

ONLINE SHOPPING CART

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report “**Online Shopping Cart**” is the bonafide work of “**Manjula Jaiswal(22BCS12266), Shreya Kumari (22BCS16807)**” who carried out the project work under my supervision.

Submitted to

Mupnesh Kumari

(E15012)

Acknowledgement

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ABSTRACT

The rapid growth of e-commerce has made online shopping platforms essential for modern retail experiences. This project presents the design and implementation of an Online Shopping Cart System, developed with Java as the primary backend programming language. The system allows users to browse products, add them to a cart, and proceed with a secure and efficient checkout process. By focusing on a user-friendly interface and robust backend logic, the platform ensures a seamless shopping experience from product selection to payment.

Java was chosen for the backend due to its platform independence, strong object-oriented features, and extensive support for web technologies through frameworks such as Spring Boot and JSP/Servlets. The application maintains a dynamic product catalog, handles session-based cart operations, and integrates with a database to store product, order, and user information. Security measures such as form validation, login authentication, and secure transaction handling have been implemented to enhance trust and reliability.

This project demonstrates a practical application of Java in building scalable, secure, and responsive web-based systems. It highlights key aspects of e-commerce development including data handling, user session management, and integration with payment gateways. Overall, the system provides a foundation for real-world online retail solutions and can be further extended with features like order tracking, reviews, and personalized recommendations.

CHAPTER 1: INTRODUCTION

1.1 Project Overview:

This project focuses on the development of an Online Shopping Cart System with Java as the backend programming language. The application allows users to browse products, add items to their virtual cart, and proceed with secure checkout and payment processing. The backend, built using Java (Servlets, JSP, or Spring Framework), handles key functionalities such as user authentication, product catalog management, inventory control, and order processing. Data is stored and managed using a relational database like MySQL, and the system ensures real-time updates to the cart and stock levels. The project is designed to be scalable, user-friendly, and secure, supporting features such as session management, transaction handling, and product filtering, making it a complete e-commerce backend solution.

1.2 Project Objective:

The objective of this project is to develop a dynamic and user-friendly Online Shopping Cart system that enables users to browse, select, and purchase products seamlessly through a web interface. The backend is implemented in Java, ensuring robust server-side processing, secure data handling, and efficient communication with the frontend. This system aims to provide core functionalities such as user authentication, product catalog management, cart operations (add, update, remove), order processing, and payment integration. By utilizing Java's scalability and platform-independence, the application is designed to support high performance, modularity, and easy future expansion. Ultimately, the goal is to deliver a secure, reliable, and responsive e-commerce platform that enhances the online shopping experience for both customers and administrators.

1.3 Identification of Tasks:

Determining the key tasks for an e-commerce shopping website entails recognising the major duties that are essential for the steady effectiveness of the services to users. Here are the primary tasks:

(i) User Registration and Authentication:

- (a) According to users, secure sign-up and login mechanisms must be employed.
- (b) User must be able to log in to the application using their social media accounts.

(ii) Product Management:

- (a) Modify product database, meaning: create new product listings, update existing ones, and remove some.
- (b) It is used to categorize products and handle their attributes.
- (c) On this website, you need to be able to upload and manage good quality images and descriptions of the products.

(iii) Search and Navigation:

- (a) Design and implement a clear navigation bar.
- (b) Enhance it with filter-and-sort capabilities, which are commonplace in sophisticated search engines.

(c) Suggest the products with a specific personal approach.

(iv) Shopping Cart and Checkout:

(a) Allow users set an aspect of the program that would allow them to add, delete and edit things in their shopping cart.

(b) Check and facilitate, secure, and multiple payment gateways option for customers.

(c) Some of the features should include opportunities for the guest checkout and the save cart.

(v) Payment Processing:

(a) Facilitate with Credit Debit card, PayPal, Wallet Integration etc.

(b) Guarantee safe payments and address the necessary security protocols (SSL, PCI DSS).

(vi) Order Management:

(a) Approving or rejecting orders and preparing order confirming documents.

(b) Supervise the tracking of order status and keep customers well informed status of their order.

(c) Address cases of return, refund or exchange.

CHAPTER 2: BACKGROUND STUDY

2.1 Existing Solution:

Existing solutions for **online shopping carts** with **Java** at the backend typically leverage a combination of technologies to offer a smooth e-commerce experience. These solutions generally use **Java-based frameworks** such as **Spring Boot** or **Java EE** for building robust, scalable backend services. The shopping cart system includes features like product browsing, adding items to the cart, managing inventory, applying discount codes, and processing payments. **Spring MVC** handles the request-response cycle, while **Hibernate** or **JPA** is used for data persistence, managing product information, user accounts, and transaction records in a **relational database** like MySQL or PostgreSQL. Additionally, some solutions integrate **RESTful APIs** for handling customer requests, such as updating the cart, checking out, or tracking orders. To manage user sessions, **Spring Security** is often employed, ensuring secure access to the cart and personal information. These platforms are typically designed to be **highly modular**, allowing for easy integration with **payment gateways** (e.g., PayPal, Stripe), **shipping APIs**, and even third-party marketing or recommendation engines. These Java-based shopping cart solutions are widely used in small to medium-scale e-commerce platforms due to their flexibility, scalability, and ease of maintenance.

2.2 Problem Definition:

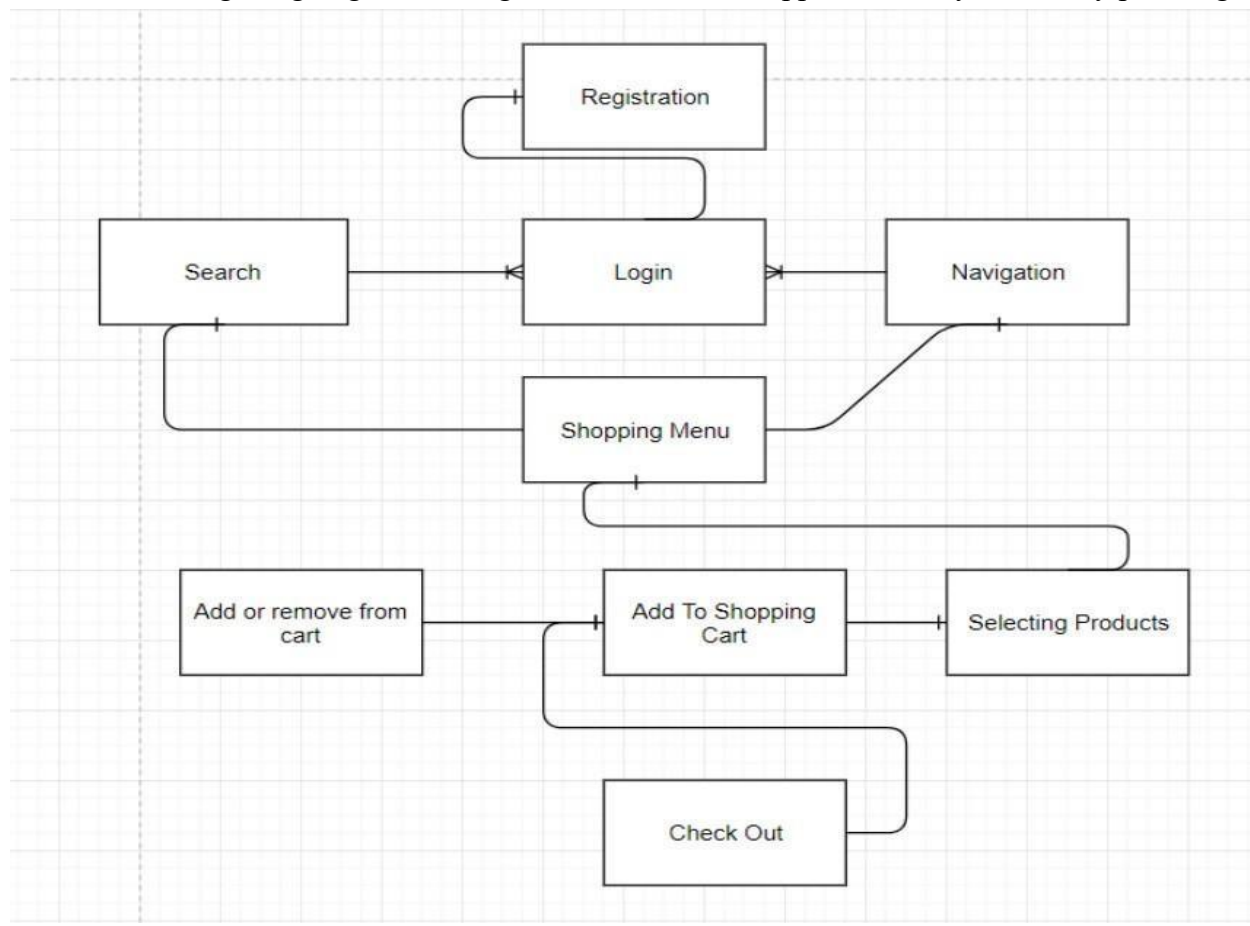
In the era of digital commerce, online shopping has become a primary mode of retail for consumers. However, the lack of an efficient, user-friendly, and reliable shopping cart system can negatively impact the user experience, resulting in lost sales and customer dissatisfaction. An online shopping cart serves as a critical component in e-commerce platforms by allowing users to add, review, and manage their selected products before making a purchase. The problem lies in the need for a seamless, real-time solution that accurately tracks items, updates inventory, calculates totals (including taxes, discounts, and shipping), and ensures secure transaction processing.

Moreover, the absence of personalized features such as saving carts, product recommendations, or integrating with payment gateways and delivery tracking systems can limit the platform's effectiveness. Many existing systems either lack scalability, perform poorly under high traffic, or fail to adapt to different devices and browsers. Therefore, the development of a robust, dynamic, and secure online shopping cart system using modern backend technologies like Java is essential to enhance user satisfaction, streamline business operations, and support the growing demand for e-commerce services.

CHAPTER 3: METHODOLOGY

3.1 Methodology

Planning out an e-commerce website means setting clear objectives and scope, researching proper markets, and choosing the right platform. It would then be the design and user experience portion: one would have to come up with wireframes and mockups of what the website would look like in regard to usability and responsiveness from device to device in each case. In development, one will take into account key functionalities such as product listings, checkout procedures, and integration of payment systems. This should be followed up with rigorous testing in the areas of usability, performance, and security, preceded by the phase of content creation. This shall include high-quality product descriptions and media. Strategic marketing through a well-thought-out post-launch strategy is important in promotion and customer engagement. This would ensure continuous process improvement and adaptability to changing market conditions through ongoing monitoring and maintenance, supplemented by scalability planning



Working Of a Online Shopping Cart

An online shopping cart is a fundamental component of e-commerce websites that allows customers to select items for purchase. Here's a breakdown of the methodology behind implementing an effective online shopping cart:

Core Components:-

➤ Item Selection & Storage

- a) Products are displayed with "Add to Cart" options
- b) Selected items are stored temporarily (cookies, local storage, or server-side sessions)
- c) Each item maintains quantity, price, options, and product ID information

➤ Cart Functionality

- a) Add items
- b) Remove items
- c) Update quantities
- d) Save items for later
- e) Apply promo codes/discounts
- f) Calculate totals, taxes, and shipping

➤ User Experience Flow

- a) Browse products → Add to cart → Review cart → Proceed to checkout

➤ Technical Implementation

- a) The implementation typically involves both frontend and backend components:

b)

a) Frontend:

- JavaScript for dynamic updates
- AJAX for asynchronous updates without page refreshes
- State management (managing the cart data)
- User interface elements (mini-cart previews, cart page, etc.)

b) Backend:

- Database for product information
- Session management
- Price calculation logic
- Inventory validation

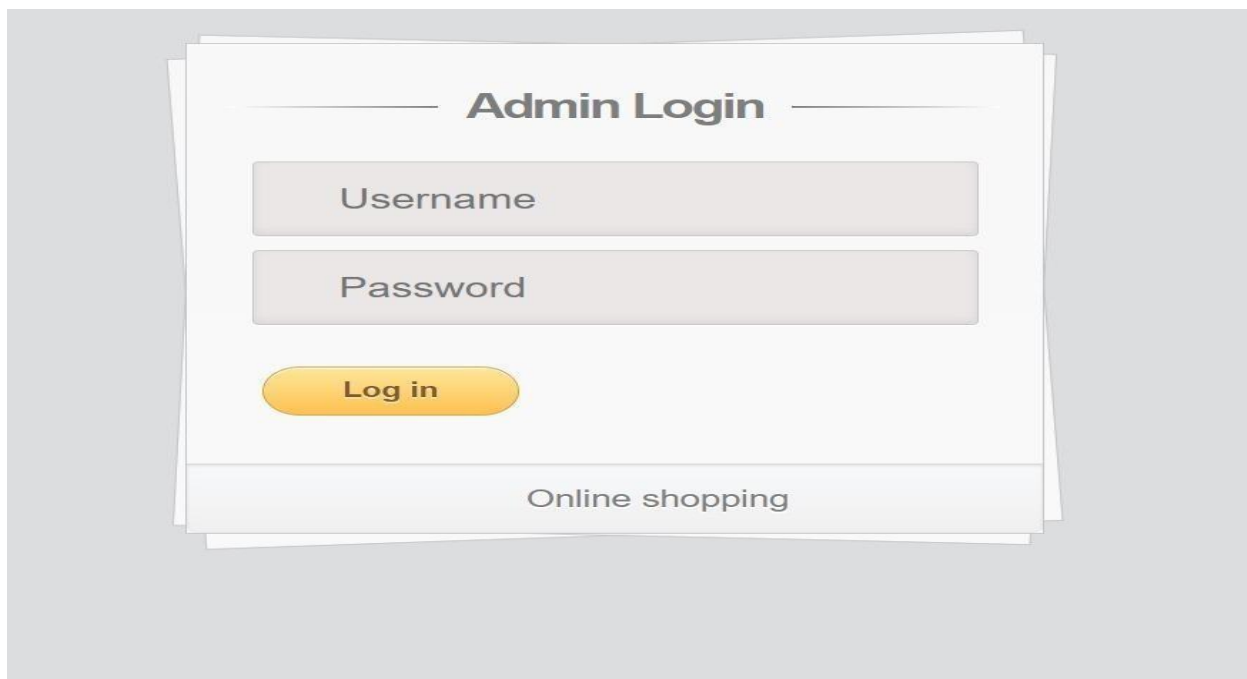
CHAPTER 4: RESULTS ANALYSIS AND VALIDATION

4.1 Implementation of Solution:

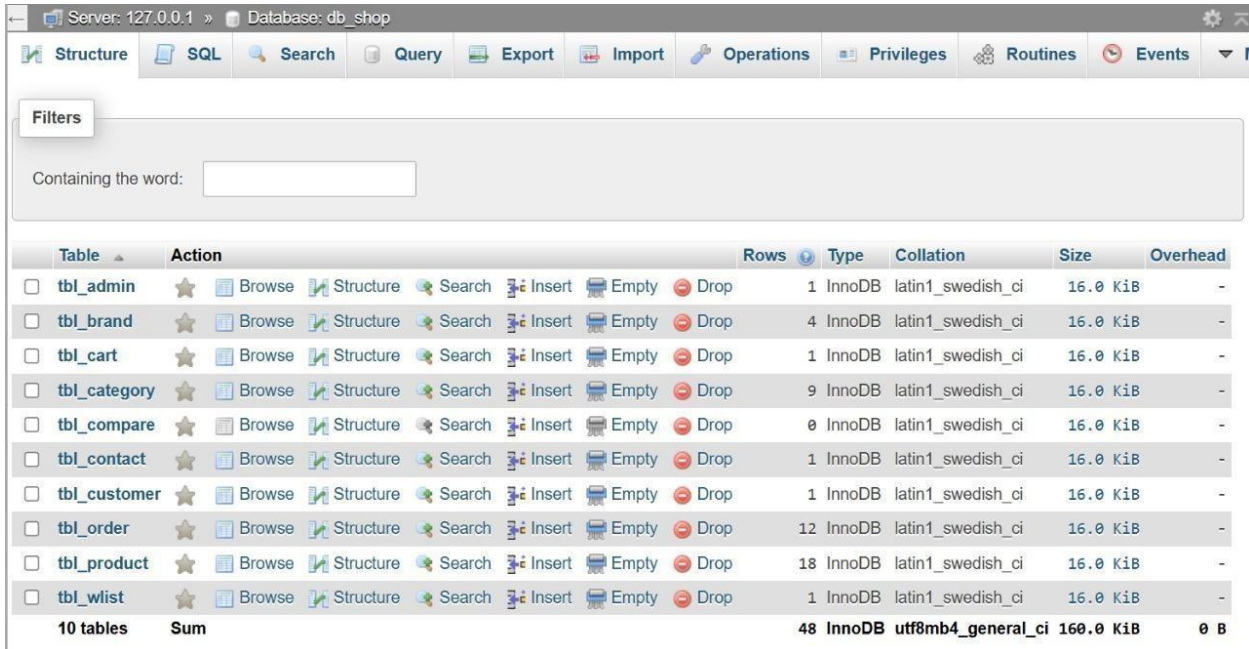
A well-designed online shopping cart begins with a robust backend structure using technologies like Node.js or Django to handle product data, user authentication, and transaction processing. The implementation requires a database schema that efficiently tracks product inventory, user accounts, and order history, while maintaining relationships between these entities. The server-side logic must handle operations such as adding/removing items, calculating totals with tax and shipping costs, and processing secure payment transactions.

The frontend implementation focuses on creating an intuitive user interface that displays the cart contents, allows quantity adjustments, and provides clear feedback on inventory availability. This typically involves HTML/CSS for structure and styling, with JavaScript frameworks like React or Vue.js to create dynamic components that update in real-time as users interact with their cart. Special attention must be paid to responsive design principles to ensure the shopping experience remains seamless across desktop and mobile devices.

Finally, security considerations are paramount in any shopping cart implementation. This includes implementing HTTPS for all communications, utilizing tokenization for payment processing to avoid storing sensitive card information, and employing protection against common vulnerabilities like SQL injection and cross-site scripting attacks. Performance optimization techniques such as caching frequently accessed data and lazy loading of product images help ensure the cart remains responsive even during high-traffic periods, while analytics integration allows for tracking user behavior to identify abandonment patterns and optimize the checkout flow.



Login Page



Server: 127.0.0.1 » Database: db_shop

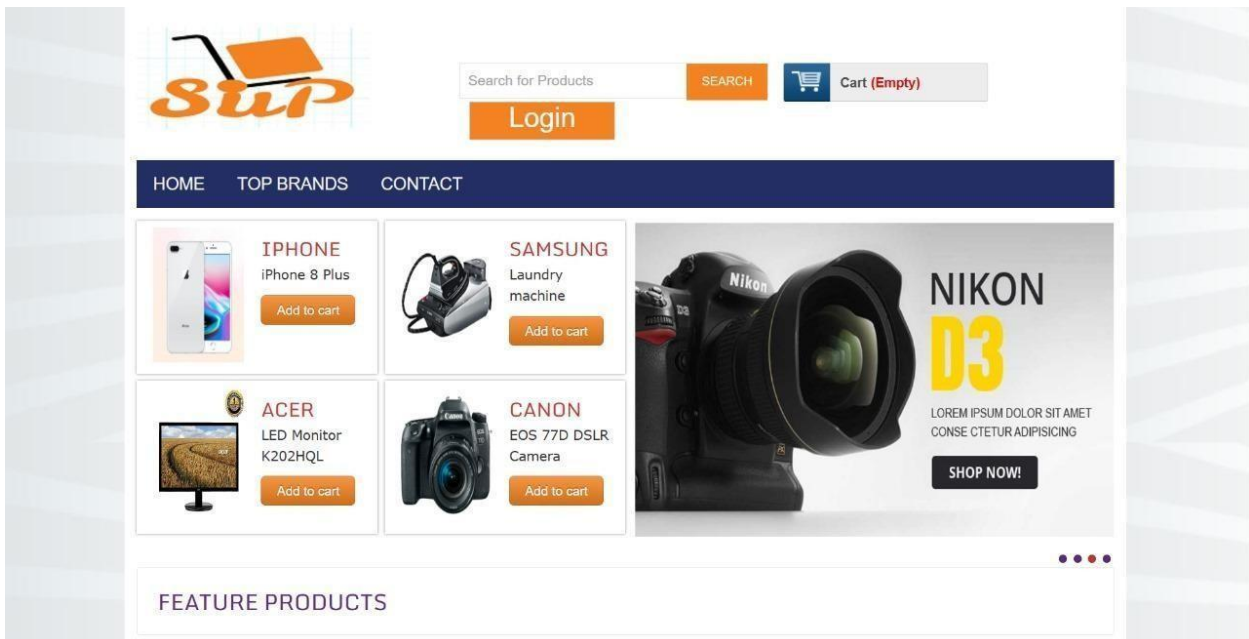
Structure SQL Search Query Export Import Operations Privileges Routines Events

Filters

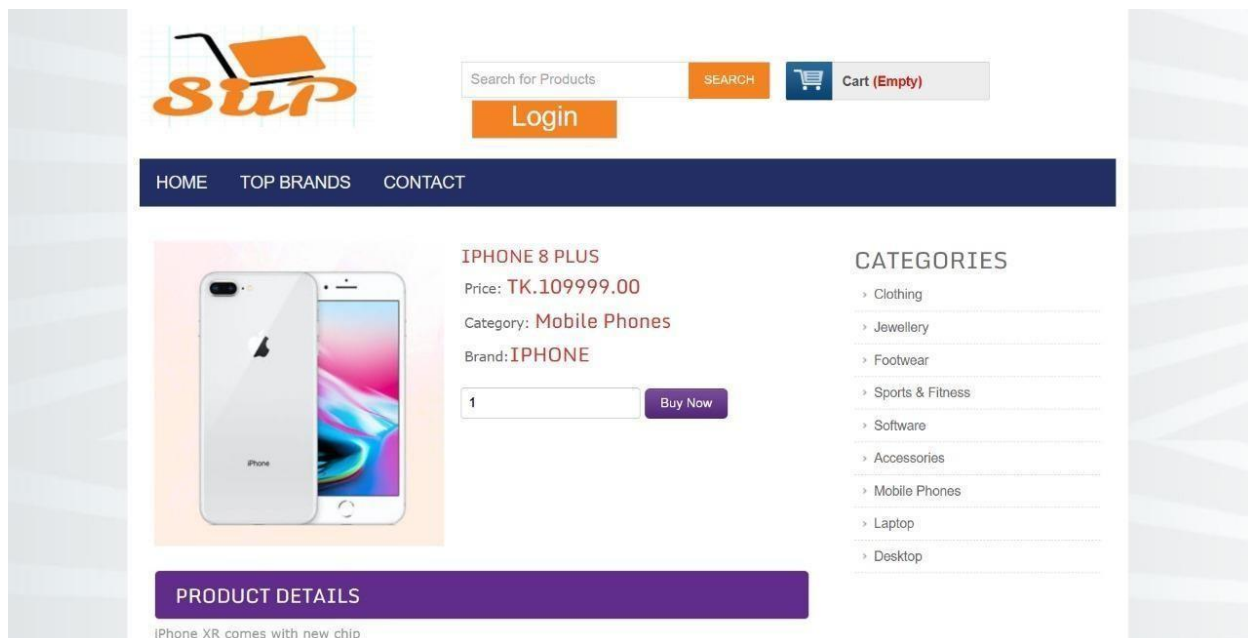
Containing the word:

Table	Action	Rows	Type	Collation	Size	Overhead
<input type="checkbox"/> tbl_admin	★ Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16.0 KiB	-
<input type="checkbox"/> tbl_brand	★ Browse Structure Search Insert Empty Drop	4	InnoDB	latin1_swedish_ci	16.0 KiB	-
<input type="checkbox"/> tbl_cart	★ Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16.0 KiB	-
<input type="checkbox"/> tbl_category	★ Browse Structure Search Insert Empty Drop	9	InnoDB	latin1_swedish_ci	16.0 KiB	-
<input type="checkbox"/> tbl_compare	★ Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	16.0 KiB	-
<input type="checkbox"/> tbl_contact	★ Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16.0 KiB	-
<input type="checkbox"/> tbl_customer	★ Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16.0 KiB	-
<input type="checkbox"/> tbl_order	★ Browse Structure Search Insert Empty Drop	12	InnoDB	latin1_swedish_ci	16.0 KiB	-
<input type="checkbox"/> tbl_product	★ Browse Structure Search Insert Empty Drop	18	InnoDB	latin1_swedish_ci	16.0 KiB	-
<input type="checkbox"/> tbl_wlist	★ Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16.0 KiB	-
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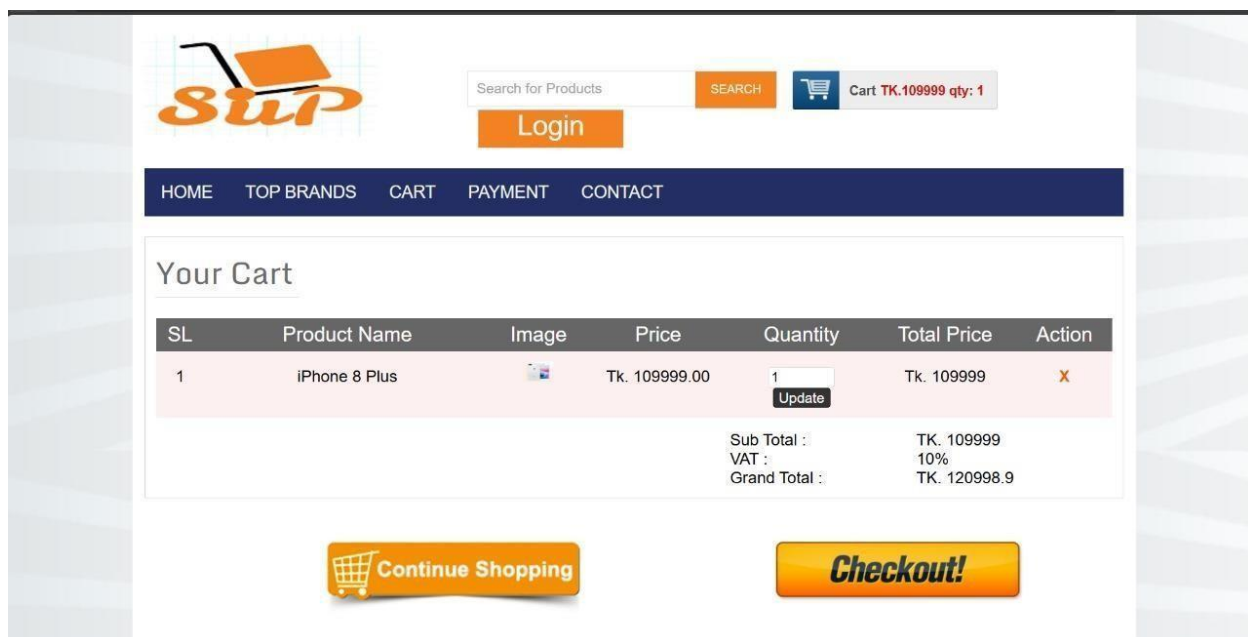
Database



Website



Website



Product Cart

CHAPTER 5: CONCLUSION AND FUTURE WORK

5.1 Conclusion:

In conclusion, an **online shopping cart** is an essential component of e-commerce platforms, providing users with a seamless and efficient way to browse, select, and purchase products. By allowing customers to add items, view their selections, and make adjustments before completing their purchases, the shopping cart enhances the overall shopping experience. A well-designed cart system not only improves customer satisfaction but also facilitates smooth transitions from browsing to checkout, increasing conversion rates for online businesses. Integrating additional features like price calculation, promotions, and real-time stock updates ensures that customers have an intuitive and satisfying experience.

Moreover, from a technical perspective, an online shopping cart involves a robust backend system to handle inventory management, user authentication, and secure payment processing. Utilizing a reliable framework like Java for backend development ensures scalability, security, and efficient data handling, crucial for maintaining performance and reliability as the user base grows. With continuous advancements in technology, future improvements may include more personalized shopping experiences, enhanced security measures, and integration with other online services, further boosting the functionality and success of online shopping carts in the e-commerce ecosystem.

5.2 Future Work:

The future work for an online shopping cart system could involve enhancing the user experience through personalized recommendations and seamless integration with advanced technologies like **Artificial Intelligence (AI)** and **Machine Learning (ML)**. By leveraging AI, the system could analyze customer behavior, predict preferences, and offer tailored product suggestions in real-time, leading to increased user engagement and higher conversion rates. Furthermore, implementing **chatbots** or **voice-based assistants** could simplify the shopping process, enabling users to interact with the system more intuitively and receive immediate assistance, making the shopping experience even more personalized and efficient. Additionally, enhancing the security of payment methods and transactions through **blockchain** or **biometric authentication** could create a more secure and trustworthy platform for customers.

Another critical area of future development is the optimization of the **mobile shopping experience** and **multi-channel integration**. With the increasing use of smartphones for online shopping, ensuring that the shopping cart system is fully optimized for mobile devices is essential. This includes improving loading times, mobile payment options, and responsive designs. Additionally, integrating the shopping cart across multiple platforms, such as web, mobile, and even voice-controlled devices like smart speakers, would provide a **seamless omnichannel experience**. Moreover, **AI-driven inventory management** could help streamline stock control and provide real-time product availability information, improving the backend efficiency of the system. As the e-commerce landscape evolves, integrating features like **Augmented Reality (AR)** to visualize products or **predictive analytics** to forecast trends will help businesses stay competitive and provide a more futuristic shopping experience for consumers.

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