BUSITEMA UNIVERSITY
Pursuing Excellence

P.O.Box 236, Tororo
Gen:+256-454448842
Dir: +256-454448864
Mob: +256-782999874
Fax: +256-454436517
Email:ar@acadreg.busitema.ac.ug
Website:www.busitema.ac.ug

CLOTH STORE INVENTORY MANAGEMENT SYSTEM

CASE STUDY: CHARITY BOTIQUE NAGONGERA TOWNSHIP

BY

GAWAYA MERCIOUS SAM

BU/UP/2021/0429

+256770665473/+256703937771,

gawayamsam@gmail.com

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SUPERVISOR: Ms. NATURINDA ENID

enaturinda.sci@busitema.ac.ug,

+256752448680.

DECLARATION

I GAWAYA MERCIOUS AM Reg. No. BU/UP/2021/0429 do hereby declare that this Project Report is original and has not been published and/or submitted for any other degree award to any other University before.

Sign. :  DATE: 16th August, 2024

APPROVAL

This Project Report has been submitted for Examination with the approval of the following supervisor/s.

Signed:  Date: 16th August, 2024

Ms. NATURINDA ENID

Department of computer studies

Faculty of Science and Education

DEDICATION

First and foremost, I thank the Almighty God who has successfully enabled me to complete with a sound mind and good health.

I then dedicate this report to my inspiration of all times my parents **MR. and Ms. MUWOYA SAMSON.** Sincerest appreciation to my lovely aunt **Ms. OPOYA FRANCIS** as well as a big shout out to my dearest siblings. Thank you so much for the support and may the Almighty reward you abundantly.

I also dedicate this report to my dear supervisor **Ms. NATURINDA ENID** who guided me on the dos and don’ts of making this report a success. For if it was not her help, maybe I would not shoot the tip of this mountain.

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LIST OF ABBREVIATIONS

1. **SSADM** Structured System Analysis and Design
2. **RAD** Rapid Application Development
3. **SAD** System Analysis and Design
4. **DFD** Data Flow Diagram
5. **ERD** Entity Relationship Diagram
6. **HTML** Hypertext Markup Language
7. **CSS** Cascading Style Sheet
8. **PHP** Hypertext Pre-Processor
9. **RAM** Random Access Memory
10. **UPS** Uninterruptible Power Supply
11. **GUI** Graphical User Interface
12. **IDE** Integrated Development Environment
13. **IMS** Inventory Management System
14. **RFID** Radio Frequency Identification
15. **ERP** Enterprise Resource Planning
16. **AI** Artificial Intelligence
17. **ML** Machine Learning
18. **IoT** Internet of Things
19. **JIT** Just In Time
20. **EOQ** Economic Order Quantity
21. **ABC** Activity-Based Costing

ABSTRACT

Inventories can be defined as any idle goods or materials of a company or firm that are waiting to be used. Cloth store inventory Management system was designed to allow the employees of Charity boutique to not only monitor stock levels and minimize stock-outs but also help them in proper record keeping and inventory tracking. The system majorly comprises of two Sections of access that include the Manager (administrator) and the employees (other users).

The Administrator Section enabled the manager to log in and it directed him to his dashboard where he was able to; view the total revenue, total orders and the low stock warning as well as the user wise orders to see how the users are performing. The admin was as well able to view the different product brands, categories and products available. The system further provided the administrator with the rights to add products, add categories and also add brands as well as edit their information. He was also provided with the right to, add, manage orders and edit order information and also add users, delete users and manage other user information.

The User section enabled the user to login and access their dashboard where they're able to view total orders, and total revenue. The user was further provided the user or employee with the rights to manage (add, edit & delete) orders.

The methodologies used was Rapid Application Development (RAD) which was easy and helped a lot in delivering a working system in a very short period of time. Furthermore, employed were MySQL as a database management system, PHP as the technology which is an open-source general purpose scripting language that is especially suited for web development and can be embedded into HTML. In addition, HTML (Hyper-text Markup Language) and CSS (Cascading Style Sheets) which are the core web scripting languages for building web pages and web

applications were used. HTML provided the structure of web pages whereas CSS was mainly used to control the styling and layout of web pages. Also used were CSS libraries like bootstrap for easy and uniform styling as well as font awesome for the icons in the system. Google fonts, which is an online repository for various font styles was also used in order to work on the appearance of the interfaces of the system

CHAPTER ONE

1.1: Background of the study

Inventory includes all tangible assets that a business owns and intends to sell or use in its operations, serving as an important component of its overall assets. It includes goods, raw materials, work-in-progress items, and finished products that are held either for resale or for use in production processes **(Shenoy et al., 2018)**. Inventory acts as a bridge between various stages of production and distribution, ensuring that there are sufficient goods available to meet customer demand **(Nenes et al., 2010).**

Inventory management is the process of efficiently overseeing the constant flow of units into and out of an existing inventory **(GIZACHEW, 2021).** The retail sector, particularly within the clothing industry, serves as the lifeblood of the consumer market, constantly adapting to the dynamic needs and preferences of customers. In this fast-paced environment, inventory management remains a linchpin of retail enterprise success. Inventory management in clothing stores has transitioned from manual counts and paper records to the use of spreadsheets, which offered more organization **(Thiesse et al., 2009).** The next significant leap was the implementation of barcoding systems that streamlined data entry and tracking. This was followed by the adoption of computerized inventory systems and Enterprise Resource Planning integration, which brought inventory management into alignment with other business operations. The arrival of Radio Frequency Identification technology marked a significant advancement with its real-time tracking capabilities **(Shen et al., 2016).** Currently, artificial intelligence and machine learning are at the forefront, providing predictive analytics for better demand forecasting and inventory optimization.

Despite the pivotal role of inventory control in ensuring product availability and customer satisfaction, many small retail clothing stores continue to employ rudimentary manual methods for managing their stock **(Gupta & Ramachandran,**

2021). These issues underscore the necessity for a more accurate, reliable, and scalable solution, signaling a critical market need for a computerized inventory management system.

By integrating automated inventory tracking, real-time stock level updates, and sales trend analysis, the proposed system will not only streamline inventory management processes but also enable these small retailers to compete more effectively in the evolving retail landscape. This research project, through a case study of an actual small clothing store, seeks to illustrate the transformative impact of adopting such a system, highlighting its potential in revolutionizing inventory management for small retail businesses.

1.2 Problem statement

Effective inventory management is a critical aspect of retail operations in the clothing industry, as it focuses on maintaining the ideal stock levels to meet customer demand without overstocking or understocking, which can lead to lost sales or excessive carrying costs **(Amoah, 2017).** Efficient inventory management practices are necessary due to the variety and rapid change of styles, sizes, and colors inherent in the clothing industry (**Wynn, 2021).**

However, currently, small clothing stores frequently struggle with the challenges of manual inventory systems, including data entry errors, document misplacement, and human miscalculations, leading to inaccuracies that can cause stock outs or overstocking both of which are detrimental to profitability and consumer trust (**Wynn, 2021).** Recognizing the limitations of these rudimentary methods and the absence of affordable, sophisticated options, there is an urgent need for a tailored computerized inventory management system that helps to address the challenges above. This project aims to demonstrate, through a case study of a boutique , the transformative potential of the new system in improving inventory accuracy,

reducing excess costs associated with poor stock management, and bolstering the competitiveness of small retail businesses in the fast-paced clothing industry.

1.3: Main objective

The main objective is to develop a cloth store inventory management system for Charity boutique.

1.3.1 Specific objectives.

1. To review literature and determine the requirements for a cloth store inventory management system.
2. To design the cloth store inventory management system.
3. To implement the designs of the cloth store inventory management system.
4. To test and validate the cloth store inventory management system.

1.4: Significance of the study

This provided Charity Boutique with a sophisticated yet accessible inventory management solution that significantly reduced manual errors, save time through a user friendly interface, and cut unnecessary costs associated with overstocking, understocking, and stock-outs. By introducing efficiency and data-driven insights into inventory control, the system stands to enhance the operational capabilities of small retailers, ultimately leading to increased customer satisfaction and competitiveness in the retail market.

1.5: Scope of the study

1.5.1 Area scope

This study took in Charity boutique Nagongera Township in Tororo district about 17 kilometers from Tororo town along Tororo- Busolwe road.

1.5.2 Content scope

Study focused on a case study that examines the current practices of Charity boutique which is a small boutique, the implementation of a tailored computerized inventory

management system, and its subsequent effects on inventory accuracy and cost-efficiency.

The study compared paper based inventory management method against the computerized inventory management, analyzed the outcomes, and provided actionable insights and recommendations for small retailers looking to enhance their competitive edge. It concluded with a discussion on the strategic implications, acknowledging the study's limitation, and suggesting directions for future research.

1.5.3 Technology scope.

The system provided a security module with two levels of access including employees who are the users and the manager who is also the system administrator. The Administrator was responsible for logging into the system, registering or entering new users, adding new products, adding new product categories, managing and entering new orders, editing orders, adding new product brands. The employees or users were responsible for logging into the system, adding and managing orders. Henceforth, to develop the system, PHP a server-side scripting language was used to create the system. Visual Studio code was used as the Integrated Development Environment (IDE) for creating the interfaces and MySQL database was be used as the database that stored the system information. The tools used included a laptop, windows 10 home Operating system.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This Chapter explores key aspects of inventory management as they apply to clothing stores, including the overview and evolution of inventory management practices and the current state of inventory management. Also to be explored are the benefits of effective inventory management, the role of inventory management systems, and also an analysis of current practices in cloth store inventory management, and the benefits of implementing computerized inventory management systems. This is aimed to analyze how a computerized inventory management system can enhance operational efficiency and competitiveness within the retail sector among others.

2.1 Overview of Inventory Management

Inventory management is the process of efficiently overseeing the constant flow of units into and out of an existing stock of goods **(Dalci & TANIŞ, 2004)**. This process usually involves controlling the transfer of units in order to prevent the inventory from becoming too high, or dwindling to levels that could put the operation of the company into jeopardy. Inventory management is primarily about specifying the size and placement of stocked goods **(Bose, 2006)**. It is a science primarily about specifying the shape and percentage of stocked goods. Inventory management is required at different locations within a facility or within multiple locations of a supply network to protect the regular and planned course of production against the random disturbance of running out of materials or goods **(Dalci & TANIŞ, 2004)**

The scope of inventory management concerns the fine lines between replenishment lead time, carrying costs of inventory, and asset management. It also includes aspects such as inventory forecasting, inventory valuation, and inventory visibility. Furthermore, it involves future inventory price forecasting, physical inventory, and

the availability of physical space for inventory. It also includes, quality management, replenishment, returns and defective goods, and demand forecasting are crucial components **(Wauna & Obwogi, 2015).**

2.2 Evolution of Inventory Management

The chronological development of inventory management in the clothing retail industry illustrates a remarkable shift from manual to automated and intelligent systems, driven by the need to scale, enhance accuracy, and optimize operations. **(Brooks & Wilson, 2007).** At the outset, retailers depended on physical counts and manual ledger entries to manage inventory, a method highly susceptible to human error and impractical for larger, more complex operations. The escalating inefficiency of these practices underscored the necessity for innovation thus bringing about the transition to electronic spreadsheets which digitized the inventory management process **(Hanna & Pantanowitz, 2016).** This shift not only improved data organization but also empowered retailers with tools for basic analytics, an essential function for managing the inflow and outflow of goods effectively. The leap to computerized inventory systems introduced barcoding, a pivotal advancement in retail technology which brought about a comprehensive and strategic approach to stock levels, procurement processes, and sales forecasting, facilitating a rigorous and systematic control of inventory **(Deepali et al., 2024)**. Later the integration of Enterprise Resource Planning systems created a unified platform that centralized inventory with other business operations which provided real-time visibility and coordination across various departments, essential in agile inventory management and responsive business strategies **(Damron et al., 2016)**. RFID technology, provided yet another significant advancement by automating inventory tracking without the need for direct line-of-sight **(Morenza-Cinos et al., 2019)**. RFID technology has greatly improved inventory accuracy and operational efficiency, constituting a critical step towards real-time inventory management

(Twist, 2005). Furthermore, the contemporary landscape of inventory management boasts the utilization of artificial intelligence and machine learning thereby endowing inventory systems with predictive analytics capabilities such capabilities facilitate intricate demand forecasting and sophisticated inventory optimization **(Pal, 2023)**. AI and machine learning allow for a proactive adjustment of inventory policies, which is paramount in mitigating risks related to overstock and out-of-stock scenarios, directly impacting profitability and customer satisfaction **(Alahyane, 2024)**.

In summary, inventory management's trajectory showcases a relentless pursuit of refinement through technology. Each stage builds on its predecessor, culminating in a present where strategic, data-driven, and automated inventory management is not just an advantage but a necessity.

2.3 The Current State of Inventory Management

Currently Radio Frequency Identification technology have advanced inventory tracking to an unprecedented level, offering automatic and continuous stock monitoring without the needs for direct line-of-sight **(Mahamani & Rao, 2010)**. Artificial Intelligence and Machine Learning are at the cutting edge, providing analytics and predictive modeling capabilities that refine demand forecasting and allow for proactive inventory adjustment, significantly advancing the efficacy of inventory management practices. The result is a highly adaptive retail sector that can swiftly respond to changing consumer behaviors, streamline operations, and ensure product availability with increased accuracy and reduced waste **(Restu et al., 2020)**. In a nutshell, the current state of inventory management is characterized by the integration of advanced technologies such as RFID, AI, and ML **(Qader et al., 2022)**. Another innovative trend shaping inventory management is block chain technology **(Mondol, 2021)**. Block chain offers decentralized and transparent digital records that are immutable and traceable. In the context of clothing stores, block

chain can enhance supply chain visibility by providing a secure ledger for tracking the movement of products from manufacturers to consumers **(Agrawal et al., 2021).** This transparency helps mitigate issues such as counterfeiting and ensures the authenticity and quality of products throughout the supply chain. By leveraging block chain, clothing stores can establish trust with consumers and suppliers, streamline inventory management processes, and improve overall supply chain efficiency **(Min & Lee, 2020)**. Furthermore, advancements in Internet of Things (IoT) devices are also contributing to the advancement of inventory management **(Singh & Adhikari, 2023)**. IoT sensors embedded in products or storage facilities can provide real-time data on inventory levels, conditions, and locations **(Singh & Adhikari, 2023)**. This data can be integrated into inventory management systems, enabling automatic replenishment, proactive maintenance, and optimized storage solutions. IoT-driven inventory management enhances operational agility and responsiveness, enabling clothing stores to adapt quickly to changing market demands and improve supply chain visibility and efficiency **(Huang et al., 2019)**. These innovations offer significant benefits, including enhanced accuracy, real-time tracking, and predictive capabilities that enable proactive inventory adjustments **(Lee & Park, 2020)**. As a result, the retail sector is becoming more adaptive, efficient, and responsive to consumer demands, ensuring product availability with increased accuracy and reduced waste **(Qader et al., 2022)**. While the perceived cost of implementing computerized inventory systems has historically been a barrier for small clothing stores, recent technological advancements have made these systems more affordable and accessible **(Garrido Azevedo & Carvalho, 2012)**. Today, there are various scalable solutions tailored to the needs of small businesses, offering flexible pricing models and cloud-based platforms that minimize upfront investment in hardware and infrastructure. This accessibility allows small clothing stores to benefit from advanced inventory management capabilities previously reserved for

larger enterprises, thereby improving overall inventory accuracy, operational efficiency, and competitiveness in the retail market **(Wang et al., 2019).**

However, current analysis reveals that many small retailers still rely heavily on manual methods or basic digital tools such as spreadsheets, which are prone to errors and inefficiencies. These practices can lead to significant challenges in maintaining accurate inventory records and responding to market demands promptly. Additionally, the integration of advanced technologies remains limited among small retailers, who may not fully utilize features such as real-time tracking, automated updates, and predictive analytics **(Kamau & Kagiri, 2015**). The current state of inventory management in the retail sector, particularly within small clothing stores, underscores the need for continued research and development of accessible, user-friendly solutions that can bridge the gap between advanced technological capabilities and practical application for small businesses. Enhancing the adoption of these technologies through education, training, and support can help small retailers overcome barriers and achieve greater operational efficiency and competitiveness.

2.4 Inventory Management Techniques and best Practices

Inventory management techniques and best practices are essential components for optimizing operational efficiency and profitability in clothing stores **(Caro & Gallien, 2010).** Accurate demand forecasting is foundational to this process, utilizing advanced statistical methods such as time series analysis and trend projection to predict future customer demand based on historical data and market trends **(Chase, 2013)**. By leveraging these techniques, clothing stores can anticipate fluctuations in demand more accurately, ensuring they maintain optimal inventory levels to meet customer needs while minimizing excess inventory costs **(Caro & Gallien, 2010)**. In addition to demand forecasting, effective inventory control

methods play a critical role in managing stock levels and reducing operational costs. Just-In-Time (JIT) inventory management is one such method that emphasizes ordering inventory only when needed, thereby minimizing storage costs and the risk of overstocking obsolete items **(Gitau, 2016)**. Economic Order Quantity (EOQ) provides a quantitative approach to determining the optimal order quantity that balances the costs of ordering and holding inventory **(Aro-Gordon & Gupte, 2016)**. By calculating the EOQ, clothing stores can minimize total inventory costs while ensuring they have sufficient stock to fulfill customer demand promptly **(FoEh & Ali, 2021)**. Activity-Based Costing (ABC) analysis further enhances inventory management by categorizing items based on their value and usage frequency **(Chu et al., 2008)**. This classification allows clothing stores to prioritize resources and efforts on managing high-value items or those with the highest demand, thereby optimizing inventory turnover and reducing the risk of stock-outs for critical products **(Levi et al., 2020)**. These inventory control methods collectively contribute to improving operational efficiency, reducing storage costs, and enhancing overall inventory management practices in clothing stores. Furthermore, case studies documenting successful implementations of these techniques provide empirical evidence of their effectiveness in real-world scenarios **(Kim and Lee, 2019)**. For example a boutique effectively implemented **ABC** analysis and JIT inventory practices to achieve significant reductions in holding costs and improve inventory turnover rates **(Kim and Lee 2019)**. Such case studies not only validate the benefits of adopting advanced inventory management strategies but also serve as practical examples for clothing stores looking to optimize their inventory processes and enhance competitiveness in the retail market. In conclusion, adopting robust inventory management techniques and best practices is crucial for clothing stores aiming to achieve operational excellence and profitability. By incorporating accurate demand forecasting, efficient inventory control methods like JIT and EOQ, and

strategic ABC analysis, clothing stores can streamline operations, reduce costs, and meet customer demands more effectively **(Gitau, 2016)** . These practices not only optimize inventory management processes but also position clothing stores to adapt to market fluctuations and maintain a sustainable competitive advantage in the dynamic retail industry **(Caro & Gallien, 2010)**.

2.5 Benefits of computerized Inventory Management

Effective inventory management provides a myriad of advantages, particularly for small clothing stores, by addressing critical operational and strategic needs that enhance overall business performance. One of the primary benefits is the reduction of holding costs and capital tied up in excess inventory, which directly impacts profitability by minimizing waste and improving cash flow **(Kamau & Kagiri, 2015**). Accurate inventory tracking ensures that stores maintain optimal stock levels, preventing stock-outs that can lead to lost sales and dissatisfied customers **(Bose, 2006).** Additionally, implementing a sophisticated inventory management system facilitates better demand forecasting, enabling stores to respond swiftly to market trends and customer preferences, thus enhancing competitiveness and customer satisfaction **(Bakar & Azaliah, 2020).**

In the context of small clothing stores, the transition to computerized inventory management systems brings significant advantages over traditional methods. It reduces manual errors, streamlines operations, and provides real-time data, which supports informed decision-making regarding stock levels and order management **(Restu et al., 2020)**. This is particularly crucial in the clothing industry where the rapid turnover of styles and sizes requires precise inventory control to avoid both overstock and stock-out scenarios **(Amoah, 2017)**. Furthermore, automated systems can integrate with sales platforms to provide insights into sales trends and inventory turnover, allowing for better planning and resource allocation **(Gitau, 2016)**. This

integration is vital for small retailers who need to maximize the use of limited resources and space **(Wang et al., 2019).**

Computerized systems also enhance the transparency and accuracy of supply chains, ensuring that products are authentic and of high quality, which is essential in building customer trust and loyalty **(Mondol, 2021)**. The capability to track inventory in real-time helps in maintaining a seamless supply chain, which is crucial for meeting customer expectations in terms of product availability and timely delivery **(Lee & Park, 2020).** For small clothing stores, this efficiency translates into a stronger market position and the ability to compete more effectively with larger retailers.

Overall, the adoption of advanced inventory management practices and technologies significantly benefits small clothing stores by optimizing stock levels, reducing costs, improving customer satisfaction, and enhancing operational efficiency, ultimately leading to increased competitiveness in a dynamic retail environment **(Qader et al., 2022).**

2.6 Challenges and research gaps

Despite the critical role of advanced inventory management systems in enhancing operational efficiency, small clothing stores face significant technical challenges with their current systems. A primary issue is the reliance on outdated manual inventory methods, which are susceptible to human error and inefficiencies that can lead to inaccurate stock levels, resulting in either stock-outs or overstocking.**.** Manual systems are not only time-consuming but also lack the capability for real-time data tracking, making it difficult to maintain up-to-date inventory records and promptly respond to market demands **(Amoah, 2017).**

Small clothing retailers often find existing computerized inventory systems to be overly complex and financially burdensome. These systems are typically designed with large enterprises in mind, featuring extensive functionalities that small

businesses may not need or have the capacity to utilize effectively **(Gupta & Ramachandran, 2021)**. Additionally, the cost of implementing advanced technologies such as RFID and AI-based systems can be prohibitively high for small retailers, who may lack the necessary financial resources and technical expertise **(Restu et al., 2020)**. This financial barrier limits their ability to adopt systems that offer real-time inventory tracking and predictive analytics, which are crucial for maintaining optimal inventory levels and improving overall operational efficiency.

A significant research gap exists in the development and adaptation of scalable, cost-effective inventory management solutions tailored to the specific needs of small clothing stores. Current research predominantly focuses on the advantages and implementations of advanced technologies within larger enterprises, leaving a void in practical applications for smaller retailers **(Garrido Azevedo & Carvalho, 2012)**. Moreover, there is insufficient empirical data on the long-term impacts of adopting computerized inventory systems on the competitiveness and operational efficiency of small clothing stores, which further highlights the need for focused studies that assess these aspects in smaller retail environments **(Qader et al., 2022).**

Technical limitations also extend to the lack of integration with other business operations, such as sales and supply chain management. Many existing systems do not offer the necessary flexibility or customization to seamlessly integrate with a small retailer's existing infrastructure. This lack of integration can lead to disjointed data management and hinder the ability to gain comprehensive insights into inventory trends and sales performance **(Kamau & Kagiri, 2015**). The absence of features for automated updates and notifications further complicates inventory management, making it difficult for small retailers to keep pace with the rapid turnover of products in the clothing industry (**Wynn, 2021)**.

Moreover, the potential of block chain technology for enhancing supply chain transparency and authenticity has not been fully explored in the context of small

clothing stores. Block chain can provide a secure and transparent ledger for tracking the movement of products, which is crucial for ensuring product authenticity and quality. However, its application in small retail settings remains under-researched, suggesting a gap in understanding how this technology can be scaled down and made accessible for smaller operations **(Mondol, 2021)**.

Finally, while the accessibility of advanced inventory management systems is improving, there is still a significant need for research into more affordable and scalable solutions. These solutions should aim to deliver the benefits of automated inventory management without requiring substantial upfront investment, making them more feasible for small clothing stores **(Wang et al., 2019).** Addressing these technical challenges and research gaps is essential for empowering small clothing stores to leverage technology effectively, thereby enhancing their operational capabilities and maintaining a competitive edge in the retail market.

Conclusion

In conclusion, the literature underscores the transformative impact of modern inventory management systems on the clothing retail industry. The transition from manual to automated inventory processes is not just a matter of operational efficiency but a strategic imperative for small retailers aiming to thrive in the fast-paced and ever-evolving retail environment. The insights gained from this literature review will serve as a foundation for exploring the implementation and benefits of a computerized inventory management system in small clothing stores, ultimately aiming to enhance their operational capabilities and market competitiveness.

CHAPTER THREE: METHDOLOGY

3.0 Introduction

This chapter laid out and presented the system design, data collection methods, sampling strategies, data analysis and ethical considerations that were used in the study.

3.1 Area of Study

The study was conducted in Charity boutique in Nagongera Township in Tororo district about 17 kilometers from Tororo town along Tororo- Busolwe road.

3.2 POPULATION AND SAMPLING

Population is the entire set of items from which you draw data for a statistical study and it can be a group of individuals, a set of items whereas sampling refers to the process of selecting a sufficient number of elements (sample) from the population. The purpose of the study determines the number of participants to involve in the study. The participants were segregated by many factors such as employment title, age, gender and other dimension that would benefit the study. In this research, ten (10) participants were involved in the study. The boutique manager was involved and the other participants came from the employees and some customers. A total sample size of ten (5) male and five(5) female participants, one shop manager, four (4) employees and five (5) customers was involved in the study as shown in the table 3.2.1 below, the method of sampling is Simple random sampling which was adopted to select the participants. The survey took three days, day one I managed to interview the manager, I then interviewed the four employees and five customers on day two and day three respectively.

Day	**Day 1**	**Day 2**	**Day 3**
Participants	**Manager**	**Employees**	**customers**
Number of participants	01	4	5
Male	0	2	3
Female	01	2	2

Table 1 Sample size of participants

3.3 System Development

The specific methodology to be employed was rapid application development (RAD). It is based on prototyping and iterative development with no specific planning involved **(Beynon-Davies et al., 1999)**. It focuses on gathering customer requirements through workshops or focus groups, early testing of the prototypes by the users using iterative concept, reuse of the existing prototypes (components), continuous integration and rapid delivery. I therefore had a discussion with the store manager and she directed me of how she wanted to manage her inventory. In the RAD model, the functional modules are developed in parallel as prototypes and are integrated to make the complete product for faster product delivery **(Meyers, 1903)**. A prototype is a working model of the system, but with limited functionality. Henceforth the most important aspect for this model to be successful is to make sure that the prototypes developed are reusable **(Ramamoorthy et al., 1984)**. Also made use of were; use case diagrams, dataflow diagrams, context diagrams and Entity Relationship diagrams and they are discussed below.

3.3.1 Use case diagrams.

This represents the activities of the users with the special functionalities of the system. The use-case diagram was used to identify the different users of the systems and the different use cases.

3.3.2 Entity-Relationship Diagram

This is a graphical representation between entities and attributes within a proposed database of the system. The ERD was used to show the different entities in the system with their different attributes and how they are related.

3.3.4 Context Diagram

This shows the basic interaction of the system with it environment. The context diagram showed the flow of data in the system.

3.4 Data collection

3.4.1 Sampling Methods

The study considered non probability sampling i.e. purposive sampling as it involved the researcher to use their expertise to select a sample that was most useful to the purposes of research. It was used in qualitative research as one got detailed knowledge about a specific phenomenon rather than making statistical references. Henceforth interviews and questionnaires were used for data collection.

3.4.2 Interviews

This technique involved asking open-ended questions to converse with respondents and collect elicit data about a subject. This involved the interviewer who in most cases is the subject matter expert to understand respondent opinions in a well planned and executed series of questions and answers. These were used as they help one explain, better understand and explore research subjects' opinions, behavior, experiences and phenomenon.

The researcher interviewed a total of nine (10) interviewees as follows;

1 store manager and 4 employees: These were interviewed to assess the operations and organization of the cloth store and the inventory management process at large.

They were also interviewed in order to find out suggestions on how to eradicate paperwork concerned with the manual system.

5 customers: the customers were interviewed in order to find out how well they are served in terms of availability of products. This was aimed to assess whether using the current inventory management system, the owners of the shop are able to know which products are available and which ones are not available in order to make sure the products needed by the customers are always available.

3.5 System Analysis and Design

Research design refers to the overall strategy utilized to carry out research that defines a succinct and logical plan to tackle established research question(s) through the collection, interpretation, analysis, and discussion of data **(Maynard, 2012)**.

There are a number of tools that were used to represent facts from the collected data. The tools included; the System Architecture, a Context Diagram, Data Flow Diagram and Use-case Diagrams. These clearly represent the raw facts gathered during the data collection process, while defining the behavior and interactions among the various components of the system as well;

3.5.1 System Architecture

This is a conceptual model that defines the structure, behavior, and other views of a system **(Cooper, 2011).** This was used to clearly show the interactions and behavior among the various components of the system.

3.5.2 Context Diagram

Relationships were established between the data items to show how the different entities relate with the system. The context diagram therefore shows the basic interaction of the system with its environment.

3.5.3 Data Flow Diagram

A Data Flow Diagram (DFD) is a graphical representation of the flow of data through an information system. It can as well be used for the visualization of data processing. System designers usually start by drawing a context diagram to show the interaction between the system and outside entities. The Data Flow Diagram shows how the data moves /flows within the system.

3.5.4 Use-Case Diagram

A use case diagram is a representation of a user's interaction with the system that shows the relationship between users and different cases in which the user is involved. A use case diagram was used to identify the type of users of the system and the different use cases.

3.6 System Implementation.

The tools employed in the implementation of Inventory Management System include the following:

- Visual Studio Code which enabled the researcher to write the dynamically generated pages easily and very quickly because it was used as the main text editor.

- Hypertext markup language (HTML) used to develop user interfaces with Cascading style sheets (CSS).

- The system was implemented on Windows 10 Operating System environment and the back end implemented using MySQL database server.

- MySQL was very useful in constructing the database of the Inventory Management System. A database is a collection of interrelated data stored with minimum redundancy to serve many users quickly and efficiently. Database was used in order to make data access easy, quick, inexpensive and flexible for the user.

- The front end was implemented using Hypertext Pre- processor (PHP). PHP is a server-side scripting language embedded in the HTML used to manage dynamic content, databases and session tracking. It enabled the researcher to write simple scripts directly into the HTML files. PHP made it quite easier to manage the large website by placing all the components of a web page in a single HTML file. The users were not in position to see the source code, thereby maintaining security of the source code.

I used tools such as PHP and HTML programming languages to implement the system interfaces in a Visual Studio Code programming environment. I also used XAMPP server as a server-21 side database tool for implementing databases. Interaction with the system interface was done by clicking and typing where asked.

3.7 Testing and Validation.

Both unit testing and integration testing were performed on the Inventory Management System to clarify the specifications of the system to reveal possible faults and establish confidence in the system.

Unit testing focused on one function at a time in that whenever the researcher designed a function, it would be tested instantly before proceeding to design another function.

Integration testing was done after all the different modules had been put together to make a complete system. Integration aimed at ensuring that all the modules of the system work hand in hand and that they could be integrated to form a complete working system.

In the end, user testing was performed. This involved the potential users of the system to test the system if it met their requirements.

Software validation was done by the researcher to check whether the software product satisfies or fits the intended use i.e., if the software met the user requirements, not as specification artifacts or as needs of those who would operate the software only; but, as the needs of all the stakeholders.

3.8 Ethical Considerations during Data Collection and Analysis.

The ethical issues that were considered during data collection and analysis include the following;

i. **Honesty**: The data results, methods, procedures and publication status were reported honestly by the researcher. The researcher did not falsify or fabricate data and neither did she deceive the public nor colleagues on the data collected and the reasons for collecting data.

ii. **Integrity:** The researcher endeavored to be sincere and consistent in all her actions during the research process and kept her promises and agreements with all the stakeholders of the Inventory Management System.

iii. **Respect for intellectual property**: During the course of this research project, the researcher endeavored never to copy, or plagiarize other people's work but instead considered text citation and referencing in a bid to acknowledge the source of the information, that is, statistics, tables, expressions and phrases.

iv. **Objectivity**: The researcher endeavored to avoid any form of systematic bias in all aspects such as natural bias in reporting data, avoided defective measuring devices, ensured proper sampling and carefully observed the respondents considering the indeterminacy principle.

v. **Confidentiality**: The researcher protected any piece of sensitive information that was provided by respondents and as well followed the guidelines that govern protection of confidential communications.

CHAPTER FOUR: SYSTEM ANALYSIS AND DESIGN

4.0 Introduction

This chapter presents the results from field study. It highlights the strengths and weakness of the current system. This chapter describes system requirements (user requirements, functional requirements, and non-functional requirements) and the design of the system (system architecture, context diagram, data flow diagram, and the flow chart diagram).

4.1 System Study and Analysis

The study was carried out at Charity boutique, Nagongera town council, Tororo district. The main purpose of the study was to find out the challenges faced by the employees and customers at the boutique. It involved studying the existing system to identify its strengths and weaknesses. The information acquired from the study was done by employing a number of data collection methods including questionnaires and an interview guide where the questionnaires were analyzed to give the basis to design a new system.

4.2 Current system

The cloth store currently operates manual inventory system, from stocks, products, ordering and purchases recorded in a book. This is faced with errors, incompleteness, and insufficient data for analysis. Information regarding stocks, products, sales and purchases are still in black and white which is not properly organized and managed. The bills, tickets, vouchers, receipts of products are recorded in a book but further operations are not being properly handled. It is on this basis that the study of developing a Cloth store inventory Management system came in handy to address some of the challenges experienced by the staff and customers at Charity boutique in Nagongera.

4.3 Features of the Cloth Store Inventory Management System

Basing on the data collected, some of the features to be included in the system are given in the table below.

Requirement	**Features**
The system should provide a different level of access for the admin from the users.	✓ The system provides two levels of access. One for the Admin and the other for other user. But they access their dashboards using the same interface. With the Admin having more functionalities.
The administrators (manager) should be able to login and manage employees, product brands types, products, category through updating and deleting where necessary.	✓ Provision of a login form to enable the admin enter a username as well as a password before accessing the dashboard. ✓ Provision of a dashboard to display the different orders and transactions. ✓ Interfaces for displaying the different category types, product categories, products, ✓ Provision of buttons for adding, updating, and deleting category types, brands and products. ✓ Provision of an interface for adding and removing users or employees
The employees (users) should be able to log in add and manage that have been made.	✓ Provision of a log inform to enable the employee enter a username as well as

	password before accessing the dashboard ✓ Provision of interface for adding and managing orders.

Table 2. Features of the cloth store inventory Management system

4.4 User requirements

The users of the system include the manager and employees. Their user requirements include the following.

i. The employees should be able to login, add orders and manage orders.
ii. The administrator (manager) should be able to log in, change password, update their log in details and managing others users, products, categories and brands by adding and deleting where necessary.
iii. The administrator should also be able to access the dashboard to view categories, products, total orders as well as the total revenue from the transactions.

4.5 Functional Requirements

Employees (users) Requirements. Employees or other users should be able to log in into the system, add and manage orders.

Administrator (manager) Requirements. The Administrator should be able to change passwords, update their log in details and manage products, categories, brands and orders through updating and deleting where necessary. Furthermore he should be able to upload new products and their images that are to be added on the boutique's database.

4.6 Non-functional requirements

Non-functional requirement is any requirement that is not a functional, data or process requirement concerned with defining the precision which the solution will record or produce data. Non-functional requirements support the functional

requirements and determine how the system must perform. Generally non-functional requirements should be;

i **Performance:** System performance defines how fast a system can respond to a particular user's action under a certain workload.

ii **Reliability:** Is the probability and percentage of the software performing without failure for a specific number of uses or amount of time.

iii **Flexibility requirement:** Each part of the system should be independent, so that changing of one part does not affect the other part and new parts can be added to increase functionality.

iv **Accuracy requirement**: The System should be more accurate in terms of computing the total revenue accumulated after an order is successfully delivered.

v **Usability:** This feature concerns the users i.e. it indicates how effectively they can learn and use the system.

4.7 Hardware/ Software requirements

4.7.1 Hardware Requirements

The hardware requirements include;

i A Universal hard disk drive.

ii A hard disk of at least 80GB.

iii Random Access Memory (RAM) not less than 1GB.

iv An uninterruptible power supply (UPS).

4.7.2 Software Requirements

The software specifications required on the computer system include;

i XAMPP (Version3. 3.0).

ii Windows 7 or higher version.

iii Internet browser such as Mozilla Firefox and Google Chrome.

iv The system should have 32/64 bits Operating System.

4.8 System Development Approach.

The specific methodology employed was rapid application development (RAD). It was based on prototyping and iterative development with no specific planning involved.

It focused on gathering user requirements through workshops or focus groups, early testing of the prototypes by the users using iterative concept, reuse of the existing prototypes (components), continuous integration and rapid delivery.

4.9 System Design

The design follows system development methods. In this study, Rapid Application Development derived from Structural System Analysis and Design Methods was invoked. The design stages included; system architecture, Context Flow Diagram, Data Flow Diagram and System modelling using Use Case Diagrams.

4.9.1 System Architecture

System architecture refers to the high-level structure and organization of a complex system. It encompasses the design of a system's components, their relationships, and how they work together to achieve the overall goals and objectives of the system.

Figure 1. System Architecture

The system user first interacts with the user interface which provides him/her with means to place a request to the database. The request is passed to server which processes it and include a command to link the available database, the query is

executed by the database through the PHP engine which acts as a tool to transform the request to a format the database can understand. The results are passed to the user through the same process. The Cloth store Inventory Management System proposed in the study was designed using a three layered architectural pattern which included

Presentation layer: This represented the various ranges of devices that were used to access the Cloths Store Inventory Management System.

Cloths Store Inventory Management System modules. This layer represented the key features which consisted of; Administrator (manager) module, employee (users) module, orders module, product module, category module and the report module.

Storage service: This layer covered the rapid and storage of data or information using a rational data base management system like MySQL which was used in this case.

4.9.2 Context Diagram

A context diagram is a high-level overview of the system that shows its interactions with external entities. It is like a map that outlines the system's boundaries and its key relationships with the outside world **(Webber, 2000).**

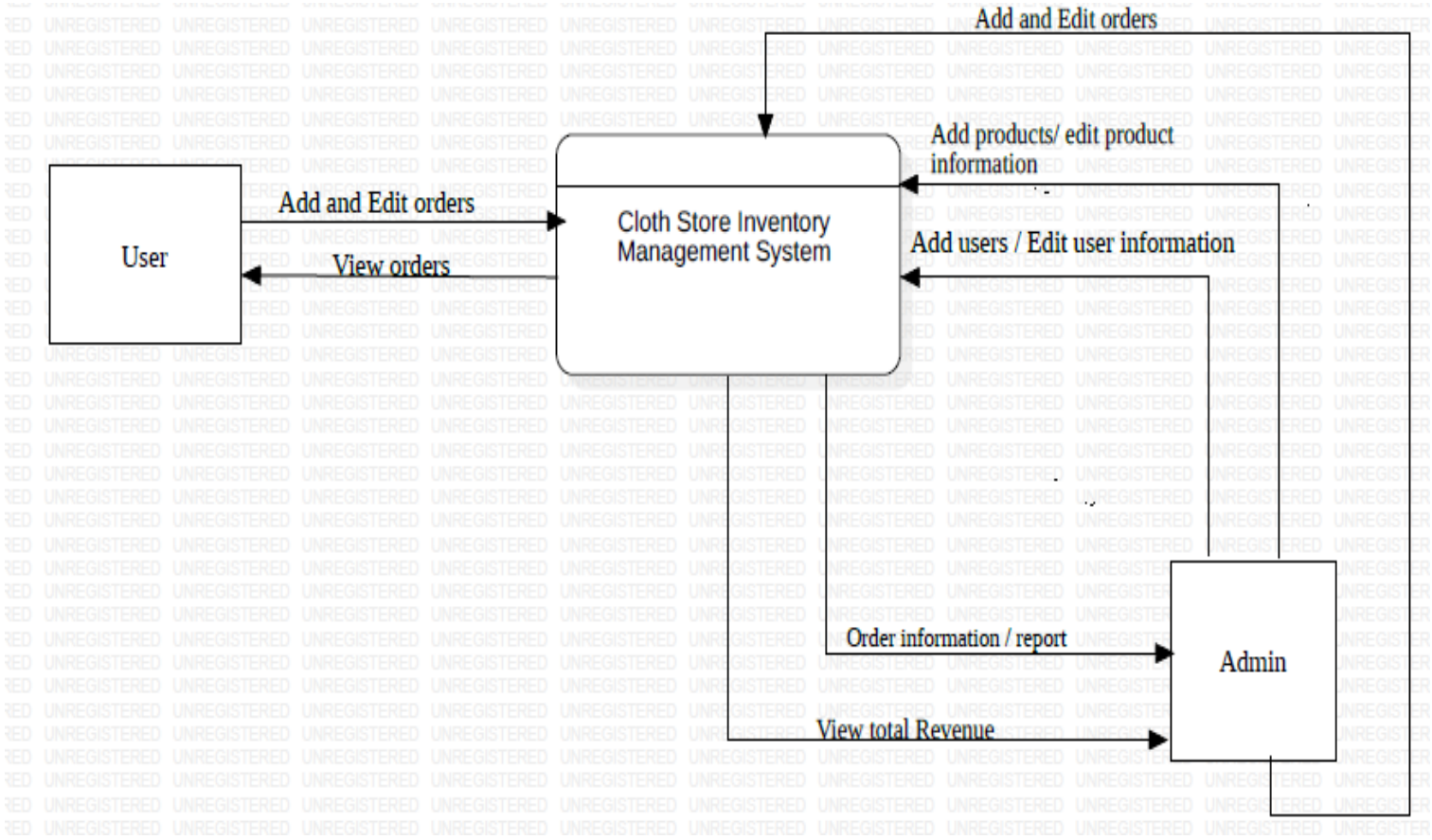


Figure 2. Context Diagram

This diagram showed the general overview of the system, and its interactions with external entities. The main external entities were the administrator and the employees.

4.9.2 Data Flow Diagram

This is a visual representation of how data flows within a system or process. The data flow diagram summarized how data/information flowed in the system.

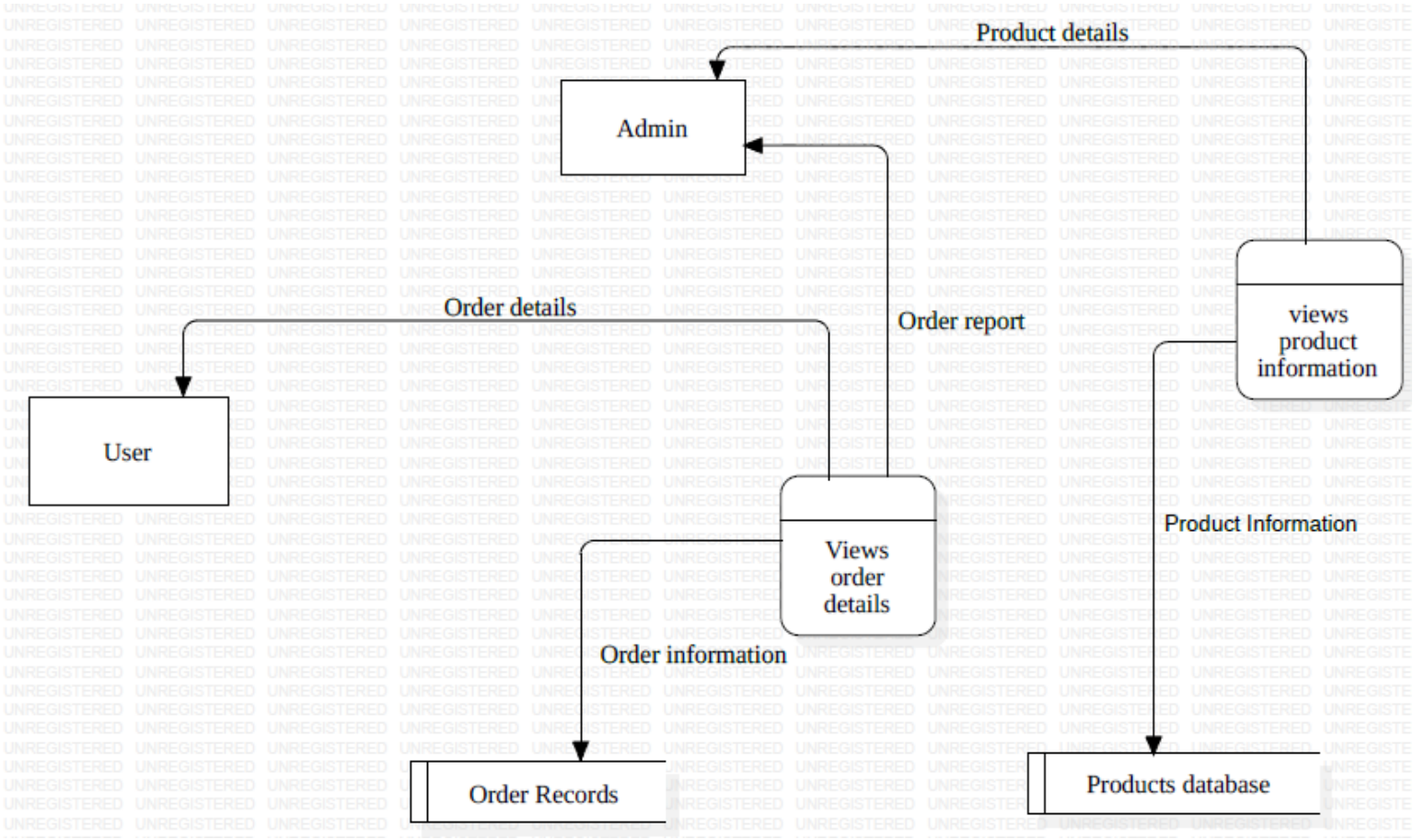


Figure 3. Data flow diagram

The users could enter the system to view orders details and also enter order information into the system.

The Administrator enters the system and can view product information and also receive an order report which can be generated from the order records.

4.9.3 Use case diagram

A use case diagram is a graphical representation of the interactions between users (actors) and a system. It visually depicts the functionalities of a system and how users will interact with it to achieve their goals.

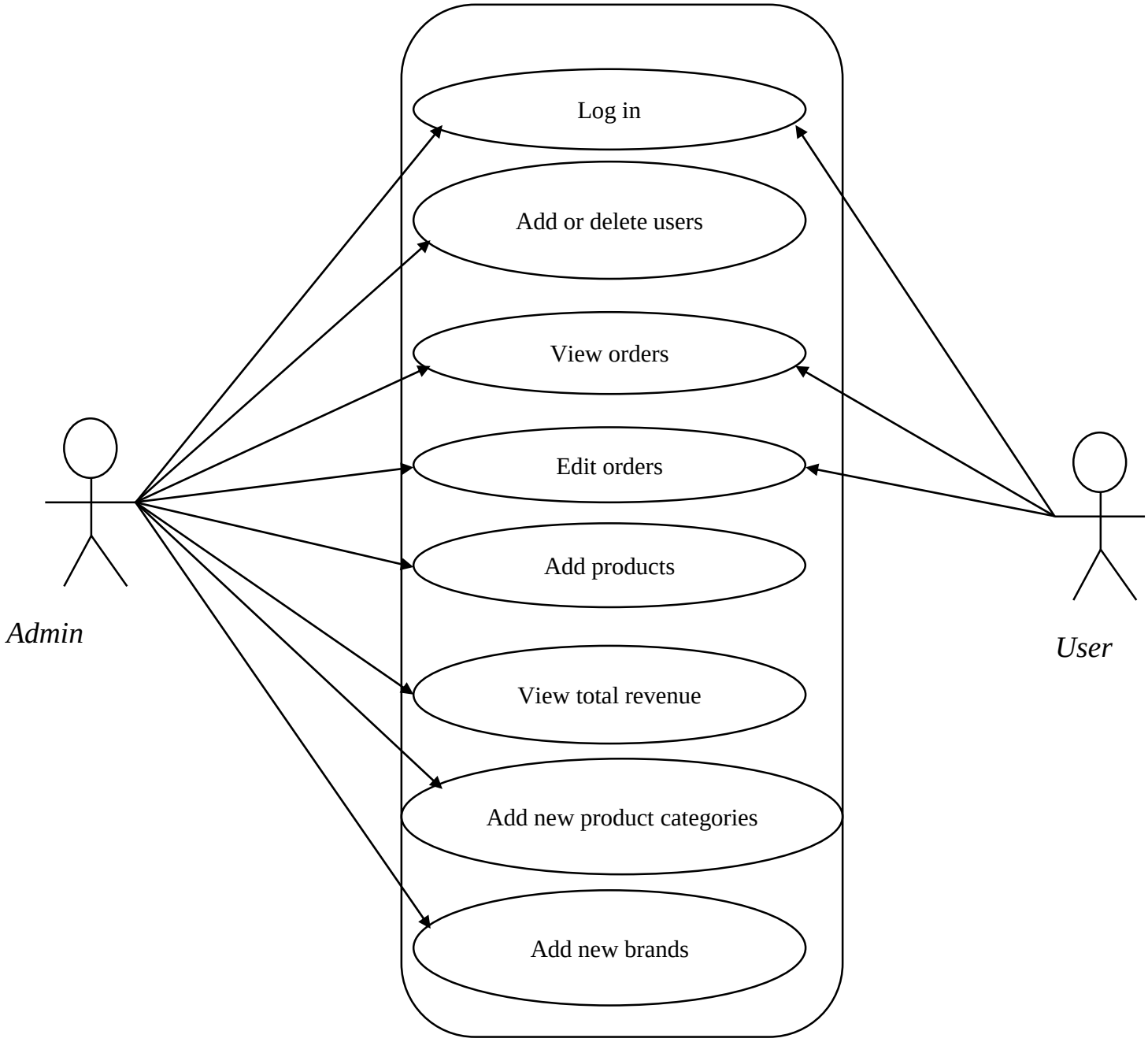


Figure 4. Use case diagram

The use case diagram showed the different activities performed by the two types of users namely admin (manager), and the users (employees)

4.9.4 Programming Tools for the Cloth store inventory Management System

The programming tools included;

- Visual Studio Code
- MySQL
- XAMPP v3.3.0
- HTML
- PHP

4.9.5 Implementation and Testing

This is where the actual development of the loth store Inventory management system happened which included developing the Graphical User Interface (GUI), implementing the model HTML and PHP, and creating the system database using MySQL. Visual Studio Code was used as a text editor.

4.9.6 Coding and testing

Coding involved transforming the identified structural design specifications into actual working computer codes after which each function was designed, a test was performed to ensure that it worked properly as per the set user expectations. Coding was done using a text editor known as Visual Studio Code, and testing was carried out on a local host XAMPP server software

4.9.7 System Documentation and Training

The system was documented after all the tests had been performed to serve as a reference point to the system administrator to maintain the system throughout its

productive life and the user Training of the system users was done after the testing of the system.

CHAPTER FIVE: TESTING AND IMPLEMENTATION

5.0 Introduction

This area focused on fulfilling the user of the requirements i.e. functional and non-functional requirement into a working / running system. It furthermore presented implementation of the design presented in Chapter Four.

5.1 Interface Design

The goal of user interface design is to make the user's interaction with the system as simple and efficient as possible, in terms of accomplishing user goals. It is also the way through which a user interacts with an application or a website. It mainly focused on the looks and style of how a system appeared to the user referring to the employee and administrator (manager) in this case. The functional and non-functional requirements that were implemented for the Cloth store inventory Management System include:

For the Admin or Manager, he/she was able to view the different products and categories available at the Boutique. The Admin was able to view the total orders, total products and the low tock warning. He should be able to view/add products, product categories and brands into the system. The administrator is also able to add new users delete users and also update user information.

Below are the interfaces for the Administrator or Boutique manager.

Login page

Figure 5. Login page

After logging in the Admin will be directed to the Admin dashboard

Admin Dash board

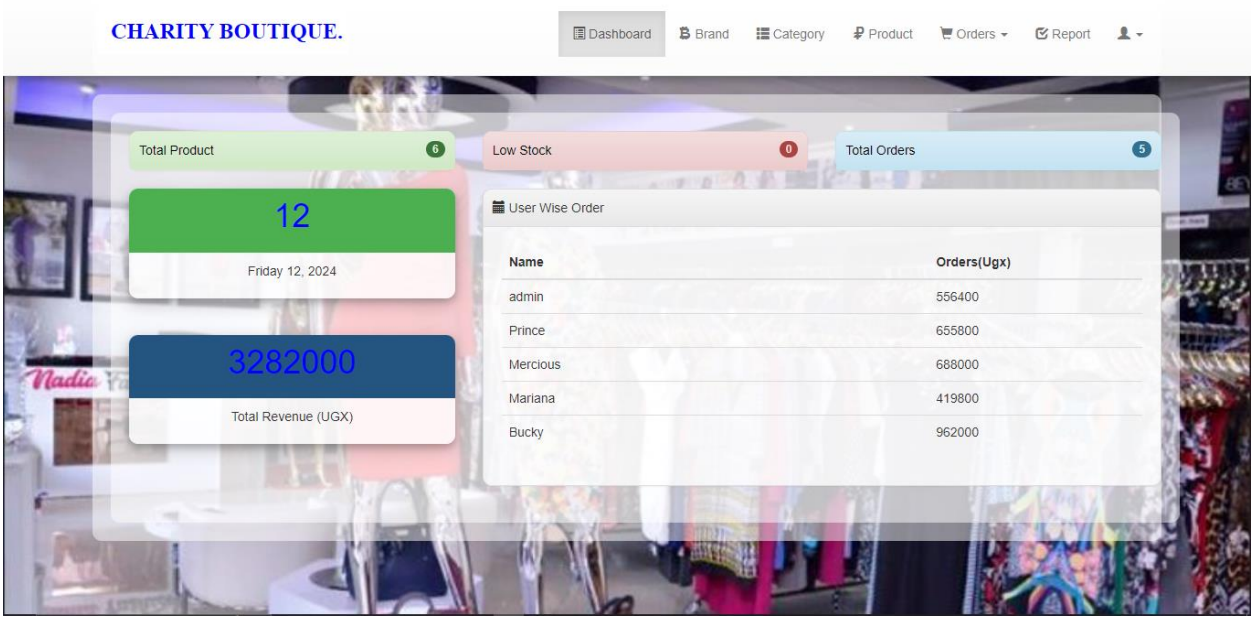


Figure 6. Admin dashboard

In the admin dashboard he can be able to view the total revenue, total orders and the low stock warning. The admin can also see the user wise orders to see how the users are performing.

The admin can as well be able to view the different product brands, categories and products available.

Interface for viewing Brands

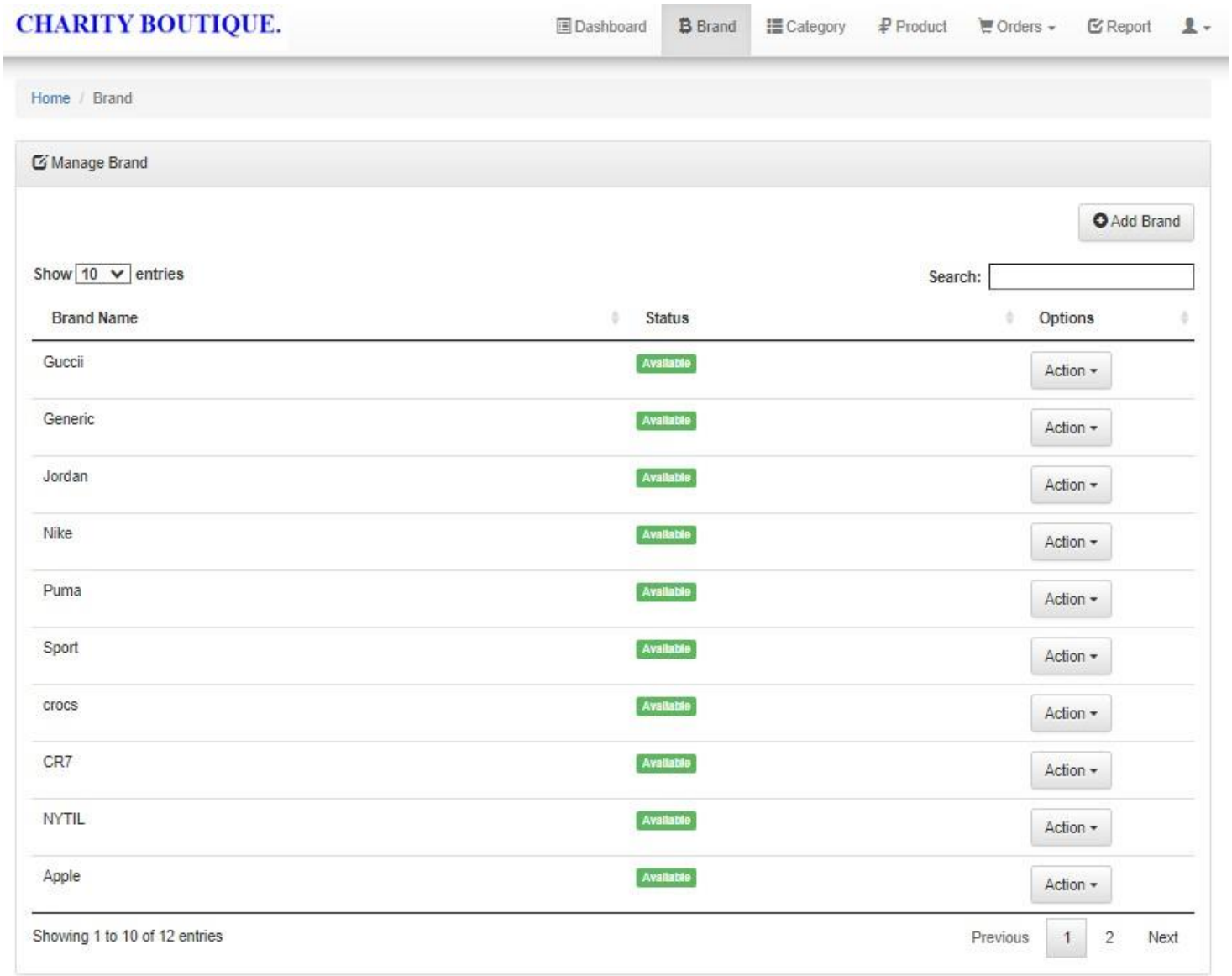


Figure 7. Product brands

Interface for viewing Categories

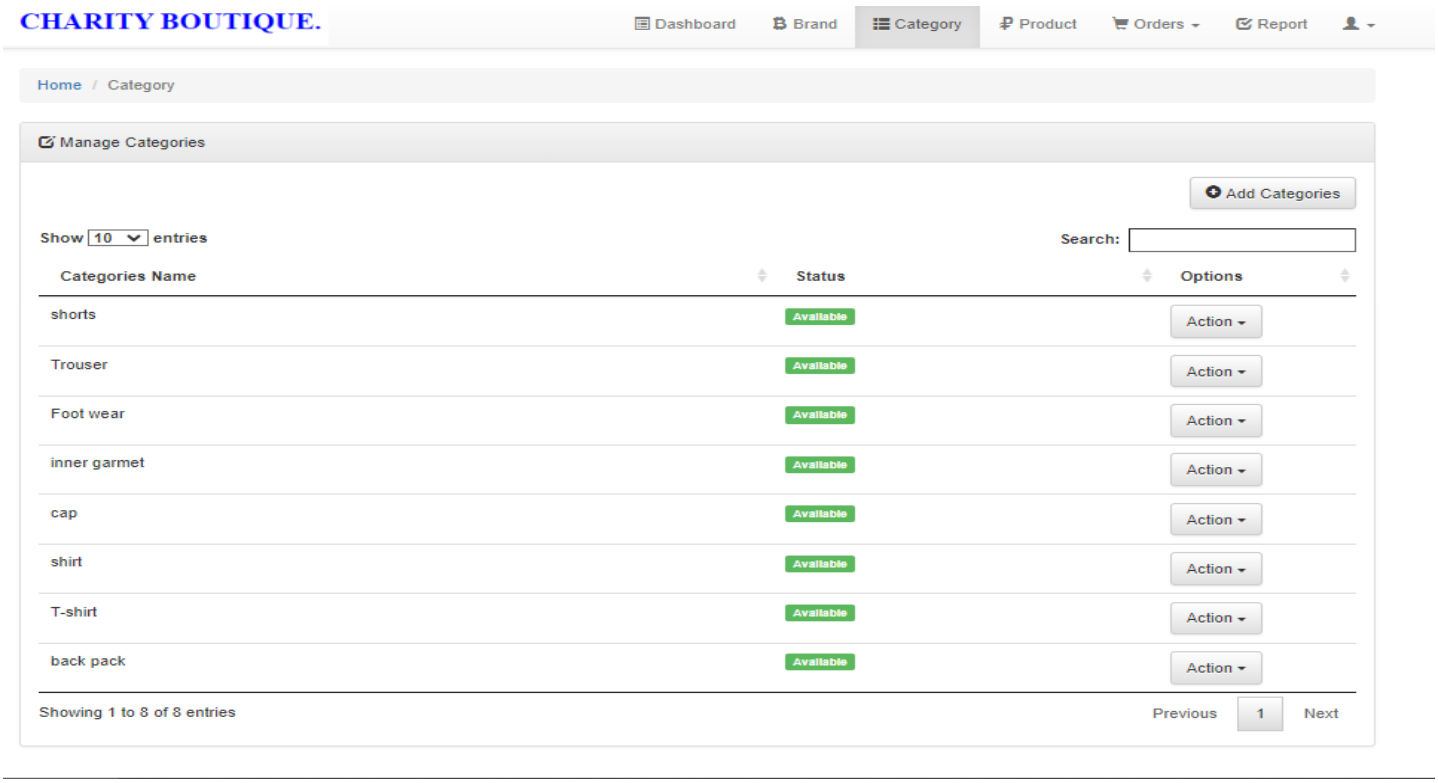


Figure 8. Product categories

Interface for viewing Products

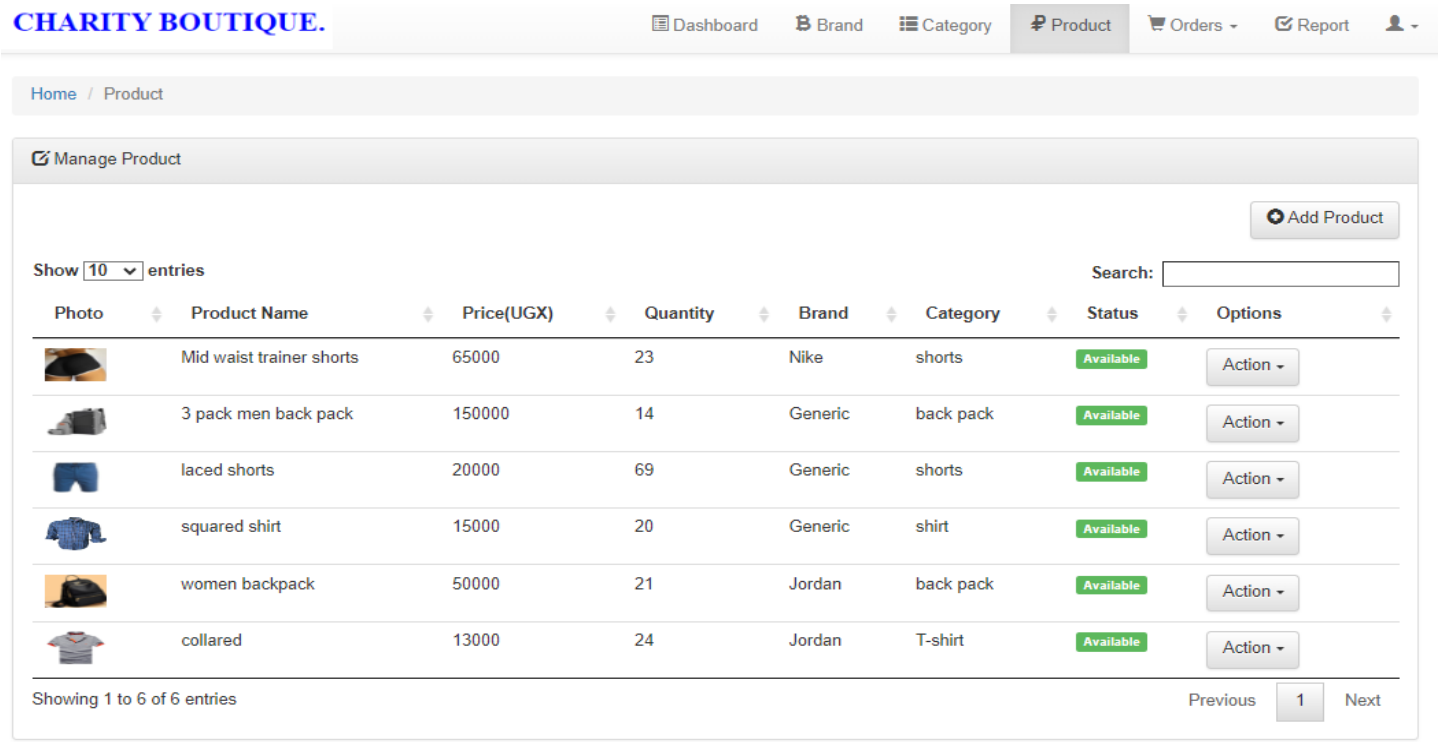


Figure 9. Products

The admin can also be able to add products, add categories and also add brands as well as edit their information

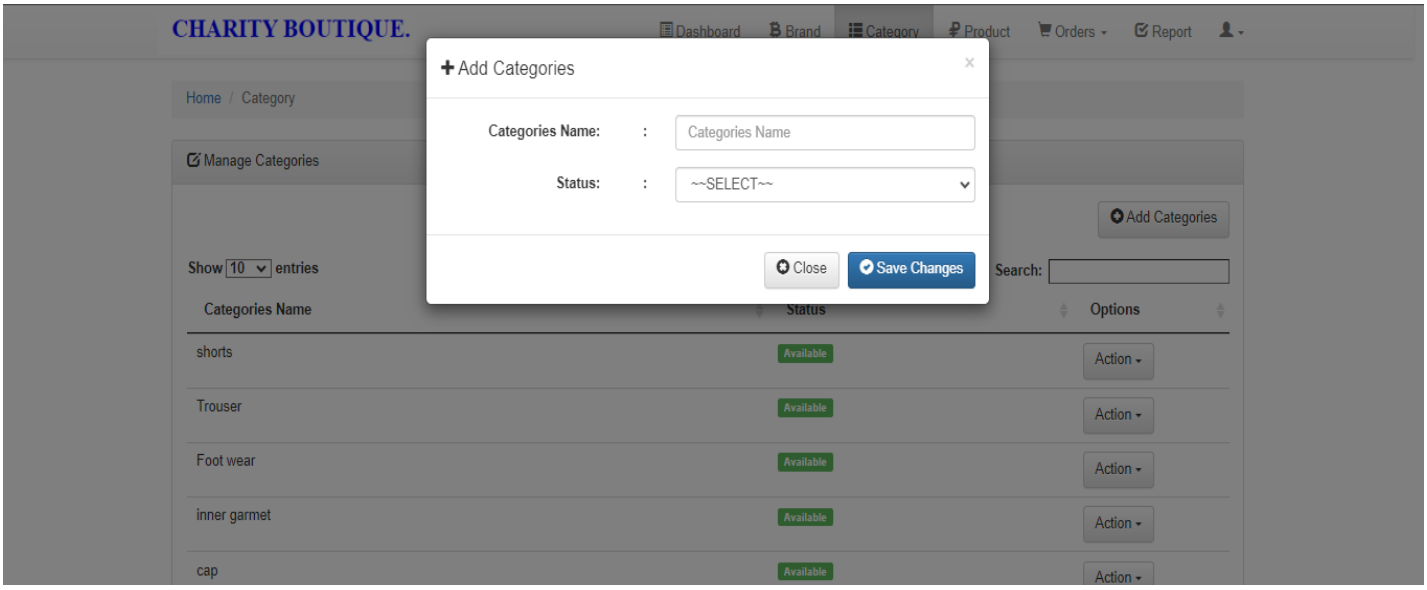


Figure 10. Interface for adding categories

Interface for adding products

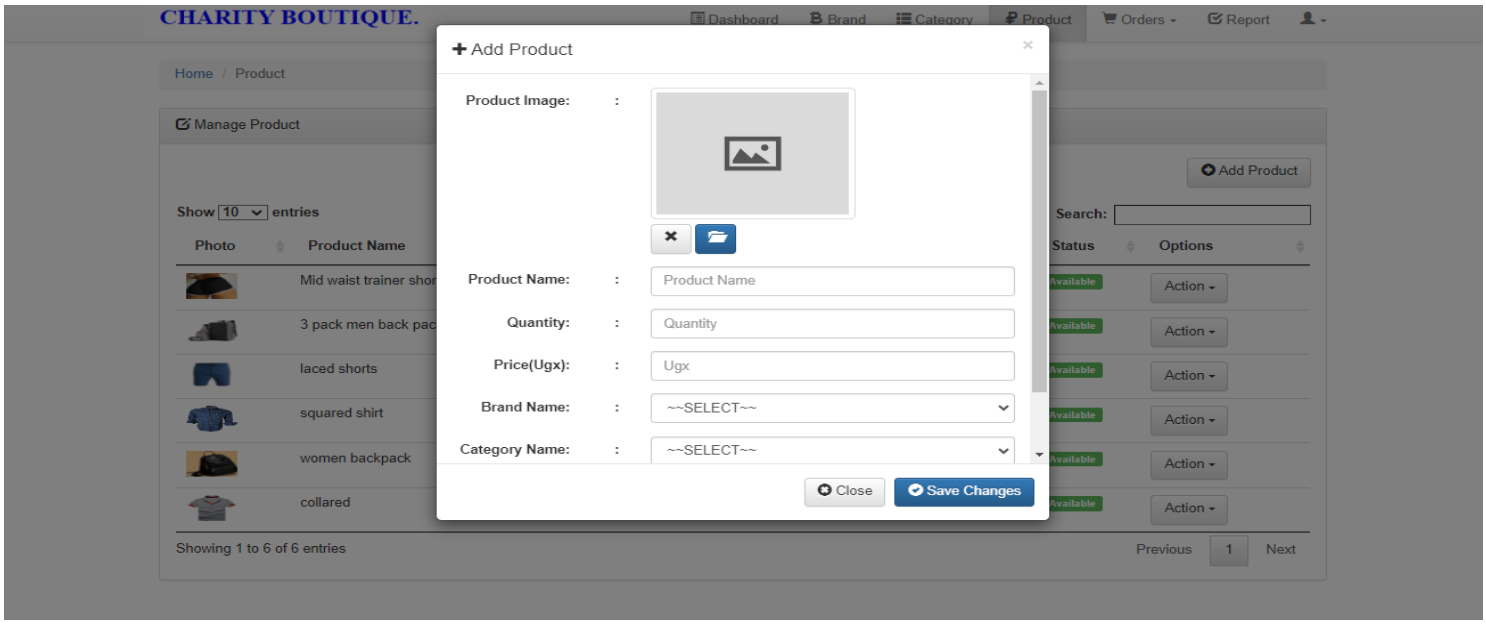


Figure 11. Interface for adding products

Interface for adding brands

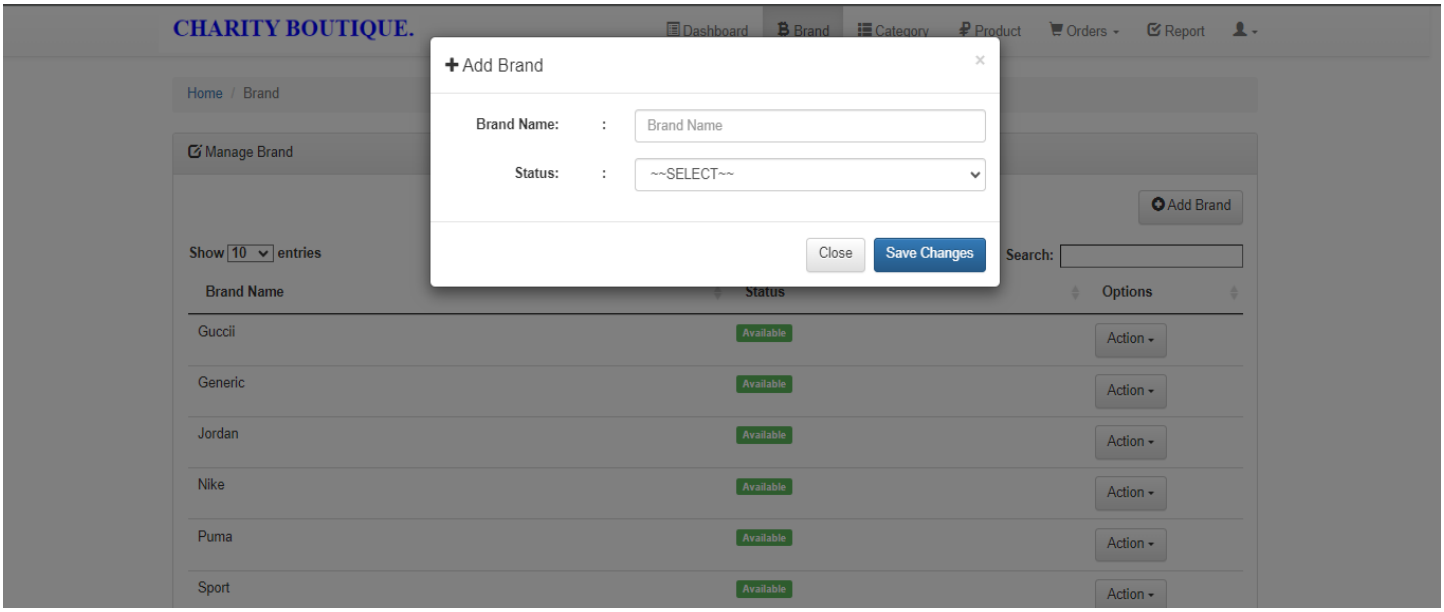
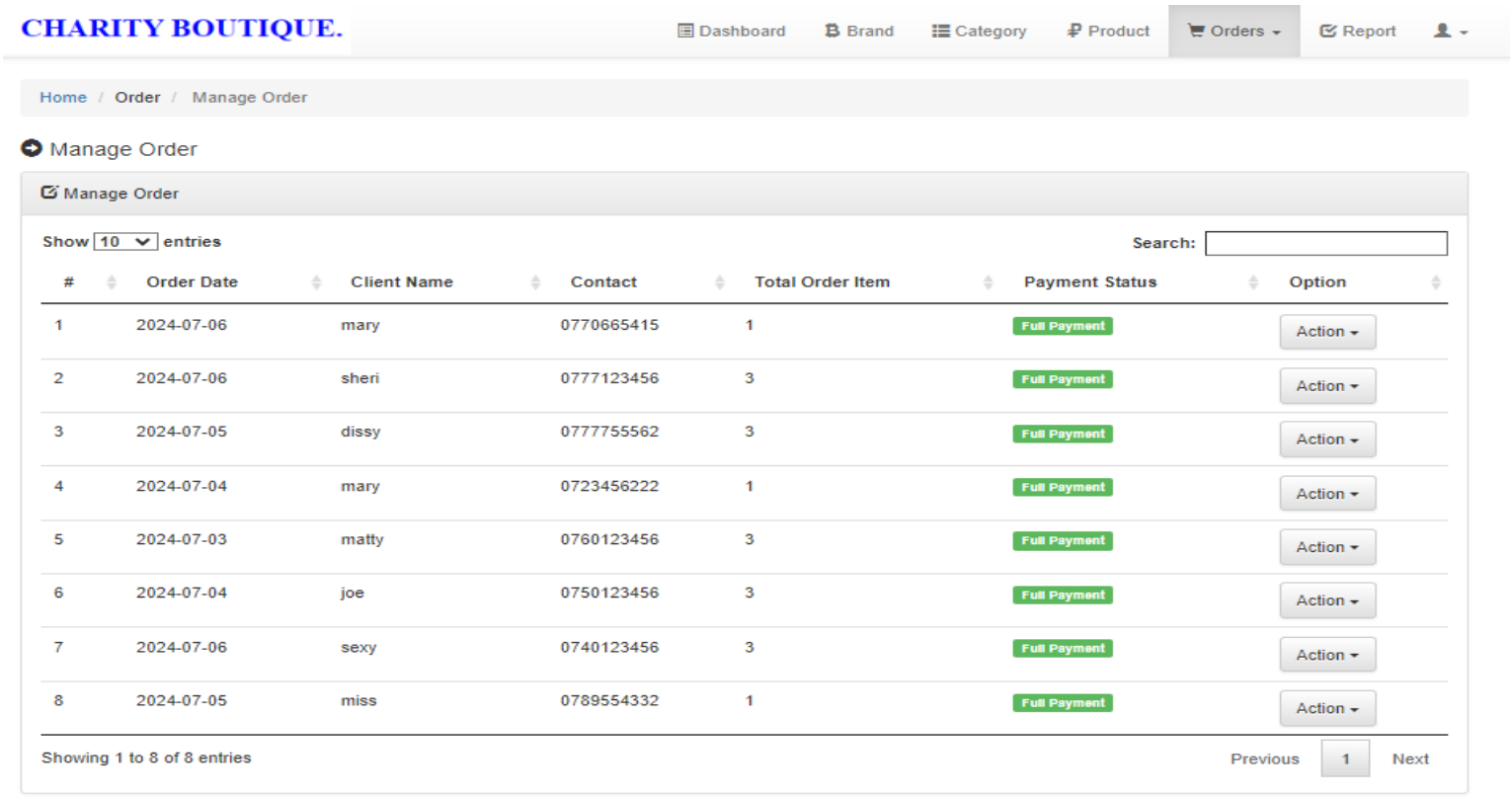


Figure 12. Interface for adding brands

The admin can also view, add, manage orders and edit order information.

Interface for viewing and managing orders

Figure 13. Interface for viewing and managing orders



Interface for adding and editing order information

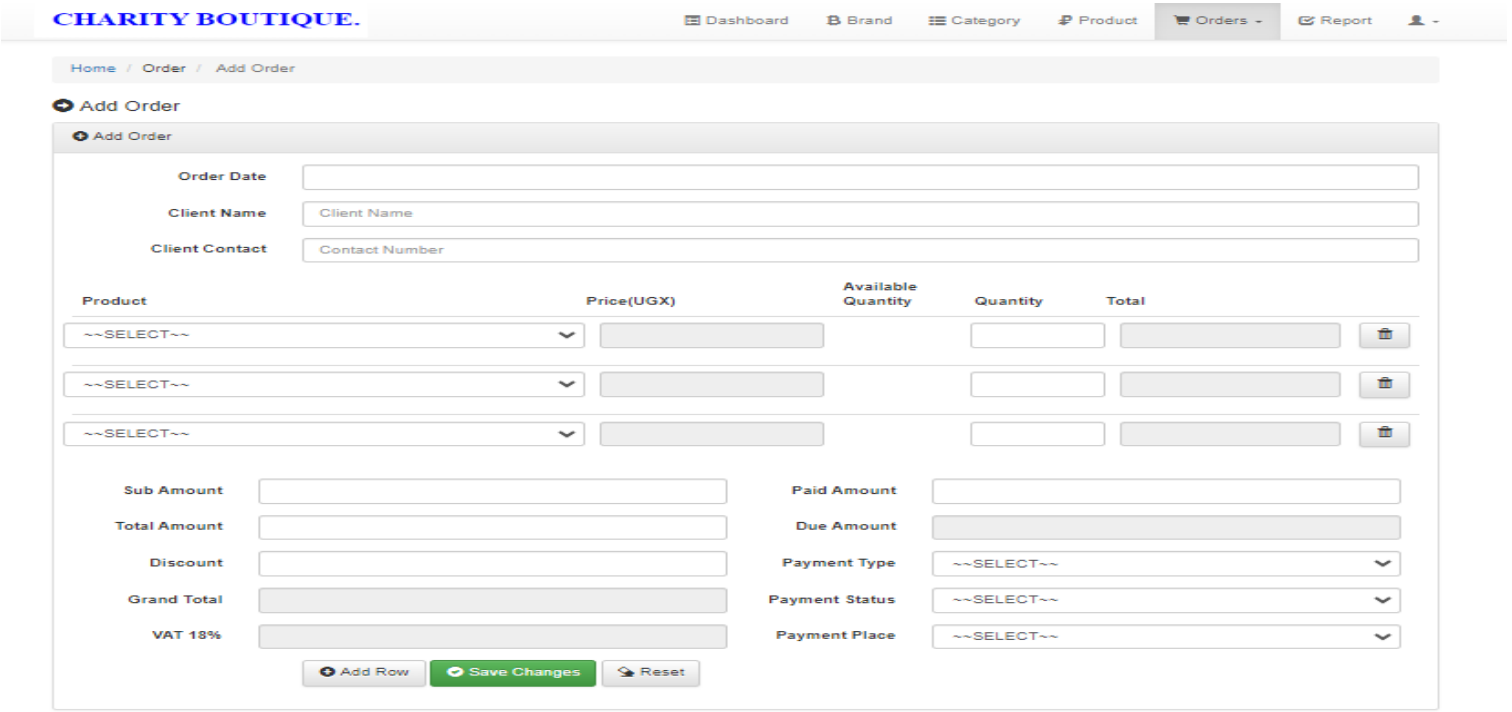


Figure 14. Interface for adding and editing orders

The admin can also add users, delete users and manage other user information

Interface for viewing and managing users

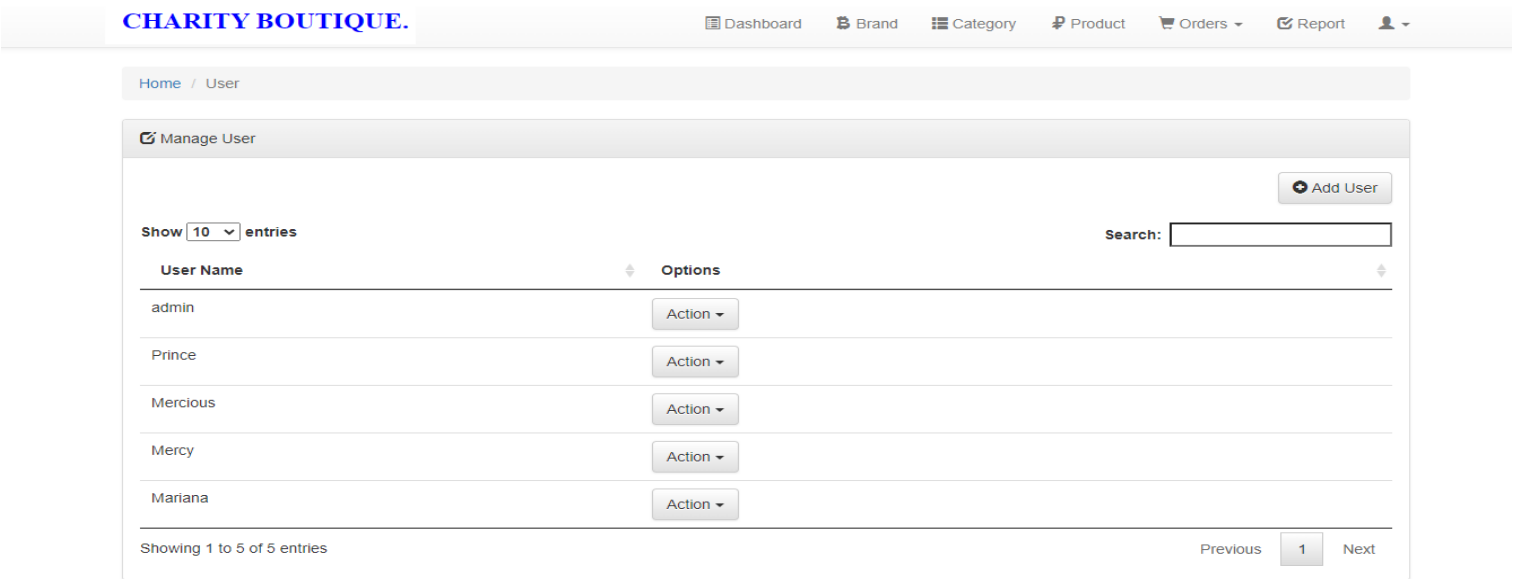


Figure 15. Interface for viewing and managing users

Interface for adding and editing user information

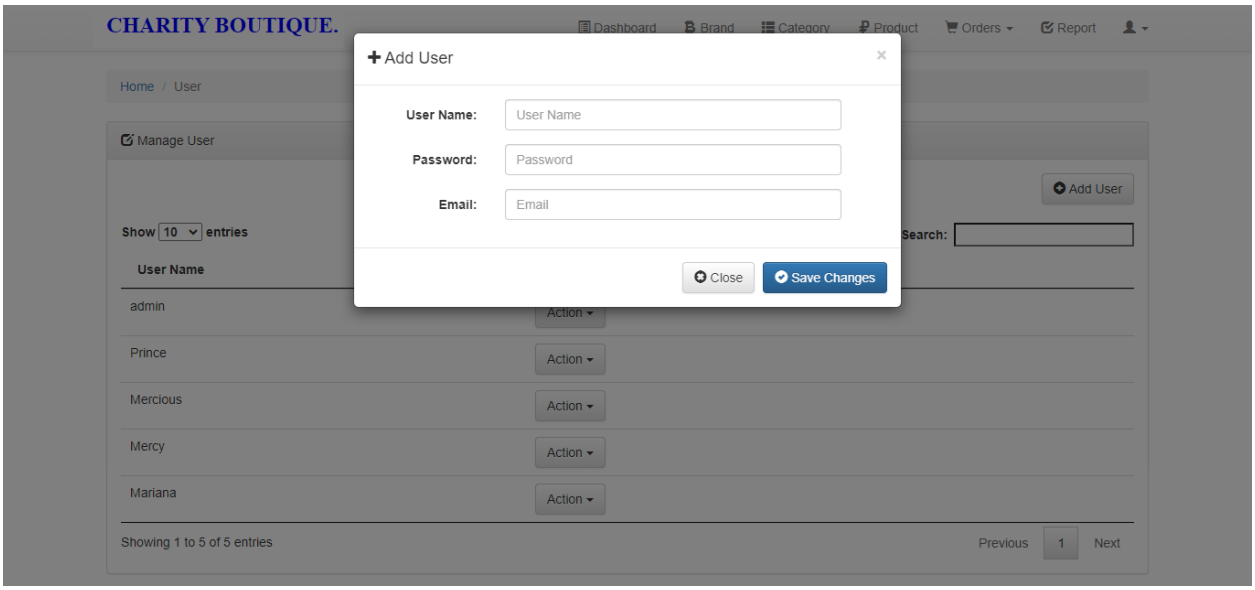


Figure 16 Interface for adding users

For the user or employee, the system provides them with an interface to view, manage, add and edit order information. The user uses the same log in interface as the admin or manager except that different passwords are used.

Employee dashboard

Figure 17.User Dash board

Similar to the admin the employee can also view manage orders.

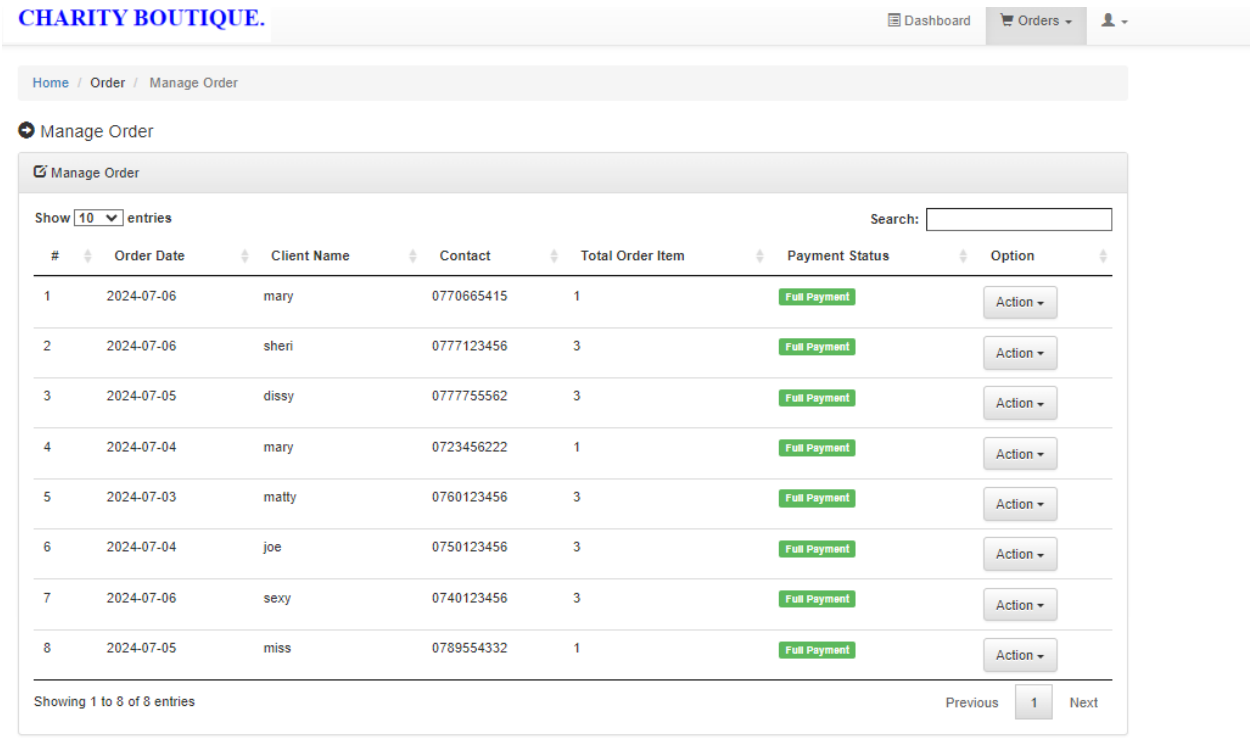


Figure 18. Interface for viewing and managing orders

Interface for adding and managing order information

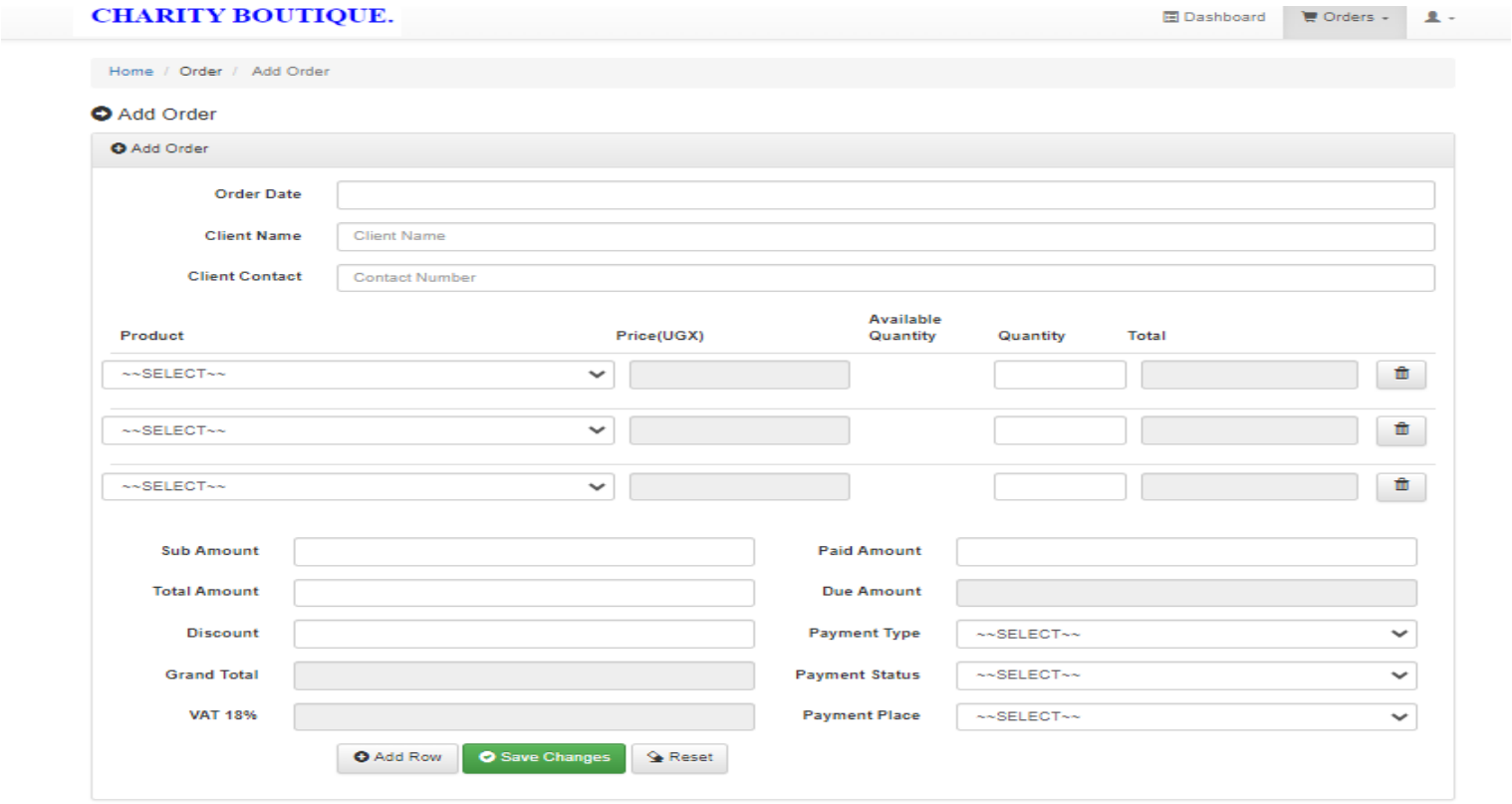


Figure 19. Interface for adding and editing order information

5.2 Data Storage

The system automatically stored the administrator, and employee details as well as the information of category types, product categories, products, and customer orders into a relational database **"store"** in tabular form. Some of the database tables include:

Users table

This table captured the details like username, password and email.

	user_id	username	password	email
Edit Copy Delete	1	admin	21232f297a57a5a743894a0e4a801fc3	
Edit Copy Delete	11	Prince	202cb962ac59075b964b07152d234b70	prince@gmail.com
Edit Copy Delete	12	Mercious	202cb962ac59075b964b07152d234b70	mercious@gmail.com
Edit Copy Delete	13	Mariana	202cb962ac59075b964b07152d234b70	mariana@gmail.com
Edit Copy Delete	14	Bucky	202cb962ac59075b964b07152d234b70	bucky@gmail.com

Brands table

This table captured details such as braBnd_id, brand_name, brand_active and brand_status which shows whether the brand is available or not.

	brand_id	brand_name	brand_active	brand_status
Edit Copy Delete	1	Gucci	1	1
Edit Copy Delete	2	Jordan	1	1
Edit Copy Delete	3	Nike	1	1
Edit Copy Delete	4	Versace	1	1
Edit Copy Delete	5	Generic	1	1
Edit Copy Delete	6	crocs	1	1

Categories table

This table stored Details such as category_id, category_name, category_active and category status which showed whether the category is available or not.

	categories_id	categories_name	categories_active	categories_status
Edit Copy Delete	1	Foot wear	1	1
Edit Copy Delete	2	T-shirt	1	1
Edit Copy Delete	3	Shorts	1	1
Edit Copy Delete	4	Back-pack	1	1
Edit Copy Delete	5	Inner garmet	1	1
Edit Copy Delete	6	cap	1	1

Orders table

This table contained details such as order_id, order_date, client_contact, sub_total, txt, total_amount and discount, grand_total, paid, due, payment_type, Payment_status, and payment_place

	order_id	order_date	client_name	client_contact	sub_total	vat	total_amount	discount	grand_total	paid	due	payment_type	payment_status	payment_place
Edit Copy Delete	1	2024-07-11	Samix	0706123456	480000.00	86400.00	566400.00	10000	556400.00	556400	0.00	2	1	1
Edit Copy Delete	2	2024-07-12	trent	076543219	560000.00	100800.00	660800.00	5000	655800.00	655800	0.00	2	1	1
Edit Copy Delete	3	2024-07-12	mariana	0712345678	600000.00	108000.00	708000.00	20000	688000.00	688000	0.00	2	1	1
Edit Copy Delete	4	2024-07-12	Drew	0786543210	360000.00	64800.00	424800.00	5000	419800.00	419800	0.00	2	1	1
Edit Copy Delete	5	2024-07-11	sam	0788891142	900000.00	162000.00	1062000.00	100000	962000.00	962000	0.00	2	1	1

Products table

This table contained details such as product_id, product_name, product_image, brand_id, quantity, rate, active and status.

	product_id	product_name	product_image	brand_id	categories_id	quantity	rate	active	status
Edit Copy Delete	1	laced shorts	../assests/images/stock/137566058066909c92be7d5.jp...	5	3	100	35000	1	1
Edit Copy Delete	2	collared	../assests/images/stock/193974880066909cbce7013.jp...	5	2	24	40000	1	1
Edit Copy Delete	3	3 pack men_s back pack	../assests/images/stock/36935634766909cec10981.PNG	3	4	45	120000	1	1
Edit Copy Delete	4	Squared	../assests/images/stock/863854965669909d3060075.jpg	5	2	35	35000	1	1
Edit Copy Delete	5	tight jeans	../assests/images/stock/1141016195669909d8105540.jp...	2	3	100	45000	1	1
Edit Copy Delete	6	ladies backpack	../assests/images/stock/1073464084669909dba719a6.PN...	2	4	42	120000	1	1

5.3 System Testing

The entire system was tested using codes. This stage of implementation ensured accuracy and efficiency operation of the system before it was given to the users. It required a series of different tests which varied at different system levels. The system tester assumed that if all parts of the system were correct then the goal would have finally been achieved.

Testing is the process of executing the program in order to identify errors or bugs. Testing shows the software errors. Therefore, testing was done after completion of the system. This was done in two formats including Unit testing and Integration testing.

5.4.1 Unit Testing

Unit testing was done on individual codes of the system to ensure that they fully yield the functional units. This was done by examining each unit, for example the code for entering an order. This was done to ensure that the order was entered successfully and prices correctly calculated.

Successfully achieving that encouraged me to go ahead with integration testing after all the identified errors were worked on individually.

5.4.2 Integration Testing

This was done after all the different modules had been put together to make a complete system. Integration aimed at ensuring that all the modules of the system worked hand in hand and that they could be integrated to form a complete working system.

5.4.3 Validation of the System

Validation of the system was done in order to confirm whether the system met its intended requirements and functionalities as intended. It involved a series of evaluations to ensure that the system is correct, consistent, complete, traceable and secure.

Functional validation was done in order to test the system's core functionalities and ensure they meet the specified requirements.

Non-functional validation was also done to test the system's performance, usability, security, compatibility and other quality attributes or non-functional aspects.

Integration validation was also done to test how well the system interacts with other systems it depends on.

CHAPTER SIX: DISSCUSION, RECCOMENATIONS, CONCLUSION AND FUTURE WORK.

6.0 Introduction

In this chapter, we discuss the findings for developing a Cloth store Inventory Management System in relation to the set objectives and methodology. The study found that the boutique fully relied on the manual system of recording inventories and transactions by the manager and the various employees i.e. noting down the orders with the use of pen and paper thus implying the amount of goods for a particular product are physically counted and the amount bought subtracted from the total amount. The Cloth store Inventory Management System that was developed focuses on replacing the manual system keeping of records as well as accuracy in data storage.

The implementation of the proposed system involved the Boutique employees such as the manager and workers, the customers and the results which were discussed as shown below.

6.1 Discussion

The discussion of this chapter is based on the theme of objectives stated in chapter one.

Objective (1): To determine the requirements for developing a Cloth store Inventory Management System

The requirements of the study were got from two sources. These include; Library research and field research. Under Library research, the study was conducted on the previous done projects about the same topic such as Electronic inventory Management system by Chebet Isaac. This guided me on the alignment of my project work. The library research generated requirements that were used in the design of the DFD database design and a few others which led to the fulfilment of

functional and non-functional requirements. The field research helped me get to know how the manual system works, the respondents' view and perception towards the Cloth store inventory Management System which also generated the requirements, such as text editors like Visual Studio Code and CSS libraries like Bootstrap, which can also be downloaded online, that were used for designing the interfaces.

Objective (2): To design a Cloth store Inventory Management System

The system was designed depending on the requirements followed by the RAD from the SSADM. The stage of design included Architecture, Context Diagram and Data Flow Diagram, Use-case diagram and database design, which enabled the smooth flow of data. Design and evaluation of the effectiveness of online ordering, encouraged the use of the different stages of design **(McKener, 2021).**

Objective (3): To implement a Cloth store Inventory Management System

The implementation of the system design was carried out using the implementation tools which included; Visual Studio code editor, Google Chrome, MySQL, HTML, XAMPP server and windows to fulfil the implementation where I came up with the interfaces in chapter 5, which interfaces include: "login, dashboard, manage user, manage product, adding manage category, and manage order. The system was implemented using parallel implementation to enable users to use the manual system as they got used to the new system **(Liamson, 2002).**

Objective (4): To test a Cloth Store Inventory Management System

The system was tested during and after implementation. Each component was tested (Unit testing) and the whole system was also tested (system testing).

Unit testing was used to test individual parts/modules of the code whereby every part of the interface was as well tested to check whether it works properly. This was essential during the identification of errors in specific units of the code thereby making debugging quite an easy task.

Integration testing was done after all the different modules had been put together to make a complete system. Integration aimed at ensuring that all the modules of the system worked hand in hand and that they could be integrated to form a complete working system.

Validation Results

After development and testing of the system, it was taken back to Charity Boutique and given out for testing to the Manager and some workers in order to look at its performance, appearance, security, integrity, efficiency, effectiveness and other quality attributes, after which the overall percentage acceptance of the system was 88% and the percentage rejection of the system was 12%.

This was because most of the users (manager, employees) agreed that the system will be able to effectively suit their needs and eradicate paperwork. Some of the users argued that the system was new to them.

6.2 Conclusion

The Cloth Store Inventory Management System should be deployed for use since most of the users agreed that the system performs its functions that suit their needs especially when it came to addressing majority of the challenges that the existing manual ordering system presented as already discussed in this write up in the previous chapters, specifically in problem statement well-stated in chapter 1. This implies that the Cloth Store Inventory Management System is deemed fit for adoption in Charity Boutique, Nagongera.

6.3 Recommendations

I recommend that my Cloth store Inventory Management System should be adopted by the different agricultural Cloths stores especially those that are still operating manually to improve efficiency, and furthermore reduce on the overall paperwork involved in the record keeping.

I also recommend the government to adopt my Cloth store Inventory Management System so that it can be deployed in various sectors of trade and overall inventories to eradicate paperwork, enable proper record keeping and tracking of stock.

I recommend my Cloth store Inventory Management System to be adopted by different academic institutions as a point of reference for development of similar systems, and for study purpose too.

6.4 Future work

As this project evolves, several key enhancements are envisioned to extend the functionality and user engagement of the inventory management system. One primary future goal is to transition the system to a web-based platform, enabling seamless online access for store owners and staff. This upgrade will also introduce a customer module, allowing customers to browse the store's inventory, place orders, and arrange for deliveries from the convenience of their location.

Incorporating a customer module opens avenues for additional features, such as integrating payment gateways for secure online transactions and offering personalized shopping experiences based on user preferences and purchase history. These enhancements will be guided by feedback from initial users and ongoing technological advancements.

Further down the line, the system can be enriched with Application Programming Interfaces (APIs) to enhance functionality. Integration of the Google Maps API will facilitate real-time tracking of orders, providing customers with live updates on delivery status. Additionally, the Twilio API can be employed to send SMS notifications, ensuring that both customers and boutique staff are promptly informed about critical updates such as order confirmations, delivery schedules, and stock alerts.

These future developments aim to create a comprehensive and user-friendly system that not only streamlines inventory management but also enhances customer

satisfaction and operational efficiency. As new technologies and user needs emerge, the system will continue to evolve, ensuring its relevance and effectiveness in a dynamic cloth retail environment.

REFERENCES

1. Achabal, D. D., McIntyre, S. H., Smith, S. A., & Kalyanam, K. (2000). A decision support system for vendor managed inventory. *Journal of Retailing*, *76*(4), 430-454.
2. Amoah, G. (2017). An inventory management system for EMELS Ghana.
3. Aro-Gordon, S., & Gupte, J. (2016). Review of modern inventory management techniques. *Global Journal of Business & Management*, *1*(2), 1-22.
4. Bakar, A., & Azaliah, N. (2020). Data-Driven Inventory Management Solution for Procurement and Supply Chain of Utility Company. *Available at SSRN 3582428*.
5. Bose, D. C. (2006). *Inventory management*. PHI Learning Pvt. Ltd.
6. Brooks, R. B., & Wilson, L. W. (2007). *Inventory record accuracy: unleashing the power of cycle counting* (Vol. 18). John Wiley & Sons.
7. Dalci, I., & TANIŞ, V. N. (2004). Benefits of computerized accounting information systems on the JIT production systems. *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *13*(1).
8. Davenport, T. H. (2000). The future of enterprise system-enabled organizations. *Information systems frontiers*, *2*(2), 163-180.
9. Deepali, C., Monika, P., & Dharmendra, S. (2024). Integrating barcode technology into warehouse management systems for enhanced efficiency and inventory accuracy. *Journal of Computer Science and Research (JoCoSiR)*, *2*(1), 8-14.
10. Dumas, C. (2008). *Effective inventory management in small to medium-sized enterprises* North-West University].
11. GIZACHEW, A. (2021). *A Thesis on Inventory Managment and Control of Ethiopian Electric Power* ST. MARY'S UNIVERSITY].

12. Gupta, S., & Ramachandran, D. (2021). Emerging market retail: transitioning from a product-centric to a customer-centric approach. *Journal of Retailing*, *97*(4), 597-620.
13. Hanna, M. G., & Pantanowitz, L. (2016). Bar coding and tracking in pathology. *Clinics in Laboratory Medicine*, *36*(1), 13-30.
14. Hegering, H.-G., Abeck, S., & Neumair, B. (1999). *Integrated management of networked systems: concepts, architectures and their operational application*. Morgan Kaufmann.
15. Kamau, L., & Kagiri, A. (2015). Influence of inventory management practices on organizational competitiveness: A case of Safaricom Kenya Ltd. *International Academic Journal of Procurement and Supply Chain Management*, *1*(5), 72-98.
16. Kitheka, S. S. (2012). *Inventory management automation and the performance of supermarkets in western Kenya*
17. Narayan, P., & Subramanian, J. (2009). *Inventory Management-principles and Practices*. Excel Books India.
18. Nenes, G., Panagiotidou, S., & Tagaras, G. (2010). Inventory management of multiple items with irregular demand: A case study. *European Journal of Operational Research*, *205*(2), 313-324.
19. Ogbo, A. I., & Ukpere, W. I. (2014). The impact of effective inventory control management on organisational performance: A study of 7up bottling company nile mile enugu, nigeria. *Mediterranean Journal of Social Sciences*, *5*(10), 109-118.
20. Otchere, A. F., Adzimah, E. D., & Aikens, I. (2016). Assessing the inventory management practices in a selected company in Ghana. *International Journal of Development and Sustainability*, *5*(3), 105-119.

21. Restu, -., Sriadhi, -., Gultom, S., & Baharuddin, -. (2020). Management information system model to increase performance of educational laboratory. *Polish Journal of Management Studies*, *21*(2), 356-369.
22. Sabila, A. D., Mustafid, M., & Suryono, S. (2018). Inventory Control System by Using Vendor Managed Inventory (VMI). E3S Web of Conferences,
23. Shen, B., Chan, H.-L., Chow, P.-S., & Thoney-Barletta, K. A. (2016). Inventory management research for the fashion industry. *International Journal of Inventory Research*, *3*(4), 297-317.
24. Shenoy, D., Rosas, R., Shenoy, D., & Rosas, R. (2018). Introduction to inventory management. *Problems & Solutions in Inventory Management*, 3-11.
25. Thiesse, F., Al-Kassab, J., & Fleisch, E. (2009). Understanding the value of integrated RFID systems: a case study from apparel retail. *European Journal of Information Systems*, *18*, 592-614.
26. Twist, D. C. (2005). The impact of radio frequency identification on supply chain facilities. *Journal of Facilities Management*, *3*(3), 226-239.
27. Wauna, S., & Obwogi, J. (2015). An assessment of the effects of inventory management procedures on performance of Kengen. *International Journal of Scientific and Research Publications*, *5*(10), 1-15.
28. Wynn, S. (2021). The Financial Impact of Manual Inventory Record Errors
29. Agrawal, T. K., Kumar, V., Pal, R., Wang, L., & Chen, Y. (2021). Blockchain-based framework for supply chain traceability: A case example of textile and clothing industry. *Computers & industrial engineering, 154*, 107130.
30. Alahyane, L. (2024). Data-Driven Optimization of Inventory Management and Sales Strategies for Automotive Component Suppliers.

31. Aro-Gordon, S., & Gupte, J. (2016). Overview of the classic economic order quantity approach to inventory management. *The Business Age, 1*(2), 1-16.

32. Beynon-Davies, P., Carne, C., Mackay, H., & Tudhope, D. (1999). Rapid application development (RAD): an empirical review. *European Journal of Information Systems, 8*(3), 211-223.

33. Caro, F., & Gallien, J. (2010). Inventory management of a fast-fashion retail network. *Operations research, 58*(2), 257-273.

34. Chase, C. W. (2013). *Demand-driven forecasting: a structured approach to forecasting*. John Wiley & Sons.

35. Chu, C.-W., Liang, G.-S., & Liao, C.-T. (2008). Controlling inventory by combining ABC analysis and fuzzy classification. *Computers & industrial engineering, 55*(4), 841-851.

36. FoEh, J., & Ali, Y. (2021). Application of Economic Order Quantity Method in Controlling Raw Material Inventory. *International Journal of Social Science and Human Research, 4*(08), 2181-2186.

37. Garrido Azevedo, S., & Carvalho, H. (2012). Contribution of RFID technology to better management of fashion supply chains. *International Journal of Retail & Distribution Management, 40*(2), 128-156.

38. Gitau, R. W. (2016). *Inventory Management Practices and Organizational Productivity in Parastatals in Kenya* University of Nairobi].

39. Mahamani, A., & Rao, K. P. (2010). Development of a spreadsheet based vendor managed inventory model for a single echelon supply chain: a case study. *Serbian Journal of Management, 5*(2), 199-211.

40. Mondol, E. P. (2021). The impact of block chain and smart inventory system on supply chain performance at retail industry. *International Journal of Computations, Information and Manufacturing (IJCIM), 1*(1).

41. Morenza-Cinos, M., Casamayor-Pujol, V., & Pous, R. (2019). Stock visibility for retail using an RFID robot. *International Journal of Physical Distribution & Logistics Management, 49*(10), 1020-1042.

42. Pal, S. (2023). Advancements in AI-Enhanced Just-In-Time Inventory: Elevating Demand Forecasting Accuracy. *International Journal for Research in Applied Science & Engineering Technology, 11*, 282-289.

43. Qader, G., Junaid, M., Abbas, Q., & Mubarik, M. S. (2022). Industry 4.0 enables supply chain resilience and supply chain performance. *Technological Forecasting and Social Change, 185*, 122026.

44. Ramamoorthy, C. V., Prakash, A., Tsai, W.-T., & Usuda, Y. (1984). Software engineering: problems and perspectives. *Computer, 17*(10), 191-209.

45. Singh, N., & Adhikari, D. (2023). AI and IoT: A future perspective on inventory management. *International Journal for Research in Applied Science and Engineering Technology, 11*(11), 2753-2757.

APPENDIX

Appendix I: Requirements collection interview guide

During this interview process, interviewers will first greet and politely ask for permission before they ask questions to the interviewees.

Topic: CLOTH STORE INVENTORY MANAGEMENT SYSTEM.

Dear Respondent;

I am Gawaya Mercious Sam, a student of Busitema University pursuing a Bachelor's Degree of Science in Computer Science. I am carrying out a research study on Cloth store Inventory Management System at Charity Boutique in Nagongera.

This survey is to guide me into understanding the current inventory Management system at Charity boutique. I kindly request for your cooperation in answering the following questions. Any information provided will be for academic purposes only and will be treated with absolute confidentiality.

I hope that my humble request may meet your kind consideration.

Thank you.

Appendix II: Questionnaire

QUESTIONNAIRE FORM (for staff, manager)

TOPIC: Cloth Store Inventory Management System.

Dear Sir/ Madam,

My name is Gawaya Mercious Sam, a student at Busitema University, pursuing a Bachelor's degree in Computer science and carrying out research on Cloth Store inventory Management System and Charity boutique, Nagongera is the case study.

I kindly request you to report appropriately to the questions provided to enable me gather credible data for the above topic.

Your responses will be used for academic purposes only and will be treated confidentially.

Use the spaces provided to answer the questions given.

1. What is your current position of responsibility at Charity Boutique?

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2. How do you manage and take records of your inventory at Charity Boutique?

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3. What are the major challenges faced in inventory management at the boutique?

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4. How do you think a Cloth store inventory Management system should operate so as to address some of those challenges stated above?

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THANK YOU!

QUESTIONNAIRE FORM II (For customers)

TOPIC: Cloth Store Inventory Management System.

Dear Sir/ Madam,

My name is Gawaya Mercious Sam, a student at Busitema University, pursuing a Bachelor's degree in Computer science and carrying out research on Cloth Store inventory Management System and Charity boutique, Nagongera is the case study.

I kindly request you to report appropriately to the questions provided to enable me gather credible data for the above topic.

Your responses will be used for academic purposes only and will be treated confidentially.

Use the space provided to answer the questions given.

1. Are you satisfied with the services of Charity boutique? (Tick the correct option)
   a) YES ☐
   b) NO ☐
2. Do they always have what you need whenever you want it?
   a) YES ☐
   b) NO ☐
   c) Others (specify)

.....

.....

.....

3. How often do they lack what you need?

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.....

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THANK YOU!