# EASYMALL: SELF-SERVICE KIOSK SYSTEM

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## ABSTRAK

The EasyMall Self-Service Kiosk System was created to improve the shopping experience in public areas like malls and college campuses. Without the assistance of personnel, it offers consumers a digital interface via which they may browse classified food and drink products, place orders, choose from a variety of flexible payment options, and leave comments. Out-of-stock orders are avoided by real-time inventory management, and the system simulates a real-world self-checkout experience by supporting QR code-based payments (such as Alipay and Touch 'n Go).

The system was developed using PHP for the backend services and was designed and edited with Sublime Text 3. It was then deployed locally using the XAMPP environment. MySQL is used for data storage and management. The architecture supports modular development and multi-role access control, as well as deployment on systems running Windows and other compatible operating systems.

The system demonstrates how smart kiosks may offer a smooth, safe, and scalable self-service experience in today's retail environment. EasyMall digitises the traditional vending process, increasing operational efficiency, decreasing staff reliance, and improving customer happiness.

## PENGENALAN

In today's digital economy, the emergence of self-service technologies has transformed the way consumers engage with retail environments. Shopping malls, food courts and campus kiosks are increasingly adopting digital systems to reduce their reliance on manual labour, speed up transactions and improve customer experience. Traditional vending machines, which are often characterised by outdated interfaces, limited payment options and manual inventory management, no longer meet the expectations of modern users.

The EasyMall Self-Service Kiosk System has been designed to address these challenges by providing a user-friendly digital platform. This enables consumers to

browse categorised products, such as food and drink, and place and pay for orders independently. The system's real-time inventory tracking and flexible payment options ensure operational transparency, efficiency and convenience for users and administrators alike.

EasyMall is a practical step towards smart retail transformation, offering an effective, scalable, and interactive solution for unattended sales and self-checkout. The project's objectives include digitising the purchasing process, reducing human error and waiting times, and enabling automated stock monitoring. Features like order review, feedback collection, and administrative control also make the system adaptable to modern retail environments.

## METODOLOGI KAJIAN

The EasyMall Self-Service Kiosk System is developed using the Waterfall Model, a traditional, structured approach to software development that consists of sequential phases, including planning, analysis, design, implementation, and testing. Each phase must be completed before moving on to the next, ensuring that all system requirements are clearly defined and fully addressed. This methodology is ideal for academic projects because it provides clear

**Analysis Phase**

During this phase, the system's objectives and user requirements were identified. The study concentrated on common issues in retail settings, such as long lines, outdated product displays, and a lack of flexible payment options. We collected both functional (browsing items, placing orders, controlling inventory) and non-functional (usability, performance, compatibility) criteria.

A literature review was also conducted to examine self-service kiosk systems already in use in commercial environments, such as shopping malls, fast food outlets and convenience stores. These systems generated useful information that helped EasyMall plan its functional scope and feature set.

**Design Phase**

The design phase included creating system architecture diagrams, database schema, and interface wireframes. Key tasks involved:

- Structuring the system into frontend (HTML, CSS, JavaScript) and backend (PHP + MySQL)
- Designing categorized product pages (e.g., Food, Drinks)
- Planning admin interfaces for stock and order management
- Building the database with tables for products, orders, feedback, and users
- Creating activity diagrams and flowcharts for user flows (e.g., ordering, payment, feedback)

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This phase ensured modularity and clear data flow between the client and server components.

**Implementation Phase**

The implementation involved actual system development using:

- **Sublime Text 3** for code editing
- **XAMPP** as the local development environment
- **PHP** to handle backend logic such as order submission, admin login, and data updates
- **MySQL** for persistent data storage
- **HTML/CSS/JavaScript** for interactive user interfaces
- **LocalStorage** to manage client-side shopping carts
- **AJAX (Fetch API)** for asynchronous data transmission

Dynamic updates, payment method simulation, admin stock control, and feedback submission functionalities were all implemented during this stage.

**Test Phase**

White box testing was conducted on key backend components of the EasyMall Self-Service Kiosk System to validate its correctness and stability.

**White Box Testing**

Specific PHP files, including save_order.php and update_product.php, were tested thoroughly for logical correctness and database interaction. The testing process involved verifying:

- Order submission logic
- Product stock update operations
- Admin login and authentication validation
- Error handling and input validation

Step-by-step tests were performed using controlled input values to ensure that each function performed as expected. All queries, updates, and session checks were monitored through debug outputs and database inspection.

**White Box Testing**

User feedback was collected based on:

- Ease of navigation
- Readability of item labels and prices

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- Clarity of admin controls
- Responsiveness of the interface

Improvements were made based on suggestions, especially on styling and cart interaction behavior.

### Test Conclusion

According to the Waterfall methodology, each phase — analysis, design, implementation and testing — was completed with distinct deliverables, ensuring an organised approach to development. Testing verified that the EasyMall system met the project goals, including reliable payment simulation, admin-side control, efficient browsing and user satisfaction, achieved through automation and feedback. The finished product is suitable for deployment in shopping centres or on campuses and provides a user-friendly, self-service retail experience.

## Detailed Function Description

### User and Order Management Functions

- **Product Browsing**: Users can browse products categorized under food and water. Each item displays a name, price, image, description, and availability.
- **Shopping Cart Management**: The system supports adding or removing products into a dynamic shopping cart, with real-time updates based on local storage.
- **Order Placement**: Users can proceed to payment after confirming the cart contents. Orders are stored in a MySQL database through PHP-based backend logic.
- **Payment Methods**: The system supports multiple payment options such as Alipay, Touch 'n Go (TnG), and credit/debit cards. QR codes are generated for e-wallet payments.
- **Receipt Option**: Users can choose whether to print a receipt after checkout. This is stored in the backend along with the order.
- **Feedback Submission**: After purchase, users can submit a rating or feedback regarding their shopping experience.

### Admin Management Functions

- **Product Data Management**: Admins can add, update, or delete products. Editable fields include product name, image URL, price, category, and description.
- **Stock Management**: Admins are alerted when stock levels fall below a set threshold. Stock quantities can be adjusted in the admin panel.
- **Order Monitoring**: Admins can view all orders submitted by users, including payment method, time, and receipt choice.

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- **Feedback Review**: Admins have access to all submitted feedback to evaluate user satisfaction and identify improvement areas.

**System & Technical Functions**

- **Authentication & Roles**: The system differentiates between admin and public users. Only admins can log in and manage data; public users access the system without login.

- **File Architecture**: The backend is developed using PHP with XAMPP and MySQL for data persistence. Frontend uses HTML, CSS, and JavaScript with localStorage integration.

- **Deployment**: The system runs on a web server (XAMPP) and is accessible via institutional hosting (e.g., `http://lrgs.ftsm.ukm.my/...`).

- **Feedback Storage**: Feedback is stored using PHP form handlers and displayed in an admin interface.

- **Order Submission Handler**: Key PHP files like `save_order.php` handle POST requests from the frontend and insert orders into the MySQL database.

**Order-Related Functions**

1. Admins can manage the food and water categories via the product management interface. They can add, update or delete product details, including the product's name, image, description, category and price.
2. Public shoppers can access the system without logging in, browse product categories, select items and place orders via an interactive shopping cart. They can remove items and update quantities before confirming payment.
3. Admins can view submitted orders from the admin panel. Each order includes an item list, the total amount, the payment method (e.g. TNG or Alipay) and the receipt preference. Admins can monitor order flow and check for low stock alerts.
4. After making a purchase, users can submit ratings or written feedback about their experience. This feedback is stored and visible to administrators.
5. Admin Mode → Order Management provides a complete order record view, allowing filtering by time, payment method and user feedback for analysis and reporting purposes.

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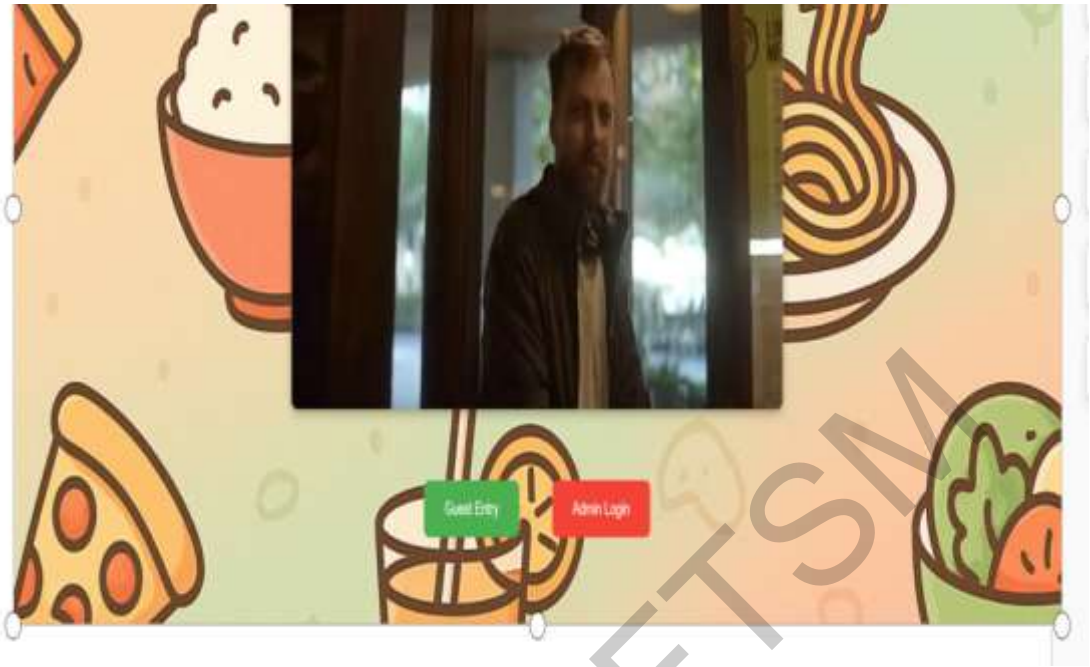


Figure 1 Entry Interface

## System Entry Interface

When users visit the platform, they are greeted with a site that acts as the portal to the vending machine system. As illustrated in Figure X, this website has a backdrop with colourful food pictures and an embedded video that plays automatically. The film aims to increase user interaction and create a pleasant environment.

The interface has two basic navigation options: "Guest Entry" and "Admin Login." Users who want to explore and buy things can do so immediately by selecting the Guest Entry button, which takes them to the product selection page without requiring login. This allows for easy access for casual users.

Administrative users, on the other hand, must click the Admin Login button to be directed to a secure login window where their credentials may be entered. This split protects administrative responsibilities like as stock management and order tracking while preserving usability for regular users.

The interface is straightforward and intuitive, making it appropriate for both new and returning users.

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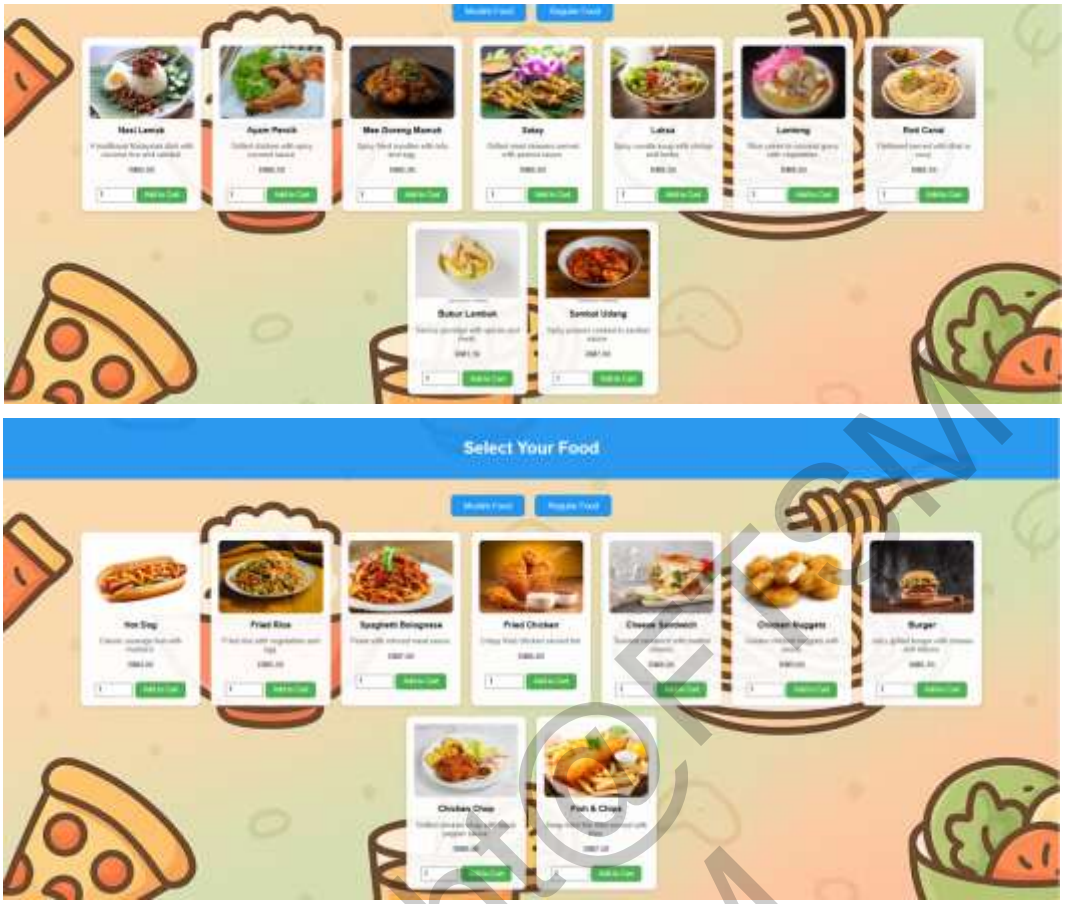


Figure 2 Food Order Interface

Once the user has successfully logged in, the platform displays the homepage for selecting food. As shown in Figure 2, the main interface features categorised food items, divided into 'Muslim Food' and 'Regular Food'. These categories are accessible via toggle buttons located at the top centre of the screen. Each food item is displayed as a card containing an image, name, brief description, price, quantity selector and an 'Add to Cart' button.

The page design features a visually appealing layout with a colourful background containing food-related illustrations, which creates an engaging and user-friendly experience. The consistent use of a card format for each item ensures clarity and ease of interaction. Users can browse the menu, select quantities and add the desired items to the cart for processing. This intuitive design supports streamlined selection and ordering processes within the vending system.

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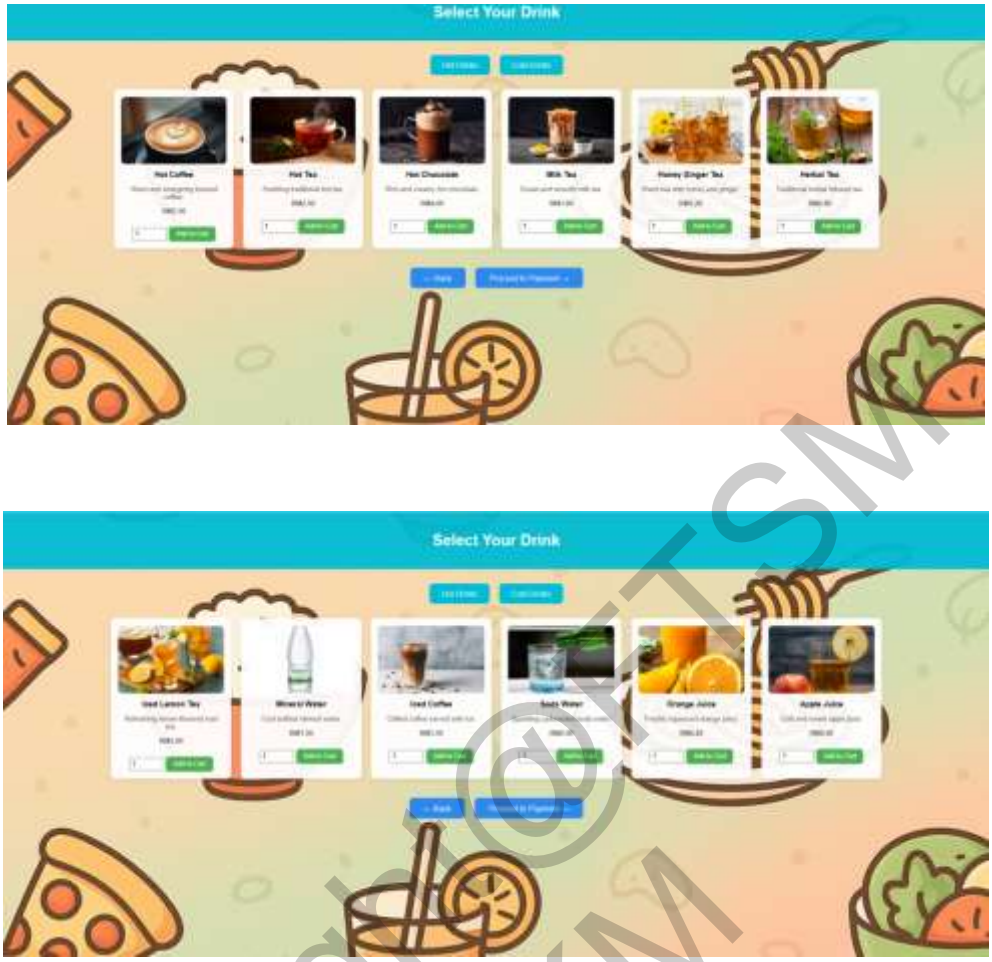


Figure 3 DrinkOrder Interface

After selecting food items, users are directed to the drinks selection interface. As shown in Figure X, the drinks page is categorised visually into two main tabs, 'Hot Drinks' and 'Cold Drinks', allowing users to switch seamlessly between types of beverage. The interface has a consistent background and theme, which maintains visual coherence with the rest of the platform.

Each drink is displayed as a card presenting an image, name, brief description, price, quantity input and an 'Add to Cart' button. Popular hot drinks, such as coffee, tea and hot chocolate, are grouped under the 'Hot Drinks' tab, while cold beverages, such as iced lemon tea, mineral water and various fruit juices, are available under the 'Cold Drinks' section.

At the bottom of the page are navigation buttons labelled 'Back' and 'Proceed to Payment', allowing users to return to the previous menu or proceed to the checkout. This ensures a smooth and logical shopping experience. This design enhances user interaction by offering intuitive controls and clearly organised product listings.

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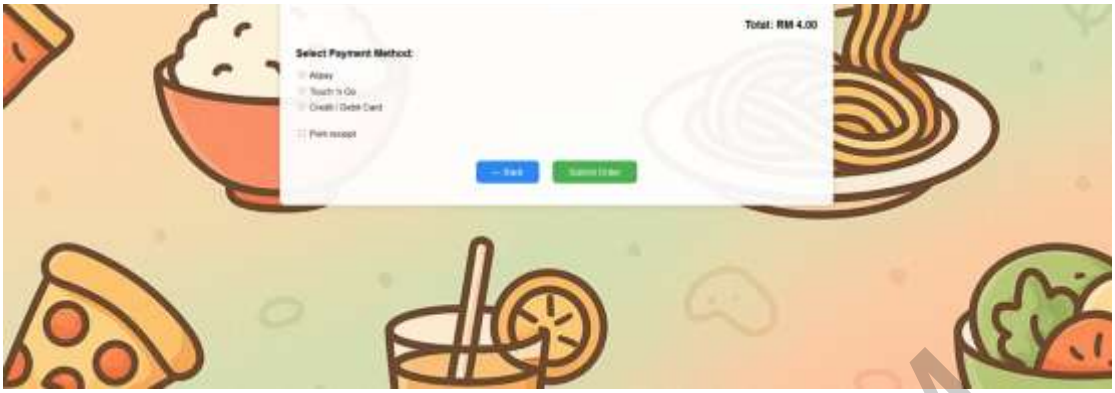


Figure 4 Payment interface

Once users have finalised their selections, the platform directs them to the payment interface, as shown in Figure 4. This page displays the total amount due in the top right-hand corner and provides a list of payment methods for users to choose from. The available options include Alipay, Touch 'n Go and credit/debit card, catering for a variety of preferences. Additionally, a checkbox labelled 'Print receipt' enables users to request a printed copy of their transaction.

Two navigation buttons are positioned at the bottom of the interface: 'Back' allows users to return and modify their order, while 'Submit Order' confirms the purchase and initiates the order processing sequence. The interface maintains the platform's consistent aesthetic with a themed background and clean layout, ensuring a smooth and intuitive checkout experience.

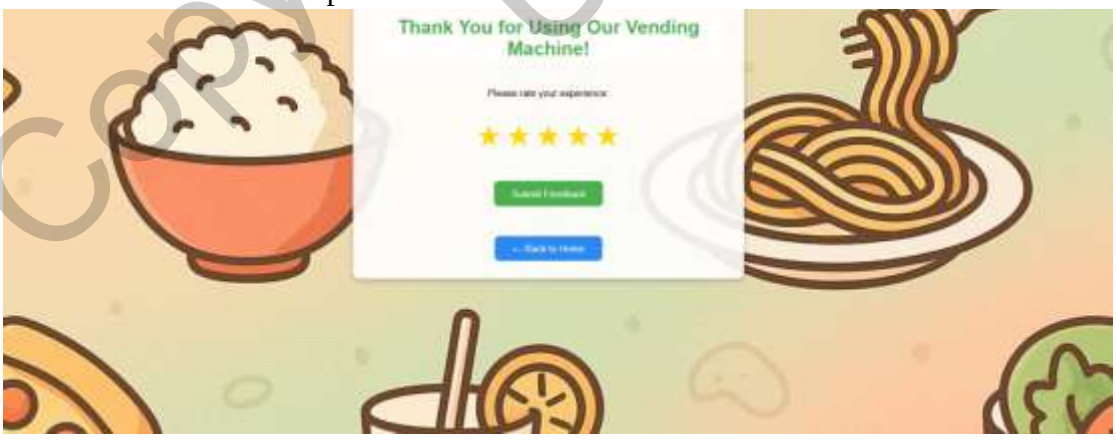


Figure 5 Feedback interface

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Once the purchase has been completed, the system transitions to the feedback interface, as shown in Figure 5. This page thanks the user for using the vending machine and invites them to rate their experience using a five-star scale. This provides a simple and intuitive way for users to express their level of satisfaction with the transaction process.

Below the rating is a green 'Submit Feedback' button that allows users to record their input into the system for service quality evaluation. A blue 'Back to Home' button is also provided to allow users to return to the main interface. The interface has a consistent design with the rest of the platform and features a visually appealing background and centralised layout to ensure a positive user experience when providing feedback.

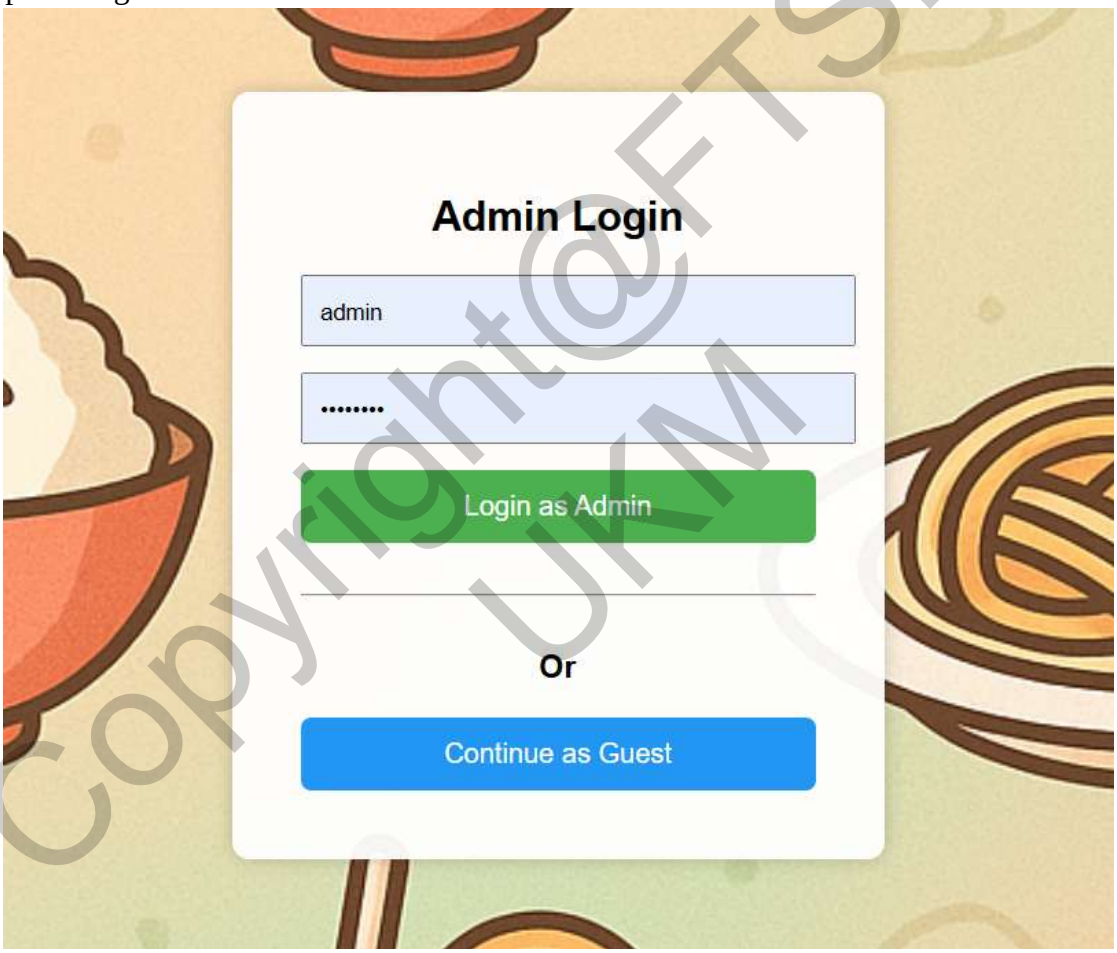


Figure 6 AdminLogin interface

When the order management module is accessed, the system prompts the user with an admin login interface, as shown in Figure 6. This login page offers two access options: 'Administrator Login' or 'Guest Access'. To access advanced functionalities such as order record viewing, system settings, and product management, administrators are required to enter a valid username and password.

The login form is centred on the page and includes two input fields for credentials, followed by a green 'Login as Admin' button. Below the login section is an alternative blue 'Continue as Guest' button for users who wish to proceed with limited access, such as viewing orders without editing permissions.

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This dual-access mechanism ensures both system security and flexibility. Only authorised personnel can perform administrative actions, while general users can still browse relevant data in restricted mode.

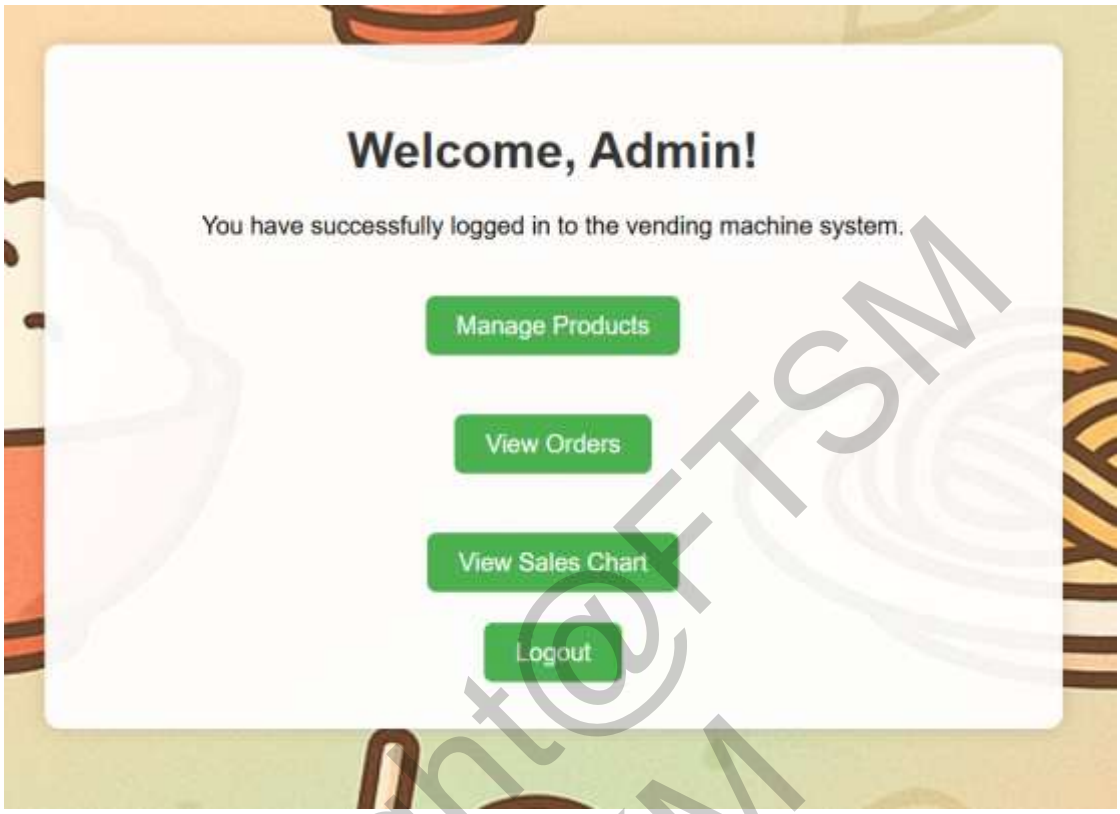


Figure 7 Admin Functions

After successfully logging in, the administrator is directed to the 'Admin Functions' interface, as shown in Figure 7. This page has four main buttons: 'Manage Products', 'View Orders', 'View Sales Chart' and 'Log Out'. This interface enables the administrator to efficiently manage items, monitor customer orders, view sales performance and log out of the system.


Figure 8 MANAGE PRODUCTS

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Figure 8 displays the Manage Products interface, which allows the admin to oversee all items listed in the vending system. The table includes columns for product ID, name, price in RM, category (e.g., muslim, hot, cold), and current stock levels. Admins can directly edit the stock value for each product and click the Update button to save changes. This interface ensures efficient inventory management by providing a centralized and intuitive layout for product updates.


Figure 9 View Orders Interface

This interface displays a detailed, tabular list of all customer orders. Each row includes the order ID, items purchased, total price, payment method (e.g. TNG, card or Alipay), receipt status and an 'Edit' button for making administrative changes. This allows the administrator to efficiently monitor and manage orders.

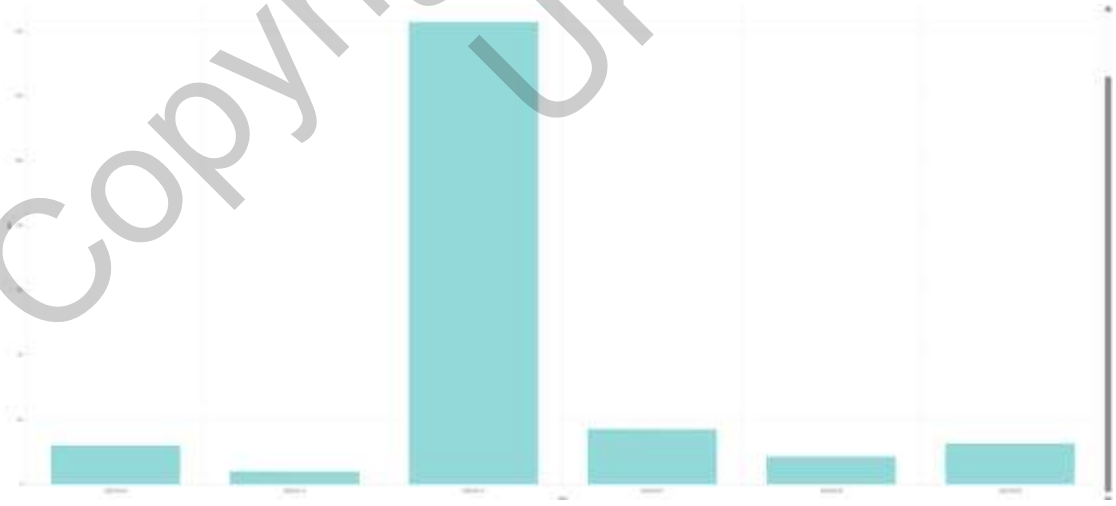

Figure 10 View Chart

This interface presents a bar chart that visualizes the sales data of various products. Each bar represents a specific item and its total sales quantity, allowing administrators to quickly identify best-selling and underperforming products for better inventory and sales strategy decisions.

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Usability testing is a final testing process conducted by user representatives and stakeholders to ensure that the developed food review platform provides the required functionality before it is released to the public. The purpose of usability testing is to evaluate the usability of the system, collect quantitative data, and assess user satisfaction.

The table shows The update_product.php script, which controls product update processes in the EasyMall Self-Service Kiosk System, underwent white box testing. In contrast to black box testing, this approach verifies that every line of the script operates as intended by examining its underlying logic, code structure, and control flow.

| Test Case ID | Description | Input Description | Expected Output | Path Covered |
|---|---|---|---|---|
| WC01 | Valid update | All required fields provided with valid values | {"status":"success", "message":"Product updated"} | Normal success path |
| WC02 | Missing name field | name is empty | {"status":"error", "message":" Missing required fields"} | Validation check → error path |
| WC03 | Invalid price format | price = "abc" | {"status":"error", "message":"Invalid input"} (or similar) | Type validation → error path |

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| Test Case ID | Result | Remarks |
|---|---|---|
| TC04 | Pass | Empty form submission blocked with appropriate error message |
| TC05 | Pass | Admin login redirected successfully to dashboard |
| TC06 | Pass | Guest access enabled without authentication |
| TC07 | Pass | Order stored correctly with selected items and total |
| TC08 | Pass | Feedback form stored comments into database successfully |

To further improve the usability of the self-service vending machine system, enhancements can be made in several key areas. Firstly, the payment and feedback interfaces could be optimised by refining the validation mechanisms and improving the responsiveness of the layout to ensure smoother user interaction and prevent submission failures. Implementing real-time confirmation messages and handling network or storage errors more effectively can improve transaction reliability further. Additionally, the product management module could be enhanced by adding category-based filters or search capabilities to help administrators locate and update product records more efficiently. Enabling advanced analytics, such as product popularity trends and time-based sales performance, would provide valuable insights for stock and marketing decisions. Furthermore, integrating real-time order tracking and receipt generation mechanisms would improve system transparency for both administrators and customers. Finally, enabling users to submit custom feedback messages alongside star ratings would enrich the data collected and better support continuous service improvement.

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**Cadangan Penambahbaikan**

Following thorough research, it was proposed that future improvements to this web-based, self-service kiosk machine system should focus on enhancing its interactivity and management features. For example, the system could integrate real-time inventory monitoring and auto-alert mechanisms to notify administrators when stock is low. Implementing user accounts with purchase history and personalised product suggestions would also improve user engagement. The feedback system could be extended to enable users to leave comments or upload images for product reviews. To boost efficiency, a more advanced order management panel with filters, charts and exportable reports would be useful for administrators. Lastly, multilingual support and accessibility features, such as high-contrast mode and keyboard navigation, would make the system more inclusive for all users.

## KESIMPULAN

The kiosk machine web system has demonstrated strong usability and functional reliability across key modules. Through comprehensive testing, all core administrative features—such as product management, order viewing, and sales chart generation—performed as expected, with intuitive user interfaces and responsive actions. The "Manage Products" section allows efficient stock updates, while the "View Orders" page displays itemized transactions with essential details such as payment method and receipt status. The "Sales Chart" provides visual insights into product popularity, enhancing decision-making for restocking and promotions.

Despite its overall stability, several areas for improvement remain. First, the system could benefit from real-time stock alert mechanisms to notify administrators when inventory drops below critical levels. This would prevent product shortages and ensure smooth operation. Additionally, implementing automated daily sales summaries and downloadable reports would enhance administrative convenience. For a more personalized experience, the system could integrate filtering options in the order table and support dynamic product categorization on the management interface.

From a compatibility perspective, the system functions smoothly across major browsers and devices, with no observed rendering issues. Security testing showed no major vulnerabilities; however, session timeout controls and login audit logs can be added to further strengthen the system’s integrity. Overall, the vending system is ready for deployment, with minor refinements recommended to boost performance and maintain operational transparency.

## PENGHARGAAN

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## RUJUKAN

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