Inventory and Customer Management System

Diploma in Software Engineering

Final Project Documentation

CODSE-23.3F

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Title Page

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The project is submitted in partial fulfillment of the requirement of Diploma in Software Engineering of National Institute of Business Management.

Declaration

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Abstract

Implementing an Inventory and Customer Management System for an IT company named Techmate – Total IT solutions is the priority of the following project. The obstacles faced when handling the process of purchasing and selling computer components while managing employees and customers was the source of generating this inspiring project proposal. Regarding those challenges, Techmate – Total IT solutions company decided to create an Automated Inventory and Customer Management System.

The proposed system that is designed to overcome these challenges included with Automated inventory management system that manages the inventory automatically, Order Management system that places orders in an effective manner while storing order details, Supplier and Customer Management for handling suppliers and customers with their details, Employee Management system for managing employees, Payroll system for making salary for employees, Report generation for track company's sales and other objects and creating quotation for customer satisfaction.

The main objective of this project is to make the company's day-to-day basis more efficient and become a support to the company to achieve their goals while improving customer satisfaction.

List of Keywords

General Terms

- Inventory management
- Customer management
- Software engineering
- Project proposal
- IT solutions
- System development
- Data management
- User interface
- Database design
- Software testing

Specific Terms

- **Organization:** Techmate - Total IT solutions
- **Problems:** Manual processes, inefficiency, errors, security risks
- **Solutions:** Automated system, database, user-friendly interface, real-time updates
- **Technologies:** C#, SQL, Figma, GitHub, Visual Studio
- **Methodologies:** Incremental development, testing strategies (unit testing, system testing, acceptance testing, performance testing, security testing, compatibility testing, exhaustive testing)
- **Implementation:** Parallel running, data migration

List of Acronyms and Abbreviations

General Acronyms

- **IT:** Information Technology
- **CRM:** Customer Relationship Management
- **ERP:** Enterprise Resource Planning
- **POS:** Point of Sale
- **SQL:** Structured Query Language
- **UI:** User Interface
- **GUI:** Graphical User Interface
- **UX:** User Experience
- **API:** Application Programming Interface
- **SDLC:** Software Development Life Cycle
- **UML:** Unified Modeling language
- **ER:** Entity Relation

Acknowledgement

We would like to express our sincere gratitude to the following individuals and organizations for their invaluable support and guidance in the development of this project.

- Ms. Chandula Rajapaksa for her insightful guidance and constructive feedback.
- National Institute of Business Management for their support and cooperation.
- Our fellow group members for their dedication, hard work, and teamwork.

We would also like to acknowledge the contributions of the various sources and references that have been consulted in the preparation of this proposal.

Table of Contents

1. Chapter 1: Introduction

1. Introduction of the Organization.

Techmate – Total IT solutions company is a small-scale IT service providing company which established a considerable large customer base across cities. Ishan Fernando is the Founder of this company. The company has one branch located at 19 Convent Rd, Kalutara 12000.

Techmate – Total IT solution company has been providing services to their customers in different categories varying from consumer grade to businesses since 2016. Main services they provide to customers are,

- computer hardware component selling,
- software supporting,
- security system installation and maintaining,
- computer hardware repair,
- Security Hardware repair and selling security/ surveillance components.

Among these services they mandate computer component distribution and personal computer servicing/ repairing.

2. Organization Structure.

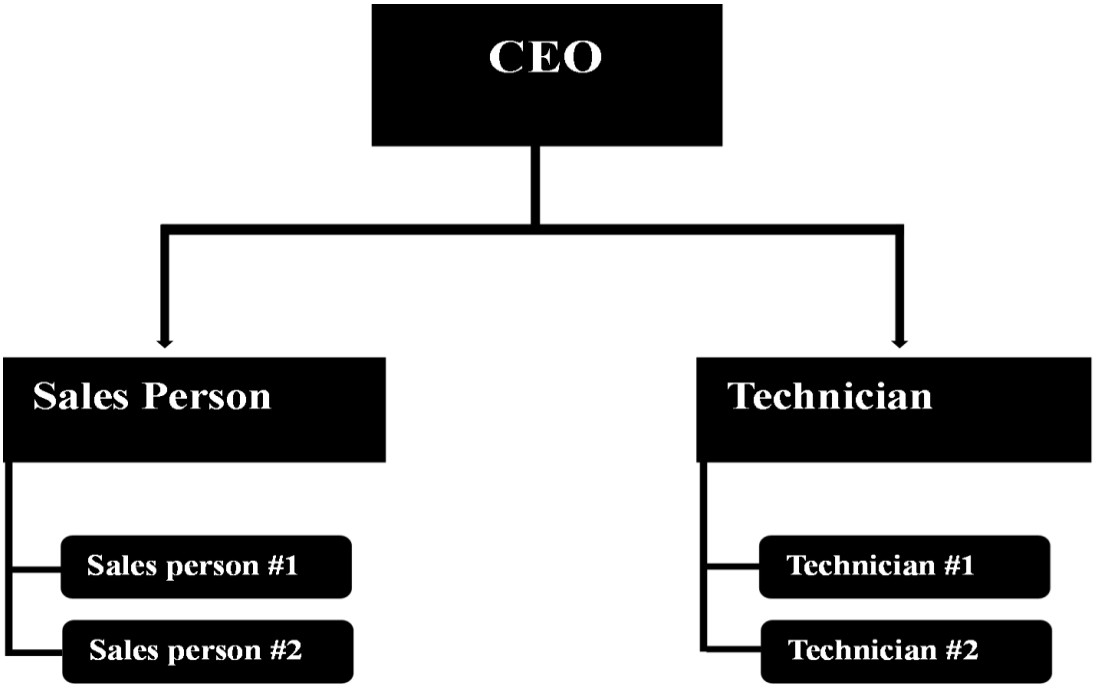


Figure 1 - Organization Structure

3. Current Operations in Organization.

Currently all the systems are managed manually in Techmate - Total IT solution. Employees use Microsoft office to store data and calculate bill amounts. And that is recently found to be very insufficient.

Data analysis and visualization are currently being managed through Microsoft Excel. All the data must be added manually to the spread sheets by workers.

Microsoft word is used for creating reports and necessary documents. Hence all the details must be searched manually through the spread sheets and must be added to the word documents. Even times and dates must be added manually.

1 Inventory management

- When purchasing orders all the items with their details must be stored. Since there is no database management system in the company workers must get all the details on a spread sheet and calculations are done manually.
- After selling items all the spread sheets and documents must be updated manually.

2 Employees management

- Same as the inventory, all worker details are stored manually by workers on spread sheets.
- In the meantime, if some changes need to be made or a customer should be removed, workers must go through the spread sheets and make the changes.

3 Customers and suppliers' management

- Details of Regular customers must be gathered and entered on spread sheets.
- When a new supplier visits the company, their details are also gathered and entered on spread sheets.

4 Get sales records

- After gathering all sales invoices and receipts issued, workers must categorize the sales data by date, customer, or service.
- After, all the details must be recorded using a spread sheet.

5 Calculating bills

- Since there is not any specific system to calculate bills, workers need to go through spread sheets and search for product details. Calculations are done using a calculator.
- After calculating the bill amount, a printed invoice should be filled in by hand with the item details, quantity and prices. Then it is given to the customer.

Since all the work is done manually it consumes more time and Laber. As an IT related company, the absence of an automated Inventory and Customer Management System can be considered as a critical operational failure.

4. Users and Responsibilities Organization.

The system is utilized by three actors Administrator, Salesperson and Technician. Every role has a certain responsibility related to the organization.

1 Administrator

The administrator holds the responsibility of supervising all strategic and operational sides of the organization, ensuring the achievement of sales, customer service and inventory management objectives. Their leadership guarantees the long-term success of the organization.

- Manage the inventory of IT products.
- Assigning tasks to employees.
- Supervise the computer repair processes.
- Generate monthly reports on sales, repairs and inventory.
- Control customers' and supplier's details.
- Manage the sales of IT products.
- Handle customer requests for computer repairs.
- Update system on the progress of repairs and sales.
- Coordinate with technicians.

2 Salesperson

- Update the IT products sold by company.
- Provide customers with product details.
- Generate product quotations for customers.

- Manage customer inquiries.
- Ensure any promotional sales are accurately reflected in the system.
- Manage customers with the system.

3 Technicians

- Update the system when repairs are finished.
- Support the customer and respond to inquiries.
- Create job notes.

5. Problem Definition.

Techmate – Total IT solutions is a developing company that has a document base system. Employees of this company manually process sales transactions, inventory management and customer management. As a result of this they are facing many challenges.

1 Inventory Management

- The products are the main force of the shop but currently there is no specific system in place to efficiently handle or store product details; like product name, price, category and stock level are manually entered into Excel sheets by employees.
- Manual data entry increases errors such as incorrect pricing or duplicate entries. These errors can cause confusion and inefficiencies. Furthermore, because this method does not provide real time updates, stock level may be inaccurate, which could result in stockouts or overstocking problems.
- It gets more difficult to scale the process as the business expands, which makes it challenging to effectively maintain a huge inventory or monitor sales trends.

2 Order Management

- This shop is currently using a traditional manual invoicing system for order handling. Employees manually draft invoices and manually review their daily income at the conclusion of the workday. This process is highly time consuming, inefficient and human errors could happen when calculations and record keeping.
- Order tracking, sales performance tracking and guaranteeing daily revenue accuracy become more challenging without the use of an automated system. Because of this worker's waste time on administrative duties that could be done more quickly and easily with an automated.

3 Supplier Management

- Supplier information is managed using spreadsheets. The shop maintains records of suppliers' names, addresses, contact information and the products they provide.
- Currently the shop uses spreadsheets for supplier management, where employees manually enter supplier information including names, addresses, contact details, and products they provide.
- This traditional system may seem simple, but it can become inefficient and increase errors when the number of suppliers grows. Keeping track of supplier details manually makes it difficult to manage.

4 Employee Management

- Employee management is carried out manually with spreadsheets being used to record information such as employee name, address, contact information and other information.
- When the administrator needs to get details of employees the present manual system is time-consuming and inefficient.

5 Customer Management

- The current customer management system only collects information about regular customers. Due to this restriction the organization is unable to gather information for new clients. This can have a negative impact on customer satisfaction and slow down the growth of the company.

6 Payroll system

- In this current manual system, a proper way to create pay sheets according to the leaves taken by customers does not exist. Adding bonus to every employee is also inefficient.

7 Operational Delays

- Processing and accessing necessary information are significantly delayed by the current document-based method. Operational delays are caused by manual processing like entering data, creating invoices and changing stock levels which slow down the operations.
- Employees are frequently spending too much time updating spreadsheets, fixing mistakes and gathering data, which reduces overall productivity and increases wait times for customers.

8 Security Vulnerabilities

- There are security vulnerabilities in the current manual system in this organization. Spreadsheets are not protected from unwanted access or data losses, they are a prime place to keep sensitive information such as sales transactions, employee details and customer details.
- The system is vulnerable to threats, without proper security like encryption or access restriction, which could result in data breaches and risk sensitive data. The organization's general security may be threatened by these defects.

6. Project Objectives.

The main objective of this project is to create an automated, integrated system that will optimize Techmate-Total IT Solutions' operational procedures. Critical operations, including product management, order management, supplier management and employee management are currently handled by the organization manually using document-based systems. The inefficiencies, time-consuming and high error rate of these manual processes constrain the company's capacity to expand its operations efficiently.

The proposed system will automate the key functions including inventory tracking, invoicing, and supplier database. The project aims to increase productivity, reduce the administrative load on staff and improve accuracy by replacing the current Excel-based system. In the end this will put the organization in a growth-oriented position by allowing it to more efficiently manage its resources, serve customers more effectively and respond to the increasing demand of its expanding business.

7. Proposed Solution.

Due to the inefficiency and unreliability of Current Operations in Organization we have been asked to design an automated inventory and customer management system with a point of sales system for the Techmate-Total IT Solutions.

Managing inventory, orders, suppliers, employees and customers are crucial tasks when it comes to a selling and distributing company like Techmate-Total IT Solutions. All the records should be stored in a database to manage them more accurately. With this automated system things can be

made easier to manage by providing the ability to store all data in a database through user-friendly interfaces.

In our proposed software solution these are the functional and nonfunctional requirements that can be recommended for the issues and problems that were stated previously.

1. Functional requirements

- Automated inventory management system

1. Add new items
    - When purchasing orders workers can simply enter the details of a product as in the product name, price and quantity. Product id is automatically assigned, and the inventory will automatically be updated.

2. Search item details
    - Search function helps to find any item that is needed to add to cart, update or remove.
    - When an item needed to be removed or the product details needed to be changed, they can be done through the system more easily and efficiently,

3. Update item details
    - Product details can be updated easily through the system. Updated details will be stored automatically in the database.

4. Remove items
    - Any product can be removed easily through the system. The product details will be removed automatically from the database.

5. Track inventory level
    - Employees can easily view and manage inventory through the system.
    - Since this method provides real time updates, stockouts or overstocking problems no longer occurred.

6. Create quotation
    - Salesperson can create quotations for the customers as their requirement through the system more efficiently.
    - Creation of quotation will not affect the inventory as the item is not sold at that current moment.

- Order Management

1. process sales
    - When selling products, all the product details can be searched and viewed easily through the system
    - When placing an order, the salesperson needs only to log into the system and choose items and the quantity. Other details of the products will be filled out automatically according to the data which is stored in the database.
    - Inventory will be automatically updated after the selling process.

2. Apply discounts
    - Salesperson should be able to apply discounts to the item itself or to the whole invoice.
    - Salesperson should be able to decide whether the discount is given by rate or by amount.
3. Calculating bill amount
    - After confirming the order, according to the products and the quantity the bill amount is calculated automatically.
    - Since all calculations are automated, room for errors has been reduced and efficiency, reliability and useability has been increased.

4. print invoice
    - After calculating the bill amount, the invoice is issued to the customer through the system. Time and date are also being tracked and stored on the database.

- Supplier and Customer Management

1. Register Supplier/Customer
    - The registration process has been made easier by the new automated system. Workers can enter supplier or customer details into the system, and it will store the details in the database. Supplier id or customer id will be generated automatically.

2. Search Supplier/Customer
    - For refer any supplier or customer details workers can search and find a specific supplier or customer with no time with the search function that is provided with the system.

3. Update details
    - Updating supplier/customer details is much easier than the previous manual process, with the search function which is included in the automated management system.

4. Remove Supplier/Customer
    - Any supplier or customer who is no longer required to be saved in the system can be removed easily with their details.

- Employee Management

    1. Register Employee
    2. Search for Employee
    3. Update Employee
    4. Remove Employee

        - Same as supplier management, Employees and customers can be also manage easily and efficiently through the automated system.

- Payroll system
    - In this proposed system it is possible to calculate the amount of salary for an employee according to the number of leaves and half days they have taken. Furthermore, adding a bonus to each employee has become a possible scenario with the presence of this payroll system.
- Report generation
    - Only admin will be able to generate reports. Admin should be able to generate order reports, inventory reports, customer reports, financial reports and service reports.
    - Since inventory and customer management systems are linked with the database, searching for details for report generation is not an issue. Hence report generation can be done very efficiently without any errors.
- Creating job notes
    - Technicians should be able to create job notes. With a description of the service, they are providing.
- Creating quotation
    - Salesperson has the ability to create a quotation that provides customers with the necessary information they need before placing an order.

2. Non-Functional requirements

1. Usability
    - The inventory and customer management system comes with a user-friendly interface that workers can easily navigate through the system and get the job done.
2. Performance
    - Solve the problem of time consumption and inefficacy by making work faster and easier.
    - The system interfaces will open in less than 1 second and the operations of saving details, editing records and making calculations can be done in no time.
3. Reliability
    - The probability of system down time is very low. Even if the software crashes or freezes due to an unavoidable reason the data will not be lost or damaged.
    - Since the probability of error occurring is being reduced, the system is more reliable than entering details and calculating bill amounts manually.
4. Security
    - Since the system is password protected only authorized users can view or change details. This prevents all unauthorized access to the system.
    - In the meantime, the sensitive data which is stored in the database is encrypted and protected providing a more secure service.
5. Scalability
    - Increasing the number of employees is a possible scenario. In this case the system should be able to operate without degrading its performance in increased number of devices.
6. Maintainability
    - Changes and updates should be easily made to the system if an error occurs, or any updates are needed.
7. Data integrity
    - The possibility of data corruption and data loss is prevented through the system providing data accuracy and consistency

8. Compatibility
    - The system should be compatible with any operating systems and devices such as personal computers and laptops.

Recommending these solutions through an automated inventory and customer management system, it is expected to solve the problems with the current process and provide more reliable, efficient and secure procedure to enhance overall business performance and customer satisfaction.

8. Chapter Summery.

Techmate – Total IT solutions company is a small-scale IT service providing company which mainly sales computer components and security components while repairing them.

The company currently manages their records and details manually using Microsoft office. As a result of this manual process, services and management are inefficient and unreliable. Due to the problems they had to face, an automated inventory and customer management system is proposed.

2 Chapter 2: Methodology

1. Introduction

The methodology chapter outlines the techniques and technical approaches that will be used in order to achieve the project objectives. The methodology used is a systematic approach which will make sure the project will be implemented efficiently and successfully.

Main levels of project methodology

- Initiation of project: Objective of this step is to identify and learn project scope, business stakeholders. In this step the team will conduct the initial meeting with stakeholders and understand the main deliverables that need to be delivered by the project.

- Requirement Gathering: In this level team will use methods such as record reviews, conduct meetings, conduct questionaries to gather required information from stakeholders.

- Planning the solution: Team members use this phase to create a plan/ blueprint of the software that need to be designed, ensuring it meets the customers' requirements.

- Development of solution: In this phase the actual software will be designed according to the plans made.

- Software testing and QA: Software will be tested against expected results in user requirements and tested for any bugs and flaws.

2. Data Collection Method(s)

Data collection is a process of gathering customer needs using different strategies to collect clear, reliable and trustworthy information.
Below are the information gathering methods we used throughout the project.

- Interviews

- Referring existing documents
- Site visiting

1. **Interviews**

   Ensuring customer satisfaction consists of the process of making sure that the needs of every user who using the system is fulfilled in the end of the development. In-person meetings are a good method to gather the needs of each user in depth.

2. Referring existing documents

   To create a new automated system, studying how the current manual system handles business tasks is crucial. Below are some documents we referred to building a complete understanding of the system.

   - Invoice samples
   - Job notes samples
   - Invoice related excel sheets

3. Site visiting

   Visiting the site was very crucial to fully understand how users will interact with the system on a day-to-day basis.

3. Software Process Model

The incremental model is being used for the development of this system. Rather than developing in a single, massive cycle, this model allows the system to be designed, developed and implemented in smaller, more manageable steps. Each

increment provides a working module of the system, allowing the organization to take advantage of core functionalities early while adding additional features.

The incremental model ensures that any modification or enhancements can be made effectively all the way through the development process. This method lowers risk, increases adaptability and provides that the system improves according to the organization's developing requirements.

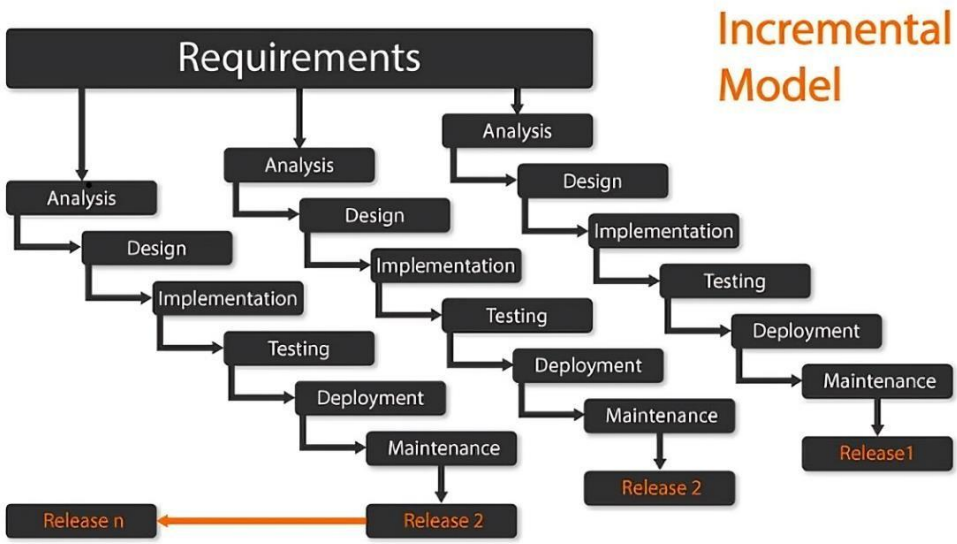


Figure 2 – Increment Model

Selecting the incremental model as our development model offers numerous advantages.

- Early Delivery of key features: the incremental model makes it possible to develop and deploy the system's essential features earlier than the schedule, giving the company access to it before the entire system is delivered.
- Flexibility and Adaptability: During the project, the model's ability to adjust in following increments in response to input or changing business requirements improves adaptability.

- Improve Testing and Debugging: Before going to the next stage, every increment is carefully tased. By ensuring that problems are found and fixed in small stages, this enhances the overall stability of the system.
- User feedback: After every release, Organization can offer feedback to make sure the system is meeting the needs and objectives of the company.

4. Software Development Tools

Developing modern software solution requires setting up developing environment and use of specific toolsets.

To design our proposed solution we will utilize software development toolkits and support services mentioned below.

- UI design tool
  - Figma is a web-based interface designing platform. It was used to design User-Interfaces before implementing them through the end product.

- Version Controlling
  - GitHub was used for version controlling and mange changes within the development process in order to deliver a quality software product.

- Programming Languages
- C#
  - According to the later discussions, C# was decided to use as the programing language altering the decision to use java.
  - C# supports object-oriented programming (OOP) principles such as encapsulation, inheritance, and polymorphism, making it easier to create modular and maintainable code.

- C# is the programing language used in this project according to fulfill its functionalities and requirements withing the given deadlines.

- SQL
  - SQL language will be used as the data manipulating language which will control the behavior of database according to controls of designed software

- Code editors

  - IntelliJ J idea community edition offered by JetBrains foundation was planning to use as primary code editor and designer for the development process.
  - As the team decided to implement the system using C# instead of Java, the decisions made regarding the primary code editor have been changed.
  - Visual Studio offered by Microsoft is the primary IDE for C# development, offering a rich set of tools and features to streamline the development process.
  - According to the later discussions, Microsoft Visual Studio Community 2022 (64-bit) – 17.11.2 was used as primary code editor and designer for the development process.

- Reports generators
  - Crystal Reports for .NET Framework, Service pack 33, Developer version was used to create Reports that is needed to generate through the system as in bills, invoices and sales reports.

5. Testing Strategies

Software testing is a crucial event of the software development life cycle. It is the process of executing a system to find bugs and errors in the Software, to get them fixed.

It ensures the quality of the system while improving its functionalities both functional and non-functional.

The types of testing strategies that are decided to use in this software testing process are mentioned below.

- Functional Requirements Testing

    1. Unit Testing

       Unite testing can be used to test system components or functions individually. Errors and bugs can be uniquely identified for each unit. It can be used to fix errors and improve the quality of service for each function separately.

    2. System Testing

       System testing is a black box type testing that is based on overall requirement specifications that covers the entire system for finding and fixing bugs and errors.

    3. Acceptance (Alpha) Testing

       Testing the system to identify all the possible errors and bugs before it is released to the real environment. Performed in a development environment.

- Non-Functional Requirements Testing

    1. Performance Testing

       Check whether the system meets the required performance. By testing it under various conditions.

    2. Security Testing

Check whether the software can be breached by any unauthorized access and how it will react to any malicious programs and viruses.

3. Compatibility Testing

   Testing how the software runs on different operating systems.

4. Exhausting Testing

   Testing all the possible data combinations by giving all the types of software inputs to check the outputs. It ensures that the system will not crash in any situation.

6. Implementation Plan

Objectives and Goals

During the implementation, the primary goal is to make sure the new system is configured and functions properly, scarifying the goals of the organization. This involves configuring it for efficiency, ensuring that all features function properly and integrating it with current processes.

Performing full testing while implementing is another key objective. This ensures that any possible problem is found and fixed quickly, and it is a secure system for long-term operation. To make sure the system stays effective as the company grows.

Timeline and Milestones

A successful project needs a set of well-planned timelines and milestones to achieve targets. This milestone outlines the key stages of project goals. The milestones we planned in the project life cycle are stated below.

Phase 1: Planning

Week1: Initial planning of project

Week 2-4: Requirement Gathering

Phase 2: Design

Week 5-6: UI design/ Documentation

Week 7-11: Technical Design and development/ Testing/ Documentation/

Phase 3: Testing and Quality Assurance

Week 11-12: System testing

Approach method

There are four usable methods when converting to a new system from a legacy system. Parallel running has been decided for use in this transition.

Hence the old manual system and the new automated inventory and customer management system can operate simultaneously until all the tests are done and make sure the program is running without any errors.

During this period, each output of the new system can be compared with the output of the old manual system.

Following this approach method the amount of risk that can happen if the system fails or crashes will be reduced.

7. Chapter Summery

This chapter describes the methodology and strategies used to carry out the project in a successful manner. The system will be delivered effectively and efficiently because of the structured plan that was selected.

Project beginning, requirement collecting, planning and development are important phases. Site visits, document evaluations, and interviews were used to gather data. The software process model that was chosen was the

incremental model because of the flexibility and capacity to deliver essential functions ahead of schedule while taking user feedback.

C# is the main programing language, SQL is the main database development tool and other software development tools including Figma, GitHub and Visual Studio were used. Stability, performance and security are tested using various methods including functional and nonfunctional.

To guarantee a seamless setup of the system, a well-defined implementation plan was established. The old manual system will continue to function alongside the new automated system unit testing verifies that it is functioning properly. This approach lowers risks without affecting productivity.

3. Chapter 3: Analysis

1. Introduction.

Requirements Analysis is one of the crucial phases of any software development lifecycle. Determining the project objectives and understanding exactly what the customer needs, which may not be what they ask for, is the critical gain of this phase.

Understanding what data is to be input into the system, what process must be performed on those data, what data should be output from the system and mainly characteristics of the system as a whole can be understood properly by analyzing requirements before implementing the system. Furthermore, identifying constraints of the system will prevent the team from having unnecessary Inconvenience

Once the requirements are gathered, analyzed and finalized, the software can be designed by going through the UML diagrams. UML, also known as Unified Modeling Language, is a graphical language for visualizing, specifying, constructing and documenting the artifacts of a system.

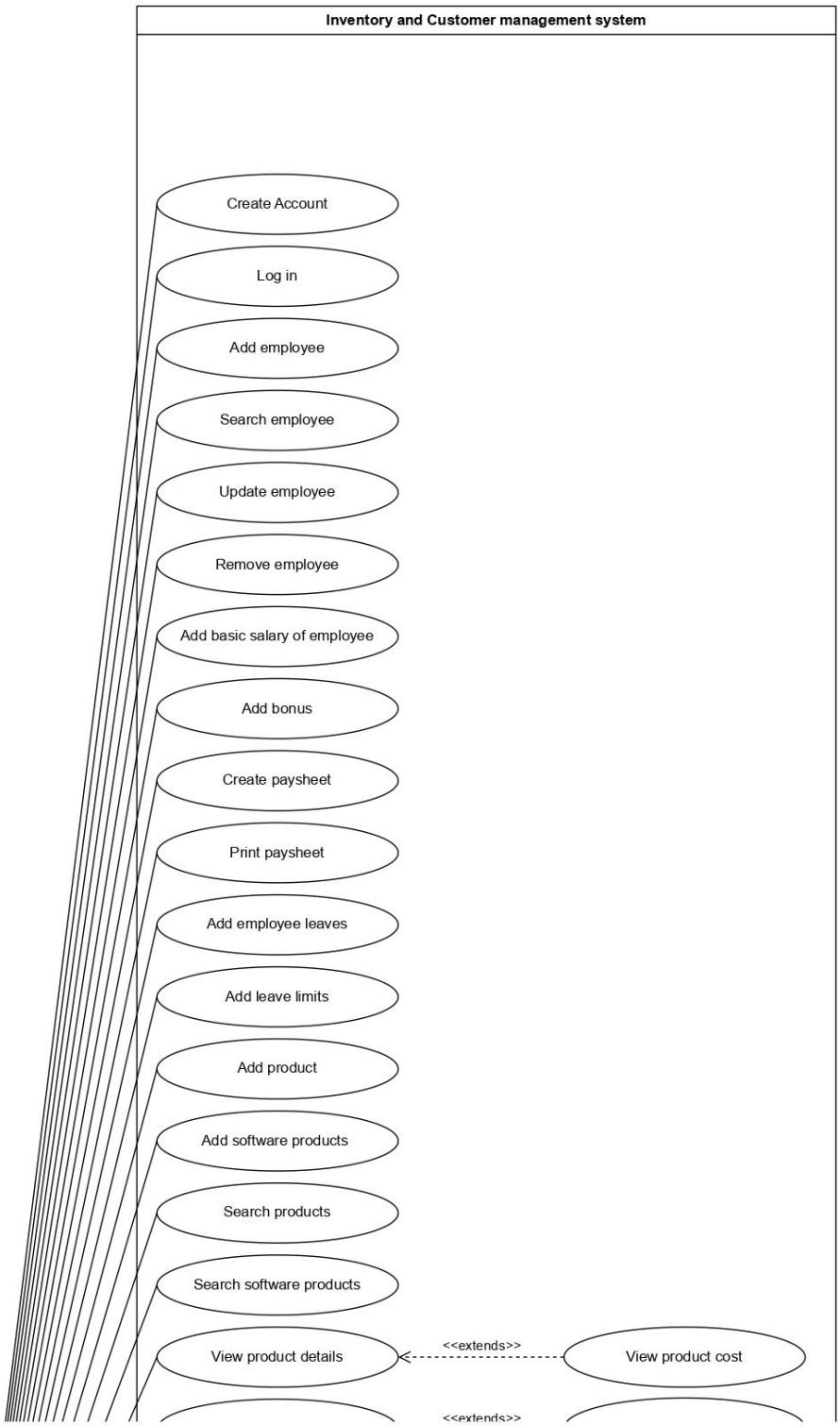
The designed UMLs for the proposed project, including Use Case Diagrams, Class Diagrams and Sequence Diagrams are attached below.

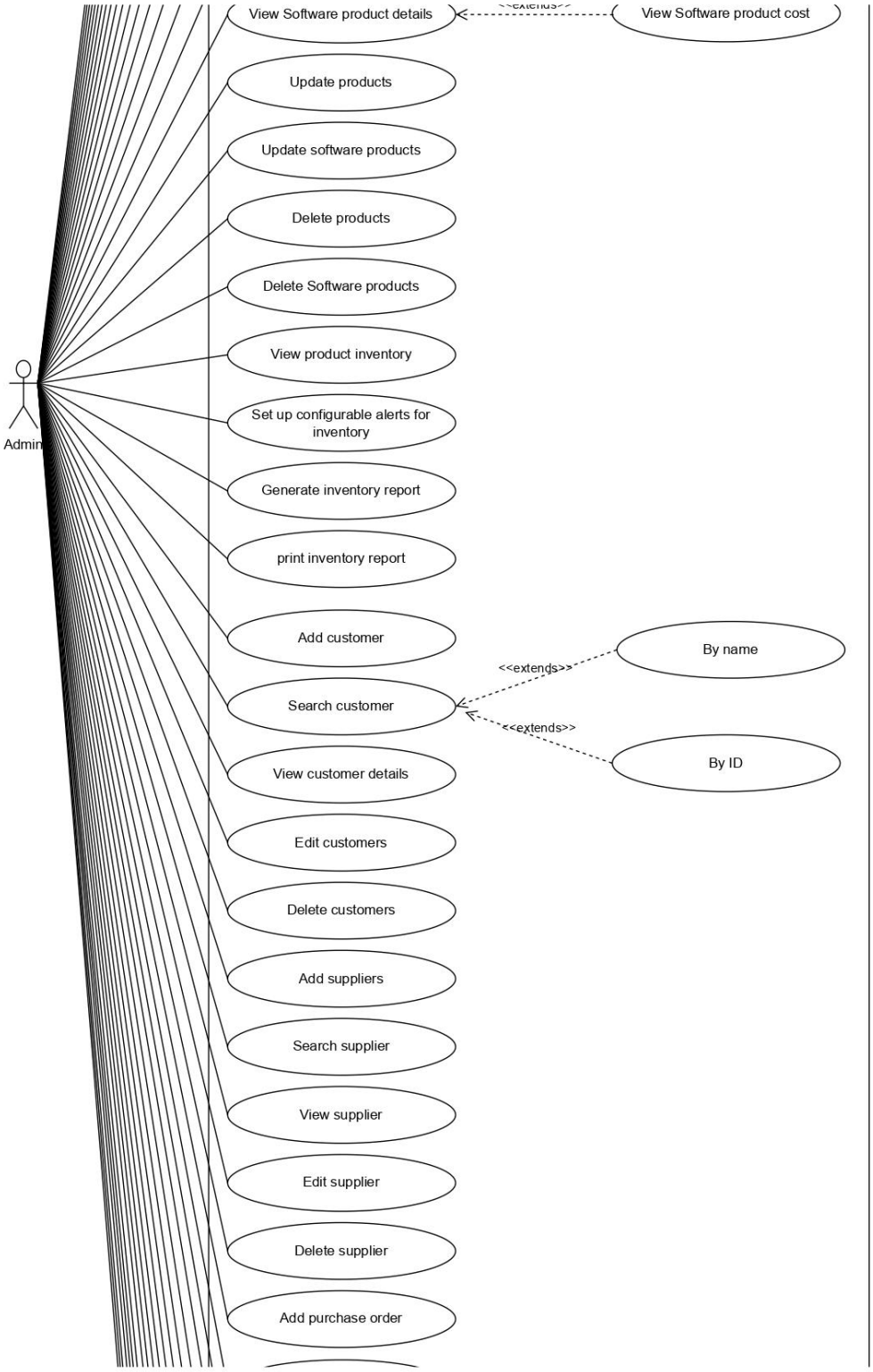
2. UML Diagram.

I. Use Case Diagram of Current System.

Since there is no system currently available in the company, use case diagram of the current system cannot be provided.

II. Use Case Diagram of Proposed System.

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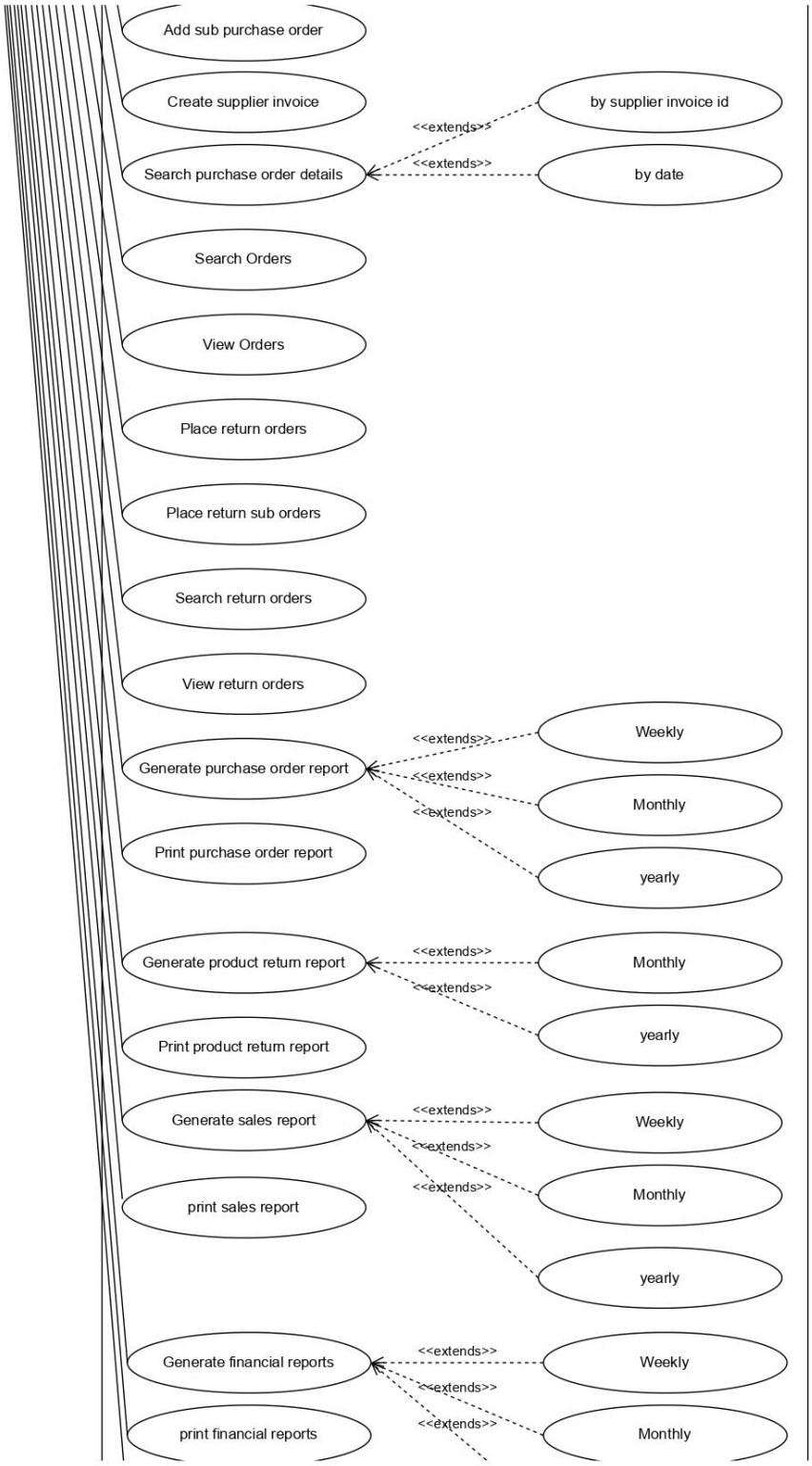
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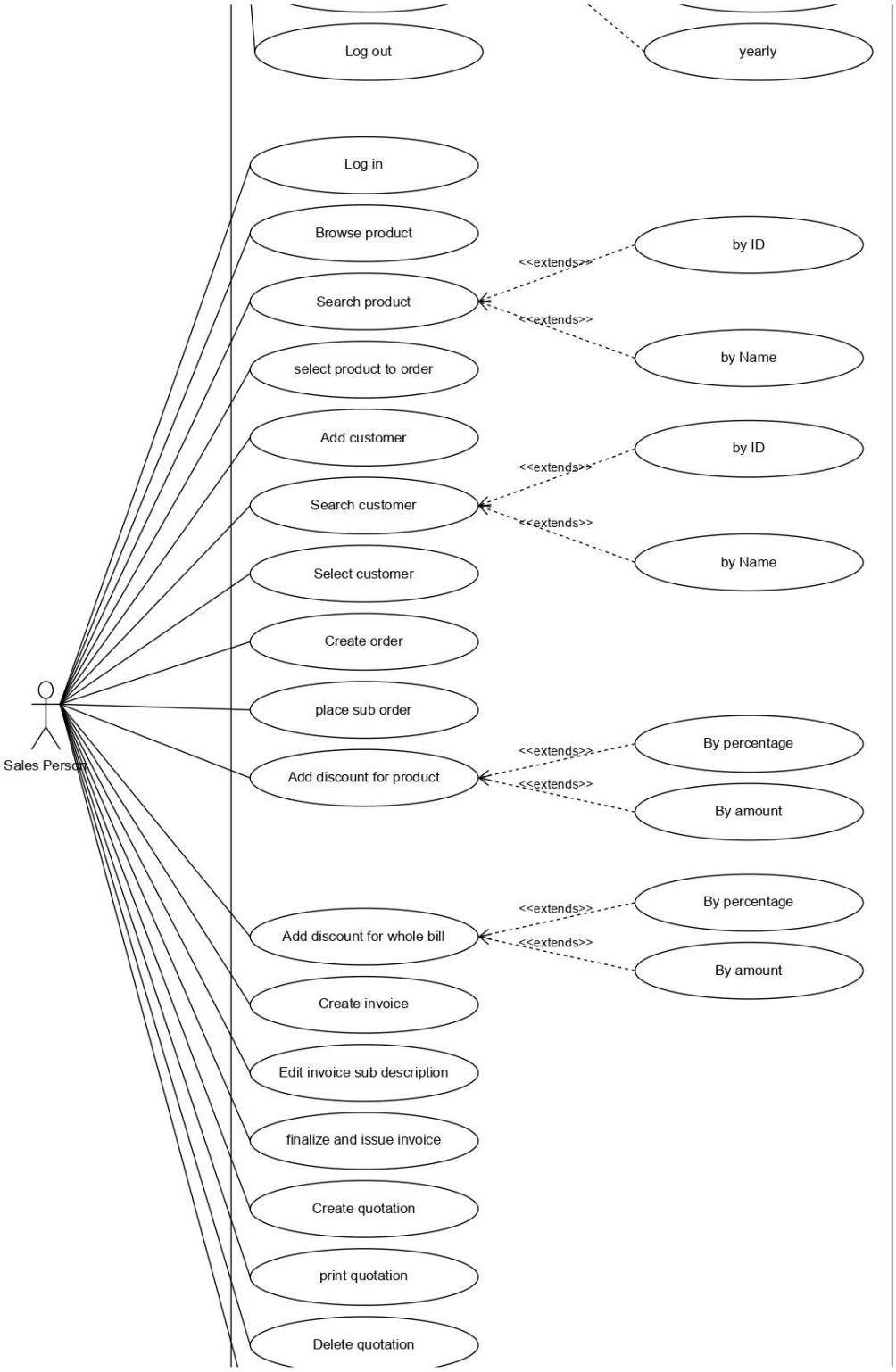
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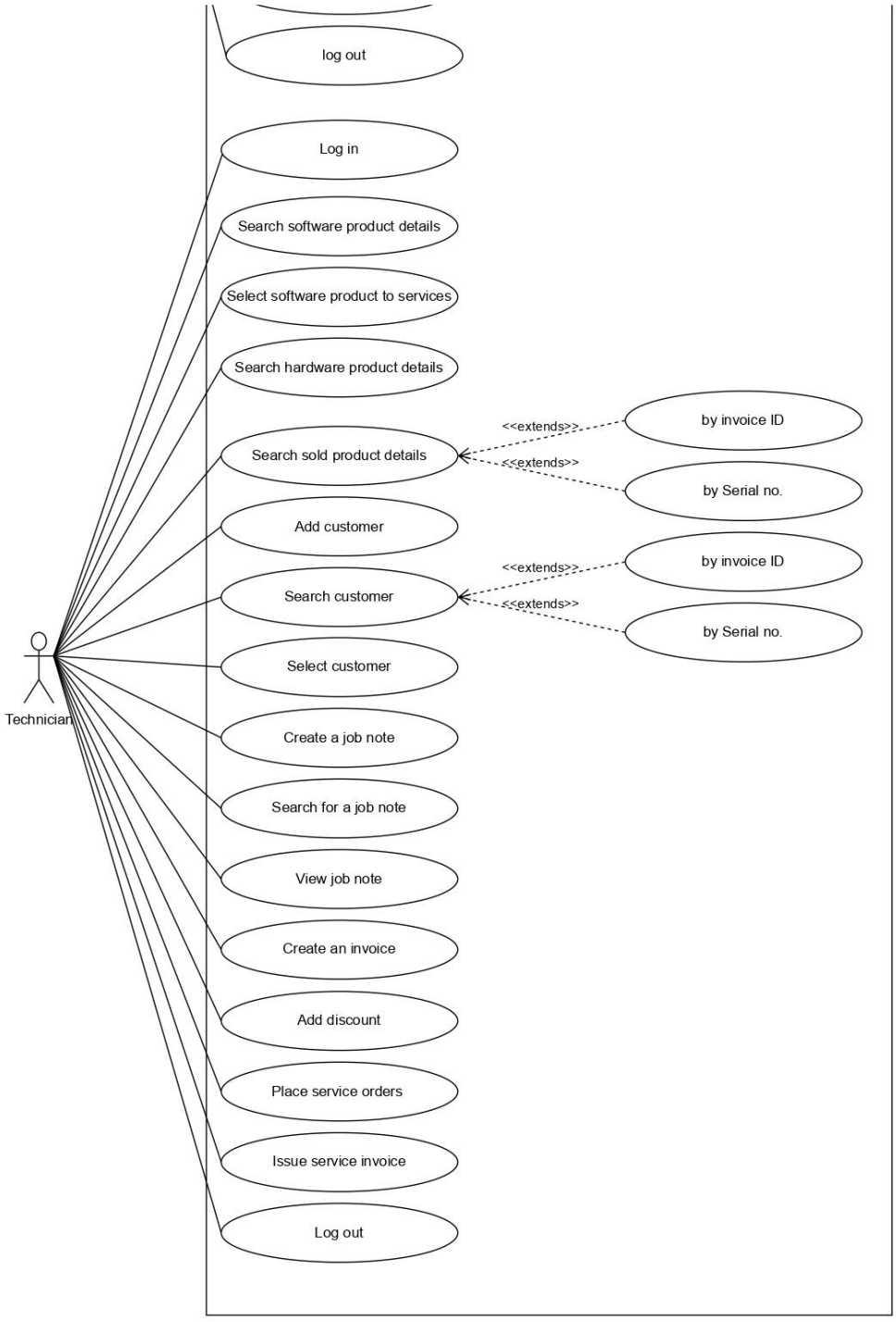
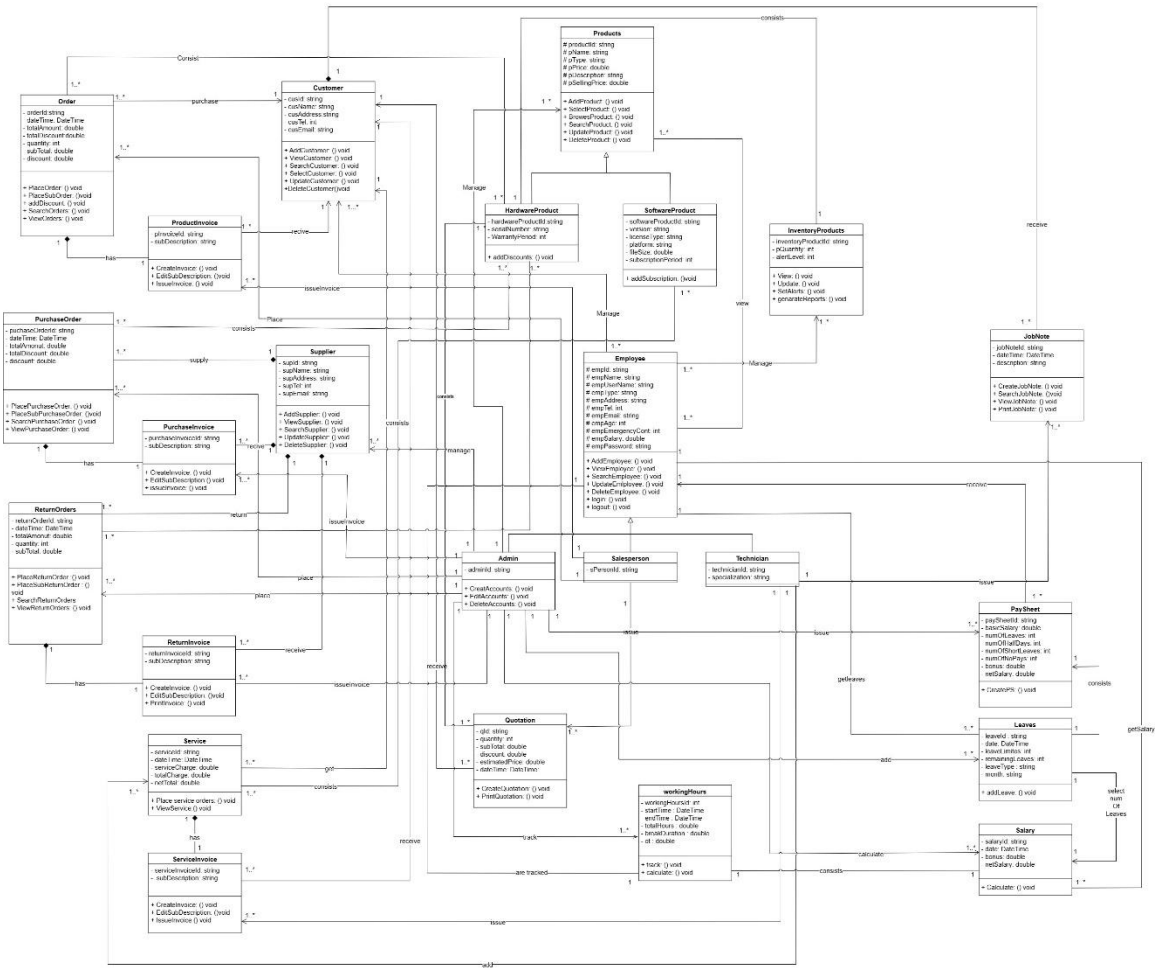
yearly
Log in
Browse product
by ID
<<extends>>
Search product
<<extends>>
by Name
select product to order
Add customer
by ID
<<extends>>
Search customer
<<extends>>
by Name
Select customer
Create order
place sub order
By percentage
<<extends>>
Add discount for product
<<extends>>
By amount
By percentage
<<extends>>
Add discount for whole bill
<<extends>>
By amount
Create invoice
Edit invoice sub description
finalize and issue invoice
Create quotation
print quotation
Delete quotation
Sales Person


log out
Log in
Search software product details
Select software product to services
Search hardware product details
Search sold product details
<<extends>>
by invoice ID
<<extends>>
by Serial no.
Add customer
Search customer
<<extends>>
by invoice ID
<<extends>>
by Serial no.
Select customer
Create a job note
Search for a job note
View job note
Create an invoice
Add discount
Place service orders
Issue service invoice
Log out
Technician

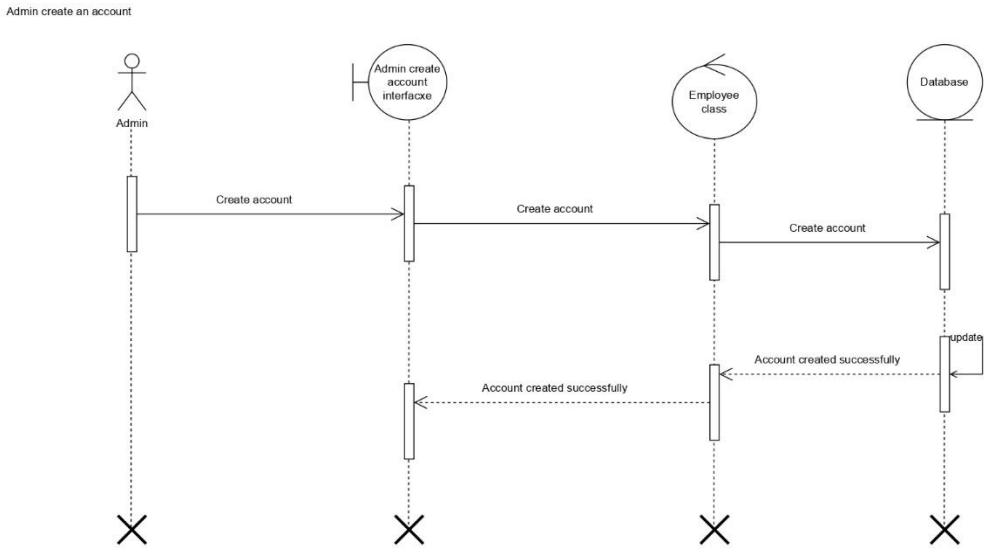
III. Class Diagram of Proposed System.



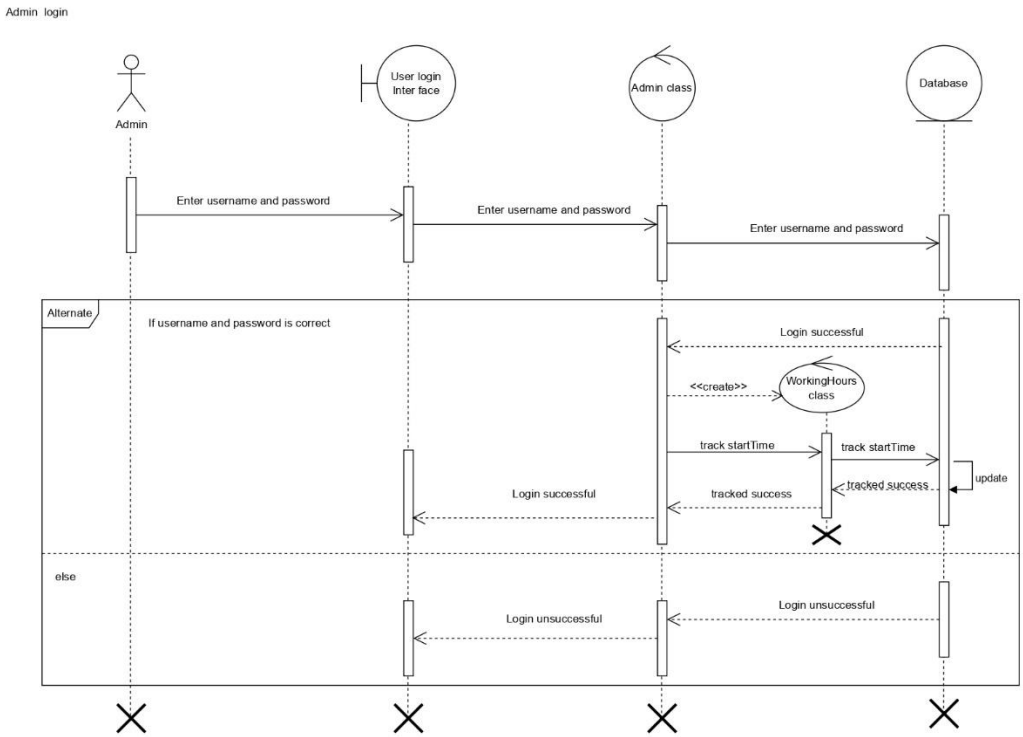
IV. Sequence Diagrams (Each Use case) for Proposed System.

- Admin

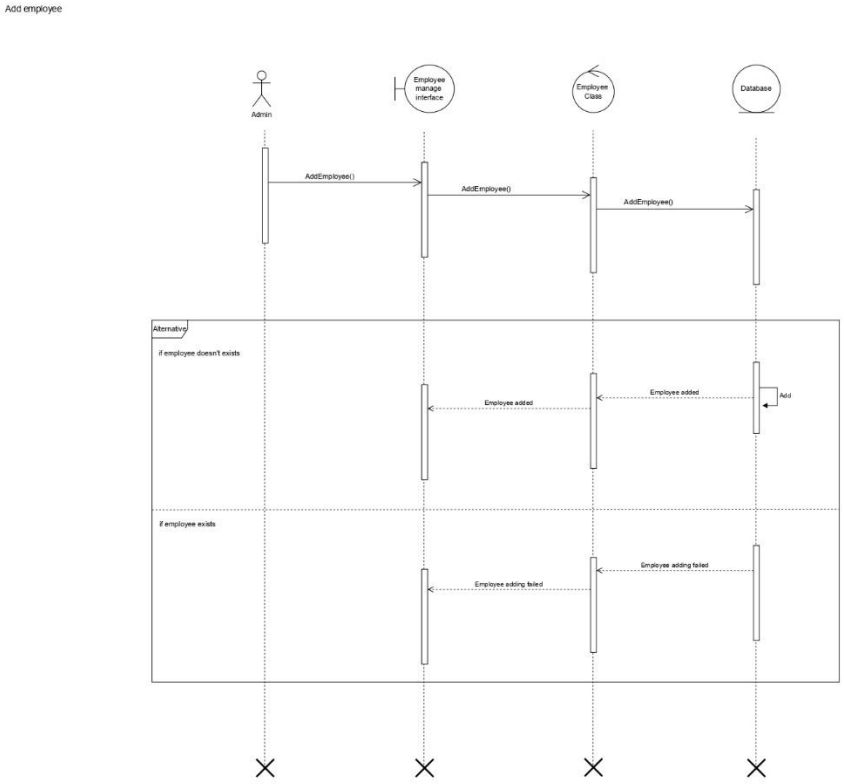
1. Create Account



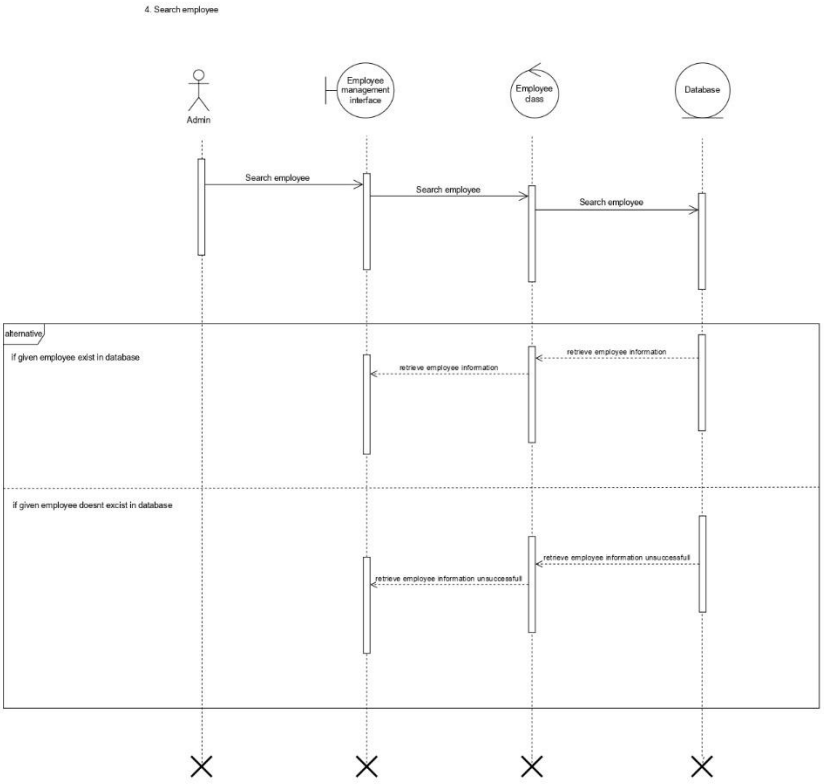
2. Log in


Admin login
Admin
User login Inter face
Admin class
Database
Enter username and password
Enter username and password
Enter username and password
Alternate
If username and password is correct
Login successful
<<create>>
WorkingHours class
track startTime
track startTime
update
tracked success
tracked success
Login successful
else
Login unsuccessful
Login unsuccessful

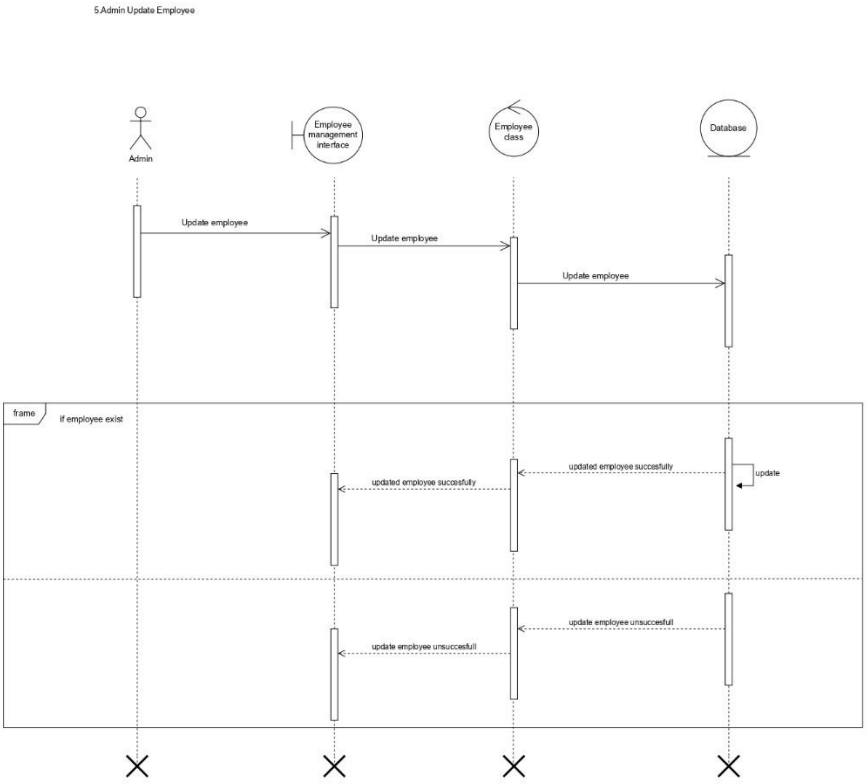
3. Add employee



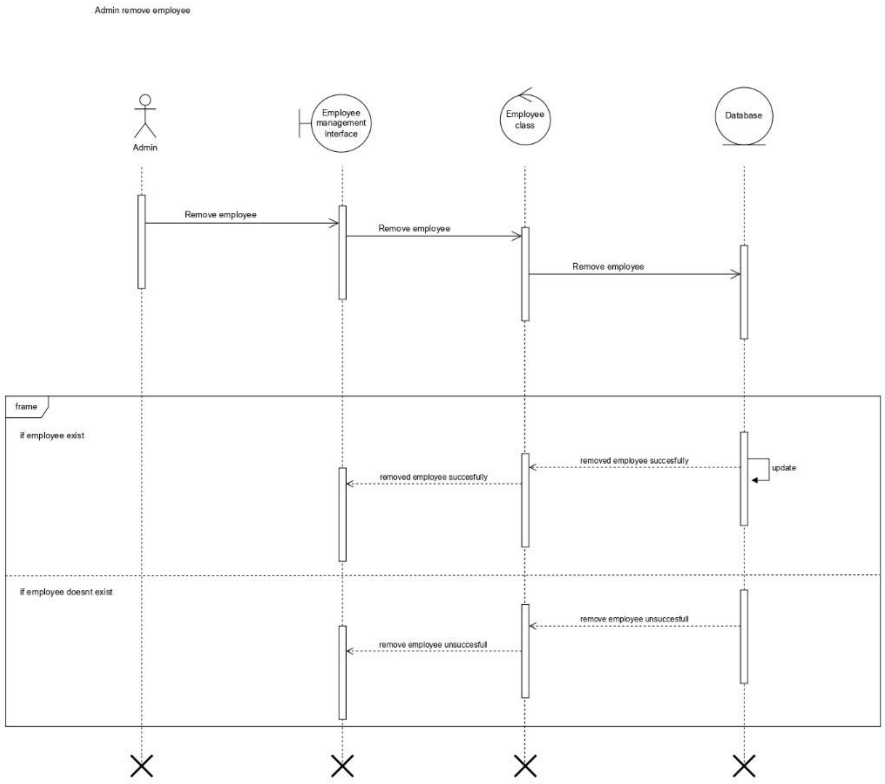
4. Search employee



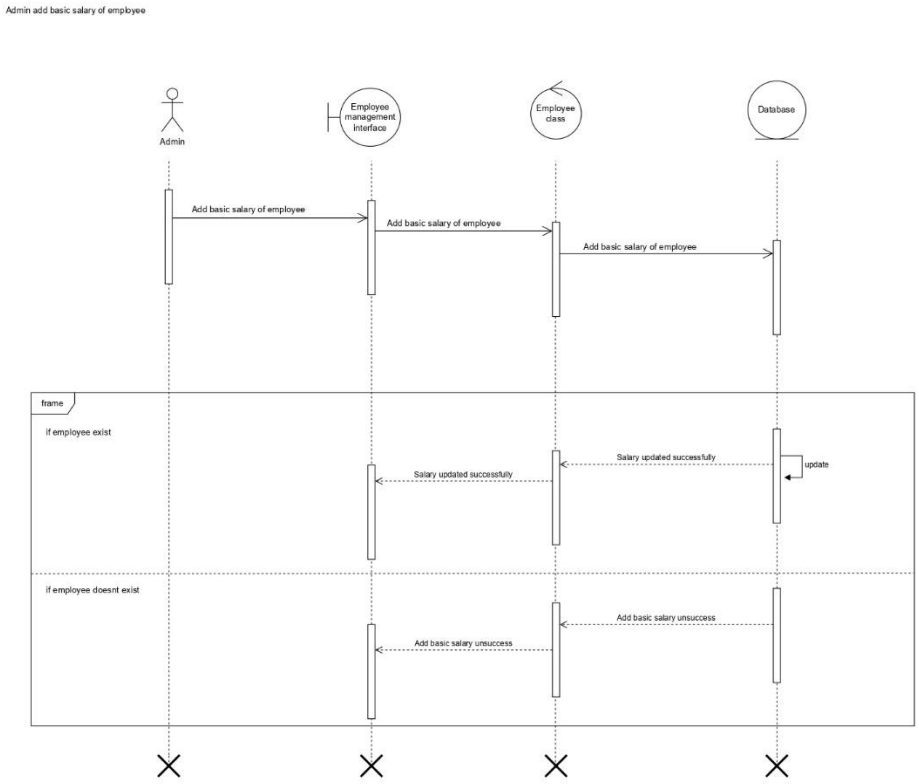
5. Update employee



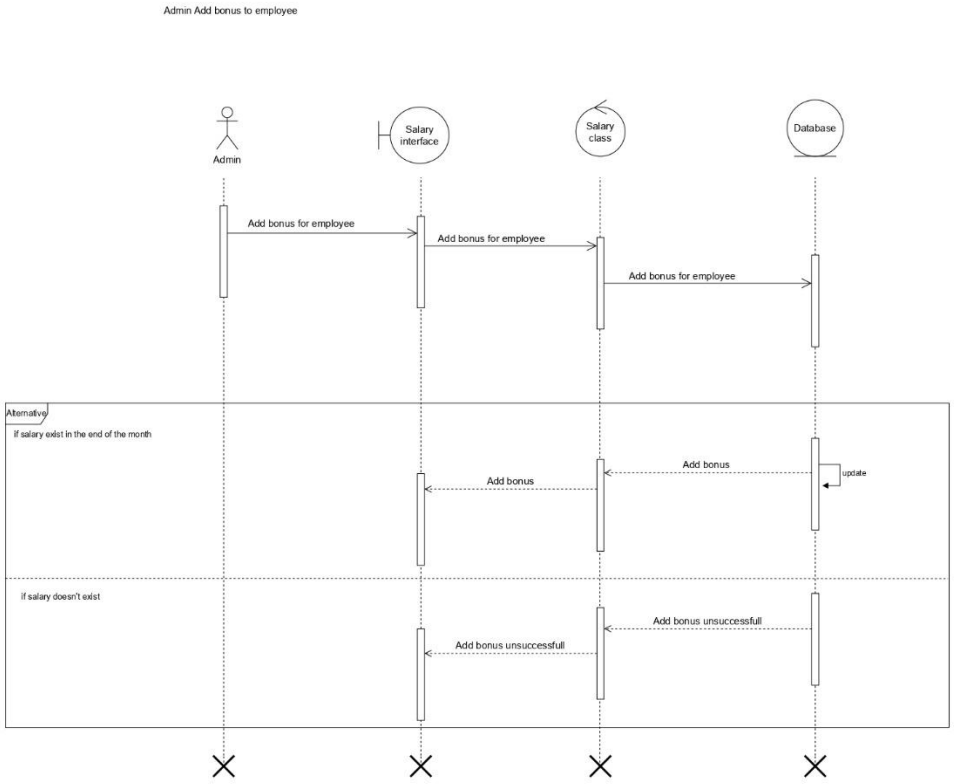
6. Remove employee



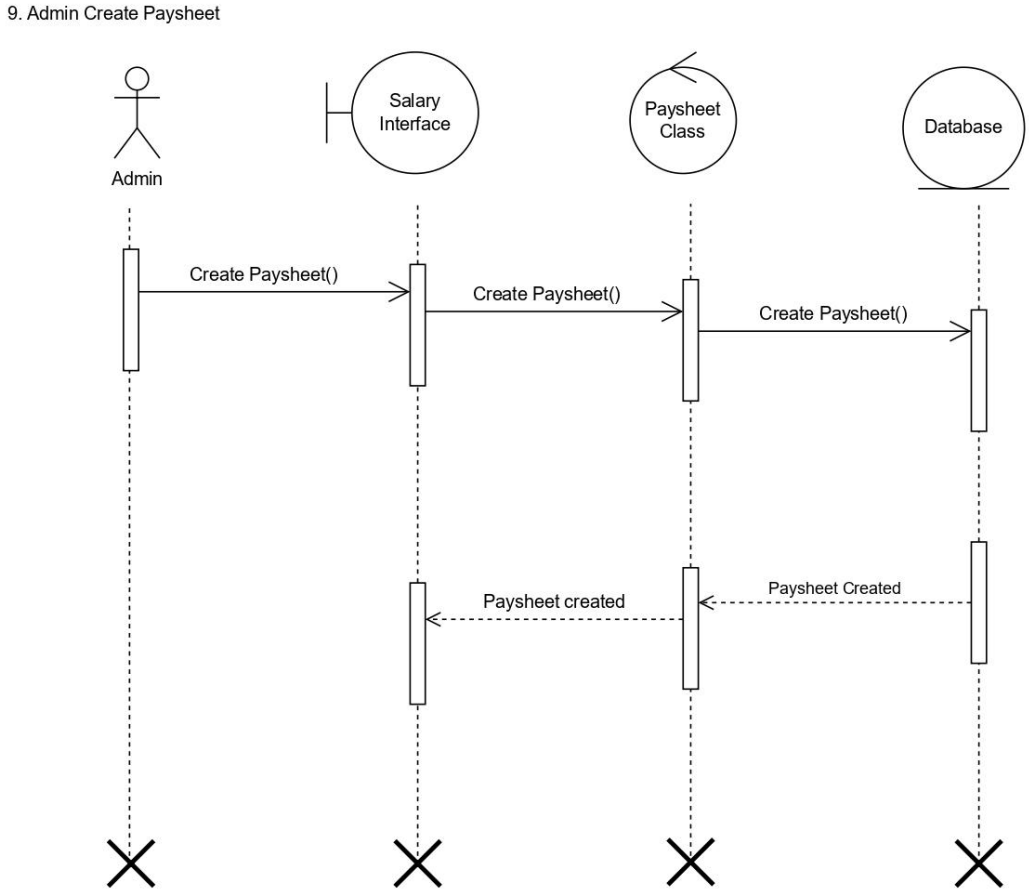
7. Add basic salary of employee



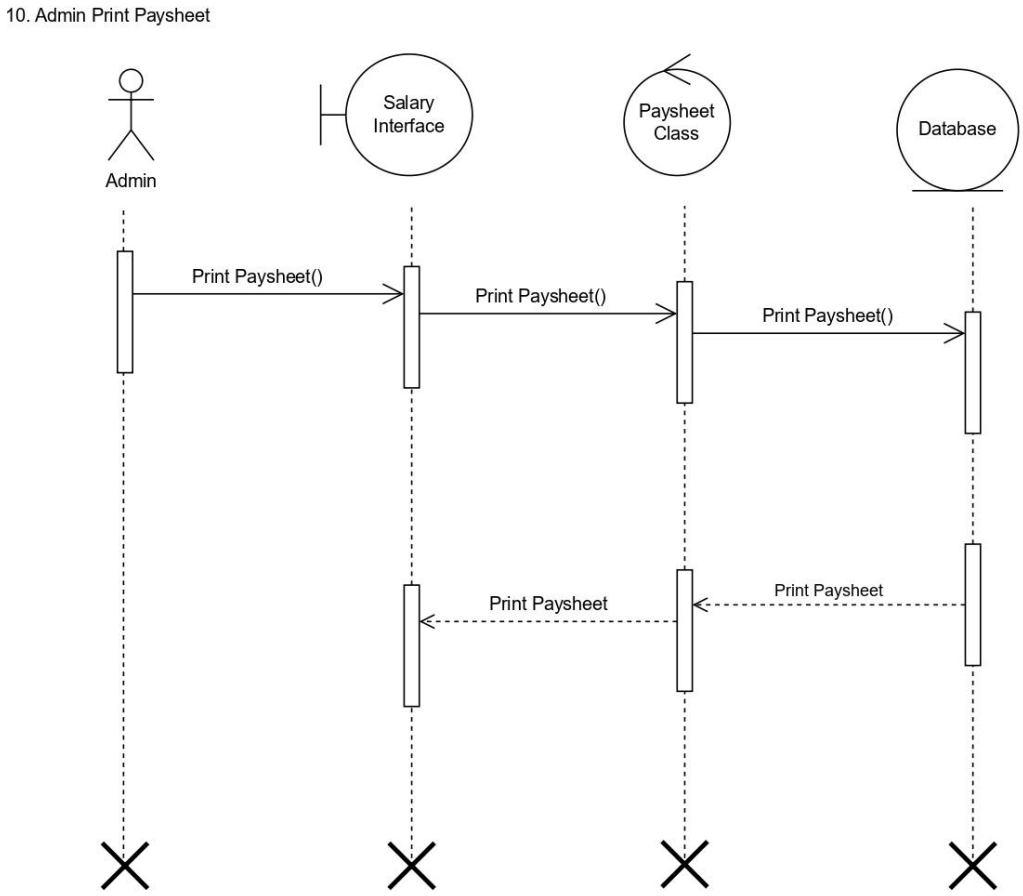
8. Add bonus


Admin Add bonus to employee
Admin
Salary interface
Salary class
Database
Add bonus for employee
Add bonus for employee
Add bonus for employee
Alternative
If salary exist in the end of the month
Add bonus
Add bonus
update
If salary doesn't exist
Add bonus unsuccessfull
Add bonus unsuccessfull

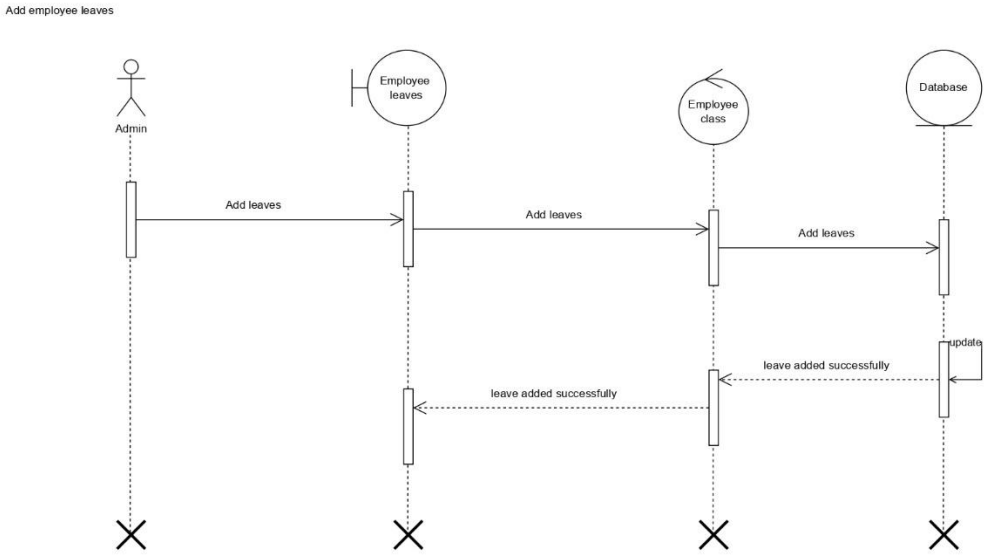
9. Create paysheet



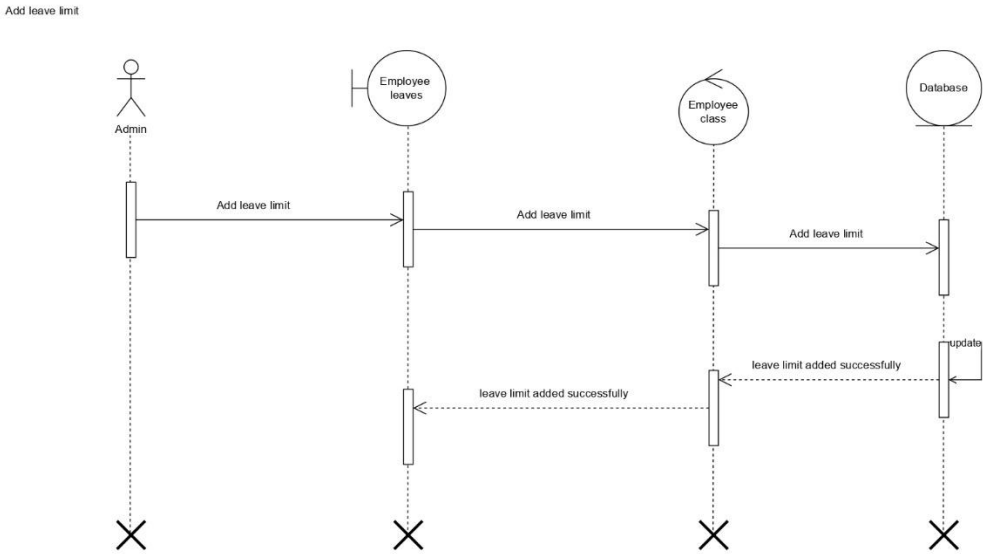
10. Print paysheet



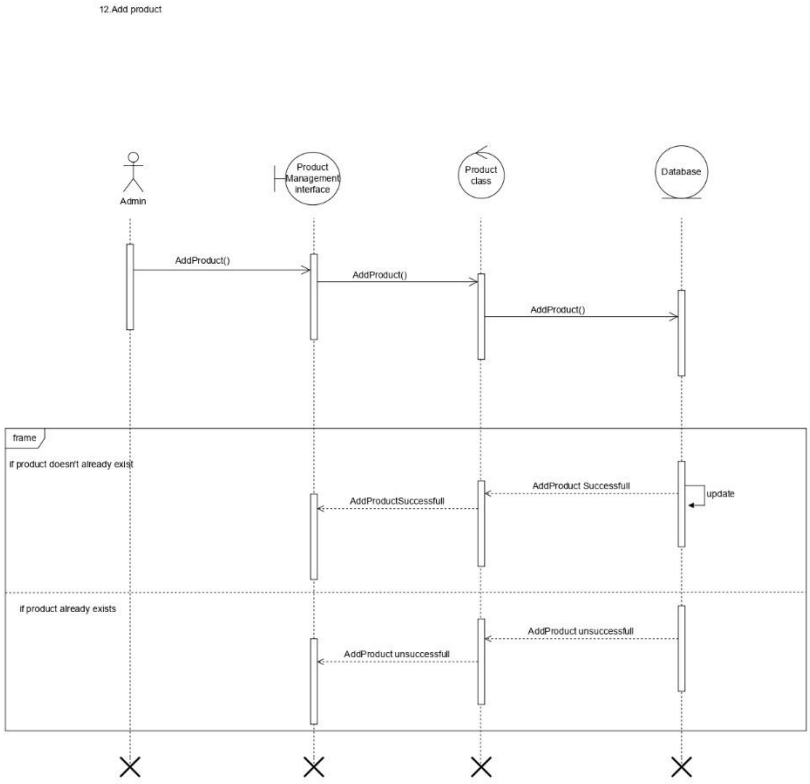
11. Add employee leaves



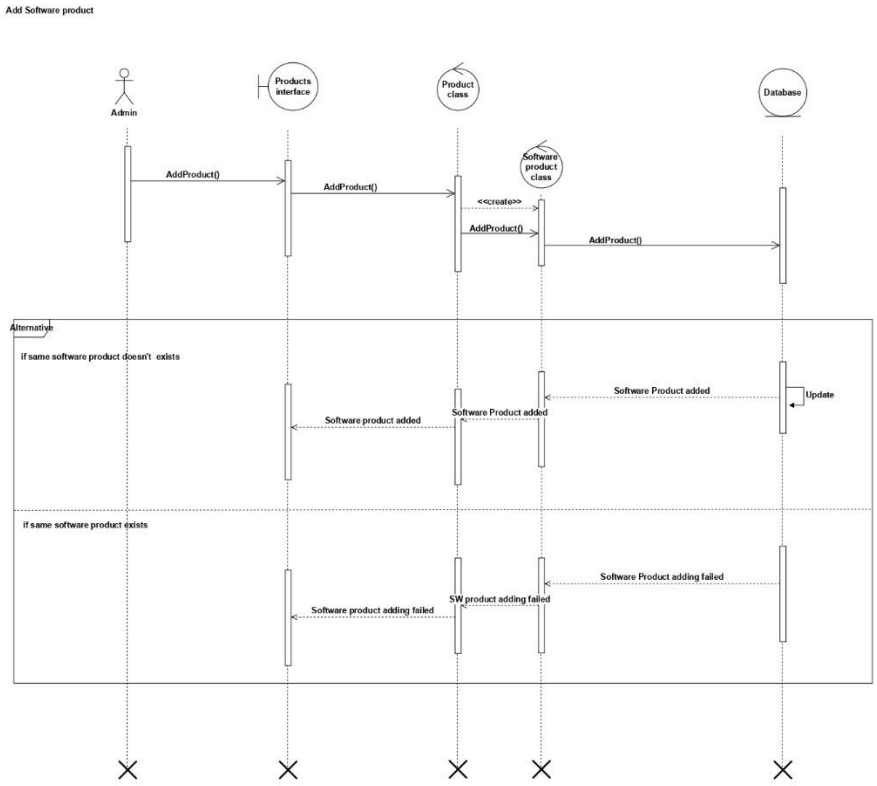
12. Add leave limits



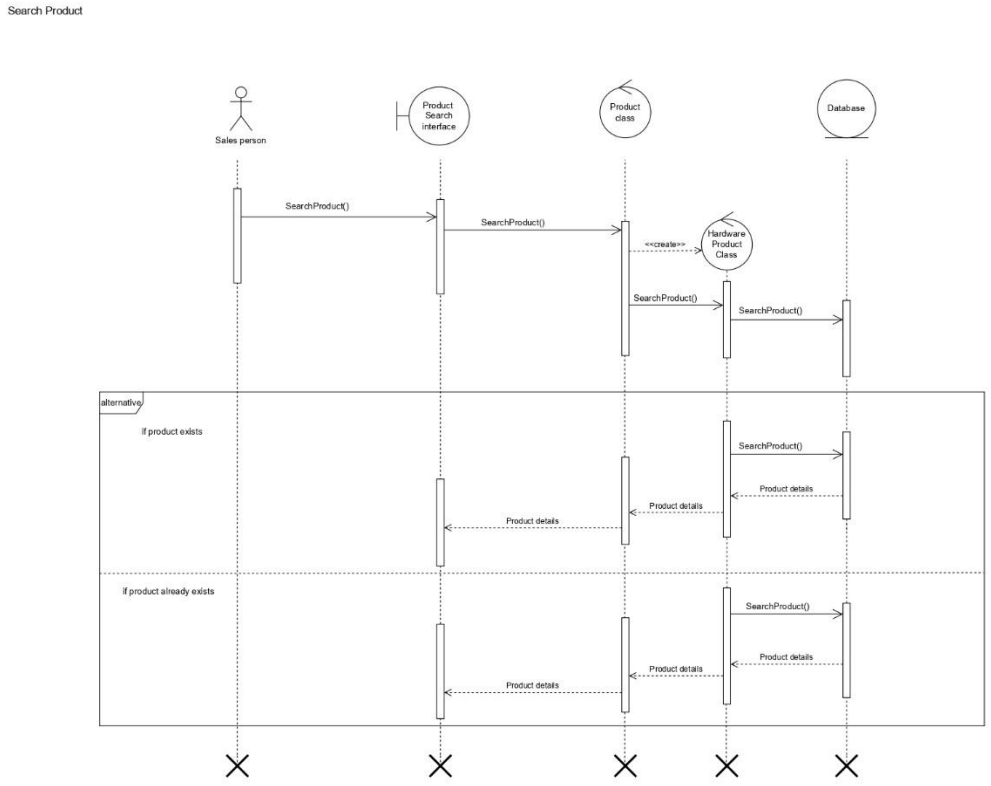
13. Add product



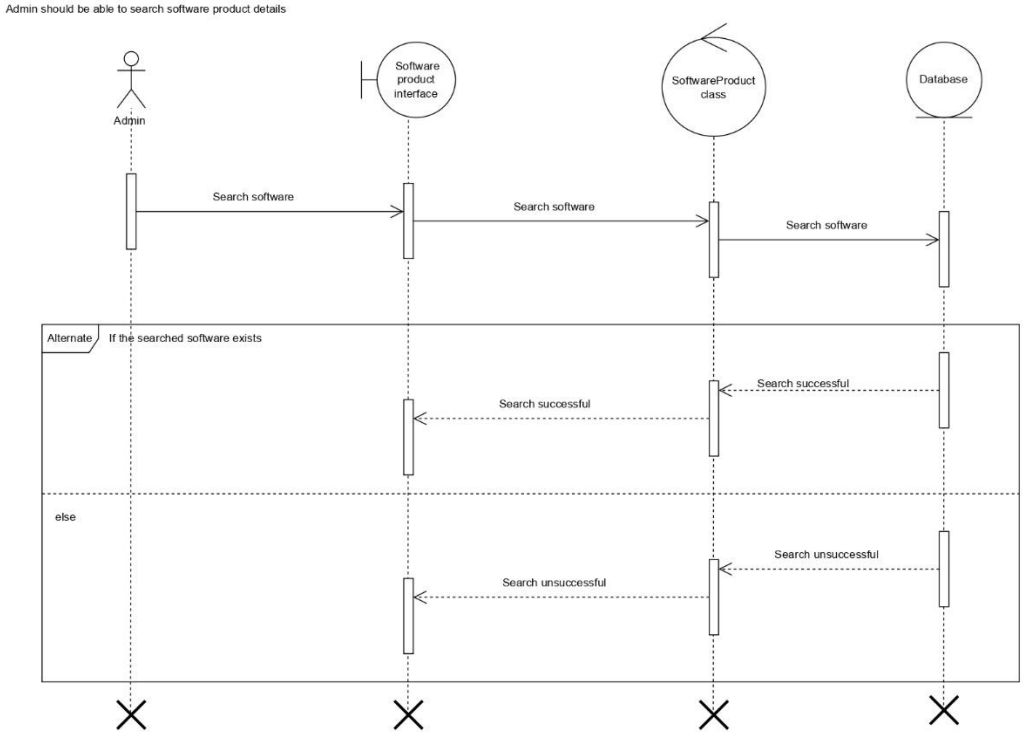
14. Add software products



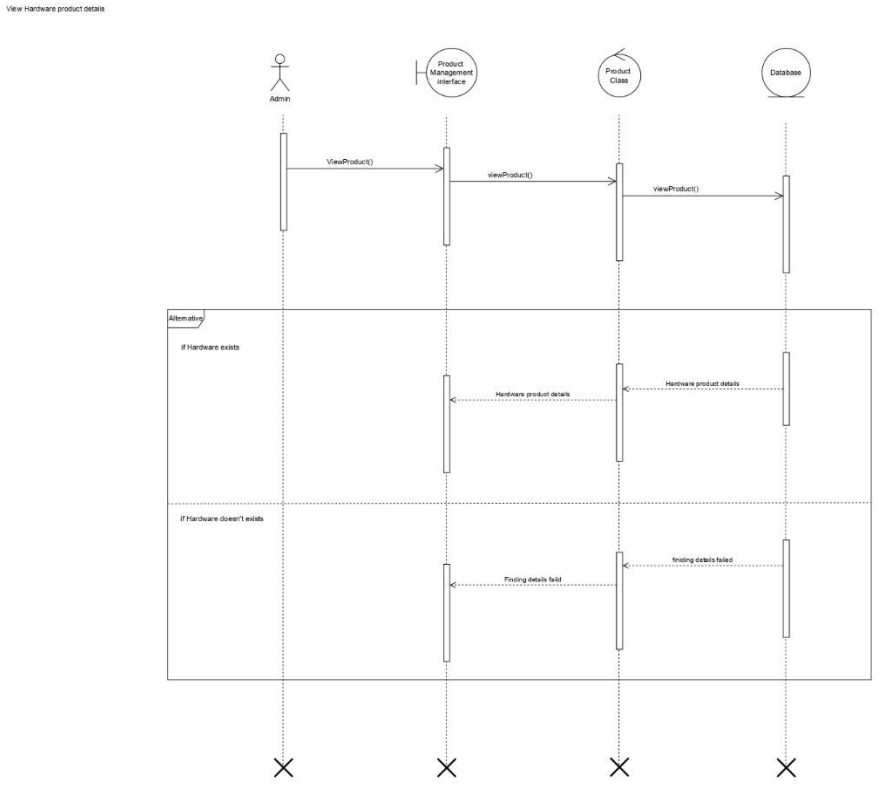
15. Search products



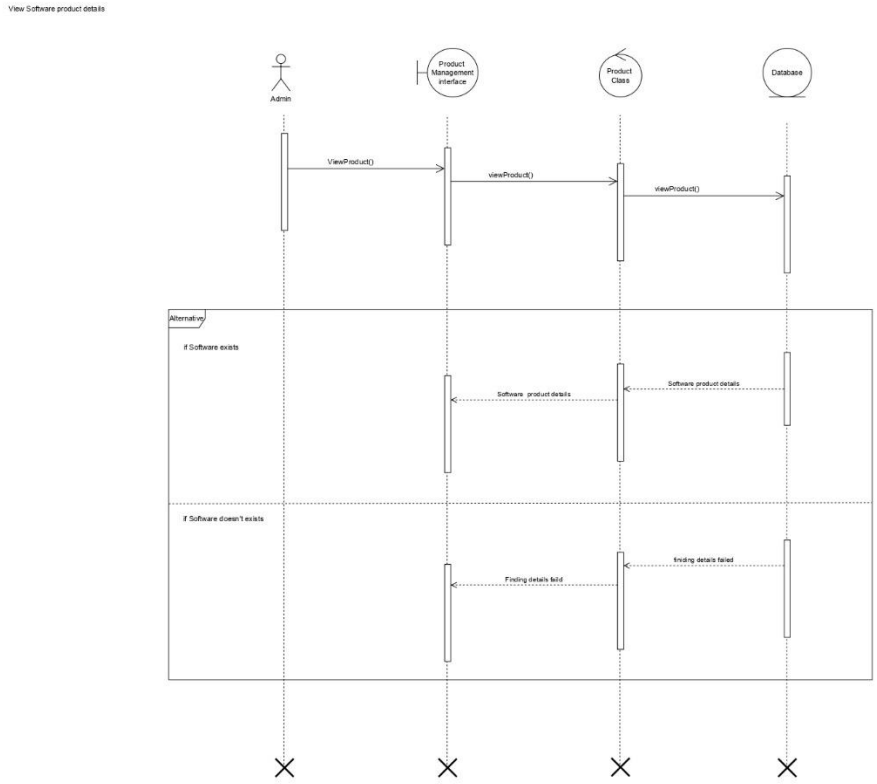
16. Search software products



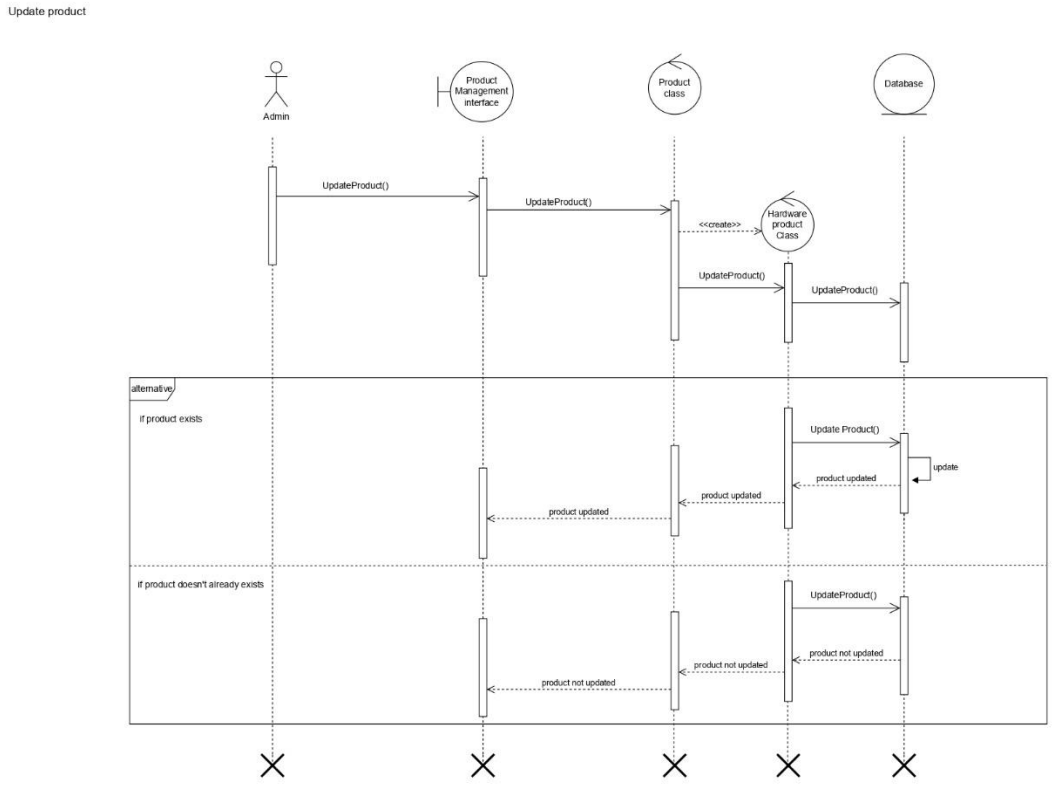
17. View product details



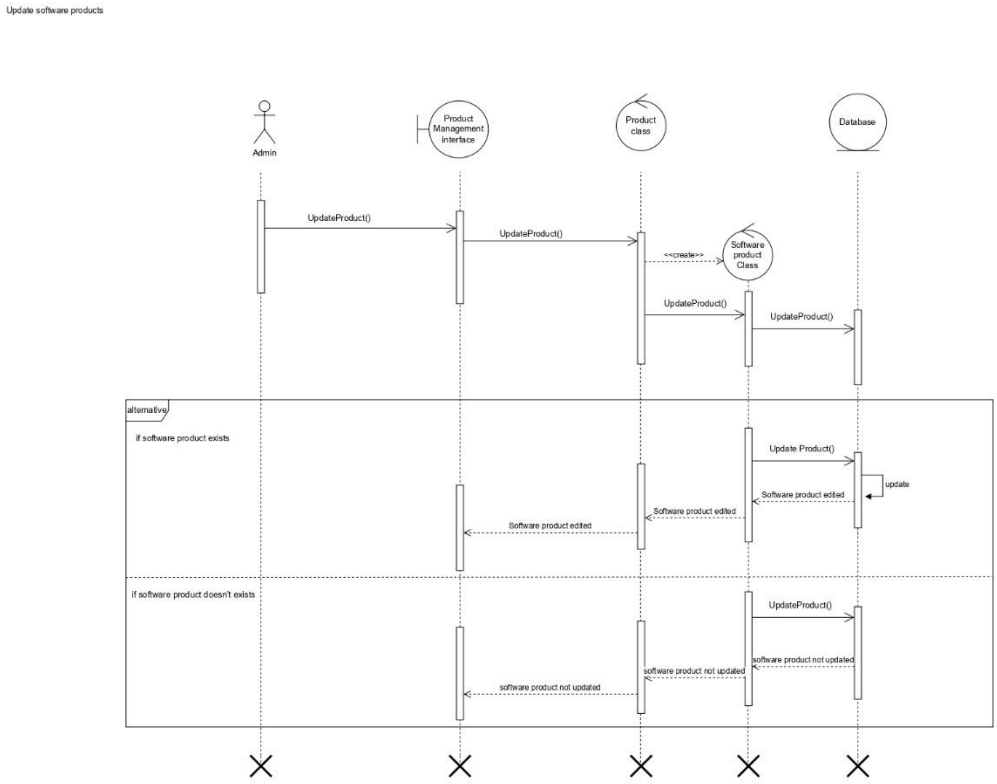
18. View Software product details



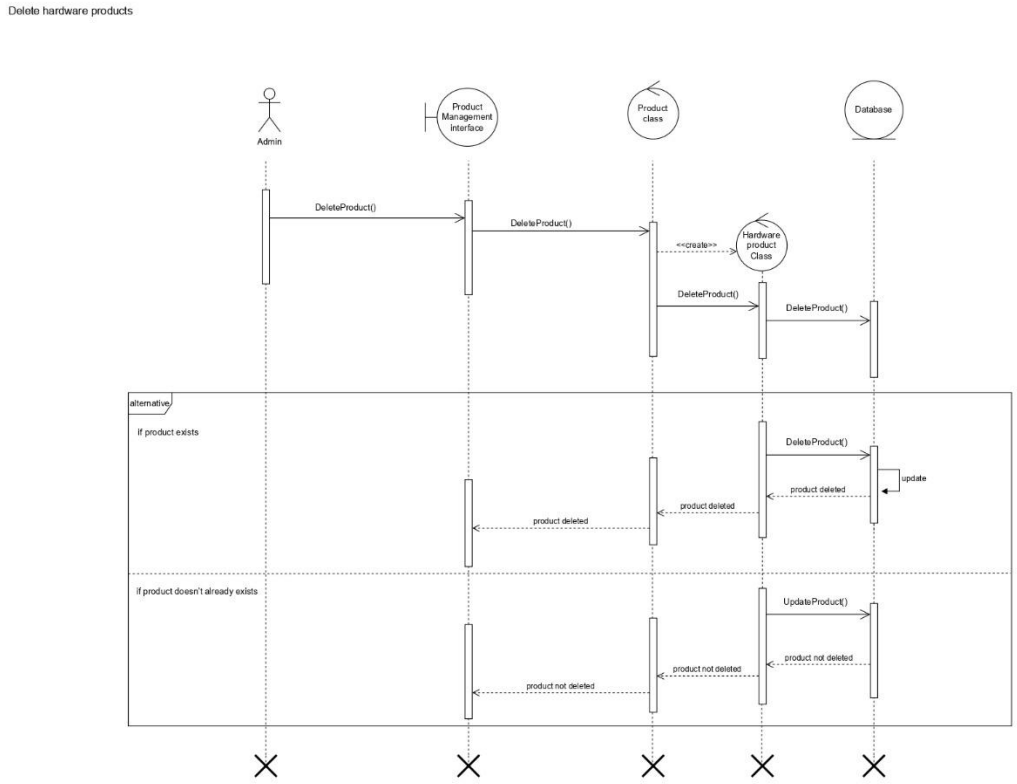
19. Update products



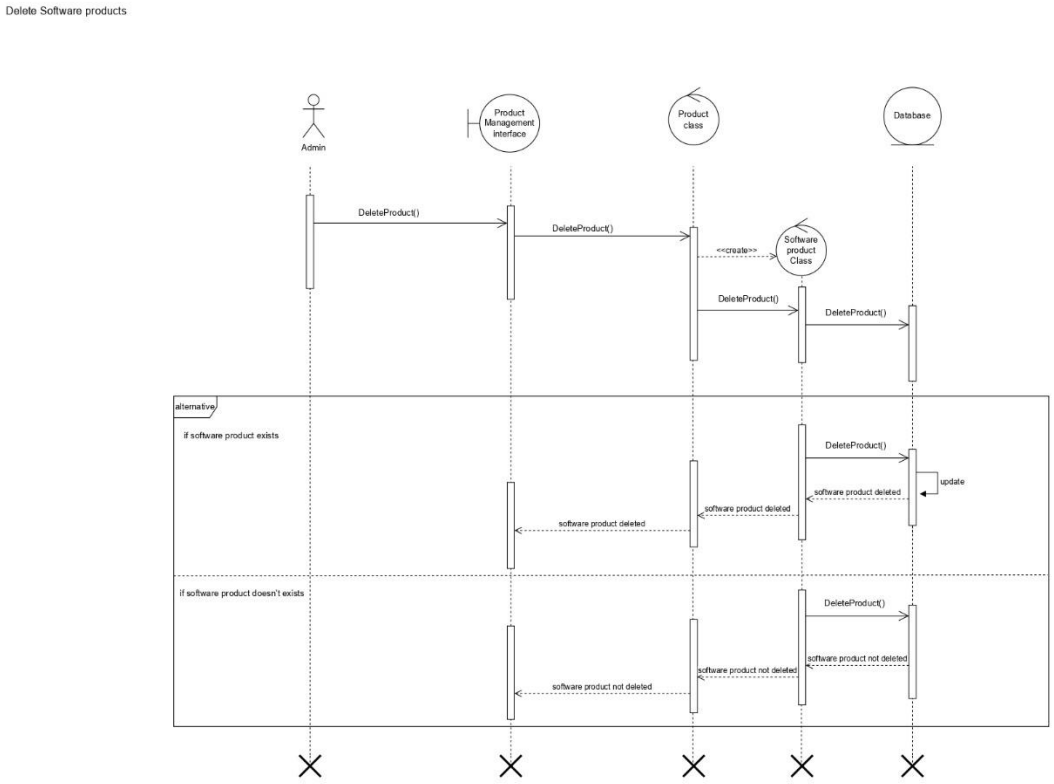
20. Update software products



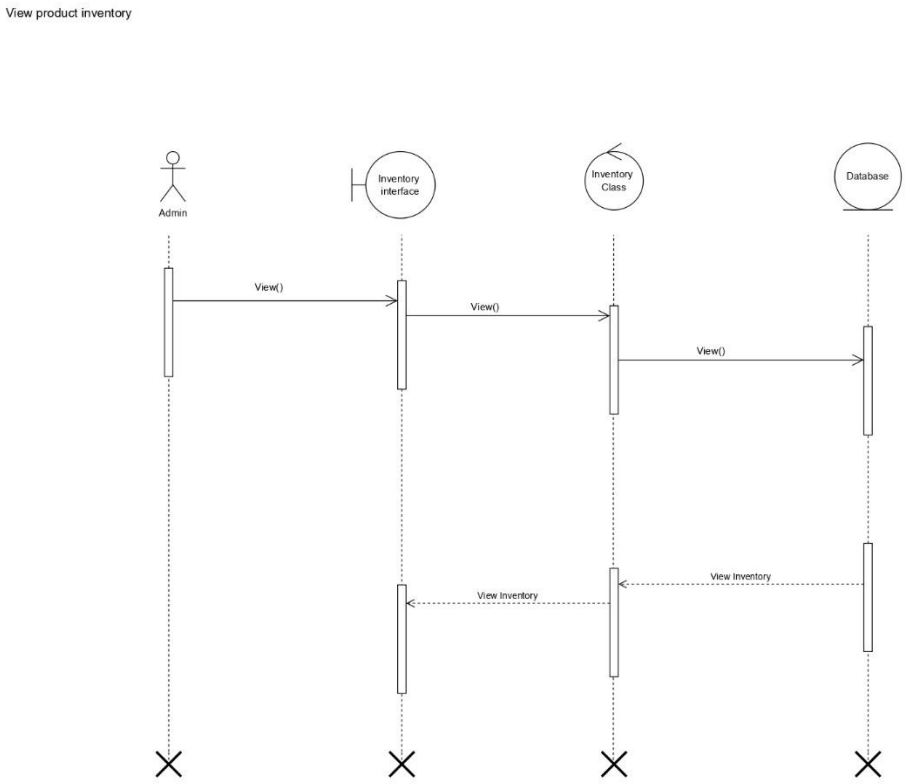
21. Delete products



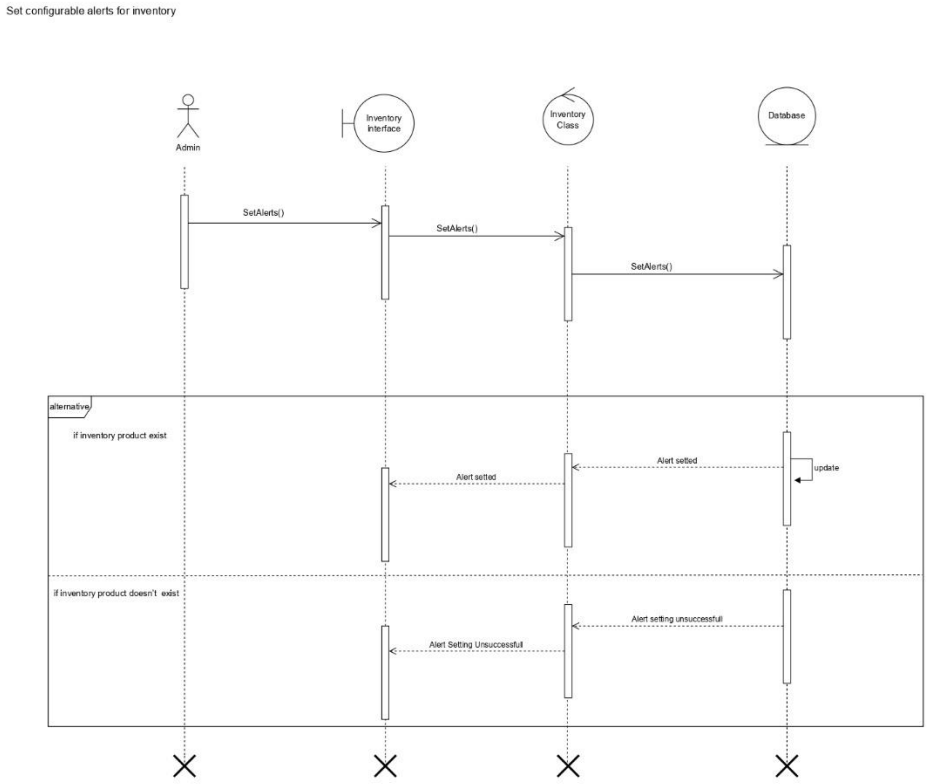
22. Delete Software products



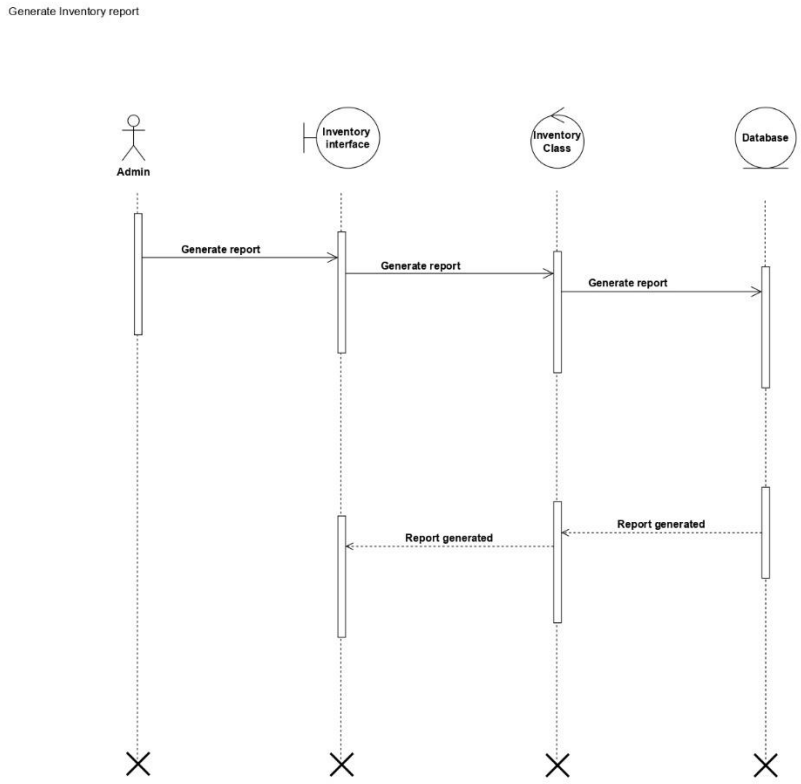
23. View product inventory



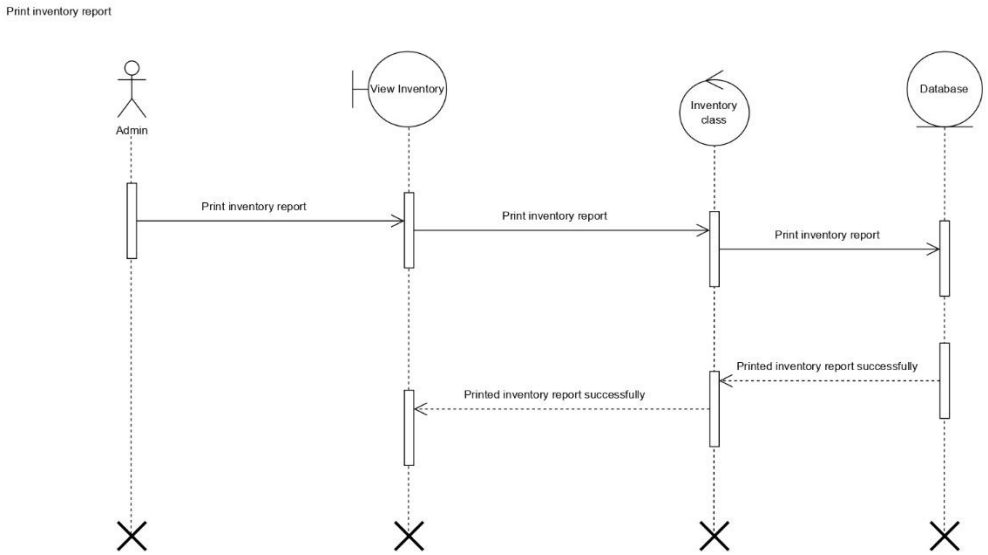
24. Set up configurable alerts for inventory



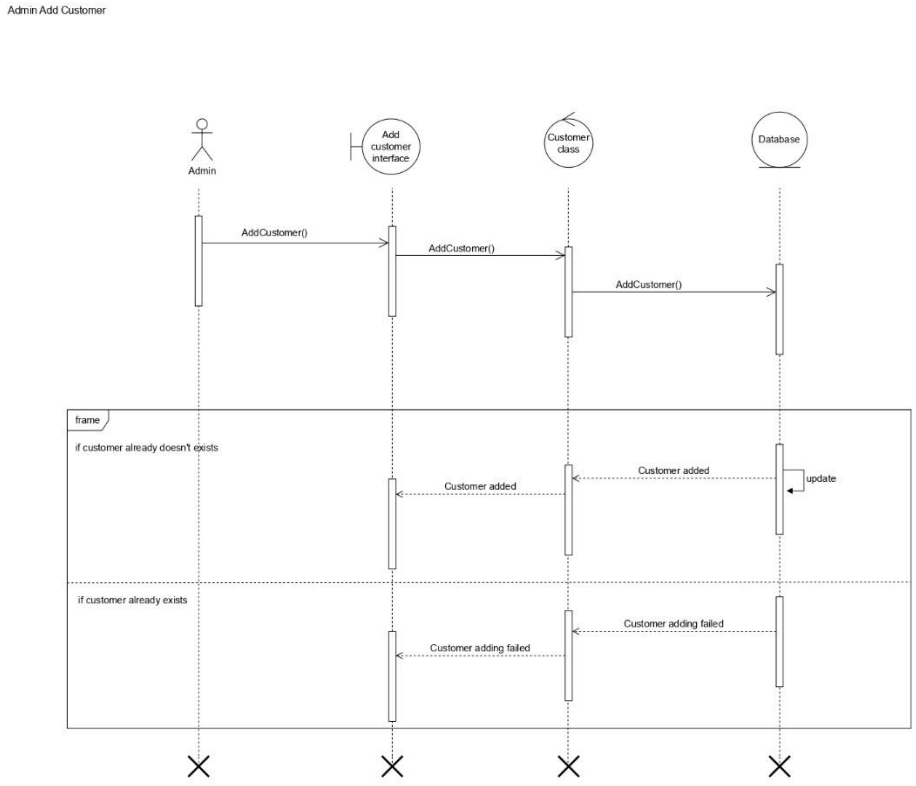
25. Generate inventory report



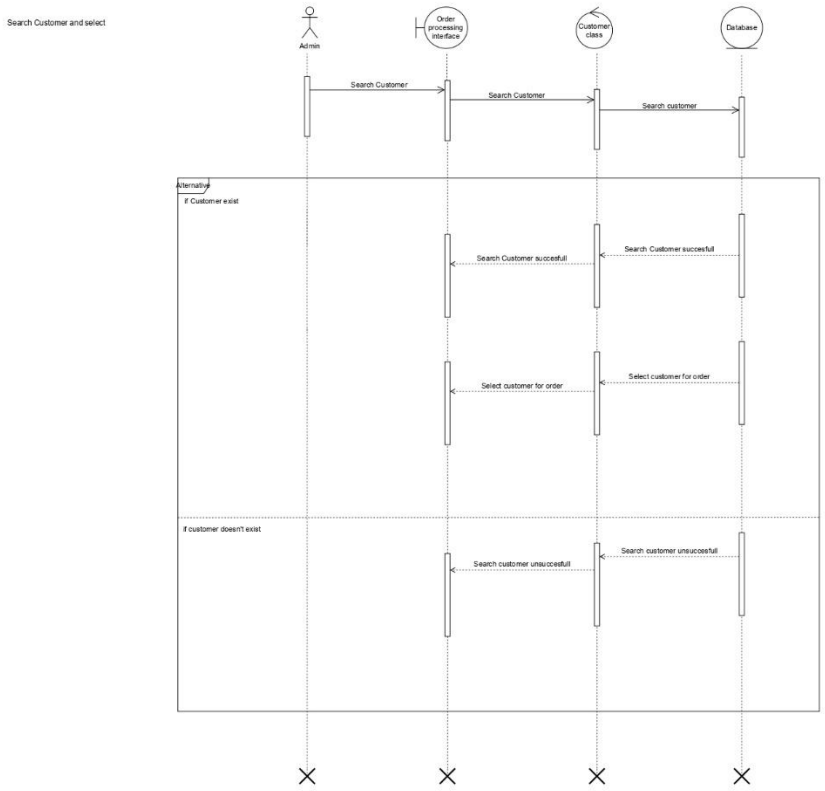
26. print inventory report



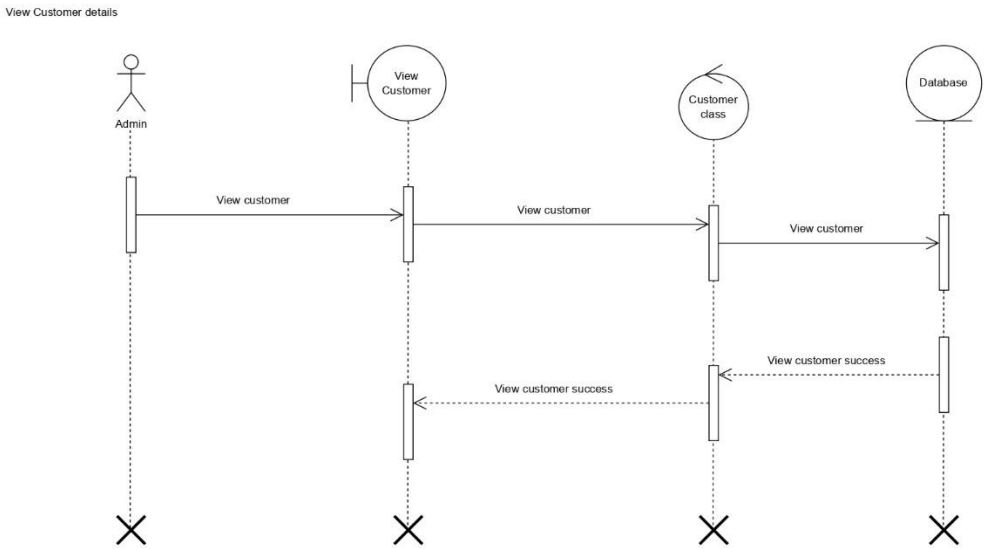
27. Add customer



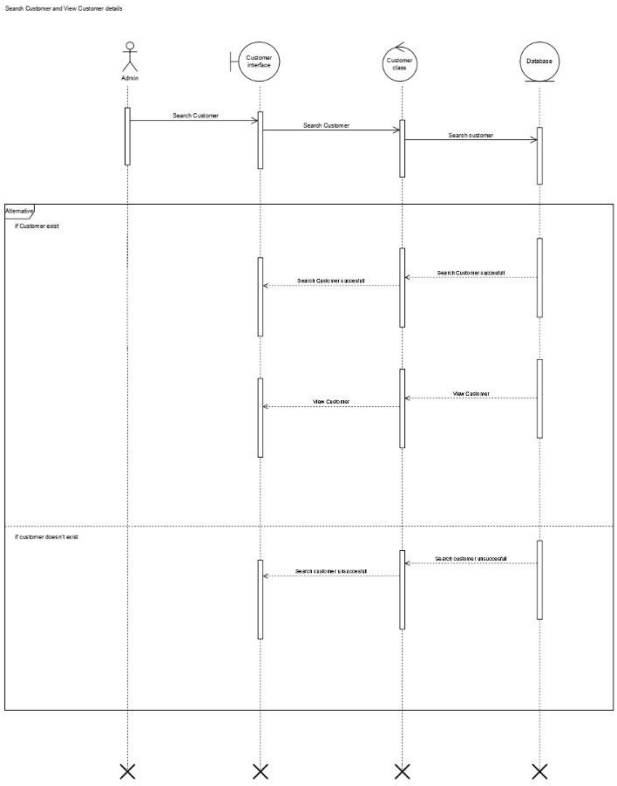
28. Search customer



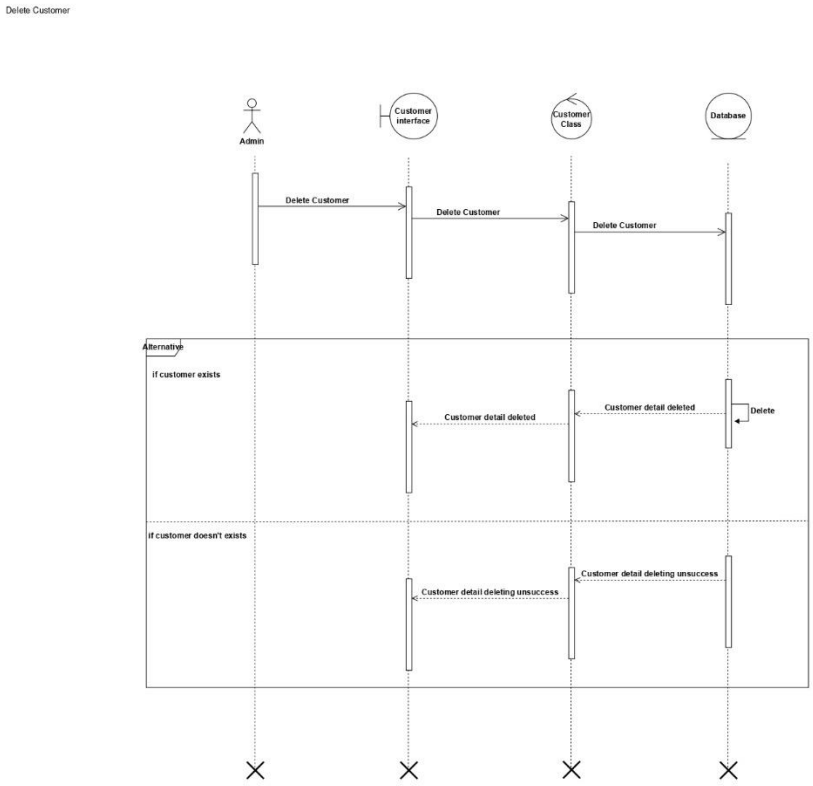
29. View customer details



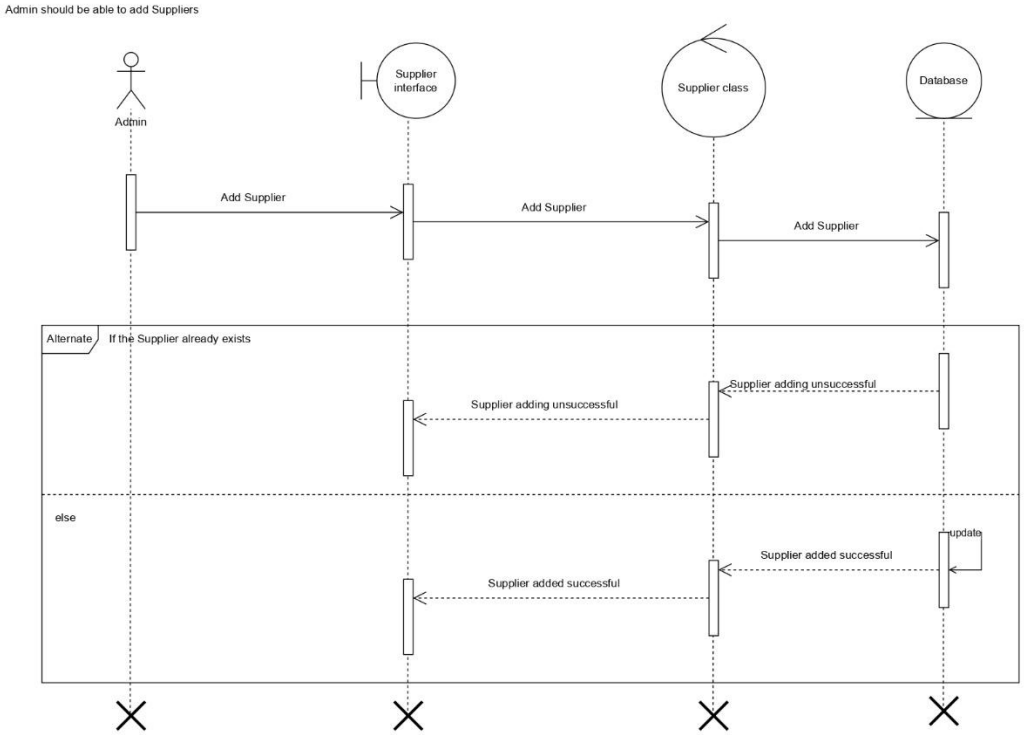
30. Edit customers



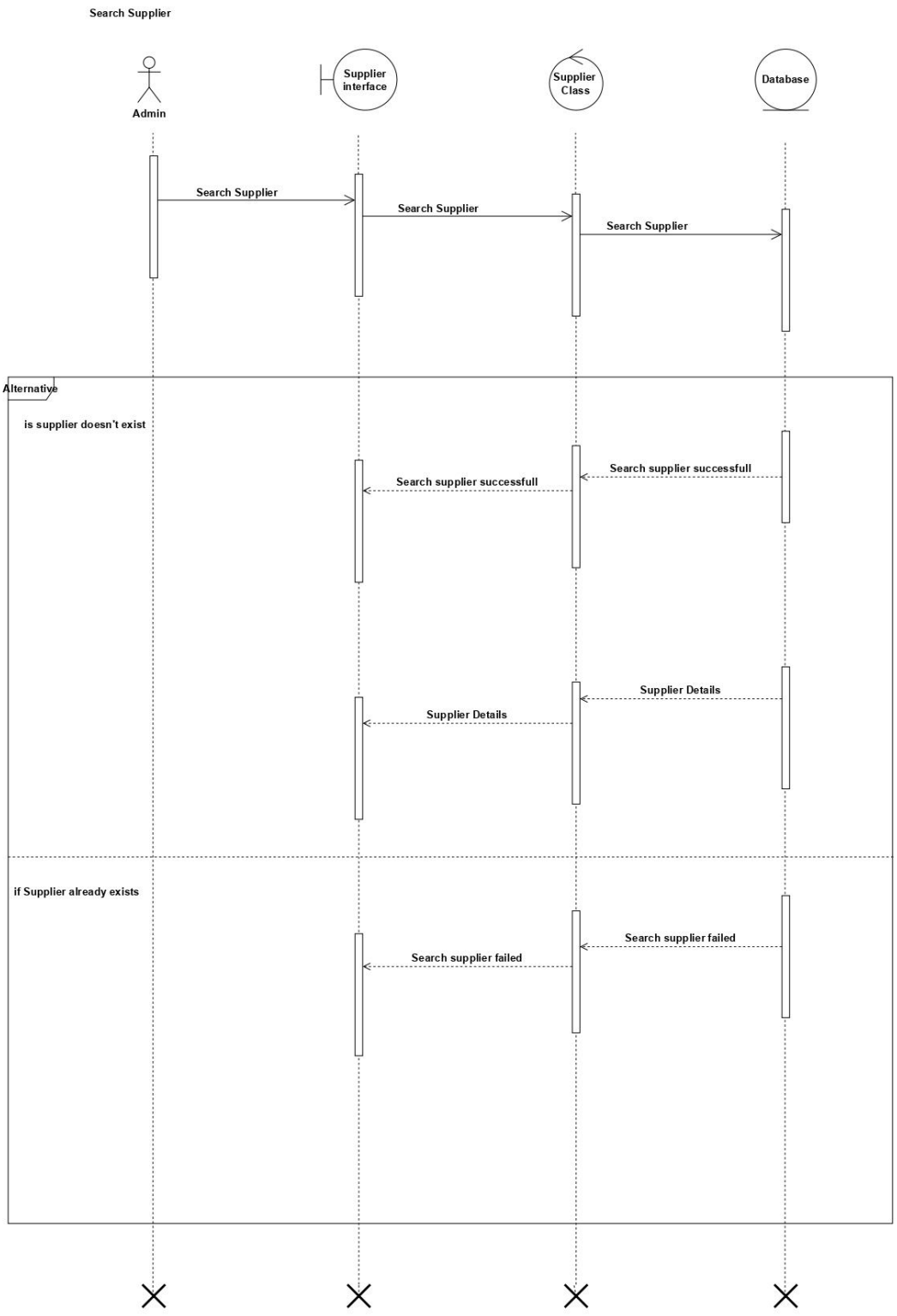
31. Delete customers



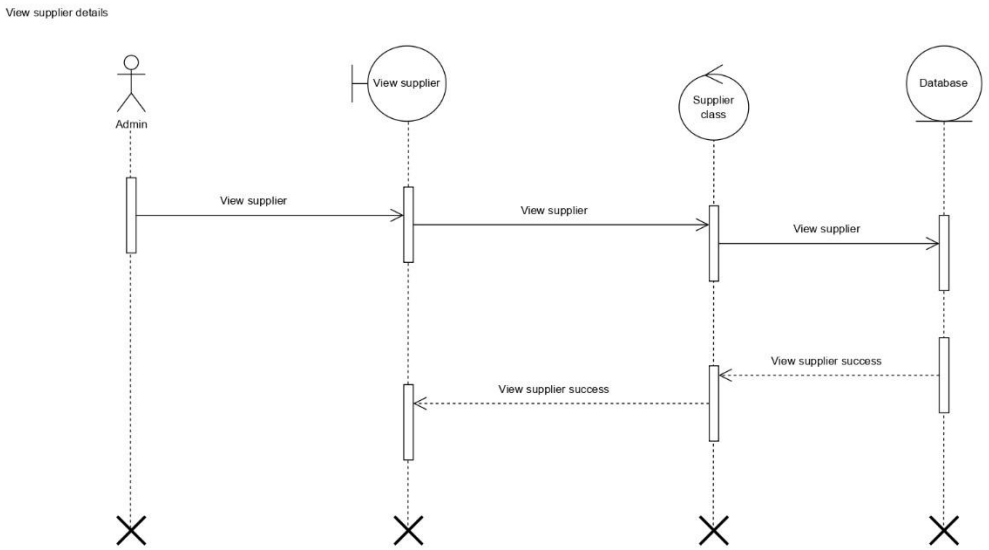
32. Add suppliers



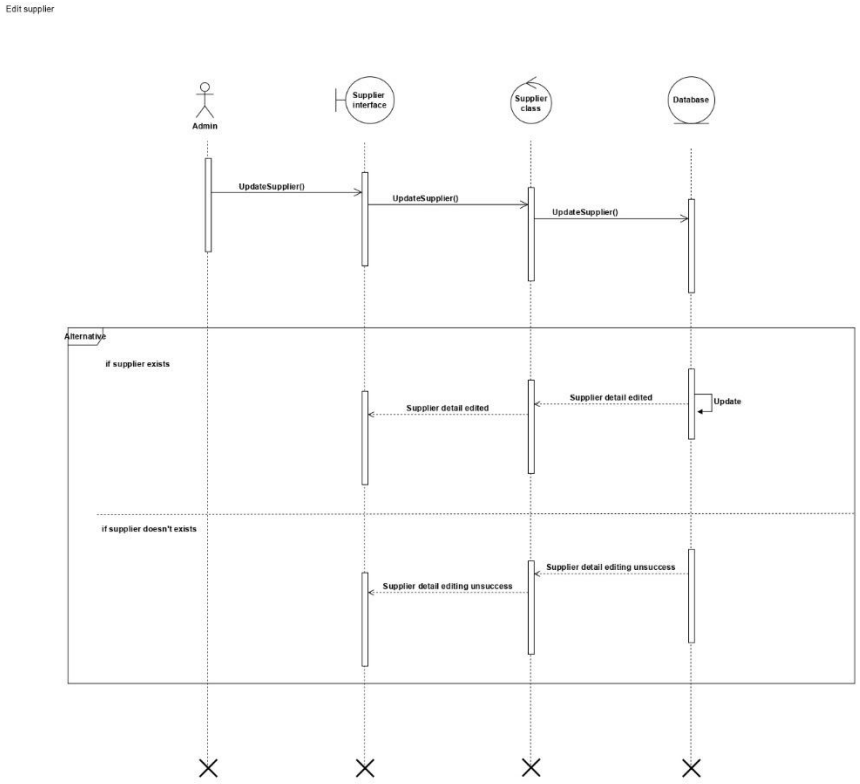
33. Search supplier



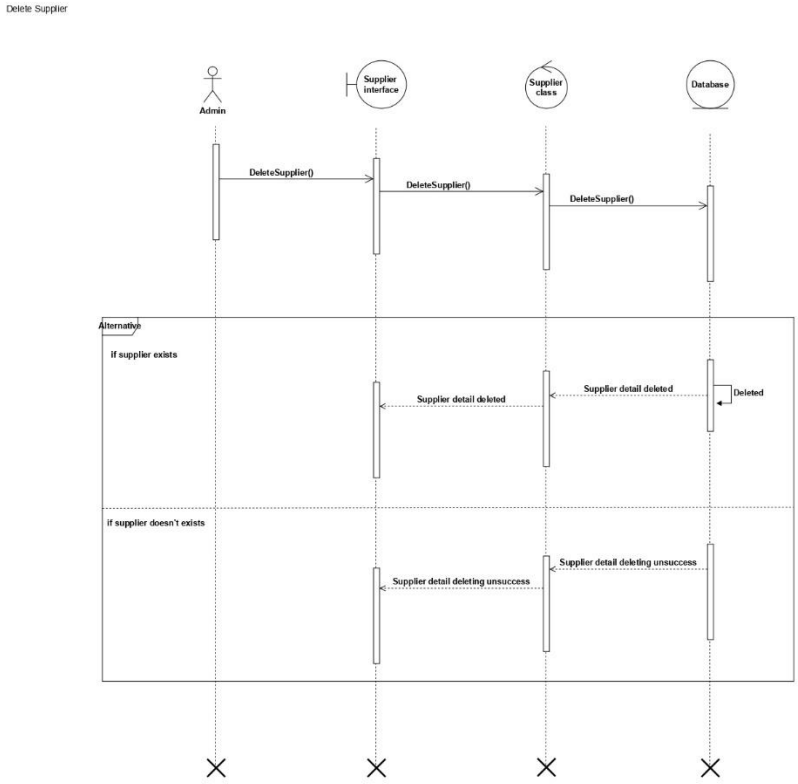
34. View supplier



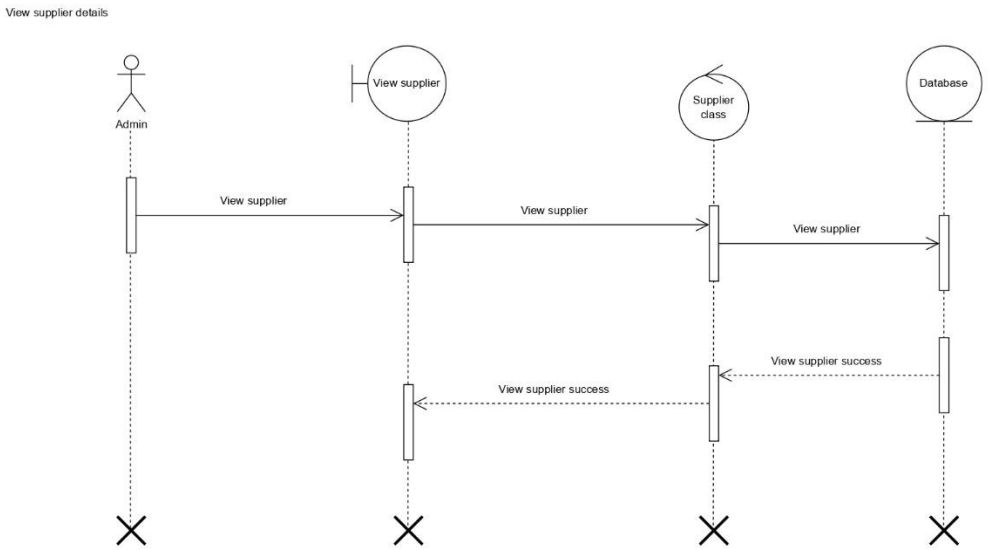
35. Edit supplier



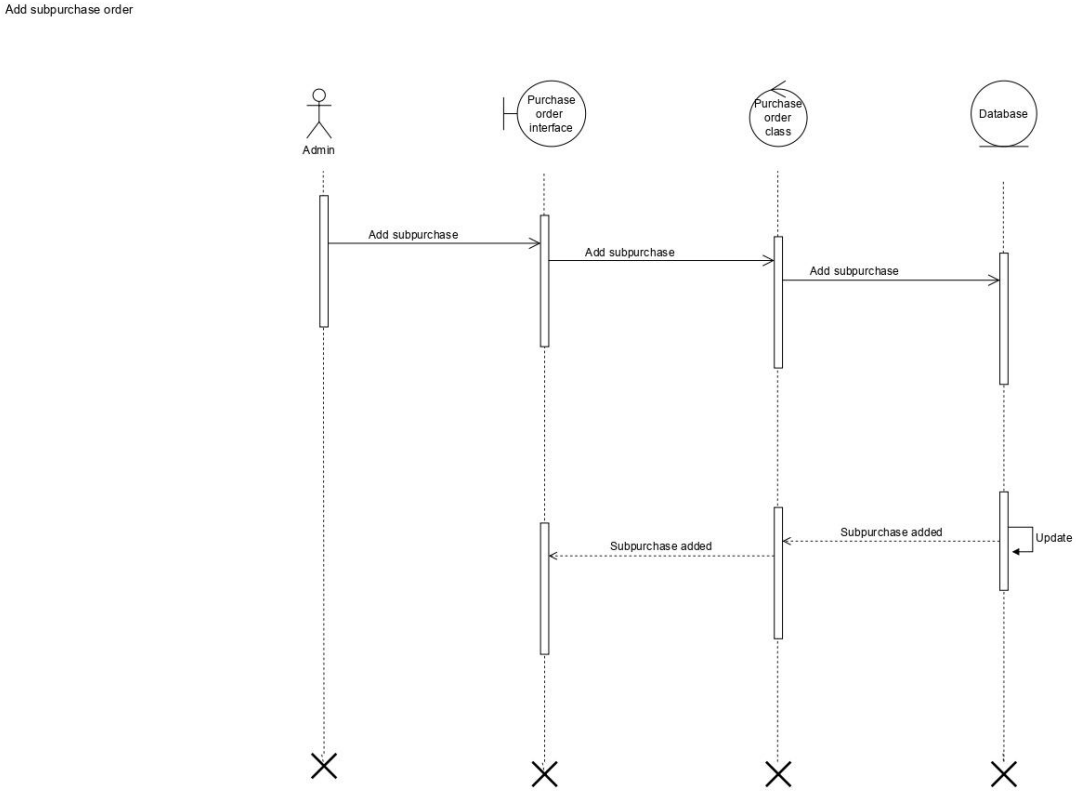
36. Delete supplier



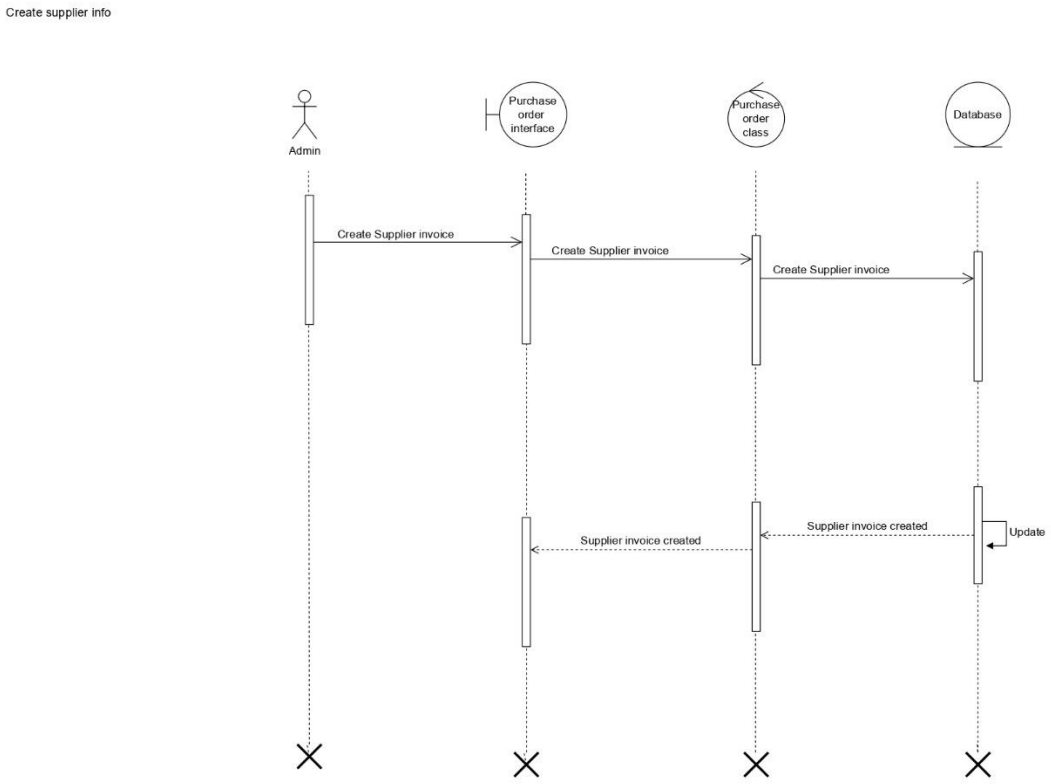
37. Add purchase order



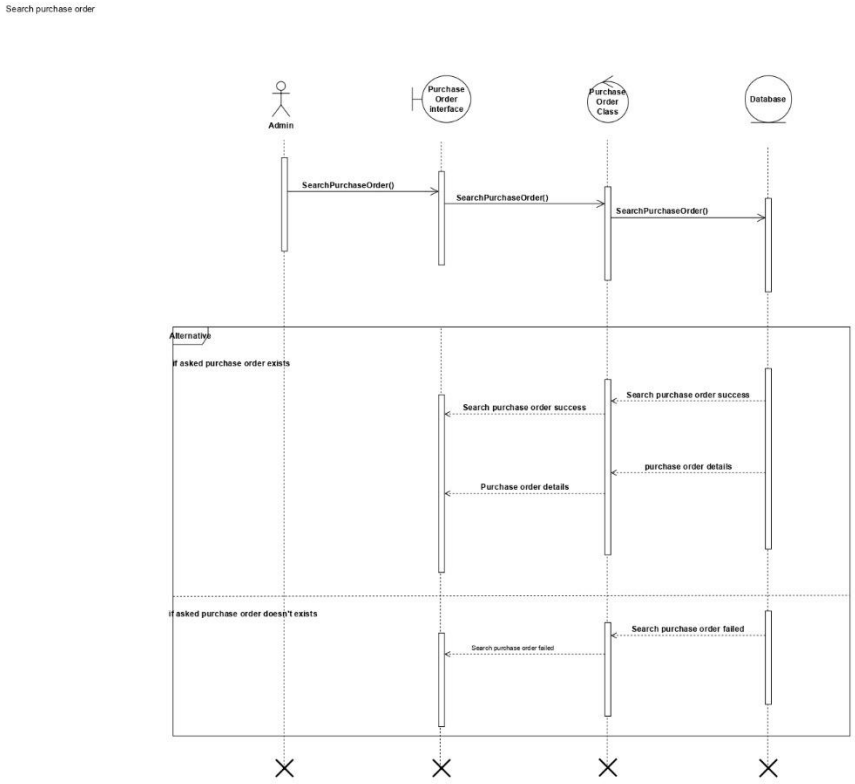
38. Add sub purchase order



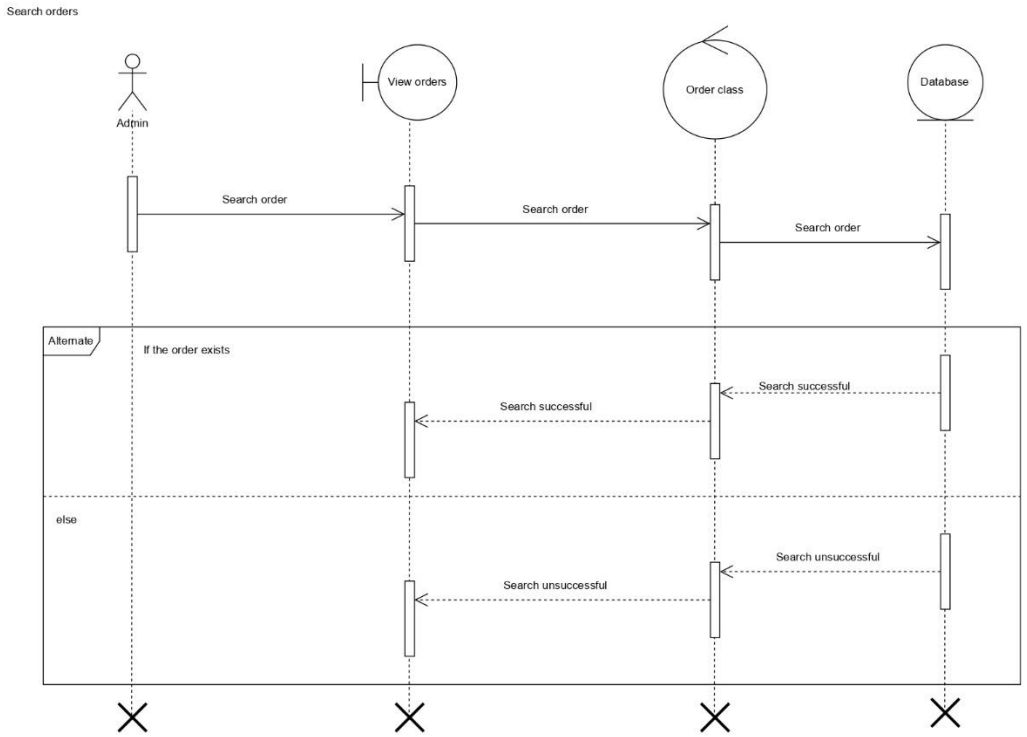
39. Create supplier invoice



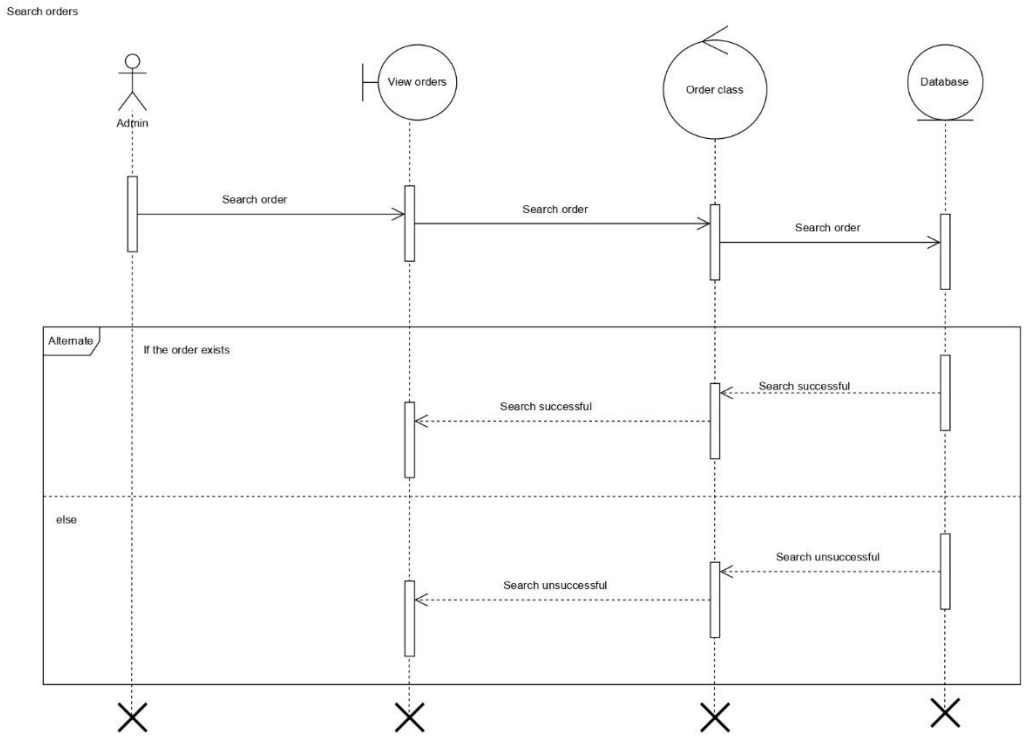
40. Search purchase order details



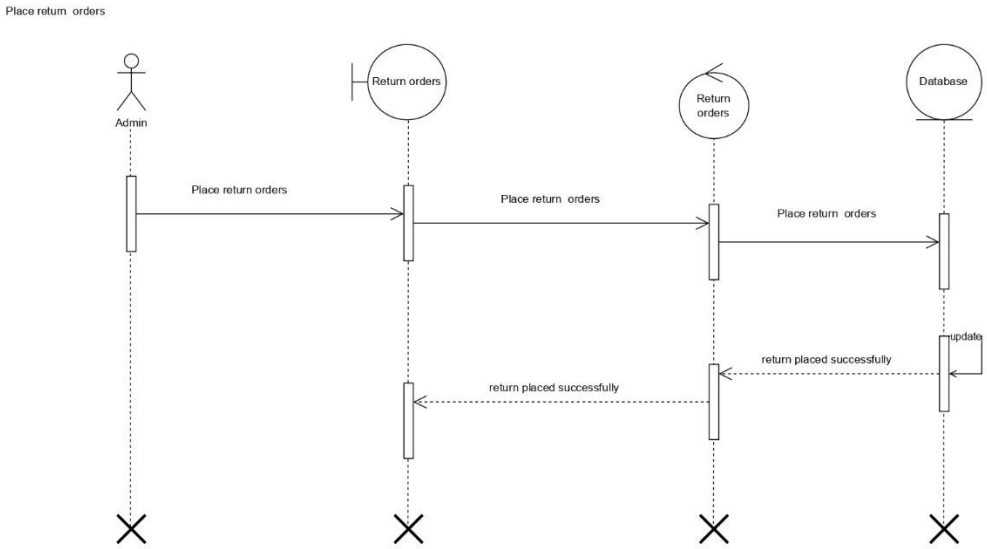
41. Search Orders



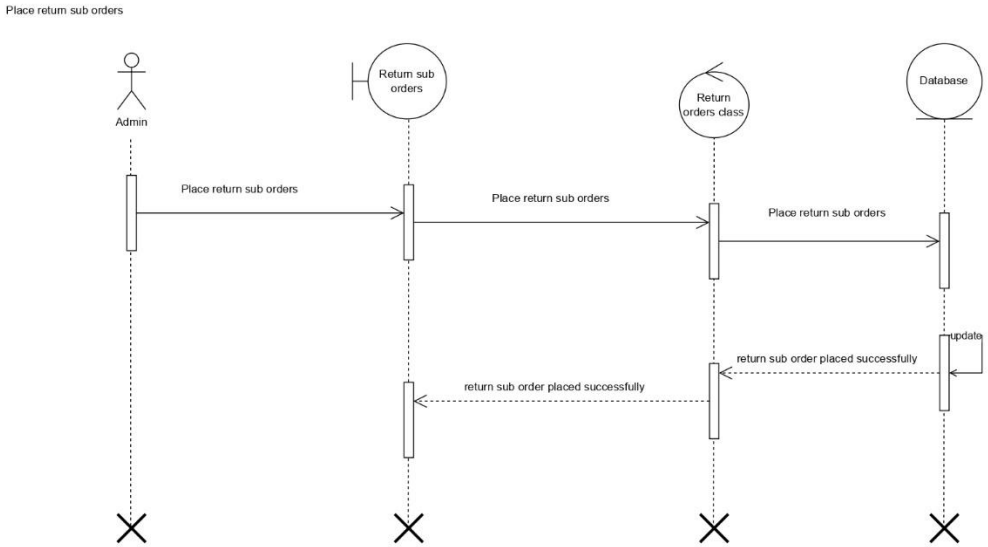
42. View Orders



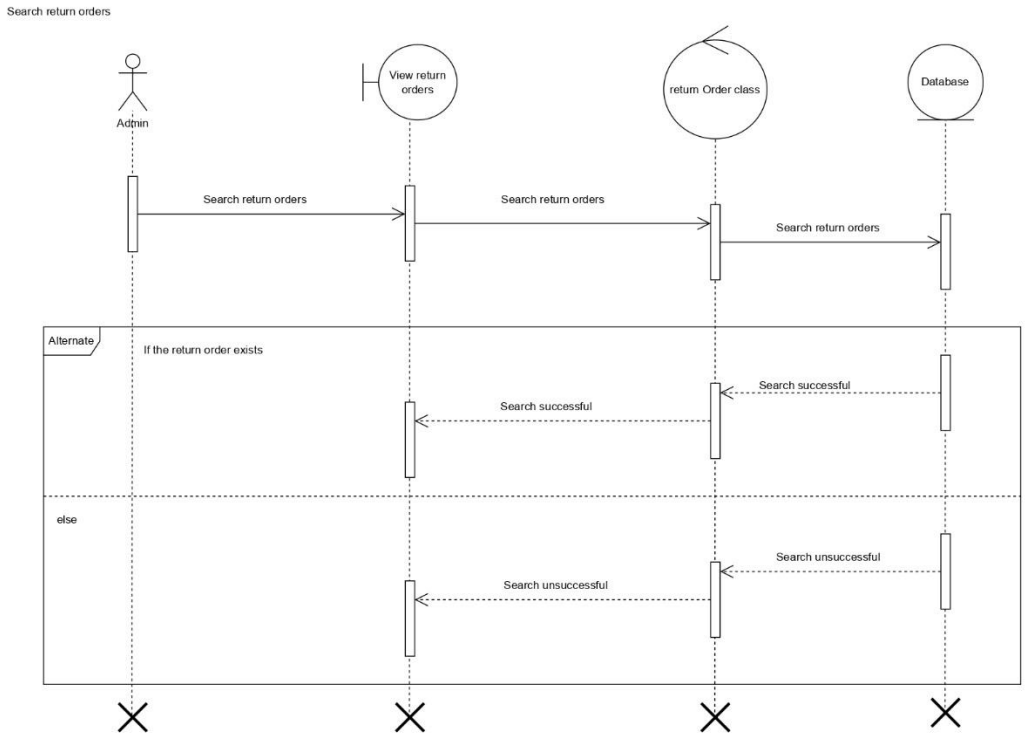
43. Place return orders



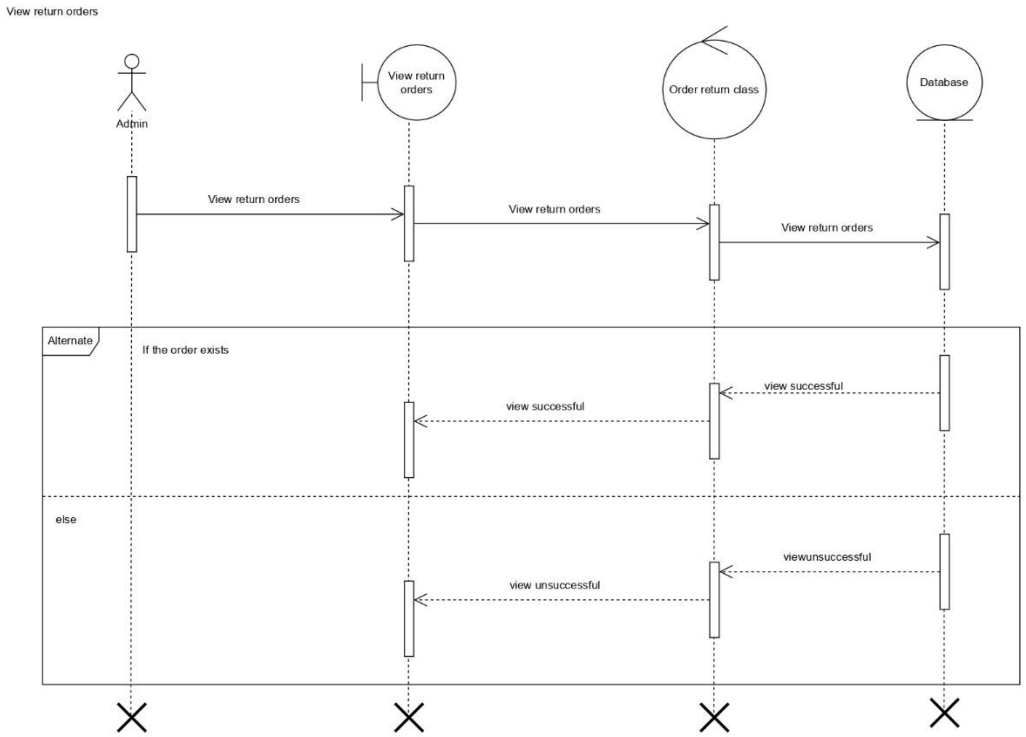
44. Place return sub orders



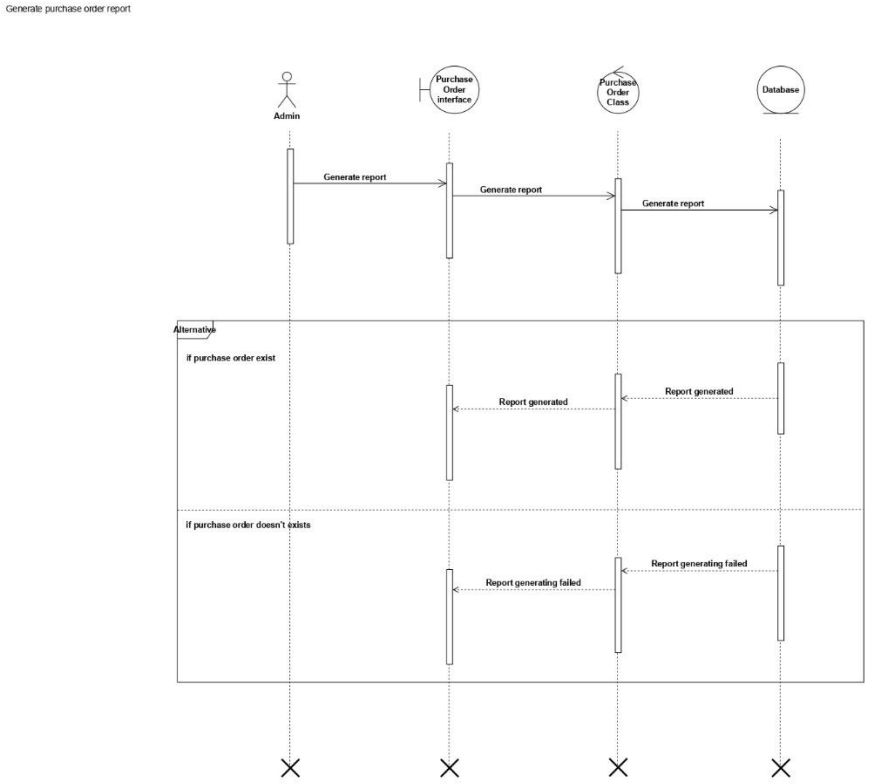
45. Search return orders



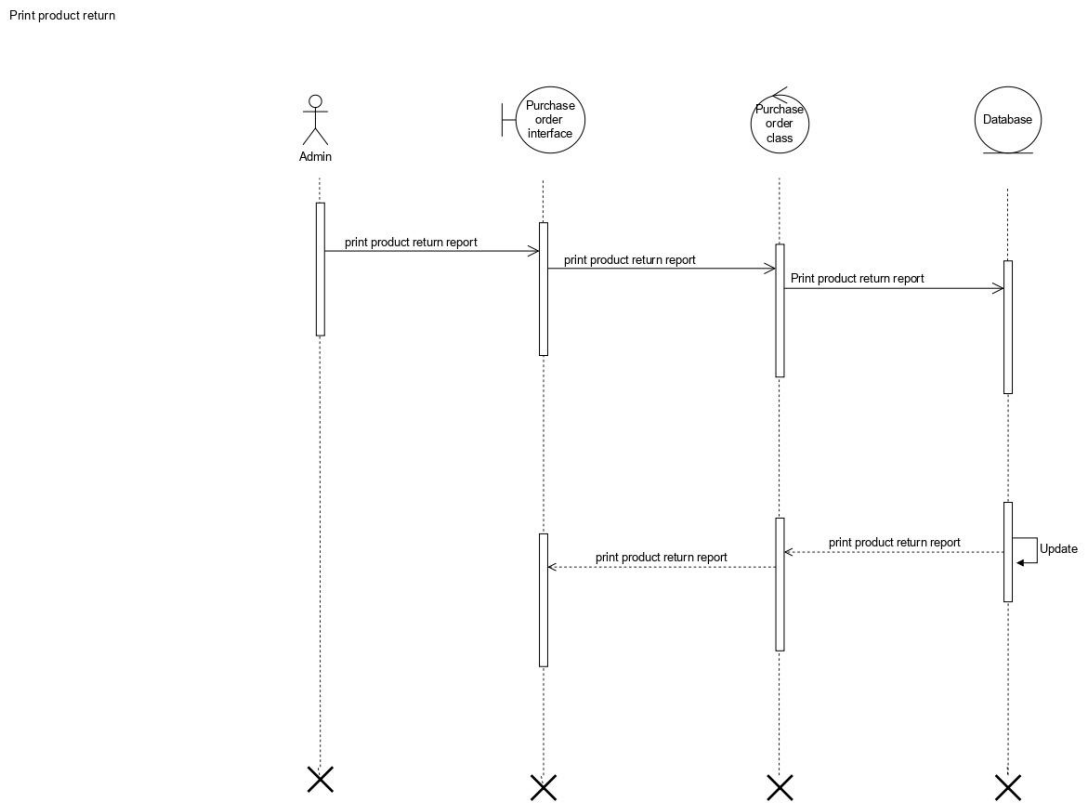
46. View return orders



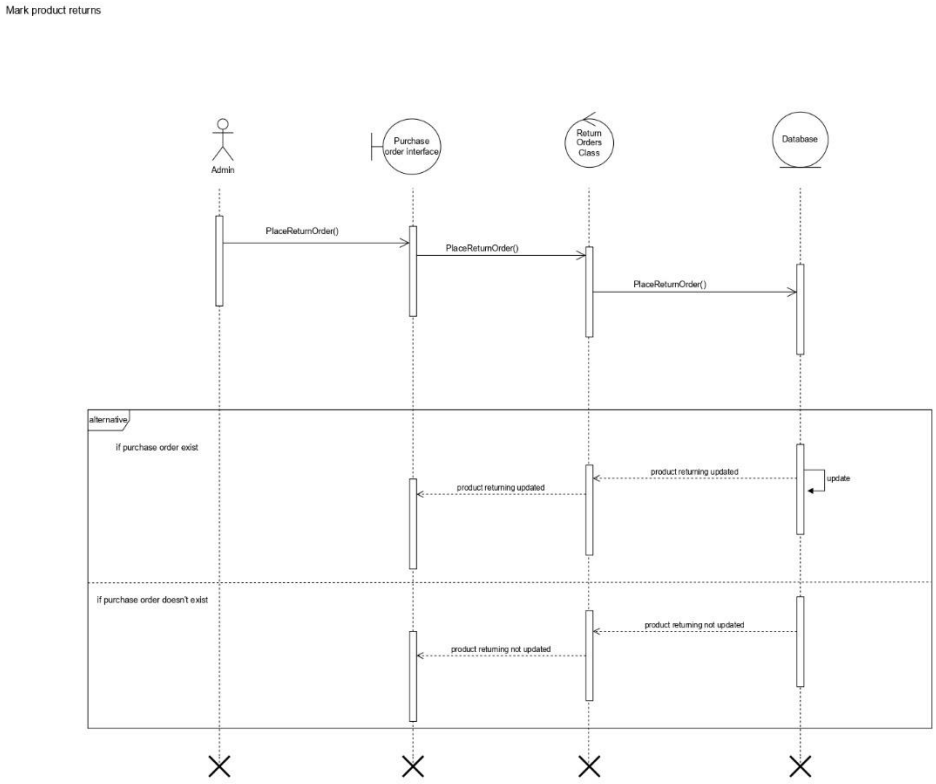
47. Generate purchase order report



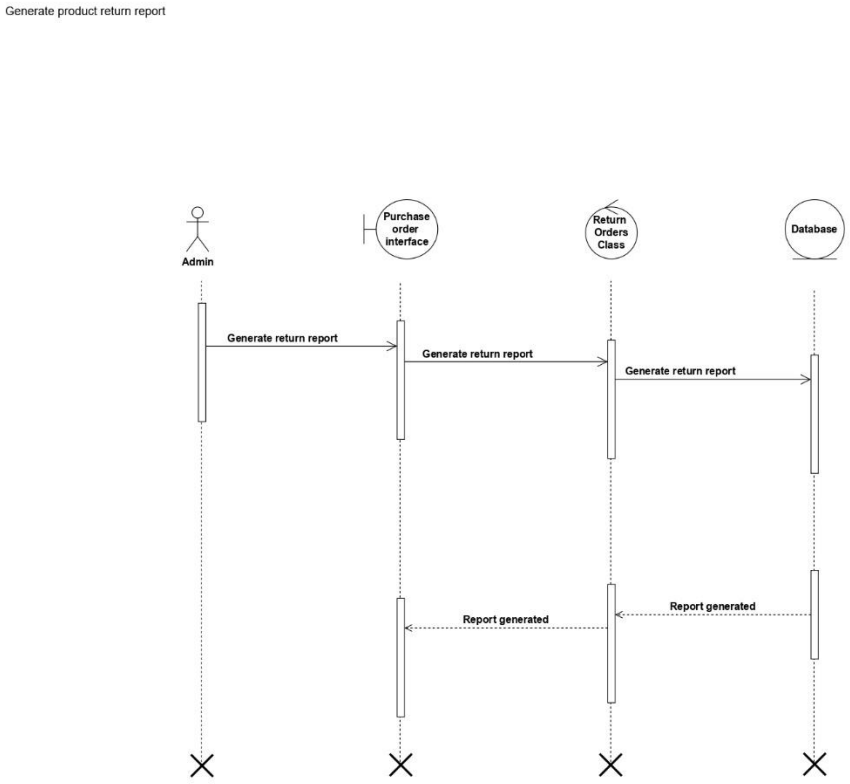
48. Print purchase order report



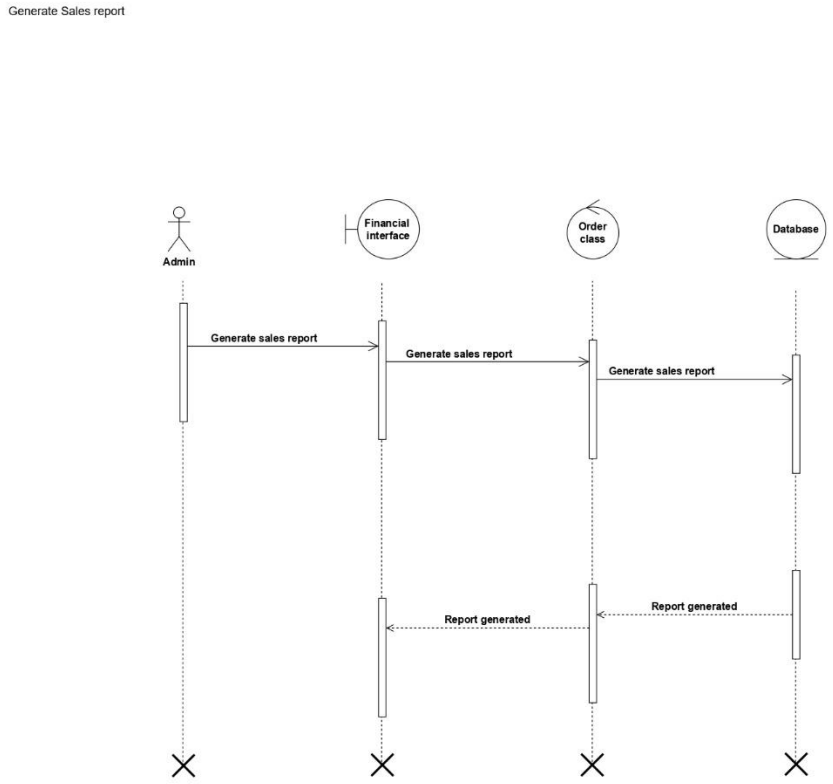
49. Generate product return report



50. Print product return report

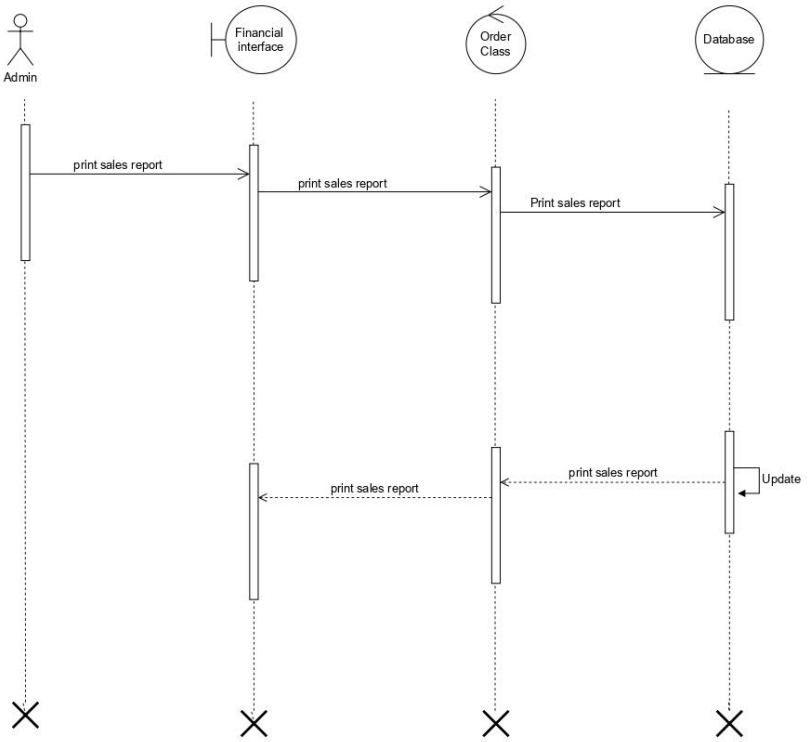


51. Generate sales report

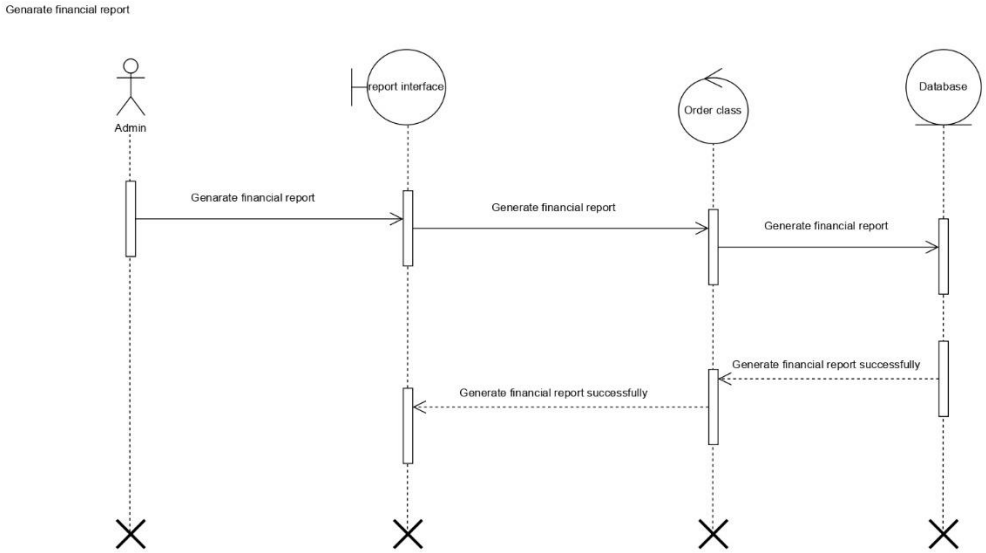


52. print sales report

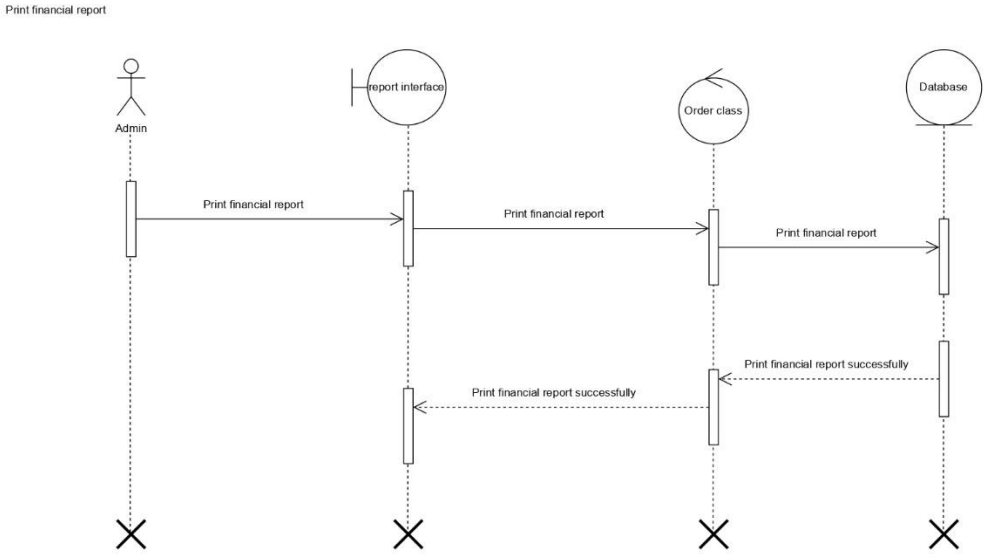
print sales



53. Generate financial reports

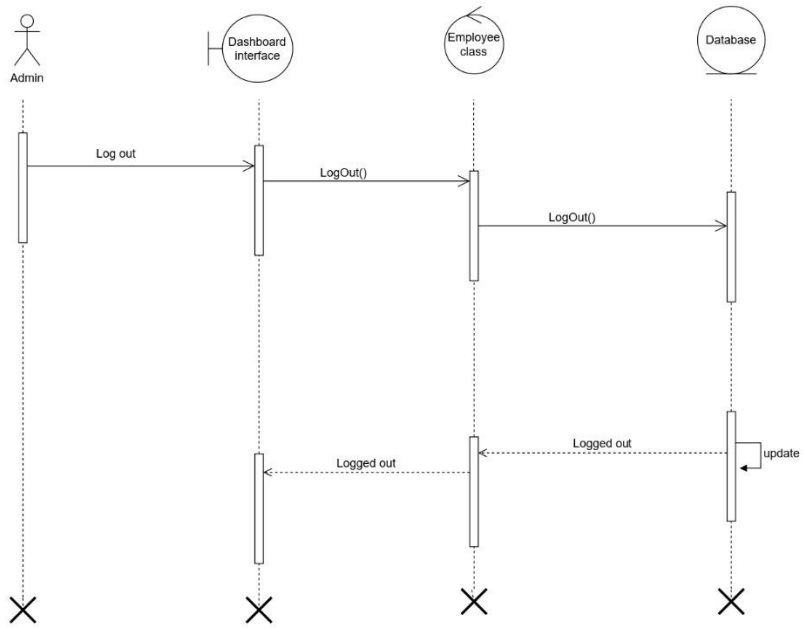


54. print financial reports



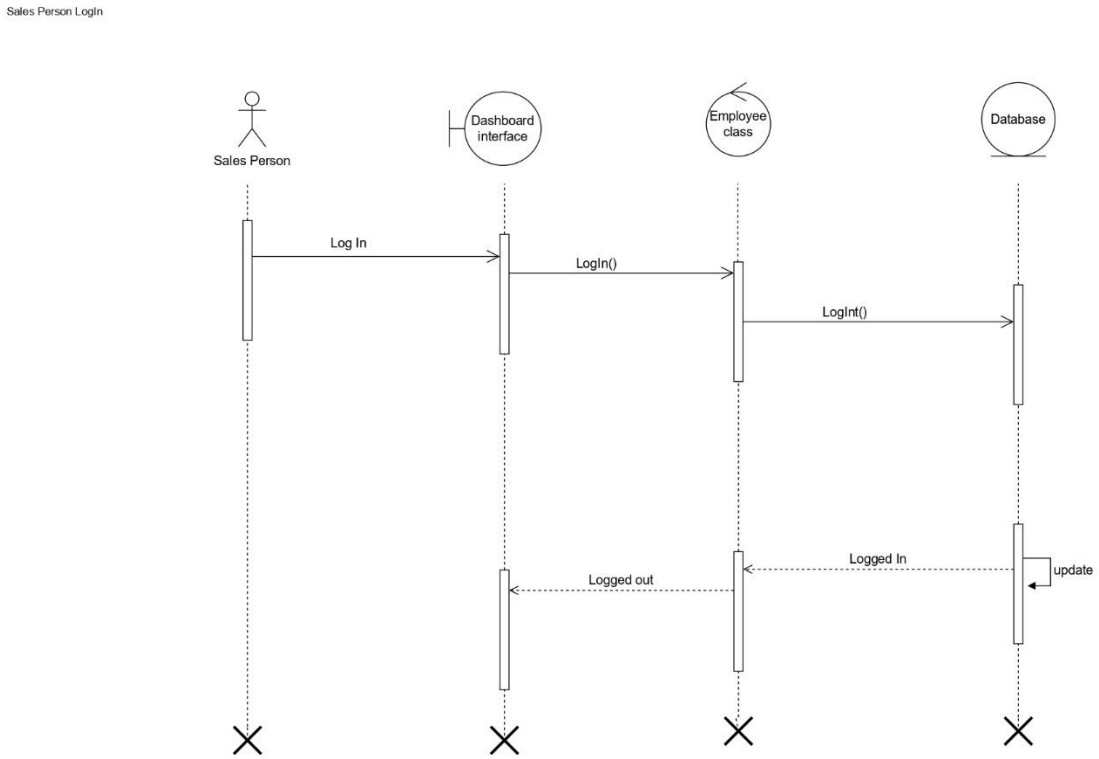
55. Log out

Admin LogOut

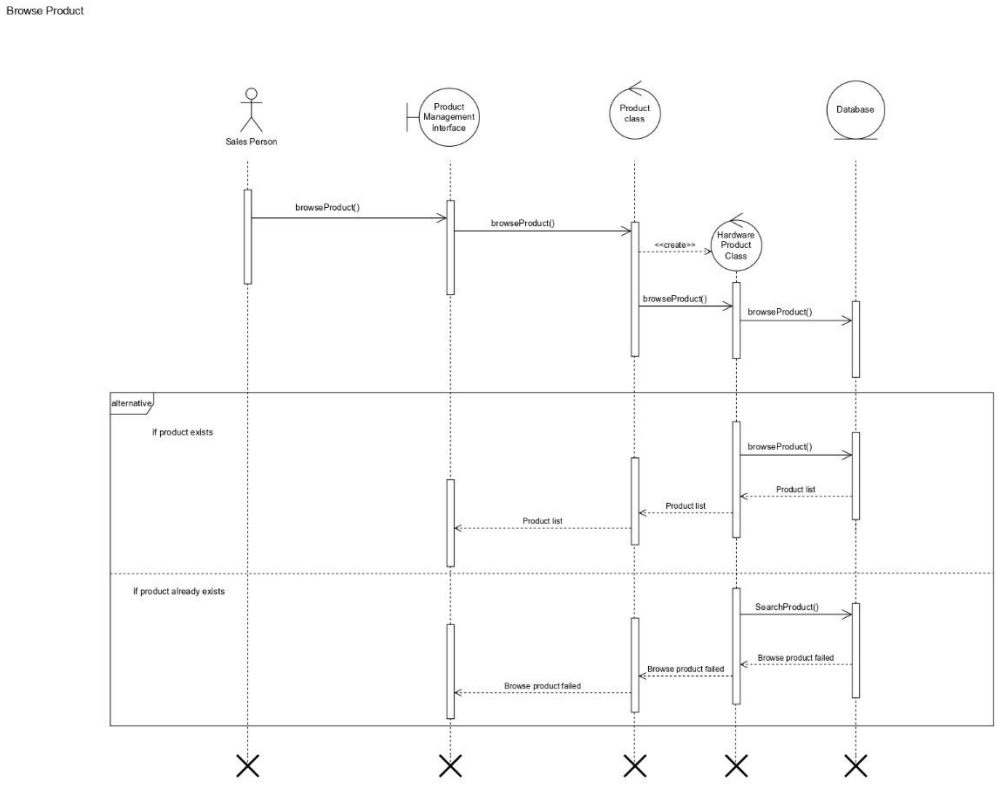


- Salesperson

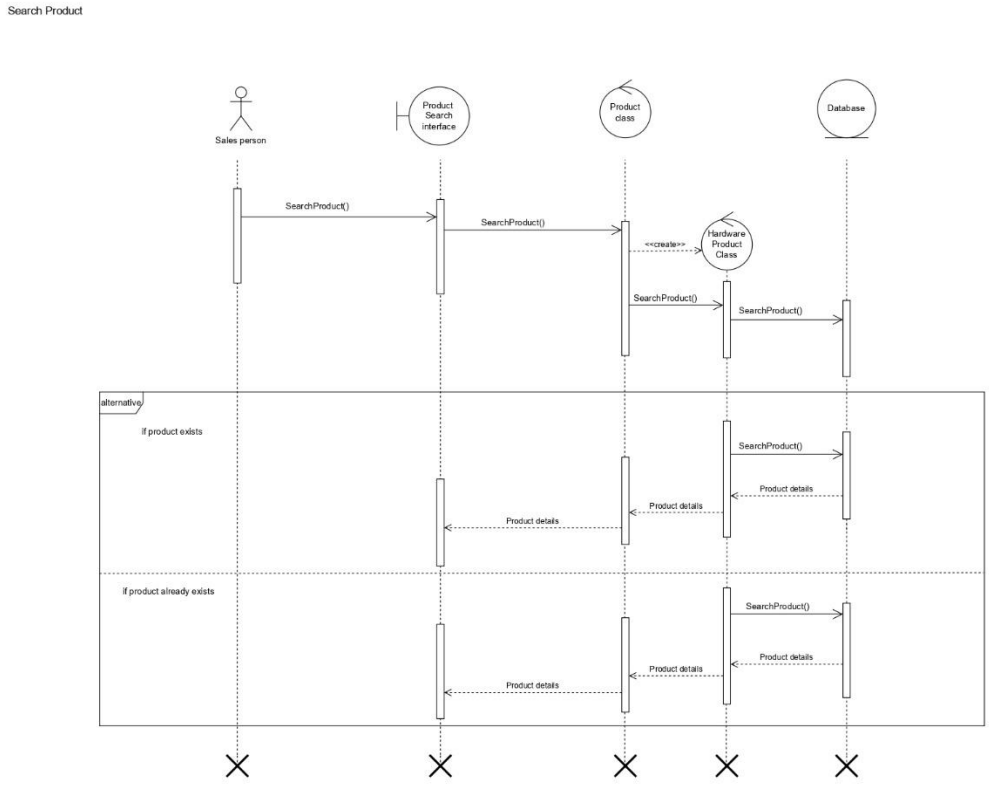
    56. Log in



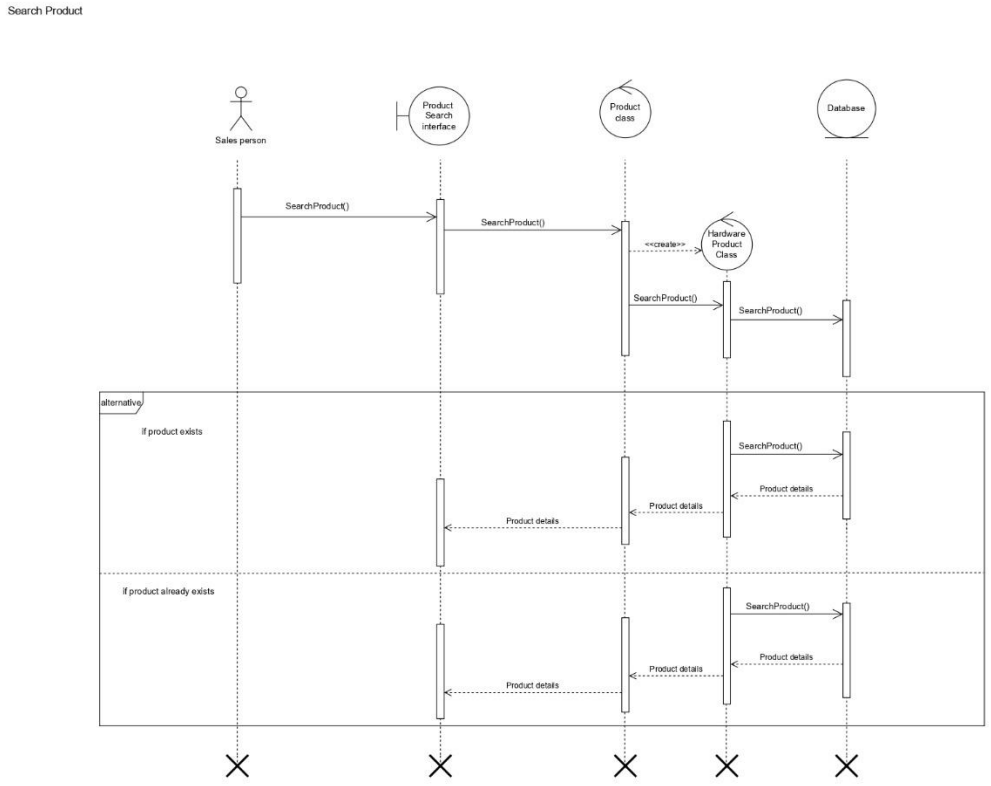
57. Browse product



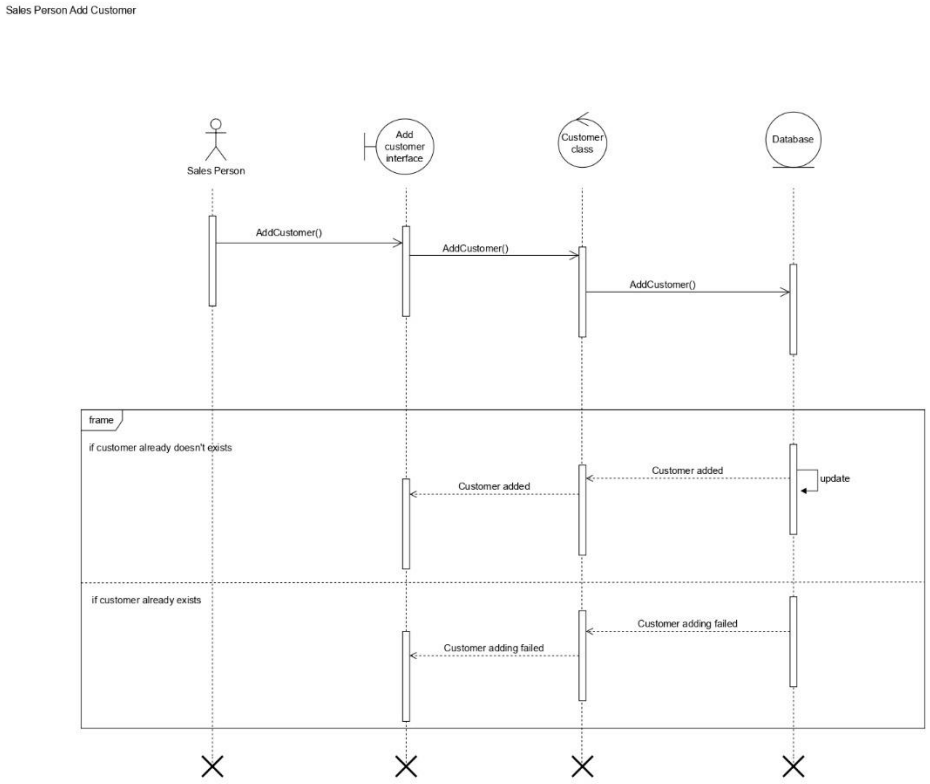
58. Search product



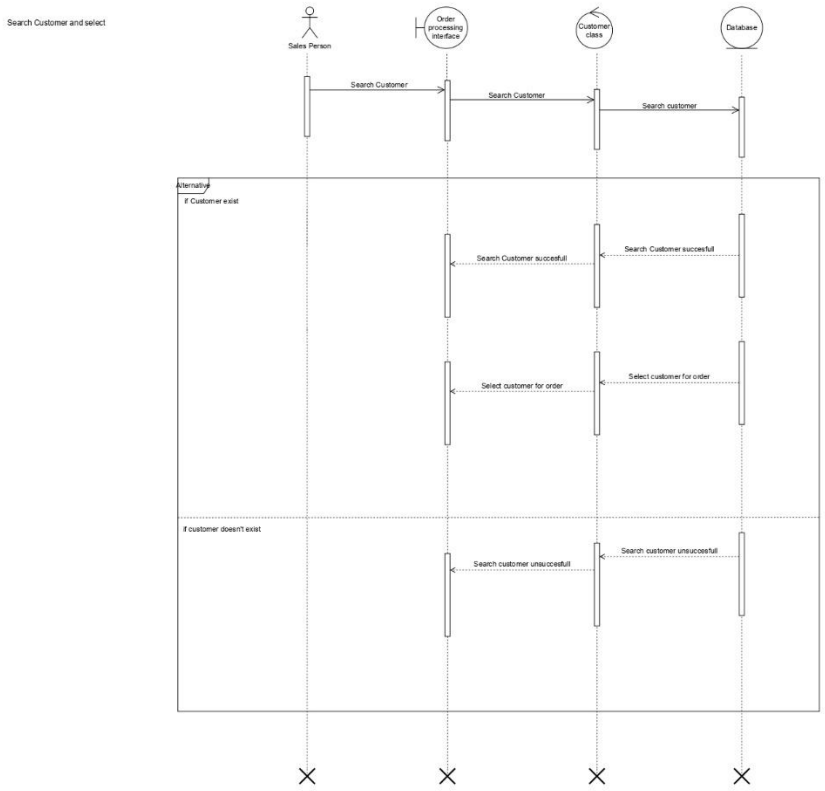
59. Select product to order



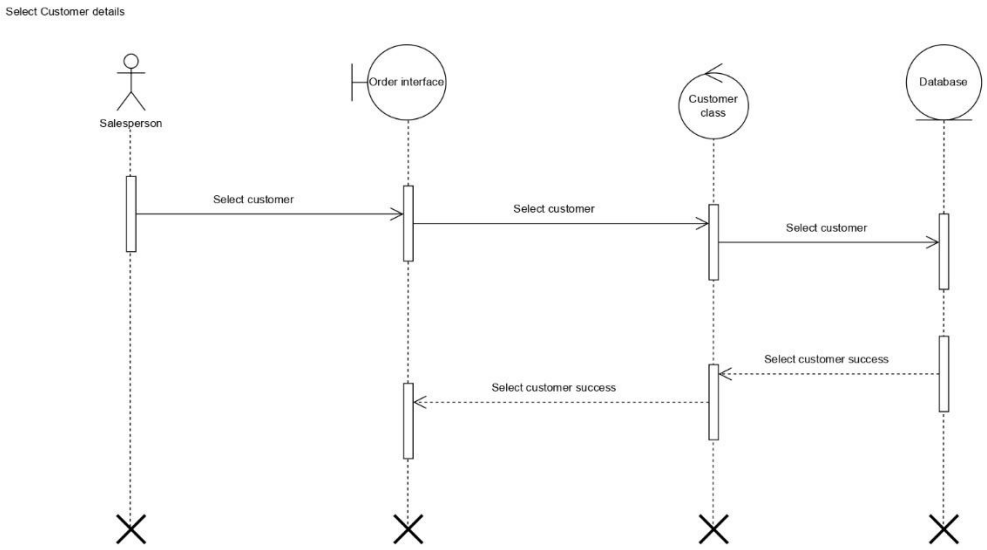
60. Add customer



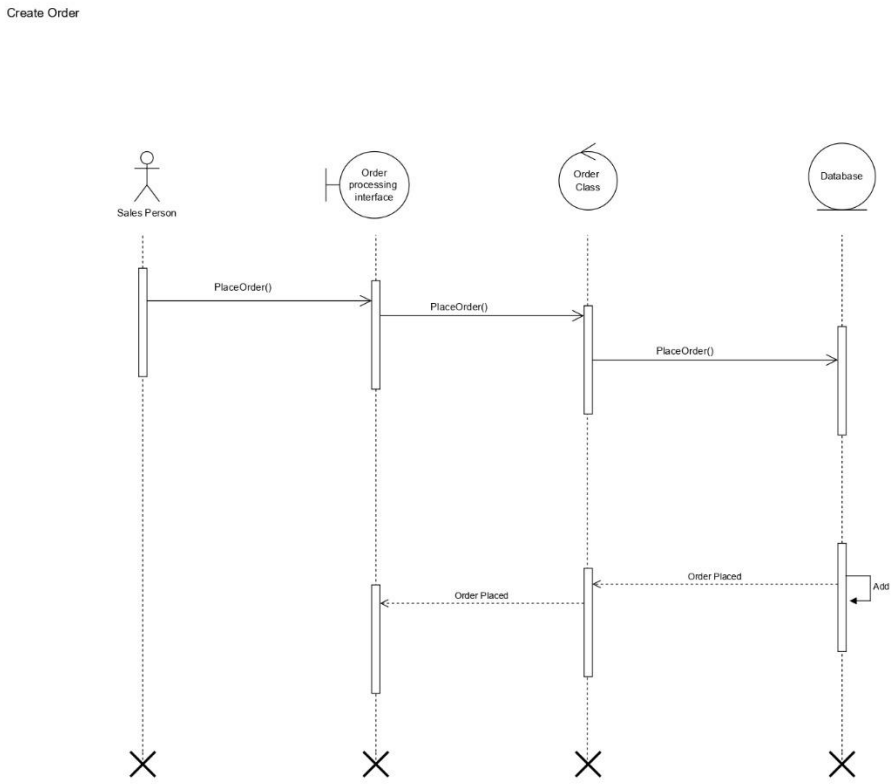
61. Search customer



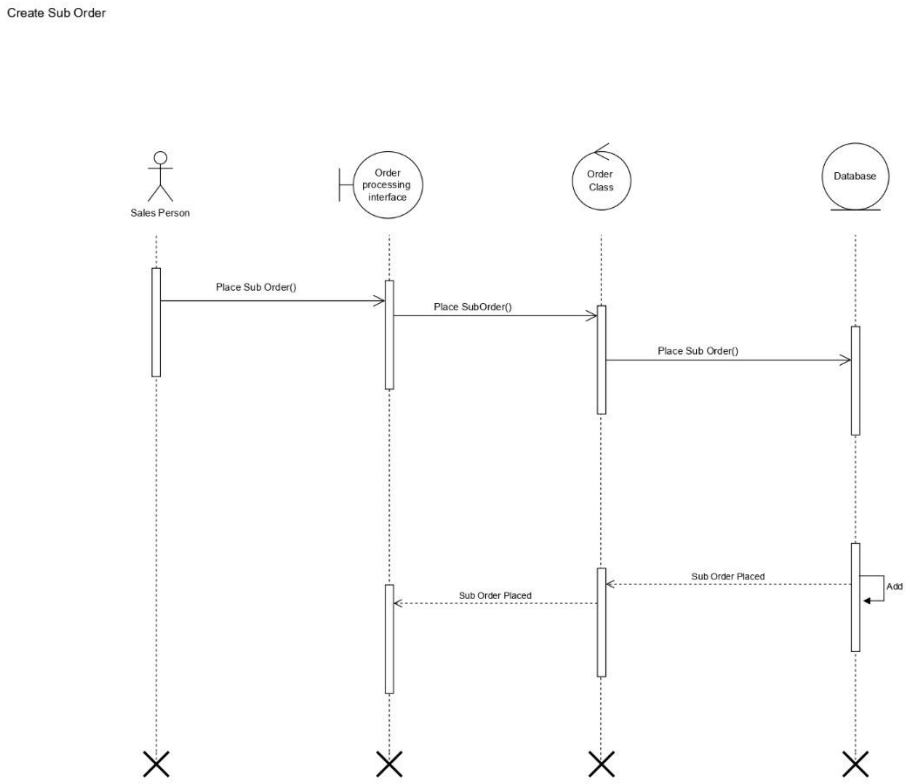
62. Select customer



63. Create order

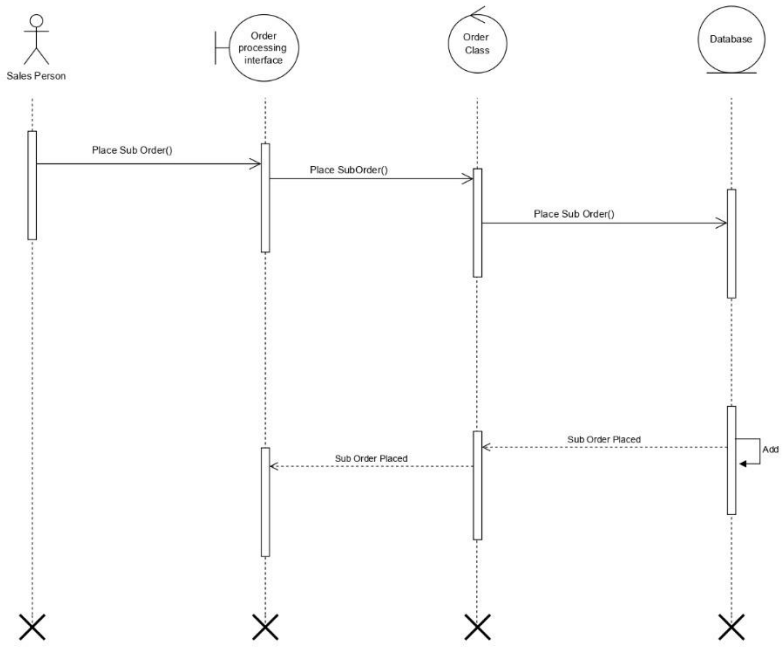


64. place sub order

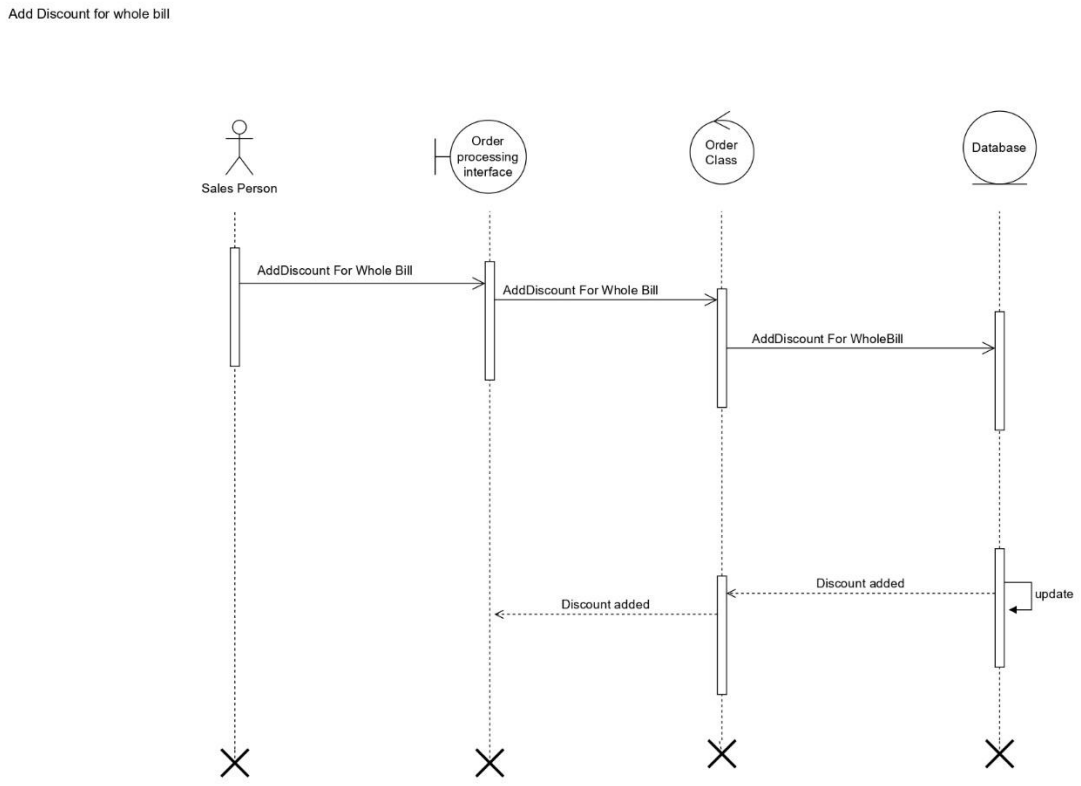


65. Add discount for product

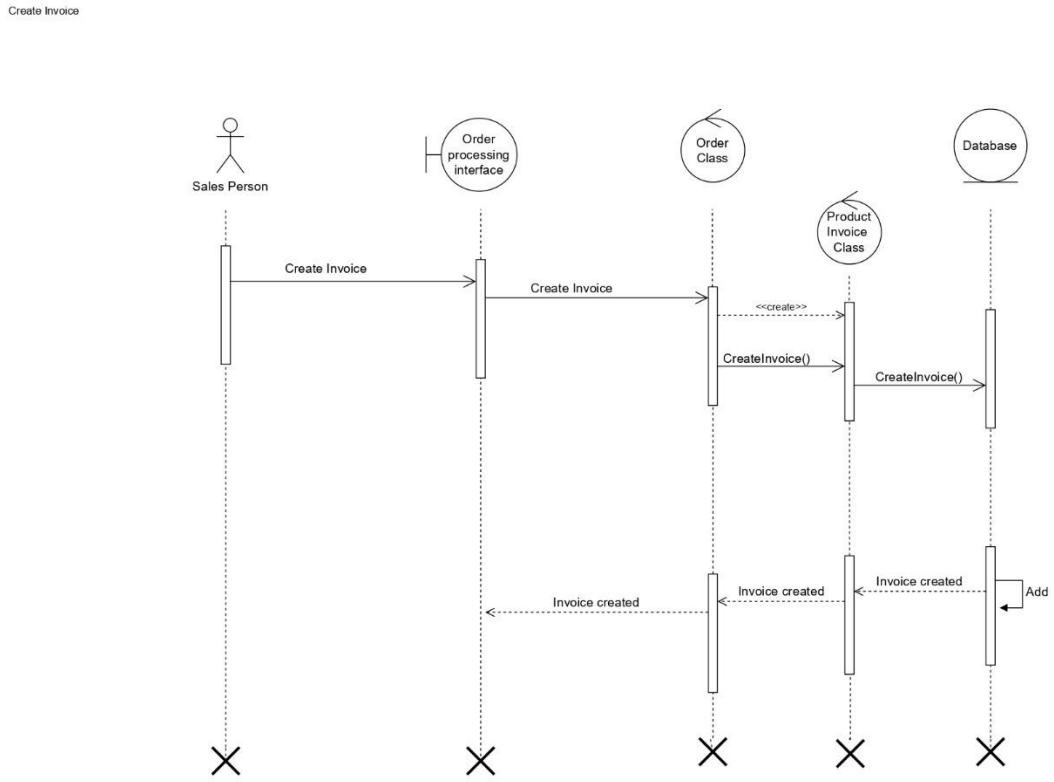
Create Sub Order



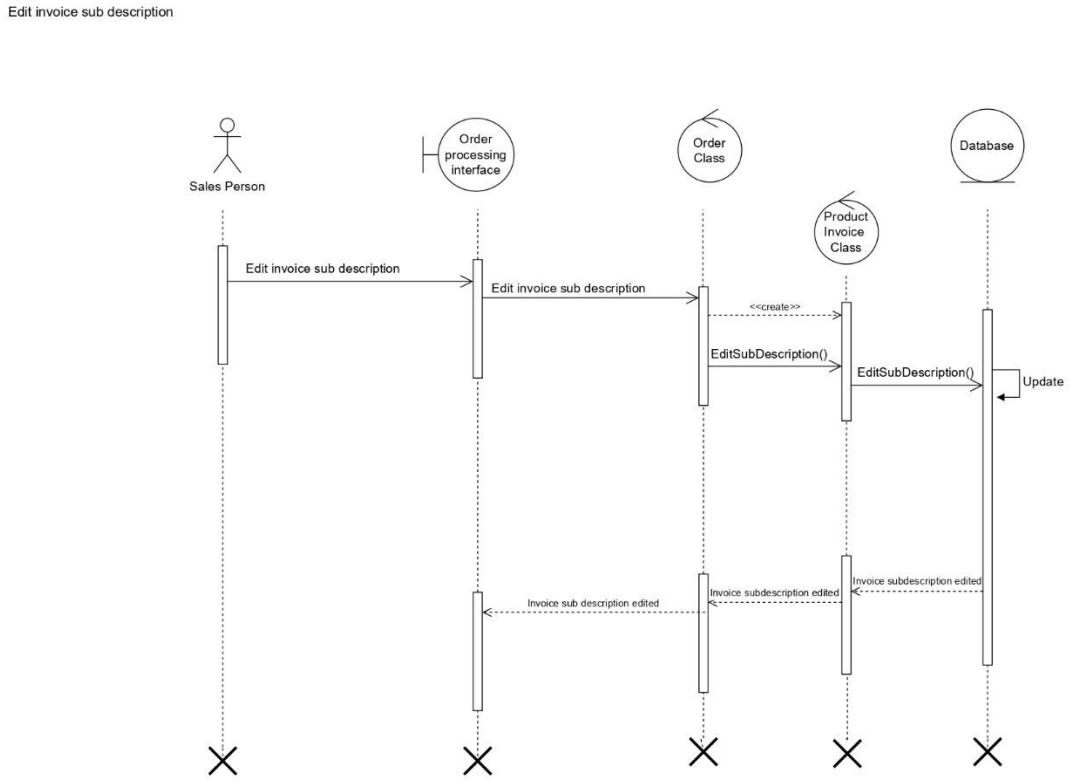
66. Add discount for whole bill



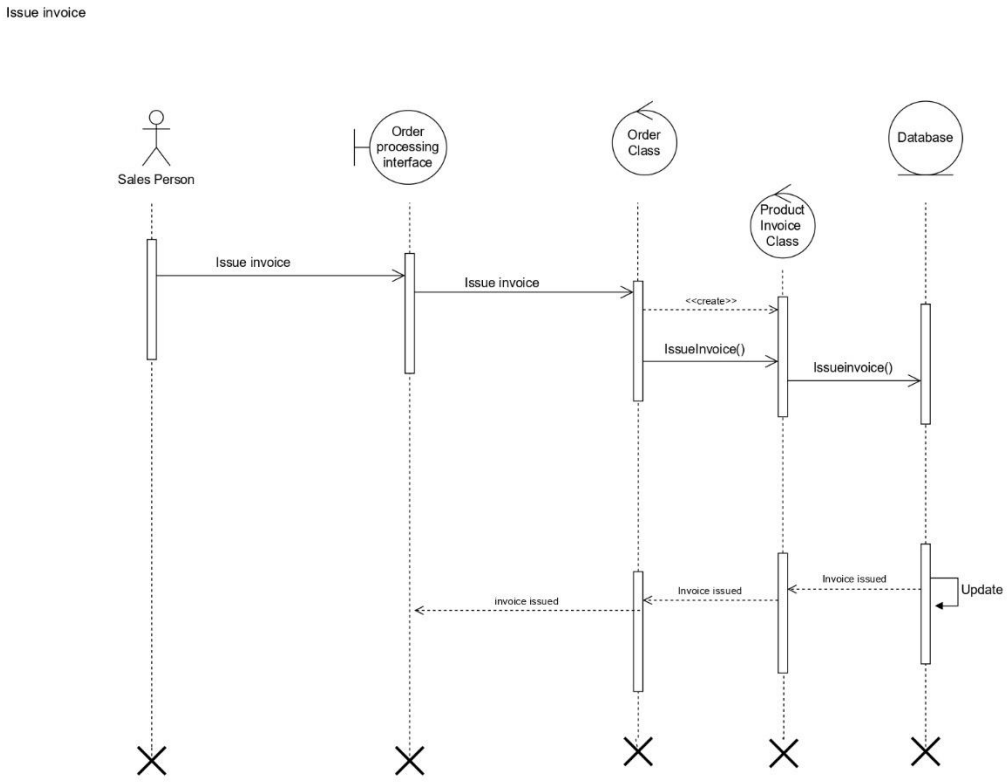
67. Create invoice



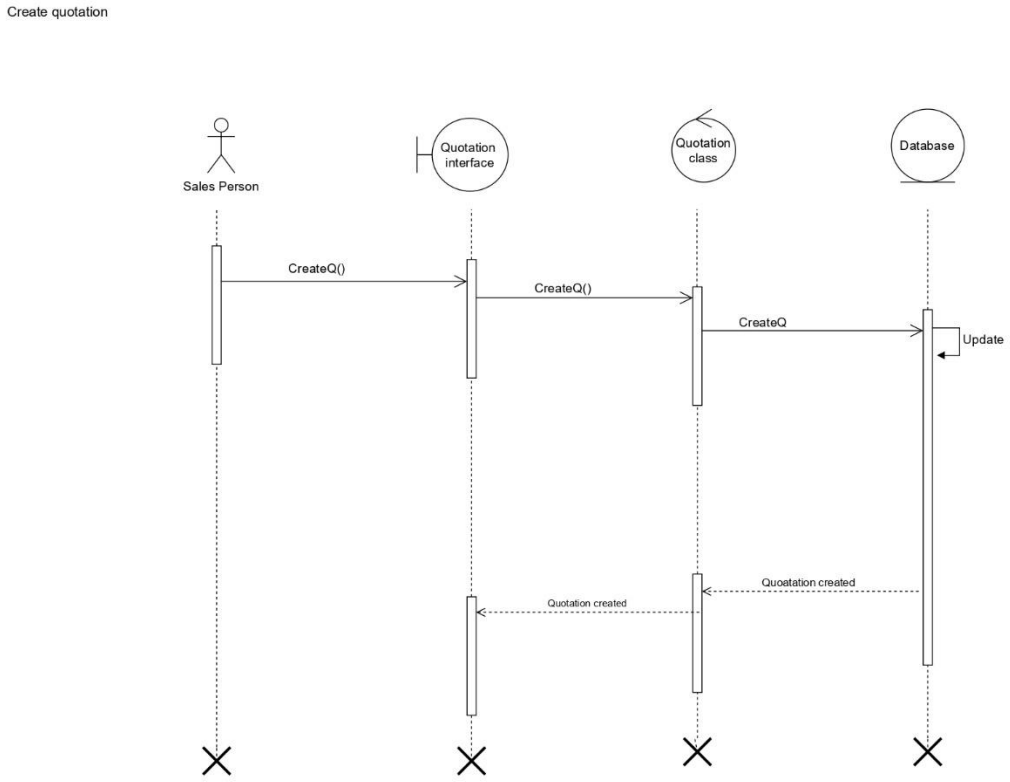
68. Edit invoice sub description



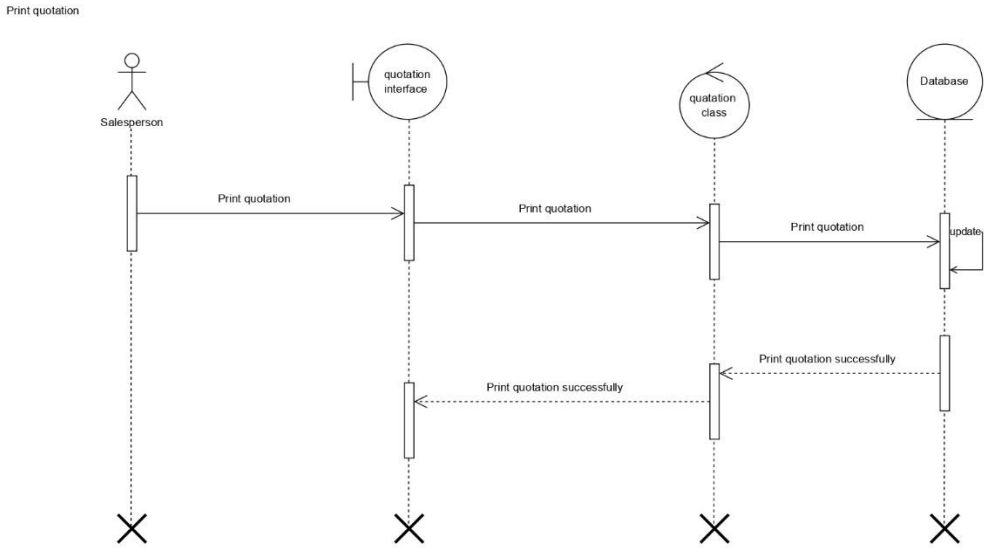
69. finalize and issue invoice



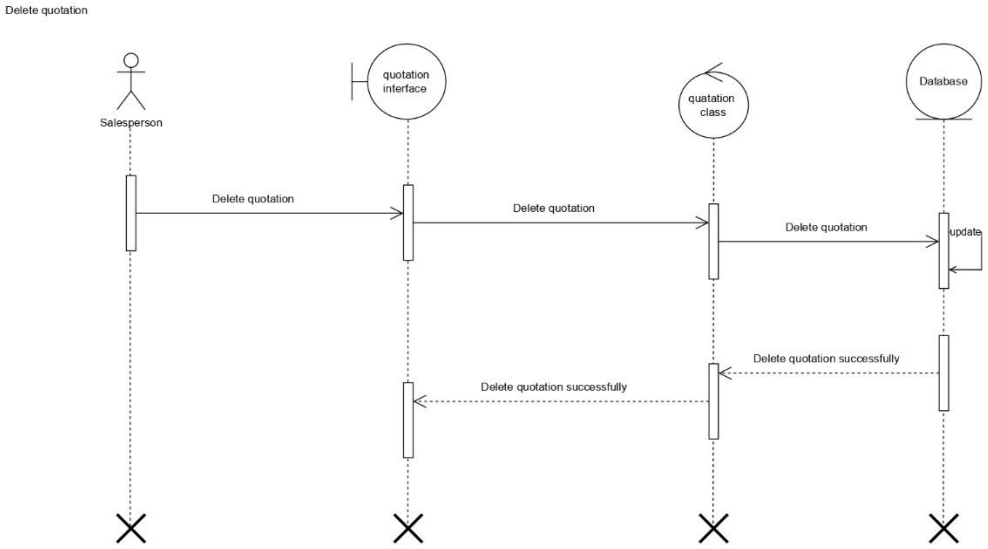
70. Create quotation



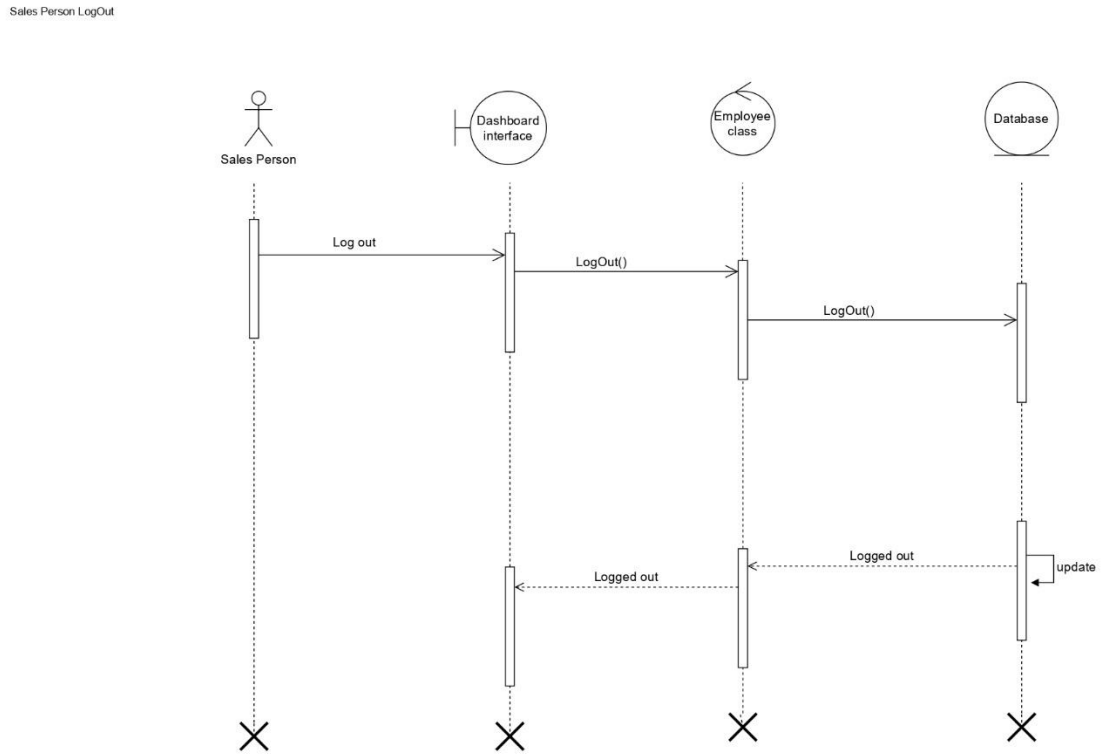
71. print quotation



72. Delete quotation

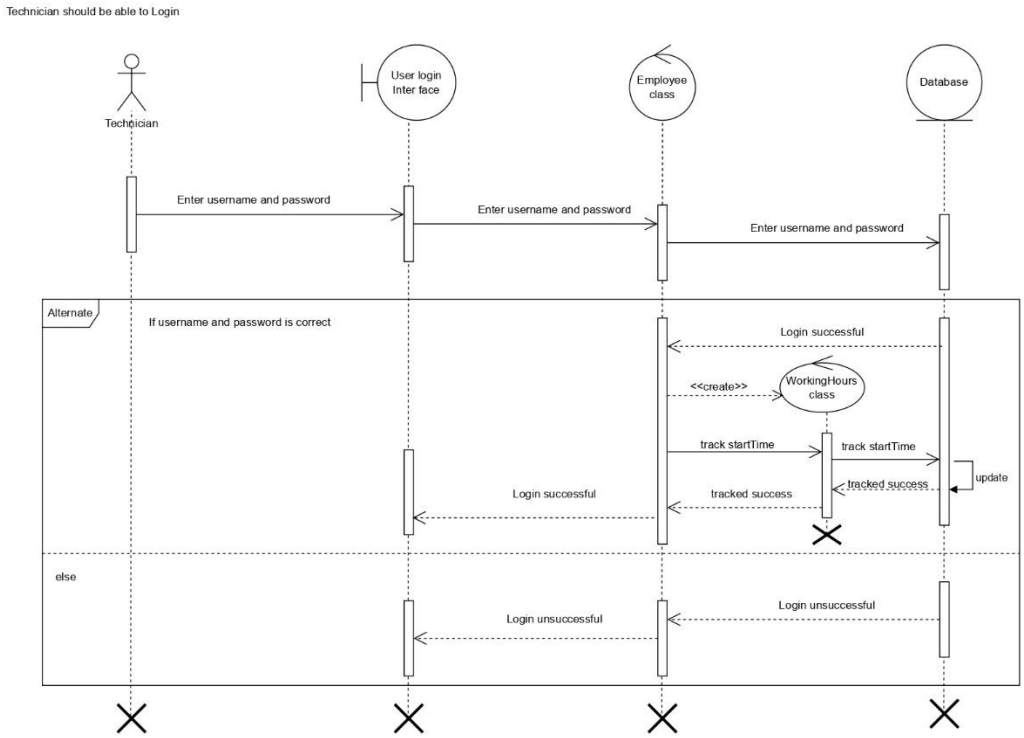


73. log out

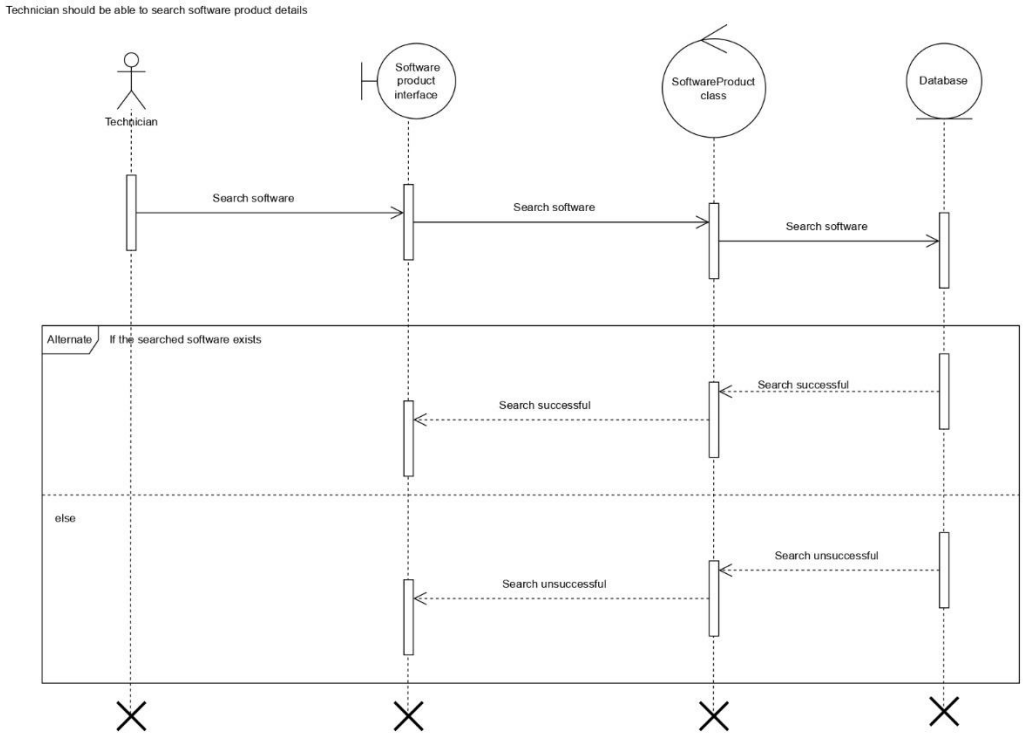

Sales Person LogOut
Sales Person
Dashboard interface
Employee class
Database
Log out
LogOut()
LogOut()
Logged out
Logged out
update

- Technician

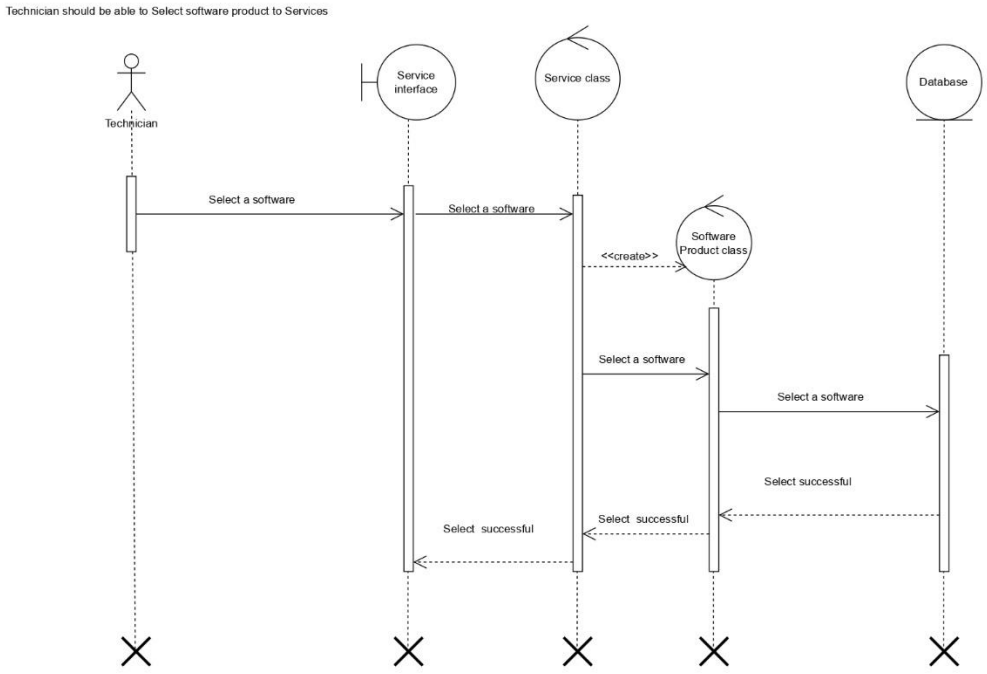
74. Log in



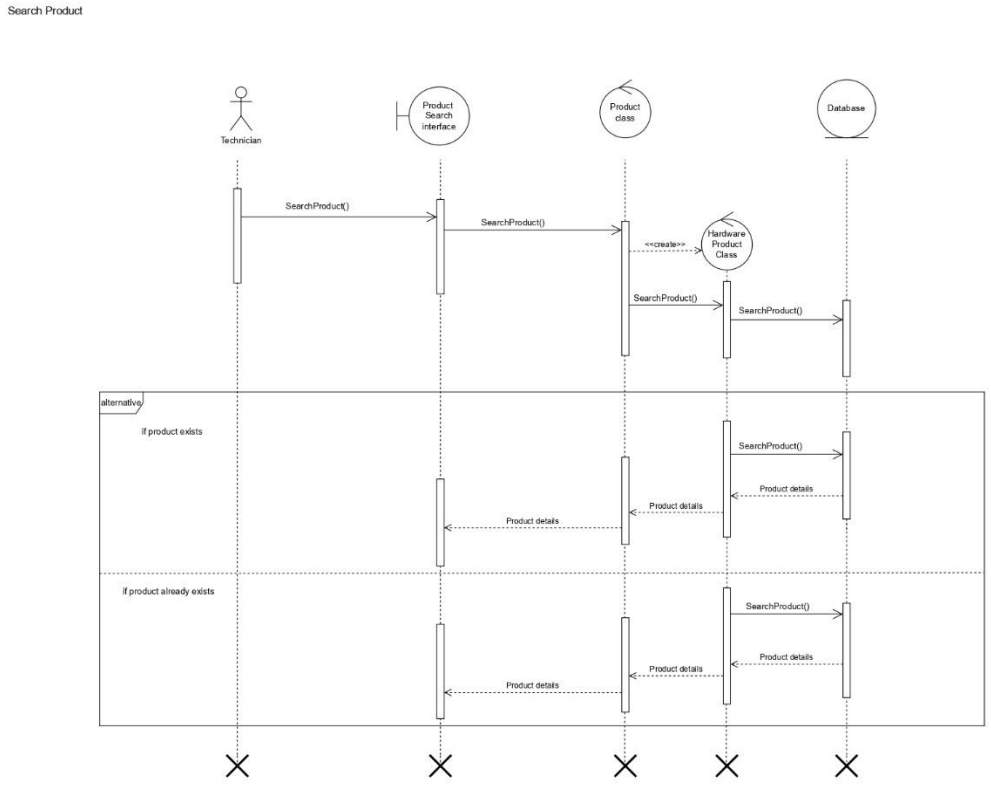
75. Search software product details



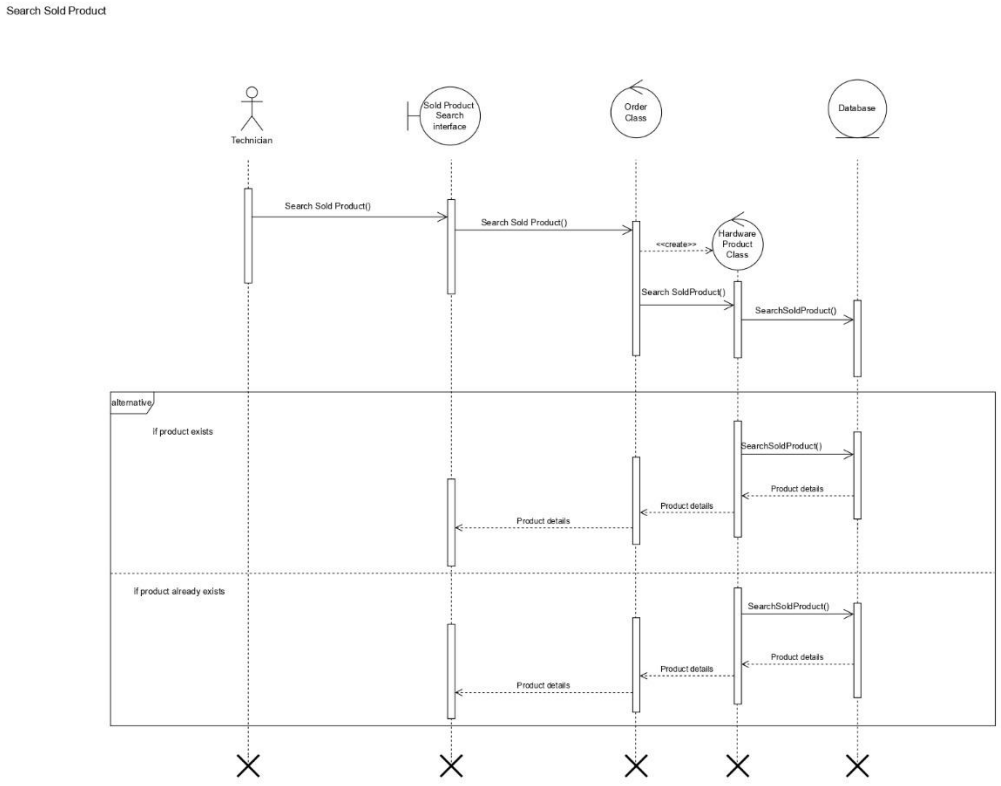
76. Select software product to services



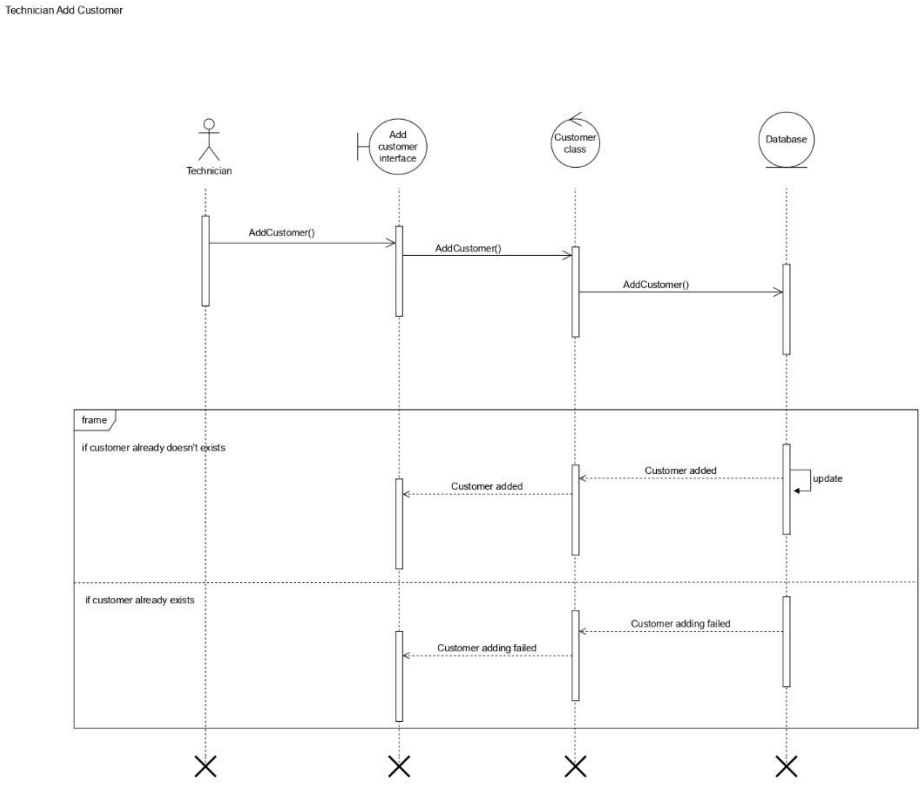
77. Search hardware product details



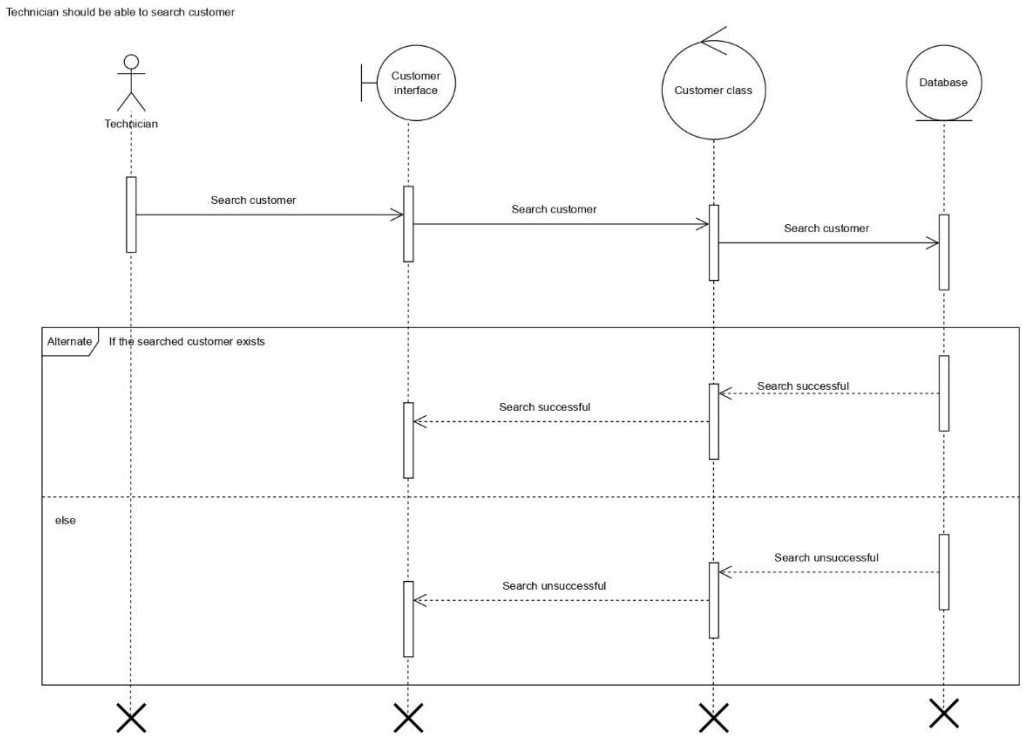
78. Search sold product details



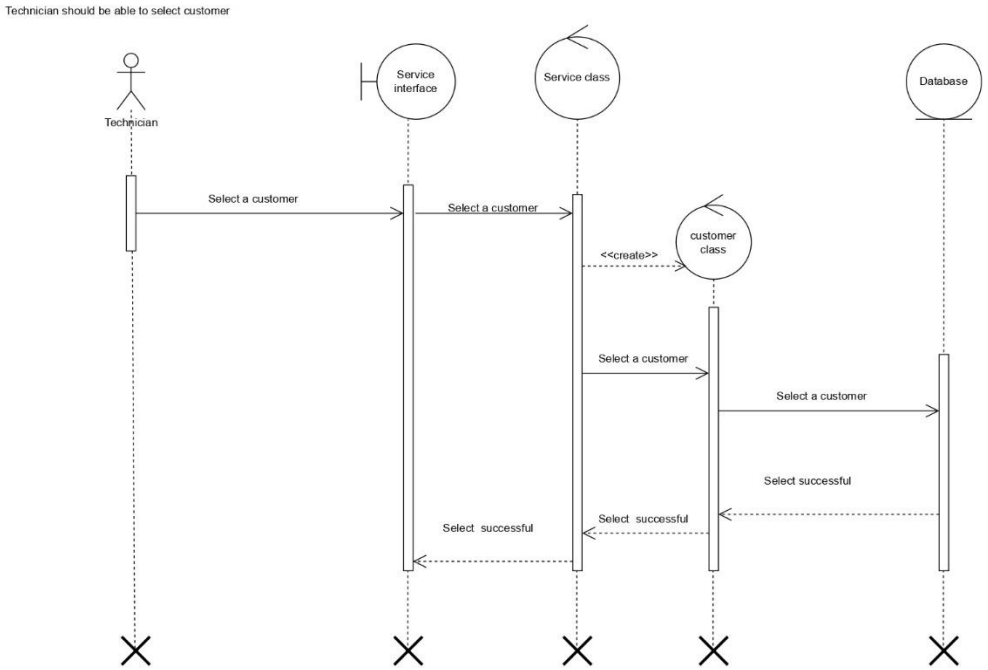
79. Add customer



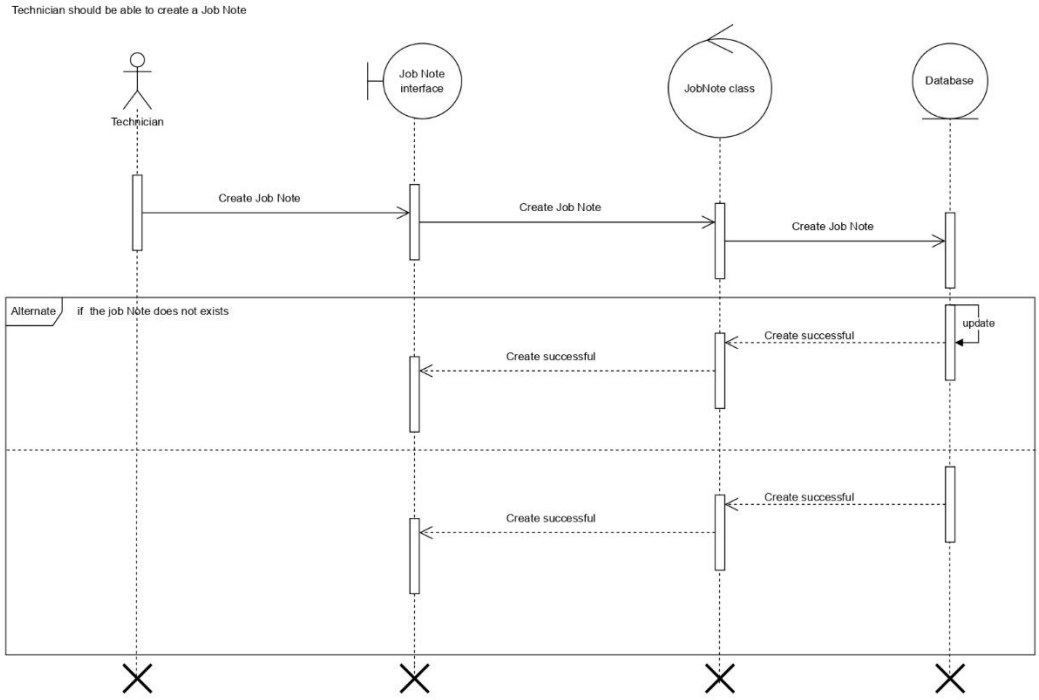
80. Search customer



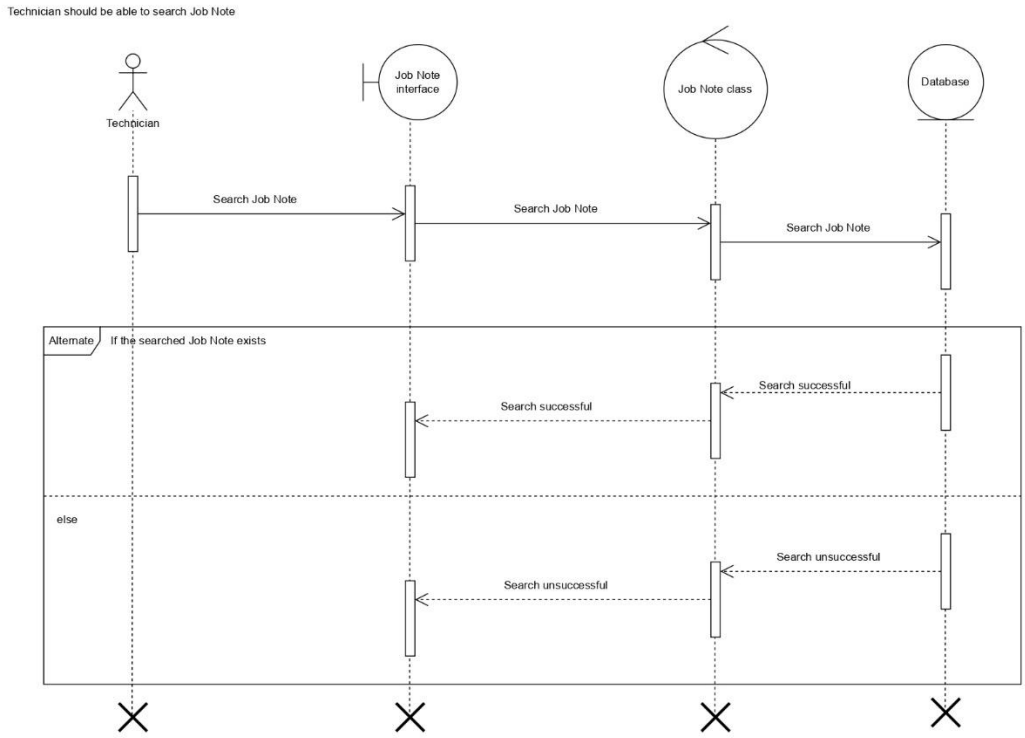
81. Select customer



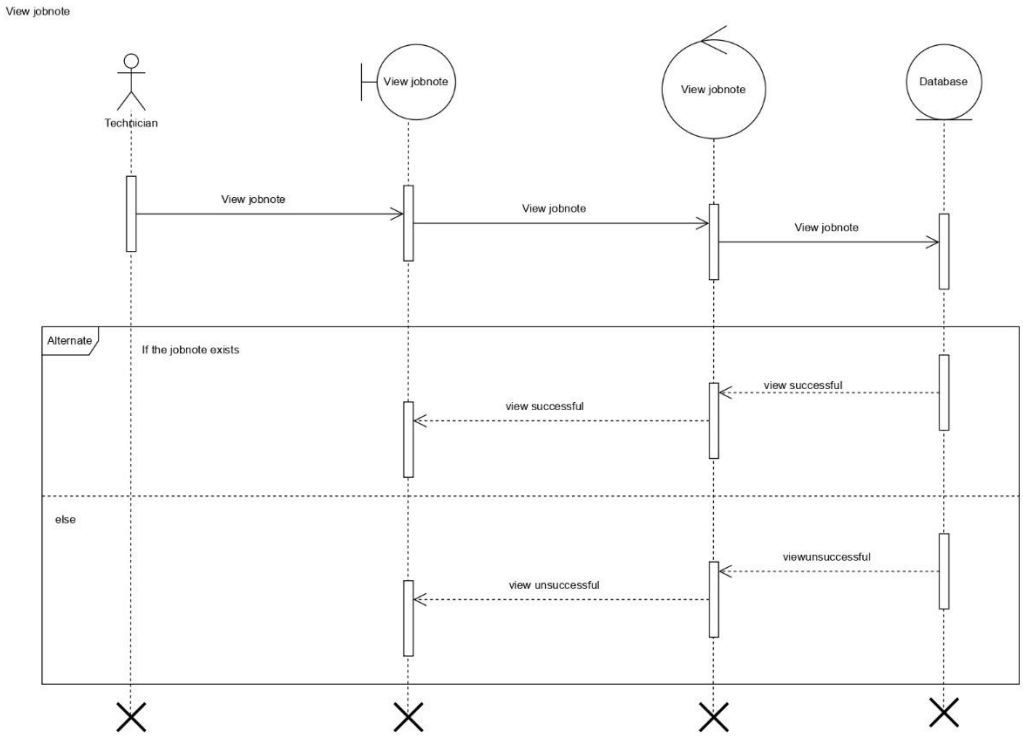
82. Create a job note



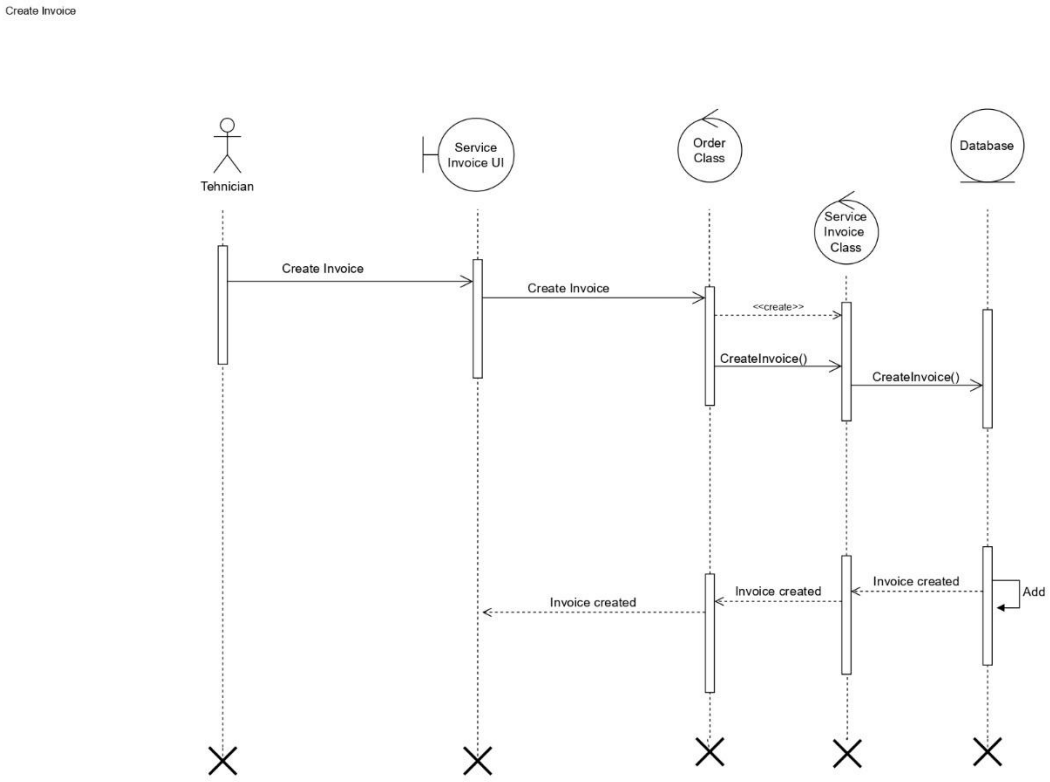
83. Search for a job note



84. View job note

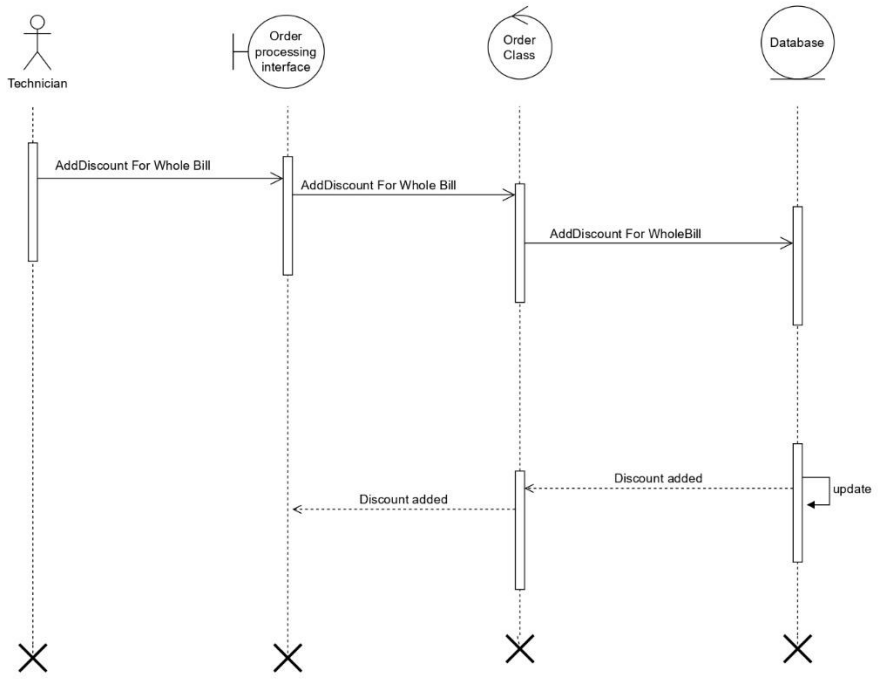


85. Create an invoice



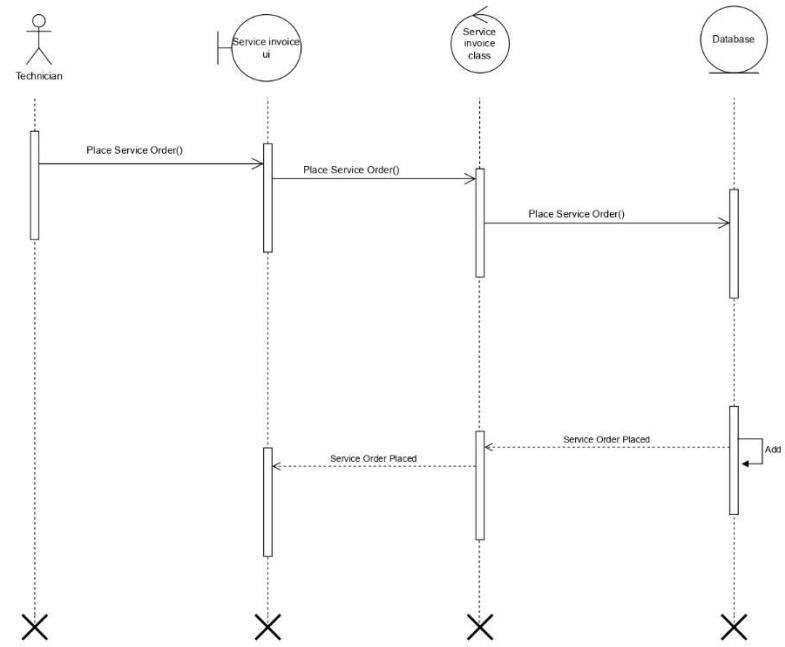
86. Add discount

Add Discount for whole bill

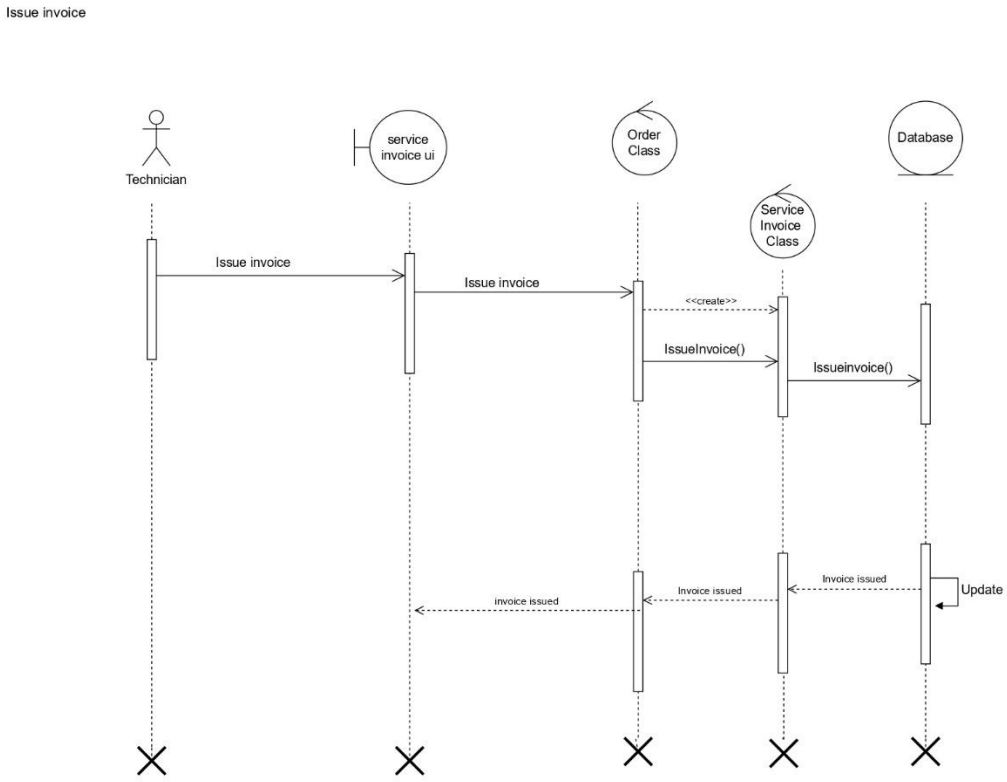


87. Place service orders

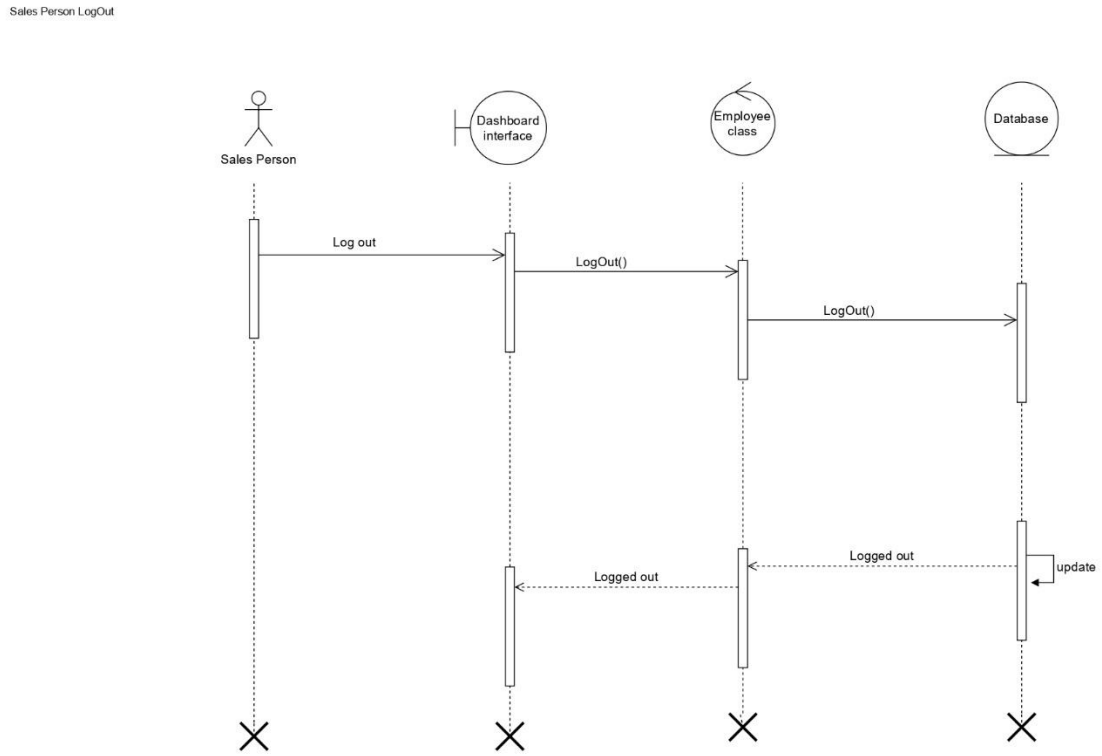
Create Service Order



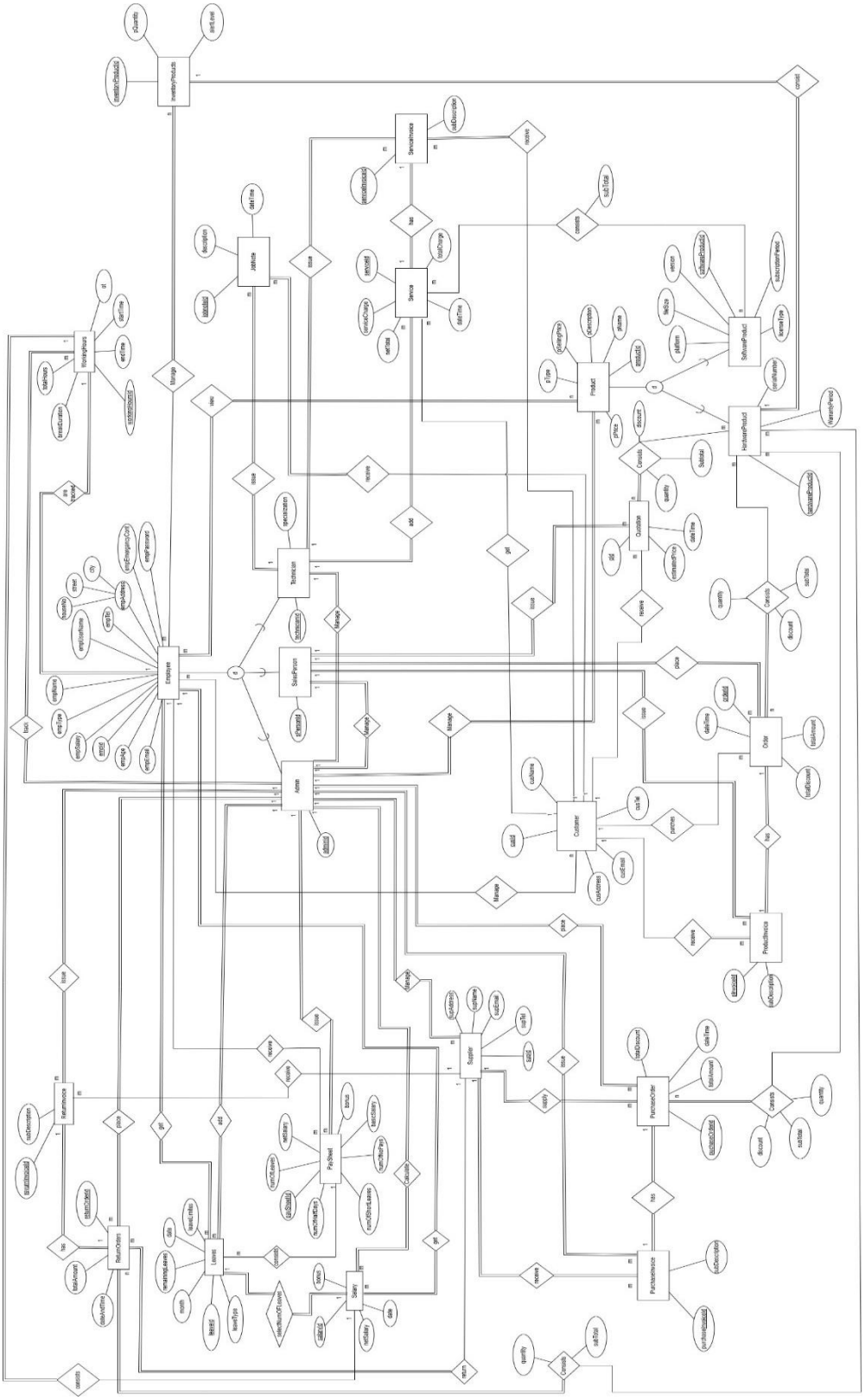
88. Issue service invoice



89. Log out


Sales Person LogOut
Sales Person
Dashboard interface
Employee class
Database
Log out
LogOut()
LogOut()
Logged out
Logged out
update

3. ER Diagram of the Proposed System.



Relational Schema

1. Employee (empId, empName, empUserName, empEmail, empAge, empType, empTel, houseNo, street, city, empEmergancyCont, empPassword)
2. Admin (adminId, empId
3. SalesPerson (sPersonId, empId, adminId(FK))
4. Technician (technicianId, empId, specialization, adminId(FK))
5. Customer (cusId, cusName, cusAddress, cusEmail, cusTel,)
6. Product (productId, pName, pType, pPrice, pDescription,pSellingPrice, adminId(FK))
7. HardwareProduct (hardwareProductId,productId, serialNumber, WarrantyPeriod)
8. SoftwareProduct (softwareProductId, productId, version, platform, licenseType, fileSize, subscriptionPeriod)
9. Order (orderId , totalDiscount, totalAmount, dateTime, sPersonId(FK), cusId(FK))
10. Supplier (supId, supName, supEmail, supTel, supAddress, adminId(FK))
11. InventoryProducts (inventoryProductId, pQuantity, alertLevel, hardwareProductId(FK))
12. Service (serviceId, serviceCharge, dateTime, totalCharge, netTotal, technicianId(FK), cusId(FK))
13. ServiceInvoice (serviceInvoiceId, subDescription, serviceId(FK), technicianId(FK), cusId(FK))
14. JobNote (jobNoteId, description, dateTime, technicianId(FK), cusId(FK))
15. Quotation (qId, estimatedPrice, dateTime, sPersonId(FK), cusId(FK))
16. ProductInvoice (plnvoiceId, subDescription, oderId(FK), sPersonId(FK), cusId(FK))

17. WorkingHours (workingHoursId, startTime, endTime, breakDuration, ot, totalHours, adminId(FK), salaryId(FK), empId(FK))
18. ReturnInvoice (reyurnInvoiceId, subDescription, returnOrderId(FK), adminId(FK), supId(FK))
19. ReturnOrders (returnOrderId, totalAmount, dateAndTime, adminId(FK), supId(FK))
20. Leaves (leaveId, remainingLeaves, leaveType, month, date, leaveLimites, adminId(FK), empId(FK), paySheetId(FK))
21. Salary (salaryId, bonus, netSalary, date, leaveId(FK), adminId(FK), empId(FK))
22. PaySheet (paySheetID, numOfNoPays, numOfShortLeaves, numOfNoPays, numOfHalfDays, basicSalary, bonus, netSalary, adminId(FK), empId(FK))
23. PurchaseOrder (puchaseOrderid, totalAmount, dateTime, totalDiscount, adminId(FK), supId(FK))
24. PurchaseInvoice (purchaseInvoiceId, subDescription, purchaseOrderId(FK), adminId(FK), supId(FK))
25. EmployeeManage (empId, cusId)
26. Employeeview (empId, pId)
27. OrderConsists (orderId, hardwareProductId, quantity, discount, subTotal)
28. PurchaseOrderConsists (purchaseOrderId, hardwareProductId, quantity, discount, subTotal)
29. ReturnOrdersConsists (returnOrderId, hardwareProductId, quantity, subTotal)
30. ServiceConsists (serviceId, softwareProductId, subTotal)
31. InventoryProductsManage (empId, inventoryProductId)
32. QuotationConsists (qId, hardwareProductId, quantity, Subtotal, discount)

4. Chapter Summery

The importance of requirements analysis and how it affects the implementation of the system was briefly discussed in the above chapter. The UMLs and ER diagrams were implemented to get a clear vision of the system designs to identify the possible outcomes from the project.

4. Chapter 4: Solution Design

1. Introduction.

According to the designed UMLs, Entity Relation diagram and Relational schema, GUIs and Databases can be created with proper foundation. Clearly designed diagrams are the source of error minimalized Interfaces and Database designs.

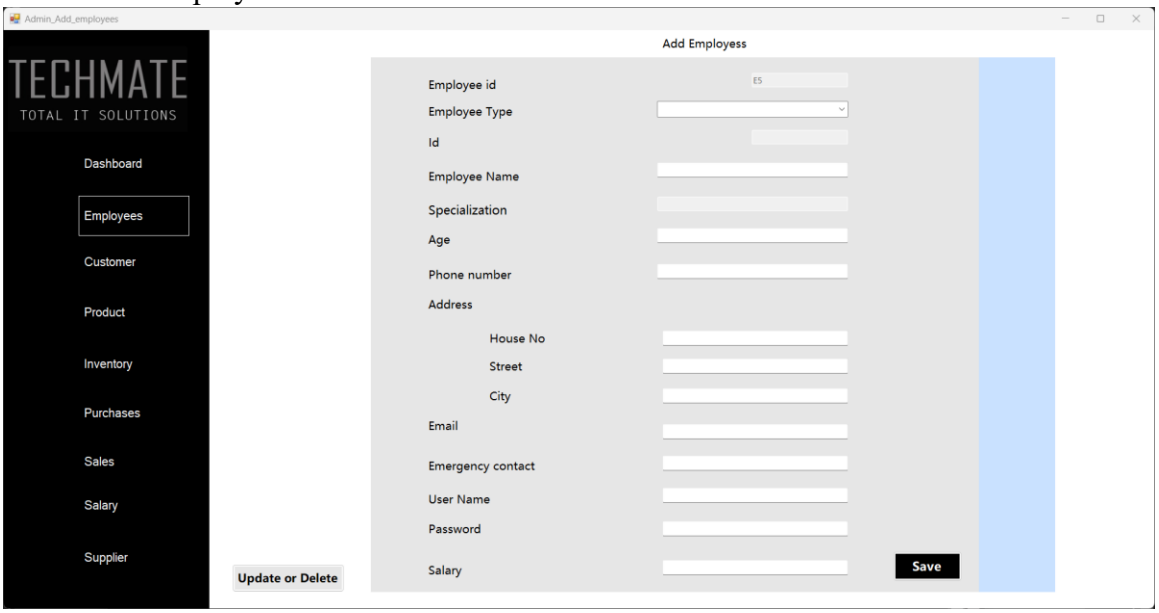
These User Interfaces carry out a user-friendly design among the system giving users the ability to navigate through the system and executing the process in an efficient manner.

Databases are designed to collect all necessary information while keeping the data integrity and security.

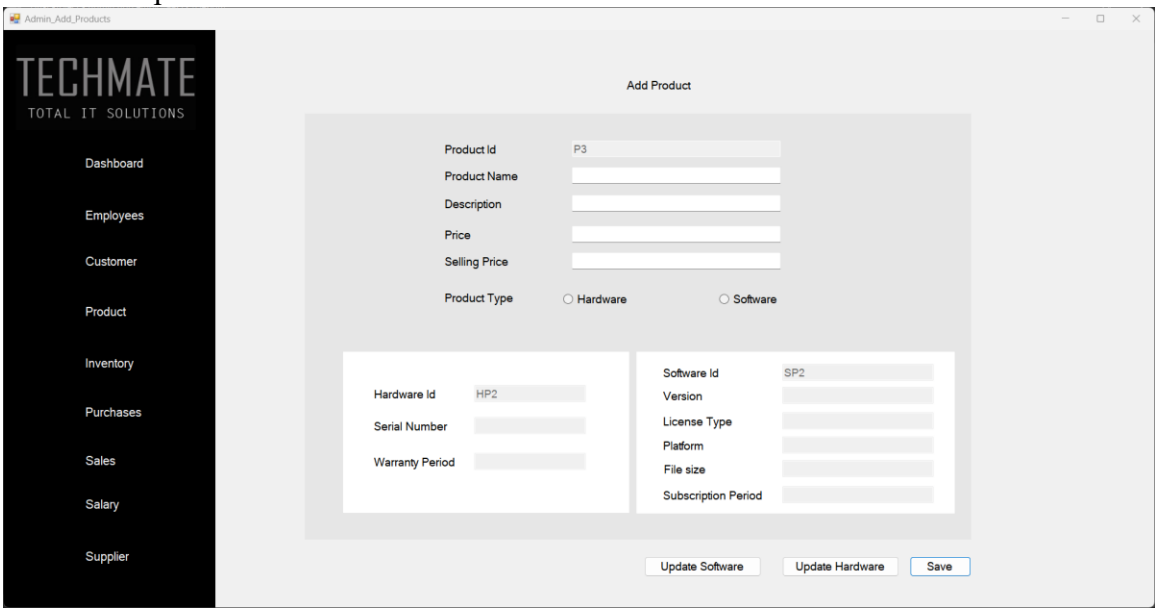
Interfaces designed for the automated inventory and customer management system are represented below.

2. Interface Design

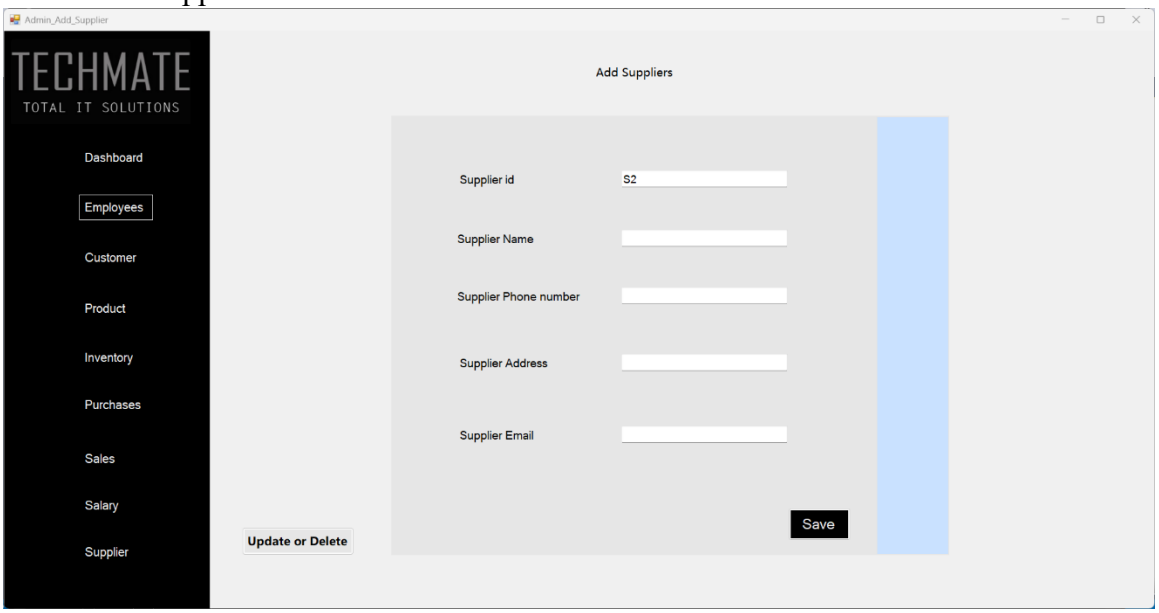
1. Admin add employee



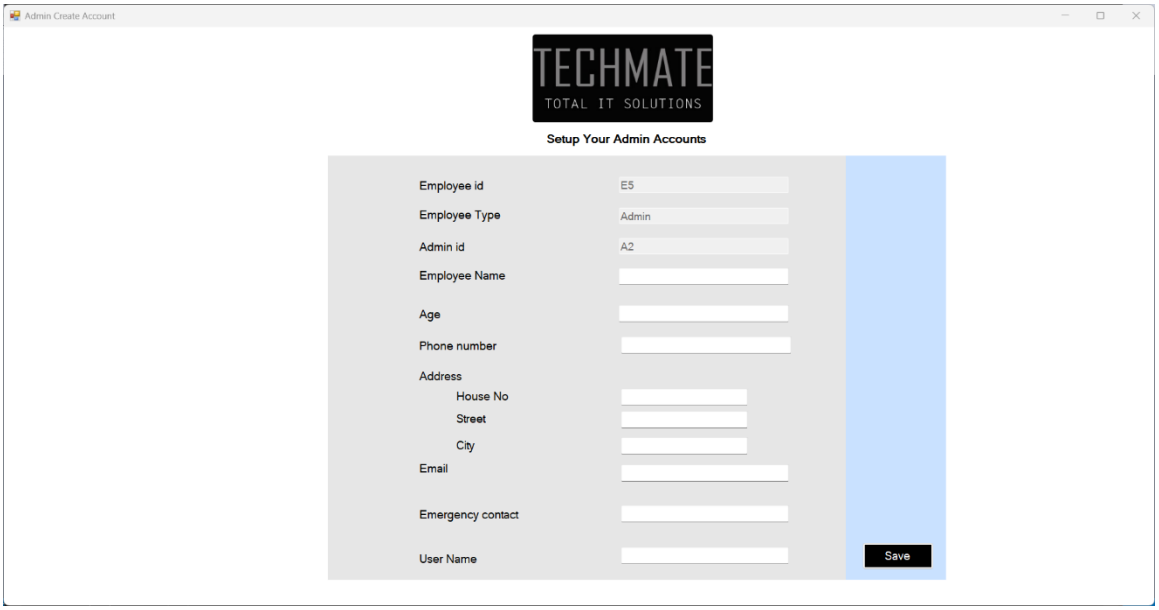
2. Admin add products



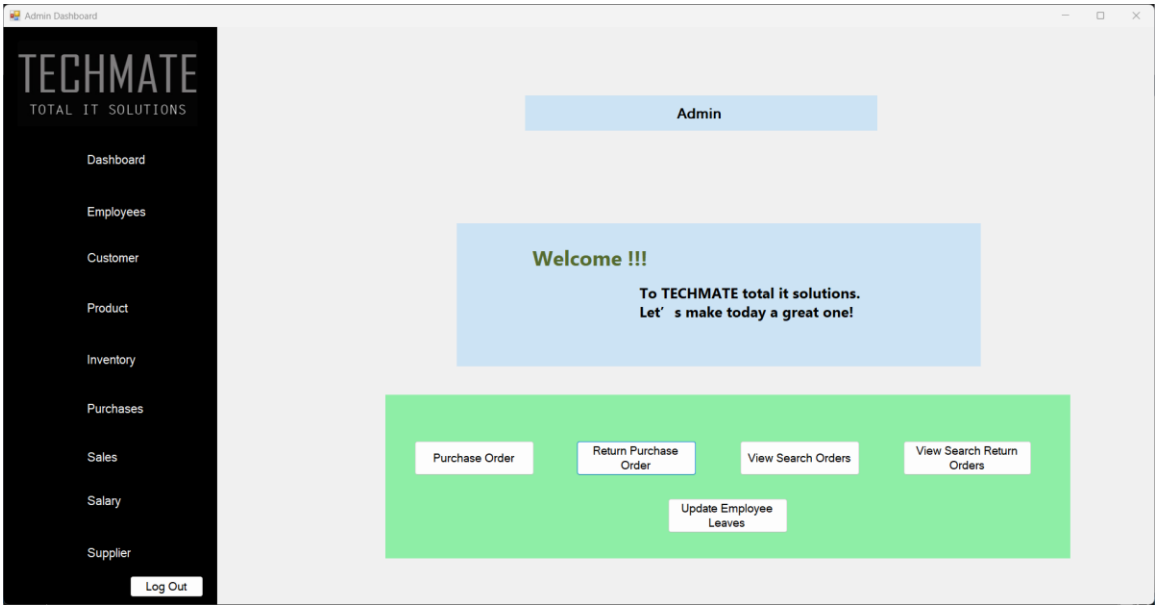
3. Admin add supplier



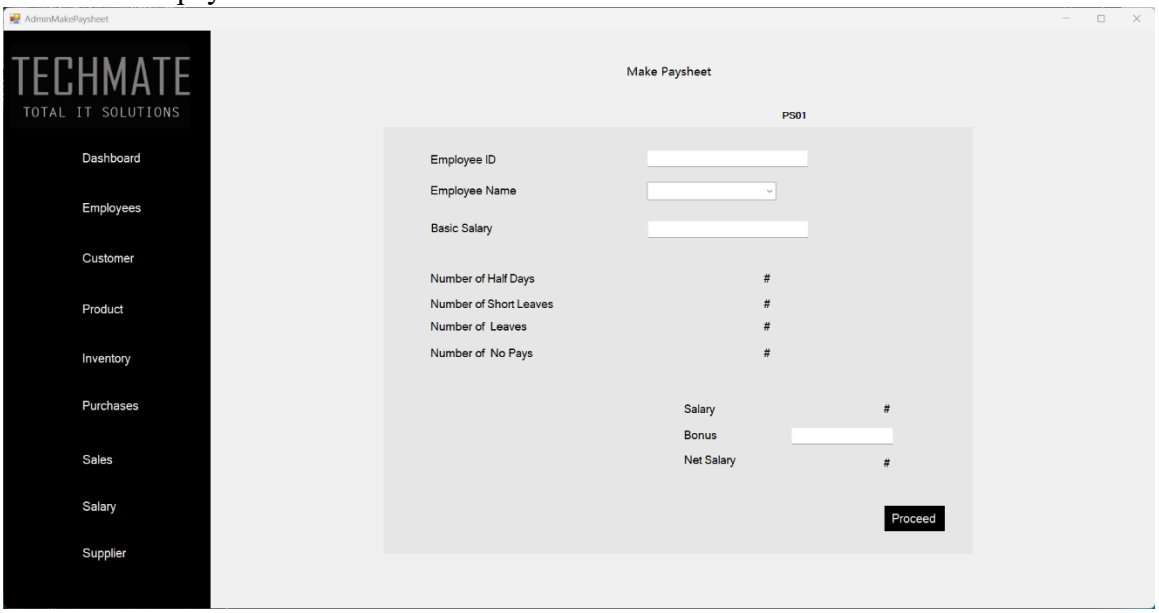
4. Admin create accounts



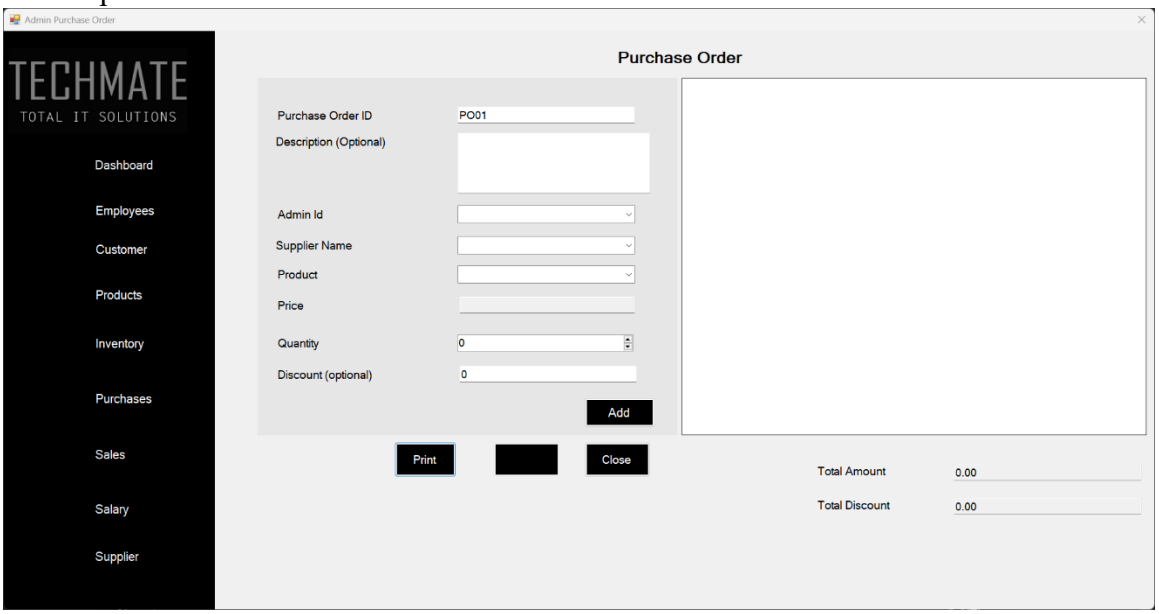
5. Admin dashboard



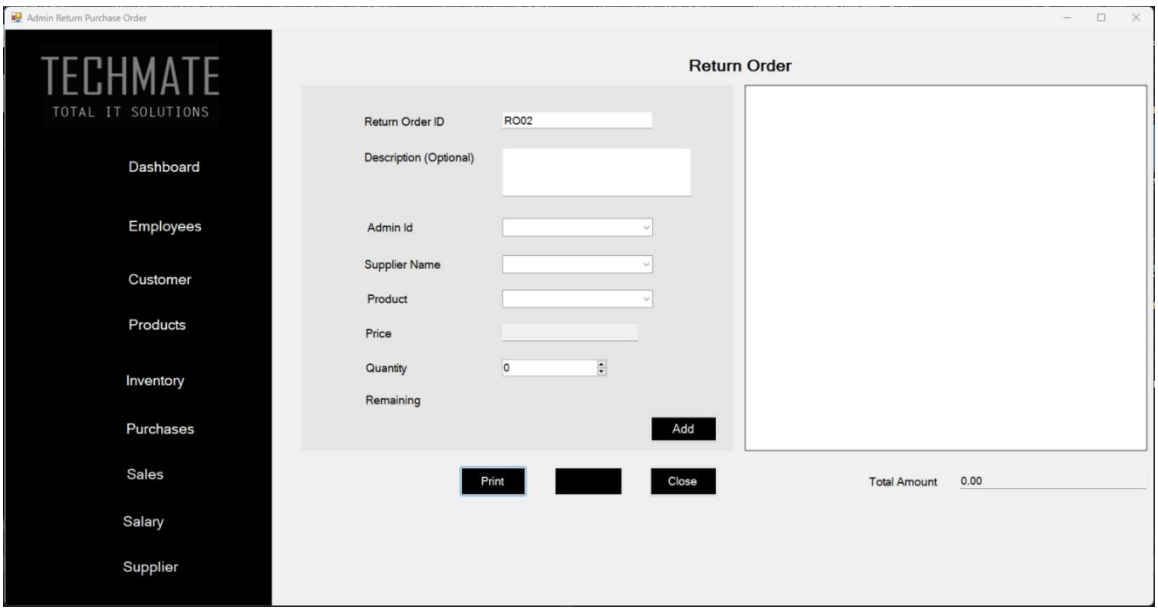
6. Admin make paysheet



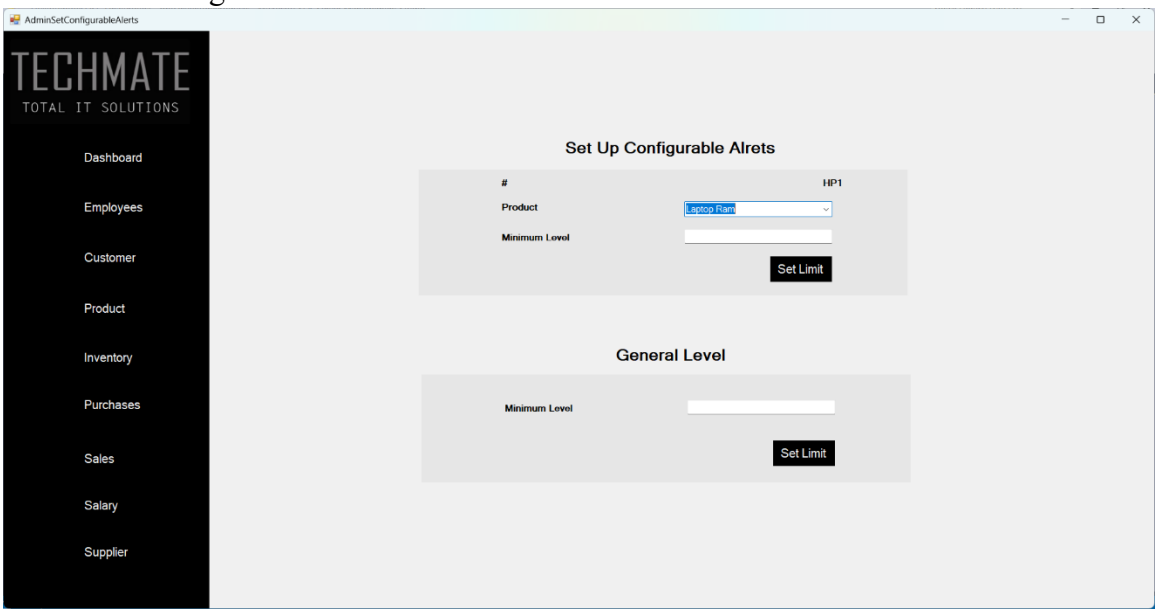
7. Admin purchase order



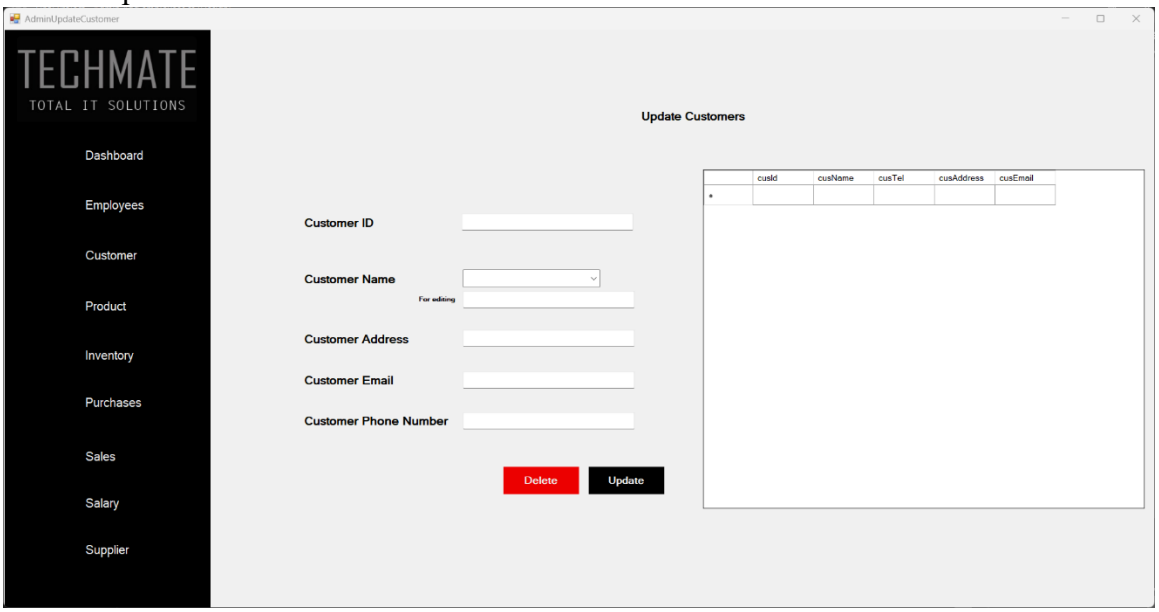
8. Admin return order



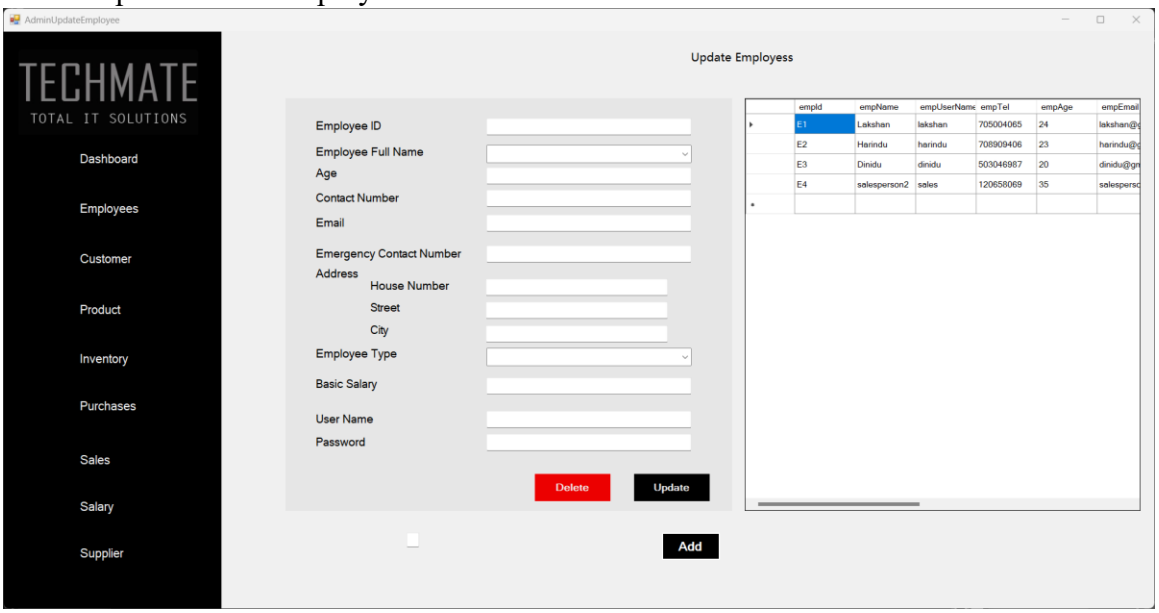
9. Admin set configurable alerts



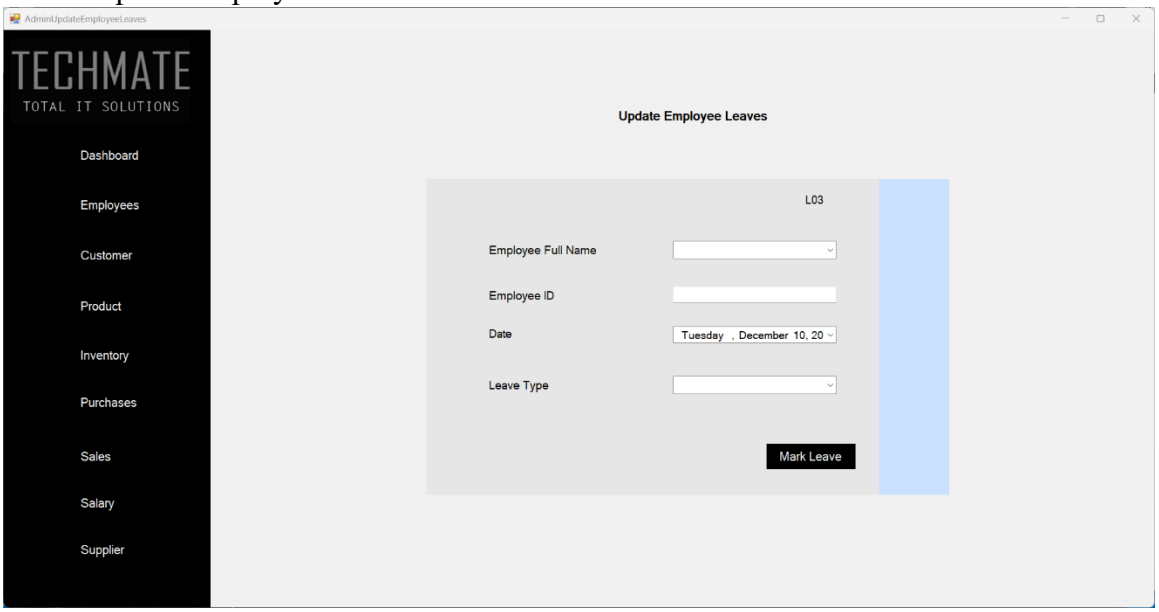
10. Admin update customers



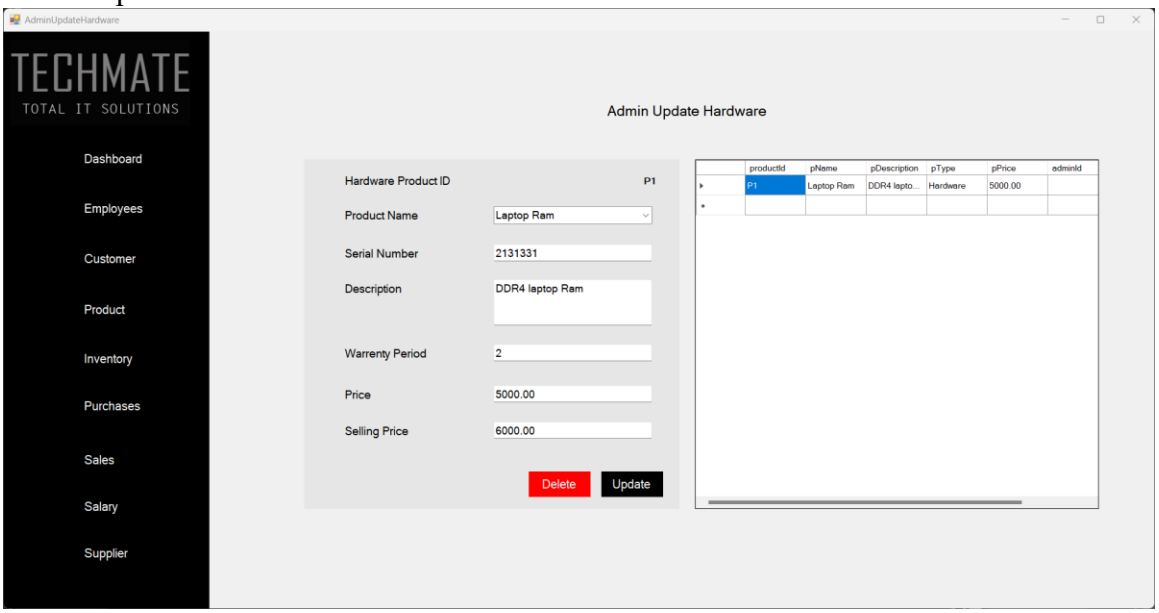
11. Admin update/delete employees



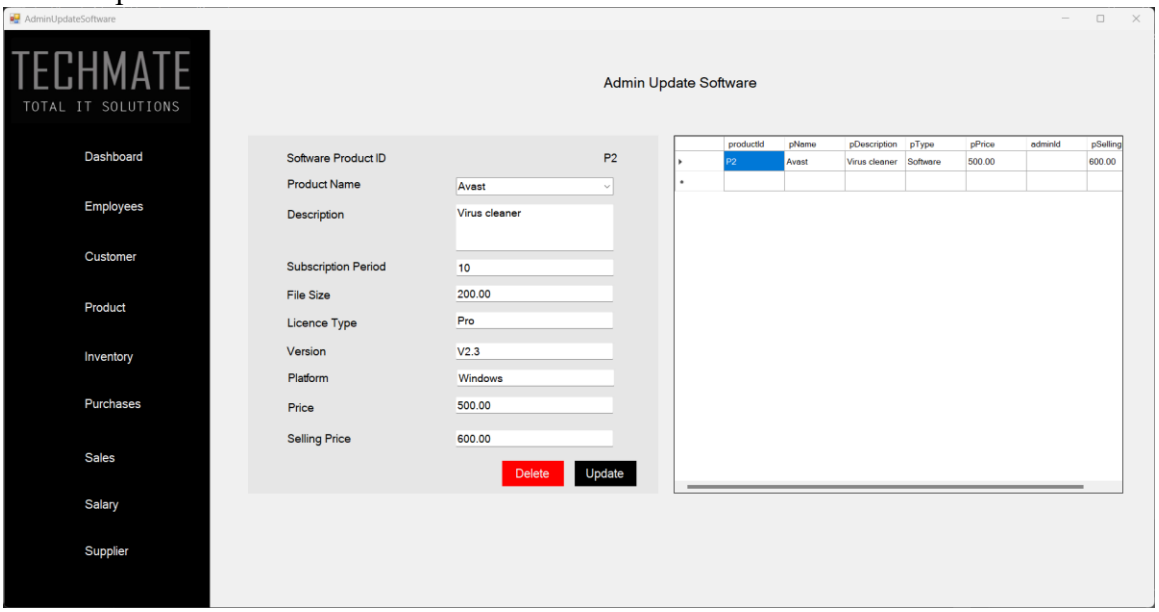
12. Admin update employee leave



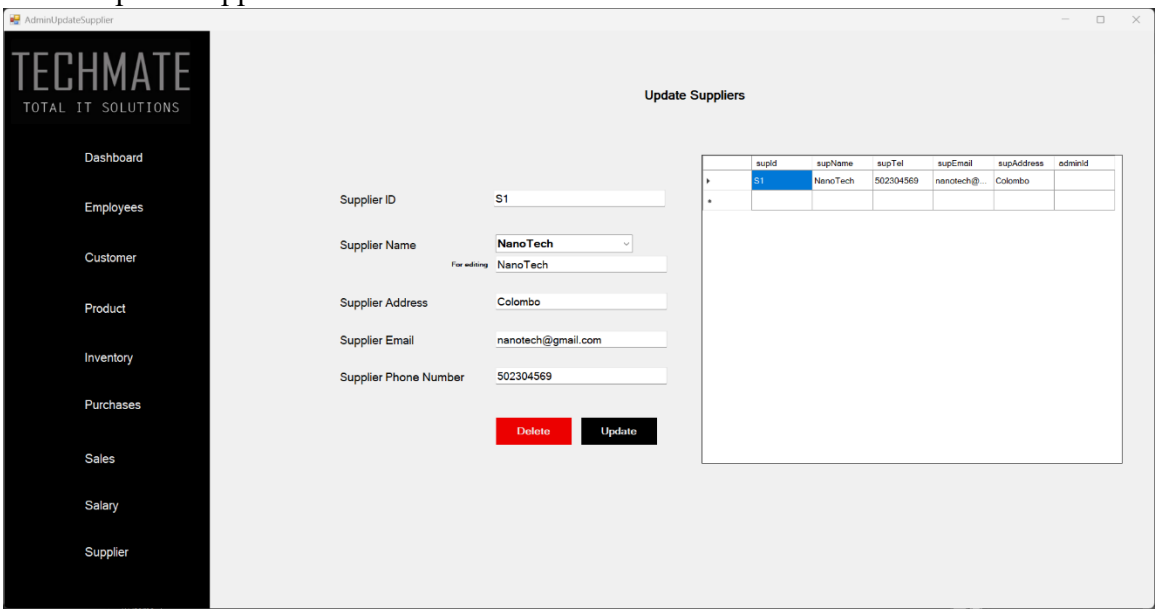
13. Admin update hardware



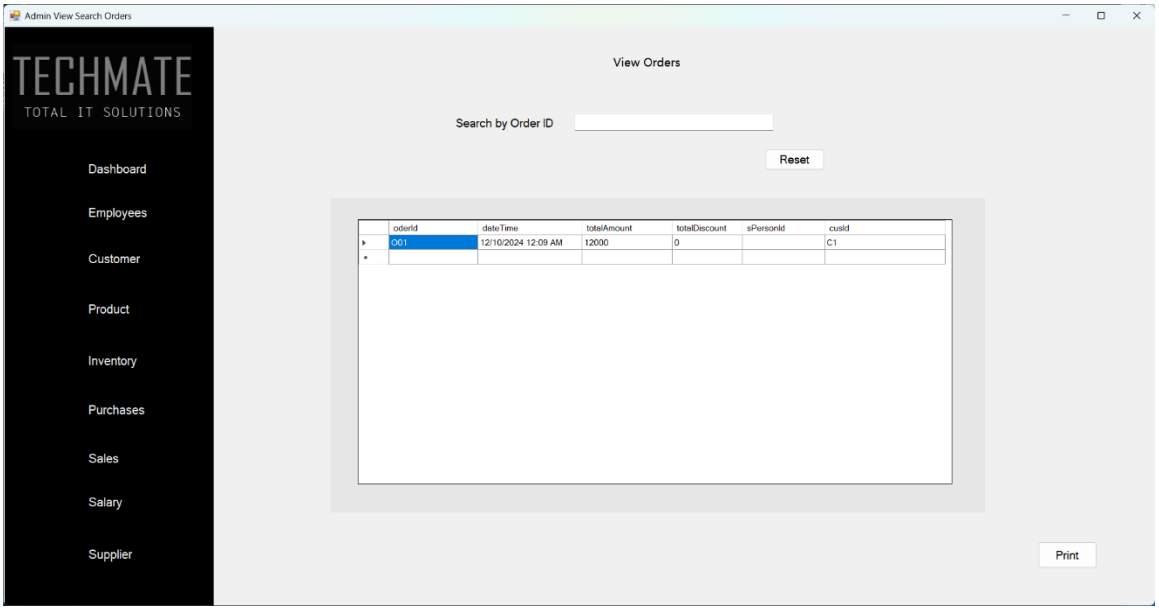
14. Admin update software



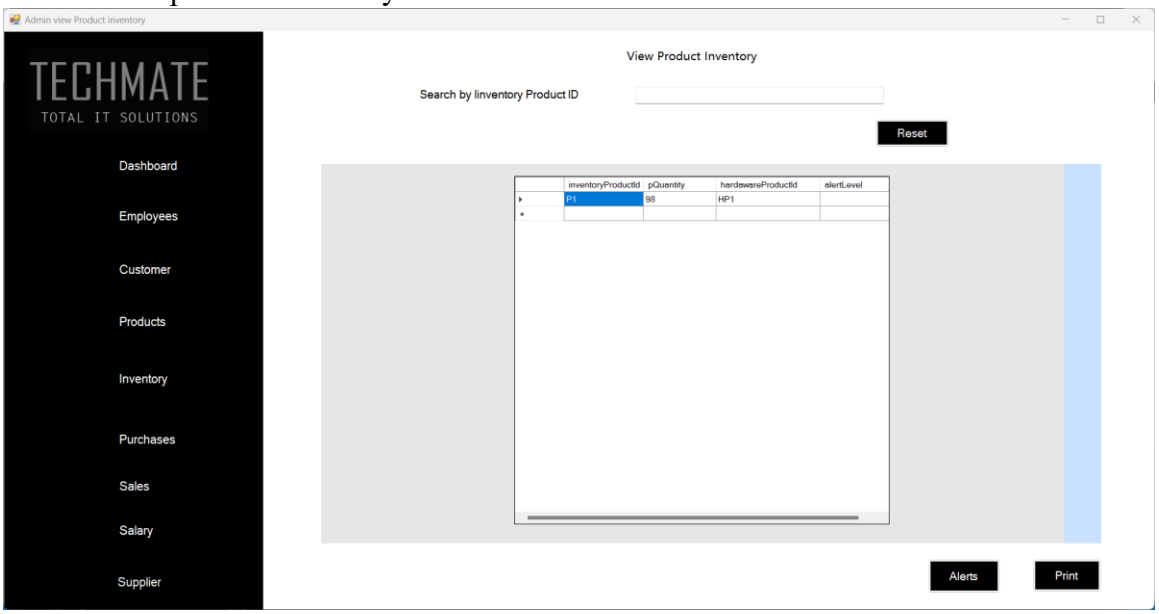
15. Admin update supplier



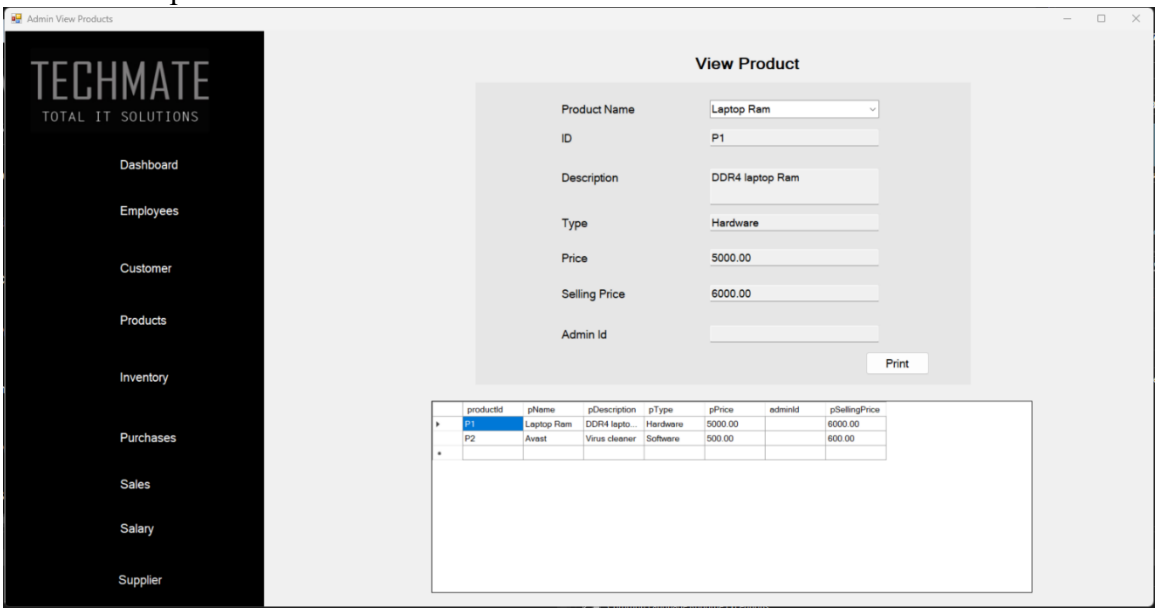
16. Admin view orders



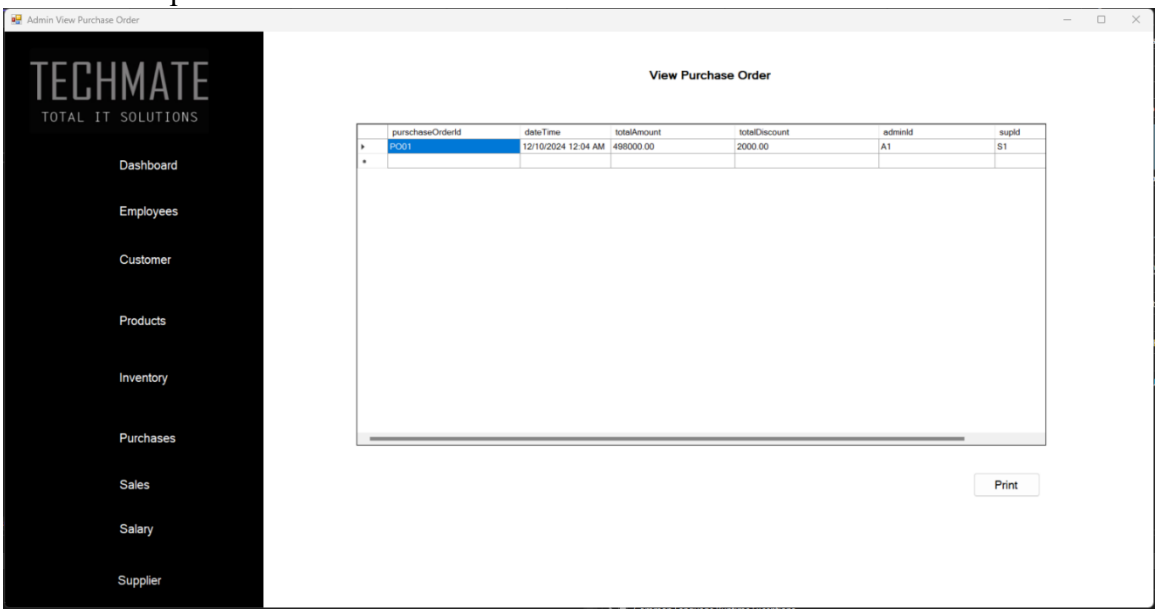
17. Admin view product inventory



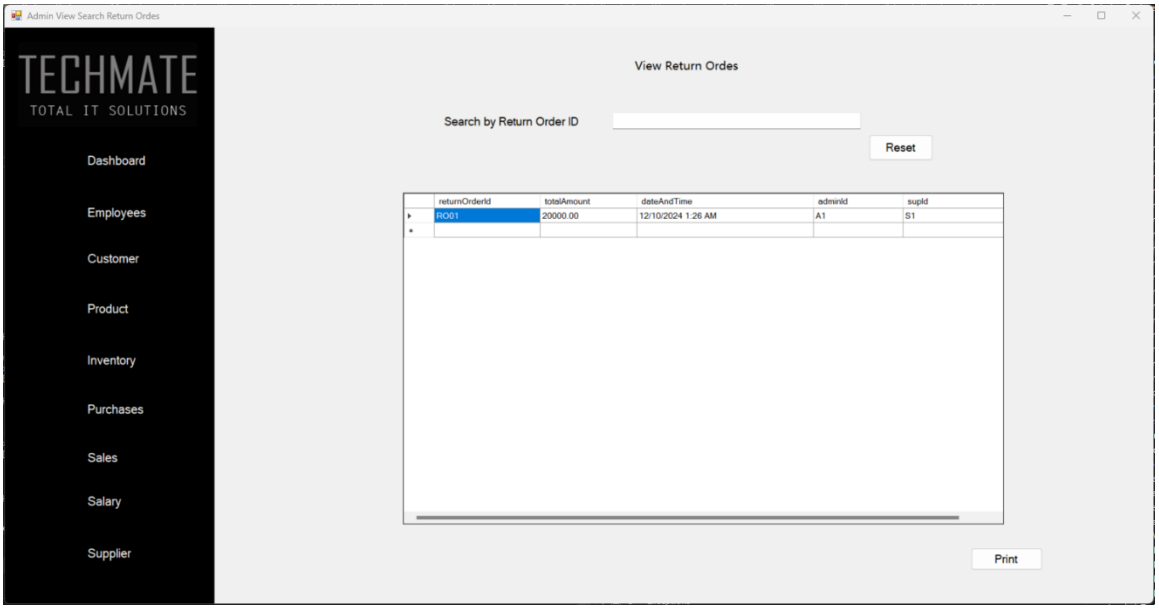
18. Admin view products



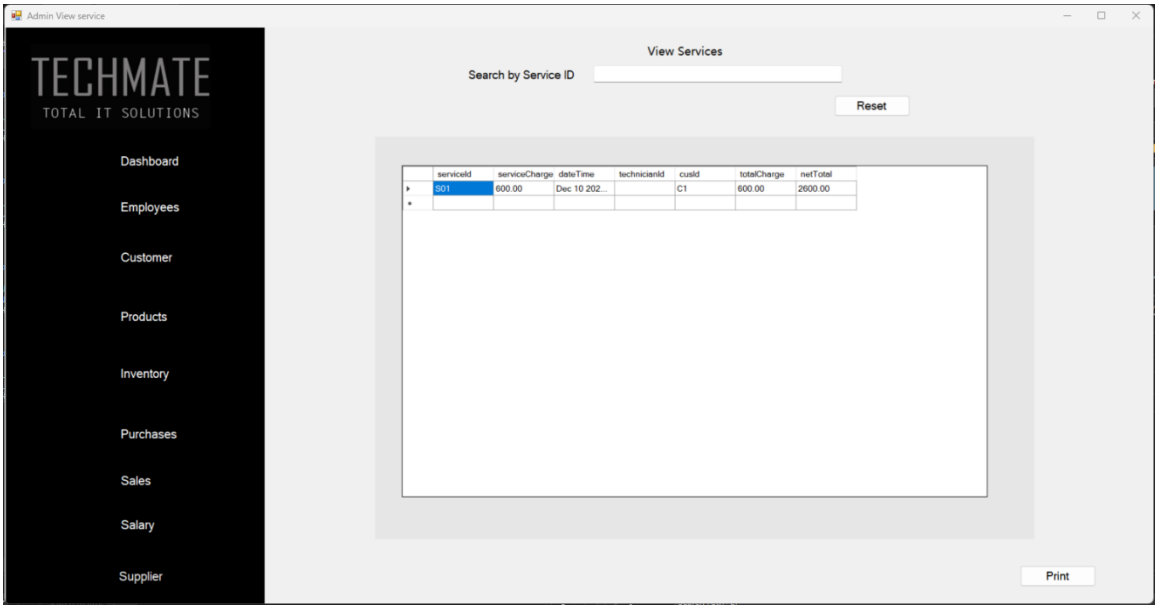
19. Admin view purchase order



20. Admin view return orders

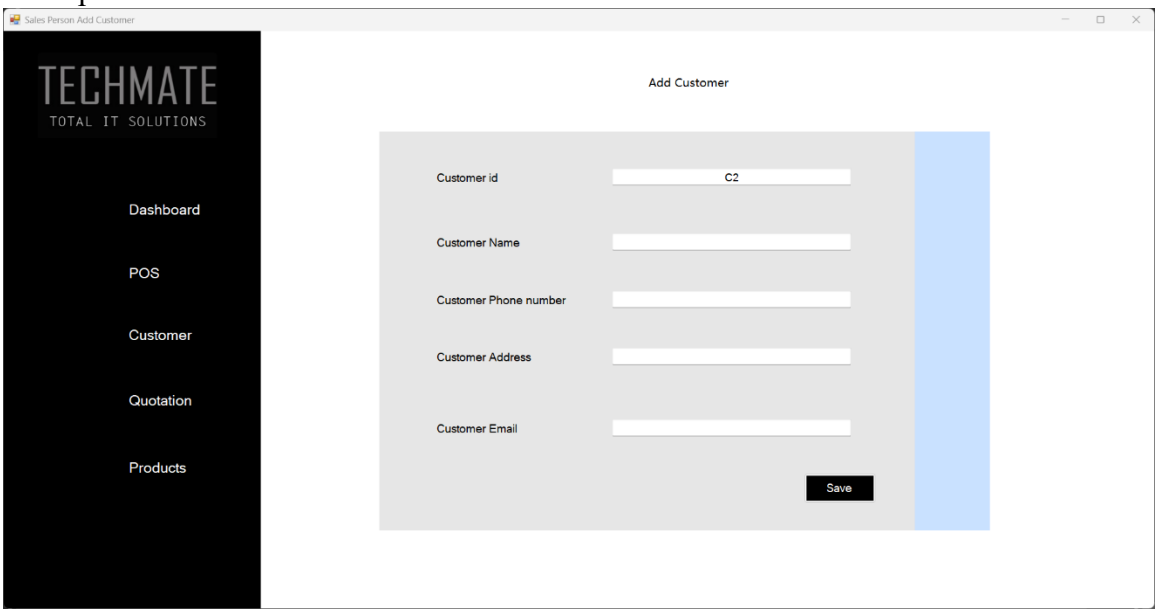


21. Admin view services

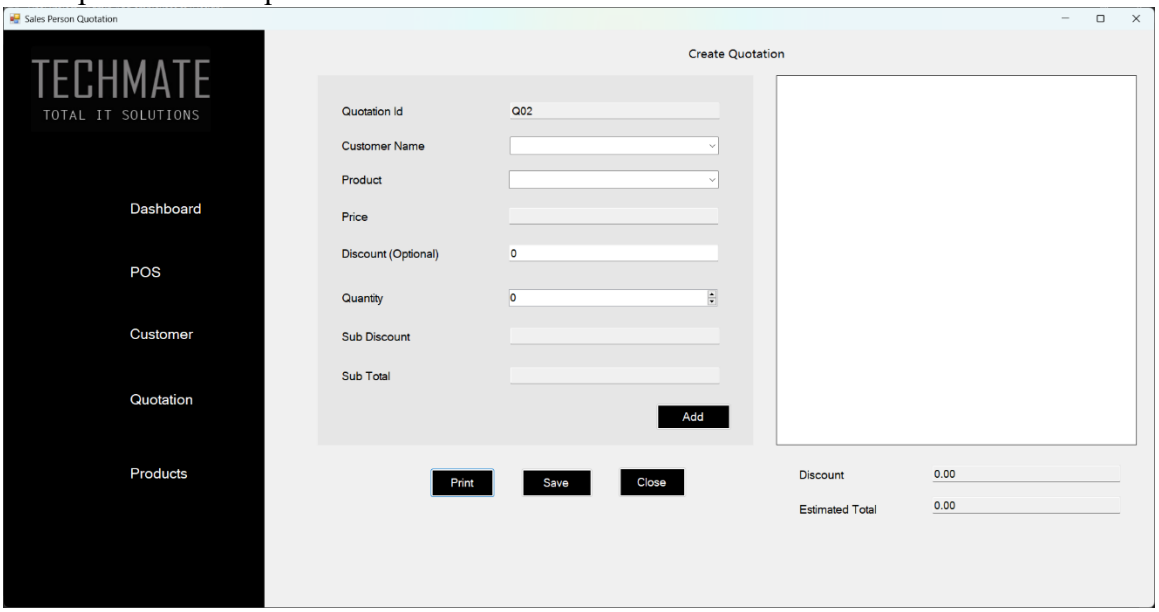


22. Log in

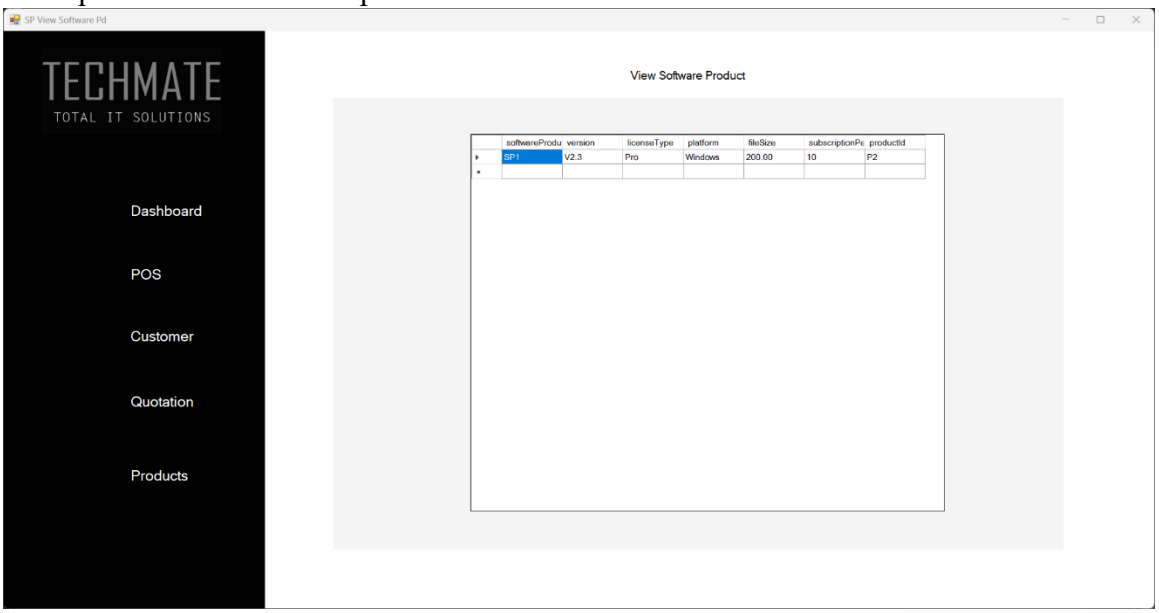
23. Sales person add customer



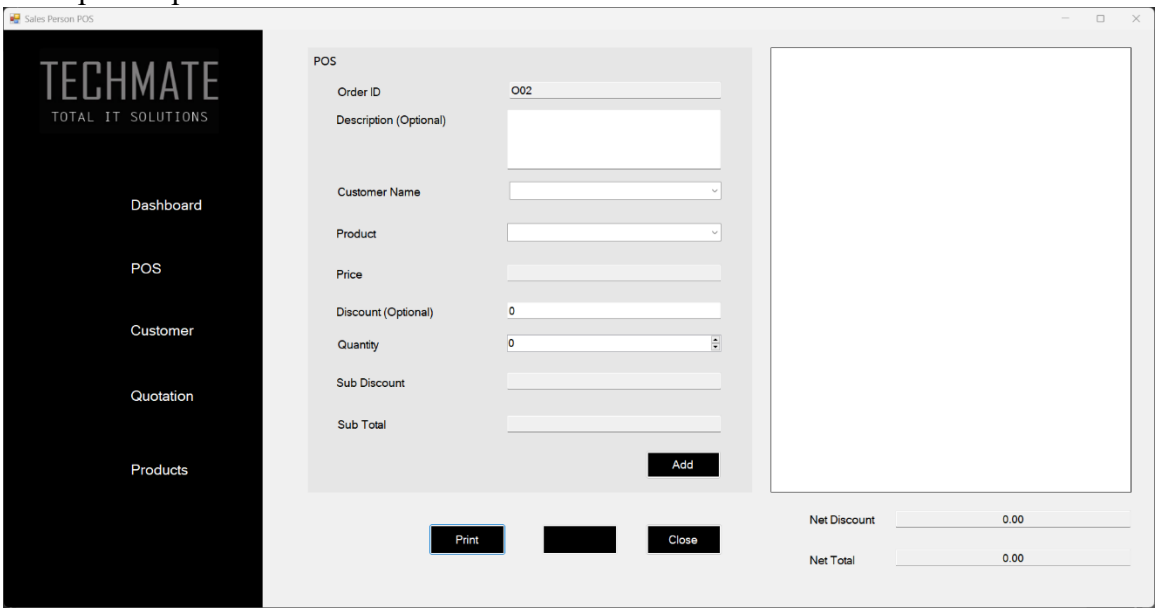
24. Sales person create quotation



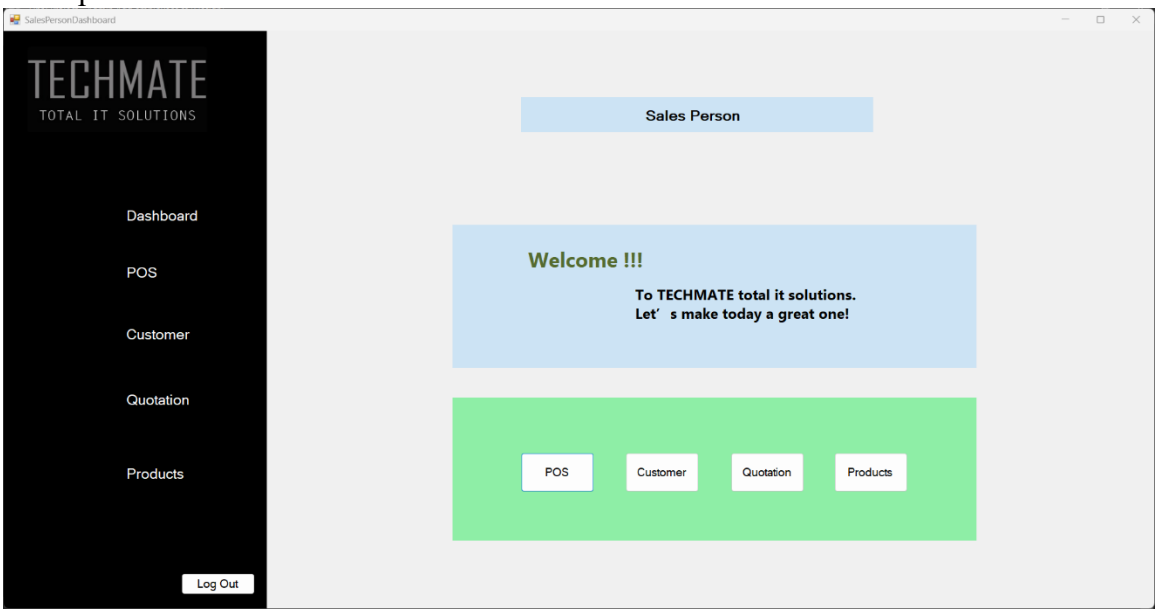
25. Sales person view software products



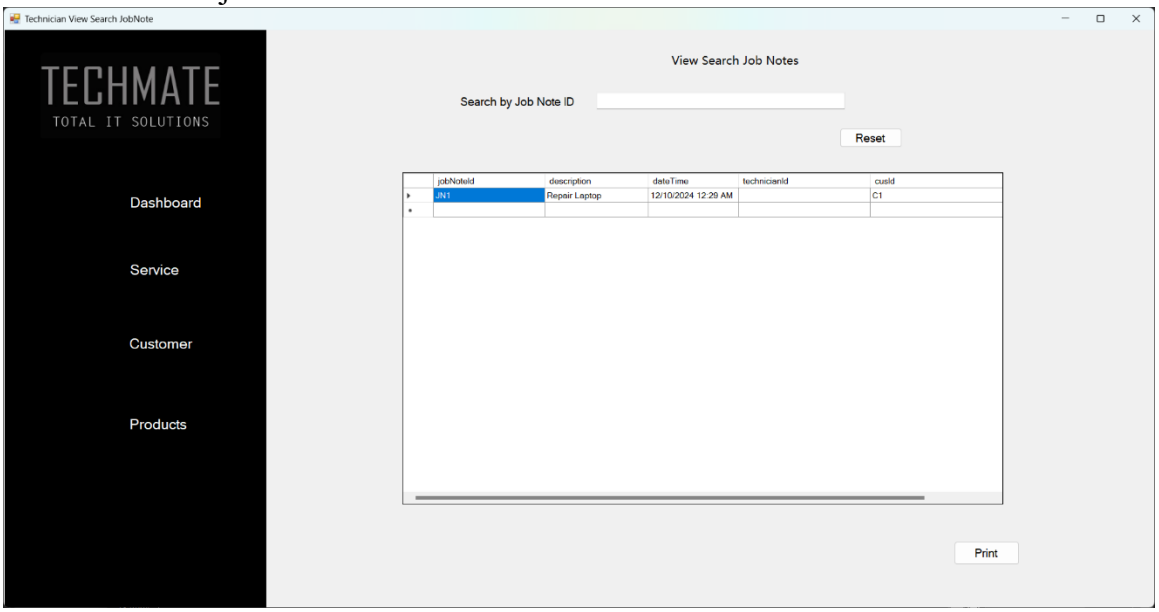
26. Sales person pos



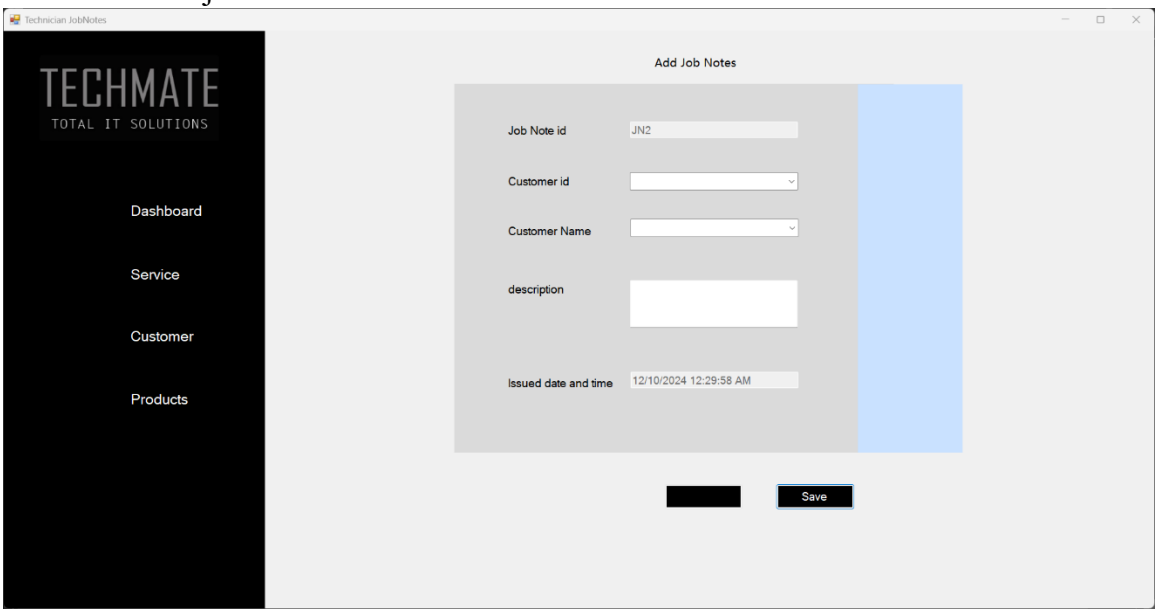
27. Sales person dashboard



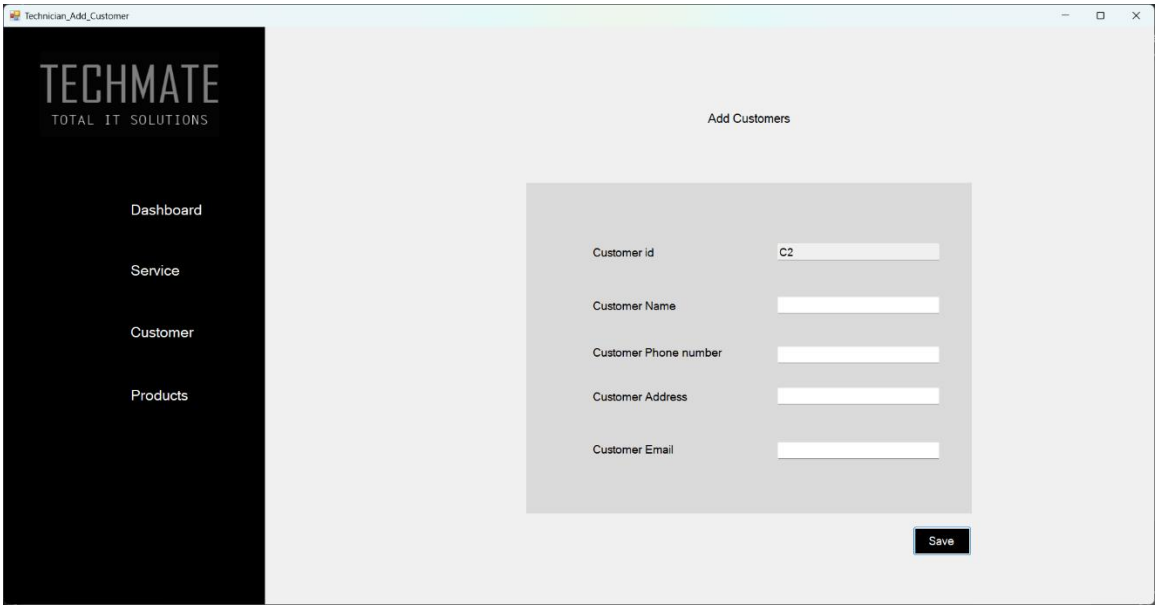
28. Technician view job notes



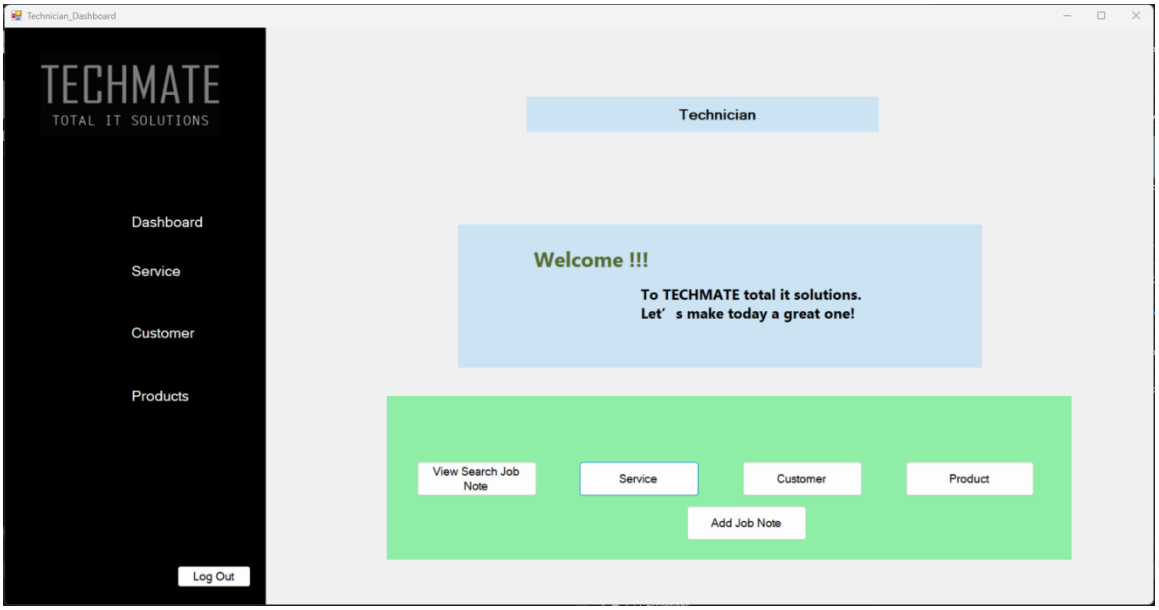
29. Technician add job note



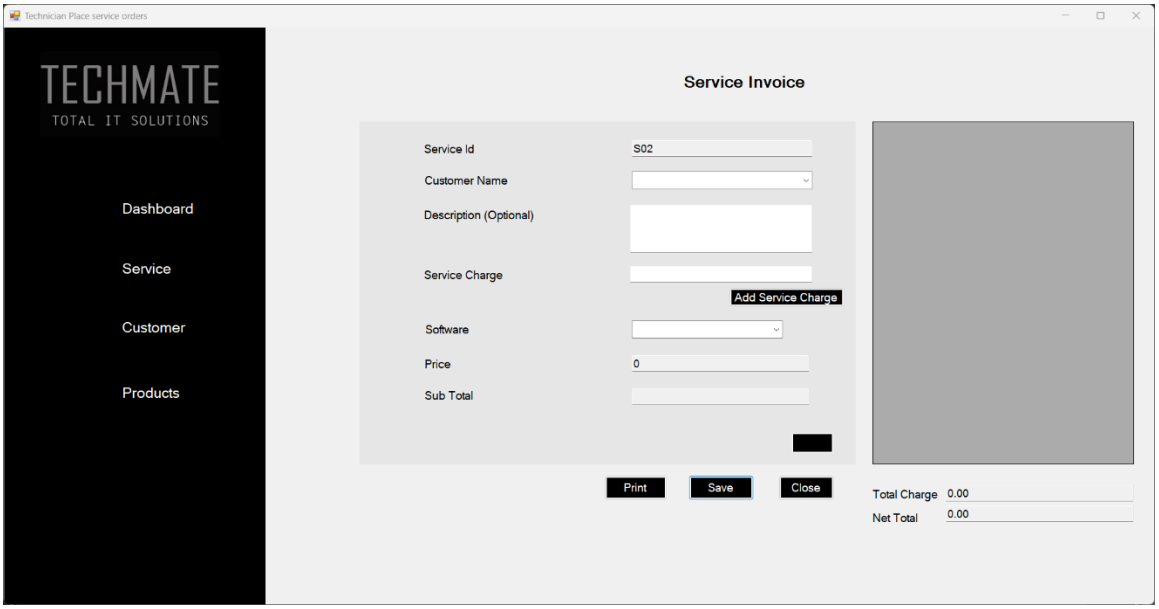
30. Technician add customer



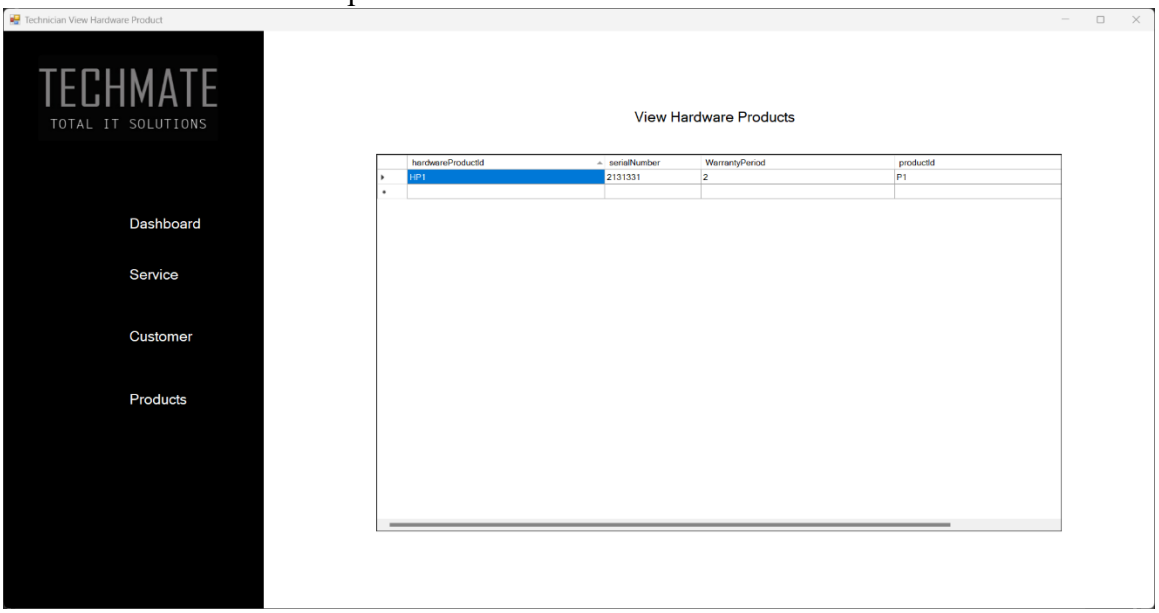
31. Technician dashboard



32. Technician service invoice



33. Technician view hardware product



3. Database Design

1. Employee table

   This table is used to store data that belongs to Employee.

Primary Key	empId		
Foreign Key	No Foreign Key		
Total Size	480		
Column Name	Data Type	Size	Description
empId	Text	50	Employee ID (Auto Increment)
empName	Text	50	Employee Name
empUserName	Text	50	Employee Username
empTel	Number	10	Employee Telephone Number
empAge	Number	2	Employee Age
empEmail	Text	50	Employee Email
empType	Text	50	Employee Type
houseNo	Text	50	Employee house number of the Address
street	Text	50	Employee street name of the Address
city	Text	50	Employee city of the Address
empEmargancyCont	Number	10	Employee Emergency Contact Number
empPassword	Text	50	Employee Password
empSalary	Number	8	Employee Salary

2. Admin Table

   This table Stores data belongs to admin

Primary Key	adminId, empId		
Foreign Key	No Foreign Key		
Total Size	100		
Column Name	Data Type	Size	Description
adminId	Text	50	Admin ID (Auto Increment)
empId	Text	50	Employee ID (Auto Increment)

3. Salesperson table

   This table Stores data belongs to Salesperson

Primary Key	sPersonId, empId		
Foreign Key	adminId		
Total Size	150		
Column Name	Data Type	Size	Description
sPersonId	Text	50	Sales Person ID (Auto Increment)
adminId	Text	50	Admin ID
empId	Text	50	Employee ID (Auto Increment)

4. Technician table

   This table Stores data belongs to Tecnician

Primary Key	technicianId		
Foreign Key	adminId		
Total Size	200		
Column Name	Data Type	Size	Description
technicianId	Text	50	Technician ID (Auto Increment)
specialization	Text	50	Technician Specialization
adminId	Text	50	Admin ID
empId	Text	50	Employee ID (Auto Increment)

5. Customer table

   This table Stores data belongs to Customer

Primary Key	cusId		
Foreign Key	No Foreign Key		
Total Size	210		
Column Name	Data Type	Size	Description
cusId	Text	50	Customer ID (Auto Increment)
cusName	Text	50	Customer Name
cusTel	Number	10	Customer Phone Number
cusAddress	Text	50	Customer Address
cusEmail	Text	50	Customer Email

6. Product table

   This table Stores data belongs to Products

Primary Key	productId		
Foreign Key	adminId		
Total Size	258		
Column Name	Data Type	Size	Description
productId	Text	50	Product ID (Auto Increment)
pName	Text	50	Product Name
pDescription	Text	50	Product Description
pType	Text	50	Product Type
pPrice	Number	8	Product Price
adminId	Text	50	Admin ID
pSellingPrice	Number	8	Product Selling Price

7. Hardware product table

   This table Stores data belongs to Hardware products

Primary Key	hardwareProductId, productId		
Foreign Key	No Foreign Key		
Total Size	152		
Column Name	Data Type	Size	Description
hardwareProductId	Text	50	Hardware Product ID (A.I)
serialNumber	Text	50	Product Serial Number
WarrantyPeriod	Number	2	Warranty Period of the Product
productId	Text	50	Product ID

8. Software product table

   This table Stores data belongs to Software Products

Primary Key	softwareProductId,Product ID		
Foreign Key	No Foreign Key		
Total Size	260		
Column Name	Data Type	Size	Description
softwareProductId	Text	50	Software Product ID (A.I)
version	Text	50	Software Version
licenseType	Text	50	Software License Type
platform	Text	50	Software Platform
fileSize	Number	8	Software File Size
subscriptionPeriod	Number	2	Subscription Period of the Software
productId	Text	50	Product ID

9. Order table

   This table Stores Order details when the Salesperson place an order.

Primary Key	orderId		
Foreign Key	sPersonId , cusId		
Total Size	130		
Column Name	Data Type	Size	Description
oderId	Text	50	Order ID (Auto Incriment)
dateTime	Date	8	Date Time
totalAmount	Number	6	Total Amount
totalDiscount	Number	6	Total Discount
sPersonId	Text	50	Sales Person ID
cusId	Text	10	Customer ID

10. Supplier table

This table Stores data belongs to Suppliers

Primary Key	supId		
Foreign Key	adminId		
Total Size	260		
Column Name	Data Type	Size	Description
supId	Text	50	Supplier ID (Auto Incriment)
supName	Text	50	Supplier Name
supTel	Number	10	Supplier Phone Number
supEmail	Text	50	Supplier Email
supAddress	Text	50	Supplier Address
adminId	Text	50	Admin ID

11. Inventory product table

This table Stores data belongs Product Inventory

Primary Key	inventoryProductId		
Foreign Key	hadwareProductId		
Total Size	116		
Column Name	Data Type	Size	Description
inventoryProductId	Text	50	Inventory Product ID (A.I)
pQuantity	Number	8	Product Quantity
hardawareProductId	Text	50	Hardware Product ID
alertLevel	Number	8	Alert Level

12. Service table

This table Stores Service Order details when Technician place a service order.

Primary Key	serviceId		
Foreign Key	technicianId , cusId		
Total Size	224		
Column Name	Data Type	Size	Description
serviceId	Text	50	Service ID
serviceCharge	Number	8	Service Charge
dateTime	Date	50	Date Time
technicianId	Text	50	Technician ID
cusId	Text	50	Customer ID
totalCharge	Number	8	Total Charge
netTotal	Number	8	Net Total

13. service invoice table

This table Stores Service invoice details when Technician issue a service invoice.

Primary Key	serviceInvoiceId		
Foreign Key	technicianId , cusId , serviceId		
Total Size	250		
Column Name	Data Type	Size	Description
serviceInvoiceId	Text	50	Service Invoice ID (A.I)
subDescription	Text	50	Sub Description
technicianId	Text	50	Technician ID
cusId	Text	50	Customer ID
serviceId	Text	50	Service ID

14. Jobnote table

This table Stores Jobnote details when Technician issue a jobnote.

Primary Key	jobNoteId		
Foreign Key	technicianId , cusId		
Total Size	208		
Column Name	Data Type	Size	Description
jobNoteId	Text	50	Job Note ID (A.I)
description	Text	50	Description
dateTime	Date	8	Date And Time
technicianId	Text	50	Technician ID
cusId	Text	50	Customer ID

15. Quotation table

This table Stores Quotation details when salesperson issue a quotation.

Primary Key	qId		
Foreign Key	sPersonId , cusId		
Total Size	166		
Column Name	Data Type	Size	Description
qId	Text	50	Quotation ID (A.I)
esitimatedPrice	Number	8	Estimated Price
dateTime	Date	8	Date And Time
sPersonId	Text	50	Salesperson Id
usId	Text	50	Customer ID

16. Product invoice table

This table Stores invoice details when Salesperson place an order.

Primary Key	pInvoiceId		
Foreign Key	orderId , sPersonId , cusId		
Total Size	250		
Column Name	Data Type	Size	Description
pInvoiceId	Text	50	Product Invoice ID
subDescription	Text	50	Product Invoice Desription
orderId	Text	50	Oder ID
sPersonId	Text	50	Salesperson Id
cusId	Text	50	Customer ID

17. Working hours table

This table Stores Working hour details of employees.

Primary Key	workingHoursId		
Foreign Key	adminId , salaryId , empId		
Total Size	229		
Column Name	Data Type	Size	Description
workingHoursId	Text	50	Working Hours ID (A.I)
startTime	Date	7	Start Time
endTime	Date	7	End Time
totalHours	Number	5	Total Hours Employee Worked
breakDuration	Number	5	Break Duration
ot	Number	5	OT
adminId	Text	50	Admin ID
salaryId	Text	50	Salary ID
empId	Text	50	Employee ID

18. Return Invoice Table

This table Stores Return Invoice details when Admin issue a return invoice.

Primary Key	returnInvoiceId		
Foreign Key	returnOrderId , adminId , supId		
Total Size	250		
Column Name	Data Type	Size	Description
returnInvoiceId	Text	50	Return Invoice ID
subDescription	Text	50	Return Invoice Description
returnOrderId	Text	50	Return Order ID
adminId	Text	50	Admin ID
supId	Text	50	Supplier ID

19. Return Orders Table

This table Stores Return Order details when Admin return an order.

Primary Key	returnOrderId		
Foreign Key	adminId , supId		
Total Size	166		
Column Name	Data Type	Size	Description
returnOrderId	Text	50	Return Order ID
totalAmount	Number	8	Total Amount of the Return Order
dateAndTime	Date	8	Date and Time of the Return Order
adminId	Text	50	Admin ID
supId	Text	50	Supplier ID

20. Leaves Table

This table Stores leave details of employees.

Primary Key	leaveId		
Foreign Key	adminId , empId , paySheetId		
Total Size	313		
Column Name	**Data Type**	**Size**	**Description**
leaveId	Text	50	Leave ID
date	Date	8	Date of Leaves
leaveLimites	Number	5	Leave Type
remaningLeaves	Number	5,2	Employee Remainnig Leaves
adminId	Text	50	Admin ID
empId	Text	50	Employee ID
paysheetId	Text	50	Paysheet ID
leaveType	Text	50	Leave Type
month	Text	50	Month

21. Salary Table

This table Stores Salary details of employees.

Primary Key	salaryId		
Foreign Key	adminId , empId , leaveId		
Total Size	224		
Column Name	**Data Type**	**Size**	**Description**
salaryId	Text	50	Salary ID
netsalary	Number	8	Employee Net Salary
date	Date	8	Date
bouns	Number	8	Employee Bonus
adminId	Text	50	Admin ID
empId	Text	50	Employee ID
leaveId	Text	50	Leave ID

22. Paysheet Table

This table Stores Paysheet details when admin issue paysheets.

Primary Key	paySheetId		
Foreign Key	adminId , empId		
Total Size	194		
ColumnName	Data Type	Size	Description
paySheetId	Text	50	PaySheet ID
numOfLeaves	Number	5	Number of Leaves
basicSalary	Number	8	Employee Basic Salary
numOfShortLeaves	Number	5	Number of short Leaves
numOfHalfDays	Number	5	Number of Half Days
numOfNoPays	Number	5	Number of payments done to the employee
adminId	Text	50	Admin ID
empId	Text	50	Employee ID
bonus	Number	8	Bonus
netSalary	Number	8	Net Salary

23. Purchase Order Table

This table Stores Purchase Order details when admin Purchase an order.

Primary Key	purchaseOrderId		
Foreign Key	adminId , supId		
Total Size	174		
Column Name	Data Type	Size	Description
purschaseOrderId	Text	50	Purchase Order ID
dateTime	Date	8	Date and items
totalAmount	Number	8	Total Amount of the Purchase Order
totalDiscount	Number	8	Total Discount
adminId	Text	50	Admin ID
supId	Text	50	Supplier ID

24. Purchase Invoice Table

This table Stores Purchase invoice details when admin issue a Purchase order.

Primary Key	purchaseIncoiveId		
Foreign Key	purchaseOrderId , adminId , supId		
Total Size	250		
Column Name	Data Type	Size	Description
purchaseInvoiceId	Text	50	Purchase Invoice ID
subDescription	Text	50	Purchase Invoice Description
purchaseOrderId	Text	50	Purchase Order ID
adminId	Text	50	Admin ID
supId	Text	50	Supplier ID

25. Employee Manage Table

This table Stores details about employee who added a customer.

Primary Key	empId , cusId		
Foreign Key	-		
Total Size	100		
Column Name	Data Type	Size	Description
empid	Text	50	Employee ID
cusid	Text	50	Customer ID

26. Employee view Table

This table Stores details about employee who added a product.

Primary Key	empId , pId		
Foreign Key	-		
Total Size	100		
Column Name	Data Type	Size	Description
empid	Text	50	Employee ID
pId	Text	50	Product ID

27. Order Consists Table

This table Stores sub-Order details when salesperson place an order.

Primary Key	orderId , hardwareProductId		
Foreign Key	-		
Total Size	121		
Column Name	Data Type	Size	Description
orderId	Text	50	Order ID
hardwareProductId	Text	50	Hardware Product ID
quantity	Number	5	Quantity of the order
discount	Number	8	Discount
subTotal	Number	8	Sub Total of the Order

28. Purchase Order Consists Table

This table Stores sub purchase Order details when salesperson purchase an order.

Primary Key	purchaseOrderId , hardwareProductId		
Foreign Key	-		
Total Size	118		
Column Name	Data Type	Size	Description
PurchaseOrderId	Text	50	Purchase Order ID
hardwareProductId	Text	50	Hardware Product ID
quantity	Number	5	Quantity of the order
discount	Number	5	Discount
subTotal	Number	8	Sub Total of the Order

29. Return Order Consists Table

This table Stores sub–Return Order details when admin return an order.

Primary Key	returnOrderId , hardwareProductId		
Foreign Key	-		
Total Size	113		
Column Name	Data Type	Size	Description
returnOrderId	Text	50	Return Order ID
hardwareProductId	Text	50	Hardware Product ID
quantity	Number	5	Quantity of the order
subTotal	Number	8	Sub Total of the Order

30. Service Consists Table

This table Stores sub–Service Order details when technician place a service order.

Primary Key	serviceId , softwareProductId		
Foreign Key	-		
Total Size	108		
Column Name	Data Type	Size	Description
serviceId	Text	50	Service ID
softwareProductId	Text	50	Software Product ID
subTotal	Number	8	Sub Total of the Order

31. Inventory Product Manage Table

This table Stores employee who updates the inventory.

Primary Key	empId, inventoryProductId		
Foreign Key	-		
Total Size	100		
Column Name	Data Type	Size	Description
empId	Text	50	Service ID
inventoryProductId	Text	50	Software Product ID

32. Quotation Consists Table

This table Stores sub-quotation details when salesperson issue a quotation.

Primary Key	qId , hardwareProductId		
Foreign Key	-		
Total Size	121		
Column Name	Data Type	Size	Description
qId	Text	50	Quotation ID
hardwareProductId	Text	50	Hardware Product ID
quantity	Number	5	Quantity
subtotal	Number	8	Sub Total
discount	Number	8	Discount

4. Report Layout Design

1. Product Invoice

When customer request an order, Salesperson place the order. Afterwards he will issue the product invoice which consists the details of the order. It contains Customer name, Description (Product name), quantity, warranty period, discount given, unit price subtotal and total price of an order.

TECHMATE – TOTAL IT SOLUTIONS
No. 19, Convent Road, Kalamulla, Kalutara
034 312 8888
071 312 2888
techmatekaluthara@gmail.com

TECHMATE
TOTAL IT SOLUTIONS

INVOICE

DATE:
11/8/2024

TO: Dinidu Gangadara

INVOICE #
01

CUSTOMER ID:
C01

SALESPERSON	JOB	PAYMENT TERMS	DUE DATE
S02 Harindu Vihan	Sales	Due on receipt	11/8/2024

DESCRIPTION	QTY	WARRANTY (YEARS)	DISCOUNT	UNIT PRICE (LKR)	SUB TOTAL (LKR)
8GB DDR4 Laptop Ram	1	2	0.00	8500.00	8500.00
512GB SSD	1	4	0.00	15000.00	15000.00
				TOTAL	23500.00
				DISCOUNT	500.00
				NET TOTAL	2300.00

Thank you for your business!

2. Inventory Report

Admin can genarate inventory report to get the currunt qunatity of products in the inventory.

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techmatekaluthara@gmail.com

TECHMATE
TOTAL IT SOLUTIONS

DATE: 11/8/2024

INVENTORY REPORT

PRODUCT ID	PRODUCT NAME	QTY
hwp01	Dell Inspiron 15	5
hwp02	HP Pavilion 14	10
hwp03	Acer Aspire 5	4
hwp04	Logitech Mouse	20
hwp05	Dell Monitor	30
hwp06	Kingston SSD	30
hwp07	Microsoft Keyboard	3
hwp08	Lenovo ThinkPad X1	10
hwp09	Samsung SSD	10
hwp10	Logitech Webcam	5
hwp11	NVIDIA GeForce RTX 4090	10
hwp12	MSI Gaming Laptop	2
hwp13	Razer Gaming Mouse	3
hwp14	HyperX Gaming Headset	7
hwp15	Western Digital SSD	10

This Report is Generated By System.

3. Purchase Order Report

Admin can genrate a report with the details of placed purchase orders.

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034 312 8888
071 312 2888
techmatekaluthara@gmail.com

TECHMATE
TOTAL IT SOLUTIONS

PURCHASE ORDER REPORT

DATE:
11/8/2024

PURCHASE ORDER ID:
PO01

SUPPLIER ID:
SU01

ITEM	QTY	DISCOUNT	UNIT PRICE (LKR)	SUB TOTAL (LKR)
HP Omen Gaming Laptop	4	0.12	392,400.00	1,379,232.00
Apple Magic Mouse	7	0.10	32,373.00	204,376.50
ASUS ROG Strix Monitor	5	0.08	114,450.00	524,010.00
Corsair Vengeance RAM	10	0.15	27,795.00	279,900.00
Seagate 2TB HDD	8	0.10	22,890.00	164,808.00
Dell XPS 13	3	0.10	327,000.00	882,900.00
Logitech G Pro Keyboard	6	0.10	42,510.00	229,554.00
Razer Naga Mouse	4	0.12	29,430.00	103,550.40
Samsung 1TB NVMe SSD	5	0.08	49,050.00	226,890.00
MSI Optix Curved Monitor	2	0.10	98,100.00	176,580.00
HyperX Cloud Headset	6	0.07	26,160.00	136,368.00
Asus Gaming Motherboard	3	0.10	65,400.00	176,580.00
			TOTAL	**5,506,748.90**
			TOTADISCOUNT	**844,851.10**
			NET TOTAL	**4,661,897.80**

This Report is Generated By System.

4. Product Return Report

Admin can generate a report with the details of return orders.

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No. 19, Convent Road, Kalamulla, Kalutara
034 312 8888
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techmatekaluthara@gmail.com

TECHMATE
TOTAL IT SOLUTIONS

PRODUCT RETURN REPORT

DATE:
11/8/2024

RETURN ORDER ID:
RO01

SUPPLIER ID:
SU01

ITEM	QTY	UNIT PRICE (LKR)	SUB TOTAL (LKR)
HP Omen Gaming Laptop	4	392,400.00	1,379,232.00
Apple Magic Mouse	7	32,373.00	204,376.50
ASUS ROG Strix Monitor	5	114,450.00	524,010.00
Corsair Vengeance RAM	10	27,795.00	279,900.00
Seagate 2TB HDD	8	22,890.00	164,808.00
Dell XPS 13	3	327,000.00	882,900.00
Logitech G Pro Keyboard	6	42,510.00	229,554.00
Razer Naga Mouse	4	29,430.00	103,550.40
Samsung 1TB NVMe SSD	5	49,050.00	226,890.00
MSI Optix Curved Monitor	2	98,100.00	176,580.00
HyperX Cloud Headset	6	26,160.00	136,368.00
Asus Gaming Motherboard	3	65,400.00	176,580.00
		TOTAL	**4,661,897.80**

This Report is Generated By System.

5. Quotation

IF Customer requst a quotation before placing an order, Salsperson should generate a quotation with the product details and estimated prices.

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TOTAL IT SOLUTIONS

QUOTATION

DATE:
11/8/2024

TO: Dinidu Gangadara

QUOTATION
01

CUSTOMER ID:
C01

SALESPERSON	JOB	PAYMENT TERMS	DUE DATE
S01 Harindu Vihan	Sales	Due on receipt	11/8/2024

DESCRIPTION	QTY	WARRANTY (YEARS)	DISCOUNT	UNIT PRICE (LKR)	SUB TOTAL (LKR)
Intel Core i9 Processor	1	3	0.05	110,000.00	104,500.00
NVIDIA RTX 4090 GPU	1	3	0.05	350,000.00	332,500.00
ASUS ROG Strix Motherboard	1	3	0.05	75,000.00	71,250.00
Corsair 32GB DDR5 RAM	1	2	0.05	48,000.00	45,600.00
Samsung 1TB NVMe SSD	1	5	0.05	48,000.00	30,400.00
Corsair Liquid Cooler	1	3	0.05	18,000.00	17,100.00
Corsair 850W PSU	1	3	0.05	25,000.00	23,750.00
NZXT H510 Case	1	2	0.05	15,000.00	14,250.00
ASUS ROG 27" Monitor	1	3	0.05	90,000.00	85,500.00
Logitech G Pro Gaming Mouse	1	2	0.05	7,000.00	6,650.00
Corsair K95 RGB Keyboard	1	2	0.05	20,000.00	19,000.00
				TOTAL	**790,000.00**
				DISCOUNT	**39,500.00**
				NET TOTAL	**750,500.00**

Thank you for your business!

6. Weekly Sales Report

Admin can generate a report about the weekly sales of the company.

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TECHMATE
TOTAL IT SOLUTIONS

DATE: 11/8/2024

WEEKLY SALES REPORT

Start Date : 11/8/2024 End Date : 11/8/2024

PRODUCT ID	PRODUCT NAME	TOTAL SOLD QTY	TOTAL DISCOUNT (%)	UNIT PRICE (LKR)	TOTAL PRICE (LKR)
hwp01	Dell Inspiron 15	5	10	180,000	810,000
hwp02	HP Pavilion 14	6	8	150,000	828,000
hwp03	Acer Aspire 5	8	5	120,000	912,000
hwp04	Logitech Mouse	9	12	2,000	15,840
hwp05	Dell Monitor	10	7	45,000	418,000
hwp06	Kingston SSD	1	5	25,000	23,750
hwp07	Microsoft Keyboard	4	10	8,000	28,800
hwp08	Lenovo ThinkPad X1	8	8	250,000	1,840,00
hwp09	Samsung SSD	10	10	30,000	270,000
hwp10	Logitech Webcam	2	15	10,000	17,000
hwp11	NVIDIA GeForce RTX 4090	4	10	400,000	1,440,000
hwp12	MSI Gaming Laptop	6	8	300,000	1,656,000
hwp13	Razer Gaming Mouse	20	12	4,000	70,400
hwp14	HyperX Gaming Headset	1	10	15,000	13,500
hwp15	Western Digital SSD	2	8	22,000	40,480
				TOTAL SALES	**8,401,270**
				TOTAL DISCOUNT	**828,750**
				NET SALES	**7,572,520**

This Report is Generated By System.

7. Weekly Sales Chart

Admin can generate a report that contain a chart of weekly sales.

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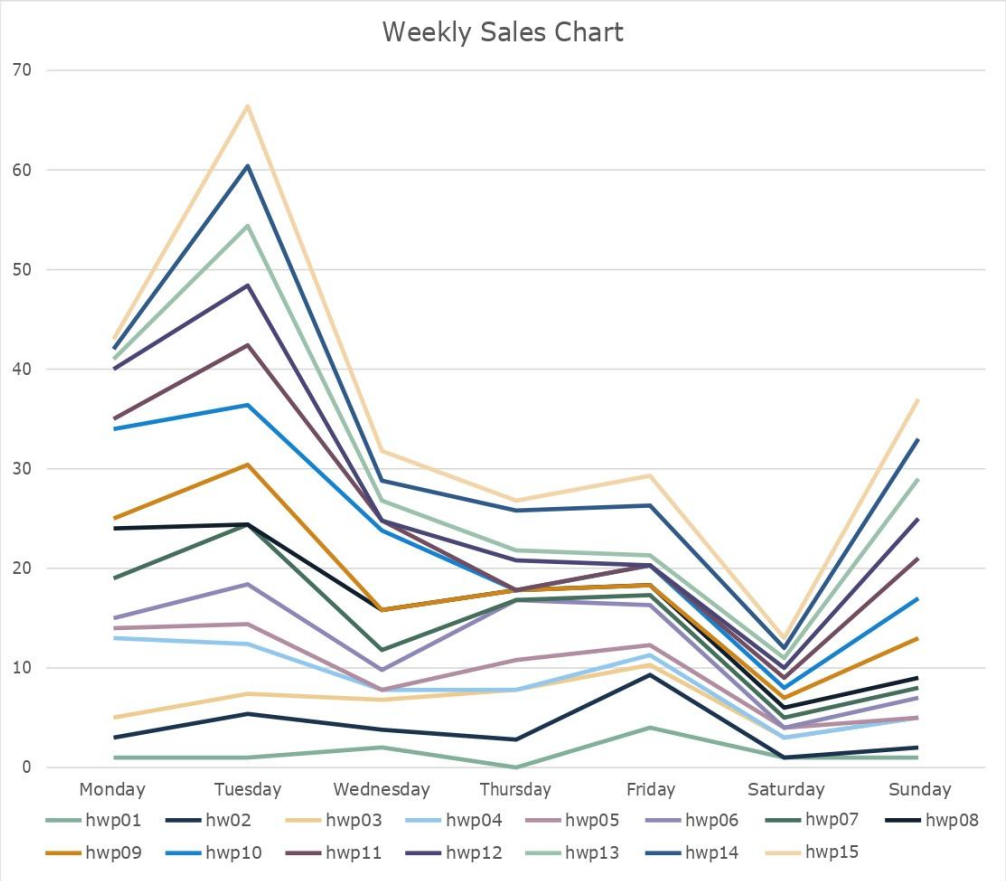
TECHMATE
TOTAL IT SOLUTIONS

DATE: 11/8/2024

WEEKLY SALES CHART

Start Date : 11/8/2024 End Date : 11/8/2024



This Report is Generated By System.

8. Monthly Sales Report

Admin can generate a report about the monthly sales of the company.

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TECHMATE
TOTAL IT SOLUTIONS

DATE: 11/8/2024

MONTHLY SALES REPORT

Start Date : 11/8/2024 End Date : 12/8/2024

PRODUCT ID	PRODUCT NAME	SOLD QTY	TOTAL DISCOUNT (%)	UNIT PRICE (LKR)	TOTAL PRICE (LKR)
hwp01	Dell Inspiron 15	5	10	180,000	810,000
hwp02	HP Pavilion 14	6	8	150,000	828,000
hwp03	Acer Aspire 5	8	5	120,000	912,000
hwp04	Logitech Mouse	9	12	2,000	15,840
hwp05	Dell Monitor	10	7	45,000	418,000
hwp06	Kingston SSD	1	5	25,000	23,750
hwp07	Microsoft Keyboard	4	10	8,000	28,800
hwp08	Lenovo ThinkPad X1	8	8	250,000	1,840,00
hwp09	Samsung SSD	10	10	30,000	270,000
hwp10	Logitech Webcam	2	15	10,000	17,000
hwp11	NVIDIA GeForce RTX 4090	4	10	400,000	1,440,000
hwp12	MSI Gaming Laptop	6	8	300,000	1,656,000
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hwp14	HyperX Gaming Headset	1	10	15,000	13,500
hwp15	Western Digital SSD	2	8	22,000	40,480
				TOTAL SALES	**8,401,270**
				TOTAL DISCOUNT	**828,750**
				NET SALES	**7,572,520**

This Report is Generated By System.

9. Monthly Sales Chart

Admin can generate a report that contain a chart of monthly sales.

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TECHMATE
TOTAL IT SOLUTIONS

DATE: 11/8/2024

MONTHLY SALES REPORT

Start Date : 11/8/2024 End Date : 12/8/2024

PRODUCT ID	PRODUCT NAME	SOLD QTY	TOTAL DISCOUNT (%)	UNIT PRICE (LKR)	TOTAL PRICE (LKR)
hwp01	Dell Inspiron 15	5	10	180,000	810,000
hwp02	HP Pavilion 14	6	8	150,000	828,000
hwp03	Acer Aspire 5	8	5	120,000	912,000
hwp04	Logitech Mouse	9	12	2,000	15,840
hwp05	Dell Monitor	10	7	45,000	418,000
hwp06	Kingston SSD	1	5	25,000	23,750
hwp07	Microsoft Keyboard	4	10	8,000	28,800
hwp08	Lenovo ThinkPad X1	8	8	250,000	1,840,00
hwp09	Samsung SSD	10	10	30,000	270,000
hwp10	Logitech Webcam	2	15	10,000	17,000
hwp11	NVIDIA GeForce RTX 4090	4	10	400,000	1,440,000
hwp12	MSI Gaming Laptop	6	8	300,000	1,656,000
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hwp14	HyperX Gaming Headset	1	10	15,000	13,500
hwp15	Western Digital SSD	2	8	22,000	40,480
				TOTAL SALES	**8,401,270**
				TOTAL DISCOUNT	**828,750**
				NET SALES	**7,572,520**

This Report is Generated By System.

10. Yearly Sales Chart

Admin can generate a report that contain a chart of monthly sales.

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TOTAL IT SOLUTIONS

DATE: 11/8/2024

YEARLY SALES REPORT

Start Date : 11/8/2024 End Date : 11/8/2025

PRODUCT ID	PRODUCT NAME	SOLD QTY	TOTAL DISCOUNT (%)	UNIT PRICE (LKR)	TOTAL PRICE (LKR)
hwp01	Dell Inspiron 15	5	10	180,000	810,000
hwp02	HP Pavilion 14	6	8	150,000	828,000
hwp03	Acer Aspire 5	8	5	120,000	912,000
hwp04	Logitech Mouse	9	12	2,000	15,840
hwp05	Dell Monitor	10	7	45,000	418,000
hwp06	Kingston SSD	1	5	25,000	23,750
hwp07	Microsoft Keyboard	4	10	8,000	28,800
hwp08	Lenovo ThinkPad X1	8	8	250,000	1,840,00
hwp09	Samsung SSD	10	10	30,000	270,000
hwp10	Logitech Webcam	2	15	10,000	17,000
hwp11	NVIDIA GeForce RTX 4090	4	10	400,000	1,440,000
hwp12	MSI Gaming Laptop	6	8	300,000	1,656,000
hwp13	Razer Gaming Mouse	20	12	4,000	70,400
hwp14	HyperX Gaming Headset	1	10	15,000	13,500
hwp15	Western Digital SSD	2	8	22,000	40,480
				TOTAL SALES	**8,401,270**
				TOTAL DISCOUNT	**828,750**
				NET SALES	**7,572,520**

This Report is Generated By System.

11. Yearly Sales Report

Admin can generate a report about the monthly sales of the company.

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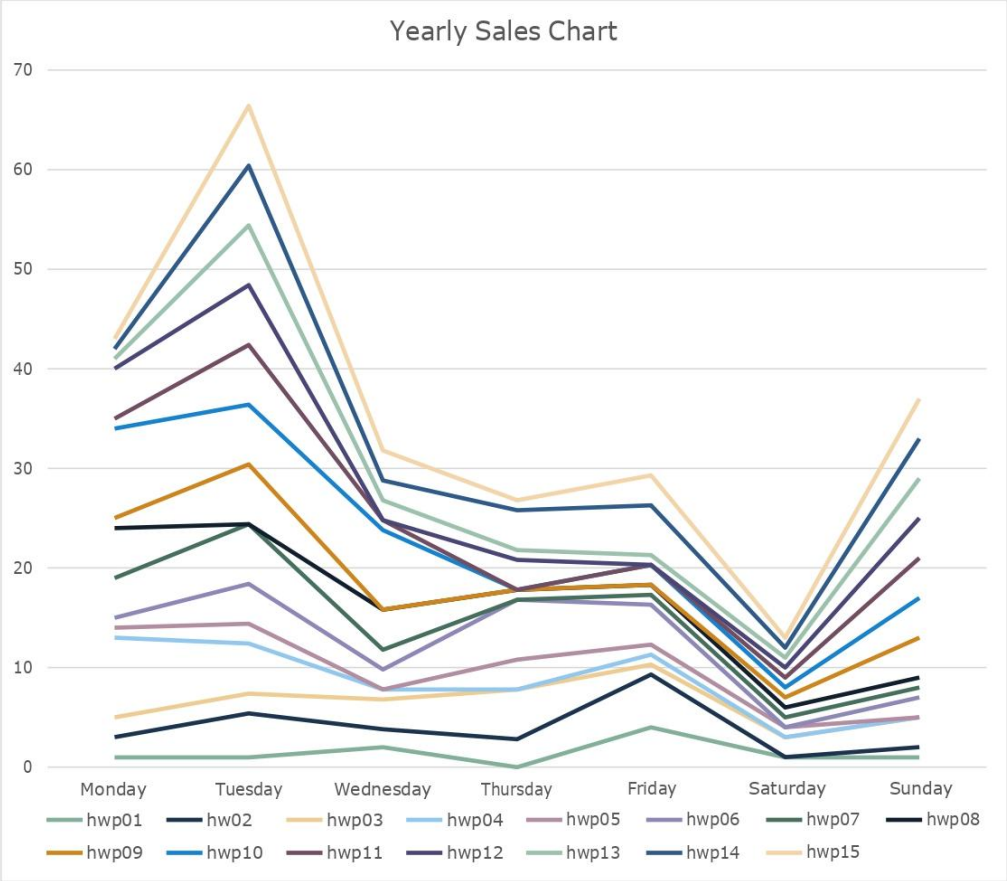
TECHMATE
TOTAL IT SOLUTIONS

DATE: 11/8/2024

YEARLY SALES CHART

Start Date : 11/8/2024 End Date : 11/8/2025



This Report is Generated By System.

5. Chapter 5: Conclusion

In conclusion, designing and implementing an automated Inventory and Customer management system for an IT company which currently operated by manually, is the main purpose of this project.

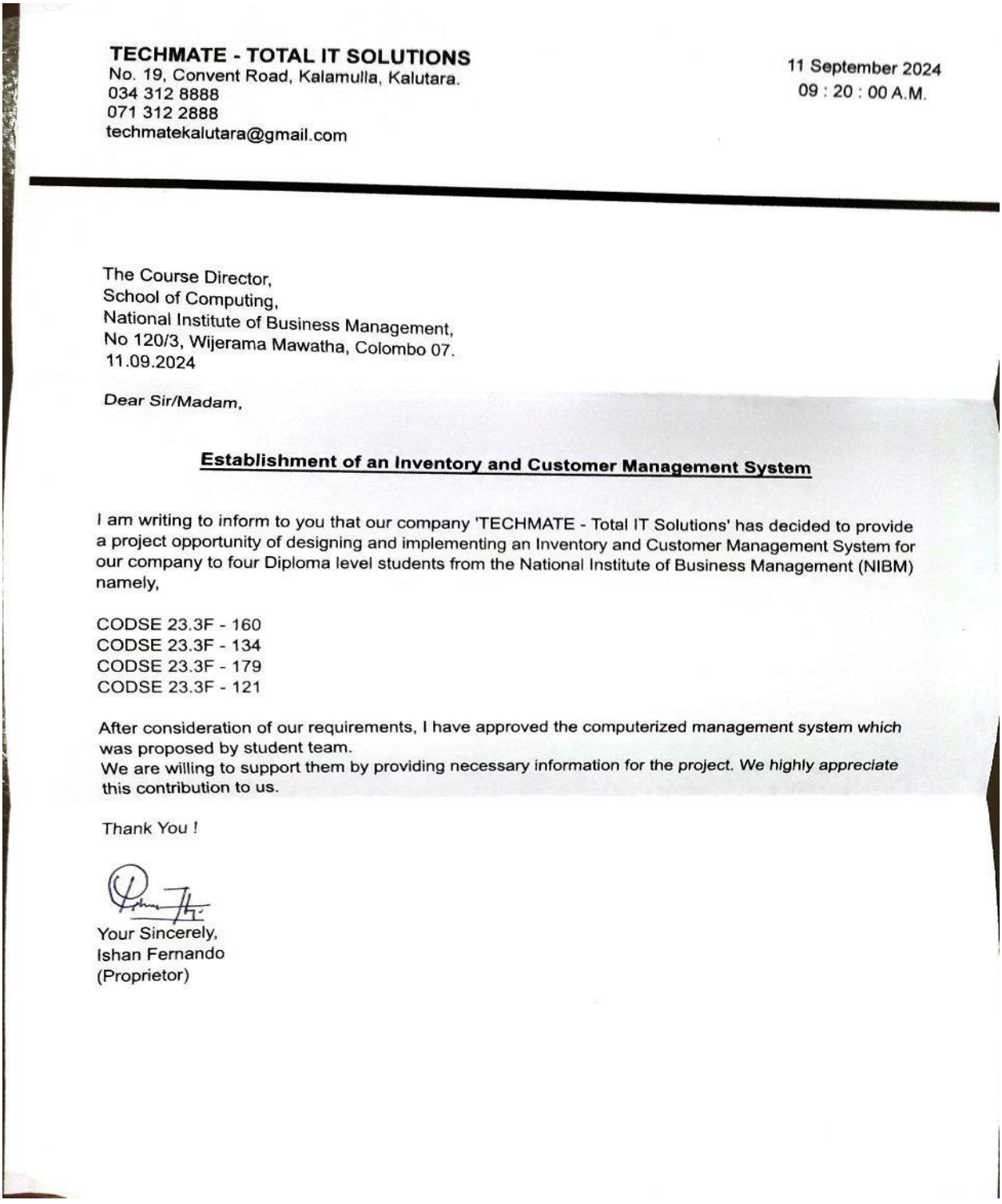
The main problems within the current system were identified by Requirements gathering and analysis. Afterward solutions were proposed to identified problems. Proposed Solutions have become a Functioning system because of the dedication of team members who worked hard for the success of this project.

References

- Lecture note- Software Engineering- Software Development Approaches
  https://lms.nibmworldwide.com/mod/hvp/view.php?id=4868429
- Lecture note- Database Management Systems - Lecture-1 ppt
  https://lms.nibmworldwide.com/mod/resource/view.php?id=4782694
- Lecture note- Software Engineering – UML diagram
  https://lms.nibmworldwide.com/mod/hvp/view.php?id=4868439
- W3schools – C#
  https://www.w3schools.com/cs/index.php
- C-Sharp Corner
  C# Corner - Community of Software and Data Developers

Appendices

Letter Issued by the organization.



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11 September 2024
09 : 20 : 00 A.M.

The Course Director,
School of Computing,
National Institute of Business Management,
No 120/3, Wijerama Mawatha, Colombo 07.
11.09.2024

Dear Sir/Madam,

Establishment of an Inventory and Customer Management System

I am writing to inform to you that our company 'TECHMATE - Total IT Solutions' has decided to provide a project opportunity of designing and implementing an Inventory and Customer Management System for our company to four Diploma level students from the National Institute of Business Management (NIBM) namely,

CODSE 23.3F - 160
CODSE 23.3F - 134
CODSE 23.3F - 179
CODSE 23.3F - 121

After consideration of our requirements, I have approved the computerized management system which was proposed by student team.
We are willing to support them by providing necessary information for the project. We highly appreciate this contribution to us.

Thank You !

Your Sincerely,
Ishan Fernando
(Proprietor)

Meeting Minutes

Meeting minutes for the 1st meeting

Date	4th September 2024
Time	10.30 p.m. - 11.30 p.m.
Purpose of the meeting	Identify the project scope and the functionalities.
Location	Via WhatsApp

Attendance	
Students	01. CODSE233F-160 A.H.V.M. Jayaratne 02. CODSE233F-134 W.A.U.S. Weerasuriya 03. CODSE233F-179 M.K.D. Gangadara 04. CODSE233F-121 D.T. Prabodhi
Organization Members	01.Manager of TECHMATE – TOTAL IT SOLUTIONS – Ishan Fernando

Agenda	
Time	Type of action
10.30 p.m. - 10.35 p.m.	Welcoming all members and introduction.
10.35 p.m. - 10.45 P.m.	Discussing billing and invoicing.
10.45 p.m. - 10.50 p.m.	Discussing customer management.
10.50 p.m. - 11.05 p.m.	Discussing purchase order.
11.05 p.m. - 11.25 p.m.	Discussing the details that need to include in an invoice, a job note and a quotation.
11.25 p.m. - 11.30 p.m.	Conclusion and finalizing the meeting.

Key point discussed	
What type of services does your company provide?	Primary services are selling computer components and delivering software services.
What type of systems do you want?	• We need a point of sales system. • Inventory management system. • And a customer management system.
What type of services does the system need to provide?	• Should be able to issue an invoice with a description, job note and quotation. • Bill amount should be automatically calculated. • Should be able to store product details. • The manager should be able to view inventory details. • Should be able to add discounts. • After selling products the inventory should be updated. • Providing software services should not affect the inventory. • Should be able to register customers. But the registration should not be mandatary. • Should be able to search and select customers.
What are the tasks that demand administrator-level access?	• Report generation. • View product cost. • Purchase order. • Supplier management.
If a customer is also a supplier?	• Add them into the same database simultaneously as a customer and a supplier providing different Ids.
Optional requirements	• System may identify the user by only entering the password. • Invoice details may be filled out after scanning the barcode.

Gathered information
• Core businesses of the company is selling computer components and providing software services. • The company prioritizes distribution. • The company needs a point of sales system, Inventory management system and a customer management system. • Products are always linked with the inventory while software services are not. • The system should be password protected, and users should have a different level of access.

Decisions made
• Design a desktop-based application. • Use My SQL as the database management system. • Create three different databases for products, users and customers. • Use C# or Java as the programing language.

Next meeting	
Date	7th September 2024
Time	09.30 p.m.
Location	Via WhatsApp

Prepared by:

CODSE233F-160 A.H.V.M. Jayaratne

student at National Institute of Business Management

20th September 2024

Meeting minutes for the 2nd meeting

Date	7th September 2024
Time	09.30 p.m. - 10.00 p.m.
Purpose of the meeting	Identify users and the Methodologies
Location	Via WhatsApp

2.1. Attendance	
Students	01. CODSE233F-160 A.H.V.M. Jayaratne 02. CODSE233F-134 W.A.U.S. Weerasuriya 03. CODSE233F-179 M.K.D. Gangadara 04. CODSE233F-121 D.T. Prabodhi
Organization Members	01.Manager of TECHMATE – TOTAL IT SOLUTIONS – Ishan Fernando

2.2. Agenda	
Time	Type of action
9.30 p.m. - 9.35 p.m.	Welcoming all members
9.35 p.m. - 9.40 p.m.	Identify structure of the company
9.40 p.m. - 9.55 p.m.	Identify the Methodologies that can be used
9.55 p.m. - 10.00 p.m.	Conclusion and finalizing the meeting.

2.3. Key point discussed	
Who uses the system?	Admin, salesperson, and technicians
What are the accessible types they have?	Only admin has an administrator privileges. And salespersons and technicians have user privileges.
How many devices should the software run?	About four devices
What is the programming language should be used?	Java should be used as the programing language.
What are the platforms can be used?	Net beans, Visual studio code and IntelliJ should be used as platforms.
What is the database management system should be used?	MY SQL should be used as the database management system.

2.4. Gathered information

• Identified three actors. Admin, salesperson and technicians should be able to use the system simultaneously. • Four devices (Personal Computers) should be able to connect and run the system.

2.5. Decisions made
• Use My SQL as the database management system. • Use Java as the programing language. • Use IntelliJ as the development platform

2.6. Next meeting	
Date	-
Time	-
Location	-

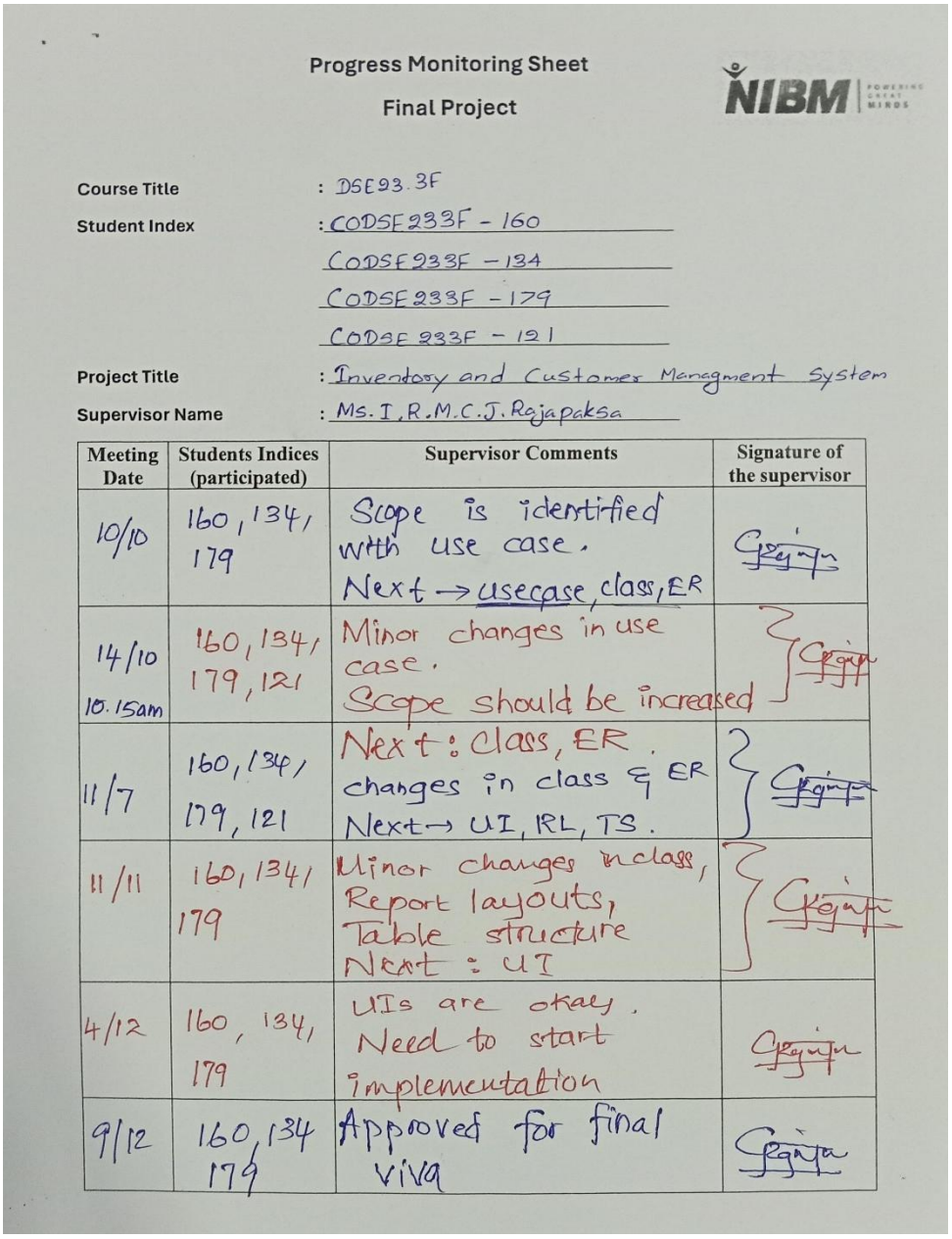
Prepared by:

CODSE233F-160 A.H.V.M. Jayaratne

student at National Institute of Business Management

20th September 2024

Log Sheet



Progress Monitoring Sheet

Final Project

NIBM

Course Title : DSE93.3F

Student Index : CODSE233F - 160
CODSE233F - 134
CODSE233F - 179
CODSE233F - 121

Project Title : Inventory and Customer Managment System

Supervisor Name : Ms. I.R.M.C.J. Rajapaksa

Meeting Date	Students Indices (participated)	Supervisor Comments	Signature of the supervisor
10/10	160, 134, 179	Scope is identified with use case. Next → usecase, class, ER	
14/10 10.15am	160, 134, 179, 121	Minor changes in use case. Scope should be increased	
11/7	160, 134, 179, 121	Next: class, ER. changes in class & ER Next → UI, RL, TS.	
11/11	160, 134, 179	Minor changes in class, Report layouts, Table structure Next: UI	
4/12	160, 134, 179	UIs are okay. Need to start implementation	
9/12	160, 134 179	Approved for final viva	