SIMATS SCHOOL OF ENGINEERING

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Console Based Shopping Portal Using C++

A CAPSTONE PROJECT REPORT

Submitted in the partial fulfilment for the award of the degree of

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IN

COMPUTER SCIENCE

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DECLARATION

We, **M.Nithya Sree ,A. Poojitha** students of **Bachelor of Engineering in computer science**, Department of Computer Science and Engineering, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, hereby declare that the work presented in this Capstone Project Work entitled **Building an online shopping portal with C++**is the outcome of our own Bonafide work and is correct to the best of our knowledge and this work has been undertaken taking care of Engineering Ethics.

(A. Poojitha 192210303)

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Date:

Place:

CERTIFICATE

This is to certify that the project entitled "**Building an Online Shopping Portal with C++**" submitted by M. Nithya Sree and A. Poojitha has been carried out under my supervision. The project has been submitted as per the requirements in the current semester of B. Tech Information Technology.

Teacher-in-charge

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CONTENTS

ABSTRACT

The Online Shopping Portal (OSP) developed in C++ is an efficient and scalable software application designed to simplify and automate e-commerce operations. The system integrates functionalities such as user account management, product catalog handling, inventory tracking, order placement, payment processing, and report generation. Built using object-oriented programming principles and advanced file handling techniques, the OSP ensures seamless user experiences, data security, and operational efficiency. By reducing manual intervention and streamlining key processes, the portal enhances customer satisfaction and vendor operations.

This project addresses current challenges in e-commerce, including managing diverse product categories, maintaining accurate inventory records, and ensuring smooth payment workflows. It also lays the groundwork for future enhancements such as integration with external payment gateways, dynamic pricing algorithms, and personalized recommendations powered by artificial intelligence. The OSP represents the transformative power of modern programming techniques in elevating traditional shopping experiences to a digital, user-centric platform.

Focused on modular design and adaptability, the system caters to online stores of various sizes and product ranges. Future scope includes cloud-based data storage, mobile-friendly interfaces, and AI-driven analytics for customer behavior insights. The OSP is a step forward in harnessing technology to meet the growing demands of digital commerce.

INTRODUCTION

The e-commerce industry has experienced unprecedented growth, driven by the increasing reliance on online shopping platforms for diverse consumer needs. An Online Shopping Portal (OSP) developed in C++ addresses these requirements by offering a cohesive platform for managing customers, products, orders, and payments efficiently. The system integrates various operations into a seamless workflow, providing users with a convenient and reliable shopping experience.

C++ is an excellent choice for developing such a system due to its performance, extensive library support, and object-oriented capabilities. These features facilitate the creation of modular, maintainable, and scalable code for a complex system like OSP. Key components of the portal include user account management for secure registration and login, a dynamic product catalog that showcases available items, and an order processing system that handles inventory checks, billing, and payment processing.

Object-oriented programming principles ensure modularity and scalability, while file handling techniques guarantee reliable storage of user and order data. The OSP simplifies the shopping process, enhances customer satisfaction, and improves operational efficiency for vendors.

KEY FEATURES OF THE ONLINE SHOPPING PORTAL

1. **User Management**:
    - Secure registration and login for customers.
    - Admin privileges for managing products and orders.
2. **Product Catalog**:
    - Dynamic display of products with details like price, category, and stock.

3. **Inventory Management**:
    - Real-time tracking of stock levels to prevent overordering.
4. **Order Processing**:
    - Automated order placement with billing and inventory updates.
5. **Payment Gateway**:
    - Secure payment processing with multiple payment options.
6. **Report Generation**:
    - Sales, inventory, and customer analytics for vendors.

OBJECTIVES

1. **Streamline E-Commerce Operations**:
    - Automate tasks like order management, billing, and inventory updates.
2. **Enhance Customer Experience**:
    - Provide a seamless and intuitive shopping experience with minimal errors.
3. **Optimize Resource Management**:
    - Ensure efficient use of inventory and minimize operational overhead.
4. **Improve Data Security**:
    - Protect user data with encryption and secure file handling.
5. **Support Scalability**:
    - Design a modular system that adapts to increased product listings and users.
6. **Enable Advanced Features**:
    - Lay the foundation for future integration of AI-driven personalization and analytics.

CASEDESCRIPTION

The Online Shopping Portal in C++ targets the challenges of managing a medium-sized online store with diverse product categories such as electronics, clothing, and groceries. The manual tracking of inventory and orders often results in inefficiencies, stockouts, and errors, adversely affecting customer satisfaction and sales. The proposed OSP automates these processes, ensuring real-time inventory updates, efficient order handling, and secure payment processing.

The system facilitates product catalog management, where vendors can update product details, prices, and stock levels. Customers can browse, select, and order products effortlessly, with instant billing and payment options. This integrated solution enhances both customer and vendor experiences, driving growth and profitability.

METHODS

- **Object-Oriented Programming (OOP)**: Uses classes for users, products, and orders, ensuring modular and reusable design.
- **File Handling**: Manages product data, user records, and order histories securely.
- **Scheduling Algorithms**: Handles inventory replenishment schedules and order prioritization.
- **Data Validation**: Ensures accuracy in user inputs and order processing.

MODULES OF THE ONLINE SHOPPING PORTAL

1. User Management
2. Product Catalog Management
3. Inventory Tracking
4. Order Placement and Processing
5. Payment Gateway Integration
6. Sales and Inventory Reporting
7. Promotional Discounts and Offers

CODE:

```
#include <iostream>

#include <string>

#include <vector>

#include <map>

#include <ctime>

using namespace std;


// Global variables

map<string, string> registeredUsers; // Stores username and password

map<string, pair<int, int>> shoppingCartItems; // Stores product name, price, and quantity

vector<string> orderDetails; // Stores details of the order

map<string, int> productCatalogItems = { {"Laptop", 50000}, {"Smartphone", 20000},
{"Headphones", 3000}, {"Camera", 25000} };

map<string, vector<string>> userPaymentDetails; // Stores payment details for each user

time_t orderPlacedDate;

time_t expectedDeliveryDate;

string currentUsername; // Tracks logged-in user
```

```
// Function declarations
void userRegistration();
void userLogin();
void productCatalog();
void shoppingCart();
void paymentProcessing(string username);
void orderManagement();
void reviewAndRatingSystem();
void adminDashboard();
void manageProducts();
void displayPaymentDetails();
void userMenu();

int main() {
    int userType;
    cout << "\n=== Online Shopping Portal ===\n";
    cout << "1. Admin\n";
    cout << "2. User\n";
    cout << "3. Exit\n";

    do {
        cout << "\nEnter your choice: ";
        cin >> userType;
        switch (userType) {
            case 1:
                adminDashboard();
                break;
            case 2:
                userMenu();
                break;
            case 3:
                cout << "Exiting the system. Thank you for visiting!\n";
                break;
            default:
                cout << "Invalid choice! Please try again.\n";
        }
    } while (userType != 3);

    return 0;
}

// Function implementations
void userMenu() {
    int choice;
    do {
        cout << "\n=== User Dashboard ===\n";
        cout << "1. Register\n";
        cout << "2. Login\n";
        cout << "3. Product Catalog\n";
        cout << "4. Shopping Cart\n";
        cout << "5. Payment Processing\n";
        cout << "6. Order Management\n";
        cout << "7. Review and Rating System\n";
        cout << "8. Back to Main Menu\n";

        cout << "\nEnter your choice: ";
        cin >> choice;

        switch (choice) {
            case 1:
                userRegistration();
                break;
            case 2:
                userLogin();
                break;
            case 3:
                productCatalog();
                break;
            case 4:
                shoppingCart();
                break;
```

```
            case 5:
                paymentProcessing(currentUsername);
                break;
            case 6:
                orderManagement();
                break;
            case 7:
                reviewAndRatingSystem();
                break;
            case 8:
                cout << "Returning to the main menu...\n";
                break;
            default:
                cout << "Invalid choice! Please try again.\n";
        }
    } while (choice != 8);
}

void userRegistration() {
    cout << "\n=== User Registration ===\n";
    string username, password;
    cout << "Enter a username: ";
    cin >> username;
    if (registeredUsers.find(username) != registeredUsers.end()) {
        cout << "Username already exists. Please try logging in.\n";
        return;
    }
    cout << "Enter a password: ";
    cin >> password;
    registeredUsers[username] = password;
    cout << "Registration successful! You can now log in.\n";
}

void userLogin() {
    cout << "\n=== User Login ===\n";
    string username, password;
    cout << "Enter your username: ";
    cin >> username;
    cout << "Enter your password: ";
    cin >> password;

    if (registeredUsers.find(username) != registeredUsers.end() && registeredUsers[username]
== password) {
        cout << "Login successful! Redirecting to Product Catalog...\n";
        currentUsername = username;
        productCatalog();
    } else {
        cout << "Invalid credentials. Please register first.\n";
        userRegistration();
    }
}

void productCatalog() {
    cout << "\n=== Product Catalog ===\n";
    cout << "Available Products:\n";
    int index = 1;
    for (const auto& product : productCatalogItems) {
        cout << char('A' + index - 1) << ". " << product.first << " - Rs. " << product.second <<
"\n";
        index++;
    }
    char choice;
    cout << "\nEnter the letter of the product you want to add to your cart (Q to return to User
Menu): ";
    cin >> choice;
    if (choice >= 'A' && choice < 'A' + productCatalogItems.size()) {
        auto it = productCatalogItems.begin();
        advance(it, choice - 'A');
        string productName = it->first;
        int productPrice = it->second;

        int quantity;
        cout << "Enter the quantity you want to add: ";
        cin >> quantity;
        shoppingCartItems[productName].first = productPrice;
        shoppingCartItems[productName].second += quantity;

        cout << quantity << " " << productName << "(s) have been added to your cart.\n";
    } else if (choice != 'Q' && (choice < 'A' || choice >= 'A' + productCatalogItems.size())) {
        cout << "Invalid choice!\n";
    }
}

void shoppingCart() {
    cout << "\n=== Shopping Cart ===\n";
    if (shoppingCartItems.empty()) {
        cout << "Your cart is currently empty.\n";
    } else {
        cout << "Items in your cart:\n";
        int total = 0;
        int index = 1;
        for (const auto& item : shoppingCartItems) {
            int itemTotal = item.second.first * item.second.second;
            cout << index++ << ". " << item.first << " - Rs. " << item.second.first << " x " <<
item.second.second << " = Rs. " << itemTotal << "\n";
            total += itemTotal;
        }
        cout << "Total amount: Rs. " << total << "\n";
        cout << "\nEnter 1 to proceed for payment or 0 to return to User Menu: ";
        int proceed;
        cin >> proceed;
        if (proceed == 1) {
            paymentProcessing(currentUsername);
        }
    }
}

void paymentProcessing(string username) {
    cout << "\n=== Payment Processing ===\n";
    if (shoppingCartItems.empty()) {
        cout << "Your cart is empty. Add items to your cart before proceeding to payment.\n";
    } else {
        int total = 0;
        for (const auto& item : shoppingCartItems) {
            int itemTotal = item.second.first * item.second.second;
            total += itemTotal;
        }
        cout << "Total amount to pay: Rs. " << total << "\n";
        cout << "Processing your payment...\n";
        srand(time(0));
        int paymentID = rand() % 100000 + 10000;
        cout << "Payment ID: " << paymentID << "\n";
        cout << "Payment successful!\n";


        string paymentDetails = "Payment ID: " + to_string(paymentID) + ", Total: Rs. " + 
to_string(total);

        userPaymentDetails[username].push_back(paymentDetails);


        shoppingCartItems.clear();

        cout << "Your order has been placed successfully.\n";

    }

}


void orderManagement() {

    cout << "\n=== Order Management ===\n";

    if (userPaymentDetails[currentUsername].empty()) {

        cout << "No orders available.\n";

    } else {

        cout << "Your Orders:\n";

        for (const string& detail : userPaymentDetails[currentUsername]) {

            cout << detail << "\n";

        }

    }

}


void reviewAndRatingSystem() {

    cout << "\n=== Review and Rating System ===\n";
    string review;
    int rating;
    cout << "Enter your review: ";
    cin.ignore();
    getline(cin, review);
    cout << "Rate the product (1-5): ";
    cin >> rating;
    cout << "Thank you for your feedback!\n";
}

void adminDashboard() {
    int adminChoice;
    cout << "\n=== Admin Dashboard ===\n";
    cout << "1. View Order Management\n";
    cout << "2. View Payment Details\n";
    cout << "3. View User Entry Details\n";
    cout << "4. Manage Product Catalog\n";
    cout << "5. Back to Main Menu\n";
    do {
        cout << "Enter your choice: ";
        cin >> adminChoice;
        switch (adminChoice) {
            case 1:
                orderManagement();
                break;
            case 2:
                displayPaymentDetails();
                break;
            case 3:
                cout << "\n=== User Entry Details ===\n";
                for (const auto& user : registeredUsers) {
                    cout << "Username: " << user.first << "\n";
                }
                break;
            case 4:
                manageProducts();
                break;
            case 5:
                cout << "Returning to Main Menu...\n";
                break;
            default:
                cout << "Invalid choice! Please try again.\n";
        }
    } while (adminChoice != 5);
}

void manageProducts() {
    int productChoice;
```

```
cout << "\n=== Manage Product Catalog ===\n";
cout << "1. Add New Product\n";
cout << "2. Delete Existing Product\n";
cout << "3. Back to Admin Dashboard\n";
do {
    cout << "Enter your choice: ";
    cin >> productChoice;
    switch (productChoice) {
        case 1: {
            string productName;
            int productPrice;
            cout << "Enter product name: ";
            cin.ignore();
            getline(cin, productName);
            cout << "Enter product price: ";
            cin >> productPrice;
            productCatalogItems[productName] = productPrice;
            cout << "Product added successfully!\n";
            break;
        }
        case 2: {
            string productName;
            cout << "Enter product name to delete: ";
            cin.ignore();
            getline(cin, productName);
            if (productCatalogItems.erase(productName)) {
                cout << "Product deleted successfully!\n";
            } else {
                cout << "Product not found.\n";
            }
            break;
        }
        case 3:
            cout << "Returning to Admin Dashboard...\n";
            break;
        default:
            cout << "Invalid choice! Please try again.\n";
        }
    } while (productChoice != 3);
}

void displayPaymentDetails() {
    cout << "\n=== Payment Details ===\n";
    for (const auto& user : userPaymentDetails) {
        cout << "Username: " << user.first << "\n";
        for (const string& detail : user.second) {
            cout << "  " << detail << "\n";
        }
    }
}
```

EXPLANATION :

Data Structures

1. **Customer Structure**:
    - o Stores customer details such as id, name, email, address, and phoneNumber.
2. **Product Structure**:
    - o Stores product details including id, name, category, price, and stockQuantity.
3. **Order Structure**:
    - o Stores order details such as orderId, customerId, productList (vector of product IDs), totalAmount, and orderDate.
4. **Payment Structure**:
    - o Stores payment details like paymentId, orderId, paymentMethod, and paymentStatus.

Online Shopping Portal Class

This class manages the core functionalities of the shopping portal, such as customer management, product inventory, order processing, and reporting.

Private Members:

- customers: A vector to store customer details.
- products: A vector for managing product inventory.
- orders: A vector to store order details.
- totalSales: A double to track cumulative sales.

Methods

1. **Customer Management**:
    - o addCustomer():
      Collects customer details and adds them to the customers vector.
    - o listCustomers():
      Displays all registered customers.
2. **Product Management**:
    - o addProduct():
      Collects product details and adds them to the products vector.
    - o listProducts():
      Displays all available products.
3. **Order Management**:
    - o placeOrder():
      Allows a customer to select products, calculates the total amount, and stores order details in the orders vector.
    - o listOrders():
      Displays all orders placed by customers.

4. **Payment Management**:
   - processPayment():
     Records payment details, including the payment method and status, and updates the order status.
   - showTotalSales():
     Displays the total revenue generated from orders.
5. **Report Generation**:
   - generateReport():
     Compiles and displays statistics, including the total number of customers, products, orders, and the total sales amount.

Main Functionality

- The program allows users to perform various actions, including adding customers, managing products, placing orders, processing payments, and generating reports.
- Data structures are dynamically updated based on user inputs.

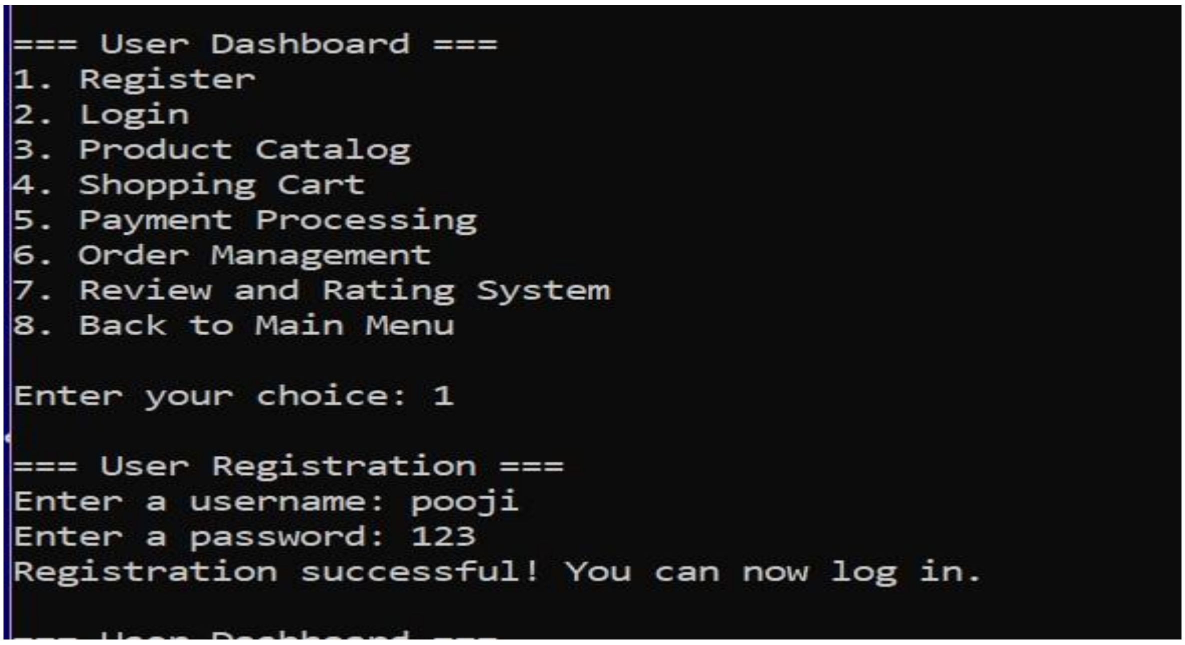
Input Handling and Validation

- Input is managed using cin.ignore() and getline() for strings, ensuring smooth handling of inputs with spaces.
- Invalid inputs are handled using default cases in switch statements, prompting the user to try again.

Design Considerations

1. **Object-Oriented Design**:
   - Encapsulation ensures secure and modular handling of data.
2. **Dynamic Data Structures**:
   - Vectors provide flexibility to manage data as the system scales.
3. **Extensibility**:
   - The modular design allows easy integration of additional features, such as discount management, personalized recommendations, or external payment gateways.

RESULT:



```
=== User Dashboard ===
1. Register
2. Login
3. Product Catalog
4. Shopping Cart
5. Payment Processing
6. Order Management
7. Review and Rating System
8. Back to Main Menu

Enter your choice: 1

=== User Registration ===
Enter a username: pooji
Enter a password: 123
Registration successful! You can now log in.
```

DISCUSSION

An **Online Shopping Portal** implemented in C++ provides an efficient solution for managing various e-commerce operations. By utilizing object-oriented programming (OOP) principles, the system organizes core functionalities such as customer management, product inventory, order processing, and billing into separate classes and structures. This modular approach ensures scalability, maintainability, and reusability of code. C++ offers powerful data management capabilities through the use of vectors and structures, allowing seamless storage and manipulation of large datasets, even as the system scales.

A key feature of the portal is its robust product inventory management, where details such as product categories, prices, and stock availability are securely stored and dynamically updated. Customer management facilitates easy registration and personalized profiles for every user, improving the shopping experience. The order management system tracks orders efficiently, calculates totals, and ensures accurate billing. Additionally, the integration of a payment management system ensures smooth and secure transactions for customers.

FUTURE SCOPE

The future scope of an **Online Shopping Portal** implemented in C++ is vast, focusing on leveraging advanced technologies to enhance the user experience and streamline operations.

1. **Integration of Artificial Intelligence (AI):**
    - AI can revolutionize the portal by enabling personalized recommendations based on user behavior and purchase history.
    - Predictive analytics can assist in inventory management by forecasting demand and optimizing stock levels.
    - Chatbots powered by AI can enhance customer service by offering instant support and handling common queries.
2. **Cloud-Based Solutions:**
    - Migrating the system to a cloud infrastructure can enable seamless access to the portal from anywhere.
    - Cloud solutions ensure scalability, allowing the portal to handle a growing customer base and data volume.
    - Improved data security through cloud-based backups ensures reliability in case of data loss.
3. **Mobile and Web Interfaces:**
    - Developing user-friendly mobile and web applications can significantly enhance accessibility.
    - Customers can browse products, place orders, and track shipments from the convenience of their devices.
    - Integration with mobile wallets and payment gateways ensures faster and more secure transactions.
4. **IoT Integration:**
    - IoT devices can be used to automate inventory updates, ensuring real-time stock tracking.
    - Smart logistics powered by IoT can enhance delivery efficiency by optimizing routes and tracking shipments.
5. **Blockchain Technology:**
    - Blockchain can enhance transparency and security in transactions.
    - Smart contracts can automate refund and warranty processes, increasing customer trust.

CONCLUSION

The **Online Shopping Portal** implemented in C++ serves as a robust and flexible framework for managing various aspects of e-commerce operations. From efficient product management and personalized customer experiences to seamless order processing and billing, the system caters to the dynamic needs of the online shopping industry. Leveraging OOP principles and dynamic data structures like vectors ensures that the system is both scalable and adaptable to future enhancements.

Future advancements, including AI, cloud integration, mobile interfaces, IoT, and blockchain, hold the potential to revolutionize the portal, making it smarter, more accessible, and secure. As the e-commerce sector continues to grow, the portal can play a pivotal role in meeting customer demands and streamlining business operations.

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