Faculty of Engineering

University of Ruhuna

Project Proposal

EE3302: DATA STRUCTURES AND ALGORITHMS

Retail Billing Automation System

GROUP MEMBERS

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INTRODUCTION

The Utility Billing System is designed to simplify and enhance the management and payment of utility bills. It comprises two integral components: the Admin Portal and the User Interface, catering to administrators and utility service customers.

The Admin Portal empowers administrators with essential tools, including secure authentication, user management, password recovery, and streamlined product catalog maintenance. This ensures efficient and secure control over the system.

On the User Interface side, both guest users and registered users are provided with user-friendly pathways. Guest users can swiftly browse and purchase products, while registered users benefit from discounted pricing. With a seamless shopping experience, users can explore products, add them to their carts, and receive detailed bills upon purchase.

Implemented using advanced data structures, algorithms, and file handling in C++, this project ensures data integrity and operational efficiency. It aims to simplify utility billing processes, improve user experiences, enhance data management, and offer cost-effective solutions through discounts for registered users. The Utility Billing System redefines the utility billing experience for all stakeholders.

OVERVIEW

The Utility Billing System project is a comprehensive software solution designed to revolutionize the management and payment of utility bills. This system provides a user-friendly and efficient platform with two primary components: the Admin Portal and the User Interface, serving both administrators and utility service customers.

- **Admin Portal:** The Admin Portal is the backbone of the system, offering administrators powerful tools to manage user accounts and the product catalog. Key features include:
  - Secure Authentication: Administrators can securely log in to access the system.
  - User Management: Create, modify, and delete user accounts as needed.
  - Password Recovery: A secure mechanism for administrators to reset passwords.
  - Product Catalog: Effortlessly maintain the product catalog by adding, modifying, or deleting items.

- **User Interface**: The User Interface caters to both guest users and registered users, providing a versatile and inclusive experience:
  - Guest Path: Ideal for users who prefer not to create accounts. Allows quick product browsing and purchase.
  - Registered User Path: Users with accounts can log in, create or update their accounts, and experience the added benefit of discounted pricing. A secure mechanism for users to reset passwords.
  - Shopping Experience: Browse products, add them to the cart, and proceed to checkout with ease.
  - Billing: Upon purchase, detailed bills are generated, with registered users benefiting from discounts.

For this management system we are using our knowledge based on data structure and algorithms in C++, Linked List, Queue, Stack, Array, and many other data structures will be used to develop this platform.

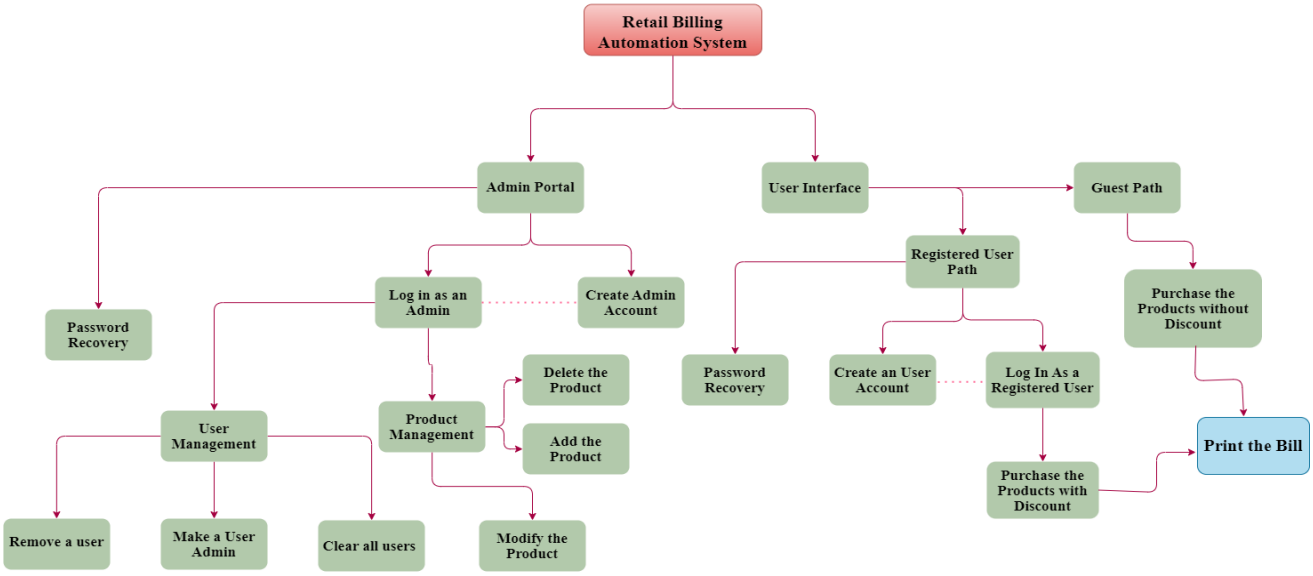

Figure 1:Organizational chart illustrating the process

OBJECTIVES

- Efficient Utility Billing: Create a system that streamlines and simplifies the utility billing process, making it more efficient for both administrators and users.
- User-Friendly Interface: Develop intuitive and user-friendly interfaces for both the Admin and User components, ensuring ease of use and accessibility.
- Secure Authentication: Implement robust authentication mechanisms to ensure the security of user accounts and administrative access.
- Comprehensive Admin Tools: Provide administrators with the necessary tools to manage user accounts, including creating, updating, and resetting admin passwords.
- Product Catalog Management: Enable administrators to maintain an up-to-date product catalog by adding, modifying, and deleting products securely.
- User Account Management: Create a user interface that allows users to log in, create accounts, and change their passwords, enhancing their control over their accounts.
- Seamless Shopping Experience: Ensure that users are directed to the "buy" page upon login, enabling a smooth and convenient shopping experience.
- Shopping Cart Functionality: Implement a functional shopping cart system for users to add products, manage their selections, and proceed to checkout.
- Billing and Discounts: Calculate bills accurately based on user purchases and apply discounts for registered users, encouraging user engagement and loyalty.
- Data Integrity: Utilize appropriate data structures and algorithms to maintain data integrity, ensuring accurate storage and retrieval.
- Error Handling and Testing: Implement robust error-handling mechanisms and conduct thorough testing to identify and rectify issues, guaranteeing system stability.
- Security Protocols: Apply encryption techniques for password storage and adopt measures to protect against common security vulnerabilities, ensuring user data security.
- Comprehensive Documentation: Maintain detailed documentation of the system's architecture, algorithms, data structures, and code to support future maintenance, updates, and scalability.
- User Education: Provide user guides and documentation to help users navigate the system effectively.

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