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**RetailPro – Design and Implementation of a Web-based Sales and
Inventory Management System for Small Retail Businesses**



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DEDICATION

This work is dedicated to our families, whose unfailing love, support, encouragement, and patience have been the cornerstone of our success. The countless hours they endured during late-night development sessions and the understanding they showed when our attention was consumed by code, database queries, and technical documentation were invaluable. We owe them more than words can express.

We also dedicate this effort to our supervisor, Sir Asad Ullah, whose patient guidance helped shape both our technical understanding and our academic approach to problem solving. His constructive feedback at every milestone kept us on track and pushed us to deliver a system that reflects genuine engineering thought rather than superficial prototyping.

Most importantly, we dedicate this project to the small retail business owners of Pakistan - the shopkeepers, pharmacists, grocers, and electronics traders who manage their livelihoods daily with manual notebooks and spreadsheets. It is our sincere hope that RetailPro, or systems like it, will one day ease the operational burden they carry every single day.

ACKNOWLEDGEMENT

In preparing this project, we were in contact with many people, researchers, academicians, and practitioners who contributed meaningfully to our understanding. We wish to express our most sincere appreciation first and foremost to our supervisor, Sir Asad Ullah of the Marketing and Business Department at Bahria Business School, for his encouragement, detailed guidance, critical feedback, and continued support throughout this research journey. Without his insights on both the technical and business dimensions of this project, the system would not have reached the quality it represents today.

We are deeply thankful to the faculty and staff of Bahria University Islamabad for providing the academic infrastructure, library resources, and learning environment that made this research possible. The institution's emphasis on applied, project-based learning directly motivated us to build a working system rather than a theoretical model alone.

We extend sincere gratitude to the retail business owners in Islamabad and Rawalpindi who participated in our surveys and interviews. Their honest accounts of the daily challenges of managing inventory manually — from lost stock records to delayed end-of-day tallies - gave us the real-world grounding that shaped every feature decision in RetailPro.

We would also like to express our heartfelt appreciation to our friend, Ms. Warda Maryam, for her invaluable technical assistance, continuous guidance, and willingness to help throughout the development of this project. Her expertise, insightful suggestions, and support in resolving technical challenges played a significant role in the successful completion of RetailPro, and we are truly grateful for her contributions.

Finally, we acknowledge the open-source community whose tools made this project possible at zero cost: the PHP Group for PHP 8, Oracle and the MySQL team for MySQL 8, the Apache Software Foundation for the web server, and the XAMPP project for bundling these into a single, accessible local development environment that any student or small business can install for free.

EXECUTIVE SUMMARY

RetailPro is a fully functional, full-stack web-based Sales and Inventory Management System designed and developed to address the operational challenges faced by small retail businesses in Pakistan. The system replaces manual, paper-based inventory and sales recording practices with a centralized, database-driven web application that delivers real-time stock visibility, transactional accuracy, automated low-stock alerting, and a complete audit trail for every stock change.

The system uses a technology stack selected for affordability, reliability, and ease of use. The backend is developed in PHP 8 and provides four RESTful API endpoints across four files. The database is MySQL 8, hosted on XAMPP using localhost port 3306 with a database named **retailpro**. It uses the InnoDB storage engine to support secure transactions and enforce foreign key relationships. Apache, included with XAMPP, handles HTTP requests. The frontend is a 1,675-line single-page application (SPA) built with HTML5, CSS3, and Vanilla JavaScript. It does not use external frameworks, build tools, or npm, and communicates with the backend through JSON-based API calls using the browser's built-in `fetch()` function.

The backend includes **config.php**, which creates the PDO database connection, enables exception-based error handling, disables emulated prepared statements, and provides shared helper functions used by all API endpoints. The **auth.php** endpoint authenticates users by checking their email, password, and active status with prepared SQL statements. The **products.php** endpoint supports full CRUD operations: retrieving active products with category names, adding new products with duplicate SKU checking and automatic category creation, updating selected product fields while validating SKU uniqueness, and performing soft deletion by setting `is_active = 0` to preserve sales history. The **sales.php** endpoint records sales using ACID-compliant transactions. It locks the selected product row, checks stock availability, updates inventory, records the sale, creates an audit log in the `stock_adjustments` table, and rolls back the transaction if an error occurs.

The frontend SPA includes five main modules: a Dashboard that displays live business statistics such as total products, stock value, today's sales, low-stock items, total revenue, top-selling products, and recent transactions; an Inventory module with filtering and stock

adjustment features; a Products module for full CRUD operations; and a Sales module that provides sales history, date-range filtering, and a new sale form.

The system was evaluated through surveys of ten retail businesses, user testing with five business owners, and concurrent transaction stress testing. The results showed that all project objectives were successfully achieved.

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