

**Report on Database Project: Online Shopping Cart (E-Commerce Website)**

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**Table of Content**

Abstract ................................................................................................................................... 3

Introduction ............................................................................................................................. 4

* Objectives ................................................................................................................... 4

Project Overview ...................................................................................................................... 4

* User Features .............................................................................................................. 5
* Admin Features ........................................................................................................... 5

Technologies Used ................................................................................................................... 5

* Front-End Development .............................................................................................. 5
* Back-End Development ............................................................................................... 5
* Database ..................................................................................................................... 5
* Tools and Software ..................................................................................................... 5

Development Process .............................................................................................................. 6

* Requirements Analysis ................................................................................................ 6
* System Design ............................................................................................................. 6
* Implementation .......................................................................................................... 6
* Testing ......................................................................................................................... 6

Challenges Faced ...................................................................................................................... 6

Key Features ............................................................................................................................. 7

* User Registration and Login ........................................................................................ 7
* Dynamic Product Catalog ............................................................................................ 7
* Cart Management ....................................................................................................... 7
* Order Management .................................................................................................... 7
* Email Notifications ...................................................................................................... 7
* Admin Panel ................................................................................................................ 7

Results and Achievements ....................................................................................................... 7

Conclusion ................................................................................................................................ 7

Acknowledgments .................................................................................................................... 7

References ............................................................................................................................... 7

**Abstract**

This report delves into the comprehensive development process of an E-Commerce Website designed for selling electronics products online. The project encompasses a fully functional platform where users can register, log in, browse products, add items to their cart, and place orders. The administrative interface empowers the admin to manage inventory, orders, and customer interactions efficiently. One of the standout features is the integration of an email notification system to enhance user engagement and operational transparency. The development process utilized modern technologies, including Java, JSP, MySQL, and Bootstrap, ensuring robust back-end functionality and a user-friendly front-end design. This document details the methodologies, challenges, and achievements encountered during the creation of this project, demonstrating our team's capability to deliver a reliable and scalable web application.

**Introduction**

In today's digital age, online shopping has become an integral part of consumers' lives, offering convenience and accessibility. Recognizing the growing demand for efficient and user-centric e-commerce platforms, we undertook the development of an E-Commerce Website specifically for electronics products. This project was designed to provide a seamless shopping experience for users while equipping administrators with the tools to manage the platform effectively.

**The primary objectives of this project include:**

* Creating a user-friendly interface for customers to browse and purchase products.
* Developing a secure and efficient back-end system for managing user data, orders, and inventory.
* Integrating email notifications to keep users informed about their activities on the platform.
* Providing robust administrative controls to handle product listings, inventory, and order processing.
* This report outlines the comprehensive steps undertaken during the project's development, including design considerations, technical implementations, and testing phases.

**Project Overview**

The E-Commerce Website facilitates the buying and selling of electronics products through an intuitive and responsive web interface. The platform caters to both end-users (customers) and administrators, offering tailored functionalities for each.

**User Features**

* Registration and login functionality with secure authentication.
* Browsing products by categories and applying filters.
* Adding products to the cart with options to update quantities.
* Checkout process with a demo payment gateway.
* Order tracking and management.
* Email notifications for registration, order confirmation, and shipping updates.

**Admin Features**

* Managing product inventory (**add**, **update**, **remove products**).
* Viewing and updating order statuses (e.g., **shipped**, **delivered**).
* Receiving low-stock notifications and restocking items.

**Technologies Used**

The project was developed using the following technologies:

**Front-End**

* HTML
* CSS
* JavaScript
* Bootstrap

**Back-End**

* Java (JDK 8+)
* JSP (Java Server Pages)
* Servlets
* JDBC (Java Database Connectivity)

**Database**

* MySQL

**Tools and Software**

* Git for version control
* Eclipse EE for integrated development environment (IDE)
* Apache Maven for project management
* Tomcat server for deployment

**Development Process**

**Requirements Analysis**

The first phase involved understanding the requirements of an e-commerce platform, including customer and admin functionalities. We conducted thorough research on existing solutions to identify gaps and opportunities for improvement.

**System Design**

The system architecture was designed to separate concerns between the front-end, back-end, and database. UML diagrams, including use case and sequence diagrams, were created to visualize the workflow.

**Implementation**

* **Front-End Development:** The user interface was built using HTML, CSS, JavaScript, and Bootstrap to ensure a responsive and visually appealing design.
* **Back-End Development:** Business logic was implemented using Java, JSP, and Servlets. Secure handling of user data and transactions was prioritized.
* **Database Integration:** MySQL was used for data storage, with tables for users, products, orders, and inventory. Queries were optimized for performance.
* **Email Integration:** Gmail API was used to send notifications to users during registration, order placement, and shipping updates.

**Testing**

The project underwent rigorous testing to ensure functionality, usability, and security. Unit tests, integration tests, and user acceptance tests were conducted to identify and resolve issues.

**Challenges Faced**

* **Database Optimization:** Ensuring efficient queries for a growing product and user base required iterative improvements.
* **Email Integration:** Configuring the Gmail API securely to send notifications posed initial challenges but was resolved with app-specific passwords.
* **Cross-Browser Compatibility:** Ensuring a consistent user experience across different browsers required extensive testing and adjustments.

**Key Features**

* **User Registration and Login:** Secure authentication and validation for new and existing users.
* **Dynamic Product Catalog:** Search and filter functionality for products.
* **Cart Management:** Add, update, or remove items from the cart seamlessly.
* **Order Management:** Real-time updates on order statuses.
* **Email Notifications:** Automated emails for key user actions.
* **Admin Panel:** Comprehensive tools for inventory and order management.

**Results and Achievements**

The E-Commerce Website met all the defined objectives, providing a robust platform for online shopping. User feedback highlighted the intuitive design and seamless functionality. The project demonstrated our ability to develop scalable and user-centric applications, showcasing expertise in full-stack development.

**Conclusion**

This project exemplifies the application of modern web technologies to solve real-world problems. By addressing the needs of both customers and administrators, the E-Commerce Website offers a comprehensive solution for managing online sales and operations. The experience gained during this project has enriched our technical and collaborative skills, preparing us for future challenges in web development.

**Acknowledgments**

We extend our gratitude to our mentors and peers who provided guidance and feedback throughout this project. Their support was invaluable in overcoming challenges and achieving our goals.

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