

**A PROJECT REPORT
ON
“RETAILER BILLING & MANAGEMENT SOFTWARE”
BY
Mr. Deepesh Dattaram Chikane
Mr. Biswajit Arun Biswas**

Towards The Partial Fulfillment of the
Bachelor of Computer Application

**SHAILENDRA EDUCATION SOCIETY'S
COMPUTER CENTER (SESCOM)
Mumbai,**

Tilak Maharashtra Vidyapeeth (Pune)
Department of Computer Science
(2023-2024)

**Under the guidance of
Prof. R. H. Gohel**



CERTIFICATE

This is certify that the project

'RETAILER BILLING & MANAGEMENT SOFTWARE'

Has been successfully competed in the academic year 2023-2024 by

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Towards The Partial Fulfillment of the 'Bachelor of Computer Application',

For the Academic Year **2023-2024** at

SHAILENDRA EDUCATION SOCIETY'S COMPUTER CENTER (SESCOM)
Center, Mumbai,

Tilak Maharashtra Vidyapeeth, Pune (Department of Computer Science),
And it is approved.

Project Guide

Examiner

**Head of Department
[SESCOM-Mumbai]**

DECLARATION

To,

Co-Ordinator,

Shailendra Education Society IT College

Respected Sir,

We, the undersigned student of B.C.A. III (Bachelor in Computer Application) hereby declare the project report entitled “RETAILER BILLING & MANAGEMENT SOFTWARE” written and submitted by us. The empirical binding in this report is based on the data collected by us, while preparing this project report.

From:

Deepesh Dattaram Chikane

Signature1 _____

Biswajit Arun Biswas

Signature2 _____

ACKNOWLEDGMENT

With immense pleasure we are presenting "**Retailer Billing & Management Software**" Project report as part of the curriculum of 'Bachelor of Computer Application'. We wish to thank all the people who gave us unending support.

we express our profound thanks to our head of department **Mr. HOD Bhushan Pimple**, project guide and project in charge **Mr. Hemchandra Kumbhar and Mr. R .H. Gohel** and all those who have indirectly guided and helped us in preparation of this project.

Deepesh Dattaram Chikane

Biswajit Arun Biswas

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Introduction

Introduction :-

In the dynamic world of retail, efficient management of sales, inventory, and employee operations is essential for the success of any business. Our project, the "RETAILER BILLING & MANAGEMENT SOFTWARE" is designed to streamline these crucial aspects of retail management, offering a comprehensive solution tailored for retailers of all scales.

This software serves as a centralized platform for creating bills, managing inventory, and overseeing employee activities, mimicking the functionalities of a sophisticated Point of Sale (POS) system. It empowers retailers to enhance operational efficiency, optimize stock levels, and provide exceptional customer service.

The primary goal of this project is to offer a user-friendly software solution that optimizes retail operations. By digitizing billing processes, inventory tracking, and employee management, retailers can minimize errors, reduce operational costs, and enhance customer satisfaction.

The scope of our software extends to various types of retail businesses, including grocery stores, boutiques, electronics shops, and more. Its modular design allows for customization based on specific business requirements, ensuring flexibility and scalability.

In the "RETAILER BILLING & MANAGEMENT SOFTWARE" developed using Python and SQLite, the system serves as a robust tool for managing retail operations efficiently. This project focuses on maintaining records of sales, inventory, and employee activities within retail settings. The software is designed with two distinct modules: admin and employee, providing tailored functionalities for different user roles.

1.1 Scope of Project :-

The scope of the "RETAILER BILLING & MANAGEMENT SOFTWARE" project encompasses a comprehensive set of features and functionalities aimed at enhancing retail operations and improving overall efficiency.

Billing Management:

User-Friendly Interface: Develop an intuitive billing interface using Tkinter for creating and managing customer invoices.

Product Catalog Management: Enable product selection from a catalog, including adding, editing, and removing products.

Discounts and Promotions: Implement features to apply discounts, promotional offers, and special pricing rules during billing.

Inventory Management:

Real-Time Inventory Tracking: Implement inventory tracking capabilities to monitor stock levels and track product availability.

Stock Replenishment Alerts: Set up automated alerts for low inventory levels to facilitate timely reordering and restocking of products.

Product Categorization: Allow categorization and organization of products for efficient inventory management.

Employee Management:

User Authentication: Implement secure login functionality to authenticate employees accessing the system.

Employee Information Management: Enable the management of employee details, roles, and permissions within the software.

Attendance Tracking: Include features for tracking employee attendance and work hours.

Supplier and Vendor Management:

Supplier Information Storage: Store and manage supplier details, including contact information, product offerings, and transaction history.

Supplier Relationship Management: Facilitate interactions with suppliers for ordering products and managing supplier invoices.

Sales Reporting and Analytics:

Reporting Dashboard: Develop reporting dashboards to visualize sales performance, trends, and key metrics.

Sales Analytics: Implement analytics tools to generate insights into customer behavior, popular products, and revenue trends.

Customizable Reports: Allow customization of reports based on specific business requirements.

User Interface (UI) and Experience (UX):

Intuitive Interface: Design a user-friendly interface using Tkinter with clear navigation and responsive design.

Error Handling: Implement error handling mechanisms to provide informative messages and guide users through the software.

Accessibility: Ensure accessibility features to accommodate users with diverse needs.

Documentation and Support:

User Manuals: Provide comprehensive user manuals and documentation to guide users on software usage and features.

Technical Support: Offer technical support and assistance to address any issues or queries related to the software.

1.2 Existing System and Need for System :-

Existing System:

The existing system for retail billing and management may involve manual processes or outdated software that pose several challenges:

Manual Processes: Many retailers still rely on manual methods for billing, inventory management, and employee supervision, leading to inefficiencies, errors, and delays in operations.

Limited Functionality: Legacy software systems may lack comprehensive features needed for modern retail management, such as real-time inventory tracking, integrated billing, and robust reporting capabilities.

Data Discrepancies: Separate systems for different functions (e.g., billing, inventory) can result in data discrepancies and difficulty in maintaining accurate and synchronized records.

Scalability Issues: Older systems may struggle to scale with the growing demands of a retail business, hindering expansion and adaptation to evolving needs.

Security Concerns: Outdated software may lack modern security features, making retail operations vulnerable to data breaches and unauthorized access.

Need for System:

The identified challenges with the existing system highlight the critical need for a comprehensive "RETAILER BILLING & MANAGEMENT SOFTWARE":

Efficiency and Accuracy: A modern software solution will streamline retail operations, automate processes, and reduce errors associated with manual tasks.

Comprehensive Functionality: The new system will provide advanced features such as real-time inventory management, integrated billing, employee supervision tools, and detailed reporting capabilities.

Retailer Billing & Management Software

Data Integrity and Synchronization: By centralizing functions within a unified system, the software will ensure data consistency and eliminate discrepancies across different operations.

Scalability and Adaptability: The software will be designed to scale seamlessly with the business, accommodating increased transaction volumes, expanding product catalogs, and evolving operational needs.

Enhanced Security: Robust security measures will be implemented to protect sensitive business data, ensuring compliance with industry standards and regulations.

Improved Decision-Making: The system will empower retailers with actionable insights derived from analytics and reporting, facilitating informed decision-making for business growth and optimization.

1.3 Hardware and Software Requirement :-

Hardware Requirements:

Processor:

Minimum: Dual-core processor (e.g., Intel Core i3 or equivalent)

Recommended: Quad-core processor (e.g., Intel Core i5 or higher) for smoother performance, especially with larger datasets and complex operations.

RAM (Memory):

Minimum: 4GB RAM for basic functionality.

Recommended: 8GB RAM or more for improved performance, especially when handling multiple tasks simultaneously.

Storage:

Minimum: 128GB Solid State Drive (SSD) or Hard Disk Drive (HDD) for storing the application and local data.

Recommended: SSD for faster data access and overall system responsiveness.

Display:

Monitor with at least 1280x720 resolution for optimal display of the application's graphical user interface (GUI).

Software Requirements:

Operating System:

Windows 10, macOS, or Linux (Ubuntu, Fedora, etc.) with the latest updates and patches.

1.4 Project category and Tools/Platform:-

Project Category:

The "RETAILER BILLING & MANAGEMENT SOFTWARE" project belongs to the category of desktop applications for retail management. This type of software is designed to run locally on individual client devices (e.g., desktop computers, laptops) without the need for continuous internet connectivity or a centralized server. The software aims to automate and streamline various retail operations, including billing, inventory management, employee management, and sales tracking, to improve efficiency and enhance business processes for retail establishments.

Tools/Platform Used:

Python:

Programming Language: Python is used as the primary programming language for developing the backend logic, business rules, and data processing functionalities of the application.

Tkinter:

GUI Toolkit: Tkinter is utilized to create the graphical user interface (GUI) of the desktop application. Tkinter provides a set of widgets and tools for designing interactive windows, buttons, menus, and forms.

SQLite:

Database Management System (DBMS): SQLite is employed as the embedded database system for storing and managing local data within the application. SQLite is lightweight, easy to set up, and suitable for desktop applications.

Proposed System

The proposed "RETAILER BILLING & MANAGEMENT SOFTWARE" represents a comprehensive solution designed to address the specific needs of retail businesses. This software will leverage Python for its flexible programming capabilities and integrate with a SQLite database for efficient data management. The core objective of this system is to streamline retail operations, improve productivity, and enhance customer service through innovative features and a user-friendly interface.

2.1 Objective:-

The objective of the "RETAILER BILLING & MANAGEMENT SOFTWARE" is to provide a comprehensive and user-friendly desktop application tailored for retail businesses, with the following specific objectives:

Efficient Billing Management:

Streamline the process of creating and managing customer invoices and receipts.

Enable quick and accurate billing transactions with features for product selection, pricing, discounts, and payment options.

Inventory Control and Management:

Facilitate real-time tracking and management of inventory levels, including stock updates, product categorization, and automatic alerts for low stock.

Optimize inventory turnover and minimize stockouts to ensure product availability and customer satisfaction.

Employee Supervision and Management:

Provide tools for managing employee information, roles, and permissions within the retail environment.

Track employee attendance, work hours, and performance to optimize workforce productivity.

Retailer Billing & Management Software

Supplier and Vendor Interaction:

Maintain a database of supplier and vendor details, including contact information, product offerings, and transaction history.

Streamline communication and transactions with suppliers for efficient inventory replenishment and supplier management.

Sales Reporting and Analytics:

Generate comprehensive reports and analytics on sales performance, customer trends, and product profitability.

Visualize key metrics through customizable dashboards to support data-driven decision-making and business growth strategies.

User-Friendly Interface and Experience:

Develop an intuitive and responsive graphical user interface (GUI) using Tkinter for easy navigation and interaction with the application.

Enhance user experience with clear menu structures, form layouts, and interactive elements.

Data Security and Integrity:

Implement robust security measures to protect sensitive data, including user authentication, data encryption, and access controls.

Ensure data integrity and reliability through efficient database management and backup procedures.

Scalability and Adaptability:

Design the software to scale seamlessly with the growing needs of retail businesses, accommodating increased transaction volumes and expanding product catalogs.

Retailer Billing & Management Software

Support future enhancements and integrations with additional features to meet evolving business requirements.

Offline Capability:

Operate as an offline desktop application, allowing retailers to manage operations even without continuous internet connectivity.

Ensure data synchronization and offline data storage capabilities for seamless functionality.

Business Efficiency and Growth:

Enable retail businesses to improve operational efficiency, reduce manual effort, and optimize resource utilization.

Support business growth and competitiveness by providing a robust software solution tailored to retail management needs.

2.2 Benefits :-

The "RETAILER BILLING & MANAGEMENT SOFTWARE" offers several key benefits to retail businesses, empowering them to streamline operations, enhance efficiency, and improve overall business performance. Some of the notable benefits include:

Efficient Billing Process:

Simplifies and accelerates the billing process, reducing manual errors and ensuring accurate transaction records.

Enables quick generation of invoices, receipts, and billing reports for improved customer service.

Inventory Optimization:

Provides real-time inventory tracking and management, minimizing stockouts and overstock situations.

Optimizes inventory turnover and reduces carrying costs by identifying fast-moving and slow-moving items.

Employee Management:

Facilitates effective employee supervision with tools for managing roles, permissions, and work schedules.

Improves workforce productivity through attendance tracking and performance monitoring.

Supplier Relationship Enhancement:

Streamlines communication and transactions with suppliers, improving inventory replenishment processes.

Enables better supplier management by maintaining detailed supplier information and transaction history.

User-Friendly Interface:

Offers an intuitive and responsive user interface, enhancing user experience and minimizing training requirements for staff.

Improves usability with features like search functionality, dropdown menus, and

customizable dashboards.

Data Security and Integrity:

Ensures data security with robust authentication mechanisms, data encryption, and access controls.

Protects sensitive business information and maintains data integrity through efficient database management practices.

Scalability and Adaptability:

Scales seamlessly to accommodate business growth and evolving operational needs.

Supports additional functionalities and integrations to meet changing business requirements.

Cost Savings and Time Efficiency:

Reduces operational costs associated with manual processes and paperwork.

Saves time by automating repetitive tasks and streamlining core business processes.

Business Growth and Competitiveness:

Drives overall business growth by improving operational efficiency, customer service, and decision-making capabilities.

Enhances competitiveness in the retail market by adopting modern technology solutions and best practices.

Preliminary Project Description

The "RETAILER BILLING & MANAGEMENT SOFTWARE" is a comprehensive desktop application designed to streamline and enhance various aspects of retail operations for businesses in the retail sector. This software aims to automate key functions such as billing, inventory management, employee supervision, and supplier interaction, providing retail establishments with an efficient and user-friendly solution to optimize business processes.

3.1 Feasibility Study:-

A feasibility study is essential to assess the viability and potential success of the "RETAILER BILLING & MANAGEMENT SOFTWARE" project. This study evaluates various aspects including technical, economic, operational, and scheduling feasibility to determine if developing and implementing the software is feasible and beneficial for the intended stakeholders.

1. Technical Feasibility:

Technology Stack: Assess the technical capabilities of Python, Tkinter, and SQLite for developing the required functionalities.

Integration: Evaluate the feasibility of integrating database management, GUI development, and business logic using the chosen technologies.

Scalability: Ensure the software architecture supports scalability to accommodate future growth and feature enhancements.

2. Economic Feasibility:

Cost-Benefit Analysis: Evaluate the cost of development, including software tools, developer resources, and infrastructure.

Return on Investment (ROI): Assess potential benefits such as increased efficiency, reduced operational costs, and improved profitability for retail businesses.

Budget Considerations: Determine if the project aligns with the available budget and financial resources.

3. Operational Feasibility:

User Acceptance: Evaluate the likelihood of user acceptance and adoption of the software by retail businesses.

Training Needs: Assess training requirements for end-users to effectively utilize the software.

Impact on Operations: Determine how the software will integrate into existing workflows and operational processes within retail establishments.

4. Scheduling Feasibility:

Timeline and Milestones: Define a realistic development timeline based on project scope, resource availability, and technical complexity.

Dependencies: Identify any dependencies or constraints that may impact project delivery and implementation.

Risk Assessment: Evaluate potential risks and mitigation strategies to ensure timely completion of the project.

3.2 Conclusion:-

Based on the feasibility study, the "RETAILER BILLING & MANAGEMENT SOFTWARE" project appears technically feasible with the chosen technology stack (Python, Tkinter, SQLite) capable of delivering the required functionalities. From an economic perspective, the project's potential benefits in terms of increased efficiency, improved inventory management, and enhanced decision-making justify the development costs. Operationally, user acceptance and training considerations will be critical to ensuring successful adoption and integration of the software into retail operations. Scheduling feasibility will depend on efficient project planning, resource allocation, and risk management to meet project milestones and deliverables.

Module

4.1 Admin Module:-

The Admin Module of the "RETAILER BILLING & MANAGEMENT SOFTWARE" is designed to empower administrators or authorized personnel with comprehensive control over various aspects of the retail operations. This module serves as the backbone for managing system settings, user access, data configurations, and overseeing critical functionalities within the software.

Employee Management:

This section allows administrators to manage employee information, including roles, permissions, attendance, and performance tracking.

Supply Management:

Provides tools for managing supplier relationships, including ordering, inventory replenishment, and supplier information.

Category Management:

Enables administrators to organize products into categories for easier navigation and management within the system.

Product Management:

Allows for adding, updating, and removing products from the inventory, including details like pricing, descriptions, and stock levels.

Sales:

Provides access to sales data, including reports on transactions, revenue, and customer insights, facilitating informed decision-making.

Exit:

Offers a convenient option to safely log out of the admin module and exit the software securely.

4.2 Employee Module :-

Product Selection:

Employees can search for products by name or category and add them to the bill by specifying the quantity desired.

Adding to Cart:

Selected products are added to a virtual cart, allowing employees to review and adjust the items before finalizing the bill.

Customer Details:

Employees enter customer information, such as name and contact details, to associate with the bill.

Generating the Bill:

Once the items and customer details are confirmed, employees click on "Generate Bill" to create the invoice.

Printing the Bill:

Employees have the option to print the bill directly if the customer prefers a physical copy.

Emailing the Bill:

Alternatively, employees can choose to email the bill by entering the customer's email address directly into the software. The system then sends the invoice via email to the customer.

Analysis and Design

The current manual data entry system for retail operations is inefficient and prone to errors, resulting in time wastage and challenges in maintaining accurate records and reports. The system lacks user-friendliness, suffers from manual control issues, and relies heavily on paper-based processes, leading to time-consuming operations and increased risk of errors and redundancy.

Disadvantages of the Present System:

Non-User-Friendly Interface:

Data is not stored in a structured and easily accessible format, making the system less user-friendly and intuitive.

Manual Control and Calculation:

All report calculations are performed manually, increasing the risk of errors and inaccuracies in billing and inventory management.

Paperwork Overload:

The reliance on paper-based visitor logs and manual record-keeping leads to excessive paperwork and storage requirements.

Time-Consuming Processes:

The current system is time-consuming due to manual data entry, report generation, and information retrieval processes.

Solutions:

The "RETAILER BILLING & MANAGEMENT SOFTWARE" addresses these challenges by offering a modern, automated, and user-friendly solution tailored for retail businesses:

Structured Data Storage:

Implement a structured database system (using SQLite) to store and manage product information, customer details, inventory levels, and transaction records efficiently.

Automated Calculations:

Automate billing, inventory management, and reporting processes to eliminate manual errors and ensure accurate calculations.

Digital Record-Keeping:

Replace paper-based visitor logs with digital records and reports accessible within the software, reducing paperwork and storage requirements.

Time Efficiency:

Streamline operations with intuitive user interfaces (developed with Tkinter) and automated workflows to save time and improve productivity.

Features:

User-Friendly Interface:

Develop a structured and intuitive user interface for easy navigation and data entry, improving user experience and efficiency.

Automated Billing and Inventory Management:

Enable automated billing processes, inventory updates, and real-time reporting to minimize manual intervention and errors.

Digital Records and Reports:

Retailer Billing & Management Software

Store and retrieve data digitally, allowing quick access to customer information, sales reports, and inventory status without the need for manual re-typing.

Efficient Time Management:

Reduce time spent on administrative tasks with automated workflows and streamlined processes, enhancing overall operational efficiency.

Design Introduction:-

Design plays a crucial role in the development phase of the "RETAILER BILLING & MANAGEMENT SOFTWARE" by defining the system in sufficient detail to enable its physical realization and implementation. The software design encompasses technical activities such as design, coding, implementation, and testing, all of which are essential for building and verifying the software solution.

Importance of Software Design

In the context of the "RETAILER BILLING & MANAGEMENT SOFTWARE," the design phase holds significant importance as it involves making critical decisions that impact the success of the software implementation, its ease of maintenance, reliability, and overall quality. This phase is where customer requirements are accurately translated into a tangible software system that meets the needs of retail businesses.

Design Activities:

Analysis and Specification:

Translate software requirements into detailed specifications, outlining functional and non-functional aspects of the system such as billing processes, inventory management, user roles, and reporting requirements.

Preliminary Design:

Focus on transforming requirements into a conceptual design, defining the system architecture, database schema (using SQLite), and user interface layout (using Tkinter).

Detailed Design:

Dive deeper into technical aspects including data structures, algorithms, module interactions, and integration strategies to ensure robustness and scalability of the software.

Goals of Software Design:

Quality Assurance:

Foster quality in development by designing a system that meets performance, usability, security, and reliability standards.

Translation of Requirements:

Accurately translate customer requirements into a software representation that fulfills business objectives and user needs within the retail environment.

Ease of Maintenance:

Create a design that facilitates ease of maintenance and future enhancements, enabling the software to evolve alongside changing business requirements.

Design Process:

Requirements Analysis:

Gather and analyze software requirements specific to retail billing, inventory management, employee supervision, and supplier interactions.

System Architecture Design:

Define the overall system architecture, identifying components, modules, and their interactions to support desired functionalities.

User Interface Design:

Develop an intuitive and user-friendly graphical interface (GUI) using Tkinter, focusing on usability and accessibility for retail staff.

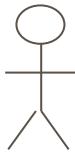
Database Design:

Design a structured database schema using SQLite to efficiently store and retrieve data related to products, customers, transactions, and inventory.

UML Diagrams:

Actor:

A coherent set of roles that users of use cases play when interacting with the use cases.



Use case: A description of sequence of actions, including variants, that a system performs that yields an observable result of value of an actor.



UML stands for Unified Modeling Language. UML is a language for specifying, visualizing and documenting the system. This is the step while developing any product after analysis. The goal from this is to produce a model of the entities involved in the project which later need to be built. The representation of the entities that are to be used in the product being developed need to be designed.

USECASE DIAGRAMS:

Use case diagrams model behavior within a system and helps the developers understand of what the user require. The stick man represents what's called an actor.

Use case diagram can be useful for getting an overall view of the system and clarifying who can do and more importantly what they can't do.

Use case diagram consists of use cases and actors and shows the interaction between the use case and actors.

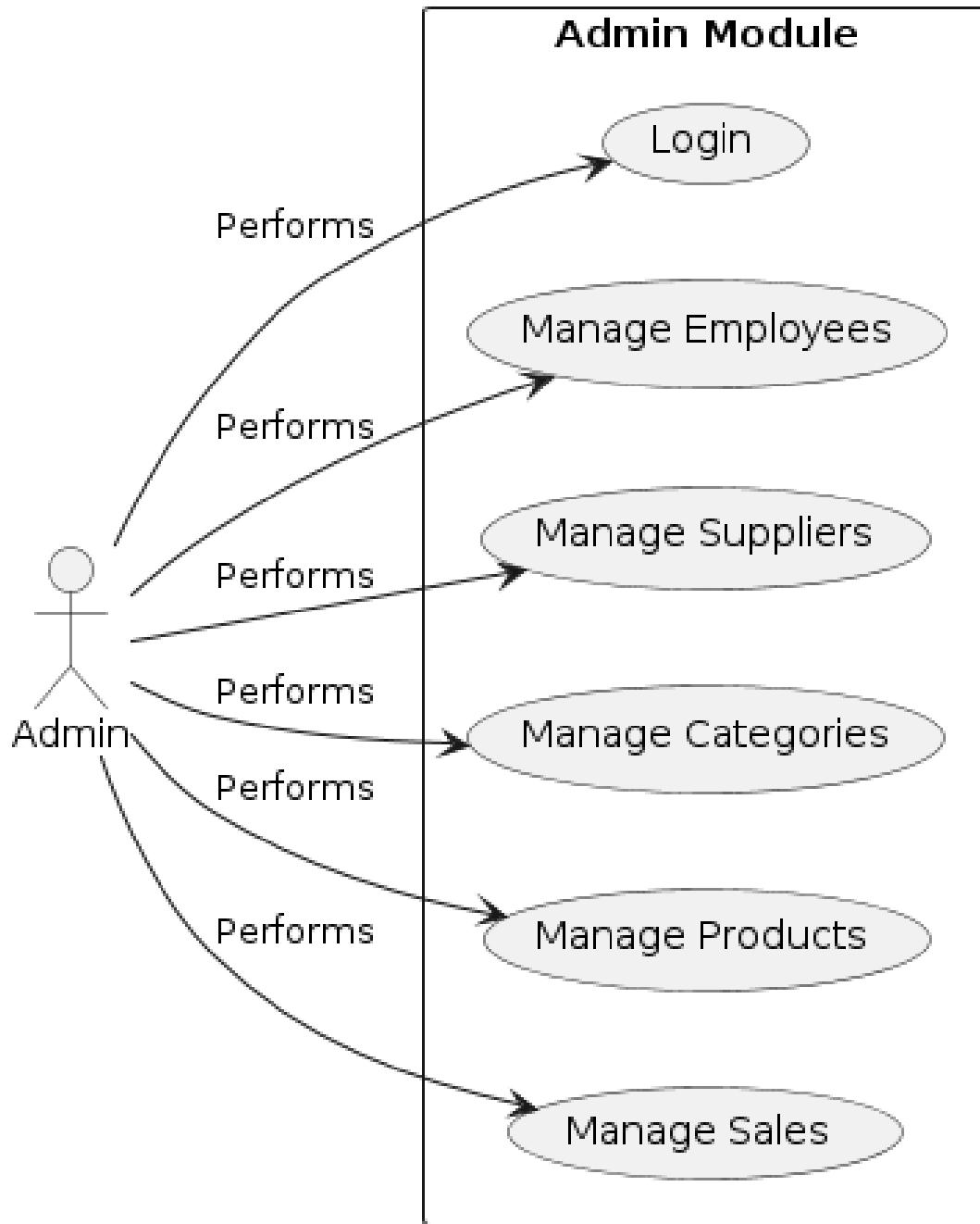
- The purpose is to show the interactions between the use case and actor.
- To represent the system requirements from user's perspective.
- An actor could be the end-user of the system or an external system.

USECASE DIAGRAM:

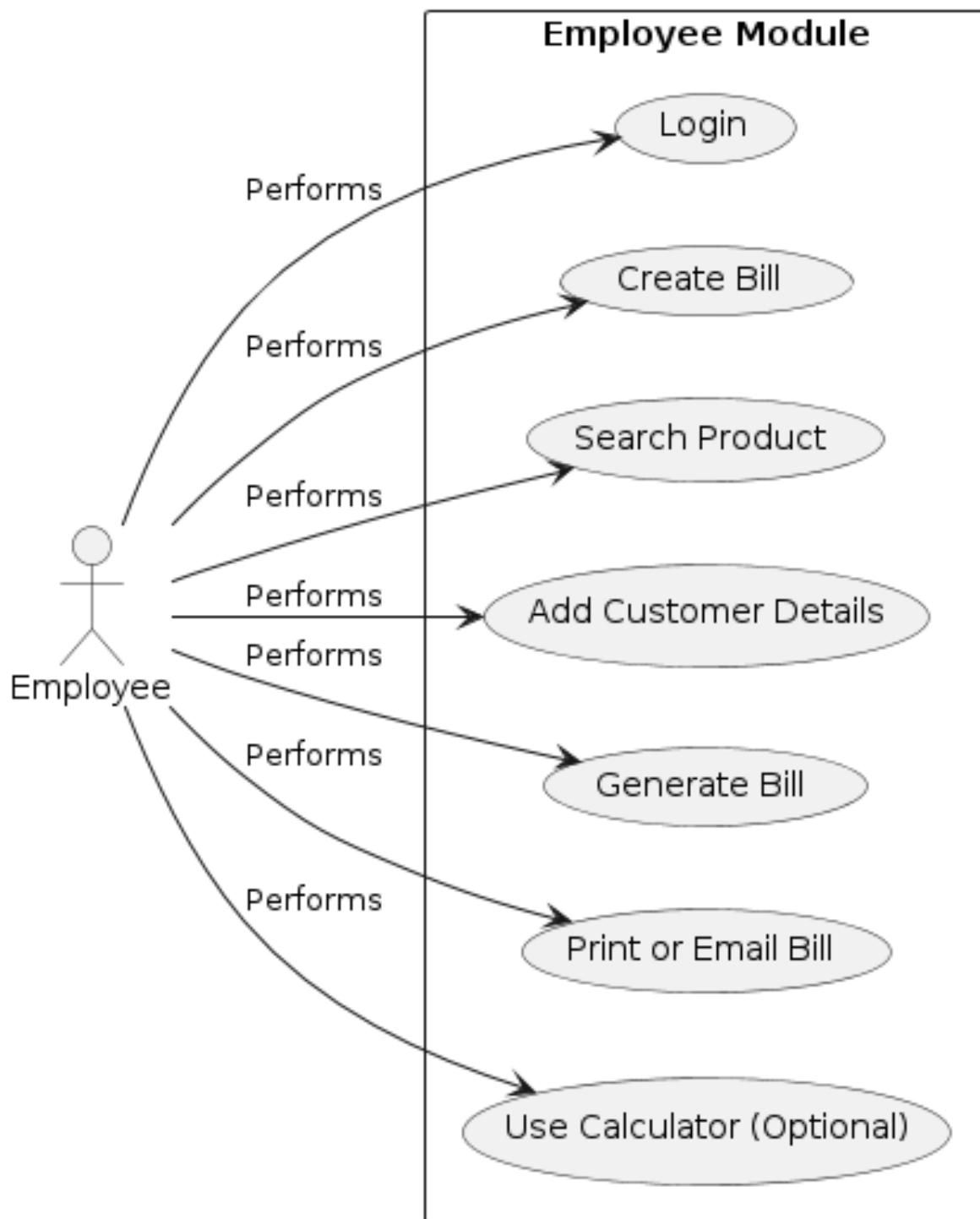
A Use case is a description of set of sequence of actions. Graphically it is rendered as an ellipse with solid line including only its name. Use case diagram is a behavioral diagram that shows a set of use cases and actors and their relationship. It is an association between the use cases and actors. An actor represents a real-world object. Primary Actor – Sender, Secondary Actor Receiver.

Use Case Diagrams:

Admin



Employee

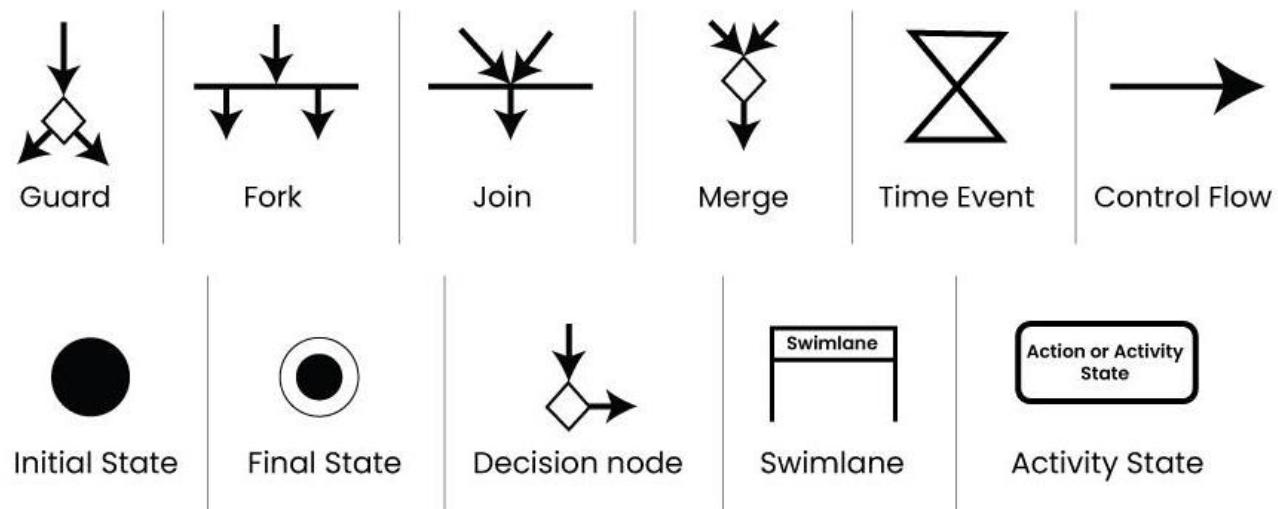


Activity Diagram

Activity diagrams are a type of behavioral diagram used in software engineering to visually represent the dynamic behavior of a system or process. They are part of the Unified Modeling Language (UML) and are widely used to model workflows, business processes, and system behaviors. An activity diagram illustrates the flow of activities within a system, showing how various actions or tasks are sequenced and executed to achieve a specific goal. These diagrams use a set of graphical notations to represent activities, control flows, decisions, concurrency, and other behavioral elements. By capturing the sequence of actions and their relationships, activity diagrams provide valuable insights into the operational aspects of a system, helping stakeholders understand the process flow and identify potential improvements or optimizations.

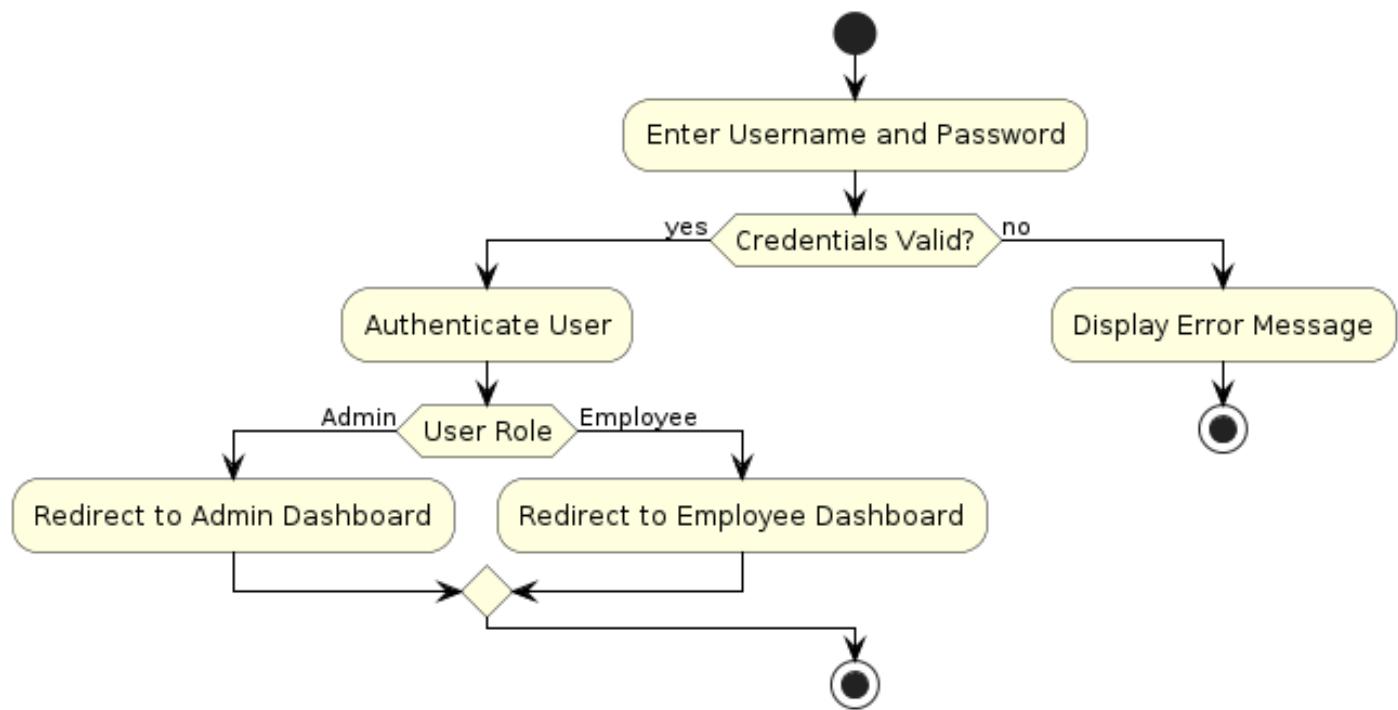
Activity diagrams are particularly effective for visualizing complex processes and interactions involving multiple actors or components within a system. They serve as a powerful tool for requirements analysis, system design, and documentation, allowing stakeholders to communicate and validate system behaviors effectively. Activity diagrams can be used throughout the software development lifecycle, from requirements gathering and design to implementation and testing. They facilitate collaboration among development teams and stakeholders by providing a common visual language to describe and analyze system behaviors and workflows.

In summary, activity diagrams are instrumental in modeling the behavioral aspects of software systems and business processes. They offer a structured and intuitive way to represent process flows, making them essential tools for system architects, business analysts, and software developers seeking to understand and communicate the dynamic behavior of complex systems.



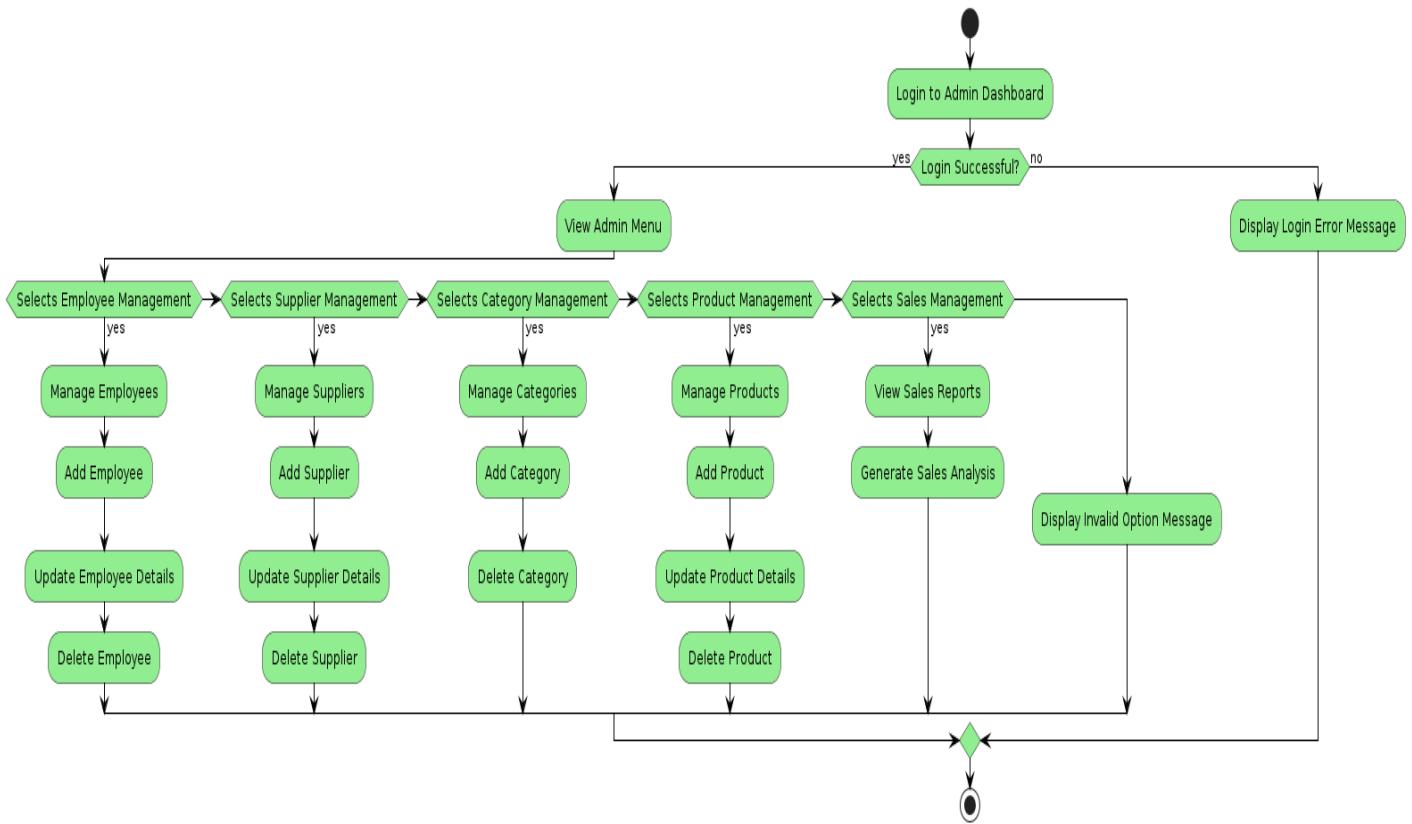
Activity Diagram

Login

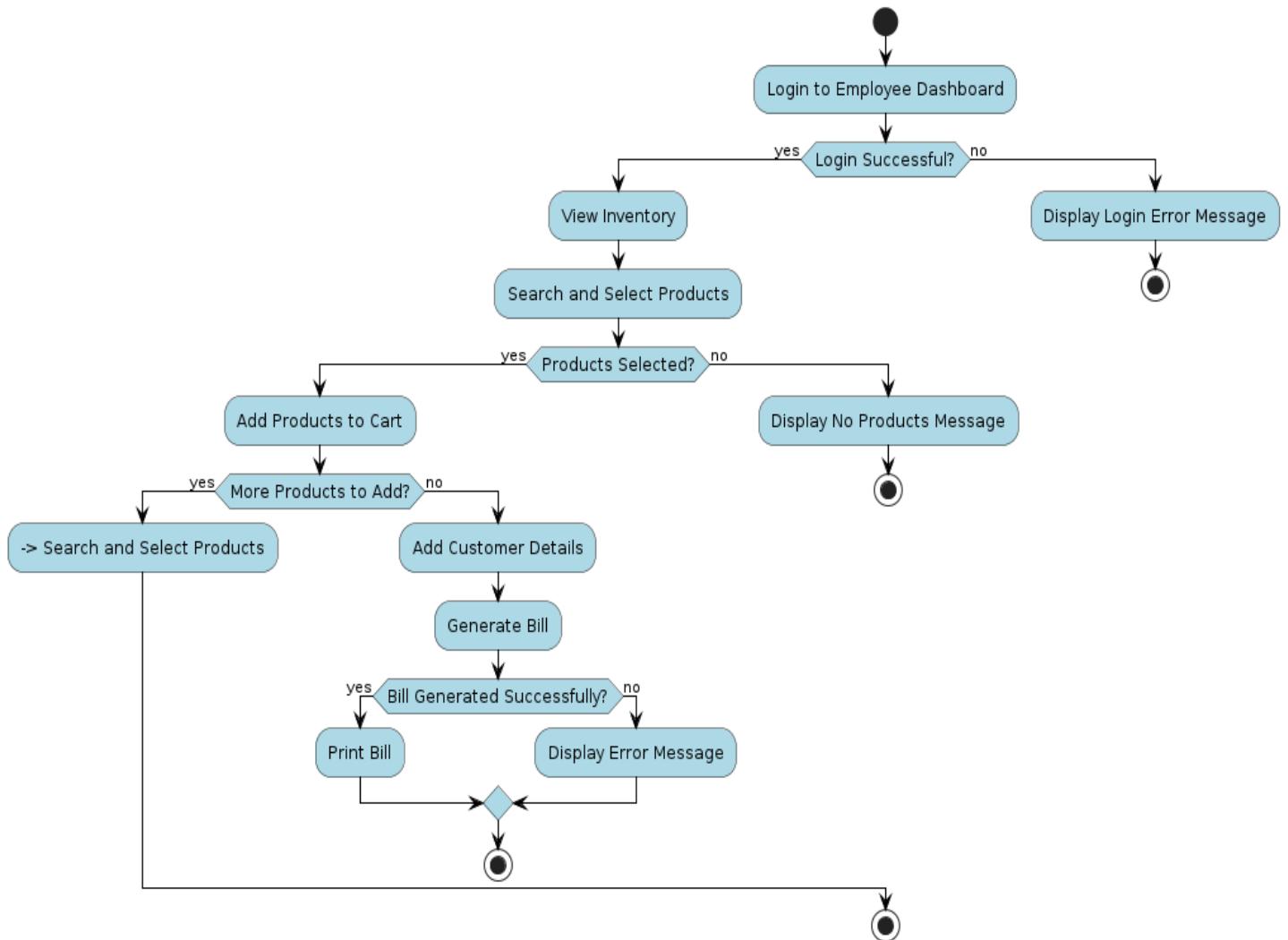


Retailer Billing & Management Software

Admin Dashboard

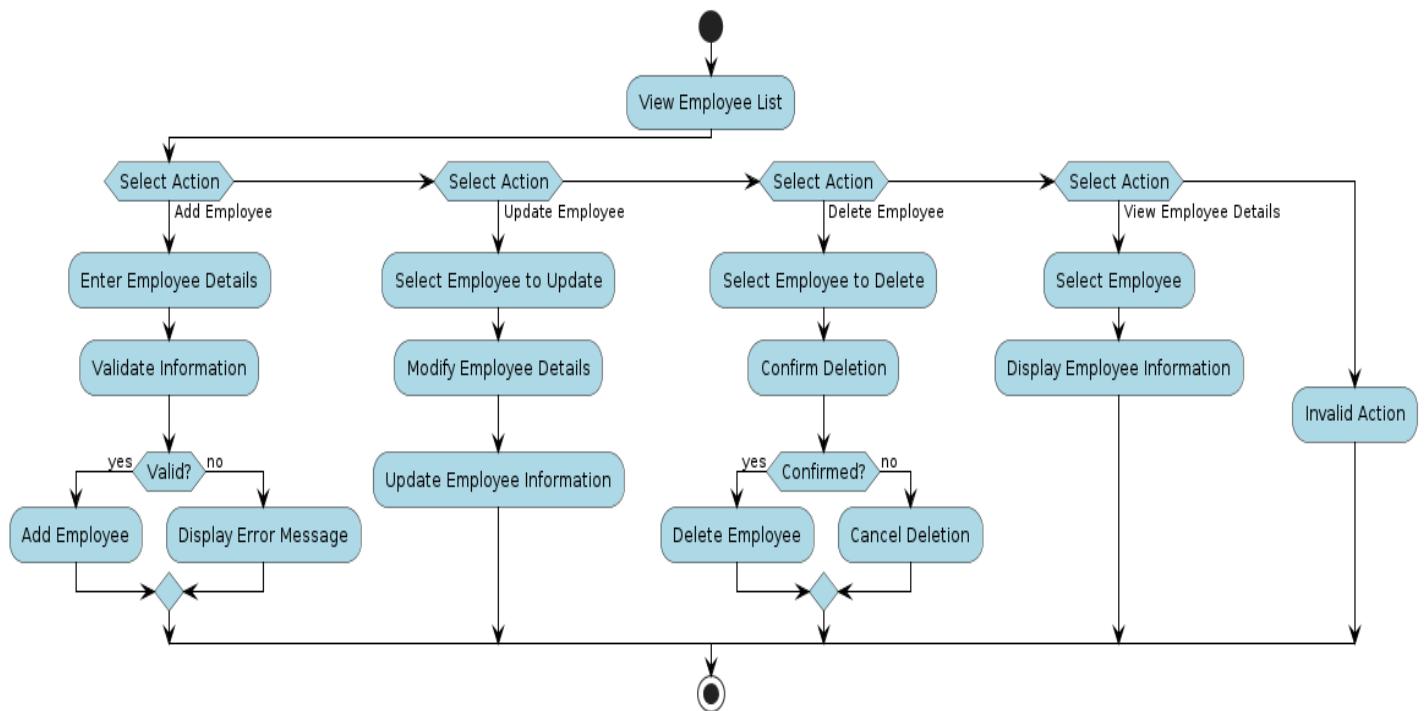


Employee Dashboard

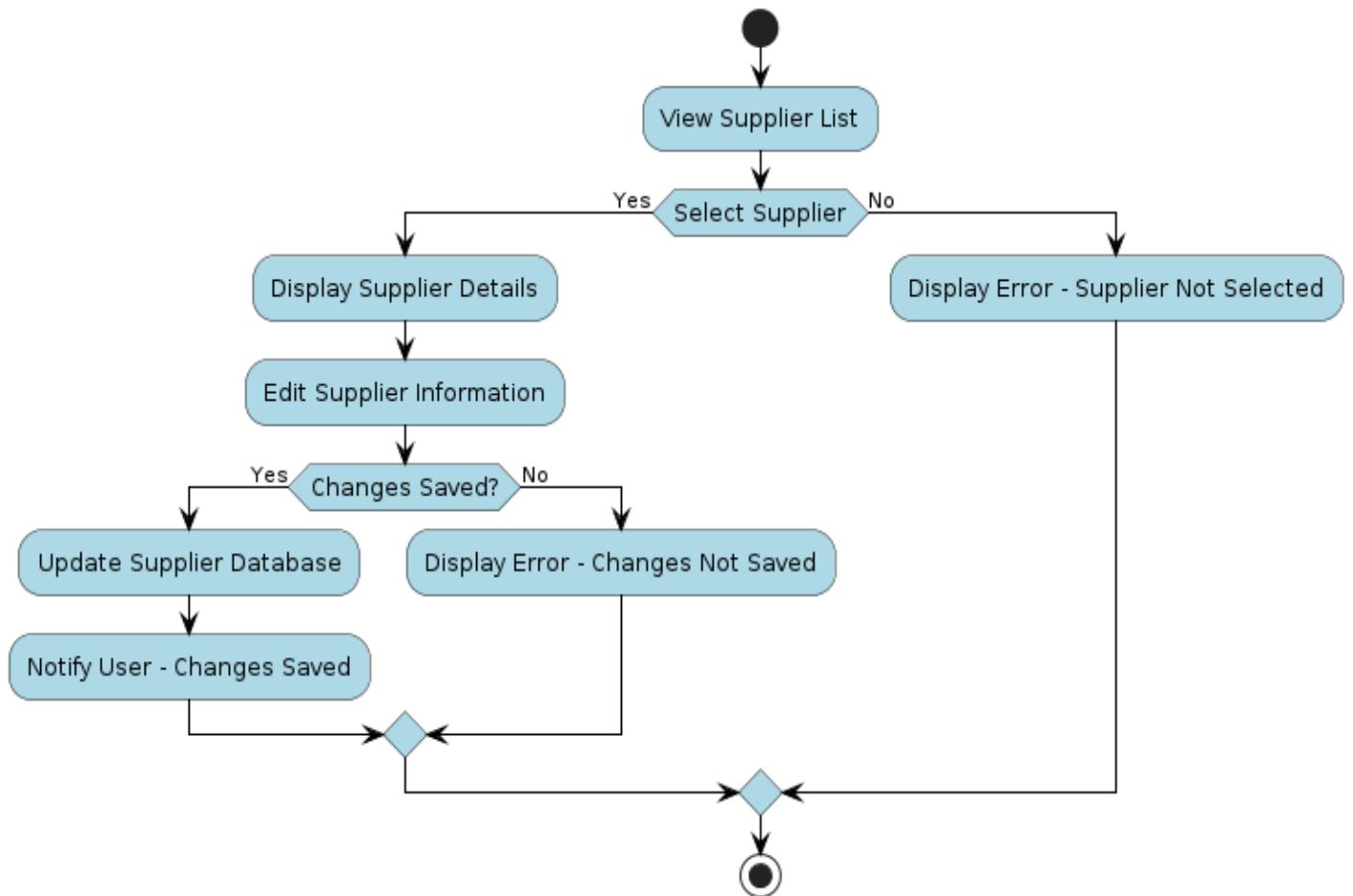


Activity Diagram For The "Admin Dashboard"

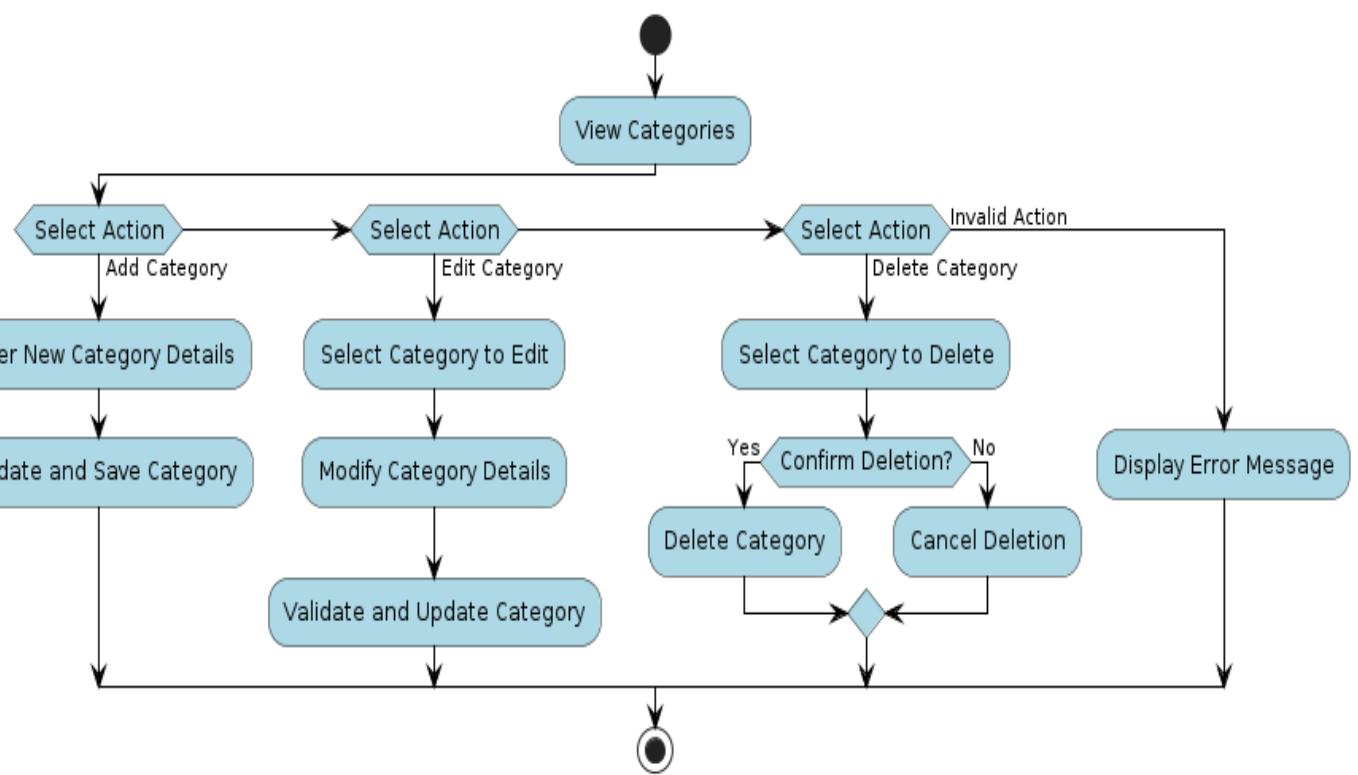
Employee



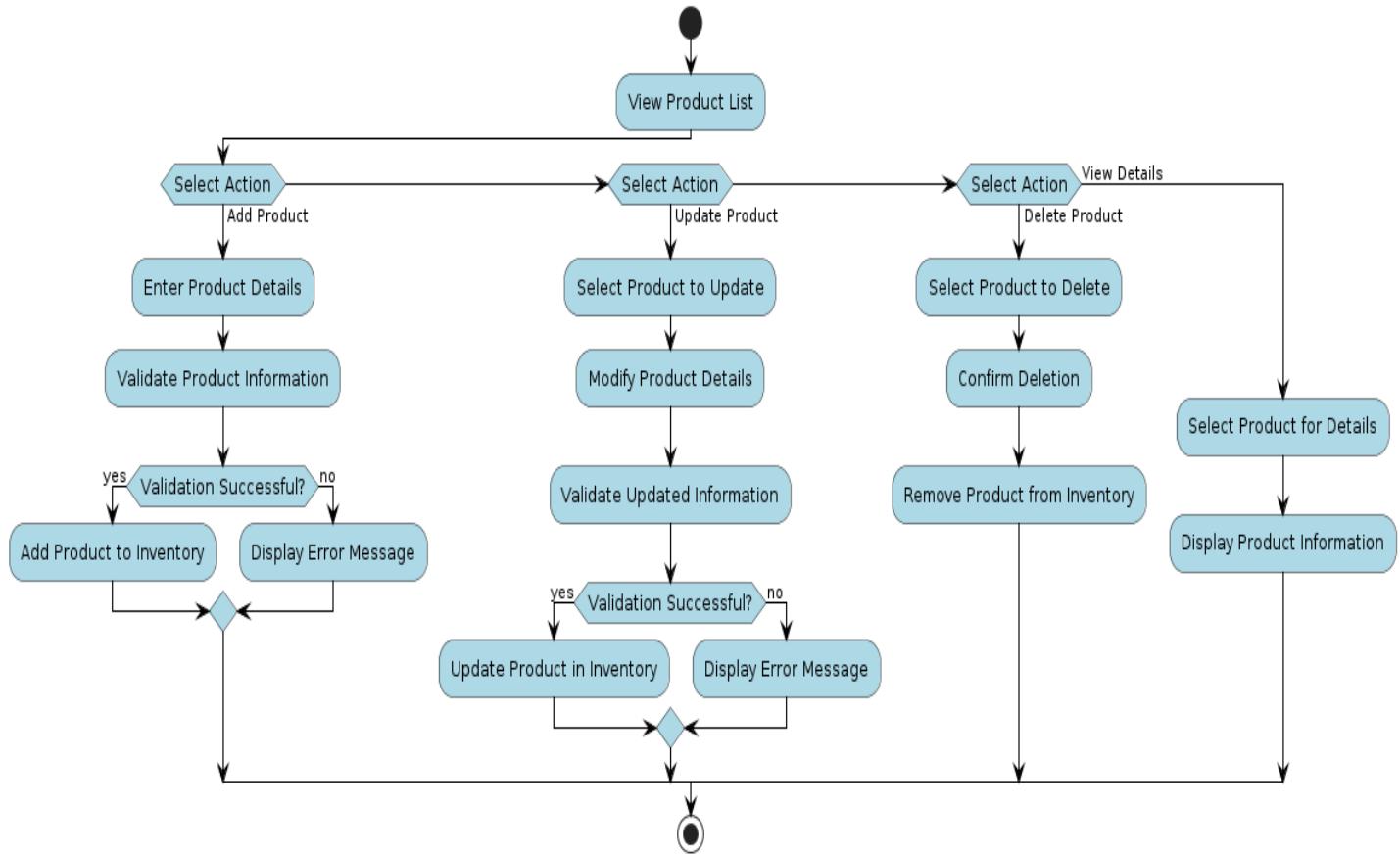
Supplier



Categories



Product



Class Diagrams:

Class diagrams are a type of UML (Unified Modeling Language) diagram used in software engineering to visually represent the structure and relationships of classes within a system i.e. used to construct and visualize object-oriented systems. Class diagrams provide a high-level overview of a system's design, helping to communicate and document the structure of the software. They are a fundamental tool in object-oriented design and play a crucial role in the software development lifecycle.

class notation is a graphical representation used to depict classes and their relationships in object-oriented modeling.

1. Class Name:

The name of the class is typically written in the top compartment of the class box and is centered and bold.

2. Attributes:

Attributes, also known as properties or fields, represent the data members of the class. They are listed in the second compartment of the class box and often include the visibility (e.g., public, private) and the data type of each attribute.

3. Methods:

Methods, also known as functions or operations, represent the behavior or functionality of the class. They are listed in the third compartment of the class box and include the visibility (e.g., public, private), return type, and parameters of each method.

4. Visibility Notation:

Visibility notations indicate the access level of attributes and methods. Common visibility notations include:

+ for public (visible to all classes)

- for private (visible only within the class)

for protected (visible to subclasses)

~ for package or default visibility (visible to classes in the same package).

1. Association

An association represents a bi-directional relationship between two classes. It indicates that instances of one class are connected to instances of another class. Associations are typically depicted as a solid line connecting the classes, with optional arrows indicating the direction of the relationship.

2. Directed Association

A directed association in a UML class diagram represents a relationship between two classes where the association has a direction, indicating that one class is associated with another in a specific way.

In a directed association, an arrowhead is added to the association line to indicate the direction of the relationship. The arrow points from the class that initiates the association to the class that is being targeted or affected by the association.

Directed associations are used when the association has a specific flow or directionality, such as indicating which class is responsible for initiating the association or which class has a dependency on another.

3. Aggregation

Aggregation is a specialized form of association that represents a “whole-part” relationship. It denotes a stronger relationship where one class (the whole) contains or is composed of another class (the part). Aggregation is represented by a diamond shape on the side of the whole class. In this kind of relationship, the child class can exist independently of its parent class.

4. Composition

Composition is a stronger form of aggregation, indicating a more significant ownership or dependency relationship. In composition, the part class cannot exist

independently of the whole class. Composition is represented by a filled diamond shape on the side of the whole class.

5. Generalization(Inheritance)

Inheritance represents an “is-a” relationship between classes, where one class (the subclass or child) inherits the properties and behaviors of another class (the superclass or parent). Inheritance is depicted by a solid line with a closed, hollow arrowhead pointing from the subclass to the superclass.

6. Realization (Interface Implementation)

Realization indicates that a class implements the features of an interface. It is often used in cases where a class realizes the operations defined by an interface.

Realization is depicted by a dashed line with an open arrowhead pointing from the implementing class to the interface.

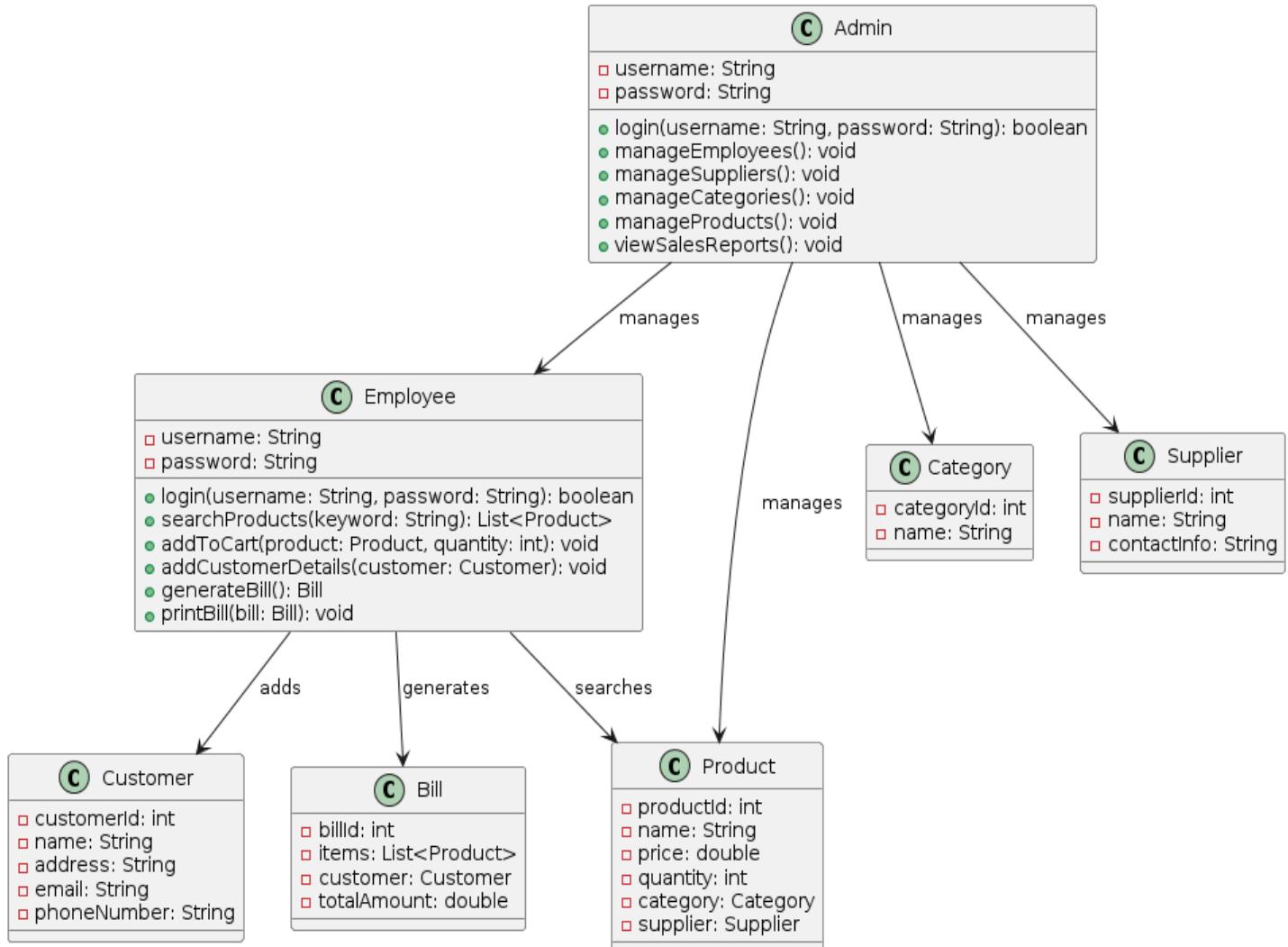
7. Dependency Relationship

A dependency exists between two classes when one class relies on another, but the relationship is not as strong as association or inheritance. It represents a more loosely coupled connection between classes. Dependencies are often depicted as a dashed arrow.

8. Usage(Dependency) Relationship

A usage dependency relationship in a UML class diagram indicates that one class (the client) utilizes or depends on another class (the supplier) to perform certain tasks or access certain functionality. The client class relies on the services provided by the supplier class but does not own or create instances of it.

Class Diagrams Of Admin and Employee



Sequence diagrams

An interaction diagram is used to show the interactive behavior of a system. Since visualizing the interactions in a system can be difficult, we use different types of interaction diagrams to capture various features and aspects of interaction in a system.

A sequence diagram simply depicts the interaction between the objects in a sequential order i.e. the order in which these interactions occur.

We can also use the terms event diagrams or event scenarios to refer to a sequence diagram.

Sequence diagrams describe how and in what order the objects in a system function.

These diagrams are widely used by businessmen and software developers to document and understand requirements for new and existing systems.

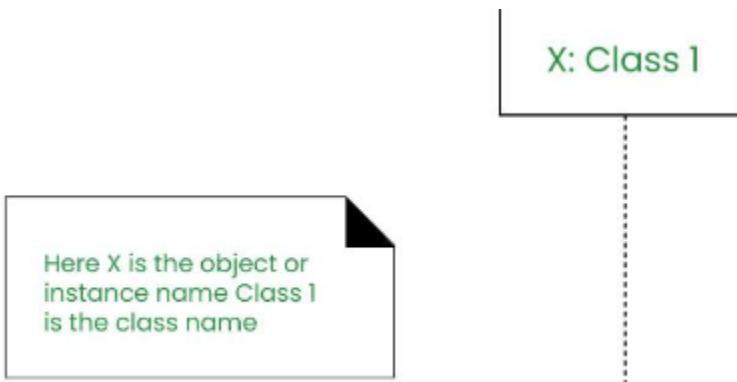
1.1. Actors

An actor in a UML diagram represents a type of role where it interacts with the system and its objects. It is important to note here that an actor is always outside the scope of the system we aim to model using the UML diagram.



1.2. Lifelines

A lifeline is a named element which depicts an individual participant in a sequence diagram. So basically each instance in a sequence diagram is represented by a lifeline. Lifeline elements are located at the top in a sequence diagram. The standard in UML for naming a lifeline follows the following format:



1.3. Messages

Communication between objects is depicted using messages. The messages appear in a sequential order on the lifeline.

We represent messages using arrows.

Lifelines and messages form the core of a sequence diagram.

Synchronous messages

A synchronous message waits for a reply before the interaction can move forward. The sender waits until the receiver has completed the processing of the message. The caller continues only when it knows that the receiver has processed the previous message i.e. it receives a reply message.

Asynchronous Messages

An asynchronous message does not wait for a reply from the receiver. The interaction moves forward irrespective of the receiver processing the previous

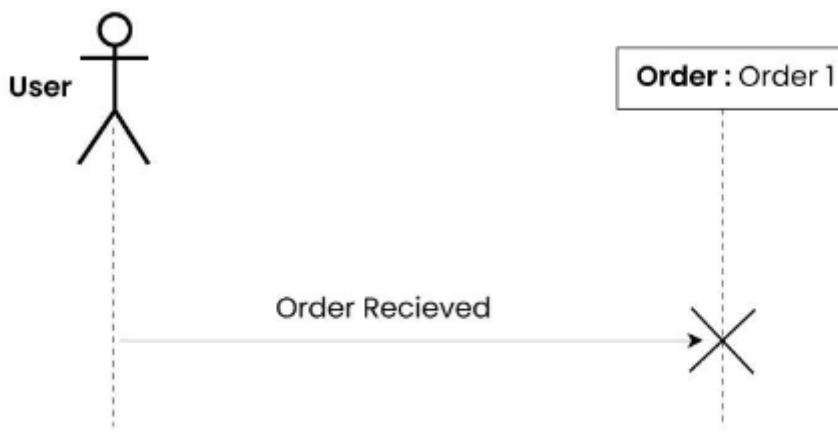
message or not. We use a lined arrow head to represent an asynchronous message.

1.4. Create message

We use a Create message to instantiate a new object in the sequence diagram. There are situations when a particular message call requires the creation of an object. It is represented with a dotted arrow and create word labelled on it to specify that it is the create Message symbol.

1.5. Delete Message

We use a Delete Message to delete an object. When an object is deallocated memory or is destroyed within the system we use the Delete Message symbol. It destroys the occurrence of the object in the system. It is represented by an arrow terminating with a x



1.6. Self Message

Certain scenarios might arise where the object needs to send a message to itself. Such messages are called Self Messages and are represented with a U shaped arrow.

1.7. Reply Message

Reply messages are used to show the message being sent from the receiver to the sender. We represent a return/reply message using an open arrow head with a dotted line. The interaction moves forward only when a reply message is sent by



the receiver.

1.8. Found Message

A Found message is used to represent a scenario where an unknown source sends the message. It is represented using an arrow directed towards a lifeline from an end point.

1.9. Lost Message

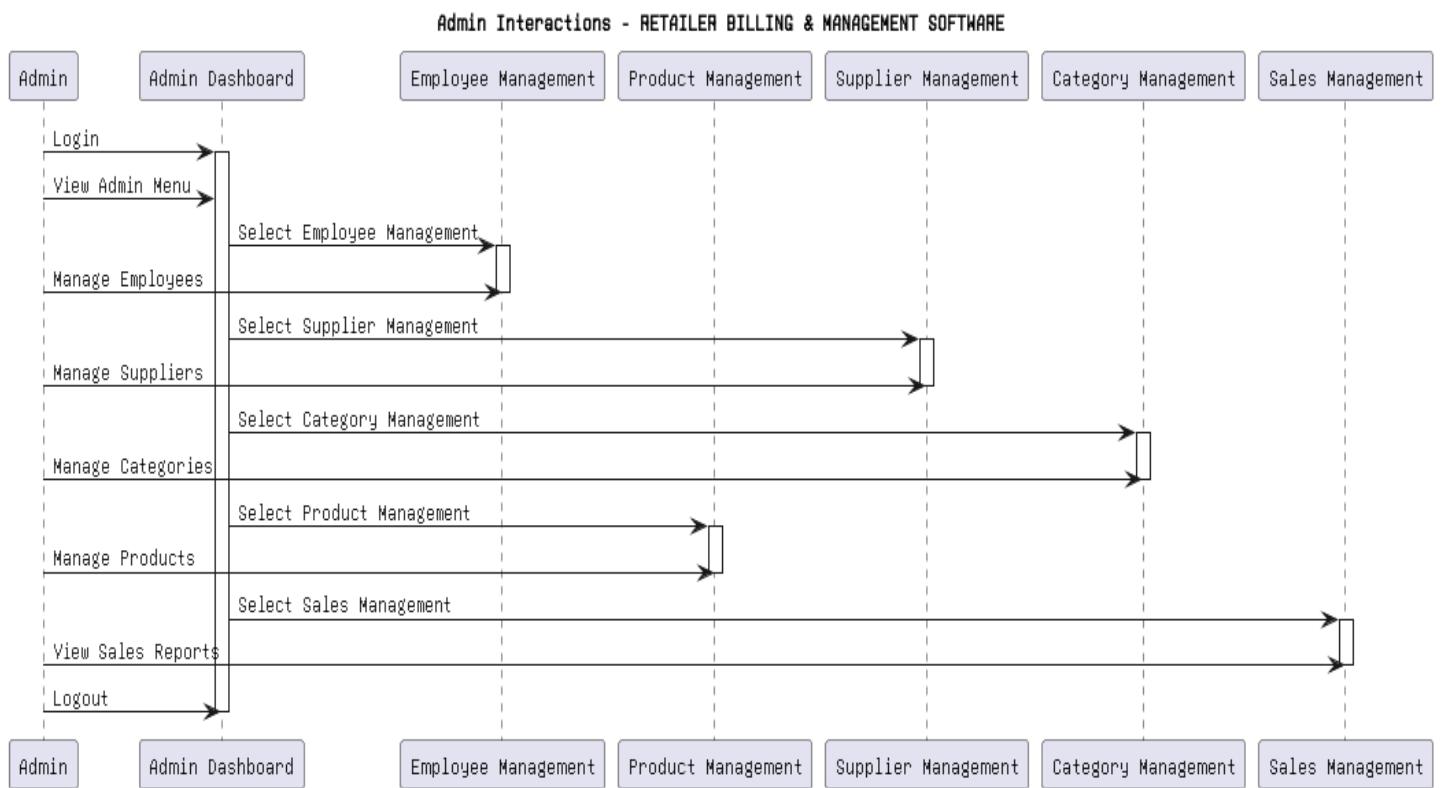
A Lost message is used to represent a scenario where the recipient is not known to the system. It is represented using an arrow directed towards an end point from a lifeline.

1.10. Guards

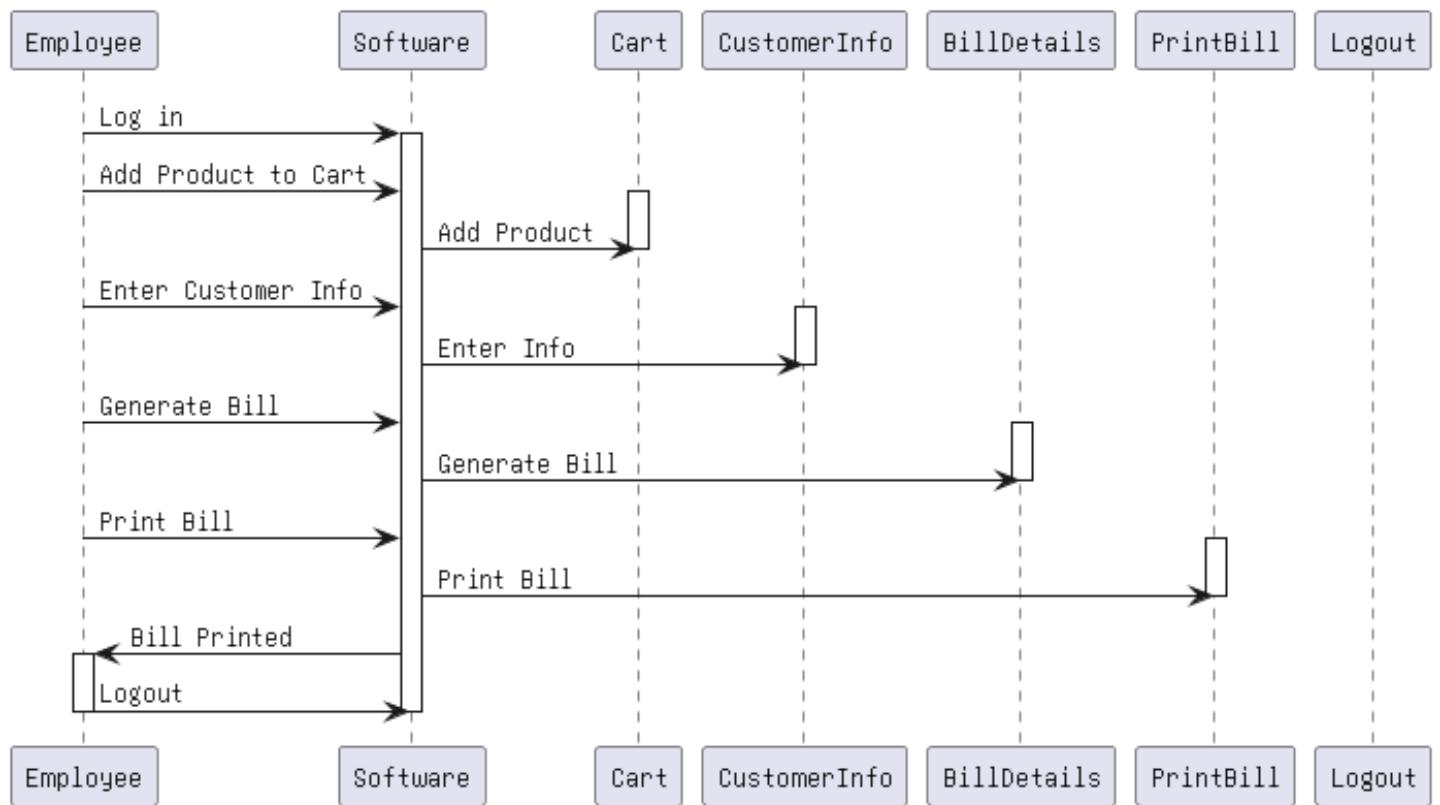
To model conditions we use guards in UML. They are used when we need to restrict the flow of messages on the pretext of a condition being met. Guards play an important role in letting software developers know the constraints attached to a system or a particular process.

Sequence diagrams

Admin



Employee



Entity-Relationship Diagram (ERD):

The Entity-Relationship Diagram (ERD) for the "RETAILER BILLING & MANAGEMENT SOFTWARE" system captures the essential entities, attributes, and relationships involved in managing product inventory, sales transactions, and user interactions. This diagram provides a structured view of the data model used by both administrators (admins) and employees within the software application.

Admin:

The Admin entity represents system administrators who oversee various operations within the software. Admins have attributes such as adminId (unique identifier), username, and password for authentication purposes.

Employee:

The Employee entity represents staff members who interact with the system to manage products, process sales, and assist customers. Employee attributes include employeeId, username, and password for user authentication.

Category:

The Category entity represents product categories, such as Electronics, Clothing, or Groceries. Each category is identified by a categoryId and has a name attribute.

Supplier:

The Supplier entity represents external vendors or suppliers who provide products to the retailer. Supplier entities have attributes like supplierId, name, and contactInfo.

Product:

The Product entity represents individual items available for sale. Each product has attributes such as productId, name, price, and quantity (indicating stock availability).

Customer:

The Customer entity represents individuals who purchase products from the retailer. Customer attributes include customerId, name, address, email, and phoneNumber.

Bill:

The Bill entity represents sales transactions or invoices generated for customer purchases. Each bill is identified by a billId and includes information about the totalAmount payable.

Secondly, the ERD illustrates relationships between these entities:

Admin Relationships:

Admins have relationships (1:N or one-to-many) with categories, suppliers, and products. This means that an admin can manage multiple categories, suppliers, and products.

Employee Relationships:

Employees interact (1:N relationships) with products, allowing them to search for items, add them to carts, and generate bills for customers.

Customer-Bill Relationship:

Customers have a relationship (1:N or one-to-many) with bills, indicating that a customer can have multiple bills associated with their purchases over time.

Functions

Function of Admin Dashboard:

Employee Management:

Add New Employee: Administrators can use this feature to add new employees to the system, entering essential details such as name, contact information, role, and permissions.

Add Admin: This function allows administrators to designate selected employees as administrators, granting them elevated privileges and access rights within the software.

Employee Details: Administrators can view comprehensive details for each employee stored in the system, including personal information, assigned roles, and work-related data.

Update Details: This feature enables administrators to modify employee information as needed, such as updating contact details, changing roles, or adjusting permissions.

Delete Employee Data: Administrators can securely remove employee records from the system when necessary, ensuring data privacy and compliance with company policies.

Access Control: The admin module includes access control functionalities to manage employee permissions, ensuring that each user has appropriate levels of access to the software's features and data.

Supplier Management:

Add Supplier: Administrators can add new suppliers to the system, entering essential details such as supplier name, contact information, and description of the products or services they provide.

Supplier Bill Details: The software allows administrators to record and track supplier bills and transactions, including invoices, payment terms, and outstanding balances.

Supplier Contact Information: Comprehensive contact information for each supplier is stored in the system, enabling easy communication and collaboration.

Category Management:

Add New Category: Administrators can add new product categories to the system, providing a structured hierarchy for organizing products based on type, brand, or other relevant criteria.

Delete Category: The software allows administrators to delete existing categories that are no longer needed or have become obsolete, ensuring a clean and up-to-date category structure.

Product Management:

Add Product: Administrators can add new products by selecting a category, specifying a supplier, and entering details such as product name, price, quantity, and status (e.g., available, out of stock). This ensures comprehensive product information and categorization within the software.

Update Product: The software allows administrators to update existing product details, such as price adjustments, quantity changes, or status updates, ensuring

accurate and up-to-date product information.

Delete Product: Administrators can remove products from the system that are discontinued or no longer carried by the business, maintaining a clean and relevant product catalog.

Sales Management:

Search by Bill Number: Administrators can input a specific bill number into the software's search functionality to retrieve the corresponding sales transaction.

View Detailed Sales Information: Once the sales transaction associated with the specified bill number is located, administrators can view comprehensive details such as items purchased, quantities, prices, total amount, customer information (if applicable), and payment method.

Retrieve Historical Sales Data: The ability to search by bill number enables administrators to access and analyze historical sales data for reporting, auditing, or customer service purposes.

Function of Employee Dashboard:

Product Selection: Employees can search for products by name or category and add them to the bill by specifying the quantity desired.

Adding to Cart: Selected products are added to a virtual cart, allowing employees to review and adjust the items before finalizing the bill.

Customer Details: Employees enter customer information, such as name and contact details, to associate with the bill.

Generating the Bill: Once the items and customer details are confirmed, employees click on "Generate Bill" to create the invoice.

Printing the Bill: Employees have the option to print the bill directly if the customer prefers a physical copy.

Accessible Tool: The calculator is readily available within the billing area, enabling employees to access it seamlessly while creating invoices.

SYSTEM DESIGN

SQLight Data Tables:

Employee Management:

Table in admin dashboard

	eid	name	email ^{v1}	gender	contact	dob	doj	password	utype	address	salary
	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter
1	100	biswajit	biswajit@gmail.com	Male	9584562169	16-09-2000	04-01-2024	biswajit@1	Employee	jamuna tower...	25000
2	200	deepesh	deepesh@gmail.com	select	9958462886	05-01-1996	08-06-2022	deepesh@2	Admin	...	40000
3	102	Divya	divya@gmail.com	Female	9542364587	18-9-2001	23-4-2024	divya@5	Employee	aditya tower...	25000
4	104	Manav	manav23@gmail.com	Male	6370189726	20/08/2001	29/10/2022	manav@23	Employee	BBSR...	30000
5	101	Raj	raj@gmail.com	Male	7329052324	06/04/2002	27/10/2022	raj@24	Employee	BBSR...	40000
6	106	ridhi	ridhi@gmail.com	Female	9958462886	07-03-1999	06-06-2024	ridhi@5	Admin	sai...	40000
7	103	Sidhart	sidhart@gmail.com	Male	9542364587	12-8-2000	12-3-2024	sidhart@5	Employee	rose...	25000
8	105	Sidhi	sidhi@gmail.com	Female	9542364587	12-8-1994	12-1-2024	sidhi@5	Employee	delta...	25000

Supplier Management:

Table in admin dashboard

Bill ^{▼1}	name	contact	desc
Filter	Filter	Filter	Filter
1 111022	RK tradesrs	9877700056	only trade raw Ingredients ...
2 123456	mv traders	9846565160	...
3 173486	Mini Mart	8976586474	We provide all kinds of Quality Grocery items!...
4 256901	Coca Cola	8654785451	All types of cold drinks are provided by us!...
5 374901	Sarada Food Mart	7648437994	Come & take Groceries!...
6 563414	Choco Moco	7890134671	Want chocolates for sell, then Choco Moco is the one stop ...
7 768538	SR Traders	9937378435	We supply all types of grocery items in BBSR region!...

Category Management:

Table in admin dashboard

CID	name
Filter	Filter
1	Rice
2	Dal
3	Wheat
4	Oil
5	Salt
6	Soap
7	Cold drinks
9	decorations

Product Management:

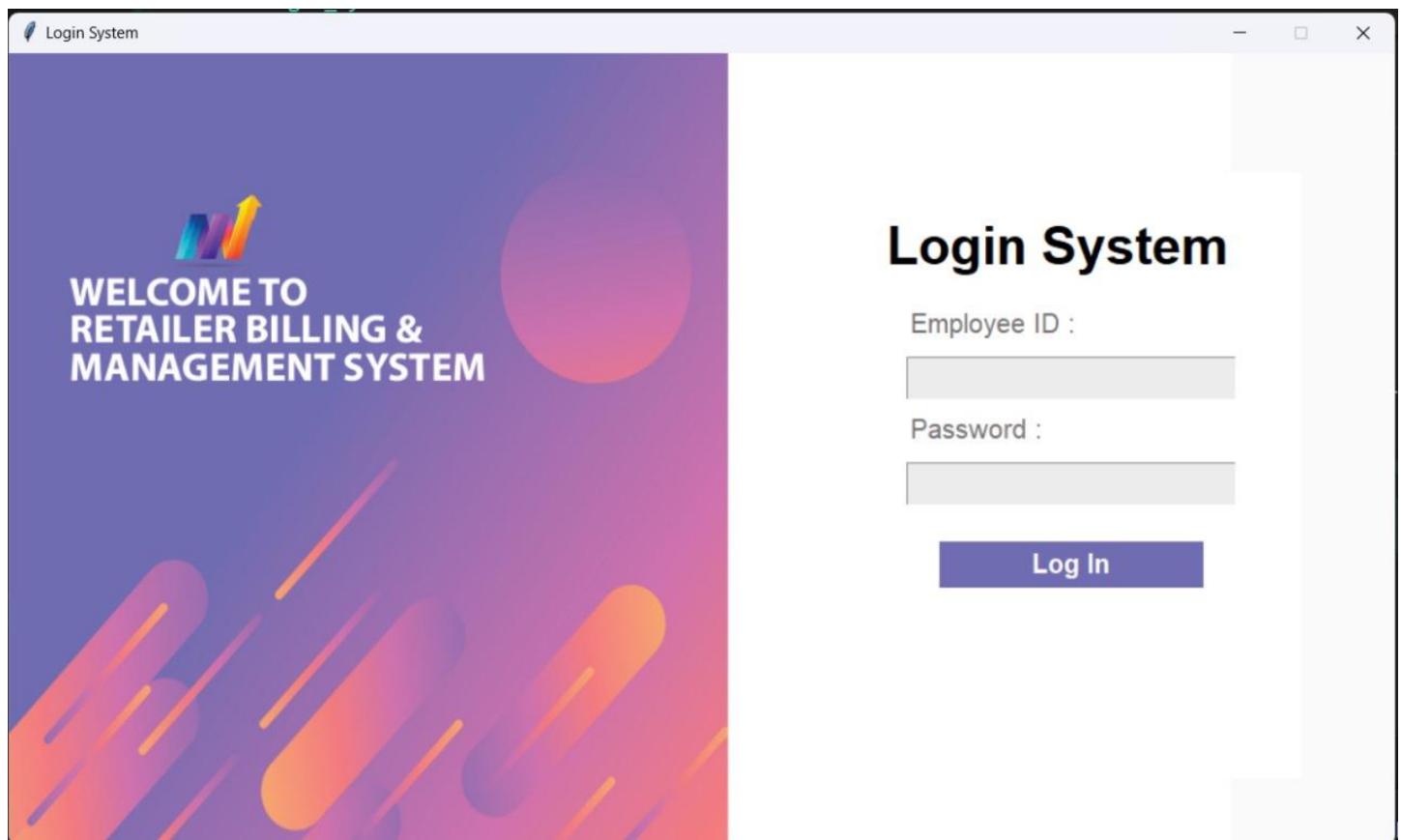
Table in admin dashboard

	pid	Category	Supplier	name	price	qty	status
	Filter	Filter	Filter	Filter	Filter	Filter	Filter
1	1	Rice	Mini Mart	Basumati(5kg pk)	350	50	Active
2	2	Rice	Mini Mart	Basumati(1kg pk)	72	47	Active
3	3	Rice	Sarada Food Mart	Brown Rice(5kg pk)	150	56	Active
4	4	Dal	SR Traders	Arhar(1kg pk)	94	29	Active
5	5	Dal	Sarada Food Mart	Masoor(1kg pk)	60	36	Active
6	6	Dal	Sarada Food Mart	Moong(1kg pk)	74	39	Active
7	7	Wheat	Mini Mart	Aashirbada(5kg pk)	190	40	Active
8	8	Oil	Sarada Food Mart	Sunflower(500ml)	105	30	Active
9	9	Oil	Sarada Food Mart	Fortune(1 Ltr)	155	19	Active
10	10	Salt	SR Traders	TATA Salt(500 gm)	6	95	Active
11	11	Salt	SR Traders	Aashirbada(1 kg)	10	50	Active
12	12	Soap	Mini Mart	Lifebuoy(4pc pk)	40	18	Active
13	13	Soap	Mini Mart	Dettol(100 gm)	35	28	Active
14	14	Soap	Sarada Food Mart	Dove(100 gm)	64	28	Active
15	15	Cold drinks	Coca Cola	Sprite(750 ml)	38	4	Active
16	16	Cold drinks	Coca Cola	Sprite(1.2 L)	65	5	Active
17	17	Cold drinks	Coca Cola	Sprite(2 L)	95	2	Active
18	18	Cold drinks	Coca Cola	Thumbs up(750 ml)	38	8	Active
19	19	Cold drinks	Coca Cola	Thumbs up(1.2 L)	65	6	Active
20	20	Cold drinks	Coca Cola	Thumbs up(2 L)	95	4	Active
21	21	Cold drinks	Coca Cola	Fanta(1 L)	58	4	Active
22	22	Cold drinks	Coca Cola	Fanta(2 L)	58	10	Active
23	23	Chocolate	Choco Moco	Dairy Milk	20	15	Active
24	24	Chocolate	Choco Moco	Dairy Milk(big)	40	13	Active
25	25	Chocolate	Choco Moco	Kit Kat	20	20	Active

User Interface Design

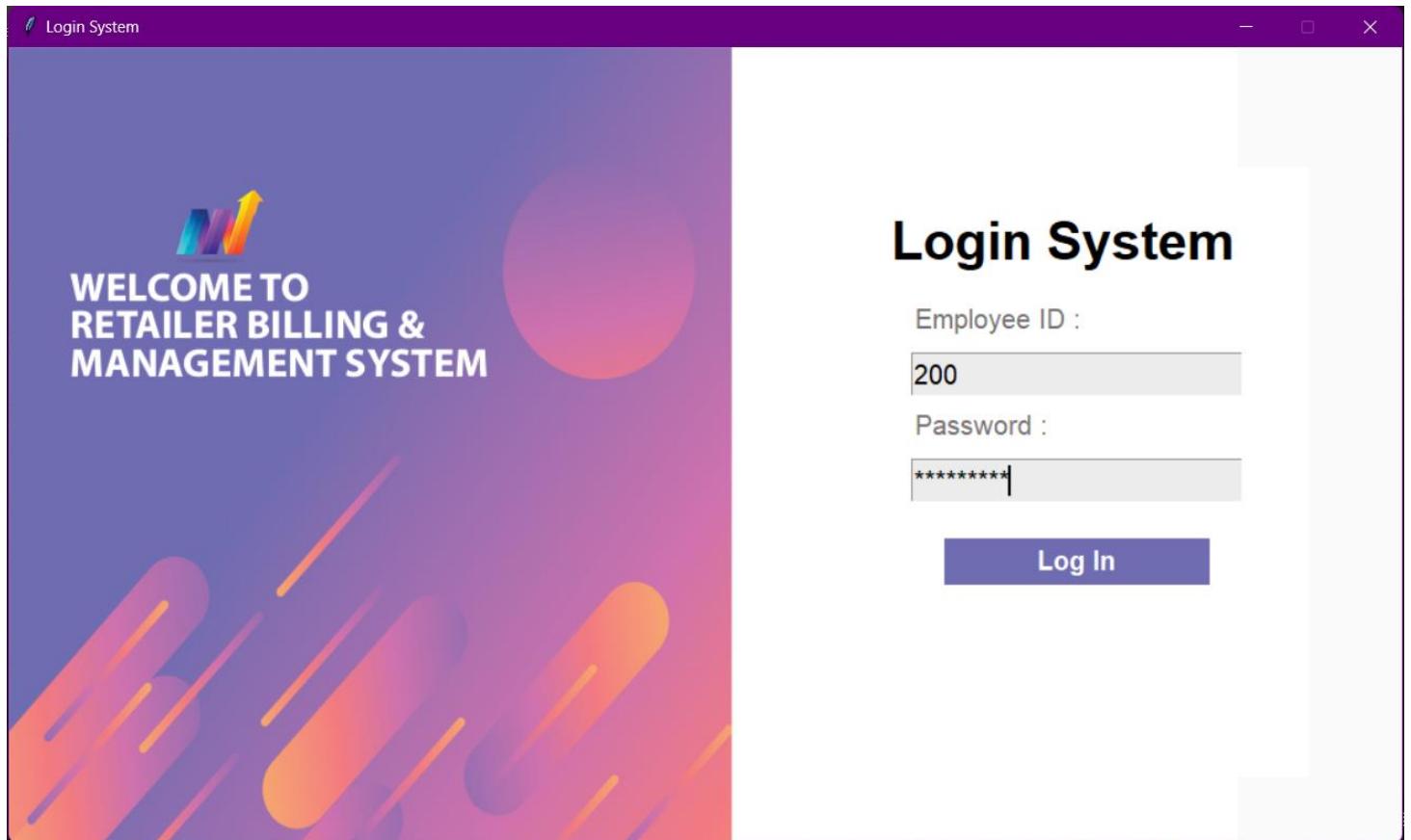
Login page:

Admin/Employee



Login page Fill:

Admin/Employee



Admin Dashboard

The screenshot displays the Admin Dashboard of the Retailer Billing & Management Software. On the left, a sidebar features a user icon and a list of menu items with corresponding icons: Menu (User icon), Employee (Two people icon), Supplier (Delivery truck icon), Category (Three squares icon), Product (Box icon), Sales (Bar chart icon), and Exit (Red circular arrow icon). The main area contains five horizontal bars, each representing a summary metric: "Total Employee [8]" (orange bar), "Total Suppliers [7]" (purple bar), "Total Category [8]" (dark blue bar), "Total Products [31]" (teal bar), and "Total Sales [8]" (green bar). The top and bottom bars are dark blue, and the middle three bars are light-colored with a thin black border. The software title "Retailer Billing & Management Software" is at the top, and a "Logout" button is in the top right corner. A copyright notice "Retailer Billing & management Software | copynght @2024" is at the bottom center.

Retailer Billing & Management Software

Admin Dashboard

Menu 1

Employee Management:

The screenshot shows the software's main window. On the left, there's a vertical sidebar with icons and labels for Menu, Employee, Supplier, Category, Product, Sales, and Exit. The main area has a title bar "Retailer Billing & Management Software" and a "Logout" button. Below the title bar is a search bar with a dropdown menu set to "select". The central part of the screen is titled "Employee Details" and contains input fields for EMP ID, NAME, Email, Address, Gender, D.O.B., Password, Contact, D.O.J., User Type, and Salary. At the bottom of this section are five buttons: Save (green), Update (yellow), Delete (red), Clear (blue), and a small "Logout" button. Below these buttons is a table displaying employee data. The table has columns for EMP ID, NAME, E-mail, Gender, Contact, D.O.B., D.O.J., Password, User Type, Address, and Salary. The data in the table is as follows:

EMP ID	NAME	E-mail	Gender	Contact	D.O.B.	D.O.J.	Password	User Type	Address	Salary
100	biswajit	biswajit@gmail.com	Male	9584562169	16-09-2000	04-01-2024	biswajit@1	Employee	jamuna tower	25000
101	Raj	raj@gmail.com	Male	7329052324	06/04/2002	27/10/2022	raj@24	Employee	BBSR	40000
102	Divya	divya@gmail.com	Female	9542364587	18-9-2001	23-4-2024	divya@5	Employee	aditya tower	25000
103	Sidhart	sidhart@gmail.com	Male	9542364587	12-8-2000	12-3-2024	sidhart@5	Employee	rose	25000
104	Manav	manav23@gmail.com	Male	6370189726	20/08/2001	29/10/2022	manav@23	Employee	BBSR	30000
105	Sidhi	sidhi@gmail.com	Female	9542364587	12-8-1994	12-1-2024	sidhi@5	Employee	delta	25000
106	ridhi	ridhi@gmail.com	Female	9958462886	07-03-1999	06-06-2024	ridhi@5	Admin	sai	40000
200	deepesh	deepesh@gmail.com	select	9958462886	05-01-1996	08-06-2022	deepesh@2	Admin	mera saden	40000

At the bottom of the screen, a footer bar displays the text "Retailer Billing & management Software | copynght @2024".

Retailer Billing & Management Software

Employee Management:

Add, Save, Update, Delete, clear

The screenshot shows the software's main window titled "Retailer Billing & Management Software". On the left, there is a vertical menu bar with icons and labels: "Menu", "Employee", "Supplier", "Category", "Product", "Sales", and "Exit". The "Employee" option is currently selected. The main panel has a purple header "Employee Details". It contains input fields for "EMP ID" (200), "NAME" (deepesh), "Email" (deepesh@gmail.com), "Address" (mera saden), "Gender" (select), "D.O.B" (05-01-1996), "Password" (deepesh@2), "Contact" (9958462886), "D.O.J" (08-06-2022), "User Type" (Admin), and "Salary" (40000). Below these are four buttons: "Save" (green), "Update" (yellow), "Delete" (red), and "Clear" (blue). At the bottom is a table showing employee data:

EMP ID	NAME	E-mail	Gender	Contact	D.O.B	D.O.J	Password	User Type	Address	Salary
100	biswajit	biswajit@gmail.com	Male	9584562169	16-09-2000	04-01-2024	biswajit@1	Employee	jamuna tower	25000
101	Raj	raj@gmail.com	Male	7329052324	06/04/2002	27/10/2022	raj@24	Employee	BBSR	40000
102	Divya	divya@gmail.com	Female	9542364587	18-9-2001	23-4-2024	divya@5	Employee	aditya tower	25000
103	Sidhart	sidhart@gmail.com	Male	9542364587	12-8-2000	12-3-2024	sidhart@5	Employee	rose	25000
104	Manav	manav23@gmail.cc	Male	6370189726	20/08/2001	29/10/2022	manav@23	Employee	BBSR	30000
105	Sidhi	sidhi@gmail.com	Female	9542364587	12-8-1994	12-1-2024	sidhi@5	Employee	delta	25000
106	ridhi	ridhi@gmail.com	Female	9958462886	07-03-1999	06-06-2024	ridhi@5	Admin	sai	40000
200	deepesh	deepesh@gmail.co	select	9958462886	05-01-1996	08-06-2022	deepesh@2	Admin		40000

At the bottom of the main panel, it says "Retailer Billing & management Software | copynght @2024".

Menu 2

Supplier Management:

The screenshot shows the 'Supplier Details' page of the software. On the left, there is a sidebar with a menu icon and several options: Employee, Supplier, Category, Product, Sales, and Exit. The main area has fields for Bill No., Name, Contact, and Description, each with an input box. Below these are four buttons: Save (green), Update (yellow), Delete (red), and Clear (blue). To the right, there is a search bar with 'Bill Number:' and a 'Search' button. A table lists supplier details with columns for Bill No., NAME, Contact, and Description. The table includes entries for various traders like RK traders, Mini Mart, Coca Cola, etc. At the bottom, there is a decorative illustration of two people shaking hands over a globe, surrounded by shipping containers and coins.

Bill No	NAME	Contact	Description
111022	RK traders	9877700056	only trade raw Ingredie
123456	mv traders	984656160	We provide all kinds of
173486	Mini Mart	8976586474	All types of cold drinks
256901	Coca Cola	8654785451	Come & take Groceries
374901	Sarada Food Mart	7648437994	Want chocolates for se
563414	Choco Moco	7890134671	We supply all types of
768538	SR Traders	9937378435	

Supplier Management:

Add, Save, Update, Delete, clear

The screenshot shows the 'Supplier Details' window of the software. On the left, a sidebar menu lists 'Menu', 'Employee', 'Supplier', 'Category', 'Product', 'Sales', and 'Exit', each with an icon. The main window title is 'Supplier Details'. It contains fields for 'Bill No.' (111022), 'Name' (RK tradesrs), 'Contact' (9877700056), and a 'Description' box containing 'only trade raw Ingredients'. Below these are four buttons: 'Save' (green), 'Update' (yellow), 'Delete' (red), and 'Clear' (blue). To the right is a table titled 'Supplier Details' with columns 'Bill No.', 'NAME', 'Contact', and 'Description'. The table lists several suppliers with their details and descriptions.

Bill No	NAME	Contact	Description
111022	RK tradesrs	9877700056	only trade raw Ingredie
123456	mv traders	9846565160	
173486	Mini Mart	8976586474	We provide all kinds of
256901	Coca Cola	8654785451	All types of cold drinks
374901	Sarada Food Mart	7648437994	Come & take Groceries
563414	Choco Moco	7890134671	Want chocolates for se
768538	SR Traders	9937378435	We supply all types of

Menu 3

Category Management:

Add and Delete

The screenshot shows the software interface for managing product categories. At the top, there's a purple header bar with the title "Retailer Billing & Management Software" and a "Logout" button. On the left, a sidebar titled "Menu" lists several options: Employee, Supplier, Category, Product, Sales, and Exit, each with a corresponding icon. The main content area has a blue header "Manage Product category". Below it, there's a text input field labeled "Enter Category Name :" and two buttons: "ADD" (green) and "Delete" (red). In the center, there's a decorative image of shopping carts filled with boxes. To the right, there's a table showing existing categories:

Category ID	NAME
1	Rice
2	Dal
3	Wheat
4	Oil
5	Salt
6	Soap
7	Cold drinks
9	decorations

Menu 4

Product Management:

The screenshot shows the software's main window with a sidebar menu on the left and a central product management form.

Left Sidebar (Menu):

- Employee
- Supplier
- Category
- Product
- Sales
- Exit

Central Form (Manage Product Details):

Form fields include:

- Category : Select
- Supplier : Select
- Product Name :
- Price :
- Quantity :
- Status : Active

Buttons: Save (green), Update (yellow), Delete (red), Clear (blue)

Right Side (Search and Data Grid):

Search Product : Select Search

P ID	Category	Supplier	Name	Price	Qty	Actr
1	Rice	Mini Mart	Basumati(5kg pk)	350	50	Actr
2	Rice	Mini Mart	Basumati(1kg pk)	72	47	Actr
3	Rice	Sarada Food Mart	Brown Rice(5kg p)	150	56	Actr
4	Dal	SR Traders	Arihant(kg pk)	94	29	Actr
5	Dal	Sarada Food Mart	Masoor(1kg pk)	60	36	Actr
6	Dal	Sarada Food Mart	Moong(1kg pk)	74	39	Actr
7	Wheat	Mini Mart	Ashirbada(5kg p)	190	40	Actr
8	Oil	Sarada Food Mart	Sunflower(500ml)	105	30	Actr
9	Oil	Sarada Food Mart	Fortune(1 Ltr)	155	19	Actr
10	Salt	SR Traders	TATA Salt(500 gm)	6	95	Actr
11	Salt	SR Traders	Ashirbada(1 kg)	10	50	Actr
12	Soap	Mini Mart	Lifebuoy(4pc pk)	40	18	Actr
13	Soap	Mini Mart	Dettol(100 gm)	35	28	Actr
14	Soap	Sarada Food Mart	Dove(100 gm)	64	28	Actr
15	Cold drinks	Coca Cola	Sprite(750 ml)	38	4	Actr
16	Cold drinks	Coca Cola	Sprite(1.2 L)	65	5	Actr
17	Cold drink	Coca Cola	Sprite(2 L)	95	2	Actr
18	Cold drinks	Coca Cola	Thumbs up(750 ml)	38	8	Actr
19	Cold drinks	Coca Cola	Thumbs up(1.2 L)	65	6	Actr
20	Cold drink	Coca Cola	Thumbs up(2 L)	95	4	Actr
21	Cold drinks	Coca Cola	Fanta(1 L)	58	4	Actr
22	Cold drinks	Coca Cola	Fanta(2 L)	58	10	Actr
23	Chocolate	Choco Moco	Dairy Milk	20	15	Actr
24	Chocolate	Choco Moco	Dairy Milk(big)	40	13	Actr
25	Chocolate	Choco Moco	Kit Kat	20	20	Actr
26	Chocolate	Choco Moco	Kinder Joy	40	10	Actr

Retailer Billing & management Software | copyright @2024

Retailer Billing & Management Software

Product Management:

Add, Save, Update, Delete, clear

The screenshot shows the software's main window with a sidebar and a central content area.

Left Sidebar (Menu):

- Menu
- Employee
- Supplier
- Category
- Product
- Sales
- Exit

Central Content Area:

Manage Product Details:

Category :	Rice
Supplier :	Mini Mart
Product Name :	Basumati(5kg pk)
Price :	350
Quantity :	50
Status :	Active

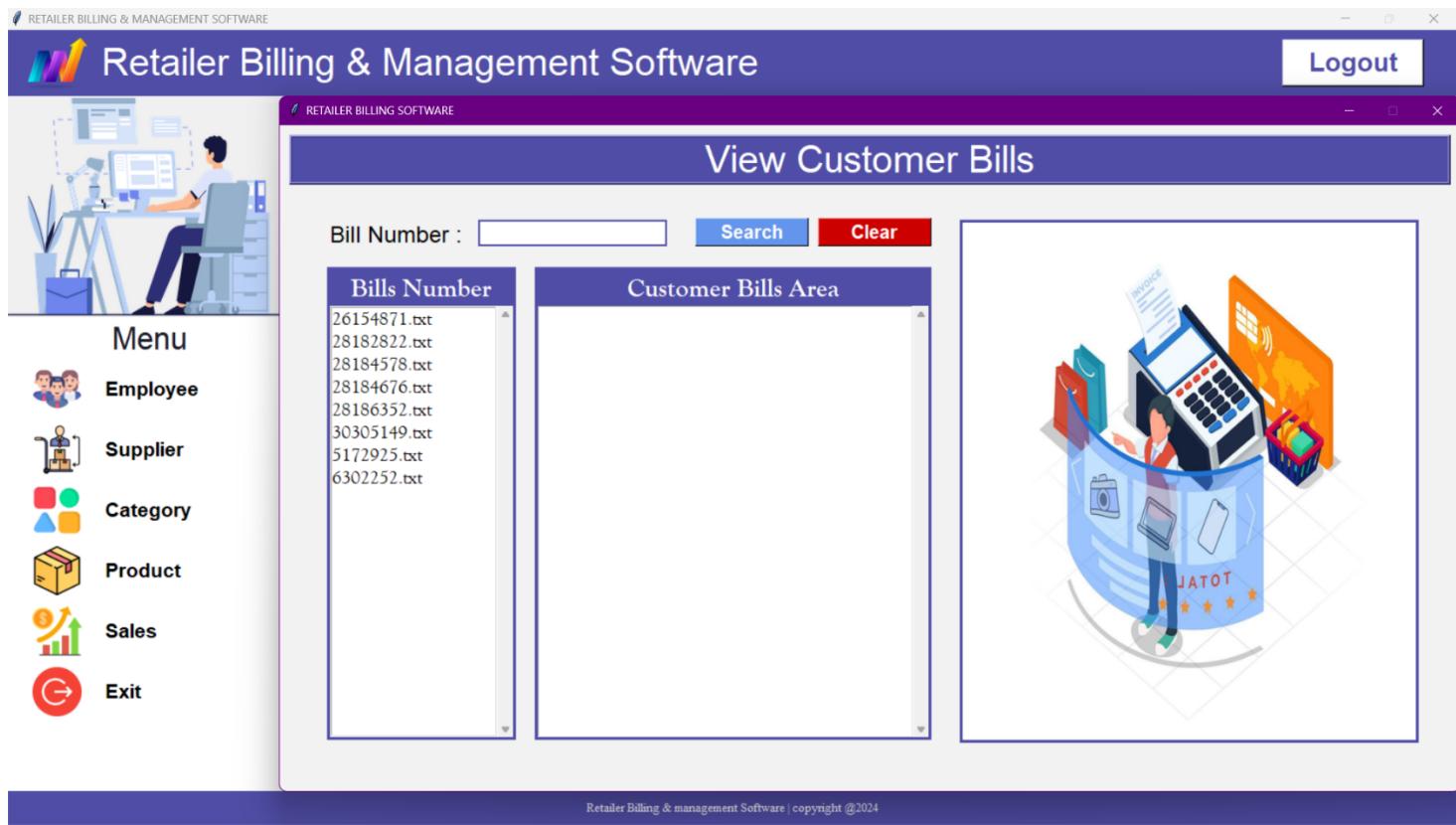
Buttons: Save (Green), Update (Yellow), Delete (Red), Clear (Blue)

Search Product:

P ID	Category	Supplier	Name	Price	Qty	Action
1	Rice	Mini Mart	Basumati(5kg pk)	350	50	Actr
2	Rice	Mini Mart	Basumati(1kg pk)	72	47	Actr
3	Rice	Sarada Food Mart	Brown Rice(5kg p)	150	56	Actr
4	Dal	SR Traders	Arahar(1kg pk)	94	29	Actr
5	Dal	Sarada Food Mart	Masoor(1kg pk)	60	36	Actr
6	Dal	Sarada Food Mart	Moong(1kg pk)	74	39	Actr
7	Wheat	Mini Mart	Aashirbada(5kg p)	190	40	Actr
8	Oil	Sarada Food Mart	Sunflower(500ml)	105	30	Actr
9	Oil	Sarada Food Mart	Fortune(1 Ltr)	155	19	Actr
10	Salt	SR Traders	TATA Salt(500 gm)	6	95	Actr
11	Salt	SR Traders	Aashirbada(1 kg)	10	50	Actr
12	Soap	Mini Mart	Lifebuoy(4pc pk)	40	18	Actr
13	Soap	Mini Mart	Dettol(100 gm)	35	28	Actr
14	Soap	Sarada Food Mart	Dove(100 gm)	64	28	Actr
15	Cold drinks	Coca Cola	Sprite(750 ml)	38	4	Actr
16	Cold drinks	Coca Cola	Sprite(1.2 L)	65	5	Actr
17	Cold drinks	Coca Cola	Sprite(2 L)	95	2	Actr
18	Cold drinks	Coca Cola	Thumbs up(750 ml)	38	8	Actr
19	Cold drinks	Coca Cola	Thumbs up(1.2 L)	65	6	Actr
20	Cold drinks	Coca Cola	Thumbs up(2 L)	95	4	Actr
21	Cold drinks	Coca Cola	Fanta(1 L)	58	4	Actr
22	Cold drinks	Coca Cola	Fanta(2 L)	58	10	Actr
23	Chocolate	Choco Moco	Dairy Milk	20	15	Actr
24	Chocolate	Choco Moco	Dairy Milk(big)	40	13	Actr
25	Chocolate	Choco Moco	Kit Kat	20	20	Actr
26	Chocolate	Choco Moco	Kinder Joy	40	10	Actr

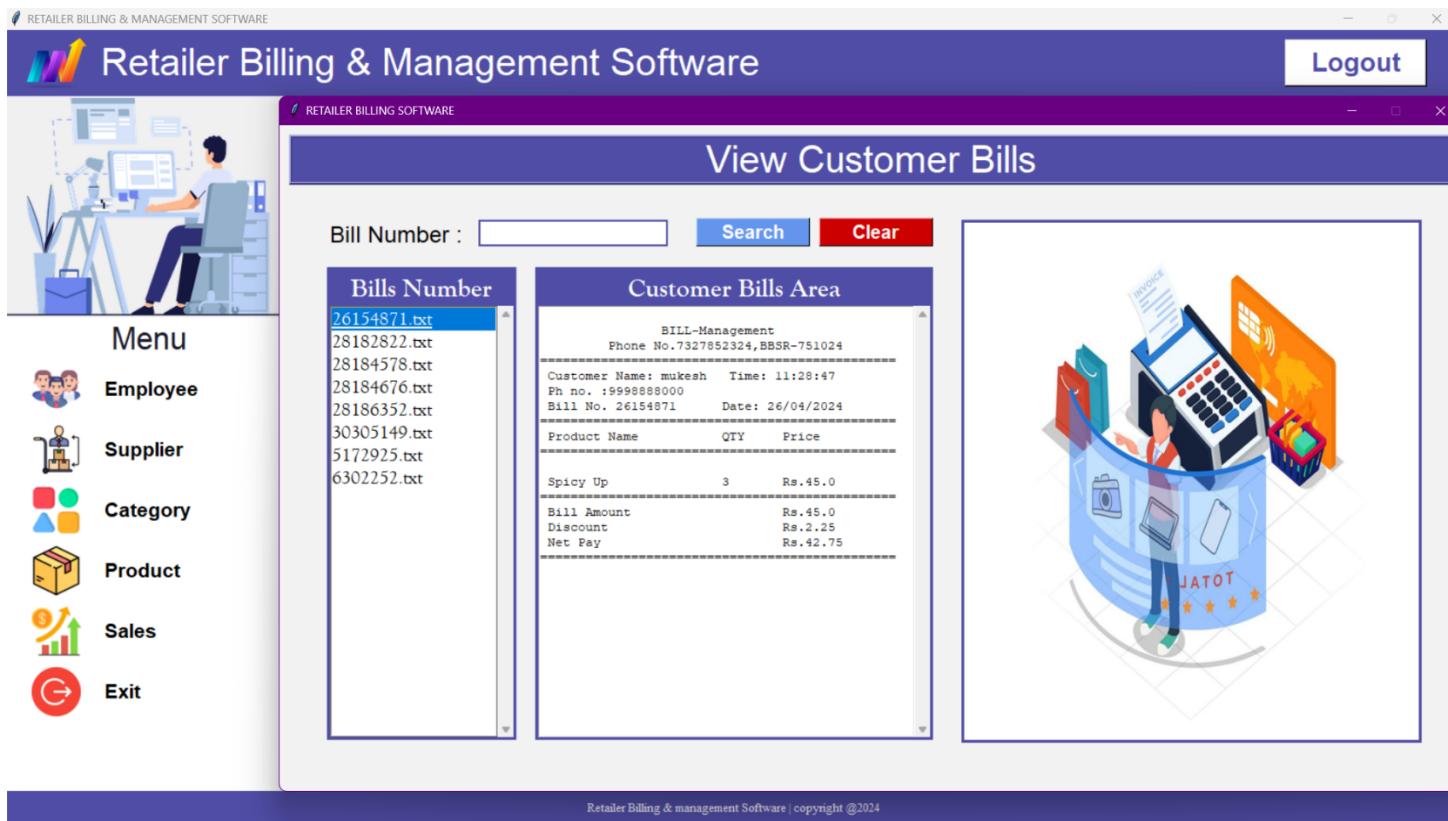
Menu 5

Sales Management



Sales Management:

All Bills



Employee Dashboard

Main Billing Area

The screenshot shows the 'Retail Billing Area' software interface. The top bar displays 'BILLING & MANAGEMENT SOFTWARE', the title 'Retail Billing Area', the date '28-04-2024', and the time '01:46:50'. A 'Logout' button is also present.

All Products: A grid of products with columns for PID, Name, Price, and QTY. The grid contains 23 rows of product data.

PID	Name	Price	QTY
1	Basumati(5kg pk)	350	50
2	Basumati(1kg pk)	72	47
3	Brown Rice(5kg p)	150	56
4	Aihar(1kg pk)	94	29
5	Masoor(1kg pk)	60	36
6	Moong(1kg pk)	74	37
7	Aashirbada(5kg p)	190	39
8	Sunflower(500ml)	105	30
9	Fortune(1 Ltr)	155	18
10	TATA Salt(500 gm)	6	94
11	Aashirbada(1 kg)	10	50
12	Lifebuoy(4pc pk)	40	17
13	Dettol(100 gm)	35	26
14	Dove(100 gm)	64	28
15	Sprite(750 ml)	38	2
16	Sprite(1.2 L)	65	5
17	Sprite(2 L)	95	1
18	Thumbs up(750 ml)	38	4
19	Thumbs up(1.2 L)	65	5
20	Thumbs up(2 L)	95	4
21	Fanta(1 L)	58	2
22	Fanta(2 L)	58	10
23	Dairy Milk	20	15

Note: Enter '0' Quantity to remove product from the Cart

Customer Details: Fields for Name and Contact No. are present. Below them is a numeric keypad.

Cart: A table showing the total number of products in the cart and a list of items with columns for PID, Name, Price, and QTY.

Cart		Total Product: [0]	
PID	Name	Price	QTY
7	8	9	+
4	5	6	-
1	2	3	*
0	c	=	/

Customer Bill Area: Fields for Product name, Price Per Qty, and Quantity. Buttons for In Stock, Clear, Add | Update Cart, Print, Clear All, and Generate /Save Bill.

Retailer Billing & Management Software

In Main Billing Area bill created

The screenshot shows the 'Retail Billing Area' software interface. The top bar displays 'BILLING & MANAGEMENT SOFTWARE', the title 'Retail Billing Area', and a 'Logout' button. The main area is divided into three sections: 'All Products', 'Customer Details', and 'Customer Bill Area'.

All Products: A grid of products with columns for PID, Name, Price, and QTY. Some entries include: Aashirbada(5kg p) 190, Sunflower(500ml) 105, Fortune(1 Ltr) 155, TATA Salt(500 gm) 6, Aashirbada(1 kg) 10, Lifebuoy(4pc pk) 40, Dettol(100 gm) 35, Dove(100 gm) 64, Sprite(2 L) 95, Thumbs up(750 ml) 38, Thumbs up(1.2 L) 65, Thumbs up(2 L) 95, Fanta(1 L) 58, Fanta(2 L) 58, Dairy Milk 20, Dairy Milk(big) 40, Kit Kat 20, Kinder Joy 40, Pulse 1, Center Fresh 1, Eclairs 1, Spicy Up 15, chanadal 125.

Customer Details: Fields for 'Name : Deepesh' and 'Contact No. : 9456183456'. Below these are four numeric input fields (7, 8, 9, +; 4, 5, 6, -; 1, 2, 3, *; 0, c, =, /) used for entering quantities.

Customer Bill Area: Displays the bill details. Header: RETAIL BILLING, Phone No. 7327852324, BBSR-751024. Customer Name: Deepesh, Time: 23:12:11, Ph no. :9456183456, Bill No. 30273235, Date: 30/04/2024. Product details table:

Product Name	QTY	Price
Basumati(5kg pk)	5	Rs.1750.0
Arhar(1kg pk)	1	Rs.94.0
Sprite(1.2 L)	1	Rs.65.0
Aashirbada(1 kg)	1	Rs.10.0
Masoor(1kg pk)	4	Rs.240.0
Kit Kat	2	Rs.40.0

Bill Amount: Rs.2199.0, Discount: Rs.219.9, Net Pay(all GST included): Rs.1979.1.

Cart: Total Product: [6]. The cart table lists the items added from the product list above.

PID	Name	Price	QTY
1	Basumati(5kg pk)	350	5
4	Arhar(1kg pk)	94	1
16	Sprite(1.2 L)	65	1
11	Aashirbada(1 kg)	10	1
5	Masoor(1kg pk)	60	4
25	Kit Kat	20	2

Bottom Buttons: Bill Amnt.(Rs.) 2199.0, Discount [5%], Net Pay(Rs.) 1979.1, Print, Clear All, Generate /Save Bill.

Implementation and System Testing

Implementation and System Testing are crucial phases in the software development lifecycle, each serving distinct purposes to ensure the successful development and deployment of a software system. Let's explore each phase in detail:

Implementation:

1. Definition:

Implementation refers to the process of translating software design specifications into executable code. It involves writing, coding, and integrating various components of the software to build the intended system.

2. Key Activities:

Coding: Writing source code using programming languages like Python, Java, C++, etc., based on design specifications.

Integration: Combining individual modules and components to create cohesive software.

Database Development: Creating database schemas, tables, and queries to manage data storage and retrieval.

External Integrations: Implementing interfaces with external systems or APIs required by the software.

User Interface (UI) Development: Building the frontend components such as screens, forms, and user interactions.

System testing:

System testing is a crucial phase in software development where the entire system is evaluated to ensure that it meets specified requirements and performs as expected in its intended environment. This testing phase focuses on assessing the overall functionality, performance, reliability, and usability of the software system as a whole.

Scope of Testing:

Functional Testing: Verifies that all functional requirements of the system are implemented correctly. This includes testing individual features, user workflows, and system interactions.

Non-Functional Testing: Evaluates aspects like performance, security, usability, reliability, and compatibility of the system.

Testing Objectives:

Validate that the software meets business requirements and user expectations.

Identify defects, bugs, and inconsistencies in the system.

Ensure that the system integrates seamlessly with external components and dependencies.

Types of System Testing:

Functional Testing:

User Acceptance Testing (UAT): Involves end-users testing the system in a real-world scenario to ensure it meets business needs.

Regression Testing: Re-tests previously validated functionalities to ensure new changes have not introduced defects.

Integration Testing: Tests how individual modules or components work together as a complete system.

Non-Functional Testing:

Performance Testing: Evaluates the system's responsiveness, scalability, and resource usage under various conditions (e.g., load testing, stress testing).

Security Testing: Checks the system's resilience against unauthorized access, vulnerabilities, and threats.

Usability Testing: Assesses the system's ease of use, user interface (UI) design, and accessibility.

Compatibility Testing: Ensures the system functions correctly across different platforms, browsers, and devices.

Testing Techniques:

Manual Testing: Testers interact with the system manually to validate functionalities, perform user workflows, and identify defects.

Automated Testing: Uses tools and scripts to automate test cases for repetitive tasks, regression testing, and performance testing.

Exploratory Testing: Testers explore the system without predefined scripts to discover defects and assess user experience.

Execution and Reporting:

Execute test cases based on test plans and scenarios defined during test preparation.

Record test results, including observations, defects, and performance metrics.

Generate test reports and communicate findings to stakeholders, developers, and project managers.

Future scope, limitations or boundaries

Future Scope:

Enhancements and Features:

Continuously add new features and functionalities based on user feedback and market trends.

Implement advanced analytics and reporting capabilities to provide insights into sales trends, inventory management, and customer behavior.

Integration with E-commerce Platforms:

Integrate the billing and inventory management software with popular e-commerce platforms for seamless online sales management.

Enable synchronization of product listings, inventory levels, and order processing between the software and online stores.

Mobile Application Development:

Develop a mobile application companion for the software to facilitate on-the-go access for employees and customers.

Implement barcode scanning and mobile payment integration for improved efficiency and customer experience.

Cloud Migration and Scalability:

Explore migrating the software to cloud-based platforms like AWS or Azure for scalability, flexibility, and enhanced performance.

Leverage cloud services for data backup, disaster recovery, and real-time data synchronization across multiple locations.

AI and Automation:

Integrate artificial intelligence (AI) technologies for intelligent inventory forecasting, demand prediction, and personalized customer recommendations.

Implement automation tools for routine tasks such as invoice generation, stock replenishment, and customer notifications.

Limitations or Boundaries:

Hardware Dependencies:

The software's performance and scalability may be constrained by the hardware infrastructure (e.g., server capacity, network bandwidth) supporting it.

Security Concerns:

Ensure robust security measures to protect sensitive customer data, transaction records, and inventory information from cyber threats and unauthorized access.

Regulatory Compliance:

Adhere to industry-specific regulations and compliance standards (e.g., GDPR, PCI DSS) related to data privacy, financial transactions, and customer information protection.

User Adoption and Training:

Address challenges related to user adoption and training, especially when introducing new features or transitioning to a mobile application environment.

Integration Complexity:

Complexity in integrating with external systems (e.g., accounting software, payment gateways) may pose challenges during implementation and maintenance.

Scalability and Performance:

Ensure the software architecture is designed to handle increasing volumes of data and transactions as the business grows.

Address potential performance bottlenecks related to database queries, API response times, and concurrent user access.

Maintenance and Support:

Plan for ongoing maintenance, updates, and technical support to address software bugs, compatibility issues, and evolving business requirements.

Conclusion & Developers comment

Conclusion:

The development of the "RETAILER BILLING & MANAGEMENT SOFTWARE" represents a significant advancement in streamlining retail operations, enhancing efficiency, and improving customer service. This software solution provides a comprehensive platform for retailers to manage billing, inventory, sales, and employee activities effectively.

Through the implementation of Python with Tkinter for the frontend and SQLite for the database management, the software offers a user-friendly interface and robust data handling capabilities. The integration of these technologies ensures scalability, flexibility, and reliability in meeting the needs of retail businesses.

Developer's Comment:

As the developer of the "RETAILER BILLING & MANAGEMENT SOFTWARE," I am pleased with the outcome of this project. Our team has worked diligently to design and implement a solution that addresses critical challenges faced by retail businesses. We aimed to deliver a user-friendly interface combined with robust backend functionalities to ensure a seamless experience for users.

Throughout the development process, we focused on incorporating industry best practices, leveraging Python's versatility, and harnessing the power of SQLite for efficient data management. We are confident that this software will empower retailers to streamline their operations, reduce manual effort, and enhance overall productivity.

References & Bibliography

<https://youtu.be/uxLuAz7b1tU?si=vFdF8zkHuqARDh46>

<https://docs.python.org/3/library/tkinter.html>