

Analysis and Testing of the Combox Web Application System Using Black Box Testing with the Equivalence Partitioning Method

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Abstract. This research focuses on evaluating the Combox web application, a digital tool designed to help Food and Beverage (F&B) business owners strengthen their online presence. The analysis was carried out through Black Box Testing, specifically using the Equivalence Partitioning method, to assess core functionalities like login, logout, product management, and pagination. The findings reveal that while most features function as intended, there are issues with product addition and editing, as well as pagination when no data is available. These results highlight areas that need refinement to improve the application's reliability and user experience. In summary, this research supports the advancement of a digital platform that enables F&B businesses to harness technology effectively in today's competitive landscape.

Keywords Black Box Testing, Equivalence Partitioning, Functional Testing, Software Testing

1. BACKGROUND

Application testing plays a crucial role in the development and improvement of an information system. Testing is conducted to ensure that the product produced meets the established standards and specifications. According to Oscar in (MZ, 2016), the purpose of application testing is to create high-quality products that can improve work efficiency. Furthermore, the quality of the application depends heavily on customer or user satisfaction levels (Cholifah et al., 2018). The importance of testing becomes even more apparent with the continuous advancement of technology, which drives digital transformation across various industries, including the Food and Beverage (F&B) industry.

Digital transformation in the Food and Beverage (F&B) industry is essential to face increasingly competitive market pressures. A strong and professional digital presence can enhance customer trust and expand market reach, in line with the needs of modern consumers who rely on online platforms to seek information and interact with businesses. However, many F&B business owners still struggle to optimize their digital presence due to their reliance on traditional systems and offline media. Therefore, there is a need for digital solutions that can effectively support marketing and customer interaction.

The Combox system was developed in response to the challenges of optimizing F&B businesses digitally. Combox is a company profile website designed to enhance the online professional image. This system is equipped with features that provide complete information

about products, services, as well as the company's vision and mission, alongside a responsive interface to support accessibility for users accessing it through smartphones.

This research aims to analyze and test the Combox web application, particularly in terms of software testing carried out during the development of the web application, as well as analyzing its impact on performance and user experience. The results of this research are expected to contribute to the improvement of software development and testing practices in the F&B industry, allowing business owners to maximize the use of digital technology to reach a broader market and enhance their competitiveness.

2. THEORITICAL STUDY

Analysis

Analysis is the process of thinking conducted to break down a system or object into its smallest parts. The purpose of this activity is to understand the characteristics of each part, the relationships between those parts, and the role or function of each in forming a cohesive whole (Septiani et al., 2020).

System testing

System testing is an essential element in a broader process often referred to as verification and validation (V&V). Verification consists of steps aimed at ensuring that the software performs specific functions correctly. On the other hand, validation involves other activities focused on ensuring that the developed software truly meets the needs and expectations of the users (Achmad et al., 2020).

Black Box Testing

Black box testing is an application testing method that does not require knowledge of its internal details, such as source code. This testing focuses on the output results based on the given input, without examining the internal parts of the application. In the Black box testing process, testing is carried out by providing various inputs to the application form to ensure whether the application functions according to the needs of the stakeholders.

Black box testing is also known as functional testing or specification-based testing because it only evaluates the application's functions based on external specifications. This method does not involve source code analysis but simply tests whether the application's functions work according to the stakeholders' requirements through observation of its basic elements (Sasongko et al., 2021).

Equivalence Partitioning

Equivalence Partitioning is a technique in black box testing that divides the input domain of a program into several data groups, allowing the creation of more specific and effective test cases. In this method, test case design is done by evaluating equivalence classes based on input conditions that reflect both valid and invalid data groups. These input conditions can be numbers, ranges of values, or sets of values that are related to each other (Pratama et al., 2023). The main advantage of this method is its broader input coverage, as the selection of representatives from each data group ensures that various scenarios can be thoroughly tested (Nelvi, 2024).

3. RESEARCH METHODS

The approach used is black box testing, a software testing method that evaluates an application without needing to understand its internal structure or source code. The equivalence partitioning technique is applied by entering data into each form in the application, where each input menu is tested and classified based on whether the data is valid or not. In this equivalence partitioning, the testing process includes input verification, evaluation of valid data groups, observation of the entered data, and ensuring the accuracy of that data (Wibowo et al., 2023).

Below is the interface of the Combox website, which will be the subject of testing, where each element and feature within the site will be tested to ensure functionality, appearance, and performance in accordance with the specifications and user requirements.

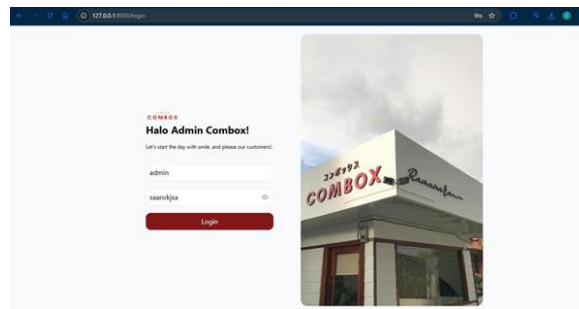


Figure 1. Login Page

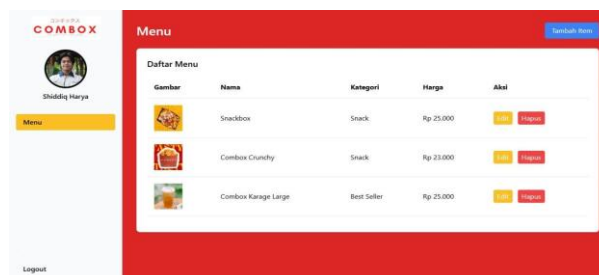


Figure 2. Admin Page

Table 1. Design of Test Classes and Application Test Items

No	Test Classes	Test Case
1	Login	Correct email input and correct password
2	Login	Email input is incorrect and password is correct
3	Login	Input correct email and wrong password
4	Login	Input wrong email and wrong password
5	Logout	Logout from the admin page
6	Create Item	Add new item with data
7	Update Item	Update existing items with valid data
8	Delete Item	Deleting the selected item
9	Pagination Menu	Ensure the "Next, Prev and data limitation" buttons function properly.

4. RESULT AND DISCUSSION

In this Black Box testing, the examination is only performed on the value of each input entered. One of the advantages of the Black Box method is that the tester does not need to have an in-depth understanding of a specific programming language to conduct the testing (Hidayat et al., 2019).

This design table serves to monitor whether the program meets the user's needs or if there are errors that require corrections to improve the quality of the program. The forms to be tested include the login, logout, and CRUD item forms. Below is a table displaying the results of testing the Combox website.

Table 2. Black Box Test Scenario for Login and Logout Forms

No	Test Scenario	Test Code	Expected Results	Test Results	Conclusion
1	Login with correct email and password	A01	Login successful, displays admin page.	Matches	Login successful and the system displays the admin page as expected.
2	Login with incorrect email and correct password	A02	Login unsuccessful, stays on login page.	Matches	Login unsuccessful, remains on the login page as expected.
3	Login with correct email and incorrect password	A03	Login unsuccessful, stays on login page.	Matches	Login unsuccessful, remains on the login page as expected.
4	Login with incorrect email and password	A04	Login unsuccessful, stays on login page.	Matches	Login unsuccessful, remains on the login page as expected.
5	Logout from admin page	A05	Logout successful, redirects to login page.	Matches	Logout successful, and the user is redirected back to the login page as expected.

Table 3. Black Box Test Scenario for the Admin Page

No	Test Scenario	Test Code	Expected Results	Test Results	Conclusion
1	Display menu data	B01	Menu list appears in the table with image, title, and price.	Matches	The menu list appears in the table with the correct format, displaying image, title, and price.
2.	Add product to table	B02	New product input available with image, title, and price, and the product is successfully added to the menu table.	Does not match	The "Add Product" button does not respond, so the input form and product addition do not function properly.
3.	Delete product from table	B03	Selected product items are deleted with a confirmation or delete info.	Partially matches	The deleted product item is successfully removed, but there is a delay and no confirmation or delete info is shown.
4.	Edit product data in table	B04	Selected product items can be viewed and edited, and changes can be saved.	Does not match	The "Edit" button does not function as expected.
5.	Display number of items per page in pagination	B05	Items displayed are limited to 5 results per table page.	Matches	Data is displayed correctly.
6.	Navigate to next page in pagination	B06	Displays the next 5 items in the table.	Matches	Data is displayed correctly.
7.	Navigate to previous page in pagination	B07	Returns to the previous 5 items in the table.	Matches	Data is displayed correctly.
8.	Pagination still functions when no data	B08	Pagination remains displayed when there is no data.	Does not match	Pagination disappears when there is no data.

From the test scenario results, the validity level of the tests was successfully achieved, as shown in Table 1. In the tested scenario, there are results with varying outcomes represented in the table below.

Table 4. Evaluation result

Scenario	Valid Test Case (%)
A01	100
A02	100
A03	100
A04	100
A05	100
B01	100
B02	0
B03	50
B04	0
B05	100
B06	100
B07	100
B08	0

The graph shown in Figure 3 displays the evaluation of software testing using the Black Box Testing approach on the Combox website. These results align with the system requirements implemented. These results may change depending on the level of system requirements that have been identified.

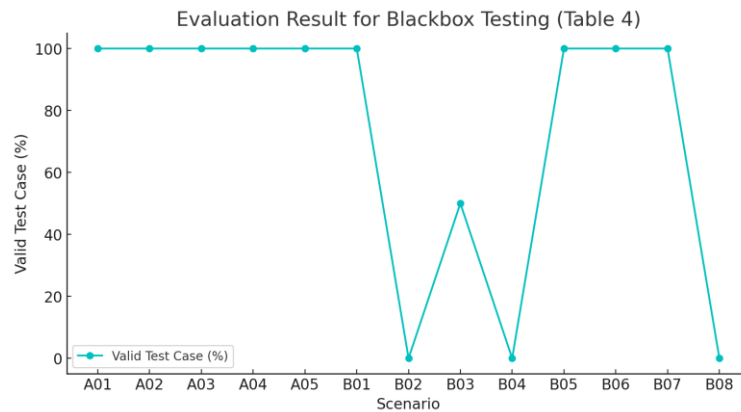


Figure 3. Black box testing graph.

5. CONCLUSION

Based on the testing of the Combox application using Black Box testing with one of the techniques, Equivalence Partitioning, several important results were obtained. The testing focused on the core functionalities of the application, including login, logout, data manipulation (CRUD), and pagination features. The testing showed that basic features such as login, logout, and pagination generally functioned as expected. However, there were some issues with functions like adding and editing products, which did not perform as intended. This indicates that the application still requires some improvements to meet the desired specifications. Additionally, pagination needs to be fixed to function properly when no data is displayed.

Based on the evaluation results, the testing of the Combox application using the equivalence partitioning technique showed that out of a total of 13 test cases, 9 test cases were successful, resulting in an effectiveness rate of 69.23%. Most of the test scenarios for the login, logout, and menu data display features achieved the expected results with a validation rate of 100%. However, some features, such as adding and editing products, experienced failures with low validation rates, ranging from 0% to 50%. This indicates a gap that needs to be addressed in the application's development, particularly for more complex features. The main focus of improvements should be on the stability and reliability of the CRUD and pagination features to ensure the application better meets user needs. Overall, the test results suggest that the Combox application is close to meeting the expected specifications, but further improvements are necessary to enhance its overall stability and functionality.

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