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Design and Implementation of a Desktop-Based Supermarket Billing and Inventory System

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ABSTRACT

In nowadays's retail landscape, green billing and inventory control systems are essential for streamlining operations and improving client pride. Traditional manual billing regularly effects in mistakes, delays, and inefficiencies in stock monitoring. This paper offers the format and implementation of a computing tool-based totally grocery keep billing and stock device advanced using Python (Tkinter for GUI), SQLite for database management, and SMTP for automatic email communication. The machine offers a person-super interface for dealing with merchandise, generating payments, tracking inventory, and sending receipts digitally. Intelligent modules which include file managing and temporary garage are included to make sure easy operations. The outcomes showcase superior accuracy, decreased billing time, and higher file control, making it a appropriate solution for small to medium scale supermarkets. Keywords: Supermarket Billing, Python Tkinter, SQLite, Inventory System, Desktop Application.

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Introduction

Supermarkets rely carefully on green billing and inventory structures to make sure smooth operations. Manual billing strategies frequently suffer from facts redundancy, human mistakes, and time delays, specifically in the course of top hours. The need for automation in billing has turn out to be a necessity to reduce operational inefficiencies and enhance purchaser experience.

Desktop-primarily based programs, despite the fact that tons much less publicized than internet or cloud-based structures, remain critical in areas with restrained internet connectivity or in stores who select offline and stable environments. This paper proposes a pc-primarily based billing and stock software designed to automate the calculation of payments, shop purchase statistics, keep inventory tiers, and deliver invoices electronically. The machine modified into developed the usage of Python and SQLite. Tkinter provides an interactive graphical interface, whilst SQLite guarantees light-weight and green records storage. Additionally, the mixing of SMTP protocols helps e-mail delivery of payments, enhancing patron convenience.

Methodology / System Design

The gadget follows a modular design which includes four key modules:

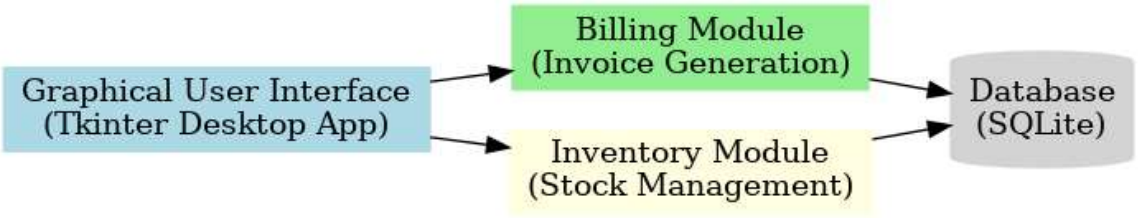
1. User Interface (Tkinter): Provides an interactive GUI for operators to enter objects, generate bills, and control stock.

2. Database (SQLite): Stores product statistics, transaction history, and stock information.

3. Billing Module: Calculates totals, applies taxes, and generates receipts.

4 .Email Integration (SMTP): Sends digital copies of bills to customers.

System Architecture



The shape consists of the GUI at the front cease, which interacts with the SQLite database on the lower once more prevent. A middleware layer plays billing operations, on the identical time as the email module integrates with the net for digital communique.

Flowchart of Billing Process

Steps:

- Start → User enters product information → Database retrieves price → Billing module calculates total → Bill is generated → Receipt revealed

Implementation

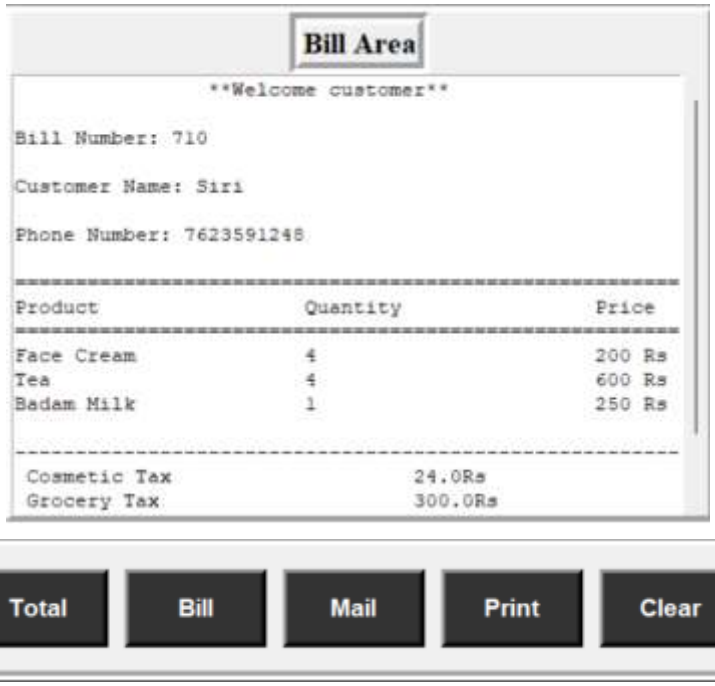
The implementation was completed the usage of Python three.10. The machine integrates the following libraries:

- **Tkinter** – for the graphical user interface.
- **SQLite3** – for database creation and management.
- **OS and tempfile** – for document handling and brief invoice storage.
- **SMTP (smtplib)** – for sending bills to consumer emails.

Features Implemented

- Adding, deleting, and updating gadgets within the cart.
- Automatic bill technology with product name, amount, and rate.
- Email transport of payments.
- Inventory management through an included database.

• Simple and person-friendly interface.


Bill Area
Welcome customer
Bill Number: 710
Customer Name: Siri
Phone Number: 7623591248
Product Quantity Price
Face Cream 4 200 Rs
Tea 4 600 Rs
Badam Milk 1 250 Rs
Cosmetic Tax 24.0Rs
Grocery Tax 300.0Rs
Total
Bill
Mail
Print
Clear
Supermarket billing System
SENDER
Sender's Email
Password
RECIPIENT
Email Address
Message
Welcome customer
Bill Number: 710
Customer Name: Siri
Phone Number: 7623591248
Product Quantity Price
Face Cream 4 200 Rs
Tea 4 600 Rs
SEND

Result

The machine come to be examined with pattern product facts and simulated transactions. Key outcomes include:

• **Accuracy:** Automated billing removed guide calculation mistakes.

• **Efficiency:** Billing machine reduced to seconds, in assessment to manual strategies.

• **Record-retaining:** All payments stored digitally for destiny reference.

• **User Satisfaction**: Operators determined the interface intuitive and smooth to apply. Potential boundaries consist of dependency on e mail server configurations for SMTP, and the shortage of multi-customer guide inside the modern-day version.

However, the tool successfully done its objectives of automating billing and keeping inventory efficiently.

Conclusion and Future Work

This paper supplied the layout and implementation of a computing tool-based definitely supermarket billing and inventory gadget. The integration of Tkinter, SQLite, and SMTP demonstrates how Python may be leveraged to growth robust, mild-weight retail solutions. Future paintings can beautify the system with the resource of:

• Adding barcode scanning for faster object entry.

• Implementing cloud database help for multi-character environments.

• Incorporating tool learning to count on frequently bought gadgets.

• Extending functionalities to mobile systems for portability. The device serves as a practical solution for small and medium supermarkets on the lookout for value-effective automation.

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