

# Web-based STMIK AKBA Student Attendance Information System by Making QR Codes an Auxiliary Medium

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## Abstract

The attendance or attendance system is a recording or provision of information on a person's presence which indicates that the person has provided information about his presence and absence, then it is stated in the form of an attendance report. Along with the development of technology, an attendance recording has also developed, where we used to use paper attendance to fingerprint attendance. In educational institutions such as campuses, attendance has an important role in the process of developing a student. Until now, there are still many campuses that still use conventional attendance to record the presence of students in class, which allows for human error or fraud from both lecturers and students. Therefore, a solution is possible to suppress errors that may occur, namely by creating a website-based attendance or attendance system where the QR Code is used as an auxiliary medium in recording the presence or absence of a student at the STMIK AKBA Makassar Campus.

**Keywords:** Attendance; QR Code; Conventional; Human Error.

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## Introduction

Technology has now developed so that it influences innovations that appear to provide convenience in everyday life (Hutahaean et al., 2022). The emergence of progress in various fields, including the field of education, requires us to play a role in helping to contribute energy and thoughts to create works that can be utilized by personnel in the education sector. Progress will bring positive changes in the field of education (Iskandar et al., 2022).

These changes also have an impact on our speed of obtaining information. The information we get in a short time will stimulate the emergence of new ideas in the field of education (Szymkowiak et al., 2021). In cyberspace, the web plays an important role in providing information. The web has now been developed and widely used as a container for providing information systems. One example of developing and using the web is designing an attendance system on campus (Ma & Feng, 2021).

The process of attendance or recording of attendance in teaching and learning activities on campus is an attendance record that will influence the learning outcomes of a student, where attendance is used as one of the main assessment elements in calculating the final grade for all courses on campus. If a student has a low attendance rate, it will affect the final grade that will be listed on the diploma (Li et al., 2021).

In general, campuses in Indonesia still use conventional (manual) attendance by distributing attendance sheets and then asking students to fill them in manually (Sinthiya et al., 2021). Activities like this can cause several problems, namely, students can manipulate the attendance record, and it takes a long time, so this method is not effective (Saputro & Murdiono, 2020). Based on the problems described above, an idea arose about how to design and create an efficient attendance information system, using assistive media, one of which is the QR Code (Keenan et al., 2020). QR Code has the advantage of being able to convey information quickly, have a fast response, are more practical, and can store more data when compared to barcodes. Utilization of the QR Code in designing a student attendance information system that

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will be created by the author in the form of a web-based information system. It is hoped that the information system created by the author can facilitate and speed up the recapitulation of student attendance so that it is more efficient.

## Method

The method used is a waterfall method to systematically describe the details of software behavior in collecting and determining system needs before the system is created. This method can also allow breaking down complex development missions into several logical steps in the form of design, code, testing, and others into ready-made end products (Iskandar et al., 2021).

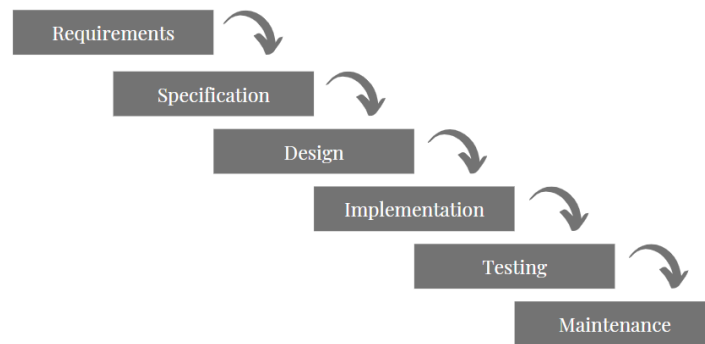


Figure 1. Waterfall Method Flow

## Requirements

The system needs analysis is performed to help describe user needs into a system design that will then be created into a web application program. The system needs that will be built in this study are that admins have access rights to enter the administrator page by logging in first and processing all data on the administrator page such as study program data, Student data (accounts), Academic Advisory Lecturer data (accounts) printing QR Codes as a means of Student attendance and report generation. Academic Advisors (academic advisors) have access to the Academic Advisory Lecturer's account settings and monitor student attendance by logging in first. Meanwhile, students only do attendance in and out using a QR Code that has previously been printed by the Admin.

## Specification

1. **QR Code**, In 1994 Denso Wave who worked for a Japanese company in the division of Denso Corporation introduced a type of matrix code or 2-dimensional barcode, easy to read by a scanner called a quick response code or QR Code, which is used as an informer in a short time with a short response as well. QR Codes can store information with vertical and horizontal models so that they can store a lot of data. Unlike Barcodes, which only store data horizontally so they can only store a small amount of data.
2. **Web browser**, which is used to view web pages. Another definition of a web browser is a portal or path that can lead us to access all information on the internet. Web browsers are used to carry out the website search process easily and effectively.
3. **PHP (Hypertext Preprocessor)**, is a web programming language in the form of scripts that can integrate with HTML. Another definition of PHP is a programming language with scripts designed to create web pages.
4. **Cascading Style Sheets (CSS)**, which are used to set styles in HTML tag tags. CSS is used to set the appearance of elements written in HTML and separate the content from the visual appearance on a web page.
5. **JavaScript** is a programming language used to create programs on HTML documents on web pages to make them more interactive and beautiful. Javascript can not only be used for website development, but also for creating mobile, desktop, and gaming applications.

6. **XAMPP**, one of the apache, PHP, and MySQL installation packages instantly used to help the installation process of the three products. XAMPP is an offline version of the database and web server on the localized computer.
7. **MySQL (My Structure Query Language)**, is one of the database management system software SQL Database Management System or DBMS. MySQL is a DBMS that can be run using Structured Query Language (SQL) commands and is used in creating website-based applications.
8. **A DATABASE** is a set of interconnected data contained in tables that can be interconnected with each other by using columns in each existing table. Another definition of a database is a set of data information stored on a computer system so that it is easy to be accessed by a computer program by calling database queries (DBMS).

## System Design

The Use Case diagram is used to show sequential activity processes in the system and can display the sequence of activities in a process. The following is a Diagram of the Use Case of the Student attendance information system using a Web-based QR Code:

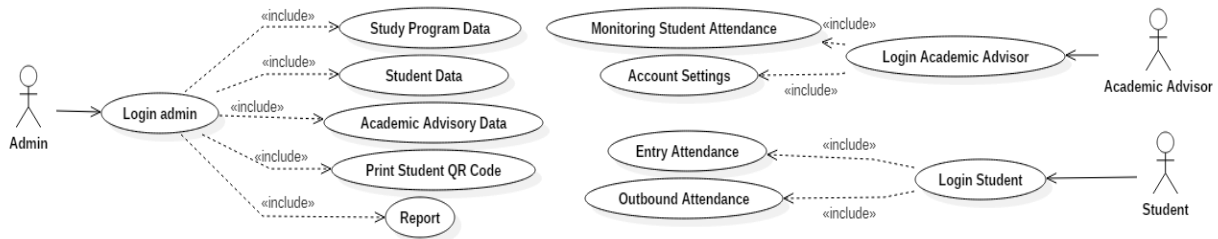


Figure 2. Diagram Usecase

Explanation of Figure 2:

Admin:

1. Login
2. Managing Study Program Data
3. Managing Student Data
4. Managing Academic Advisor Data
5. Print a Student QR Code
6. Managing Reports

Academic Advisory Lecturer:

1. Login
2. Monitor student attendance
3. Manage your account

Student:

1. Login
2. Doing absent exit

## Results and Discussion

### Result

The Login page is a form used by users to enter the dashboard page. In this system, 3 actors obtain login rights, namely Admin and Academic Advisory Lecturer, where each actor is given different access rights, as shown in figure 3.

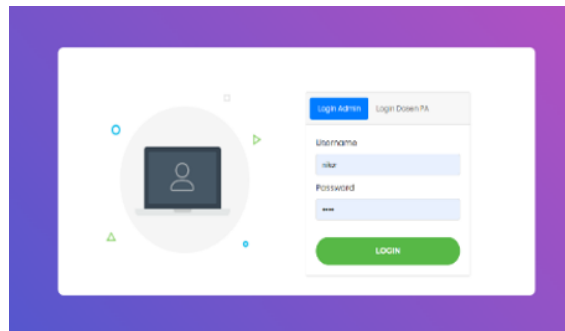


Figure 3. Login Page

In figure 4 the Admin Dashboard Page displays data consisting of total students, total Academic Advisory Lecturers, and total Study Programs that have been inputted and stored in the database. On the page, admins can manage Student data such as inputting student data to add student data, edit student data and delete student data, admins can also manage Study Program data and manage Academic Pansehat Lecturer data.

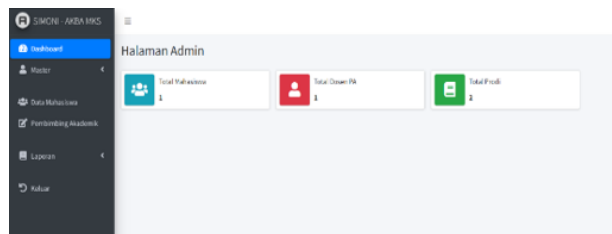


Figure 4. Admin Page

Figure 5 displays the Academic Pansehat Lecturer Dashboard Page, consisting of data from the total number of students, the total Academic Advisory Lecturers, and the total Study Programs that have been inputted and stored in the database. In addition, Academic Advisory Lecturers can monitor Student attendance and search for Student attendance data, this page is equipped with a report feature to make it easier to report data.

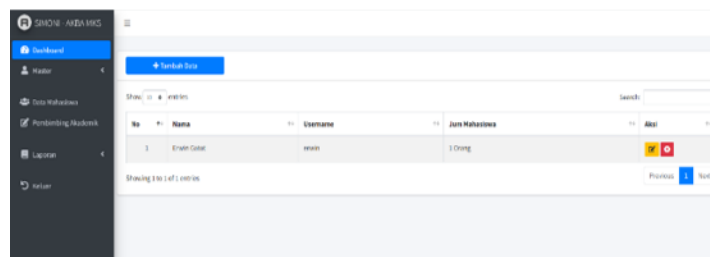


Figure 5. Academic Advisory Lecturer Page

Figure 6 shows the Student Attendance process both when entering the classroom and leaving the classroom, Students use a camera from a smartphone device or use a laptop to scan a QR Code, this page also contains a Student Identity Card file consisting of NIM data, Student Name, Gender, Department, Academic Advisory Lecturer, Address, Student Identity card can be downloaded in Pdf file format and can also be printed.



Figure 6. Student Page

The results of the research implementation are based on the analysis that has been carried out which includes the implementation of the system and the testing stages of the system that has been made to determine the success rate of the system, then testing all the features in the system using the BlackBox method is carried out. The BlackBox method is often used in the functional testing of any component or feature contained in the system.

Table 1. BlackBox Testing

Test Items	Test Scenarios	Test Results
Admin Page	Login Admin	Succeed
	View and manage Data Base	Succeed
	Add, Rename and Delete Student data	Succeed
	Add, Rename and Delete PA Lecturer data	Succeed
	Add, Rename and Delete Study Program data	Succeed
	Print Student Id Card with QR Code (PDF file)	Succeed
	Print Student Monitoring Report (PDF file)	Succeed
Academic Advisory Lecturer Page	Academic Advisory Lecturer Login	Succeed
	Academic Advisory Lecturer Menu page display	Succeed
	Student Monitoring Form	Succeed
	Academic Advisory Lecturer Account setting form (name, username, password, and re-password)	Succeed
	Print Student Monitoring Report (PDF file)	Succeed
Student Page	Student Login	Succeed
	Absent Login via webcam Laptop or Smartphone	Succeed
	Absent Exit via webcam Laptop or Smartphone	Succeed

In table 1, testing has been carried out on each page of the Admin, Academic Advisory Lecturer, and Student Page, each scenario test is carried out functional testing of the components contained on the page such as logging in, managing data, testing button functions, then for the test results declared successful or free from System Errors.

## Discussion

Web-based Student Attendance Information Systems can make the QR Code an auxiliary medium for the attendance process, this research is in line with several previous studies to become QR Code As an attendance process (Masalha & Hirzallah, 2014). The Attendance Information System using QR Codes is not only used in academics but also used in the industrial world (Vinod et al., 2020). An attendance Information System with a QR Code can help the monitoring process making it easier for users to report (Nuhi et al., 2020).

## Conclusions and Suggestions

### Conclusions

Based on the results of research that has been carried out, it can be concluded that the Student attendance system application using a Web-based QR Code can be used as an alternative because it is more effective, efficient, and fast in conducting attendance, recapturing attendance data and making Student attendance reports. This system is also proven to be good in minimizing fraud in the attendance process such as absenteeism, human error, and others. In addition, this system application can generate accurate Student attendance data and save budgets on paper use.

### Suggestions

The application of the Student attendance system using a Web-based QR Code is far from perfect, therefore it is recommended that developing this system can be developed by encrypting the creation of a QR Code to prevent QR Code forgery. Then to further maximize this system, it is recommended that a lock location be added for a certain radius of the webcam when doing attendance so that students cannot miss when they are outside the predetermined radius.

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