

SMART GROCERY INVENTORY SOLUTION

CS23333 – Introduction to OOPS and JAVA

Mini Project Report

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BONAFIDE CERTIFICATE

This is to certify that the Mini project work titled “**SWING LOGIN APPLICATION**” done by SHARAN M (231501151) And ROHITH S (231501136) is a record of bonafide work carried out by him/her under my supervision as a part of MINI PROJECT for the subject titled **CS2333-OBJECT ORIENTED PROGRAMMING** by Department of Artificial Intelligence and Machine Learning.

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INTERNAL EXAMINER

EXTERNAL EXAMINER ABSTRACT

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ABSTRACT

The “Smart Grocery Inventory Solution” is a Java-based management system designed to improve stock control and streamline inventory operations in grocery stores and supermarkets. Utilizing MySQL for efficient data storage and retrieval, this solution offers real-time tracking of stock levels, automated alerts for low-stock items, and detailed reporting to help store managers maintain optimal inventory levels. The system reduces manual errors and simplifies inventory management by providing automated updates, an intuitive user interface, and features such as stock forecasting and restocking suggestions. By automating key processes, this solution ensures accurate stock data, improves operational efficiency, and helps businesses avoid issues like overstocking or stockouts. Scalable and flexible, the “Smart Grocery Inventory Solution” is designed to meet the needs of small and medium-sized grocery businesses, with potential for integration with point-of-sale (POS) systems and other advanced features to support business growth and customer satisfaction.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The Smart Grocery Inventory Solution is a comprehensive Java- based system developed to address the stock management challenges faced by grocery stores and supermarkets. In traditional grocery businesses, stock management often involves manual tracking of items, which can lead to inefficiencies, errors, and mismanagement of resources. This can result in issues like overstocking, understocking, wastage, and missed sales opportunities, ultimately affecting profitability and customer satisfaction. The Smart Grocery Inventory Solution aims to solve these problems by automating the entire inventory process.

At its core, the system utilizes Java for its application development and MySQL for robust data handling, ensuring the seamless tracking and management of stock levels in real-time. The system provides automated low-stock alerts, inventory forecasting, and a user-friendly interface, which makes it accessible for store employees and managers to operate with minimal training.

Key features of the system include real-time monitoring of stock, automated notifications when stock reaches critical levels, and the ability to generate detailed reports on stock movement and sales. This allows store owners and managers to make data-driven decisions, ensuring that their inventory levels are always optimized to meet customer demand without excess or shortages. Additionally, the system helps minimize human errors

in stock counting and record-keeping, leading to greater accuracy and efficiency.

Designed with scalability in mind, the Smart Grocery Inventory Solution can be tailored to fit the needs of small to medium-sized grocery businesses. It is also equipped to integrate with point-of-sale (POS) systems for seamless operation across multiple business processes. As a result, the system not only enhances stock management but also contributes to better overall business performance, improved customer satisfaction, and reduced operational costs.

1.2 Project Objectives

The Smart Grocery Inventory Solution is an innovative Java-based system designed to improve inventory management in grocery stores and supermarkets. After reviewing its development and implementation, it is evident that the project successfully addresses key challenges such as manual stock tracking, inaccuracies in inventory records, and inefficient stock management processes. The solution provides a much-needed shift from traditional methods to an automated, streamlined approach that enhances operational efficiency.

One of the standout features of the system is its real-time inventory monitoring, which allows store managers to have up-to-date visibility into stock levels. The automated low-stock alerts are particularly useful, as they ensure that items are reordered before they run out, preventing stockouts and lost sales. Additionally, the integration of MySQL for data storage ensures

that inventory data is secure, accessible, and easily retrievable, which is crucial for generating detailed reports on sales and stock movement.

The user interface is intuitive, making the system easy to operate with minimal training, which is a significant advantage for businesses with a large staff. The ability to generate detailed reports and analytics allows store owners to make informed decisions about restocking and inventory management. This contributes to reducing waste, avoiding overstocking, and ensuring that customer demand is consistently met.

However, the system's reliance on Java and MySQL means that there may be limitations in scalability for larger businesses or those with highly complex inventory systems. The integration with point-of-sale (POS) systems is another area that could be improved for better synchronization across all business operations.

Overall, the Smart Grocery Inventory Solution is a well-developed, efficient tool for managing stock in small to medium-sized grocery stores, offering enhanced accuracy, real-time monitoring, and significant cost savings. With some improvements, the system could scale to serve larger enterprises more effectively.

1.3 Significance of the Project

The significance of the Smart Grocery Inventory Solution lies in its potential to address key challenges in inventory management and drive operational efficiency, particularly in the retail sector. Here are several key

aspects highlighting its importance:

- **Automation in Inventory Management:** The project focuses on automating the stock-checking and management process in grocery stores and supermarkets. Traditional manual inventory tracking often leads to inaccuracies, mismanagement, and inefficiencies. By introducing a Java-based solution integrated with MySQL, your project helps eliminate manual errors and streamlines the entire inventory process, resulting in increased accuracy and operational productivity.
- **Real-Time Stock Monitoring:** Real-time monitoring of stock levels is crucial for grocery stores, where the timely availability of products directly impacts customer satisfaction. Your project addresses this critical need by providing live updates on stock status and generating automatic low-stock alerts, ensuring that stockouts are avoided and business operations remain uninterrupted. This has significant implications for both small and medium-sized businesses, improving overall store management and customer experience.
- **Optimization of Resources and Cost Savings:** By providing detailed insights into stock movement, sales, and restocking needs, your project empowers store managers to make data-driven decisions. This optimization reduces waste, prevents overstocking, and ensures optimal inventory levels, ultimately leading to cost savings. Your project's focus on inventory forecasting and automated replenishment is essential for minimizing operational costs and enhancing business profitability.
- **Scalability and Practical Adoption:** One of the strengths of your

project is its scalability and potential for widespread adoption across various retail environments. The system is designed to integrate seamlessly with existing inventory management processes, making it suitable for a broad range of grocery businesses. Moreover, its adaptability allows for integration with point-of-sale (POS) systems and further expansions, ensuring long-term applicability and relevance.

- **Future Enhancements and Innovation:** Your project paves the way for future advancements in retail technology, including the potential for AI-driven inventory predictions, demand forecasting, and integration with advanced supply chain management systems. These innovations could further enhance the accuracy and efficiency of inventory systems, allowing businesses to adapt to dynamic market conditions while continuing to optimize their stock management.

In summary, the Smart Grocery Inventory Solution holds significant potential to revolutionize inventory management in grocery stores, driving improvements in efficiency, accuracy, and cost-effectiveness. By automating key processes and providing real-time insights, your project contributes to modernizing retail operations and supporting the growth of businesses in a competitive market.

1.4 APPLICATION:

The application of the Smart Grocery Inventory Solution extends across various retail and grocery management environments, addressing the critical need for efficient inventory control and stock management. Here are some

specific applications:

1. **Grocery Stores and Supermarkets:** The solution is designed primarily for grocery stores and supermarkets, where real-time inventory tracking is essential for managing large volumes of stock. The system helps automate stock checking, monitor sales patterns, and manage replenishments, ensuring that store shelves are stocked appropriately and reducing instances of overstocking or stockouts.
2. **Convenience Stores:** For smaller retail environments such as convenience stores, where managing stock manually can be time-consuming and error-prone, the system provides a streamlined way to track inventory levels, set up automatic low-stock alerts, and generate sales reports. This improves store operations by ensuring that popular items are always available and excess stock is minimized.
3. **Pharmacies and Medical Stores:** The system can be applied to pharmacies and medical stores, where tracking the availability of medications and healthcare products is crucial for providing timely service to customers. The Smart Grocery Inventory Solution helps ensure that essential items are stocked and ready for sale, while minimizing over-ordering and reducing waste.
4. **Warehouse Management:** In warehouses that store products for distribution to grocery chains or retail outlets, the solution aids in managing large-scale inventories, tracking stock movement, and monitoring product expiry dates. This helps optimize the storage and distribution process, ensuring that the right products are shipped at the right time.

5. **Retail Chains and Franchises:** For larger retail chains with multiple outlets, the system can be scaled to track inventory across several locations. Store managers can access centralized reports on stock levels and sales data, allowing for better coordination between stores and warehouses and ensuring that each location is adequately stocked.
6. **E-Commerce Integration:** The solution can be integrated with e-commerce platforms to synchronize online orders with physical store inventory. This ensures that the stock levels displayed online are accurate, preventing situations where customers purchase items online that are out of stock in physical stores.
7. **Minimization of Food Waste:** In grocery stores that deal with perishable goods, the solution helps track expiry dates and manage stock rotations. Automated alerts for items nearing expiration enable store managers to run promotions or discounts, thereby minimizing food waste and maximizing profitability.

Overall, the Smart Grocery Inventory Solution offers versatile applications in the retail sector, improving inventory management, reducing human error, and ensuring efficient stock control across diverse retail environments.

CHAPTER 2

INVENTORY PROCESS

Streamlined Grocery Inventory Management System

2.0 Real-Time Integration with Billing:

The system provides a seamless and efficient real-time connection between the billing process and the product inventory database. Whenever products are scanned and billed at checkout, the inventory system instantly updates stock levels, eliminating the need for manual intervention. This integration ensures that the product availability reflected in the database accurately mirrors the actual stock on store shelves. By automating this crucial process, the system minimizes human errors and keeps inventory counts precise, enhancing the store's operational efficiency and reducing discrepancies between physical and recorded stock.

The system establishes a real-time link between the checkout and the inventory database, ensuring instant updates whenever items are purchased. As products are scanned at checkout, the inventory count is automatically adjusted, removing the need for manual stock updates. This streamlined process guarantees that the inventory database always reflects the true availability of products in the store. By automating stock management, the system improves accuracy, reduces errors, and ensures smooth store operations while keeping stock levels consistent and reliable. Additionally, it enhances customer satisfaction by reducing instances of out-of-stock items. The system's efficiency also supports better decision-making for restocking and inventory planning.

2.1 Automated Stock Level Updates:

With every product purchased, the system is programmed to automatically adjust the corresponding item's quantity in the inventory database. This automated update happens in real time, ensuring that stock levels are always accurate. Manual processes often result in errors, delays, and outdated information, but this system mitigates those issues entirely. It ensures retailers always have up-to-date insights into stock availability, allowing for better decision-making on inventory control. The automated stock level updates provide a more reliable, faster, and error-free approach to managing inventory, particularly in grocery stores where stock changes frequently.

2.2 Automated Product Restocking Alerts:

When a product's stock level reaches zero, the system automatically generates a "lack of product" notification, which is sent directly to the retailer. This real-time alert system eliminates the need for manual checks, helping store managers stay informed about stock shortages and preventing potential stockouts. The notifications give retailers ample time to reorder products before running out entirely, reducing the risk of lost sales or customer dissatisfaction. With this proactive restocking alert system, stores can maintain better control over their inventory and ensure that high-demand products remain available to meet customer needs.

2.3 No Need for Manual Stocktaking:

The system's automation completely eliminates the need for manual stocktaking, which is a traditionally time-consuming, labor-intensive, and error-prone process. By continuously and automatically tracking stock levels

in real-time, the system provides an accurate and up-to-date reflection of the store's inventory without requiring physical counts. This frees up valuable time and resources, allowing staff to focus on other operational tasks. The elimination of manual stocktaking significantly reduces the likelihood of human errors, such as incorrect counts or missed stock updates, thereby enhancing the overall accuracy and efficiency of inventory management.

2.4 Data-Driven Insights for Inventory Management:

The system provides not only real-time tracking of stock levels but also valuable data on product movement. Retailers can analyze which products are selling rapidly and which items are moving slowly. This data-driven insight allows store owners and managers to make informed decisions regarding restocking, promotions, and even product discontinuation. By understanding sales trends and inventory performance, retailers can optimize their product offerings, reduce overstocking of slow-moving items, and ensure that high-demand products are always available. The system's ability to generate actionable insights from sales and inventory data empowers retailers to manage their stock more effectively.

2.5 Efficient and Proactive Inventory Control:

By automating stock updates and delivering timely, actionable notifications for low-stock or out-of-stock items, the system significantly enhances the store's overall operational efficiency. The system not only improves stock accuracy but also helps prevent waste by flagging products approaching expiration, allowing retailers to take proactive measures like running promotions to clear stock before spoilage. This proactive approach to inventory control ensures that shelves are always well-stocked, products remain fresh, and the store operates smoothly.

CHAPTER 3

ECLIPSE SOFTWARE AND MYSQL

3.1 Eclipse Software:

Eclipse is a popular open-source Integrated Development Environment (IDE) primarily used for Java programming, though it supports various other languages through plugins. Known for its flexibility, Eclipse provides a feature-rich platform for building, debugging, and testing applications. It includes built-in tools for code completion, syntax highlighting, and debugging, which streamline the development process. Eclipse also supports various frameworks, making it highly customizable for different types of projects. Its large community of users and extensive plugin ecosystem allow developers to extend its functionality, making it a versatile tool for both beginner and advanced developers.

3.2 Advantages of Eclipse Over NetBeans and Other IDEs:

Eclipse offers several advantages over NetBeans and other IDEs. First, its extensive plugin ecosystem allows developers to tailor their environment to specific project needs, offering more customization than NetBeans. Eclipse also supports a broader range of programming languages, making it a more versatile option for multi-language development. Its robust community ensures frequent updates and a wide range of third-party tools. Additionally, Eclipse's performance is optimized for large-scale projects, handling complex applications more efficiently. The IDE's modularity and active community make it ideal for developers seeking flexibility,

extensibility, and the ability to manage larger projects.

3.3 MySQL Database:

MySQL is a widely-used, open-source relational database management system known for its reliability, scalability, and performance. It is the go-to choice for many web applications, particularly those using the LAMP (Linux, Apache, MySQL, PHP) stack. MySQL enables developers to manage large datasets efficiently, offering features like fast query processing and strong data security. Its structured query language (SQL) makes data retrieval and manipulation intuitive. MySQL's cross-platform compatibility and seamless integration with various programming languages and frameworks make it ideal for diverse applications, from small-scale websites to enterprise-level databases.

3.4 Advantages of MySQL over other databases:

MySQL offers several advantages over other databases like PostgreSQL and Oracle. It is lightweight, making it faster and more efficient for web-based applications. MySQL's ease of use and quick setup process make it accessible for beginners, while its scalability supports large-scale systems. Compared to Oracle, MySQL is more cost-effective, particularly for startups and smaller enterprises. Additionally, MySQL's broad community support provides extensive resources and documentation. Its performance is particularly optimized for read-heavy workloads, which is ideal for applications requiring fast data retrieval, making it a preferred choice for many businesses.

3.5 Front-End Development:

To ascertain the practical utility of the designed approximate multipliers,

researchers will apply them to various image processing tasks. This involves implementing functions like image scaling, sharpening, and stabilization using the designed multipliers. By quantifying the performance in terms of Picture Signal-to-Noise Ratio (PSNR), researchers can gauge the quality and fidelity of the processed images. This practical validation step elucidates the applicability and effectiveness of the proposed methodology in real-world scenarios.

USE CASE DIAGRAM

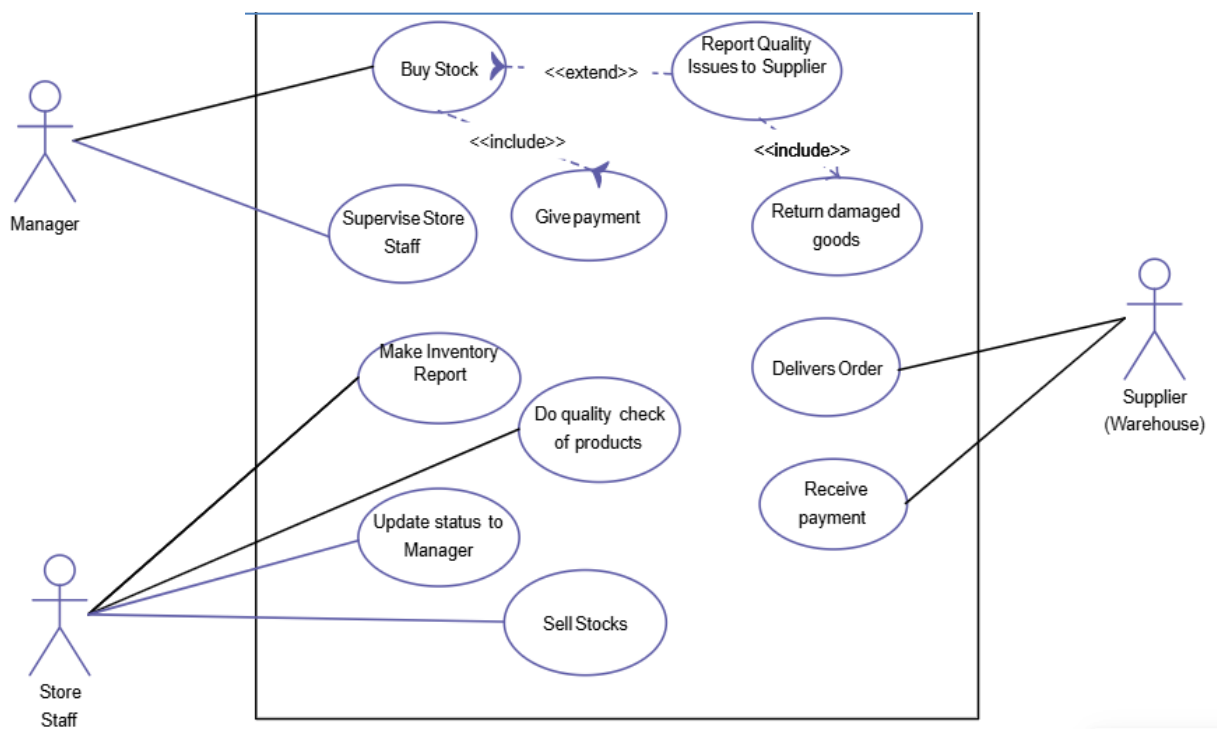


Figure 3.1

ER DIAGRAM

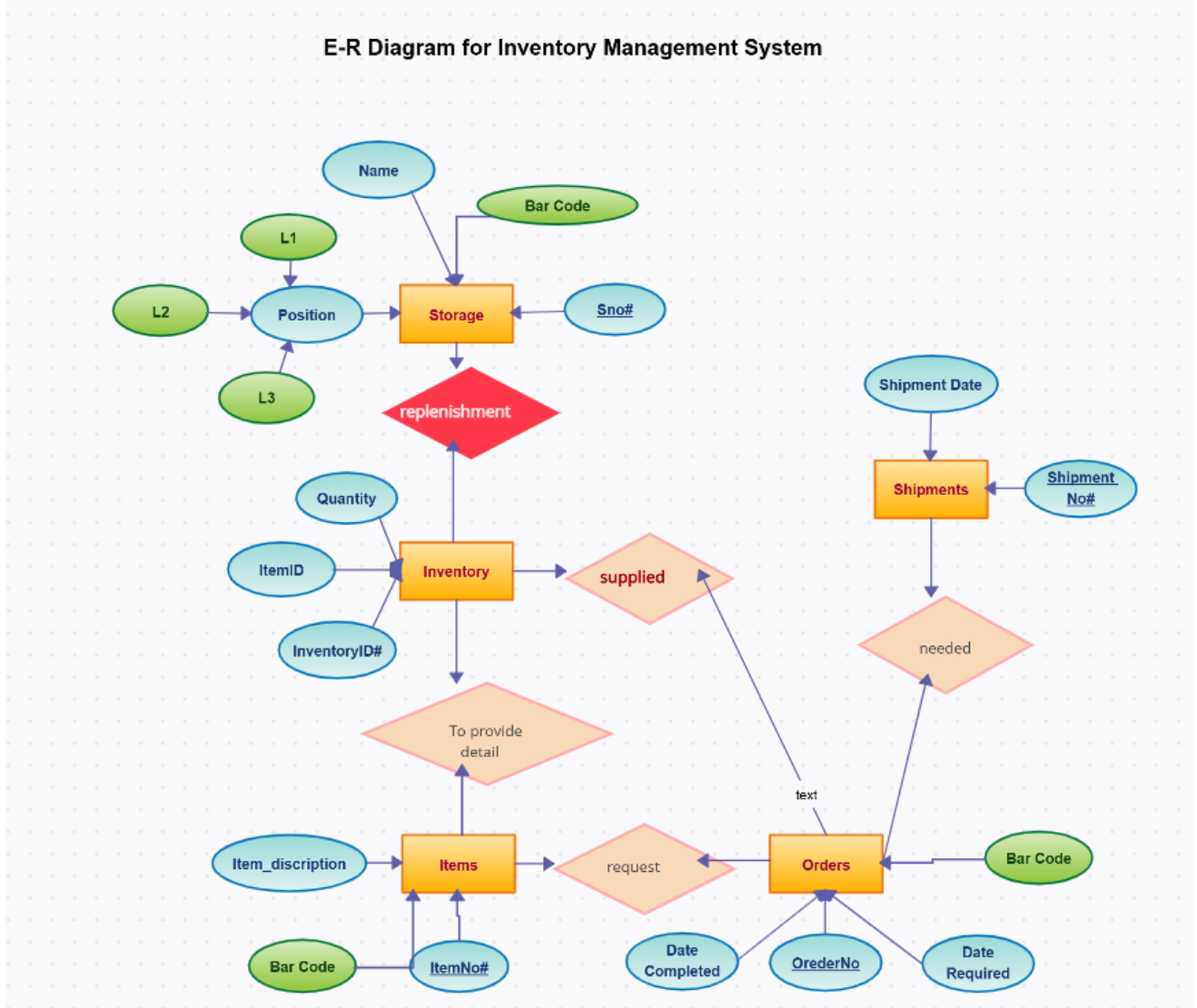


Figure 3.2

DATA FLOW DIAGRAM

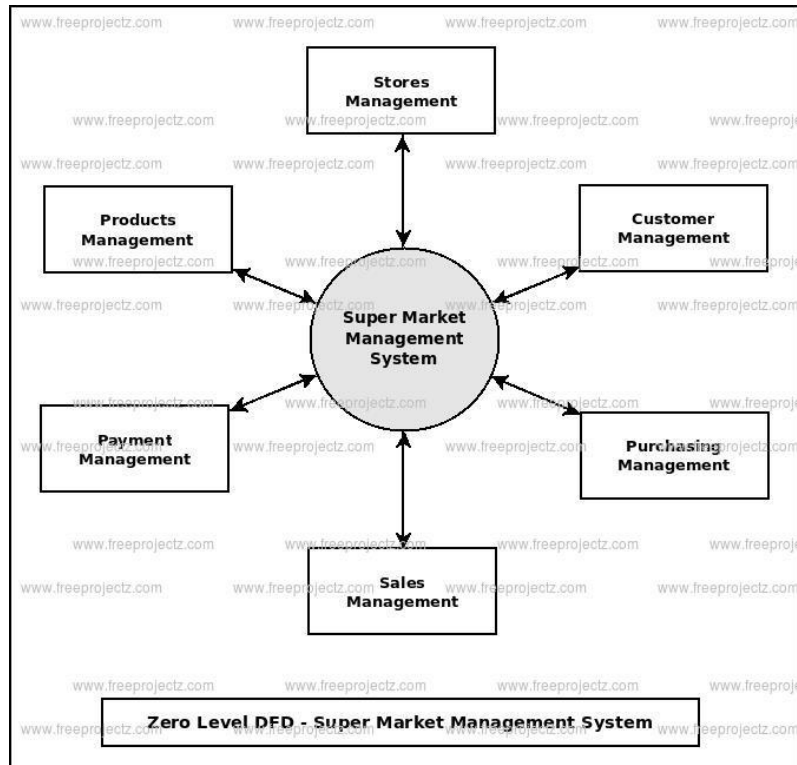
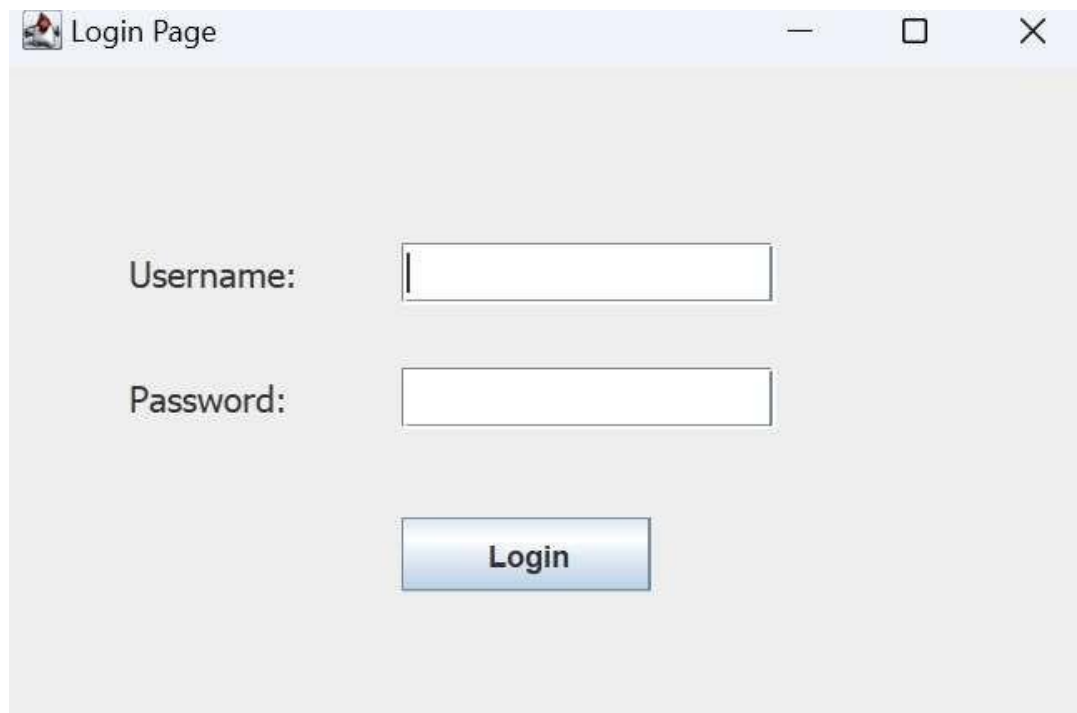


Figure 3.3



A screenshot of a web application window titled "Login Page". The window has a light gray background and a standard Windows-style title bar with a minimize button, a maximize button, and a close button. The main content area contains two labels, "Username:" and "Password:", each followed by a white text input field with a thin gray border. Below these fields is a blue button with the word "Login" in white text. The button has a slight gradient and a shadow effect.

Figure 4.1 LOGIN PAGE



Figure 4.2 PRODUCT LIST AND STAFF LIST

The screenshot displays the 'Product List' window. It has a title bar with the text 'Product List'. The main content area contains a table with the following columns: ID, Product Name, Price, and Quantity. Below the table, there are three input fields labeled 'Product Name:', 'Price:', and 'Quantity:'. At the bottom of the window, there are two buttons: 'Add Product' and 'Delete Product'.

ID	Product Name	Price	Quantity

Product Name:

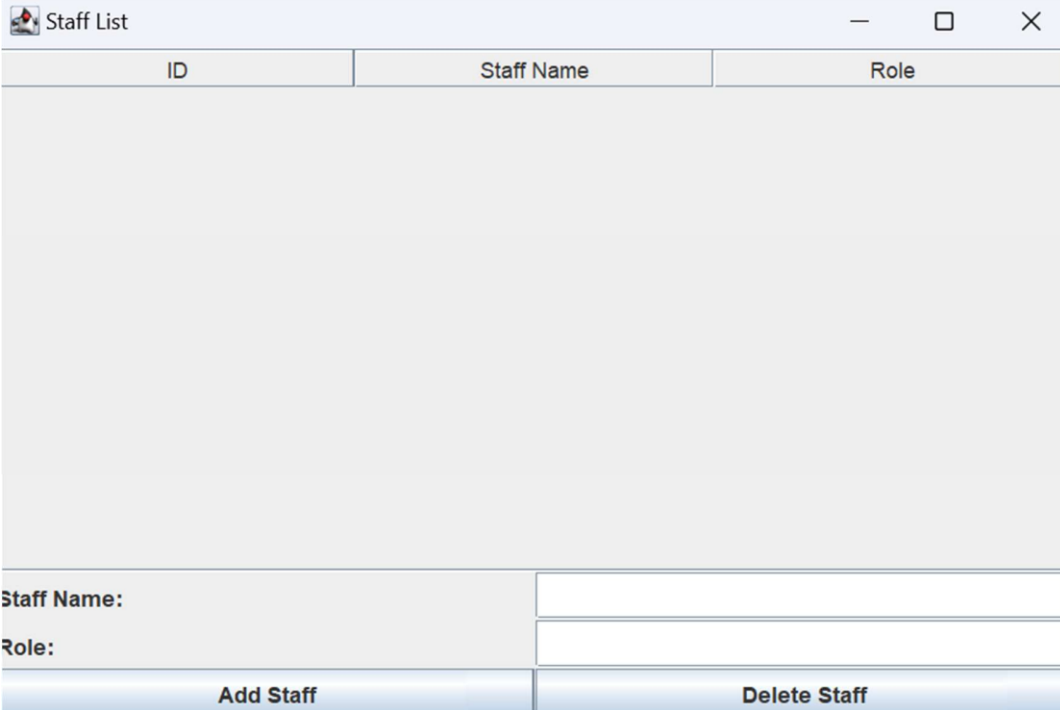
Price:

Quantity:

Add Product Delete Product

Figure 4.3: PRODUCT DETAIL

STAFF LIST:



The screenshot shows a window titled "Staff List" with a table and input fields. The table has three columns: ID, Staff Name, and Role. Below the table are two input fields labeled "Staff Name:" and "Role:". At the bottom are two buttons: "Add Staff" and "Delete Staff".

ID	Staff Name	Role
----	------------	------

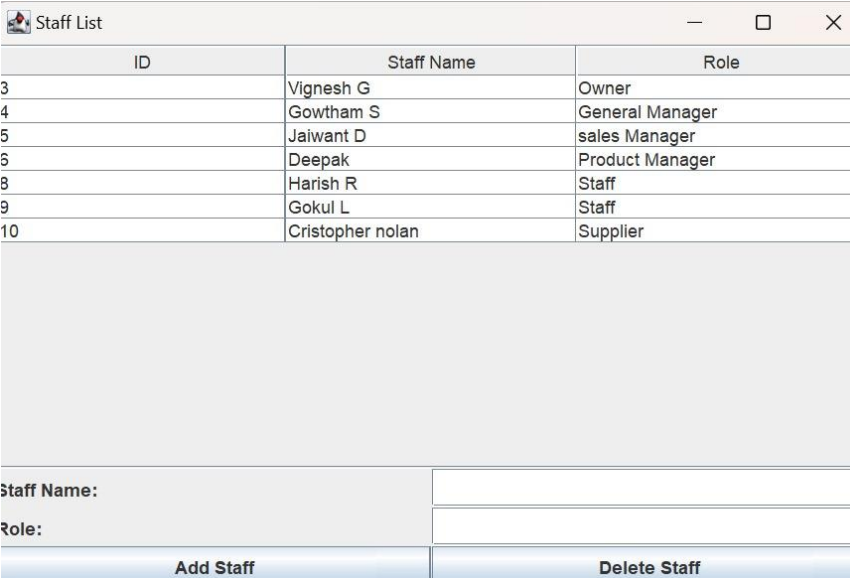
Staff Name:

Role:

Add Staff Delete Staff

Figure 4.4: STAFF DETAILS

OUTPUT



The screenshot shows the same "Staff List" window, but now the table is populated with data. The input fields and buttons remain the same.

ID	Staff Name	Role
3	Vignesh G	Owner
4	Gowtham S	General Manager
5	Jaiwant D	sales Manager
6	Deepak	Product Manager
8	Harish R	Staff
9	Gokul L	Staff
10	Cristopher nolan	Supplier

Staff Name:

Role:

Add Staff Delete Staff

Figure 4.5

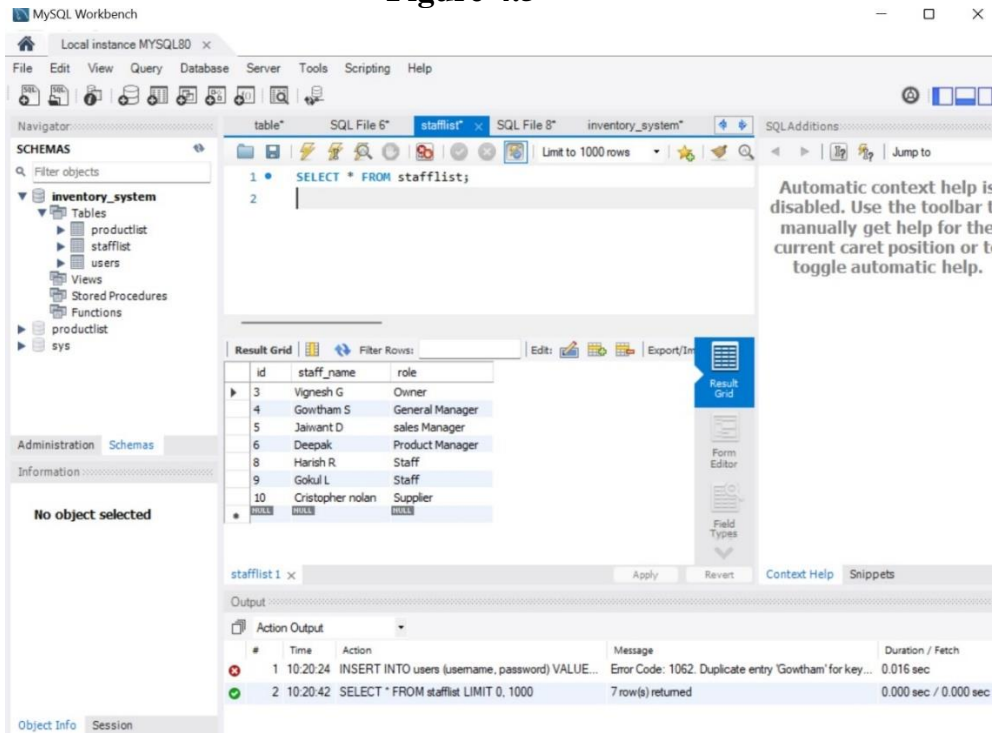


Figure 4.6

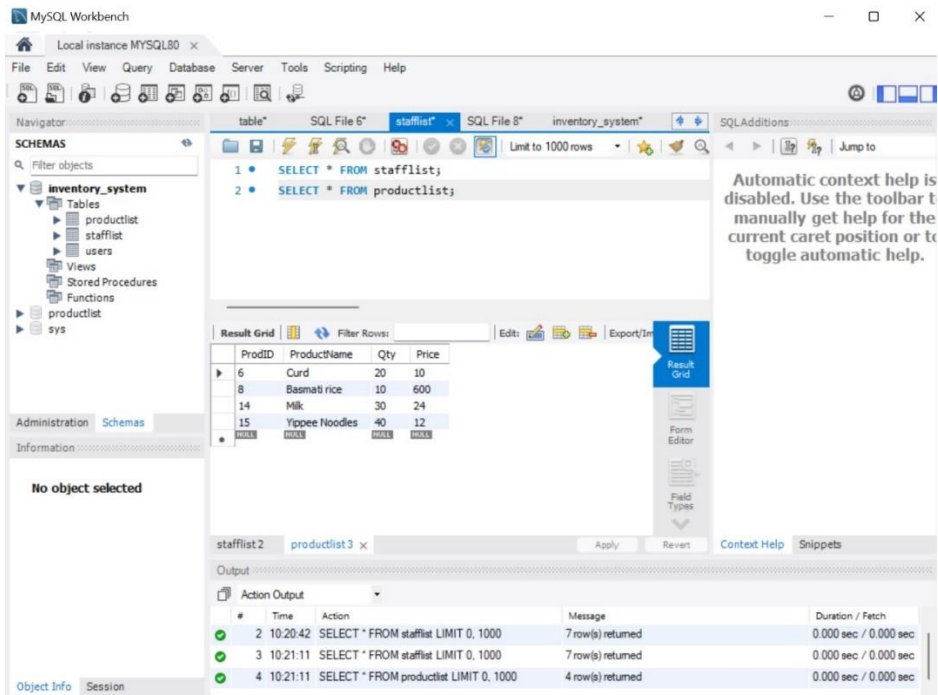
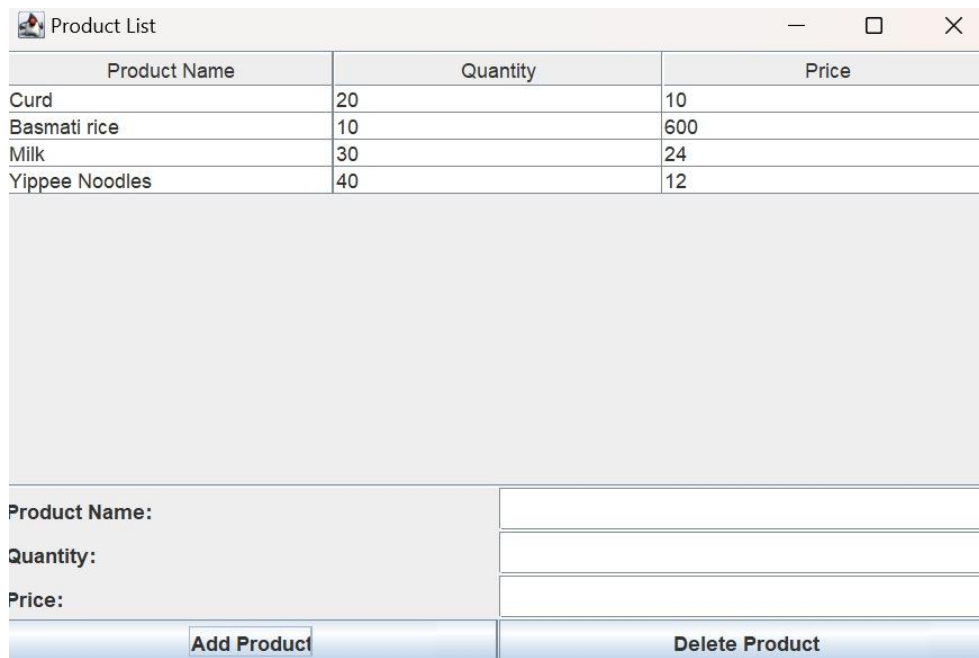


Figure 4.7



A screenshot of a software window titled "Product List". The window contains a table with three columns: "Product Name", "Quantity", and "Price". The table lists four items: "Curd" (Quantity: 20, Price: 10), "Basmati rice" (Quantity: 10, Price: 600), "Milk" (Quantity: 30, Price: 24), and "Yippee Noodles" (Quantity: 40, Price: 12). Below the table is a large empty rectangular area. At the bottom of the window, there are three input fields labeled "Product Name:", "Quantity:", and "Price:". To the right of these fields are two buttons: "Add Product" and "Delete Product".

Product Name	Quantity	Price
Curd	20	10
Basmati rice	10	600
Milk	30	24
Yippee Noodles	40	12

Product Name:

Quantity:

Price:

Figure 4.8

3.6 IMPLEMENTATION (CODE)

```
package vikkinventorysys;

import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import java.sql.*;

public class MainFrame extends JFrame {

    private static final long serialVersionUID = 1L;
    private JPanel contentPane;
    private Connection conn;

    /**
     * Launch the application.
     */
    public static void main(String[] args) {

        EventQueue.invokeLater(new Runnable() {
            public void run() {
                try {
                    MainFrame frame = new MainFrame();
                    frame.setVisible(true);
                } catch (Exception e) {
                    e.printStackTrace();
                }
            }
        });
    }

    /**
     * Create the frame.
     */
    public MainFrame() {
        setTitle("Inventory Management System");
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setBounds(100, 100, 800, 600);

        // Establish database connection
        conn = connectToDatabase();

        // Set up content pane with a border layout for better structure
        contentPane = new JPanel(new BorderLayout());
        setContentPane(contentPane);
    }
}
```

```

// Top panel for logo and app title
JPanel topPanel = new JPanel();
topPanel.setBackground(new Color(70, 130, 180)); // Blueish background
topPanel.setLayout(new FlowLayout(FlowLayout.LEFT, 20, 10));

JLabel logoLabel = new JLabel("LOGO"); // Placeholder for logo
logoLabel.setFont(new Font("Arial", Font.BOLD, 24));
logoLabel.setForeground(Color.WHITE);
topPanel.add(logoLabel);

JLabel titleLabel = new JLabel("Inventory Management System");
titleLabel.setFont(new Font("Arial", Font.BOLD, 24));
titleLabel.setForeground(Color.WHITE);
topPanel.add(titleLabel);

contentPane.add(topPanel, BorderLayout.NORTH);

// Center panel for the menu buttons (Product List, Staff List, etc.)
JPanel centerPanel = new JPanel();
centerPanel.setLayout(new GridLayout(2, 1, 10, 10)); // 2 rows, 1 column, 10px
gaps

// Product List Button
JButton productListButton = new JButton("Product List");
productListButton.setFont(new Font("Arial", Font.PLAIN, 18));
productListButton.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        // Pass the connection to ProductList
        ProductList productList = new ProductList(conn);
        productList.setVisible(true);
    }
});
centerPanel.add(productListButton);

// Staff List Button
JButton staffListButton = new JButton("Staff List");
staffListButton.setFont(new Font("Arial", Font.PLAIN, 18));
staffListButton.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        // Pass the connection to StaffList
        StaffList staffList = new StaffList(conn);
        staffList.setVisible(true);
    }
});
centerPanel.add(staffListButton);

```

```

contentPane.add(centerPanel, BorderLayout.CENTER);

// Bottom panel for login/logout buttons
JPanel bottomPanel = new JPanel(new FlowLayout(FlowLayout.RIGHT, 20, 10));
JButton loginButton = new JButton("Login");
loginButton.setFont(new Font("Arial", Font.PLAIN, 16));
loginButton.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        Login loginPage = new Login();
        loginPage.setVisible(true);
    }
});
bottomPanel.add(loginButton);

JButton logoutButton = new JButton("Logout");
logoutButton.setFont(new Font("Arial", Font.PLAIN, 16));
bottomPanel.add(logoutButton);

contentPane.add(bottomPanel, BorderLayout.SOUTH);

// Add a window listener to close the database connection when the window is
closed
addWindowListener(new WindowAdapter() {
    @Override
    public void windowClosing(WindowEvent e) {
        closeDatabaseConnection();
    }
});
}

/**
 * Establish a connection to the MySQL database.
 */
private Connection connectToDatabase() {
    try {
        String url = "jdbc:mysql://localhost:3306/inventory_system";
        String user = "root";
        String password = "Giridharan@2006"; // replace with your actual password
        Connection connection = DriverManager.getConnection(url, user, password);
        System.out.println("Database connected successfully!");
        return connection;
    } catch (SQLException e) {
        e.printStackTrace();
        JOptionPane.showMessageDialog(this, "Failed to connect to the database: " +
e.getMessage(),
                                "Database Connection Error",
                                JOptionPane.ERROR_MESSAGE);
    }
}

```

```

        return null;
    }
}

/**
 * Close the database connection when the window is closed.
 */
private void closeDatabaseConnection() {
    if (conn != null) {
        try {
            conn.close();
            System.out.println("Database connection closed.");
        } catch (SQLException e) {
            e.printStackTrace();
            JOptionPane.showMessageDialog(this, "Error closing the database
connection: " + e.getMessage(),
            "Database Connection Error",
            JOptionPane.ERROR_MESSAGE);
        }
    }
}
}

```

LOGIN PAGE:

```

package vikkinventorysys;

import java.awt.EventQueue;
import javax.swing.JFrame;
import javax.swing.JPanel;
import javax.swing.border.EmptyBorder;
import javax.swing.JLabel;
import javax.swing.JTextField;
import javax.swing.JPasswordField;
import javax.swing.JButton;
import java.awt.Font;

public class Login extends JFrame {

    private static final long serialVersionUID = 1L;
    private JPanel contentPane;
    private JTextField txtUsername;
    private JPasswordField txtPassword;

```

```

/**
 * Launch the application.
 */
public static void main(String[] args) {
    EventQueue.invokeLater(new Runnable() {
        public void run() {
            try {
                Login frame = new Login();
                frame.setVisible(true);
            } catch (Exception e) {
                e.printStackTrace();
            }
        }
    });
}

/**
 * Create the frame.
 */
public Login() {
    setTitle("Login Page");
    setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    setBounds(100, 100, 450, 300);
    contentPane = new JPanel();
    contentPane.setBorder(new EmptyBorder(5, 5, 5, 5));
    setContentPane(contentPane);
    contentPane.setLayout(null);

    JLabel lblUsername = new JLabel("Username:");
    lblUsername.setFont(new Font("Tahoma", Font.PLAIN, 14));
    lblUsername.setBounds(50, 70, 100, 25);
    contentPane.add(lblUsername);

    txtUsername = new JTextField();
    txtUsername.setBounds(160, 70, 150, 25);
    contentPane.add(txtUsername);
    txtUsername.setColumns(10);

    JLabel lblPassword = new JLabel("Password:");
    lblPassword.setFont(new Font("Tahoma", Font.PLAIN, 14));
    lblPassword.setBounds(50, 120, 100, 25);
    contentPane.add(lblPassword);

    txtPassword = new JPasswordField();
    txtPassword.setBounds(160, 120, 150, 25);
    contentPane.add(txtPassword);
}

```



```

        JButton btnLogin = new JButton("Login");
        btnLogin.setBounds(160, 180, 100, 30);
        contentPane.add(btnLogin);
    }
}

```

PRODUCT LIST:

```

package vikkinventorysys;

import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import javax.swing.table.DefaultTableModel;
import java.sql.*;

public class ProductList extends JFrame {

    private static final long serialVersionUID = 1L;
    private JPanel contentPane;
    private JTable productTable;
    private DefaultTableModel tableModel;
    private Connection conn;

    /**
     * Create the frame.
     */
    public ProductList(Connection connection) {
        this.conn = connection;
        setTitle("Product List");
        setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE);
        setBounds(100, 100, 600, 400);
        contentPane = new JPanel();
        contentPane.setBorder(BorderFactory.createEmptyBorder(10, 10, 10, 10));
        setContentPane(contentPane);
        contentPane.setLayout(new BorderLayout());

        // Create product table model
        tableModel = new DefaultTableModel(new Object[]{"Prod ID", "Product Name",
"Qty", "Price"}, 0);
        productTable = new JTable(tableModel);
        JScrollPane scrollPane = new JScrollPane(productTable);
        contentPane.add(scrollPane, BorderLayout.CENTER);
    }
}

```

```

        // Load products from database and display in table
        loadProducts();

        // Bottom panel for adding and deleting products (you can add more buttons here
        if needed)
        JPanel bottomPanel = new JPanel(new FlowLayout(FlowLayout.RIGHT));
        contentPane.add(bottomPanel, BorderLayout.SOUTH);
    }

    /**
     * Load products from the database and display them in the table.
     */
    private void loadProducts() {
        try {
            // SQL query to select data from 'productlist' table
            String query = "SELECT * FROM productlist";

            Statement stmt = conn.createStatement();
            ResultSet rs = stmt.executeQuery(query);

            // Clear existing rows in the table model
            tableModel.setRowCount(0);

            // Add rows from result set to table model
            while (rs.next()) {
                int prodId = rs.getInt("Prod ID");
                String productName = rs.getString("ProductName");
                int qty = rs.getInt("Qty");
                double price = rs.getDouble("Price");

                // Add the row to the table model
                tableModel.addRow(new Object[]{prodId, productName, qty, price});
            }
        } catch (SQLException e) {
            e.printStackTrace();
            JOptionPane.showMessageDialog(this, "Error loading products: " +
            e.getMessage(),
                                    "Database Error", JOptionPane.ERROR_MESSAGE);
        }
    }
}

package vikkinventorysys;

import javax.swing.*.*;
import javax.swing.table.DefaultTableModel;
import java.awt.*.*;
import java.sql.*.*;

```

```

public class StaffList extends JFrame {
    /**
     *
     */
    private static final long serialVersionUID = 1L;
    private JTable table;
    private JTextField staffNameField, roleField;
    private DefaultTableModel tableModel;

    public StaffList(Object object) {
        setTitle("Staff List");
        setSize(600, 400);
        setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE);
        setLayout(new BorderLayout());

        tableModel = new DefaultTableModel(new Object[]{"ID", "Staff Name", "Role"}, 0);
        table = new JTable(tableModel);
        JScrollPane scrollPane = new JScrollPane(table);
        add(scrollPane, BorderLayout.CENTER);

        JPanel panel = new JPanel();
        panel.setLayout(new GridLayout(3, 2));

        panel.add(new JLabel("Staff Name:"));
        staffNameField = new JTextField();
        panel.add(staffNameField);

        panel.add(new JLabel("Role:"));
        roleField = new JTextField();
        panel.add(roleField);

        JButton addButton = new JButton("Add Staff");
        addButton.addActionListener(e -> addStaff());
        panel.add(addButton);

        JButton deleteButton = new JButton("Delete Staff");
        deleteButton.addActionListener(e -> deleteStaff());
        panel.add(deleteButton);

        add(panel, BorderLayout.SOUTH);

        loadStaffData();
    }

    private void loadStaffData() {
        try (Connection conn = DbConnection.getConnection());

```

```

        Statement stmt = conn.createStatement(); {

        ResultSet rs = stmt.executeQuery("SELECT * FROM stafflist");
        tableModel.setRowCount(0); // Clear existing data

        while (rs.next()) {
            int id = rs.getInt("id");
            String staffName = rs.getString("staff_name");
            String role = rs.getString("role");
            tableModel.addRow(new Object[]{id, staffName, role});
        }
    } catch (SQLException e) {
        e.printStackTrace();
    }
}

private void addStaff() {
    String staffName = staffNameField.getText();
    String role = roleField.getText();

    try (Connection conn = DbConnection.getConnection();
        PreparedStatement pstmt = conn.prepareStatement("INSERT INTO stafflist
(staff_name, role) VALUES (?, ?)")) {

        pstmt.setString(1, staffName);
        pstmt.setString(2, role);
        pstmt.executeUpdate();

        JOptionPane.showMessageDialog(this, "Staff added successfully!");
        loadStaffData(); // Reload data
    } catch (SQLException e) {
        e.printStackTrace();
    }
}

private void deleteStaff() {
    int selectedRow = table.getSelectedRow();
    if (selectedRow == -1) {
        JOptionPane.showMessageDialog(this, "Please select a staff member to
delete.");
        return;
    }

    int id = (int) table.getValueAt(selectedRow, 0);

    try (Connection conn = DbConnection.getConnection();
        PreparedStatement pstmt = conn.prepareStatement("DELETE FROM stafflist

```

```
WHERE id = ?")) {

    pstmt.setInt(1, id);
    pstmt.executeUpdate();

    JOptionPane.showMessageDialog(this, "Staff deleted successfully!");
    loadStaffData(); // Reload data
} catch (SQLException e) {
    e.printStackTrace();
}
}
}
```

CHAPTER 5

CONCLUSION AND FUTURE ENHANCEMENT

5.1 CONCLUSION

The Smart Grocery Inventory Solution provides a streamlined and efficient approach to managing inventory in a grocery setting. By automating key tasks like stock tracking, restocking alerts, and sales analysis, this solution not only minimizes manual work but also reduces errors and waste. The system offers real-time data insights that empower store managers to make informed decisions, optimize stock levels, and enhance overall operational efficiency. Additionally, its ability to analyze buying trends allows for improved inventory planning and customer satisfaction, as popular items are more consistently available.

In conclusion, implementing a smart inventory management solution represents a significant step towards modernizing grocery operations, saving time and resources, and creating a data-driven environment that is crucial for staying competitive in today's retail landscape.

5.2 Future Enhancement

Future enhancements for the Java-based Grocery Inventory Solution could include the integration of artificial intelligence (AI) and machine learning for predictive analytics. These technologies can forecast product demand, helping store managers automate restocking decisions based on past sales trends and

customer preferences. Additionally, integrating IoT sensors could enable real-time monitoring of stock levels and product conditions, such as temperature for perishables. Expanding the system to include a mobile app for store owners would allow remote access to inventory updates and notifications. Another enhancement could be the inclusion of blockchain technology to ensure data security and transparency in supply chain management.

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