CHAPTER I

INTRODUCTION

1.1 Background

With the development of the era, computer science study programs are increasingly in demand. It can be said that all industrial sectors currently use the services of graduates of this study. One of them is the education sector, at Amikom University of Yogyakarta itself, there are quite a number of services that are carried out using technology such as attendance, tuition payments, etc. However, there are several services that have not been completed using technology, one of which is the new student registration exam computer-based test (CBT) which is still being carried out by being required to attend offline. Even if later this service is available online, of course this will make the service more efficient in terms of time, cost, and flexibility.

Currently the system is in the development stage but is only available for the Android operating system. iOS is the second most used operating system in Indonesia after Android. Based on data from *gs.statcounter* at the end of Q1 2021, this operating system made by Apple has a market share of 8% and is predicted to increase in the future. However, to create iOS-based applications, there are several architectures that can be used, including Model View Controller (MVC), Model View Presenter (MVP), Model View ViewModel (MVVM), and View Interactor Presenter Entity Router (VIPER) [1]. Based on research conducted by Sholichin, Isa, et al. In 2019, which compared the four architectures, it was found that MVVM and VIPER had better results, compared to MVP and MVC, in terms of testability, modifiability and performance. The same thing was also done by Wisnuadhi et al. in 2020 which compares the MVP and MVVM design patterns on the native android application with the results, the MVVM design pattern is better in terms of CPU usage and execution time [2].

Based on the problem above, the author creates a solution, namely the iOS based Amikom Online Exam application. This application aims to help prospective new students of Yogyakarta Amikom University to take online registration exams. With this application registrants or prospective students do not need to come to Amikom University of Yogyakarta, especially when the author is writing this document during the covid-19 virus pandemic. This will be more efficient considering that many prospective students come from outside the island of Java. And this will help reduce the cost of those activities. In building this system, the author uses the MVVM architecture where according to some literature, MVVM has better performance in terms of CPU usage and execution time than other architectures such as MVP, MVC, and VIPER.
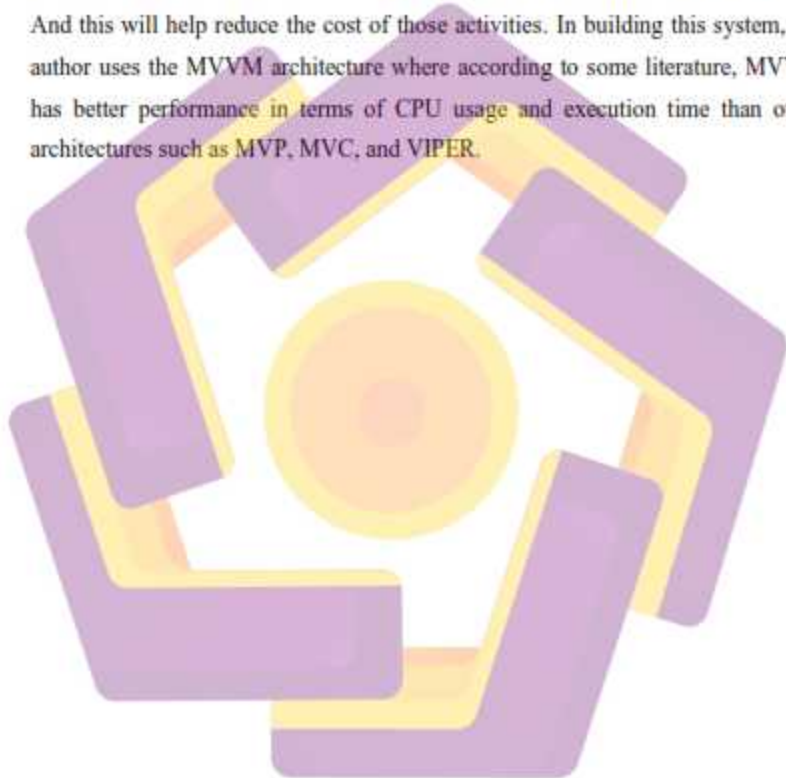
1.2 Problems

Therefore, the question arises, how does the MVVM architecture perform in terms of CPU usage, memory usage, and time of execution. Then how to develop an iOS-based online exam application using the MVVM architecture.

1.3 Problems Limitation

The author makes a limitation of the problem to prevent the scope of the problem from expanding in this study. Here is the problem limitation:

1. iOS-based applications are built using the Swift programming language.
2. The IDE used is Xcode version 12.4.
3. This application can only be used on the iOS platform minimum version 13.
4. The author only uses the MVVM architecture without making comparisons with other architectures.
5. Performance testing used is based on CPU usage, memory usage, and execution time.
6. Iteration of testing for each test case carried out 5 times.
7. The system built only for the side of the test takers (prospective students).

1.4 Research Purpose

The aims and objectives of the research are as follows:

1. As a requirement for graduation for a bachelor's degree final project.
2. Build an iOS-based Amikom Online Exam Application using the swift programming language.

1.5. Research Benefits

The benefit that can be obtained for other researchers is to gain new knowledge about the development of iOS-based mobile applications using the MVVM architecture. Meanwhile, other benefits for prospective Amikom student exam participants are related to time and cost-efficiency.

1.6   Research Methodology

The research method used by the author in the analysis and design of this application, as follows:

1.6.1   Data Collection Method

1. Observation Method

This method is used for observations related to systems that have been built on the Android operating system.

2. Interview Method

Conducted an interview with one of the initiators of the Amikom Online Exam application, namely Mr. Arief Setyanto as Deputy Chancellor 4 of Universitas Amikom Yogyakarta to obtain information related to the application.

3. Literature Method

This method is used in order to obtain information or theoretical concepts using the internet and journals as reference material.

1.6.2   Analysis Methodology

1.6.2.1 SWOT Analysis

SWOT analysis is a method to determine whether a system is feasible or not, by identifying problems with Strength, Weakness, Opportunity, and Threat

1.6.2.2 System Requirements Analysis

System requirements analysis consists of:

1.   Functional Needs

2.   Non-Functional Needs

1.6.2 Development Methodology

The steps in the development of this application using the Waterfall method, which include:

1. Analysis
2. Design
3. Implementation
4. Testing
5. Maintenance

1.6.3 Software Architecture

To design the Amikom Online Exam application. In this study, the author uses the Model View ViewModel (MVVM) architecture.

1.6.4 System Design

The design system used in this research is UML (Unified Modeling Language). There are 2 diagrams in UML, namely Use Case Diagrams to explain the functionality of the system to be created, Activity Diagrams to describe system workflows.

1.6.5 Testing

The testing method used to test the results and functionality of the results of the research conducted. The testing method used is Quality Assurance test-case. This test case is a design or set of steps conducted by a user to ensure that a software's features and functionalities are correct.

1.6.6 Systematics Writing

In the preparation of this thesis, it is necessary to have a writing systematic which consists of interrelated parts so that it can be used as a main reference. The brief description of this arrangement is as follows:

CHAPTER I INTRODUCTION

Contains the background, problem formulation, problem boundaries, research aims and objectives, research benefits, research methods, and writing systematics.

CHAPTER II RELATED WORKS

This chapter contains a description of the theories used and related to this research.

CHAPTER III RESEARCH METHODOLOGY

This chapter contains the analysis of the methods used, to develop IOS Application online examination system.

CHAPTER IV IMPLEMENTATION AND DISCUSSION

This chapter contains a discussion of the implementation of the methods used as well as the analysis and design that has been done previously and testing the results obtained.

CHAPTER V CONCLUSION

This closing chapter contains the conclusions obtained by the author through the previous chapters and answers the problem formulations in chapter 1, as well as suggestions for further research.

REFERENCES

This section contains a list of references that have been used in writing.