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SECD2523 - DATABASE

SEMESTER 1 2023/2024

P1 – SYSTEM PROPOSAL

GROUP 6

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Section: section 10

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1.0 Introduction

Clothes and food play an integral role in our lives. There has been a recent surge in online activity in the retail sector, including fashion and food. This shift has become a popular lifestyle, allowing people to savour a diverse range of culinary delights and explore stylish clothing, all from the comfort of their homes. Businesses that offer both delicious food and fashionable clothing tend to attract customers.

In this era where commerce and lifestyle intersect, the retail landscape is undergoing a major shift. The convenience and ubiquity of online platforms have become not only a convenience, but also a way of life, profoundly affecting consumer behaviour. Customers can now engage in a myriad of activities while anticipating the arrival of their orders. One of the entrepreneurs navigating this market is **STAKEHOLDER**, the visionary owner behind **COMPANY**, a store that sells gourmet food and fashionable clothing.

Our project focused on enhancing **COMPANY**'s existing business systems to ensure they resonate harmoniously with the changing needs of the retail market. In this proposal, we outline a comprehensive plan for the development of **COMPANY**'s online system. Addressing the challenges identified by **STAKEHOLDER**, such as inventory management, data analysis and insights, transaction security and order accuracy and processing, our project aims to elevate **COMPANY**'s operations and pave the way for sustained growth.

2.0 Background Study

The traditional approach to inventory management has proven to be a bottleneck for our stakeholders' business. Persistent issues such as stock-outs, lost sales, and capital tied up in excess inventory have been attributed to manual tracking processes and delayed reordering. Therefore, our proposed inventory management system introduces automation as a cornerstone for operational efficiency. By implementing automated inventory tracking, the system ensures real-time visibility into stock levels, mitigating the risk of stock-outs and providing instant insights. Additionally, the integration of reorder automation establishes a seamless process by setting predefined thresholds that trigger automatic reorder requests. This feature not only streamlines inventory replenishment but also minimises manual intervention, allowing for timely restocking and contributing to a more agile and responsive supply chain.

Apart from this, there is only one payment method for the stakeholder's business and that is Cash on Delivery (COD). Therefore, they need a safe and reliable online transaction system to prevent enterprises from facing potential data leaks and financial losses. To solve this problem, our system prioritises strong transaction security by combining a secure payment gateway with encryption protocols to ensure the protection of customer financial data during online transactions. Additionally, two-factor authentication (2FA) has been implemented to add an extra layer of security to user accounts, especially those involved in financial transactions. This dual security approach enhances the overall integrity of the system and promotes trust and confidence in secure online interactions.

With the current system, they are unable to ensure order accuracy and track delivery status. So, our system focuses on order accuracy and efficiency with two key features. Firstly, a transparent order tracking system provides real-time visibility for both buyers and sellers throughout the supply chain. This enhances transparency and helps stakeholders monitor order status. Secondly, a communication platform is integrated to facilitate clear and real-time communication among buyers, sellers, and other stakeholders involved in the order fulfilment process. These features streamline communication and contribute to an accurate and efficient order processing workflow.

3.0 Problem Statement

1. Inventory Management

   Since our stakeholder runs the business in a traditional business model, he often faces significan7t challenges in managing inventory effectively, such as stock-outs, lost sales, and funds tied up by excess inventory. Manual tracking processes and delayed reordering lead to operational inefficiencies, while the inability to maintain optimal inventory levels cause the business from meeting customer demand in a timely manner.

2. Data Analysis and Insights

   Our stakeholders had issues collecting and analysing order data because the manual data collection process limited the depth of understanding. As a result, it was unable to leverage valuable data to understand customer behaviour, purchasing patterns, and market trends. The absence of a systematic approach to data analysis undermines the optimization of business strategies for better results.

3. Transaction Security

   Our stakeholder requires a safe and secure online transaction system. Lack of security features such as encryption and secure payment gateways can lead to data breaches and financial losses. Customers' sensitive information, such as credit card details, personal addresses and contact information, may be accessed, and exploited by unauthorised parties. Unauthorised access to payment information can result in unauthorised transactions, leading to financial losses for both businesses and customers. This leads to a lack of trust between buyers and sellers.

4. Order Accuracy and Processing

   Our stakeholder has experienced issues with order entry errors, pricing discrepancies and fulfilment inaccuracies in order processing systems. The lack of transparent communication exacerbates these issues, making it difficult for buyers and sellers to track orders and ensure accuracy throughout the supply chain.

4.0 Proposed solution

The system will require users to register basic personal information, such as name, address, interests, etc. This data will be used by the system to develop content suitable for users. At the same time, this will also update the data in real time according to the user's habits. The real-time synchronisation function will also be applied to product inventory updates. The system will give priority to recommending products with sufficient inventory to users so that the purchase progress can go smoothly and improve efficiency. In addition, the system will set up multiple security verifications before users make payments. This not only ensures the safety of users' funds, but also reduces the occurrence of crime. Security verification includes sending OTP, manually confirming transactions. The basic information of these users will be protected at all levels to prevent leakage. In terms of transportation, the system will use mutual confirmation to ensure that there are no errors in product information such as order number, product quantity. The shipping company will not start shipping until the system confirms that the order number is consistent with the one provided by the merchant, which can reduce the occurrence of errors.

4.1 Feasibilities

1. Technical feasibility

For this system, users can access it on any device such as mobile phones, tablets, computers. This is a very convenient system for users. Moreover, browsing data on all devices will be synchronised to the system, and the system will store and encrypt this data to prevent problems such as outsourcing.

2. Operational feasibility

During the user's use, the data collected by the system can improve the system's filtering and content recommendation functions. Stakeholders also benefit from the elimination of manual data collection steps, making it easier and more accurate to provide users with suitable products. Therefore, after our research, this system is operational and brings convenience.

5.0 Objective

- To provide the seller a platform that can collect the data easier.
- To make the job calculating stock easier
- To make the seller track the sales.
- To provide seller a new platform for selling

6.0 Scope

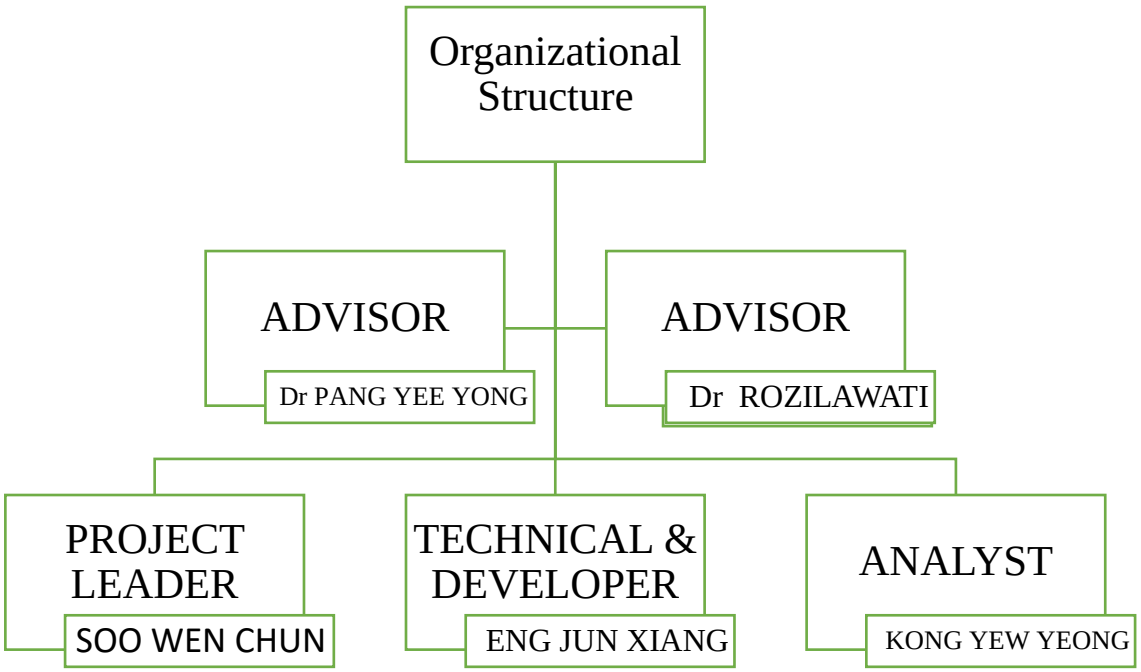
This system excels in helping sellers with their daily tasks such as counting and updating their inventory. The system will also provide services to different groups of people such as buyers and transporters. Sellers can count sales and inventory in this system to calculate restocking time more accurately. In addition, they can also provide a system to view sales and profits, which greatly reduces sellers' risks, such as problems such as being unable to make ends meet and overstocking. The system also provides a platform for buyers and sellers to communicate so that buyers can get good products. In terms of transportation, express delivery can update the latest status of goods such as their location in real time to let sellers and buyers know. This reduces the risk of missing items. When the goods are delivered, the platform can also notify the buyer to sign for receipt and update the product status.

6.1 System boundary

The system provides a simple and clean operation interface, making it easy for users to operate and find the functions they want to use, so as to attract more users. In addition, the system will provide sellers and transportation platforms to facilitate transportation throughout Malaysia. So, sellers will be able to sell goods all over Malaysia. The system will also track the package status and show it to buyers and sellers.

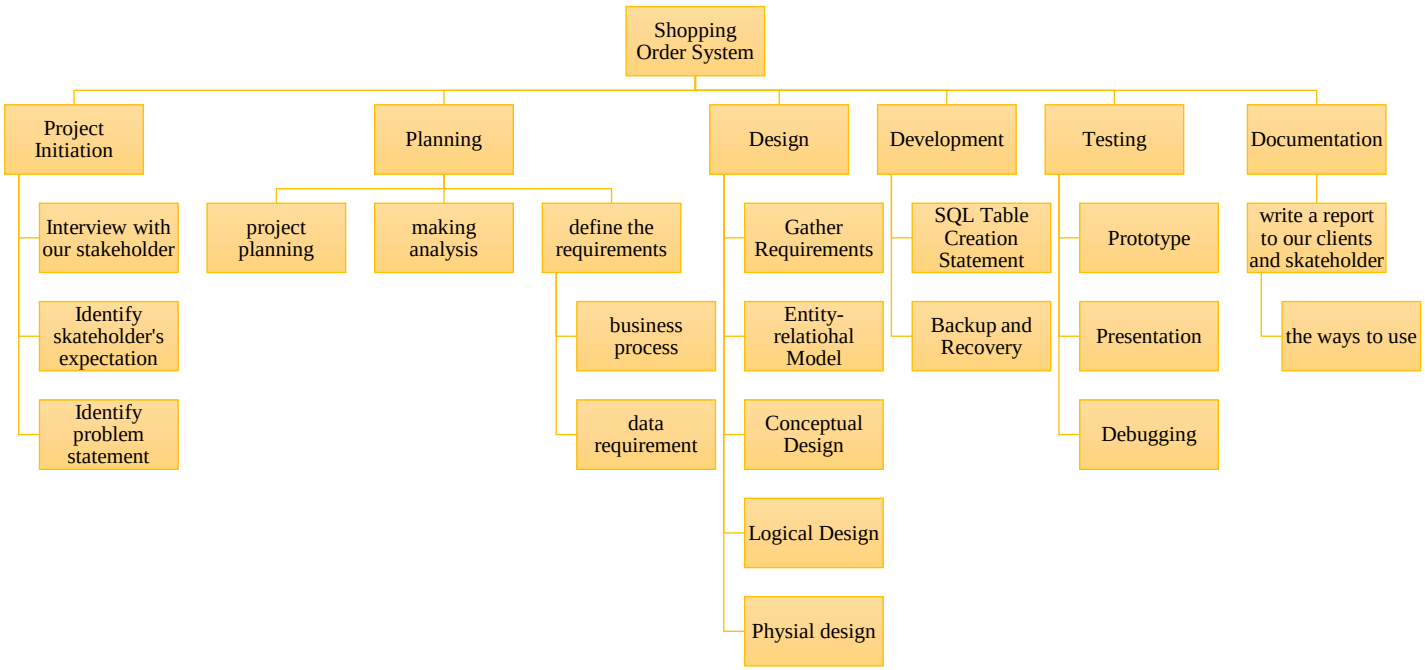
7.0 Project Planning

7.1 Human Resource



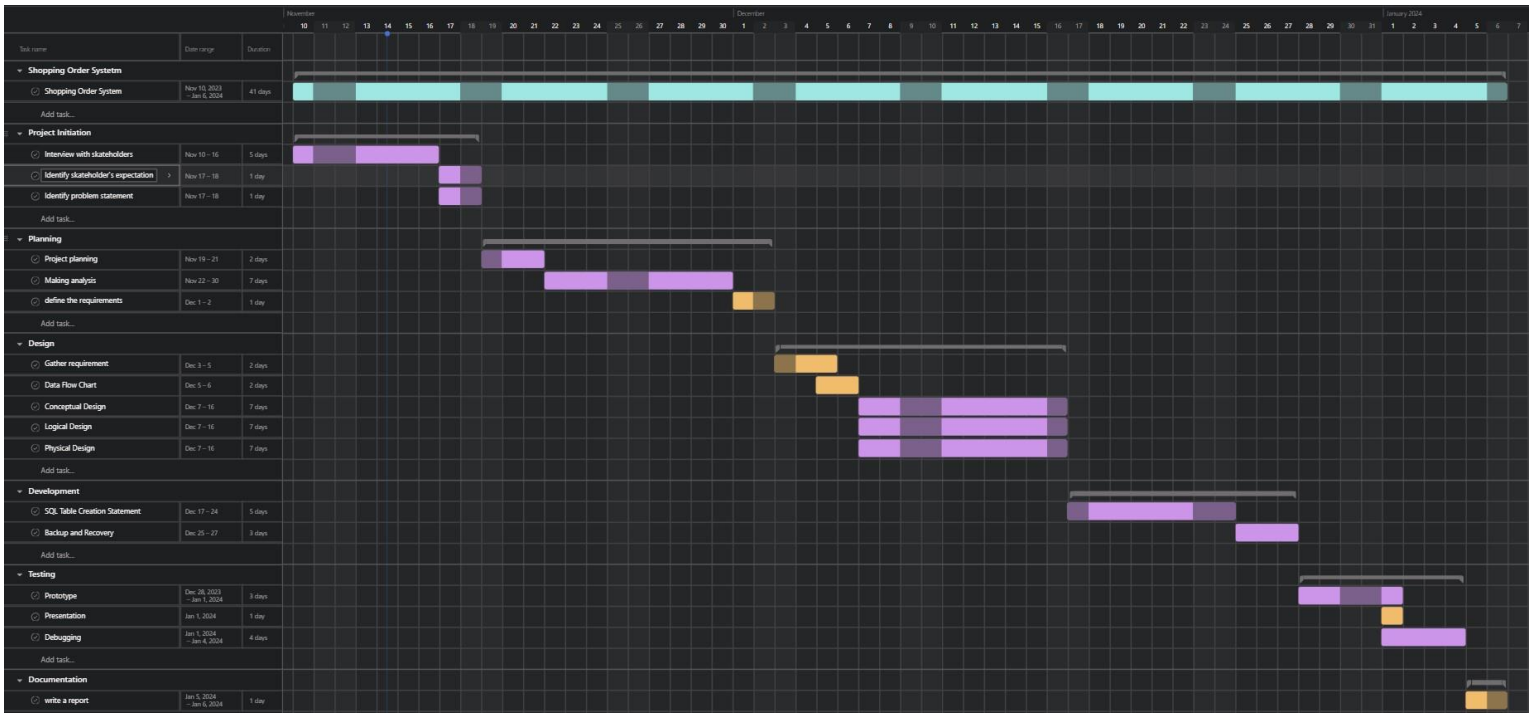
Role	Name	Responsibility
Advisor 1	**Dr Pang Yee Yong**	• **Guide us during the process of project** • **Give some advice to enhance the quality of our project**
Advisor 2	**Dr Rozilawati**	
Project Manager	**SOO WEN CHUN**	• **Plan project** • **Monitor project work** • **Distribute the tasks to teammates**
Technical & Developer	**Eng Jun Xiang**	• **Designing the system fulfilled with the requirements** • **Checking the performance of system** • **Data development** • **Troubleshooting** • **Debugging**
Analyst	**Kong Yew Yeong**	• **Make an analysis about the project** • **Interpret information** • **Creating reports and charts**

7.2 Work Breakdown Structure (WBS)



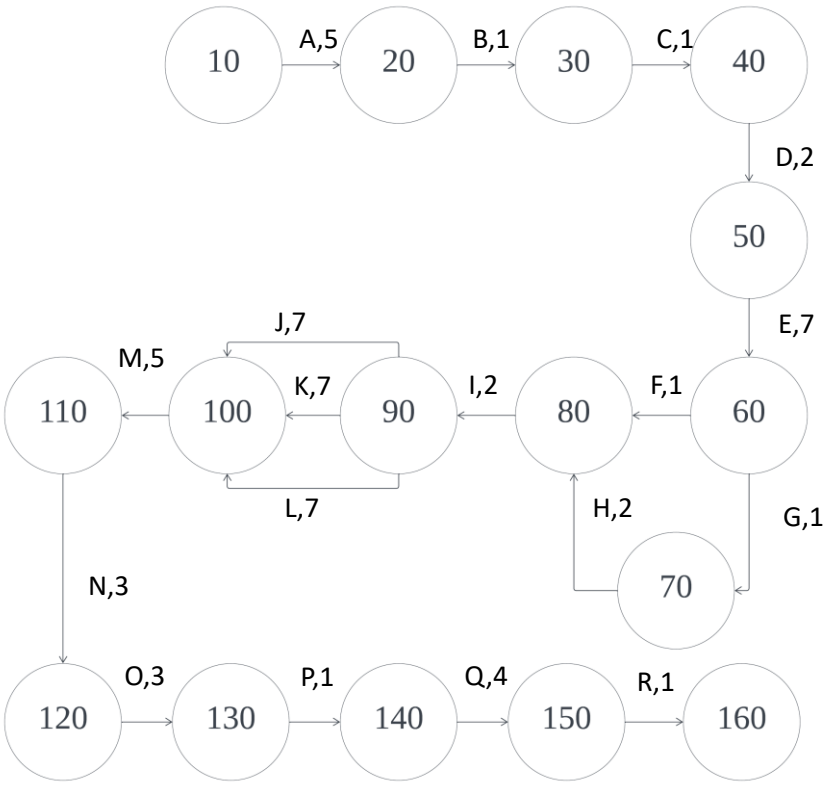
7.3 Gantt Chart

Task name	Assignee	Due date	Priority	Status
Shopping Order Systetm				
Shopping Order System		Nov 10, 2023 – Jan 6, 2024	Low	
Add task...				
Project Initiation				
Interview with skateholders		Nov 10 – 16	High	
Identify skateholder's expectation		Nov 17 – 18	High	
Identify problem statement		Nov 17 – 18	High	
Add task...				
Planning				
Project planning		Nov 19 – 21	High	
Making analysis		Nov 22 – 30	High	
define the requirements		Dec 1 – 2	Medium	
Add task...				
Design				
Gather requirement		Dec 3 – 5	Medium	
Data Flow Chart		Dec 5 – 6	Medium	
Conceptual Design		Dec 7 – 16	High	
Logical Design		Dec 7 – 16	High	
Physical Design		Dec 7 – 16	High	
Add task...				
Development				
SQL Table Creation Statement		Dec 17 – 24	High	
Backup and Recovery		Dec 25 – 27	High	
Add task...				
Testing				
Prototype		Dec 28, 2023 – Jan 1, 2024	High	
Presentation		Jan 1, 2024	Medium	
Debugging		Jan 1, 2024 – Jan 4, 2024	High	
Add task...				
Documentation				
write a report		Jan 5, 2024 – Jan 6, 2024	Medium	


November
December
January 2024
Task name
Date range
Duration
Shopping Order Systetm
Shopping Order System
Nov 10, 2023 – Jan 6, 2024
41 days
Add task...
Project Initiation
Interview with skateholders
Nov 10 – 16
5 days
Identify skateholder's expectation
Nov 17 – 18
1 day
Identify problem statement
Nov 17 – 18
1 day
Add task...
Planning
Project planning
Nov 19 – 21
2 days
Making analysis
Nov 22 – 30
7 days
define the requirements
Dec 1 – 2
1 day
Add task...
Design
Gather requirement
Dec 3 – 5
2 days
Data Flow Chart
Dec 5 – 6
2 days
Conceptual Design
Dec 7 – 16
7 days
Logical Design
Dec 7 – 16
7 days
Physical Design
Dec 7 – 16
7 days
Add task...
Development
SQL Table Creation Statement
Dec 17 – 24
5 days
Backup and Recovery
Dec 25 – 27
3 days
Add task...
Testing
Prototype
Dec 28, 2023 – Jan 1, 2024
3 days
Presentation
Jan 1, 2024
1 day
Debugging
Jan 1, 2024 – Jan 4, 2024
4 days
Add task...
Documentation
write a report
Jan 5, 2024 – Jan 6, 2024
1 day

7.4 Pert Chart

Activity	Activity Name	Predecessor	Duration (days)
A	Interview stakeholder	NONE	5
B	Identify stakeholder's expectation	A	1
C	Identify problem statement	B	1
D	Project planning	C	2
E	Making analysis	D	7
F	Business process	E	1
G	Data requirement	E	1
H	Gather requirement	G	2
I	Entity-relational model	F, H	2
J	Conceptual Design	I	7
K	Logical Design	I	7
L	Physical Design	I	7
M	SQL Table Creation Statement	J, K, L	5
N	Backup and Recovery	M	3
O	Prototype	N	3
P	Presentation	O	1
Q	Debugging	P	4
R	Write a report	Q	1



8.0 Requirement Analysis

8.1 Current business process

8.1.1 Business rule

Business Rule #1

Rule: Each customer can place multiple order

Entity: Customer

Relationship: relationship between customer and order is one-to-many

Attribute: There is an association between the Customer entity and Order entity

Business Rule #2

Rule: Each order contains one or more quantity of products

Entity: Order, Product

Relationship: relationship between Order and Product is one-to-many

Attribute: An association entity is needed to represent the relationship between Order and Product

Business Rule #3

Rule: Each customer can place multiple order from several users

Entity: Customer

Relationship: relationship between Customer and User is one-to-many

Attribute: There is an association between the Customer entity and User entity

Business Rule #4

Rule: Each user has their own identifier

Entity: User

Attribute: UserID

Business Rule #5

Rule: Each customer has their own identifier

Entity: Customer

Attribute: CustomerID

8.1.2 Data Requirement

1. User Data Requirement
    - UserID: int
    - UserName: string
    - UserPH: string
    - UserEmail: string

2. Customer Data Requirement
    - CustomerID: int
    - CustomerName: string
    - CustomerPH: string
    - CustomerAddress: string
    - CustomerEmail: string

3. Product Data Requirement
    - ProductID: int
    - ProductName: string
    - ProductCode: int
    - ProductDes: string
    - ProductQty: int

4. Order Data Requirement
    - OrderID: int
    - ProductID: int
    - ProductQty: int
    - OrderDate: string
    - TotalPrice: int
    - CustomerID: int

5. Tracking Data Requirement
    - TrackingNo.: int
    - TrackingDate: string
    - TrackingAddress: string

8.1.3 Database Requirement

1. Performance Requirements

a. Response Time:
- Ensure that database queries and transactions have low latency, providing quick responses to user requests.

b. Scalability:
- Design the database system to scale horizontally or vertically to accommodate increased data and user loads over time.

2. Security Requirements

a. Data Encryption
- Encryption is to prevent the exposure the customer personal information during transmission of data

b. Authentication and Authorization
- Verify the identity of user before entering to protect the database
- Ensure the only authorized users to access the database

c. Backup and Recovery
- Duplicate the data and store it in a secure place when system failure or data corruption

3. Reliability and Availability

a. High Fault Tolerance
- Design the database system to withstand hardware failure or unexpected outages without affecting data integrity

b. High availability
- To minimize downtime and ensure continuous access to the database

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9.0 Transaction requirements

9.1. Data Entry

a. Account Registration
   - Allow data entry for new customer details
   - Capture new customer's personal information, such as name, contact information and address.

b. Product Display
   - Analyse the favourite product of customers
   - Filter and display the related products to customers

c. Order Placement
   - User should be able to manually record customer orders.
   - Capture customer details including name, contact information, and shipping address.
   - Display the ordered products, and the total price.

d. Customer communication
   - Generate the order confirmation messages for customers.
   - Updated the status of parcel to customers

9.2 Data Update/ Delete Transactions

a. Customer Information Update
   - Allow stakeholders to update customer's information
   - Example: contact information and shipping address

b. Product Information
   - Enable stakeholders to update their product information.
   - Example: stock quantity, description, and new price of the product

c. Order Update
   - Allow the changes to the quantity of order made by customers
   - Allow the changes of product selected by customers
   - Allow the authorized users to cancel orders

9.3 Data Queries

a. Information Restoration
   - Allow users to restore the information of customer based on customer name

b. Product Detail Query
   - Enable users to query and retrieve the product information based on the product's identity

c. Order History
   - Enable users to query and retrieve the history of product ordered

d. Stock Status
   - Enable users to query and retrieve the remaining stock of product

e. Payment Tracking
   - Record the payment details for each order, including payment method
   - Ensure the amount of payment received is accurate

f. Sales Report
   - Generate a report including the amount of sales, the total price of products sold, and the total profit made by users

10. Benefits and Summary of Proposed System

This proposed system is for our System Analysis and Design (SAD) and Database project. First, we map out the proposed project goals and provide project scope and system boundaries to illustrate our ideas. Through this proposal, we aim to assist in the development of a system that can be used by stakeholder companies to address challenges in their business activities and improve the efficiency of the system. As a suggestion, the system can keep track of all activities as per the requirements of the stakeholder business operations thus simplifying all operations.

Business Benefits:

- The system helps in collecting comprehensive customer data, enabling stakeholders to analyse loyalty and preferences to formulate informed marketing and promotional strategies.
- Real-time feedback and ratings enable continuous assessment of sales conditions, enabling timely identification of factors that increase or decrease sales.
- Accurate recording of menu inventory levels ensures timely replenishment, helping to streamline inventory control and optimise inventory management.
- The system establishes clear, real-time communication channels between buyers, sellers, and stakeholders, thereby improving order accuracy and processing efficiency.

Customer Benefits:

- Customers will experience a streamlined and user-friendly interface with detailed menu instructions, eliminating confusion and simplifying the ordering process.
- Customers have the flexibility to tailor their orders to special requirements and customise optional features to their personal preferences.
- The system provides customers with real-time tracking of their orders, including delivery time and the real-time location of the delivery person, ensuring a seamless and hassle-free experience.
- Customers can easily provide feedback and ratings, promoting improved communication and satisfaction with menu and service.

11.0 Summary & Reflection

SOO WEN CHUN

I do appreciate that I have the opportunity to be the leader of this group. Before starting the project, we have assigned a workflow diagram and distributed the tasks to my teammates. We discussed all requirements and problem statements after interviewing our stakeholders. Besides that, we also gain some ideas and advice from our advisor who are Dr Pang Yee Yong, our SAD lecturer and Dr Rozilawati, our Database lecturer. In this project, I have the opportunity to learn how to use the application Asana to create our project planning including Work Breakdown Structure (WBS), Pert Chart and Gantt Chart. When doing this project, I realised that a clear business rule and requirement analysis including data requirement, database requirement and transaction requirement are important to guide us in designing a good system.

KONG YEW YEONG

For the first phase of the project, we planned to develop a system to help stakeholders cope with the surge in online retailing of fashion and food. I start by understanding how the stakeholders operate and looking at the capabilities of their current systems. After understanding the issues, he was experiencing, we came up with several solutions to improve the efficiency of his company's systems. We focus on improving the operational efficiency of our stakeholders' stores, solving the following problems: inventory management, data analysis, transaction security and order accuracy.

ENG JUN XIANG

In this system, users can check sellers' reviews, sales volume, etc. Because buyers can evaluate and rate products and sellers after purchasing. Buyers can decide which store to buy from based on reviews. In addition, users can also select different products in the inventory. Because users can check whether the product is still in stock. Users can also select the shipping address and check the location of the package in real time to prevent loss.