BELGUT DAIRY MANAGEMENT INFORMATION SYSTEM

PRESENTED BY BOAZ

IMMACULATE

INDEX NO:

INSTITUTION: NAIROBI NATIONAL POLYTECNIC

A TRADE PROJECT SUBMITTED TO KENYA NATIONAL EXAMINATION COUNCIL IN THE PARTIAL FULLFILMENT OF THE AWARD OF DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

EXAMINATION SERIES: JULY 2025

ACKNOWLEDGEMENT

I thank God for granting me the grace, strength, knowledge and persistence to undertake this project and see it to completion. I also want to thank my supervisor Mr. Felix for guiding me and supporting me from the start till the end in the development of the system. I would like to thank my parents for providing for me the financial support and also my friends for the help in creating the system.

DECLARATION

I declare that this project is my original work and has not been presented to any examinationbody before, for the award of diploma or degree.

NAME: BOAZ IMMACULATE SIGNATURE

....

DATE ....

Supervisor

This research project has been submitted to the Kenya national examinations council with myapproval as the supervisor.

SUPERVISOR'S NAME: MR.FELIX SIGNATURE

....

DATE

ABSTRACT

The Belgut dairy information management system is designed to streamline operations within dairy farming,enghancing effeciency and productivity.The sysytem aims to facilitatethe collection,storage,and analysis of data related to dairy cattle management ,production metrics and financial operations.By integrating modern technology with traditional daily practices,BDMIS enables farmers to monitor herd,healthg,optimize milknproduction,and ,manage resource effectively.

the key features of the sysytem iclude user friendly interface for data entry,real-time analyticcs for perfomance trackingand reporting tools that assist in decesion ,making The BDIMS also incoporates mobile accessibility,allowing farmers toaccess critical information on-the-go.By implementing this comprehensive information management system,Belgut dairy can improve operational effeciency ,reduce costs,and ultimately enhance profitability,contributing to the sustainability of the dairy industry.

In general the Begut Dairy Systemstand as a privtol solution in modernizing dairy farming practices ensuring that farmers are equipped with the neccesarybtools to thrive in a competitive market.

TABLE OF CONTENTS

List of Tables

CHAPTER 1

- **INTRODUCTION**

The dairy industry plays a crucial ro;ein the agricultural landscape of belgut,contributing significantly to the local economy and food security.However,traditional dairy farming pracices oftenly faces challenges such as inefficient record keeping limited acces to real-time data,and difficultiesin herd management.This issues can hinder farmers ability to make informed decesions,optimize production and enhance profitability.

The belgutdairy management information system is designed ti address these challenges by entegrating modern tecnnology into dairy farming operations.This systemoffers a comprehensive solution for managing various aspects of dairy production,including herdhealth monitoring,milk production tracking,and financial management.By centralizing data and providing user-friendly interface,BDMIS empowers farmers to streamline their operations and improve effeciency.

Key functions of BDMIS include the management of individual animal records,milk sale tracking,and detailed reporting tools. These features enable dairy farmers to monitor the perfomance of metrics ,identify trends and amke data-driven decesions that enhaces productivity.Furthermore,the system's mobile accessibility allows farmers to access vital information anytime and anywhere,ensuring they remain informed and responsive to their operations.

The Belgut Dairy Management Information System represents a pivotal advancement in dairy farming practices,equipping farmers with the necessary tools to thrive in an increasingly competitive market.By adopting such a system,the dairy sector in belgut can improve its operational effeciency,reduce costs,and contribute to the sustainability of the industry.

- **Background**

The Dairy industry in belgut,a region known for its rich agricultural heritage ,is a vital component of the local economy.Dairy farming has been practiced for generations,providing livelihoods for many families amd contributing significantly to food supply.However thesector faces several challenges,including outdated record-keeping practices,inefficiency in milk production,and difficulties in managing herd health amd financial operations.

Historically dairy farmers in Belgut relied on manual ,methiods for tracking productions,sales,and animal health.These traditional approaches often resulted in inaccuracies,lost data and a lack of real-time data insight.As the demand for dairy production continues to grow,the need for more effecient and effective management system has become evident.

In response to these challenges,the Belgut Dairy Information Management System wsas developed to modernize dairy farming practices.By integrating technologyninto daily operations,BDMIS aims to enhance data accuracy ,streamline processes and improved decesion-making fort farmerrs.This systemis not only designed to replace manual record-keeping but also to provide tools for comprehensive analysis and reporting.

The development of BDMIS aligns with global trendsin agricultral technology,where data-driven solutions are transforming farming practices.By adopting such systems,farmers can better monitor herd health,optimize milk production and manage resources effectively.The implimentation of BDIMS is expected to foster greater transparency,enhances productivity,and ultimately increased profitability for dairy operations in Belgut.

The Belgut Dairy Information Management System represrnts a signifant step towards modernizing the dairy industry in the region .By leveraging technology,farmers can overcome traditional challenges and positiopn themselves for success in a competitive marketb ensuring the sustsinsbility of dairy farming in Belgyut for future generations.

- **Statement of the problem**

  The Dairy industry in belgut faces significnt challenges that hinder operational effeciency and productivity.Traditional record-keeping methods,primarily manual and paper -based,lead tominnaccuracies and inefficiencies in tracking vital data related to herd management,milk production,and fCustomers will also save the money that they would have spent to travel to stalls. The delivery will be made to their home

and they will just have to wait for their ordered products. Customers will be able to know in advance whether the products they want to buy is in stock or not. There will also be a reduction in the number of member of staff who will have to be employed since everything will now be computerized.

inancial trasaction .Farmers struggle with thelack of real-time access to critical information,makingit difficult to monitor herd health,manage resources effectively,and make informed busines decesions.

Additionally the rising demand for dairy products requires farmers to optimize their operations to remain competitive.However,without centralized sysytem to collect,annalyze and report data,many dairy farmers in Belgut are unable to identify trends,tracks perfomance metrics,or respond promptly to emerging issues in their operations.

- **Proposed Solution**

The system willmake it easier to geenerate records and monitor the milk production.

The system will ensure accountability of invoices and revenues.

The goal of Belgut management system isto provide computerized process that is stress free,reliable and quick through theuse of asp.net computer programming.

- **Objectives**

The following are the objectives of the proposed system:

General Objectives

The system will offer information on market trends and pricing to help farmers make informed decesions

Specific Objects

To provide a platform where the customers can perform them following;
 i.   The system will help in the registration of farmers
 ii. The system willallow the admin to add nr categories and edit
 iii. The system will generate records for farmers
 iv. The system will enable farmers to keep track of revenue

- **Resources**

- **Hardware requirements**

  - A computer with at least 4Gb ram, a hard disk of at least 500GB and a processor of at least 26GHz
  - An 8 GB flash disk

- A printer
- A modem

- **Software requirements**

  - WAMP server(MYSQL)
  - Google chrome OR any other browser
  - Visual studio

- **Functional requirements**

  - Order Placement - The proposed system will allow customers to place orders after creating an online account. Once they have placed their orders, they will have to wait for the administrator to approve their order. A customer can check the status of his/her order by logging in to his/her account and going to the profile page.

  - Milk Production Tracking-The proposed system will allow farmers to keep track of daily milk yield per animal and quality testing metrics,complemented by analytics for generating production trend reports.

  - Effective inventory management-it is neccessary to track feed stock levels and supplies while the sales and distribution module must manage customer records ,order processing,and invoicing.

  - Financial management- This feature should monitor operational cost and and revenues with the capability to generate profit and loss statements.

  - User Report-its vital featuring a help center with FAQS and user guides as well as support ticket system for reporting issues or requesting assistance .Implementing these elements will require carefull consideration of technology stack,datav security measures,and user training to ensure effective management of dairy operations in Belgut

- **Non-Functional requirements**

- Security – Every user of the system will have a unique password and this will ensure that the customers information will be secure
- Reliability – This system will be running throughout the entire day and night therefore the customers will be able to make their orders at any time and the processing of the order will begin immediately.
- Convenience – As long as a user has internet access, he/she can be able to access the system and place an order.
- User friendliness - the system will implement a user-friendly interface to make sure that the customers will not have a hard time while interacting with the system.

- **Budget and budget justification**

Number	Item	Quantity	Specification	Unit cost	Total cost

Table 1: Budget & Specification

- **Schedule**

This table shows the proposed time that will be used to complete each step.

No	Activity	Duration	Proposed start date	Proposed date	end	Actual date	start	Actual date	end	Deliverables
1	Project Identification and feasibility study	14 days	29th Aug 2019	15th Sept 2019		31st Aug 2019		8th Sept 2019		A well framed project Idea
2	Proposal	21 days	31st Aug	3rd Sept 2019		3rd Oct 2019		6th Oct 2019		A documented proposal

3	Proposal presentation	1 day	1st Oct 2019	1st Oct 2019	1st Oct 2019	1st Oct 2019	Presentation ofproposal	th e	proje ct
4	Data Collecti on	14 days	4th Oct 2019	28th Oct 2019	4th Oct 2019	28th Oct 2019	A collecti on requirements	of	users
5	Syste m Analys is	21 days	31th Oct 2019	25th Nov 2019	31st Oct 2019	26th Oct 2020	Analyzed requirements		
6	Syste m Desig n	90 days	30th Nov 2019	1st Mar 2020	30th Mar 2020	8th Aug 2020	Creating DFDs , designingdatabase and user interface		

Table 2: Schedule

- **Justification**

A Dairy management information system in Belgut is maltifaceted,addressing both operational efficiency and business growth.DMIS centralizes critical data,allowing real-time tracking of milk production,animal health and inventory management.This integration enhances decesion-making by providing accurate insights into daily operations,ultimately leading to improved productivity.

The system facilitates better animal management by maintaining comprehensive records of each animal's health,breeding history and milk yield.This proactive approach tolivestock care can significantly reduces disease outbreaks and improve herd perfomance.Furthermore streamlined inventory management ensures that feed and supplies are readily available preventing costly disruption.

Belgut dairy management system enhances financial management by tracking expenses and revenues,enabling farmers to identify profitable practices and areas needing improvement.Automated invoicing and sales tracking simplify financial processes,reducing time spent on administrative tasks.

The DMIS supports scallability,allowing Belgut dairy operations to grow and adapt to changing market conditions.By investing in technology that enhances effeciency,improves animal

welfare,and supports financial transparency,Belgut can position itself for sustainable growth in the competitive dairy industry.

- **Scope**

The Belgut Dairy Management System will enhace dairy farm operations through various key features .It willmanage user accounts for different roles ,trackanimal health details such as breed and health monitor daily milk production and quality.The system will streamline inventory management for feed sndsupplie,and simplifies sales processes by handling customers data and generating invoices.

Financial tools will track income and expenses,offering insights through reports .Users will benefit from dashboard and customizable reports for better decesion-making .The system will ensure regulatory compliance by maintaining necessary health reports and permits.Integration with other sysytems,such as accounting software and mobile apps will facilitate data flow.User support will be provided through resourse and help system .The DMIS aims to improve effeciency and effectiveness in dairy farm management.

CHAPTER 2

- **LITERATUE REVIEW**

- **INTRODUCTION**

Research shows that effective DMIS can lead to better animal health management,optimized milk production,abd improved financial tracking,while also facilitating regulatory compliance and operational trasparency.However ,challenges such as high implementation costs,userresistance,and the need for technical training pose barriers to adoption
The dairy industry is vitgal to the agricultural economy in belgut ,contributing significantly to local livelihoods and food security.As demand for dairy products grows,effecient management system are essential.Dairy Management Information System have become crucial tools for streamlining operations enhancing productivity and improving decesion making in dairy farming.

- **CONCEPTUAL FRAMEWORK**

- **CITATIONS**

A study carried out by Assistant Prof. Manav Rachna - (2006), in the International Institute of Research and Studies, Faridabad, Haryana, India on "UNDERSTANDING E-COMMERCE: A STUDY WITH REFERENCE TO COMPETITIVE ECONOMY, indicates that, Practically e-commerce in India started becoming popular when the internet users and smart phone sales was gaining prominence. But over the years there is no doubt the e-commerce has become popular among roughly 30% of the population living in the cities but due to limited scope of

product variety and standardization the sale through e-commerce is not increasing at faster pace. Only limited but branded items are on sale because of the limitations of selection and reassurance to customers that their buying is cost saving with a priory condition that after sale service and product quality is guaranteed by e-commerce. The growth of e-commerce is dependent on factors like the financial literacy, standard of living, nature of habitation,

payment system i.e digital vis-à-vis cash and more importantly on up-scaling of manufacturing enterprises. It appears that daily used products are least common in the e-commerce mode and only the most branded and customized but with standardization are more popular on e-commerce mode.

Vivian Khoo, (2011) in A Comprehensive Review on E-Commerce Research indicates that the e-commerce adoption research, namely diffusion of innovation (DOI) and technology acceptance model (TAM). The five factors of DOI (relative advantages, compatibility, complexity, trial-ability, and observability) imply that the traits of an innovation itself would determine its adoption. On the other hand, technology acceptance model (TAM) views that the extent of technology acceptance is affected by two key determinants, namely perceived usefulness (the extent of belief that application of particular system would enhance ones' job performance) and perceived ease of use (the extent of perceived difficulties and challenges in using a particular system). However, due to the limitation of these two determinants in explaining various external contextual influences, TAM has been extended (such as TAM2, TAM3 and Unified Theory of Acceptance and Use of Technology [UTAUT]) through introduction of additional external variables to further improve its predictive power [5].

Another research done by Abdul Gaffar Khan A.G (2013), indicates that Information Technology has been playing a vital role in the future development of financial sectors and the way of doing business in an emerging economy like Bangladesh. Increased use of smart mobile services and internet as a new distribution channel for business transactions and international trading requires more attention towards e-commerce security for reducing the fraudulent activities. The advancement of Information and Communication technology has brought a lot of changes in all spheres of daily life of human being. E-commerce has a lot of benefits which add value to customer's satisfaction in terms of customer convenience in any

place and enables the company to gain more competitive advantage over the other competitors. This study predicts some challenges in an emerging economy.

- **CRITIQUE OF THE EXISTING SYSTEM**

The system that is currently in use is a manualized system. Stall owners have to employ people to monitor the sales for them. This makes there is no system to generate reports on the sales that have been made.

Some of the drawback of this manual system include the following:

Manual systems often operate in silos, lacking integration with other agricultural or financial systems.

This can hinder comprehensive farm management and data analysis.

Manual data entry and record-keeping can be time-consuming and prone to human error.Tasks that could be automated take longer, leading to delays in decision-making.

- Data Inaccuracy

Handwritten records are susceptible to mistakes, leading to inaccurate data.

Errors in data entry can compromise the integrity of reports and analyses.

- Limited Accessibility

Information stored manually is often not easily accessible, especially in remote areas.

Lack of centralized data storage makes it difficult to retrieve and analyze information quickly.

- Poor Data Management

Tracking historical data is challenging, making it difficult to identify trends over time.

Manual systems often lack the capacity to handle large volumes of data effectively.

- Inadequate Reporting

Generating reports manually is labor-intensive and can result in outdated information.

Users may not have access to real-time data, impacting timely decision-making.

- Scalability Issues

As the dairy operation grows, the manual system may struggle to keep up with increased data volume.

Scaling operations could lead to more errors and inefficiencies.

- Lack of Integration

Training and Skill Dependency.

Dependence on specific individuals for record-keeping can create bottlenecks if those

- **RESEARCH GAPS**

Adopting a new means of service in Kenya can be quite a challenge. This is mostly a challenge especially if it involves the use of internet, specifically in regions that do not have a good internet coverage. Improvement of technology will further improve businesses and even lead to increase in competition.

There is a very large potential for online services. Internet usage keeps on growing. Although this kind of growth comes with a fair share of challenges, the level of preparation to face challenges is what determines.

- **SUMMARY**

At this point, a proper review has been made concerning the previous studies of online Dairy management system by revisiting the existing literature including previous studies and findings made from the studies conducted earlier on. This review of literature combines factors that other studies have done that will influence the customers decision in an online platform.

CHAPTER 3

SYSTEM DEVELOPMENT METHODOLOGY

- **Introduction**

A system development methodology is s technique that clearly outlines the steps, techniques and procedures followed in the development process of the system. This system was developed using agile methodology which minimizes risks by developing short time boxes. It promotes continuous integration of development an testing.

- **Agile Software Development**

Agile Software Development is an approach that is used to design a disciplined software management process which also allows some frequent alteration in the development project. This is a type of software development methodologies which is one conceptual framework for undertaking various software engineering projects.

It is used to minimize risk by developing software in short time boxes which are called iterations that generally last for one week to one month. It encourages flexible responses to change. Agile methodology is a practice that promotes continuous iteration of development and testing throughout the software development lifecycle of the project.

It is one of the simplest and effective processes to turn a vision for a business need into software solutions. Agile is a term used to describe software development approaches that employ continual planning, learning, improvement, team collaboration, evolutionary development, and early delivery. In the Agile model, both development and testing activities are concurrent, unlike the Waterfall model.

Figure 1: Agile Methodology

- **The agile process Flow**

  - Concept - Projects are envisioned and prioritized
  - Inception - Team members are identified, funding is put in place, and initial environments and requirements are discussed

  - Iteration/Construction - The development team works to deliver working software based on iteration requirements and feedback
  - Release - QA (Quality Assurance) testing, internal and external training, documentation development, and final release of the iteration into production
  - Production - Ongoing support of the software
  - Retirement - End-of-life activities, including customer notification and migration.

This view presents the full Agile lifecycle model within the enterprise. In any enterprise there may be projects operating simultaneously, multiple sprints/iterations being logged on different product lines, and a variety of customers, both external and internal, with a range of business needs.

- **Advantages of the Agile Methodology to the Dairy System**

  - This system adapts to flactuating milk prices,regulations,ansd demands.

- Faster delivery value.Agile delivers workind software in short increnents.Quicker returns on investment through raid deployment
- Agile's has allowed close collaboration between developers,farmers,and managers.
- most importantly Agile's methodology has enhanced daily-stand- ups,print backlogs,and burndown charts provide visibility.(BETTER DECESION MAKING AND RISK MANAGEMENT)

Justification of the methodology in relation to the project topic

- **Faster time to market:**Agile's focus on delivering working software in a short cycles enables Belgut Dairy to realize value from the sysytem sooner.This allows quicker implementation of new fearures and improvements ,providing a competitive edge.
- **Enhanced Product Quality :**Agile's emphasis on continious testing and integration helps to identify and resolve issues early inthe development process.This leads to a moye robust and reliable system that meets the high quality standards.
- **Improved Collaboration and Communication:**Agile emphsizes close collaboration between developers,stakeholders, and end users .Thus fosters a shared understanding of the systems's goals and requirements,leading to more effective development and a product that better meets the needs of Belgut Dairy.
- **Adaptability to changing Requirements:** The dairy industry is subject to flactuations in market demand,regulations,and technological advancement.Agile's iterative approach allows for continious feedback and adaptation,ensuring the system remains relevant and effective.

CHAPTER 4

- **SYSTEM ANALYSIS AND DESIGN**

- **INTRODUCTION**

System analysis and design is the systematic process which includes phases such as design analysis deployment and maintenance. In this area it involves designing the database, the user interface and requirement gathering.

- **DATA COLLECTION**

Machine Learning & Predictive Analytics

Analyzes historical and real-time data to:

Predict diseases

Optimize breeding times

Improve milk yields

Forecast feed needs

Mobile Applications

Apps for farmers/cooperatives (e.g FarmCloud):

Record milk production

Monitor animal health

Track breeding cycles

Manage feeding schedules

Get alerts and reminders

Drones and Satellite Imaging
Used in pasture-based systems for:

Monitoring grazing patterns

Assessing pasture health

Tracking herd movement

Fact Finding Technique

These are the specific methods that the analysts use to gather the necessary details that will be needed in the development of the system. It is the process of collection of data and information based on techniques. These techniques contain sampling of existing documents, research, observation, questionnaires, interviews, prototyping and joint requirements planning.

Questionnaires

During the research period of the system, I issued out questionnaires to some of the stakeholders, which I later collected after they had been filled.
Structured forms are sent to many stakeholders to Collects:

- Milk production patterns
- Recordkeeping habits
- Challenges faced (manual logs, delayed payments, etc.)

Good for collecting quantitative and qualitative data from a larger sample.

Purpose: Understand real-world workflows by watching how tasks are done.

Observations

Understand real-world workflows by watching how tasks are done**.**Visit collection centers and farms to observe milk weighing, animal health checks, and how records are written.

Focus Groups

Gather insights and feedback through group discussions.Organize sessions with groups of farmers or cooperative leaders to discuss challenges and expectations from the new system.

Field Visits

Combine observation, informal interviews, and environmental understanding.Visit rural dairy farms to assess infrastructure limitations (network, electricity, phone use) that could impact system design.

- **FEASIBILITY STUDY**

- **Technical Feasibility**

Belgut Dairy System can be able to run on minimal computer requirements; therefore, no other special additional features will be required to be installed. The Dairy system also does not require people who are highly skilled to operate it since it is simple to use. Belgut Dairy Management System can still be upgraded later in future based on its requirements.

- **Economic Feasibility**

Dairy System is economically feasible for implementation due to Machinery needed for the hardware not heavy and hence the installation cost is quite affordable. There is also no special form of training that is needed. The system provides a very friendly interface which the user will not have a har time navigating through.

- **Operational feasibility**

The system can easily be accepted by its users without any issues since there is no special skill set. The system is very flexible since it categorizes market analysis,technical requirements,financial projections.risk assesment.

• **Requirement Specification**

The requirement document was analyzed for better understanding of what is required of the system. The ways of implementing these requirements were analyzed. The database will be updated each time the administrator adds, deletes an item or an order that has been placed.

The administrator is the only one who can view all the user accounts of the system and has the option to delete a user, delete an order, view the items that has been placed as an order each time a user signs up, his/her details will be captured in the users table.

• **Data collection**

This research aims at inducing documentary review of the prime data collection tool prior the design of the proposed system. Specifically, random participants to take part in gathering the essential data to enhance the effective framework of the proposed system.

Advantages of using documentary

- Provides access to difficult subjects
- Research may impose their own meaning when interpreting data
- Low cost in obtaining details

Disadvantages of using documentary review

- Can be time consuming

- Some materials may provide irrelevant details which may be misleading.

• **Data and System Analysis**

4.6.1 Belgut Dairy Management System data analysis

System analysis is the study of sets of interacting entities, including computer system analysis. This field is closely related to requirements analysis or operations research. It can also an "an explicit" formal enquiry carried out to help someone identify a better course of action and make

a better decision than he might otherwise have made. System analysis is a methodology that involves the application of systematic approaches to collect facts about an existing system the aim of improving it from better performance.

4.6.2 Analysis of the existing System

This analysis serves as a pointer on how to embark on building the proposed system that will help the human resource staff to provide optimal ordering management of the uniforms.

Below are some of the problems that are evident in the current system:

- **Data entry errors:**Manual entries increases the likelihood of mistakes leadind to incorrect inventory levels and order details.

- **Limited Data Access:**Information may notbe readly accessibble hindering decesion-making and responsive to customers needs.

- **Poor Inventory Management:**Difficulty in tracking stock levels can result in overstocking or stockouts impacting sales and customer satisfaction.

- **CustomerRelationship Challenges :**Difficulty in maintaining customer records and preferences may lead subpar services and lost sales opportunities.

4.7 Conceptual Design

Conceptual design will be the very 1st phase of design in which drawings were the tools used. The conceptual design phase provided a good description of what the system would do in terms of a set of integrated ideas and concepts about what it would look like and that could be understandable to the users.

4.8 LOGICAL DESIGN

4.8.1   System design Flowchart

A system flowchart is a type of diagram that represents an algorithm or process, showing the processing steps at each stage using various shapes all connected with arrows. Such a diagrammatic representation can give a step by step solution to a given problem. Process operations are represented in boxes, and arrows connecting these boxes to represent the flow control. Flowcharts are used in analyzing, designing, documenting, or managing process or

program in various fields. Different symbols are used in the flowchart to represent input, output, decision, connectors and process.

USER FLOWCHART

START

Landing Page is displayed
(containing all the products)

Customer selects an item by clicking the "add to cart button"

Cart page is displayed and user selects quantity

Have an account?

No → Sign up

yes → Login

Enter Location, contact and payment details

Place Order

Stop

32

ADMIN SYSTEM FLOWCHART

START

↓

Login

↓

approve or delete Orders, Add or delete cars

↓

Print reports

↓

STOP
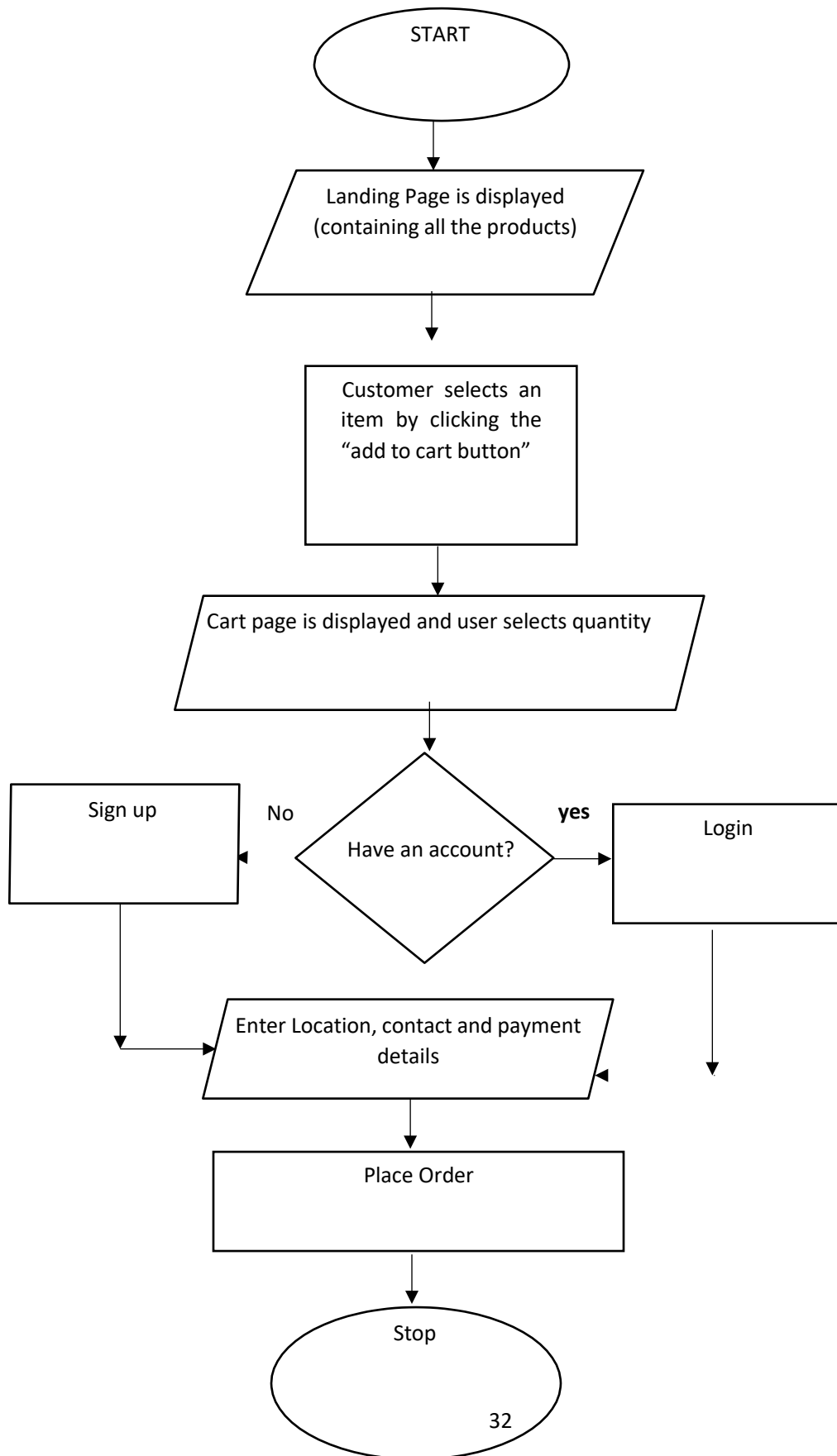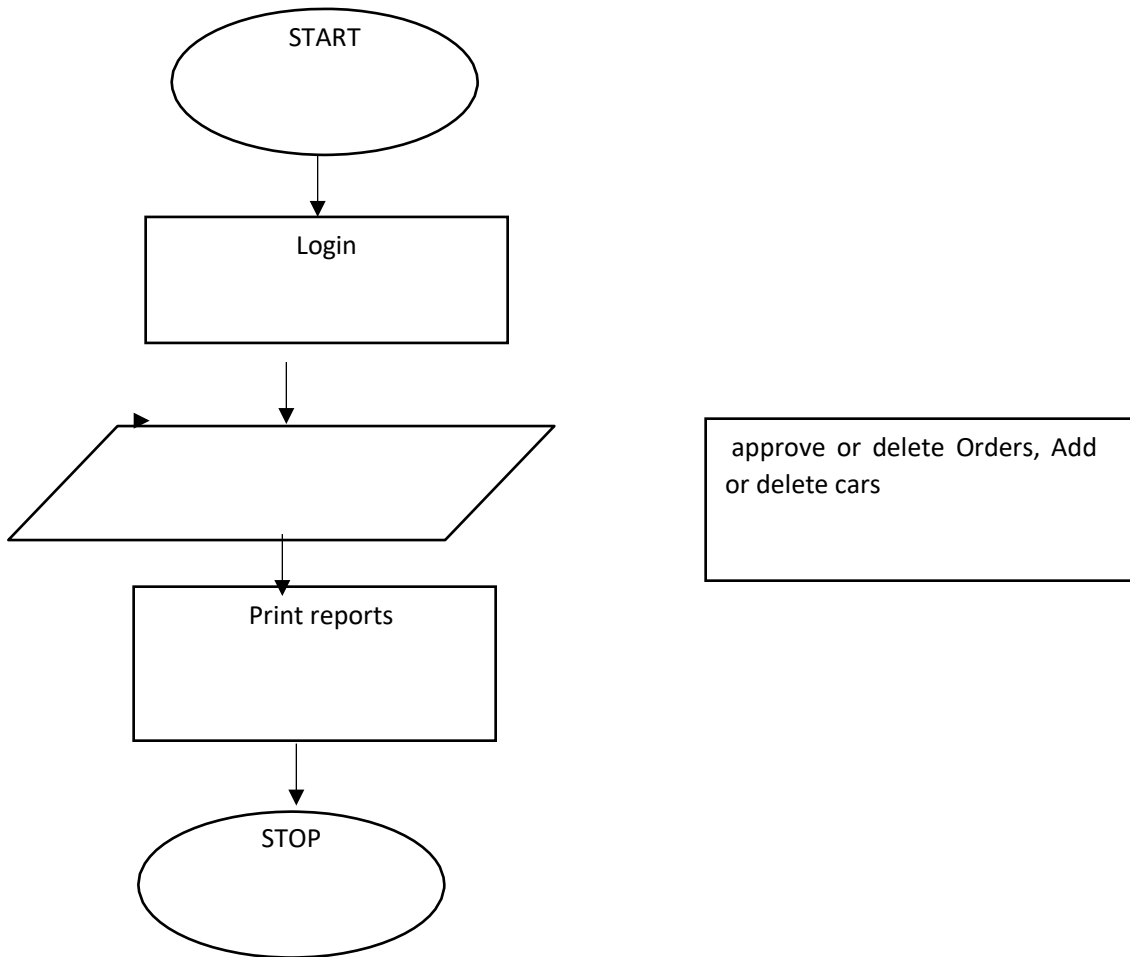
4.8.2 Use case Diagram

This is an interaction between the user and the system. Use case diagrams are used for capturing functional requirements of the system. It's the functionality of the system of the system.

The following is the use case diagram of the system Admin
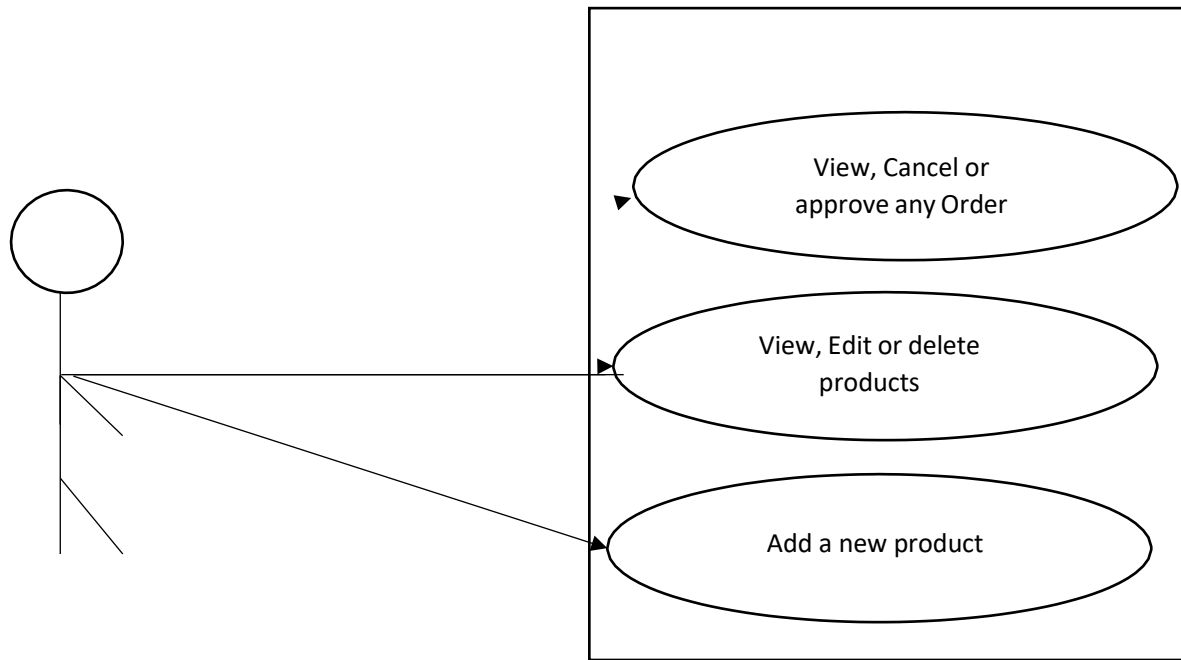
The following is the use case diagram of the User
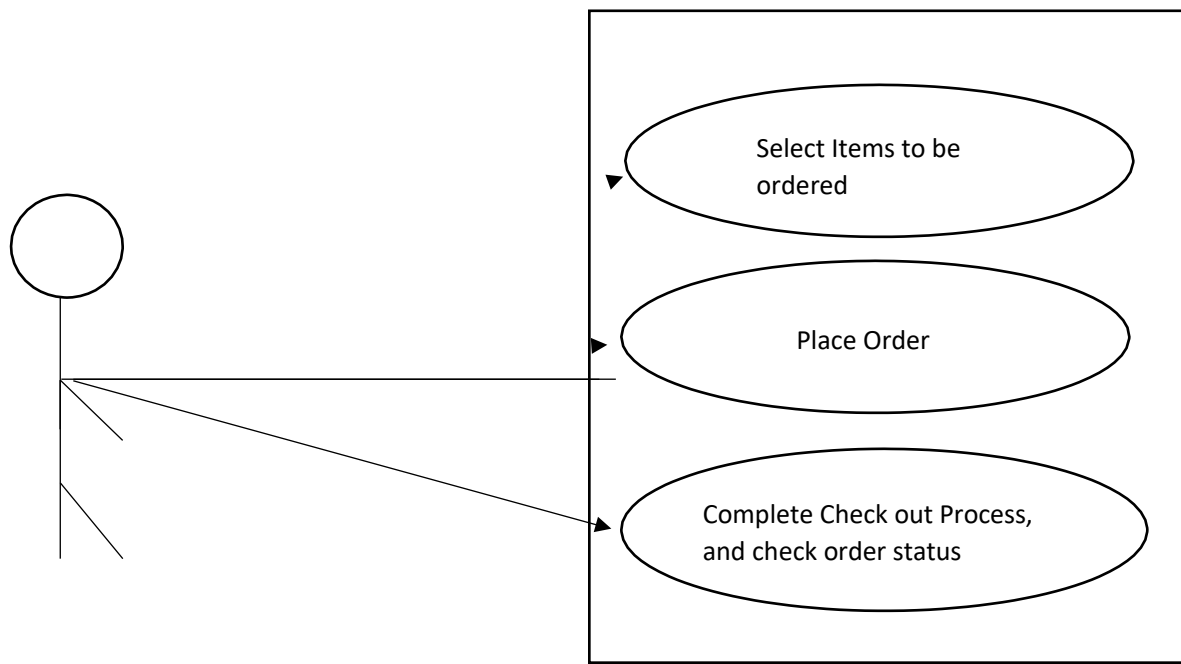
4.8.3   Database Design

A database is a single file which contains a related record, ensuring there is no duplication if data. A good database needs to be common to all users and independent of the programs that use it to generate the desired output. This system uses Mongo database in the design of the database management system. The database used is limited to only the administrator of the system (Management).

This is a shared collection of data that are related or files that meet the immediate need of authorized users. These data may be informing of text, numeric, date or encoded images. Mongo DB organizes its data inform of documents and the following are the models used. The above table serves the responsibility of the administrators that will have access to the system. It stores the administrator details.

4.8.3.1 User Model

Field Name	Type	Description
Name	String	Tore the name of the user
E-mail	String	Store the users email
Password	String	Save users password
Contact	String	Store users phone number

Table 3: Users Table

4.8.3.2 Product model

Field Name	Type	Description
Name	String	Store the product's name
Image	String	Store the product's image
Brand	String	Store the product's brand
Price	Number	Store the product's price
Category	String	Store the product's category

Count in stock	Number	Store the product's stock number
Description	String	Store the product's description
Rating	Number	Store the product's rating
Reviews	Number	Store the product's reviews
Field Name	**Type**	**Description**
User	String	Store the user' name
Order Items	Object	Store the orders that have been made
Shipping	Object	Shipping information
Payment	Object	Save payment information
Items Price	Number	Store the price of item ordered
Total price	Number	Store the total cost of all items
Is paid	Boolean	Record if payment has been made or not
Paid at	Date	Record if payment has been made
Delivered at	Date	Record if the item has been delivered

Table 5: Orders Table

Physical DesignMock up

Table 4: Products Table

Order Model

Home Page Mock Up

This is the mock-up of the home page, of the proposed system

Milk		Login

Product A

(image)

Price

Brand

Category

Product B

(image)

Price

Brand

Category

Product C

(image)

Price

Brand

Category

\
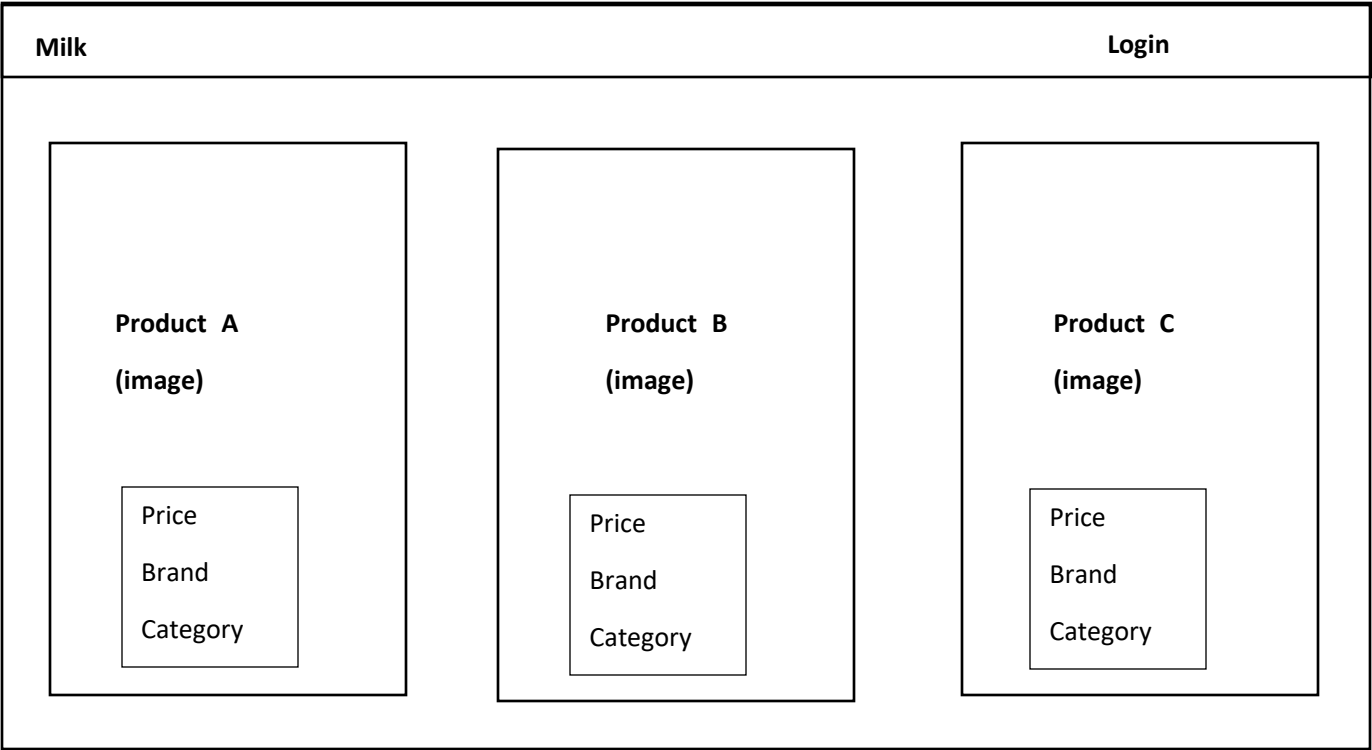
Product Page Mock Up

This is the mock up for the product page of the proposed system

Milk		Login

Product A

(image)

Price

Brand

Category

Add to cart
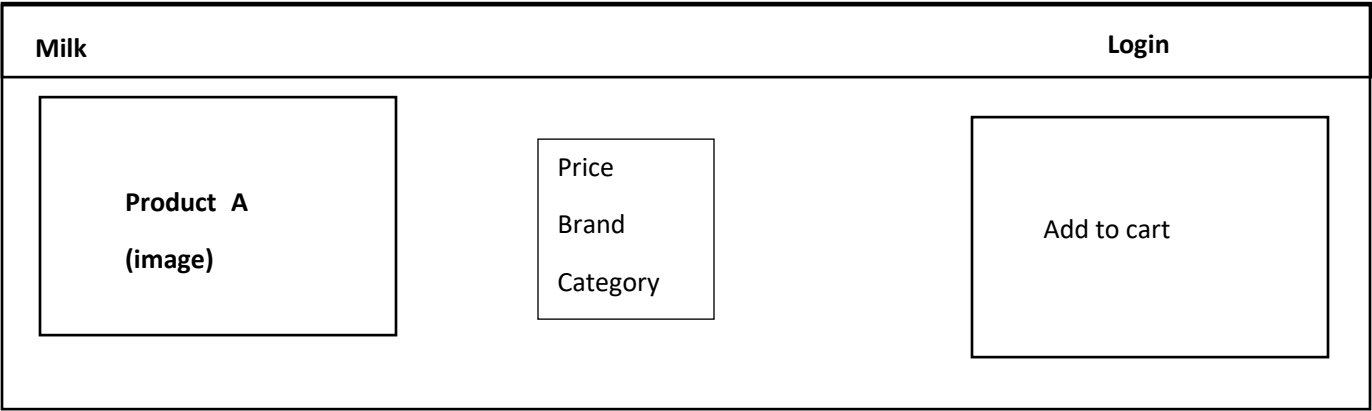
Log in Page Mock Up

This is the mock up of the login form of the proposes system.

Sign in here
email
password
SIGN IN
Is this your first time?
Create a new account here

User sign up form mock up

Name

email

Phone   number

password

Re-enter password

REGISTER

Already have an account?

LOGIN HERE

Products Page Mock up

This is the mock up for the products page of the proposed system. This is the page that will contain a list of all products currently available

Milk				Login
Name	Price	Brand	Category	Qty

CHAPTER 5

5.0 SYSTEM CODE GENERATION AND TESTING, CONCLUSION ND RECOMENDATIONS

5.1 Introduction

This chapter presents the generation of the source code that was used to develop the system. It also entails the screenshots of the actual system. It also includes the testing scope used for the system. This System implements a MySQL database, a SQL type of database. The backend is built with python. The front end is built using a HTML, Css and Javascript.

5.2. System Screenshots
5.2.1 Home page
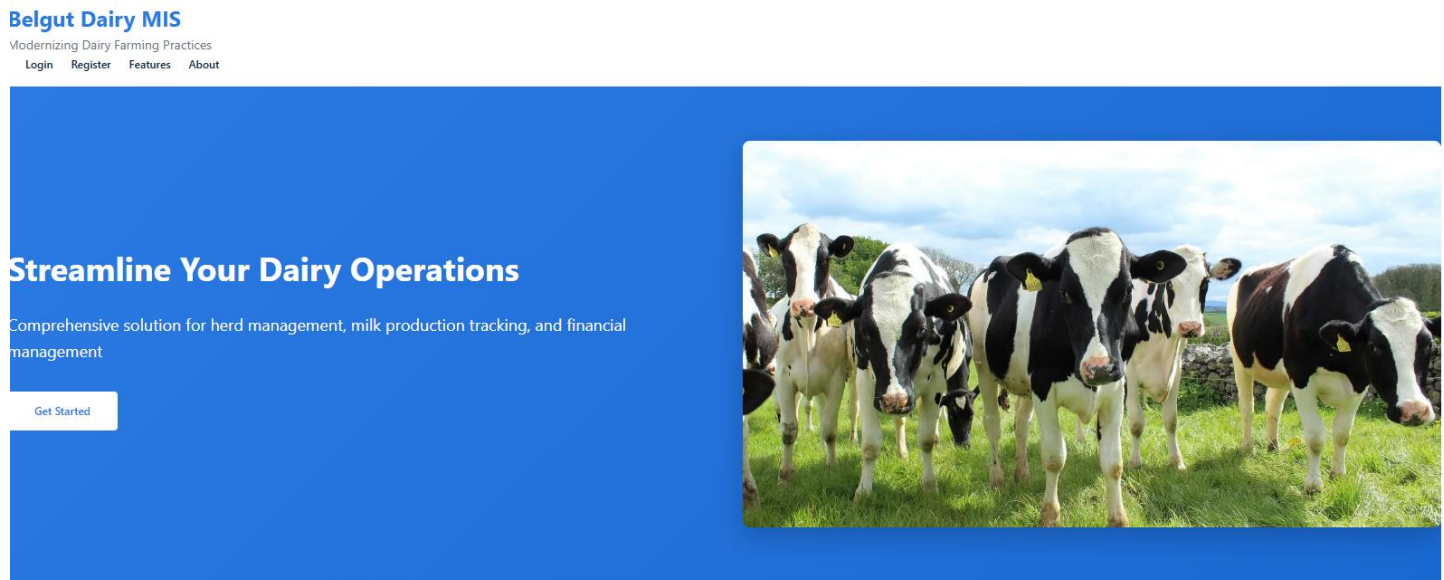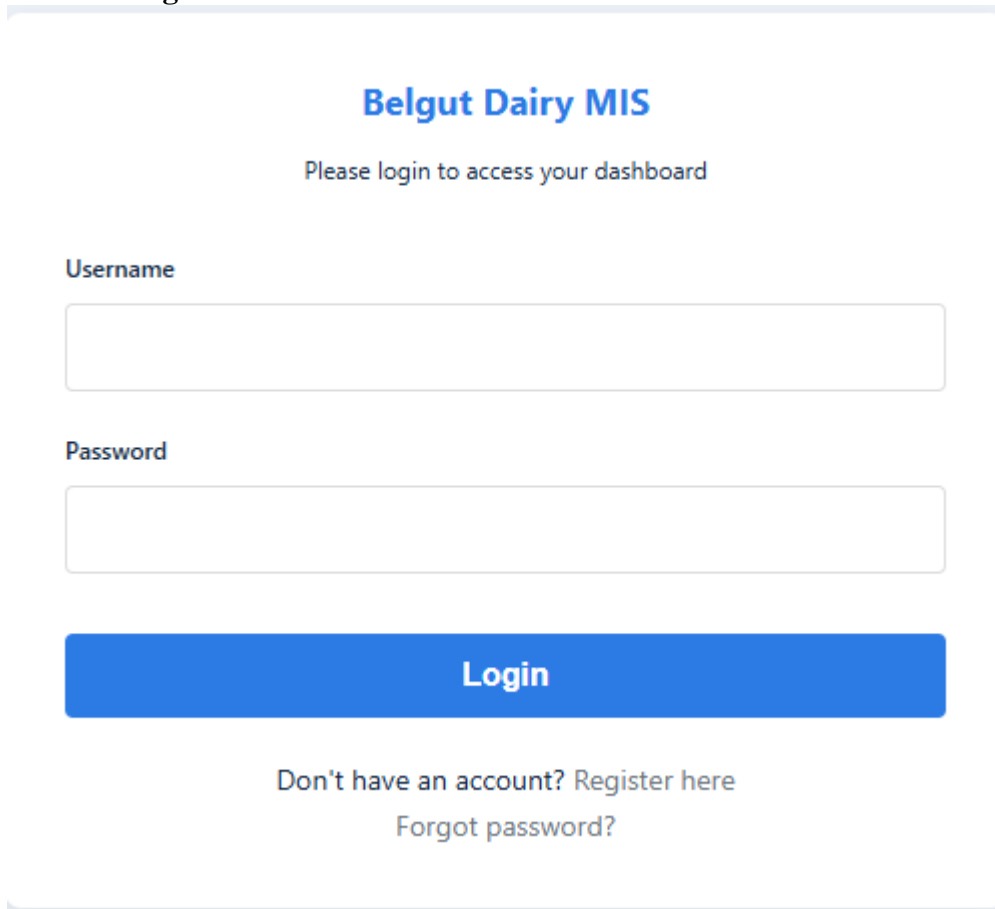
Figure 17: Home page

5.2.2 Dashboard
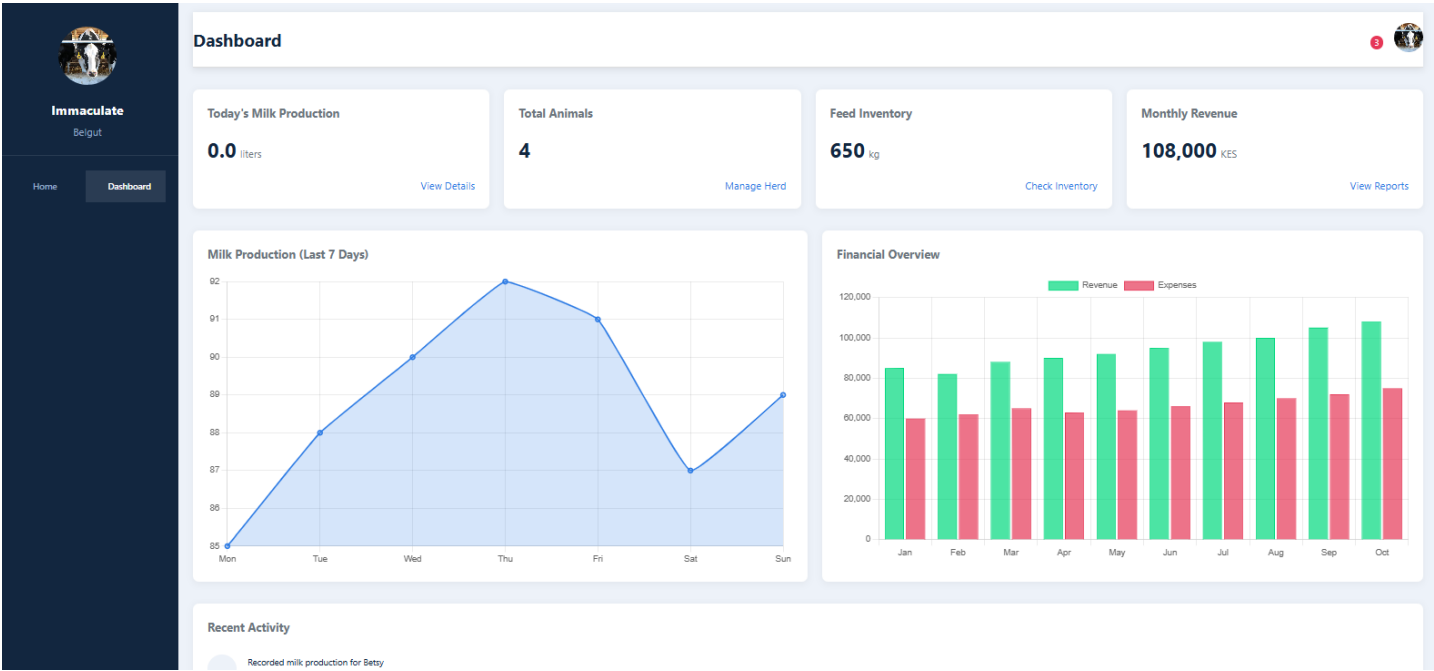
Dashboard

Immaculate
Belgut

Home   Dashboard

Today's Milk Production	Total Animals	Feed Inventory	Monthly Revenue
0.0 liters	**4**	**650** kg	**108,000** KES
View Details	Manage Herd	Check Inventory	View Reports

Milk Production (Last 7 Days)

Financial Overview

Revenue   Expenses

Recent Activity

Recorded milk production for Betsy

5.2.23 Login Screen

Belgut Dairy MIS

Please login to access your dashboard

Username

Password

Login

Don't have an account? Register here
Forgot password?

Figure 19: login Form

5.2.3 Sign Up Screen

Farmer Registration

Create your account to access the Belgut Dairy Management System

Full Name

Email Address

Phone Number

Farm Name

Location

Username

Password

Confirm Password

Register

5.2.4 Milk recording

Milk Recording

+Add Record

Date: dd/mm/yyyy   Animal: All Animals   Apply Filters   Reset

Date	Animal ID	Animal Name	Morning (L)	Evening (L)	Total (L)	Quality	Actions

Previous   Page 1 of 1   Next

Figure   21:   Reset   password   for

41

5.3 System Code Generation

5.3.1 Home page source code

```html
6   <!DOCTYPE html>
7   <html lang="en">
8   <head>
9       <meta charset="UTF-8">
10      <meta name="viewport" content="width=device-width, initial-scale=1.0">
11      <title>Belgut Dairy Management Information System</title>
12      <link rel="stylesheet" href="css/style.css">
13  </head>
14  <body>
15      <header>
16          <div class="logo">
17              <h1>Belgut Dairy MIS</h1>
18              <p>Modernizing Dairy Farming Practices</p>
19          </div>
20          <nav>
21              <ul>
22                  <li><a href="login.html">Login</a></li>
23                  <li><a href="register.html">Register</a></li>
24                  <li><a href="#features">Features</a></li>
25                  <li><a href="#about">About</a></li>
26              </ul>
27          </nav>
28      </header>
29
30      <main>
31          <section class="hero">
32              <div class="hero-content">
33                  <h2>Streamline Your Dairy Operations</h2>
34                  <p>Comprehensive solution for herd management, milk production
    tracking, and financial management</p>
35                  <a href="register.html" class="cta-button">Get Started</a>
36              </div>
37              <div class="hero-image">
38                  <img src="images/dairy-farm.webp" alt="Dairy Farm">
39              </div>
40          </section>
41
42          <section id="features" class="features">
43              <h2>Key Features</h2>
44              <div class="feature-grid">
45                  <div class="feature-card">
46                      <img src="images/herd-icon.jpg" alt="Herd Management">
47                      <h3>Herd Management</h3>
```

```
48                        <p>Track individual animal health, breeding history, and milk
    yield</p>
49                    </div>
50                    <div class="feature-card">
51                        <img src="images/milk-icon.jpeg" alt="Milk Production">
52                        <h3>Milk Production</h3>
53                        <p>Record and analyze daily milk production with quality
    metrics</p>
54                    </div>
55                    <div class="feature-card">
56                        <img src="images/inventory-icon.jpg" alt="Inventory">
57                        <h3>Inventory</h3>
58                        <p>Manage feed stock levels and veterinary supplies</p>
59                    </div>
60                    <div class="feature-card">
61                        <img src="images/finance-icon.webp" alt="Financial">
62                        <h3>Financial Reports</h3>
63                        <p>Generate profit/loss statements and track expenses</p>
64                    </div>
65                </div>
66            </section>
67
68            <section id="about" class="about">
69                <h2>About BDMIS</h2>
70                <p>The Belgut Dairy Management Information System is designed to
    modernize dairy farming practices in the Belgut region. By integrating technology
    into daily operations, BDMIS enhances data accuracy, streamlines processes, and
    improves decision-making for farmers.</p>
71                <p>Our system provides mobile accessibility, allowing farmers to access
    critical information anytime, anywhere, ensuring they remain informed and
    responsive to their operations.</p>
72            </section>
73        </main>
74
75        <footer>
76            <p>&copy; 2025 Belgut Dairy MIS. All rights reserved.</p>
77
78        </footer>
79
80        <script src="js/main.js"></script>
81 </body>
82 </html>
```

5.3.2 Dashboard Source Code

```
!DOCTYPE html>
<html lang="en">
```

```
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Dashboard - Belgut Dairy MIS</title>
    <link rel="stylesheet" href="css/style.css">
</head>
<body>
    <div class="dashboard-container">
        <aside class="sidebar">
            <div class="profile-info">
                <img src="images/profile-icon.jpg" alt="Profile">
                <h3 id="userName">Immaculate</h3>
                <p id="farmName">Belgut</p>
            </div>

            <nav class="sidebar-nav">
                <ul>
                    <li><a href="index.html"><i class="icon-home"></i> Home</a></li>
                    <li class="active"><a href="dashboard.html"><i class="icon-
dashboard"></i> Dashboard</a></li>
                    <li><a href="milk-recording.html"><i class="icon-milk"></i> Milk
Recording</a></li>
                    <li><a href="herd-management.html"><i class="icon-herd"></i> Herd
Management</a></li>
                    <li><a href="inventory.html"><i class="icon-inventory"></i>
Inventory</a></li>
                    <li><a href="reports.html"><i class="icon-reports"></i> Reports</a></li>
                    <li><a href="#"><i class="icon-settings"></i> Settings</a></li>
                    <li><a href="#" id="logoutBtn"><i class="icon-logout"></i>
Logout</a></li>
                </ul>
            </nav>
        </aside>

        <main class="main-content">
            <header class="content-header">
                <h1>Dashboard</h1>
                <div class="header-actions">
                    <div class="notification">
                        <i class="icon-notification"></i>
                        <span class="badge">3</span>
                    </div>
                    <div class="user-menu">
                        <img src="images/profile-icon.jpg" alt="User">
                    </div>
                </div>
            </header>
```

```html
<div class="dashboard-widgets">
    <div class="widget">
        <h3>Today's Milk Production</h3>
        <div class="widget-content">
            <span class="value" id="todayMilk">0</span>
            <span class="unit">liters</span>
        </div>
        <div class="widget-footer">
            <a href="milk-recording.html">View Details</a>
        </div>
    </div>

    <div class="widget">
        <h3>Total Animals</h3>
        <div class="widget-content">
            <span class="value" id="totalAnimals">0</span>
        </div>
        <div class="widget-footer">
            <a href="herd-management.html">Manage Herd</a>
        </div>
    </div>

    <div class="widget">
        <h3>Feed Inventory</h3>
        <div class="widget-content">
            <span class="value" id="feedStock">0</span>
            <span class="unit">kg</span>
        </div>
        <div class="widget-footer">
            <a href="inventory.html">Check Inventory</a>
        </div>
    </div>

    <div class="widget">
        <h3>Monthly Revenue</h3>
        <div class="widget-content">
            <span class="value" id="monthlyRevenue">0</span>
            <span class="unit">KES</span>
        </div>
        <div class="widget-footer">
            <a href="reports.html">View Reports</a>
        </div>
    </div>
</div>

<div class="dashboard-charts">
```

```html
            <div class="chart-container">
                <h3>Milk Production (Last 7 Days)</h3>
                <canvas id="milkChart"></canvas>
            </div>

            <div class="chart-container">
                <h3>Financial Overview</h3>
                <canvas id="financeChart"></canvas>
            </div>
        </div>

        <div class="recent-activity">
            <h3>Recent Activity</h3>
            <ul id="activityList">
                <!-- Activities will be populated by JavaScript -->
            </ul>
        </div>
    </main>
</div>

<script src="https://cdn.jsdelivr.net/npm/chart.js"></script>
<script src="js/data.js"></script>
<script src="js/main.js"></script>
</body>
</html>
```

5.3.3 Milk recording Source Code

```html
!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Milk Recording - Belgut Dairy MIS</title>
    <link rel="stylesheet" href="css/style.css">
</head>
<body>
    <div class="dashboard-container">
        <aside class="sidebar">
            <!-- Same sidebar as dashboard.html -->
        </aside>

        <main class="main-content">
            <header class="content-header">
                <h1>Milk Recording</h1>
                <div class="header-actions">
                    <button id="addMilkRecord" class="primary-button">+ Add Record</button>
```

```
            </div>
        </header>

        <div class="content-section">
            <div class="filter-section">
                <div class="filter-group">
                    <label for="filterDate">Date:</label>
                    <input type="date" id="filterDate">
                </div>
                <div class="filter-group">
                    <label for="filterAnimal">Animal:</label>
                    <select id="filterAnimal">
                        <option value="all">All Animals</option>
                        <!-- Options will be populated by JavaScript -->
                    </select>
                </div>
                <button id="applyFilter" class="secondary-button">Apply Filters</button>
                <button id="resetFilter" class="tertiary-button">Reset</button>
            </div>

            <div class="table-container">
                <table id="milkRecordsTable">
                    <thead>
                        <tr>
                            <th>Date</th>
                            <th>Animal ID</th>
                            <th>Animal Name</th>
                            <th>Morning (L)</th>
                            <th>Evening (L)</th>
                            <th>Total (L)</th>
                            <th>Quality</th>
                            <th>Actions</th>
                        </tr>
                    </thead>
                    <tbody>
                        <!-- Records will be populated by JavaScript -->
                    </tbody>
                </table>
            </div>

            <div class="pagination">
                <button id="prevPage" disabled>Previous</button>
                <span id="pageInfo">Page 1 of 1</span>
                <button id="nextPage" disabled>Next</button>
            </div>
        </div>
    </main>
```

```html
    </div>

<!-- Milk Recording Modal -->
<div id="milkRecordModal" class="modal">
    <div class="modal-content">
        <span class="close-modal">&times;</span>
        <h2 id="modalTitle">Add Milk Record</h2>
        <form id="milkRecordForm">
            <input type="hidden" id="recordId">

            <div class="form-group">
                <label for="recordDate">Date</label>
                <input type="date" id="recordDate" required>
            </div>

            <div class="form-group">
                <label for="recordAnimal">Animal</label>
                <select id="recordAnimal" required>
                    <!-- Options will be populated by JavaScript -->
                </select>
            </div>

            <div class="form-row">
                <div class="form-group">
                    <label for="morningYield">Morning Yield (L)</label>
                    <input type="number" step="0.1" id="morningYield" min="0">
                </div>

                <div class="form-group">
                    <label for="eveningYield">Evening Yield (L)</label>
                    <input type="number" step="0.1" id="eveningYield" min="0">
                </div>
            </div>

            <div class="form-group">
                <label for="milkQuality">Quality</label>
                <select id="milkQuality">
                    <option value="excellent">Excellent</option>
                    <option value="good">Good</option>
                    <option value="fair">Fair</option>
                    <option value="poor">Poor</option>
                </select>
            </div>

            <div class="form-group">
                <label for="milkNotes">Notes</label>
                <textarea id="milkNotes" rows="3"></textarea>
```

```
            </div>

            <div class="form-actions">
                <button type="submit" class="primary-button">Save Record</button>
                <button type="button" class="secondary-button cancel-
modal">Cancel</button>
            </div>
        </form>
    </div>
</div>

    <script src="js/data.js"></script>
    <script src="js/main.js"></script>
</body>
</html>
```

5.4 System Testing

System testing is carried out to detect any system failures and correct them as soon as possible. The importance of System testing cannot be over emphasized as it helps reveal errors that would negatively affect the system and its smooth running. The system used 2 types of testing: Unit Testing and User Acceptance Testing. These tests were conducted to ensure efficiency of the system and to ensure solving of all errors.

5.4.2 Unit Testing

This type of testing involves using modules and the operating procedures being tested to determine whether they are fit for use. The user details should be verified from the users' tables and if they are valid, they can continue to use the system. They can also set their own passwords to ensure that their user information will be secure.

 In the admin module, the admin can be able to view all the exiting users in the system. The admin can also view all the products as well as the orders that have been made and the details of the people who have made those orders. The system after carefully being analyzed has been identified to be presented with the following modules:

Order module

User Module

Products Module

MODULE DESCRIPTION

Order Module - In this module, the orders that have been made by a user will be contained here. It will also contain the date when the products were ordered. The status of the order, i.e. whether it is approved or not will also be included here.

User Module - In this module, a user first has to login in or register if the user doesn't have an account and can be able to view all the uniforms available and can place an order for the specific uniform that the user wants. The user can also specify the quantity that he/she wants

Products Module - This is the module where all of the existing product information (uniform details) are stored. This information includes details such as the name and cost of the product. It will also indicate whether the product is still in stock or not.

5.4.3 User acceptance Testing

In this testing, actual system users test the software to make sure it can handle required tasks in the real-world scenarios, according to specifications. This occurs before the system becomes implemented. The results of this test will enable the management to be sure whether they are ready to begin using the new system or not.

During the system acceptance and testing, we got a number of people to register an account in the system. The member who are registered in the system were amounted to 30. The user response was captured and recorded. The user acceptance table and figure below was based on the 30 respondents.

5.4.4 System Functionality Acceptance Rate

Ordering process	Respondents	Percentage
Good	22	85%
Bad	6	14%
Need Improvement	1	1%

5.4.5 Challenges Faced while developing the system

5.4.5.1 Unavailability of a computer to use for the development of the system

5.4.5.2 Financial challenge in terms of carrying out the case study and printing the questionnaires

5.4.5.3 Lack of cooperation from the respondents during data gathering stage

5.4.5.4 Difficulty of finding the articles with the exact details and guidance when developing thesystem

5.5.5 Recommendations for the future advancement of the system

During the development process of the system, one module that was not properly and fully implement is the payment module. I therefore recommend that it should be worked on in order toallow customer to make payment via mobile money transfer. A good API can also be developed for the same.

REFERENCES

https://practicaldairytrainingcentre.com/how-to-create-a-profitable-dairy-farming-business-plan-in-kenya/

https://study.com/academy/lesson/dairy-farming-overview-history-types.html

Dairy Herd Management: Research nutrition, reproduction, and health management practices.

Sustainable Farming: Explore resources on sustainable dairy farming, including waste management and environmental impact.
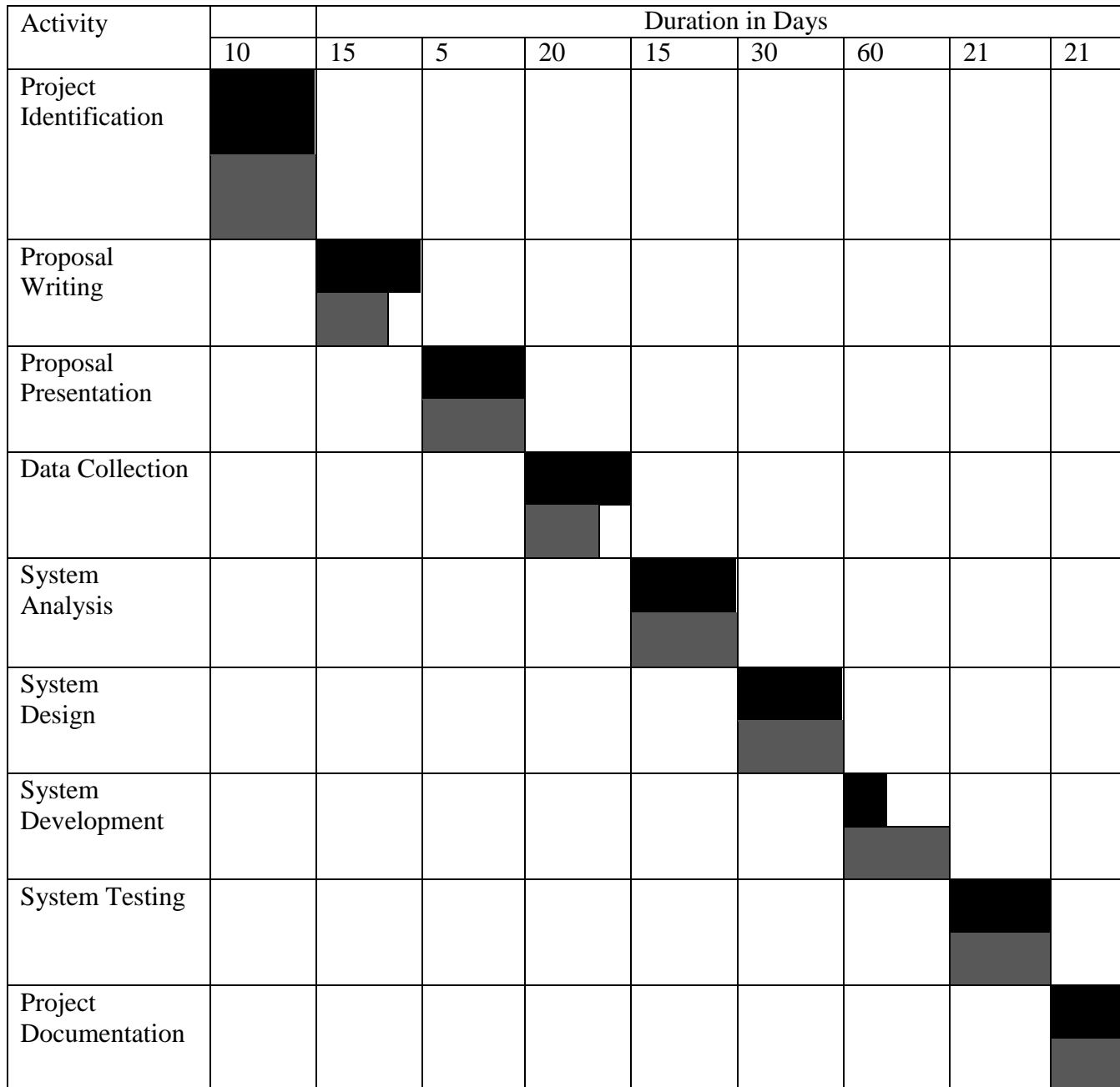
Business Planning: Find information on creating a profitable dairy farming business plan, including housing, feeding, and water systems.

Kenyan Dairy Farming: If your focus is on Kenya, look for studies on smallholder dairy farming typologies and determinants.

APPENDICES

Gantt Chart

This is a figure to show the trends taken for the project to be complete successfully.

Activity	Duration in Days								
	10	15	5	20	15	30	60	21	21
Project Identification	■								
Proposal Writing		■							
Proposal Presentation			■						
Data Collection				■					
System Analysis					■				
System Design						■			
System Development							■		
System Testing								■	
Project Documentation									■

Key:

Scheduled Time	■
Actual Time	▬