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THE TESTING OF LIBRARY APPLICATION BY USING BOUNDARY VALUE ANALYSIS

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ABSTRACT

Information System Testing or application testing is the process of implementing a program with the aim of finding an error. Tests are done well in order to find out an error which is not revealed. In this study, one of the tests used is Black Box Testing with Boundary Value Analysis methods or techniques. This Boundary Value Analysis technique is tested by determining the lower and upper limits of the data to be tested. The test is carried out on the added member form which consists of the id_anggota fields, member names, addresses, telephone, and email in the Library application.

INTRODUCTION

Library application is an application that was made to assist a school or agency in managing book management, library member management, book loan management and book returns. Through this application, it is expected to help the library staff or employees in managing a library.

In this application there are a number of modules including the registration module for library members, the book module, the modul of book lending, the module of book return. After the application is completed, it is necessary to do such a testing to ensure all processes run as expected.

In general, testing an application or software can be done by using white box and black box testing techniques. White box testing is a test based on checking the design details, using the control structure of the program design procedurally to divide the test into several test cases [1]. At a glance, it can be concluded that White box testing is a guide to get the correct program into 100%.

The advantages of using white box testing are the testing done in order to look for errors in program logic or coding, mismatching of assumptions, errors in typing coding. However, the disadvantage is the software which is classified as white box testing is considered as a wasteful strategy.

Black box testing is a testing technique that focuses on specifying the functions that exist in the software which is developed. Black box testing tends to be able to find a

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number of things such as incorrect or absent fucntional, interface errors, errors in data structures or database access external, performance errors, initialization and termination errors [2].

The advantage of using black box testing is: the testers do not need to have knowledge of a particular programming language. The testing is carried out from the user's point of view, it really helps to reveal ambiguity or inconsistencies in the requirements specifications, programmers and testers interrelate with each other [2],[3].

Some of the reasons why a software needs to be safeguarded firstly through testing, which it can survive in the world of software business, can compete with other software, important for global marketing, streamline costs to avoid marketing or production failures, and retain customers and increase profits [6].

METHOD

The techniques possessed by black box testing include Equivalence Partitioning, Boundary Value Analysis, Robustness Testing, Behavior Testing, and Cause-Effect Relationship Testing [4].

Boundary Value Analysis (BVA) is a black box testing that focuses on the input process by testing the value of the upper and lower limits [3]. Some basic principles in Boundary Value Analysis (BVA), namely BVA focus on a boundary value where there are hidden defects, BVA leads to the selection of test cases that practice boundary values, BVA is a design of test case techniques that complement Equivalence Class Testing, BVA testing the input around the upper and lower boundary of a valid range of values, BVA tests the maximum and minimum values, BVA tests the limit of the data structure used, eg array size [7].

Some conditions or requirements in testing by using Boundary Value Analysis is if the input conditions are on the values a and b, then the test cases (a - 1), a, (a + 1) and (b - 1), b, (b + 1), if the input conditions require a number of n values, then test with a number of (n - 1), n and (n + 1) values [1] ,[3].

RESULT AND DISCUSSION

Black box testing with Boundary Value Analysis Technique is applied to the library applications. This library application contains several functions and modules. But we are going to discuss is about Added member module, where the added member form consists of a data entry form as shown in Image 1. In this form there are five data entry fields, namely id_member, member_name, address, telephone, email.

Based on the form of add Anggota, the testing will be carried out by preparing some test data. Examples of testing will be done in the id_anggota field, where in this field has a provision for member id, namely AA 00 000 (AA = Library code, 00 = agency code, 000 = member serial number) and testing is done by having some data entry rules.

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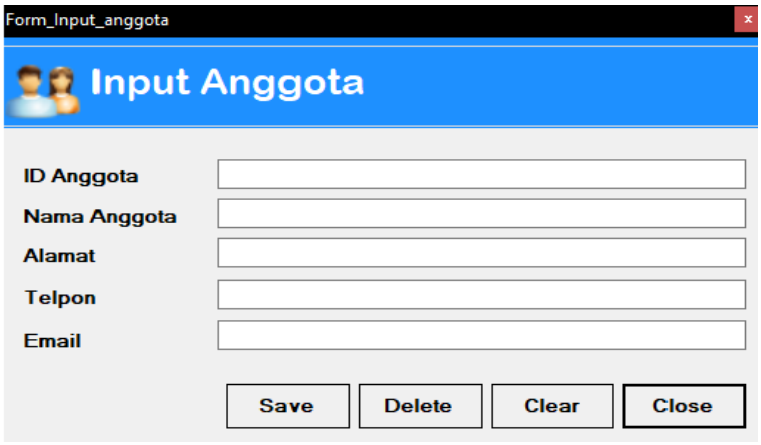

Image 1. Form of Add Anggota

Table1. Table Structure Anggota

Name Field	Type data	Constraint
id_anggota	Int(10)	PK
nama_anggota	Varchar(50)	
alamat	Varchar(100)	
telpon	Int(13)	
email	Varchar(15)	

The first rule for the field id_anggota must be in 3 words

Table 2. Test results for the first rule

Sample Data	Expected Result	Result	Conclusion
PS 02	F	T	Failed
------	F	T	Failed
PS 02 001	T	T	Success
PS 02 001 01	F	T	Failed
PS02-01	F	T	Failed

The second rule the first word is the PS library code

Table 3. Test results for the second rule

Sample Data	Expected Result	Result	Conclusion
PR	F	T	Failed
--	F	T	Failed
PS	T	T	Success
PT	F	T	Failed
PP	F	T	Failed

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The third rule the second word is an agency code 02

Table 4. Test results for the third rule

Sample Data	Expected Result	Result	Conclusion
01	F	T	Failed
02	T	T	Success
--	F	T	Failed
03	F	T	Failed

The fourth rule; the third word is the serial number of members 001-999

Table 5. Test results for the fourth rule

Sample Data	Expected Result	Result	Conclusion
000	F	T	Failed
001	T	T	Success
010	T	T	Success
100	T	T	Success
0001	F	T	Failed

Furthermore, the testing is done on the field entry of Anggota's name which has a Varchar data type with a size 50 field.

Table 5. Test Results of Anggota Field Name

Sample Data	Expected Result	Result	Conclusion
--------	F	T	Failed
Roberto Carlos	T	T	Success
Datuak Parpatiah Nan Sabatang	T	T	Success
Febri Dristyan	T	T	Success
0001	F	T	Failed

From the test results show that this application still has many shortcomings, like the incomplete input data validation process therefore it still needs improvement by adding the validation function [1].

Application testing is often interpreted as verification and validation (V&V). Verification shows the collection of activities that ensure that the application has implemented a specific function. While, Validation refers to a different set of activities that ensure that applications that have been built can be traced to user needs.

The testing which using the Boundary Value Analysis technique has a good tracking because it tests all menu instructions available so that it can determine the level of error that belongs to the application being tested [5].

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CONCLUSION

When the testing of data entry or sample data, all data input is stored in the database, it indicates that the application is running in accordance with the expected goals.

The testing conducted by the Black Box method with the Boundary Value technique analysis is very easy to do and use because it only requires testing on the lower bound and upper limit input data of the expected data.

After the testing, it can be seen from the results of the input data that were tested from the id_anggota field, it can be concluded that all the sample data that were tried were successfully entered even though the data was not expected, therefore it could cause the data stored to be invalid. Clearly, the application verification and validation functions are needed.

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