

## Flutter Application for Dormitory Resident Monitoring (Case Study: Lambung Mangkurat South Kalimantan Student Dormitory)

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### Article Information

Received:  
October 2023

Accepted:  
November 2023

Published:  
December 2023

### ABSTRACT

The management of the Lambung Mangkurat South Kalimantan Student Dormitory is responsible for providing reports on their dormitory residents. These reports include personal data and Study Result Cards to confirm that boarders are students. However, currently, the administrators use WhatsApp groups to collect these reports, which causes a backlog and difficulty in data collection. Therefore, a research project was initiated to develop an application that can assist residents and administrators in collecting and managing these reports. The app serves as a monitoring and evaluation tool for the boarders. It can also track their financial, academic, and daily picket activity reports. The research started with a literature study to identify the problems and objectives of the project. The current system procedures were analyzed to identify areas that needed improvement. Based on the research results, an Android-based application was developed and successfully implemented at Lambung Mangkurat South Kalimantan Student Dormitory. This application has features that allow dormitory managers to monitor daily picket activities, academic reports, and cash billing information more efficiently.

**Keywords:** Monitoring, Android, Flutter, Clean Architecture, BLoC, UCD

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**Citation Information:** Yusuf Wijasena, A., & Zakariyah, M., (2023). Flutter Application for Dormitory Resident Monitoring (Case Study: Lambung Mangkurat South Kalimantan Student Dormitory). *Tunas: Jurnal Pendidikan Guru Sekolah Dasar*, 9(1), 86-95. DOI. 10.33084/tunas.v9i1.6150

## INTRODUCTION

Lambung Mangkurat South Kalimantan Student Dormitory is one of the student dormitories specifically for South Kalimantan residents who are studying in Yogyakarta. This dormitory is located on Jalan A.M. Sangaji No.66, Cokrodingrat, Jetis, Yogyakarta City, DI Yogyakarta. In the management of Lambung Mangkurat South Kalimantan Student Dormitory, dormitory administrators are required to provide data reports on people living in the dormitory, in the form of Study Result Cards as proof that those living in the dormitory are students. Dormitory residents are also required to participate in activities held in the dormitory, such as daily picket, monthly community service, and weekly religious activities. In addition to the activities held in the dormitory, dormitory residents are also required to pay monthly cash to pay bills such as electricity, wifi, and other household needs. All of these reports are collected in one Whatsapp group which makes these reports accumulate and makes it difficult for the Management to collect data to make reports every month and year.

Therefore, this research aims to build an application that can help residents and dormitory administrators collect data that will be used as reports every month. This dormitory resident monitoring system application can also be used as a forum for activity, financial, and academic reports from dormitory residents which dormitory administrators will later submit to the South Kalimantan Provincial Government. Monitoring itself is an activity of supervising, observing, or checking the performance of a process (Kementerian Pendidikan dan Kebudayaan, 1988). One study discusses the information

system and management of dormitory units which includes data collection of dormitory residents, information distribution, guest data collection, and complaints about dormitory facilities (Siagian et al., 2020). Other research also discusses the distribution of information on activities in the dormitory environment (Maulana et al., 2021). Other researchers also discuss the management of routine activities followed by dormitory residents (Hariyadi et al., 2019). There is also research to improve the effectiveness and accuracy of picket data and reduce the error rate on picket implementation reports to facilitate operations related to picket implementation (Wildan Audina, 2020). The next research is about managing data about dormitories such as data on borrowing goods, dormitory inventory, proposals, and outgoing letter archives (Sri Kusuma Aditya et al., 2019). The difference between current research and previous research is in the features provided in this application, namely the upload feature of academic results, daily picket reporting, and monthly bill information from dormitory residents. Applications that are developed using flutter by applying clean architecture can facilitate maintenance if an error occurs or add new features to the application. Clean architecture is the application of principles in building an application where modular, scalable, and testable code base separation is carried out (Duy, 2017).

## METHOD

Based on the problem analysis described in the introduction, a design was designed using the UML (Unified Modelling Language) user design process tailored to user needs. UML is

a visual modeling method as a means to design or create object-oriented software. UML can model all types of software that can run on hardware, operating systems, and networks (Haviluddin, 2011). After going through the process of brainstorming, designing, and improving, the following are the UML results of this research.

The use case diagram describes the activities carried out by the system from the point of view of outside observations such as

what scenarios will occur when the user interacts with the system (Agus Suryana, 1996). In this study, there are two actors in the use case of the monitoring and evaluation system for dormitory residents. The use case diagram can be seen in Figure 1.

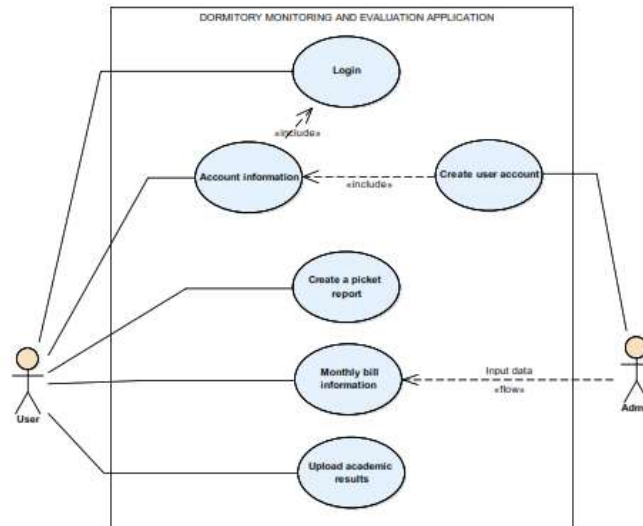


Figure 1. Use Case

In the picture above, the admin can register user accounts and add information about user accounts, and download picket reports and academic reports from each user account. Admin can also enter cash bills for each user account. Meanwhile, users can log in through the account that has been registered by the admin and can create picket reports and upload reports on their academic results. Users can also see information about their monthly cash bills.

#### Activity Diagram

The activity diagram itself describes the processes that occur in a system. These activities can be a sequence of menus or processes contained in the system. Activity diagrams also serve to analyze use case diagrams by describing actors, actions that need to be performed, and when they must occur (Agus Suryana, 1996). In the application, there are four activities, namely Login activity, picket report activity, academic report activity, and cash bill activity. The activity can be seen in the following pictures.

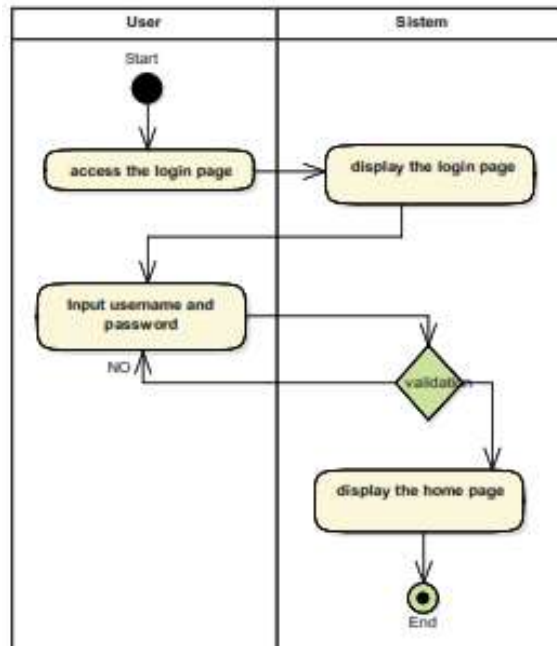


Figure 2. Login Activity

Based on the picture above, the login activity is an activity where the user is asked to enter a username and password that will be validated by the system repeatedly and if it has been

validated, the system will display the main menu of the application being built.

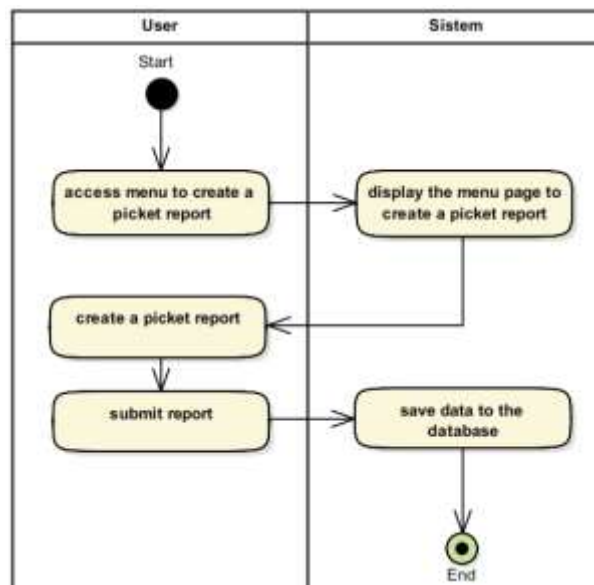


Figure 3. Report Activity

Based on the picture above, the user will access the menu to create a picket report and the system will display the menu of the picket report. Then the user will create a picket report by

uploading photos before and after the picket activity is carried out then after the user submits the report, the system will save the picket report data in the database.

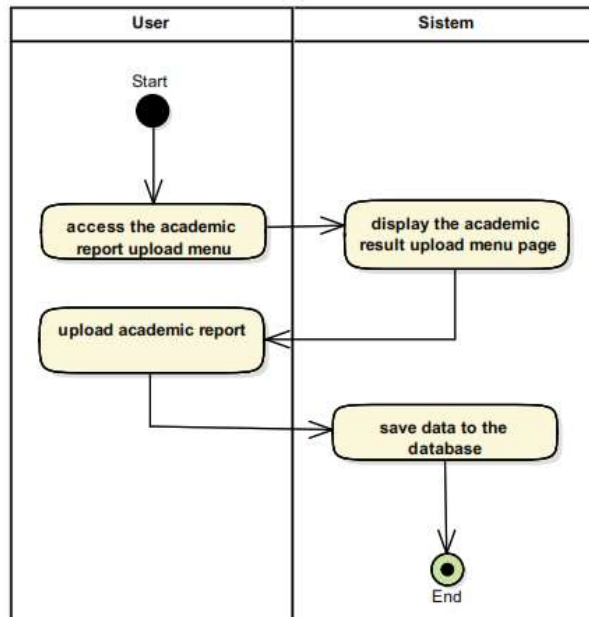


Figure 4. Academic Reports Activity

It can be seen in Figure 4, in the academic report activity, the user will access the upload academic reports menu and the system will respond by displaying the menu of upload academic

reports. Furthermore, the user will upload the Study Result Cards then submit and the system will save the user upload data in the database.

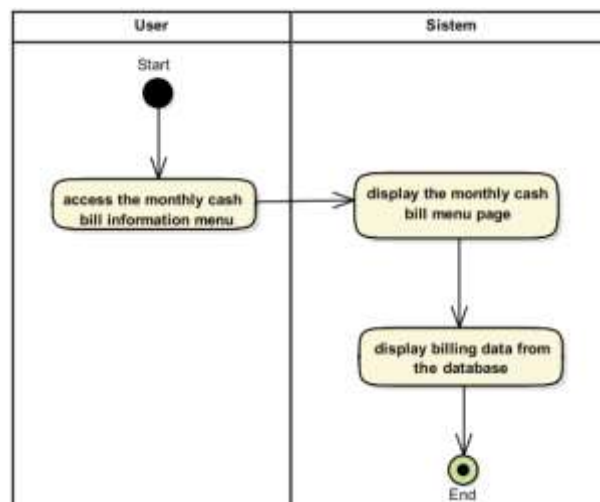


Figure 5. Billing Information Activity

In the billing information activity above, to view billing information the user will access the cash billing menu and later the system will display dormitory billing data that has been stored in the database.

#### Class Diagram

Class diagram is a part of UML that describes the structure of class descriptions, packages, and objects along with

relationships with each other such as containment, inheritance, association, and others. Class itself has three main areas, namely name (and stereotype), attributes, and methods (operations)(Agus Suryana, 1996). In this research, the class diagram is used to describe the design of the relationship between databases of the application being built, the database design can be seen in Figure 6.

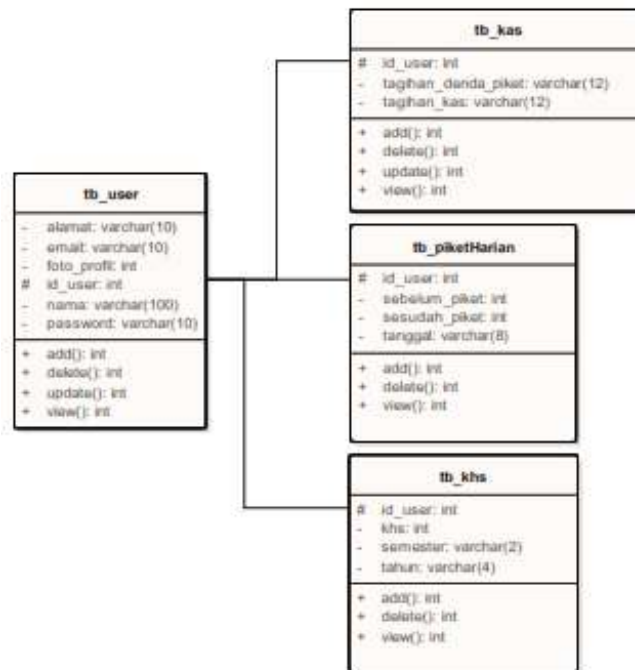


Figure 6. Class Diagram

In Figure 6 above, the database design used in this research is explained, where there are user, cash, daily picket, and academic reports classes. The three classes, namely cash, daily picket, and academic reports have a relationship with the user class.

#### Architecture Model

Clean Architecture is used to separate the presentation layer (widgets, screens, and displays), domain layer (application core

logic), and data layer (API and Database). This research only uses two layers of Clean architecture, namely the presentation layer and the data layer where the domain layer will be handled using BLoC State Management. BLoC (Business Logic Component) itself aims to separate business logic from the user interface, making it possible to send changing data to display objects efficiently (Abdillah et al., 2023). Architecture in the application can be seen in the figure 7.

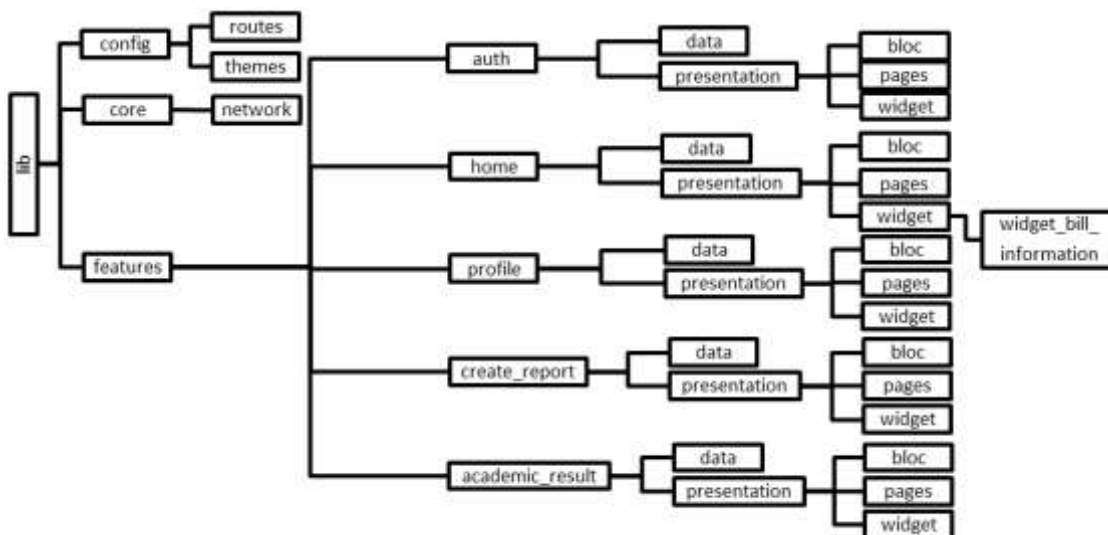


Figure 7. Flutter Architecture

## RESULTS AND DISCUSSION

The results and discussion will show the stages of developing a dormitory resident monitoring application. The system built is an Android-based application built using the Flutter framework which is equipped with a RESTful API Web Service for data exchange between users and admins. Flutter is a

Google application-level framework targeted at developing mobile applications (Tashildar et al., 2020). Web service itself has the meaning of an application that is made so that it can be called and accessed by other applications via the internet or intranet, while REST is a distributed software architecture technique such as the World Wide Web (Gilvy Langgawan Putra et al., 2019). The stages that are passed when building an

application, namely the system implementation stage to testing the system built.

### System Implementation

At this stage, the previously designed system is implemented into an application. The user interface design of the application is built using the user-centered design method, user-centered design is a method of designing system interfaces that involve prospective users so that they can provide input on system interfaces that are easy for users to use (Pramesti et al., 2022).

The following is a display of the features available in the application.

### Login Page

This page is the initial display when the application is run, where the user will be asked to enter a username and password that gives access to the main menu of the application being built. The appearance of the application Login page can be seen in Figure 8.

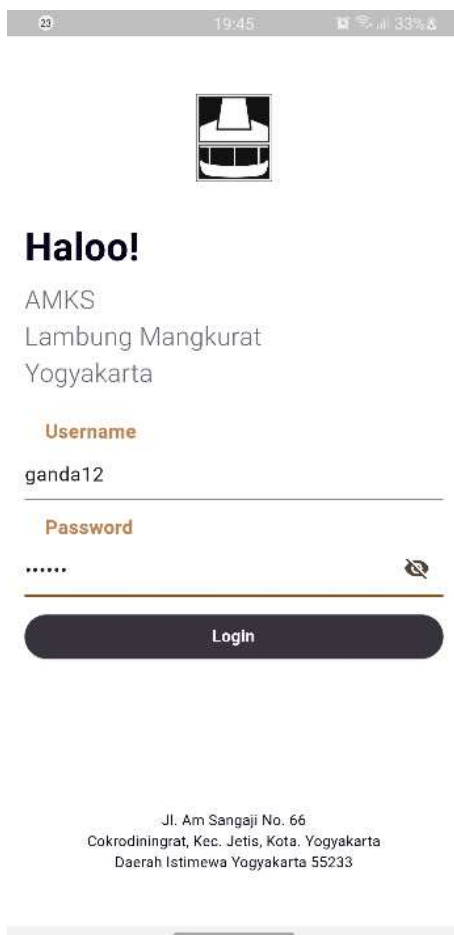


Figure 8. Login Page

### Picket Reports Page

The picket report page is a place for dormitory residents to report their daily picket activities in the form of photos before

and after picket activities are carried out. After the user submits, the report data will be saved to the database. The display of the picket report page can be seen in Figure 9.

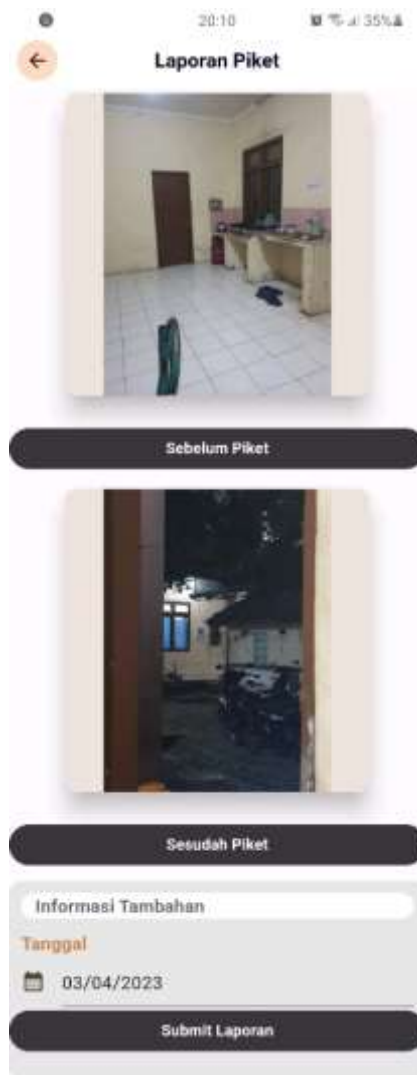


Figure 9. Picket Reports Page

### Academic Report Page

The academic report page is a menu where the user will upload his academic results in the form of a student result card file in

pdf form. All files uploaded by the user will be stored in the database. The following is a view of the academic reports page.



Figure 10. Academic Reports Page

### Bill Information Page

Bill information is a menu for displaying monthly cash bills from each user, where the admin will input the bill data and display it on this page. The bill information page can be seen in Figure 11.



Figure 11. Bill Information Page

### System Testing

To find out the results and reactions of the application built, testing is carried out using blackbox testing techniques. Blackbox testing is the technique most often used to verify and validate the quality of software. The test is a procedure for

executing a program or system to find errors. Software testing is an important activity in the software development life cycle (Nidhra, 2012). The results of testing the application built can be seen in Table 1.

Table 1. Blackbox Testing Result

Unit	System Test	System Reactions	Test Result	Tested by
Login	Entering unregistered accounts	Displays a message that "account is not registered"	Successful	User
	Enter the registered account	Display dashboard page	Successful	User
Create Picket Report	Uploading photo files	Display all photos from media files	Successful	User
	Confirmation of selecting an image	Display selected image	Successful	User
	Enter the date the report was created	Display calendar	Successful	User
	View monthly bills for each account	Displays billing data that has been inputted by the admin	Successful	User
User's Bill	Uploading student result card files in PDF format	Display all PDF files from the file media	Successful	User
	Select the semester of the student result card	Displays semester options 1-12	Successful	User
	Enter school year data	Display the number according to the input	Successful	User

Based on the results of testing using Blackbox testing, the application built can run well. On the Login page, the account that has been registered can be used to log into the application. Furthermore, on the create picket report page, the application can display all photos from the media and successfully save the data into the database on the academic report page, the student result card from the user is successfully stored in the database. Likewise, on the bill information page, the system successfully displays bill data from each user.

In addition to testing with blackbox testing techniques, beta testing is also carried out to describe the external testing

process where the application built is tested on users who will use the application (Tjandra & Pickerling, 2015). The purpose of this test is to provide an opportunity for later review if there are errors in the application being built. Testing in the form of a questionnaire consists of five questions asked to ten dormitory residents. To find out the results of the questionnaire, a comparison of the questionnaire results from the agree and disagree options was carried out. The results of the questionnaire testing can be seen in Table 2.



Table 2. Questionnaire Testing Result

Question	Agree	Disagree
Do you agree that the interface of the monitoring and evaluation application for dormitory residents has an attractive appearance?	6	4
Do you agree that the Dormitory monitoring and evaluation application helps you in reporting picket and academic results?	8	2
Do you agree that the information displayed in the application is informative enough?	8	2
Do you agree that the dormitory resident monitoring and evaluation application helps in making the system more efficient for Lambung Mangkurat South Kalimantan Student Dormitory?	7	3
Do you agree that the monitoring and evaluation application for dormitory residents needs to be developed further?	5	5

The results of the questionnaire test in Table 2 show that the application built can help in reporting and disseminating information at Lambung Mangkurat South Kalimantan Student Dormitory. The monitoring and evaluation application for dormitory residents is also considered quite efficient as a new reporting and information dissemination system.

## CONCLUSION

Based on the results of the research conducted, namely the creation of an android-based dormitory resident monitoring and evaluation application that was successfully implemented at Lambung Mangkurat South Kalimantan Student Dormitory, it can be concluded that the dormitory management can monitor daily picket activities through the dormitory picket report feature, the dormitory management can also monitor the academic results of each dormitory resident through the academic report feature, and the dormitory management can provide information more efficiently by using the cash bill information feature.

Based on the test results from the blackbox testing that has been carried out in Table 1, it can also be concluded that the application built during the research can run well and function properly so that it is ready to be used by dormitory residents. Development suggestions that can be made to make the application built can be even better, such as adding information features, contacting dormitory administrators, and feedback on evaluation results to users after using the application.

## REFERENCES

Abdillah, M. M. F., Sardi, I. L., & Hadikusuma, A. (2023). Analisis Performa GetX dan BLoC State Management Library Pada Flutter Untuk Perangkat Lunak Berbasis Android. *Jurnal Penelitian Informatika*, 1, 73–78. <https://doi.org/10.25124/logic.v1i1.6479>

Agus Suryana. (1996). *Unified Modelling Language*.

Duy, T. B. (2017). *Reactive programming and clean architecture in Android Development*.

Gilvy Langgawan Putra, M., Ihsan Alfani Putera, M., Studi Informatika, P., & Matematika dan Teknologi Informasi Institut Teknologi Kalimantan, J. (2019). *Analisis Perbandingan Metode SOAP dan REST yang Digunakan Pada Framework Flash Untuk Membangun Web Service*.

Hariyadi, S., Suryono, W., Teknik Listrik Bandara, J., Teknik Penerbangan, F., & Penerbangan Surabaya Jl Jemur Andayani, P. I. (2019). *Rancang Bangun Sistem Informasi dan Monitoring Taruna Berbasis Raspberry Pi di Asrama F Politeknik Penerbangan Surabaya*.

Haviluddin. (2011). *Memahami Penggunaan UML (Unified Modelling Language)*.

Herwina, H., Al Bahij, A., & Sutinah, S. (2021). Kecerdasan Naturalis Dan Intention To Act Terhadap Responsible Environmental Behavior Siswa Sekolah Dasar: Natural Intelligence And Intention To Act On Responsible Environmental Behavior Of Elementary School Students. *Tunas: Jurnal Pendidikan Guru Sekolah Dasar*, 7(1), 60–65. <https://doi.org/10.33084/tunas.v7i1.3017>

Kementerian Pendidikan dan Kebudayaan. (1988). *Kamus Besar Bahasa Indonesia*.

Maulana, A., Hasanah, R., & Haidar, A. (2021). Perancangan dan realisasi aplikasi manajemen kegiatan asrama berbasis Android dan RFID. *JITEL (Jurnal Ilmiah Telekomunikasi, Elektronika, Dan Listrik Tenaga)*, 1(2), 123–134. <https://doi.org/10.35313/jitel.v1i2.2021.123-134>

Nidhra, S. (2012). Black Box and White Box Testing Techniques - A Literature Review. *International Journal of Embedded Systems and Applications*, 2(2), 29–50. <https://doi.org/10.5121/ijesa.2012.2204>

Pramesti, A. G., Adrian, Q. J., & Fernando, Y. (2022). Perancangan UI/UX Pada Aplikasi Pemesanan Buket Menggunakan Metode User Centered Design (Studi Kasus: Bouquet Lampung). *Jurnal Informatika Dan*

*Rekayasa Perangkat Lunak (JATIKA)*, 3(2), 179–184.  
<http://jim.teknokrat.ac.id/index.php/informatika>

Siagian, E. K., Mulyana, A., Hartaman, A., & Siagian, E. K. (2020). *Perancangan Sistem Informasi dan Pengelolaan Asrama Putri Universitas Telkom Berbasis Web dan Aplikasi Android*.

Sri Kusuma Aditya, C., Nuryasin, I., Rahmayanti, V., Robby Fathuda, M., & Asrama Mahasiswa Kalimantan Selatan, A. (2019). *Rancang Bangun Sistem Informasi Berbasis WEB Pada Asrama Mahasiswa Kalimantan Selatan (AMKS) Mandastana Malang Menggunakan Arsitektur HMVC (Hierarchical, Model, View, Controller)*. 1(2), 141–150.

Tashildar, A., Shah, N., Gala, R., Giri, T., & Chavhan, P. (2020). *APPLICATION DEVELOPMENT USING FLUTTER*.

*International Research Journal of Modernization in Engineering Technology and Science @International Research Journal of Modernization in Engineering*, 2582–5208. [www.irjmets.com](http://www.irjmets.com)

Tjandra, S., & Pickerling, C. (2015). *Aplikasi Metode-Metode Software Testing pada Configuration, Compability, dan Usability Perangkat Lunak*.

Wildan Audina. (2020). *Rancang Bangun Sistem Piket Kepegawaian Berbasis Web di PT Perusahaan Gas Negara TBK*.