UNDERGRADUATE THESIS

PERFORMANCE ANALYSIS OF THE E-OBE APPLICATION USING BLACK BOX AND WHITE BOX TESTING METHODS

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SURABAYA
2026

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ABSTRACT

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Thesis Title:	Performance Analysis of The E-OBE Application Using Black Box and White Box Testing Methods
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In today's digital era, the development of mobile-based academic applications such as E-OBE, used by Universitas Trunojoyo Madura (UTM), requires rigorous testing to ensure optimal system reliability, security, and functionality. However, manual functionality testing is often inefficient for detecting complex backend issues within modern REST API architectures. This study aims to comprehensively evaluate the system performance quality of the E-OBE mobile application using a combination of manual testing methods and automated testing tools.

The method used in this study is White-Box testing, applying the basis path technique to manually measure the logical complexity of each function within the system controllers. Simultaneously, this research also implements automated Black-Box testing using the EvoMaster tool. This tool targets REST API endpoints configured through the OpenAPI schema to generate extensive test cases. The White-Box testing results show that the cyclomatic complexity values across all tested controllers range from 1 to 5. These figures indicate that the application's program flow and internal logic are relatively simple, well-structured, and have a low risk of system failure.

Conversely, the automated Black-Box testing successfully detected 27 unique faults out of the 49 HTTP calls generated. These faults were largely dominated by discrepancies between the API responses and the documentation schema with 22 findings (error 101), followed by server errors (HTTP 500) with 4 findings, and 1 authentication issue. It can be concluded that the E-OBE application inherently possesses an excellent internal logic architecture with a low risk of code failure. However, the application still requires significant improvements in its API documentation and external input handling to resolve schema inconsistencies and prevent server crashes, thereby ensuring system reliability during future front-end integrations.

Keywords: *Black Box Testing*, E-OBE, EvoMaster, REST API, *White Box Testing*.

ACKNOWLEDGEMENTS

Praise be to Allah SWT for all His graces, guidance, and gifts to the author so that the thesis proposal with the title **"Performance Analysis of The E-OBE Application Using Black Box and White Box Testing Methods"** can be completed properly.

The author would like to thank Mrs. Made Hanindia Prami Swari, S.Kom, M.Cs as Supervisor I and Mr. Dr. I Gede Susrama Mas Diyasa, S.T., M.T., IPU as Supervisor 2 who are willing to take their time to provide guidance, advice and motivation to the author. In addition, during the preparation of the thesis proposal, the author also received a lot of assistance from various parties. For this the author would like to thank the:

1. Mrs. Prof. Dr. Ir. Novirina Hendrasarie, M.T. as the Dean of the Faculty of Computer Science, National Development University "Veteran" East Java.
2. Mrs. Dr. Intan Yuniar Purbasari, S.Kom., M.Sc. as the Coordinator of Informatics Study Program, Faculty of Computer Science, National Development University of East Java.
3. Lecturers of the Data Science Departement, National Development University of East Java Veterans for their guidance during the author's education.
4. My dearest Mother, who has always played an important role in the writer's journey, always provides support, both material and mental. It's always a place to go back when the writer feels tired. Always present with his best prayers, being a source of strength that never goes out, the writer can survive until now.
5. My dearest Father, who taught to be someone who was responsible, worked hard, and did not give up easily. His advice and examples are an important foundation for the author in undergoing each process with determination.

The author realizes that in the preparation of the following thesis there are many shortcomings. For this reason, constructive criticism and suggestions from all parties are highly expected for the perfection of writing the following thesis. Finally, with all the limitations that the author has, hopefully the following report can be useful for all parties in general and the author in particular.

Surabaya, July 24, 2026

Author

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