ensuring data integrity and confidentiality.

In conclusion, by implementing this comprehensive medical store management system, the local pharmacy stands to enhance its efficiency, improve inventory management, and deliver an exceptional experience to its customers, all while ensuring the security and integrity of its data.

## Complex Engineering Problem 3

### Library Management System

In a bustling local library, the efficient management of books and user transactions is facilitated by a robust Library Management System. This system is divided into two integral parts:

- The Administrator Interface
- The User Portal.

The Administrator Interface empowers library staff to oversee the library's collection, ensuring its accuracy and accessibility:

- Admins can seamlessly **add** new books to the system, meticulously inputting details such as title, author, publication year, and quantity available.
- Furthermore, the system enables administrators to **update** existing book information as needed.
- Whether correcting errors, updating availability status, or enriching entries with additional details, this functionality ensures the catalog remains current and informative.
- Admins also hold the authority to **remove** outdated or irrelevant books from the system.
- By simply selecting the book to be deleted, confirming the action, and executing the command, the catalog is streamlined, maintaining its relevance and usefulness.
- The Administrator Interface also boasts a powerful search feature, facilitating quick and efficient retrieval of specific books based on various criteria such as title, author.

On the other hand, the User Portal offers patrons a seamless and intuitive platform to explore the library's offerings and conduct transactions:

- Upon logging into the User Portal, patrons are greeted with a comprehensive book catalog, **displaying** a plethora of titles along with essential details such as author, genre, and availability status.
- Patrons can easily **locate** books of interest and check their availability.
- If a desired book is available, users can proceed to borrow it with a simple click, initiating a transaction that seamlessly integrates with the library's circulation system.

- The User Portal also grants patrons access to their borrowing history, allowing them to review past transactions and keep track of due dates using file handling in C.

In summary, the Library Management System harmoniously integrates the Administrator Interface and User Portal to streamline library operations and enhance the user experience.

## **Complex Engineering Problem 4**

### **Bus Ticket Reservation System**

In a bustling city, a transportation company is seeking to streamline its ticket reservation process through the implementation of a modern Bus Ticket Reservation System. As the developer tasked with this project, your objective is to create a user-friendly system that caters to the needs of both administrators and travelers alike.

For the administrative side of things,

- the system will feature an intuitive panel where authorized personnel can manage seat availability, pricing, and other essential aspects of the ticketing process.
- This includes setting the available seat numbers for each bus route, assigning prices to seats based on factors such as distance and location, and managing seat information through **updates, deletions, and search functionalities.**

Meanwhile,

- Travelers will have access to a simple and efficient interface that allows them to browse available seats, make reservations, and calculate the cost of their bookings.
- Travelers can easily select their preferred seats and proceed with their bookings, with the system automatically calculating the total cost based on their selections.
- The system will utilize file handling techniques to store and manage information about seat availability, ticket prices, and booking transactions.
- This ensures easy access and secure storage of data, providing administrators with the necessary tools to manage seat availability and pricing effectively while maintaining data integrity and confidentiality.

Overall, the implementation of this Bus Ticket Reservation System aims to streamline the ticketing process, enhance customer satisfaction, and optimize operational efficiency for the transportation company, providing a seamless booking experience for travelers while facilitating effective management for administrators.

## Complex Engineering Problem 5

### Super Shop Management System

You've been asked to create a new computer system for the local super shop to make things easier for everyone. This system will have two parts:

- one for the people who work in the shop and
- another for the customers who come to buy things.

For the shop workers, they'll have a special place on the computer where they can do important tasks.

They can log in safely and do things like

- **adding** new products to the shop,
- checking how much of each product they have left,
- and even **changing or deleting** the items if they need to.

This helps them keep everything organized and running smoothly.

For the customers, using the computer will be simple and helpful.

- They can easily find what they're looking for by typing it in or browsing through categories.
- Once they find something they want to buy, they can see details like the price and if it's available.
- Then, they can add it to their virtual shopping cart and pay for it securely when they're ready.
- After their buying, the system will reduce the quantity of the selected item.

Behind the scenes,

- The computer system keeps everything safe and correct.
- It stores all the important information about the products and customers securely.
- There are special protections in place to make sure only the right people can access this information.

In conclusion, the implementation of this advanced Super Shop Management System promises to revolutionize the shop's operations, optimize efficiency, and elevate the customer experience to new heights, positioning the local super shop as a leader in the retail landscape.