

Project: Online Shopping System

using

Object-Oriented Programming in C++

Abstract

We are designing an Online Shopping System, a C++ based application to simulate a simple e-commerce platform. Built on Object-Oriented Programming (OOP) principles, the system emphasizes modularity, reusability, and scalability, ensuring a structured foundation for future enhancements. By leveraging OOP concepts such as encapsulation, inheritance, and polymorphism, the program maintains clean, efficient, and maintainable code.

The system provides a comprehensive user experience, enabling users to register, log in, and manage their shopping activities seamlessly. It features a product catalog organized into categories, complete with detailed product information such as price, discounts, and reviews. Users can search and filter products based on criteria like price range, category, and customer ratings, enhancing the overall shopping experience. Additionally, the system includes a shopping cart for adding, removing, and modifying items, as well as an order placement mechanism for confirming purchases and tracking order history.

This project serves as a practical application of Software Development Fundamentals-II, incorporating standard data structures, searching and sorting algorithms, and menu-driven programming in C++. It is designed to be interactive and user-friendly while maintaining a focus on code efficiency and readability.

Topics of OOPS used

The project makes use of several core Object-Oriented Programming concepts to structure and manage the online shopping system effectively. The key OOPS topics used are:

- 1. Classes and Objects:** The Product class models the properties of a product (name, price, discount, quantity, etc.) and operations on products.
- 2. Encapsulation:** Product data members (name, category, price, etc.) are bundled together inside the product class along with member functions (display(), getDiscountedPrice()) that operate on the data.
- 3. Abstraction:** Complex operations like displaying product details and calculating discounted prices are hidden inside the class methods, exposing only simple function calls to the user.
- 4. Constructor:** The Product class uses a parameterized constructor to initialize the product attributes directly when creating a new Product object.
- 5. Vectors (Dynamic Arrays of Objects):** catalogue, cart, and orders are vectors that dynamically store and manage multiple Products objects.
- 6. Functions (Modularity):** Each feature like search(), browseOffers(), purchaseProduct() is organized into separate functions, improving code clarity and maintainability.
- 7. File Handling:** The catalogue is loaded from a file (catalogue.txt) using ifstream, demonstrating real-world application scenarios.

Project Design

The project is designed to simulate an online shopping system where users can browse, search, add products to cart, and place orders. The design follows object-oriented programming (OOP) principles to create a modular, scalable, and easy-to-understand system. The overall flow is menu-driven, providing users with a seamless shopping experience.

Major Components

1. Product Class

- **Purpose:**

Models a single product with attributes like name, category, price, discount, quantity, and reviews.

- **Key Functions:**

- Display product details to the user.
- Calculate and return the price after applying the discount.

2. Vectors for Data Storage

- **catalogue:** Stores all available products loaded from the file.

- **cart:** Stores products the user has added to their cart.

- **orders:** Stores the products purchased by the user.

Vectors allow dynamic addition, removal, and traversal of products without worrying about array size limitations.

3. File Handling

- **File Name:** Catalogue.txt ● **Purpose:**

Loads initial product information into the system at startup.

- **Method:**

- Reads each product line-by-line.
- Parses each product's attributes and adds it to the catalogue vector.

4. Main Modules

Each major user action is implemented as a separate module:

- **Main Menu:** Allows the user to navigate to Cart, Orders, Search, Offers, Categories, or Exit.

- **Cart Menu:** View cart contents, remove products, or purchase directly from the cart.
- **Search:** Search for products by name and apply optional filters like category, price, discount, or reviews.
- **Offers:** Browse products currently on discount.
- **Categories:** Browse products by selecting a predefined category like Electronics, Clothes, Toys, Books, or Furniture.
- **Orders:** View all purchased products.

5. Supporting Functions

- Load the products from a file into the system.
- Display a list of products.
- Find a product by name and return its index.
- Remove a product from a vector.
- Process the purchase of a product and add it to the order history.
- Sort products based on user-selected criteria like price, discount, or reviews.
- Convert a string to uppercase for case-insensitive search.

6. User Flow

- When the program starts, it displays a welcome message and the main menu.
- Users can navigate through different options: Cart, Orders, Search, Offers, Categories.
- Products can be added to the cart or purchased immediately.
- After purchasing, the product is removed from the cart and added to the orders list.
- Users can repeatedly perform actions until they choose to exit.

Design Highlights

- **Encapsulation:**

All product-related data and operations are grouped inside the Product class.

- **Modularity:**

Each major feature like cart management, search, and browsing is broken into separate, reusable functions.

- **Dynamic Data Management:**

Vectors are used instead of arrays to allow dynamic, flexible management of products, cart, and orders.

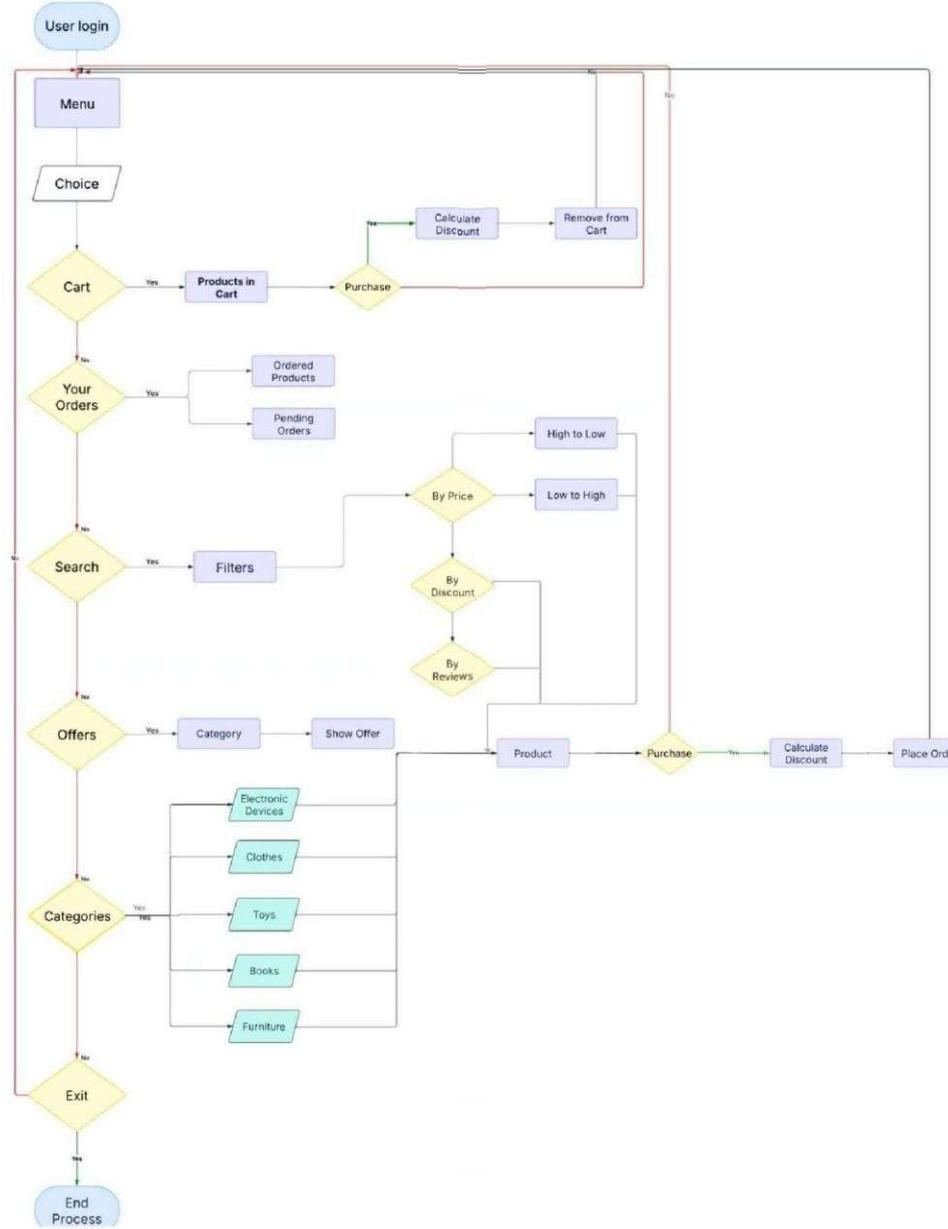
- **User Experience:**

The system uses a clear, readable, and interactive console menu with confirmation prompts and purchase summaries.

- **Extendability:**

New categories, features like wishlist or user login can be easily added without breaking the current system.

Flowchart



Sample Outputs

MENU:

```
Enter your name or login ID: Arnav
Welcome, Arnav!
```

```
--- Main Menu ---
```

- 1. Cart
- 2. Your Orders
- 3. Search
- 4. Offers
- 5. Categories
- 6. User Settings
- 7. Exit

```
Choice: |
```

User Settings:

```
--- User Settings ---
```

```
Current Contact: 88551144
```

```
Current Address: JIIT Sector-62 Noida, U.P.
```

```
Enter new contact: 9810009310
```

```
Enter new address: JUIT Solan, Himachal Pradesh
```

```
Details updated.
```

SEARCH

Keyword:

```
Choice: 3
Choose a filter:
1. Keyword
2. Category
3. Price (Low to High)
4. Price (High to Low)
5. Discount
6. Reviews
Choice: 1
Enter product name keyword: samsung

ID: 2
Name: Samsung Galaxy S22
Category: Electronic Devices
Price: 699.99
Discount: 15%
Quantity: 3
Reviews: 4.5 stars

1. Add to Cart
2. Purchase Now
3. Cancel
Choice: |
```

Category:

```
Enter category: Toys

ID: 4
Name: LEGO Set
Category: Toys
Price: 59.99
Discount: 20%
Quantity: 10
Reviews: 4.8 stars
Do you want to purchase a product? (y/n):
```

Price:

ID: 5
Name: Harry Potter Book
Category: Books
Price: 29.99
Discount: 0%
Quantity: 50
Reviews: 4.9 stars

ID: 4
Name: LEGO Set
Category: Toys
Price: 59.99
Discount: 20%
Quantity: 10
Reviews: 4.8 stars

ID: 6
Name: Office Chair
Category: Furniture
Price: 149.99
Discount: 25%
Quantity: 7
Reviews: 4.4 stars

ID: 2
Name: Samsung Galaxy S22
Category: Electronic Devices
Price: 699.99
Discount: 15%
Quantity: 3
Reviews: 4.5 stars

ID: 1
Name: iPhone 14
Category: Electronic Devices
Price: 799.99
Discount: 10%
Quantity: 5
Reviews: 4.7 stars
Do you want to purchase a product? (y/n):

Discount:

```
ID: 4
Name: LEGO Set
Category: Toys
Price: 59.99
Discount: 20%
Quantity: 10
Reviews: 4.8 stars

ID: 2
Name: Samsung Galaxy S22
Category: Electronic Devices
Price: 699.99
Discount: 15%
Quantity: 3
Reviews: 4.5 stars

ID: 1
Name: iPhone 14
Category: Electronic Devices
Price: 799.99
Discount: 10%
Quantity: 5
Reviews: 4.7 stars

ID: 3
Name: T-shirt
Category: Clothes
Price: 19.99
Discount: 5%
Quantity: 20
Reviews: 4.2 stars

ID: 5
Name: Harry Potter Book
Category: Books
Price: 29.99
Discount: 0%
Quantity: 50
Reviews: 4.9 stars
Do you want to purchase a product? (y/n):
```

Reviews:

```
ID: 4
Name: LEGO Set
Category: Toys
Price: 59.99
Discount: 20%
Quantity: 10
Reviews: 4.8 stars
```

```
ID: 1
Name: iPhone 14
Category: Electronic Devices
Price: 799.99
Discount: 10%
Quantity: 5
Reviews: 4.7 stars
```

```
ID: 2
Name: Samsung Galaxy S22
Category: Electronic Devices
Price: 699.99
Discount: 15%
Quantity: 3
Reviews: 4.5 stars
```

```
ID: 6
Name: Office Chair
Category: Furniture
Price: 149.99
Discount: 25%
Quantity: 7
Reviews: 4.4 stars
```

```
ID: 3
Name: T-shirt
Category: Clothes
Price: 19.99
Discount: 5%
Quantity: 20
Reviews: 4.2 stars
Do you want to purchase a product? (y/n):
```

Offers

```
---Best Offers ---  
ID: 6  
Name: Office Chair  
Category: Furniture  
Price: 149.99  
Discount: 25%  
Quantity: 7  
Reviews: 4.4 stars  
  
ID: 4  
Name: LEGO Set  
Category: Toys  
Price: 59.99  
Discount: 20%  
Quantity: 10  
Reviews: 4.8 stars  
  
ID: 2  
Name: Samsung Galaxy S22  
Category: Electronic Devices  
Price: 699.99  
Discount: 15%  
Quantity: 3  
Reviews: 4.5 stars  
Do you want to purchase a product? (y/n): |
```

Categories

```
--- Categories ---  
1. Electronic Devices  
2. Clothes  
3. Toys  
4. Books  
5. Furniture  
Choose: 3  
  
ID: 4  
Name: LEGO Set  
Category: Toys  
Price: 59.99  
Discount: 20%  
Quantity: 10  
Reviews: 4.8 stars  
Do you want to purchase a product? (y/n): |
```

Cart

Add to Cart:

```
ID: 4
Name: LEGO Set
Category: Toys
Price: 59.99
Discount: 20%
Quantity: 10
Reviews: 4.8 stars
Do you want to purchase a product? (y/n): y
Enter product ID: 4

1. Add to Cart
2. Purchase Now
3. Cancel
Choice: 1
Product added to cart.
```

Cart Menu:

```
--- Cart Menu ---
Products in Cart:

ID: 4
Name: LEGO Set
Category: Toys
Price: 59.99
Discount: 20%
Quantity: 10
Reviews: 4.8 stars

ID: 2
Name: Samsung Galaxy S22
Category: Electronic Devices
Price: 699.99
Discount: 15%
Quantity: 3
Reviews: 4.5 stars

1. Purchase
2. Remove from Cart
3. Exit Cart
Choice:
```

Remove from Cart:

```
1. Purchase
2. Remove from Cart
3. Exit Cart
Choice: 2
Enter product ID to remove: 4
Product removed from cart.

--- Cart Menu ---
Products in Cart:

ID: 2
Name: Samsung Galaxy S22
Category: Electronic Devices
Price: 699.99
Discount: 15%
Quantity: 3
Reviews: 4.5 stars

1. Purchase
2. Remove from Cart
3. Exit Cart
Choice:
```

Purchase

```
1. Purchase
2. Remove from Cart
3. Exit Cart
Choice: 1
Enter product ID to purchase: 2

---- Purchase Summary ----

ID: 2
Name: Samsung Galaxy S22
Category: Electronic Devices
Price: 699.99
Discount: 15%
Quantity: 3
Reviews: 4.5 stars
Price after discount: 594.992
Order placed successfully!
Delivering to: JIIT Sector-62 Noida, U.P.
```

Your Orders

```
---- Your Orders ----

ID: 4
Name: LEGO Set
Category: Toys
Price: 59.99
Discount: 20%
Quantity: 10
Reviews: 4.8 stars

ID: 2
Name: Samsung Galaxy S22
Category: Electronic Devices
Price: 699.99
Discount: 15%
Quantity: 3
Reviews: 4.5 stars

---- Main Menu ----
1. Cart
2. Your Orders
3. Search
4. Offers
5. Categories
6. User Settings
7. Exit
Choice: 7
Exiting. Thank you!
```