

Black Box Testing on the Wingpos Website Using the Equivalence Partitioning Technique

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Abstract. In the digital age, efficient sales transaction management is crucial for business success. Point of Sale (POS) systems, such as Wingpos, are a solution for transaction recording, inventory management, sales reporting, and data analysis. However, software errors can disrupt operations and compromise security aspects. This research aims to assess the functionality and quality of the Wingpos website by using the Black Box Testing method, which tests software by comparing actual outputs to expected results based on given inputs. The Equivalence Partitioning technique was applied to focus on testing functional aspects of the login and register features. Through this testing, technical insights into the quality of the Wingpos software were gained, as well as a systematic approach to web-based application testing. The results of the study are expected to improve user experience and serve as a reference in the development of similar systems in the future.

Keywords Black Box Testing, Functional Testing, Equivalence Partitioning, POS System, Software Testing.

1. INTRODUCTION

In today's digital era, the ability to manage sales transactions in an effective and efficient manner has become a crucial aspect in achieving business success. An integrated Point of Sale (POS) system offers a comprehensive solution that includes not only transaction recording, but also inventory management, sales reporting, and data analysis (Geni *et al.* 2024). In the software development process, errors or bugs can have a serious impact, both on operational smoothness and security aspects. Therefore, an effective and efficient software testing phase is very important. Over time, software testing has developed into a complex field with a variety of methods and techniques (Abdillah *et al.* 2024).

This study aims to evaluate the quality and functionality of the Wingpos website through the Black Box Testing method which functions to determine the functionality of the software by entering and seeing the output as expected or not (Sari 2019). Meanwhile, for the approach used, namely, Equivalence Partitioning which focuses on functional testing of data (Fadhilasari *et al.* 2024).

The main motivation for this research is to contribute to the development of efficient and reliable POS systems that support decision-making (Christian & Widiatry, 2023). By fixing

system development gaps, this research is expected to help improve user experience and overall business efficiency (Agil Sakinah *et al.* 2024a).

Through this testing, it not only provides technical insights into the quality of Wingpos Software, but also a systematic approach in testing web-based software (Samdono *et al.* 2024). The research results are expected to serve as a reference in the development of similar systems in the future, especially in the application of the Black Box Testing method to assess the functionality and reliability of login and registration features.

2. LITERATURE REVIEW

Black Box Testing

Black Box Testing is a software testing method that focuses on the external functions of the software without examining its internal code. This method aims to verify whether the software operates according to the specified requirements. One of the main advantages of Black Box Testing is its simplicity in identifying errors at the input-output level without requiring an in-depth understanding of the application's internal structure (Sari 2019).

This testing technique is commonly used in various application scenarios, such as e-commerce systems, web-based applications, and enterprise software. Previous studies have demonstrated that Black Box Testing is effective in detecting functional errors, including input validation, data processing, and incorrect outputs (Abdillah *et al.* 2024b).

Equivalence Partitioning Technique

Equivalence Partitioning is a technique within Black Box Testing that divides test data into several groups or partitions based on similar characteristics. This technique enables more efficient testing by requiring only one test case from each partition to verify the entire group of data. This technique is particularly useful for testing web-based applications, especially in scenarios involving user input such as login and registration. Using Equivalence Partitioning, testers can identify input validation limits, which often pose security vulnerabilities or functional errors (Fadhilasari *et al.* 2024).

The Importance of POS System Testing

Point of Sale (POS) systems play a crucial role in modern businesses by handling transactions, inventory, and sales data analysis. Mistakes in these systems can have a major impact on business operations, including the loss of transaction data or disruptions in inventory management. Based on the research in the journal, errors in POS systems can undermine their functionality, making effective testing, such as Black Box Testing with Equivalence

Partitioning, essential for identifying potential issues in processes like transaction handling, data integrity, and inventory tracking (Candy dan Joycelin 2024)

Software testing for POS systems must include functional and security testing due to the sensitive data being processed. Based on the research in this journal, Black Box Testing, particularly using the Equivalence Partitioning technique, is effective in identifying weaknesses in processes such as login, registration, and transaction data management. This approach focuses on verifying the system's functionality without accessing the internal code, ensuring that transactions are processed correctly and securely while protecting sensitive data from potential security vulnerabilities (Handono *et al.* 2024).

Previous studies have shown that Black Box Testing has been applied to various applications with positive results. (Agil Sakinah *et al.* 2024b) found that the Equivalence Partitioning technique effectively reduces the number of test cases in asset management applications without sacrificing test coverage. Meanwhile, (Fadhilasari *et al.* 2024) used this method to identify input validation errors in search, checkout, and login features on e-commerce platforms. Additionally, (Abdillah *et al.* 2024b) highlighted the role of Black Box Testing in detecting errors in inventory information systems, particularly in recording and tracking processes.

However, most studies have focused on e-commerce and asset management applications, while web-based POS systems have received less attention. Furthermore, specific input validation, such as email format and password length, is often overlooked in testing login and registration features.

This study aims to address these gaps by applying Black Box Testing using the Equivalence Partitioning technique to the Wingpos POS system. This approach is expected to detect functional errors and improve input validation, thus contributing to the advancement of testing methods for web-based POS systems.

3. METHODS

This research uses a Black Box Testing approach with the Equivalence Partitioning technique to test the functionality of the login and registration features on the Wingpos website. This method was chosen because it allows testing based on input and output without access to the source code. The research stages include analysis of test requirements to identify the features being tested, design of test cases by dividing input data into equivalent partitions, and execution of tests by entering data into the system and comparing the results with the expected

output. After testing, the results are evaluated to ensure the system meets the functional specifications set, then the results are documented for further improvement and validation by the development team.

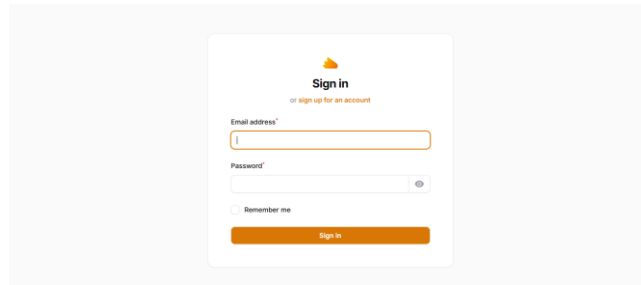


Figure 1. Login Page

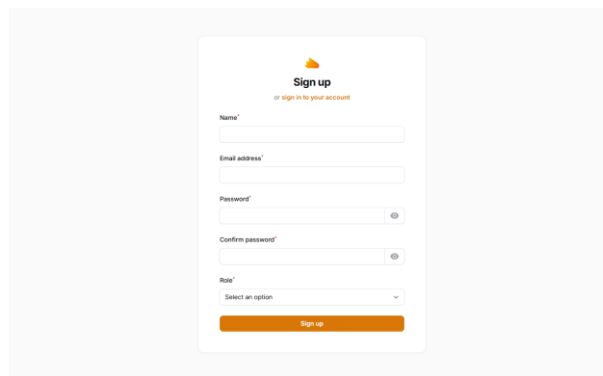


Figure 2. Register Page

4. RESULTS

The testing of the login and registration functions on the Wingpos website aims to identify any errors that occur, so they can be fixed before being used by users. The test result table includes conclusions to determine whether the test scenarios conducted were successful or not. The following table shows the test result.

Table 1. Black Box Test Scenario for Login and Register Forms

Test Code	Test Scenario	Expected Results	Actual Results	Conclusion
WINGSPOS-001	Login without entering both Email and Password	System should reject and display the message: "Please enter username and password."	System only displays an alert on the username field with the message: "Please fill out this field."	Does Not Match

WINGSPOS -002	Login by entering Email but leaving Password empty	System should reject and display a message indicating the Password field is required.	Displays an alert on the password field: "Please fill out this field."	Match
WINGSPOS -003	Login by entering Password but leaving Email empty	System should reject and display a message indicating the Email field is required.	An alert appears on the username field: "These credentials do not match our records."	Match
WINGSPOS -004	Login with incorrect Username and/or Password	System should reject and display a message: "The username or password entered is incorrect."	Alert appears only on the username field: "These credentials do not match our records."	Does Not Match
WINGSPOS -005	Login with valid Username and Password	System should allow login and display the dashboard page.	Successfully logs in and displays the dashboard page.	Match
WINGSPOS -006	Register a new account	Redirects to the dashboard with a message indicating the account was successfully created.	Redirects to the dashboard.	Match
WINGSPOS -007	Register with an already registered account	Redirects back to the registration page with a message indicating the account already exists.	Redirects to the registration page with the message: "The email address has already been taken."	Match
WINGSPOS -008	Register with an invalid email domain	Redirects back to the registration page with a message indicating the email is invalid.	Logs into the dashboard without displaying an invalid email message.	Does Not Match
WINGSPOS -009	Register with a password less than 8 characters	Redirects back to the registration page with a message indicating the password must be	Redirects to the registration page with the message: "The password field	Match

		at least 8 characters long.	must be at least 8 characters."	
WINGSPOS-010	Register with one or more empty input fields	Redirects back to the registration page with a message indicating the required fields must be filled.	Redirects to the registration page with the message: "Please fill out this field."	Match

5. DISCUSSION

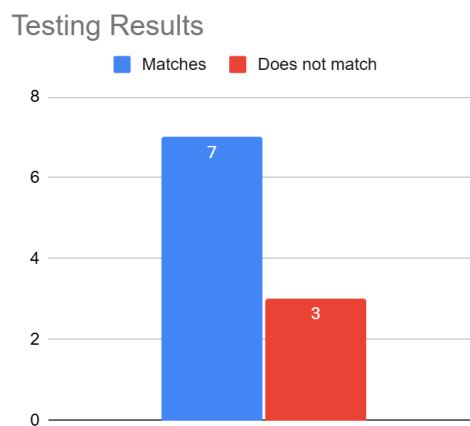


Figure 3. Testing Results Chart

Using black-box testing with the equivalence partitioning method, the functionality of the website's login and registration features can be evaluated. Based on Figure 3, it is observed that seven test results match the expected outcomes, while only three test results do not meet the expected outcomes.

For the Login feature, it is evident that in some testing scenarios, the results do not match the expected results. In test codes WINGPOS-001 and WINGPOS-004, there is an error message displayed only for the email field, while none is displayed for the password field. Aside from these errors, the test results align with expectations.

Meanwhile, For the registration feature, there is just one test case that does not match the expected results, specifically test ID WINGPOS-008. The system fails to validate whether the email domain entered by the user is valid. This allows users to register with emails that have invalid domains.

6. CONCLUSION

This research has demonstrated the utility of Black Box Testing with the Equivalence Partitioning technique in evaluating the functionality of the Wingpos website's login and registration features. The findings highlight the importance of systematic software testing in identifying and addressing functionality gaps that may impact the user experience. While most test scenarios for both features produced expected results, certain discrepancies were identified, such as errors in login validation and the inability to handle invalid email domains during registration. These findings underline the necessity for iterative testing and improvements in the system to ensure optimal functionality and reliability.

For future researchers, it is recommended to expand testing to include other features of the Wingpos website and to explore complementary testing methodologies to enhance the comprehensiveness of the evaluation. Additionally, integrating automated testing tools may increase efficiency and precision in detecting bugs.

LIMITATION

Several limitations were identified during this research that may affect the interpretation and generalization of the findings:

- a. **Scope of Testing:** The study focused solely on the login and registration features, leaving other essential functionalities untested. This limited scope may restrict the conclusions' applicability to the overall system performance.
- b. **Error Validation:** The testing process identified discrepancies in error messages for certain scenarios, particularly during login and email validation. However, the root causes of these issues were not deeply investigated, which could have provided more insights into potential system flaws.
- c. **Manual Testing:** The reliance on manual testing introduced the possibility of human error, which may have affected the consistency and accuracy of the findings.
- d. **Environmental Factors:** The tests were conducted in a controlled environment, which may not fully replicate real-world conditions, such as varying network speeds or device configurations.

These limitations suggest avenues for improvement, including a broader testing scope, deeper analysis of error patterns, and the adoption of automated testing frameworks to mitigate human error and increase testing coverage.

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