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Analysis of Web-Based E-Commerce Testing Using Black Box and White Box Methods

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ABSTRACT
The Shoopers application is an E-Commerce application that offers its services through the website. During its journey, this application must be able to serve and provide convenience to its users. The launch of this website was carried out in 2021, but there are still reports from users complaining that some features are not working. used. The purpose of this study is to test all website functions. After the black-and-white-box testing methodology, the results show that there are still inputs whose results are not as expected and will later have an impact on the customer database. By carrying out this test the researcher was able to test the Shopers application and find out the shortcomings of the program so that it could be developed further.

Keywords: *E-Coomerce, Testing, Black Box, White Box.*

1. Introduction

As we know, the development of technology is advancing from year to year. With this increasingly widespread technological development, it is a challenge for the company sector to make new technology-based innovations. Not only in the field of the corporate sector, institutions or organizations also come down to keep up with technological developments to obtain information quickly.

Technology also has the benefit of making people facilitate their activities. In fact, almost all activities have been carried out based on the internet. Starting from education, administration and even some marijuana is already internet-based. Shopping on the internet has been very widespread by buyers, because shopping online saves time and energy. Buyers don't have to bother going out to buy what they need. Or even if the item is abroad, the buyer does not need to spend time, going abroad just to buy the item. Even buyers can also shop at home and soon the goods arrive in front of the house.

The website that can be used as an implementation for shopping is Shoopers. Shoopers is a website-based shopping application that provides shopping services and makes it easier for buyers to shop for their needs. And this website also supports the MSME (Micro, Small and Medium Enterprises) market. This Shoopers website can be accessed on the page, www.toko.ghaniib.my.id.

The innovation made by this author is useful for simplifying shopping activities with just a website. And also make it easier for buyers to transact without having to meet in real time. With this Shoopers website, buyers get benefits including, making buying and selling transactions

easily and quickly, the information obtained is easy to access and also this Shoopers Website is very practical in any aspect.

But in an application system that has been made, there are many good or bad possibilities that will occur. Therefore, in making an application system, it is necessary to test the system as a whole in terms of functional (Black Box) and structural (White Box). The goal is to find out how the system runs according to its usefulness or experience can occur when the system is run and also to find out how the Shoopers website application system works.

2. Literature Review

Currently, information technology is growing rapidly. In addition to the development of technical devices and software as supporting applications, these developments are currently also based on the increasingly widespread use of information systems technology. (Nurianto, 2018) Information technology is also developing very rapidly today. In addition to the development of the type of technology and application software that supports it, this development is also characterized by the increasing use of information technology.(National et al., 2015)Information system is a unit in meeting the needs of transaction processing that operates in supporting the organization. And also information is the result of data processing and can provide benefits to the recipient which can describe real events that are used in decision making.(Achmad, 2018).

The development of information technology from time to time can facilitate one's business. Technology is an important component in daily human work, therefore technology must be developed to produce quality communication and network services as an example of its application is Electronic Commerce (e-commerce). (Indrajit, 2000).

Electronic Commerce or better known as e-commerce is the entire transaction process connected through a computer network. E-commerce is one form of E-Busines, usually, the scope of e-business is broader, not only buying and selling relationships but also includes connecting business partners, user services, job vacancies and other forms. In addition to www network technology, e-commerce also requires database technology, e-letters or electronic mail (e-mail), and other forms of non-computer technology such as goods delivery systems, and payment tools available in the form of Application Programming Interface (API).(Indrajit, 2000).

In its implementation form, Electronic Commerce (e-commerce) will use the Website as its main media. Website or can also be called a website, website, website or portal. That is a collection of interrelated web pages, the main page or directory of a website is the home page, while individual pages are usually interpreted as web pages, in other words, a website is a website that can be accessed and used by internet users from all over the world. . World A website is a website that can be accessed and viewed by internet users themselves. The number of internet users that is increasing day by day is a dynamic market potential (Abas, 2013).

E-commerce can include electronic financial exchanges, electronic information trading, computerized stock administration frameworks and computerized information gathering frameworks. In Indonesia itself there are several companies that are fixated on e-commerce, some of which are Bukalapak, Elevenia, and JD.id. Each of these companies contains a site where prospective buyers can view, select, and purchase specified items. In order to be able to make the best choice when making shopping preparations, in addition to planned shoppers having to physically look at several marketplace sites for the products they want to buy, they also need to find the best items based on the number of items with the most important offers or the best deals. With the help of the best web display applications and web raking strategies, you can view various commercial centers and display display results simultaneously. Approved testing comes by using white box testing and dark box testing, the framework has been able to provide the most excellent product.(A. Yani et al., 2019)

The e-commerce market is growing very rapidly in Indonesia with the number of internet users reaching 82 million people or 30% of the total population in Indonesia, making e-commerce a gold mine that offers opportunities in the future. (Al Mudzakir & Bakar, 2020).

However, websites that have been planned or created often have errors or successes. To identify errors or successes from the system that has been made, testing is even done. Testing is a process to identify errors in the system, then fix them. This stage is an important stage in system development because this stage is the stage that ensures that a system is free from errors (Achmad, 2018)

Testing is done before the software is launched. This is a form of verification and validation which will determine whether the product is suitable for use or not (Kristina et al., 2017). The research conducted shows that to get accurate results and high consistency, testing requires the implementation of a combination of all existing software. And testing approaches whenever possible the high efficiency level of certain testing techniques does not guarantee the number of bugs revealed.

Tests carried out on applications using Black Box testing and White Box testing combined with usability testing show that the program is working well, only need to improve and adjust to the latest technology (Rosa & Ramadhani, 2022)

Black Box Testing is an easy-to-use method because it only requires the lower limit and upper limit of the expected data. The estimated amount of test data can be calculated from the number of fields and input data to be tested, the input rules that must be met and the upper and lower limit cases applied. In this way, it can be seen if in data processing there is an unexpected availability of input data that causes a decrease in the efficiency of the stored data (Cholifah et al., 2018)

White Box Testing is a type of test design that uses the control structure of the process design to create test cases. By using whitebox testing methods, software developers can create test cases such as verifying that all independent module methods are executed at least once, applying the right decision in terms of both true and false, fulfilling all information within its limits, and testing local data structures to ensure their validity (Kristina et al., 2017).

Black box testing is the only option when the source code is incomplete or even non-existent. For example, when third-party components whose source code is not available. In addition, black box testing is a suitable option when testing APIs with architectures that are very complex if done with whitebox testing, for example because they consist of many services, possibly developed in different languages. In fact, black box testing is independent of the programming language used to implement the API to test (Viglianisi, et. al. 2020).

Some previous studies have explored testing related to the output side, if there are errors or if there are parts that do not meet the requirements. Hamzah et. al. (2018) investigated infrastructure facility management systems in universities. The system is designed with Near Field Communication through the use of Android phones to increase the use of this system. The method used to design this system is the waterfall method with the results showing that the use of the Infrastructure Facility System using Android-based NFC technology is easy to use for employees and the Head of Infrastructure in managing their inventory.

Research by Rafli, et al in 2021 entitled Solar Power Plant Sales Data Processing Application using Model View Controller Based on Codelgniter Framework and White Box Testing. The results of black box testing show that the features in the application run well and the results of white box testing on the login menu produce the same region and path values. (Tamara Aldisa, 2021).

Research researched by Pramudita, 2020 with the title Black Box Testing on E-campus Applications with the Equivalence Partitioning Method, the test results show that the existing e-campus application runs as expected, but there are some facts at the evaluation stage, namely notifications while testing value input (Pramudita, 2020).

3. Research Method

The method used in this research is a qualitative research method, namely the black box method with the aim of knowing whether the overall function of this application has run and there are no errors or bugs in it. Then, the author also tries to apply white box testing to analyze the correctness of the program structure created and the performance of the program (Maturidi, 2014). This research is organized based on the research framework.

While conducting activities in accordance with the research flow shown in the figure above. In order for each research activity to run smoothly and optimally, several research methods were used, including the following.

1. Literature Study

One of the problem-solving methodologies is literature study, which is the search and collection of literature. The literature is in the form of articles, reference books, the internet and other sources.

2. System Testing

a) White box testing is a test used in checking the overall value of the design, using the control structure of the program design procedurally which aims to divide the test into several test cases. At a glance, it can be concluded that white box testing is a guide to getting the correct program as a whole.

b) Black-Box Testing is a test that focuses on the value of the functional specifications of the software, the functional test can define a set of input conditions and perform tests on the functional specifications of the design program.

3. Report

After testing the system on the e commerce application, the last step is to make a report and the results of the tests carried out to get an analysis report and conclusions about the system.

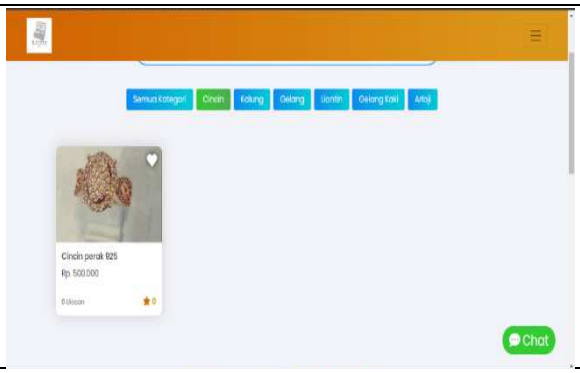
4. Results and Discussion

a. Black Box Testing

Black Box Testing or also known as Behavioral Testing is a test that aims to observe the input and output results of a system without having to know the source code of the system being tested. This test is usually carried out at the last stage of system development to find out whether the system can function properly or vice versa.

The following is a table of Black Box Testing on the E - Commers website (http://www.toko.ghaniib.my.id/).

Table 1. Home Page Testing Results

No	Home Page Test Scenario	Home Page Testing Results	Status
1.	Click on any of the product images to view product details		Successful

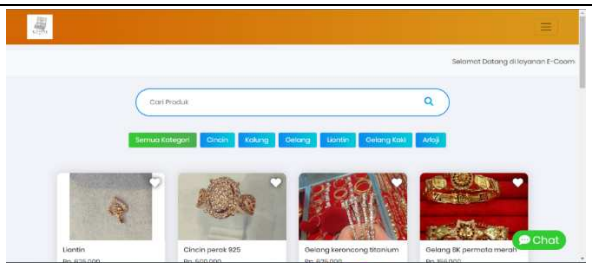
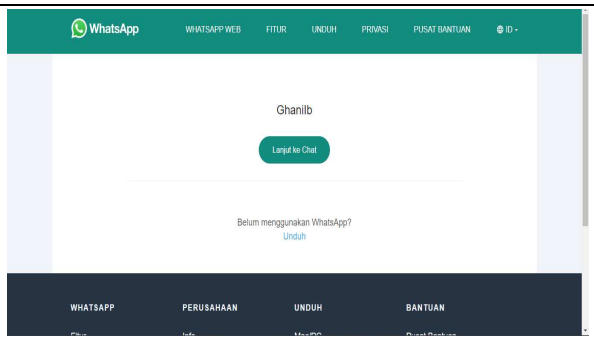
2.	Click the "view all products" button. then it will be directed to the product page		Successful
3.	Click the "chat" button. then the system will redirect to the WhatsApp owner page to interact / chat when customers have questions and problems with the system..		Successful
4.	Click the "view all posts" button. then the system will redirect to the blog page page.		Successful

Table 2. Product Page Testing Results

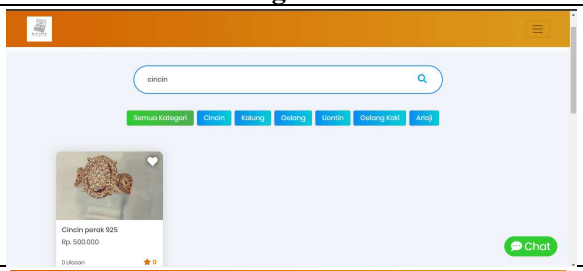
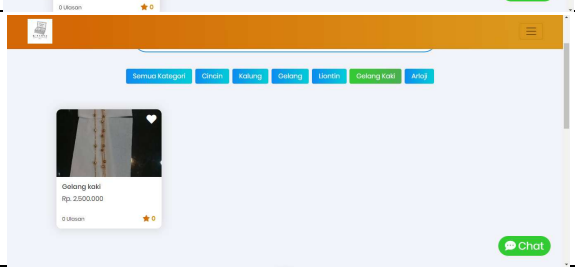
No	Product Page Testing Scenario	Product Page Testing Scenario Product Page Testing Results	Status
1.	Fill in the search input form. then the system will display products according to the input keywords made.		Successful
2.	Clicking one of the category buttons. then the system will display products according to the selected category.		Successful

Table 3. Register Page Testing Results

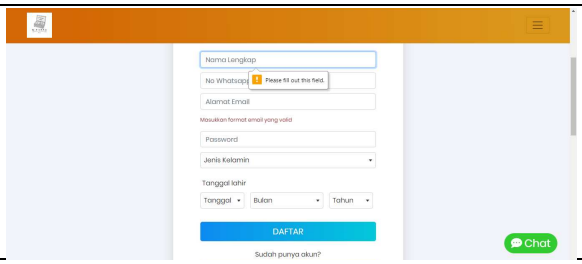
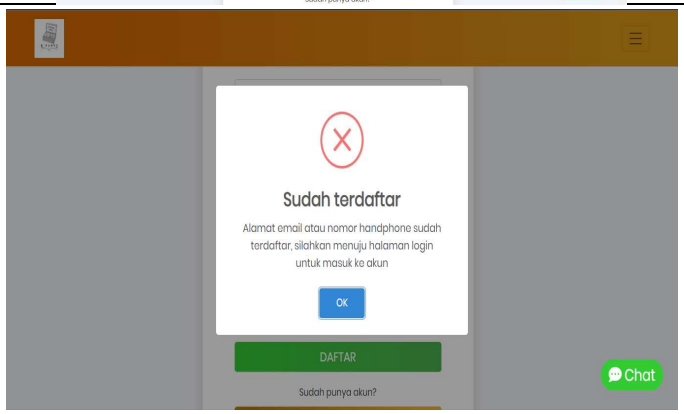
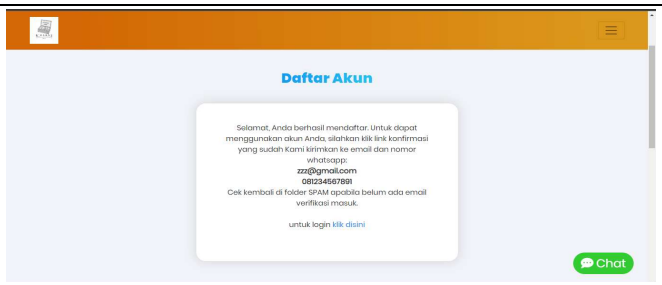
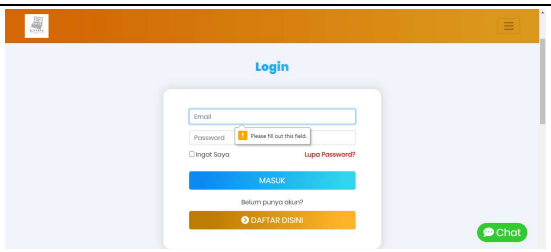
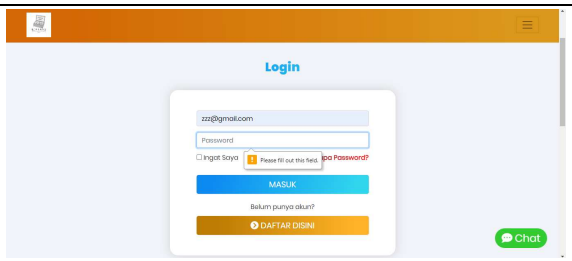
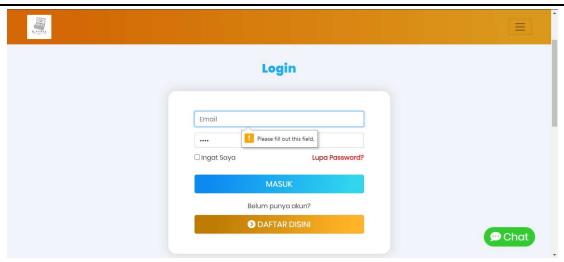
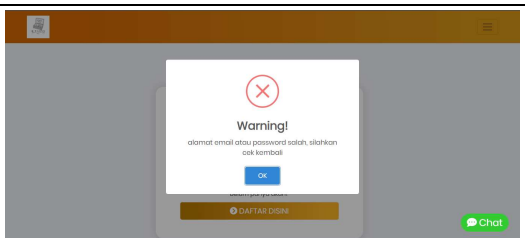
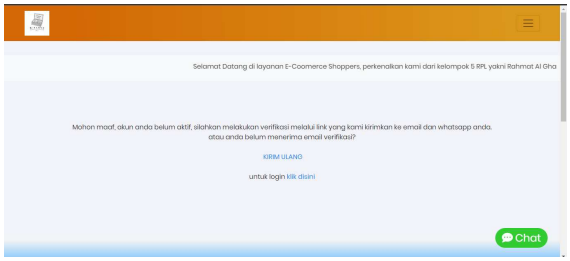
No	Register Page Testing Scenario	Register Page Testing Results	Status
1.	Leave the register input form blank. then the system will give an alert to fill in the blank input form.		Successful
2.	Testing Results RM Page Fill in the register input form. But the value of the email input form and whatsapp number is invalid. Then the system will give an alert/register warning		Successful
3.	Fill in the register input form correctly. Then the system will display a confirmation link message via whatsapp/email to users who have just registered an account.		Successful

Table 4. Login Page Testing Results

No	Login Page Testing Scenario	Login Page Testing Results	Status
1.	Empty the username input and password input. then the system will provide an alert to fill in the empty input form		Successful

2.	Fill in the username input, and leave the password input blank. Then the system will give an alert to fill in the empty password input.		Successful
3.	Leave the username input blank and fill in the password input. Then the system will give an alert to fill in the empty username input.		Successful
4.	Fill in the username input that has not been registered and fill in the password. Then the system will give an alert/warning		Successful
5.	Fill in the username input that has been registered and fill in the wrong password. Then the system will give an alert that the inputted password is wrong.		Failed

b. White Box Testing

White Box Testing is testing done to test a system by analyzing and examining the internal structure and code of the system. If Black Box Testing only sees the input and output results of a system, White Box Testing is more focused on the input and output flow of the system.
Stages of White Box Testing on the E-Commers system:

1. Login

Login is important in every system. To access the system every user must have a login page, so that no one else can access deeper into the system.

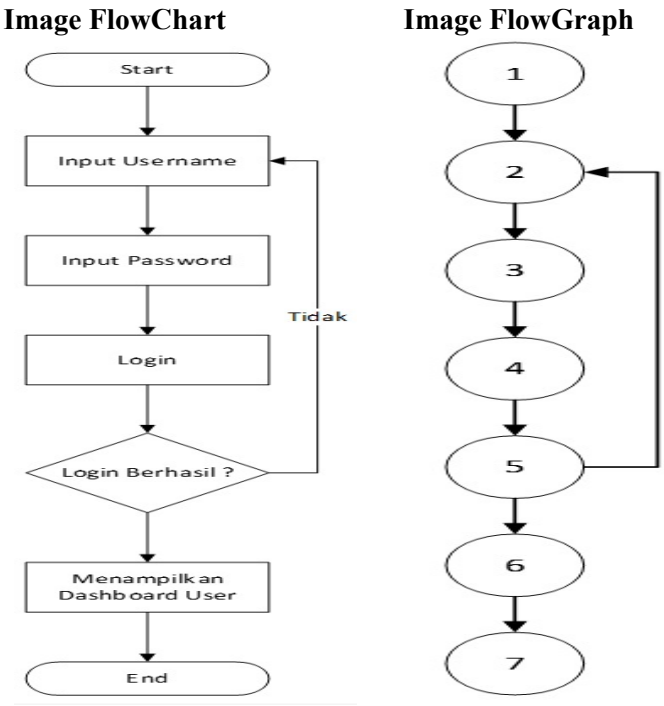


Figure 2. White Box Login FlowChart and FlowGraph

Table 5. Login Path

Path	1
Jalur	1-2-3-4-5-6-7-8
Scenario	1. Start 2. Input username/email 3. Input password 4. Login 5. Login successful 6. Display user dashboard 7. End
Testing Results	Successful
Path	2
Jalur	1-2-3-4-5-2-3-4-5-6-7
Scenario	1. Start 2. Enter user name 3. Enter password 4. Login 5. Login failed 6. Enter username 7. Enter password 8. Login successful 9. Done
Testing Results	Successful

2. Register or Register Account

Register is a registration stage for each program that functions to connect the user's personal data in the program. This registration process uses a system that can store the personal data of each user.

Figure FlowChart **Figure FlowGraph**

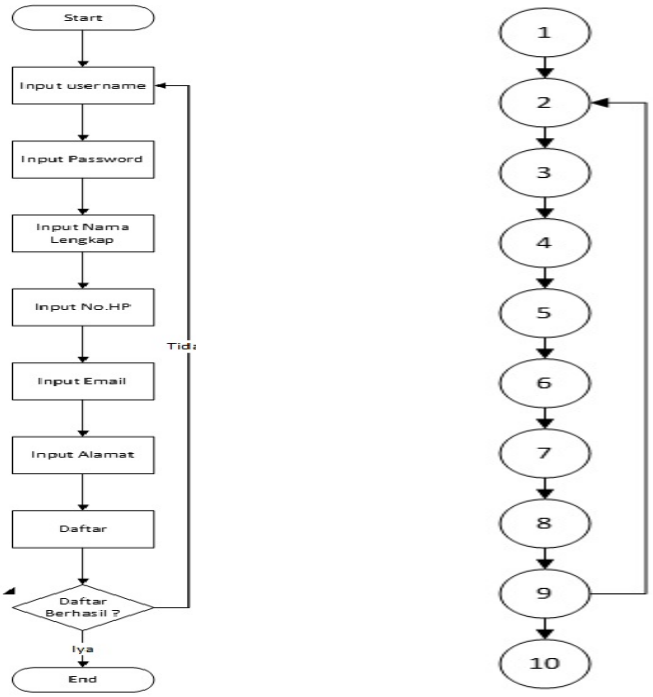


Figure 3. White Box Registration FlowChart and FlowGraph

Table 5. Registration Path

Path	1
Jalur	1-2-3-4-5-6-7-8-9-10
Skenario	1. Start 2. Input username 3. Input password 4. Full name input 5. HP number input 6. Email input 7. Email Verification 8. Register 9. Register successfully 10. End
Testing Results	Successful
Path	2
Jalur	1-2-3-4-5-2-3-4-5-6-7-8-9-2-3-4-5-6-7-8-9-10

Scenario	1.	Start
	2.	Input username
	3.	Input password
	4.	Full name input
	5.	HP number input
	6.	Email input
	7.	Address input
	8.	Register
	9.	Register failed
	10.	Username input
	11.	Input password
	12.	Full name input
	13.	HP number input
	14.	Email input
	15.	Email Verification
	16.	Register
	17.	Sign up successfully
	18.	End
Testing Results	Successful	

3. Transaction

Transactions are the stages of buying and selling activities between buyers and sellers.

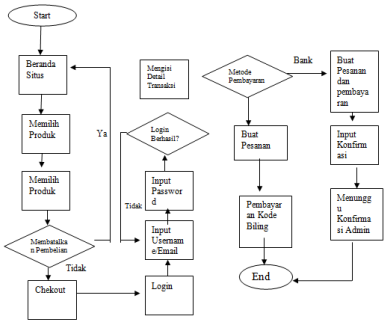


Figure 3. FlowChart and FlowGraph of White Box Transaction

Table 5. Transaction Path

Path	1	
Jalur	1-2-3-4-5-6-7-8-9-10-11-12-17-18-19	
Scenario	1.	Start
	2.	Home page
	3.	Choose Product
	4.	Click cart
	5.	Proceed to order
	6.	Checkout
	7.	Login
	8.	Input username/Email
	9.	Input password
	10.	Login successful
	11.	Fill in Transaction Details
	12.	COD payment method
	13.	Create order
	14.	Waiting for order status from admin
	15.	End
Testing Results	Successful	

5. Conclusions

Based on the discussion that has been explained, this Shoopers e-commerce application was made to facilitate buying and selling transactions easily, concisely and safely only through a website. However, even planned website applications will be subject to error or success. Therefore, an application must pass a software test. The testing tests that will be carried out, including White Box and Black Box, can be concluded that the website-based Shoopers e-commerce application is declared successful because it is able to provide convenience to the admin regarding expanding the business market. But this system can only be used if there is an internet network

References :

A. Yani et al., 2019; Abas, 2013; Achmad, 2018; Al Mudzakir & Bakar, 2020; Cholifah et al., 2018; Indrajit, 2000; Irmawati, 2011; Kristina et al., 2017; Ningrum et al., 2019; Novitasari et al., 2021; Pramudita, 2020; Rosa & Ramadhani, 2022; Tamara Aldisa, 2021; Tri Snadhika Jaya, 2018)

A. Yani, D. D., Pratiwi, H. S., & Muhardi, H. (2019). Implementasi Web Scraping untuk Pengambilan Data pada Situs Marketplace. *Jurnal Sistem Dan Teknologi Informasi (JUSTIN)*, *7*(4), 257. https://doi.org/10.26418/justin.v7i4.30930

Abas, W. (2013). Analisa Kepuasan Mahasiswa Terhadap Website Universitas Negeri Yogyakarta (Uny). *Manajemen*, 1–6.

Achmad, B. (2018). Pengujian Dan Implementasi Sistem. *Journal of Chemical Information and Modeling*, *53*(9), 1689–1699.

Al Mudzakir, T., & Bakar, A. (2020). Desain Dan Implementasi Customer Relationship Management Berbasis Web (Studi Kasus : Toko Baju Ladya). *Systematics*, *2*(1), 1. https://doi.org/10.35706/sys.v2i1.3444

Ceccato, Mariano. (2020).RestTestGen:Automated Black-Box Testing of RESTful APIs. ICST (*International Conference on Software Testing),* 1-12.

Cholifah, W. N., Yulianingsih, Y., & Sagita, S. M. (2018). Pengujian Black Box Testing pada Aplikasi Action & Strategy Berbasis Android dengan Teknologi Phonegap. *STRING (Satuan Tulisan Riset Dan Inovasi Teknologi)*, *3*(2), 206. https://doi.org/10.30998/string.v3i2.3048

Hery Nuryanto. (2018). Sejarah Perkembangan Teknologi Informasi dan Komunikasi, balai Pustaka, Jakarta Timur

Indrajit, R. E. (2000). *Manajemen Sistem Informasi Dan Teknologi Informasi*.

Irmawati, D. (2011). Jurnal Ilmiah Orasi Bisnis – ISSN: 2085-1375 Edisi Ke-VI, November 2011. *Jurnal Ilmiah Orasi Bisnis*, *4*(November), 113–121.

Kristina, Hoendarto, G., & Tendean, S. (2017). Penggunaan Metode Kotak Hitam dan Kotak Putih dalam Menguji Sebuah Produk Sistem Informasi. *InTekSis*, *4*(1), 1–11.

Nasional, S., Informasi, T., Informasi, S., Dipanegara, S., Jl, M., Kemerdekaan, P., Kalingga, A., Meubel, J., & Jati, K. (2015). *Perancangan Aplikasi E-Commerce Pada Kalingga Jati Meubel Furniture Aprizal 1) , Nurdiansah 2)*. 6–8.

Ningrum, F. C., Suherman, D., Aryanti, S., Prasetya, H. A., & Saifudin, A. (2019). Pengujian Black Box pada Aplikasi Sistem Seleksi Sales Terbaik Menggunakan Teknik Equivalence Partitions. *Jurnal Informatika Universitas Pamulang*, *4*(4), 125. https://doi.org/10.32493/informatika.v4i4.3782

Novitasari, Y. S., Adrian, Q. J., & Kurnia, W. (2021). Rancang Bangun Sistem Informasi Media Pembelajaran Berbasis Website (Studi Kasus: Bimbingan Belajar De Potlood). *Jurnal Teknologi Dan Sistem Informasi (JTSI)*, *2*(3), 136–147. http://jim.teknokrat.ac.id/index.php/JTSI

Pramudita, R. (2020). *Pengujian Black Box pada Aplikasi Ecampus Menggunakan Metode Equivalence Partitioning*. *4*(2), 193–202.

Rosa, N. A., & Ramadhani, S. R. (2022). Pengembangan Aplikasi Mobile Berbasis Android untuk Manajemen Antrian Bimbingan KP dan Proyek Akhir dengan Memanfaatkan Fitur Location Based Service. *Journal of Applied Informatics and Computing*, *6*(1), 78–86. https://doi.org/10.30871/jaic.v6i1.3379

Tamara Aldisa, R. (2021). Aplikasi Pengolahan Data Penjualan Pembangkit Listrik Tenaga Surya Menggunakan Model View Controler Berbasis Framework Codelgniter Dan White Box Testing. *Jurnal Sains Komputer & Informatika (J-SAKTI*, *5*(2), 677–686.

Tri Snadhika Jaya. (2018). Pengujian Aplikasi dengan Metode Blackbox Testing Boundary Value Analysis. *Jurnal Informatika Pengembangan IT (JPIT)*, *3*(2), 45–46. http://www.ejournal.poltektegal.ac.id/index.php/informatika/article/view/647/640