UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING, UTM JOHOR BAHRU

SEMESTER 1, SESSION 2023/2024

PROJECT PHASE 2

SECD2523: DATABASE

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SUBMISSION DATE : 16 DECEMBER 2023

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1.0 Introduction

In Project Phase 2, we will identify the entities and attributes of each entity based on the requirements in Project Phase 1. Determine all possible relationships between entities and the multiplicities for each relationship. Create a conceptual ERD to represent the information above. We also include enhanced ERD features wherever possible and produce the data dictionary for the created conceptual design.

2.0 DFD (To-be)

A data flow diagram (DFD) is a graphical representation of the flow of data and information in a system or a process. It shows the sources and destinations of data, the processes that transform data, and the data stores that hold data. A DFD can help to understand, analyze, and design a system or process. Figure 2.1 is the DFD for the TS Mart System with various activities involved:

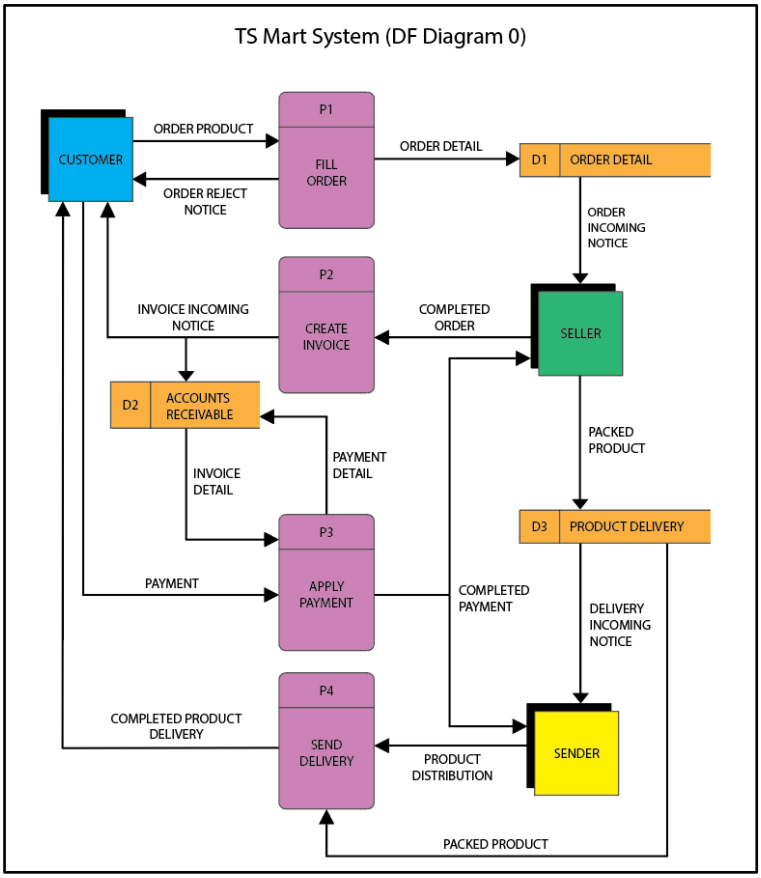

Figure 2.1: DFD TS Mart System

3.0 Data & Transaction Requirement

Data and transaction requirements are important for ensuring data integrity, accuracy, accessibility, and consistency, as well as efficient and effective business operations and analytics.

3.1 Proposed Business Rule

The two (2) business rules can be proposed from the requirement of the TS Mart System. Which is:

- Delivery can be made by many senders, but one sender can only make one delivery at a time.
- Shopping orders can be made by many customers, but one customer can only make one shopping order at a time.

3.2 Proposed Data & Transactional

Data Requirement

Entity Name	Attributes	Data Requirement
Admin	aID aName aPhone aEmail aPassword	• aID and aEmail should be unique to each other and the admin user. • Phone number should be stored at least 1 and at most, 2
Customer	cID cName cAddr City State Postcode cPhone cEmail cPassword	• cID and cEmail should be unique to each other and other customer users • Phone number should be stored at least 1 and at most, 2

Sender	sID sName sPhone sEmail sPassword	• sID and iEmail should be unique to each other and another sender • Phone number should be stored at least 1 and at most, 2
SuperMarket	smName smAddr smPhone smEmail smPassword	• smName and smEmail should be unique to each other and another supermarket • Phone number should be stored at least 1 and at most, 2
SuperMarket_Item	itemID itemPrice itemCategory	• itemId and itemCategory should be unique to each other and another item • Must have at least 1 item in each category listed

Transaction Requirement

Entity Name	Data Entry	Data Update	Data Deletion	Data Queries
Admin	Sign up by admin	Update information by admin	Delete account by admin	-
Customer	Sign up by customer	Update information by customer	Delete account by customer	Query on customer data by admin
Sender	Sign up by sender	Update information by sender	Delete account by sender	Query on customer data by admin

SuperMarket	Sign up by supermarket admin	Update information by supermarket admin	Delete account by supermarket admin	Query on supermarket data by customer
SuperMarket_Item	Sign up by supermarket admin	Update information by supermarket admin	Delete item by supermarket admin	Query on supermarket item data by supermarket admin

4.0 Database Conceptual Design

Database conceptual design is the first stage in the database design process. The goal at this stage is to design a database that is independent of database software and physical details. It involves identifying the main entities and their relationships within the problem domain and creating a conceptual model that represents them.

4.1 Conceptual ERD

One of the common techniques for conceptual design is to use an entity-relationship diagram (ERD), which shows the entities, attributes, and relationships graphically. Figure 4.1 shows the entities, attributes, and relationships of the TS Mart System:

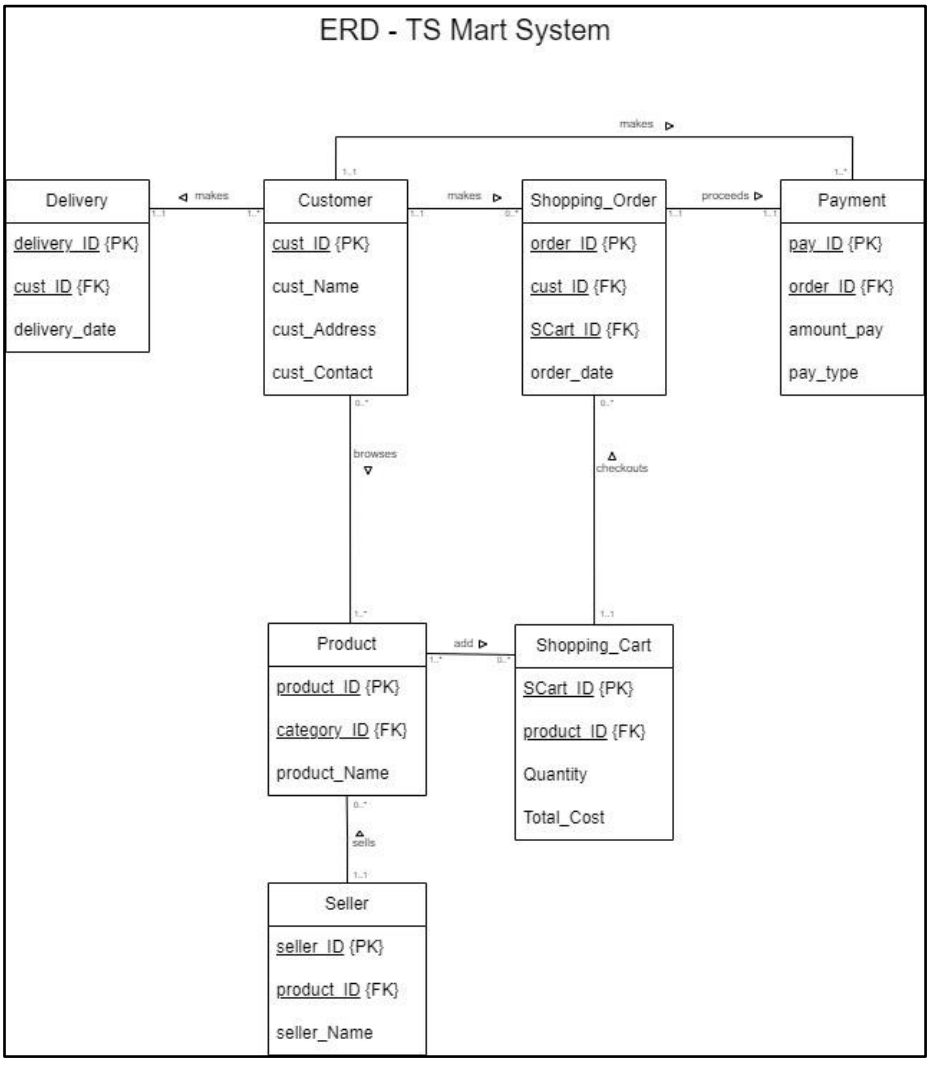

Figure 4.1: ERD TS Mart System

4.2 Enhanced ERD (EERD)

An enhanced ERD (EERD) is an advanced type of database diagram that represents the requirements and complexities of complex databases. It extends the original ERD model with additional concepts such as sub-classes, super-classes, specialization, generalization, union, and aggregation. Figure 4.2 shows the EERD added with the specific concepts:

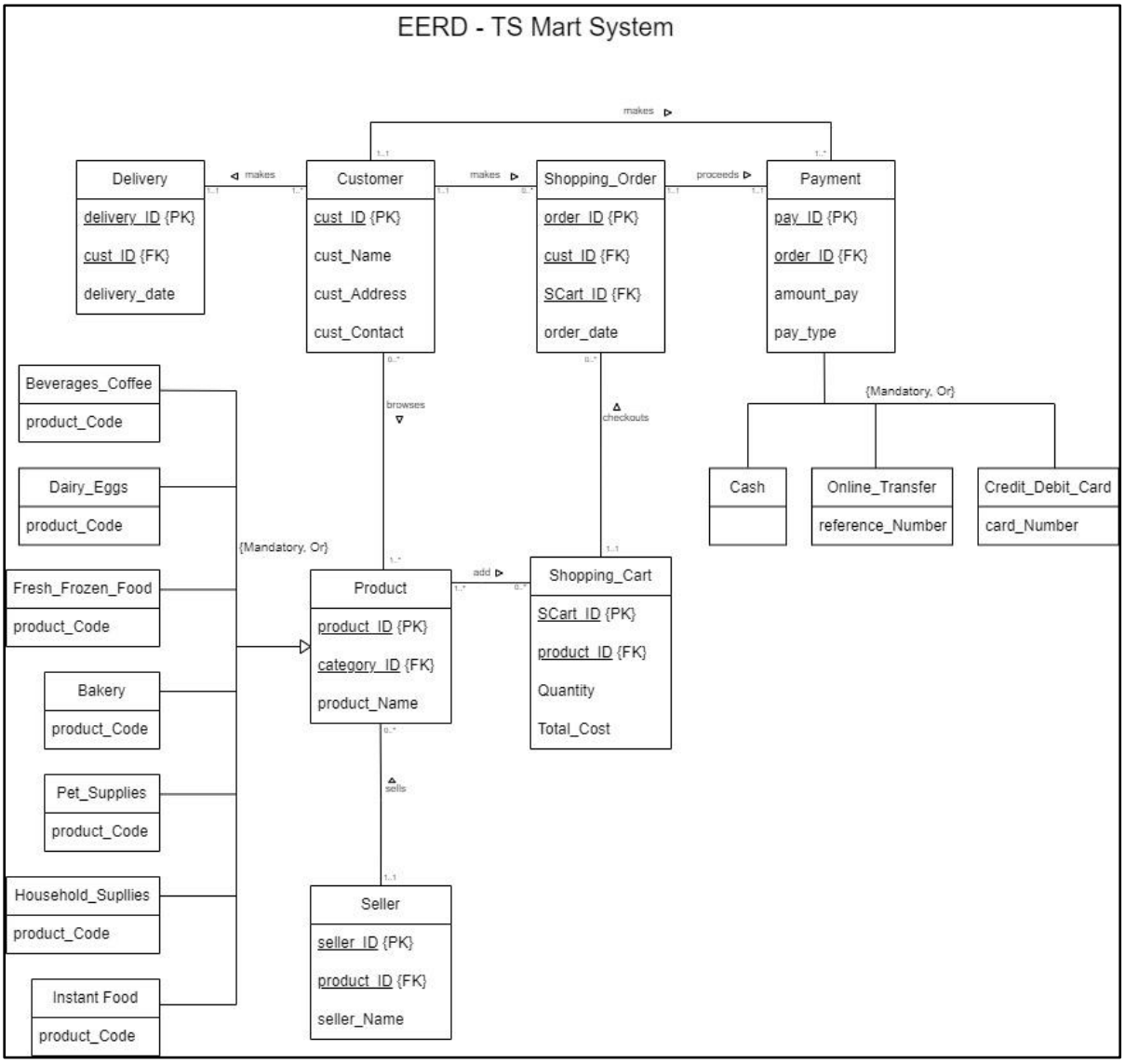

Figure 4.2: EERD TS Mart System

5.0 Data Dictionary

A data dictionary in database is a component that stores the collection of names, definitions, and attributes for data elements that are being used in a database. The data dictionary also stores metadata, which is data about the database. A data dictionary helps to understand, organize, and manage the data elements and their relationships within a database. The table below is the data dictionary of the TS Mart System:

Data Dictionary

Entity Name	Attributes	Data Type & Length	Description	Nulls	Multi-valued
Customer	cust_ID	Decimal (10)	Identifier for customer order ID	NO	NO
	cust_Name	Varchar2 (50)	Name of the customer	NO	NO
	cust_Address	Varchar2 (50)	Address of the customer	NO	NO
	cust_Contact	Varchar2 (15)	Contact number of the customer	NO	NO
Product	product_ID	Decimal (20)	Identifier for the product	NO	NO
	category_ID	Decimal (10)	Category ID for the product	YES	YES
	product_Name	Varchar (50)	Name of the product	NO	NO
Delivery	delivery_ID	Decimal (20)	Identifier for the delivery ID	NO	NO
	cust_ID	Decimal (10)	Identifier for the customer order	NO	NO
	delivery_date	Decimal (10)	Date of the delivery	NO	NO

Seller	seller_ID	Decimal (10)	Identifier for the seller ID	NO	NO
	product_ID	Decimal (20)	Identifier for the product	NO	NO
	seller_Name	Varchar2 (50)	Name of the product seller	NO	NO
Shopping_Order	order_ID	Decimal (20)	Identifier for the order	NO	NO
	cust_ID	Decimal (10)	Identifier for the customer order ID	NO	NO
	SCart_ID	Decimal (20)	Identifier for the shopping cart	NO	NO
	order_date	Decimal (10)	Date of the order	NO	NO
Shopping_Cart	SCart_ID	Decimal (20)	Identifier for the shopping cart	NO	NO
	product_ID	Decimal (20)	Identifier for the product	NO	NO
	Quantity	Decimal (1000)	Quantity of the order	NO	NO
	Total_cost	Decimal (1000)	Total cost of the order	NO	NO
Payment	pay_ID	Decimal (10)	Identifier for the order payment	NO	NO
	order_ID	Decimal (10)	Identifier for the order	NO	NO
	amount_pay	Decimal (1000)	Amount pay to the seller	NO	NO
	pay_type	Varchar2 (20)	Payment type that used to pay order	NO	NO

6.0 Summary

TS Mart were designed to meet the dynamic demands of today's customers. This technologically advanced system allows customers to effortlessly explore and purchase products from the convenience of their homes while integrating modern technology with efficient business processes. The interconnected network of customers, ordering systems, payment gateways, inventory management, and shipping is vividly illustrated through a comprehensive Data Flow Diagram (DFD). TS Mart highlights are secure payment options and huge inventory product just at the end of your fingertips. Using the DFD, TS Mart ensures efficiency, accuracy, and transparency for the best customer experience throughout the shopping journey. TS Mart' system stands out as an intelligent solution for modern days shopping, elevating the user experience and optimizing backend operations for smooth and precise response.