

Stage 4: Final System Report

Name

Institution

Class

Professor

Date

Stage 4: Final System Report

I. Introduction to the full systems study

Precision Electronics Parts (PEP), Inc., is a small private electronics firm based in Kansas. The company specializes in manufacturing various precision electronic equipment and spare parts for medical equipment and has remained operational for at least 20 years. PEP recently invented the low-voltage motor, which gained popularity because of its efficiency and reliability. The demand for the motor rose, increasing the pressure on the billing and invoicing departments because their current systems could not handle the increased workload. The increased pressure led to a backlog of processing the customers' invoices, billing and payment receipts.

As the newly hired Business and IT Systems Analyst, my role is to provide PEP's IT Steering Committee (ITSC) with professional and technical guidance and assistance to address the problem of delayed invoicing, billing, and payment receipt processing. The proposed system will enable PEP's Finance Department to improve its control and solve the problems of late invoicing, billing, payment collection, and processing errors in received orders.

A. An overview of the events leading up to the study

PEP recently invented the low-voltage motor, which quickly gained popularity because of its efficiency and reliability. The demand for the motor rose, mounting pressure on the inventory management, ordering & shipping, and finance departments because their current systems could not handle the increased workload. For instance, the increased pressure resulted in a backlog of processing customer invoices, billing, and payment receipts.

B. The subject of the study

The primary aim is to help PEP's Financial Department improve its control and solve the problems of late invoicing, billing, payment collection, and processing errors in received orders. This will allow them to catch up with the high pressure caused by the increasing demand for efficient and effective custom low-voltage motors.

C. The objective and scope of the proposed system

The proposed system aims to maximize daily business operations by improving the system's ability to process invoicing, billing, and payment collection accurately and quickly. The new system will replace the manual business process with automated billing, invoicing, and payment control. The proposed system also aims to improve customer experience by providing automated payment and account management systems. The new system implementation scope will include inventory management, ordering & shipping, and finance departments.

D. A statement of recommendations and justifications for the proposed system

I will recommend to the IT Steering Committee (ITSC) a third-party Software as a Service (SaaS) software such as the Intuit QuickBooks Pro Plus 2022 Accounting Software because it gives the firms a clear insight into the financial processes. This software will enable PEP's Financial Department to focus clearly on its billing, invoicing, and payment control. This accounting software is suitable because it costs an annual subscription fee of \$349.99 and an additional \$300 fee for additional users.

II. Description of the Current Process/System

A. A brief description of the current process or the current system and how it is used

The current system is used to process invoices, billing, and payment controls. However, the increased sales of the custom low voltage motor mounted pressure on the Ordering &

Shipping Department, Inventory Management Department, and Finance Department, resulting in backlogs of billing, invoices, and payment process.

B. The purpose of the current process or system

The purpose of the current process/system is to help PEP's Financial Department manage the customers' ordering & shipping, invoices, billing, and payment activities. It's used to process the business activities of PEP to help reduce the workload on the Ordering & Shipping Departments, Inventory Management Departments, and Finance Department.

C. The problems with the current process or system and the rationale for a new system

The company has built a low-voltage motor for medical equipment that decreases electricity costs. Due to the high demand for the motors, pressure to fill orders has been put on the Ordering & Shipping Department, Inventory Management Department, and Finance Department.

Also, the Finance department is experiencing a backlog in their invoice, billing, and payment processes. The aim is to help PEP improve its system's effectiveness, efficiency, reliability, and speed to address the backlog problem. The software-engineering techniques will be used to design new applications that enhance the functionality of the current systems.

D. The operating cost of the present system, if applicable

The operating cost of the present system was not provided. However, the cost of the proposed system will depend on the software and hardware requirements, together with the specific consultancy services needed.

Description of the Proposed System

A. An overview of the proposed system

The proposed system will enable PEP's Ordering & Shipping Department, Inventory Management Department, and Finance Department to improve the invoicing, billing, and payment control activities to address the backlogs experienced with the present system. The new system will enable PEP to improve its general management of the ordering & shipping, invoicing, billing, and payment processes.

B. The scope of the project

The scope of the project is to streamline the company's operations to cut costs, increase revenue and maintain customer satisfaction. The project will overhaul the company's business process and create and revamp the delivery process. It will introduce a real-time tracking system for the ordering & shipping activities to limit the delivery period to two days. The new system will drive PEP's capability by digitally transforming its business operations to allow customers to make payments and manage their accounts electronically. It will also allow the Ordering & Shipping Department, Inventory Management Department, and Finance Department to perform electronic invoicing, billing, payment control, and sharing of data with other departments for transparency.

C. The tangible and intangible benefits of the proposed system

The tangible benefits that the company will enjoy are faster invoicing, billing, and payment processing by the Finance Department. The proposed system will also benefit the firm by increasing operation efficiency, minimizing operating costs, and maximizing market value. The intangible benefits include optimized customer satisfaction, excellent company reputation, customer loyalty, and job satisfaction.

D. Feasibility Analyses

a. Technical Feasibility - When assessing technical feasibility, the analyst must assess the hardware, software, and network resources availability. The newly proposed web-based system will improve the Ordering & Shipping Department and the Inventory Management Department operations by leveraging the speed and efficiency of the associated activities.

b. Financial Feasibility – The projected benefits of the proposed system will outweigh the total cost of ownership (TCO). Upon implementation, the new system will improve accuracy and efficiency when processing PEP billing, invoicing, and payment activities. The system will process huge sales volumes without experiencing backlogs or any form of delay. The increased processing of sales, invoices, and payments will optimize the customers' experience and maximize sales and the firm's overall revenues and profits. This will enable PEP to improve its return on investment (ROI) within a year from the implementation of the proposed system.

c. Organizational/Behavioral Feasibility - Organizational feasibility means that a proposed system will be used effectively after it has been developed. The new system will improve staff and customers' experience by eliminating the manual system associated with stress. Automated payment management, billing, and invoicing will reduce the stress among the staff in various departments since the individuals will have a reduced workload.

E. Time and cost estimates to implement the proposed system

The project will take two months to be implemented since the web-based SaaS Software will have to be tested and changes implemented before making it available for the intended purpose. The company will engage in a legal agreement with the service provider and pay for the annual premium subscription service at about \$349.99 and an additional \$300 fee for every additional user. The system will support 25 users; therefore, PEP will have to pay \$349.99 for

one user and \$200 additional fees for 24 users, as agreed between the company and the service provider. In total, the company will spend \$5,149.99 annually on Intuit QuickBook Accounting Software. The proposed system will handle automatically track all the payment, billing, and invoicing activities and auto-generate reports for effective control and management of the company's business processes.

F. Requirements Checklist

I. Functional Requirements

PEP operates on a monthly reporting schedule in which the invoicing adds, updates, and maintains the product codes and pricing on the 15th of every month. The customers are required to make their payments by the 10th of every month. The functional reports are shared with all departments for transparency and easy access to invoices, billing, and payment information by the staff. PEP's primary aim is to track the invoices, billing, and collection of customer payments. Therefore, the proposed system will describe the system's core functionality of the solutions by managing the output, input, and processing requirements.

a. Output Requirements

i. Order & Shipping Report – the Ordering & Shipping Department sends its monthly report to Invoicing. The products, quantities ordered and shipped, and their serial codes are entered into the invoicing module to allow computation of their prices and preparation of the invoice.

ii. Customer Billing Report – Customers are required to send their payments (received in lump sum payments) by the 10th of every month to the AR. The AR updates the customers' account records immediately after receiving the payments.

iii. Overdue Accounts Report – the Invoicing Department is responsible for identifying overdue accounts using two criteria; 30 days and 60 days or more overdue. These reports are then sent to the Accounts Receivable (AR) and Sales Departments to facilitate the collection of the arrears from the customers. A 2% fee is applied to all invoices that are overdue by 30 days or more. For all invoices that are 60 days or more overdue (although rare), the ordering and shipping department is notified to halt all delivery services to the customer until the invoice is paid in full.

b. Input Requirements

i. Order & Shipping Report

- Products Ordered
- Products Shipped
- Quantity Ordered
- Product Pricing
- Calculated Price
- Customer Organization Name (primary key)
- Customer Zip Code +4
- Customer State
- Customer City
- Customer Organization Street Address

ii. Customer Billing Report

- Calculated Price (Calculated Field)
- Amount Due (Calculated Field)
- Amount Paid

- Date Paid
- Customer Organization Name (primary key)
- Product Order Date
- Products Ordered
- Quantity Ordered
- Product Price Per Unit

iii. Overdue Accounts Report

- Customer State
- Customer Zip Code + 4
- Customer Organization Name (primary key)
- Customer Street Address
- Calculated Price (Calculated Field)
- Amount Due (Calculated Field)
- Amount Paid
- Date Paid
- Amount 30 Days Overdue (Calculated Field)
- Amount 60 Days Overdue (Calculated Field)
- Amount Greater Than 60 Days Overdue (Calculated Field)
- 2% Overdue Amount (Calculated Field)
- Secondary Contact First Name
- Secondary Contact Last Name
- Secondary Contact Phone Number
- Secondary Contact Email Address

- Primary Contact First Name
- Primary Contact Last Name
- Primary Contact Phone Number
- Primary Contact Email Address
- Products Ordered
- Product Ordered Date
- Quantity Ordered
- Product Price Per Unit

c. Processing Requirements

i. Overdue Report

- Days overdue – this is calculated from the last date paid (DP) if the customer misses paying on the most recent scheduled payment date (all days after the 10th of each month after the last DP). The days overdue are classified as either 30 days or more or 60 days or more. The accounts with 30 days or more receive a 2% additional fee for the delay, while those exceeding 60 days receive “Hold” status. All the accounts on Hold do not receive shipments until they clear the pending debts.
- Overdue Amount – This is calculated by applying an additional 2% fee on the amount due. The formula for calculating the overdue amount is; *(Amount Due * 2% Overdue Fee) = Overdue Amount.*

ii. Order & Shipping Report

- Calculated Price (CP) – this is obtained by multiplying the Unit Product Pricing (PP) by the Quantity of Products Ordered (Calculated Price = Product Pricing * Quantity Ordered).

iii. Customer Billing Report

- Amount Due obtained by multiplying the total products shipped by their unit pricing as indicated on each invoice. ($\text{Amount Due} = \text{Product Pricing} * \text{Quantity Ordered/Shipped}$)
- Amount Paid (AP) – collect information on the actual amount the customer pays with respect to the amount due.
- Date Paid (DP) – obtained from customer payment information.
- Amount Outstanding (AO) – obtained by subtracting the amount paid from the amount due; $\text{AO} = \text{AD} - \text{AP}$. If the amount paid (AP) is less than the amount due (AD), the result is the amount outstanding (AO).

II. Technical Requirements

The technical requirements will address the system security, system controls, system performance, and continuity requirements of the new system. The proposed system will address security requirements and business continuity amid unfavorable events during the development of the new system to ensure a smooth transition and less risk. Addressed below are the system security, system controls, system performance, and continuity requirements that will contribute to the technical requirements.

a. Security Requirements

The personal and financial information of the company and customers are very sensitive and must be kept confidential and secured from unauthorized access by third parties (Kaila & Nyman, 2018). PEP must therefore implement robust security systems to secure the business

data, as this boosts the customers' trust and confidence in doing business with the company. The required security elements are:

- **Multi-layered firewall** – this serves as the first line of defense against potential threats from external attackers. The multi-layered firewall is suitable because it offers the company's network and servers double protection from cyber threats (Saarikko et al., 2020; Woland et al., 2018). It monitors the network traffic and blocks unauthorized traffic from entering the company's network. Cisco's firewall can be considered for the company's network.
- **Encryption** – the company should implement encryption software to encrypt all its stored and in-transit data (Woland et al., 2018). This helps block third parties from accessing the content of the invoices, orders, and billing reports shared between the firm and the customers.
- **Anti-malware software** – this software will help prevent malware attacks targeting the network systems. It will block malicious codes such as DoS and DDoS from penetrating the company's network and causing damage to the network system (Woland et al., 2018).
- **Multiple authentication systems** – the company should introduce a complementary authentication system to block internal and external threats from using a single security loophole to access the system illegally. For example, the password should be accompanied by biometric authentication or a one-time password sent to the account holder's personal contact for access to be granted.
- *Network monitoring and intrusion software* – this software will help monitor, detect and report the unusual traffic attempting to penetrate the system for quick

action. This will facilitate a quick response to the problem and help mitigate the impact of the attack.

- **Network isolation** – segmenting the network into separate zones with individuals and departments having different access rights will optimize the company's network security. As a result, only authorized individuals and departments will have access to specific network segments (Woland et al., 2018). This will minimize internal threats and maximize the confidentiality of information.

b. System Control Requirements

The system control requirements will ensure the system functions within the expected legal regulations, efficiency and reliability. They include:

- *Risk management* – this will identify all the potential risks, recommend the most suitable solutions and specify stakeholder roles.
- **Disaster recovery** - will provide a comprehensive plan for responding to and addressing daily system issues as they occur. This will promote smooth system functioning.
- **Change management** – it will ensure all changes made to the system are in the best interest of the company and not individuals. The change management plan will also ensure that the implemented changes have a minimal adverse impact on PEP.

c. Performance Requirements

- **Scalability** – the system must be expandable to accommodate the connection of new devices, more users during high workload sessions, and additional process transactions at high speeds.

- **Response time** – the response time for the orders should not exceed 24-48 hours.

The new system must therefore support multiple users and operate faster to allow quick responses to orders and customer concerns. This will also promote the speed of preparing overdue customer billing and ordering & shipping reports.

- **Workload** – the new system must support a huge workload because PEP has numerous departments that operate simultaneously. In particular, the system should support input, processing, output, and printing of invoices, orders, and billing reports from multiple users simultaneously.

d. Business Continuity Requirements

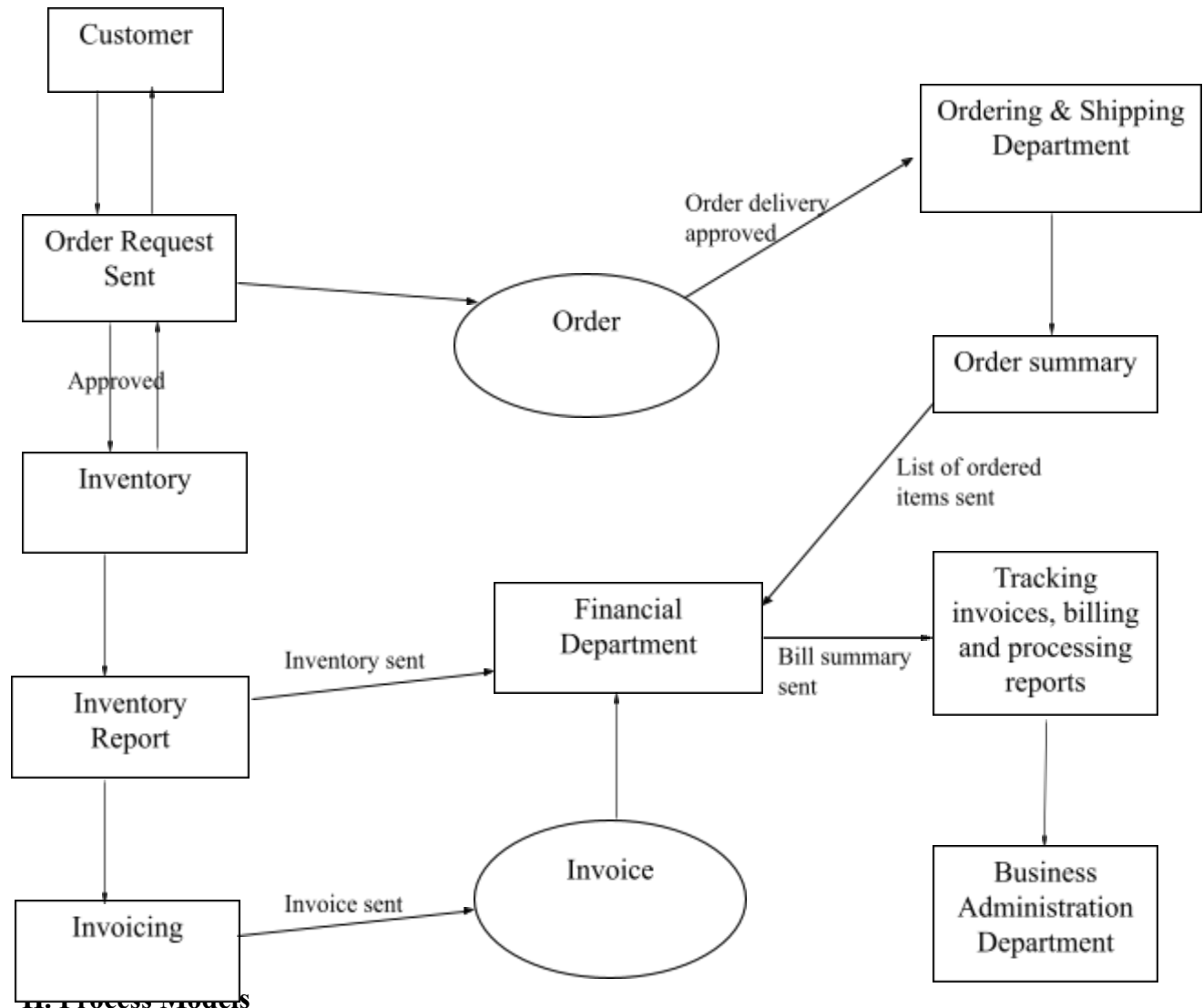
The business continuity requirements will enable PEP recover quickly from disruptive events to promote smooth operations. They include:

- Creation of standard operating procedures –establishment of remote data centers, back-up servers, server restore, automatic system reboot and system crash and recovery.
- Financial procedures – implement customer information guidelines.
- Business continuity procedures- effective ordering and shipping procedures to promote quick delivery of products to customers even during harsh times.

Data Models

Data Flow Diagram

The data flow diagram presents a step-by-step visual procedure by which the information flows through various departments and stakeholders from the initial to the final stage of the process. This diagram will enable the leadership, management, and staff to visualize how the information will generally flow on a normal business day.



To successfully implement the proposed system, PEP requires three process models.

They include structured English, a Decision table, and a Decision Tree.

a). Structured English

The structured English tool will enable the company to describe the sequence, selection, and iteration involved in the business process. For example, the system will use the following criteria to provide a discount to a customer:

IF outstanding days is; $1 < \text{outstanding days} \leq 30$ days

Then apply 2% fee on amount due

Else

IF outstanding days > 60 days

Then

Put customer on hold and stop delivery

End If

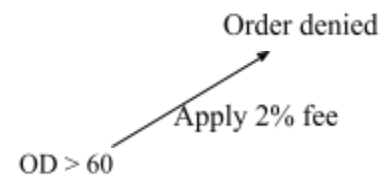
The customer pays outstanding amount
in full.

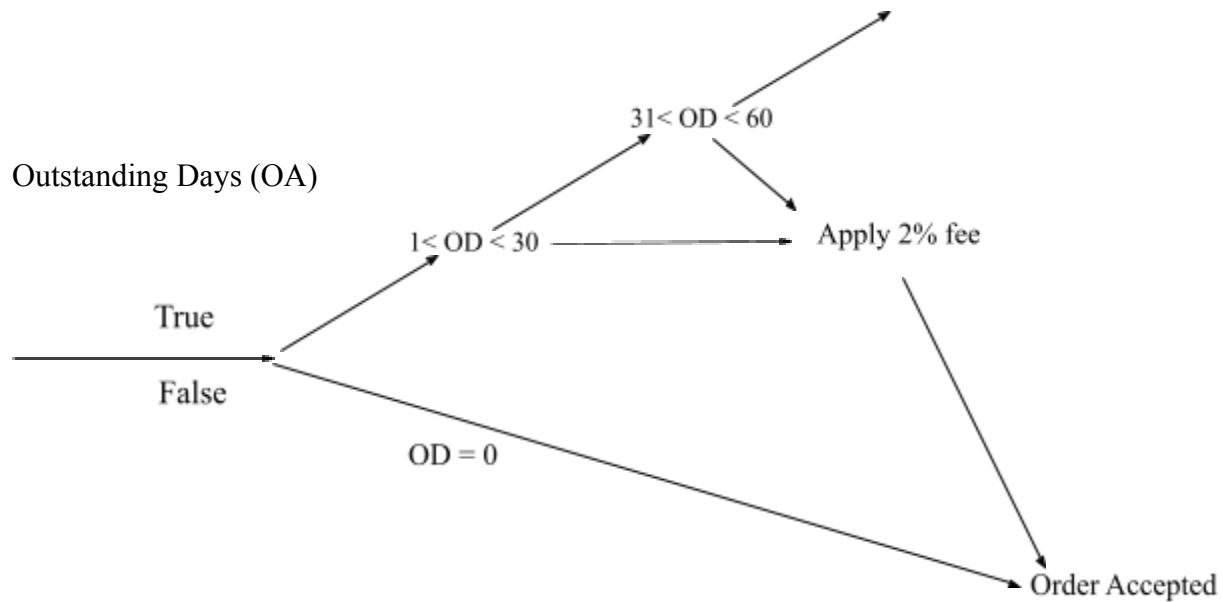
b). Decision Table

The decision tree depicts a matrix table. It groups rule with similar conditions and actions to help establish overlaps and gaps. The decision table will enable the company to implement the right process rules with zero overlaps or gaps.

Conditions	0	15	40	65
Outstanding days < 1	True	False	False	False
1 < Outstanding days < 30	False	True	False	False
31 Outstanding days < 60	False	False	True	False
Outstanding days >61	False	False	False	True
Apply 2% additional fee on amount due	False	True	True	True
Apply hold flag on Account	False	False	False	True
Accept order	True	True	True	False

c). Decision Tree





I. System Design Specification

Currently, PEP seeks to deploy a monthly reporting system that can track the transactions and operations of all its departments. This strategy is intended to address the payment and billing problems affecting its billing and invoicing departments due to the lack of an advanced system with the needed functionality features. The delayed invoicing, payment and billing operations have continued to mount pressure on the company, causing the leadership to look for a better strategy to address them. The proposed system will enable the billing and invoicing departments to process invoices and payments quickly and accurately, thereby preventing delays, errors, and unclarity. The output layout will outline how the new system will accept, process, and display the final reports for reference by the relevant departments and customers.

i. Order & Shipping Report

Monthly Invoicing Report			
ID	1		
Organization_Name	MedStar Union Memorial Hospital		
Organization_Address	201 E University Pkwy		
City	Baltimore		
State	MD		
Zip_Code	21218		
Order_Date	01/18/2018		
Product_Ordered	Low Voltage Motor		
Quantity	35		
Price_Per_Unit		\$500.00	
Employee_ID	UM-45621		
ID	2		
Organization_Name	St. Agnes Hospital		
Organization_Address	900 S Caton Ave		
City	Baltimore		
State	MD		
Zip_Code	21229		
Order_Date	02/28/2018		
Product_Ordered	Low Voltage Motor		
Quantity	55		
Price_Per_Unit		\$500.00	
Employee_ID	SAH-159-763		

Figure 1: New invoice/shipping & order report (Prepared using MS Access)

The monthly customer report will provide the clear quantity and pricing of the items ordered and delivered to the customers. This will enable the invoicing department to have an accurate and up-to-date record of all the ordered and shipped items to use in generating the monthly invoices. Under the proposed system, the order and shipping department will be able to accept new orders, update the customer's order placement status, add product codes, add and update the item prices, and send the updated order and shipping report to invoicing department. The generated monthly invoice or billing & order report will be as in *fig.1* above.

Customer Billing Report (Accounts Receivable Report)

Accounts Receivable Report			
ID	1		
Organization_Name	MedStar Union Memorial Hospital		
Organization_Address	201 E University Pkwy		
City	Baltimore		
State	MD		
Zip_Code	21218		
Order_Date	01/18/2018		
Product_Ordered	Low Voltage Motor		
Quantity	35		
Price_Per_Unit	\$300.00		
Employee_ID	UM-45621		
ID	2		
Organization_Name	St. Agnes Hospital		
Organization_Address	900 S Caton Ave		
City	Baltimore		
State	MD		
Zip_Code	21229		
Order_Date	02/28/2018		
Product_Ordered	Low Voltage Motor		
Quantity	35		
Price_Per_Unit	\$300.00		
Employee_ID	SAH-123-763		

Figure 2: Customer billing report/AR report (Designed using MS Access)

The customers are expected to pay for their orders by the 10th of every month in a lump sum. This system feature will make it easy for customers to make payments and access their payment reports. The new system will update the customer's accounts immediately after the payments are received by the Accounts Receivable (AR). This will make increase the speed, accuracy, and efficiency of producing and updating the customers' billing/payment reports. In case of delayed or failed payment, the invoice/shipping & order report will be automatically replaced with the overdue reports, which will be sent to the sales department to show the customers whose accounts are overdue and specific period. Provided in *fig.2* is a designed sample of how the report will look.

Overdue Accounts Report

OverDueCollections			
ID	1		
Organization_Name	MedStar Union Memorial Hospital		
Address	201 E University Place		
City	Baltimore		
Zip_Code	21218		
POC_First_Name	Sandra		
POC_Last_Name	Reid		
POC_Email_Address	Sandra.Reid@MedStar.com		
POC_Phone	443-769-4755		
Backup_First_Name	John		
Backup_Last_Name	Williams		
Backup_Email_Address	John.Williams@MedStar.com		
Backup_Number	410-769-4755		
Order_Date	01/18/2018		
Product_Ordered	Low Voltage Meter		
Quantity	33		
Price_Per_Unit		\$300.00	
Final_Price		\$9,900.00	
Amount_Due		\$9,900.00	
Date_Paid	01/18/2018		
30_Days_Overdue	☒		
60_Days_Overdue	☒		
7%_Overdue_Amount		\$1,180.00	
Unique_Solution_Provider	MDUS57258		

Figure 3: New overdue accounts report preview

The overdue account report will provide the list of all customers whose account payments have not been cleared. The overdue period will be highlighted, and the two percent overdue charges will apply automatically to the customer's next invoice. The report will also inform the sales department of the customers whose accounts are on hold so that they can halt taking their orders and making deliveries.

Input Layout

The input layout will make it easy to track the accuracy of the financial data entered into the system before various departments generate the financial reports. The new input layout will offer various departments, such as invoicing and billing, a user-friendly interface for tracking the

data entered into the system. The users will find it easy to update the customers' transaction details, order and shipping details, as well as invoice data. The new layout will also make it easy for the customers to understand the content of the payment reports and raise concerns whenever there is a need. The layouts for the order & shipping report, customer billing report, and overdue accounts report will be shown in figures 4, 5, and 6 below.

i. Order & Shipping Report

[illegible]

ii. Customer Billing Report

[illegible]

iii. Overdue Accounts Report

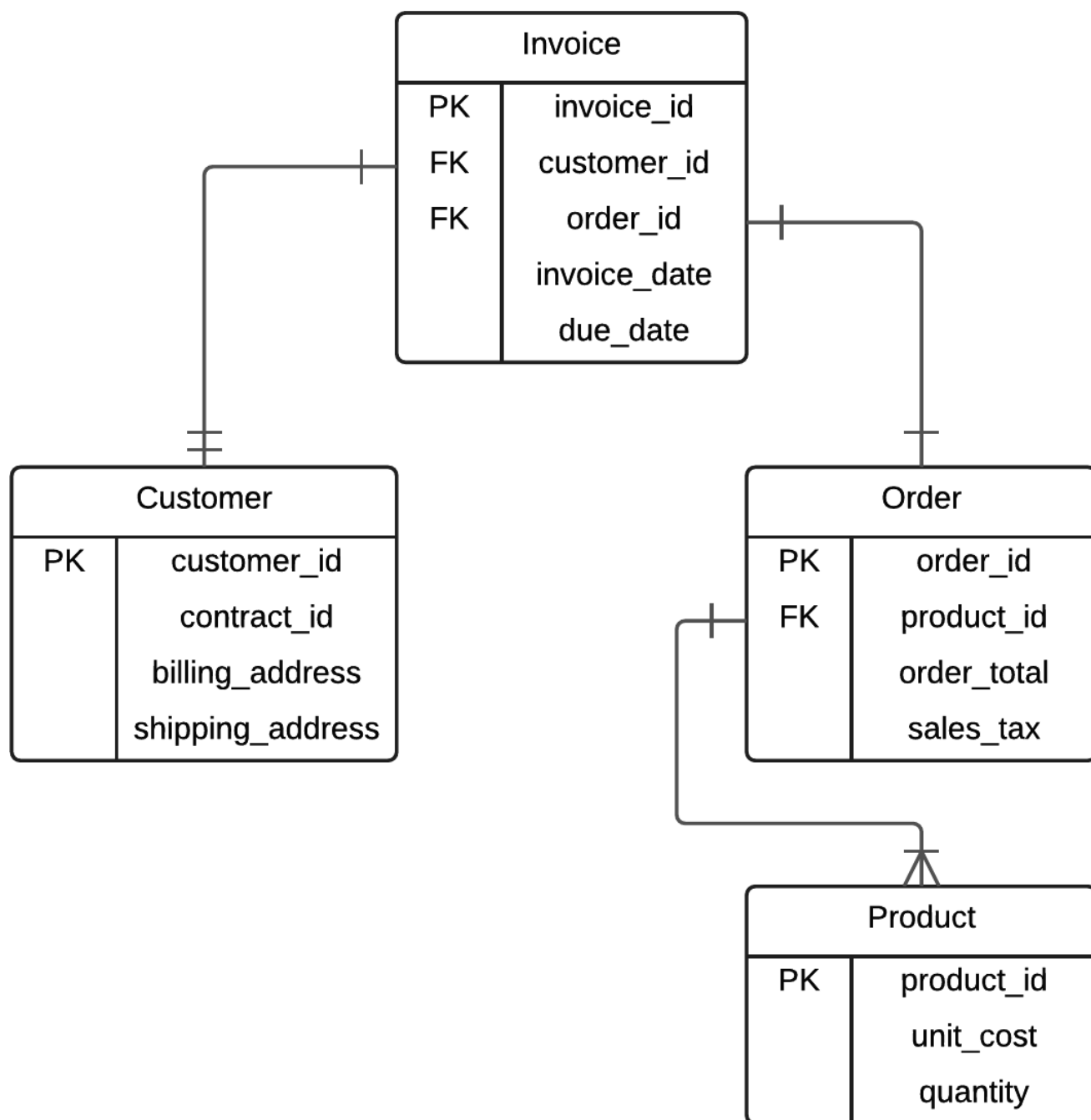
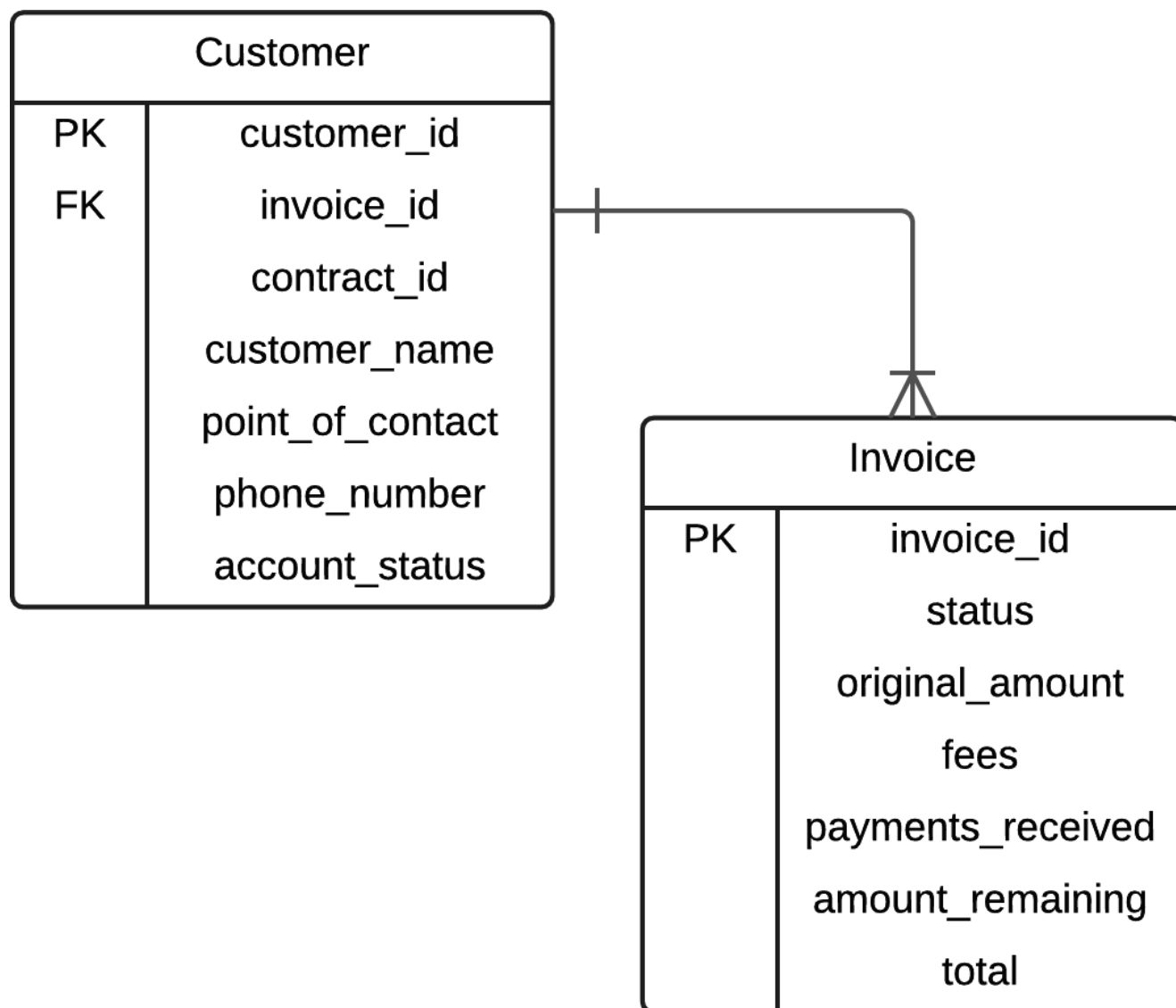
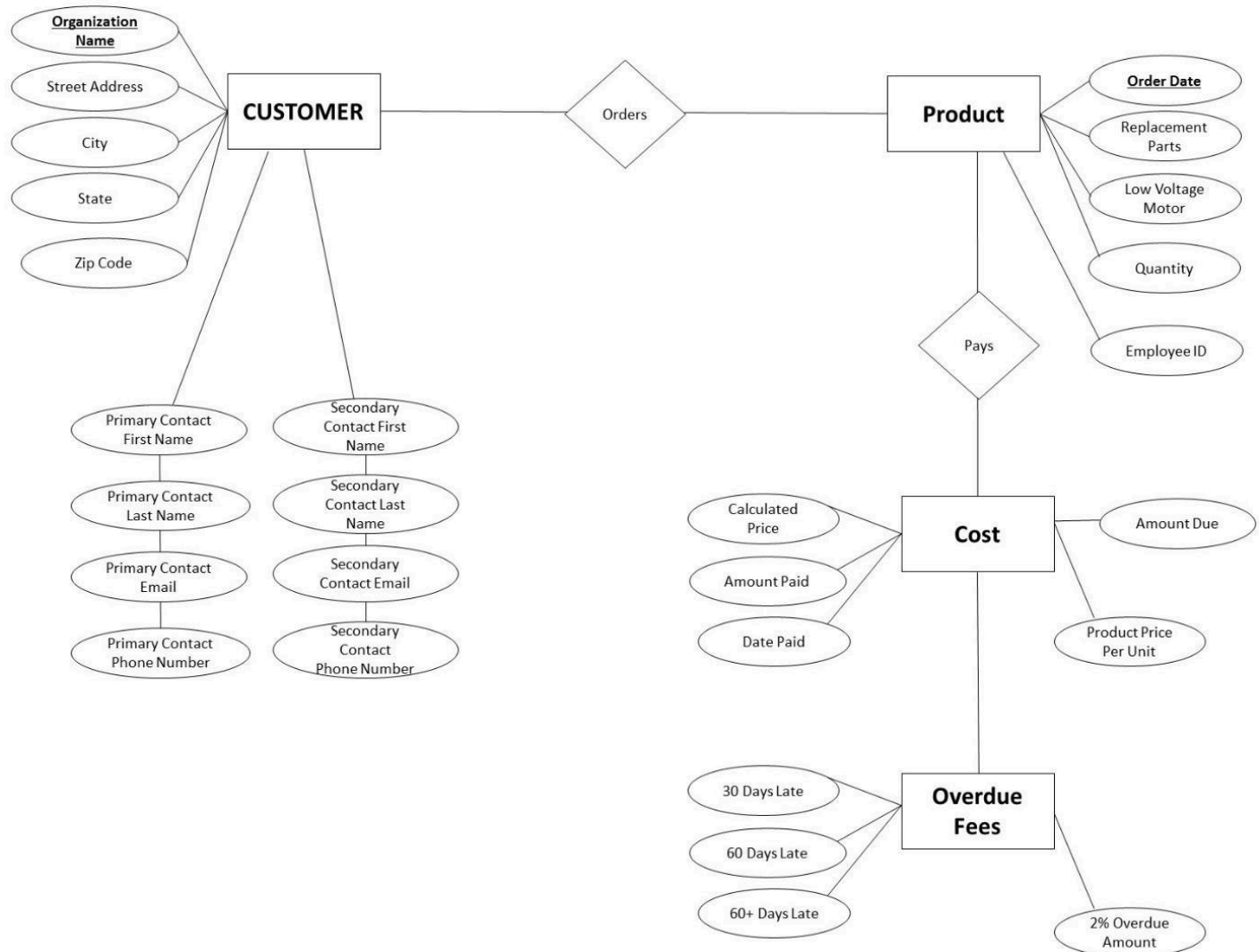


Figure 4: Order & Shipping Report

ii. Customer Billing Report*Figure 5: Customer Billing Report*

iii. Overdue Accounts Report



J. Recommended Acquisition Strategy

i. Identify scope of what to buy

1. Product or service?

PEP should buy the web-based SaaS service (Intuit QuickBooks) service because of its essential accounting elements needed to address PEP's situation.

2. Commercial-off-the-shelf or custom?

The commercial-off-the-shelf (COTS) service is most suitable for improving PEP's business process. The COTS system for each department can be tailored to meet the specific needs of each department.

3. Use in-house or contractor support?

PEP should use the contractor support because the SaaS service can be customized to meet the organization's needs. Seeking the contractor support will help PEP minimize the implementation, operational and maintenance costs.

ii. Select hosting alternative (dedicated servers, data center, or cloud computing)

Cloud computing is the most suitable alternative for PEP's proposed system because of its excellent capabilities that will allow the staff to operate remotely. The cloud computing option will also save the cost that PEP would have spent maintaining the physical servers and data centers.

K. Implementation Plan

i. A list of personnel needs to develop, install and maintain the new system

- **Project manager** – will oversee the project from planning to completion stages. The project manager will lead the implementation team in implementing the new system in time.
- **Budget Analyst** – will be in charge of all the financial elements of the project. For example, the budget analyst will authorize release of funds for the project activities.

- **Risk manager/expert** – will perform risk assessment on the new system and help identify and mitigate the potential risks that may adversely affect the project outcome.
- **System Engineer** – this expert will assess PEP’s hardware and advice whether its compatible with the SaaS or they need improvement to be compatible. In case of incompatibility, the system engineer will configure the two to be compatible.
- **Network engineer** – will design PEP’s network to ensure it aligns well with the requirements of the recommended SaaS. The network engineer will also test the system functionality to ensure they meet the standard requirements.

ii. A proposed timetable for installing the proposed system and staff-hours required to complete the project

Personnel	Daily Maximum Time Allowed	Total Time Allocation for 2 Months
Project manager	8 hours	320 hours
Budget Analyst	8 hours	320 hours
Risk Manager/Expert	8 hours	180 hours
System Engineer	8 hours	90 hours
Network Engineer	8 hours	90 hours

IV. Financial Information

A. The operating cost of the present system, if applicable

Not applicable because it was not presented in the case.

B. The estimated implementation cost of the proposed system

The estimated cost for implementing the proposed system will depend on the type of the software and hardware needed. The cost will increase if PEP seeks to customize its new system.

C. The estimated operating cost and the estimated useful life of the new system

The estimated annual cost of QuickBooks Accounting Software will be \$5,149.99 for the 25 systems accounts across different departments in the organization. PEP will benefit from the new system through increased accuracy, efficiency and processing speed.

D. The tangible and intangible benefits of the proposed system

The tangible benefits that the company will enjoy are faster invoicing, billing, and payment processing by the Finance Department. The proposed system will also benefit the firm by increasing operation efficiency (process improvement), minimizing operating costs (cost saving), and maximizing market value (high productivity). The intangible benefits include: optimized customer experience (satisfaction), improved company reputation, and minimized legal issues associated with noncompliance.

V. Summary

The proposed system is suitable and necessary for addressing PEP's situation. Due to high functionality speed and workload, the proposed system will enable PEP to process the business activities (invoice, billing, and payment processes) quickly and efficiently, thus, keeping up with the increasing orders of the custom low-voltage motor. The new system's automated capability will improve the speed and accuracy of processing PEP's business activities, resulting in improved performance, productivity, and profitability. More importantly, implementing the new system will relieve the Ordering & Shipping Department, Inventory Management Department, and Finance Department from backlogs and delayed billing, invoices, and payment process. The reduced pressure will allow PEP staff to focus on other growth strategies necessary for organizational sustainability.

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