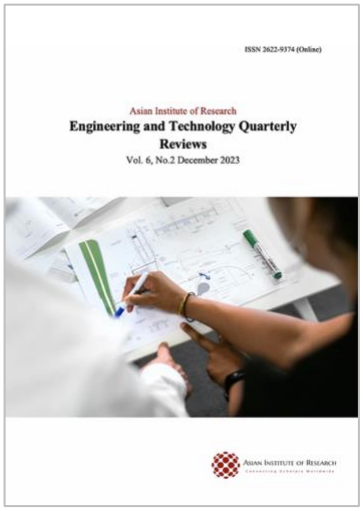

Engineering and Technology Quarterly Reviews

Nugraha, F. J. T., Kusnadi, A., & Tobing, F. A. T. (2023), Implementation of the Rapid Application Method Development (RAD) in Clothes Sale Website Design. In: *Engineering and Technology Quarterly Reviews*, Vol.6, No.2, 10-18.

ISSN 2622-9374

The online version of this article can be found at:
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Published by:
The Asian Institute of Research

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The Asian Institute of Research
Engineering and Technology Quarterly Reviews
Vol.6, No.2, 2023: 10-18
ISSN 2622-9374
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Implementation of the Rapid Application Method Development (RAD) in Clothes Sale Website Design

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Abstract
Rapid Application Development (RAD) is a software development method that speeds up software production by reducing complex and time-consuming processes. RAD can be used as a reference for developing superior information systems in speed, accuracy and lower cost. In this study, the application of the RAD method will be carried out to design a business website selling Mamigaya breastfeeding clothes by testing using EUCS and blackbox testing. The first phase of RAD is understanding fast design system analysis & requirements. Requires a high level or knowledgeable end user to define what the system function should be. The second stage is a repetition of the prototype cycles development stage, namely development, demonstration, refine. This includes creating physical designs for databases and mainly focuses on translating designs into programming code. Based on the results obtained from a survey using EUCS, the satisfaction level of respondents reached 88.58% and the results of blackbox testing showed that the features on the website could function. Thus, it can be concluded that the application of RAD can produce a good website.

Keywords: Web Design, RAD, Mamigaya, EUCS

1. Introduction

RAD is a software development method that speeds up software production by reducing thecomplicated and time-consuming planning process.RAD can be used as a reference for developing an information system that is superior in terms of speed, accuracy and lower cost (Flora, 2018). The RAD model is an adaptation of the waterfall model, where rapid development is achieved using a component-based construction approach (Subhiyakto & Astuti, 2019). The RAD method works bymeans of an iterative and incremental approach, whichmeans that all application projects are developed in stages through repeated iterations. This iterationallows app developers to create, review, and modify apps based on feedback. The RAD method has a technical flow in speeding up the

website development process, such as Prototyping, Rapid Modeling, Timeboxing, and Reuse Components (Beynon-Davies et al., 1999). This methodis widely used in website design and runs with a good success rate.

In this study, the application of the RAD method will be carried out to design a website for the Mamigaya breastfeeding clothing sales business. Mamigaya is a brand from a shop that sells various models of nursing clothes that are produced at a convection in the Bandung area, West Java. Mamigayahas been initiated since 2012. This business is run by Faridah Alawiyah as the owner of Mamigaya, sales aremade online through various marketplace applicationssuch as Shopee, Tokopedia, Lazada, Facebook, and also market it offline operating at home.

However, when using the marketplace, you will always get a sales discount from the application everytime you make a transaction. The commission percentage that is commonly charged by some marketplaces varies from 1% to 20%. So this makes Mamigaya need to provide a sizable commission to the application if Mamigaya makes a lot of transactions on the marketplace. In using applications from third parties such as marketplaces also have greater competition compared to e-commerce. So based on the results of interviews with Mamigaya, Mamigaya needs a sales application website that can also provide educational information about breastfeeding clothing products.

2. Related Theory

2.1 Profile Mamigaya

Mamigaya is a brand from a shop that sells variousmodels of nursing clothes that are produced at a convection in the Bandung area, West Java. Mamigayahas been initiated since 2012. This nursing clothes business is run online through various marketplace applications such as Shopee, Tokopedia, Lazada, Facebook, and also markets it offline operating athome. Mamigaya specifically sells clothes for breastfeeding mothers.

The nursing clothes sold by Mamigaya have various models and categories, starting from the basicssuch as Elsha, Pappi, Sofie. Then there are maxi dresses such as the Izza Maxi Series, Abaya Series, Aulia Maxi Series, Aisyah Gradasi Merah, Reina Denim Square, Midi Kania, and many more.Based on the results of the interviews conducted with Mamigaya, the various models of nursing clothes that are sold by Mamigaya are made with comfortable materials and follow the style of young mothers so thatthese nursing clothes can also be used for work, and Mamigaya's breastfeeding clothing products are marketed at affordable prices. prices between IDR50,000 to IDR 200,000.

Mamigaya's customers come from manybackgrounds, Mamigaya currently has marketingcovering almost all regions in Indonesia, and has penetrated foreign countries such as Singapore, Malaysia, the Netherlands and Germany who are interested in the Mamigaya model. Currently, Mamigaya itself has 13.9 thousand followers on one ofthe marketplaces, namely Shopee. The Instagram application Mamigaya has 51.2 thousand followersand 1,739 product photo posts posted on the first account, and has 23.8 thousand followers and 2,108 product photo posts posted on the second account.

2.2 Rapid Application Development (RAD)

The Rapid Application Development method is an object-oriented approach that produces a system with the aim of shortening the processing time for applications and processes in order to empower the software system as quickly and accurately as possible (Tabrani & Priyandaru, 2021). RAD is development and part of SDLC is a software engineering methodology that focuses on building applications quickly and efficiently. This approach focuses on shorter development cycles, reusable components, and high-level development tools. RAD also emphasizes iterative development, enabling processes that are more flexible and responsive to changing user needs. To design an information system that takes at least 180 days, you have to go through stages that take quite a long time, so by applying the RAD method it only takes 30-90 days to complete the software system (Setyatama & Andrianto, 2018). This method emphasizes user involvement in the analysis and planning process so that it can meet user needs properly so as to increase system user satisfaction.

1) Analysis Quick Design: The first phase of RAD is understanding the system requirements of Analysis Quick Design.Requires a high level or knowledgeable end user to determine what the system function should be. So that it becomes a structured discussion about the business problem that needs to be solved. This phase of the process includes deciding what programming language and database to use. PHP scripts and MySQL database are used as development tools to develop prototypes. PHP itself is a scripting language that was originally designed to produce dynamic web pages. It has evolved to include command line interface capabilities and can be used in graphical applications. Also in this phase, theoverall structure of the software is determined. It is important to understand the system requirements before proceeding to prototype development (Abd Ghadas et al., 2015).

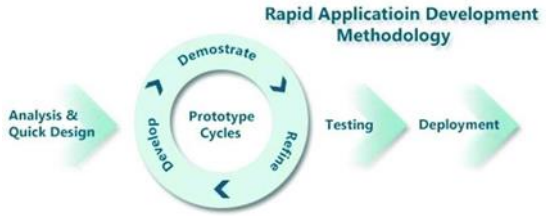

Figure 1: Diagram RAD (Abd Ghadas et al., 2015)

2) Prototype Cycles: The second phase is a repetition of the prototype development phase, namely development, demonstration, design. This includes creating the physical design for the database and mainly focuses on translating the design into programming code. The code for connecting from the programming language to the MySQL Database Management System (DBMS) was created (Abd Ghadas et al., 2015). 1) Demonstrate: This stage is the stage where the first prototype is made and shown to users to get initial feedback. This first prototype was created to test ideas roughly, and to determine what features needed to be improved or changed. 2) Refine: This stage involves perfecting the prototype after initial feedback is received. The prototype will be improved and modified based on feedback from the user, so that the prototype becomes better and fits the user's needs. 3) Develop: This stage is the stage where the refined prototype is developed into the final product. This stage involves programming and testing the application until the application is ready for release.

3) Testing: This stage is the application testing stage that has been built. In this stage, the application is thoroughly tested to ensure that it functions properly and meets user requirements. The trials include testing application functionality and testing user satisfaction. After the trial is complete, the application can be upgraded and improved according to the test results. The next process involves improving and correcting prototype errors. This stage is repeated until the prototype meets the research objectives.

4) Development: This stage is the final stage of software development. In this stage, the application is developed and refined according to the requirements and user feedback. After the application has been developed, it can be released and distributed to end users. However, app development doesn't end at this stage, as maintenance and improvements are usually required over the life of the app. RAD uses a number of tools and techniques to streamline the development process. This includes prototyping, iterative development, and component-based development. Prototypes allow developers to test early versions of applications quickly, so that user feedback can be integrated early in the process. Iterative development allows developers to create a basic version of an application and then gradually add more features and functionality. Component-based development allows developers to use reuse components and modules in different applications, making the development process faster and more efficient. Overall, RAD is an efficient and effective methodology for software development. This allows developers to create applications quickly and respond to customer needs (Kirmani, 2017).

2.3 Blackbox Testing

Blackbox Testing is a software testing technique (Kusnadi et al., 2018). This method is used to determine the functionality of the application.

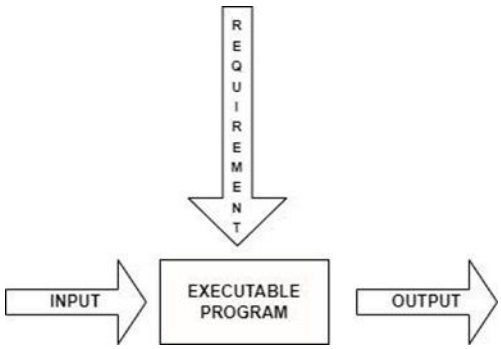

Figure 2: Black Box Testing (Viglianisi et al., 2020)

The main focus of Blackbox Testing is the input available to an application and the expected output for each input value. This test method is based on software requirements and specifications. It is a software testing technique in which the inner workings of the system under test are unknown to the tester. It is also called specification-based testing and behavior testing. This technique is so named because in this test, the tester does not need to know about the internal code of the application implementation. This test handles both valid and invalid input according to the customer's requirements (Viglianisi et al., 2020).

2.4 Likert Scale

The Likert Scale method is a method used to measure the level of user satisfaction using a Likert scale (Joshi et al., 2015). In this study, the Likert scale was used to measure user In this study, the Likert scale was used to measure user opinion on the website selling breastfeeding clothes that had been made. The following is the scale level and the score used (Table 1) :

Table 1: Scale Score of The Questionnaire

No	Answer Choices	Score
1	Strongly Agree	5
2	Agree	4
3	Neutral	3
4	Don't Agree	2
5	Strongly Disagree	1

2.5 End-User Computing Satisfication (EUCS)

End User Computing Satisfaction is an overall assessment of the use of information systems based ontheir experience in using the system (Abdinnour-Helm et al., 2005)(Santoso et al., 2023). End User Computing Satisfaction has 5 aspects which contain Content, Accuracy, Format, Ease of use and Timeliness.

1) Content: Measures user satisfaction with the content of the system. to fill the system usually consists of functions and modules that can be used by system users, as well as information generated by the system.
2) Accuracy: Measuring user satisfaction based on data accuracy when the system receives input, the system processes it as information.
3) Format: Measures user satisfaction in terms of appearance and system user interface aesthetics.
4) Ease of Use: Measures user satisfaction with the site's ease of use usage when using the system, data entry, data processing andsearching for the required data.
5) Timeliness: Measures user satisfaction with site accuracy system time in presenting or providing the information needed by the user.

3. Method

To complete the formulation of the problem that has been described previously, then below are thestages carried out in completing the research, namely:

1) Study of literature: Literature study is the initial stage in writing a research report. Literature study was conducted to obtain information and theories related to the RAD method and other supports, especially in terms of website design. Sources of information and theories needed in research can be obtained from scientificjournals, scientific papers, books, and interviews.
2) Analysis Quick Design: carried out by analyzing the needs planning process by conducting direct interviews with resource persons to identify problems and also collect the necessary data or recruitment and identify the ultimate goal or goals of the system and the desired information requirements. In this publication only part of the design is shown.
3) Prototype Cycles: At the prototype cycles stage, the design is made repeatedly if there is still a design discrepancy againstthe required requirements that have been identified in the first stage beforehand.
4) Testing stage, continuing development and integration by considering feedback from users or regarding designs that have been made and turning them into beta applications. If the process goes smoothly then it can proceed to the next stage, meanwhile if the application to be developed does notmeet the requirements, the developer returns to the system design stage.
5) Development: At the development stage, implementing thesystem design on the beta application that was tested in the previous stage and has received approval from the user. Before the system is implemented, the program first undergoes a testing process where errorsin the system to be developed are detected. At this stage, usually provide feedback on the system being built and seek approval for the system.
6) Report: At this stage of writing the report will cover all theresearch that has been carried out from the initial stagein the research, namely the study of the literature to thedevelopment carried out, then the conclusions and suggestions resulting from the research that has been carried out.

4. Implementation

Figure 3 is a sitemap of the page used for the customer panel. Customers can access the entire panel by logging in first with their registered email and correct password in the database. If a customer does not have an account, they can register on the create account page. Once the customer successfully logs in, they can add items to their shopping cart and proceed with the ordering process.

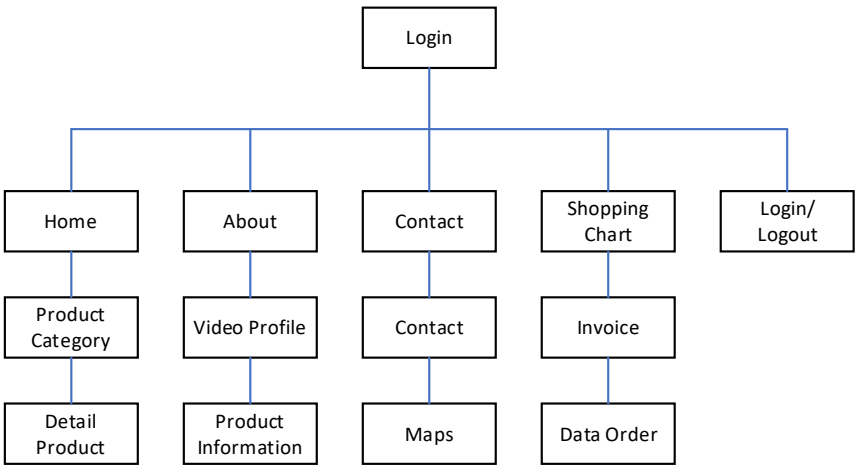

Figure 3: Customer Site Map

In this website design, a use case diagram is needed to illustrate the activities performed by actors within the system (Figure 4).

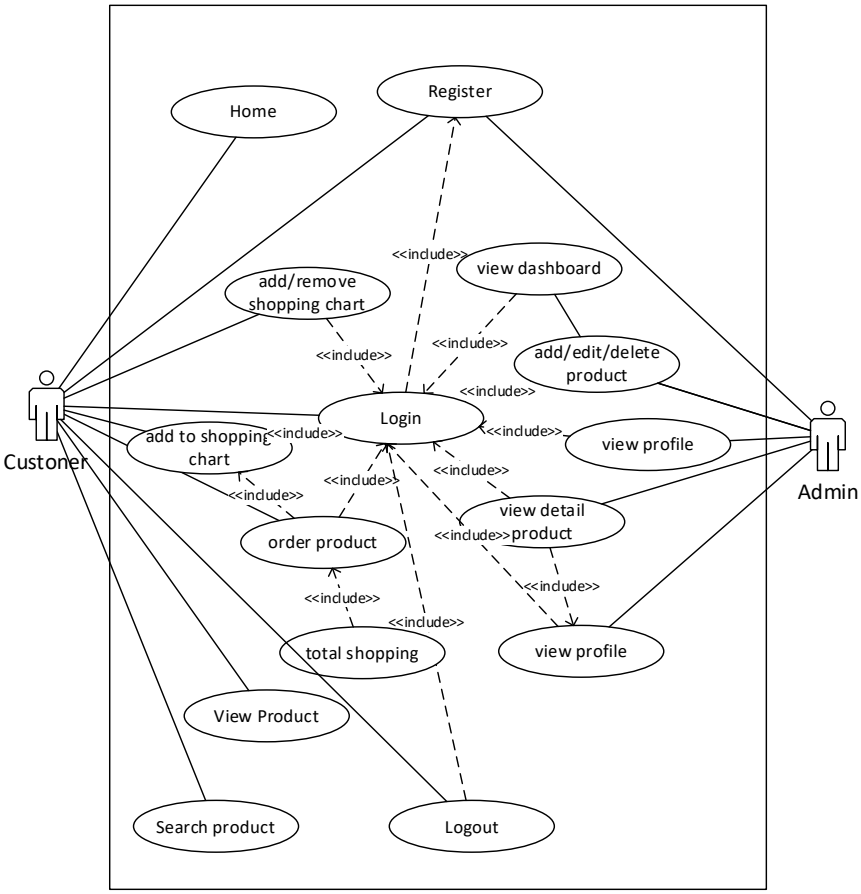

Figure 4: Use Case Diagram

4.1 Development

The implementation of the application of the rapid application development method in web design selling breastfeeding clothes at Mamigaya is using the code igniter framework and SQL database. It accessible at the link https://mamigaya.online. The systemis made in the form of a website with 2 actors namely admin and customer. The login page is used by admins and customers to be able to enter the system by filling in an email and password. The implementation of the login page is shown in Figure 5.

Figure 5: Login Page

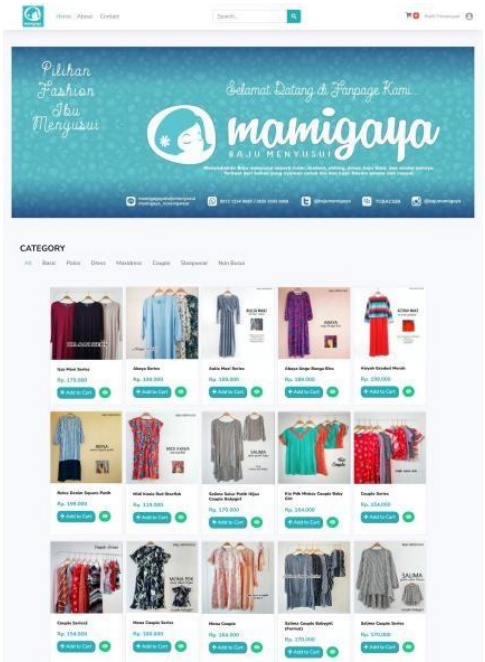

Figure 6: Home Page

4.2 Development

The home page is the main page of the website. Infigure 6 the customer can see the products displayed on the website. However, when the customer wants toadd a product to the cart, the customer is required to log in first, when the add to cart button is clicked it will display a message modal to log in first.

4.3 Testing

Test blackbox testing by testing all the features on the website with the result that the features can function as they should. The user satisfaction test is carried out bydistributing online questionnaires to users who have tried the online shop website. User satisfaction test forthe application of the rapid application development method to website design selling breastfeeding clothesat Mamigaya uses the End-User Computing Satisfaction (EUCS) method. The EUCS method has 5 main factors that form thebasis for compiling a user satisfaction questionnaire. Table 2 show the result of survey:

Table 2: The Questionnaire Results

Aspect	SS	S	N	TS	STS
Content	23	10	4	0	0
Accuracy	21	10	5	1	0
Format	17	13	6	1	0
Easy of Use	24	9	3	1	0
Timeliness	18	12	6	1	0

The first question got 37 respondents, 23 people answered strongly agree, then 10 people answered agree, and 3 people answered neutral. Same explanation for the other question. After getting the results of the total preset for eachquestion, then then calculating the overall results of the percentages to be able to find out the total overall score of all EUCS factors. Based on the results obtained from the percentage calculation, it can be concluded that the answers of allrespondents to the question about the 5 factors inEUCS achieved a total score of 88.58%. This shows that respondents strongly agree with the results ofapplying the rapid application development (RAD) method in designing a website selling breastfeedingclothes.

5. Discussion

Implementing Rapid Application Development (RAD) on an e-commerce website can offer several advantages, though it requires careful consideration and planning to ensure success. Here's a discussion on implementing RAD for an e-commerce website:

- Speedy Development: RAD enables rapid creation of an e-commerce website by building quick prototypes. This allows businesses to enter the market faster or respond swiftly to changing trends.
- User Involvement: RAD involves stakeholders and users at every development stage. This facilitates valuable feedback, leading to a solution that better aligns with user needs.
- Flexibility: The RAD approach allows for easy changes and adjustments during development, making the solution more responsive to evolving needs or customer requests.
- Iteration: The ability to create prototypes and iterate quickly aids in refining and enhancing website functionality incrementally.
- Improved Quality: Through continuous iterations and feedback, the final solution has the potential to be of higher quality and functionality.

Considerations:

- Complexity: While RAD speeds up development, neglecting proper planning and analysis can lead to complexity issues later on.
- Scalability: While RAD is suitable for generating initial prototypes and solutions, consideration must be given to how this solution will be scaled into a larger, more scalable e-commerce platform.
- Code Quality: Rapid development can lead to subpar code quality if not managed properly, which might result in security and performance issues down the line.
- Intensive User Involvement: The RAD process involving heavy user participation may demand more time and effort from both developers and users.
- Maintenance: Without proper management, rapid iterations can pose challenges in terms of maintenance and documentation.

Implementing RAD for an e-commerce website can be a highly beneficial approach if executed well. However, it's important to follow best software development practices and consider potential challenges along the way.

4. Conclusion

The results of testing this website are carried out by distributing questionnaires, on this website a system test is carried out using the black box testing method to see whether the functionality of the developed website is working properly or not. Then the website has also been tested for user satisfaction, the results of the questionnaire that has been distributed are calculated using the end-user computing satisfaction method and the final total percentage score can reach 88.58%, which means the user strongly agrees with these breastfeeding clothes sales website. Thus, can it was concluded based on theresults of the discussion of the conclusions of the RADmethod from the system testing stage with the black box testing method and testing user satisfaction with EUCS, that the application of the RAD method to website design selling breastfeeding clothes at Mamigaya was successfully carried out.

Acknowledgments

Thank you to Universitas Multimedia Nusantara for providing this research facility.

References

Abd Ghadas, Z. A., Wan Ismail, W. N., Abd Aziz, A., Harun, N. A., Jusop, M., & Abd Rahman, C. A. (2015). LAFAMS: Account Management System for Malaysian Small Legal Firms. *Pertanika Journal of Social Sciences & Humanities*, *23*.

Abdinnour-Helm, S. F., Chaparro, B. S., & Farmer, S. M. (2005). Using the end-user computing satisfaction

(EUCS) instrument to measure satisfaction with a web site. *Decision Sciences*, *36*(2), 341–364.
Beynon-Davies, P., Carne, C., Mackay, H., & Tudhope, D. (1999). Rapid application development (RAD): an empirical review. *European Journal of Information Systems*, *8*(3), 211–223.
Flora, H. K. (2018). *Adopting an agile approach for the development of mobile applications*.
Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, *7*(4), 396.
Kirmani, M. M. (2017). Agile methods for mobile application development: A comparative analysis. *International Journal of Advanced Research in Computer Science*, *8*(5).
Kusnadi, A., Wella, Winantyo Rangga, & Pane, I. Z. (2018). *Evaluation of Feature Detectors on Repeatability Quality of Facial Keypoints In Triangulation Method*. 3–6.
Santoso, B. G., Tobing, F. A. T., & Kusnadi, A. (2023). ERP Odoo Based Medical Reimbursement System Using Scrum Method:(Study Case: Group of Retail and Publishing Kompas Gramedia). *2023 20th International Joint Conference on Computer Science and Software Engineering (JCSSE)*, 327–332.
Setyatama, F., & Andrianto, I. K. (2018). Rapid Application Development (RAD) Method For Developing Clinical Laboratory Information System (Case Study: PT. Populer Sarana Medika). *JEECS (Journal of Electrical Engineering and Computer Sciences)*, *3*(2), 421–430.
Subhiyakto, E. R., & Astuti, Y. P. (2019). Design and development meeting schedule management application using the rad method. *2019 International Conference of Artificial Intelligence and Information Technology (ICAIIT)*, 60–64.
Tabrani, M., & Priyandaru, H. (2021). Application of the Rapid Application Development Method to the BAZNAS Zakat Receipt Information System in Karawang. *Jurnal Teknologi Dan Open Source*, *4*(1), 78–84.
Viglianisi, E., Dallago, M., & Ceccato, M. (2020). Resttestgen: automated black-box testing of restful apis. *2020 IEEE 13th International Conference on Software Testing, Validation and Verification (ICST)*, 142–152.