Software Design Specification

for

Puff Lab Application

Version 1.0

Prepared by

Group Name: Codezilla

Faziana Binti Mashor	**83865**	**83865@siswa.unimas.my**
Delneeza Anak Dismon	**87143**	**87143@siswa.unimas.my**
Khairul Wafi Bin Mazelan	**84230**	**84230@siswa.unimas.my**
Caleigh Susan Anak Jeffry	**82476**	**82476@siswa.unimas.my**
Bethsheba Sewing	**82469**	**82469@siswa.unimas.my**

Instructor: **Ts. Nurfauza Binti Jali**

Course: **TMA3084_SoftwareEngineeringLaboratory**

Lab Section: ***Group 1 and Group 2***

Teaching Assistant: ***Ts. Nurfauza Binti Jali***

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Contents

Revisions

Version	Primary Author(s)	Description of Version	Date Completed
Draft Type and Number	Full Name	Information about the revision. This table does not need to be filled in whenever a document is touched, only when the version is being upgraded.	00/00/00

1 Introduction

1.1 Purpose

The purpose of this document is to specifies the software design and architecture of the Puff Lab Application following the corresponding Software Requirement Specification document. The design of our project is driven by functional requirements, constraint, features and system interfaces. The system aims to meet the needs of stakeholders by providing an intuitive platform for both administrator and customer to place and manage orders and streamline sales transactions for improved operational efficiency and customer satisfaction.

1.2 System Overview

Puff Lab App is a mobile application designed to streamline the ordering and management processes for cream puff and beverage sales. It features separate interfaces for administrators and customers. Customers can create accounts, browse products across four menu categories, place orders and review their choice in an order summary before confirming their orders. Customers can also track real-time order status, manage their account details, view order history, leave reviews, and contact the business through various channels, including phone, email, and social media platforms like WhatsApp and Instagram.

From the administrator’s interfaces, the app provides real-time insights into business performance, and customer feedback management. The admin interfaces allow product menu updates and interaction with customer reviews. Additionally, administrators can manage orders through distinct status categories such as "New Order," "Processing," and "Completed."

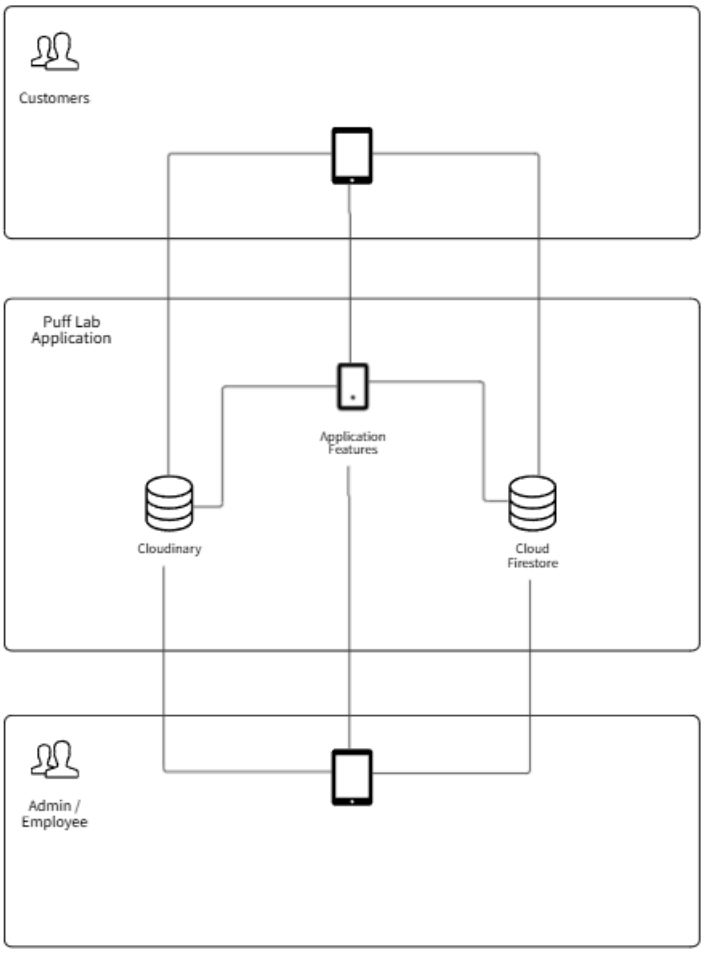

Figure 1: System Architecture of Puff Lab Application

The System Architecture Diagram for the Puff Lab App shows the interaction between key components. Customers interact with the system to browse the menu, place orders, make payments, manage profiles, and provide feedback, while admins manage orders, update the menu, and review customer feedback. Both interfaces connect to the core Puff Lab Application, which handles user authentication, order management, payment processing, and feedback integration.

The Puff Lab Application integrates with cloud services for efficient data and media handling. Cloudinary manages multimedia content, including product images, ensuring optimized media delivery for enhanced user experience. Cloud Firestores stores structured data such as user profiles, order details, order histories, and customer reviews. Customers can perform actions such as logging in, registering, managing their profiles, browsing the menu, placing orders, making payments, and leaving feedback. Meanwhile, admins have access to functionalities like managing

customer orders, updating product inventory, viewing order histories, and handling customer feedback. This architecture supports scalability, maintainability, and responsiveness, providing a comprehensive, reliable, and user-centric solution for both operational management and customer satisfaction.

1.3 Definitions, Acronyms and Abbreviations

Acronyms and Abbreviations

1. cloudinary - a media management platform primarily used for image and video storage, manipulation, and delivery
2. Cloud Firestore - a NoSQL cloud database from Firebase used for storing and syncing app data in real-time. (just the data, no image)
3. Dart - A programming language optimized for building mobile, desktop, server, and web applications.
4. IEEE – Institute of Electrical and Electronic Engineers
5. UI - User Interface

1.4 Supporting Materials

For this document, the IEEE formatting requirements are used. Formatting requirements involve the document being in Arial Font, size 11, single-spaced, and with 1” margins on all sides. Bold letters indicate the main topic and the subtopic for ease of readability of topics desired. All the diagrams and figures in this document are numbered accordingly in order, and a short description is provided where necessary.

1.5 Document Overview

This document provides an overview of the system architecture and high-level design for the Puff Lab App. The document shows a structured approach to the application’s overall structure and functionality. The next section focuses on the system architecture, offering a top-level design view that details the major components, their interactions, and the underlying technologies. It includes the high-level component diagram and an explanation of the decisions behind the system’s decomposition, highlighting the goals of scalability, maintainability, and ease of understanding. This

section ensures that the Puff Lab App is built to handle both customer-facing features and admin functionalities in a seamless and efficient manner.

The document then delves into the high-level design, presenting detailed diagrams such as State chart diagrams to represent the control flow of the system. These diagrams illustrate how different components interact with one another through transitions between various states, providing a clear model of how the app operates. It further breaks down the key components into more manageable subsystems, explaining their responsibilities and how they contribute to the overall functionality of the Puff Lab App. The goal of this section is to provide a thorough understanding of the system's behavior and how the components work together to ensure a smooth user experience for both customers and admins.

2 Architecture

This section provides the view of the Puff Lab App's system architecture, serving as the foundation for more detailed design work. It includes the High-Level Component Diagram, which visually represents the major components of the system and their interactions. This diagram offers a broad overview of the system's structure, highlighting key elements such as the customer interface, admin dashboard, product management, order processing, and payment systems. The Puff Lab App should be architecturally three-tiered and divided into three layers.

- Interface Layer
- Application Layer
- Storage Layer

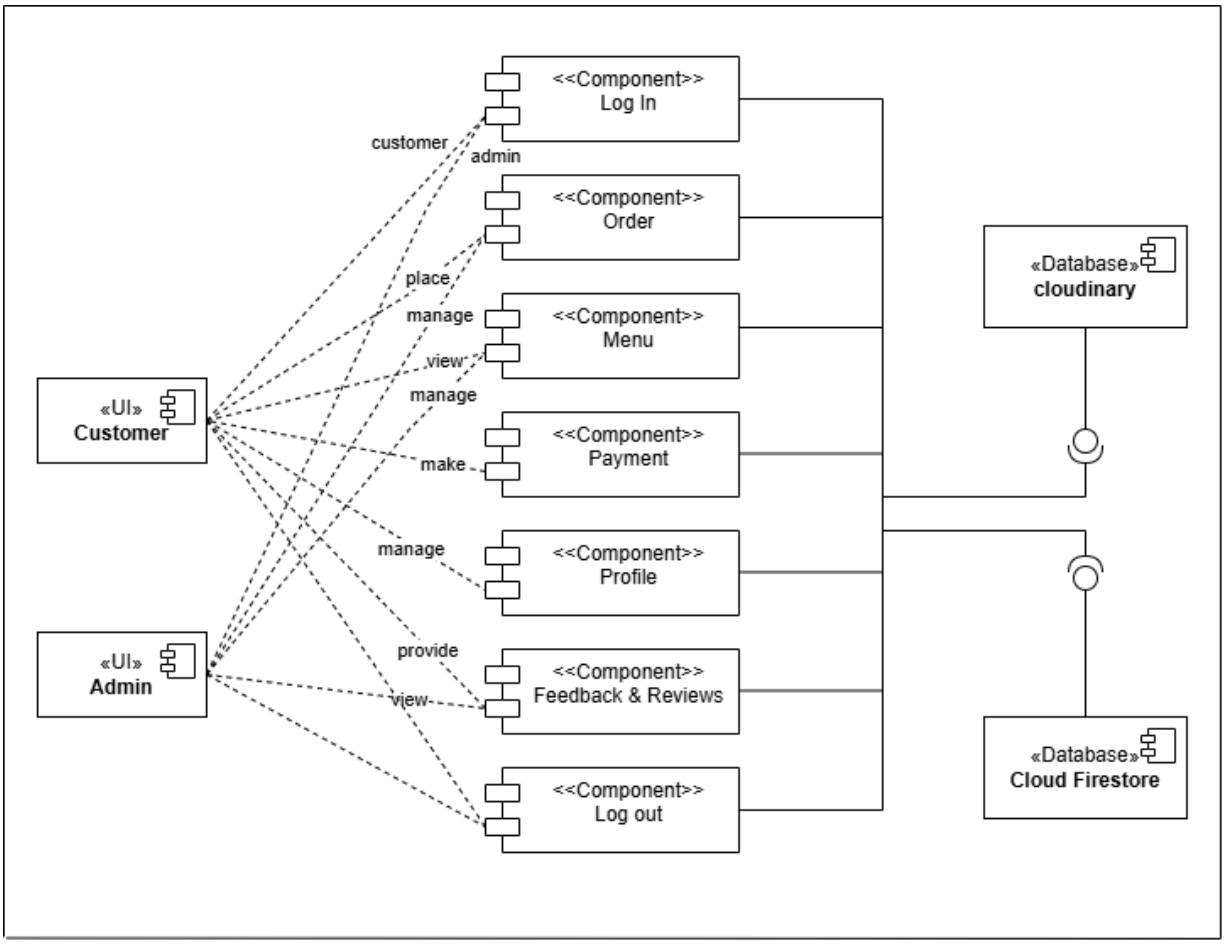

Figure 2: Puff Lab App High-Level Design Component Diagram

For a mobile application built using Dart, the interface layer is the graphical interface that managing the user interface and handling interactions with the user. This layer contains widgets that define the structure, appearance, and behavior of the app's screens and elements, such as buttons, text fields, and forms. This layer sends user commands to the application layer and displays results returned from the system.

The application layer implements the core business logic and handles requests from the interface layer. This layer implements the logic for uploading images to Cloudinary and fetching or updating documents in Cloud Firestore.

The storage layer handles data persistence and media management. Cloud Firestore is a NoSQL cloud database from Firebase used for real-time database operations, storing structured data and syncing it across devices. Cloudinary provides cloud-based media management, handling image and video uploads, transformations, and delivery.

2.1 System Component

Based on the Puff Lab App High-Level Design Component Diagram in Figure 2, the system can be broken down into a few components below:

- Customer
- Admin
- Log In
- Order
- Menu
- Payment
- Profile
- Feedback & Reviews
- Log Out

2.1.1 Customer

The Customer component represents the end user who interacts with the Puff Lab app.

1. Customer and Log In components allow customers to authenticate and log into the system.
2. The Customer and Order components enable customers to view the product catalogue, select products, and place orders.
3. The Customer and Menu components allow customers to view the available products and make selections based on their preferences.
4. The Customer and Payment components allow customers to make payments.
5. The Customer and Profile components enable customers to manage their account details, view past orders, and update personal information.
6. The Customer and Feedback & Reviews components allow customers to leave reviews and feedback.
7. The Customer and Log Out components are to log the customer out of the system when they are finished.

2.1.2 Admin

The Admin component represents the administrators who manage the Puff Lab app's operations.

1. The Admin and Log In components allow the admin to securely log into the system and access the admin dashboard.
2. The Admin and Menu components allow the admin to manage the product catalogue.
3. The Admin and Order components allow admin to view order list and update order status.
4. The Admin and Feedback & Reviews components enable the admin to view and delete customer feedback if necessary.
5. The Admin and Log Out components are to log the customer out of the system when they are finished.

2.1.3 Log In

The Log In component handles the user authentication process for both customers and admins.

1. The Log In and Customer components allow customers to authenticate and access their profiles and other app features.
2. The Log In and Admin components allow administrators to authenticate and access the admin functionalities.

2.1.4 Order

The Order component handles the management of customer orders.

1. The Order and Customer components allow customers to place new orders, track orders and view order history.
2. The Order and Payment components are to ensure the customer can complete the payment process for the order.
3. The Order and Admin components enable admin to accept order, update order status and view order history.

2.1.5 Menu

The Menu component handles the management of product catalogue.

1. The Menu and Customer components allow customers to browse the menu, select and customize their desired products.
2. The Menu and Admin components allow the admin to manage the product details, including images, prices and descriptions.

2.1.6 Payment

The Payment component handles the processing of payments for customer orders.

1. The Payment and Customer components allow customers to make payments for their orders.
2. The Payment and Order components are to ensure payments are properly linked to orders.

2.1.7 Profile

The Profile component enables customers to manage their personal information.

1. The Profile and Customer components allow customers to view and update their account information, such as contact details.

2.1.8 Feedback & Reviews

The Feedback & Reviews component allows customers to provide feedback and rate their experiences with the Puff Lab app.

1. The Feedback & Reviews and Customer components allow customers to leave reviews for products and services.
2. The Feedback & Reviews and Admin components allow the admin to review customer feedback and take necessary actions.

2.1.9 Log Out

The Log Out component allows both customers and admins to securely log out of the app when they're finished.

3 High Level Design

An overview of an entire system can be described in High-Level Design (HLD), which identifies the product's main components and interfaces. Admin and Customer state charts illustrate the dynamic behavior of the Puff Lab Application. All state charts outline administrator's and customer’s behavior. The overall Puff Lab Application system for the respective entity is summarized in the figure below.

3.1 State Charts

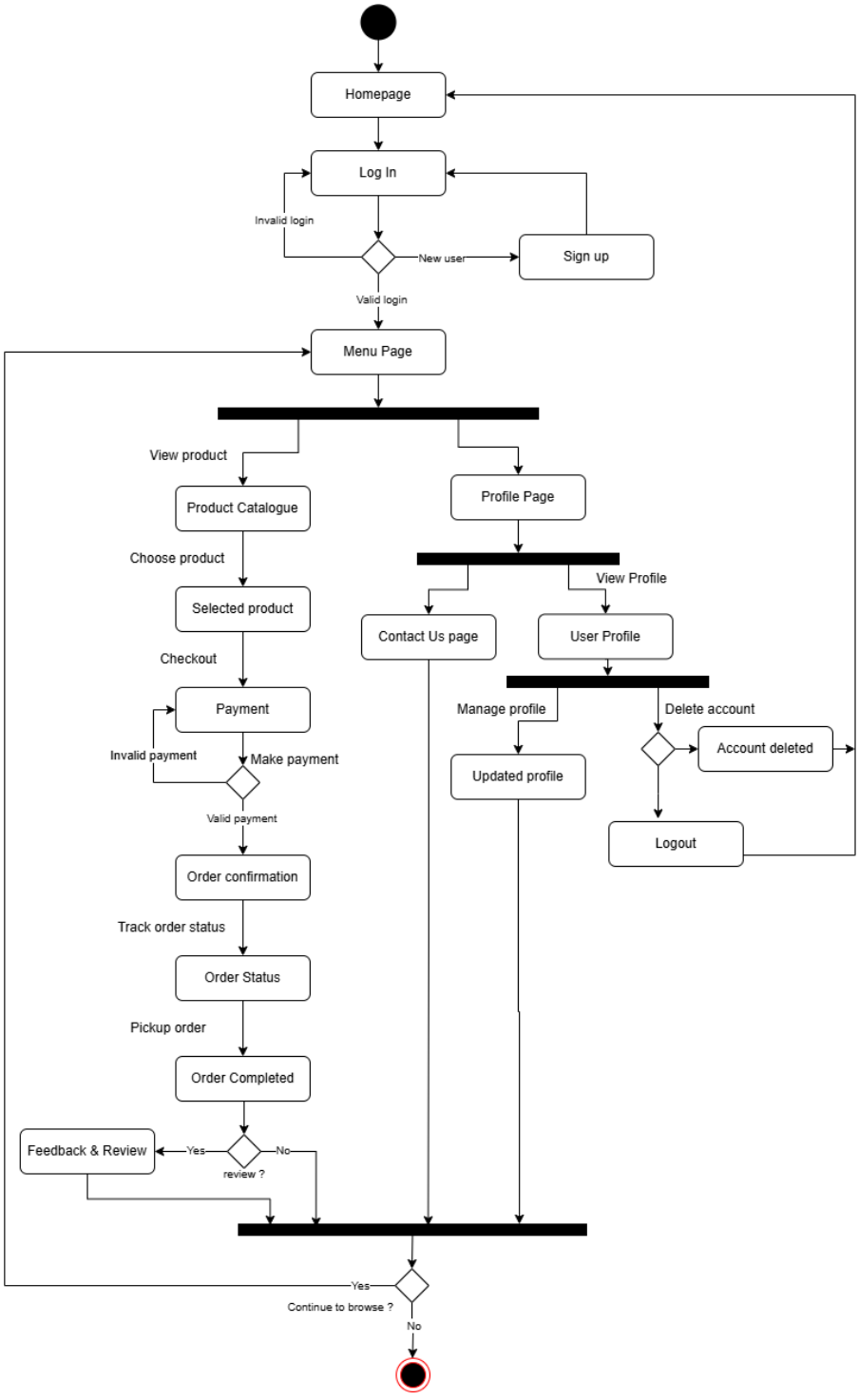

Figure 3: Customer State Chart

If the customer has successfully logged in to the system using their account, several actions are possible:

1. The customer can view the Main Menu, which provides access to various options, including product browsing, profile management, and order tracking.
2. The customer can view products by navigating to the product catalogue, where they can select items for purchase. Once a product is selected, the customer can proceed to place an order.
3. The customer can make a payment after placing an order. If the payment is successful, they will receive an order confirmation, followed by options to track the order status and proceed with the order pickup.
4. After picking up the order, the customer will be prompted to provide feedback or leave a review. They can choose to submit a review or skip this step.
5. The customer can access the Profile Page to view their personal information, such as name, contact details, and account settings.
6. The customer can also manage their profile by updating details or delete their account if they wish to remove their profile from the system.
7. If assistance is required, the customer can navigate to the Contact Us page for support or inquiries.

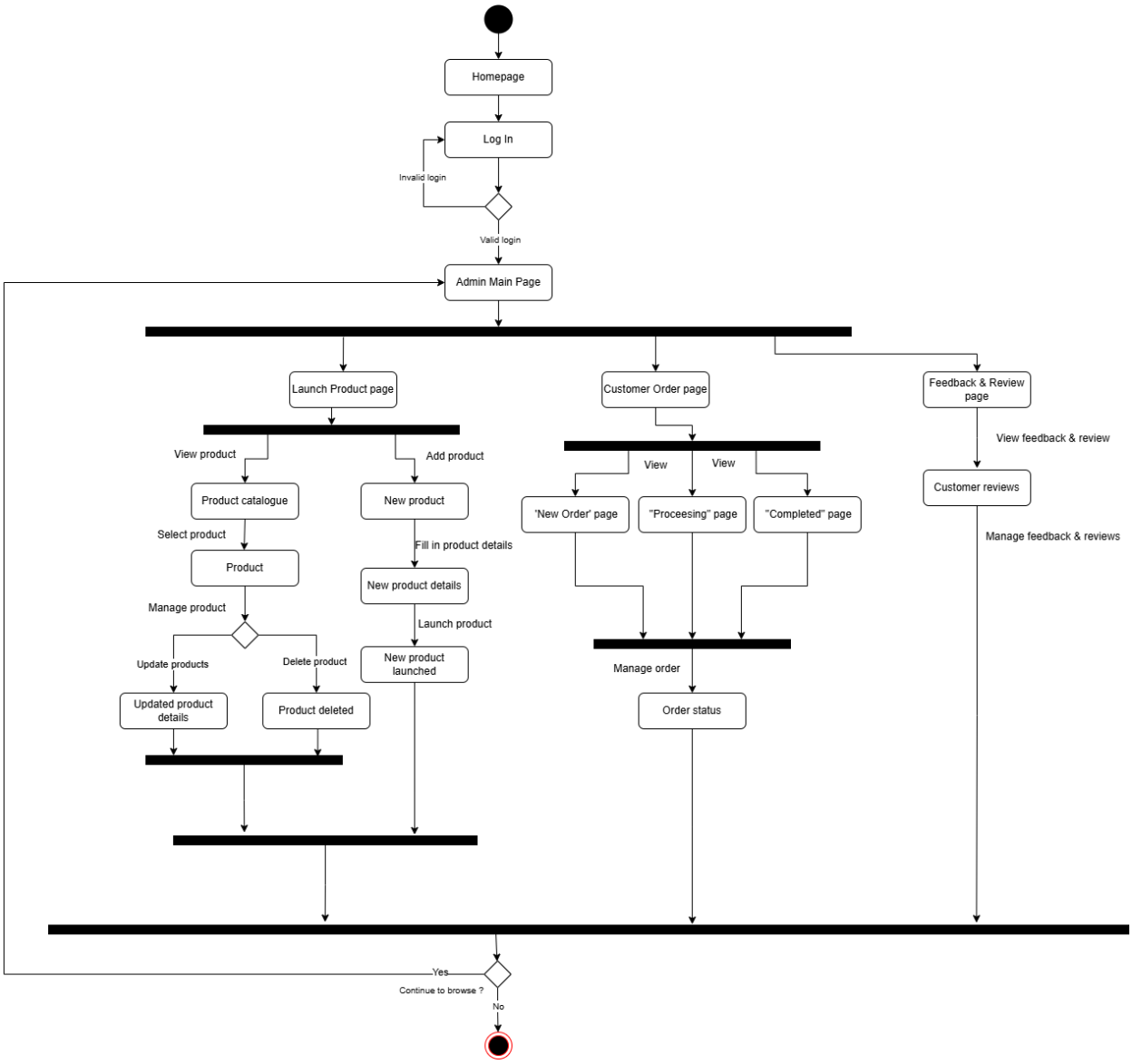

Figure 4: Admin State Chart

If the admin has successfully logged in to the system using their account, several actions are possible:

1. After login Admin can be navigate to Admin Main Page.
2. In the Launch Product Section, the admin can manage products:

- View product details of items listed in the menu.
- Add new products by filling in the product details and saving them to the system.
- Update product details to modify existing information.
- Delete products to remove them from the menu.

3. The admin can navigate to the Order Section, where order management is handled:
    - Admin can view the order list.
    - Admin can update the order status.
4. In the Feedback & Review Section, the admin can:
    - View and delete customer feedback & reviews.

3.2 View / Model Component

3.2.1 Sign Up (Customer)

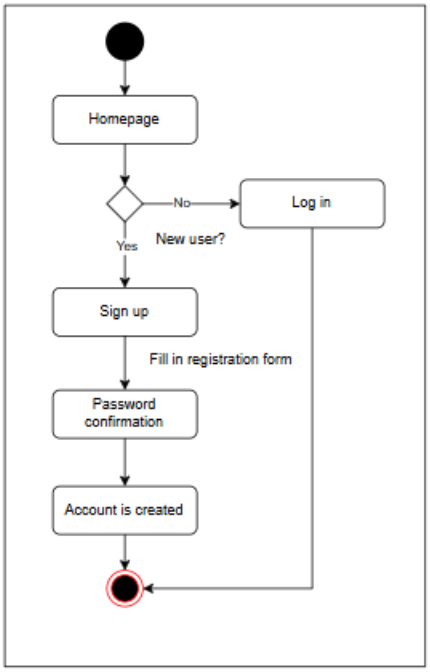

Figure 5: Customer Sign Up State Chart Model Component

If the customer chooses to sign up for a new account:

1. The process starts on the Homepage, where the customer is prompted with a decision new user account and log in.
    - If existing customer, the customer is directed to the Log In process to enter their existing account credentials.
    - If new customer, the customer proceeds with the Sign-Up process.
2. The customer selects the Sign-Up option, which leads to a registration form where they must fill in their details, including personal information and account credentials.
3. After completing the form, the system prompts for password confirmation to ensure the customer has correctly entered their desired password.
4. Once the password is confirmed and all information is validated, the customer's account is created successfully.
5. The customer can now log in using their newly created account.

3.2.2 Place Order (Customer)

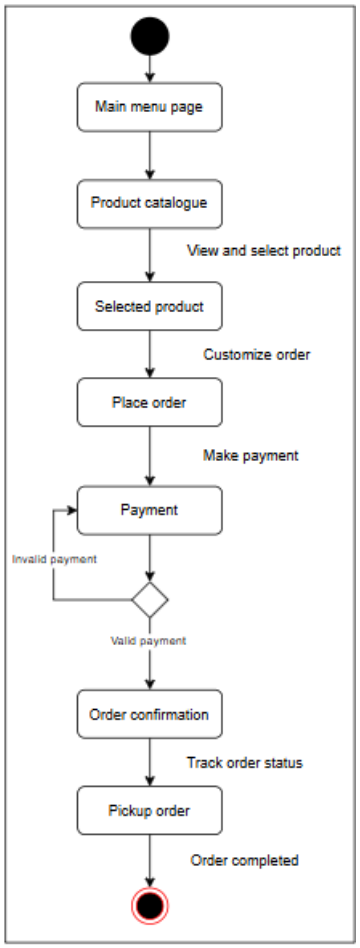

Figure 6: Customer Place Order Customer State Chart Model Component

If the customer has successfully logged in:

1. The customer can view the Product Catalogue, which displays the list of available products. The customer can navigate through the catalogue to view and select items.
2. The customer can select a product from the catalogue and proceed to the add to cart page, where they can customize the order.
3. The customer can place the order on the after finalizing their customization and proceed to the payment process.
4. If the payment is valid, the system confirms the order. If the payment is invalid, the customer is prompted to retry the payment.

5. The customer will receive order confirmation after their order has been successfully placed and paid.
6. The customer can track their order status.
7. The customer can pick up the order. Once the order is picked up, the system updates the order as completed.

3.2.3 Manage Account (Customer)

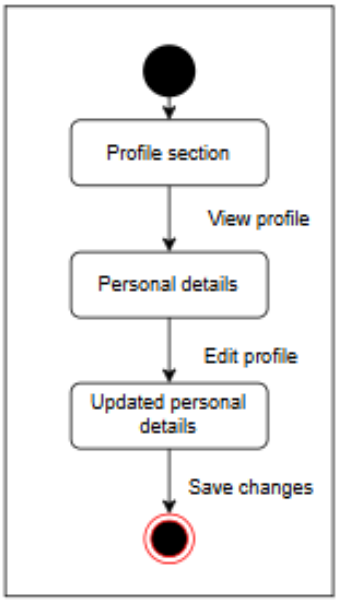

Figure 7: Customer Edit Profile State Chart Model Component

If the customer accesses the Profile Section:

1. The customer can view their profile, which displays their personal details.
2. The customer can select the Edit Profile option to modify their personal details.
3. After editing, the customer can choose to save the changes, which finalizes the updates to their profile.

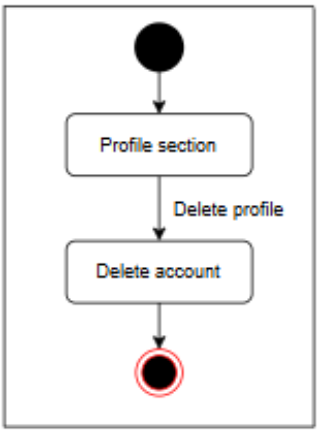

Figure 8: Customer Delete Account Customer State Chart Model Component

If the customer accesses the Profile Section:

1. The customer can view their profile, which displays their personal details.
2. In the Profile Section, the customer can initiate the deletion of their profile by selecting the "Delete Profile" option.

3.2.4 Log In (Admin)

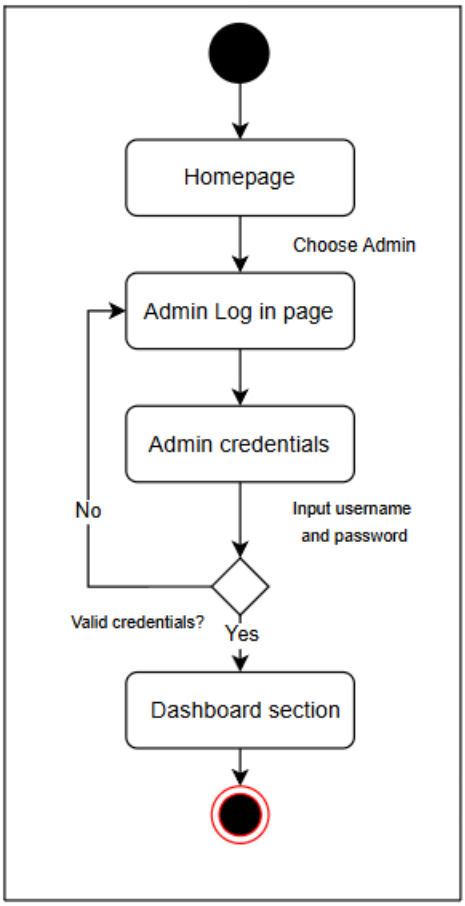

Figure 9: Admin Log in State Chart Model Component

1. The admin can start at the Homepage, where they choose the "Admin" option to proceed to the login process.
2. The admin is redirected to the Admin Login Page, where they can enter their username and password.
3. The admin inputs their credentials (username and password) on the Admin Login Page.
4. The system validates the entered credentials:
    - If the credentials are invalid: The system denies access and redirects the admin back to the Admin Login Page to retry.
    - If the credentials are valid: The system grants access.
5. Upon successful login, the admin is redirected to the Admin Main Page, where they can manage the system and perform administrative tasks.

3.2.5 Manage Product (Admin)

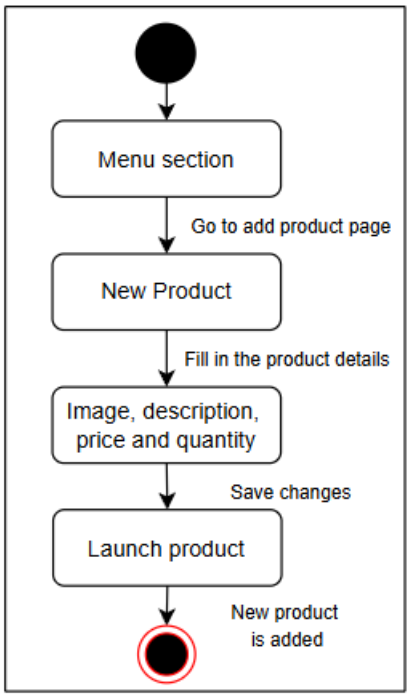

Figure 10: Admin Add New Product State Chart Model Component

If admin navigates to Menu section,

1. Admin can choose to add new product.
2. The admin provides the necessary product details including Image, Description, Price, and Quantity.
3. Once all details are filled in, changes are saved.
4. Admin finalizes the process by launching the product.

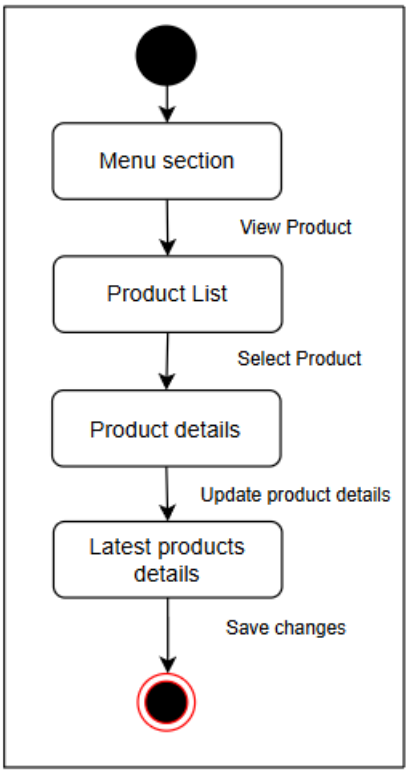

Figure 11: Admin Update Existing Product State Chart Model Component

If admin navigates to Menu section,

1. Admin can choose to update existing product.
2. Admin needs to select and view the product to update the details.
3. Admin fills in the new product details and save the changes.
4. The new product details will be displayed.

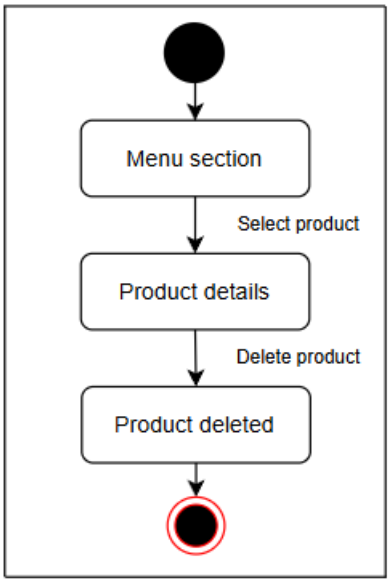

Figure 12: Admin Delete Product State Chart Model Component

If admin navigates to Menu section,

1. Admin can choose to delete existing product.
2. Admin needs to select and view the product.
3. The admin initiates the deletion process by clicking the delete option.
4. The product is deleted.

3.2.6 Manage Orders (Admin)

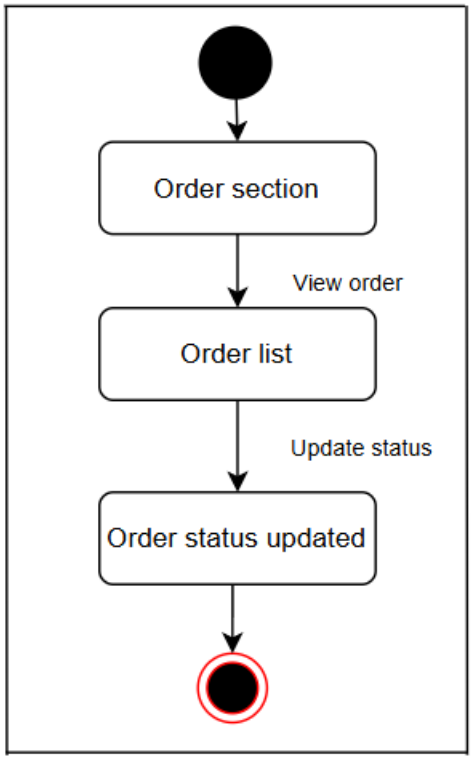

Figure 13: Admin Order Management State Chart Model Component

If admin navigates to Order section, admin can view the order list history.

1. Admin can view the order list.
2. Admin can update the status of selected orders.

3.2.7 Manage Customer Feedback & Review (Admin)

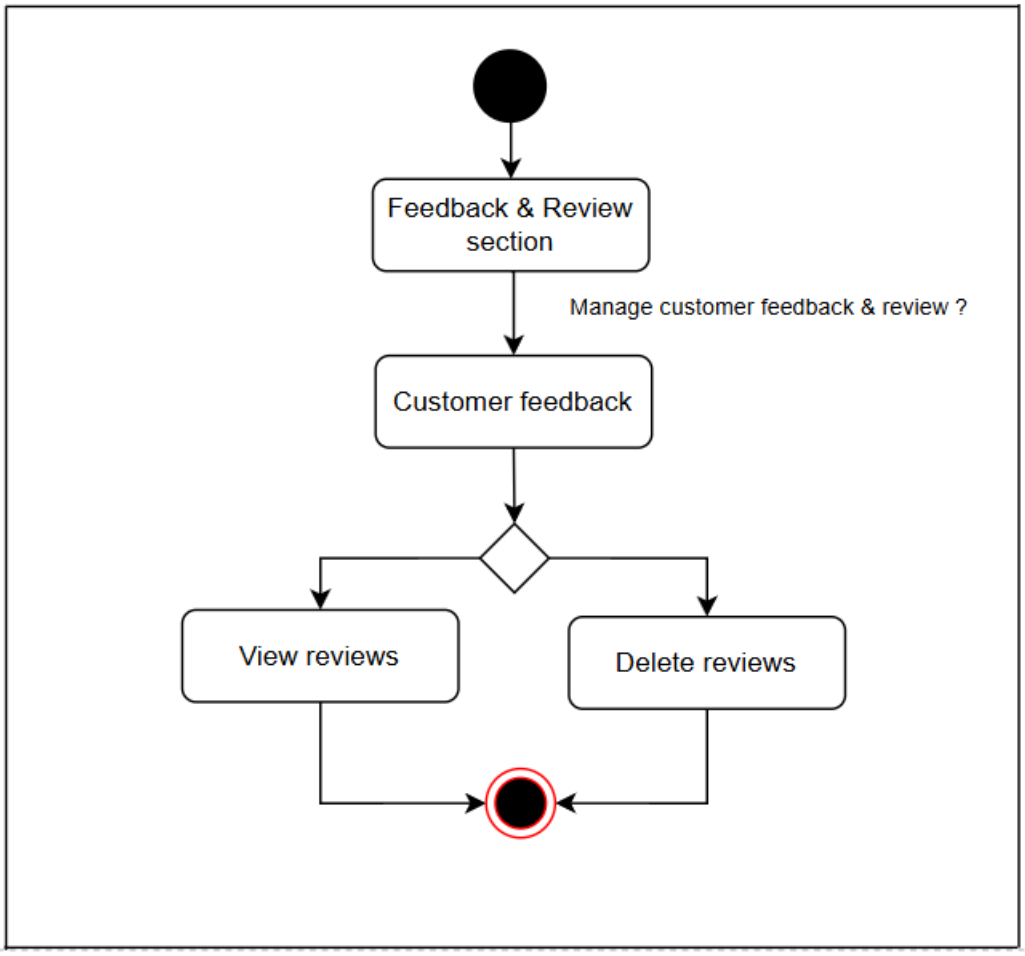

Figure 14: Admin Manage Customer Feedback & Reviews State Chart Model Component

In the Feedback & Review Section, the admin can perform several actions to manage customer feedback and enhance user engagement:

1. The admin can manage content visibility by viewing and deleting customer feedback & reviews.

Appendix

Refined Class Diagram

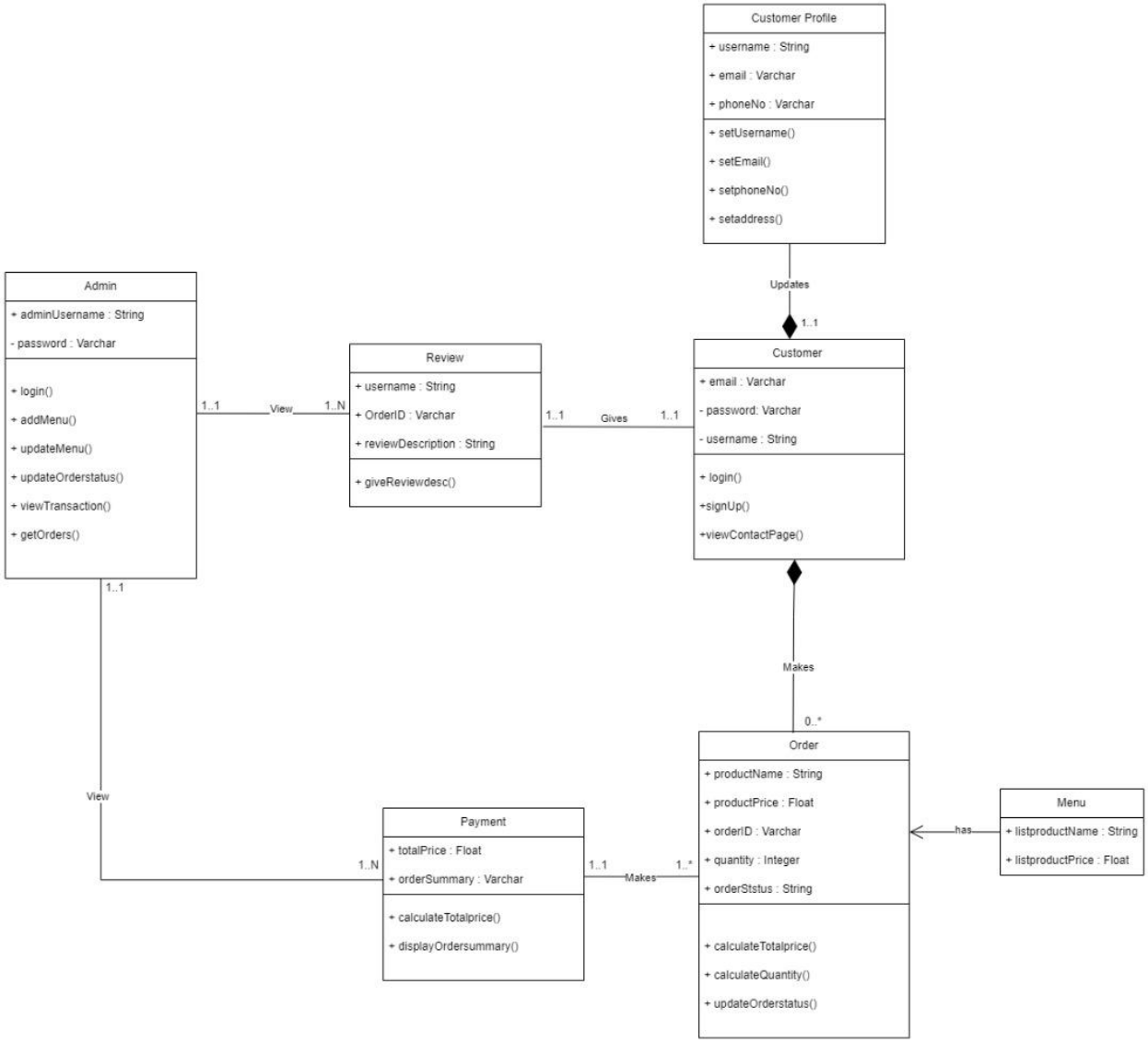

Figure 14: Class Diagram for Puff Lab Application

Refined Use Case Diagram

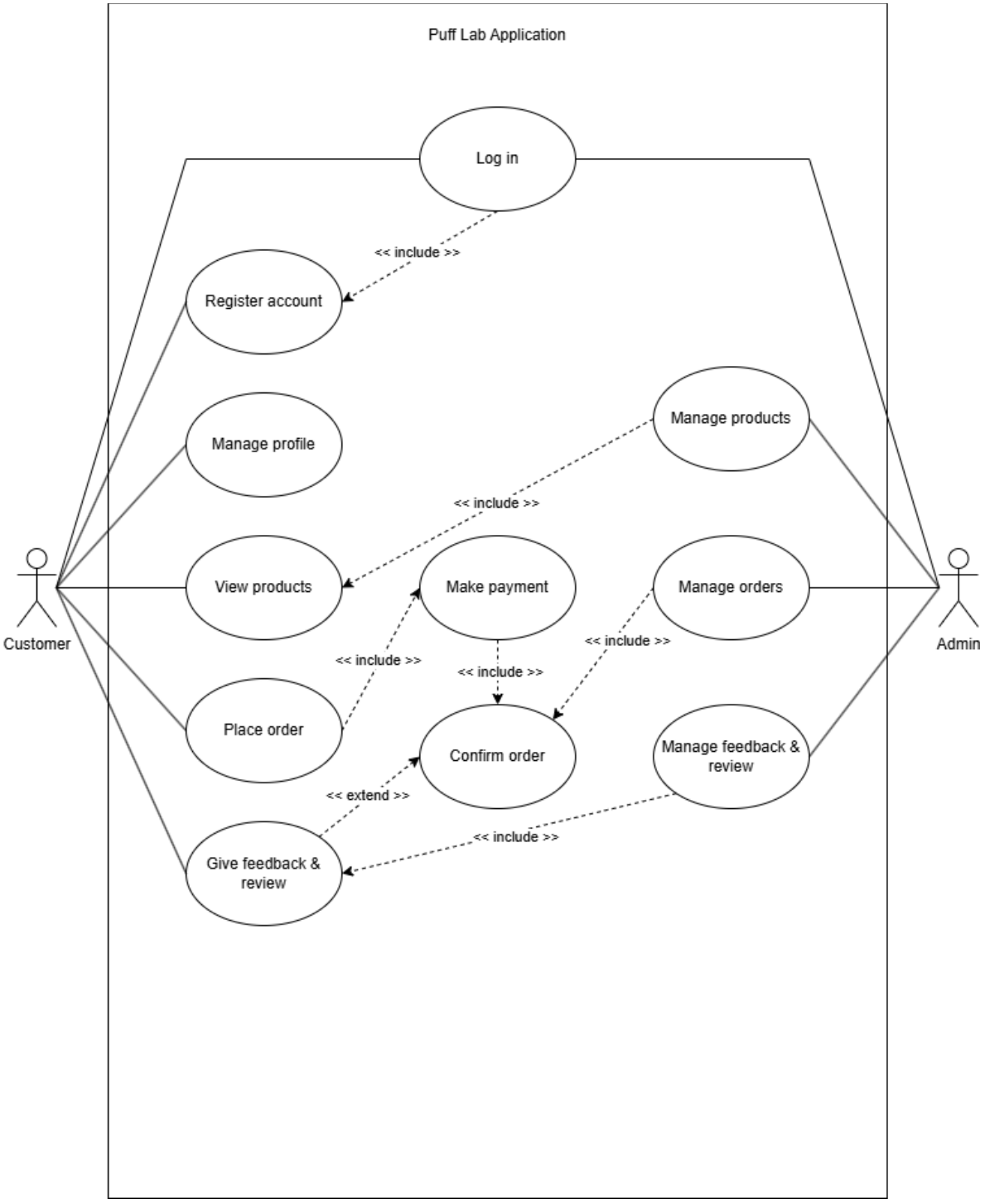

Figure 3 Use Case Diagram

Appendix A – Group Log

Project Meeting Minutes	
Meeting title:	Documentation for Puff Lab Application
Date & Time started:	6 January 2024 (Monday)
Location:	Petary, UNIMAS
Project Name:	Puff Lab Application
Attendees:	1. Caleigh Susan Anak Jeffry 2. Bethsheba Sewing 3. Delneeza Anak Dismon 4. Faziana Binti Mashor 5. Khairul Wafi Bin Mazelan
1.0 Agenda Item	
Caleigh Susan Anak Jeffry Project Manager / Planning Manager	Discuss the content and task for the Software Design Specification document.
Action Items:	Manage the SDS Document. [Assigned task: Delneeza Anak Dismon, Bethsheba Sewing]
2.0 Agenda Item	
Faziana Binti Mashor Quality Manager / Test Manager	Discuss the content and task for the Test Cases Document.
Action Items:	Manage the User Test Cases Document. [Assigned task: Caleigh Susan Anak Jeffry, Khairul Wafi Bin Mazelan]
3.0 Agenda Item	
Khairul Wafi Bin Mazelan Process Manager / Support Manager	Discuss the content and task for the User Manual.
Action Items:	Manage the User Test Cases Document. [Assigned task: Faziana Binti Mashor]
4.0 Agenda Item 4	

Caleigh Susan Anak Jeffry Project Manager / Planning Manager	Discuss the updates on Business Proposal and Software Requirement Specification Document.
Action Items:	Revise the Business Proposal and Software Requirement Specification Document. [Assigned task: Delneeza Anak Dismon, Bethsheba Sewing]
Project Manager ensuring everyone had a clear understanding of their responsibilities and deadlines and thanked everyone for their efforts in developing Puff Lab Application.	
Next Meeting:	The next meeting will be notified through email.
Meeting adjourned at:	4.30 pm
Minutes prepared by:	Faziana Binti Mashor (83865)
Minutes approved by:	Caleigh Susan Anak Jeffry (82476)