SOFTWARE REQUIREMENTS SPECIFICATION

For

Integrated Utang Management System

for Small Convenience Store

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1. Introduction

In many small convenience stores, the "utang" or "credit" system is a common practice that allows customers to purchase products and settle payments at a later date. This practice is usually managed manually through handwritten notebooks or ledgers. While this traditional method works for some stores, poor management often leads to data loss, incorrect balances, and difficulties in tracking payments. Without an organized system, business owners face income loss, customer conflicts, and inefficiencies in managing outstanding credits.

1.1. Purpose

The main goal of this project is to create an Integrated Utang Management System that simplifies the recording and monitoring of customer credit transactions. By replacing manual handwritten methods with a secure digital platform, the system aims to speed up operations, reduce errors, and protect important information. It will store customer information, track credit transactions, automatically update balances, and provide real-time alerts. These features help business owners manage credit more efficiently while providing better service to their customers.

1.2 Intended Audience

The primary users of this system are convenience store owners who have full administrative control over the system including customer account management, transaction processing, and financial reporting, and regular customers who purchase items on credit and participate in transaction verification through OTP confirmation.

1.3 Product Scope

This system provides a digital solution for managing customer credit transactions with enhanced security features. Its scope includes customer information

management, secure transaction recording with OTP verification, real-time balance tracking, internal alert notifications, and basic report generation. The system is designed for small business owners and their customers, and excludes advanced financial services like online banking or third-party payment integration.

Key Features

Customer Profile Management

The system maintains organized records of each customer including their name, email address, and address. This helps store owners easily identify customers and manage their credit accounts professionally.

Secure Transaction Confirmation

All utang and payment transactions require OTP (One-Time Password) verification from customers. This two-step confirmation process ensures that every transaction is authorized and secure, preventing unauthorized activities. OTPs are delivered via email to the customer's registered email address.

Real-time Balance Tracking

The system automatically calculates and updates customer balances whenever new transactions are confirmed. This provides accurate, up-to-date information about how much each customer owes or has paid.

Due Date Management System

The system includes comprehensive due date tracking for utang transactions, with automated reminders for approaching and overdue payments. Email notifications are sent to customers for due date alerts.

Credit Limit Monitoring

The system tracks each customer's credit usage and alerts store owners when someone approaches or reaches their credit limit. This helps prevent over-borrowing and manages financial risk.

Dual-role Access System

Different user roles (Owner, Customer) have appropriate access levels and features. Owners have full administrative control, while customers can view their own records, transaction history, and pending transactions.

Email Notification System

The system provides email notifications for OTP delivery, due date reminders, and transaction confirmations, keeping customers informed about their credit activities.

Internal Alert System

The system provides instant web-based notifications for important activities like new transactions, OTP requests, credit limit warnings, and due date alerts.

1.4 Definitions, Acronyms, and Abbreviations

Definitions

- Utang: A credit or debt owed by a customer to a store for purchased goods
- Balance: The remaining amount a customer owes to the store
- Debt Limit: The maximum amount a customer is allowed to borrow
- OTP: One-Time Password used to verify transactions
- Pending Transaction: A transaction waiting for OTP confirmation
- Due Date: The scheduled date when a utang should be paid
- Principal Amount: The original amount borrowed before interest

- Interest Amount: Additional charge applied to the principal amount

Acronyms and Abbreviations

- IUMS: Integrated Utang Management System
- ID: Identification
- OTP: One-Time Password
- SMTP: Simple Mail Transfer Protocol
- SQL: Structured Query Language

2. Overall Description

The Integrated Utang Management System is a user-friendly web application designed specifically for small convenience stores to manage customer credit transactions securely. Store owners use it to record and monitor credit activities, while customers participate through OTP verification for transaction confirmation and receive email notifications. The system requires a functional device with internet access and focuses on security, accuracy, and ease of use.

2.1 User Characteristics

Store Owners

Have full control over the system including customer account management, transaction processing, due date monitoring, and report generation. They ensure the system runs smoothly and make important business decisions based on the data. Owners can add new customers, process utang and payment transactions, monitor due dates, and generate financial reports.

Customers

Participate in the credit system by providing personal information and confirming transactions through OTP codes received via email. They can view their transaction history, current balance, pending transactions, and due date information through their customer dashboard. Customers benefit from accurate records, secure transaction processes, and timely email reminders.

2.2 Constraints

The system requires a computer, tablet, or smartphone with internet access to operate. Its accuracy depends on proper data entry by the store owner, since incorrect information affects customer balances. The system is designed specifically for small convenience stores and may not be suitable for large supermarkets with complex needs. Data security relies on proper device management and regular system maintenance. Email delivery depends on proper SMTP configuration and customer email accessibility.

2.3 Assumptions and Dependencies

The system assumes that store owners will enter transaction data accurately and that customers will cooperate with the OTP verification process. Users are expected to have basic familiarity with web applications and email access. The interface is designed to be simple enough for users who are accustomed to manual record-keeping. The system can run on various devices including smartphones, tablets, and computers with modern web browsers. Proper email configuration is required for OTP delivery and due date notifications.

3. Requirements Specifications

This section describes the specific requirements of the Integrated Utang Management System (IUMS). It defines what the system can do, its performance standards, interface requirements, and overall structure.

3.1 Functional Requirements

- User Registration & Login – Secure login system for Owners, and Customers with different access levels
- Customer Profile Management – Store owners can create, view, and delete customer records with personal information
- Secure Transaction Recording – Record utang and payment transactions with OTP email verification for security
- Pending Transactions Management – Handle transactions waiting for customer OTP confirmation
- Automated Balance Calculation – System automatically updates customer balances when transactions are confirmed
- Credit Limit Monitoring – Track credit usage and alert when customers approach their limits
- Email Notification System – Send OTP codes and due date reminders via email to customers
- Real-time Alert System – Provide instant web notifications for transactions, OTP requests, and system activities
- Transaction History – Maintain complete records of all customer transactions with due date information
- Dual-role Dashboards – Separate interfaces for Owners and Customers with appropriate features

- Due Date Reporting – Generate summaries of upcoming due dates and overdue utang
- Customer Self-Service – Customers can view their balance, transaction history, and profile information
- System Settings – Configure application settings, interest rates, and credit limits

3.2 Non-Functional Requirements

- Performance – Customer search and transaction processing within 2-3 second
- Security – Secure login and OTP protection for all financial transactions
- Usability – Simple, intuitive interface designed for non-technical users
- Reliability – Accurate balance calculations and transaction records
- Availability – Accessible via web browsers on various devices
- Maintainability – Organized code structure for future updates and improvements
- Email Reliability – Robust email delivery system for OTP and notification services
- Data Integrity – Consistent due date tracking and balance calculations across all transactions

3.3 External Interface Requirements

3.3.1 User Interfaces

- Owner Interface – Complete system management, customer management, transaction processing, due date monitoring, and reporting
- Customer Interface – View personal transaction history, current balance, pending transactions, due dates and reporting

- Web Interface – Responsive design that works on computers, tablets, and smartphones with dark theme styling

3.3.2 Hardware Interfaces

- Client Devices – Computers, laptops, tablets, or smartphones with web browsers
- Server – Web server capable of handling multiple users and transactions with SQLite database support

3.3.3 Software Interfaces

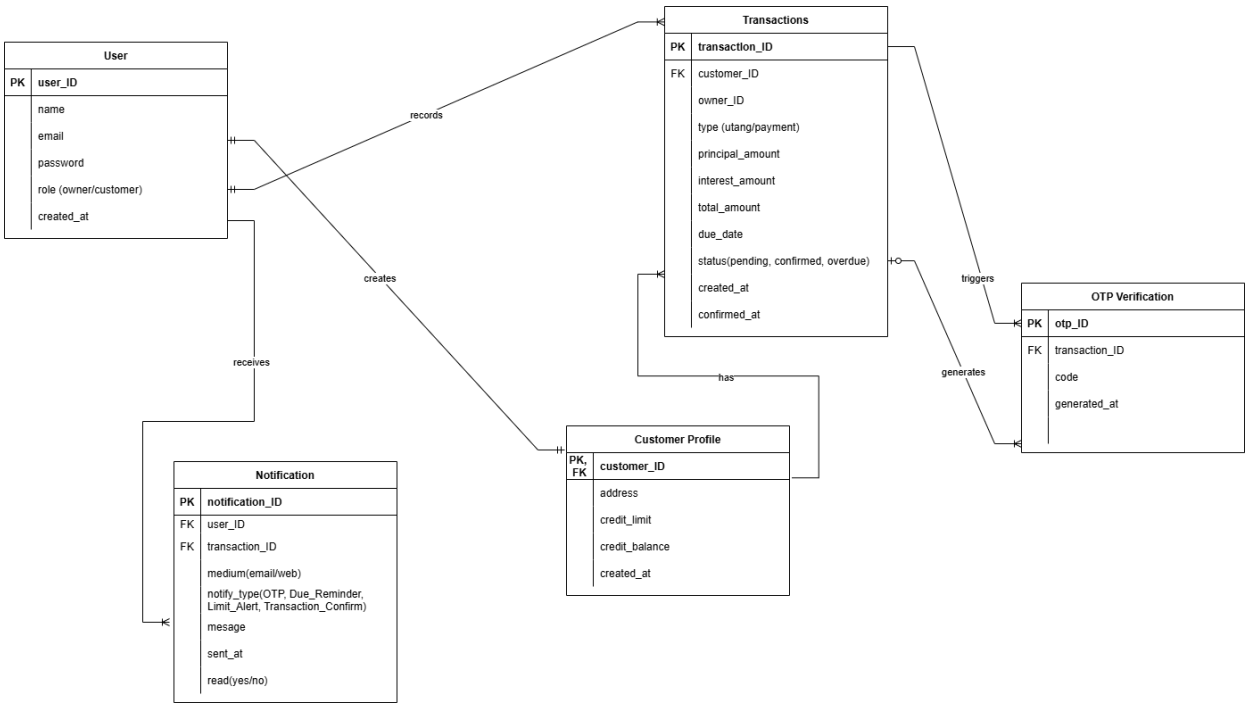
- Operating Systems – Works with Windows, Linux, Android, and iOS through web browsers
- Database – SQLite database for storing customer and transaction information and due date information
- Web Framework – Streamlit web application with Python backend
- Email Service – SMTP email integration for OTP delivery and due date notifications

3.3.4 Communication Protocols

- SMTP (Simple Mail Transfer Protocol) – Email protocol for OTP delivery, due date reminders, and transaction notifications via Gmail service
- SQLite Database Protocol – Local database communication for data persistence and transaction records
- Streamlit Session Protocol – Internal state management for user sessions and real-time UI updates
- Python Function Calls – Internal business logic communication between system components

3.4 System Models

3.5 Database Design



3.6 Implementation

6.1 Development Environment

- Local Development: Python virtual environment with required dependencies
- Version Control: Git for source code management and collaboration
- IDE: VS Code with Python extensions and Streamlit integration
- Testing Environment: Local Streamlit server with Gmail SMTP integration
- Database: SQLite with SQLite3 Python driver
- Email Service: Gmail SMTP with App Passwords for authentication
- Web Framework: Streamlit for frontend and backend integration

6.2 Programming Languages and Framework

- Primary Language: Python 3.8+
- Web Framework: Streamlit for rapid web application development
- Database: SQLite for lightweight data storage and portability
- Styling: Streamlit components with custom CSS for dark theme interface
- Email Integration: SMTP library for OTP and notification services

6.3 Tools and Libraries

- Data Management: SQLite3 for database operations
- Email Service: SMTP library with TLS support
- Authentication: Streamlit session management for user state persistence
- Date/Time: Python datetime for transaction timestamps and due date calculations
- Data Validation: Comprehensive amount and date validation functions