**DIPLOMA IN INFORMATION TECHNOLOGY**

**PROJECT TITLE: DEVELOPMENT OF A BOOKSHOP MANAGEMENT SYSTEM WITH BLOCKCHAIN.**

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*A proposal submitted to the Department of information technology in the School of computing and informatics in partial fulfillment of the requirements for the award of Diploma in Information Technology Jomo Kenyatta University of Agriculture and Technology.*

*2025*

*This proposal is my original work and has not been presented for a degree in any other University*

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

This proposal has been submitted for examination with my approval as University Supervisor

Signature.......................................................... Date....................................................

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1.1

# INTRODUCTION:

Uchumi Bookshop is a mid-sized retail store located in a bustling urban center in juja, serving a diverse clientele that includes students, teachers, professionals, and institutions. The shop specializes in academic books, stationery, and educational materials, making it a key resource for the community’s learning needs. The daily operations at Uchumi Bookshop rely heavily on manual processes. Every morning at 8:00 AM, the shopkeeper arrives to open the store, dust and arrange books on the shelves, prepare the cash box with float money, and set up a manual sales ledger alongside a stock tally notebook. A chalkboard placed outside is updated with “New Arrivals” or special offers to attract passing customers. Throughout the day, from 9:00 AM to 5:00 PM, staff members assist walk-in customers by manually locating books based on their memory of shelf sections. When a customer asks about a book’s availability, the staff either checks the stock notebook or physically searches the shelves to confirm. Students and individual customers often pay in cash or via mobile money services such as M-Pesa, with the cashier calculating totals using a calculator, issuing a handwritten receipt from a carbon copy book, and placing the payment in the cash box. Professionals sometimes pay by mobile money or bank transfers, especially for higher-priced items or when purchasing multiple books for office use. Institutions such as schools and colleges place bulk orders for textbooks, exercise books, and office supplies, and their payments are typically made via cheque or direct bank transfers after receiving an invoice. Bulk orders are coordinated by senior staff, who record the order details in an “Institution Orders” ledger, prepare invoices manually using printed forms, and liaise with suppliers to ensure timely delivery. When suppliers deliver stock, staff manually cross-check the shipment against the order list to verify quantities and titles before updating the stock register. Any discrepancies are noted and communicated back to the supplier for correction. Once confirmed, new stock is arranged on the shelves, and excess stock is stored in the storeroom. The shop’s operations are organized in a simple hierarchy: the shop manager oversees overall activities, manages supplier relationships, approves bulk orders, and handles high-value transactions; the procurement officer is responsible for ordering new stock, receiving deliveries, and updating the stock register; sales attendants and cashiers assist customers, calculate totals, issue manual receipts, handle cash and mobile payments, and update the sales ledger; the stock clerk monitors inventory levels and alerts the procurement officer when restocking is needed, while the accountant, who works on a part-time basis, reconciles cash, cheques, and bank transfers and maintains financial records. A general assistant supports with arranging shelves, cleaning, and helping during peak hours. At the end of each day, around 6:00 PM, the manager and cashier reconcile cash in the box with the sales ledger, update stock records for all sales and deliveries, and write a summary in the daily logbook before securing the day’s cash in a safe or preparing it for deposit

1.2

PROBLEM DEFINITION:

Uchumi Bookshop’s operations are heavily dependent on manual processes, which create significant inefficiencies and challenges in its daily workflow. At the start of each day, staff prepare handwritten sales ledgers and stock tally notebooks, while promotional updates are written on a chalkboard outside the shop. This reliance on physical records is time-consuming and prone to human errors such as misrecorded sales or misplaced stock tallies, limiting the shop’s ability to advertise effectively or maintain accurate records. Throughout the day, staff assist customers by manually locating books on shelves or checking handwritten stock notebooks to confirm availability. Without a centralized inventory system, they depend on memory and physical searches, resulting in long waiting times for customers and delays during peak hours. Payment processing is also entirely manual; cashiers use calculators to total purchases and issue handwritten receipts using carbon copy books. This approach often leads to calculation errors, misplaced receipts, and difficulties reconciling daily cash, especially when handling large volumes of transactions. For professionals and institutions that place bulk orders, staff record order details in separate ledgers and communicate with suppliers via phone calls or emails, with no centralized system to track progress. This manual coordination increases the risk of lost information, delayed deliveries, and unnoticed discrepancies in stock quantities. Inventory management poses further challenges as stock levels are updated by hand after each sale or delivery, preventing real-time tracking and often resulting in stockouts or overstocking. These issues are compounded by role-specific bottlenecks; critical tasks such as placing supplier orders or approving institutional transactions are limited to senior staff, causing workflow delays when they are unavailable. At the end of each day, cash and stock reconciliation requires meticulous manual checks by the manager and cashier, which are time-intensive and susceptible to errors. These operational weaknesses hinder Uchumi Bookshop’s ability to serve its growing customer base efficiently and make it difficult to compete with modern retailers who use automated systems for faster and more accurate service delivery.

1.3

PROPOSED SOLUTION  
To address the operational challenges at Uchumi Bookshop, a comprehensive Bookshop Management System (BMS) enhanced with blockchain technology is proposed. This system will replace manual sales ledgers and stock tally notebooks with a digital platform that automates sales, inventory tracking, payment processing, supplier interactions, and reporting.

The core features will include:

Point-of-Sale (POS) System: Automates transactions, generates receipts, and supports multiple payment methods such as cash, mobile money, and bank transfers.

Inventory Management: Real-time monitoring of stock levels, automatic alerts for low stock, and prevention of overstocking or shortages.

Bulk Order Module: Dedicated functionality for handling institutional or professional bulk purchases with automated invoice generation and payment tracking.

Procurement Module: Streamlined supplier management, purchase order logging, and delivery tracking to ensure accurate stock replenishment.

Role-Based Access Control: Ensures that staff (from general assistants to managers) only access the functions they are authorized to, enhancing both security and accountability.

Blockchain Integration:

-Immutable Transaction Records – every sale, refund, and payment recorded on a blockchain ledger to prevent fraud and tampering.

-Supply Chain Transparency – supplier deliveries and stock movements logged for traceability.

-Customer Loyalty Tokens – blockchain-based loyalty rewards and bulk order credits to enhance customer retention.

.1.4

OBJECTIVES:

The main objectives of implementing the Bookshop Management System with Blockchain are:

1. Automation of Operations

-Replace manual record-keeping with an integrated digital system to increase efficiency and reduce human errors.

2. Enhanced Security and Data Integrity

-Use blockchain to store financial and inventory data in a tamper-proof, transparent manner that ensures trust and accountability.

3. Improved Customer Experience

-Provide faster transactions through the POS system, introduce blockchain-based loyalty tokens, and offer bulk order management for institutions and professionals.

4. Efficient Inventory and Supplier Management

-Implement real-time stock monitoring, automated alerts, and blockchain-backed supplier tracking to prevent discrepancies.

5. Accurate Reporting and Decision-Making

-Generate automatic daily, weekly, and monthly reports that are accurate, auditable, and verifiable using blockchain technology.

1.5

JUSTIFICATION:

The justification for implementing the Bookshop Management System with Blockchain lies in the limitations of the current manual processes and the growing need for digital transformation in retail operations:

-Operational Efficiency: Manual ledgers and physical stock tallies are slow, prone to errors, and consume valuable staff time. Automation reduces inefficiencies and frees up staff for customer service.

-Transparency and Trust: In a retail environment where accountability is crucial, blockchain provides immutable and transparent records that cannot be manipulated, protecting both the business and customers.

-Customer Retention: Introducing loyalty rewards and faster service enhances customer satisfaction and positions Uchumi Bookshop as a modern, technology-driven business.

-Competitive Advantage: Many traditional bookshops rely solely on manual or semi-digital systems. By adopting blockchain, Uchumi Bookshop differentiates itself with a cutting-edge solution that builds trust and attracts more institutional clients.

-Scalability and Future Growth: The system will not only solve current challenges but also prepare Uchumi Bookshop for future expansion, integration with online platforms, and partnerships with digital payment providers.

2.0

## PROPOSED SOFTWARE METHODOLOGY

**2.1**

**Introduction**

This chapter describes the software development methodology adopted for the design and implementation of the Bookshop Management System. The methodology provides a structured approach to ensure that each stage of development is well-planned, executed, and tested for accuracy and efficiency. For this project, the **Waterfall Model** has been selected due to its linear and sequential structure, which is best suited for projects with clear requirements and well-defined goals.

### 2.2

### Justification for Using the Waterfall Model

The Waterfall Model is a traditional software development methodology that divides the project into distinct phases. Each phase must be completed before the next one begins. It is the most suitable model for this project for the following reasons:

* **Clearly Defined Requirements:** The requirements of the bookshop management system are well-understood and not expected to change frequently.
* **Simple Project Scope:** The system has a straightforward flow and limited complexity, making it ideal for a linear development model.

### 2.3

### Waterfall Model Phases

The following are the phases of the Waterfall Model that will guide the development of the Bookshop Management System:

#### 2.3.1 Requirements Gathering and Analysis

In this phase, the system requirements are collected from the stakeholders. For the bookshop management system, the requirements include inventory tracking, sales management, customer records, book search features, and reporting functions. A detailed requirement specification document will be created.

#### 2.3.2 System Design

Based on the gathered requirements, the system architecture and design are developed. This includes database design, user interface layouts, and module specifications. The output of this phase is a detailed system design document that acts as a blueprint for implementation.

#### 2.3.3 Implementation

In this phase, the actual coding of the system is done based on the design specifications. Each module (such as inventory management, customer management, and sales) will be developed separately and integrated to form the complete system.

#### 2.3.4 Testing

After implementation, the system is tested to ensure it meets the initial requirements and is free of defects. Unit testing, integration testing, and system testing will be performed to validate the system’s performance and reliability.

#### 2.3.5 Deployment

Once testing is complete and the system is stable, it will be deployed for actual use. This may include installation in the bookshop’s computers or server and training of users on how to operate the system.

#### 2.3.6 Maintenance

After deployment, ongoing maintenance will be provided to fix any issues, improve performance, and add new features as required. Feedback from the users will guide future enhancements.

### 3.0

### RESOURCES

### 3.1

### Human Resources

These are the people involved in the development of the system:

* **Project Developer** – Responsible for designing, coding, and testing the system.
* **Supervisor** – Provides academic guidance and reviews progress.

3.2

Software Resources

Software tool Purpose

Visual Studio Code Code editor or IDE for writing code

XAMPP / MySQL Local server and database management

PHP / Python / Java Programming language

HTML/CSS/JavaScript Frontend web development

3.3

Hardware Resources

Hardware Specification

Laptop/PC Minimum: Core i5, 4GB RAM, 256GB HDD

Flash Drive For backup and file transfer

Internet Access For downloading libraries, tools, and research

4.0

##### BUDGET

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | Min (KES) | |  | | --- | |  |  |  | | --- | | **Max (KES)** | |
| Software Resources | 0 | |  | | --- | |  |  |  | | --- | | 3,000 | |
| Hardware Resources | 1,100 | 2,000 |
| Internet & Power | 800 | 1,500 |
| Miscellaneous | 500 | 1,300 |
| Total | 2,400 | 7,800 |

5.0

##### PROJECT SCHEDULE

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No.** | |  | | --- | |  |  |  | | --- | | **Activity/Task** | | |  | | --- | |  |  |  | | --- | | **Start Date** | | End Date | |  | | --- | |  |  |  | | --- | | **Duration** | |
| |  | | --- | | 1 | | Project Topic Selection & Approval | |  | | --- | | June 24, 2025 | | |  | | --- | | June 28, 2025 | | 5 days |
| |  | | --- | | 2 | | Requirement Gathering & Analysis | June 29, 2025 | |  | | --- | | July 5, 2025 | | 7 days |
| |  | | --- | | 3 | | System Design (UI + Database + Architecture) | |  | | --- | | July 6, 2025 | | |  | | --- | | July 12, 2025 | | |  | | --- | | 7 days | |
| |  | | --- | | 4 | | Database Setup and Backend Development | July 13, 2025 | July 20, 2025 | |  | | --- | | 8 days | |
| |  | | --- | | 5 | | Frontend Development | |  | | --- | | July 21, 2025 | | |  | | --- | | July 28, 2025 | | |  | | --- | | 8 days | |
| |  | | --- | | 6 | | System Integration | |  | | --- | | July 29, 2025 | | |  | | --- | | July 31, 2025 | | |  | | --- | | 3 day | |
| |  | | --- | | 7 | | Testing & Debugging | August 1, 2025 | |  | | --- | | August 4, 2025 | | |  | | --- | | 4 days | |
| |  | | --- | | 8 | | Documentation Writing | August 5, 2025 | |  | | --- | | August 9, 2025 | | |  | | --- | | 5 days | |

###### 6.o

###### GANTT CHART

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Task No. | Task Name | Start Date | End Date | Duration (Bars) |
| 1 | Project Topic Selection & Approval | June 24 | June 28 | █████ |
| 2 | Requirement Gathering & Analysis | June 29 | July 5 | ███████ |
| 3 | System Design (UI + DB + Architecture) | July 6 | July 12 | ███████ |
| 4 | Backend Development | July 13 | July 20 | ████████ |
| 5 | Frontend Development | July 21 | July 28 | ████████ |
| 6 | System Integration | July 29 | July 31 | ███ |
| 7 | Testing & Debugging | Aug 1 | Aug 4 | ████ |
| 8 | Documentation Writing | Aug 5 | Aug 9 | █████ |

INTRODUCTION