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Simple Additive Weighting (SAW) Method for Admission of New Students Entitled to Scholarships at STMIK Logika Medan

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ABSTRACT

New student admissions will certainly be done annually by the university. However, in the process, universities sometimes collaborate in the selection of campus scholars. Based on this, this research was conducted to develop a system for selecting new students who are entitled to receive scholarships at STMIK Logika Medan. The results of this study indicate that: :(a) Having a decision support system using the SAW method can help facilitate campus tasks in determining potential new students to accept; (b) To identify potential new students, they must meet the criteria that have been established; (c) Based on the data test results of 5 prospective new students, it was found that the prospective new student named Syifa Annisa had the highest score. Based on the results of these tests, the built application is able to provide information about the eligibility decision to admit new students;(d)Reporting in the form of sorting the final system results from highest to lowest value can make the resulting population value data easier to read for related parties.

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1. INTRODUCTION

The admission of new students who are eligible to receive scholarships is an important decision-making issue. To determine the admissions of new students eligible to receive scholarships, universities need a method so that the selection of admissions of new students eligible to receive scholarships does not take a long time. The process of admitting new students who are eligible to receive scholarships is an activity that turns data into information.

According to Azhar Susanto (2010), what is meant by an information system is a set of subsystems, both physical and non-physical, which are interconnected with each other and work together harmoniously to achieve an objective. , namely transforming data into useful information. According to Laudon in Azhar Susanto (2013: 52), information systems are components that are interconnected and work together to collect, process, store and disseminate information to support decision-making, coordination, control and to provide an overview of the activities within the company. From the opinions stated above, it can be concluded that an information system is an organized combination of people, hardware, software, communication networks and data sources that collect, transform and disseminate information within an organization. An information system can be defined as a collection of subsystems,

both physical and non-physical, which are interconnected with each other and work together harmoniously to achieve a goal, namely the processing of data into useful information.

Therefore, in order for the calculations on this decision support system to be more accurate, a method is used, namely Simple Additive Weighting (SAW). SAW is also known as the weighted addition method. The basic concept of Simple Additive Weighting (SAW) is to find the weighted sum of performance rankings for each alternative performance across all attributes. The advantage of this method is that the relative order of magnitude of the standard values remains the same (Afshari et al, 2010). With this method, appropriate calculations and criteria will be obtained for the admission of new students who are entitled to scholarships, so that they do not miss the target.

2. RESEARCH METHODE

The system development method is the waterfall model. The waterfall model is a system development technique. The cascade is also known as the linear sequential model and the classical cycle. This cascade provides sequential software steps. In Figure 1, the Waterfall model is illustrated.

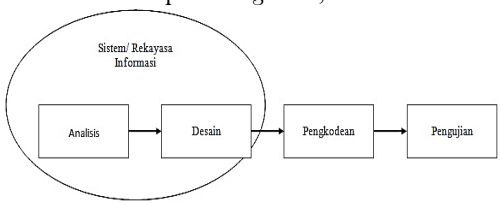

Figure 2.1 Waterfall model

Here are the steps of the waterfall model, namely:

a. Analysis step
   At this point, the authors perform an analysis to identify the necessary user data to be used in the development of a computerized system that can accomplish the tasks required by the user. Problem analysis and system requirements analysis are part of this step.
b. Design stage
   The author creates a system design at this point which will be built before coding. This walkthrough focuses on creating a user interface, which includes use case diagrams, sequence diagrams, activity diagrams, and class diagrams
c. Coding
   Coding is the process of converting a design into a language the computer can understand.
d. Essay
   After the coding step, the authors tested the created system. Tests are performed to identify weaknesses and problems in the system so that they can be repaired.

Then, for data collection, the authors use various techniques to obtain the necessary data, including:

a. Observation (direct observation)
   In this approach, the author goes directly to the place of research to make direct observations, examine problems that arise during the process, and assess the current progress of the process of receiving scholarships.
b. Interview
   In this approach, the author directly questioned the authorities of STMIK Logika Medan on topics related to research, in particular the process of receiving scholarships and the problems that arose.
c. Literature review
   Using this approach, the authors search for theories in journals, books, the internet, and other sources that support this research on how to build applications, system development techniques, and more.

3. RESULT AND ANALYSIS

a. System Implementation

At this stage, the authors proceed to the tests and the implementation of the information system which was built after going through the stages of analysis and design. While testing and implementing new student admission applications, the author uses the required hardware and software. Here are the devices used to test and implement applications, namely:

1) *Hardware*
   a) *Laptop ASUS E402YA*

- *AMD® Carrizo-L APU E2-7015 Processor*
- *Display 14.0" (16:9) LED-backlit HD (1366x768) Glare 60Hz Panel with 45% NTSC*
- *Memory 4 GB DDR3L 1333MHz SDRAM*
- *Hardisk 1 TB*

b) And Other Supporting Hardware.

2) *Software*

a) Windows 10 Home Operating System;
b) XAMPP;
c) PHP Programming Language;
d) Sublime text;
e) MySQL databases;
f) Mozilla Firefox browser;
g) Microsoft Visio;
h) And Other Supporting Software.

b. *Flowchart* Program

This flowchart illustrates the flow of functions that can be performed in the new student admissions application that has been created. The flowchart of the program can be seen in Figure 3.1.

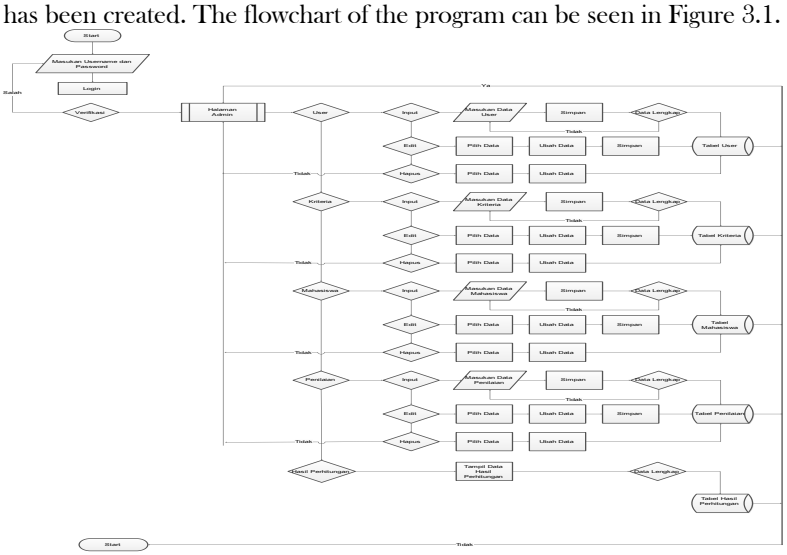

Figure 3.1 Flowchart Program

c. Viewing Community Service Information Application Pages

Page views of app login page view, dashboard page view, user data page view, user data list page view, data page view criteria, view criteria data list page, view student page, view student data list page, view assessment page, view student list page evaluation data, display the evaluation page.

1) Display the login page

On this page, the administrator logs in by entering the specified username and password. The page display can be seen in Figure 3.2.

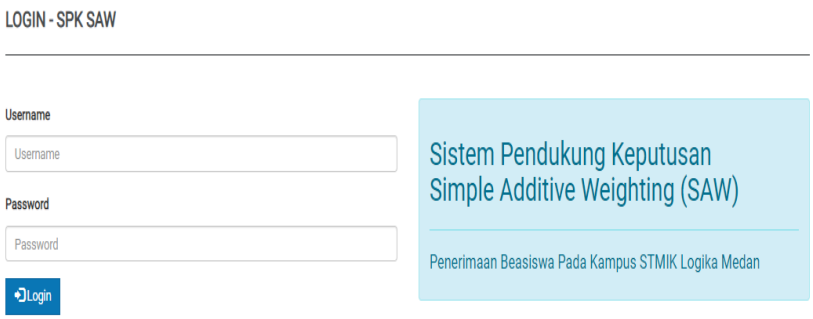

Figure 3.2 Login Page Display

2) Display Dashboard Page
After the admin logs in successfully, the admin can go to the mail archiving application and select the available menu. The page display can be seen in Figure 3.3.

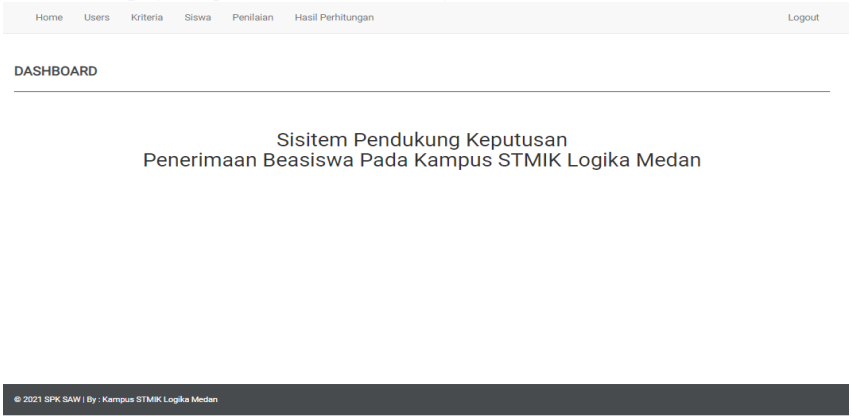

Figure 3.3 Dashboard Page Display

3) View User Data Pages
On this page, the admin can process the user data. The page display can be seen in Figure 3.4.

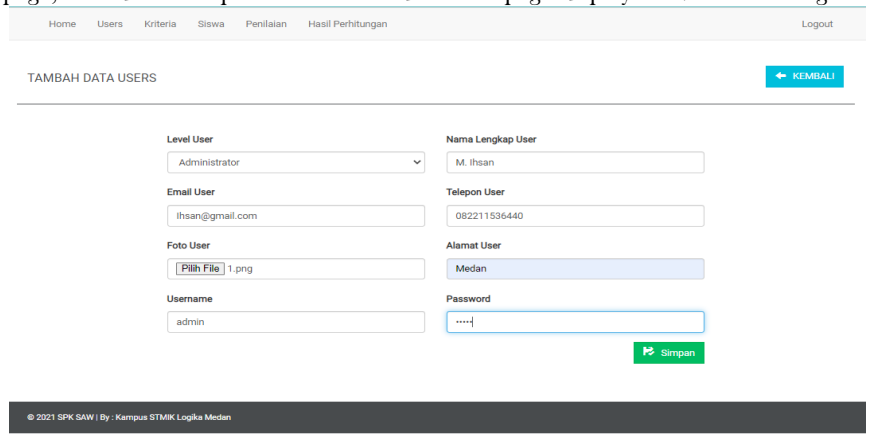

Figure 3.4 User Data Pages Display

4) User data list page display
On this page, the admin can see the user data that has been processed. The page display can be seen in Figure 3.5

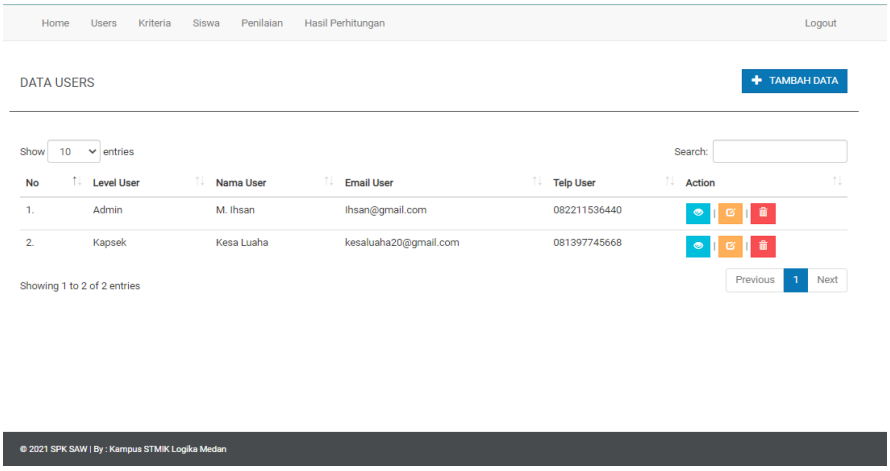

Figure 3.5 User Data List Page Display

5) Criteria Data Page Display
On this page, the admin can edit the criteria data. The page display can be seen in Figure 3.6.

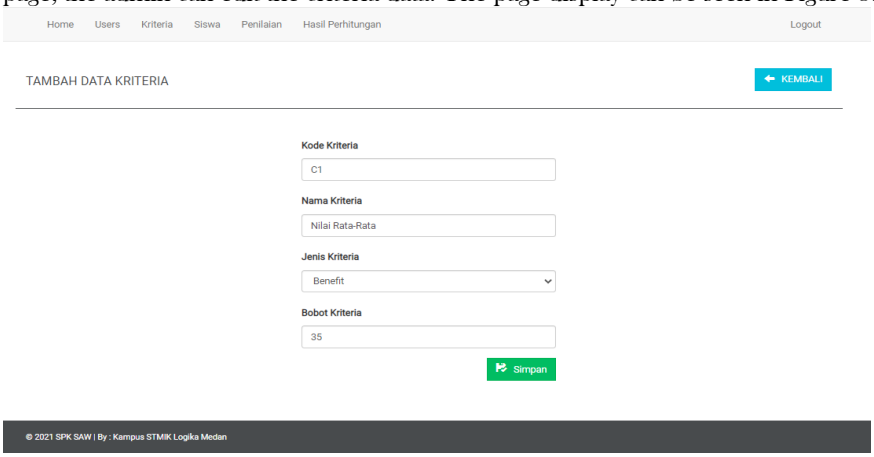

Figure 3.6 Criteria Data Page Display

6) Criteria Data List Page Display
On this page, the admin can see the criteria data that has been processed. The pageviews can be seen in Figure 3.7.

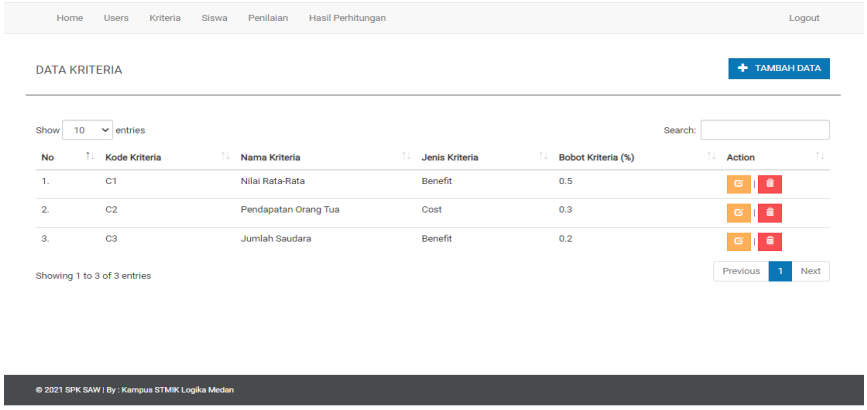

Figure 3.7 Criteria Data List Page Display

7) Viewing Student Data Pages
On this page, the admin can process student data. The pageviews can be seen in Figure 3.8.

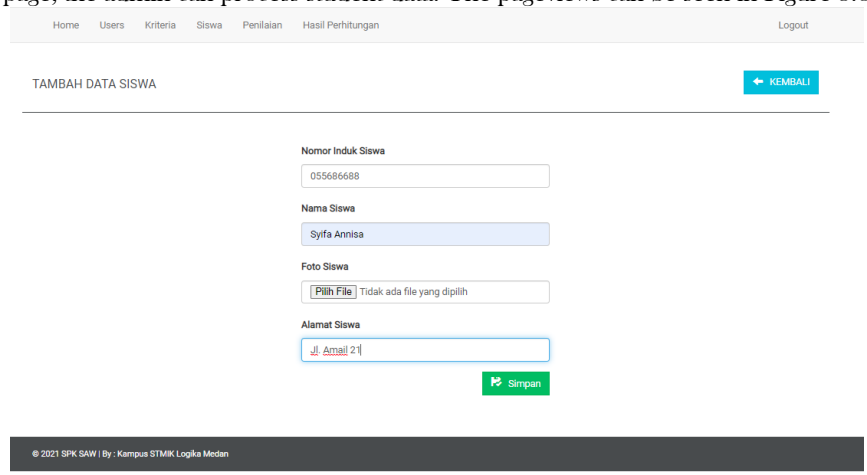

Figure 3.8 Viewing Student Data Pages Display

8) View Student Data List Page
On this page, the admin can see the student data that has been processed. The page display can be seen in Figure 3.9

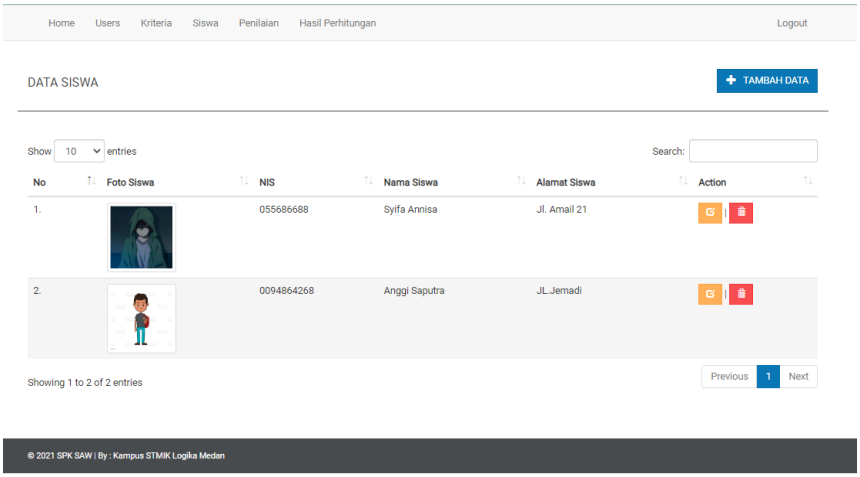

Figure 3.9 View Student Data List PageDisplay

9) Viewing the Rating Data Page
On this page, the admin can edit the rating data. The pageviews can be seen in Figure 3.10

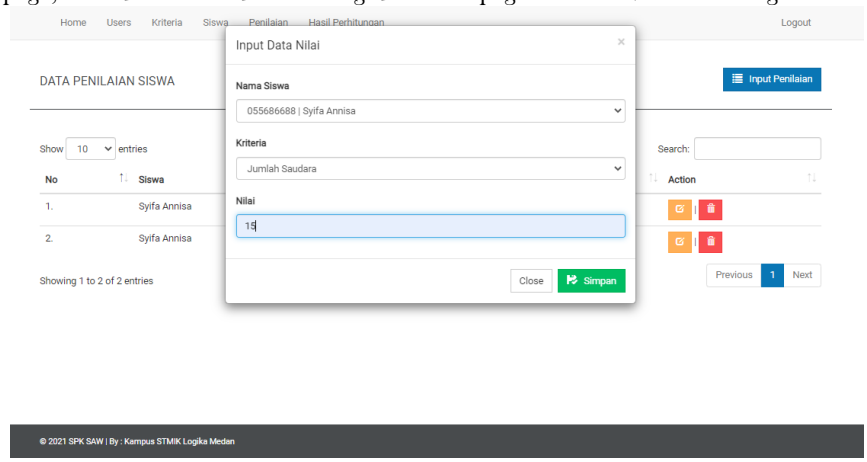

Figure 3.10 Viewing the Rating Data Page Display

10) Displaying the evaluation data list page
On this page, the admin can view the assessment data that has been processed. The page display can be seen in Figure 3.11

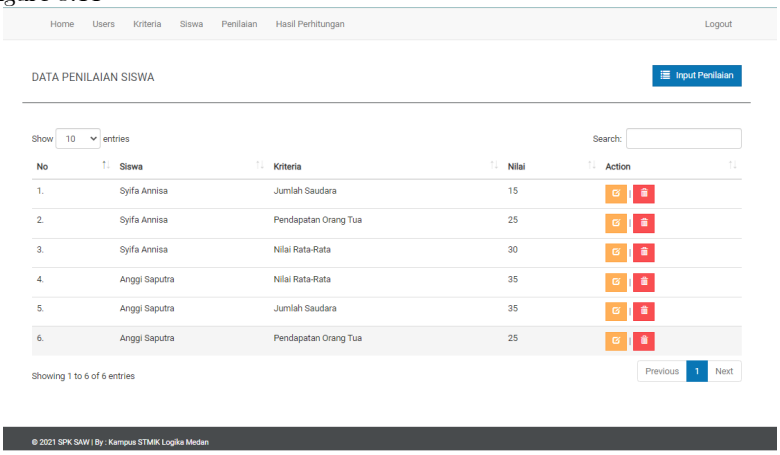

Figure 3.11 Displaying the evaluation data list page

11) Display of calculation result data pages

On this page, the admin can process the calculation result data. The pageviews can be seen in Figure 3.12.

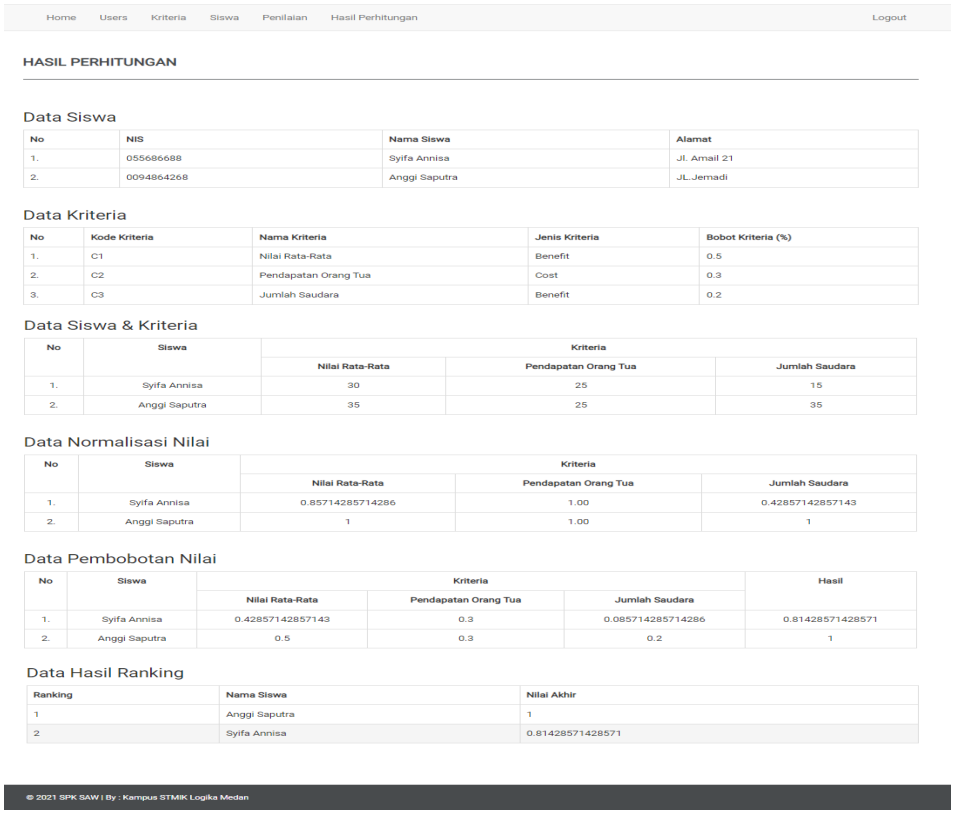

Figure 3.12 Display of calculation result data pages

d. System test

At this stage, the author is testing the payroll application that has been built. Tests are performed on each process contained in the payroll application with pass and fail conditions. The test results can be viewed in Table 3.1.

Table 3.1. Test result

Tested Modules	Testing Procedure	Input	Output	Conclusion
Login Admin	- Open the app - Enter username "admin", password "admin" - Click Login	Username "admin", password "admin"	admin can enter into the application and select the available menu	Succeed
Login Admin	- Open the app - Enter username "admin", password "xxx" - Click Login	Username "admin", password "xxx"	Admin cannot enter into the application	Fail
User Data	- Open the app - Login - Select the Users menu - Enter complete User data - Click input	Complete user data	User data successfully added	Succeed
User Data	- Open the app - Login - Select the Users menu	User data is incomplete	User data failed to add	Fail

	- Clear one of the User data - Click input			
Criteria Data	- Open the app - Login - Select the Criteria menu - Enter the complete Criteria data - Click input	Complete Criteria Data	Criteria data successfully added	Succeed
Criteria Data	- Open the app - Login - Select the Criteria menu - Clear one of the Criteria data - Click input	Criteria data is incomplete	Criteria data failed to add	Fail
Student Data	- Open the app - Login - Select the Student menu. Enter student data in full - Click input	Complete Student Data	Student data successfully added	Succeed
Student Data	- Open the application - Login - Select the Student menu Clear one of the Student data . Click input	Clear one of the Student data	Student Data failed to add	Fail
Assessment Data	- Open the app - Login - Select the Assessment menu Enter the complete Assessment data - Click input	Assessment Data completely	Assessment Data Succeed plus	Succeed
Assessment Data	- Open the application - Login - Select the Assessment menu . Clear one of the Assessment data . Click input	Clear one of the Rating data	Assessment data failed to add	Fail
Results Data Calculation	- Open the app - Login - Select the Results menu Calculations Enter data	Results Data Calculation completely	Come on stage Results Calculation	Succeed

4. CONCLUSION

Based on the description and discussion in previous chapters, several conclusions can be drawn, including the following:

a. Having a decision support system using the SAW method can help facilitate campus tasks in determining potential new students to accept;
b. To identify potential new students, they must meet the criteria that have been established;

c. Based on the data test results of 5 prospective new students, it was found that the prospective new student named Syifa Annisa had the highest score. Based on the results of these tests, the built application is able to provide information about the eligibility decision to admit new students;
d. Reporting in the form of sorting the final system results from highest to lowest value can make the resulting population value data easier to read for related parties.

Based on the research results, several suggestions should be made in order to develop this system for the better, including the following:

a. With the web method of accepting new students to STMIK Logika Medan, it requires knowledge and training for computer operators to execute it;
b. For further research, it is hoped that this system can be developed, not only in manual data collection, but also in filling in the data of students who may be online over time;
c. For the application security system, it is further improved so that it is not easily damaged by other people who are not interested and by people who are not responsible so that data security can be guaranteed and maintained.

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