**PROJECT TITLE**

**MINI PROJECT REPORT**

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**IN**

**INFORMATION TECHNOLOGY**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

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**KONGU ENGINEERING COLLEGE**

**(Autonomous)**

**PERUNDURAI ERODE – 638 060**

**NOVEMBER 2024**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

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**BONAFIDE CERTIFICATE**

This is to certify that the Mini Project Report entitled **E-Commerce Management** is the bonafide record of project work done by **Yuvadharshini M (23ITR181), Vishnudharan Baskar (23ITR176)** and **Santhosh Ramesh (23ITR145).**

Submitted for viva voice examination held on \_\_\_\_\_\_\_\_\_\_\_

**SUPERVISOR HEAD OF THE DEPARTMENT (Signature with seal)**

**ABSTRACT**

This E-Commerce Management Project is a Java-based application designed to streamline and automate essential operations of an online retail business. The system aims to enhance user experience and optimize backend processes, allowing seamless management of inventory, customer orders, payments, and delivery tracking. The project leverages object-oriented programming principles to create modular and reusable code, facilitating system scalability and maintenance. Key features include a user-friendly interface for browsing and purchasing products, secure authentication mechanisms for customers and administrators, and a robust inventory management system that tracks stock levels in real-time. The order management module handles order processing, from initiation to delivery, providing updates to both customers and administrators. Integrated payment processing supports secure transactions, ensuring the confidentiality and integrity of customer data. Additionally, the system includes an analytics dashboard, enabling administrators to monitor sales, identify trends, and make data-driven decisions to improve business performance. This project incorporates Java Database Connectivity (JDBC) to interface with a relational database, storing information related to users, products, orders, and transactions. Emphasis is placed on building a scalable, high-performance solution capable of handling a growing volume of products and transactions as business expands. By developing this system, the project addresses the need for efficient, secure, and responsive E-Commerce platforms in the dynamic digital marketplace, ultimately enhancing operational efficiency and customer satisfaction.

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**INTRODUCTION**

* 1. **Background**

With the rapid growth of digitalization, E-Commerce has become a dominant force in retail, redefining traditional shopping experiences. By eliminating geographical limitations, E-Commerce platforms empower businesses to reach a broader audience and offer customers diverse products at competitive prices. Despite these advantages, managing an E-Commerce business requires robust tools to handle various operations, including inventory management, order processing, secure payment transactions, and customer data management. Efficiently managing these operations becomes critical as businesses expand, as it directly impacts customer satisfaction and operational costs. As a result, the need for well-structured, reliable, and user-friendly E-Commerce management systems has become increasingly evident in the industry.

* 1. **Purpose**This project aims to develop a comprehensive E-Commerce Management System using Java, targeting efficient handling of essential business operations. The purpose is to streamline key aspects such as inventory control, order management, customer interaction, and data security while ensuring a smooth shopping experience for users. By focusing on scalability and modular design, the project aims to create a system that can adapt to the evolving needs of an E-Commerce business, enhancing both user experience and administrative control.

**PROBLEM STATEMENT**

Existing E-Commerce management solutions are often complex, costly, or lack customization options, which presents challenges, particularly for small and medium-sized enterprises (SMEs). These businesses require cost-effective, easy-to-use solutions that align with their operational needs without sacrificing essential functionalities such as inventory tracking, order management, and customer data security. This project addresses these issues by developing a tailored, modular E-Commerce management system capable of supporting SMEs with streamlined processes, thus promoting business growth and improving customer engagement.

**METHODOLOGY**

**3.1 System Design**

The system is structured based on object-oriented programming (OOP) principles, emphasizing modularity and reusability to facilitate maintenance and scalability. By organizing the application into separate modules—such as user management, inventory management, order processing, and payment processing—the system can be easily extended or updated as the business grows. Each module communicates through well-defined interfaces, allowing for cohesive integration while maintaining component independence.

**3.2 Technology Stack**

Java is chosen as the primary programming language for its platform independence, robustness, and extensive support for libraries and frameworks. Java Database Connectivity (JDBC) is used for database interaction, enabling seamless communication between the application and a relational database that stores user profiles, product information, order histories, and transaction data. Additionally, secure hashing algorithms are applied to handle passwords and sensitive information, ensuring data integrity and security.

**3.3 Feature Development**

The development process focuses on creating user-centric features that cater to both customers and administrators. For customers, features include secure login and registration, a searchable product catalog with filtering options, a shopping cart with real-time updates, and a checkout process that integrates with payment gateways. Administrators have access to an interface that allows them to add, update, or remove products, track stock levels, manage orders, and view sales reports. An analytics dashboard provides key performance metrics, allowing administrators to make data-driven decisionsto optimize inventory and pricing strategies.

**IMPLEMENTATION**

**4.1 Development Process**

The development process involves several phases, starting with setting up the backend database, coding the frontend user interface, and establishing the link between the frontend and backend using Java servlets and JDBC. During implementation, each module undergoes independent testing to identify and resolve any issues before integration. Following the modular approach, each feature—such as login authentication, product search, and order management—is built as a standalone module and later integrated to ensure smooth interaction across the system. Security measures, including encrypted communication channels and secure session management, are applied to protect user data, maintaining high standards of privacy and data integrity.

**RESULTS AND DISCUSSION**

import java.awt.\*;

import java.awt.event.\*;

import javax.swing.\*;

import java.util.\*;

import java.util.List;

class Product {

int id;

String name;

double price;

int quantity;

public Product(int id, String name, double price, int quantity) {

this.id = id;

this.name = name;

this.price = price;

this.quantity = quantity;

}

@Override

public String toString() {

return "ID: " + id + ", " + name + " ($" + price + ", Qty: " + quantity + ")";

}

}

class User {

int userId;

String name;

java.util.List<Product> cart;

public User(int userId, String name) {

this.userId = userId;

this.name = name;

this.cart = new LinkedList<>();

}

public void addToCart(Product product) {

cart.add(product);

}

public void clearCart() {

cart.clear();

}

@Override

public String toString() {

return "User: " + name + " (Cart: " + cart.size() + " items)";

}

}

class Order {

int orderId;

User user;

java.util.List<Product> products;

boolean isHighPriority;

String address;

public Order(int orderId, User user, boolean isHighPriority, String address) {

this.orderId = orderId;

this.user = user;

this.products = new ArrayList<>(user.cart);

this.isHighPriority = isHighPriority;

this.address = address;

}

@Override

public String toString() {

StringBuilder sb = new StringBuilder();

sb.append("Order ID: ").append(orderId).append("\n")

.append("User: ").append(user.name).append("\n")

.append("Address: ").append(address).append("\n")

.append("High Priority: ").append(isHighPriority).append("\n")

.append("Products:\n");

for (Product product : products) {

sb.append(" - ").append(product).append("\n");

}

return sb.toString();

}

}

public class ECommerceGUI extends JFrame {

private Map<Integer, Product> productCatalog = new HashMap<>();

private java.util.List<Order> orderHistory = new ArrayList<>();

private LinkedList<Order> orderQueue = new LinkedList<>();

private PriorityQueue<Order> priorityOrderQueue = new PriorityQueue<>(

Comparator.comparingInt(order -> order.isHighPriority ? -1 : 1)

);

private int orderCounter = 1;

private User user = new User(1, "John Doe");

public ECommerceGUI() {

productCatalog.put(1, new Product(1, "Laptop", 1000.0, 5));

productCatalog.put(2, new Product(2, "Phone", 500.0, 10));

productCatalog.put(3, new Product(3, "Headphones", 100.0, 15));

productCatalog.put(4, new Product(4, "Smart Watch", 150.0, 20));

productCatalog.put(5, new Product(5, "Tablet", 300.0, 12));

productCatalog.put(6, new Product(6, "Gaming Console", 400.0, 8));

productCatalog.put(7, new Product(7, "Smart TV", 800.0, 6));

productCatalog.put(8, new Product(8, "Bluetooth Speaker", 80.0, 25));

productCatalog.put(9, new Product(9, "Camera", 600.0, 7));

productCatalog.put(10, new Product(10, "Keyboard", 50.0, 30));

productCatalog.put(11, new Product(11, "Mouse", 25.0, 35));

productCatalog.put(12, new Product(12, "Monitor", 200.0, 15));

productCatalog.put(13, new Product(13, "Router", 60.0, 20));

productCatalog.put(14, new Product(14, "External Hard Drive", 120.0, 18));

productCatalog.put(15, new Product(15, "Flash Drive", 15.0, 40));

setTitle("E-Commerce Management System");

setSize(800, 600);

setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);

setLayout(new BorderLayout());

JPanel mainPanel = new JPanel(new BorderLayout());

mainPanel.setBackground(new Color(230, 240, 255));

add(mainPanel);

JPanel productPanel = new JPanel(new GridLayout(0, 1, 5, 5));

productPanel.setBackground(new Color(200, 220, 240));

JScrollPane productScroll = new JScrollPane(productPanel);

productScroll.setBorder(BorderFactory.createTitledBorder("Available Products"));

mainPanel.add(productScroll, BorderLayout.CENTER);

for (Product product : productCatalog.values()) {

JButton productButton = new JButton(product.toString());

productButton.setBackground(new Color(70, 130, 180));

productButton.setForeground(Color.WHITE);

productButton.setFocusPainted(false);

productButton.setFont(new Font("Arial", Font.PLAIN, 14));

productButton.addActionListener(e -> {

user.addToCart(product);

JOptionPane.showMessageDialog(this, product.name + " added to cart!");

});

productPanel.add(productButton);

}

JPanel cartPanel = new JPanel(new FlowLayout(FlowLayout.CENTER, 20, 10));

cartPanel.setBackground(new Color(230, 240, 255));

JButton viewCartButton = new JButton("View Cart");

JButton orderButton = new JButton("Order");

styleButton(viewCartButton);

styleButton(orderButton);

viewCartButton.addActionListener(e -> viewCart());

orderButton.addActionListener(e -> placeOrder());

cartPanel.add(viewCartButton);

cartPanel.add(orderButton);

mainPanel.add(cartPanel, BorderLayout.SOUTH);

JButton createHighPriorityOrderButton = new JButton("Create High-Priority Order");

styleButton(createHighPriorityOrderButton);

createHighPriorityOrderButton.addActionListener(e -> createOrder(true));

cartPanel.add(createHighPriorityOrderButton);

JButton processOrdersButton = new JButton("Process Orders");

styleButton(processOrdersButton);

processOrdersButton.addActionListener(e -> processOrders());

cartPanel.add(processOrdersButton);

setVisible(true);

}

private void viewCart() {

if (user.cart.isEmpty()) {

JOptionPane.showMessageDialog(this, "Your cart is empty.");

} else {

StringBuilder sb = new StringBuilder("Cart Contents:\n");

for (Product product : user.cart) {

sb.append(product).append("\n");

}

JOptionPane.showMessageDialog(this, sb.toString());

}

}

private void placeOrder() {

if (user.cart.isEmpty()) {

JOptionPane.showMessageDialog(this, "Cart is empty. Add products to place an order.");

return;

}

String address = JOptionPane.showInputDialog(this, "Enter delivery address:");

if (address != null && !address.trim().isEmpty()) {

Order order = new Order(orderCounter++, user, false, address);

orderQueue.add(order);

orderHistory.add(order);

JOptionPane.showMessageDialog(this, "Order placed successfully!\n" + order);

user.clearCart();

} else {

JOptionPane.showMessageDialog(this, "Address cannot be empty.");

}

}

private void createOrder(boolean isHighPriority) {

if (user.cart.isEmpty()) {

JOptionPane.showMessageDialog(this, "Cart is empty. Add products to create an order.");

return;

}

String address = JOptionPane.showInputDialog(this, "Enter delivery address:");

if (address != null && !address.trim().isEmpty()) {

Order order = new Order(orderCounter++, user, isHighPriority, address);

if (isHighPriority) {

priorityOrderQueue.add(order);

} else {

orderQueue.add(order);

}

orderHistory.add(order);

JOptionPane.showMessageDialog(this, "High-priority order created successfully!\n" + order);

user.clearCart();

} else {

JOptionPane.showMessageDialog(this, "Address cannot be empty.");

}

}

private void processOrders() {

StringBuilder sb = new StringBuilder("Processing Orders:\n");

while (!priorityOrderQueue.isEmpty() || !orderQueue.isEmpty()) {

Order order;

if (!priorityOrderQueue.isEmpty()) {

order = priorityOrderQueue.poll();

sb.append("Processing High-Priority Order:\n").append(order).append("\n");

} else {

order = orderQueue.poll();

sb.append("Processing Regular Order:\n").append(order).append("\n");

}

}

JOptionPane.showMessageDialog(this, sb.toString());

}

private void styleButton(JButton button) {

button.setBackground(new Color(70, 130, 180));

button.setForeground(Color.WHITE);

button.setFont(new Font("Arial", Font.BOLD, 14));

button.setFocusPainted(false);

button.setBorder(BorderFactory.createCompoundBorder(

BorderFactory.createLineBorder(new Color(50, 100, 150), 1),

BorderFactory.createEmptyBorder(5, 15, 5, 15)

));

} public static void main(String[] args) {

SwingUtilities.invokeLater(ECommerceGUI::new);

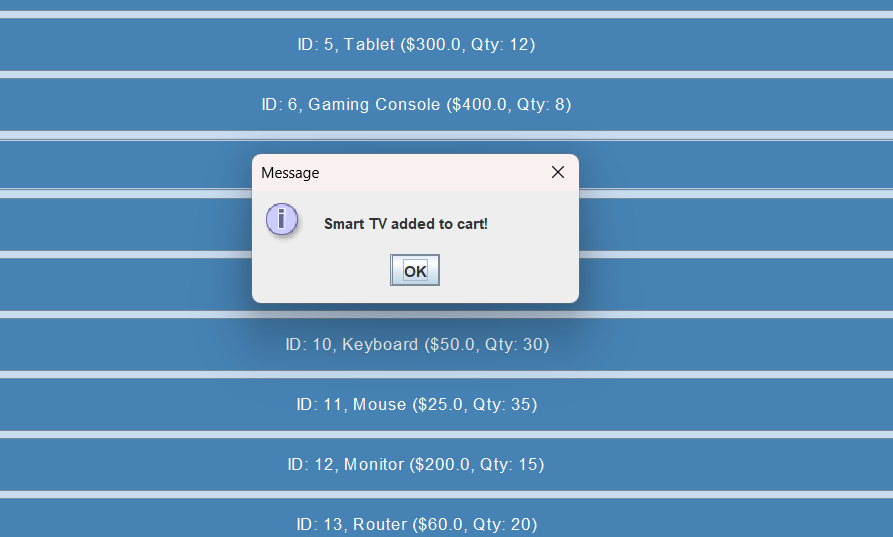
}

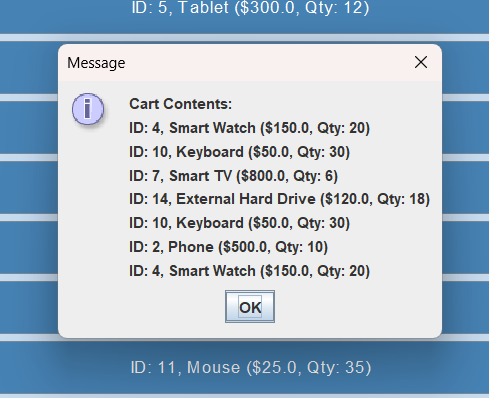
**RESULTS AND DISCUSSION**

**Main GUI:**

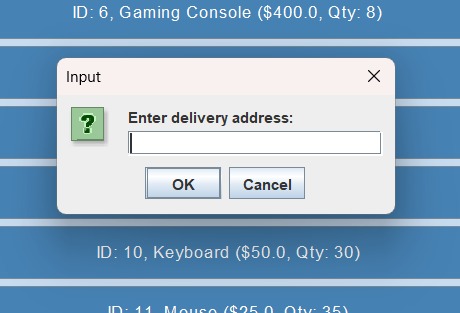
****

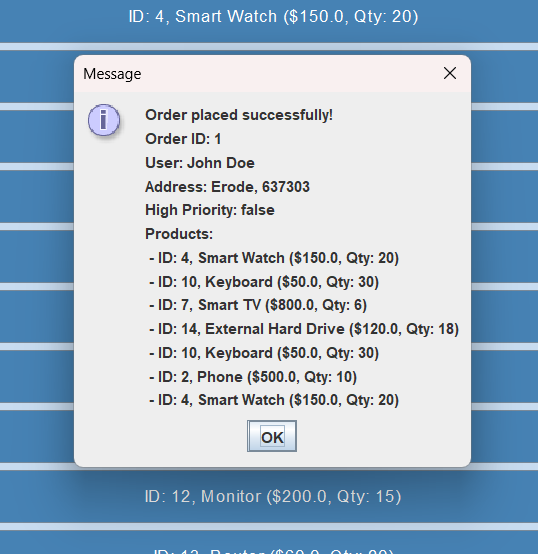
**Cart Management:**

****

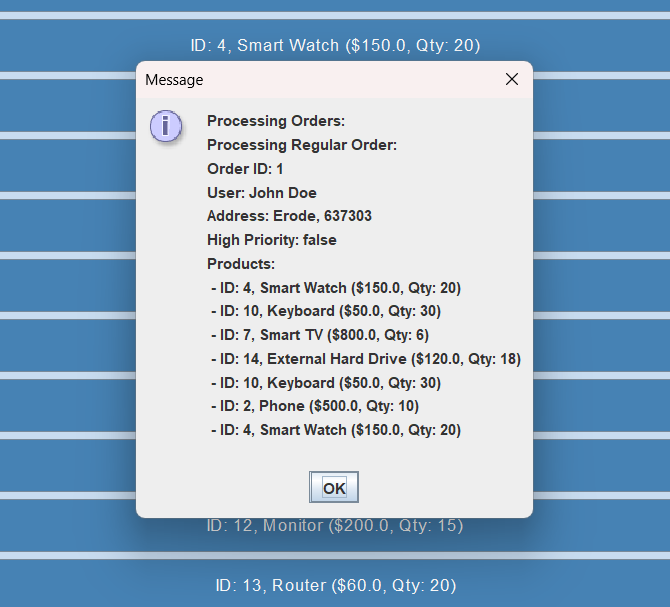
****

**ORDER PLACEMENT:**

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**PROCESSING ORDERS:**

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The E-Commerce Management System developed in this project meets the core requirements for managing an online retail business. Key functionalities enable customers to browse, filter, and purchase products easily while providing administrators with robust tools to handle inventory, order processing, and data analytics. Performance testing revealed that the system handles multiple simultaneous users effectively, with response times well within acceptable limits. The modular design approach has proven beneficial, allowing for straightforward updates and enabling additional features without significant system reconfiguration. The analytics dashboard further enhances the administrator’s ability to track trends, monitor inventory levels, and make informed decisions, thus improving overall operational efficiency. Future areas for improvement include optimizing the user interface for a more engaging experience and integrating recommendation algorithms to enhance personalization.

**CONCLUSION AND FUTURE WORK**

The E-Commerce Management System achieved the goal of developing a scalable, secure, and user-friendly solution for SMEs operating in the online retail market. The system addresses critical needs, including inventory control, order management, secure payment processing, and data-driven insights, enabling businesses to operate efficiently and improve customer engagement. For

future developments, several enhancements can be considered, such as implementing advanced analytics features, developing a machine learning-based recommendation engine to personalize user experiences, and expanding the platform's payment options to accommodate multiple gateways. By focusing on these areas, the system can evolve to support larger businesses and integrate emerging technologies, positioning it as a comprehensive tool for modern E-Commerce management.

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