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Equivalence Partitions Method on Black Box Testing of Motor Service Information Systems at CM Jaya Motor Kudus Web-Based with SMS Gateway

Noor Latifah[1], Diana Laily Fithri[2], Fajar Nugraha[3], Yudie Irawan[4], Zulfa Himmatul Ulya[5]

[1,2,3,4,5]Informations System Department, Muria Kudus University, Jawa Tengah, Indonesia
Email: [1]noor.latifah@umk.ac.id, [2]diana.laily@umk.ac.id, [3]fajar.nugraha@umk.ac.id, [4]yudie.irawan@umk.ac.id, [5]201653052@std.umk.ac.id

Abstract

CM Jaya Motor is located on Jl. Sunan Kudus No.100 Demaan Kudus is a service business in the field of motorcycle maintenance, especially the Honda motorcycle brand, to increase the satisfaction of the services provided to customers, a motorcycle service information system was built at CM Jaya Motor. The motorbike service information system at CM Jaya Motor Kudus aims to make it easier for customers. The motor service information system at CM Jaya Motor Kudus before being implemented requires testing the system or software first, this is done to be able to find deficiencies and errors that still occur in the system. Tests in this study used the black box method with the evaluation partition technique. Black box testing is carried out without detailed knowledge of the internal structure of the system or component being tested. Obtaining Equivalence Partitions Test Case Design from the evaluation of the Equivalence class which shows the state of the input process, a collection of valid and invalid conditions. The test results show that the quality of the Motor Service Information System at Web-Based CM Jaya Motor Kudus with SMS Gateway still needs to be improved.

Keywords: Testing; BlackBox; Equivalence Partitions; Customer; Service

1. INTRODUCTION

CM Jaya Motor is a specialized service business in the field of motorcycle maintenance, namely the Honda motorcycle brand. CM Jaya Motor's location on Jl. Sunan Kudus No. 100 Demaan Kudus. This CM Jaya Motor service provider has a large number of customers, to increase the satisfaction of the services provided to customers, a motorbike service information system was built at CM Jaya Motor. The motorbike service information system at CM Jaya Motor Kudus aims to make it easier for customers. With this system, customers can not come directly when they want to service their motorbikes and information from the workshop can still be conveyed [1]. Services that have not utilized an information

system can cause problems if there are many customers who will perform the service, information about customer service schedules is difficult to convey to customers if the recording is still done manually. The maximum quota given by the repair shop is sometimes full, causing the customer to have to rearrange his service schedule the next day or find another repair shop. The solution to this problem can be solved by building a web-based motorcycle repair reservation service application to make it easier[2]. This information system is also supported by the many applications of web-based online transactions and whatsapp notifications in various business fields and is supported by easy internet access[3].

The motorbike service information system was designed and built with the aim of making it easier for customers when booking a queue for their motorbike service so that customers do not need much time to wait for the queue number to arrive. The use of the SMS Gateway in this system helps make it easier for customers to get service queue number information along with the hours or time the customer has to come to the workshop as well as notifications for periodic service schedule reminders. The system built includes booking services to get workshop information more quickly and easily, customers who have already registered can order motorbike service by selecting the desired service, can find out the estimated costs to be billed. Customers who don't come or cancel their workshop service orders in a row will be blocked automatically by the system, but the block can be reopened by coming in person and confirming to the workshop.

Motor service information systems at CM Jaya Motor Kudus, before being implemented, it is necessary to test the system or software first. System testing is necessary before implementing an information system for its users, this is done to be able to find out deficiencies or errors that are still present in the system to be implemented [4]. The purpose of software is to get product results that are more guaranteed in quality and can provide high productivity[5]. System testing is an information gathering activity needed to evaluate work effectiveness[6]. Errors in the system or software can be identified and corrected beforehand during testing so that they do not cause future losses when the system or software is implemented. Application or system testing can find problems or errors that are not found at the start or the beginning so that it is said to be successful. The testing process must be able to fix errors so that the quality of the software increases. Apart from finding errors and being able to fix them in the testing process, there is something that needs to be considered, namely good design, because in good design an error can be found more easily in the program when testing is carried out so that the testing process can be more effective and efficient[7].

Software testing that will be used in the motor service information system at CM Jaya Motor is a black box software testing method with equivalence partitioning techniques. Black box testing is carried out without detailed knowledge of the internal structure of the system or components being tested. The focus of black box testing is the functional requirements of the software according to the requirements specifications of the software[6]. The advantage of using the Black Box method is that in its implementation the test does not need to have in-depth knowledge of certain programming matters[8]. The Equivalence Partitions method is a method that exists in the Blackbox testing technique which is carried out by means of the input domain of a program being broken down or divided into data classes in order to obtain a Test Case. Equivalence partitions technique is a technique used in black box testing and is a test according to input data on each form or page contained in a website-based information system. Each input menu will be tested and grouped based on its benefits, in order to accept what will be valid or invalid[4]. The design of the Equivalence Partitions Test Case is obtained from the evaluation of the Equivalence class which describes the input conditions, a set of conditions that are valid or not. Input conditions are usually in the form of a numeric value, a range of values, and a collection of values related to Boolean conditions[9].

2. METHODS

2.1 Research Stages

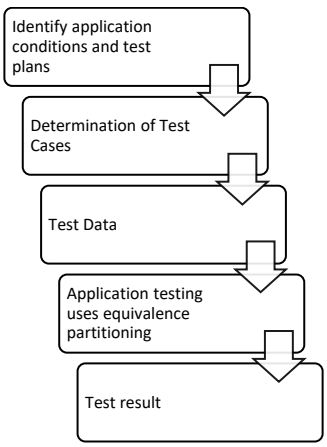

Figure 1. The blackbox testing flow process uses the equivalence partitioning technique

Equivalence Partitioning Method is also known as Equivalence class partitioning (ECP). It is a software testing technique or black box testing that divides input

domain into classes of data, and with the help of these classes of data, test cases can be derived. The black box testing flow process using the equivalence partitioning technique can be seen in Figure 1.

2.2 Test Plan

Several stages will be carried out in this research. The initial stage begins with determining the test case software that will be tested using the equivalence parity technique. The next stage is initializing standard input and output. This stage is carried out to obtain test documentation using the equivalence partitions method and the value of the effectiveness level of the equivalence partitions method. Based on the form and black box testing technique, a test case design with functions is made to conclude whether the system is successful or not. Below is an explanation of test case design tables based on equivalence partitions.

a. Spare parts data input form and spare parts data form

The spare part data input form is used to add spare part data which includes the spare part name, price, image and description which will then be saved. If the storage is successful then the spare part data will be stored in the database and will appear in the spare part data form. The spare parts data input form and spare parts data form can be seen in Figure 2 and figure 3 , while for the Test Case design the Spare parts Data Input Form and Spare parts Data Form can be seen in Table 1.

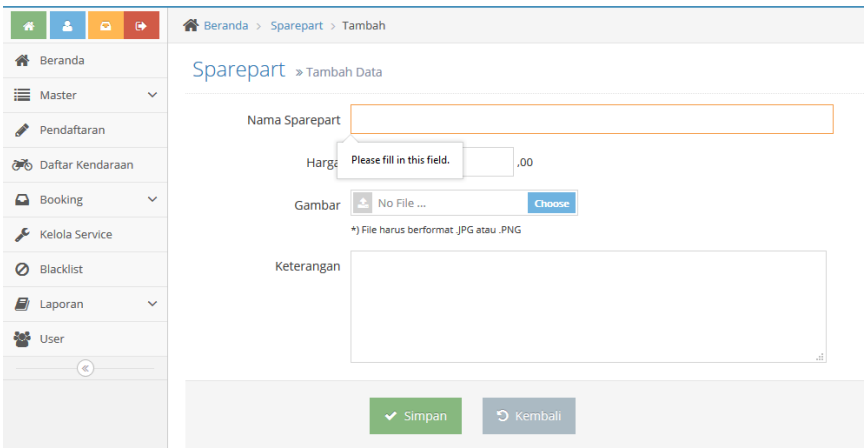

Figure 2. Spare Parts Data Input Form

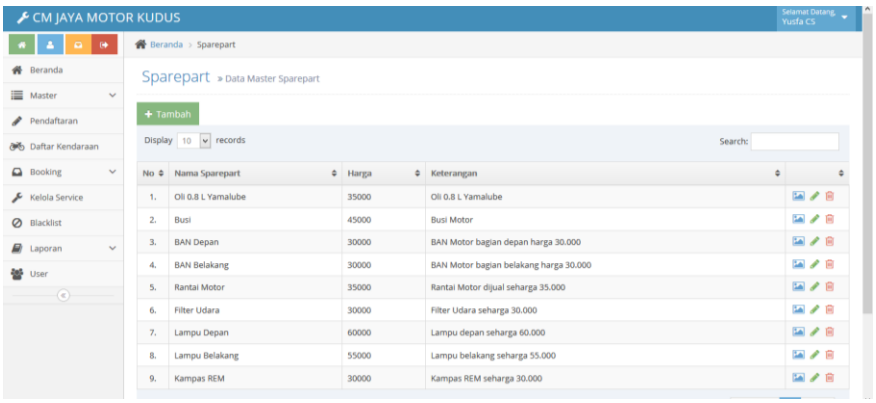

Figure 3. Spare Parts Data Form

Table 1. Design Test Case Form Input Data Spare Parts and Form Data Spare Parts

Id	Description	Expected results
RTC.01	Access the spare parts data form	The system will display the spare parts data form
RTC.02	Select the input button on the spare part data input form	The system displays a spare part data input form to be filled in
RTC.03	Fill in the spare part data input form which includes the name of the sample spare part filled in with "busi", fill in the price with the field "45000" and fill in the description with the field "busi motor", input the image with the image file "busi.jpg" then select the save button.	The system will display the message "Data is saved" the input data will be saved to the database and immediately appear in the spare part data
RTC.04	Do not enter the name of the spare part, price is filled with "expensive" or not filled in, description is not filled in, image is entered in the file "busi.doc" then pressed the save button.	The system will display an error message "there is still empty data" and will not save data to the database.
RTC.05	Pressing the cancel button without filling in any fields.	The system will not perform any process.

b. Customer Registration Page

The customer registration page is accessed to register as a customer by inputting the customer's personal data which includes No KTP, name, address, cellphone number, gender , address email, username and password. If the data has been entered correctly, press the register button and it will be stored in the database. The customer registration page can be seen in figure 4 and the test case plan of the customer registration page can be seen in table 2.

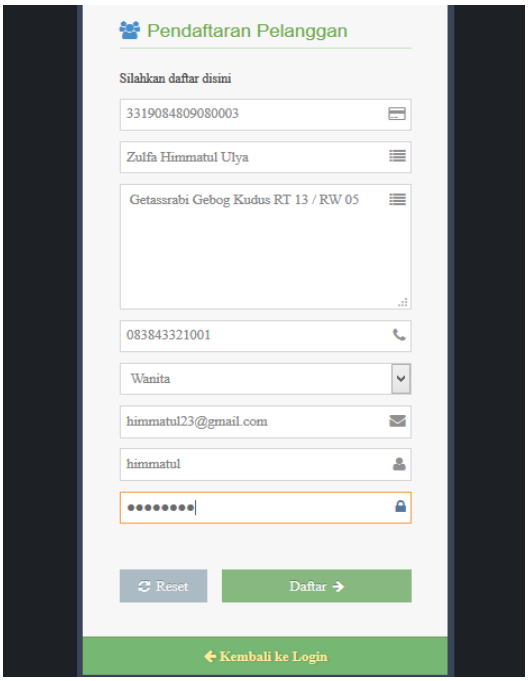

Figure 4. Customer Registration Page

Table 2. Customer Registration Form Test Case Design

Id	Description	Expected results
RTC. 11	Access the customer registration form	The system displays the customer registration form
RTC. 12	Fill in the prospective customer's data by inputting NIK with the entry "3319084809080003", filling in the name "Zulfa Himmatul Ulya", filling in the address "Getasrabi Gebog	The system will display the message "Data saved" and save the data that has been filled in

Id	Description	Expected results
	RT13/RW 05", filling in the HP No. "083843321001", filling in the gender by selecting one of the provided "Wanita", fill in the email address himmatul123@gmail.com, fill in the username "himmatul" and fill in the password "Himma-12" then select the Register button.	completely into the database.
RTC. 13	Not filling in the prospective customer's data completely and correctly, filling in the NIK with the fields "abcd080003", filling in the name "Zulfa Himmatul Ulya", filling in the address "Getasrabi Gebog RT13/RW 05", filling in the HP No. "abhytjs", not choosing and not filling in the type gender by selecting one that has been provided, filling in the email address himmatul123@gmail.com, filling in the username "himmatul" and filling in the password "Himma-12" then selecting the Register button.	The system displays a message that there is incomplete data and the system does not store the data that has been filled in.
RTC. 14	Pressing the Reset button	The system will leave the fill data blank.

c. Add Service page

The service page is used to input what services can be booked by customers. The input on the add service page includes the name of the service, the estimated time to perform the service, the estimated cost, and a description of the service package offered. The add service page can be seen in figure 5 and the test case design of the add service page can be seen in Table 3.

Table 3. Design Test Case Page Add Service

Id	Description	Expected results
RTC. 21	Access the add service form	The system displays the add service form
RTC. 22	Fill in the complete service data, enter the name of the service "Complete	The system will display the message "Data saved"

Id	Description	Expected results
	service package", enter estimated time "45", enter estimated cost "70000" and enter information "complete service package includes carburetor cleaning, adjustment, spark plug cleaning, chain adjustment and lubrication wheel", then choose to press the Save button.	then the system saves data that has been filled in completely into the database and displays it.
RTC. 23	Fill in service data that is incomplete and does not match the actual fields, do not enter the name of the service "-", enter an estimated time of "forty", enter an estimated cost of "70000 rupiah" and do not enter a description "-", then choose to press the Save button.	The system displays a message that there is incomplete data and will not store data that has been filled in that is not appropriate.
RTC. 24	Pressing the Back button	The system will clear the input

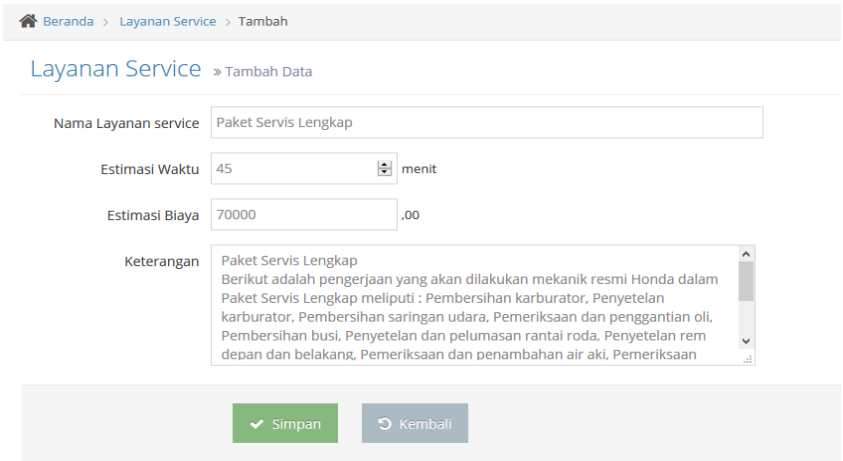

Figure 5. Add Service page

d. Manage Service page

The Manage service page is accessed to make a booking service by inputting booking data which will later appear the queue number, type of service, service date and service time. If you agree, press the save button. The Manage service

page can be seen in Figure 6. The test case design for the Manage service page can be seen in Table 4.

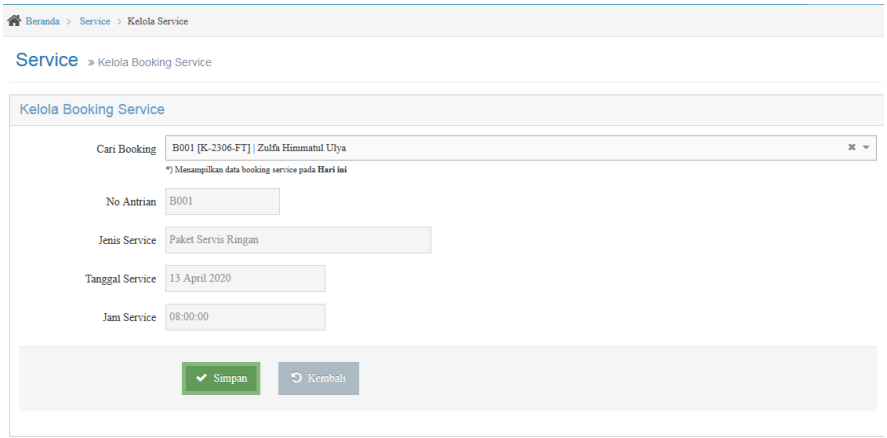

Figure 6. Manage Service page

Table 4. Test Case Design Manage Service Page

Id	Description	Expected results
RTC.31	Access the add booking service form	The system displays the manage booking service form
RTC.32	Look for the booking code that has been obtained after the customer registers by selecting the booking code "B001 [K-2306-FT] Zulfa Himmatul Ulya", the system automatically fills in the queue number, type of service, service date and service time, then press the button save if you agree with the time displayed by the system. And press the back button if it doesn't match the service time.	The system saves data after pressing the save button and will not process it if pressing the Back button.
RTC.33	If you don't search for a booking code or don't select a booking code, the entries in the queue number, type of service, date of service and service hours will not appear and the save button will not be active.	The system displays a message, please select the booking code first.
RTC.34	Press the Back button.	The system will empty the input.

3. RESULTS AND DISCUSSION

The results of designing test cases that have been carried out and made in table 1, table 2, table 3 and table 4, the test can be carried out. The results of the visible test will be accommodated and explained in table 5 below.

Table 5. Test Results

Id	Testing Explained	Desired Results	Test Results	Conclusion
RTC.01	Access the spare parts data form	The system will display the spare parts data form	The system displays the spare part data form	As expected
RTC.02	Select the input button on the spare part data input form	The system displays a spare part data input form to be filled in	The system displays the spare parts data input form	As expected
RTC.03	Fill in the spare part data input form which includes the name of the sample spare part filled in with "busi", fill in the price with the field "45000" and fill in the description with the field "busi motor", input the image with the image file "busi.jpg" then select the save button.	The system will display the message "Data is saved" the input data will be saved to the database and immediately appear in the spare part data	The message "data is saved", the system saves the input data to the database and displays the stored data to the spare part data.	As expected
RTC.04	Do not enter the name of the spare part, price is filled with "expensive" or not filled in, description is not filled in, image is entered in the file "busi.doc" then pressed the save button.	The system will display an error message "there is still empty data" and will not save data to the database.	The message "There is still empty data" appears and does not save data.	As expected
RTC.05	Pressing the cancel button without filling in any fields.	The system will not perform any process.	The system will not perform any process.	As expected
RTC.11	Access the customer registration form	The system displays the customer registration form	The system displays the customer registration form	As expected
RTC.12	Fill in the prospective customer's data by inputting NIK with the entry "3319084809080003", filling in the name "Zulfa Himmatul Ulya", filling in the	The system will display the message "Data saved" and save the data that has been filled in	The message "Data saved" appears and the system saves the data that has been	As expected

Id	Testing Explained	Desired Results	Test Results	Conclusion
	address "Getasrabi Gebog RT13/RW 05", filling in the HP No. "083843321001", filling in the gender by selecting one of the provided "Wanita", fill in the email address himmatul123@gmail.com, fill in the username "himmatul" and fill in the password "Himma-12" then select the Register button.	completely into the database.	filled into the database	
RTC.13	Not filling in the prospective customer's data completely and correctly, filling in the NIK with the fields "abcd080003", filling in the name "Zulfa Himmatul Ulya", filling in the address "Getasrabi Gebog RT13/RW 05", filling in the HP No. "abhytjs", not choosing and not filling in the type gender by selecting one that has been provided, filling in the email address himmatul123@gmail.com, filling in the username "himmatul" and filling in the password "Himma-12" then selecting the Register button.	The system displays a message that there is incomplete data, and the system does not store the data that has been filled in.	The message "Data is not complete", the system does not save data to the database.	As expected
RTC.14	Pressing the Reset button	The system will leave the fill data blank.	The system will leave the fill data blank.	As expected
RTC.21	Access the add service form	The system displays the add service form	The system displays the add service form	As expected
RTC.22	Fill in the complete service data, enter the name of the service "Complete service package", enter estimated time "45", enter estimated cost "70000" and enter information "complete service package includes carburetor cleaning, adjustment, spark plug cleaning, chain adjustment	The system will display the message "Data saved" then the system saves data that has been filled in completely into the database and displays it.	The message "Data saved", the system saves the data that has been filled in completely into the database and displays it.	As expected

Id	Testing Explained	Desired Results	Test Results	Conclusion
	and lubrication wheel", then choose to press the Save button.			
RTC.23	Fill in service data that is incomplete and does not match the actual fields, do not enter the name of the service "-", enter an estimated time of "forty", enter an estimated cost of "70000 rupiah" and do not enter a description "-", then choose to press the Save button.	The system displays a message that there is incomplete data and will not store data that has been filled in that is not appropriate.	The message "Incomplete data" appears, the system does not save data into the database.	As expected
RTC.24	Pressing the Back button	The system will clear the input	The system will clear the input	As expected
RTC.31	Access the add booking service form	The system displays the manage booking service form	The system displays the manage booking service form	As expected
RTC.32	Look for the booking code that has been obtained after the customer registers by selecting the booking code "B001 [K-2306-FT] Zulfa Himmatul Ulya", the system automatically fills in the queue number, type of service, service date and service time, then press the button save if you agree with the time displayed by the system. And press the back button if it doesn't match the service time.	The system saves data after pressing the save button and will not process it if pressing the Back button.	The system will save the selected data.	As expected
RTC.33	If you don't search for a booking code or don't select a booking code, the entries in the queue number, type of service, date of service and service hours will not appear and the save button will not be active.	The system displays a message, please select the booking code first.	The message "Choose a booking code" appears	As expected
RTC.34	Press the Back button.	The system will empty the input.	The system will empty the input.	As expected

The total number of tests in this study were 17 tests on 5 functions, namely the spare parts data input function, the customer registration function, the service addition function, and the service page. The functions were tested 7 times which resulted in failing 4 times on:

a. Test case Do not enter the name of the spare part, price is filled with "expensive" or not filled in, description is not filled in, image is entered in the file "busi.doc" then pressed the save button.
b. Test Case Not filling in the prospective customer's data completely and correctly, filling in the NIK with the fields "abcd080003", filling in the name "Zulfa Himmatul Ulya", filling in the address "Getasrabi Gebog RT13/RW 05", filling in the HP No. "abhytjs", not choosing and do not fill in the gender by selecting one that has been provided, filling in the email address himmatul123@gmail.com, filling in the username "himmatul" and filling in the password "Himma-12" then selecting the Register button.
c. Test Case Filling in service data that is incomplete and not in accordance with the actual fields, not entering the name of the service "-", entering an estimated time of "forty", entering an estimated cost of "70000rupiah" and not entering a description "-", then selecting pressing the Save button
d. Test case Not looking for a booking code or not selecting a booking code then the entries in the queue number, type of service, date of service and service hours will not appear and the save button will not be active.

4. CONCLUSION

Tests carried out on the Motor Service Information System at Web-Based CM Jaya Motor Kudus with SMS Gateway using the Blackbox Equivalence technique aim to test the Motor Service Information System at Web-Based CM Jaya Motor Kudus with SMS Gateway without knowing the source code used. The Blackbox method based on Equivalence Partitions can help the Test Case design process to find undetected errors in the error handling section. The test results show that the quality of the Motor Service Information System at Web-Based CM Jaya Motor Kudus with SMS Gateway still needs to be improved. This test shows that there are still errors in the input of spare parts data, the customer registration function, the service addition function, and the service page. The hope is that these errors can be corrected so that the quality of the applications made is better. Suggestions for further research can add other Blackbox techniques such as Boundary Value Analysis or Error Guessing.

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