THE COOPERATIVE UNIVERSITY OF KENYA

DEPARTMENT OF COMPUTING AND MATHEMATICS

YEAR 4 FINAL PROJECT

BOUTIQUE WEB-BASED SYSTEM

BY

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This project submitted in partial fulfillment of the requirements for the award of the Degree in Computer Science of The Co-operative University of Kenya.

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DECLARATION AND APPROVAL

I hereby declare that this Project ***BOUTIQUE WEB-BASED SYSTEM*** *is* my own work and has, to the best of my knowledge, not been submitted to any other institution of higher learning for any award.

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APPROVAL

This project *[Report]* has been submitted with my approval as the University supervisor.

Supervisor Name: MRS. LUCY WANGUI

Signature: ..... **Date: .....**

ACKNOWLEDGEMENT

First and for most, I would like to express my sincere thanks to the almighty God for the gift of life, wisdom understanding he has given to me, a reason for my existence and to my families for the love and support they had been provided throughout course.

Mrs. Lucy Wangui whom was my supervisor and the whole Department of Computer Science and Information Technology, I thank her for the expertise and intelligence she displayed whole supervising this project. I believe this good work in a result of her good guidance and cooperation.

DEDICATION

I wish to dedication this entire project report to my beloved family for their tireless support they accorded me throughout the project period. I also extend my sincere gratitude to my friends for the moral support. Above all, to the Almighty God for good health and sound mind throughout my studies.

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ABSTRACT

E-commerce shopping play a great importance in the modern business environment. Boutique web based system has opened the door of opportunity and advantage to the firms. The research aims to provide theoretical contribution in understanding the present status of online shopping. The Study discuss the consumers' online shopping behaviours. Paper also identify the problems faced by the consumers when they want to accept internet shopping. Present paper is an expressive study based on the detailed review of earlier pertinent studies related to the various concepts of online shopping to discover the concept of e-commerce shopping. Solitude and safety risk emerge regularly as a reason for being cautious about internet shopping. Shopping convenience, information seeking, social contact, and diversity affects the consumer attitude towards online shopping. The impossibility of product testing, problems with complaints, product return and misuse of personal data are the main doubts regarding on-line shopping. The system will have two main modules which include the store management module and the customer module. The store management module will allow the store owner (admin) to manage the inventory, add new products, track sales, and generate reports. The customer module will allow customers to browse and purchase products online, track their orders, and provide feedback on their shopping experience. The system will be developed using HTML, CSS, and JavaScript on the front end and Python programming language on the backend, with a MySQL lite3 database to store the data. The system will provide a seamless shopping experience for customers and streamline the management of the boutique store, resulting in increased efficiency and profitability.

LIST OF ABBREVIATIONS

Terminology	Meaning
CI/CD	Continuous Integration and Deployment
CMS	Content Management System
CSS	Cascading Stylesheet
DBMS	Database Management System
DFD	Data Flow Diagram
FAQ	Frequently Asked Questions
HTML	Hypertext Mark Up Language
SDLC	Software Development Life Cycle
UML	Unified Modelling Language
WAN	World Area Network
XSS	Cross site scripting

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CHAPTER ONE

1.0 INTRODUCTION

Economic developers serve as a bridge between businesses and the resources they need to find success, especially in changing markets and turbulent times. In many cases, this role is one of providing information to local businesses on useful tools to build or grow their endeavors. In this project the usefulness of e-commerce to businesses owners and a community's economy is outlined through the description of various resources available. According to e-commerce statistics for 2020, 95 percent of retail sales are expected to be made via the internet by 2040. E-commerce, or transactions conducted over the internet, has rapidly gained popularity since the first online purchase in 1994. With the advent of e-commerce in 1994, consumers began to shift their buying experience from brick and mortar businesses to online shopping; now the majority of all retail sales are now conducted online. To survive, businesses must adapt to this shift of e-commerce.

Boutique e-commerce website is an online shopping platform that allows people to interact with products online and even buy them without physically visiting the situated location of the retail shop. In this way, it creates time-saving and cuts down cost for customers.

1.1 BACKGROUND TO THE STUDY

Traditional marketing and management of fashion industry is experiencing a revolution because of the emergence of e-commerce. Since the birth of e-commerce, businesses have been able to make use of the Internet in reducing costs associated with purchasing, managing supplier relationships, streamlining logistics and inventory, and developing strategic advantage and successful implementation of business re-engineering. E-commerce allows companies to improve communications within the supply chain and enhance service offering, thus providing chances for competitive differentiation.

Also, the design of a website is highly dependent and controlled by the target audience and for the intended purpose. For example, in a Boutique e-commerce website there is need to place contents in a highly dependent in a way that it will be positively perceived by the recipient of the product. Studies have shown that there is importance of keeping the user central in design process of a website for example independent age. Some researchers explained that combination of both

aesthetical and usability aspects are all necessary for claiming the user interest and it also maximizes the website quality. This all seems to apply to the importance of the user's first impression and the understanding of how the website should be designed to be valued in their eyes. This will decide whether users will stay on your website or exist hence necessity for good design and user interaction.

Electronic commerce is beginning to play a central role in fulfilling the daily needs of people. A particularly insightful view was expressed that "Spread of E-commerce shall be directly related to growth of internet in the country."(Mehta, 2001).

1.2 STATEMENT OF THE PROBLEM

Traditionally, customers used to buy the products at the real, in other words, factual shops or supermarkets. It needs the customers to show up in the shops in person, and walk around different shopping shelves, and it also needs the owners of shops to stock, exhibit, and transfer the products required by customers. It takes labour, time and space to process these operations.

Furthermore, the spread of the Covid-19 pandemic which commenced early 2020 has caused a lot of changes in our lifestyle, people fearing to get outside their homes, transportation almost shut down and social distancing becoming all the most important aspect. Big to small scale business that relied on the traditional incurs a lot of consequence due to the lockdown issues. Some tend to move towards using social media platforms like Facebook, WhatsApp Business, Instagram etc. to sell their products. However, the social media platforms have been beneficial for marketing purposes alone but leave the whole task of customer and massive order management via direct messaging (DM), which takes a lot of time to respond to all customers. In addition, everyone tends to use social media, posing a great challenge to differentiate between scammers and legit sellers.

1.3 OBJECTIVES

1.3.1 General Objectives

This project is directed to design an online fashion system which is referred to as a Boutique which will create a venue where people can shop for fashion products of their choice online.

1.3.2 Specific Objectives

- Boost sales through cross selling and up selling of the products online
- Provide a user with details of the date he/she signed up for the first time
- Boost customer loyalty through customer retention
- Maximize reaching of more customers at the right time
- To provides a solution to reduce and optimize the expenses of customer order management.
- To develop a database to store information on fashion products and services.

1.4 SIGNIFICANCE OF THE STUDY

With the aid of an efficient information system, fashion associations can be able to react quickly by giving out information about changes in the market and latest trends to the public. An online application not only saves time and money, but also minimizes administrative efforts and cost. It provides an avenue to market products to a whole new audience.

Here are benefits of having an e-commerce boutique;

- Easy advertisement of new products and services
- Saves time on the part of the buyer due to the fact that they can do transactions for any product or make enquiries about any product or services provided by a company anytime and anywhere.
- It creates an avenue for expansion to national and international markets.
- An online fashion system improves the brand image of a company.
- It aids a fashion company in providing better customer service.

1.5 SCOPE OF THE STUDY

Every project is done to achieve a set of goals with some conditions keeping in mind that it should be easy to use, feasible and user friendly. As the goal of this project is to develop an online fashion system which will be user friendly, easy to use and feasible. This will bring effectiveness and enable efficient order management.

It is very possible to observe the customer potentials and purchase patterns because all the ordering history is stored in the database. It is efficient managing all the operations of an online store within a single platform. The proposed project

1.5.1 Customer/Client Side

- Customer can view/search products without login.
- Customer can also add/remove product to cart without login (if customer try to add same product in cart. It will add only one)
- When customer tries to purchase product, then he/she must login to system.
- After creating account and login to system, he/she can place order.
- If customer clicks on pay button, then their payment will be successful and their order will be placed.
- Customer can check their ordered details by clicking on orders button.
- Customer can see the order status (Pending, Confirmed, Delivered) for each order.
- Customer can download their order invoice for each order.
- Customer can send feedback/ask question to admin (without login).

1.5.2 Administrator side

- Admin can provide username, email, password and your admin account will be created.
- After login, there is a dashboard where admin can see how many customers is registered, how many products are there for sale, how many orders placed.
- Admin can add/delete/view/edit the products.
- Admin can view/edit/delete customer details.
- Admin can view/delete orders.
- Admin can change status of order (order is pending, confirmed, out for delivery, delivered).

1.6 ASSUMPTIONS

This study is based on the following assumptions;

- Boutique e-commerce will enable easy advertisement of new products and services online.
- It will boost customer loyalty through customer retention
- It will maximize reaching of more customers at the right time
- It will provide a solution to reduce and optimize the expenses of customer order management.

1.7 LIMITATION AND DELIMITATION

On the contrary, designing web applications is characterized by some constraints and limitations. Limitation to this project is that developers are limited to a small set of graphical widgets for use in presenting a user interface. Web-based applications require high investment in software, as well as maintenance costs for the software and personnel for software administration. In this project, verification of credentials for membership cannot be done hence bringing up feature of delimitation.

1.8 DEFINITION OF TERMS

- **Boutique** – a small shop dealing in fashionable clothing or accessories
- **E-commerce** – electronic commerce is the buying and selling of goods and services, or the transmission of funds or data, over an electronic network, primarily the internet.
- **Website** – is a collection of web pages and related content that is identified by a common domain name and published on at least one web server.
- **Revolution** – refers to a fundamental change in something.
- **Re-engineering**- is the examination and alteration of a system to reconstitute it in a new form.
- **Supply chain** – is the network of all the individuals, organizations, resources, activities and technology involved in the creation and sale of a product. A supply chain encompasses everything from the delivery of source materials from the supplier to the manufacturer through to its eventual delivery to the end user.
- **Fashion** – is a distinctive and often habitual trend in the style in which a person dress.
- **Association** – an association is an organized body of people who have an interest, activity, or purpose in common; a society.
- **Web based applications** – a web-based application is a software package that can be accessed through the web browser. The software and database reside on a central server rather than being installed on the desktop system and is accessed over a network.
- **Credentials** –refers to previous achievements, training, and general background, which indicate that they are qualified to do something.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Literature review is an expressive study based on the detailed review of earlier pertinent studies related to the various concepts of online shopping to discover the concept of online shopping. It highlights the status of online shopping, importance and problems of online shopping, factors affecting online shopping and a critical review of the privacy and security issues in online shopping.

2.2Concepts of Boutique E-Commerce Web-Based System

Online buying behavior is affected by various factors like, economic factors, demographic factors, technical factors, social factors, cultural factors, psychological factors, marketing factors and legislative factors. Customers choose an online-shop mainly based on references, clarity terms of delivery, graphic design and additional services. Problematical customers read discussions on the Internet before they spend their money on-line and when customers are incapable to purchase the product fast and with no trouble they leave online-shop. Kotler, (2003) described Consumer buying method as learning, information-processing and decision-making activity divided in several consequent steps: Problem identification, Information search, Alternatives evaluation, Purchasing decision, Post-purchase behavior. Euthymic identified the main constituent of the online shopping experience as follows:

- The functionality of the website that includes the elements trade with the site's usability
- The emotional elements planned for lowering the customer's hesitation by communicating trust and credibility of the online seller and website and
- The content elements including the aesthetic aspects of the online presentation and the marketing mix usability and trust.

2.3 Related Systems

2.2.1 2NU Boutique

2NU Boutique is an online shopping store for smart career women that specialize in offering unique and fashionable clothing. Their website is designed to provide an easy, accessible shopping

experience. For the 1ast time you don't have to go through the hustle of going from place to place through the traffic to get to the shops in time before they close.

2.2.2 Sarai Afrique

Sarai Afrique Fashion House has been serving women for the last five years and the experience we have gained over this time with manufacturers and designers allow us to offer top quality designs at competitive prices in the industry. They take great pride in the relationships, Sarai Afrique form with our customers whom they consider part of the Sarai Afrique family.

2.3 Limitations and Weaknesses of This System

Online shopping encounters a great barrier to the online purchase aim of customers. General problems include prospect of having credit card. The obscurity to confirm the reliability of the provide goods and the risk to buy a product that it would not value as much as customer pay for it. After sales problems, involved difficulty to change not working product with a new one and products warranty are not assured.

Here are some of the weaknesses of e-commerce systems;

- Lack of personal attention by the sellers which result to non-customer satisfaction.
- Lack of quality – sometimes you find that an item ordered by a customer is not the one delivered to him.
- The customers can not touch and fell of the products when they want to purchase.
- Sometimes delivery time for the product ordered arrives late.
- Sometimes they will pay the shipping charges so the cost of the product may increase.

On the other hand, there is factor of privacy and security which acts as a limitation to every aspect of online purchases. In most cases, people are hesitant to provide their personal and financial details in spite of advanced data encryption security systems in place. Moreover, there are some websites that do not have the capability and features installed to authenticate transactions.

Previous studies had shown that Internet users as a whole agreed that privacy and security issues are vital for them to shop online (Rohm and Milne, qtd. in Miyazaki and Fernandez, n.d). Most of them regard their personal information as their main concern (U.S. FTC, qtd. in Miyazaki and Fernandez, n.d). In the research conducted by Miyazaki and Fernandez, who are the authors of the articles themselves, privacy and security issues accounted for more than 65 percent of consumers' main concern as oppose to the other 35 for shopping inconveniences and others (Fernandez et al., n.d). They also concluded that more experienced Internet users tend to have more concern regarding privacy issues but less concern on security issues. Nevertheless, consumers still consider both as their main concern for online shopping as suggested in the survey.

However, customer rights and security aspects are not just the responsibility of online merchants. To uphold them, the consumers themselves need to act. According to "Ten Things Your Mother Never Told You about Online Shopping" published in Yahoo! Internet Life, to be an ace consumer, online shoppers need to prepare themselves with some basics (Halpin, 2011). As the prominent method of payment is credit card or by use of M-pesa transactions, consumers should be more aware in handling it .Consumers should limit themselves from releasing unnecessary personal information such as age and income to protect their privacy (Hood & Halpin, 2011

2.4 Proposed Solution

This project is directed to design an online fashion system which is referred to as a Boutique which will create a venue where people can shop for fashion products of their choice online for all genders and ages. From the related systems discussed above, we see that most of them deal with ladies' clothing which bring about an unbalanced environment. Therefore, the proposed solution will address both genders bringing a balanced environment for both genders.

By all these, the system will be able to achieve the following;

- Will be able to display the first time user ever used the system
- Boost sales through cross selling and up selling of the products online
- Enable customers to capture our leads through social media platforms
- Maximize reaching of more customers at the right time
- To provides a solution to reduce and optimize the expenses of customer order management.
- To develop a database to store information on fashion products and services

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This Section describes the methodology applied during the development of Boutique web based system. A methodology is a model, which project managers employ for the design, planning, implementation and achievement of their project objectives. Effective project management is essential in absolutely any organization, regardless of the nature of the business and the scale of the organization. From choosing a project to right through to the end, it is important that the project is carefully and closely managed.

3.2 Project Design

The boutique web based system was developed by the standard System Development Life Cycle (SDLC) processes that is system planning and requirement analysis, system design, system implementation and testing.

The methodology to be adopted will be;

- Extensive survey of the existing system will be carried out through review of related work and requirement analysis.
- The proposed web-based leave management system will be designed using Universal Modelling Language (UML) tools such as sequence diagram and use case diagrams.
- The web based system will be implemented using Python (Django framework), HTML (Hypertext Markup Language), JavaScript and CSS (Cascading Style Sheet).
- After the development of the system, evaluation will be carried out on the system to examine the efficiency and general performance of the system; and test the ability of the system to verify and ensure the proper execution of the system.

The analysis, design and development of this project would involve the following steps:

- Definition of the problem space - The problem is defined by the issues involved in the current boutique e-commerce web based systems.

- Analysis of the existing web based system - This involves broad literature review on the existing web based systems, its operation, functionalities, benefits and the deficiencies.
- Design of the web based system - An adequate solution to the problem will be proposed after the reviewing of the existing e-commerce websites which involves conceptualizing the various modules required to implement this project.

3.4 Design Procedures

The section describes the system study, analysis, design strengths and weaknesses of the current system, Contest level diagrams, Entity Relationship Diagram, Architectural design. After interpretation of the data, tables were drawn and process of data determined to guide the researcher of the implementation stage of the project. The tools, which were employed during this methodology stage, where mainly tables, Data Flow Diagrams and Entity Relationship Diagrams. The design ensures that only allows authorized users to access the systems information.

3.4.1 Process Flow

Figure 1: process flow

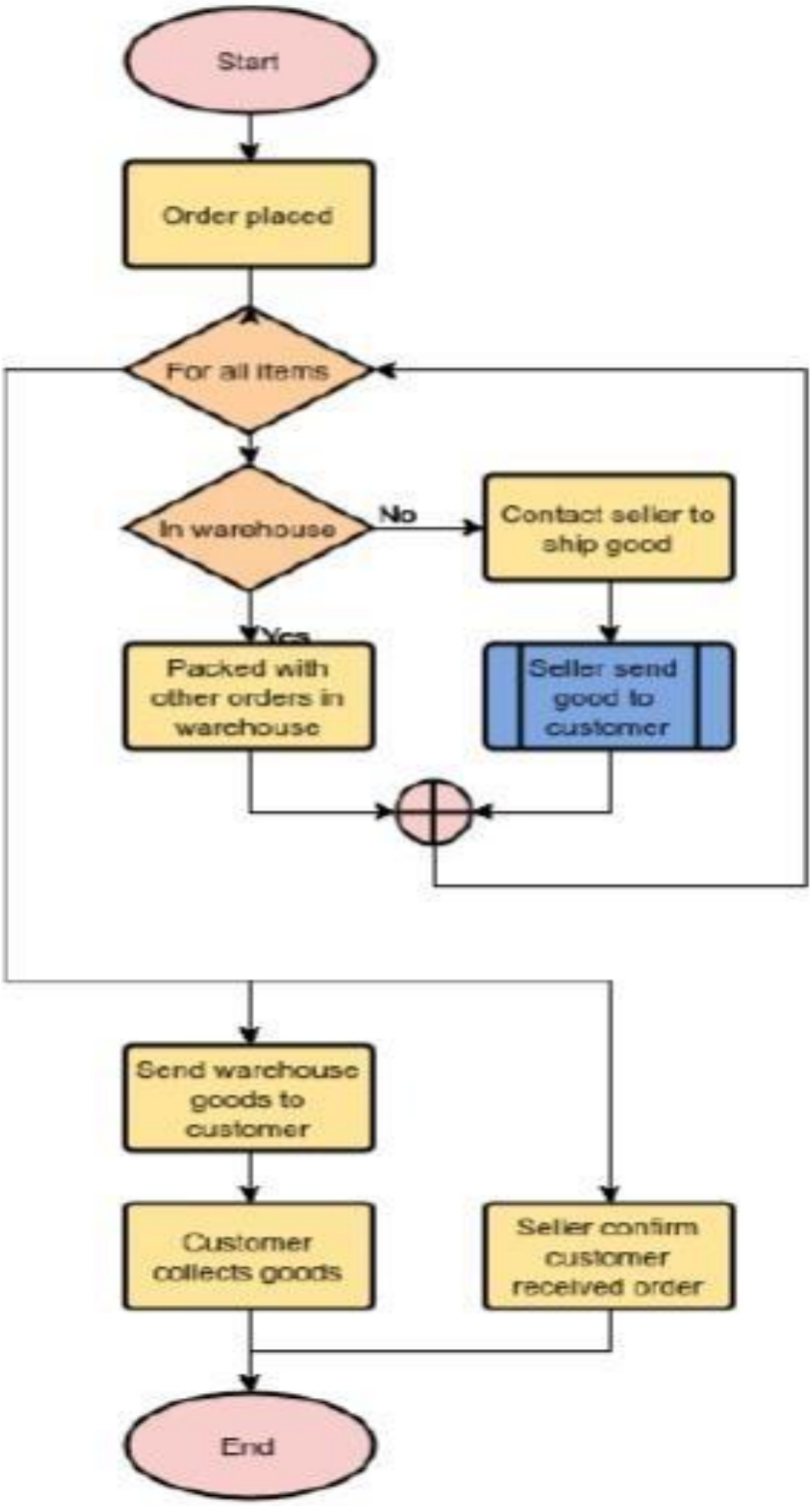
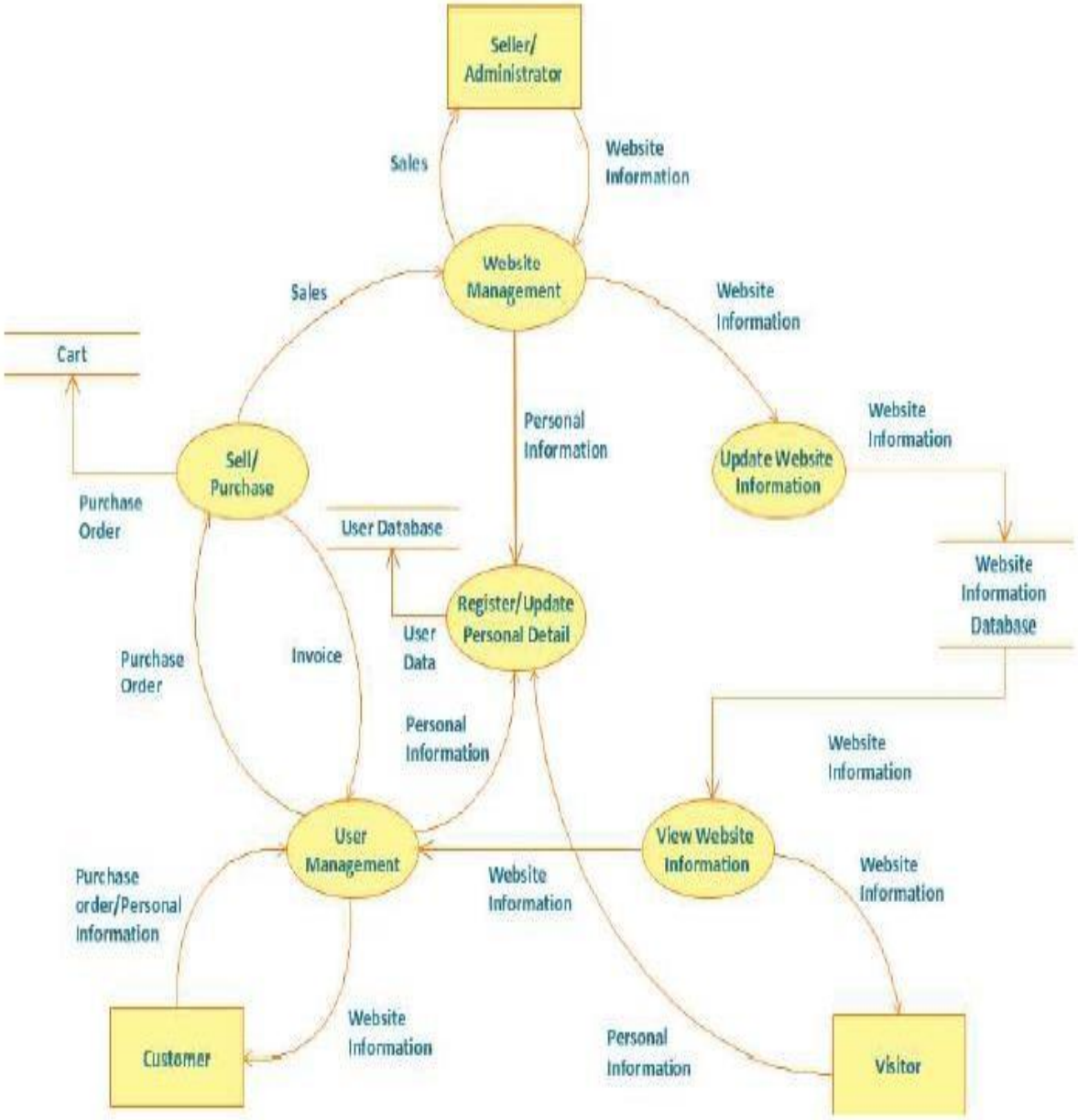


Figure 2 :

3.4.2 Data Flow Diagram

3.4.3 UML Diagram

Figure 3: UML Diagram



3.5 System Requirements

This section describes the hardware components and software requirements needed for effective and efficient running of the web based system.

3.5.1 Hardware Requirements

Table 1

	Hardware	Minimum system requirements
1	Processor	2.4 GHz Processor speed
2	Disk Space	500 GB
3	Memory	2 GB RAM

3.5.2 Software Requirements

Table 2

	Software	Minimum system requirements
1	Operating System	01 Windows 8, Windows 10 or MAC Ox 10.8,10.9, or 10.11, LINUX
2	Database Management System	SQL Lite 3
3	Runtime Environment	PyCharm or Visual Studio Code
4	Web Browser	Google Chrome, Firefox or Brave

3.6 Data Collection and Analysis

A complete understanding of software requirement is essential to the success of a web development effort. No matter how well designed or well coded, a poorly analyzed and specific program will disappoint user and bring grief to the developers.

Data Collection is the process of gathering and measuring information on variables of interest in an established systematic fashion that enables one to answer stated research questions, test hypothesis and evaluate the outcomes. Data Collection is an important aspect of any type of research study. Inaccurate data collection can impact the results of a study and ultimately lead to

invalid results. The methods used to gather the projects requirements involves Quantitative research to review the existing systems in the market.

3.7 Data Collection Methods

This study used quantitative techniques like online survey and questionnaire. Quantitative data collection methods play an important role in impact evaluation by providing information useful to understand the processes behind observed results and assess changes in people's perceptions of their well-being. Furthermore, quantitative methods can be used to improve the quality of survey based quantitative evaluations by helping generate evaluation hypothesis; strengthening the design of survey questionnaires and expanding or clarifying quantitative evaluation findings. These methods are characterized by the following attributes:

- They tend to be open-ended and have less structured protocols
- They rely more heavily on interactive interviews; respondents may be interviewed several times to follow up on a particular issue, clarify concepts or check the reliability of data
- They use triangulation to increase the credibility of their findings
- Generally, their findings are not generalizable to any specific population, rather each case study produces a single piece of evidence that can be used to seek general patterns among different studies of the same issue.

Existing written and visual materials were assessed to find important data and information towards the development of the system. During data collection, the investigation on previous existing web based systems found out how the current system operates, not only that but also tried out which problems are faced and how best they can be settled.

CHAPTER FOUR

4.0 SYSTEM ANALYSIS

4.1 Detailed analysis of current system

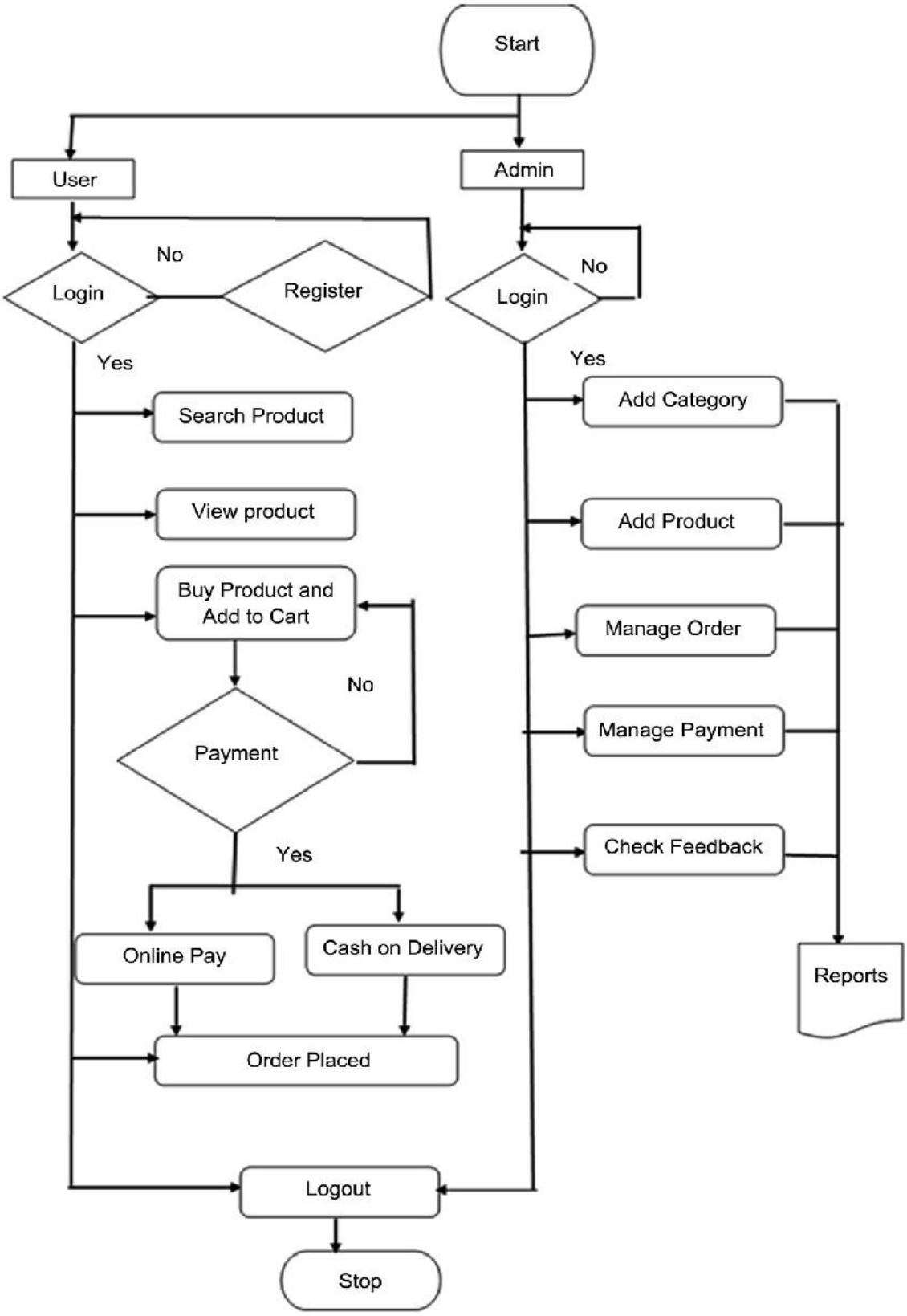
This chapter should show the current state of the system and the new study. It was the process of conducting a thorough examination of the current system for shopping online. The goal was to understand the current system's functionalities, processes, and data flows, and to identify potential areas for improvement.

4.1.1 Flow charts

Flow charts were used to visualize the flow of data, processes, and interactions between the different components of the system. They helped to identify bottlenecks or areas where the system may be inefficient or confusing for users.

A typical example of a flowchart in the previous system;

Figure 4: Flowchart



In particular, flow charts were used to:

- Identify processes - Flow charts were used to represent the different steps involved in the web based system, from user registration all the way to payment and report receipt generation of the ordered items.
- Illustrate data flow - Flow charts helped to visualize the flow of data within the system for example the interaction of admin and the new customers.
- Highlight bottlenecks: Flow charts helped to identify areas where the system may be inefficient or slow, such as processes that take a long time to complete such as user having problem in doing transaction or even new user registration.
- Identify areas for improvement: By visualizing the flow of processes, data, and interactions within the system, flow charts helped to identify areas where the system could be improved, such as processes that are repetitive or confusing for users.

Using the flow charts in the system requirement analysis, led to a better understanding of the current system and identify potential areas for improvement, which informed the design of a new, improved system.

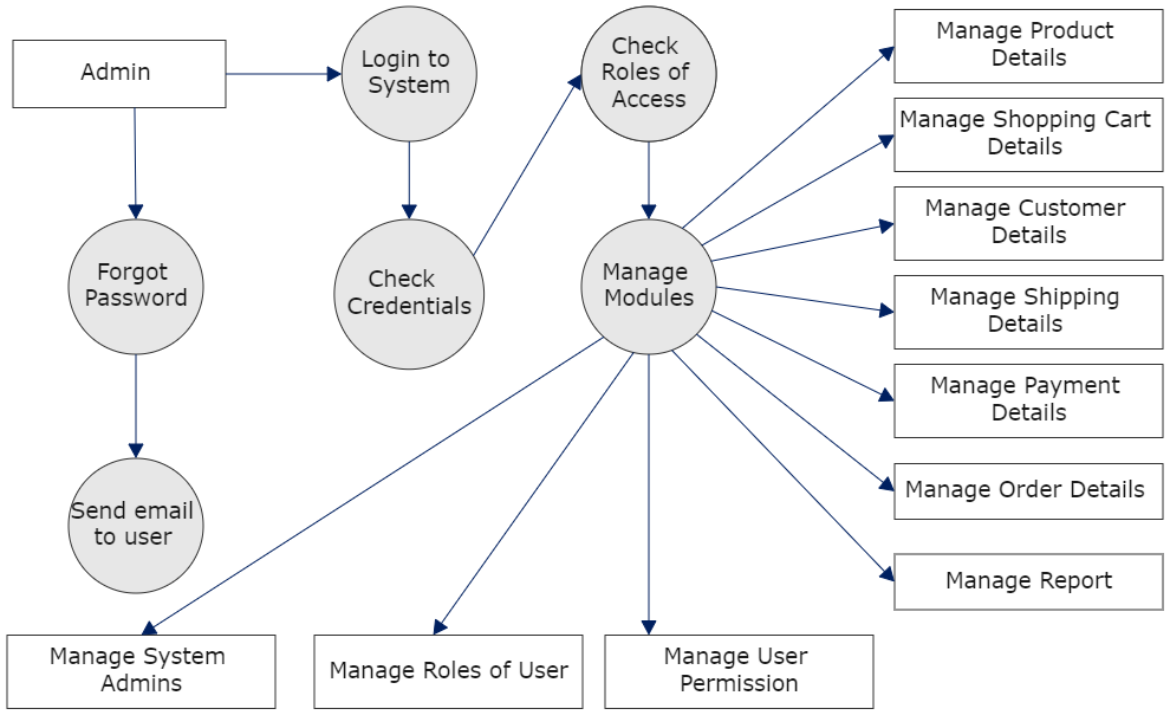
- User Interface - The user interface is the graphical representation of the system that the user interacts with. It typically includes screens, forms, buttons, and other visual elements that allow the user to input data, navigate through the system, and view output.
- Server-side Scripting - This component is responsible for handling all of the backend processing of the system. It includes software that runs on the server and processes user requests, performs database queries, and generates dynamic web pages.
- Database - The database component stores all of the system's data, such as customer information, product data, and order history. It is typically a relational database management system (RDBMS) that allows for efficient data retrieval and storage.
- Security - Security is an essential component of any web-based system, especially one that deals with sensitive customer information. This component includes measures such as authentication, access control, encryption, and firewalls to protect the system and its data from unauthorized access.

- Analytics - Analytics allows the system to track user behavior, monitor performance, and generate reports on system usage. This component typically includes tools for data visualization and analysis.
- Content Management System (CMS) - A CMS allows the system administrators to manage and update the system's content, such as product descriptions, prices, and images. It typically includes a graphical user interface that makes it easy for non-technical users to update the system.

4.1.2 Data Flow Diagrams (DFDs)

DFDs were used to represent the flow of data within the system. They were used to understand how data is processed and stored, and to identify any data that might be redundant or unnecessary.

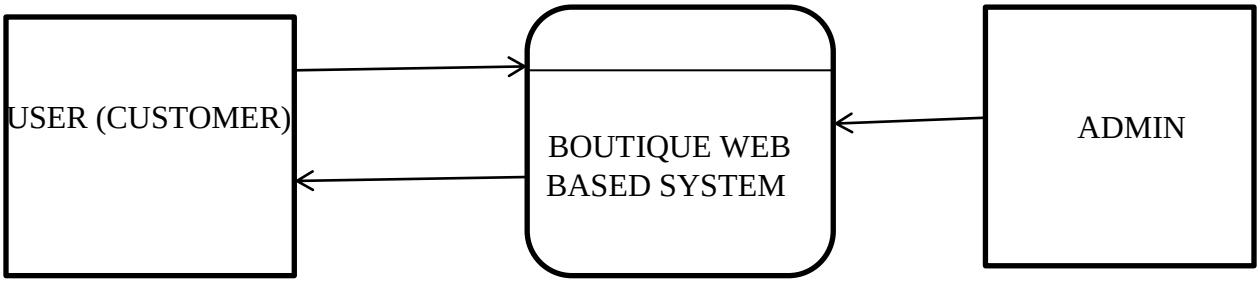
Figure 5: Data flow diagram Level 1 Admin



4.1.3 Context Diagrams

The context diagram was used to provide a high-level view that showed the entire system as a single process with its relationship to external entities. The context diagram provided an overview of the system's boundaries and the interactions between the system and external entities, such as users and the android systems.

Figure 6: Context Diagram



The context diagram was useful in the early stages of this system development as it helped to identify the scope of the system, its interfaces with external entities, and the high-level data flows between them. It provided a high-level overview of the system that was easily understood by stakeholders who didn't have technical knowledge.

4.1.4 Level 0 DFD

A Level 0 Data Flow Diagram was used for visual representation of the Boutique web based system at the highest level of abstraction. It provided an overview of the system and showed the major processes and data flows within the system.

The Level 0 DFD included the following:

- External Entities: User(Customer)
- Processes: User Registration and Login, User Budget, Reviews, Blogs
- Data Stores: User Profile and Login Information, User Profile, Product details, Shopping List etc.
- Data Flow: The flow of data between the main processes and external entities in the system.

4.1.5 External Entities

The identified entities of the system were any client/customer within Nairobi and its environments who would like to purchase clothing online.

4.1.6 Processes

The processes involved in the web based system were;

- User Registration: Any user who wants to order items must register and their data captured and stored in the database.
- User authentication: The process verified the identity of the user and granted access to the system and data
- Inventory management: The system should have the ability to manage inventory levels, keep track of products, and provide alerts when inventory levels are low.
- Order processing: The system should allow customers to place orders online and manage the processing of those orders, including the ability to accept payments, generate invoices, and provide order status updates.
- Customer management: The system should provide a centralized location for managing customer information, including contact details, order history, and preferences.
- Sales reporting: The system should provide sales reports that show sales by product, category, and customer, as well as inventory reports that show stock levels and product movement.
- Marketing and promotion: The system should have the ability to promote products and services, track customer engagement, and offer promotional discounts and incentives.
- Security and privacy: The system should have strong security measures in place to protect customer information and prevent unauthorized access.

4.1.7 Data stores

MySQL lite data store was used in the development of the web based system and the identified data stores were;

- Product data store: This database stores information about the boutique's products, including product name, description, price, size, color, and inventory levels.

- Customer data store: This database stores information about the boutique's customers, including customer name, contact information, order history, and preferences.
- Order data store: This database stores information about the boutique's orders, including order number, customer information, products ordered, order status, and payment information.
- Inventory data store: This database stores information about the boutique's inventory, including product quantity, location, and stock levels.
- Employee data store: This database stores information about the boutique's employees, including employee name, contact information, schedule, and performance metrics.
- Marketing data store: This database stores information about the boutique's marketing efforts, including customer engagement metrics, promotional campaigns, and sales reports.

4.1.8Data Flows

The dataflow for a boutique web-based system typically involves the movement of data between different components of the system. Here's an overview of the typical dataflow for a boutique web-based system:

- User input: The dataflow starts when a user interacts with the system by entering data into the system, such as placing an order, updating their customer information, or browsing the product catalog.
- Front-end processing: The user input is processed by the front-end components of the system, which include the user interface and client-side scripts. The front-end components may perform validation and formatting of the data before sending it to the back-end components.
- Back-end processing: The data is then sent to the back-end components of the system, which include the server-side scripts and databases. The back-end components may perform additional validation and processing of the data, such as updating the inventory levels or generating an invoice.
- Data storage: The processed data is stored in the appropriate data stores, such as the order database, inventory database, or customer database.

- Data retrieval: When a user requests information from the system, such as viewing their order history or browsing the product catalog, the system retrieves the relevant data from the appropriate data stores.
- Output: The retrieved data is then formatted and presented to the user through the user interface, completing the dataflow cycle.

4.2 System requirements

4.2.1 Functional requirements

The functional requirements described what the web based system was supposed to do, in terms of the actions it had to perform or the behaviors it had to exhibit in response to particular inputs from users. These requirements were defined in terms of specific features, functions, and capabilities that the android system had to possess in order to meet the needs of its users.

The functional requirements included were;

- User Registration: Any user who wants to order items must register and their data captured and stored in the database.
- User authentication: The process verified the identity of the user and granted access to the system and data
- Inventory management: The system should have the ability to manage inventory levels, keep track of products, and provide alerts when inventory levels are low.
- Order processing: The system allows customers to place orders online and manage the processing of those orders, including the ability to accept payments, generate invoices, and provide order status updates.
- Customer management: The system provides a centralized location for managing customer information, including contact details, order history, and preferences.
- Sales reporting: The system provides sales reports that show sales by product, category, and customer, as well as inventory reports that show stock levels and product movement.
- Accessibility: The system should be designed with accessibility in mind, ensuring that it can be used by people with disabilities.

4.2.2 Non-functional requirements

The non-functional requirements specified the criteria that the Boutique web based system had to meet in terms of its operation. In the system, the non-functional requirements included were:

- Performance: The system was responsive and efficient, with fast page load times and minimal latency, ensuring a smooth and enjoyable user experience.
- Scalability: The system was able to handle increasing volumes of users, data, and transactions without a significant drop in performance or availability.
- Reliability: The system was reliable and available at all times, with minimal downtime and fast recovery times in case of failures or disruptions.
- Security: The system had robust security features in place, including user authentication and authorization, data encryption, and protection against cyber-attacks and data breaches.
- Usability: The system was easy to use, with an intuitive user interface, clear navigation, and consistent user experience across different devices and platforms.
- Compatibility: The system was compatible with different devices, operating systems, and web browsers, ensuring that it can be accessed by users regardless of their device or location.
- Maintainability: The system was easy to maintain and update, with clear documentation, modular design, and easy-to-use administrative tools.

4.2.3 Hardware Requirements

The hardware requirements were:

- Processor: At least a quad-core processor was recommended, although a dual-core processor could be sufficient for the web based system.
- RAM: At least 1GB of RAM was recommended, although the web based system was able to run on devices with as little as 512MB of RAM.
- Display: The Boutique web based system was designed to work well on a variety of screen sizes and resolutions. It was easy to read and interact with on both small and large android devices.

- Web Server: A dedicated web server may be required to host the web-based system. The server should have enough processing power and memory to handle incoming requests from users and perform database operations.
- Database Server: A separate database server may be required to store and manage the data used by the web-based system. The server should have enough storage space and processing power to handle large amounts of data and perform data retrieval and modification operations.
- Network Infrastructure: The web server and database server should be connected through a secure and reliable network infrastructure, such as a LAN or WAN. The network infrastructure should have enough bandwidth to handle incoming and outgoing traffic from the servers.
- Load Balancer: A load balancer may be required to distribute incoming traffic between multiple web servers, ensuring that no single server is overloaded.

CHAPTER FIVE

5.0 SYSTEM DESIGN

Detailed design of the proposed system

This entails the description of the design environment and system components

Introduction

The system design defined the architecture, components, modules, interfaces, and data for the Web based system to satisfy specified requirements. It involved translating the system requirements into a detailed design that defined how the system was built and implemented. The system design phase aimed at creating a high-level conceptual view of the system and defined its components, data flow, architecture, and interfaces. This phase was critical as it set the stage for the implementation phase, where the system was actually built and tested. The goal of system design was to ensure that the system would meet the requirements and would be reliable, efficient, and scalable.

5.1 Architectural design

Architectural design defined the system architecture, which included identifying the components, modules, interfaces, and data for the web-based system. It involved making high-level design decisions and choosing the appropriate design patterns, technologies, and frameworks that were used in the development process. The architectural design phase was critical as it set the foundation for the rest of the system design and development process. It provided a blueprint for the system that the development team followed and helped ensure that the system was scalable, maintainable, and would met the functional and non-functional requirements.

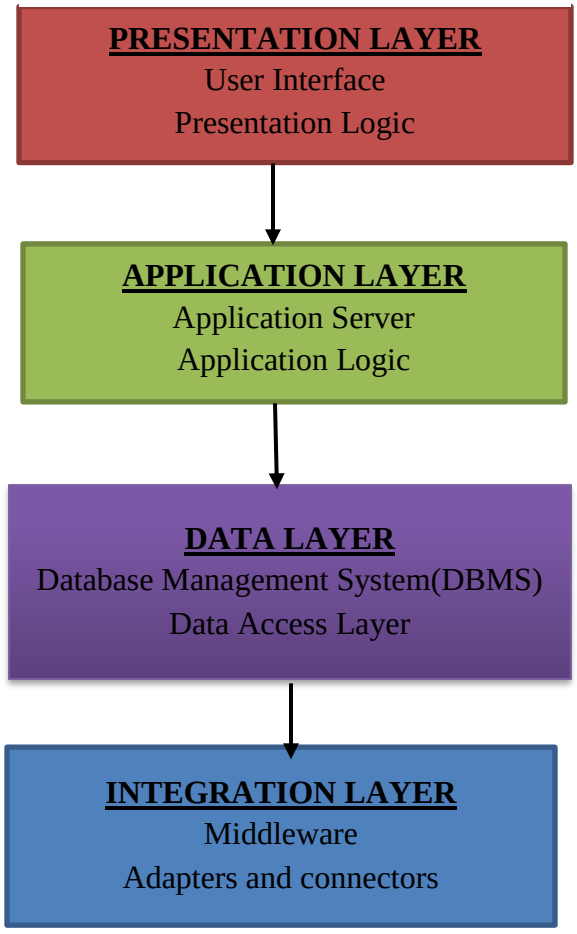
Here are the main components of the web-based system architectural design in terms of layers;

- Presentation layer - This layer deals with the user interface and the way information is presented to the user. The main components of this layer would include the user interface, which includes the web page layout, navigation menus, and forms, as well as the presentation logic that determines how data is displayed to the user.
- Application layer - This layer is responsible for managing the application's business logic and data processing. The main components of this layer would include the application

server, which handles user requests and data processing, as well as the application logic, which implements the business rules and logic of the system.

- Data layer - This layer is responsible for managing the system's data storage and retrieval. The main components of this layer would include the database management system (DBMS), which manages the storage and retrieval of data, as well as the data access layer, which provides an interface between the application layer and the DBMS.
- Integration layer - This layer is responsible for integrating the system with external systems and services. The main components of this layer would include middleware, which provides communication between different systems, as well as adapters and connectors, which allow the system to interact with external services and systems.

Figure 7



5.2 Database Design

Introduction

This outlines the database design for the boutique web based system. The purpose of the database is to efficiently manage the various entities involved in the business process, including customers, products and orders.

Entities and Relationships

The main entities in the database are as follows:

Customers: This entity includes information about customers, such as their name, email address, phone number, and billing and shipping addresses.

Products: This entity includes information about products, such as their name, description, price, and stock level.

Orders: This entity includes information about orders, such as the order ID, order date, and total cost.

The relationships between the entities are as follows:

- Customers place orders
- Orders include one or more products
- Orders are managed by admins
- Products are supplied by suppliers

Database Design

To efficiently manage the entities and their relationships, the database has been designed with the following tables:

- Customer: This table includes columns for customer ID, name, email address, phone number, billing address, and shipping address. The customer ID column is the primary key for this table.

- Product: This table includes columns for product ID, name, description, price, and stock level. The product ID column is the primary key for this table.
- Order: This table includes columns for order ID, order date, customer ID, and total cost. The order ID column is the primary key for this table, and the customer ID column is a foreign key that links to the customer table.
- Supplier: This table includes columns for supplier ID, name, email address, and phone number. The supplier ID column is the primary key for this table.

Constraints and Indexes

To ensure data consistency and integrity, the following constraints have been defined:

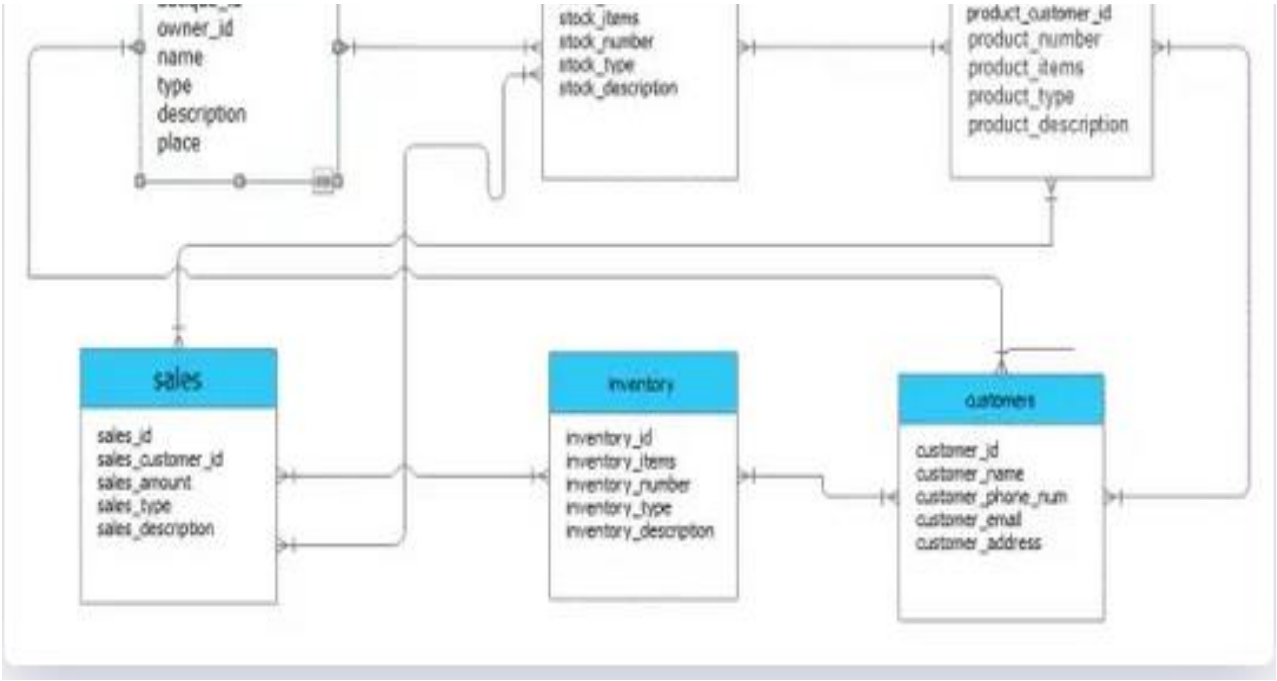
- Orders cannot be placed for products that are out of stock
- Customers must provide a valid email address
- Employees must have a unique email address
- Suppliers must have a unique email address

To improve search performance, the following indexes have been created:

- An index on the product ID column in the product table
- An index on the customer ID column in the order table

Database Design table

Figure 8



5.3 User interface design

The user interface should have a cohesive design, using consistent branding and colors throughout the system. The design should also prioritize ease of use, with clear navigation and intuitive functionality. Finally, it's important to test the user interface with real users to ensure that it meets their needs and is easy to use.

- Homepage: The homepage should be visually appealing, with high-quality images showcasing the boutique's products. It should also provide clear navigation to other pages within the system. A search bar can be included to help users quickly find specific products.
- Product pages: Each product page should have a clear and attractive image of the product, along with a detailed description and pricing information. Users should be able to select different sizes, colors, and other product options. A "buy now" button can be prominently displayed on the page to encourage users to make a purchase.

- Shopping cart: The shopping cart should display the products that the user has added to their cart, along with pricing information and an option to remove items. Users should be able to easily proceed to checkout from this page.
- Checkout: The checkout page should be simple and easy to use, with clear instructions for users to enter their shipping and payment information. Users should be able to review their order before submitting it.
- Account management: Users should be able to create an account to store their shipping and payment information for future purchases. They should also be able to view their order history and track the status of current orders.
- Contact and support: The system should provide a clear way for users to contact the boutique with questions or concerns. A help center or FAQ page can also be included to provide answers to common questions.

CHAPTER 6

IMPLEMENTATION AND TESTING

6.1 Development environment

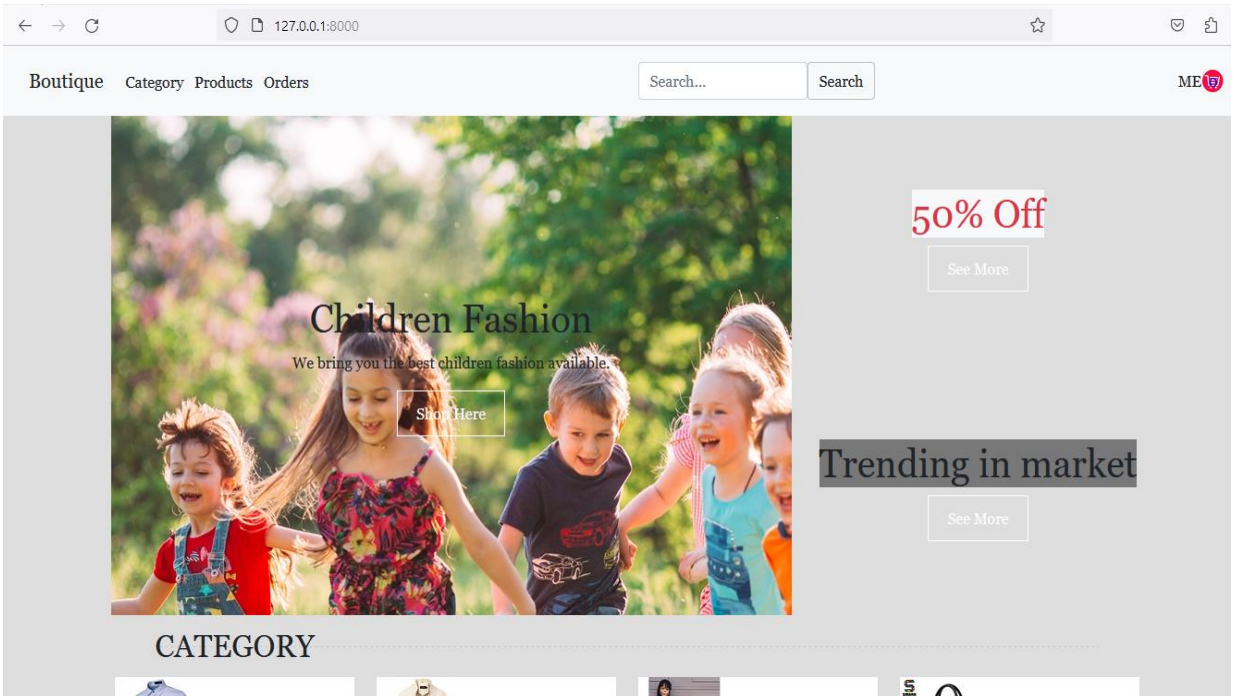
The system was developed as a website consisting of the front-end part and the backend consisting of a database for storing Boutique related data. Its integration is as below.

6.2 System components

The system was developed as a website but integrated to include a database for storing of required data in the system. System components are the individual parts or elements that make up a larger system. They are the building blocks that work together to create a functioning system

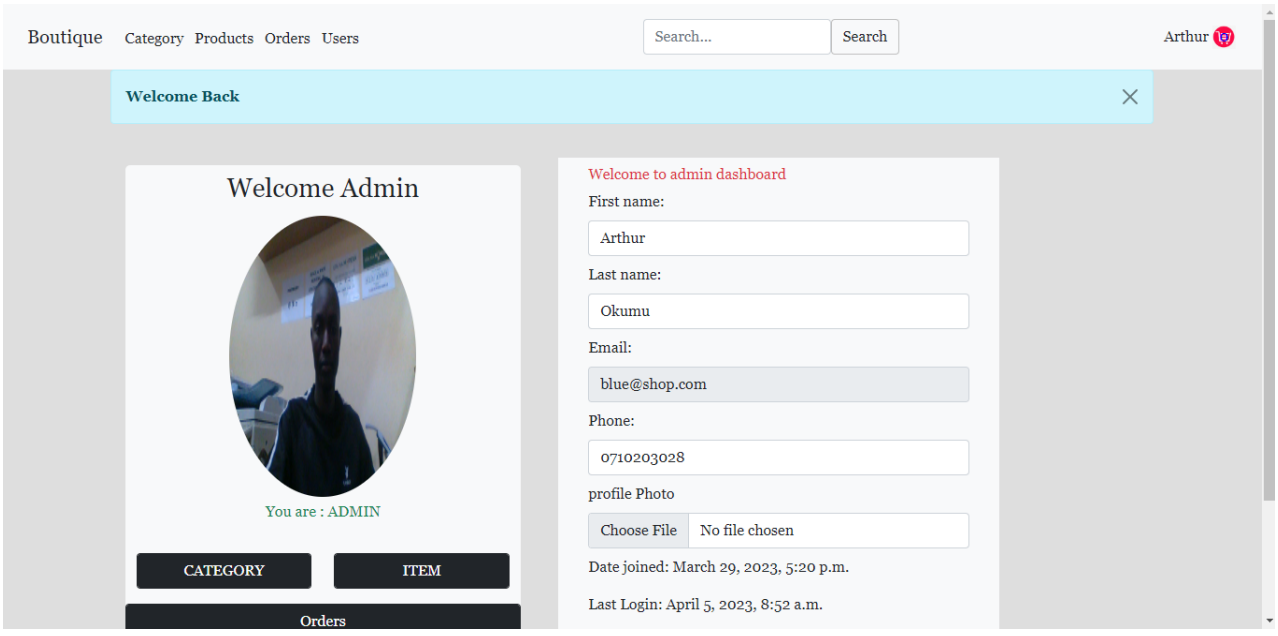
- Front-end: The front-end component of a boutique web-based system is responsible for providing a user interface that customers can interact with. This typically includes the website design, layout, and functionality, such as product catalogs, shopping carts, and checkout processes.

Figure 9: User interface dashboard



- Back-end: The back-end component of a boutique web-based system is responsible for handling the server-side functionality of the system, such as processing orders, managing product catalogs, and storing customer data. This component typically includes a web server, application server, and database management system.

Figure 10: Admin dashboard



- User authentication: User authentication is an essential component of any web-based system that allows users to create accounts, log in, and manage their profiles. This component typically includes features such as password hashing, account recovery, and session management.

Figure 11: Sign up dashboard

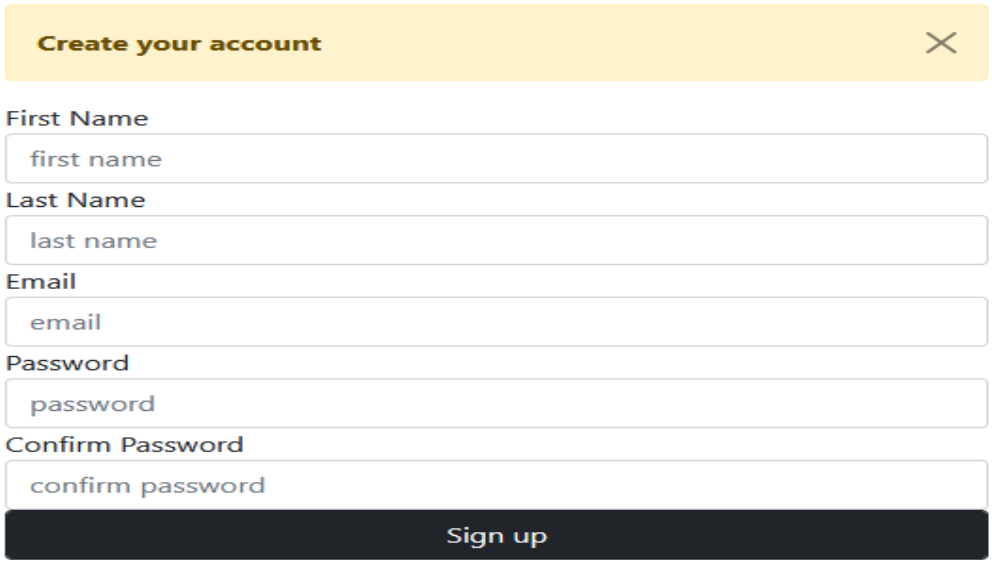
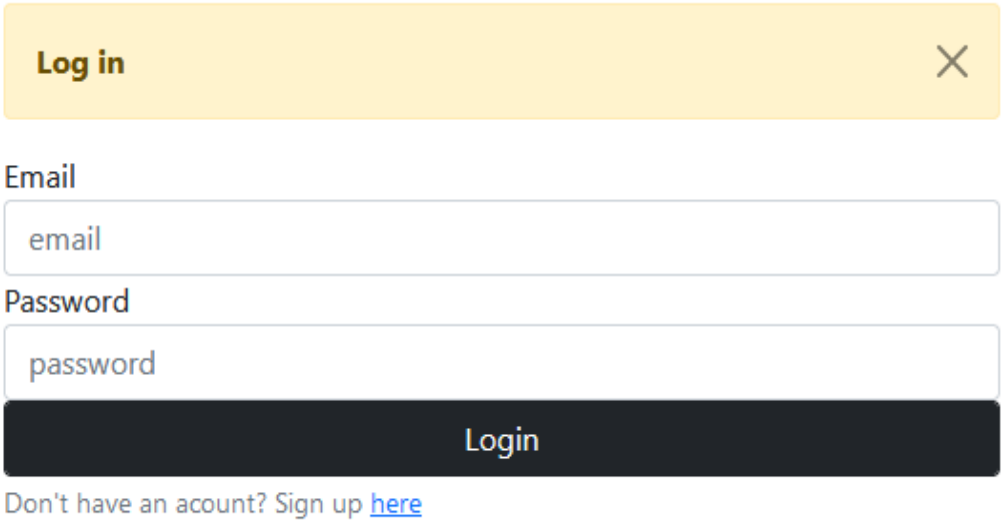
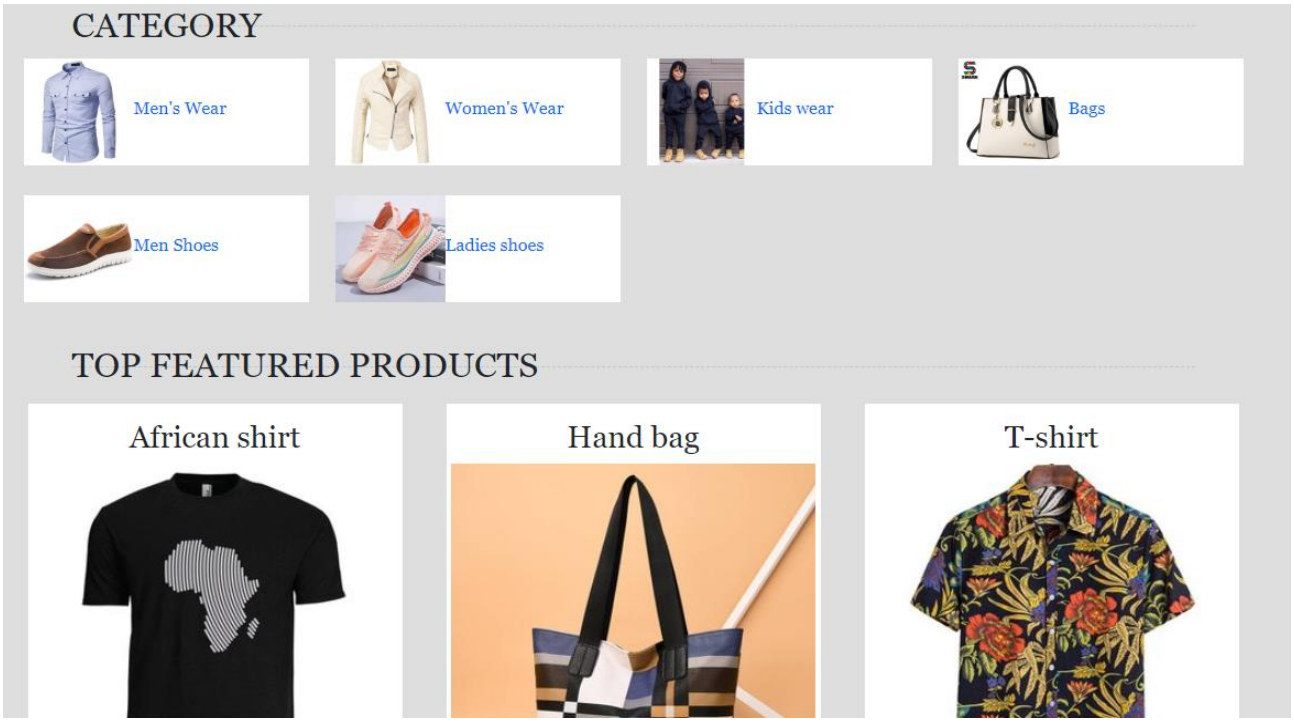


Figure 12: Login dashboard



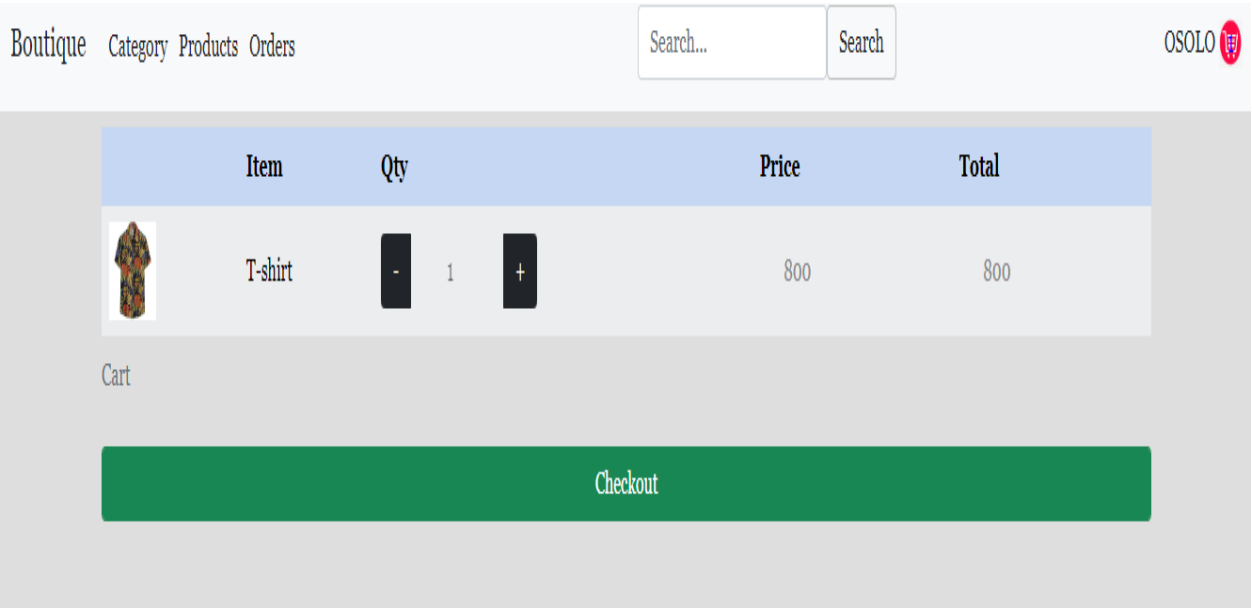
- Product catalogs: A boutique web-based system typically includes a product catalog that displays the products available for purchase. This component might include features such as product images, descriptions, reviews, and ratings.

Figure 13:Product catalogue



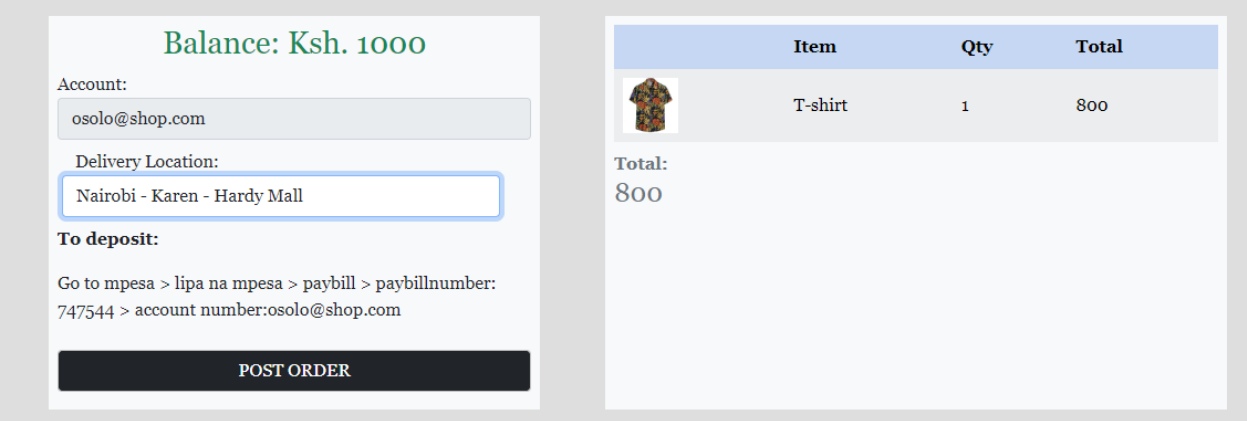
- Shopping carts: The shopping cart component of a boutique web-based system allows customers to add items to their cart and manage their purchases. This component might include features such as the ability to modify quantities, apply discount codes, and view the total cost of their order.

Figure 14: Shopping cart



- Payment processing: The payment processing component of a boutique web-based system allows customers to pay for their purchases using a secure payment of M-pesa Paybill.
- Shipping and order fulfillment: The shipping and order fulfillment component of a boutique web-based system is responsible for managing the logistics of delivering products

Figure 15: Shopping and order fulfilment dashboard



to customers. This component might include features such as real-time shipping rates, order tracking, and returns management.

6.3 Test Plan (test data, test cases, and test results)

System testing involved in-house testing of the entire system before delivery to the user. Its aim was to satisfy the user the system meets all requirements of the client's specifications.

6.3.1 Validation

The system was tested and implemented successfully and thus ensured that all the requirements as listed in the software requirements specification were completely fulfilled. In case of erroneous input corresponding error messages were displayed, system could validate the problem and correct it successfully.

6.4 System Testing

System Testing was done on individual modules as they were completed and become executable. It was confined only to the designer's requirements. Each module was to be tested using the following two Strategies:

i. Black Box Testing

In this strategy some test cases were generated as input conditions that fully executed all functional requirements for the program. This testing helped users to find errors in the following categories:

- Incorrect or missing functions
- Interface errors
- Errors in data structure or external database access
- Performance errors
- Initialization and termination errors.

In this testing only the output was checked for correctness.

The logical flow of the data was not checked.

ii. White Box testing

In this the test cases were generated on the logic of each module by drawing flow graphs of that module and logical decisions are tested on all the cases. It was used to generate the test cases in the following cases:

- Guarantee that all independent paths have been executed.
- Execute all logical decisions on their true and false Sides.
- Execute all loops at their boundaries and within their operational bounds.
- Execute internal data structures to ensure their validity.

CHAPTER SEVEN

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Technical Lessons and Achievements

The purpose of this project was to develop a web-based system for a boutique that would allow customers to browse and purchase clothing and accessories online. The system was designed to be user-friendly and provide a seamless shopping experience for customers, while also providing the boutique with a new revenue stream.

7.1.1 Technology Stack

The system was built using the following technology stack:

- Python as the primary programming language
- Django web framework for building the backend
- MySQL lite database for storing data
- HTML, CSS, and JavaScript for building the frontend

7.1.2 System Architecture

The system was designed with a three-tier architecture:

- Presentation layer: This layer included the frontend code that customers interacted with when browsing and purchasing products.
- Application layer: This layer included the Django web framework, which processed customer requests and communicated with the database to retrieve and store data.
- Data layer: This layer included the MySQL lite database, which stored all of the boutique's product and customer data.

7.1.3 Best Practices

The following best practices were used throughout the development process:

- Code reviews were conducted to ensure that all code adhered to the established coding standards.

- Automated tests were created to ensure that the system was functioning correctly and to catch any bugs before they made it into production.
- Continuous integration and deployment (CI/CD) pipelines were set up to streamline the development and deployment process.

7.1.4 Performance Optimization

The following performance optimization techniques were used in the development of the system:

- Caching was implemented to reduce the number of database queries and improve response times.
- Load balancing was used to distribute incoming traffic across multiple servers to improve scalability and availability.
- The database was optimized by creating indexes on frequently queried columns.

7.1.5 User Experience

The user interface was designed to be visually appealing and easy to navigate, with clear calls-to-action and prominent product images. The checkout process was streamlined to minimize friction and reduce cart abandonment rates.

7.1.6 Security

The following security measures were implemented in the system:

- Passwords were stored securely using crypt encryption.
- User authentication and authorization were implemented to ensure that only authorized users could access certain parts of the system.
- All customer data was encrypted in transit and at rest.
- Protection against common security vulnerabilities, such as SQL injection and cross-site scripting (XSS), was implemented.

7.2 Conclusions

The development of the boutique web-based system was a success, with the system providing a seamless shopping experience for customers and generating a new revenue stream for the boutique. The project utilized best practices and performance optimization techniques to create a secure and scalable system that can be used as a template for future projects.

7.3 Recommendations

From the development of the current system to its success, here are some of the recommendations I would like to give;

- Expand the product line: The boutique web-based system currently only allows customers to purchase clothing and accessories. Consider expanding the product line to include additional items, such as home decor or beauty products, to attract a wider customer base.
- Implement user feedback: Gather feedback from customers on their experience using the system, and use this feedback to make improvements. Consider implementing features such as customer reviews, a suggestion box, or a customer service Chabot to improve customer satisfaction.
- Expand payment options: Currently, the system only supports payments through M-PESA PAYBILL options. Consider adding support for additional payment options, such as PayPal or Apple Pay, to provide customers with more flexibility.

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APPENDICES

APPENDIX A

Proposed schedule of work

Table 3: Schedule of work

Phase	No of days	Deliverable
Requirement Gathering	7	System Requirement Gathering
Analysis	10	System Requirement Study
Design	20	Design document
Coding	60	Implementation of system
Testing	60	Testing Document
Documentation	90	Testing Document
Report Presentation	1	Presentation To panel
Closing Project	1	Review Report

Gantt chart the work schedule

Table 4: Gantt chart for work schedule

Items of Work/Activities					**Months**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Conceptualization and Scoping of Project Title	■								
Proposal writing and submission to DCeL		■	■						
System Development				■	■				
Project Report writing				■	■	■	■		
Project Presentation and Submission								■	
Corrections and final submission									■

APPENDIX B: DATA COLLECTION METHODS

OBSERVATION

Observe the behavior of customers, staff, and other stakeholders in the boutique environment to gather data on their interactions, preferences, and needs. The following observations were made;

- The flow of customers through the store, including areas where they tend to linger or avoid
- The behavior of staff, including their interactions with customers and their use of technology or other tools
- The layout and organization of products, including which items are most popular and which are rarely purchased

The overall ambiance and atmosphere of the boutique, including lighting, music, and decor

INTERVIEWS

Conduct structured or semi-structured interviews with customers, staff, and other stakeholders to collect data on their experiences, opinions, and expectations regarding the boutique. The following questions was asked:

- **For customers:**

  What brought you to the boutique today?

  How did you hear about us?

  What do you think of our selection and prices?

  How would you rate the service you received? What suggestions do you have for improvement?

- For staff:

  What are your responsibilities at the boutique?

  How do you interact with customers?

  What do you think are the strengths and weaknesses of the boutique?

  How would you improve the boutique if you had the chance?

For stakeholders:

What is your relationship with the boutique?

What are your expectations for the boutique?

What do you think are the challenges and opportunities for the boutique?

SURVEYS

Design and administer surveys to customers, staff, and other stakeholders to gather data on their demographics, preferences, satisfaction levels, and other relevant factors. The following surveys was be used:

For customers

A satisfaction survey that asks about their experience at the boutique, their likelihood to recommend the boutique to others, and their demographic information (age, gender, income, etc.)

For staff

A survey that asks about their job satisfaction, their opinion of the management and the work environment, and their suggestions for improvement

For stakeholders:

A survey that asks about their perception of the boutique's role in the community, its reputation, and its potential for growth and development.

APPENDIX C: PROPOSED BUDGET

Table 5: Proposed budget

S. No.	Items	Specifications	Quantity	@ Ksh	Amount, Ksh
1.	Printing paper	A4, high quality	1 ream	700	7,000
2.	Printer tonners		1	6,000	6,000
3.	Writing pad	A4, high quality	5	100	500
5.	Equipment				5,000
6.	Subsistence		15 days	1,500	5,000
	Total				**29,500**

THANK YOU!!