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Black Box Testing for HIV AIDS Digital Counseling Website (D-Cohiva Apps) with State Transition Technique

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Abstract: The Al-Irsyad University Cilacap lecturer team has created the Digital Counseling HIV/AIDS (D-Cohiva) website with the Software Development Life Cycle (SDLC) stages. The D-Cohiva website provides internet-based interventions on HIV/AIDS counseling that can be used anywhere and anytime. In general this study attemps to analyze the related inputs and outputs, as well as to determine the suitability of the actual conditions with the expected conditions and ensure the quality and functionality of the D-Cohiva website, black box testing with the state transition technique was conducted. The research method used by researchers is the descriptive-qualitative method, namely by collecting data, then analyzing and describing the results of their observations. The system testing technique used is the black box with state transition technique. The study obtained eight test cases with 100% success, in accordance with the expected results. Conclusion: The D-Cohiva website is feasible to use and guaranteed according to the desired function.

Keywords: Black Box; State Transition; Website D-Cohiva,

Introduction

The Al-Irsyad University Cilacap lecturer team has created the Digital Counseling HIV/AIDS (D-Cohiva) website with the Software Development Life Cycle (SDLC) stages. The SDLC stages are an additional model of the waterfall model. The SDLC-type model can make application development simpler and more flexible and has been well tested (Efendi & Jati, 2023; Haq et al., 2023).

The D-Cohiva website provides internet-based interventions on HIV/AIDS counseling that can be used anywhere and anytime, especially for key populations and users in general. The key populations are male sex workers (MSM), commercial sex workers (CSW), injecting drug users (IDU), and high-risk couples.

To analyze the related inputs and outputs, as well as determine the suitability of the actual conditions with the expected conditions and ensure the quality and functionality of the D-Cohiva website, black box testing with the State Transition Technique was carried out. Black Box Testing is a method of testing strategy in which tests are derived from program details or items. The system is treated as a 'black box, whose behavior can only be determined by analyzing the associated inputs and outputs. Black box testing is done by testing the inputs and outputs of each system's functionality and is easy to do (Baktiar et al., 2021; Muhammad Rizky et al., 2021; D. Setiawan et al., 2020).

This black box testing tries to find errors in the functional category of the website, such as interface errors, performance errors, or initialization errors, although sometimes it only tests the functionality (Oktafian et al., 2020; Susilawati et al., 2022). With Black Box testing, website programs can be tested without needing to test the design or program code to find out whether the program function meets the expected specifications (Erlangga et al., 2023; Zidan et al., 2022).

The types of black box testing consist of functional testing, non-functional testing, and regulation testing (Ichsanudin et al., 2022). There are several Black Box testing techniques, namely equivalence partitioning, boundary value analysis, decision tables, state transition testing, and use case testing (Ikhlaashi & Putro, 2020;

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Marthasari et al., 2022; Ningrum et al., 2019). The Black Box State Transition is a test of the transition between states. The state transition technique is useful for seeing whether the movement from one particular state to another is appropriate in terms of the actions taken to move states and the conditions required to move states. Black Box State Transitioan testing is done by creating test cases that test inputs that have been divided into several groups according to their function (Baktiar et al., 2021; Mintarsih, 2023).

The advantages of Black Box State Transition testing are that it saves time and money in the system development process, has simple techniques, and does not require resources or testers who know the structure of the code; it does require testers who understand the expectations of the system flow well (Marthasari et al., 2022; A. Setiawan et al., 2022).

The purpose of this research is to ensure movement between sections of the status in accordance with its function. With the achievement of the goal, the D-Cohiva website is feasible to use and guaranteed in accordance with the desired function.

Method

The research method used by researchers is the descriptive-qualitative method, namely by collecting data, then analyzing and describing the results of their observations. The system testing technique used is the Black Box with State Transition technique.

Testing Methodology

Black Box State Transition Testing shows how the system behaves as a result of external events that have been previously designed. There are 3 stages that are passed in Black Box State Transition testing. The first stage is to create a state transition diagram (STD) scenario with system flow. The second stage creates a test scenario and the results of the tests contained in tables 1 and 2. The third stage is to draw conclusions from the tests that have been carried out (Baktiar et al., 2021; Dhanamma et al., 2015; A. Setiawan et al., 2022). Here is the flow of the STD system.

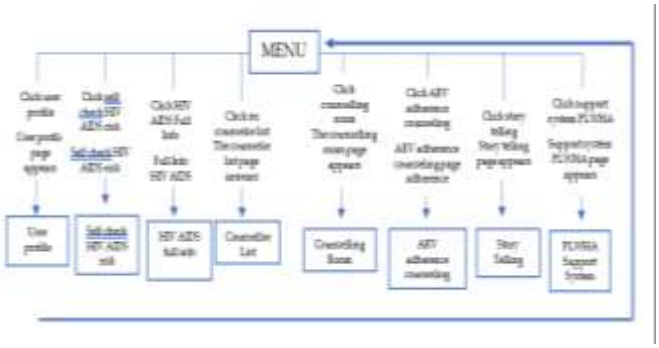

Figure 1. *State Transition Diagram*

Testing Table

The test table below is based on the STD that has been designed. There are a total of eight transitions designed. The action column is the action taken to perform the state move, and the destination column contains the destination state when the transition is complete. Each action will be symbolized from T1 to T8.

Table 1. Testing table based on STD

Transition	From	Action	Destination
T1	User Profile	Click user profile	Enter menu user profile
T2	Self Check HIV AIDS risk	Click Self Check HIV AIDS risk	Enter menu Self Check HIV AIDS risk
T3	HIV AIDS Full Info	Click HIV AIDS Full Info	Enter menu HIV AIDS Full Info
T4	Counsellor List	Click Counsellor List	Enter Menu Counsellor List
T5	Counselling Room	Click Counselling Room	Enter menu Counselling Roon
T6	ARV adherence counselling	Click ARV adherence counselling	Enter menu ARV adherence counselling
T7	Story Telling	Click Story Telling	Enter Menu Story Telling
T8	PLWHA Support System	Click PLWHA Support System	Enter Menu PLWHA Support System

Result and Discussion

Test results are obtained after the admin tests the D-Cohiva website. The following test results are presented in Table 2. Testing a system is a process that cannot be separated from the SDLC stages. There are 3 techniques for finding defects in software, namely the white box testing technique, the black box testing technique and the gray box testing technique (Khan & Khan, 2012). In this discussion, we review the software testing that hass been carried out, namely the black box testing technique, which focuses on testing each software functional specification (Safitri & Pramudita, 2018) Testing is an activity that is applied to find whether there are errors in the content, function, usability, navigation capabilities, performance, and security of the application. According to ISO 9216 and ISO 9241, one of the characteristics of a quality application is an application that is able to work functionally, namely, testing that ensures that the application can run in accordance with functional requirements (Widia et al., 2022; Rianto Rahadi, 2014).

The D-Cohiva website created by the Al-Irsyad University Cilacap lecturer team has gone through a black box, or what is also called behavioral testing. This test is carried out as part of the SDLC stage at the end of making the D-Cohiva website.

Table 2. Results Testing

Transition	Scenario	Output	Conclusion
T1	Admin enter the user profile	Admin can display the user profile menu and fill in the profile	Successfully
T2	Admin enter the HIV AIDS Risk self check menu	Admin can display the HIV AIDS risk self check menu and can check the HIV AIDS risk	Successfully
T3	Admin enters the HIV AIDS full info menu	Admin can display the HIV AIDS full info menu	Successfully
T4	Admin enters the counselor list menu	Admin can display the menu counselor list menu	Successfully
T5	Admin enters the counselling room menu	Admin can display the counselling room menu	Successfully
T6	Admin enters the ARV adherence counselling menu	Admin can display the ARV adherence counselling menu	Successfully
T7	Admin enters the Story Telling menu	Admin can display the Story Telling menu	Successfully
T8	Admin enters the Support System PLWHA menu.	Admin can display enters the Support System PLWHA menu.	Successfully

The D-Cohiva website testing process has gone through stages by creating a test table as listed in Table 1. Black Box testing must create test cases with two comparisons between true and false to be able to validate the overall function of the system and whether it has worked properly (Nurfauziah & Jamaliyah, 2022). The advantage of Black Box testing is that testing is carried out from the user's perspective, and testers do not need to have programming skills (Rambe & Prihantoro, 2022; Zidan et al., 2022).

Figure 2. Transition T1

Figure 3. Transition T2

Figure 4. Transition T3

Figure 5. Transition T4

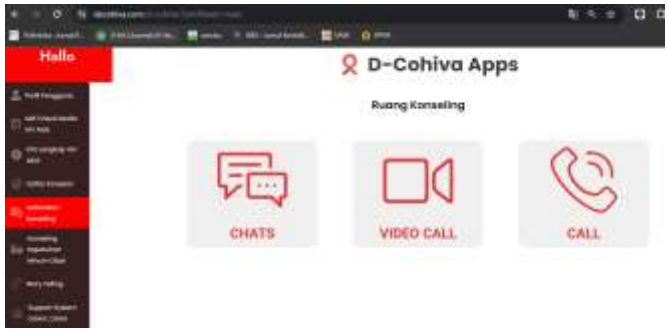

Figure 6. Transition T5

Figure 7. Transition T6

Figure 8. Transition T7

Figure 9. Transition T8

The implementation of Black Box Testing involves 1 tester as an admin outside the UNAIC lecturer team. A total of nine test cases on the D-Cohiva website have been tested. The results shown in Table 2 are 100% successful. That is, the results of this study indicate that the purpose of black box testing of the state transition technique is achieved. It is known that the purpose of the Black Box State Transition technique is to look for incorrect or missing functions, interface errors, performance errors, and functional validation (Baktiar et al., 2021; Nurfauziah & Jamaliyah, 2022; Rianto Rahadi, 2014; Sukardjo et al., 2023).

Conclusion

D-Cohiva website using Black Box Testing with the State Transition Testing technique produces eight test cases and is 100% successful, or in accordance with the expected results. These results indicate that the D-Cohiva website is feasible to use and guaranteed to perform the desired function. The D-Cohiva website can operate without experiencing bugs and has good quality.

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Conflicts of Interest
The authors declare no conflict of interest.

References

Baktiar, A. R., Mulainsyah, D., Sasmoro, E. C., & Sumiati, E. (2021). Pengujian Menggunakan Black Box Testing dengan Teknik State Transition Testing Pada Perpustakaan Yayasan Pendidikan Islam Pakualam Berbasis Web. *J. Kreat. Mhs. Inform, 2*(1), 142-145. https://doi.org/10.37676/jmi.v14i1.472

Dhanamma, J., Sunita, M,, Akanksha, G., & Sheetal, W. (2015). A New Innovation Technique Of State Transition Testing Used For DBT. *Informatics Engineering, an International Journal (IEIJ), 3*, 1-10. Retrieved from https://zenodo.org/records/1405277

Efendi, M., & Jati, H. (2023). Evaluation of the Android-based Learning Outcomes Report for Effective and Effective Student Learning Outcomes. *Jurnal Penelitian Pendidikan IPA, 9*(5), 2357-2362. https://doi.org/10.29303/jppipa.v9i5.3643

Erlangga, R. F., Irawan, A., & Saifudin, A. (2023). Pengujian Fungsional Aplikasi Penjualan Bahan Material Metode Black Box Testing. *Jurnal Manajemen, Ekonomi, Hukum, Kewirausahaan, Kesehatan, Pendidikan dan Informatika (MANEKIN), 1*, 188-191. Retrieved from https://journal.mediapublikasi.id/index.php/manekin

Haq, M. S., Setiawan, A. C., Widyanah, I., Naqiyah, N., & Ashadi, F. (2023). Development of Electronic-Public Relations Through" Mp Mobile Apps" for Optimization of Information Systems. *Jurnal Penelitian Pendidikan IPA, 9*(5), 2409-2416. https://doi.org/10.29303/jppipa.v9i5.3610

Ichsanudin, M. N., Yusuf, M., & Suraya, S. (2022). Pengujian Fungsional Perangkat Lunak Sistem

Informasi Perpustakaan Dengan Metode Black Box Testing Bagi Pemula. *STORAGE: Jurnal Ilmiah Teknik dan Ilmu Komputer, 1*(2), 1-8. https://doi.org/10.55123/storage.v1i2.270

Ikhlaashi, S., & Putro, H. P. (2020). Komparasi Dua Teknik Black Box Testing: Equivalence Partitioning dan Boundary Value Analysis (Studi Kasus: Aplikasi Postcrossing). *Annual Research Seminar (ARS)*, *5*(1), 213–220. Retrieved from https://seminar.ilkom.unsri.ac.id/index.php/ars/article/view/2141

Khan, M. E., & Khan, F. (2012). A Comparative Study of White Box, Black Box and Grey Box Testing Techniques. In *IJACSA) International Journal of Advanced Computer Science and Applications*, *3*(6). https://dx.doi.org/10.14569/IJACSA.2012.030603

Marthasari, G. I., Wahyuningsih, A. T., Aviansyah, M. R., Ramadhani, M. A., & Rahmatullah, Z. (2022). Pengujian Website Infotech Menggunakan Teknik Black-Box Decision Table. *Jurnal Informatika Universitas Pamulang, 7*(1), 115-119. https://doi.org/10.32493/informatika.v7i1.17315

Mintarsih, M. (2023). Pengujian Black Box Dengan Teknik Transition Pada Sistem Informasi Perpustakaan Berbasis Web Dengan Metode Waterfall Pada SMC Foundation. *Jurnal Teknologi Dan Sistem Informasi Bisnis*, *5*(1), 33–35. https://doi.org/10.47233/JTEKSIS.V5I1.727

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), 125-130. http://dx.doi.org/10.32493/informatika.v4i4.3782

Nurfauziah, H., & Jamaliyah, I. (2022). Perbandingan Metode Testing Antara Blackbox Dengan Whitebox Pada Sebuah Sistem Informasi. *Jurnal Visualika, 8*(2), 105-113. Retrieved from https://jurnas.saintekmu.ac.id/index.php/visualika/article/view/24

Oktafian, M. D., Haetami, M. A., Jibril, M., Said, R., & Desyani, T. (2020). Implementasi Pengujian Black Box menggunakan Teknik Equivalents Partitions pada Aplikasi Pendaftaran Commuter Line Berbasis Web. *Jurnal Teknologi Sistem Informasi Dan Aplikasi*, *3*(3), 138–143. https://doi.org/10.32493/JTSI.V3I3.5353

Rambe, A. R., & Prihantoro, H. (2022). *Pengujian Otomatis Aplikasi Mobile dengan Teknik Black-box Menggunakan Appium (Studi Kasus: Pengembangan Aplikasi Jala Mobile)*. Universitas Islam Indonesia. Retrieved from https://dspace.uii.ac.id/handle/123456789/41742

Rahadi, D, R. (2014). Pengukuran Usability Sistem Menggunakan Use Questionnaire Pada Aplikasi Android. *Jurnal Sistem Informasi (JSI)*, *6*(1), 661–671. Retrieved from https://ejournal.unsri.ac.id/index.php/jsi/article/view/772

Rizky, M., Agustin, A., Herdiyani, T. C., Waluyo, A., & Riyanto, J. (2021). Pengujian Black Box menggunakan Teknik State Transition Testing pada Aplikasi BMI Calculator Berbasis Android. *Scientia Sacra: Jurnal Sains, Teknologi dan Masyarakat, 1*(3), 206-213. Retrieved from https://www.pijarpemikiran.com/index.php/Scientia/article/view/76

Safitri, N., & Pramudita, R. (2018). Pengujian Black Box Menggunakan Metode Cause Effect Relationship Testing. *INFORMATION SYSTEM FOR EDUCATORS AND PROFESSIONALS: Journal of Information System*, *3*(1), 101–110. Retrieved from http://101.255.92.196/index.php/ISBI/article/view/1050

Setiawan, A., Gunawan, H., Hidayatullah, A., Putra, M. A. S., Sugema, R. C., Pane, A. H., Nasution, A. R., & Irsyad, M. (2022). Black Box Testing Dengan Teknik State Transition Testing Pada Inventori Alat-Alat Medis. *Jurnal Sains Dan Teknologi (JSIT)*, *2*(2), 151–158. https://doi.org/10.47233/jsit.v2i3.218

Setiawan, D., Fadhillah, M. A., Wibawa, A., Sugiarto, I., Mulyana, A., & Kusyadi, I. (2020). Pengujian Black Box pada Aplikasi Perpustakaan Berbasis Web Menggunakan Teknik Equivalence Partitioning. *Jurnal Teknologi Sistem Informasi Dan Aplikasi*, *3*(2), 95. https://doi.org/10.32493/JTSI.V3I2.3955

Sukardjo, M., Oktaviani, V., Tawari, S., Alfajar, I., & Ichsan, I. Z. (2023). Design of Control System Trainer Based on IoT as Electronic Learning Media for Natural Science Course. *Jurnal Penelitian Pendidikan IPA*, *9*(2), 952–958. https://doi.org/10.29303/JPPIPA.V9I2.3097

Susilawati, F. E., Suparman, & Patalo, A. M. G. (2022). Pengujian Black Box Aplikasi Penjualan Pupuk Bersubsidi Menggunakan Teknik Equivalence Partitioning. *Jurnal Ilmiah Teknologi Informasi, 12*(2), 30-34. https://doi.org/10.30605/dcomputare.v12i2.48

Widia, I. D. M., Rosalin, S., Asriningtias, S. R., & Sonalitha, E. (2022). Black Box Testing Menggunakan Boundary Value Analysis dan Equivalence Partitioning pada Aplikasi Pengadaan Bahan Baku Batik dengan Pendekatan Use Case. *JIMP (Jurnal Informatika Merdeka Pasuruan), 6*(1).

Retrieved from http://ejurnal.unmerpas.ac.id/index.php/informatika/article/view/300

Zidan, M., Nur'aini, S., Wibowo, N. C. H., & Ulinuha, M. A. (2022). Black Box Testing pada Aplikasi Single Sign On (SSO) di Diskominfostandi Menggunakan Teknik Equivalence Partitions. *Walisongo Journal of Information Technology*, *4*(2), 127–137. https://doi.org/10.21580/wjit.2022.4.2.12135