

Akademi Memandu Suria SibU Management System

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Abstract: *Akademi Memandu Suria SibU* is a driving school founded in 2012 and it is located at Jalan Deshon Timur in SibU. Currently, *Akademi Memandu Suria SibU* is still using a traditional manual-based system that is paper documentation and logbook to manage their data. This has caused several problems and reduces the effectiveness of their management process. Besides, tutors of the driving school faced difficulty in tracking the learning progress and time schedule of the students. Based on these issues, a responsive web-based driving school management system is developed to solve the problem they faced. In this project, the prototype modal is used to develop the *Akademi Memandu Suria SibU* management system. The project is carried out by repeating the building system prototype, testing the prototype, and refining the prototype until the customer's acceptable prototype is obtained. In the system implementation phase, there are 5 main programming languages that are used to create the *Akademi Memandu Suria SibU* management system which are HTML, CSS, PHP, JavaScript, and MySQL. At the end of the project, a responsive web-based *Akademi Memandu Suria SibU* management system is developed and solved the problems faced by *Akademi Memandu Suria SibU*.

Keywords: Management System, Web-Based System, Responsive Web Design, Driving School, Learning Progress Tracker

1. Introduction

Akademi Memandu Suria SibU is a driving school founded in 2012 and it is located at Jalan Deshon Timur in SibU. *Akademi Memandu Suria SibU* has around 80 people of workers, 20 people are staff workers while 60 people are tutors. Currently, *Akademi Memandu Suria SibU* is still using a traditional manual-based system that is paper documentation and logbook to manage their data. This has caused several problems, such as data redundancy and inconsistency, difficulty in data retrieval, and the lack of backup and recovery methods. Besides, the tutors of the driving school also faced difficulty in tracking the learning progress and time schedule of the students.

The objective of this project is to identify the requirement of Akademi Memandu Suria SibU then analyse and the best configuration for Akademi Memandu Suria SibU, to design and implement a responsive web-based driving school management system for Akademi Memandu Suria SibU, and to test and evaluate Akademi Memandu Suria SibU management system to ensure its effectiveness and usability by conducting several real testing cases.

At the end of the project, a responsive web-based driving school management system for Akademi Memandu Suria SibU is developed to solve the problems faced by Akademi Memandu Suria SibU. The website will be developed using web technology such as Html, CSS, JavaScript, etc. The system developed able to provide a user-friendly and effective way in the management of data. The staff workers can easily update, delete, and retrieve the data from the system and insert new data into the system. Besides, the system also provided a backup feature to Akademi Mamandu Suria SibU so that they can recover data when needed. Next, the Akademi Memandu Suria SibU management system has a login mechanism to ensure that only admin, tutors, and students can access the system. The system also can help the tutor to track the learning progress of their student while students can view and adjust their tuition time through the system. Furthermore, the student can make their tuition fee payment through this system and the system will generate the invoice for the student after the payment is done. The system also records the car exam result of the student and notices their tutors about the result.

2. Literature Review

2.1 Computerized Management System

A computerized management system is a digital-based system on electronic devices that help to maintain a database of information about an organization's maintenance operations. [1] These computerized management systems are designed to simplify complex work and help workers do their jobs more effectively. Besides, using a computerized management system also help for keeping a record, track and complete the works in a timely and cost effective manner. [2]

The core of the computerized management system is its database. [3] The database of a computerized management system is a data model that able to organize and manage all data in a good manner. These databases must be specially designed for different fields and organizations to meet their requirement and needs.

In the Akademi Memandu Suria SibU management system, the administrators and staff of Akademi Memandu Suria SibU can easily and effectively manage the data of students, workers, and tutors. A database that fit the requirement of Akademi Memandu Suria SibU is developed to store and manage all data. The administrators can create, read, update, and delete data from the database through the system.

2.2 Schedule

The word schedule in Cambridge Dictionary mean a list of planned tasks or works to be done showing the times when they are intended to happen. [4] A schedule is a time management tool, usually in the form of a timetable listing all the activities that are planned to be carried out at a specific time.

Scheduling, the verb of schedule, is the process of creating a schedule. This process includes deciding how to order different tasks and how to commit limited resources between a variety of tasks in the best way. [5]

In the Akademi Memandu Suria SibU management system, a scheduling feature is developed for tutors and students. Tutors and students can use this feature to arrange their training time efficiently. Tutors do not need to contact each student to confirm the schedule, and the student can easily arrange their lesson according to the tutors' free slot show in the system.

2.3 Online Transaction

An online transaction is a password protected payment method that authorizes a transfer of funds over the Internet. [6] This transaction must comply with the strict regulations set by the banking and financial regulations of the country or region. Currently, most of the online transaction done by credit and debit card, online banking, and mobile wallet.

Akademi Memandu Suria SibU management system provides students with online transaction functions, which allow them to make the payment through online banks and mobile wallets. After the payment made, the system will then generate an invoice for the student.

2.4 Responsive Web Design

Responsive web design is the approach that allows the website to be designed and developed in order to respond to the user's environment such as the screen size, orientation, and the platform of the user's device. [7]

Responsive web design uses the same copy of HTML and CSS code that able to automatically resize, display, hide or enlarge the element on the website, to make it look good on all devices. [8] The CSS code in the HTML page renders the web page with a different display and view of contents on all devices when the page is received from the server.

A meta tag with attributed name equal to viewport, `<meta name="viewport" content="width=device-width, initial-scale=1.0">`, is used to signal to browsers that the webpage adapts to all devices. This meta tag is able to give the browser the information of the device width and instruct the browser to adjust the dimensions and scaling of the page to the width of the device. [9]

2.5 Current Process of Akademi Memandu Suria SibU Management System

Currently, Akademi Memandu Suria SibU is using a traditional manual-based system that is paper documentation and logbook to manage their data. The administrators and staff of Akademi Memandu Suria SibU must spend a lot of time manually archiving all documents so that the data can be kept in good condition. Besides, tutors of Akademi Memandu Suria SibU also have to manually contact each student to plan the time schedule. To make payment of tuition fees, students must go to the counter and pay in cash or credit card.

2.3 Study of Unisex Driving Academy Management System [10]

Unisex Driving Academy is a driving school established in 1987 and is located in Kawasan Perindustrian Nilai, Negeri Sembilan. Unisex Driving Academy management system is developed for Unisex Driving Academy to promo their course, publish information, and manage students. Students can register for an account on the registration page of the website, select the desired course, and then pay through the system. In addition, students can also leave a message to the staff of the Unisex Driving Academy if they need any inquiries.

2.4 Study of Perfect Driving Academy Management System [11]

Unisex Driving Academy is a driving school founded by Dato' Sri Lim Kok Han in 2007. It has nine branches located in Klang Valley, Subang Jaya, Petaling Jaya, Puchong, Seri Kembangan, and Kuala Lumpur. Perfect Driving Academy Management System is developed to manage students of Perfect Driving Academy and serve as a portal to promote its courses. Students can visit the site to register an account and view the latest course information on it. After registering on the register page, students will get an account to log in to the system. Students can then choose a course package and pay the course fee to start the driving training.

2.5 Study of Metro Driving Academy Management System [12]

Metro Driving Academy is a driving school established in 1998. It has two branches located in Petaling Jaya and Puchong. Metro Driving School management system is developed to serve as a portal to promote its courses. Students can only register for courses on the course registration page of the system. Therefore, there is no user login function in the system. The system will receive student registration information and store it in the database to simplify the subsequent process.

2.6 Comparison Table of Related Existing Systems

Table 1 shows the comparison between Unisex Driving Academy Management System, Perfect Driving Academy Management System, and Metro Driving Academy Management System.

Table 1: Comparison Table of Existing Systems

Features/System	Unisex Driving Academy Management System	Perfect Driving Academy Management System	Metro Driving Academy Management System
User Login	√	√	X
User Account Registration	√	√	X
Course Registration	√	√	√
Notice and Promotion	√	√	√
Data Management	√	√	X
Online Payment	√	√	X
Payment Invoice	√	X	X
Time schedule	X	X	X
Learning Progress Tracker	X	X	X
Student Exam Record	X	X	X
Chat Box	√	X	X
Platform	Web-based	Web-based	Web-based

3. Methodology

3.1 Prototype Model

In this project, prototype model is used to develop the Akademi Memandu Suria Sibul management system. The prototyping model is a software development model in which a prototype is built, tested and then reworked as necessary. [13] This process will be repeated and repeated until the customer's acceptable prototype is obtained, so that a complete system or product can be developed. The main purpose of the prototyping model is to satisfy the customer's needs and requirements. [14] To acquire this purpose, an iterative, trial-and-error process will take place between the developers and the users.

The prototyping model is the best choice among other software development models when the project requirements are not well known in detail ahead of time. The prototyping model allows customers to actively participate in software development. Therefore, developers can get more feedback and gain a better understanding of the customer's needs in the initial stage of software development. When the customer evaluates the prototype, many errors and missing features can be identified, which can reduce the risk of project failure. [15]

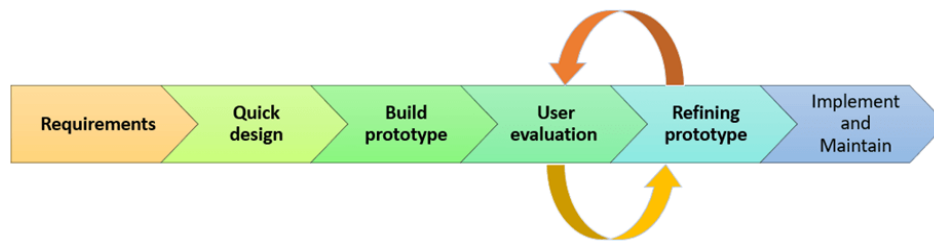


Figure 1: Phases of Prototyping Model [15]

Figure 1 show the phases in the prototyping model. There are 6 main phases in the prototyping model. These phases are requirement gathering phase, quick design phase, build prototype phase, user evaluation phase, prototype refinement phase, and system implementation and maintenance phase.

The prototyping model starts with the requirement gathering phase. The customer’s requirements and need will be collected and analysed under this phase. After gathering and analysing the project requirement, a quick design is taking place to create a brief idea of the system for the user. Next, an actual prototype is designed and create based on the information gathered from previous phases. The prototype is then presented to the customer for the initial evaluation. [15] If the customer is not satisfied with the prototype, the prototype needs to be refined according to their feedback and suggestions. These phases (quick design phase, build prototype phase, customer evaluation phase, and prototype refinement phase) will be repeated and repeated until all the requirements specified by the customer are met.

Once the customer is satisfied with the prototype, the final system is then designed and implemented based on the final prototype accepted by the customer. In the system implementation phase, the development and construction activities of the final system such as system coding, system debugging, and system testing will begin. When the system is completed, the system is delivered to the customer. After the system delivered to the customer, the system still has to be maintained and updated from time to time to increase and keep the performance of the system.

3.2 System Development Workflow

There is a total of six phases from the prototype model. As shown in Table 2, each phase has its own assignment and output that need to produce during the entire project development. Besides that, the output had been completed within the specific days that have been given.

Table 2: Software development activities and their task

Phase	Task	Output
Requirement Phase	<ul style="list-style-type: none"> • Gather and analyse the collected user requirement • Create user requirement document 	<ul style="list-style-type: none"> • System flow chart • Questionnaire • User requirement document
Quick Design Phase	<ul style="list-style-type: none"> • Perform quick design • Draw context diagrams, data flow diagrams, and entity relationship diagrams • Design database 	<ul style="list-style-type: none"> • Context diagram • Data flow diagram • Entity relationship diagram
Build Prototype Phase	<ul style="list-style-type: none"> • Construct the prototype system • Create GUI of the system 	<ul style="list-style-type: none"> • Prototype System
User Evaluation Phase	<ul style="list-style-type: none"> • Present the prototype system to the customer • Collect the feedback and suggestion from the customer • Refine the user requirement 	<ul style="list-style-type: none"> • Refined user requirement document

Refining Prototype Phase	<ul style="list-style-type: none"> • Refine the prototype system 	<ul style="list-style-type: none"> • Refined prototype system
Implementation and Maintain Phase	<ul style="list-style-type: none"> • Writing code • Debugging • Develop database • Installation of system • Planning test cases • Execute the test cases • System maintenance 	<ul style="list-style-type: none"> • System database • Test cases report • Stable and final version of system

3.2 Programming Language

The programming languages that are used in the development of web-based systems are Html, CSS, PHP, and JavaScript. Next, the database used in the system is MySQL. Table 3 shows the programming languages that are used in system development.

Table 3: Programming Language used in Development

Platform	Programming languages
Web	<ul style="list-style-type: none"> • Html - Html is a markup language that used to make up the layout and structure of the website. It can be considered as the skeleton of the website. [16]
	<ul style="list-style-type: none"> • CSS - CSS is a markup language used to style a website. This language describes how the website is presented and adds a variety of styles (background, font, layouts, etc.) [16] to make Html webpages more beautiful and attractive.
	<ul style="list-style-type: none"> • Php - Php is a server-side scripting language used to make dynamic and interactive Web pages. Php offers plenty of frameworks and it is quite easy to use in developing website. [17]
	<ul style="list-style-type: none"> • JavaScript - JavaScript is a front-end language used for creating and developing interactive and user-friendly websites. [17] JavaScript is capable of achieving several things including controlling the browser, editing content on a document that has been displayed, allowing client-side scripts to communicate with users and also asynchronous communication. [18]
Database	<ul style="list-style-type: none"> • MySQL - MySQL is a popular open-source and cross-platform relational database management system (RDBMS) that is supported by Oracle. With its proven performance, reliability and ease-of-use, MySQL has become the leading database choice for web-based applications. [19] Besides, MySQL supports many programming languages (C, Java, JavaScript, PHP, and Python), [20] so developer have more selection to choose the language that they are more familiar with.

4. Analysis and Design

4.1 Functional Requirement Analysis

Table 4 show and describe the modules included in the Akademi Memandu Suria Sibu management system. In the table below, there are nine main modules include login module, create account module,

manage account module, view account details module, exam record module, payment mechanism module, payment record module, learning progress tracker module, and time schedule module.

Table 4: Functional Requirement of the proposed system

No.	Modules	Describe
1.	Login	<ul style="list-style-type: none"> The system should allow admin, tutors, and student of Akademi Memandu Suria SibU login into the system using their credentials.
2.	Create account	<ul style="list-style-type: none"> The system should only allow admin to create the account for staffs. The system should allow staff to create the account for tutors and students. The system should not allow tutors and students to create account by themselves.
3.	Manage account	<ul style="list-style-type: none"> The system should allow admin, staffs, tutors, and students to manage and update their account profile. The system should allow admin, staffs, tutors, and students to change their account password.
4.	View account details	<ul style="list-style-type: none"> The system should only allow admin to view all users account details include staffs, tutors, and students. The system should allow staffs can only view the account details of tutors and students.
5.	Exam record	<ul style="list-style-type: none"> The system should allow staff to insert the exam result of the student into the system The system should allow tutor to view the exam result of their students. The system should allow student to view their own exam result.
6.	Payment mechanism	<ul style="list-style-type: none"> The system should allow students to make their tuition fee payment through the system The system should auto-generate the invoice to the students after the payment made.
7.	Payment record	<ul style="list-style-type: none"> The system should allow admin and staffs to view and check the payment history of students.
8.	Learning progress tracker	<ul style="list-style-type: none"> The system should allow tutors to update their teaching progress to the system. The system should allow tutors to make comment for their students. The system should allow students to view their learning progress and their tutor comment.
9.	Time schedule	<ul style="list-style-type: none"> The system should allow tutors and students to view their time schedule. The system should allow tutors to set their available time into the system. The system should allow students to book their learning time schedule. The system should allow students to make change on their time schedule.

4.2 Non-Functional Requirement Analysis

Table 5 show and describe the non-functional requirement include in the Akademi Memandu Suria SibU management system. In the table below, there are five main non-functional requirements, that are performance, reliability, usability, security, and cultural and political.

Table 5: Non-Functional Requirement of the proposed system

No.	Non-functional requirement	Describe
1.	Performance	<ul style="list-style-type: none"> • The system should ensure the interaction between the user and the system does not exceed more than 2 minutes. • The system should be able serve up to 500 users at a time.
2.	Reliability	<ul style="list-style-type: none"> • The system should allow user to access it 90% of the time without failure.
3.	Usability	<ul style="list-style-type: none"> • The system should provide user friendly interface. • The system should be easily to use.
4.	Security	<ul style="list-style-type: none"> • The system should be able to work on any web browser and devices. • The system should only allow user with credentials to access the system. • The system should only allow admin and staff to create account. • The system should encrypt and salt the password of the accounts.
5.	Cultural and Political	<ul style="list-style-type: none"> • The system should not contain any icons that could be considered offensive in any market country.

4.3 User Requirement Analysis

User requirement analysis is a process of defining what can a user able to do with the system. Table 6 shows the user requirement of the proposed system. The table shows the ability of all users include admin, staff, tutor, and student in the system.

Table 6: User Requirement of the proposed system

No.	User Requirement
1.	Admin, tutors, and student of Akademi Memandu Suria Sibuh are able to login into the system using their credentials.
2.	Admin can create the account for staffs.
3.	Admin and staff can create the account for tutors and students.
4.	Tutors and students are not allowed to create account by themselves.
5.	Admin, staffs, tutors, and students can manage and update their account profile.
6.	Admin, staffs, tutors, and students can change their account password.
7.	Admin can view all users account include staffs, tutors, and students.
8.	Staffs can view the account of tutors and students.
9.	Admin and staff can insert the exam result of the student into the system.
10.	Tutor can view the exam result of their students.
11.	Student only can view their exam result.
12.	Students can make their tuition fee payment through the system.
13.	Students will receive an auto-generated invoice after the payment.
14.	Admin and staffs can view and check the payment history of students.
15.	Tutors can update their teaching progress to the system.
16.	Tutors can make comment for their students.
17.	Students can view their learning progress and their tutor comment from the system.
18.	Tutors and students can view their time schedule through the system.
19.	Tutors can set their available time into the system.
20.	Students can use the system to book their learning time schedule.
21.	Students can make change on their time schedule.

4.4 Use Case Diagram

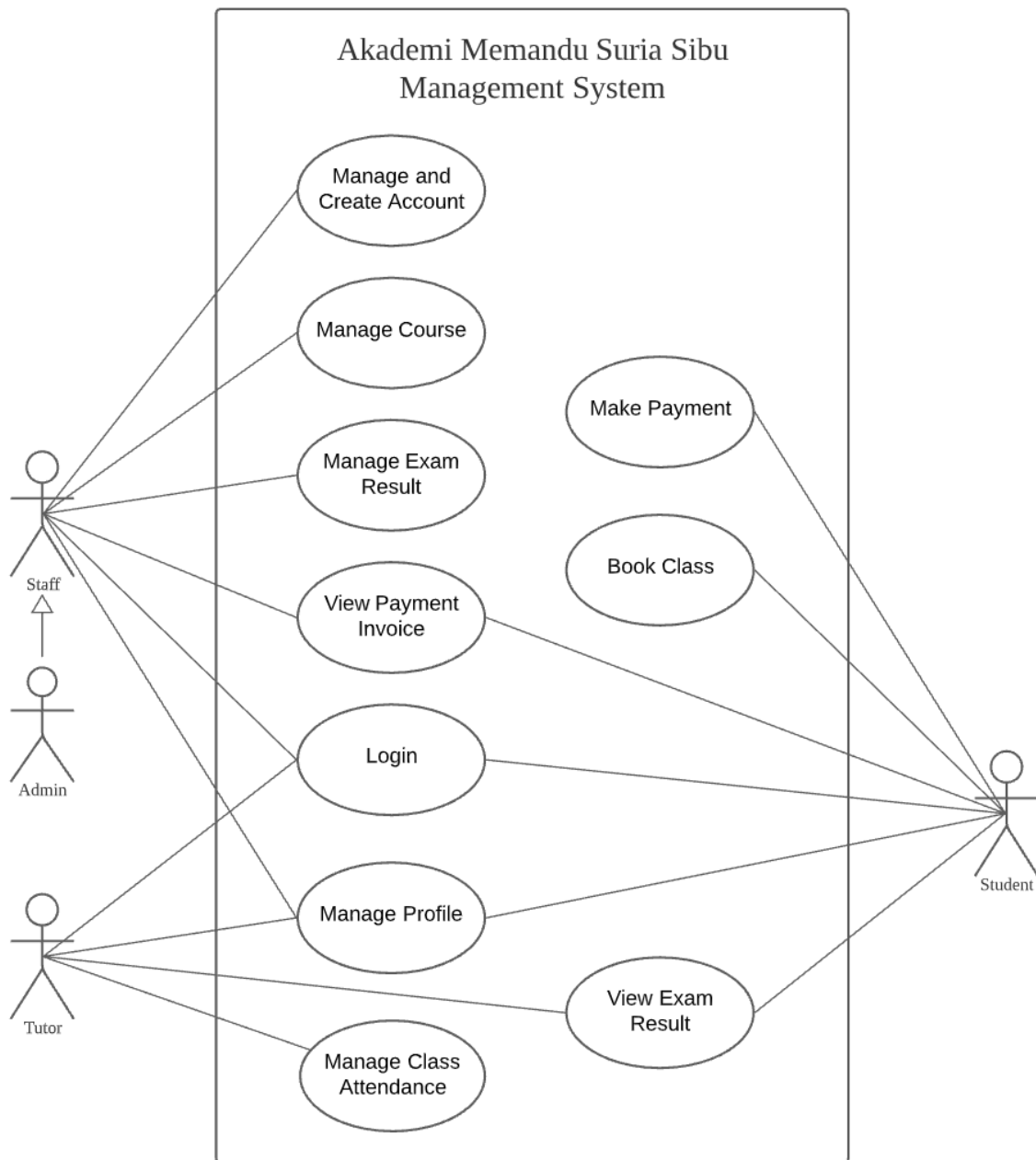


Figure 2: Use Case Diagram of Akademi Memandu Suria SibU Management System

Figure 2 above shows the use case diagram of Akademi Memandu Suria SibU Management System. In this figure, there are four entity which are, admin, staff, tutor, and student. From the figure, the staff and admin can login to the system, manage their profile, manage and create account, manage the course, manage exam result, and view payment invoice. Tutor in this system is able to login, manage their profile, manage class attendance, and view student exam result. For the students, they are able to login, manage profile, book class, view exam result, and make a tuition fee payment.

4.5 Context Diagram

Figure 4 shown in **Appendices A** shows the context diagram of Akademi Memandu Suria SibU management system. The context diagram of Akademi Memandu Suria SibU Management System contains four main entities include Admin, Staff, Student, and Tutor. The figure illustrates the information flows between the entities and the proposed system.

4.6 Data Flow Diagram Level 0 (DFD 0)

Figure 5 shown in **Appendices B** shows the Data Flow Diagram Level 0 of Akademi Memandu Suria Sibul management system. The diagram shows the overall data flow between four entities of the system (Admin, Staff, Student, Tutor), the system process, and the data stores of the system. There is nine system process and data stores show in the diagram. The nine main system processes are the create account, login, view and manage account information, insert and view student exam result, make payment, view student payment, update teaching progress, view student learning progress, and view and set time schedule. The nine data stores are staff, tutor, student, admin, student exam, payment, student progress, tutor time schedule, and student time schedule. The view and manage account information

4.7 Entity Relationship Diagram (ERD)

An Entity Relationship Diagram (ERD) is a structural diagram use in database design to show the relationship of the entities in the database. Figure 6 shown in **Appendices C** shows the Entity Relationship Diagram (ERD) of Akademi Memandu Suria Sibul management system.

In Figure 6, there are nine entities which are Account, Staff, Tutor, Student, Course, Student-Course, Class, Student exam, and payment. Each of the entity above has its own attributes which describe the content property or characteristic of the entity that holds it. Besides, the diagram above also shows the relationship between each entity. This relationship on the entity shows how an entity associates with another entity.

4.8 Flowchart

A flow chart is a type of diagram that represents a workflow or process. The flowchart is drawn to visualize the workflow and process of the module in the proposed system. In this part, several flowcharts are drawn by using Lucidchart and these flowcharts are then discussed. Figures 7 to 9 are appended in **Appendices D**.

Figure 7 shown in **Appendices D** shows the flowchart of the Login module in the Akademi Memandu Suria Sibul management system. This module is available for all users in the system include system admin, staff, tutor, and student. Staff should request an account from the admin while the tutor and student should request an account from the staff. After that, users should input their login credentials into the system. The system will check and validate the login request. If the login credentials are valid, the system will proceed with login process otherwise the system will show an error message to the users.

Figure 8 shown in **Appendices D** shows the flowchart of the Time Schedule Module. This module allows the tutor and student to manage and view their time schedule. First, both tutor and student should log into the system in order to use this module. After login, the tutor can insert their available teaching time into the system. Then, students can view their tutor available teaching time and make their class reservation.

Figure 9 shown in **Appendices D** shows the flowchart of the Payment Module. The payment module should allow the students to make their payments. First, the students have to log in to the system. Then, the students have to open the payment page and view their bills. If there is an unpaid bill, students are able to view the bill details and input their payment information. After the students submit the payment information, the system will validate the information received. If the information inputted is valid, the system will show a payment success message otherwise the system will display an error message.

5. Implementation and Testing

5.1 Implementation

In the implementation phase, the coding of the proposed system is done. The Apache server is used during implementation in order to host the developed system. Besides that, four main programming languages are used to develop the prototype system which are Html, CSS, Php, and JavaScript. MySQL is the database which used in this proposed system to store the system data. Figure 10 to 12 shown in the **Appendices E** shows the screenshot of the system interface.

5.2 Testing

In this project, two types of testing are performed which are unit testing and user acceptance testing. Unit testing is performed during the system development in order to test individual units or component work as expected. User acceptance testing is then performed after the implementation of the system is completed. There are total of five end users who took the user acceptance test which are one admin, one staff, two tutor, and one student. Figure 3 below shows the bar chart of the user acceptance testing result.

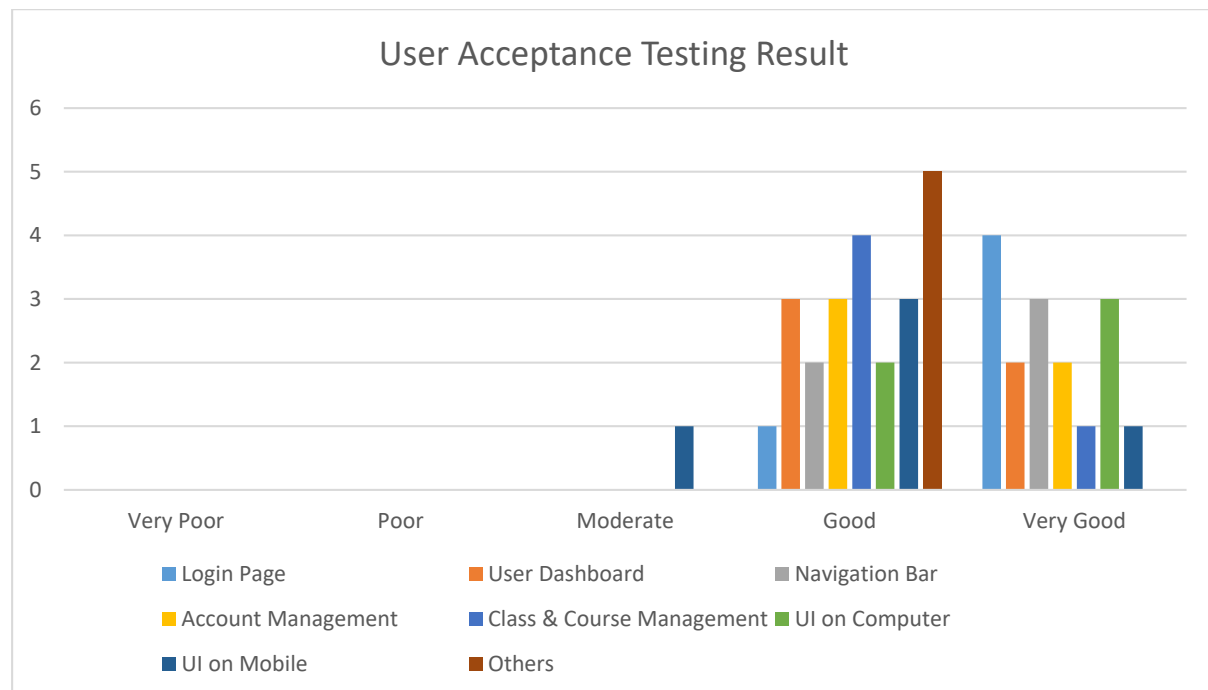


Figure 3: Bar Chart of User Acceptance Testing Result

6. Conclusion

In this project, a responsive web-based driving school management system for Akademi Memandu Suria Sibul is developed. There are several advantages that the proposed system provides to for Akademi Memandu Suria Sibul. One of the main advantages of the Akademi Memandu Suria Sibul Management System is that it allows the tutors of Akademi Memandu Suria Sibul to track the learning progress of the student. Besides, the tutors can also view their class timetable that auto-generated from the system. The students of Akademi Memandu Suria Sibul are able to make a class booking and make a tuition fee payment through the system. Furthermore, the system also records all the payments made by the student and auto-generates the payment invoice for the student. For the admin and the staff of Akademi Memandu Suria Sibul, they are now able to manage the data in the driving school more efficiently through the proposed system. Moreover, the Akademi Memandu Suria Sibul Management System provides a responsive user interface so that the system can be worked fine on any device.

In a conclusion, all of the objectives of this project have been successfully achieved and the proposed system can be function well on any device. Besides, the proposed system had solved the problems faced by the Akademi Memandu Suria SibU and help the users to manage their data include user account, course, class, and payment more efficiently.

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Appendices A

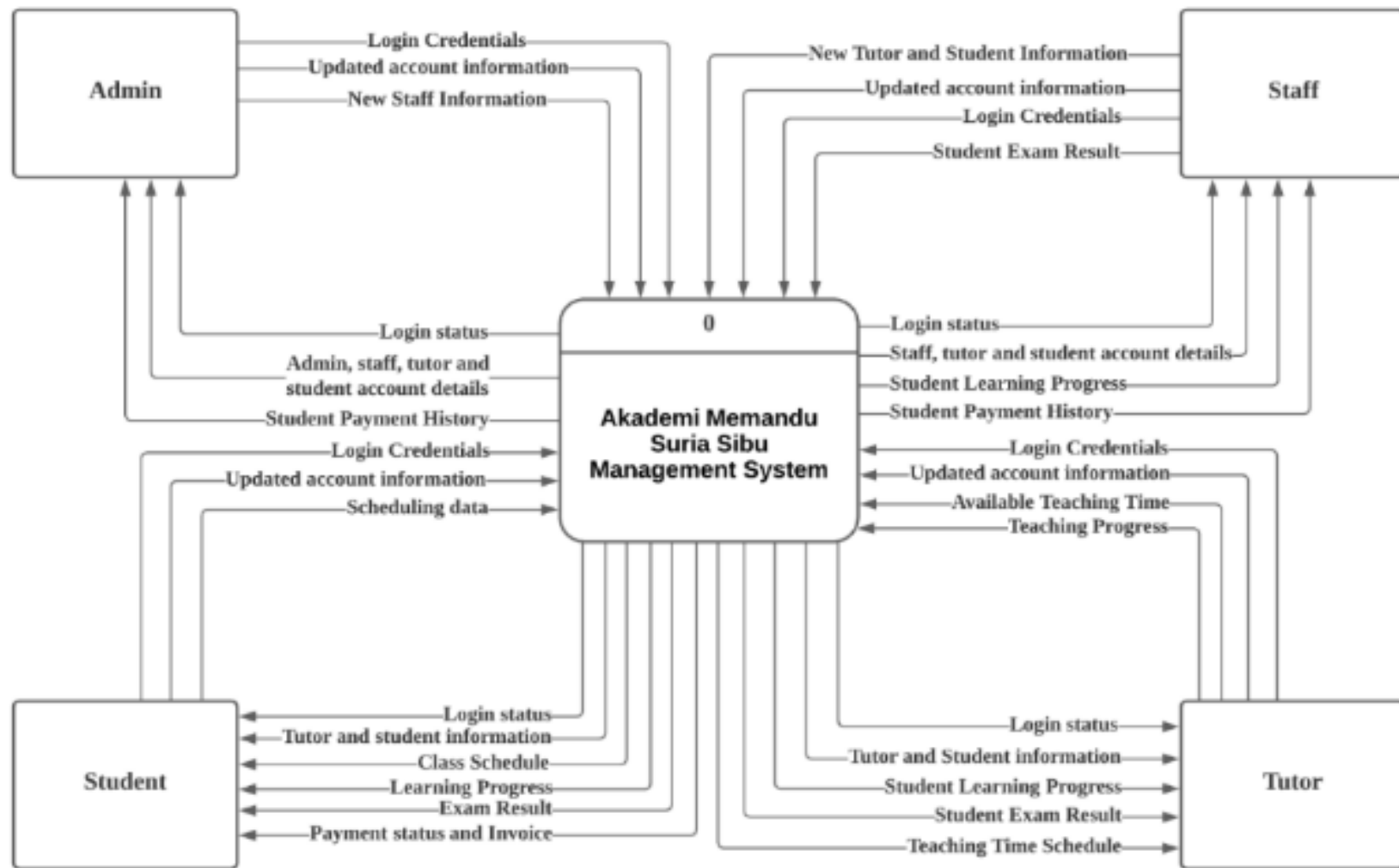


Figure 4: Context Diagram of Akademi Memandu Suria SibU Management System

Appendices B

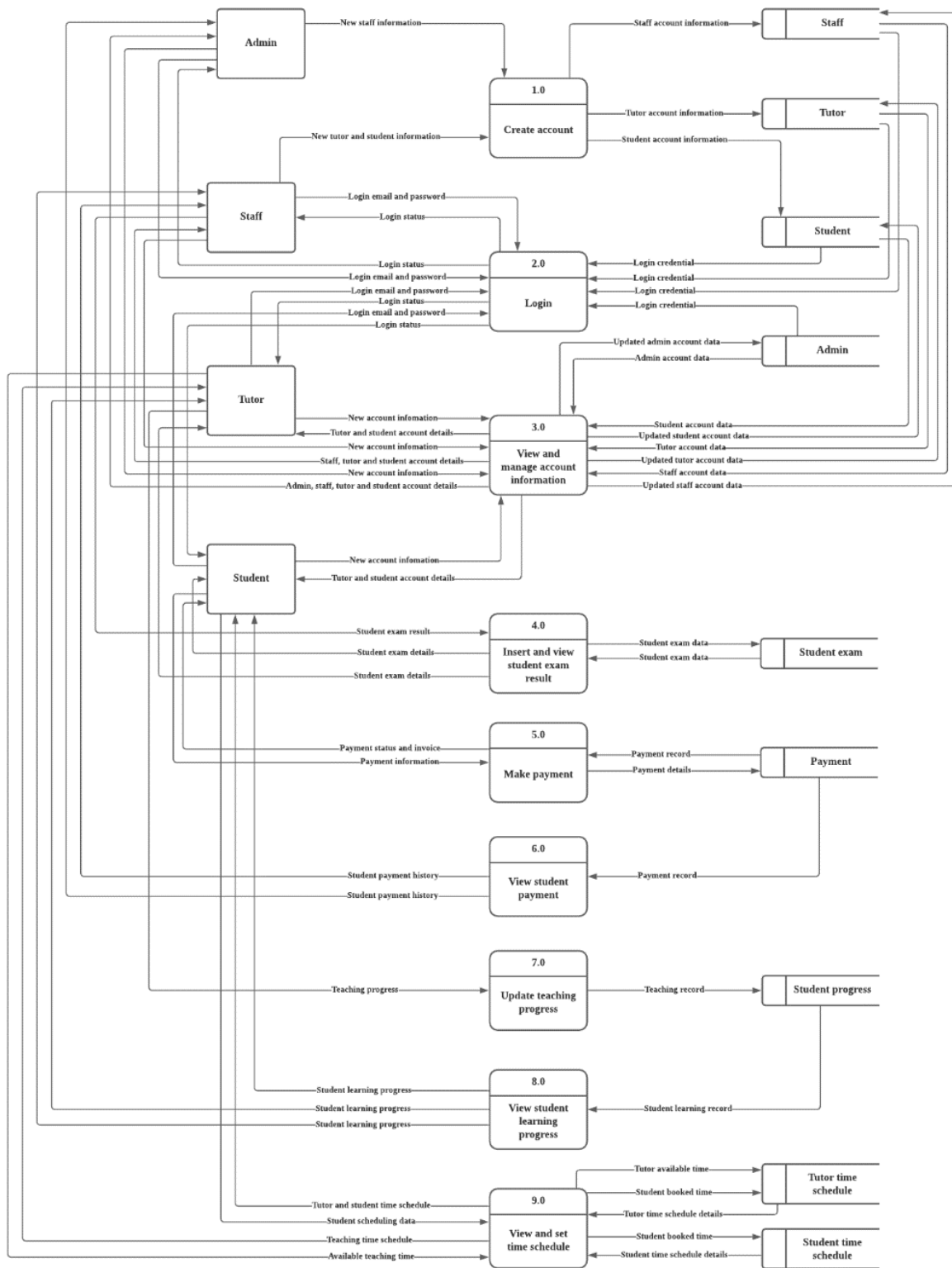


Figure 5: Data Flow Diagram Level 0 (DFD 0) of Akademi Memandu Suria Sibu management system

Appendices C

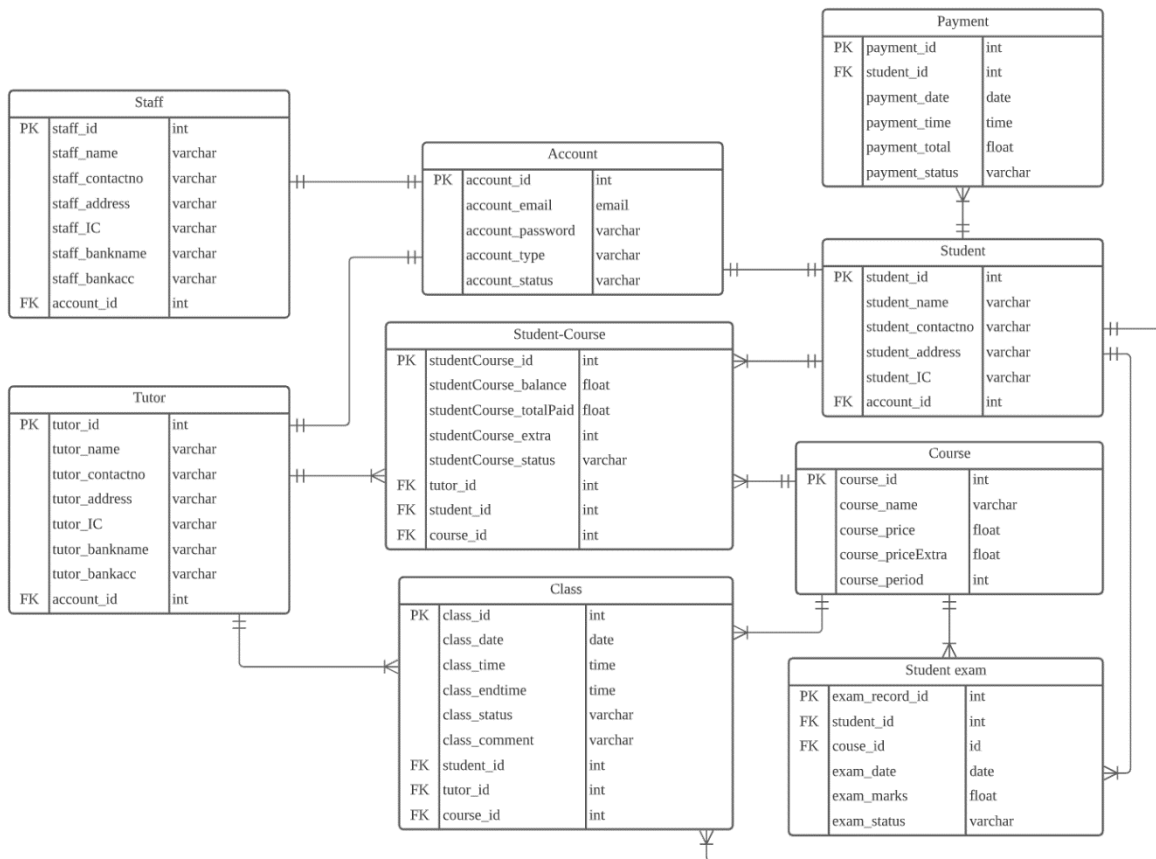


Figure 6: Entity Relationship Diagram (ERD) of Akademi Memandu Suria SibU Management System

Appendices D

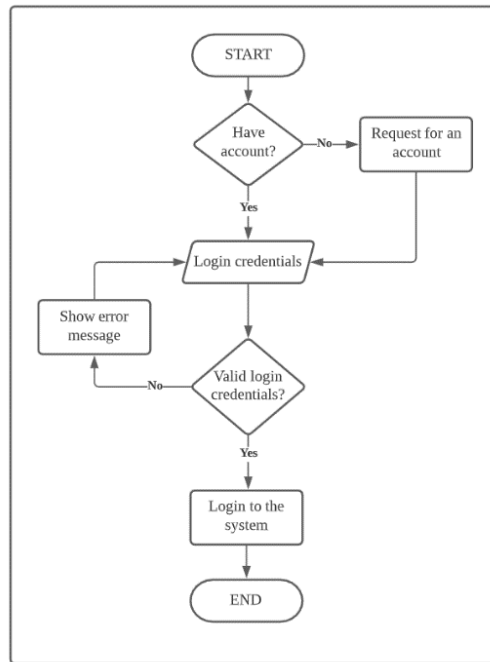


Figure 7: Flowchart of Login Module

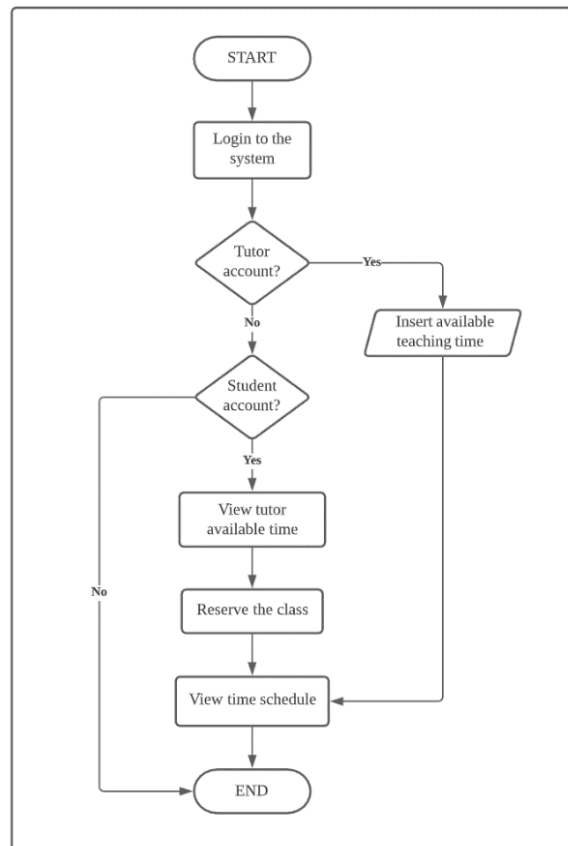


Figure 8: Flowchart of Time Schedule Module

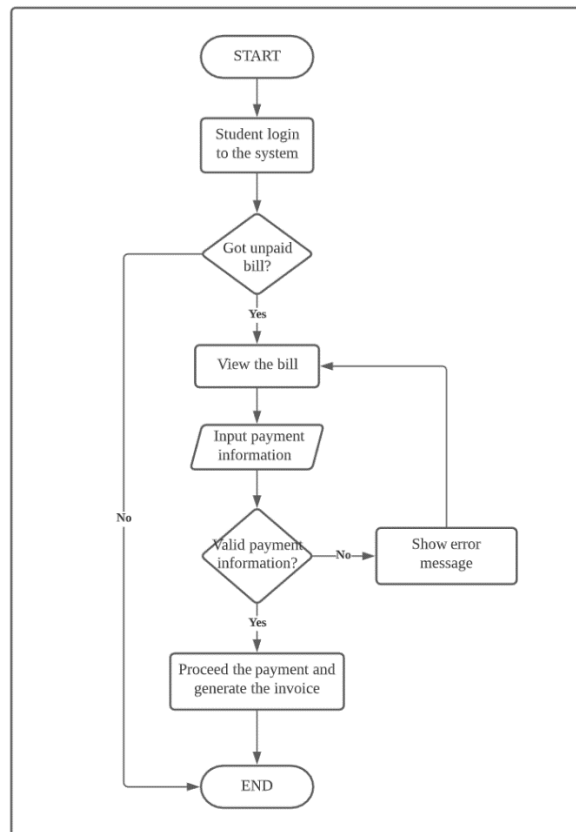


Figure 9: Flowchart of Payment Module

Appendices E

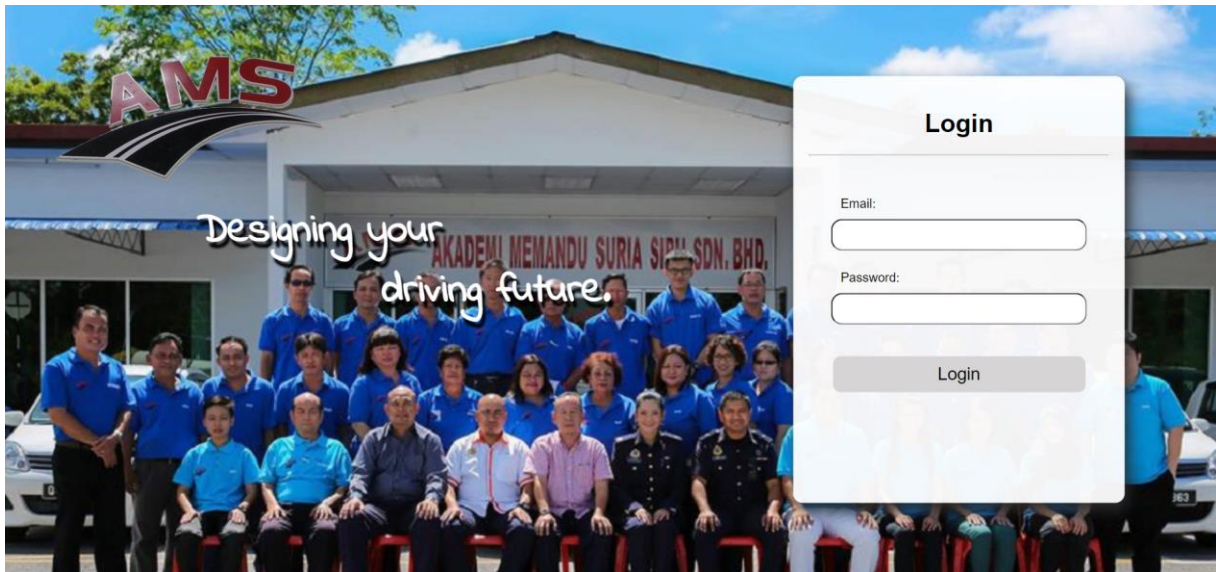


Figure 10: Interface of Login

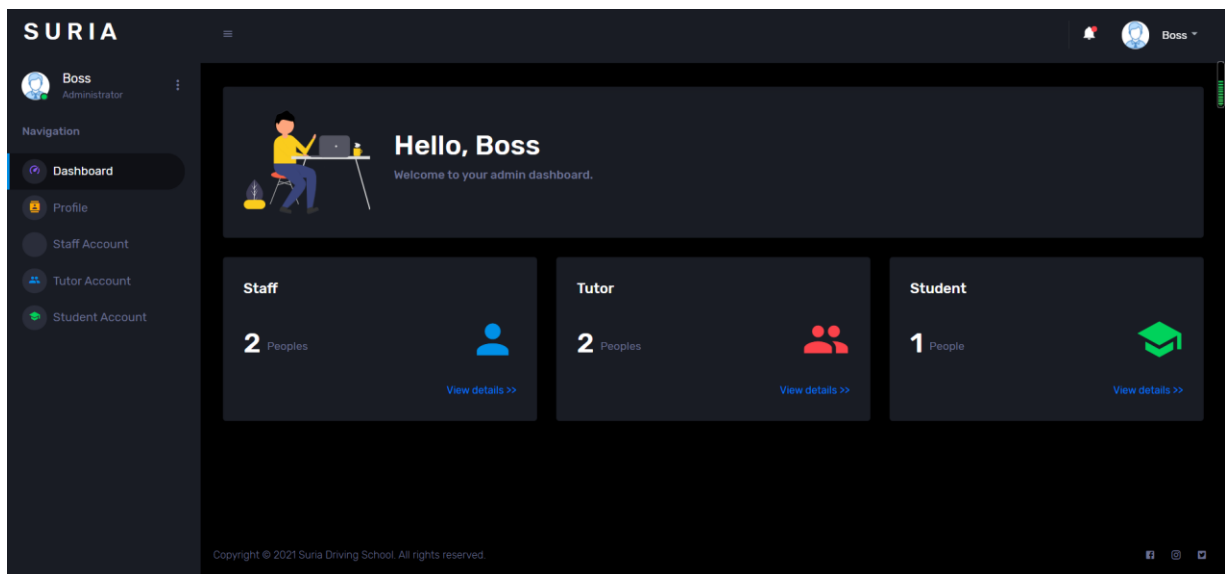


Figure 11: Interface of Dashboard

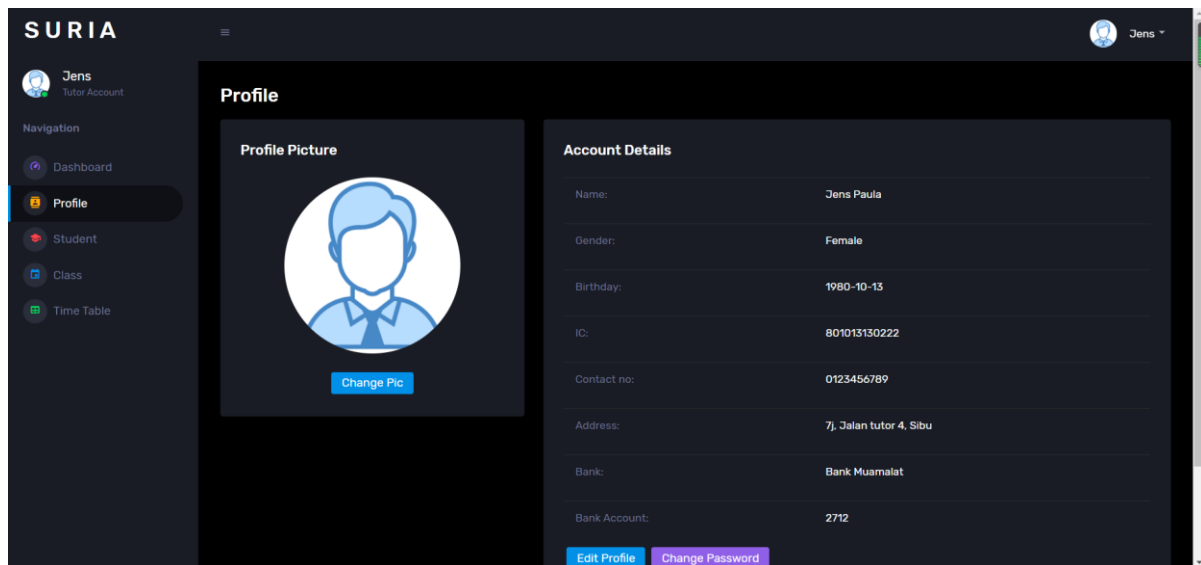


Figure 12: Interface of Manage Profile