**Hong Kong Institute of Vocational Education (21-22) Department of Information Technology**

**HD in Software Engineering**

**Requirement Specification Report**

**Date:** 25th February, 2022

**Group 2**

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We declare that this is a group project and that no part of this submission has been copied from any other student’s work or from any other source except where due acknowledgement is made explicitly in the text, nor has any part been written for us by another person.

**Abstract**

This report reviews the current system of Better Limited and we are required to identify the problems and develop a new application system for the Company. Better Limited offers all kinds of electronic appliances and provides delivery and installation services to their customers. There are two retail stores currently located at Kowloon and Tsuen Wan.

Recently, they are planning to expand their business in Hong Kong and Pearl River Delta Region, such as Shenzhen and Guangzhou, as the business becomes larger. However, the current system has a multitude of infrastructural issues, and it is bound with a lot of limitations. By receiving the feedback in the user interviews, we are tasked to design a more comprehensive system and provide the necessary building blocks for the company’s future expansions.

In February, our group identified several major issues that affected the company’s operational capabilities and limited the company’s future expansions, issues such as handwritten records and transferences, absence of internet infrastructure, isolated workstations, and the lack of centralized data. These issues have led to difficulty in data sharing, data inconsistency, intense manual work, and a huge workload endurance in departments. Overall, affecting the company’s operation. In order to fix these issues and accommodate the major changes in the future, the current system will be replaced by a more comprehensive network infrastructure and internal system. Providing a more reliable and efficient workflow to the staff and enhancing the company’s operations. The aim is to optimize the management system by computerizing the workstations across the departments to minimize the paperwork and centralize the data into a database. The new system will also provide the basic functionalities for management and have the capabilities to cater for the company’s future expansion, such as multiple language preferences, online store, and digital payment transactions.

The problem findings, functional requirements and non-functional requirements of our proposed system will show the improvements in detail. It lays down the fundamental structure of the application system and provides a clear concept of how a central computerized management system can support and strengthen the company’s business model.

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1. Introduction
   1. Company’s Background

Better Limited is an electronic appliance retail store. The Company's primary business is to sell different sizes of electronic appliances, such as hairdryers, television, air-conditioner, etc. They also provide delivery and installation service to the customers.

The company is divided into five departments which are the Sales Department, Inventory Department, Purchase Department, Accounting Department, and the Technical Support Department. The Sales Department is responsible for the daily sales in the two retail stores which are located at Kowloon Bay and Tsuen Wan. The company’s only office is situated in Kowloon Bay and has a 6000 sq/feet warehouse next to it. The company currently employs approximately 90 employees.

* 1. Project Background

Better Limited is planning to expand the business in Hong Kong and Pearl River Delta Region, such as Shenzhen and Guangzhou, as the business becomes larger. In order to accommodate the major changes, the current system will be replaced by a new and more comprehensive internal system. Providing a more reliable and efficient workflow to the staff and enhancing the company’s operations. We aim to optimize the management system by computerizing the workstations across the departments to minimize the paperwork and centralize the data into a database. The new system will also provide the basic functionalities for management and have the capabilities to cater for the company’s future expansion.

1. Problems Findings
   1. Problems in Sales Department
      1. General Operations

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| Problem Description |
| In the current system, the Sales Representatives in retail stores receive sales orders from customers every day. If the item is available in-store, payment will be processed directly. The payment receipt is currently handwritten, one copy for the store and the other for the customer.  Firstly, the paper / handwritten receipts and copies will cause a lot of manual work to the staff. It is prone to human error and damage. Also, it is very difficult to back up the data.  Moreover, the paper receipt has a high possibility of data loss and high risk in security since the copies can be easily lost and stolen. Also, anyone with copies of the receipts can view the information.  In addition, paper records and documents have a high volume in storage which will lead to storage insufficiency. Also, it is difficult to transport. Overall, it will slow down the department’s operation. |
| Solution |
| The new system software will digitize all forms of paper and handwritten documents, including all the receipts and records. The software will provide input brackets for the necessary fields in a receipt. Allowing the Sales Representative to input the sales data. The system will then generate a digital receipt and import the data into the centralized database management system, and the database will back it up. Finally, the Sales Representatives are given an option to print it out. |

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| Problem Description |
| In the current system, if the requested item is unavailable in-store or the stock level of that item is close to or below re-order level, the sales manager will call the Inventory Department at the warehouse for restocking.  However, the system does not have a clear definition to identify the minimum stock level for each item. This unclear definition will cause confusion for the manager on the re-order amount.  In addition, the verbal exchange of the re-order information from the sales manager to the Inventory department can be eliminated since the restock process should be handled by a computerized platform, thereby enhancing the efficiency of the process and reducing the wastage of human resources. |
| Solution |
| The new system software will have the capability to identify the unclear definitions, including the minimum stock level of each item by calculating the quantity of the items in stock. The system will then pop up a notification to inform the Sales Representative whenever an item has met the minimum stock level, below the stock level or out of stock.  The new system software will provide an intranet infrastructure and cross-departmental communication features. The software will send the restocking request, along with the relative items and the re-order amount, in a form of a message to the related department. Allowing the staff to communicate and share data across departments simultaneously. Eliminating the use of verbal communication. |

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| Problem Description |
| In the current system, the customer needs to pay 20% or more of the price as a deposit for unavailable items over $5000.  The lack of computerization in the current system makes additional calculations very difficult for the Sales Department. Resulting in a manual approach to the calculations which is prone to human errors. |
| Solution |
| The new system software will automatically detect the requirements of an additional fee and calculate the correct prices of the respective item during payment. Ensures the correct charges are applied to the customers. |

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| Problem Description |
| In the current system, deposit receipts are kept in the deposit folder until the payment is completed.  A large number of deposit receipts in a folder will cause difficulty in searching useful data. |
| Solution |
| The new system software will automatically import the sales data of each transaction into the centralized database management system, and the database will back them up. The Sales Representative can easily retrieve records of complete and incomplete payments from the database through the software in a form of a payment deposit. |

* + 1. Delivery

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| Problem Description |
| The Sales Representative will arrange the deliveries with the Inventory Department for large items, and the availability of delivery workman will be checked before the delivery.  Currently, the system does not have a clear definition to identify a large item. This unclear definition will cause confusion for the Sales Representative on the decision of item deliveries.  The lack of automation in the scheduling model within the delivery system may cause a heavy workload at the Sales Department and the Inventory Department in the peak periods of sales. Also, the large among of delivery arrangements will increase the possibilities of human error, such as mistaking the wrong delivery date.  Moreover, the department will need to check the availability of each delivery workman and manually assign them to different delivery schedules. This can significantly slow down the workflow of the delivery services. |
| Solution |
| The new system software will have the capability to identify the unclear definitions, including the volume (size) of each item in the store by importing the items’ data from the centralized database through the software. Then, it will inform the Sales Representative whenever an item is large enough to require a delivery.  The new system software will provide a scheduling assistant to automatically arrange available workmen to a delivery schedule. When dealing with purchases that required a delivery, the software will automatically arrange the deliveries to the three different delivery sessions for the Sales and Inventory Department. After the customer has given a delivery address and approved the schedule, the software will arrange the available workmen to the schedule. |

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| Problem Description |
| The company uses standalone PCs and electronic spreadsheets to manage the delivery services in the centres. Since the PCs are not inter-connected, data between different centres cannot be readily shared.  The lack of proper interconnection between workstations makes data sharing very difficult. This will increase the probability of data inconsistency. |
| Solution |
| The new system will provide a network infrastructure to connect all departments, and provide newly purchase devices and peripherals that have the hardware capabilities to connect all workstations, including computers, servers, monitors, printers, etc. |

* + 1. Installation

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| Problem Description |
| The Sales Representative will arrange installation service with Technical Support Department and availability of the workman will be checked before the arrangement can be made successfully. Also, the Installation time should be at least 2 hours after the delivery.  The lack of centralized data and platformization in the communication between three departments makes data sharing very difficult and slow down both delivery and installation operations.  Also, the department needs to check the availability of each workman and manually assign them to different installation schedules. This can significantly slow down the workflow of delivering an installation service.  The lack of automation in the scheduling model may cause a heavy workload at the Sales Department and the Technical Support Department in the peak period of sales.  The lack of automation in calculating the additional 2 hours delay period in each installation after delivery makes scheduling installations even more difficult and complex. |

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| Solution |
| The new system software will provide cross-departmental communication features. The software will send a message to the Sales Department after the Inventory department has completed delivery. Then, the Sales Department will message the Technique Support Department that the respective delivery has completed and can proceed with the installation schedule.  The new system software will provide a scheduling assistant to automatically arrange available workmen and technicians for a delivery that needs an installation. When dealing with purchases that required delivery and installation, the software will automatically arrange the installation schedule 2 hours after the delivery schedule for the Sales and Technique Support Department. After the customer has approved the delivery schedule, along with the installation schedule, the software will arrange the available technicians for the schedule.  The new system software will automatically calculate the correct schedule for each installation arrangement according to the delivery schedule. |

* 1. Problems in Assets Management
     1. Sales Management

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| Problem Description |
| In the current system, the Sales Representatives need to frequently work on sales data to see if the stock matches with sales and inform the sales manager.  The lack of automation in the calculation for data checking results in an inefficient manual approach in the calculation of sales data. A large number of sales and the exchange of that information between the Sales Representatives and the sales manager will increase the possibilities of human error, and a large amount of time will be wasted. |
| Solution |
| Since the payment records and the in-store stock amount of each store is stored in the centralized database, the new system software will import both records to calculate and create a presentation of mismatch data. Therefore, the Sales Representatives do not need to compare and calculate it manually. |

* + 1. Stock Management

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| Problem Description |
| Currently, the Sales Manager will decide the restock amount and send the request to Inventory Department when the stock level is too low.  Firstly, the current system does not have a clear definition to identify the minimum stock level for each item. This unclear definition will cause confusion for the manager on the restock amount.  Moreover, the lack of platformization in requesting a restock between departments resulted in a verbal exchange of information. It is inefficient and will increase the possibilities of human error by mistaking the restock amount. |
| Solution |
| The new system software will have the capability to identify the unclear definitions, including the minimum stock level of each item by calculating the quantity of the items in stock. The system will then pop up a notification to inform the Sales Representative whenever an item has met the minimum stock level, below the stock level or out of stock. #Repeat solution  The new system software will provide an intranet infrastructure and cross-departmental communication features. The software will send the restocking request, along with the relative items and the re-order amount, in a form of a message to the related department. Allowing the staff to communicate and share data across departments simultaneously. Eliminating the use of verbal communication. |

* + 1. Products & Inventory Management

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| Problem Description |
| In the current system, the Sales Managers, Accounting Manager and Purchase Manager will update the price, re-order level and re-order amount of each item, and mark the phasing out products if necessary.  The lack of centralized data between departments makes data sharing and managing products in the inventory very difficult.  Also, the enormous amount of handwritten paperwork means the data need to be modified manually. This will increase the probabilities of human error and data inconsistency. Also, it will slow down the workflow of the management. |
| Solution |
| Since all the receipts, records and documents have been digitalized and all these data are stored in the centralized database, the managers from different departments can define, access, modify and maintain (create, read, update & delete) these share resources from the database through the software easily. Eliminates manually work surrounding the handwritten paperwork. |

* 1. Problems in Inventory Department
     1. Task 1: Handling Delivery Requests

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| Problem Description |
| In the current system, each delivery request is followed up by three handwritten copies of delivery notes, one for the Inventory Department, and two others will be delivered together with the item.  The handwritten copies of the delivery note will increase the possibility of human error and the chance of data inconsistency. |
| Solution |
| The new system software will digitize all forms of paper and handwritten documents, including the delivery notes. The software will provide input brackets for the necessary fields in a delivery note. Allowing the Inventory Clerk to input the delivery data. Then, the software will generate a digitized delivery note. Finally, the clerk will be given an option to print it out, along with the print quantity. Moreover, the software will automatically import the delivery notes into the centralized database management system, and the database will back them up. |

* + 1. Task 2: Restock Inventory

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| **(Requesting a Restock)** |
| Problem Description |
| In the current system, the inventory Clerk will monitor the stock. If a non-phasing out item reaches a certain level, the Inventory Clerk will send a re-order request to the Purchase Department for approval.  The system does not have a clear definition to identify the minimum stock level for each item. This unclear definition will cause confusion for the Inventory Clerk on identifying the restock amount.  Also, the lack of platformization in exchanging information and requesting a re-order is inefficient, and it makes the restocking procedure in the Inventory Department very time consuming. This will slow down the operations of the department drastically when there are multiple items that need to be restocked. Also, the verbal exchange of the information will increase the possibilities of human error by mistaking the re-order amount. |
| Solution |
| The new system software will have the capability to identify the unclear definitions, including the minimum stock level of each item by calculating the quantity of the items in the warehouse. The system will then pop up a notification whenever an item has met the minimum stock level, below the stock level or out of stock.  The new system software will provide an intranet infrastructure and cross-departmental communication features. As for the **Inventory Department**, the software will send the restocking request, along with the relative items and the re-order amount, in a form of a message to the **Purchase Department**. Allowing the staff to communicate and share data across departments simultaneously. Eliminates the use of verbal communication. Then, the department will wait for approval. |

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| **(Request Approval)** |
| Problem Description |
| After the request is approved, a Purchase Order will be generated and sent to the Accounting Department.  The paper form of the purchase order generated by the purchasing department makes data backups very difficult and it will have a high impact on data loss. |
| Solution |
| The new system software will provide cross-departmental communication features. The software will generate a digital Purchase Order and sent it to the Accounting Department in the form of a message. |

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| **(Restock Purchase)** |
| Problem Description |
| After the purchase approval, the purchase order will be sent to the supplier, and another copy will be sent to the Inventory for checking with the Goods Inwards Clerk later.  The hardcopy form of the purchase order is inefficient and difficult for data checking when receiving goods. it also will have a high impact on data loss.  The lack of automation in the calculation for data checking will increase the possibilities of human error. |
| Solution |
| Since the Purchase Order is generated digitally, the software will import it to a centralized database management system, and the database will back it up. Allowing the Good Inwards Clerk to retrieve the data from the database. Eliminates the hardcopy form of the order. Also, the software will compare the items and the quantity in the order with the initial purchase request by checking the data automatically. |

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| **(Receiving Goods)** |
| Problem Description |
| Finally, the Inventory clerk needs to check the Delivery Note to see if the received goods match with the corresponding Purchase Order. If the items and the corresponding quantity are correct, a Goods Received Notes will be generated by the Inventory Department, and it will be sent to the Purchase Department and the Accounting Department.  The lack of automation in the calculation for data checking is inefficient and time consuming when dealing with multiple received goods from different suppliers and it will increase the possibilities of human error.  The paper form of the Goods Received Note generated by the Inventory Department is inefficient and makes data backups very difficult. It will also cause a high impact on data loss.  The lack of centralized data makes data sharing and sending information to different departments very difficult and inefficient. |
| Solution |
| The new system software will provide cross-departmental communication features. The software will generate Goods Received Notes for the Inventory Department and sent them to the Purchase and the Accounting Department in the form of a message.  Since the Goods Received Notes is generated digitally, the software will import them to a centralized database management system, and the database will back it up. Allowing the Purchase and the Accounting Department to retrieve the data from the database. Eliminates the paper form of the Goods Received Notes and makes data sharing and sending information more efficient between departments. |

* + 1. Task 3: Handling Defect Items

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| Problem Description |
| Defect items from the customers are returned to the Inventory Department. Two copies of the Goods Returned Note are prepared; one is kept in Inventory, and the other is sent to the Accounting Department.  The paper form of the Goods Returned Note is inefficient and makes data backups very difficult. It will also cause a high impact on data loss.  The lack of centralized data for data sharing makes sending information to the Accounting Department very difficult. |
| Solution |
| The new system software will provide cross-departmental communication features. The software will generate Goods Returned Notes for the Inventory Department and sent them to the Accounting Department in the form of a message.  Since the Goods Returned Notes is generated digitally, the software will import it to a centralized database management system, and the database will back it up. Allowing the Accounting Department to retrieve the data from the database. Eliminates the paper form of the Goods Returned Notes and makes data sharing and sending information more efficient between departments. |

* 1. Problems in Accounting Department

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| Problem Description |
| In the current system, the Accounting Department will receive receipts of completed orders on the first day of each month. The department also receives payment receipts monthly, purchase orders and invoices from Purchase Department and Suppliers. All these data will use to analyze the sales activities and generate reports.  Firstly, the lack of centralized data between departments makes sharing and sending data to the Accounting Department very difficult and inefficient. Also, the absence of real-time data sharing will cause a delay in data modification. If the Accounting Department wants to make any changes involving the money, they must wait until the very first day of each month. However, real-time data sharing still has its shortcoming because it has a huge reliance on internet speed and the database will endure a massive workload.  Although, in a traditional sense, the Accounting Department will handle the methods for the calculation and will only demand the data that they needed. The new system application should provide the necessary needs for basic calculations and analyses.  In addition, the Accounting Department is burdened with a heavy workload in a short period of time due to a large number of handwritten receipts being handover each month, and the possibilities for analysis error will be increased. Therefore, the exchange of data should be more frequent. Handwritten receipts should be eliminated for reducing the possibility of human error, and the analysis process should be computerized. Also, the lack of automation in the calculation is inefficient and it will slow down the operations of the department. |
| Solution |
| The new system software will send the required data to the Accounting Department per week for analysis. This keeps a balance between the internet speed and the workload of the database. Making sure the data will not bottleneck the bandwidth of the internet and the database will not endure a large amount of data all at once. Minimizing the data lost in less frequent backups and the overflow of data in rapid uploads.  The new system software will provide basic calculation and analysis functionalities to the Accounting Department. Also, it can present the organized data in the form of charts to the managers from a different departments. |

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| Problem Description |
| Besides, if there are any defective items, Accounting Department will ask Inventory to send them back to the supplier after informing them.  The lack of platformization in communication between departments results in verbal communication when handling defective items. This will increase the possibilities of human error. |
| Solution |
| The new system software will provide cross-departmental communication features. The software will message the Inventory Department to send the defective items back to the respective supplier after the Accounting Department has received the Goods Returned Notes from them. |

* 1. Problems in Technical Support Department

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| Problem Description |
| Technical Support Department receives the installation requests from the Sales Representative, the manager will arrange workman to install the item for the customer.  The Technical Support Department need to check the availability of each workman and manually assign them to different installation schedules.  The lack of automation in the scheduling model may cause a heavy workload at the Sales Department in a peak period of sales.  The lack of centralized data in sending data and handling requests resulted in a verbal communication between departments. This will increase the possibilities of human error and slow down the operations of the department. |
| Solution |
| The new system software will provide a scheduling assistant to automatically arrange available workmen and technicians for a delivery that needs an installation. When dealing with purchases that required delivery and installation, the software will automatically arrange the installation schedule 2 hours after the delivery schedule for the Sales and Technique Support Department. After the customer has approved the delivery schedule, along with the installation schedule, the software will arrange the available technicians for the schedule. #Repeat Solution  The new system software will provide cross-departmental communication features. The software will send a message to the Sales Department after the Inventory department has completed delivery. Then, the Sales Department will message the Technique Support Department that the respective delivery has been complete and can proceed with the installation schedule. #Repeat Solution |

* 1. Additional Problems

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| Problem Description |
| As a new store will be opened in Pearl River Delta Region soon, both English and Simplified Chinese user interfaces are expected, especially for the functions used by the staff in the retail store.  In terms of business, the limited language preferences will cause a lack of diversity for customers leading to customer churn. In a long term, this will reduce business volume and decrease the company’s revenue.  In terms of the company’s inner workings, the limited language preferences will increase the learning curve for new employees who are not familiar with the default language. Resulting in spending more time in induction training. This will cause wastage in human resources which will increase the operational cost. |
| Solution |
| The new system software will provide three main language preferences, including English, Traditional Chinese, and Simplified Chinese, to both customers and employees. |

1. Functional Requirements
   1. Sales Department
      1. Sales Order

The sales representative will scan the barcode of the goods or input the item details, such as the goods ID, or goods name to this system, and it will create a sales order with the full list of goods information including the quantity and price, payment, or deposit when the goods are not available at the moment. When the sales order is placed, the system will automatically generate a receipt for the company and customer.

This system will store the sales order and receipt details in the database, and share the data with another department, such as the accounting department. The sales representative can create, read, update, and delete the sales order or receipt. All of these changes will update the database data as well. The system can increase productivity and decrease manpower.

* + 1. Receipt

The system will print a payment receipt according to the sales order. This receipt will be given to the customer when the payment is fully completed.

If the item is out of stock and over $5000, the Receipt will show the deposit payment and the final payment. Receipts will be sent to the Accounting Department.

Due to the current system is using the handwritten receipt, when there is a mistake written or changes, the sales representative needs more time to write a new receipt, moreover, when the handwritten receipt is lost, it will lead to a lot of problems, like data loss, and unclear payment. So, the automatically generated receipt is good for the company and it can reduce human errors and increase productivity.

* + 1. Restock

The system will automatically send a re-stock request to the inventory department when the stock level in the retail store is too low or out of stock, the re-stock request will list the goods that need to be delivered to the retail store, the quantity of the goods and the retail store location. For example, if the sales managers set the re-stock level as 5, the system will notify the sales department when the goods stock level is nearly 5. So, the sales manager can use this function to request a delivery. Moreover, when the goods’ stock level is lower than 5 or out of stock, the system will automatically send a re-stock request to the inventory if the sales manager forgot to send a request for the re-stock. A restock request will be generated by the system after the user input the re-stock amount and the corresponding items. Then, the request will be sent to the Inventory Department.

* + 1. Delivery Request

The sales representative will arrange a delivery service with the inventory department for sales orders with large items. The system will create the sales delivery note when the sales order required delivery service, the sales delivery note will be sent to the inventory department, the delivery workman will deliver the goods based on the sales delivery note and upload the note with the customer’s signature photo when the delivery is done. In the current system, the sales delivery note is handwritten, if the note is lost, it is hard to track whether goods were delivered to customers successfully.

* + 1. Goods Returned Note

The system will create goods returned Notes when the customer returns defective items to the retail store. The sales representative will check if the goods have a fault or do not work correctly, the goods name with return reason will be input into the system. When the goods returned note is created, it will be sent to the inventory department and accounting department for the record. After the accounting department receives the goods returned note from the sales department, the accounting department will contact the supplier about the defective goods, and notify the inventory department to send them back to the supplier.

* + 1. Digital payment

The company will offer electronic payments such as Octopus, WeChat Pay, Alipay, visa and master for customers to pay on the retail store from Kowloon Bay and Tsuen Wan. The reason for using Digital payment because it makes it easier to record transactions.

* 1. Accounting Department
     1. Receive Receipt

When the sales order is completed, the system will automatically send the related receipt to the accounting department, all receipts will be stored in the database. Deposit receipt will be stored in the receivable account table, the accounting department can view the deposit receipt to check if there is any bad debt.

* + 1. Receive Purchase Order

The purchase order will be sent to the accounting department from the inventory department for approval. The accounting department will decide the purchase order may have more than one item. After the accounting department receives the purchasing order, the accounting department will make a deal with the supplier to purchase the goods that need to be purchased.

* + 1. Data Analyze

The accounting department can view the payment receipts on the system and use the data to analyze the sales activities. All documents and sales data will be stored in the database, which is convenient for accounting clerks to do data analysis, the system will generate a daily, weekly, or monthly report for the accounting department. The system will analyze the sales data from the sales order and show it on the report to identify the specific sales profit and net income.

* + 1. Generate Reports

The accounting department receives the sales order and receipts from the sales department once a month in the current system, it is hard to do the data analysis because of the purchase department and suppliers. There will be a function to generate reports using the data received from the other departments.

* + 1. Return Defective Goods

After the accounting department receives the goods returned note from the sales department, the accounting department will contact the supplier about the defective goods, and notify the inventory department to send them back to the supplier. The system will create a table to store all defective goods in the database, the accounting clerk can see the goods return to reason and check the supplier details to notify the inventory department to send it back.

* 1. Purchase Department
     1. Purchase Order

When the purchasing department approves the re-order request, the system will create a purchase order for those items and send it to the accounting department to make a purchase. The purchase order will list the goods that need to be purchased, the quantity of the goods, and the supplier name, this order will send to the accounting department and request a payment. The purchasing department can update or delete the order when there are any changes or cancel orders.

* 1. Inventory Department
     1. Re-order Request

The system will automatically send a re-order request to the purchasing department when the stock level in the warehouse is too low or out of stock, the re-order request will list the goods that need to be purchased, the quantity of the goods, and the supplier’s name. For example, if the inventory department set the re-stock level as 5, the system will notify the inventory department when the goods stock level is nearly 5. So, the inventory clerk can use this function to request a re-order. Moreover, when the goods’ stock level is lower than 5 or out of stock, the system will automatically send a re-order request to the purchasing department if the inventory clerk forgot to send a request for the re-order.

* + 1. Delivery Note

In the current system, the sales delivery note is handwritten, if the note is lost, it is hard to track whether goods were delivered to customers successfully. The system will create the sales delivery note when the sales order required delivery service, the sales delivery note will be sent to the inventory department, when the inventory clerk receives a delivery request from the sales department. The system will create a delivery note for the sales order with the delivery service and print it to the delivery workman for the delivery. The delivery workman will deliver the goods based on the sales delivery note and upload the note with the customer’s signature photo when the delivery is done.

* + 1. Completed and Uncompleted Delivery

The delivery workman will upload a photo of the customer’s signature to the system to confirm that the delivery is completed. If the delivery is unsuccessful, the delivery workman will report the problem and arrange a rescheduled delivery on the system. The system will check the available time slot for the delivery.

* + 1. Goods Received Note

When the goods from the supplier are inbound to the warehouse, the goods inward clerk will check the goods received with the corresponding Delivery Note and Purchase Order.

When all details are correct, the goods will count into the stock, and the system will create the goods received the note. The system will send it to the purchasing department and the accounting department for the record.

* 1. Technical Support Department
     1. Installation Order

The system will create an Installation Order to arrange installation according to the Delivery Note with the items required. The technical support department follows the delivery sessions timetable to arrange the Installation service, so the technical support clerk marks the installation time in the installation service arrangement for installation workmen the following work. The system will update the installation time automatically when the delivery time has changed.

* + 1. Completed and Uncompleted Installation

The installation workman will upload a photo of the customer’s signature to the system to confirm that the installation is completed. If the installation is uncompleted, the installation workman will report the problem and arrange a rescheduled installation on the system. The system will check the available time slot for the re-installation.

* + 1. Duty Record

After the installation workman finishes the installation, the workman will access the system to report the installation is completed. The system will save the data to the duty record. The technical support manager can check the duty record in the system to see the daily work schedule and completed installation order.

* 1. User Management
     1. Login Module

The system will require the staff to login for user authentication to access data throughout the system. The login module provides security to data access.

The system will provide different access permissions for the users according to their accounts, and the accounts are given to the staff according to their position in the company.

The account also makes user activities traceable by the user’s log.

* + 1. Logout Module

The users can log out from their account in the system application.

* + 1. Update Account Details

The admin user (management-level staff) can change the user's account details, including user name, password, position, department, etc.

* 1. Data Management
     1. Stock Level Data Can Be Viewed

The sales department can check the warehouse stock level and in-store stock level through the system.

* + 1. Data Modification

The price, re-order level, re-order amount, and marking phasing out items can be updated by sales managers, accounting managers, and purchase managers.

* 1. System Functions
     1. Restock Module

The restock module simplifies the re-order process in both retail stores and Inventory Department. It provides an intranet and graphical user interface for the store managers and inventory clerks to input the corresponding re-order amount for a specific item and send their requests to the corresponding department. This helps to improve the efficiency of the operations in both departments.

For the Sales Department, a restock request will be generated by the system after inputting the re-order amount and the corresponding items. Then, the request will be sent to the Inventory Department.

For the Inventory Department, a restock request will be generated by the system after inputting the re-order amount and the corresponding items. Then, the request will be sent to the Purchase Department for approval.

* + 1. Notification Module

For the Sales Department, the system will inform the store manager for a restock if an item is nearly reached or reached the minimum stock level or it is out of stock. After the item is delivered, a notification will inform the store manager that the item should have arrived. This applies to the Inventory Department as well.

A notification will appear at the “Restock Tab” to remind the user to restock. The notification will only appear for the store manager at the retail store to eliminate the verbal exchange of information between the sales representative and store manager.

The Inventory Department will receive a notification of a restock from the Sales Department. The notification will specify the specific items and corresponding amount.

The Purchase Department will receive a notification of a reorder request from the Inventory Department. The notification will specify the specific items and corresponding amount. After the request is approved by the Accounting Department, another notification is sent to the Purchase Department and they will proceed with the purchase.

The Accounting Department will receive a notification for the purchase order from the Purchase Department. The notification will specify the specific items, corresponding amount and the related price.

* + 1. Data Presentation & Logical Interface

The system will display the relations from the database in real-time and provide functionalities that enable the user to add, modify and delete data.

The Inventory Department can view the in-stock items through the interface.

* + 1. Printing Function for Receipt and Delivery Note

The printing function can allow the staff to print the payment receipt to the customer, and it also allows the Inventory Department to print out the two Delivery Notes to the delivery workman and customer.

* + 1. Language Preference

To cater to the company’s expansion in the Pearl River Delta Region, the system offers three different kinds of language options to the users. English, Traditional Chinese, and Simplified Chinese. The users can change their language preferences according to their needs.

1. Non-Functional Requirements
   1. Usability

Due to containing plenty of information and function, the system must provide a user friendly and neat interface for users.

It is essential to boost users’ working efficiency, the system sets up several classifications for different departments and positions. The user cannot find the information and function of another department or higher position on the interface.

However, some of the users in the information Technology Officer are being trained to use C#, manage the database server and application server.

The system will provide two search functions including item search functions and consumer search functions. The item search functions involve different attributes such as Category, Item Name, Item ID for users to search. Besides, the consumer-order search functions involve different attributes such as consumer name, order ID, phone number for users to search.

* 1. Operational
     1. Logging

Protecting the important and complete information, the system should provide a logging function to trace the transactions and details of products. On the other hand, the operation logging function should set permission for different positions to check the details.

* + 1. Run Hours

The database server will be open 24 hours to prevent data loss.

As the main user of the system is company staff, the application system does not provide 24 hours service to save money. It will operate on working hours from 6 am to 12 pm, excluding public holidays.

* + 1. Delivery Sessions

The company will offer 3 delivery sessions from Monday to Saturday, excluding public holidays. Each delivery session only accepts a maximum of 5 appointments.

|  |
| --- |
| Time of Delivery Session: |
| * Morning (9:00am – 12:00nn) * Afternoon (1:00pm – 5:00pm) * Evening (6:00pm – 10:00pm) |

* + 1. Assign Item ID

The assignment system will assign an ID for each item automatically when the item is inbounded in the warehouse.

* 1. Security
     1. Access control

For staff accounts, the specified department managers can create, read, modify, delete accounts of that department.

A login function means that the users will have to login to the system to have different permission of operation in the system. In addition, the users need to log out after using the system. The system allows permission below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The Access of Admin User | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
| ✓ | ✓ | ✓ | ✓ | Permission of Staff Account |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Sales Manager | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
| ✓ | ✓ | ✓ | ✓ | Re-stock Request (Warehouse to store) (specify stores) |
|  | ✓ |  |  | Inventory List |
| ✓ | ✓ | ✓ | ✓ | Item List |
| ✓ | ✓ | ✓ | ✓ | Customer List |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Sales Representatives | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
| ✓ | ✓ | ✓ | ✓ | Payment Receipt (specify stores) |
| ✓ | ✓ | ✓ | ✓ | Sale Order (specify stores) |
|  | ✓ |  |  | Re-stock Request (Warehouse to store) (specify stores) |
| ✓ | ✓ | ✓ | ✓ | Sales Delivery Note |
| ✓ | ✓ | ✓ | ✓ | Installation Note |
|  | ✓ |  |  | Inventory List |
| ✓ | ✓ | ✓ | ✓ | Goods Return Note |
|  | ✓ |  |  | Item List |
| ✓ | ✓ | ✓ |  | Customer List |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Inventory Clerk | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
|  | ✓ |  |  | Re-stock Request (Warehouse to store) |
|  | ✓ | ✓ |  | Inventory List |
| ✓ | ✓ | ✓ | ✓ | Re-order Request |
|  | ✓ |  |  | Good Return Note |
|  | ✓ |  |  | Sales Delivery Note |
|  | ✓ |  |  | Goods Received Note (inventory to purchase clerk) |
|  | ✓ | ✓ |  | Item List |
|  | ✓ |  |  | Supplier List |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Goods Inwards Clerk | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
|  | ✓ |  |  | Purchase Order |
| ✓ | ✓ | ✓ | ✓ | Goods Received Note |
|  | ✓ | ✓ |  | Inventory List |
|  | ✓ |  |  | Item List |
|  | ✓ |  |  | Supplier List |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Purchase Manager | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
|  | ✓ |  |  | Inventory List |
| ✓ | ✓ | ✓ | ✓ | Item List |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Purchase Clerk | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
|  | ✓ |  |  | Re-order Request (inventory to purchase clerk) |
| ✓ | ✓ |  | ✓ | Purchase Order |
|  | ✓ |  |  | Good Received Note |
|  | ✓ |  |  | Item List |
| ✓ | ✓ | ✓ | ✓ | Supplier List |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Delivery Workman | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
|  | ✓ | ✓ |  | Re-stock Request (Warehouse to store) |
|  | ✓ | ✓ |  | Sales Delivery Note |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Technical Support Manager | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
| ✓ | ✓ | ✓ | ✓ | Arrangement of Installation for Installation Workman |
|  | ✓ |  |  | Sales Delivery Note |
|  | ✓ |  |  | Delivery Sessions Timetable |
|  | ✓ |  |  | Duty Record |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Technical Support Clerk | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
|  | ✓ |  |  | Installation Note |
|  | ✓ |  |  | Sales Delivery Note |
|  | ✓ |  |  | Delivery Sessions Timetable |
|  | ✓ |  |  | Duty Record |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Installation Workman | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
|  | ✓ | ✓ |  | Installation Note |
|  | ✓ |  |  | Sales Delivery Note |
|  | ✓ |  |  | Inventory List |
|  | ✓ | ✓ |  | Duty Record |
|  | ✓ |  |  | Delivery Sessions Timetable |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Accounting Manager | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
|  | ✓ |  |  | Item List |
|  | ✓ |  |  | Inventory List |
|  | ✓ |  |  | Payment Receipts |
|  | ✓ |  |  | Purchase Order |
|  | ✓ |  |  | Goods Received Note |
|  | ✓ |  |  | Goods Return Note |
|  | ✓ |  |  | Supplier List |
| ✓ | ✓ | ✓ | ✓ | Generate Reports |
| ✓ | ✓ | ✓ | ✓ | Data Analyze |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The **Access of** Accounting Clerk | | | | Data |
| **CREATE** | **READ** | **UPDATE** | **DELETE** |  |
|  | ✓ |  |  | Payment Receipts |
|  | ✓ |  |  | Purchase Order |
|  | ✓ |  |  | Goods Received Note |
|  | ✓ |  |  | Goods Return Note |
|  | ✓ |  |  | Item List |
|  | ✓ |  |  | Supplier List |
| ✓ | ✓ | ✓ | ✓ | Generate Reports |
| ✓ | ✓ | ✓ | ✓ | Data Analyze |

* + 1. Data Storing

All data from different departments will be centralized on a database server (in a third-party database server) providing SQL service in pursuit of data integrity. Also, users will not worry about data inconsistency as the same documents were put in a different department since the third-party is going to be responsible for the data protection. In addition, each department has its own independent database to store the data. Therefore, the database must have enough capacity to store the data.

To avoid data loss, all data from the company databases will be backed up by the NAS server per week. Backing up the data per week will balance between the possibility of data loss caused by backing up once a month and the huge operational cost caused by backing up once a day.

* 1. Compatibility

The system should be compatible with the geographic operation system. The application server will be provided with three languages such as English, Simplified Chinese, and Traditional Chinese to meet different district users’ needs. In addition, various regional users can apply an electronic spreadsheet that is a unified format. The system will narrow the gap of stores between Hong Kong and the Pearl River Delta Region and speed up the operation.

* 1. Performance

The system is required to display a concise interface for users to search for information and deal with consumer requests. Thus, performance should be tidy and reloaded quickly. For instance, the loading time on inserting information and getting information should be reduced. When the user fills the electronic spreadsheet, the performance should provide many options for the user to choose from.

* 1. Reliability

Saving plenty of consumers and transaction information, the system must be reliable. It must use a stable and fast server and test perfectly to avoid exceptions before launching. Also, maintenance services play a vital role to ensure that the system and servers work smoothly.

To solve the problem of data inconsistency, the system will provide multi-threading. Only one user can update information in a section at a time lest other users repeat to update.

1. Driving Question

Explain how the project answers this question: “How can an organization get benefit from a central computerized management system?”

A central computerized management system is typically stored in a database and used to manage web content, allowing multiple contributors to create, edit and publish.

Better Limited without a central computerized management system that uses handwritten records to store the information of their business, which is more prone to erroneous data. These companies are used to updating data manually which increases the possibility of mistakes. Compared with manual work, using a central computerized management system may decrease the risk of errors and reduce the loss caused by incorrect data. It can simplify the information updates necessary for the company. For instance, Better Limited prepares to expand its business in the Pearl River Delta Region. There may be seasonal or special promotions, or constantly changing products. A central computerized management system lets staff both add new content and remove out-of-date content quickly and efficiently. Therefore, it can boost staff’s motivation working efficiency for companies.

In addition, the central computerized management system lifts the market competitiveness of the company. Up to a minute, the system is successfully employed by megacorporations such as Fortress and Muji. Following these companies, Better Limited uses a central computerized management system to combine information on their branch stores. Due to the central computerized management system, the staff in the different branches can provide a certain answer for them when customers have any question about the company. It increases customers’ confidence in using our products or services. Thus, the system achieves higher competitiveness compared to other companies without this system.

To conclude, the central computerized management system plays a vital role in improving Better Limited's operation. It brings plenty of benefits for an organization such as decreasing the risk of errors and lifting market competitiveness.

1. Conclusion

Nowadays, information technology has gradually integrated into society. The computerized data management system provides services for various entrepreneurs, making it easier for growing a successful business.

In order to enhance the competitiveness of this company, we have planned to build up a computerized system to improve the current situation. It can reduce the manpower cost of the company. On the other hand, it can increase the operating efficiency of the company and reduce the chance of mistakes.

In the current plan, we did a detailed analysis based on this company’s background, operations, and comments from staff with various positions.

We did a detailed analysis based on this company’s background, operations, and comments from staff with various positions.

In fact, the company uses standalone PCs and electronic spreadsheets to manage the delivery services in the centres. Since the PCs are not interconnected, data between different centres cannot be readily shared. If their data sharing system is not perfected, it will lead to a large number of communication errors and delays in the transaction of goods, resulting in large losses for the company.

The Company decides to improve the current situation with the best usage of information technology. We are going to develop a warehouse management system. The purpose of the system is the Computerized storage of data and calculations. To solve part of the major problems of lots of handwriting work, causing frequent errors in data entry. Also, we are going to add some functions to solve the major problems of message reception error and slow communication.

Finally, we will plan the design specification to implement the system.

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