SECP2523: DATABASE

SEMESTER 1 2023/2024

DATABASE DESIGN DESCRIPTIONS: CONCEPTUAL DATABASE DESIGN

FOR AK Maju Resources System

Group Name: Unicode

Members:

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Stakeholder:

Representative Name	Date Interviewed
AK Maju Resources SDN. BHD. **Noor Azam Bin Khalid** **(CEO of AK Maju)**	24th October 2023

Printing Date: 2 December 2023

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1. Introduction

1.1 Overview About The Company

Figure 1 - AK Maju Resources Organizational Chart

Figure 1 is AK Maju Resources Organizational Chart that shows the team of their company and their position. AK Maju Resources Sdn. Bhd. is a dynamic company founded by Encik Noor Azam Khalid that was incorporated on April 9, 2014, in Segamat, Johor. With a team of approximately 10 dedicated staff members and 3 of them in charge as admin, they offer a diverse range of services, specializing in design signboards, printing, advertising, ironworks, air conditioning, wiring, and CCTV installations.

The company's core expertise lies in advertisement design, with their highly knowledgeable staff providing professional advice to customers on suitable materials and designs. They have successfully designed various marketing collaterals, including signboards, banners, brochures, money angpau envelopes, restaurant menu boards, t-shirts, and more. The company has garnered a strong reputation for their exceptional design capabilities and high-quality output.

AK Maju Resources has received outstanding reviews from its customers, earning a perfect 5-star rating on their Facebook page and an impressive 4.2-star rating on Google. Customers have praised the company for their professionalism, excellent communication, and reasonable pricing. The company's commitment to delivering top-notch products, coupled with their easy accessibility and positive customer interactions, has resulted in a high level of customer satisfaction and repeat business.

One of the challenges faced by AK Maju Resources is the time-consuming process of producing quotations. To address this issue, the company seeks a system that can calculate costs quickly and accurately, streamlining the quotation generation process. Additionally, they require a system that enables efficient and easy updating of material stock levels, reducing the time spent on inventory management.

With their exceptional expertise in advertisement design, a strong customer base, and a commitment to delivering high-quality products, AK Maju Resources is poised for continued success in the industry. By implementing an efficient system that addresses their specific needs, the company aims to further enhance their operational efficiency, customer satisfaction, and overall business growth.

1.2 Problems

There are several notable challenges that Ak Maju Resource are currently facing, and these issues become evident when analyzing the efficiency of the current method employed by the staff to encounter the problems.

First. the way they manage their inventory can be challenging, especially since dealing with a large quantity of items, but having to deal with all of them manually, To address this, the company need a reliable system that allows them to manage their inventories for both construction and advertising. There can be complications for which they wouldn't know which specific items would be available for the customers, and whether or not the materials are running low.

Second, it is noted how Ak Maju Resource are dealing with producing the quotations, invoices and receipts manually. They have the data written manually and proceed to store the data in an excel document by keying them in manually. This can lead to a waste of time and energy consumed by the company's staff. Moreover, it should also be considered that due to the fact that Ak Maju Resource deals with supplying construction materials, this company has to always keep in contact with the Malaysian Public Works Department (JKR) because they are the one who sets the standard specification in terms of the construction materials costs. Due to this, there will be a lot of changes in terms of the manufacturing price for the materials that Ak Maju Resource are providing. This led to a constant change of data and it troubled this company because most of this pricelist were kept by them in a hardcopy form.

Third, Ak Maju Resource also struggles with keeping track of their previous customers, because they don't have the proper system to keep all the customers' information such as their names, contacts, and addresses. Ak Maju also have conflicts in which they are not only providing these services to the public, but they are also dealing with the government when it comes to supplying construction materials. It is also known how basically all the customers and clients of Ak Maju Resource remain the same group of organizations, so it may come off as a hassle on how the company will have to keep track of the repeating clients of them manually.

1.3 Proposal

We've proposed comprehensive solutions to alleviate Ak Maju Resources operational challenges by introducing a user-friendly system with enhanced features. To access the system, staff members are required to have their accounts registered by the admin, prioritizing data security. A secure login process is reinforced with an account recovery method to safeguard confidential information.

The system boasts a well-organized dashboard, providing a centralized hub for efficient order management. Adminan easily enter and adjust new orders, while previous customer data, crucial for repeat business, is readily accessible. This streamlined approach replaces the manual methods of maintaining client information, offering a more approachable and structured system.

Addressing inventory management concerns, the system features an inventory management module that simplifies tracking available materials. It eliminates the need for manual data management and storage, offering real-time insights into stock levels. The system sends alerts when specific materials are sufficient to use for the current transaction, enabling proactive reorder decisions. This not only streamlines inventory management but also aids in generating reports identifying top-selling products and those requiring increased attention.

Moreover, the system serves as a comprehensive solution for generating invoices and quotations. It automates the calculation of material costs and incorporates delivery costs based on customer preferences, enhancing accuracy and efficiency. The system also facilitates the creation of delivery slips and leverages stored customer information for seamless document distribution via whatsapp. This not only saves time for Ak Maju Resource staff but also ensures clarity in communication and documentation of agreements with clients.

Another significant feature is the monthly report module, which simplifies the generation of financial reports. Previously managed in an outdated system with hardcopy documents, the system now automated report generation using stored data. Staff members benefit from automatic calculations of profits and costs, eliminating the need for manual computations.

In summary, the proposed system addresses multiple facets of Ak Maju Resources operational challenges, promoting efficiency, accuracy, and improved communication throughout the business processes.

1.4 Definitions, Acronyms and Abbreviations

- Authentication: The process of verifying the identity of a user accessing the system.
- Dashboard: A graphical user interface that provides a consolidated view of important information and data.
- Emloyee Registration: The process of creating a new employee account in the system.
- Login: The process of accessing the system using valid credentials.
- Password Management: The functionality that allows users to reset, change, or recover their passwords.
- Data Visualization: The representation of data in visual formats such as charts, graphs, or tables.
- Reporting: The generation of detailed reports based on system data.
- User Management: The administration and control of user accounts, permissions, and roles.
- Customization Options: The ability to personalize the user interface and settings according to user preferences.

2. Database System Requirement

2.1 System Overview

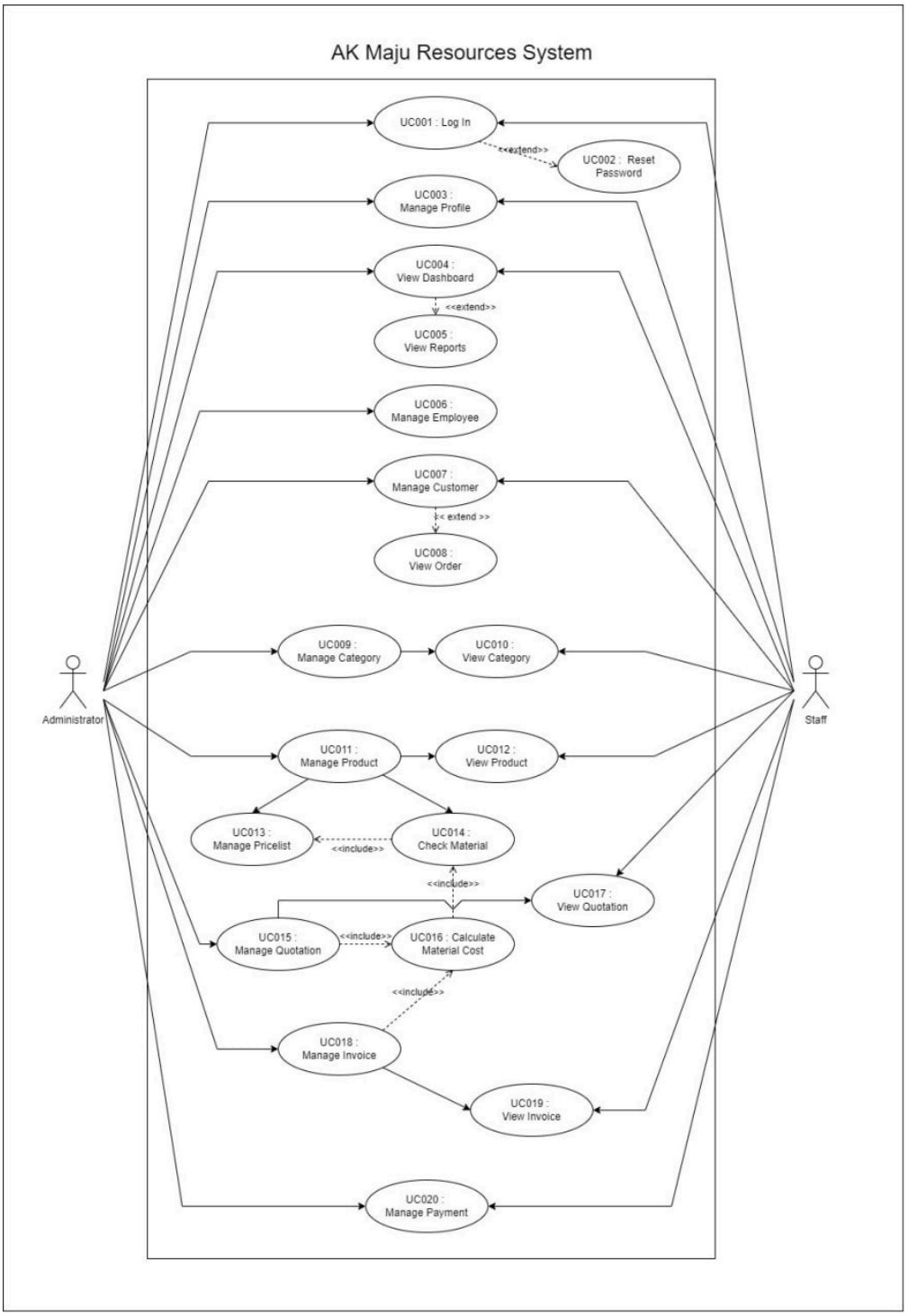


Figure 2: Use Case Diagram for AK Maju Resources System

Figure 2 shows the overall use case diagram for the proposed system. Based on figure 2, this system will consist of modules for Authentication, Dashboard, Inventory Management, Quotation and Invoice. The proposed system will revolutionize Ak Maju Resources advertisement and construction operations by introducing automation, organization, and data-driven decision-making.

The Authentication module will enable staff members to register their accounts, securely log in, and recover their accounts if needed. This ensures that only authorized personnel can access the system, safeguarding the confidentiality of Ak Maju Resources data.

The Well-Organized Dashboard module will provide a centralized view of customer orders, allowing staff members to efficiently manage and adjust orders for construction and advertising services. It will also offer access to comprehensive customer data, facilitating easy retrieval of address and contact information for repeat clients. By organizing and structuring client information, the system replaces manual record-keeping methods with a more accessible and efficient approach.

The Inventory Management module will assist Ak Maju Resource in effectively managing their inventory. It will provide real-time visibility of material stock levels, automatically alerting the company when certain materials are running low. This feature streamlines inventory control and enables timely reordering.

The Quotation Module of the system provides a comprehensive solution for generating precise quotations. This module automates the calculation of costs based on material prices. In quotation, included details such as quotation number, quotation date, terms of payment, and item details. This module also will automates the generation of those details.

Similarly, the Invoice Module also automates cost calculations based on material prices and also delivery cost. In the generation of invoice, the detail is the same as quotation but it includes purchase order and delivery order number. Delivery Order which includes almost the same detail with invoice also will be generated in this module.

Through the implementation of these modules, the proposed system will enhance efficiency, accuracy, and customer satisfaction for Ak Maju Resource, transforming their advertisement and construction processes into a streamlined and data-driven operation.

2.2 Module Authentication and Dashboard

ARINI is the person in charge of documenting Authentication and Dashboard Module.

2.2.1 Module Description

The Ak Maju Resources system's User Authentication Module makes sure that workers have safe access to the platform. Staff members use their registered login credentials to access the system. The system has a password reset feature in case you forget your password. By entering their registered email address on the login page, employees can start the process. After submitting, they receive an email with a reset link that allows them to reset their password and log back into the system. The secure and private storage of the company's critical data within the system is enhanced by this strong authentication procedure.

For employees of Ak Maju Resource, the Business Management Module acts as a central hub, offering a visually intuitive and well-organized interface. The dashboard provides a thorough summary of the company's important metrics by displaying critical data in card and graphical formats. Employees have access to three crucial reports within the dashboard: the Stock Balance Report, which provides an overview of inventory levels; the Profit or Loss Report, which offers insights into financial performance; and the Transaction Listing Report, which details all pertinent transactions.

Employees can also manage their user profiles with the help of this module. Right from the dashboard, they can update their personal information and change their passwords. You can find information about Ak Maju Resources clients in the Customer Information section. Additionally, the dashboard makes order tracking easier by showing each customer's order's progress through a status column that indicates whether the order is paid for, unpaid, deleted, or active.

Employees can quickly navigate and retrieve customer-specific information from the Customer Order page. Accessing quotes, invoices, and payment evidence associated with every customer's order falls under this category. In addition to improving user convenience, the seamless integration of these features in the Dashboard Module helps Ak Maju Resource make decisions and manage orders more effectively.

2.2.2 Transaction Requirement : Data Entry

1. Enter the login details
2. Enter new profile details
3. Enter other expenses in loss and profit report
4. Enter employee details
5. Enter customer details

2.2.3 Transaction Requirement: Data Update/Deletion

1. Update new password
2. Update profile details
3. Update employee details
4. Delete employee

2.2.4 Transaction Requirement Data Queries

1. List the list of customers that have paid
2. List the list of products
3. List the list of employees
4. List the list of customers

2.2.5 Local Conceptual Data Model (ERD) for Module 1

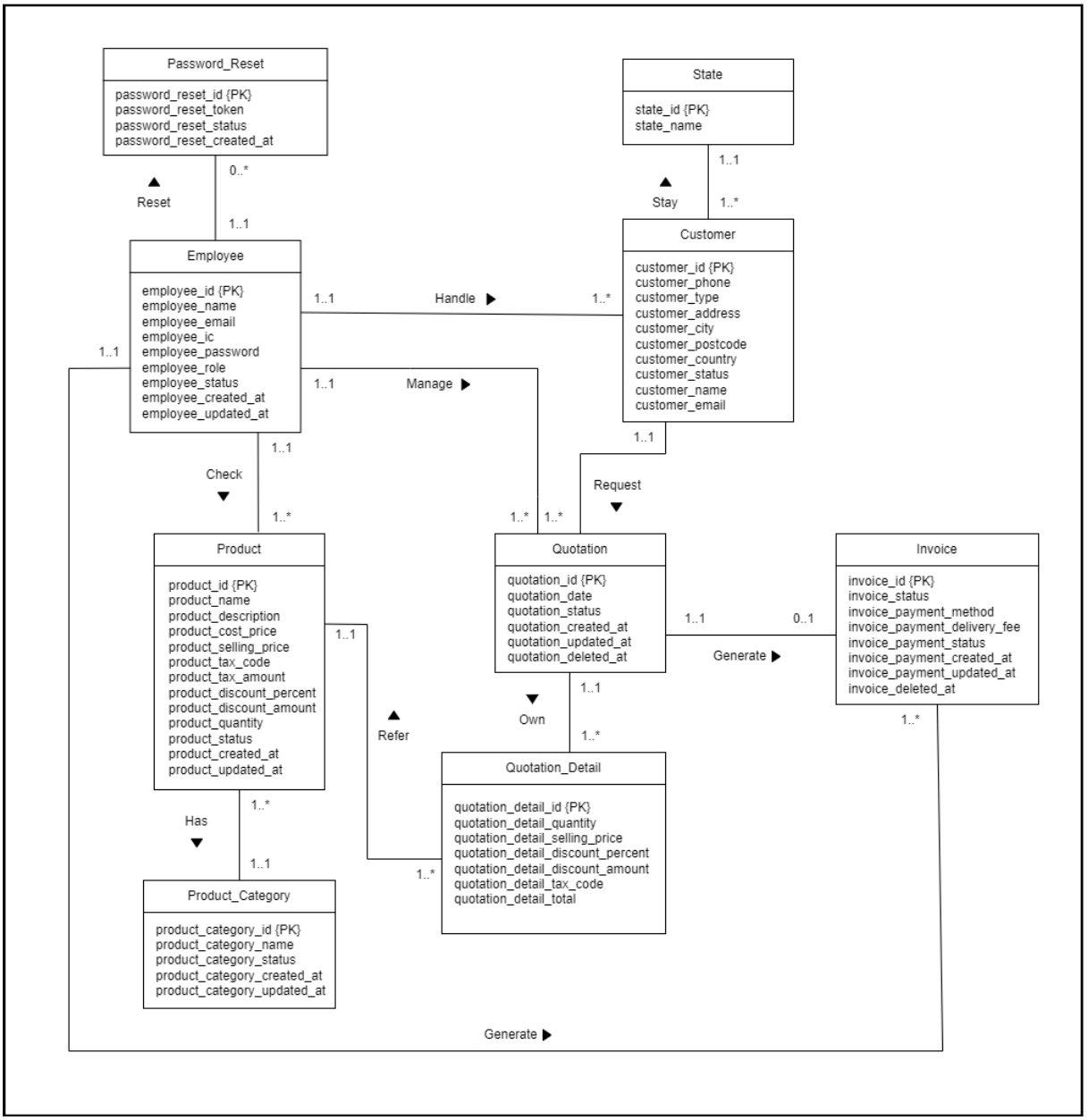


Figure 3 - Authentication and Dashboard Local Conceptual Data Model

2.3 Module Inventory Management

NAVASARATHY is the person in charge of documenting the Inventory Management Module.

2.3.1 Module Description

The Ak Maju Resources system's Inventory Management Module offers a complete solution for streamlining the administration of goods, categories, and staff access. The Manage Employee section, which is only accessible by authorized administrators, serves as a portal to the system, enabling the registration of new hires and guaranteeing a restricted and regulated group of authorized personnel. It also gives you the ability to kick out former employees, which increases system security by limiting access.

Simultaneously, Ak Maju Resources Category Management feature enables administrators to dynamically arrange services. Adding new categories, editing current ones, switching between active and inactive states, and deleting categories as needed are all simple tasks for administrators. This flexibility provides a systematic method for classifying products and guarantees that the system stays flexible and in line with any modifications to the business's service offerings.

Centralizing control over products is made possible by the Product Management page, which is seamlessly integrated with the category system. Administrators have the ability to add new products, change product information, and deactivate products by making them inactive. This page provides a central location for product information management and also makes it easier to modify prices and quantities. The Inventory Management Module's close integration of employee, category, and product management improves Ak Maju Resources operational efficiency and guarantees a unified framework for its inventory procedures.

2.3.2 Transaction Requirement : Data Entry

1. Enter new category details
2. Enter new product details

2.3.3 Transaction Requirement: Data Update/Deletion

1. Update category details
2. Update product details
3. Delete category
4. Delete product

2.3.4 Transaction Requirement Data Queries

1. List all categories
2. List all products

2.3.5 Local Conceptual Data Model (ERD) for Module 2

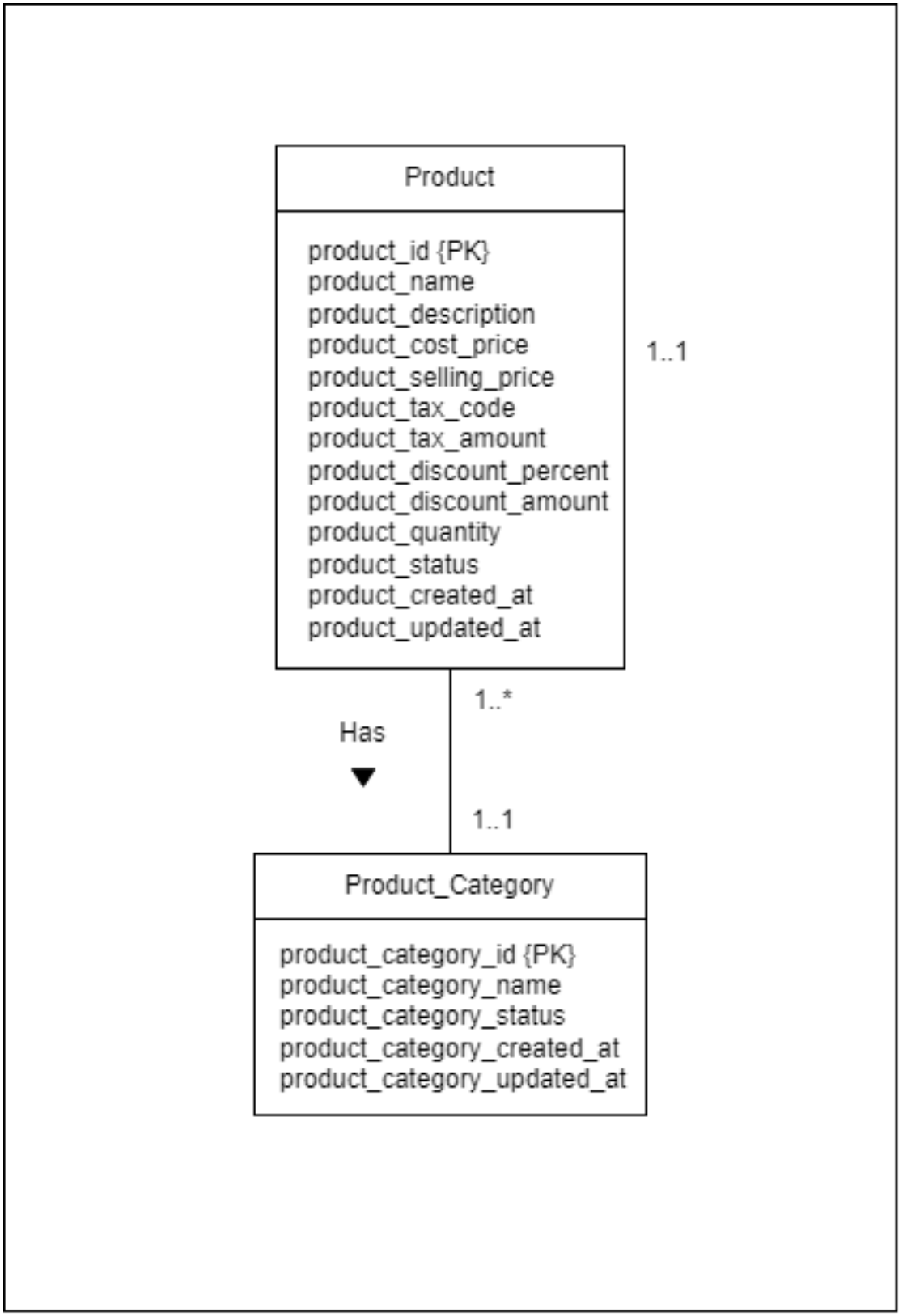


Figure 4 - Inventory Management Local Conceptual Data Model

2.4 Module Quotation

NIK ZULAIKHAA is the person in charge of documenting the Quotation Module.

2.4.1 Module Description

The Ak Maju Resources system's Quotation Module is essential to optimizing the creation, administration, and delivery of quotations to customers. This module includes multiple essential features designed to improve productivity and offer a smooth experience for employees of the company. In the first place, it makes quotation creation simple and enables employees to produce precise and comprehensive quotations for customers based on their unique needs. The module has an automatic cost calculation mechanism that calculates the total costs of materials, services, and possible delivery charges dynamically. Furthermore, it facilitates the creation of expert quotation documents, guaranteeing lucidity and openness in correspondence.

Another noteworthy feature is the integration with WhatsApp, which allows employees to click on the client's phone number displayed on the quotation to send generated quotes directly to clients via WhatsApp. Record-keeping is given top priority in this module, which keeps an extensive history of quotations intact despite changes or deletions, making them accessible for auditing and reference needs. Customization and amendment capabilities empower staff to modify quotations until an invoice is generated, offering flexibility in response to client interactions.

Last but not least, the system's smooth integration with reporting guarantees that quotation data is easily added to the monthly reports, supporting thorough financial analysis. Essentially, the Quotation Module streamlines the entire ordering process at Ak Maju Resources, from creation to order confirmation, promoting effectiveness and professionalism.

2.4.2 Transaction Requirement : Data Entry

1. Select customer name
2. Select items
3. Enter quantity

2.4.3 Transaction Requirement: Data Update/Deletion

1. Update quotation details
2. Delete existing quotation

2.4.4 Transaction Requirement Data Queries

1. List the lists of quotations requested by the customers.

2.4.5 Local Conceptual Data Model (ERD) for Module 3

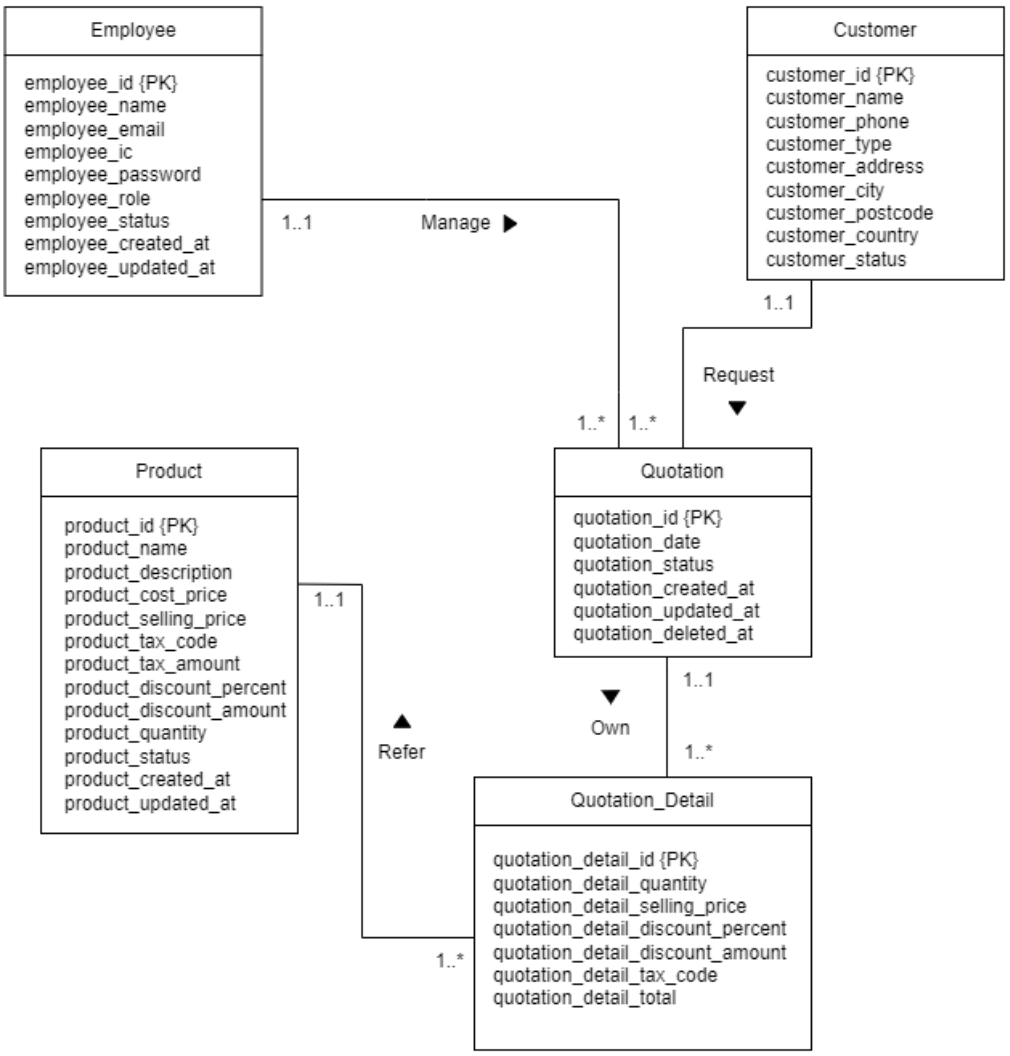


Figure 5 - Quotation Local Conceptual Data Model

2.5 Module Invoice

ERINA is the person in charge of documenting the Invoice Module.

2.5.1 Module Description

The Ak Maju Resources system's Invoice Module is a feature-rich and crucial part intended to manage financial transactions and expedite the invoicing process. This module gives staff members an easy-to-use interface for creating, viewing, and managing invoices. Viewing and accessing invoices allows staff members to obtain comprehensive information about customer transactions, which is one of its primary features. Employees can specify the payment method that the customer has selected when creating an invoice from a quotation, giving the system flexibility to accommodate a range of payment methods.

Additionally, the Invoice Module makes it easier for employees to accurately reflect the total cost in the generated invoices by facilitating the inclusion of delivery fees when applicable. Crucially, an editing feature allows the payment method and delivery cost to be changed after the invoice is generated, guaranteeing flexibility in response to changing customer preferences or order modifications. Additionally, the module allows delivery orders and invoices to be viewed, printed, and saved simultaneously as PDF documents, providing a practical means of sharing and archiving transaction records.

A Payment submodule is part of the Invoice Module and is essential to monitoring payment statuses. Workers can record proof of payment uploaded by customers and mark orders as paid. By uploading a new document, you can review and edit this proof of payment as needed. Order payment status can be easily tracked with the help of the Payment Submodule, which makes it clear whether an order has been settled or is still pending.

In conclusion, the Invoice Module guarantees flexibility in accepting different payment methods and adjusting costs as necessary, while also streamlining the process of creating and managing invoices. By enabling Ak Maju Resource to keep precise records of transaction statuses and proof of payments, the integration of a Payment Submodule improves the overall financial tracking system and helps to create a more effective and transparent financial management process.

2.5.2 Transaction Requirement : Data Entry

1. Select payment type
2. Enter delivery fee
3. Upload proof of payment

2.5.3 Transaction Requirement: Data Update/Deletion

1. Update the invoice details
2. Delete the details of purchased items
3. Delete existing invoice

2.5.4 Transaction Requirement Data Queries

1. List invoices purchased by customer

2.5.5 Local Conceptual Data Model (ERD) for Module 4

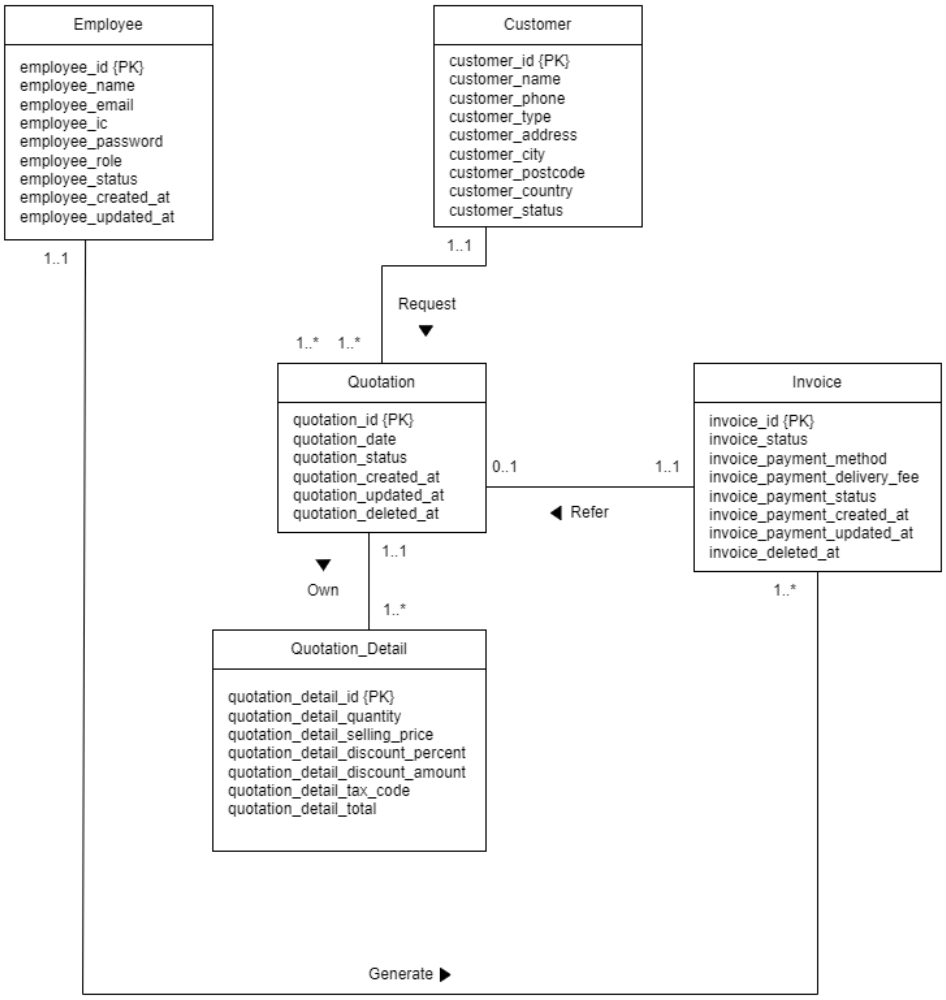


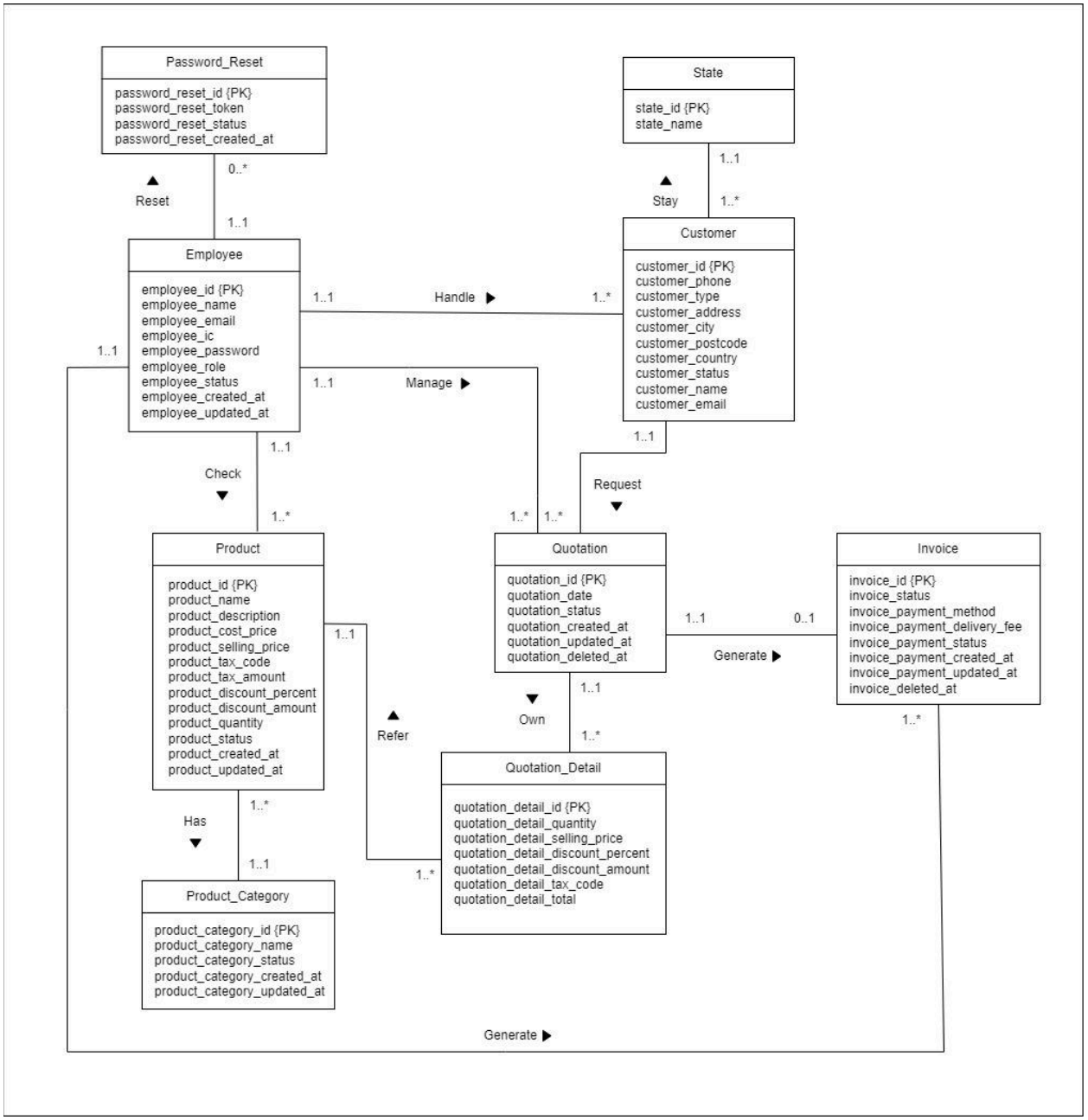
Figure 6 - Invoice Local Conceptual Data Model

3. Global Conceptual Data Model (Global ERD)

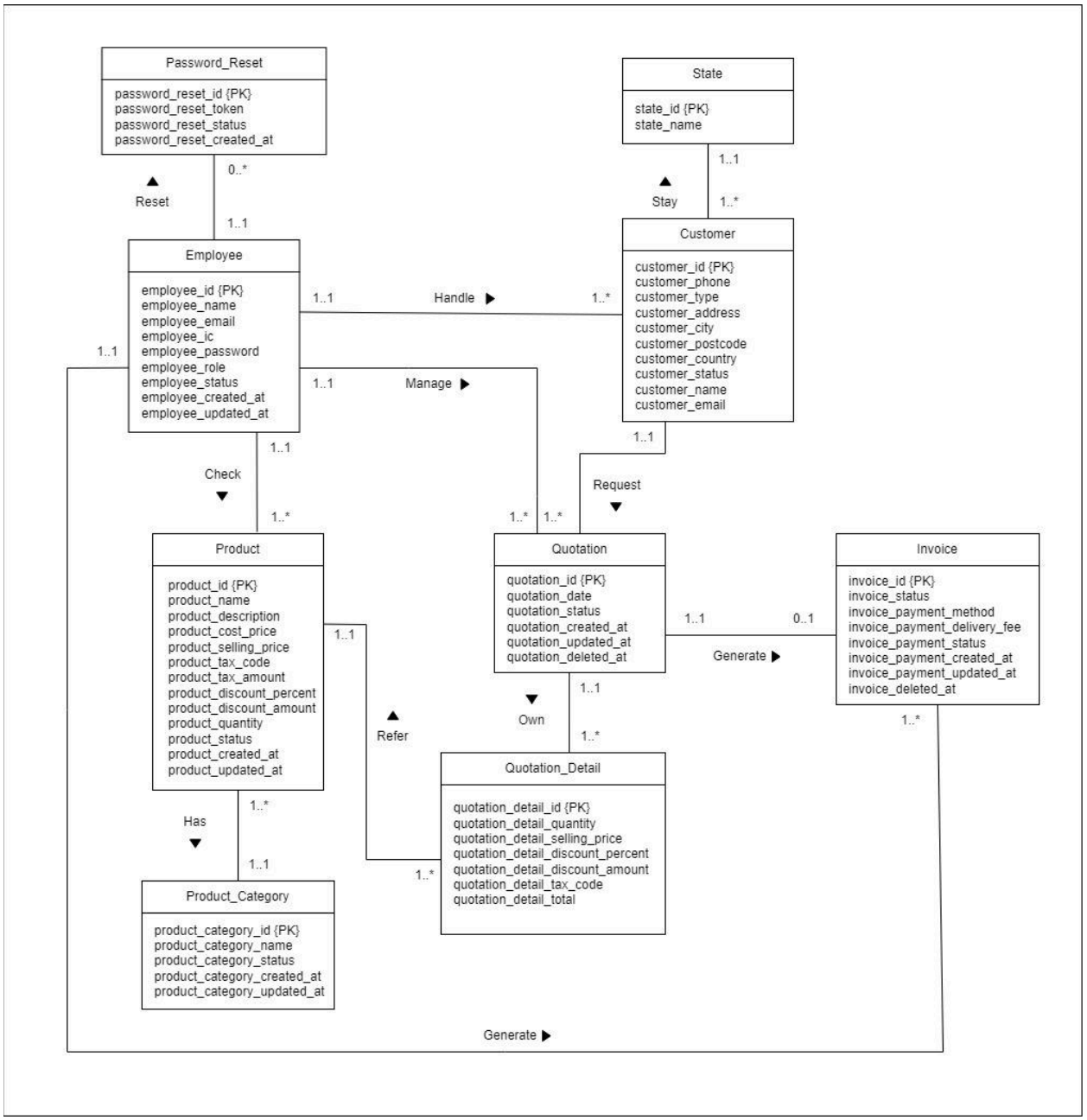
3.1 Global Conceptual Design (ERD)

The global conceptual ERD is produced through the merging or combination of the local conceptual model based on the 5 modules in our system as specified in Chapter 2. This global conceptual ERD consists of 9 entity types and 11 relationship types. Every entity and attribute is important as we need to store the data of the system in it. Besides, an ERD gives a snapshot of how the entities relate to each other. Other than that, we will also apply a transaction path method to discover the unnecessary relationship or redundancy and the loss of relationship that lead to transaction cannot be completed.

Figure 7 - System ERD Diagram



3.2 Verified Global Conceptual Design (Verified ERD)



8 - Verified System ERD Diagram

3.3 Data Dictionary for the global conceptual ERD

3.3.1 Identify Entity Types

No.	Entity Name	Description
1	Employee	Used to store user (admin and staff) information
2	Password_Reset	Used to store user's password that has been reset
3	Customer	Used to store customer's information
4	State	Used to store lists of state that the customer stays at
5	Product_Category	Used to store category of the product
6	Product	Used to store informations of the product
7	Quotation	Used to store informations of the customer's quotation
8	Quotation_Detail	Used to store details of each item that is inside the quotation
9	Invoice	Used to store invoice details

3.3.2 Identify Entity Types

No.	Entity Name	Multiplicity	Relationship	Multiplicity	Entity Name
1	Employee	1..*	Handle	1..1	Customer
2	Employee	1..*	Manage	1..1	Quotation
3	Employee	1..*	Check	1..1	Product
4	Employee	1..*	Generate	1..1	Invoice
5	Employee	0..*	Update	1..1	Password_Reset
6	Customer	1..1	Request	1..*	State
7	Customer	1..*	Has	1..1	Quotation
8	Quotation	0..1	Generate	1..1	Invoice
9	Quotation	1..*	Own	1..1	Quotation_Detail
10	Quotation_Detail	1..1	Refer	1..*	Product
11	Product	1..1	Has	1..*	Product_Category

4. Appendices

4.1 Use Case Diagram for the system

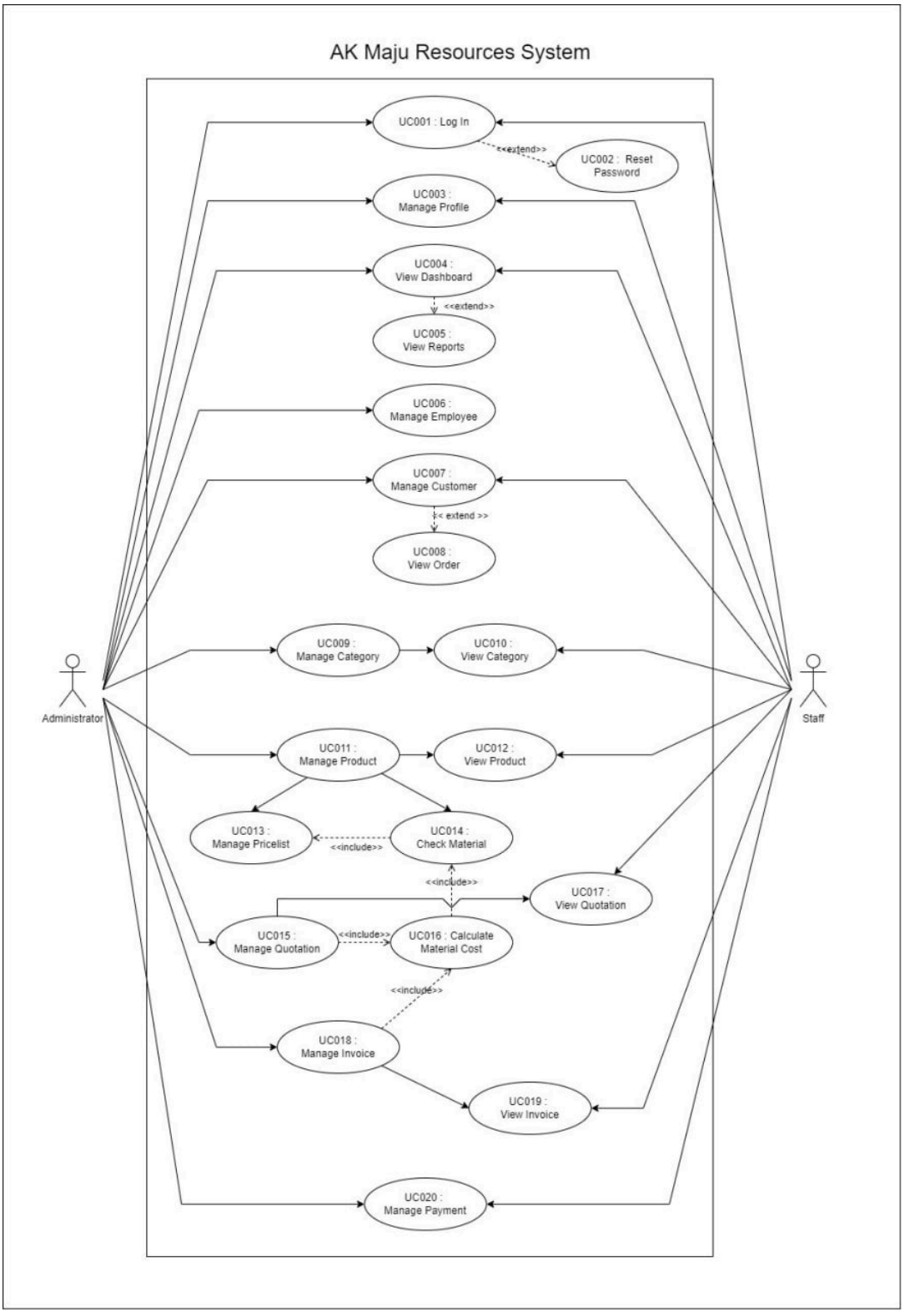
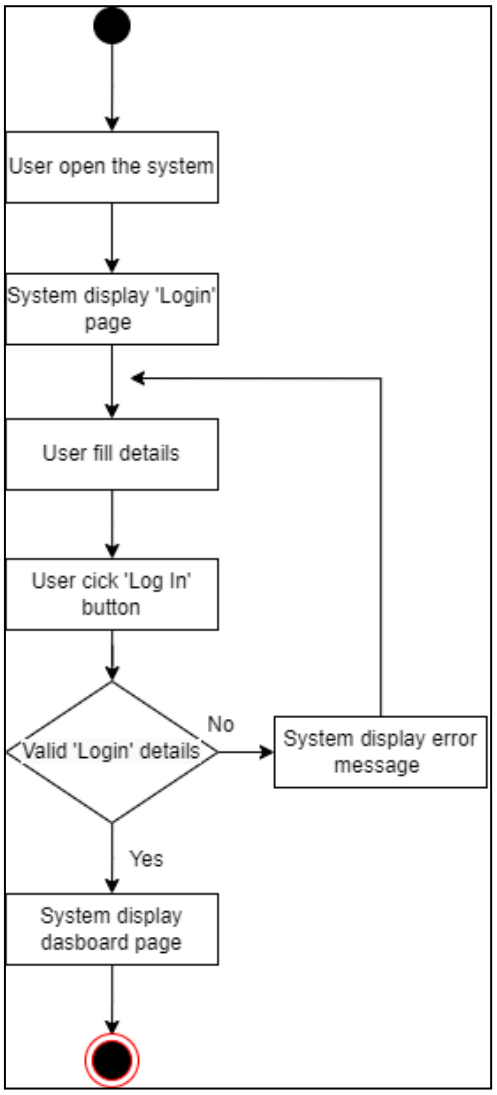


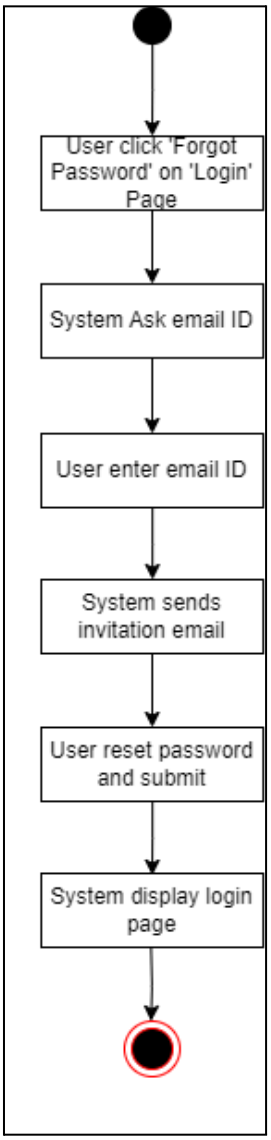
Figure 8 - Use Case Diagram for AK Maju Resources System

4.2 Activity Diagrams for every use case identified

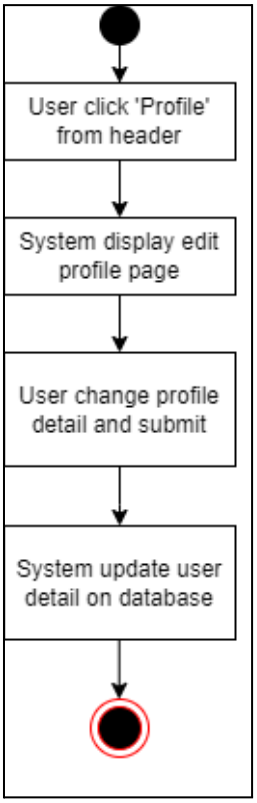
Activity Diagram for Module Authentication - UC001:Log In



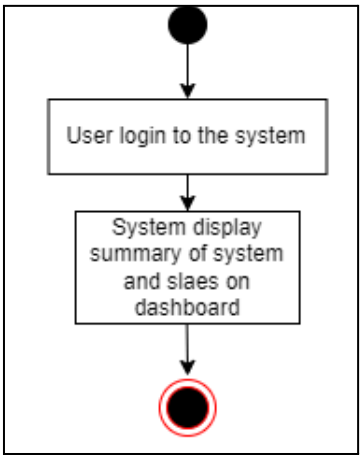
Activity Diagram for Module Authentication - UC002:Reset Password



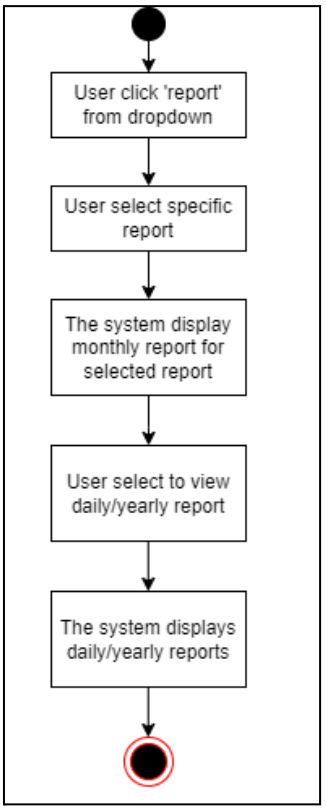
Activity Diagram for Module Authentication - UC003:Manage Profile



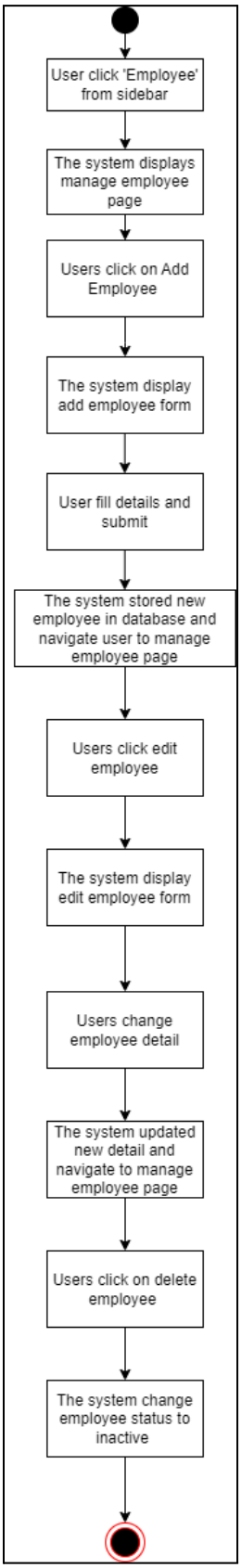
Activity Diagram for Module Authentication - UC004:View Dashboard



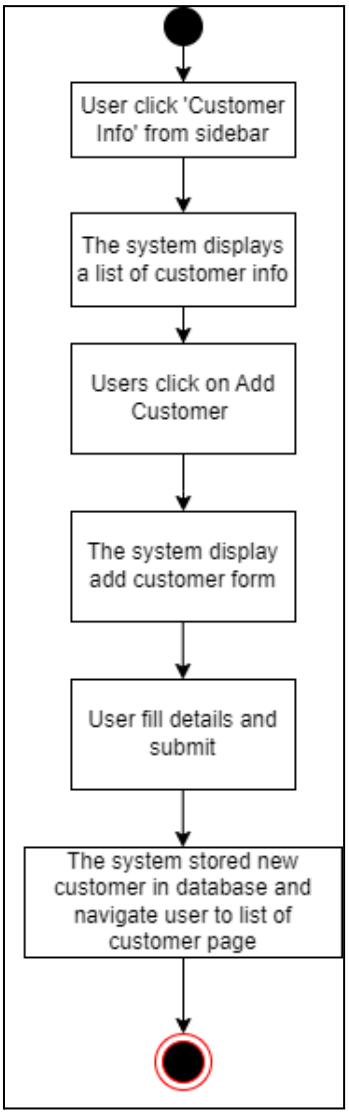
Activity Diagram for Module Dashboard- UC005:View Reports



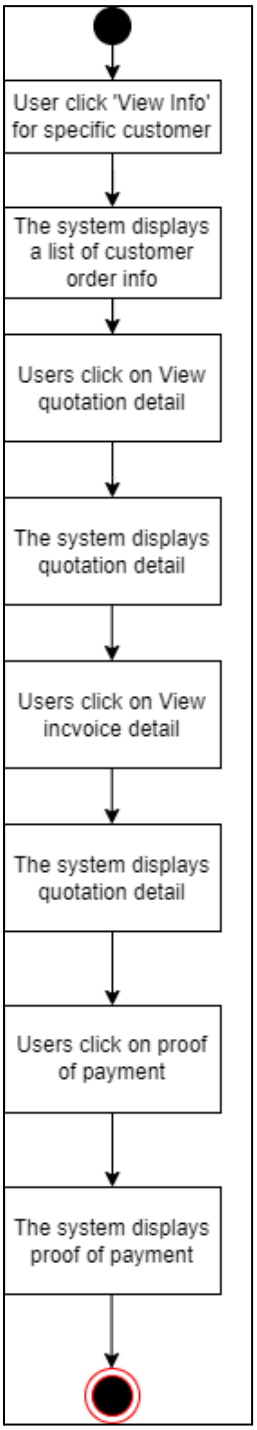
Activity Diagram for Module Dashboard- UC006:Manage Employee



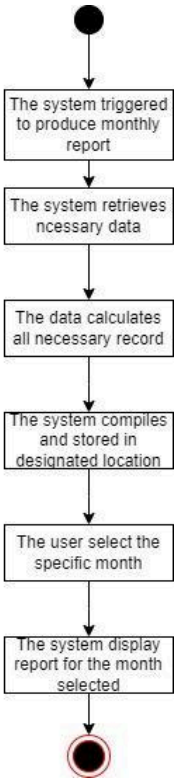
Activity Diagram for Module Dashboard- UC007:Manage Customer



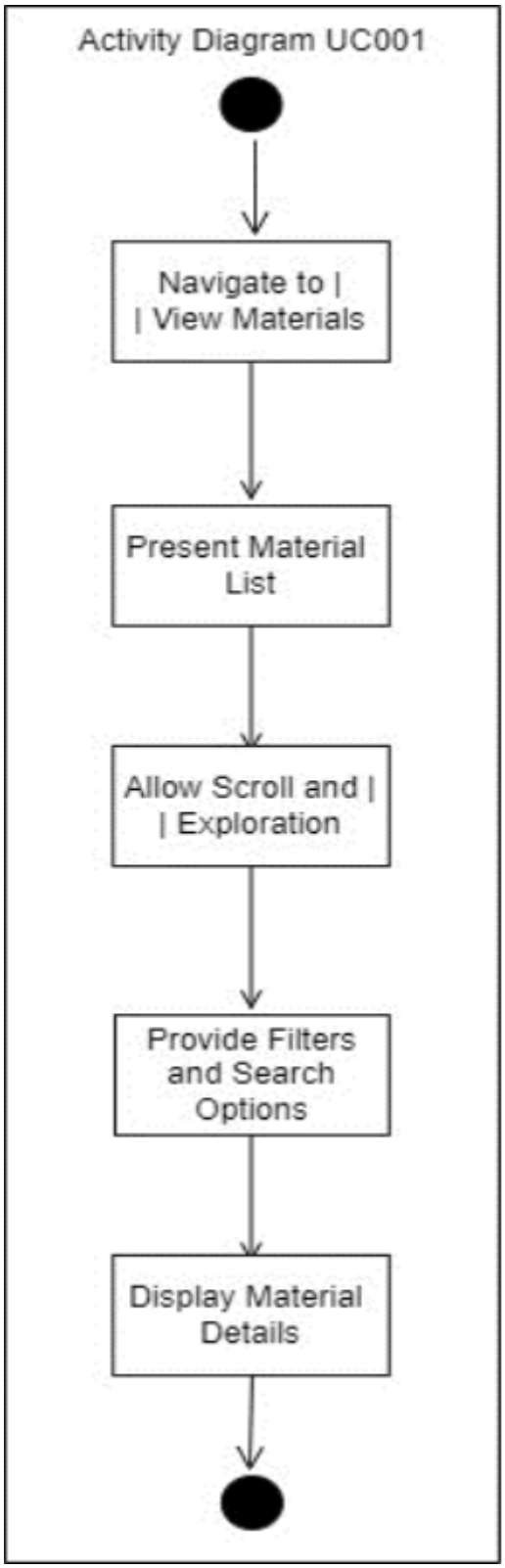
Activity Diagram for Module Dashboard- UC008:View Order



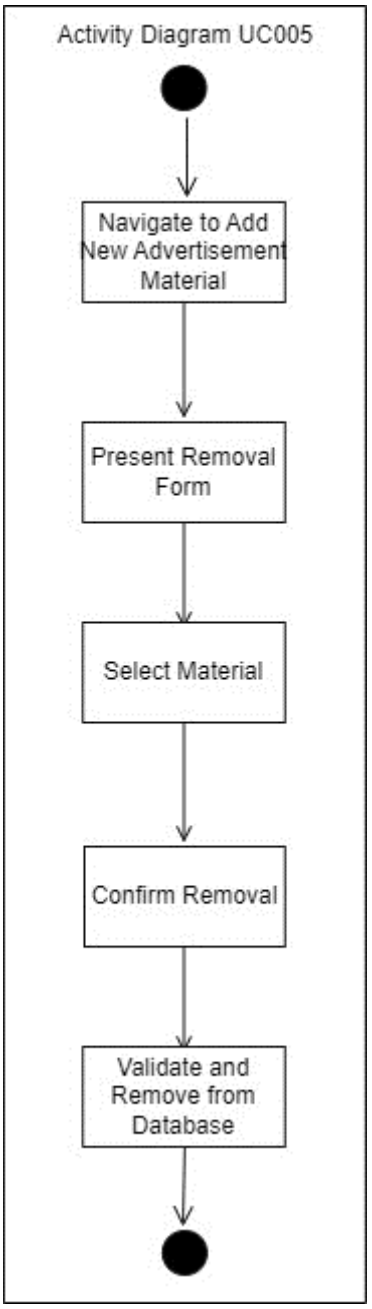
Activity Diagram for Module Inventory Management- UC009:Manage Category



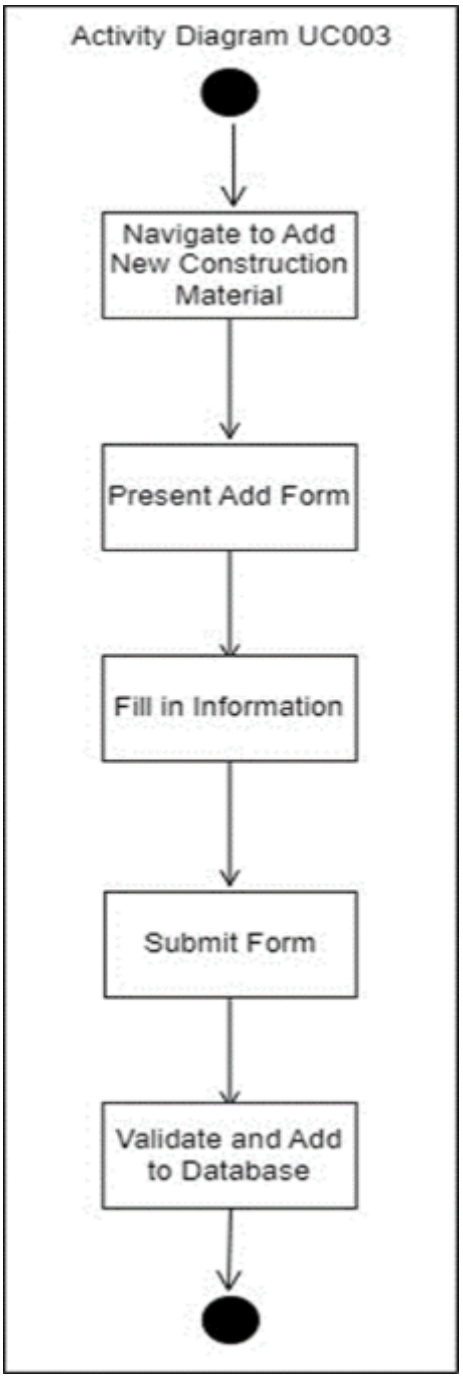
Activity Diagram for Module Inventory Management - UC010:View Category



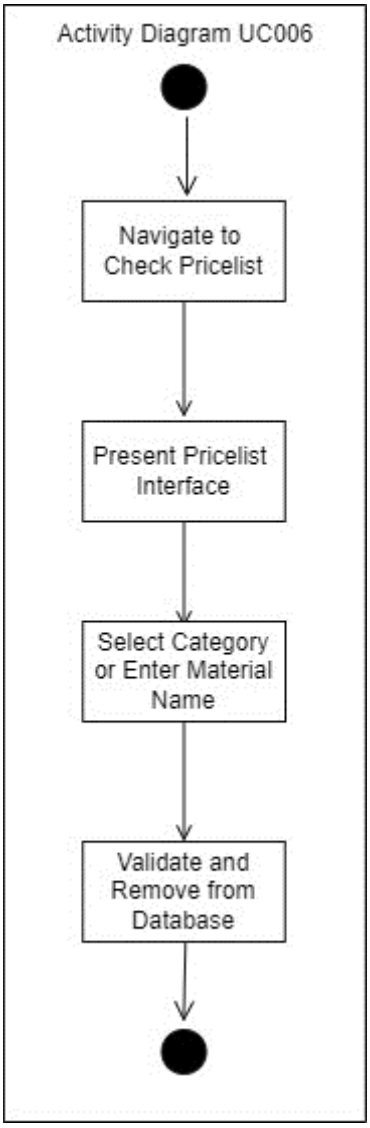
Activity Diagram for Module Inventory Management - UC011:Manage Product



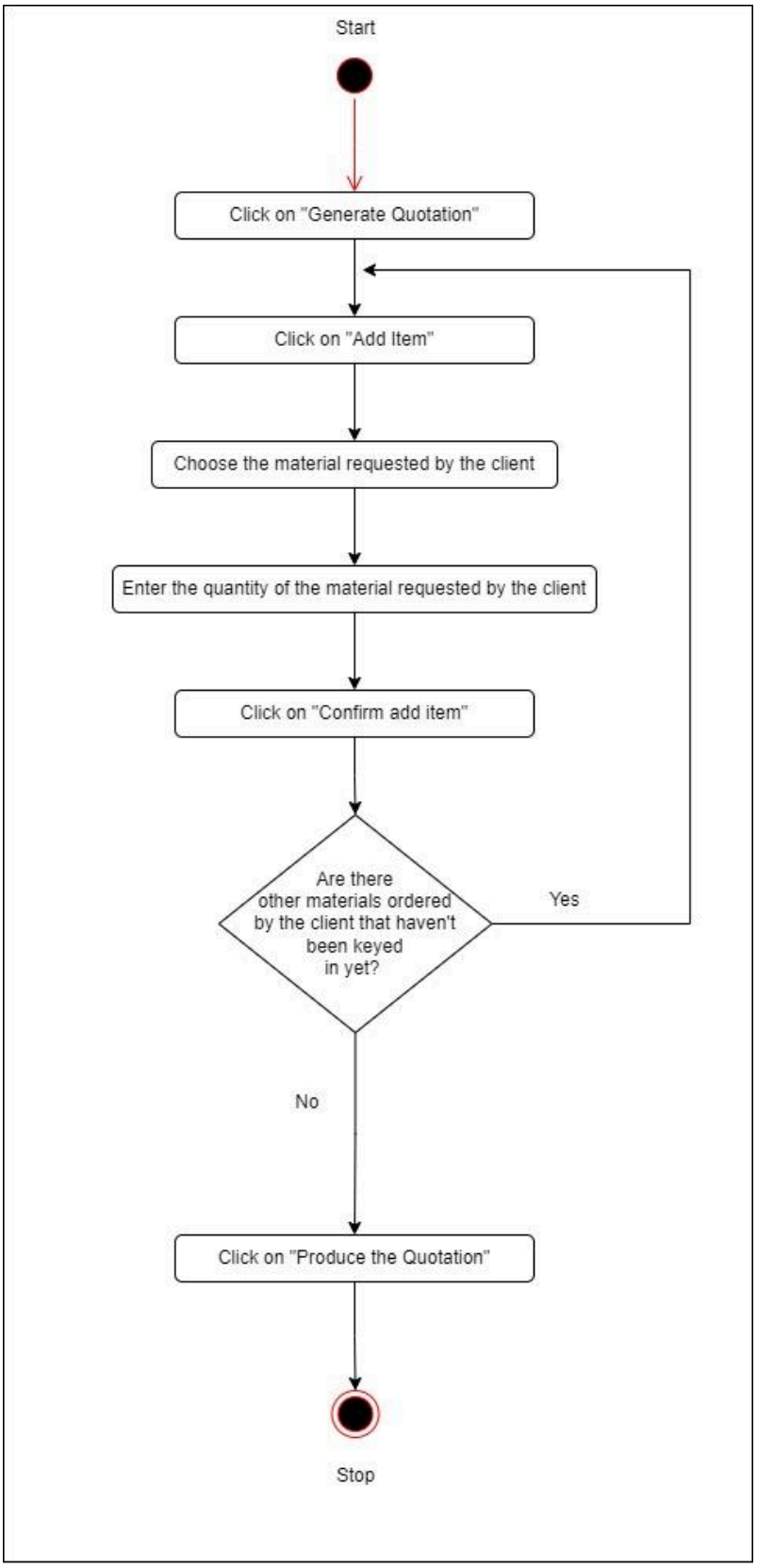
Activity Diagram for Module Inventory Management - UC012:View Product



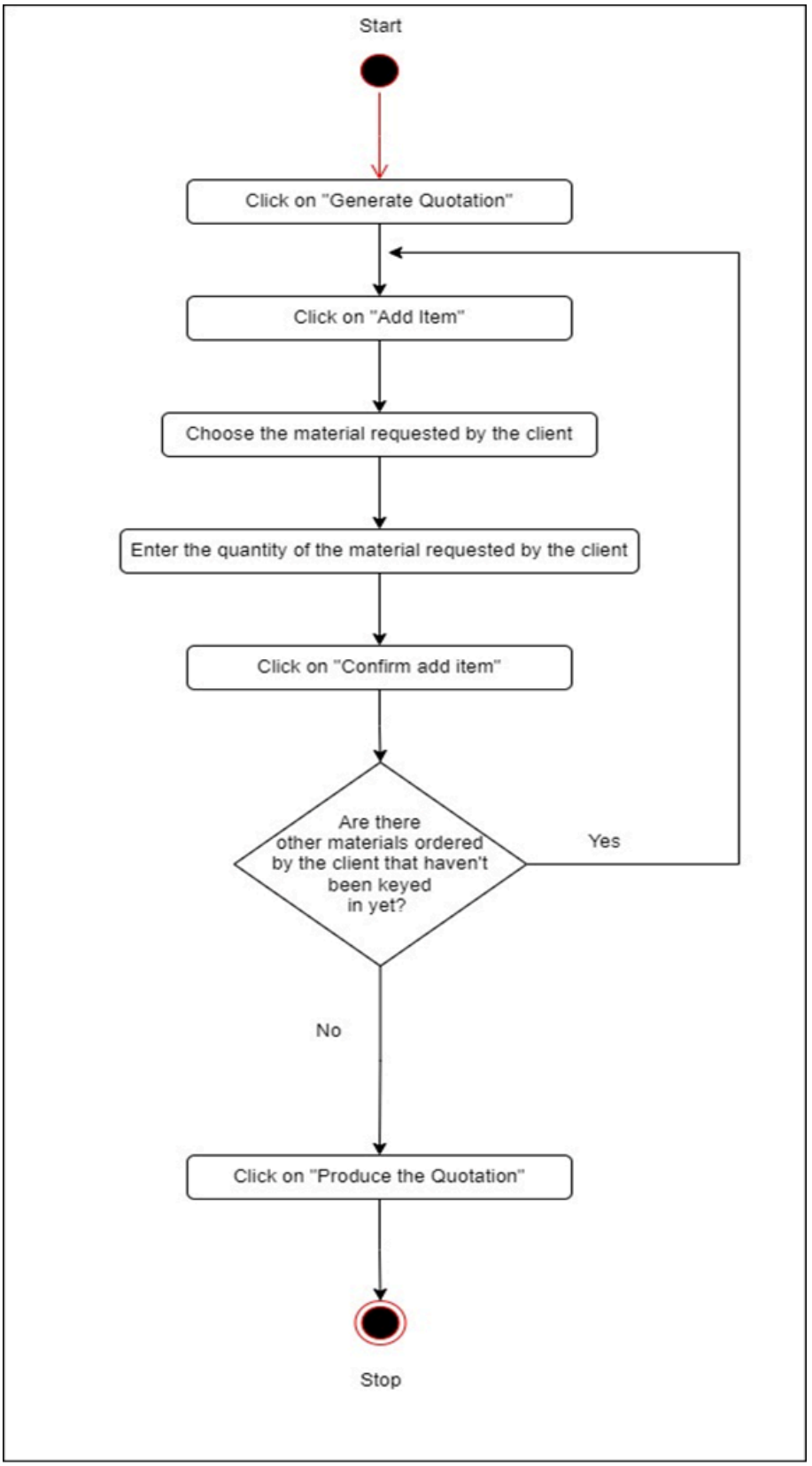
Activity Diagram for Module Inventory Management - UC013:Manage Price List



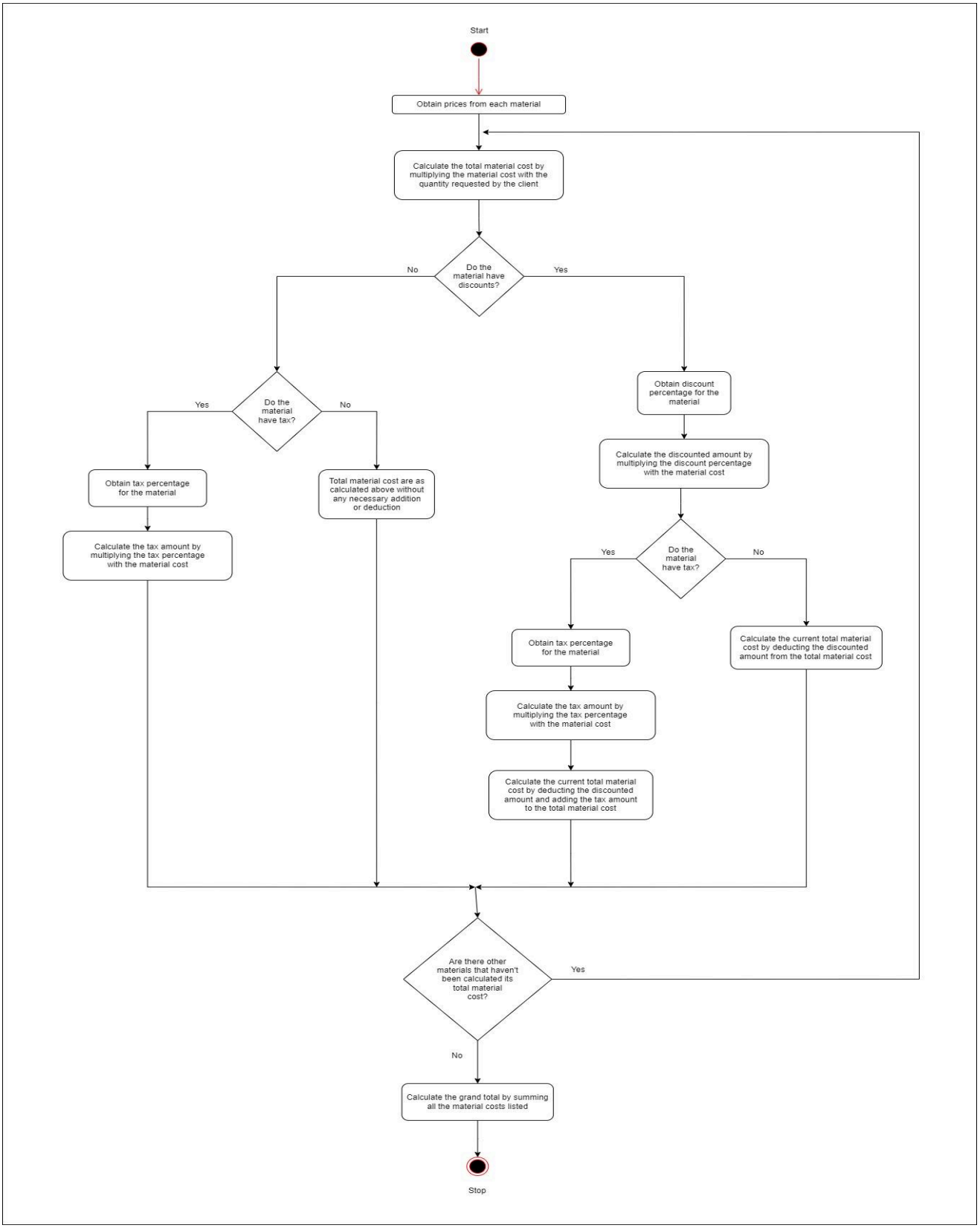
Activity Diagram for Module Quotation - UC014:Check Material



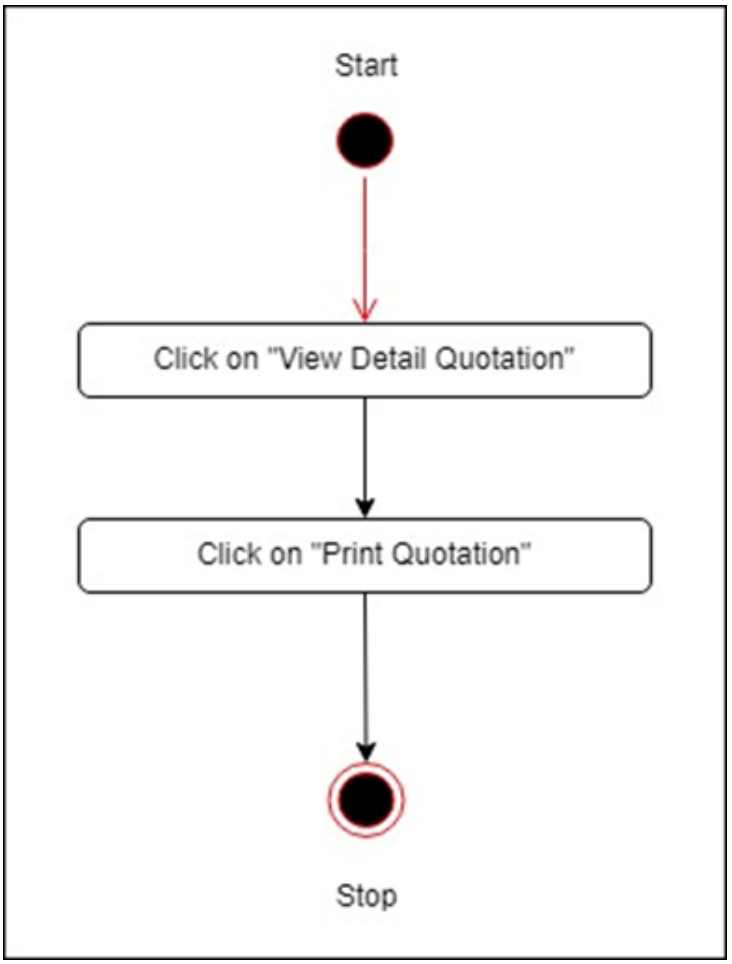
Activity Diagram for Module Quotation - UC015:Manage Quotation



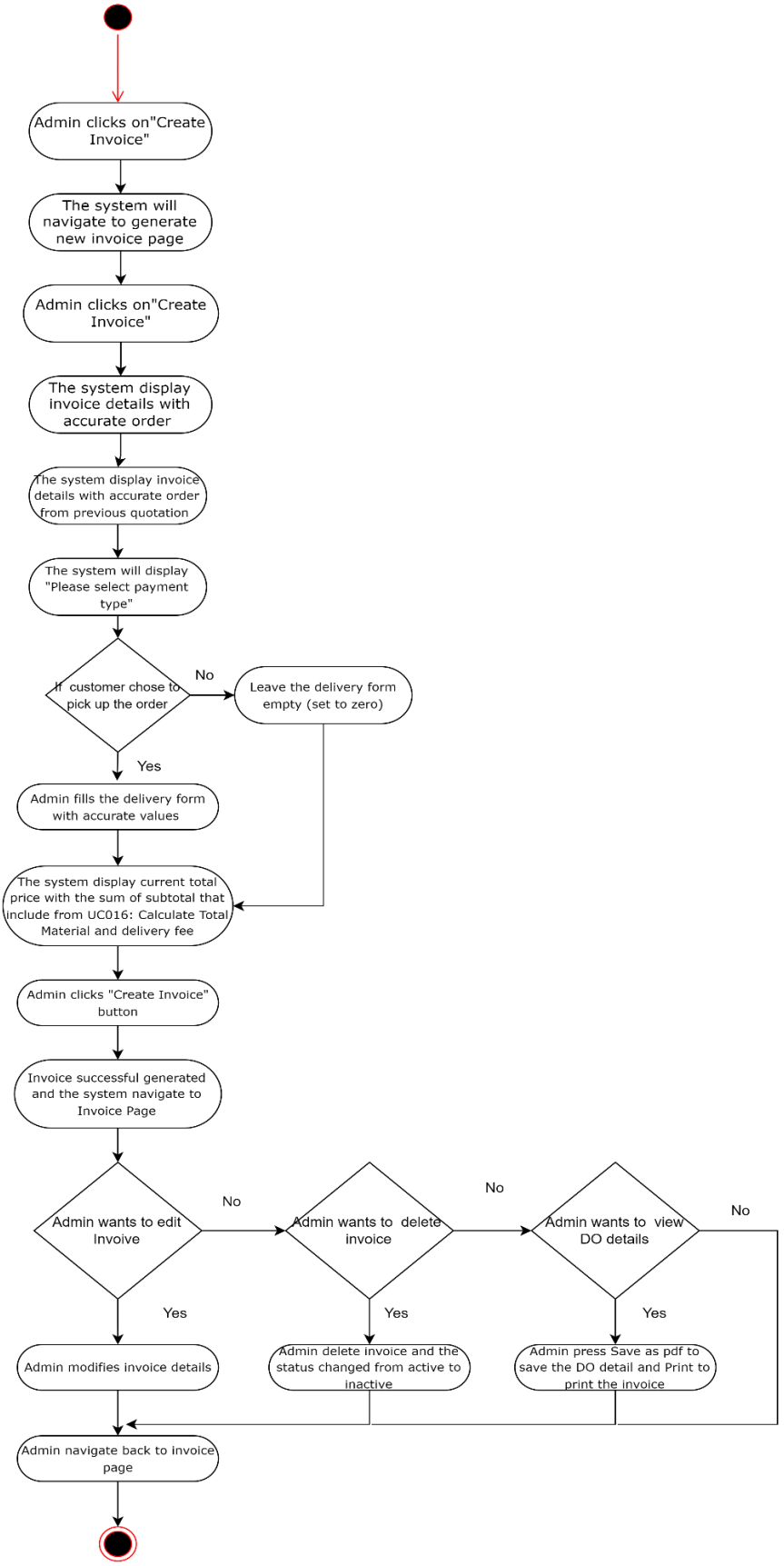
Activity Diagram for Module Quotation - UC016:Calculate Material Cost



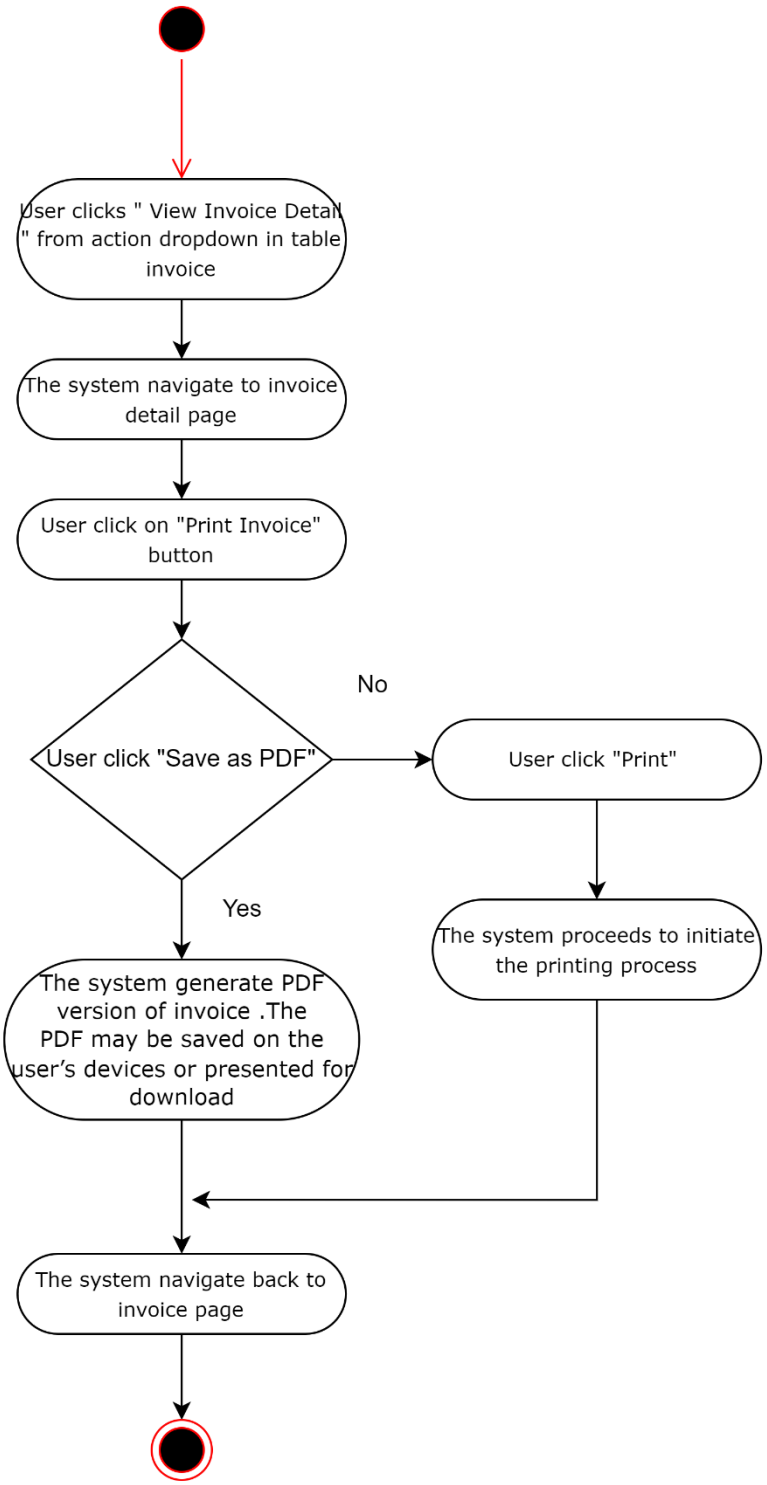
Activity Diagram for Module Quotation- UC017:View Quotation



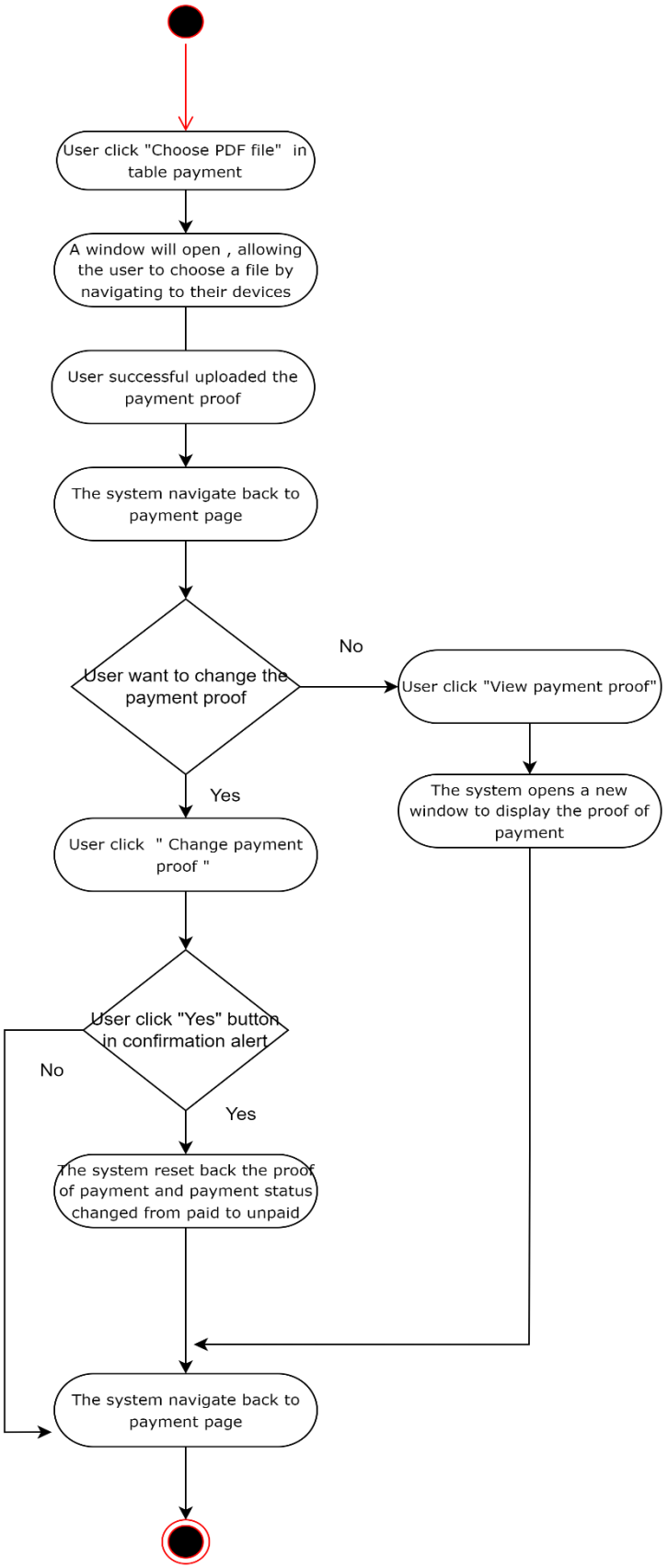
Activity Diagram for Module Invoice- UC018:Manage Invoice



Activity Diagram for Module Invoice- UC019:View Invoice



Activity Diagram for Module Invoice- UC020:Manage Payment



4.3 Meeting Log

FACULTY OF COMPUTING
UTM Johor Bahru

SECP2613 – System Analysis & Design (WBL)
Log Meeting

MEETING AGENDA

Group Name:	Unicode	**Time:**	10pm
Date of Meeting: (MM/DD/YYYY)	11/25/2023	**Location:**	Google Meet

1. Meeting Objective
To discuss about report requirement To discuss about ERD for each module To divide the task for each member

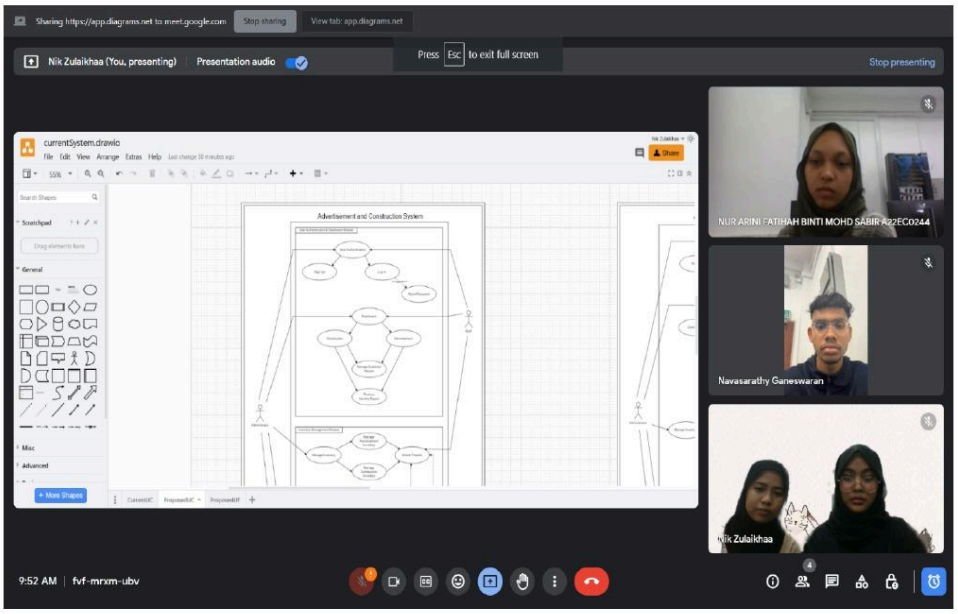
2. Attendees			
Name	**Department/Division**	**E-mail**	**Phone**
Nurul Erina binti Zainuddin	School of Computing	nurulerina@graduate.utm.my	+60 13-920 4698
Nik Zulaikhaa Binti Zuraidi Afandi	School of Computing	nikzulaikhaa@graduate.utm.my	+60 17-278 9819
Nur Arini Fatihah binti Mohd Sabir	School of Computing	nurarinifatihah@graduate.utm.my	+60 11-2330 5904
Navasarathy A/L Ganeswaran	School of Computing	navasarathy@graduate.utm.my	+60 12-676 9195

3. Meeting Agenda		
Topic	**Person in Charge (PIC)**	**Action**
Stating all report requirement	All members	List down the requirement based on the dicussion
Divide task for each member	Nik Zulaikhaa	Leader divide the task fo each group member based on their working style

4. Meeting Reflection
Overall, the meeting was productive in achieving its objectives. We were able to compile a list of requirements and foster a common understanding of the project's scope among the team members. Moving forward, we should continue to maintain open communication and monitor the progress of the project to ensure it aligns with the defined requirements.

Prepared by:

.....
(Nurul Erina binti Zainuddin)



Group discussion through Google Meet