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1.0 Introduction

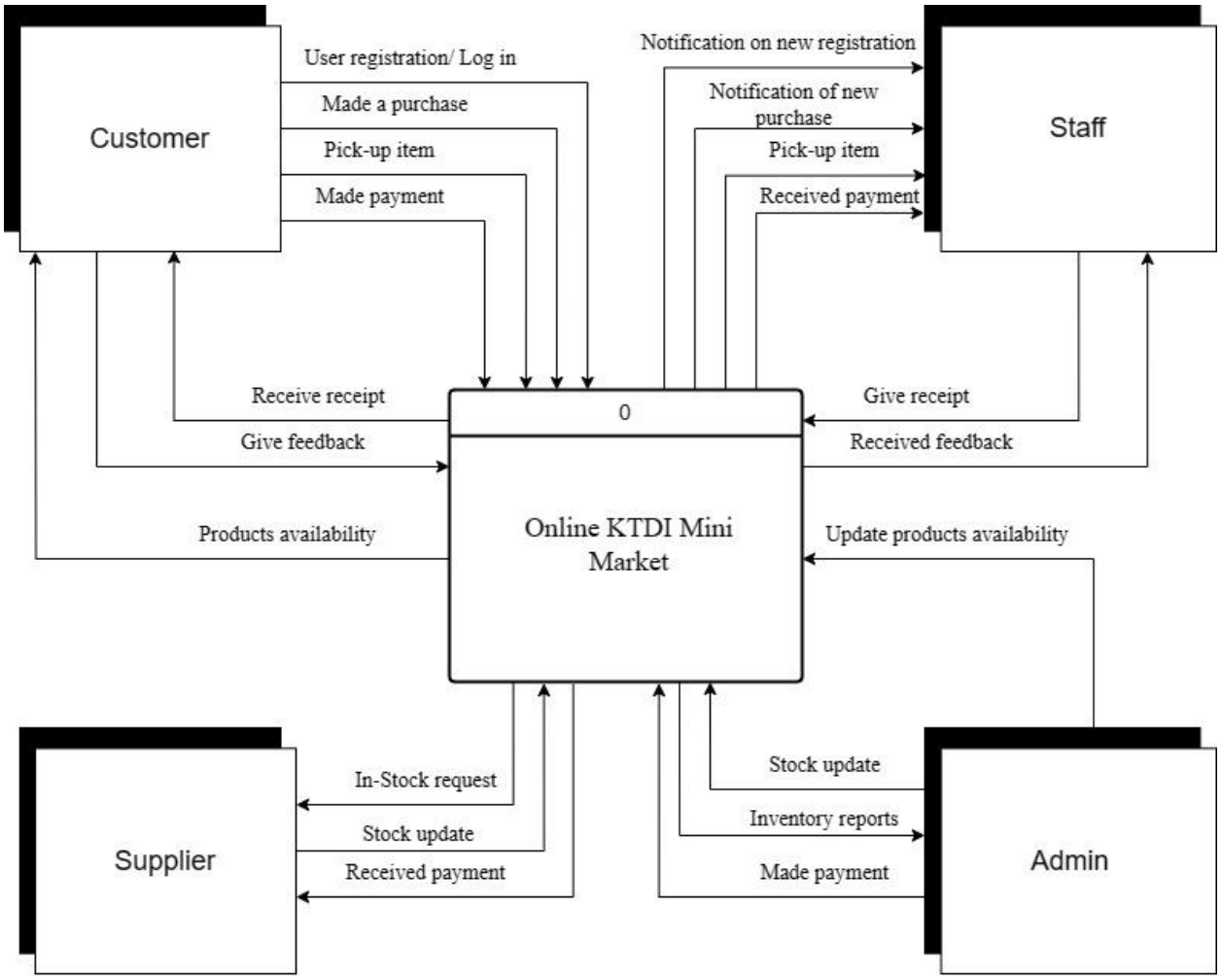
The internet is a crucial part of everyone's life, especially for those who do online commerce and shopping all over the world. There is a lot of the system that is created to make the client sits in front of the computer and quickly purchases. People like to buy everything online in our fast-growing environment. Because so many people are now utilizing e-commerce technologies, there is a need to develop an online shopping system that is simple to use and secure for client information. This is why online grocery stores exist and have grown popular, and it is intended to analyze and create an online grocery system.

The act of shopping online is the process by which consumers buy products or services directly from a vendor over the internet in real time, without the need of an intermediary provider. This initiative aims to deliver the benefits of an online grocery system to clients of a physical store. It allows you to buy things from the tiny market from anywhere using a computer and the internet. As a result, clients will be able to use the mini market's online grocery system and home delivery service.

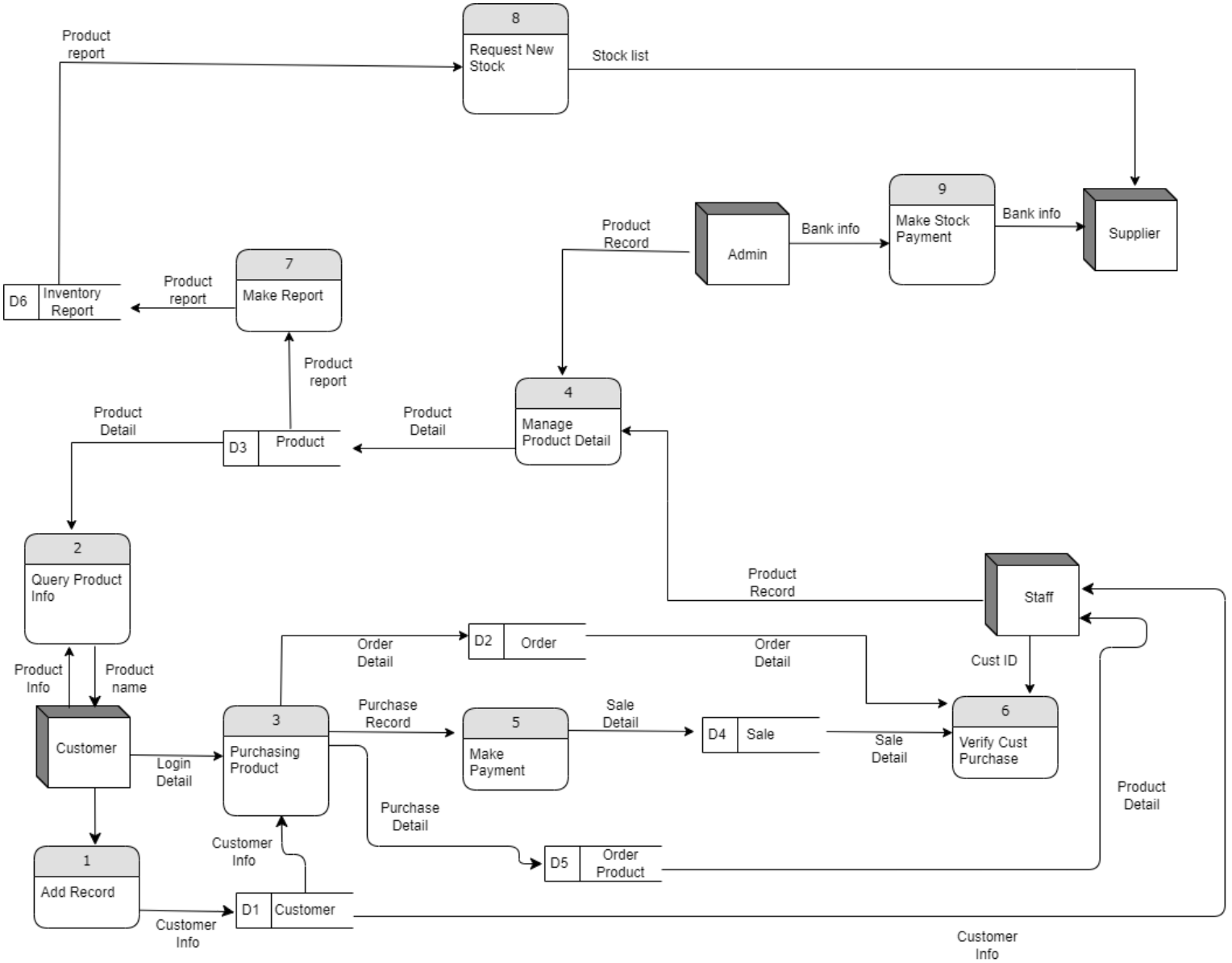
This study is expected to contribute to the practical knowledge of vendors by better understanding the buying process of online grocery shopping from the plans consumers elaborate before shopping, to the actual buying process, and finally to the post shopping evaluation, as well as some of the implications on sales of this retail channel versus a more traditional one.

2.0 DFD (to-be)

Context Diagram

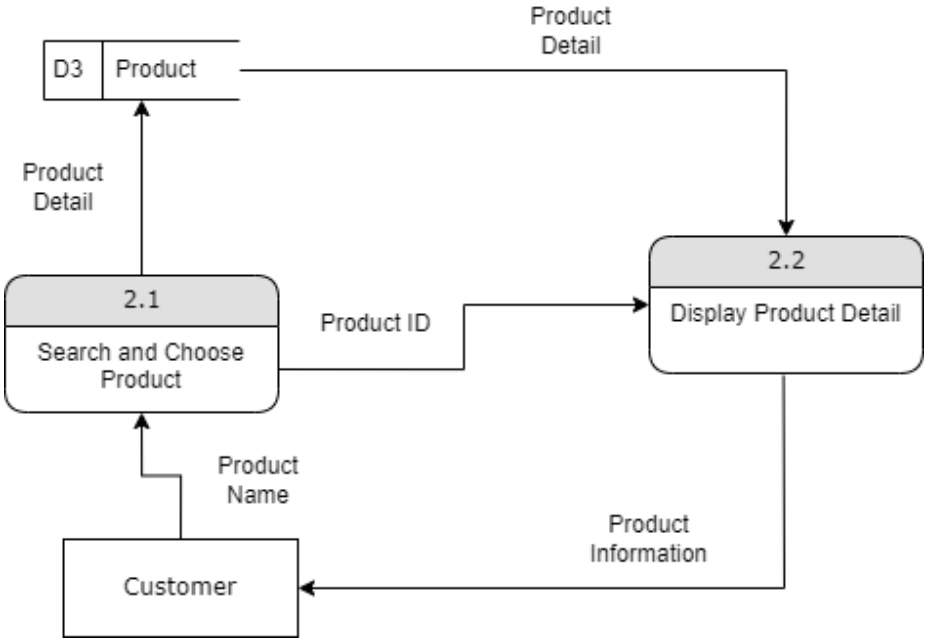


Parent Diagram

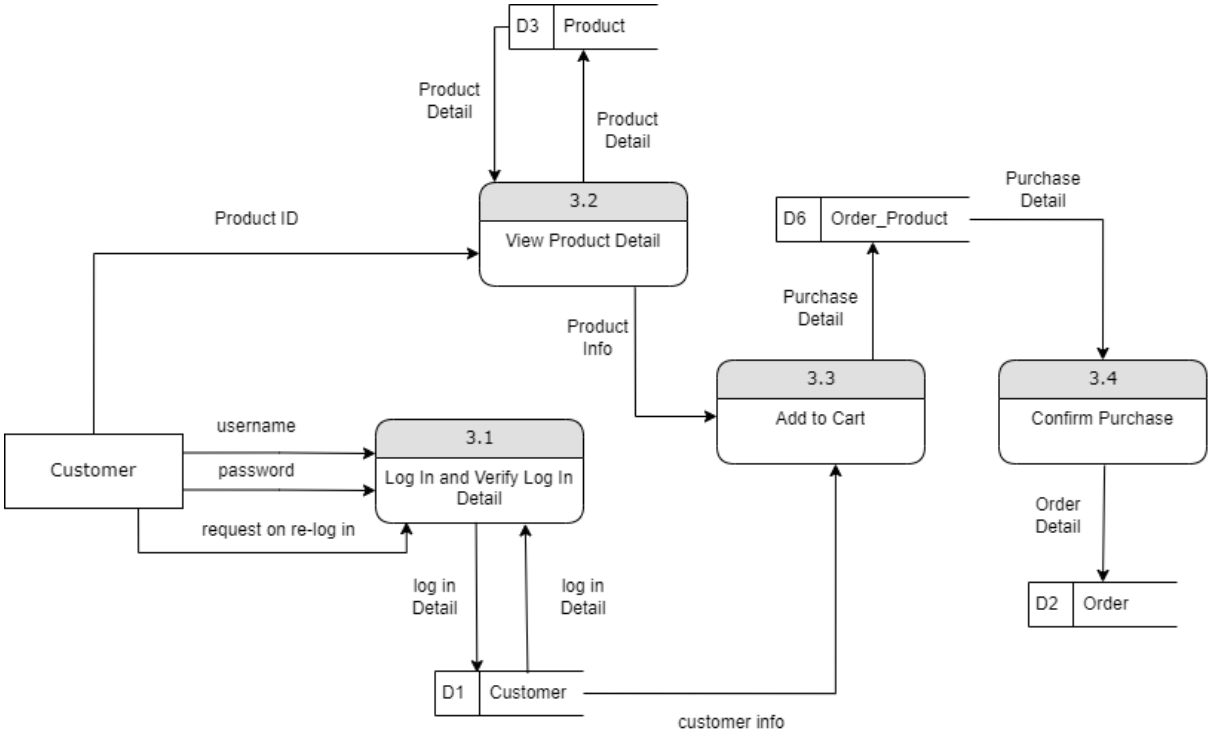


Child Diagram

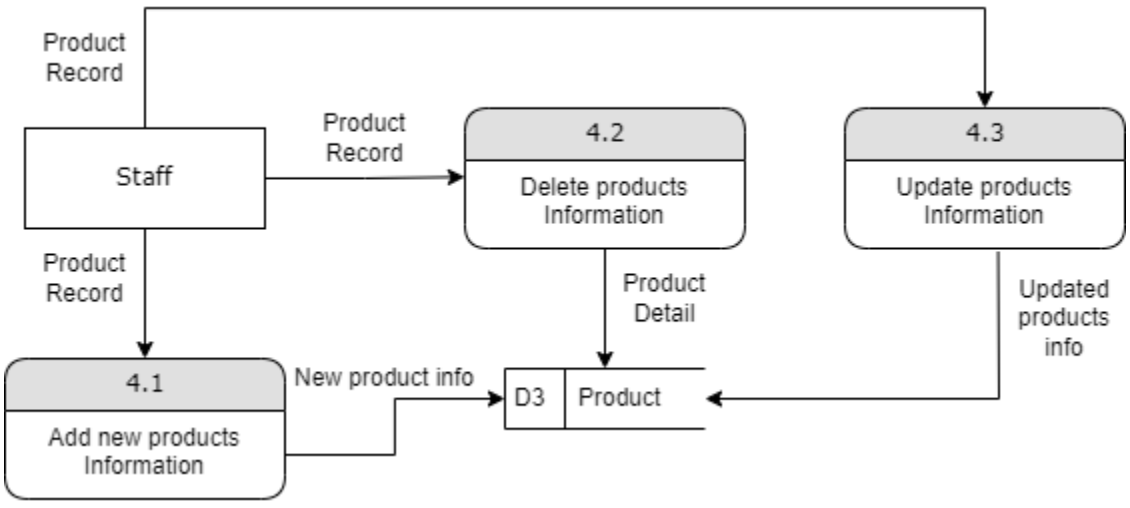
Child Diagram for Process 2



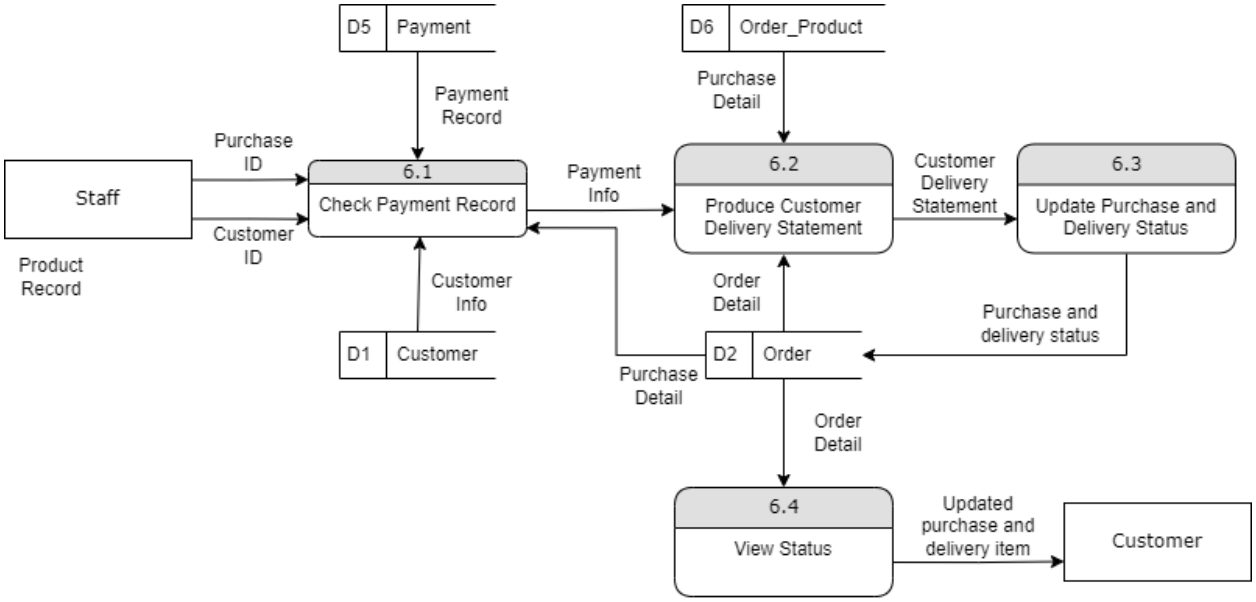
Child Diagram for Process 3



Child Diagram for Process 4



Child Diagram for Process 6



3.0 Data & Transaction requirement

Entity	Data to be stored	Requirement of data
Customer	• Username, Password, Email, Address, Contact Number. • Customer ID{pk}, Product ID{pk}, Quantity, Order Status.	• Unique username and email for each customer. • Ability to modify the customer's order list.
Staff	• Staff ID{pk}, Username, Password, Email, Contact Number. • Product ID{pk}, Quantity, Order Status. • Order ID{pk},Payment Status, Transaction Details.	• Unique staff ID and access permissions. • Ability to modify the order list and notify the admin. • Access to the order and payment database
Admin	• Admin ID{pk}, Username, Password,	• Unique admin ID and high-level access

	Email, Contact Number. ● Supplier Contact Information , Order Details ● Transaction Details, Profit Calculation	permissions. ● Ability to communicate with suppliers ● Access to payment and financial transaction records.
Supplier	● Supplier ID{pk}, Supplier Name, Contact Information. ● Product ID{pk}, Product Name, Price, Availability. ● Order Details, Admin/Staff Contact Information.	● Unique supplier ID and contact details. ● Access to product catalog for updating availability. ● Ability to receive and respond to order alerts.

3.1 Proposed business rule

Inventory Management Rule :

Define minimum stock levels for each item based on historical sales data, seasonality, and lead time from suppliers. When stock falls below the minimum level, an automatic reorder alert should be triggered. Set maximum stock levels to prevent overstocking and wasted inventory costs. Consider factors like shelf life, product popularity, and storage space limitations. Utilize sales data and external factors like holidays or promotions to forecast future demand and optimize inventory levels.

Employee Authorization Rule :

The system should implement user authentication protocols such as secure login credentials and possibly two-factor authentication to ensure that only authorized individuals can access the system. Admin and staff have varying responsibilities within the mini mart and their access to the inventory management system should align with their roles. Staff should only have access to the data necessary for their job functions while admin is able to control the whole system. Limiting data access helps protect sensitive information and prevents unauthorized individuals from viewing or modifying critical data.

Operational Efficiency Rule:

Define automated purchase order triggers based on predefined rules. For example, when stock falls below a minimum level or reaches a reorder point, a purchase order is automatically generated. Establish clear rules for receiving deliveries and updating inventory records. This ensures accuracy and minimizes discrepancies. Define consistent pricing and margin rules for all products. This simplifies calculations and maintains profitability.

Regular System Updates Rule:

The inventory management system will undergo regular updates to incorporate technological advancements and address any issues or improvements identified during its usage. Regular updates help in keeping the system current and secure with the evolving needs of the business.

Customer Experience Rule:

Maintain a clean, organized, and welcoming interface of the system to ensure that products and price are clearly displayed and price and description is easy to understand. Also, ensure real-time product availability information is displayed in the system and communicated to customers. This helps to avoid disappointment and lost sales due to out-of-stock items. Lastly, design and implement loyalty programs to reward repeat customers such as point accumulation rules and redemption options.

Feedback Rule:

Customers are encouraged to provide feedback through the mobile application. Customers have the option to submit feedback anonymously to encourage honest and unbiased opinions. Customer feedback will be treated as a valuable resource for continuous improvement of KTDI mini mart. Positive feedback will be showcased on the mini mart's online platforms. This will contribute to a positive public image, highlights the mini mart's strengths and fosters a positive perception among customers.

3.2 Proposed data & transactional

Customer View:

Data Entry

- Enter details of Customer: Username, Password, Email, Address, Contact Number.
- Enter details of Order: Customer ID, Product ID, Quantity, Order Status.
- Enter details of Sale transaction: Customer ID, Order ID, Payment Status, Transaction Details.

Data Update/Deletion:

- Update/Delete the details of Customer: Username, Password, Email, Address, Contact Number.
- Update/Delete the details of Order: Customer ID, Product ID, Quantity, Order Status.
- Update/Delete the details of Sale transaction: Customer ID, Order ID, Payment Status, Transaction Details.

Data Queries

1. List the availability of stocks.

2. List the customer name, address, phone number, email.
3. Access queries related to specific customer orders.
4. Generate a detailed sales report for a particular customer, including transaction specifics.

Staff View :

Data Entry

- Enter details of Staff: Staff ID, Username, Password, Email, Contact Number.
- Enter details of Order: Staff ID, Product ID, Quantity, Order Status.
- Enter details of Sale transaction: Staff ID, Order ID, Payment Status, Transaction Details.

Data Update/Deletion

- Update/Delete the details of Staff: Staff ID, Username, Password, Email, Contact Number.
- Update/Delete the details of Order: Staff ID, Product ID, Quantity, Order Status.
- Update/Delete the details of Sale transaction: Staff ID, Order ID, Payment Status, Transaction Details.

Data Queries

1. List the availability of stocks.
2. List the client name, address, phone number, email.
3. Access queries related to specific staff orders.
4. Generate a detailed sales report for a particular staff member, including transaction specifics.

Admin View:

Data Entry

- Enter details of Admin: Admin ID, Username, Password, Email, Contact Number.
- Enter details of Order: Admin ID, Product ID, Quantity, Order Status.
- Enter details of Sale transaction: Admin ID, Order ID, Payment Status, Transaction Details.

Data Update/Deletion

- Update/Delete the details of Admin: Admin ID, Username, Password, Email, Contact Number.
- Update/Delete the details of Order: Admin ID, Product ID, Quantity, Order Status.
- Update/Delete the details of Sale transaction: Admin ID, Order ID, Payment Status, Transaction Details.

Data Queries

1. List the availability of stocks.
2. List the client name, address, phone number, email.
3. Access queries related to specific admin orders.

4. Generate a detailed sales report for a particular admin, including transaction specifics.

Supplier View :

Data Entry

- Enter details of Supplier: Supplier ID, Supplier Name, Contact Information.
- Enter details of Product: Product ID, Product Name, Price, Availability.
- Enter details of Order: Supplier ID, Product ID, Quantity, Order Status.

Data Update/Deletion

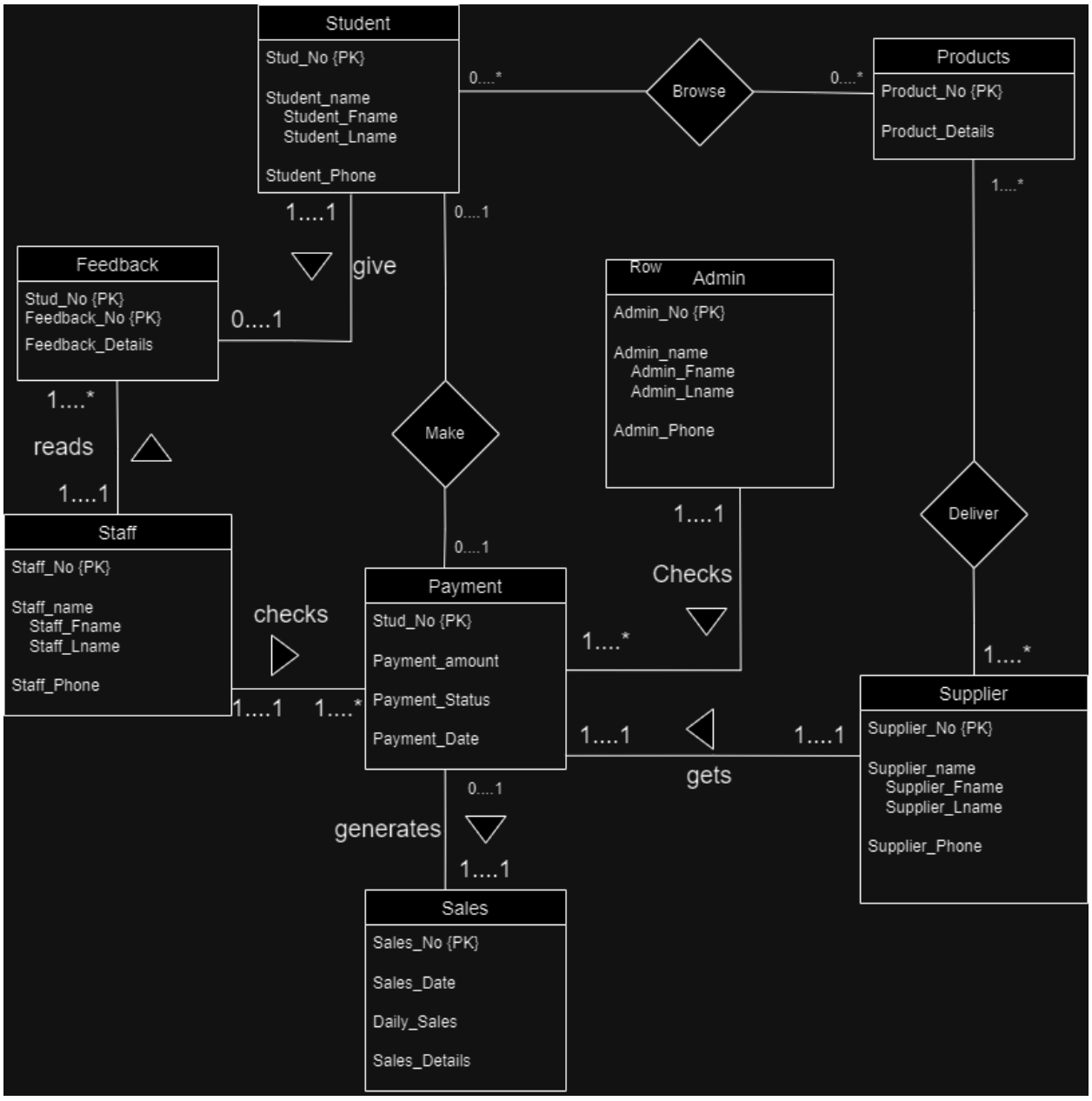
- Update/Delete the details of Supplier: Supplier ID, Supplier Name, Contact Information.
- Update/Delete the details of Product: Product ID, Product Name, Price, Availability.
- Update/Delete the details of Order: Supplier ID, Product ID, Quantity, Order Status.

Data Queries

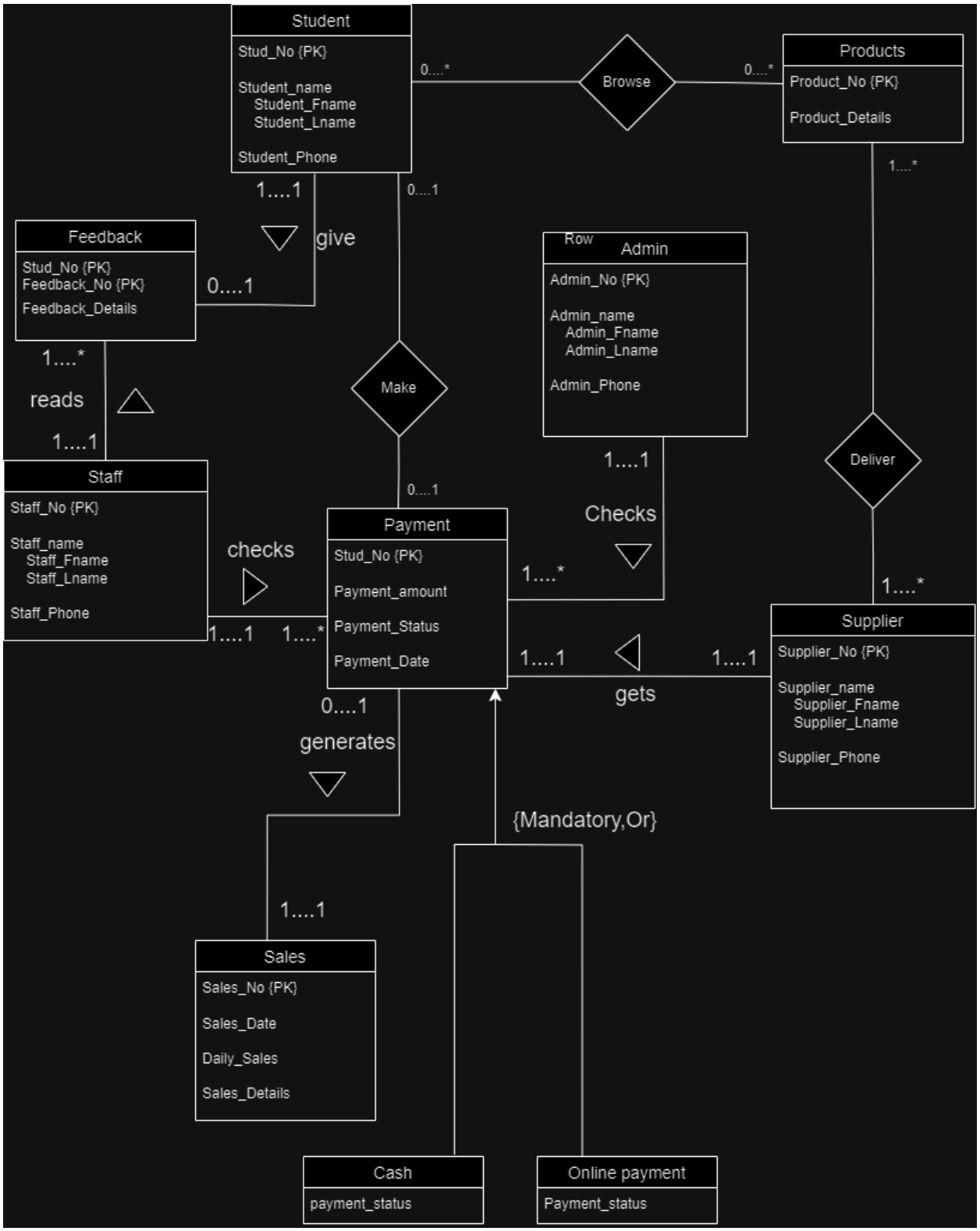
1. List the availability of stocks.
2. List the client name, address, phone number, email (for billing purposes).
3. List of supplier phone numbers, supplier address, supplier bank account.
4. Access queries related to specific supplier orders.
5. Generate a detailed sales report for a particular supplier, including transaction specifics.

4.0 Database conceptual design

4.1 Conceptual ERD



4.2 Enhanced ERD (EERD)



5.0 Data dictionary

Entity Name	Attributes	Description	Data Type & Length	Nullity
Student	Stud_No {PK} Student_name - Student_Fname - Student_Lname Student_Phone	Student number Student first name Student last name Student phone number	varchar(10) varchar(20) varchar(20) number(15)	No No No Yes
Staff	Staff_No {PK} Staff_name - Staff_Fname - Staff_Lname Staff_Phone	Staff number Staff first name Staff last name Staff phone number	varchar(10) varchar(20) varchar(20) number(15)	No No No Yes
Admin	Admin_No {PK} Admin_name - Admin_Fname - Admin_Lname Admin_Phone	Admin number Admin first name Admin last name Admin phone number	varchar(10) varchar(20) varchar(20) number(15)	No No No Yes
Supplier	Supplier_No {PK} Supplier_name - Supplier_Fname - Supplier_Lname Supplier_Phone	Supplier number Supplier first name Supplier last name Supplier phone number	varchar(10) varchar(20) varchar(20) number(15)	No No No Yes
Feedback	Stud_No {PK} Feedback_No {PK} Feedback_Details	Student number Feedback number Feedback details	varchar(10) varchar(10) varchar(20)	No No No
Products	Product_No {PK} Product_Details	Product number Product details	varchar(10) varchar(20)	No No
Payment	Stud_No {PK} Payment_amount Payment_Status Payment_Date	Student number Payment amount Payment status Payment date	varchar(10) number(5) char(10) date	No No No No
Sales	Sales_No {PK} Sales_Date Daily_Sales Sales_Details	Sales number Sales date Daily sales Sales details	varchar(10) date number(10) number(10)	No No No No

6.0 Summary

The deployment of an online grocery system specifically designed for Mini Mart KTDI, a convenience shop located at College Tun Dr Ismail, UTM Johor, is the focal point of the study. The shop now uses manual, paper-based operations, which leads to inefficiencies in order processing, inventory management, and customer relations. A complete system that includes a Point of Sale (POS), Inventory Management, Supply Chain Management, Customer Relationship Management (CRM), and a Training and Support System is what is suggested as a solution.

This initiative's main goals are to improve record-keeping procedures, create a safe online platform for managing stock and sales, and make the small market system more convenient for customers overall. With an emphasis on developing a user-friendly system that includes elements like search capabilities, grocery categories, expedited payment procedures, real-time stock availability updates, and a message system, the scope of the project includes UTM personnel, students, and external clients.

The suggested solution comes with a number of benefits in addition to solving Mini Mart KTDI's problems. These include a decrease in sold-out products, legible product information displays, and real-time updates on product availability that enhance the user experience. The solution offers simplified data administration, data-driven insights that optimize inventory levels, and online payment options integration for cashless transactions. The planned online grocery system essentially aims to modernize and improve Mini Mart KTDI's operating efficiency, giving its customers a smoother and better shopping experience.