



## **PineApple**

Version 1.1.0

DFD Specification Document

GroupB2

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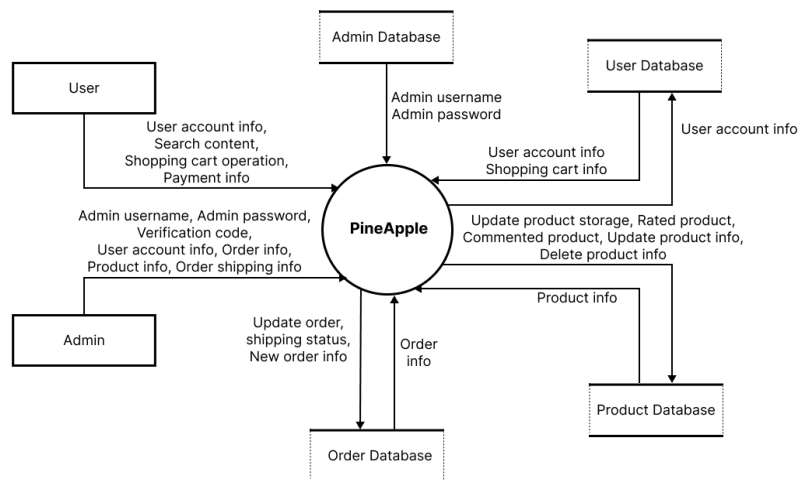
# 1. High-Level Context Diagram

## 1.1 Description

In *PineApple*, there are two types of operators, i.e., regular users and administrators, and four databases, i.e., *Admin Database*, *User Database*, *Product Database*, and *Order Database*. After logging in, an administrator can only use administrative functions (“admin functions”) while a user can only use the other functions except for admin functions.

In the diagram, to facilitate clearer presentation, there are multiple data flows along the same arrow, but not all data are needed at the same time. And no data flow order is implied in the diagram below either. As the actual data needed for each function varies, please refer to the feature-specific descriptions for more detailed explanation.

## 1.2 DFD (Level 0)



# 2. System Diagram

## 2.1 Description

To enjoy *PineApple*, users and admins should log in the application through SMS or username-password verification. The **Admin Login** and **User Login System** fetch the corresponding information from Admin data and User data databases to verify the identity. New users need to undergo the **Signup** procedure to create their own account with phone number, email, username and password through the system. The registering user must input the verification he/she received to complete the verification and signup process.

Upon successful login, an authentication token, which records the access right and username of the current operator, will be produced. The token has to be presented in all procedures, except the **Admin Login**, **User Signup**, **User Login**, **Search and Select Product** and **Recommendation System**. If the token is missing from the input, or the token records an access right different from the one required by the receiving functions, this particular procedure will not proceed. The **Admin Functions** procedure requires admin level of access right while **Shopping Cart**, **Checkout Payment**, **Order Status** and **Product Review and Rating** procedures require user level of access right.

The **Admin functions** procedure allows administrators to perform variety operations on product database, user database, and order database after providing a valid authentication token. Administrators can retrieve or delete product and user info, update an order's delivery status. All the above operations are operated on the corresponding database in real-time.

The **Search and Select Product** procedure is a collection of many search and select functions. It helps users use different search content to retrieve desired and suitable products in their preferred ways. Through the selection functions users can easily place the selected product into the shopping cart.

The **Recommendation System** procedure has two subsystems: homepage recommendation and search recommendation. The homepage recommendation will help to recommend high-quality and befitting products to the users. Moreover, the search recommendation can serve the recommendation list to the search functions to make the search result more suitable.

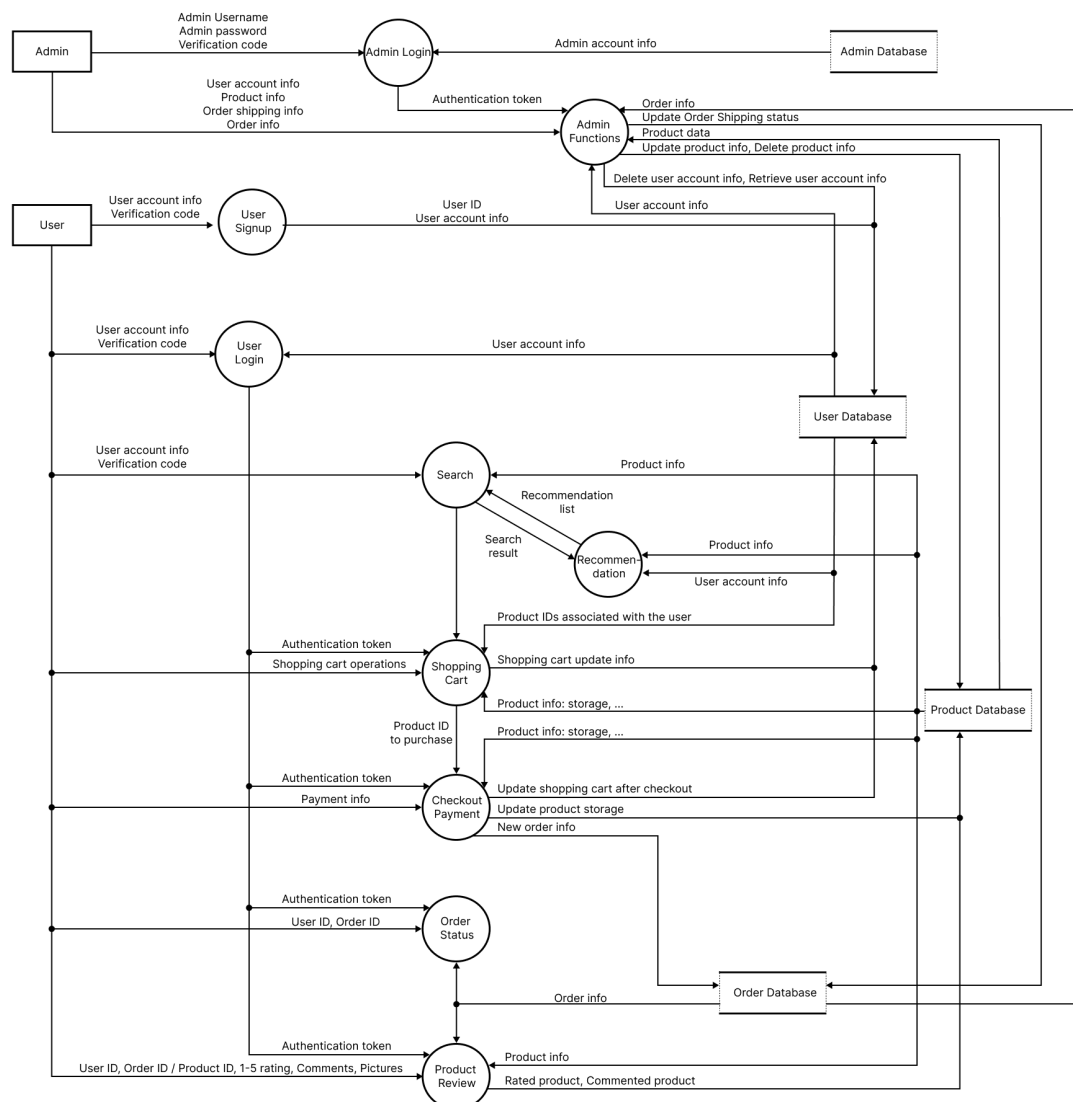
The **Shopping Cart** procedure displays the products associated with the user's shopping cart. It processes the user's operations on the shopping cart items and updates the shopping cart info in the *User Database*.

The **Checkout Payment** procedure processes the user's request to purchase a product for a certain amount. It collects the user's payment info, verifies the transactions, then generates the order and updates corresponding databases.

The **Order Status** function lets the user select orders and check their status, i.e., the shipping status, ordered time, number of ordered products, etc.

In **Product Review and Rating** function, the user can give a 1-5 rate, comments, and pictures to completed orders. This information will be stored in the *Product Database*, and used for future recommendations.

## 2.2 DFD (Level 1)



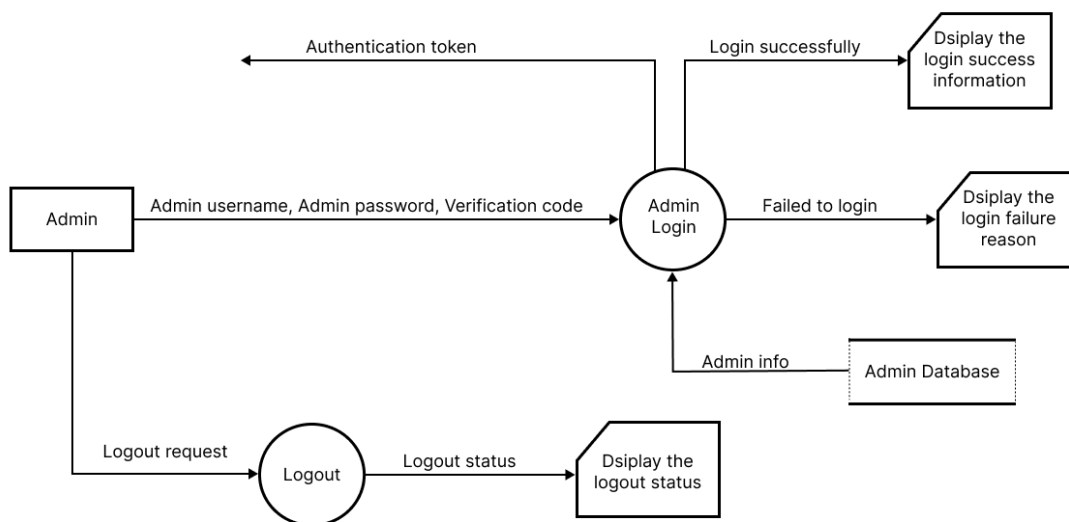
## 3. Feature Diagrams

### 3.1 Admin Login

#### 3.1.1 Description

The administrator must first enter his administrator username and administrator password and then enter the verification code to the **Admin Login** function. The system will access the *admin database* to obtain the admin account information. After comparing and verifying it with the entered information, if the comparison is not successful, the reason for the login failure will be displayed. If the login is successful, a successful login prompt will be displayed and an authentication token will be sent for subsequent use. After logging in, the administrator can send a logout request to the **Logout** function and then the status will be displayed.

#### 3.1.2 DFD

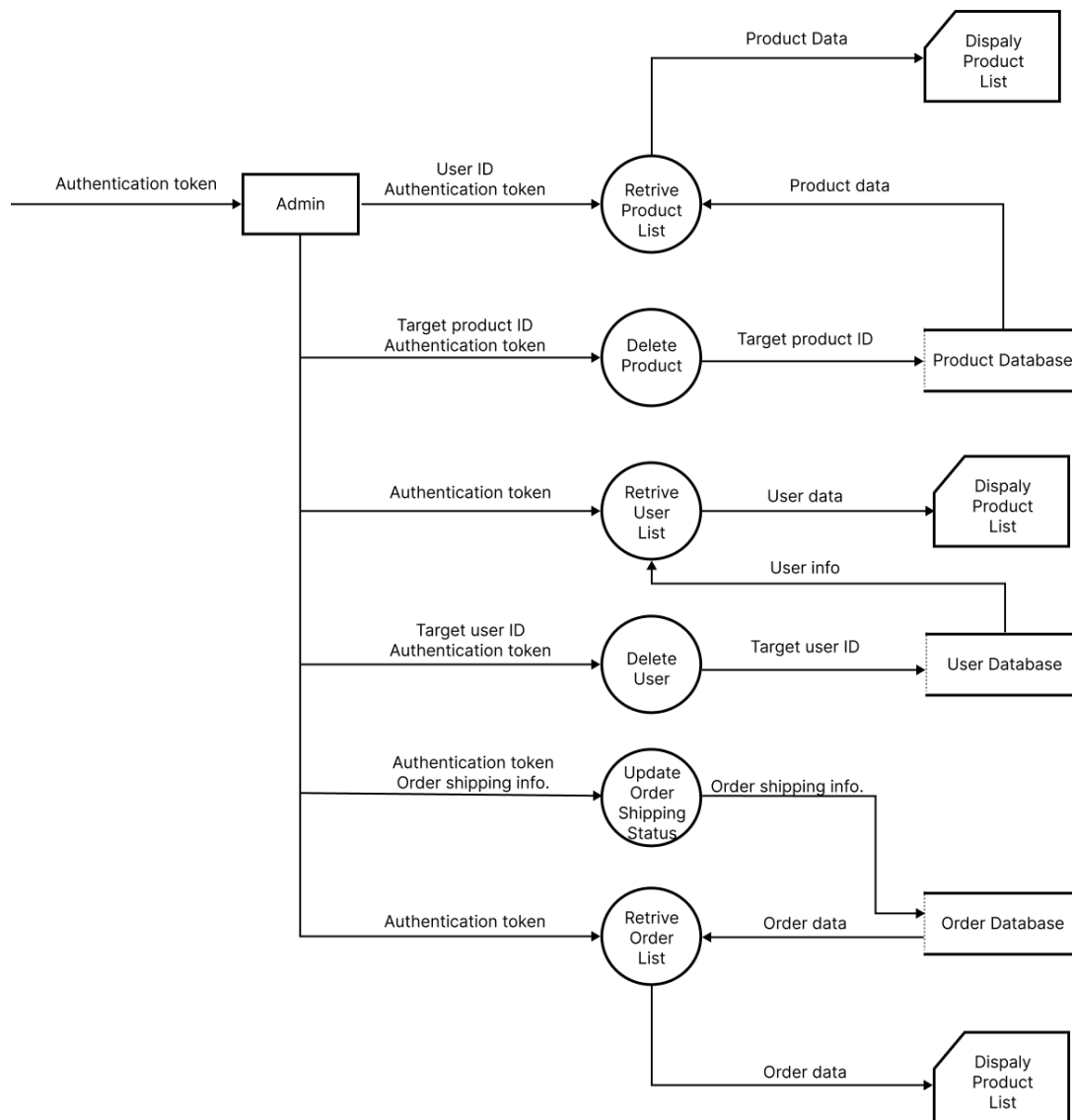


### 3.2 Admin Functions: Users, Products, Orders

#### 3.2.1 Description

To view the product list the administrator needs to provide a valid authentication token and then the system uses that token to retrieve the product list from the *Product Database* and then displays the retrieved product data as a product list. To delete the product administrator, you need to provide the target product ID and a valid authentication token to the **Delete Product** function. After the system verifies the token, the corresponding target product will be deleted from the *Product Database*. To view the user list, the administrator needs to provide a valid authentication token to the **Retrieve User List** function, which is used by the system to retrieve the user list from the *User Database* and then display the retrieved user data as a user list. To delete a user, the administrator needs to provide the target user ID and a valid authentication token to the **Delete User** function. After the system verifies the token, it deletes the corresponding target user from the *User Database*. To view the order list, the administrator needs to provide a valid authentication token to the **Retrieve Order List** function. The system uses the token to retrieve the order list from the *Order Database* and displays the retrieved order data as an order list. To update the order shipping status, the administrator needs to provide a valid authentication token and order shipping information to the **Update Order Shipping Status** function. Then the order shipping information will be updated in the *Order Database*.

### 3.2.2 DFD

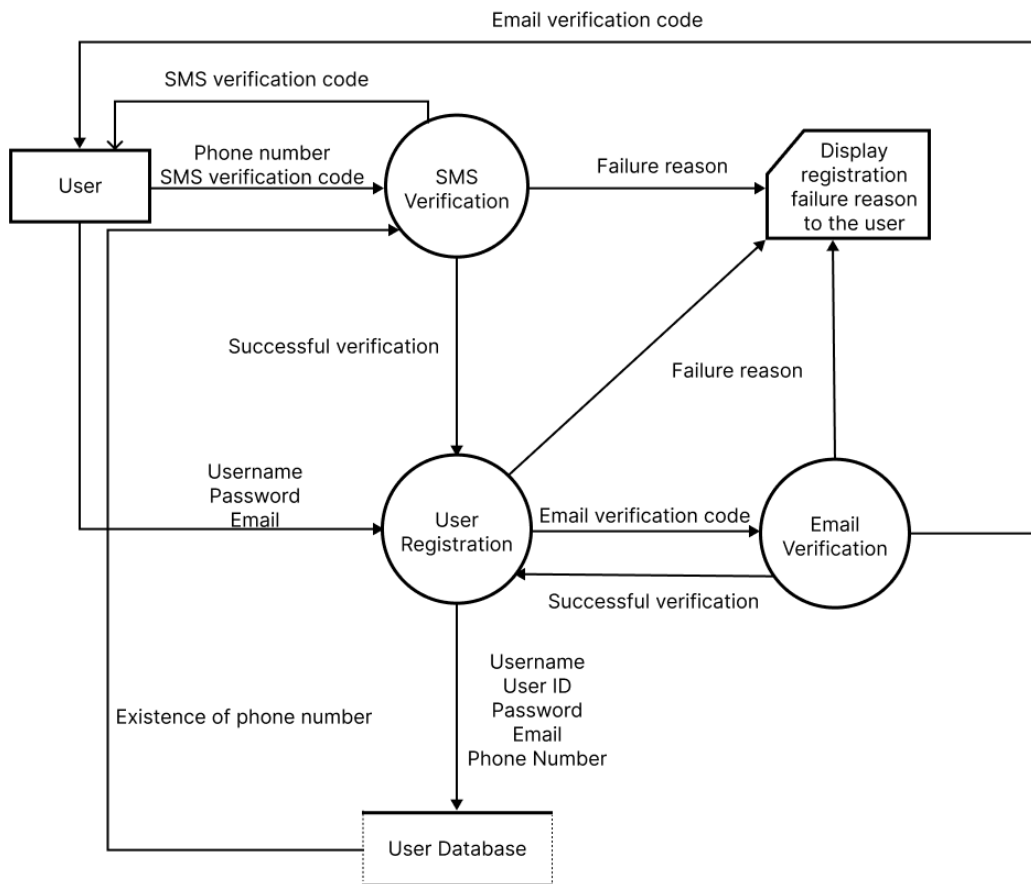


## 3.3 User Signup

### 3.3.1 Description

New user first inputs the phone number to **SMS Verification**, which will check the nonexistence of the phone number in the *User Database* and send users a message for verification. If the user passes the SMS verification, the user can input their email, desired username and password to the **User Registration** function. Then, the **Email Verification** function will send the email verification code to the user. After the user inputs the correct verification code, the **Email Verification** function will send a “successful verification” signal to the **User Registration** function. Then the **User Registration** function will generate a specific user ID and store the user’s email, phone number, username, user ID and password into the *User Database*. If the registration fails at any point, the corresponding function will report the registration failure reason to the user.

### 3.3.2 DFD

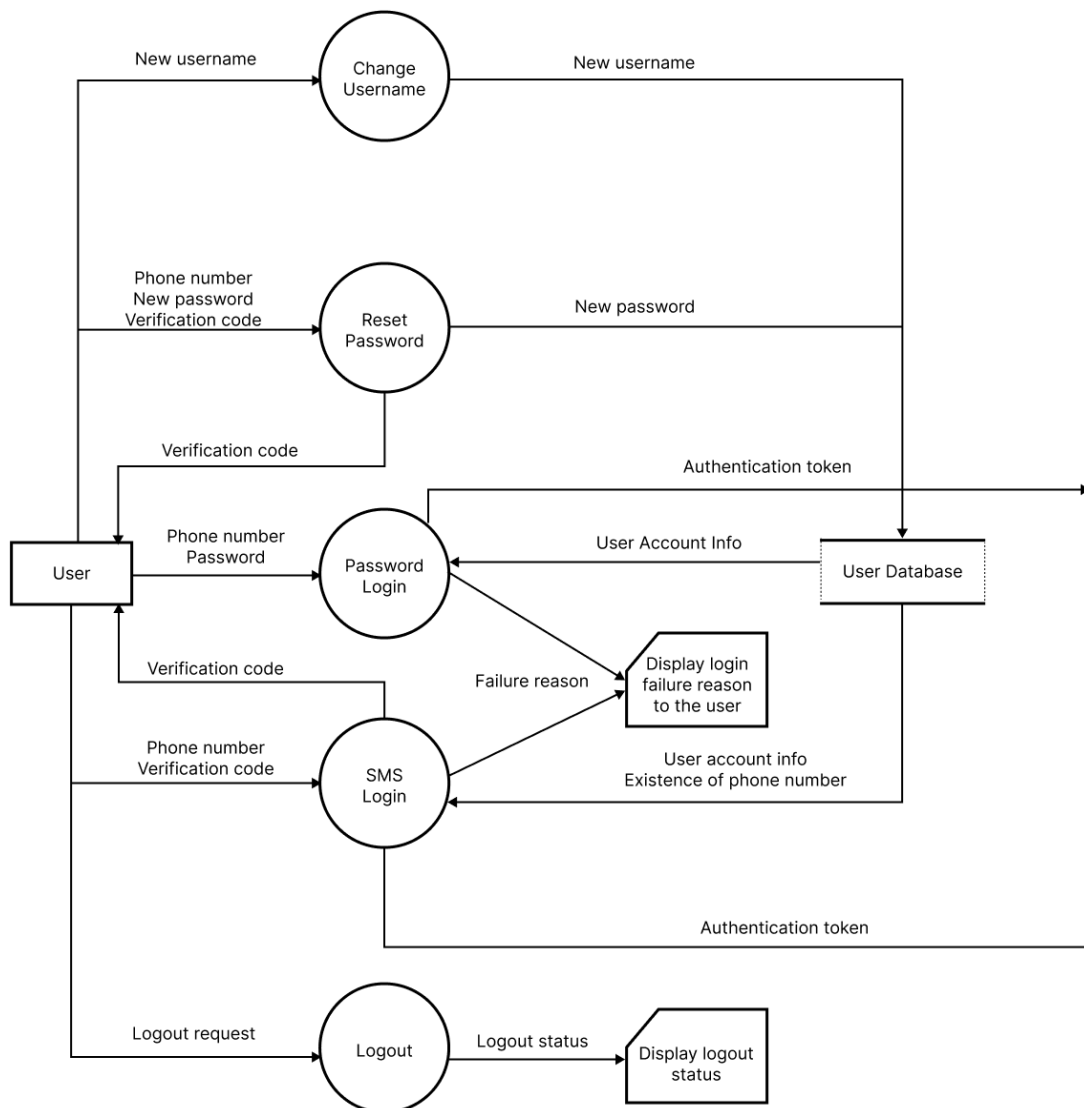


## 3.4 User Login

### 3.4.1 Description

A user has two ways to login, password login and SMS login. As for the **Password Login** function, when a user first inputs the phone number and password, the **Password Login** function will access the user account info from the *User Database* for verification. As for the **SMS Login** function, when a user first inputs the phone number, the **SMS Login** function will check the existence of the phone number in the *User Database* and send a verification code to the user. After inputting correct verification code, the user can successfully login. If the login process fails at any point, the corresponding function will report the login failure reason to the user. The user can input the phone number to the **Reset Password** function, the **Reset Password** function sends a verification code to the user. If the user inputs a correct verification code, he/she can input a new password. The **Reset Password** function will send the new password to the *User Database* and update the password. After logging in, the user can send a request to the **Logout** function and the logout status will be displayed. If the user successfully logs in, an authentication token will be produced for later uses.

### 3.4.2 DFD



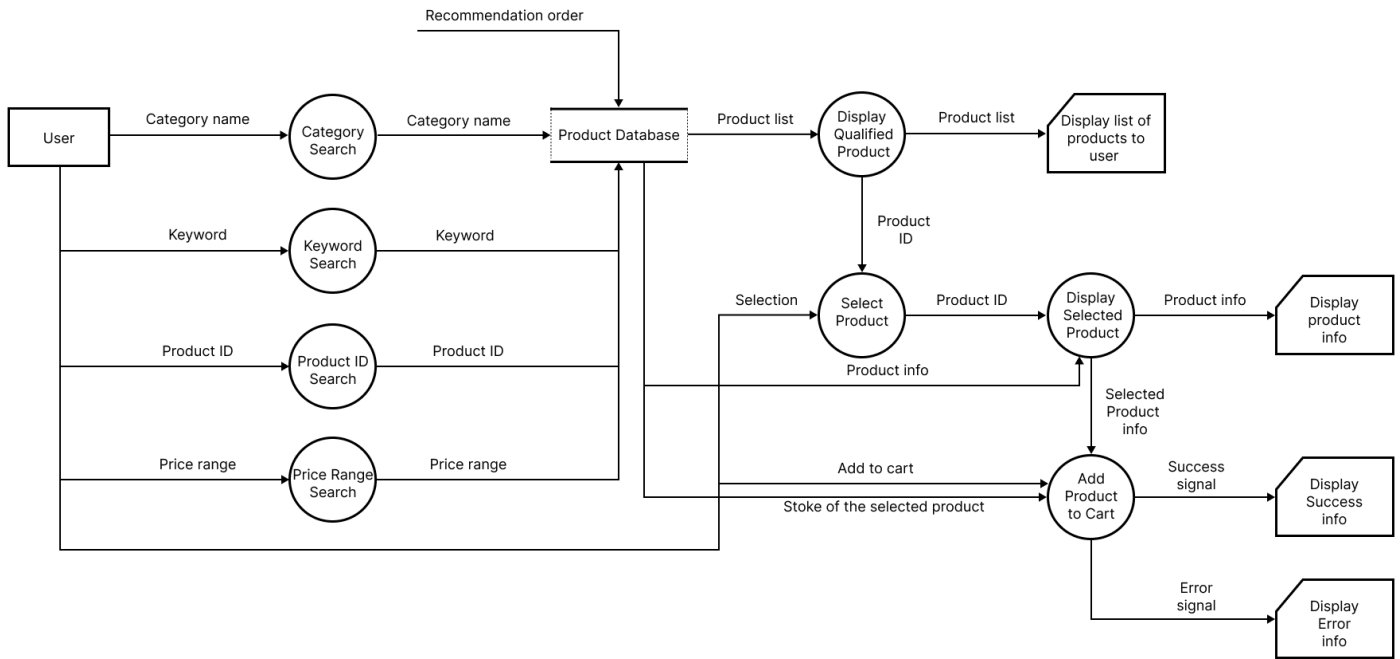
## 3.5 Search and Select Product

### 3.5.1 Description

This search and select product procedure helps the user to search and select the desired and suitable products. The user can choose to search for matching products by entering a single or more search options such as category, keyword, product ID and price range in the search box. The corresponding *category search*, *keyword search*, *product search* and *price search* functions will use this information in the *Product Database* to search for qualified products. The products that meet the requirements are sorted into a list using the recommendation order. This product list with information like picture, name, etc. will be output to the *Display Qualified Product* function and then be displayed on the products list page. The user can view and select any of the products they prefer. The selection command will be received by the *Select Product function*, and then the *Display Selected Product* function will be called to display the detailed product information. After the user has finished selecting the desired product, they can add the product to their shopping cart. The *Add Product to Cart* function will check the inventory of the corresponding product in the database. If the stock is zero, it will display an error message otherwise it will remind the user that the product has been successfully added to the cart.

### 3.5.2 DFD



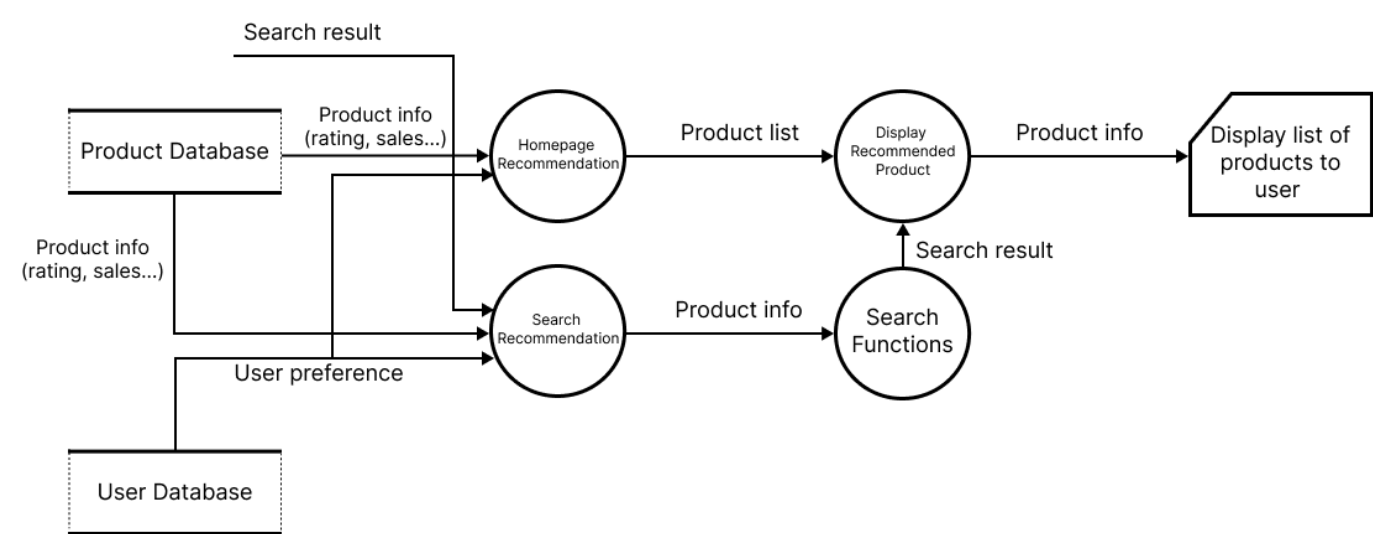


### 3.6 Recommendation System

#### 3.6.1 Description

The recommendation system allows *PineApple* to recommend products of better quality and more in line with the user's preferences. In the recommendation system, the *Product Database* and *User Database* will send the product information and user preference respectively to the *Homepage Recommendation* and *Search Recommendation* functions. After that, the *Homepage Recommendation* function will send the recommended product list to the *Display Recommended Product* function, which will display the products that the user may like on the homepage to facilitate the users' purchase. Another recommendation function, the *Search Recommendation* function, will provide better search results during the user's search. The function will be responsible for analysing the input and sending the product information to the *Search Functions* mentioned in 3.5. Then, these search functions will output the appropriate search result to the *Display Recommended Product* function to display corresponding product lists to the user.

#### 3.6.2 DFD

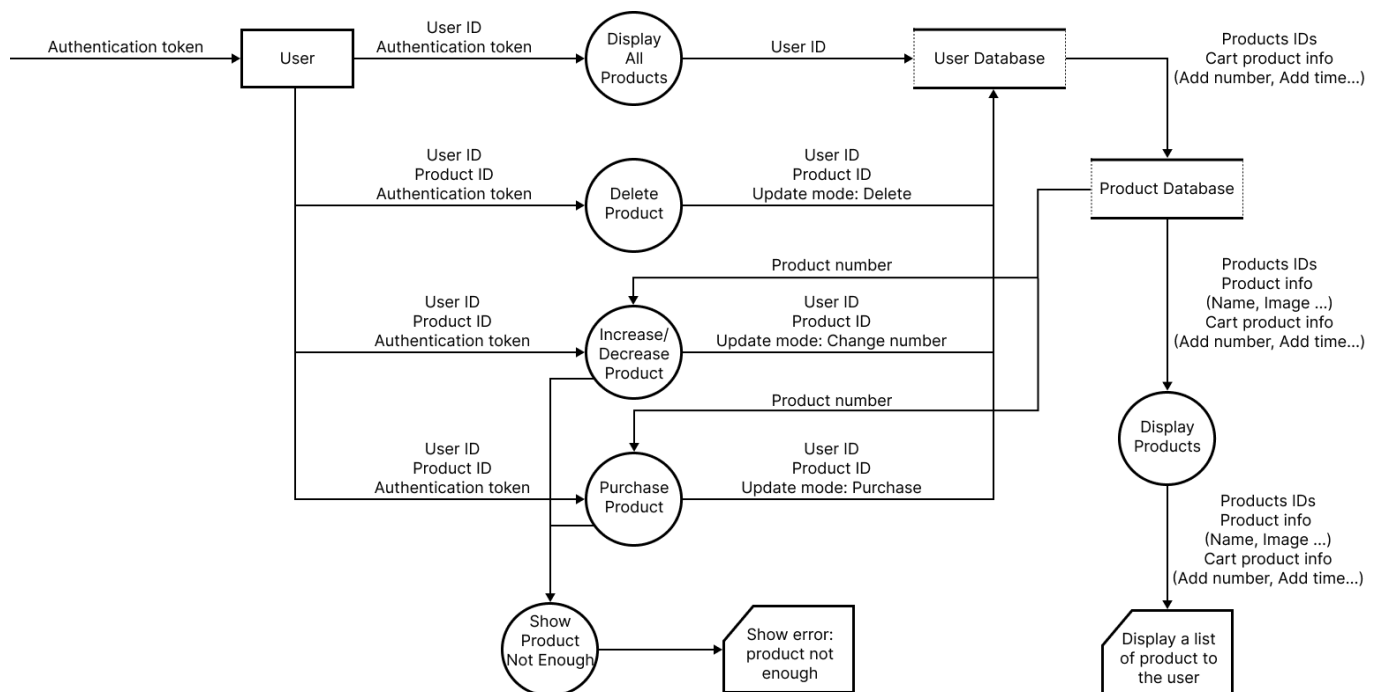


## 3.7 Shopping Cart

### 3.7.1 Description

When the user enters the main page of the shopping cart, **Display All Product** is automatically called, which takes user ID as key to search in *User Database* for the corresponding shopping cart info (e.g., product ID). Then the shopping cart info is used to search in the *Product Database* for detailed product info (e.g., image, name). At last the **Display Product** function is called to render the webpage with the info. To delete a product, the user provides the product ID and user ID to **Delete Product** function, which sends an update information to the *User Database* to delete the product for the corresponding user, and then re-render the website. **Increase/Decrease Product** works similarly, only that it will further check the availability of the product. If the storage is not enough, it will call **Show Product Not Enough** function to display the error information. **Purchase Product** function also works similarly, only that it will jump to the payment website if the product is currently available. Meanwhile, an authentication token is needed to access these functions to ensure security.

### 3.7.2 DFD

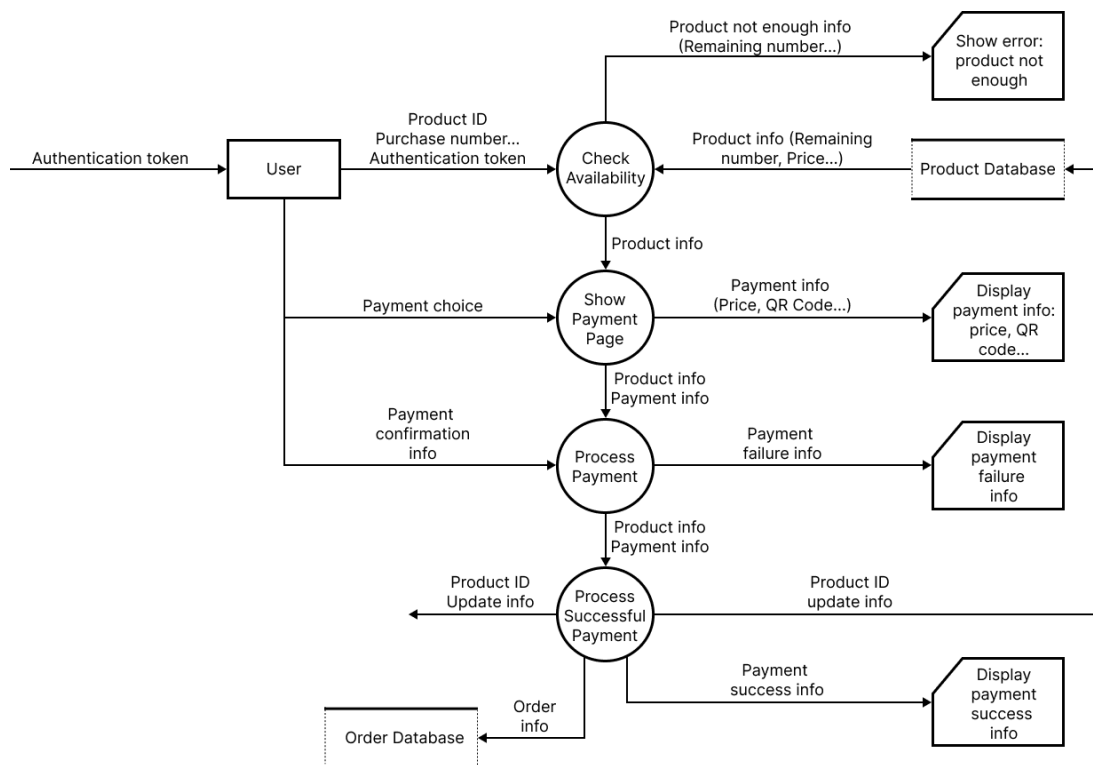


## 3.8 Checkout Payment

### 3.8.1 Description

To checkout and pay for a product, the user first provides info of the product to purchase (e.g., product ID and purchase number), together with the authentication token, to **Check Availability** function to further check whether the storage is enough. If not, print the corresponding information on the screen. Then, the **Show Payment Page** function is called to ask the user for the desired payment method. Once a payment method is chosen, corresponding payment messages (e.g., QR Code) will be displayed on the screen. After the payment is made by the user (signified by user providing certain information regarding payment), the **Process Payment** function is called to verify the payment. If failed, error messages will be printed. If success, the function will pass the product and payment info to **Process Successful Payment** function, which (1) generates an order based on the provided info and store it in the *Order Database*; (2) updates storage in the *Product Database*; (3) update order history in *User Database*; and (4) print payment success message on the screen.

### 3.8.2 DFD

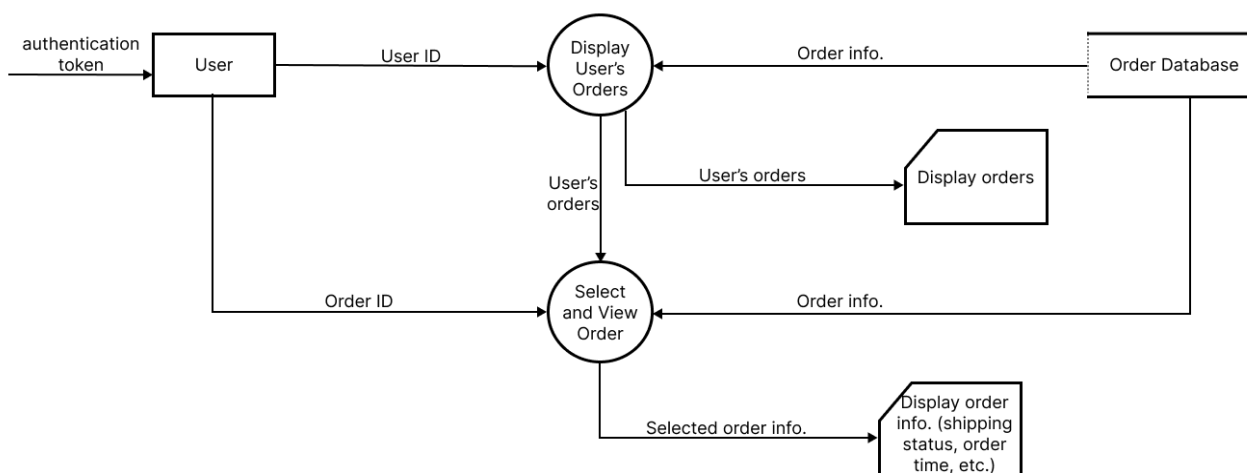


## 3.9 Order Status

### 3.9.1 Description

To view the status of the order after payment, the user should first login to the account to get an authentication token for permission to access related functions. With authentication, the **Display User's Orders** function will retrieve order info. from the *Order Database* and display the user's orders according to the User ID. In the meantime, it will also input the User's orders into the **Select and View Order** function. After the user selects an order to view its status, the order ID of the selected order will also be input to the **Select and View Order** function. Then the function will retrieve order info. from the *Order Database* and combine it with the other inputs to get the status of the selected order, namely, the order's shipping status, ordered time, number of ordered products, etc. Finally, all these statuses will be displayed on the screen.

### 3.9.2 DFD



## 3.10 Product Review and Rating

### 3.10.1 Description

The user can review and rate the purchased product after the order is completed. To use this function, the user should first login and get authenticated. Then, the **Get Completed Orders** function will retrieve order info. from the *Order Database* and display the user's completed orders according to the User ID. At the same time, the completed orders will also be input into the **Select an Ordered Product** function, which will combine the order info. retrieved from the *Order Database*, the product info. retrieved from the *Product Database*, the order ID or the product ID of the order or product the user selected, and the completed orders to get the selected product that the user wants to review and rate. Then, the selected product will be input into two functions: **Rate the Product**, which takes a 1-5 rating from the user, and **Comment the Product**, which takes comments or pictures from the user. The rated and commented product will then be updated into the *Product Database* and displayed on the screen through the two functions.

### 3.10.2 DFD

