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Black Box Testing Using the Equivalence Partitions Technique to Test the Functionality of the Ternaku.id Website

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ABSTRACT

A data validation process that is not optimal can result in inappropriate data stored in the database, such as a login process that can cause errors. This can be detrimental to website owners and users, so it is necessary to improve the quality of more accurate validation. The ternaku.id website, which has been designed in such a way, must go through a testing stage to ensure the quality of the software itself. A good test case is if the test has the possibility of finding an uncovered error. In this research, functionality testing will be carried out using black box testing using the Equivalence Partition method. This method test solves or divides the input domain of the program into data classes so that test cases that are considered relevant enough to test the registration or registration functionality, login, and investment application features on the Ternaku can be obtained.id website. The results of tests carried out on 11 functions showed that 3 functions failed and 8 functions succeeded.

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INTRODUCTION

The Ternaku.id platform is a livestock investment platform that applies the Internet of Things (IoT) in the process of monitoring livestock development. The Ternaku.id platform is the result of collaboration between Dermaji village and the Telkom Institute of Technology Purwokerto, which was officially launched on November 28, 2022, and can be accessed using a browser at www.ternaku.id. During development, the ternaku.id platform carried out several tests, including User Interface testing to test the application interface and functionality testing to test the functions of several features that have been created.

Testing is carried out to ensure that the developed software can run as it should [1]-[2]. Software testing is the process of executing a program that has been developed by a programmer or developer [3]-[4]. Testing is carried out to find out whether there are still bugs or errors in the application[5]. A validation or inspection process is also needed to find out whether the application being developed has met the expected objectives or not[6]. One method of testing software is to use the black-box testing method, which will test the functionality to check input and output based on their respective values[7].

Black Box testing is testing that does not pay attention to the details of the software, which only tests input values[8]. Black Box testing aims to see whether the software being developed is suitable for use and in accordance with the initial purpose of its creation[9]. Black Box testing is used to find errors such as missing or incorrect functions, interface errors, performance errors, errors in data structures, and initialization and termination errors[10]. One technique that can be used to test data based on input is Equivalence Partitions[11].

Equivalence Partition is a testing method that focuses on input data in each form by dividing it into valid and invalid groups[12]. Equivalence Partition is one of the techniques in Black Box testing, which functions to check the condition and type of input[13]. In general, the Equivalence Partition technique is a technique for determining the type of input by dividing the input data into two valid and invalid parts caused by three models of errors in the function, errors in the data, and errors in the interface[14].

METHOD

The method used in this research is a functionality testing method using black box testing with the Equivalence Partitions technique. The platform that will be tested is the livestock investment website ternaku.id. Testing is carried out to find errors in the system being built by dividing the input domain into classes so that test cases for the application can be obtained[15].

This research begins by creating a Test Case for the Ternaku.id website, which will be carried out using the Equivalence partitions method. Table 1, Table 2, and Table 3 show that the test cases and expected results are on the Ternaku.id website. The Test Case section contains input that will be tested on the Ternaku.id website.

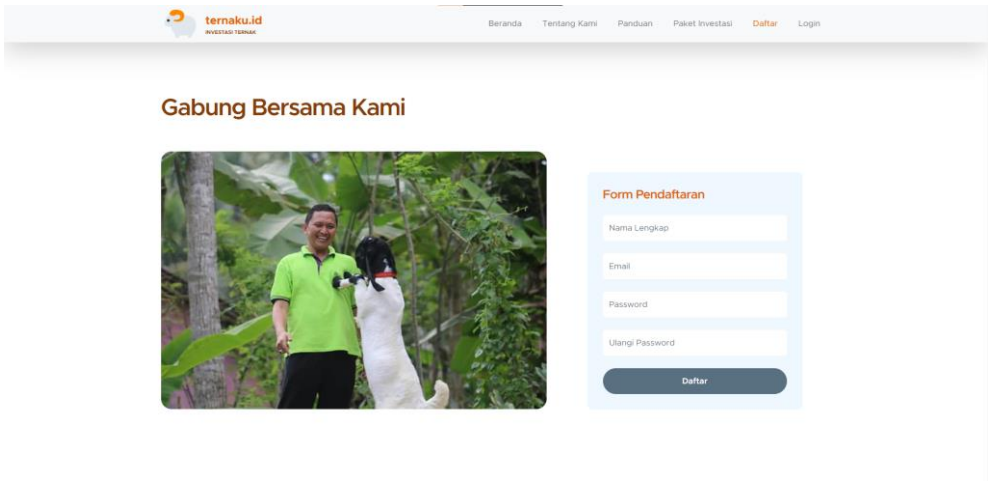

Figure 1. Registration Form

Based on Figure 1, several test cases will be carried out on the registration form, such as emptying all registration fields, registering using the wrong email format, and so on.

Table 1, Testing of case perform.

Id	Test Case	Expected results
A-001	Register by emptying all fields.	The system rejects the registration request and displays the alert "Please fill out this field".
A-002	Register by leaving the email field blank.	The system rejects the registration request and displays the alert "Failed registration, email field must not be empty".
A-003	Registering using an inappropriate email format	The system rejects the registration request and displays the alert "Please include '@' in the email address
A-004	Register by entering a password that does not match in the Repeat Password field	The system rejects the registration request and displays the alert "Password is not the same, please try again".

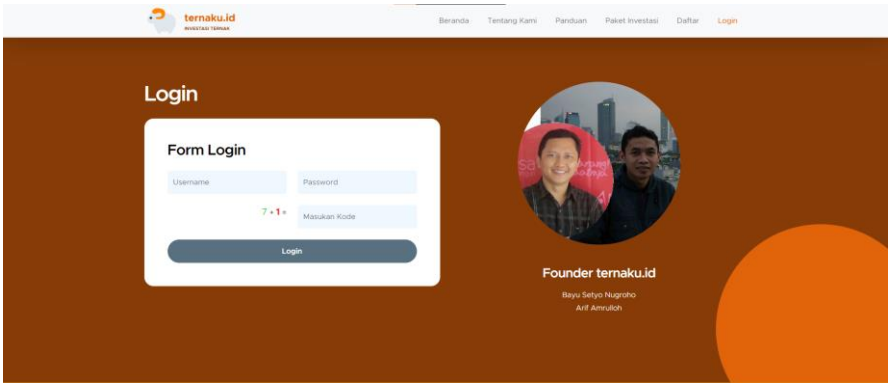

Figure 2. Login Form

Based on Figure 2, there are several test cases that will be carried out on the login form, such as logging in by leaving all login fields blank, entering the wrong password, and so on.

Table 2. Test case design for login form

Id	Test Case	Expected results
B-001	Log in by leaving all fields blank,	The system rejects the login request and displays the alert "please fill out this field",
B-002	Login by filling in all fields according to the data that has been registered and the correct code,	Displays the Dashboard page of the Ternaku.id website,
B-003	Log in by filling in a valid code field but the email and password are invalid	The system rejects the login request and displays the alert "E-mail / password does not match, please try again",
B-004	Log in by filling in the valid email and code fields but the password is invalid	The system rejects the login request and displays the alert "Password does not match, please try again",
B-005	Log in by filling in the valid email and password fields but the code is invalid	The system rejects the login request and displays the alert "sorry, wrong code, please try again".

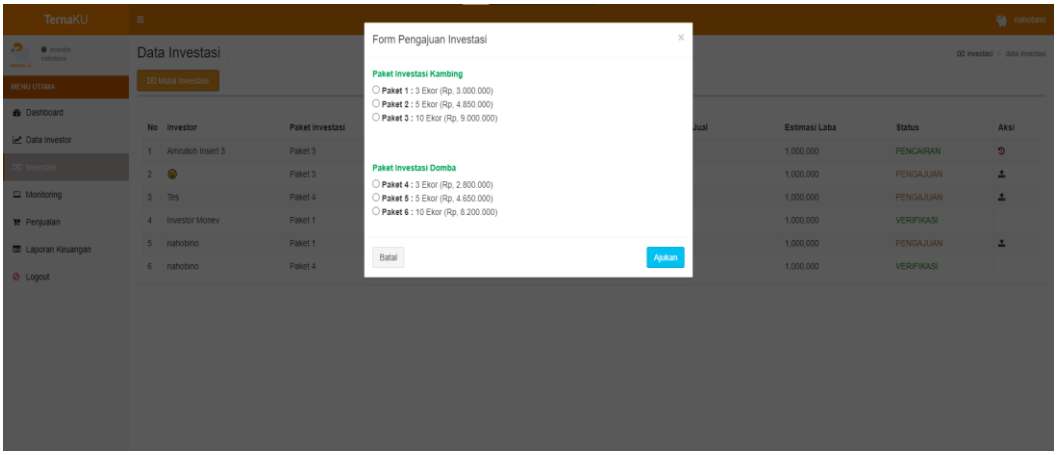

Figure 3. Investment Data Page

Based on Figure 3, there are 2 test cases that will be carried out on the investment application form.

Table 3. Test Case Design for Investment Submission Form

Id	Test Case	Expected results
C-001	Choose one of the investment packages on the investment application form.	Displays a "success" alert and displays data from the investor applicant that has just been entered on the investment page.
C-002	Do not choose one of the investment packages on the investment application form.	The system rejects the submission request and displays the alert "please select one of these options".

RESULT & DISCUSSION

In Tables 1, 2, and 3, the Test Case design has been explained, and then in Table 4 and Table 5 are the test results of the Test Case and the conclusions. The Steps section in Table 4 contains the testing steps on the Ternaku.id website along with the inputs. Test results also show the response or output from the Ternaku.id website when given inputs by the Test Case that has been designed.

Table 4. Test results from Ternaku.id

Id	Steps	Expected Results	Test Results
A-001	1. Go to the registration form 2. Enter Full Name: 3. Enter E-mail: 4. Enter Password: 5. Enter repeat password: 6. Click Register	The system rejects the registration request and displays the alert "Please fill out this field".	The system rejects the registration request and displays the alert "Please fill out this field".
A-002	1. Go to the registration form 2. Enter Full Name: Pramudya Adi W 3. Enter E-mail: 4. Enter password: adiwiw28 5. Enter repeat password: adiwiw28 6. Click Register	The system rejects the registration request and displays the alert "Failed registration, email field must not be empty".	The system rejects the registration request and displays the alert "Please fill out this field".
A-003	1. Go to the registration form 2. Enter Full Name: Pramudya Adi W 3. Enter E-mail: pramudyadiw 4. Enter password: adiwiw28 5. Enter repeat password: adiwiw28 6. Click Register	The system rejects the registration request and displays the alert "Please include '@' in the email address"	The system rejects the registration request and displays the alert "Please include '@' in the email address"
A-004	1. Go to the registration form 2. Enter Full Name: Pramudya Adi W 3. Enter your e-mail: pramudyadiw@gmail.com 4. Enter password: adiwiw28 5. Enter repeat password: adiwiw404 6. Click Register	The system rejects the registration request and displays the alert "Password is not the same, please try again".	The system rejects the registration request and displays the alert "Password is not the same, please try again".
B-001	1. Go to the login form 2. Enter E-mail: 3. Enter Password: 4. Enter Code 8 + 4: 5. Click Login	The system rejects the login request and displays the alert "please fill out this field",	The system rejects the login request and displays the alert "please fill out this field",

B-002	1. Go to the login form 2. Enter your e-mail: pramudyadiw@gmail.com 3. Enter password: adiwiw28 4. Enter Code 8 + 4 : 12 5. Click Login	Displays the Dashboard page of the Ternaku.id website	Displays the Dashboard page of the Ternaku.id website
B-003	1. Go to the login form 2. Enter E-mail: pramudyadiw 3. Enter password: adiwiw404 4. Enter Code 8 + 4 : 12 5. Click Login	The system rejects the login request and displays the alert "E-mail / password does not match, please try again",	The system rejects the login request and displays the alert "sorry username / password does not match, please try again",
B-004	1. Go to the login form 2. Enter your e-mail: pramudyadiw@gmail.com 3. Enter password: adiwiw404 4. Enter Code 8 + 4 : 12 5. Click Login	The system rejects the login request and displays the alert "Password does not match, please try again",	The system rejects the login request and displays the alert "sorry username / password does not match, please try again",
B-005	1. Go to the login form 2. Enter your e-mail: pramudyadiw@gmail.com 3. Enter password: adiwiw28 4. Enter Code 8 + 4 : 10 5. Click Login	The system rejects the login request and displays the alert "sorry, wrong code, please try again".	The system rejects the login request and displays the alert "sorry, wrong code, please try again".
C-001	1. Go to the investment page 2. Click Start Investing 3. Choose one of the investment packages 4. Click submit	Displays a "success" alert and displays data from the investor applicant that has just been entered on the investment page.	Displays a "success" alert and displays data from the investor applicant who has just been entered into the investment page.
C-002	1. Go to the Investment page 2. Click Start Investing 3. Click Apply	The system rejects the submission request and displays the alert "please select one of these options".	The system rejects the submission request and displays the alert "please select one of these options".

Table 5. Conclusion of Ternaku.id test results

No	Id	Conclusion
1	A-001	Succeed
2	A-002	Fail
3	A-003	Succeed
4	A-004	Succeed
5	B-001	Succeed
6	B-002	Succeed
7	B-003	Fail
8	B-004	Fail
9	B-005	Succeed
10	C-001	Succeed
11	C-002	Succeed

The total number of tests from this research was 11 on the register or registration, login, and investment application functions. The registration function was tested 4 times, which resulted in 3 successes, namely in the test case: logging in by leaving all fields blank, registering with an email format that did not match, and registering by entering a password that did not match in the repeat password field. And once the test case fails, register by leaving the email field blank.

Then, the login function was tested 5 times and resulted in 3 successes, namely in the Test Case: logging in by leaving all fields blank, logging in by filling in all fields with registered data and matching code and logging in by entering a valid email and password. But the code doesn't fit. It failed 2 times in the Test Case, logging in by filling in valid code fields but with an invalid email and password and logging in by filling in valid email and code fields with an invalid password.

Then, the investment application function was tested 2 times and resulted in 2 successes, namely in the test case selecting one of the investment packages and not selecting one of the investment packages.

CONCLUTIONS

The test results show that the quality of the Ternaku.id website still has 3 test cases that produce errors or fail, namely in the registration and login sections. It is hoped that the results of this research can be used as evaluation material for the ternaku.id web manager to correct these errors. It is recommended that for further research, we add other black box techniques, such as Pair Testing or Boundary Value Analysis so that we can find other errors on the Ternaku.id website to produce a website with satisfactory quality.

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