Hong Kong Institute of Vocational Education (Tuen Mum)
Department of Information Technology

ITP4522 Assignment

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Requirement Specification Report

Student	Contribution to the project (%) (Total 100%)	Signature
21XXXXXXX CHAN TAI MAN	50%	
21XXXXXXX CHAN SIU MING	50%	

IT114105/1C Group C02

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Study Background

Our client is an electronic appliance retail store called Better Limited which mainly sell small to large electronic appliances, such as hairdryers, TV, Air-Conditioner and so on. They are planning to expand the business in Hong Kong and Pearl River Delta Region. They need to computerize the management system as their business becomes larger and we would develop the new centralize computer management system to instead the current system. It is expected that the new system could solve the current problem effectively like time wasting, data inconsistency.

Initial Finding

After studying the current management and daily operation of Better Limited, we found that it occurred some problems.

First, there are a lot of manual tasks like inventory counting, payment processing. It is much time-wasting and costly. It also led to the high risk of failure as it would be liable to cause human errors and confusion.

Second, there is not a centralized database, the documentation is scattered without integration and the data cannot be readily shared between departments and branches.

Also, they use paper documents to hold different types of information and it led to several problems as the reason like document is not protected, easily damaged by natural disasters or fire, and take up lots of space.

Proposal / Solution

We are going to develop a cloud-based Point-of-sales (POS) system. It would auto synchronize all data to the cloud server instantly and it could manage the business on any device. Regarding this system, it would be provided different mainly function like inventory management, payment processing to enhance the work efficiently.

Planning Phase

Project Charter

Project Name

POS Management System Development

Key Stakeholders

- Better Limited (Project Sponsor)
- Chan Tai Man (Project Manager)
- Project Team Member

Background

Our client is planning to expand the business in Hong Kong and Pearl River Delta Region. They need to computerize the management system as their business becomes larger and we would develop the centralize computer management system to instead the current system. It is expected that the new system could solve the current problem effectively like time wasting, data inconsistency.

Scope

We would create the database system to store the data of company like the account information, transaction details. Moreover, we would develop the Point-of-sales system to manage the business.

By the end of the project, we would deliver the following product

- The cloud-base point-of-sales (POS) system (iPad and desktop version),

Out of scope:

- Extra equipment connection
- third-party API integration

Goals

This project is aimed to solve the current problems like time consuming, data inconsistency. We hope that the goals could be achieved as follow.

- Saved the time which used to handle complex task by at least 30%
- Reduced the erroneous by 50%
- Increase the sales performance by at least 20%

Assumptions

To achieve project goals, we are relying on the conditions or situations as follow.

- Most manual task is completed automatically by system
- All of employees are trained to operate the system
- Users have the basic knowledge of business and technical

Constraints

Potential factors as follow that will impact the delivery of the project

- The specification of devices too low
- Over budget

Project Budget

We would spend around HKD 300,000 including hardware purchasing, software development.

Milestones

Milestones 1: Identity the system requirement

Milestones 2: Design system

Milestones 3: System development

Milestones 4: System tesing

Risks and Dependencies

The most significant risks as follow which might happen before the project is delivered

- Employees are unfamiliar for the system
- Bug occurred
- Server overload

System Request

Project Sponsor

- Better Limited

Current Needs

- Improve efficiency of the store
- Improve the store image
- Improve data inconsistency problem
- Increase the system security

Requirements

- Allow to view the inventory status and count instantly
- Allow to check the availability and duty records of worker
- Allow to record and view each order and payment transaction
- Allow to own the system account for each employee
- Create the sales and business report generator
- Ensure the data can be readily shared between different centers

Expected Value

- Enhance efficiency and productivity
- Reduced risk of human errors
- Enhance the system security
- Keep the data consistency

Feasibility Analysis

Technical Feasibility	1. Familiarity with the system ■ Although some of employees have little experience with the new POS system, we would provide the on-site or video training to ensure that they could operate easily. 2. Familiarity with technology ■ The development team is trained to use C# language. 3. Project size ■ Our project team size is small which would consist of 2 member and there is business user involvement. ■ The project is expected to be completed in 6 months
Economic Feasibility	■ Tangible Costs and Benefits ■ The total budget for building the system is HKD 450,000 ■ The annual operating costs is around HKD 170,000 ■ Saved the time which used to handle complex task by at least 30% ■ Reduced the erroneous by 50% ■ Increase the sales performance by at least 20% ■ Intangible Costs and Benefits ■ Simplify the workflow ■ enhance efficiency and productivity

	■ reduce human error ■ Enhance the system security ■ Keep the data consistency
Organizational Feasibility	From an organizational perspective, the project has low risk. ■ The employees are trained to use the system and they have a basic knowledge of business and technical. ■ The CEO would like to optimize the company's operation to support expansion

Development Method

We will use the Parallel Development to be our development method in the system.

First, the project team is familiar to the programming language as they were trained to use c#. Also, we identified the user requirements through different Requirement elicitation approaches.

Second, this method can help to develop the complex system, who need to develop many functions like order management, inventory management, payment processing. Moreover, the system needs to reliable that we need to ensure the security and stability of the system.

Finally, as we will spend around six months to develop the system, this method enables teams to work simultaneously to accelerate development to complete the project on time.

Staff Plan

Our development team will consist of 2 staff who assigned different role as follows.

Project Manager

Staff Name: Chan Tai Man

Responsibility: Tracking and leading the project operations to ensure the project is completed on time and budget

System analyst

Staff Name: Chan Siu Ming

Responsibility: Identify system requirements through requirements analysis to solve the business problems

UI Designer

Staff Name: Chan Siu Ming, Chan Tai Man

Responsibility: In charge of design the UI and UX for the system

System Developer

Staff Name: Chan Tai Man

Responsibility: Conceive of, design, and build software programs.

Tester

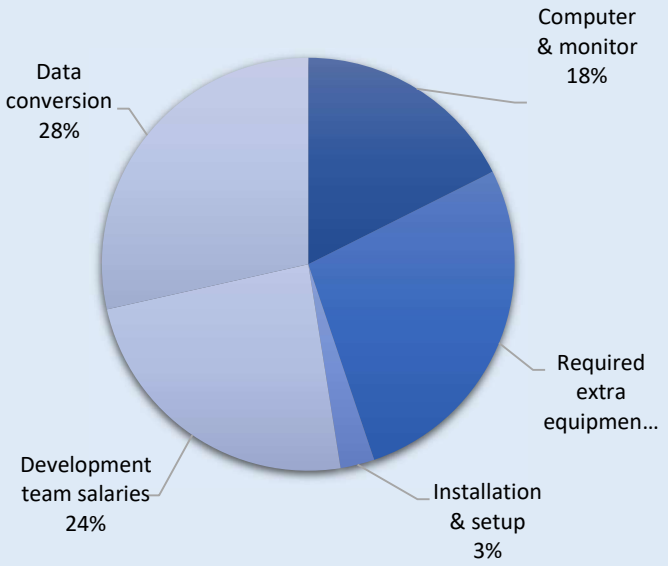
Staff Name: Chan Siu Ming

Responsibility: Testing the system to find the bug

Budgeting

The total budget around HKD 300,000 will be used for development which is one-time cost. And around HKD 40,000 is added for buffer.

Development Cost	
Computer & monitor	HKD 55,000
Required extra equipment	HKD 30,000
Installation & setup	HKD 9,500
Development team salaries	HKD 120,000
Data conversion	HKD 50,000



Regarding the daily operation, it needs spend around HKD 170,000 for the annual operating cost.

Operational Cost	
Software maintenance	HKD 15,000
Software licensing fees	HKD 5,000
Cloud server	HKD 5,000
Operational employee salaries	HKD 150,000

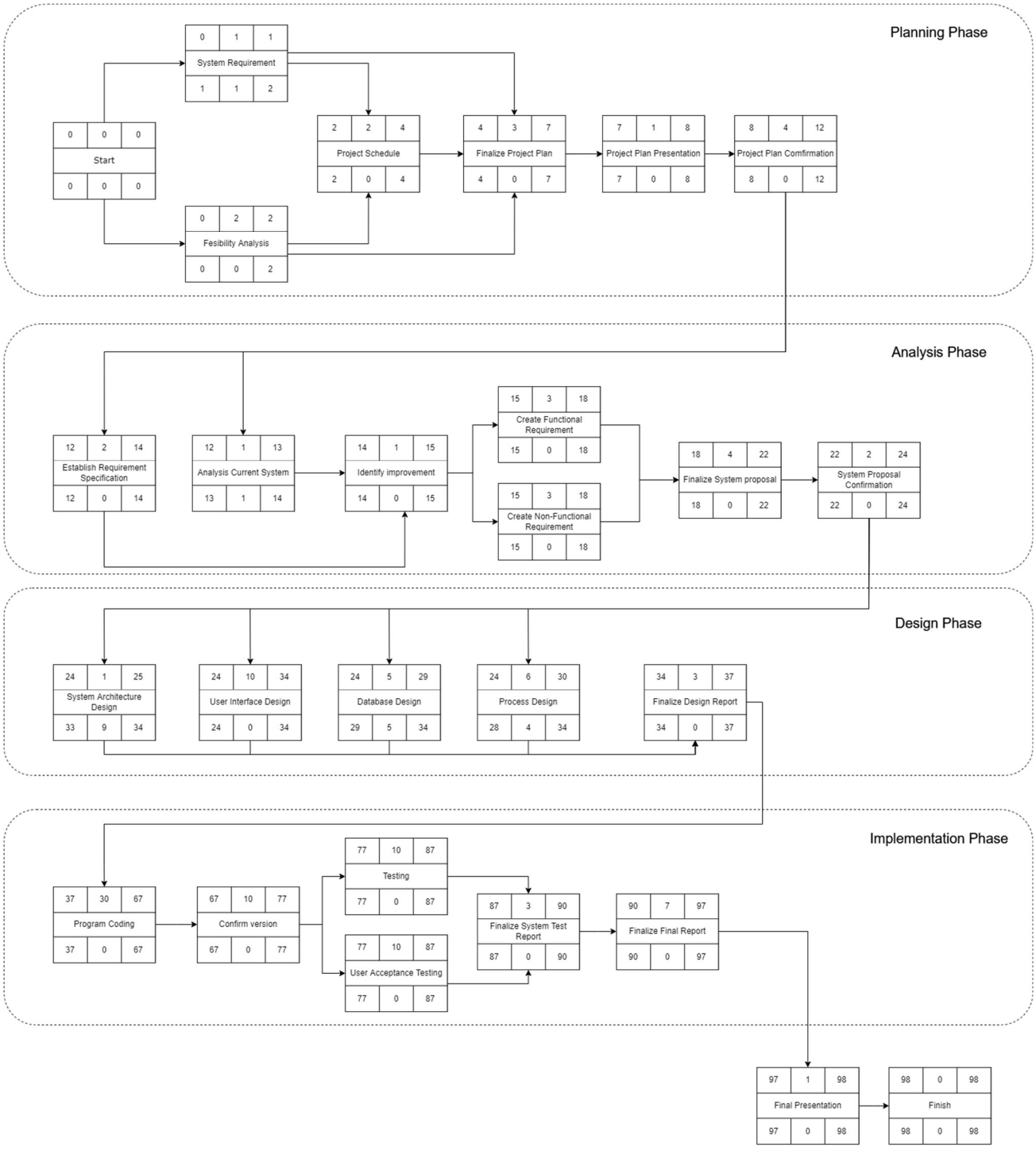
Work Schedule

ID	Precedence	Task Name	Duration (Days)	Start Day	End Day	Assigned	Status
1	-	Planning Phase	12	1/2	11/2	All	Open
1.1	-	System Requirement	1	1/2	1/2	Chan Tai Man	Open
1.2	-	Feasibility Analysis	2	1/2	1/2	Chan Tai Man Chan Siu Ming	Open
1.3	1.1 1.2	Project Schedule	2	2/2	3/2	Chan Tai Man Chan Siu Ming	Open
1.4	1.1 1.2 1.3	Finalize Project Plan	3	4/2	6/2	Chan Tai Man	Open
1.5	1.4	Project Plan Presentation	1	7/2	7/2	Chan Siu Ming	Open
1.6	1.5	Project Plan Confirmation	4	8/2	11/2	Chan Tai Man	Open
2	-	Analysis Phase	11	12/2	22/2	All	Open
2.1	1.6	Establish Requirement Specification	2	12/2	13/2	Chan Tai Man	Open
2.2	1.6	Analysis Current System	1	12/2	12/2	Chan Siu Ming	Open
2.3	2.1 2.2	Identify improvement	1	14/2	14/2	Chan Siu Ming	Open

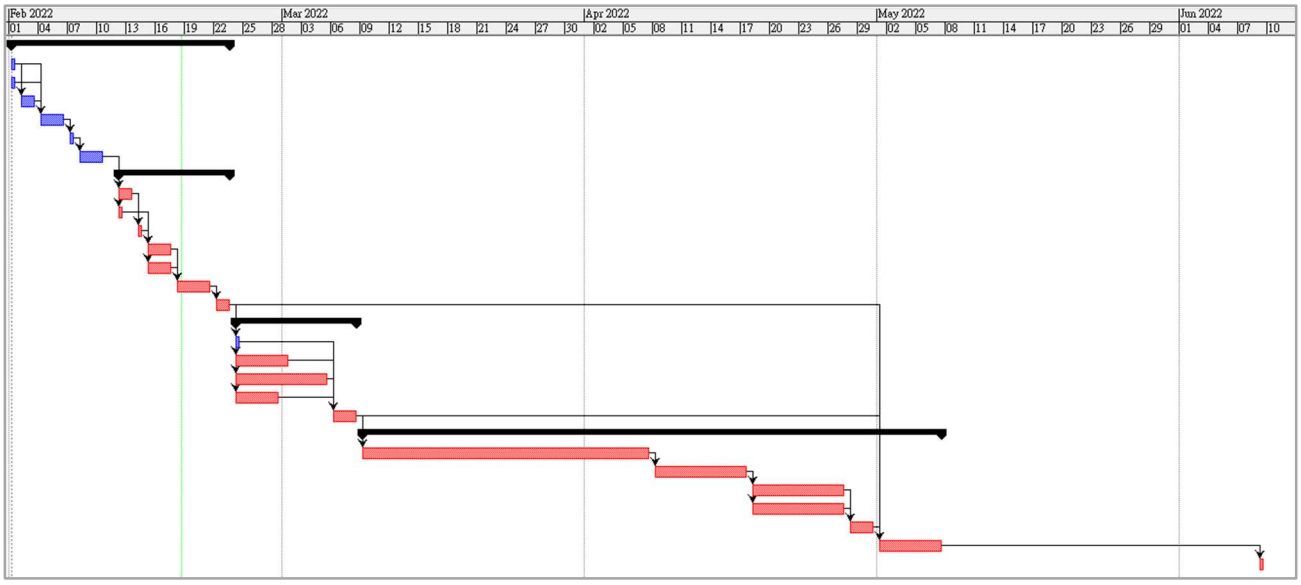
2.4	2.3	Create Functional Requirement	3	15/2	17/2	Chan Tai Man Chan Siu Ming	Open
2.5	2.3	Create Non-Functional Requirement	3	17/2	17/2	Chan Tai Man Chan Siu Ming	Open
2.6	2.4 2.5	Finalize System Proposal	4	18/2	21/2	Chan Tai Man	Open
2.7	2.6	System Proposal Confirmation	2	22/2	23/2	Chan Tai Man	Open
3	-	Design Phase	13	24/2	7/3	All	Open
3.1	2.8	System Architecture Design	1	24/2	24/2	Chan Tai Man Chan Siu Ming	Open
3.2	2.8	Process Design (Use case)	6	24/2	29/2	Chan Tai Man	Open
3.3	2.8	User Interface Design	10	24/2	3/3	Chan Siu Ming	Open
3.4	2.8	Database Design (ER Diagram)	5	24/2	28/2	Chan Tai Man	Open
3.5	3.1 3.2 3.3 3.4	Finalize Design Report	3	5/3	7/3	Chan Tai Man Chan Siu Ming	Open
4	-	Implementation	60	8/3	6/5	All	Open
4.1	3.5	Program Coding	30	8/3		Chan Siu Ming	Open
4.2	4.1	Confirm version	10	7/4		Chan Siu Ming	Open

4.3	4.2	Testing	10	17/4	26/4	Chan Siu Ming	Open
4.4	4.2	User Acceptance Testing	10	17/4	26/4	Chan Siu Ming	Open
4.5	4.3 4.4	Finalize System Test Report	3	27/4	29/4	Chan Siu Ming	Open
4.6	2.8 4.5	Finalize Final Report	7	30/4	6/5	Chan Tai Man Chan Siu Ming	Open
5	4.6	Final Presentation	1	6/9	6/9	Chan Tai Man Chan Siu Ming	Open

PERT Chart


Planning Phase
0 1 1
System Requirement
1 1 2
0 0 0
Start
0 0 0
2 2 4
Project Schedule
2 0 4
4 3 7
Finalize Project Plan
4 0 7
7 1 8
Project Plan Presentation
7 0 8
8 4 12
Project Plan Comfirmation
8 0 12
0 2 2
Fesibility Analysis
0 0 2
Analysis Phase
12 2 14
Establish Requirement Specification
12 0 14
12 1 13
Analysis Current System
13 1 14
14 1 15
Identify improvement
14 0 15
15 3 18
Create Functional Requirement
15 0 18
15 3 18
Create Non-Functional Requirement
15 0 18
18 4 22
Finalize System proposal
18 0 22
22 2 24
System Proposal Confirmation
22 0 24
Design Phase
24 1 25
System Architecture Design
33 9 34
24 10 34
User Interface Design
24 0 34
24 5 29
Database Design
29 5 34
24 6 30
Process Design
28 4 34
34 3 37
Finalize Design Report
34 0 37
Implementation Phase
37 30 67
Program Coding
37 0 67
67 10 77
Confirm version
67 0 77
77 10 87
Testing
77 0 87
77 10 87
User Acceptance Testing
77 0 87
87 3 90
Finalize System Test Report
87 0 90
90 7 97
Finalize Final Report
90 0 97
97 1 98
Final Presentation
97 0 98
98 0 98
Finish
98 0 98

Gantt Chart



Analysis Phase

Fact-Finding Results

We obtained the information about the current system and solicit opinions and ideas about the new system through different requirement elicitation approaches as follows.

Requirement elicitation approaches

Interviews	We will interview different stakeholders and ask them about the current problems of the system and the requirements of the new system. We would design the suitable function and provide suit with a solution to the current issue using their opinion.
Observation	We will observe what system issues exist in the current system. In addition, repeated observation sessions and interviews may be required to supplement the facts gathered.
Questionnaires	We will record the feedback from the questionnaires. It can identify the areas of the system from the users that need to be improved and their needs can be met.
View the system documents	The system documentation will help programmers and users learn more about the details of system functionality. It can also provide guidance on obtaining the required documentation to assist in the work.

Fact finding

1. **Low efficiency**

   As some tasks is processed manually, it is too time-wasting and costly. Therefore, the in-store system needs to be computerized to improve efficiency and store image.

2. **Data inconsistency**

   Since documents may have multiple copies in different departments and locations, other documents cannot be synchronized after being modified. Therefore, it is required to integrate the data in the database server.

3. **Document cannot share**

   As the data is stored in local PCs and there is no interconnection between different computers, the data cannot be shared between different centers. Therefore, it is required to connect all computers to the database system for staff to share documents easily.

4. **Waste of paper**

   They usually use paper documents to store information, but this wastes a lot of paper. Therefore, there is a need to reduce the use of paper, and all documents should be stored in the database system and should be viewable and traceable except for the customer's documents.

5. Security and technical requirement

To ensure the system security, all the staff should have their account to manage and log their records and tasks and they have to login with password. Also, the new system should be developed in the programming language C# as some of our staff are trained to use C#.

Current problems

After understanding the company operation, we identified the problems and corresponding solutions as follow.

1. **Many manual tasks**

   There are many trivial and repetitive tasks is handled manually like inventory taking and accounting, which time-wasting and consumes a lot of manpower. It is costly as it leads to unwanted costs like labor costs. Also, it would affect employee morale as the lack of diversity in what they do. Moreover, the chances of human-caused errors happening are almost inevitable that are caused by human neglect. These issues are dangerous to the business which would obstruct the growth of the business and reduce productivity.

2. **Information is scattered without integration**

   Since they did not have a centralized database, a document may have more than one copy filed in different departments, and locations. It led to disorganized, and it is hard to maintain consistency and integrity of data. As they cannot consolidate data, it needed to take more time to organize while using. Therefore, they could not get enough and correct data and use it effectively for analysis and make better business decisions by employees.

3. **Lack of data-sharing**

   Since data is only stored locally and departments operate separately, it is difficult to share data across centers, thus creating data silos. They are unable to edit and collaborate across departments. They also do not have access to the same data and therefore do not have a complete picture of the company' operations. In addition, it threatens the integrity of data, leading to inconsistencies between departmental data and redundant copies of existing data.

4. **Limitations of paper documents**

   Since they use paper documents to hold different types of information, this can lead to several problems. First, since the information is not encrypted or protected, the risk of data leakage is high, and it is difficult to prevent unauthorized access. Second, it can be easily damaged by natural disasters or fire, or over time, causing the paper to turn yellow and the ink to fade. In addition, it will take up lots of space and cause the place to be cluttered. It also takes lots of time to retrieve documents.

Proposed solutions

1. **Automation**

   We will design a series of function to automating the manual process in different department. For example:

   - Inventory taking and tracking,
   - calculate the purchasing amount and generate an invoice,
   - Real-time recording of every sales order and payment transaction,
   - organize sales/business data and generate the sales/business report.

2. **Data integration & File-sharing**

   We will provide a cloud server to store information on transactions, inventory, employees, and other business data. All business data, such as product details, customers, and orders, will be automatically synchronized. At the same time, all business data from different departments will be integrated into the cloud server and all computers will be connect to the cloud server to enable data interaction and data flow. Employees can access the same data and make changes to it in real-time.

3. **Digitize documents**

   We will develop document management features to integrate physical document archiving electronically to get off paper. It allows staff to store, manage and track electronic files. Moreover, all data can be encrypted to keep sensitive documents locked and secure. It also allows the operator to grant permission to staff for

specific files that ensure that documents are not tampered with or accessed without authorization.

Functional Requirements

We are going to design the function as follows to solve the current problem of the needs of each department.

1. Sales Department

Features

- Select products in the product catalog
- Connect to electronic payment terminal, support multiple payment methods (credit card, Alipay)
- Immediate recording of each sales record
- Automatically calculate total sales amount and print recipes
- Check detailed product information
- Create new members
- View members' purchase history
- Offer promotions and discounts to members

2. Inventory Department & Purchase department

Features

- Real-time inventory status updates
- Automatic inventory tracking and counting
- Inventory shortage alarms
- Generate Purchase Orders/Receiving Orders/Return Orders to relevant departments or suppliers

3. Accounting Department

Features

- Calculate the profit, expense, loss automatically
- Generate sales and business reports automatically
- Calculate employee wages
- Manage every invoice and orders
- View the current sales performance

4. Information Technology Officer

Features

- Checking the availability of workers
- Record each worker's shift record
- View each employee's personal information and attendance
- Upload the work timetable

5. CEO & Manager

Features

- Create an account for each employee
- Manage permissions for each user
- Modify user information
- Update product price or re-order amounts

Non-Functional Requirements

1. Operational

Accessibility

- The user interface and components will be designed simple and clean for beginners and allow non-technical to easily operate it to complete the work and quickly familiarize to the operation of the system
- Accessibility features would be added to convenient disabled employees

Extensibility

- Add the function would be allowed if there are other needs for client

Portability

- The system shall be able to work with different operating system like Mac, Window
- The system shall be operated with handheld devices like iPad

Maintainability

- 75% maintainability for 24 hours
- New versions of the system will be released every six months

2. Performance

Speed

- Response time must be 4 seconds or less for any transaction over the network
- The database of cloud server must be updated in real-time

Usability

- It can handle around 5,000 transactions
- The system shall be available to 99% of the time every month
- The cloud server should be available 24/7

Capacity

- A typical transaction will require the transmission of 300K of data
- It can handle a maximum of 1000 transaction at simultaneous.

Reliability

- A mean time between failures should not less than 10 days
- The number of critical failures should less than 3 times
- When the system fails, it will not affect the user behavior and data, and it will be automatically uploaded and saved after the network is restored.

3. Security

Encryption & Authentication

- All data will be encrypted
- Staff logging in form outside the office will be required to authenticate

Virus Control

- All uploaded files will be checked for checked for viruses before being saved in the system

4. Culture

- The system language which is Simplified Chinese and English would be included to convenient for employees of different nationalities (Other system language can be added themselves if needed)
- Support different currency which is HKD and CNY (Other currency can be added themselves if needed)

Sample hardware and software specification

Operating System

- Windows
- Mac

Special Software

- Microsoft word, excel
- Adobe Acrobat Reader

Hardware

- 512-GB hard disk drive
- CPU: Intel i5 Quad-Core (or equivalent)
- RAM: 4GB to 8GB DDR4
- 20-inch LCD Monitor and 8-inch iPad

Network

- The minimum recommended Internet speed is 2 Mbps download / 1 Mbps upload while the optimal Internet speed would be 6 Mbps download / 2 Mbps upload

Current and proposed system

The current system

Currently, the system does not have a centralized database and all documents are not from a single source. Documents are scattered in different departments. This means that data cannot be easily shared between different departments and branches.

In addition, they require many tasks to be handled manually. This wastes time and reduces productivity.

The proposed system

For the upcoming system, we will develop a cloud-based point-of-sale system. The POS system will automatically back up all company department data to the cloud server in real time. The cloud server can also access their POS from any location and manage their business remotely.

Meanwhile, a centralized database unifies all documents for management. Departments can manage their accounts on the device, and departments will have different features to meet their business needs.

All in all, it can improve their business and make it bigger. Moreover, it helps to solve the current problems efficiently.