



Web-Based Financial Information System Testing of PT Perta Sakti Abadi Using the Black Box Testing Method

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Abstract. Software testing is a critical phase in information system development to ensure the system's quality and reliability. This study aims to evaluate the reliability and functionality of PT Perta Sakti Abadi's financial information system using the black-box testing method with the Equivalence Partitioning (EP) technique. This technique allows input data to be grouped into valid and invalid categories, minimizing test cases without reducing testing coverage. The testing focuses on the login feature as the system's primary component by evaluating various input combinations. The testing scenarios include boundary conditions to ensure the system handles inputs correctly in various situations. The results indicate that the system successfully verifies valid credentials, rejects access with invalid data, and provides informative error messages. Additionally, the system demonstrates resilience in handling testing scenarios, including inputs with special characters and empty fields. Input validation mechanisms function optimally, supporting secure user access and ensuring the login feature aligns with functional specifications. This successful testing forms a strong foundation for testing other modules, such as multi-level authentication and data encryption. Thus, the Equivalence Partitioning technique within the black-box testing method proves effective in enhancing the quality of web-based financial information systems.

Keywords: software testing, black-box testing, equivalence partitioning, input validation, financial information system

1. INTRODUCTION

In information system development, software testing is a crucial stage to ensure the system functions according to specifications and user requirements. One method frequently used is black box testing, which has proven effective in evaluating software functionality without requiring an understanding of internal code structure. Black box testing allows developers to focus on output validation based on various input combinations, making it a reliable tool for detecting errors or inconsistencies in the system.

Equivalence Partitioning (EP) technique becomes a primary approach in this method. By grouping input data into valid and invalid categories, this technique allows a reduction in the number of test cases without reducing testing coverage. This technique not only improves testing process efficiency but also provides representative results regarding system reliability. Previous research has proven the effectiveness of this method in testing various system types, such as academic information systems (Pratama *et al.*, 2023), inventory management systems (Fahrezi *et al.*, 2022), and employee performance assessment systems (Wijaya & Astuti, 2021).

Even in e-commerce and other web-based applications, this method successfully improved software quality significantly by ensuring optimal functionality (Kusuma *et al.*, 2024).

The urgency of this research lies in ensuring web-based financial information systems can operate optimally and meet user needs. Errors in information systems, especially those related to financial management, can cause serious impacts on company operations. This includes risks of data loss, calculation errors, or system failures that can disrupt business activities. Therefore, ensuring the reliability of financial information systems becomes an unavoidable priority.

This research specifically focuses on PT Perta Sakti Abadi's Financial Information System, which serves as the company's backbone in managing financial data and processes. By applying black box testing using the EP technique, this research aims to evaluate system performance and identify potential shortcomings or weaknesses. The research problem raised is: How reliable is PT Perta Sakti Abadi's Financial Information System when tested using the black box testing method?

The purpose of this research is to evaluate web-based Financial Information System functionality through functional testing using the black box testing method. Additionally, this research also seeks to provide improvement recommendations based on test results if any discrepancies or weaknesses are found in the system. Thus, this research is expected to contribute to improving a reliable, secure financial information system that meets the company's operational needs.

2. METHODS

This research was carefully conducted, starting from the preparation stage that included system requirement tracing, testing plan development, to test case creation through the Equivalence Partitioning (EP) method. Additionally, we checked the readiness of equipment and materials such as laptops we checked the readiness of devices and materials such as the operating system using Windows version 11, PHP programming language, Laravel framework version 11, MYSQL database, Editor with Visual Studio Code and Apache web server and laptop hardware with Acer Swift 3 specifications, Intel Core i5-12500H Processor VGA Intel Iris Xe Graphics, 14 " 2.8K Display (2880 x 1800), OLED with TUV Rheinland EyeSafe, 100% DCI-P3, 90 Hz, < 0.2ms, HDR 500 Display, 500 nits, 16:10 aspect ratio, 16 GB LPDDR5 RAM and a trial system for the PT Perta Sakti Abadi Financial Management Information

System and the Financial Management Information System test system of PT Perta Sakti Abadi.

The research used software integrating Black Box Testing-based testing with the Equivalence Partitioning (EP) approach to group input data into valid and invalid categories. The research was conducted on November 13, 2024, at the IPB Programming Laboratory, focusing on testing one of the main features, namely the login and logout system. The research subject was a web-based software prototype developed using the CodeIgniter framework with an MVC approach.

The research procedure began with initial steps involving test scenario compilation and test environment preparation. Then, testing was conducted using the Equivalence Partitioning (EP) method to systematically group input data based on valid and invalid categories. This technique helps reduce the number of test cases without reducing testing coverage, in line with the theory stating that Equivalence Partitioning divides the input domain into data classes to efficiently identify valid and invalid cases (Wijaya & Astuti, 2021).

Test results were recorded in an assessment table. Test results were evaluated descriptively to assess system performance according to established requirements, focusing on input validation, compatibility, and system responsiveness (Mahrozi & Yaqin, 2024). Research tools included a laptop with specific specifications and testing documentation. Findings included documenting test results in the Software Test Document, then analyzing by comparing actual results with expected results based on system requirements. All data and improvement recommendations were neatly and systematically recorded.

Testing was conducted based on test cases from the application using the Equivalence Partitioning (EP) technique. Attempts were made on the login field, and results were documented. Below is an image of the login page for the PT Petra Sakti Abadi Financial Management Information System.

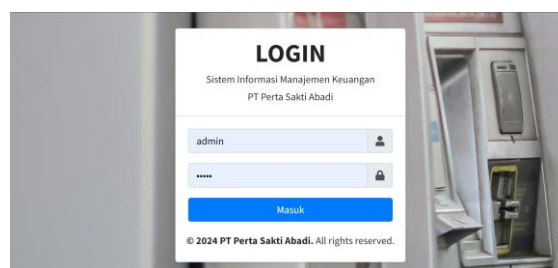


Figure 1. Login Page of Financial Management Information System Website
PT Perta Sakti Abadi

Login testing with valid username and password showed that the system successfully accepted the input and the login process proceeded smoothly until the user was directed to the application dashboard. This test proved that the system could recognize valid data combinations and execute the login function as expected.

Further testing was conducted using an incorrect username with a valid password. Test results showed that the system rejected this input combination and displayed an appropriate error message. This indicates that the system has implemented validation to verify username authenticity.

The next test used a valid username but an incorrect password. The result was that the system again rejected the input and provided a relevant error message. This demonstrates that password validation also works well to ensure access security.

Finally, testing was done with both an incorrect username and password. The test results showed that the system consistently rejected inputs that did not match the data stored in the database. The error messages also supported users in correcting their input.

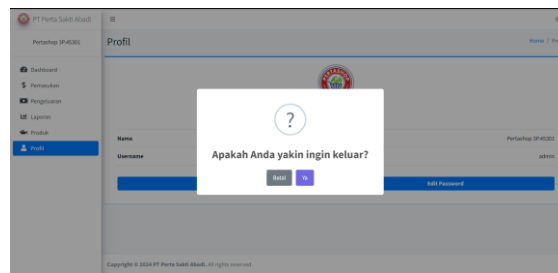


Figure 2. Logout page of Financial Management Information System Website
PT Perta Sakti Abadi

3. RESULTS

Testing of PT Perta Sakti Abadi's financial information system was conducted using black-box testing with the Equivalence Partitioning (EP) technique. The test results focused on the functional aspects of the login and logout system. The results of the login and logout form tests are shown in Table 1.

Table 1. Login form test results

ID	Part Name	Description	Expected results	Test Results	Conclusion
1.	Admin enters valid Email Address and Password	Admin enters valid Username and	The system only allows access to the dashboard if the	As Expected	Accepted

		<p>Password. Admin presses the Login button. The system verifies the credentials and redirects the admin to the dashboard page.</p>	<p>credentials entered are valid. Admin can access the dashboard page if the login is successful.</p>		
2.	Admin entered an incorrect Username and valid Password	<p>Admin enters wrong Username and valid Password. Admin presses the Login button. System verifies credentials whether correct or not</p>	<p>The system displays an error message indicating that “The username or password you entered is incorrect!”. The system does not provide access to the Dashboard page.</p>	As Expected	Accepted
3.	Admin entered valid Username and wrong Password	<p>Admin enters valid Username and wrong Password. Admin presses the Login button. System verifies credentials whether correct or not</p>	<p>The system displays an error message indicating that “The username or password you entered is incorrect!”. The system does not provide access to the Dashboard page.</p>	As Expected	Accepted
4.	Admin entered wrong Username and wrong Password	<p>Admin enters wrong Username and wrong Password. Admin presses Login</p>	<p>The system displays an error message indicating that “The username or password you entered is</p>	As Expected	Accepted

		button. System verifies credentials whether correct or not	incorrect!'. The system does not provide access to the Dashboard page.		
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Table 2. Form log out test results

ID	Part Name	Description	Expected results	Test Results	Conclusion
1.	Testing admin logout function	1.Admin is on the main dashboard page 2.There is an exit button that can be pressed to start the logout process	The system displays a logout confirmation pop-up with the options "Yes" to logout and "No" to cancel. Once the admin selects "Yes," the session ends, and the admin is redirected to the login page. If the admin selects "No," the admin remains on the dashboard page.	As Expected	Accepted

Login Feature Testing for PT Perta Sakti Abadi's Financial Information System was conducted using black-box testing with the Equivalence Partitioning (EP) technique. This technique was chosen because it effectively groups input data into valid and invalid categories, thereby reducing the number of test cases without compromising testing coverage. The testing focused on input validation to ensure that the login system only allows access with valid credential combinations.

The test results showed that in the first scenario, when valid username and password were entered, the system successfully verified the credentials and directed the user to the dashboard, as expected. In the second scenario, when the username was incorrect but the password was valid, the system precisely rejected access and displayed a relevant error message. These results affirm that the system has a good validation mechanism for user

credentials. The third and fourth scenarios, which tested combinations of valid username with incorrect password, as well as both username and password being incorrect, showed consistent results. The system rejected login access and provided informative error messages, ensuring users understand the cause of the error.

Additionally, testing was conducted using extreme data, such as usernames with character lengths exceeding the maximum limit and passwords with unusual symbols or special characters. The system proved capable of handling these cases by rejecting inputs that do not meet standard requirements without compromising performance or security. This demonstrates that the system has good resilience against potential exploitation through invalid inputs. During testing, system response time was also observed. Despite involving various input data combinations, the system continued to provide quick and consistent responses, ensuring optimal user experience. With this rapid response, the system maintained operational efficiency even under intensive testing conditions.

These test results show that the login system functions well according to specifications. No weaknesses or inconsistencies were found in the tested scenarios. The Equivalence Partitioning (EP) technique proved effective in ensuring the system can handle various input combinations with high consistency. The success of this testing not only guarantees the reliability of the login feature but also provides an important basis for further testing of other system modules, such as data security and multi-level authentication. This indicates that the login feature is ready to be used for financial information system operations with a high level of reliability.

The logout feature in PT Perta Sakti Abadi's Financial Information System plays a crucial role in maintaining user data security and integrity. Logout function testing was conducted to ensure that the system can correctly terminate user sessions, prevent unauthorized access, and provide a good user experience.

In the first test, the admin was on the main dashboard and could see the logout button available to close the user session. When the logout button was pressed, the system displayed a confirmation pop-up asking the admin to choose between "Yes" to logout and "No" to cancel the logout process. This provides an additional layer of protection against unintentional button presses.

If the admin selects the "Yes" option, the system will end the active session and redirect the admin back to the login page. This process occurs quickly and responsively, in less than one second, showing that the system has successfully processed the logout request and

efficiently removed session information. Once the session ends, all admin login-related data can no longer be accessed without logging in again, which adds a layer of security to the system. Conversely, if the admin chooses the "No" option, the system will cancel the logout process and return the admin to the dashboard without any changes to the session status. This feature ensures that the admin has full control over the decision to logout or continue the session without interruption.

During testing, attempts were also made to ensure that after logout, there is no direct access to the dashboard even if the URL is manually attempted. The result was that the system successfully blocked these attempts and forced the admin to return to the login page. This demonstrates that the system has a robust mechanism for handling session deletion and preventing unauthorized access.

The successful logout testing provides confidence that the feature functions as expected. Moreover, this feature is important in reducing the risk of data leakage or unauthorized access on devices used by admins, as well as securing transactions or sensitive data in the financial information system. This successful logout testing also indicates that the system is ready to be operated in a broader environment, with a high level of reliability.

In the future, further system testing can focus on implementing additional security features, such as session timeout, which can automatically terminate user sessions after a certain period of inactivity, providing a higher level of security against unauthorized access.

4. CONCLUSION

Based on the login feature testing of PT Perta Sakti Abadi's Financial Information System using black-box testing with the Equivalence Partitioning (EP) technique, it can be concluded that the system has functioned in accordance with the specified functional specifications. Testing was conducted through various scenarios of valid and invalid input data combinations, demonstrating that the system can consistently verify credentials and provide appropriate responses for each test scenario.

In valid input scenarios, the system successfully provided dashboard access only when correct username and password were entered. Conversely, invalid input combinations, such as incorrect username, incorrect password, or both, were rejected with informative error messages. These messages not only help users understand the cause of the error but also improve the overall user experience. These results confirm that the input validation mechanism in the login system has operated optimally, ensuring user data security and integrity.

The use of the Equivalence Partitioning (EP) technique proved highly effective in grouping input data into valid and invalid partitions. This allows for a reduction in test case numbers without compromising testing coverage, making the testing process more efficient while remaining comprehensive. Testing also included extreme data, such as inputs with character lengths exceeding maximum limits and use of special characters, which showed that the system can handle these situations well without compromising performance or security.

The success of this testing provides confidence that the login feature is worthy of implementation in the company's operational environment. The feature has proven to not only meet functional requirements but also support overall system security. Moreover, the successful testing of the login feature provides a strong basis for continuing testing on other modules in this information system, such as multi-level authentication, financial data management, and data encryption security.

Overall, the login feature is declared ready to support company operations with a high level of reliability. The application of black-box testing with the Equivalence Partitioning technique was not only effective in this testing but also shows great potential for improving software quality in other web-based systems.

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