

A Furniture Ordering System with OTP for Alghail

Hasan Mohammed Hasan Ahmed Al-hubaishi¹, Nur Ziadah Harun^{1*}

¹ *Fakulti Sains Komputer dan Teknologi Maklumat,
Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA*

*Corresponding Author: nurziadah@uthm.edu.my
DOI: <https://doi.org/10.30880/aitcs.2025.06.01.016>

Article Info

Received: 30 July 2024

Accepted: 18 June 2025

Available online: 30 June 2025

Keywords

One-Time Password, E-Commerce,
Ordering, Alghail Furniture, Account
Verification, Authentication, Security

Abstract

In today's digital landscape, where online transactions and systems are ubiquitous, ensuring information security is paramount. The existing manual order management process at Alghail Furniture lacks necessary security measures and operational efficiency, posing critical challenges in the realm of online furniture ordering. To address these issues, this project introduces a Furniture Ordering System for Alghail with a One-Time Password (OTP) verification after registration. This project caters to the domain of e-commerce by implementing a robust OTP verification system during user registration, which introduces dynamic and time-sensitive verification codes. Key security features, including Bcrypt hashing, password validation, Captcha, session timeout, and OTP-based verification, are integrated to fortify the system. The Agile methodology was employed, focusing on iterative development and continuous testing to ensure functionality and security. The system's beneficiaries include customers and administrators, providing a secure and user-friendly platform for order placement and account management. The anticipated outcomes encompass heightened security, a more efficient order processing system, and enhanced user experience. The project successfully improved order processing efficiency and user satisfaction, contributing to a safer and smoother landscape for online furniture shopping, addressing the evolving challenges in the digital realm.

1. Introduction

In today's digital era, ensuring information security is paramount, especially in the realm of online systems and transactions[1]. The Alghail Furniture Ordering System project focuses on enhancing security and streamlining the ordering process using One-Time Password (OTP) verification. This system addresses significant challenges in online furniture ordering, such as ensuring the security of personal and financial information. By automating the order placement process and implementing OTP-based user verification, the project aims to build user trust and reduce the risk of unauthorized access.

Currently, Alghail Furniture relies on a manual order management process that lacks essential security measures and operational efficiency. This manual approach is vulnerable to security breaches, operational inefficiencies, errors, and order processing delays. The proposed solution involves developing an automated ordering system with integrated OTP, providing dynamic user verification, and enhancing both security and efficiency[2]. This system will benefit various stakeholders, including users who can conveniently place orders online and administrators who can efficiently manage orders and user accounts.

The primary issue with the current manual system is the lack of robust security measures, which expose sensitive customer data to potential breaches. Additionally, operational inefficiencies result in errors and delays in processing high order volumes. Implementing an automated system with OTP verification after registration will

enhance security by ensuring that only legitimate users can create accounts, thereby reducing the risk of unauthorized access and improving operational efficiency.

The objectives of the project include designing and developing a web-based furniture ordering system with OTP verification and conducting security and user acceptance testing to ensure its reliability. The system's scope encompasses user registration, order placement, account management, and an admin interface for managing products, orders, and user accounts.

The outcomes of the project include enhanced security through OTP integration, streamlined order processing, and an interactive user interface that simplifies the registration and login process. Administrators will benefit from effective control over orders and user accounts via a user-friendly interface. Overall, the project aims to deliver a secure, user-friendly system that aligns with its objectives and scope.

The significance of this project lies in its potential to improve security and efficiency in online furniture transactions. By verifying user accounts through OTP during registration, the system ensures only legitimate access, contributing to a safer and more efficient online shopping environment. This project not only benefits Alghail Furniture but also sets a user-friendly standard for the broader e-commerce industry.

In this documentation, Section 2 discusses the related works and systems that are currently available in the market and provides a comparison between the available system and the proposed system. Next, Section 3 will explain the methodologies used for the development of this system. Section 4 will investigate the System Analysis and Design of the proposed system.

2. Literature Review

This section reviews relevant literature for the Alghail Furniture Ordering System with OTP. It covers Alghail Furniture's manual order process, explores e-commerce, emphasizes OTP, and analyzes key security features. The section also reviews existing online shopping systems for discussion.

2.1 Alghail Furniture

Alghail Furniture, situated on Algeria Street in Sana'a, Yemen, is a well-regarded furniture shop specializing in Sofas, cupboards, beds, tables, and desks. Despite its established reputation, Alghail Furniture currently relies on manual record-keeping using traditional methods such as paper and Excel spreadsheets. The five-person team, including a manager and cashier, manages day-to-day operations by manually handling orders. This conventional approach, though functional, presents challenges in efficiency, accuracy, and scalability. To address these issues and enhance information security, the Alghail Furniture Ordering System project introduces an OTP, aiming to revolutionize the order management process for improved security and efficiency in online furniture transactions.

2.2 E-Commerce

The evolution of e-commerce has transformed retail, providing convenience for consumers and new opportunities for businesses. Online ordering allows customers to browse, select, and purchase items from home, contrasting with the traditional need to visit physical stores. This shift emphasizes the importance of security to protect sensitive information and build user trust[3]. Key security measures include encryption technologies like OTP verification for user identity during registration. The Alghail Furniture Ordering System incorporates these best practices to ensure a safe and trustworthy online shopping experience.

2.3 Account Verification

Ensuring the authenticity of user accounts is crucial in e-commerce to maintain a secure and trustworthy platform. Account verification during registration prevents unauthorized access and protects sensitive information. Implementing One-Time Passwords (OTPs) offers a secure and user-friendly method, generating single-use code that cannot be reused if intercepted. OTP verification enhances security and is easy for users, involving code entry via email or SMS[4]. In the Alghail Furniture Ordering System, OTP verification safeguards the platform by ensuring only legitimate users can create accounts, prevent fraudulent registrations and aligning with industry's best practices.

2.4 Authentication

Authentication is essential for enhancing system security by validating user identities at the start of interactions, ensuring only authorized access. Traditional methods use usernames and passwords, but modern techniques employ multiple authentication factors, adding layers of security. In web applications, authentication confirms user identities by verifying credentials against a database of authorized users[5]. Advanced methods, like two-factor and multi-factor authentication, further strengthen this process, protecting against unauthorized access and potential breaches.

2.5 One-time Password

One-Time Password (OTP) is a crucial security mechanism for user authentication, generating unique codes for single use. In the Alghail Furniture Ordering System, OTPs are used for email verification during user registration, ensuring only legitimate users can create accounts. This method is resistant to various attacks, such as brute force and phishing scams, due to the time-sensitive nature of OTPs[6]. The system employs a robust OTP-generating algorithm, making code hard to guess or detect. Email OTP enhances authentication by reducing interception risks and enabling encryption[7]. In the Alghail system, users receive OTPs via email to complete registration securely.

2.6 Security Features

The Alghail Furniture Ordering System will bolster security with two-factor authentication and robust features such as Bcrypt hashing, stringent password policies, Captcha, session management, and activity logging. These measures aim to safeguard user information, prevent unauthorized access, and ensure the system's overall security integrity. Detailed explanations of these features will follow in subsequent sections as part of the ongoing system development and enhancement.

2.6.1 Bcrypt Hashing

The Alghail Furniture Ordering System employs Bcrypt hashing, a secure method that incorporates salting and intentional slowness to enhance password protection. Bcrypt's features make it resistant to precomputed attacks and brute-force attempts, adding an extra layer of defense against cybersecurity threats[8]. The system's use of Bcrypt ensures long-term efficacy and resilience, contributing to robust password security.

2.6.2 Password Validation

The Alghail Furniture Ordering System prioritizes password security by implementing password validation rules and ensuring strong and resilient passwords. Recognizing the risks associated with weak passwords, the system encourages users to create robust passwords through guidelines such as minimum length and the use of alphanumeric characters. Password meters provide visual feedback on password strength, guiding users to adhere to recommended security practices. Following OWASP guidelines, the system promotes the adoption of lengthy passwords and passphrases, emphasizing their significant impact on password strength[9].

2.6.3 CAPTCHA

The Alghail Furniture Ordering System incorporates CAPTCHA as a vital security measure, using diverse challenges to distinguish between human users and automated scripts. These challenges enhance digital security by preventing automated bots from exploiting the system[10]. The continual evolution of CAPTCHA techniques contributes significantly to safeguarding digital interactions, fortifying defenses against unauthorized access, and countering malicious activities.

2.6.4 Session Time-Out

The Alghail Furniture Ordering System incorporates a session time-out feature, a crucial security measure to enhance user authentication and prevent unauthorized access. This mechanism automatically logs users out after a predefined period of inactivity, minimizing the risk of security breaches, particularly in shared or public computer environments[11]. The implementation of a well-defined session time-out period in the Alghail system contributes to a secure and trustworthy online ordering experience, ensuring the confidentiality of user data and preventing potential security vulnerabilities.

2.7 Study of Existing Related Systems

In this section, a few existing systems related to furniture shopping systems were examined. The systems are Fortytwo, Mumu, and Majuhome websites. The purpose is to study the features and authentication mechanisms of the existing system. As a result of this, the Alghail furniture ordering system with OTP can be improved.

2.7.1 Fortytwo Website

FortyTwo Shop is a prominent online retail platform headquartered in Singapore[12]. Committed to ensuring a secure shopping experience, the platform's registration process mandates users to provide essential details, including their names, email addresses, and a secure password. The inclusion of a captcha adds an extra layer of security, deterring unauthorized registrations by automated bots. During the straightforward login process, users authenticate through a combination of their email address and the password created during registration.

2.7.2 Mumu Website

Mumu Shop, a trusted furniture retailer in Johor, Malaysia, focuses on providing a secure and personalized shopping experience[13]. The registration process gathers comprehensive user information, including names, email, telephone, address, and a secure password. With commitment to customer engagement, Mumu Shop tailors' services to specific regions. The straightforward login process requires users to enter their email and password.

2.7.3 Majuhome Website

Majuhome Shop in Kuala Lumpur, Malaysia, prioritizes a secure and personalized shopping experience[14]. The comprehensive registration process gathers user information for enhanced engagement. The streamlined login emphasizes security and user trust, aligning with the shop's success in Kuala Lumpur and providing a strategic model for regional market tailoring.

2.8 Comparison with the Existing Systems

Table 1 Analysis between Fortytwo, Mumu, Majuhome, and Alghail System

System	Fortytwo[12]	Mumu[13]	Majuhome[14]	Alghail furniture ordering system with OTP
Platform Used	Web-based	Web-based	Web-based	Web-based
Account verification	No	No	No	Yes
Login	Yes	Yes	Yes	Yes
Ordering	Yes	Yes	Yes	Yes
Password Validation	Yes	No	Yes	Yes
Captcha	Yes	No	Yes	Yes
Session Time- out	No	Yes	No	Yes
One-Time Password	No	No	No	Yes

Table 1 provides a comparative analysis of online shopping platforms, Fortytwo, Mumu, and Majuhome, with the proposed Alghail Furniture Ordering System. All operate on a web-based model, prioritizing user-friendliness and featuring a login function. Differences arise in password validation and captcha usage during registration. Mumu and Alghail include session time-out for enhanced security. The Alghail system introduces an innovative one-time password mechanism during registration, adding an extra layer of authentication security.

3. Methodology

This section provides an overview of the methodology employed in crafting the Alghail Furniture Ordering System with OTP. The chosen development model, Agile methodology, is explored in detail, where each phase of the Agile development model is examined as individual subsections. Following this, a comprehensive summary of the system development workflow is presented, encapsulating the key activities within each phase. The section delves into the software and hardware requirements essential for the successful implementation of the proposed project.

3.1 Agile Model

The agile model is a modern and flexible software development approach that has replaced traditional methodologies[15]. It emphasizes adaptability to changing project requirements. Fig. 1 presents the process involving iterative cycles covering planning, requirements analysis, design, development, testing, and deployment. With six structured phases, the agile methodology ensures responsiveness and ongoing value for development teams.

3.1.1 Planning Phase

The planning phase in the Agile methodology for the Alghail Furniture Ordering System involves collecting requirements and setting priorities. This foundational stage emphasizes interactions with stakeholders to understand challenges with the existing manual ordering process at Alghail Furniture. The goal is to address operational inefficiencies and security vulnerabilities. Thorough planning ensures a clear grasp of project requirements and fosters collaboration for a cohesive development journey.

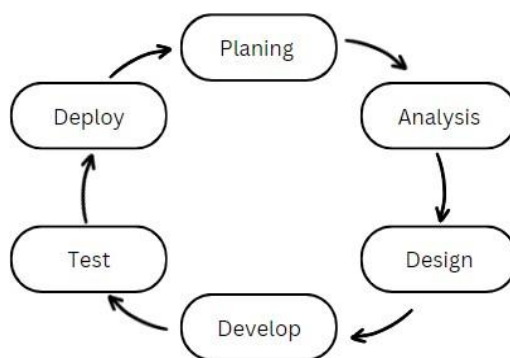


Fig. 1 The Phases of Agile Model [16]

3.1.2 Analysis Phase

In the Analysis phase of developing the Alghail Furniture Ordering System, a comprehensive system architecture is designed to align seamlessly with gathered requirements. Utilizing visuals like Data Flow Diagrams (DFD) and Entity-Relationship Diagrams (ERD), the phase involves a thorough examination of existing systems, extensive research on features, and specific requirements gathering for OTP verification. Relevant information is systematically collected from journal papers and articles related to e-commerce and OTP, providing insights into both functional and non-functional requirements.

3.1.3 Design Phase

In the Design phase of developing the Alghail Furniture Ordering System with OTP, a detailed plan and blueprint are created. This involves defining system architecture, designing the user interface for a seamless experience, planning the database schema, specifying algorithms for core functionalities, and integrating security measures. The phase establishes a clear and detailed plan, laying the foundation for the systematic implementation of the Alghail Furniture Ordering System in subsequent phases.

3.1.4 Development Phase

The Development phase of the Alghail Furniture Ordering System involves building the system based on design specifications. Key elements include implementing functionalities, features, and the OTP mechanism for enhanced security. Visual Studio Code is a development tool, XAMPP serves as the local host, and PHP, HTML, CSS, and JavaScript are utilized for systematic and user-friendly development.

3.1.5 Testing Phase

In the Agile methodology for the Alghail Furniture Ordering System, the Testing phase ensures system functionality through positive and functionality testing. Comprehensive testing, including user acceptance testing, system, OWASP, and unit testing, is conducted on modular segments. This approach guarantees a thorough examination of functionalities, addressing identified issues for enhanced system performance. The focus is on validating alignment with both functional and non-functional requirements, delivering reliable and user-friendly online furniture ordering experience.

3.1.6 Deployment Phase

In the Deployment phase, the Alghail Furniture Ordering System is released and installed into the operational environment, involving server configuration, database uploading, and OTP integration. Thorough testing precedes deployment, with user training and documentation ensuring effective navigation. Continuous monitoring addresses challenges, ensuring a smooth integration into the online furniture ordering landscape.

4. System Analysis and Design

This section explained the system analysis and design that have been conducted for this project.

4.1 System Requirements Analysis

The system requirements for the Alghail Furniture Ordering System with OTP through Email encompass functional and non-functional aspects, and user requirements. These requirements delineate the essential tasks and feature that the system must fulfill to meet user needs effectively.

4.1.1 Functional Requirements

The functional requirements for the Alghail Furniture Ordering System with OTP define the necessary features for the system's proper operation. The project includes the allocation of different modules, each accessible only to authorized users. Table 3 presents a detailed overview of the functional requirements for the Alghail Furniture Ordering System.

Table 3 *Functional Requirements for Alghail Furniture*

Module	Functional Requirements	User
Registration	Alghail System should allow customers to register and verify their account using an OTP sent to their email.	Customer
Login	Alghail System should allow customers able to login using Email, and Password.	Customer
Register and Login	Alghail System should allow admin to register new admin and able to login using username, and password.	Admin
Order	Alghail System should allow customers to browse the catalog, select items, and place orders for furniture products.	Customer
Manage	Alghail System should allow the admin to manage accounts, categories, products, orders, and payments.	Admin

4.1.2 Non-Functional Requirements

The non-functional requirements for the Alghail Furniture Ordering System with OTP delineate the system's behavior during execution, covering operational, performance, security, and usability aspects. Table 4 provides an overview of the non-functional requirements for the Alghail Furniture Ordering System.

Table 4 *Non-Functional Requirements for Alghail Furniture*

Module	Non-Functional Requirements
Operational	<ol style="list-style-type: none"> 1. The system should be straightforward to maintain and upgrade. 2. The system is compatible with a wide variety of browsers.
Performance	<ol style="list-style-type: none"> 1. Alghail System should always be accessible. 2. The system can handle concurrent users.
Security	<ol style="list-style-type: none"> 1. The password must be a combination of capital letters, small letters, numbers, and characters to meet the strong password requirements. 2. The password is encrypted with Bcrypt.
Usability	<ol style="list-style-type: none"> 1. Provides admin and customers with a user-friendly dashboard.

4.1.3 User Requirements Analysis

In this section, the features and functionalities of the proposed application will be elucidated for the user. User requirements, outlining the tasks achievable by both customers and admins, are presented in Tables 5

Table 5 *User Requirements Analysis for Alghail Furniture*

Module	Non-Functional Requirements
Operational	Users shall be able to securely register, and OTP sent to their registered email for account verification.
Performance	Users shall be able to efficiently manage user accounts, including categories, products, and orders.
Security	Users shall be able to securely register, log in, browse the catalog, select furniture, place orders, and access order history and account details.
Usability	Users shall be able to securely log out, ensuring overall system security and positive user experience.

4.2 System Analysis

System Analysis for the Alghail Furniture Ordering System with OTP through Email employs Structured Analysis principles, providing a logical understanding of the system's operations. Visual aids, including the Data Context Diagram, Data Flow Diagram, Entity Relationship Diagram, and System Flowcharts, are presented in the following subsections to illustrate the operational dynamics of the system.

4.2.1 Data Context Diagram (DFD CD)

Fig. 2 depicts the Data Context Diagram (DFD CD) for the Alghail Furniture Ordering System with OTP through Email. It illustrates the data flow for admins, customers, and the system, emphasizing the need for customers to provide the correct email, password, for system access to access authorized modules.

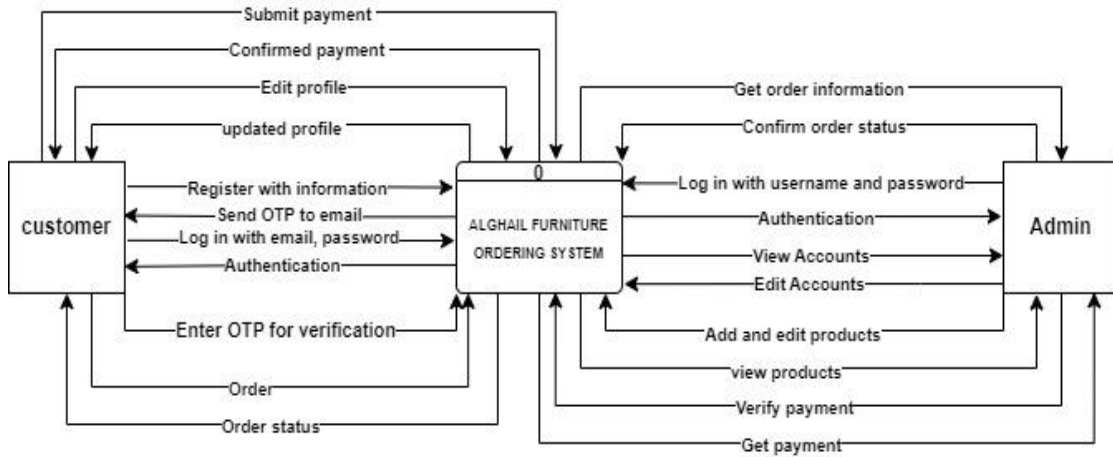


Fig. 2 Data Context Diagram for Alghail Furniture

4.2.2 Entity Relation Diagram (ERD)

An entity relationship diagram is designed to outline the relationship between entities in Alghail Furniture Ordering System. Fig. 3 shows the connection between entities in Alghail Furniture Ordering System.

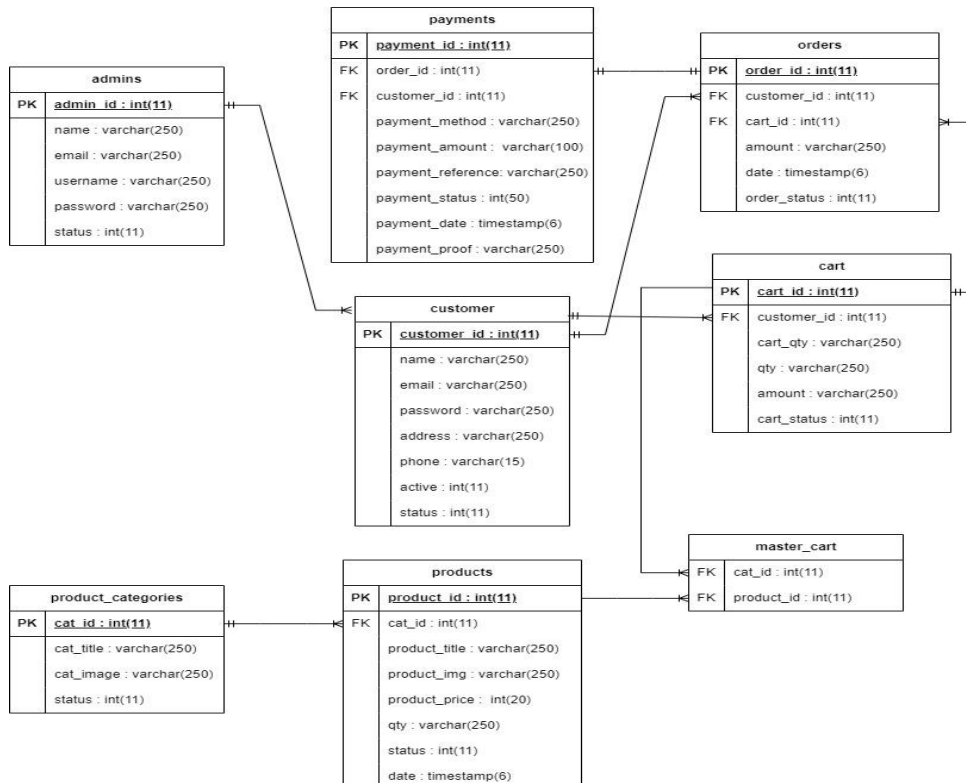


Fig. 3 Entity Relation Diagram (ERD) for Alghail Furniture

4.2.3 System Flowchart

The flowchart for the Alghail Furniture Ordering System illustrates processes for two main users. There are admins and customers. Fig. 4 shows that customers start at the home page. New customers register with an OTP, creating an account if valid. Existing customers log in, add products to their cart, place orders, make payments, and view order status, ending with logout. Admins log in with credentials to access the dashboard for managing accounts, categories, products, orders, and payments, also ending with logout.

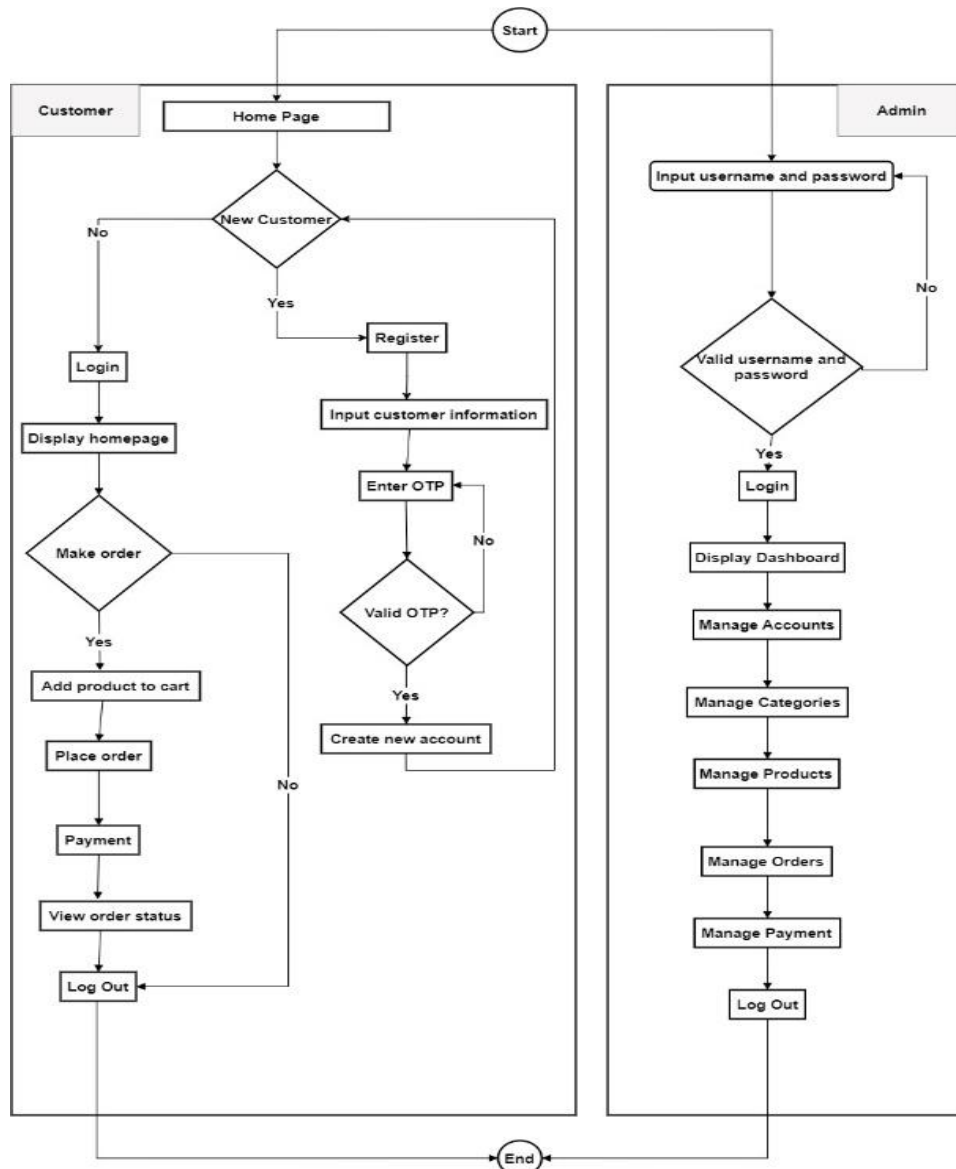


Fig. 4 Flowchart for customer register for Alghail Furniture

4.3 System Design

After all the user requirements are successfully analyzed, the project will proceed in the design phase. In this phase, both interface and database had been designed to help visualize Alghail Furniture Ordering System with OTP through Email before proceeding with the development.

4.3.1 System Architecture

Fig. 5 outlines the system architecture design of the Alghail Furniture Ordering System with OTP through Email. For customer login, email and password verification trigger OTP generation and email dispatch. Admin login involves username and password verification. Admin activities include managing accounts, categories, products, orders, and payments, all recorded in the database. Customers can order, edit accounts, payment, and check order status within the system.

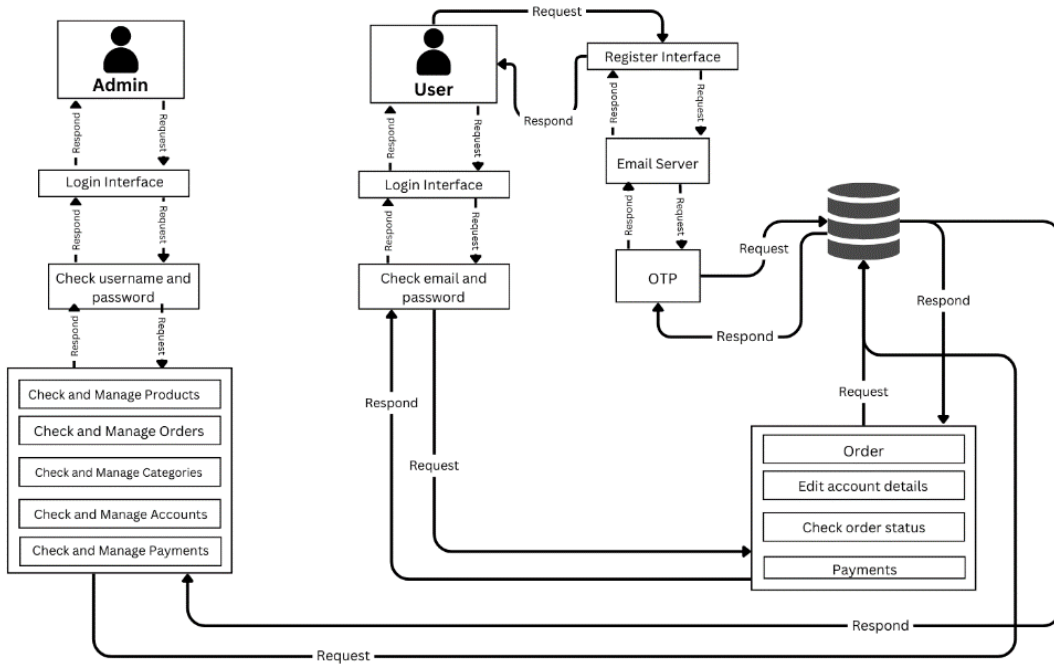


Fig. 5 System Architecture for Alghail Furniture

4.3.2 Interface Design

The user interface is designed to provide a clear image of the page that will be developed into Alghail Furniture Ordering page. The design of Alghail Furniture’s user interface is illustrated in Fig. 6 through Fig. 9.

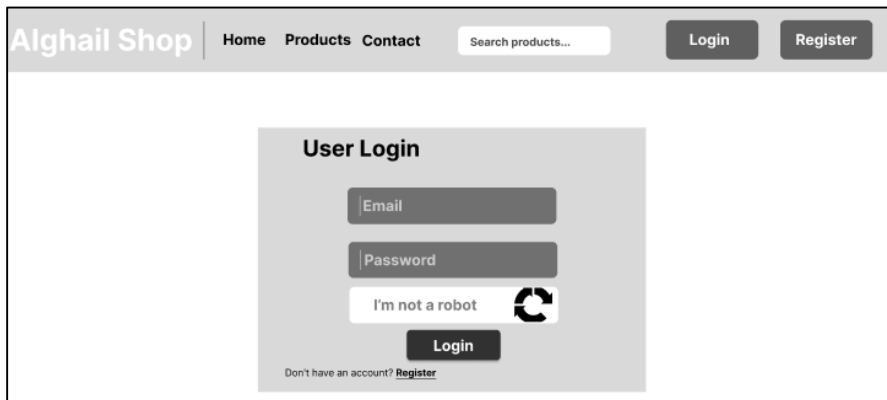


Fig. 6 Login Interface Page for Customer

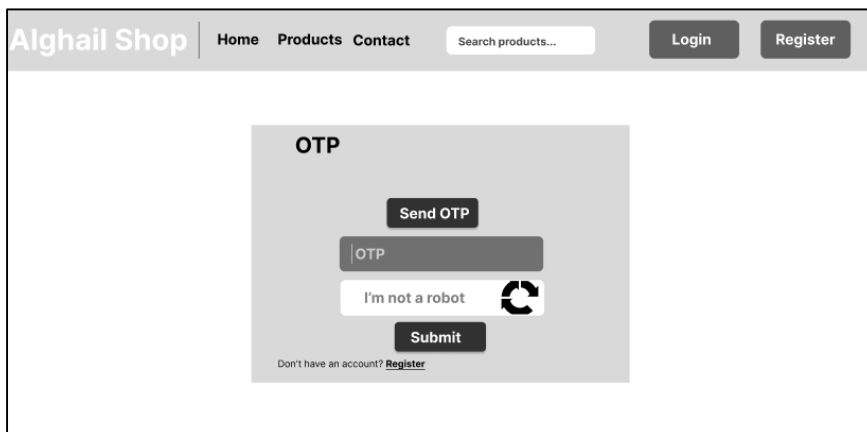


Fig. 7 OTP Interface Page

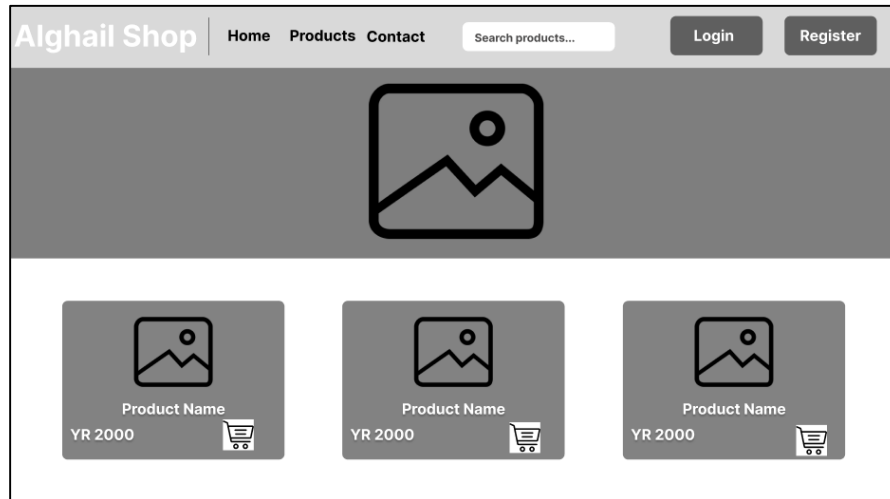


Fig. 8 Homepage Interface Page for Customer

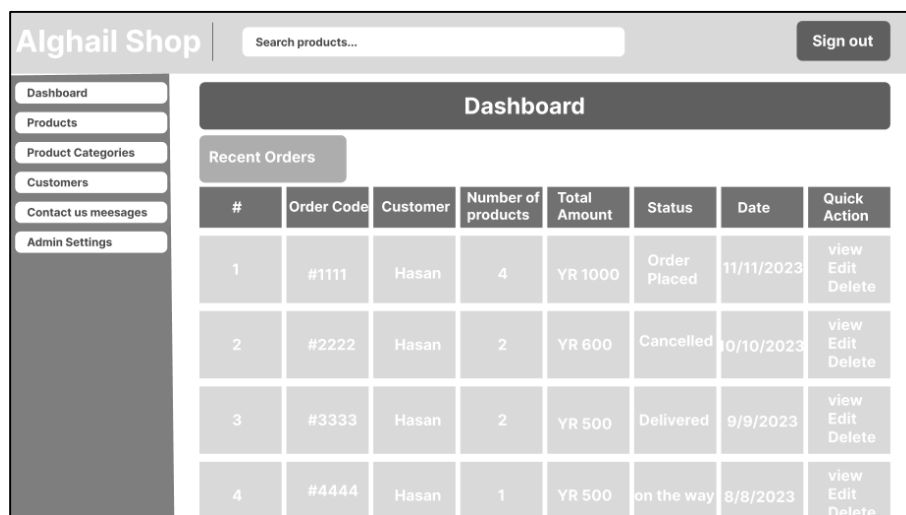


Fig. 9 Homepage Interface Page for Admin

5. Implementation and Testing

This section explains in about the implementation and testing of Alghail System. This section will describe the implementation of security module, and implementation of system property. This section will describe user acceptance testing results.

5.1 Implementation of Security Module

This section discusses the security modules implemented in the Alghail Furniture system, ensuring confidentiality, integrity, and availability. The key security features include one-time password (OTP) verification, Bcrypt hashing, password validation, CAPTCHA, and session time-out.

5.1.1 One-Time Password

In Fig. 10 the `generateOTP` function enhances security by creating a one-time password (OTP) based on the user's phone number. Initially, the phone number is converted to a string and hashed using SHA-256, ensuring the original number is not easily retrievable. The numeric digits are extracted from the hash, shuffled, and the first six digits form the OTP, padded with leading zeros if necessary. This process guarantees a consistent six-digit OTP, enhancing user experience and system processing. The secure, unique OTP verifies user identity without relying on third-party services, reducing costs and protecting sensitive user data.

```

36 function generateOTP($phone) {
37     // Ensure phone number is treated as a string
38     $phone = (string)$phone;
39
40     // Hash the phone number using SHA-256
41     $hash = hash('sha256', $phone);
42
43     // Extract digits from the hash
44     $digits = preg_replace('/\D/', '', $hash);
45
46     // Shuffle the digits to randomize them
47     $digitsArray = str_split($digits);
48     shuffle($digitsArray);
49     $shuffledDigits = implode('', $digitsArray);
50
51     // Take the first 6 digits from the shuffled digits
52     $otp = substr($shuffledDigits, 0, 6);
53
54     if (strlen($otp) < 6) {
55         $otp = str_pad($otp, 6, '0', STR_PAD_LEFT); // Pad with zeros if less than 6 digits
56     }
57     return $otp;
58 }
    
```

Fig. 10 Partial Code Generating OTP



Fig. 11 The OTP Generated and Received by User

Fig. 11 shows the email verification message sent to Alghail website users. The email includes a prominently displayed verification code that users must enter on the verification page to confirm their email address, activating their account. This process ensures the validity and security of user accounts, preventing unauthorized access. The email's clear and simple design aids users in easily locating and using the verification code.

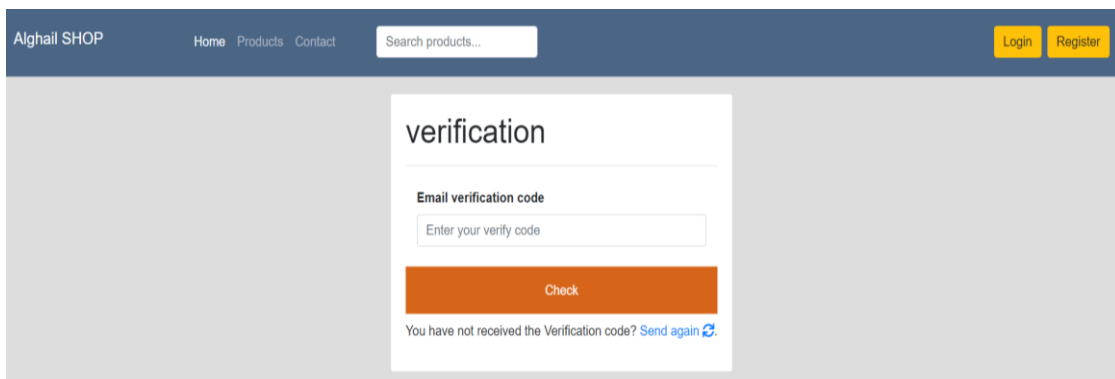


Fig. 12 One-Time Password (OTP) Verification Page for User

Fig. 12 shows the email verification page for Alghail SHOP. Users are prompted to enter the verification code sent to their email to activate their account. If users have not received the code, they have the option to resend it by clicking the provided link.

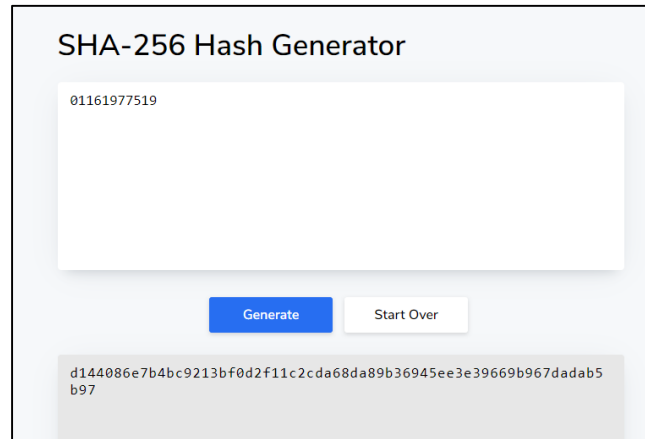


Fig. 13 SHA-256 hash generator

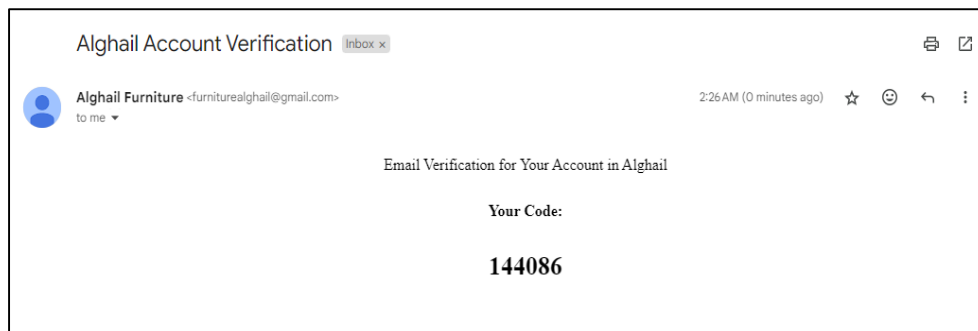


Fig. 14 OTP email sent to the user

Fig. 13 and 14 provide evidence that the One-Time Password (OTP) is generated based on the hashed value of the user's phone number, demonstrating the system's capability to derive an OTP from user-specific information. For this demonstration, the OTP generation code was temporarily modified to take the first six digits from the SHA-256 hash of the phone number. In Fig. 14, the phone number "01161977519" is hashed using SHA-256, resulting in a unique 64-character hexadecimal string. The first six digits of this hash are extracted to form the OTP. Fig. 15 shows the OTP email sent to the user, with the OTP "144086" matching the first six digits of the hashed phone number. This process ensures that each OTP is securely linked to the user's phone number, verifying the system's capability to generate user-specific OTPs.

5.1.2 BCRYPT Hashing

Fig. 15 demonstrates the process of hashing and confirming user passwords during registration or password change. The password is first trimmed to remove extra spaces using the `trim()` function. It is then securely hashed using the `password_hash()` function with the `PASSWORD_DEFAULT` algorithm, ensuring it is stored in a hashed format in the database. This method enhances the security and integrity of user passwords, adhering to best practices in user authentication and data protection.

```

93     $password = trim($_POST["password"]);
94     // Hash the user's password using BCRYPT for secure storage
95     $password = password_hash($password, PASSWORD_DEFAULT);
96 }
97 }
98 }
99 // Check if the confirm password field is empty
100 if (empty($_POST["confirm_password"])) {
101     $error_confirm_password = '<label class="alert alert-warning"><i class="ico">&#9747;</i> Please Enter Confirm Password</label>';
102 } else {
103     $confirm_password = trim($_POST["confirm_password"]);
104     $confirm_password = password_hash($confirm_password, PASSWORD_DEFAULT);
105 }
106 $confirm_password = $_POST['confirm_password'];
107 // Check if the password and confirm password match
108 if ($_POST["password"] !== $_POST["confirm_password"]) {
109     $error_confirm_password = '<label class="alert alert-warning"><i class="ico">&#9747;</i>The passwords do not match</label>';
110 } else {
111     $password = trim($_POST["password"]);
112     $password = password_hash($password, PASSWORD_DEFAULT);
113 }

```

Fig. 15 Partial Code for Bcrypt Hashing for Password

user_id	name	email	password
30	motea	alnusdddwirihani@gmail.com	\$2y\$10\$ryA0XOXRduxpvn.OVCOGn.tyCCyKW55Y7fIDgR4MXFm
35	Mohammed Alqadsi	mohammed1@gmail.com	\$2y\$10\$.VjelNQefYhjvqOv66gNnO2FcORhitvLGIs3vJ4YyWD...
36	ali ali	ali@gmail.com	\$2y\$10\$gom7STfQhkHiKaGKeNO1/uqlbDMKq6nXXUZtUnBTBZ
37	Abdulqader Alquadhi	obad@gmail.com	\$2y\$10\$GqwA9RqGyIUOGw4Ik5c.K.UYySC0TSW0cL9gRLznLpX
38	Hasan Mohammed	hsn@gmail.com	\$2y\$10\$HXZhavkaDr9Om0jN7hz7RumcVEIEepf4hhtlNsj3Dz/...

Fig. 16 BCRYPT Hashing for Password in Database

Fig. 16 shows a sample of user data stored in a database. The passwords are securely stored using the BCRYPT hashing algorithm, ensuring that even if the database is compromised, the passwords remain protected.

5.1.3 Password Validation

Fig. 17 shows the code for enforcing password complexity requirements. The code first checks if the password is at least 8 characters long using the `strlen()` function. If not, an error message prompts the user to enter a longer password. It then uses the `preg_match()` function to ensure the password contains at least one uppercase letter, one lowercase letter, one number, and one symbol. If any condition is not met, an error message informs the user of the requirements. This approach enhances account security by enforcing strong, hard-to-guess passwords.

```

78 if (empty($_POST["password"])) {
79     $error_password = '<label class="alert alert-warning"><i class="ico">&#9747;</i> Please Enter Password</label>';
80 } else {
81     // Verify that the password is at least 8 characters long
82     if (strlen($_POST["password"]) < 8) {
83         $error_password = '<label class="alert alert-warning"><i class="ico">&#9747;</i> Password Sholde Be Than 8 char or more</label>';
84     } else {
85         // Verifies that the password contains uppercase letters, lowercase letters, numbers, and symbols
86         if (!preg_match("/[A-Z]/", $_POST["password"]) ||
87             !preg_match("/[a-z]/", $_POST["password"]) ||
88             !preg_match("/[0-9]/", $_POST["password"]) ||
89             !preg_match("/[\W]/", $_POST["password"])) {
90             $error_password = '<label class="alert alert-warning"><i class="ico">&#9747;
91             </i>The password must contain uppercase letters, lowercase letters, numbers, and symbols</label>';
92         }
93     }
94 }

```

Fig. 17 Partial Code for Validation Process for Password Complexity

Password

Show Password

The password must contain uppercase letters, lowercase letters, numbers, and symbols

Confirm Password

Fig. 18 The Error Message if User Enter Password That Does Not Fulfil the Password Policy

Fig. 18 illustrates a user interface for entering and confirming a password, with a validation message indicating the requirements for a strong password. The password must contain uppercase letters, lowercase letters, numbers, and symbols.

5.1.4 CAPTCHA

In Fig. 19, the `onSubmit` function enables the submit button upon successful reCAPTCHA completion. The `onloadCallback` function renders the reCAPTCHA widget, and `grecaptcha.render` initializes it with a site key and specifies `onSubmit` as the callback. This adds security against spam and automated submissions, ensuring only genuine users can register on the platform. Fig. 20 shows the integration of Google's reCAPTCHA in a registration form. This mechanism helps prevent automated bots from submitting the form, enhancing the security and integrity of user registrations.

```

73     var onSubmit = function(token) {
74         document.getElementById("submitBtn").disabled = false;
75     };
76
77     var onloadCallback = function() {
78
79         grecaptcha.render('g-recaptcha', {
80             'sitekey': '6LdB98kpAAAAACZ9s-9d1JSr9nq9iACyxOTxUag0',
81             'callback': onSubmit
82         });
83     };

```

Fig. 19 Partial Code for CAPTCHA Integration

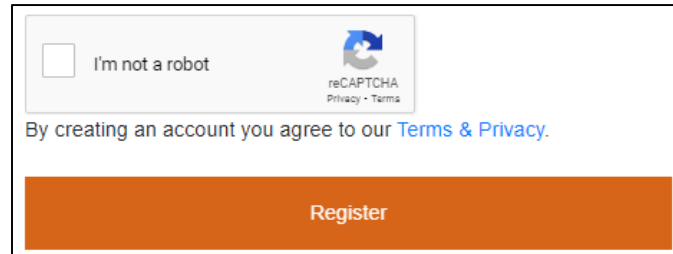


Fig. 20 CAPTCHA Integration

5.1.5 Session Time-Out

Fig. 21 shows a PHP code snippet implementing a session timeout mechanism to log out users after 15 minutes of inactivity. It checks if the time since the last activity exceeds 900 seconds. If so, it unsets session variables, destroys the session, and redirects to the login page. If the session is still active, it updates `\$_SESSION['last_activity']` to the current time, maintaining session activity with user interaction. This enhances security by preventing unauthorized access to inactive sessions.

```

1  <?php
2
3  // Check if the time elapsed since the last activity is greater than 900 seconds (15 minutes)
4  if (time() - $_SESSION['last_activity'] > 900) {
5      // Unset all session variables
6      session_unset();
7      // Destroy the session
8      session_destroy();
9      // Redirect to the login page
10     header('refresh:0;url=login.php');
11 } else {
12     // Update the last activity time to the current time
13     $_SESSION['last_activity'] = time();
14 }

```

Fig. 21 Partial Code for Destroy Session

5.2 Implementation of System Properties

In this section the modules implemented in Alghail Furniture System are discussed. There are four modules implemented in Alghail Furniture System which are login module, register module, ordering module and admin module.

5.2.1 Login Module

Fig. 22 shows the user login page requiring email, password, and CAPTCHA. Fig. 23 shows the code for handling user login securely. It uses prepared statements to prevent SQL injection, verifying the email and password against the database. If the password matches and the account is active, a session starts, setting session variables and redirecting the user. If inactive, the user is prompted to activate their account via email. Incorrect credentials display an error message. This ensures secure authentication and session management, enhancing security and user experience.

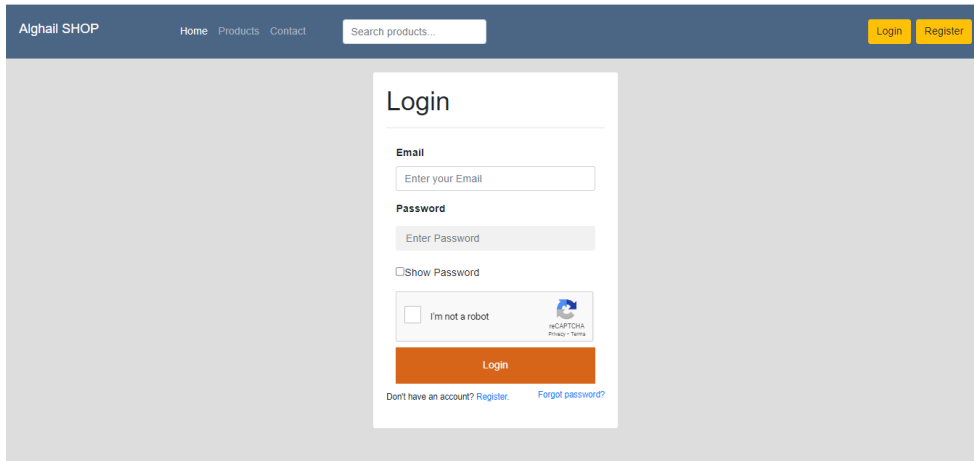


Fig. 22 Login Page for User

```

5  if (isset($_POST["login"])) {
6      $email = $_POST['email'];
7      $password = $_POST['password'];
8      $query = 'SELECT * FROM users WHERE (email = :email) ';
9      $values = [':email' => $email];
10     try {
11         $res = $connect->prepare($query);
12         $res->execute($values);
13     } catch (PDOException $e) {
14         /* Query error. */
15         $message = ' <label class="bar warn"><i class="ico"&#9888;</i> Something went wrong.</label>';
16         die();
17     }
18     $row = $res->fetch(PDO::FETCH_ASSOC);
19     /* If there is a result, check if the password matches using password_verify(). */
20     if (is_array($row)) {
21         if (password_verify($password, $row['password'])) {
22             /* The password is correct. */
23             if ($row['active'] == 1) {
24                 session_start();
25                 $_SESSION['name'] = $_POST['email'];
26                 $_SESSION['user_id'] = $row['user_id'];
27                 $_SESSION['last_activity'] = time();
28                 /* create user session and redirect back to index page */
29                 if ($_GET['redirect']) {
30                     $url = $_GET['redirect'];
31                     header("location:$url");
32                 } else {
33                     header("location:index.php");
34                 }
35             } else {
36                 $_SESSION["Email"] = $email;
37                 include_once("../mail/index.php");
38             }
39         } else {
40             $message = ' <label class="alert alert-danger"><i class="ico"&#9888;</i> Your credentials is incorrect. Try again with valid details please</label>';

```

Fig. 23 Partial Code for Login Page in User

5.2.2 Register Module

Fig. 24 shows the registration page for Alghail SHOP. Users must provide their full name, email, phone number, address, password, and confirm their password. They also need to complete a reCAPTCHA challenge to register an account.

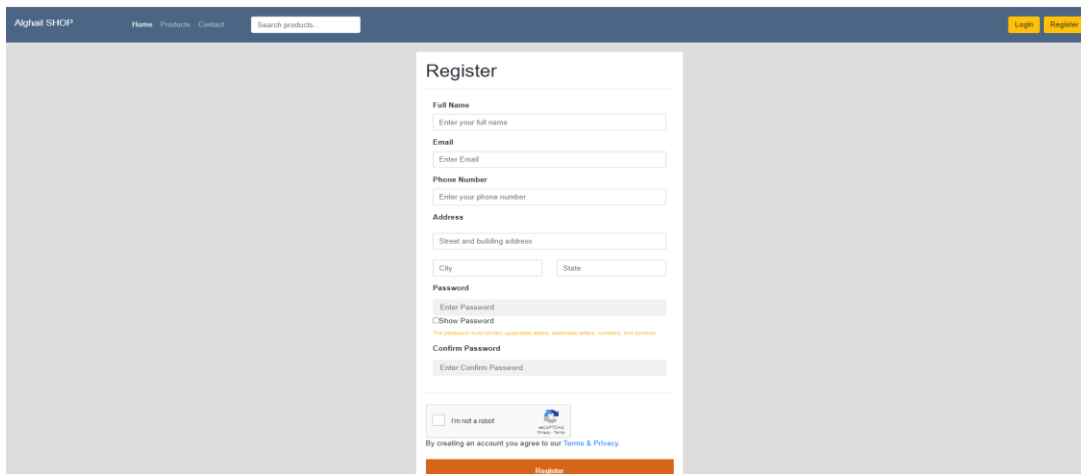


Fig. 24 Register Page for User

5.2.3 Ordering Module

Fig. 25 shows the product details page with images, descriptions, prices, quantity selection, add-to-cart options, and user reviews. While Fig. 26 depicts the shopping cart page, allowing users to review items, adjust quantities, and see an order summary with subtotal, shipping fees, tax, and total amount.

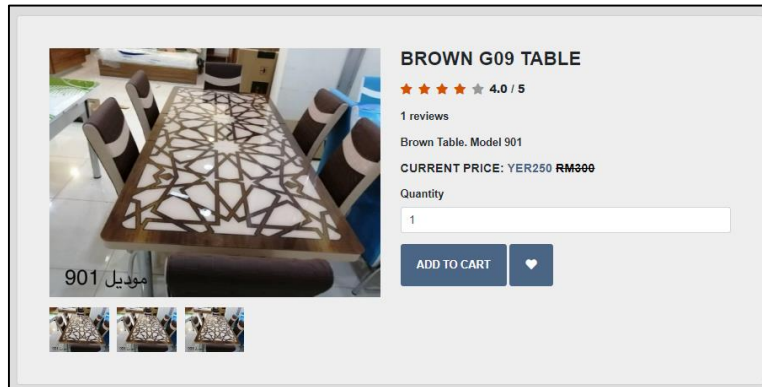


Fig. 25 Product Page for User

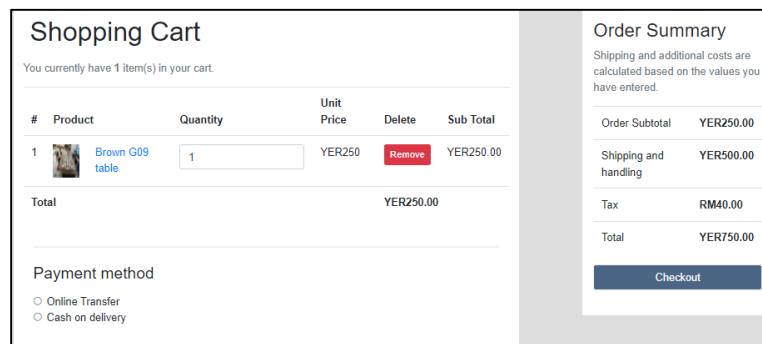


Fig. 26 Cart Page for User

Fig. 27 lists user orders with order codes, item counts, total amounts, statuses, dates, and actions. Fig. 28 details specific orders, including codes, dates, product details, prices, statuses, payment proof uploads, and a print invoice option. Fig. 29 displays the payment page for online transfers, featuring account details, reference IDs, and payment proof uploads. These pages facilitate product viewing, cart management, order tracking, detailed order access, and secure payments.

All my orders

You currently have 1 orders.

#	Order Code	Order Items	Total Amount	Order Status	Order Date	Action	Delete
1	#BNDS1100041651	1	YER5,250.00	Order on the way Payment completed	1 week ago	view	Delete

Fig. 27 Orders Page for User

Order #BNDS1100041651 [Print Invoice](#)

2024-05-29 10:16:33

Order summary

#	Product Image	Product	Quantity	Unit price	Subtotal
1		Zeta Bedroom	1	YER4,750.00	YER4,750.00

Tax fee: YER40.00
Shipping fee: YER500.00
Total: YER5,250.00

Order Status: Order on the way Payment status: Payment completed [Report issue](#)

Proof of payment uploaded

#	File Name	View	Download
1	352f4c9fb2c51f9aac7837a3ba4985.pdf	View	Download

Fig. 28 Order Page for User

Complete checkout
 Your order **#BNDS284642098** is pending payment. Pay now

You're paying using transfer Please make the payment to the following account
 Account Name: Alghail Furniture
 Account Number: 123456789
 Account Bank: Bank Al-kuraimi
 Make sure to include reference id **#BNDS284642098** while making the payment

Paid Amount (YER)

Proof of payment (Receipt)
 No file chosen

I acknowledged that I transferred the same amount required and my transfer is subject to approval

Fig. 29 Online Transfer Payment Page for User

5.2.4 Admin Module

Fig. 30 presents the product management page for viewing, editing, deleting, or adding products. While, Fig. 31 shows the orders management page, detailing customer orders and providing management actions.

Dashboard / Products [Add new product](#)

Show entries Search:

#	Title	Image	Price	Sold	Label	Date	Status	Edit	Delete
1	Brown G09 table		YER 300	2	Brown	2024-05-29 07:31:17.119609	Active	Edit	Delete
2	Black Ct4 table		YER 250	2	Ct4	2024-05-29 07:13:13.001625	Active	Edit	Delete
3	G&W Livingroom		YER 2000	0	G&W	2024-05-29 07:07:43.038602	Active	Edit	Delete
4	Green bedroom		YER 3000	1	green	2024-05-29 06:54:09.178604	Active	Edit	Delete
5	Pink bedroom		YER 3000	0	Pink	2024-05-29 06:38:35.323898	Active	Edit	Delete
6	Blue bedroom		YER 3000	0	Blue	2024-05-29 06:33:29.495199	Active	Edit	Delete

Fig. 30 Products Page for Admin

Dashboard / Orders

Show entries Search:

#	Order Code	Customer	Number of products	Total Amount	Status	Date	Quick Action
1	#BNDS603159266	Hasan Mohammed	1	YER6,100.00 Not paid	Order placed	21 minutes ago	view Edit Delete
2	#BNDS284642098	Hasan Mohammed	1	YER750.00 Not paid	Order placed	32 minutes ago	view Edit Delete
3	#BNDS1100041651	Hasan Mohammed	1	YER5,250.00 Payment completed	Order on the way	1 week ago	view Edit Delete
4	#BNDS1573522430	Abdulqader Alquadhi	1	YER6,300.00 Payment completed	Order confirmed	1 week ago	view Edit Delete
5	#BNDS1582167851	motea	1	YER510.00 Payment completed	Order confirmed	1 week ago	view Edit Delete
6	#BNDS330372063	motea	1	YER520.00 Payment requires verification	Order confirmed	1 week ago	view Edit Delete

Showing 1 to 6 of 6 entries Previous Next

Fig. 31 Orders Page for Admin

Fig. 32 depicts the categories management page for editing, deleting, or adding product categories. Fig. 33 displays the customers management page, listing customer information and management options.

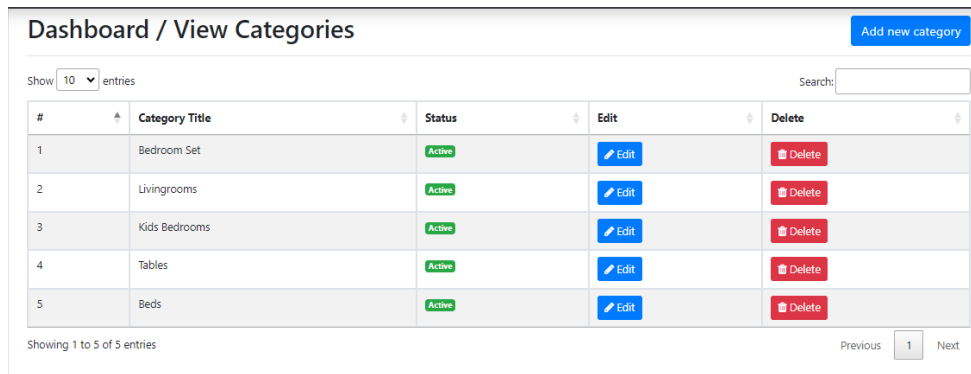


Fig. 32 Categories Page for Admin

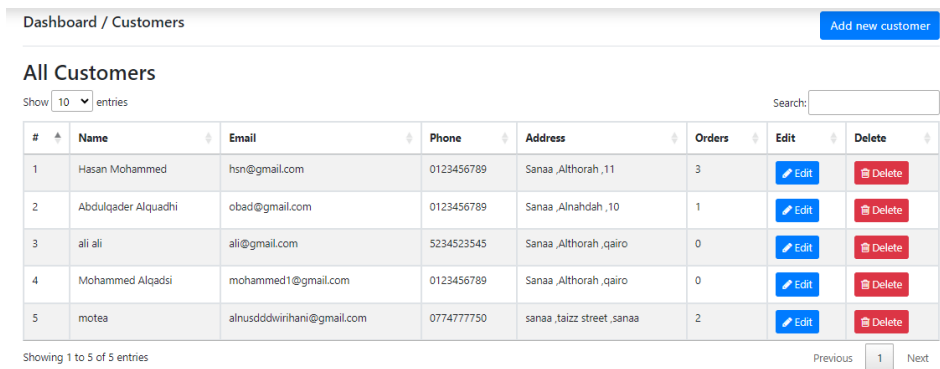


Fig. 33 Customers Page for Admin

Fig. 34 illustrates the reports page with charts for monthly income, product sales, and customer orders, supporting data-driven decisions. These pages improve efficiency in managing products, orders, categories, customers, and sales analysis.

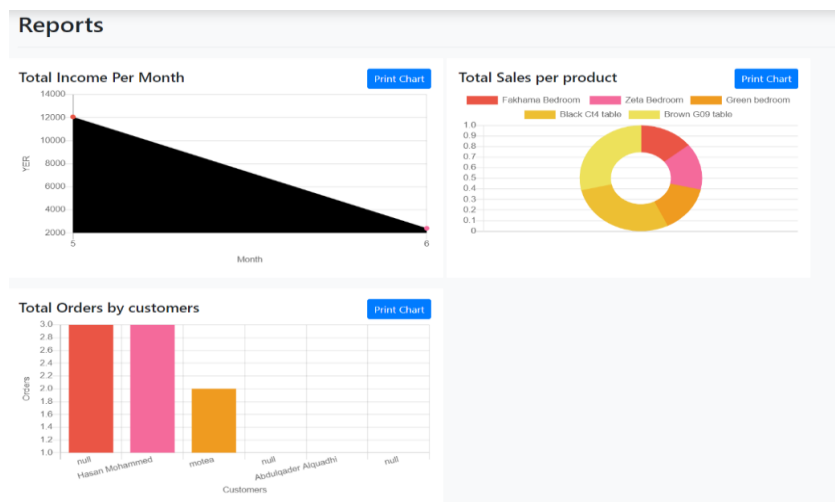


Fig. 34 Reports Page for Admin

5.3 Testing

In this section, the testing results of the proposed system are discussed. The testing phase is conducted on the entire system to verify its security and ensure it meets the project requirements.

5.3.1 User Acceptance Testing

This section discusses the user acceptance form, which evaluates the test case of the proposed system from the user's perspective. The system involves two types of users: the admin of Alghail Furniture and the customers, who interact with the system differently. The user acceptance form results, collected through interview sessions with both customers and admins after using the system, are presented in Tables 5 and 6 respectively. Table 5

presents the user acceptance form results for users, based on a scale from 1 (Extremely Dissatisfied) to 7 (Extremely Satisfied). The findings show high user satisfaction across all system modules, including the login page, OTP page, Customer Page, and overall system performance. Table 6 presents the user acceptance form results for the Admin of Alghail Furniture, based on a scale from 1 (Extremely Dissatisfied) to 7 (Extremely Satisfied). The findings show high satisfaction across all system modules, including the login page, Admin page, and overall system performance.

Table 5 *User Acceptance Form for customers*

No	Question	Result
		Dissatisfied 1 -7 Satisfied
Login Page		
1	User can login without problem	6
2	User can use reCAPTCHA	7
3	Display message easy to understand	6
OTP Page		
4	User can get OTP via email	6
5	User can enter the correct OTP	7
6	User can use OTP without problem	7
Customer Page		
7	User can add products to cart	7
8	User can place order	6
9	User can do the payment without problem	6
10	User can view and edit user information	7
Overall System		
11	Each user can use system without problem	6
12	The interface is easy to understand	7
13	The system easy to understand	6

Table 6 *User Acceptance Form for Admin*

No	Question	Result
		Dissatisfied 1 -7 Satisfied
Login Page		
1	User can login without problem	7
2	Display message easy to understand	6
Admin Page		
3	User can edit, add, and delete categories	7
4	User can edit, add, and delete products	6
5	User can edit, add, and delete orders	7
6	User can manage payments	6
Overall System		
7	Each user can use system without problem	7
8	The interface is easy to understand	7
9	The system easy to understand	6

6. Conclusion

In conclusion, the proposed Alghail Furniture Ordering System successfully achieved its primary objectives by incorporating a robust OTP verification mechanism during user registration, ensuring enhanced security and user

authentication. The development process resulted in an efficient, secure, and user-friendly platform for online furniture ordering, with functionalities such as user registration, order placement, and account management thoroughly tested and validated.

The system offers several advantages, including enhanced security through OTP verification, an intuitive user interface, efficient order processing, scalability for future growth, and improved data management. These features collectively enhance user experience and operational efficiency while maintaining accurate and up-to-date information for better inventory and order management.

However, the system has some disadvantages. The initial setup cost may be a financial burden, and its dependency on internet connectivity can be a limitation in areas with unstable access. Additionally, users accustomed to traditional methods may require time and training to adapt to the new system.

Future implementations could include developing a mobile application for increased accessibility, integrating various payment gateways to offer more payment options, and incorporating advanced data analytics to provide insights into customer behaviour, sales trends, and inventory management.

Acknowledgement

The authors would like to thank the Faculty of Computer Science and Information Technology, University Tun Hussein Onn Malaysia for its support.

Conflict of Interest

Authors declare that there is no conflict of interest regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: **study conception and design:** *H. M. H. Ahmed Al-hubaishi, N. Z. Harun*; **data collection:** *H. M. H. Ahmed Al-hubaishi, N. Z. Harun*; **analysis and interpretation of results:** *H. M. H. Ahmed Al-hubaishi, N. Z. Harun*; **draft manuscript preparation:** *H. M. H. Ahmed Al-hubaishi, N. Z. Harun*. All authors reviewed the results and approved the final version of the manuscript.

References

- [1] F. Alkhudhayr, S. Alfarraj, B. Aljameeli, and S. Elkhdiri, "Information Security: A Review of Information Security Issues and Techniques," 2nd International Conference on Computer Applications and Information Security, ICCAIS 2019, May 2019, doi: 10.1109/CAIS.2019.8769504.
- [2] D. E. Kurniawan, M. Iqbal, J. Friadi, F. Hidayat, and R. D. Permatasari, "Login Security Using One Time Password (OTP) Application with Encryption Algorithm Performance," J Phys Conf Ser, vol. 1783, no. 1, p. 012041, Feb. 2021, doi: 10.1088/1742-6596/1783/1/012041.
- [3] A. M. Aseri and A. Aseri, "Security Issues For Online Shoppers", Accessed: Nov. 19, 2023. [Online]. Available: www.ijstr.org
- [4] "The One-time Password (OTP) Ultimate Guide | Ping Identity." Accessed: Jun. 09, 2024. [Online]. Available: <https://www.pingidentity.com/en/resources/blog/post/one-time-password-ultimate-guide.html>
- [5] "Identification and Authentication | Scienceweb." Accessed: Nov. 23, 2023. [Online]. Available: <https://scienceweb.uz/publication/6488>
- [6] P. Mohan and S. Chelliah, "An Authentication Technique for Accessing De-Duplicated Data From Private Cloud Using One Time Password," <https://services.igi-global.com/resolvedoi/resolve.aspx?doi=10.4018/978-1-5225-8176-5.ch021>, pp. 435-445, Jan. 1AD, doi: 10.4018/978-1-5225-8176-5.CH021.
- [7] "OTP SMS Authentication: Comparing OTP SMS to Other Authentication Methods." Accessed: Jun. 09, 2024. [Online]. Available: <https://d7networks.com/blog/otp-sms-authentication-comparison/>
- [8] C. Skanda, B. Srivatsa, and B. S. Premananda, "Secure Hashing using BCrypt for Cryptographic Applications," 2022 IEEE North Karnataka Subsection Flagship International Conference, NKCon 2022, 2022, doi: 10.1109/NKCON56289.2022.10126956.
- [9] "Introduction - OWASP Cheat Sheet Series." Accessed: Nov. 21, 2023. [Online]. Available: <https://cheatsheetseries.owasp.org/>
- [10] Y. Zhang, H. Gao, G. Pei, S. Luo, G. Chang, and N. Cheng, "A survey of research on CAPTCHA designing and breaking techniques," Proceedings - 2019 18th IEEE International Conference on Trust, Security and Privacy in Computing and Communications/13th IEEE International Conference on Big Data Science and Engineering, TrustCom/BigDataSE 2019, pp. 75-84, Aug. 2019, doi: 10.1109/TRUSTCOM/BIGDATASE.2019.00020.

- [11] J. Hasan and A. M. Zeki, "Evaluation of web application session security," IET Conference Publications, vol. 2019, no. CP758, 2019, doi: 10.1049/CP.2019.0178.
- [12] "Furnish Your Home | Furniture & Home Décor | FortyTwo." Accessed: Dec. 27, 2023. [Online]. Available: <https://www.fortytwo.my/>
- [13] "MUMU Living Online Store | Designer Home Furniture." Accessed: Dec. 27, 2023. [Online]. Available: <https://mumuliving.com/>
- [14] "Online Furniture Mall In Kuala Lumpur, Malaysia – MAJUHOME eStore." Accessed: Dec. 27, 2023. [Online]. Available: <https://online.majuhome.com.my/>
- [15] S. Al-Saqqa, S. Sawalha, and H. Abdelnabi, "Agile Software Development: Methodologies and Trends," International Journal of Interactive Mobile Technologies, vol. 14, no. 11, pp. 246–270, 2020, doi: 10.3991/IJIM.V14I11.13269.
- [16] P. Venkateswara, R. V Pradeep Kumar, B. Pradeep, and K. Reddy, "Applying Agile Software Methodology for the Development of Software Development Life Cycle Process (SDLC)," Journal for Research, vol. 04, 2018, Accessed: Dec. 07, 2023. [Online]. Available: www.journal4research.org.