

## Attendance Tracking System with RFID for Form 6

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### Abstract

This project develops a specialized Attendance Tracking System using Radio-Frequency Identification (RFID) technology, specifically tailored for Form 6 students at SMK Benut. Addressing the challenges of traditional attendance methods, this system utilizes RFID technology to track student presence during exams in an efficient, accurate, and secure manner. The primary focus is on overcoming inefficiencies such as time consumption, data inaccuracies, and the reduction of potential latecomers or absenteeism prevalent in manual processes. The system design emphasizes user-friendly interfaces for educators and administrators, integrating seamlessly with existing educational infrastructures. Key features include automated attendance recording, real-time data processing, and a centralized database for secure information management. The implementation follows a Prototype Methodology, ensuring adaptability to stakeholder feedback and evolving educational requirements. This initiative is a key step towards improving academic integrity and administrative efficiency in educational institutions, establishing a standard for technology-driven attendance management in academic assessments.

## 1. Introduction

The introduction of digital technology into educational settings has sparked an explosion of new ideas aimed at improving both academic integrity and administrative efficiency. Among these technical advances, the use of RFID (Radio Frequency Identification) technology for attendance tracking has shown great promise. This paper describes the creation of an RFID-powered Attendance Management System (AMS) designed primarily for Form 6 students in educational institutions.

Traditional methods of tracking student attendance, particularly during examinations, often happen with inefficiencies. Manual processes such as signing attendance sheets or physical counting are not only time-consuming, but also prone to errors. The proposed RFID-based system addresses these challenges head-on, offering a solution that is both efficient and accurate.

This system leverages RFID technology to automate the process of recording student attendance, thereby reducing the potential for errors, and enhancing the overall reliability of the attendance records. The design of the system places a strong emphasis on user-friendly interfaces, ensuring ease of use for educators and administrators. It also integrates seamlessly with existing educational infrastructures, streamlining the attendance management process.

Key features of the AMS include automated attendance recording, real-time data processing, and a centralized database for secure information management. The implementation of the system follows a Prototype Methodology, allowing for adaptability to stakeholder feedback and evolving educational requirements [1]. This initiative represents a significant step towards setting a new standard for technology-driven attendance management in academic assessments, aiming to improve academic integrity and administrative efficiency in educational institutions [2].

## 2. Related Work

The integration of Radio Frequency Identification (RFID) technology in attendance tracking systems has garnered significant interest in recent educational research. This section examines existing RFID-based attendance systems, drawing insights from various studies to contextualize the development of the proposed Attendance Management System (AMS) for SMK Benut.

Three notable systems were reviewed: the Teacher and Student Attendance System at Noor Faqih Usman Foundation based on RFID integrated with Raspberry Pi, the Internet of Things (IoT) Based Smart Attendance System Using RFID, and the RFID Based Attendance Monitoring System with Light Emitting Diode (LED) Authentication. Each system demonstrates the practical application of RFID technology in educational settings, highlighting benefits such as automation, real-time data processing, and potential integration with existing infrastructures.

The Teacher and Student Attendance System illustrates the utility of RFID technology in streamlining attendance processes through a hardware framework that includes Arduino Uno, NodeMCU ESP8266 microcontrollers, and Raspberry Pi. This system exemplifies the shift from traditional paper-based methods to digital attendance storage, emphasizing environmental benefits and enhanced efficiency.

The Internet of Things Based Smart Attendance System underscores the importance of real-time tracking and data integration. It operates by registering student attendance through RFID readers, thereby enhancing monitoring accuracy and saving time. The literature review acknowledges the challenges of initial costs and scalability but highlights the overarching benefits in student engagement and resource savings.

Lastly, the RFID Based Attendance Monitoring System with Light Emitting Diode Authentication offers an innovative approach to attendance tracking, particularly in environments lacking internet connectivity. This system uses RFID cards and RC522 RFID reader models, providing immediate feedback through Light Emitting Diode indicators and auditory alerts, thereby enhancing the accuracy of attendance records.

**Table 1** System's Comparison

Features	Noor Faqih Usman Foundation System [3]	IOT Based Smart System [4]	LED Authentication System [5]	AMS
Customize Examination Scheduling	X	X	X	√
Integration with Student Information System (SIS)	X	X	X	√
User Experience and Privacy	X	X	X	√
Adaptive to Educational Levels	X	X	X	√
Real-time Data Analysis	X	√	X	√
Scalability	X	√	√	√

Security Measures	√	√	√ LED Authentication	√ Enhanced Privacy Controls
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The proposed RFID-based Attendance Management System for Form 6 students builds upon these systems, aiming to address gaps such as integration with Student Information Systems (SIS), improved user experience, and privacy considerations. The focus is on creating a tailored, integrated, and user-centric solution that leverages robust hardware integration and local network capabilities. This system aims to offer a more adaptive, efficient, and secure method for managing student attendance, distinguishing itself through features like customized scheduling for Form 6, seamless integration with SIS, and enhanced privacy controls.

### 3. Methodology/Framework

The development of the RFID-powered Attendance Management System (AMS) for SMK Benut was guided by the Prototype Methodology. This approach, known for its iterative development and emphasis on stakeholder feedback, ensured that the system was tailored to the specific needs of the educational institution [6]. Below is an overview of the system development workflow based on this methodology:

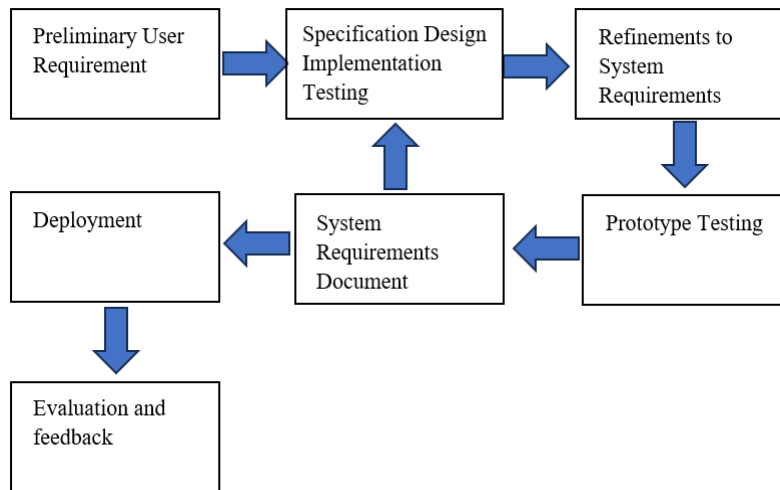


Fig. 1 Prototype Model Adapted from S. Kurniali (2014)

Table 2 System Development Workflow

Phase	Task	Output
Preliminary User Requirements	<ul style="list-style-type: none"> <li>Gather initial requirements from stakeholders.</li> <li>Document initial requirements</li> </ul>	<ul style="list-style-type: none"> <li>List of initial system requirements</li> <li>UML</li> <li>ERD</li> <li>Flowchart</li> </ul>
Specification Design Implementation Testing	<ul style="list-style-type: none"> <li>Create detailed system design</li> <li>Develop initial prototype</li> <li>Conduct initial testing</li> </ul>	<ul style="list-style-type: none"> <li>System architecture</li> <li>Schema and data dictionary</li> <li>UI (wireframe)</li> </ul>

Refinements to System Requirements	<ul style="list-style-type: none"> <li>Analyze feedback from initial testing</li> <li>Identify areas for improvement</li> <li>Adjust system requirements</li> </ul>	<ul style="list-style-type: none"> <li>Prototype I</li> </ul>
Prototype Testing	<ul style="list-style-type: none"> <li>Conduct iterative testing on updated prototype</li> <li>Gather feedback</li> </ul>	<ul style="list-style-type: none"> <li>Test cases</li> </ul>
System Requirements Document	<ul style="list-style-type: none"> <li>Finalize system requirements</li> <li>Document system specifications</li> </ul>	<ul style="list-style-type: none"> <li>Final System Requirements Document</li> </ul>
Deployment	<ul style="list-style-type: none"> <li>Implement the system in the production environment</li> <li>Set up RFID hardware and centralized database</li> </ul>	<ul style="list-style-type: none"> <li>Deployed system</li> <li>Operational RFID hardware and database</li> </ul>
Evaluation and Feedback	<ul style="list-style-type: none"> <li>Collect user feedback post-deployment</li> <li>Monitor system performance</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing user feedback</li> <li>System performance reports</li> </ul>

Each phase of this methodology played a crucial role in the development process. The initial phase focused on understanding the user requirements, followed by designing and testing the prototype. Feedback was continuously integrated, leading to refinements and further testing. The deployment phase marked the transition of the system from a developmental stage to a real-world operational phase [7]. The final phase, Evaluation and Feedback, ensured ongoing improvement based on user interactions and system performance. This methodological approach was instrumental in developing a system that is not only technologically sound, but also highly responsive to the needs of its users.

### 3.1 System Requirement Analysis

This segment delves into the intricate functional and non-functional specifications essential for the AMS, tailored to the needs of SMK Benut. Functional requirements encompass various modules like User Management, RFID Integration, and Attendance Recording, each critical for the system’s operation. Non-functional requirements address the system's performance, scalability, security, and usability, ensuring the AMS is efficient, scalable, and secure.

**Table 3** *Functional requirement*

No	Module	Description
1	User Management Module	Enables administrators to create, modify, and manage user accounts, ensuring appropriate access levels are assigned.
2	RFID Integration Module	Allows an integral for the functionality of the attendance tracking system.
3	Attendance Recording Module	Allows teachers to record student attendance accurately and efficiently, utilizing RFID technology.

4	Database Management Module	Allows to manage secure storage and retrieval of student information and attendance records, primarily for administrative use.
5	Reporting and Analytics Module	Allows to generate various types of reports related to student attendance.
6	Examination Management Module	Facilitates the scheduling, administration, and tracking of examinations. This includes managing examination details such as date, time, and name of the subject.

**Table 4** *Non-functional requirements*

No	Requirement	Description
1	Performance	The system should provide real-time updates and operate efficiently under high load.
2	Scalability	The system should be capable of handling an increasing number of users and data entries.
3	Security	The system must ensure the confidentiality and integrity of student data.
4	Usability	The interface should be user-friendly and accessible to all types of users.
5	Compatibility	The system should be compatible with various devices and operating systems.
6	Reliability	The system should have minimal downtime and provide accurate attendance tracking.

### 3.2 User Requirement Analysis

The user requirement analysis ensures that the system aligns with the specific needs of its users, including administrator and teacher. It focuses on securing accounts, managing user roles, and streamlining attendance recording, thereby maintaining system integrity and effectiveness.

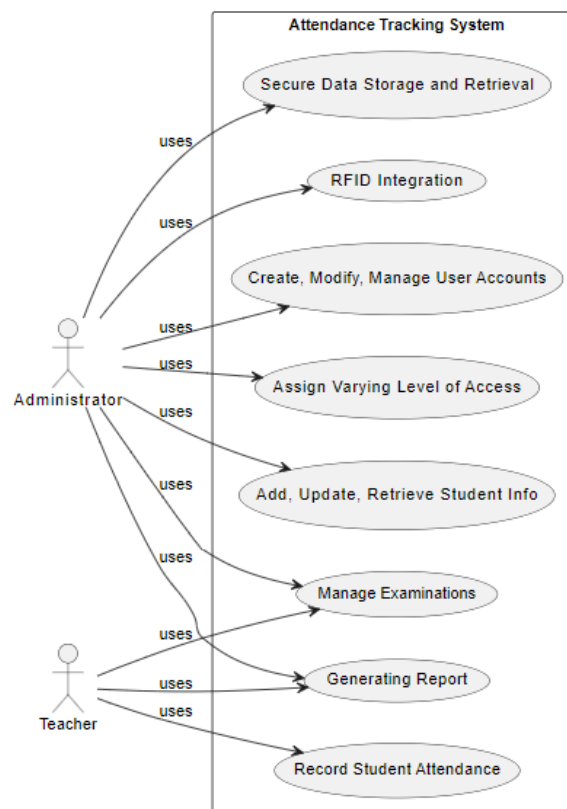
**Table 5** *User requirements*

No	Requirement
1.	All users (administrators and teachers) must have an account with a valid ID and password for system access.
2.	Administrators should be able to create, modify, and manage user accounts and assign access levels.
3.	Teachers should be able to record student attendance using RFID technology.
4.	Administrators should have the capability to securely store, retrieve, update, and manage student information and attendance records.
5.	The system should provide reporting and analytics features for administrators and teachers to generate attendance reports.

6. The system should ensure real-time updates and efficient operation under high load (Performance).
  7. Users should experience seamless performance even as the number of users and data entries grow. The system must adapt to increased demand without compromising user experience
  8. Users should feel confident that their personal and sensitive information, like student data, is protected against unauthorized access and breaches. Administrators need assurance of stringent security measures to maintain data confidentiality and integrity.
  9. The user interface should be accessible and user-friendly for all user types.
  10. Users expect the system to be consistently available with minimal interruptions
  11. Users rely on its accuracy and dependability for tracking attendance without errors or inconsistencies.
  12. Users should be able to provide feedback on the system, which is then used for continuous improvements.
  13. The system should allow scheduling, managing, and tracking of examination details, including date, time, and subject name.
- 

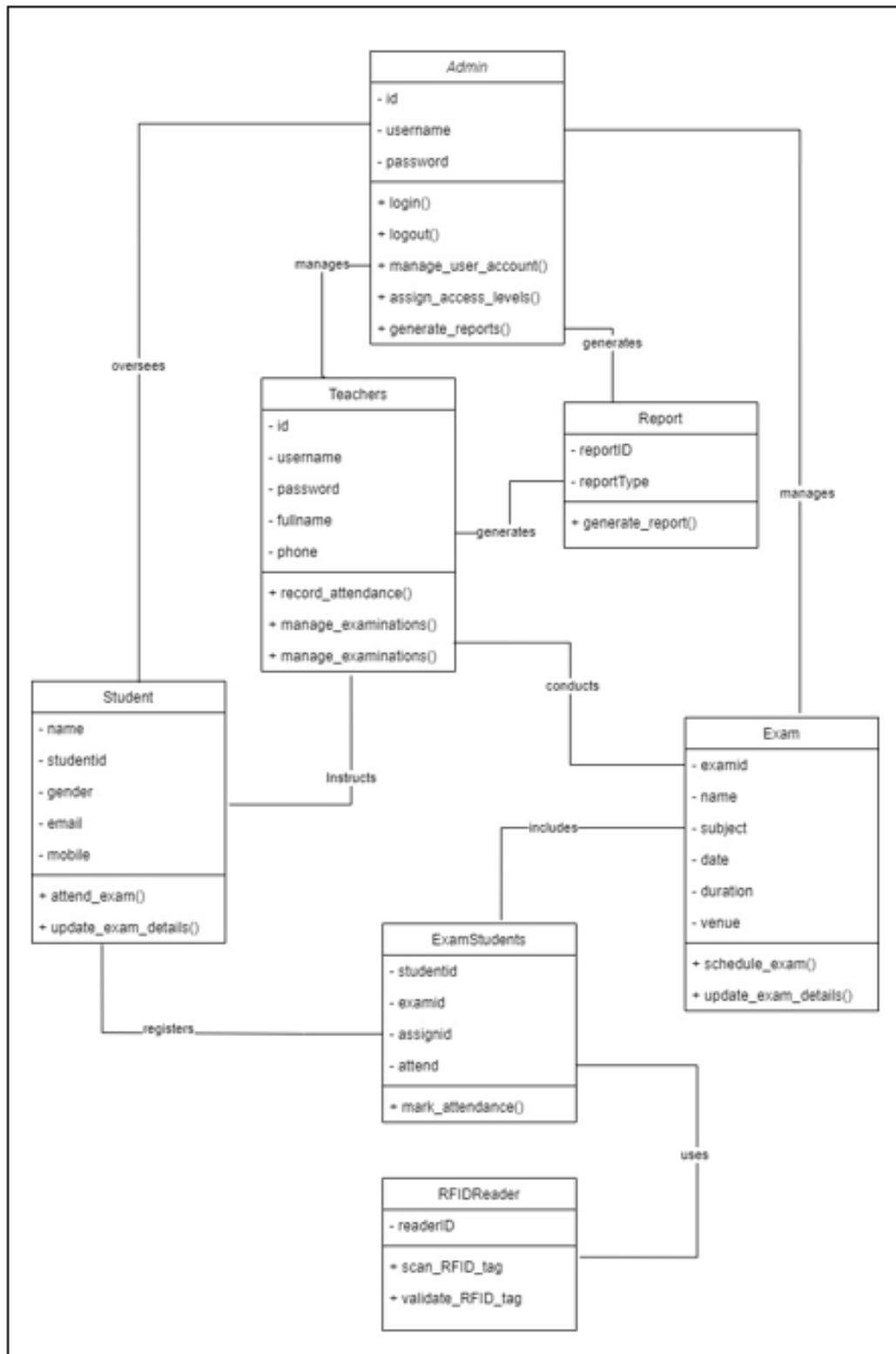
### 3.3 System Analysis

The system design bridges the requirements with the proposed system, converting functionalities into graphical representations. This includes a use case diagram that illustrates user-system interactions and clarifying the roles of different user types within the system



**Fig. 2** Use Case Diagram of Attendance Tracking System

The class diagram is essential in outlining the system's structure, showing the relationships between different classes and how they interact within the AMS.



**Fig. 3** Class Diagram of Attendance Tracking System

The sequence diagrams provided illustrate the key operations and interactions within the RFID-based Attendance Management System. Fig. 4 shows the process of managing user accounts, including creation, update, and deletion by an administrator. Fig. 5 outlines the steps for integrating and configuring RFID settings. Fig. 6 demonstrates how teachers record student attendance using RFID technology, from scanning IDs to logging attendance data. Fig. 7 details database management activities, such as updating records and performing backups. Fig. 8 explains how teachers generate attendance reports by setting criteria and retrieving data. Finally, Fig. 9 illustrates the management of examination details, including adding or updating exam information and confirming changes. These diagrams collectively provide a comprehensive overview of the system's functionality and interactions.

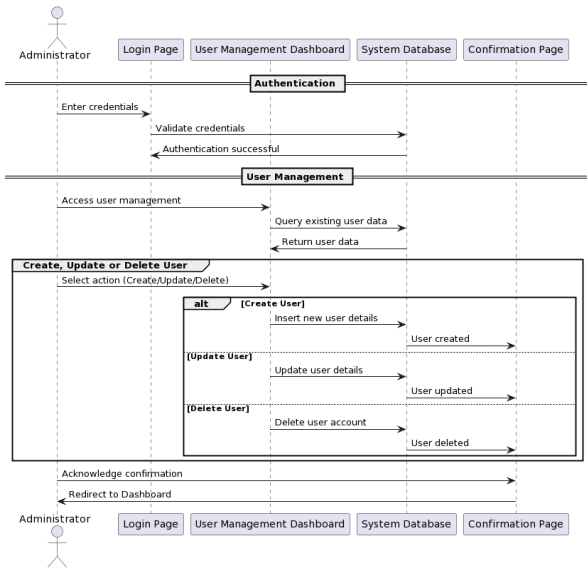


Fig. 4 Sequence Diagram of Manage Users

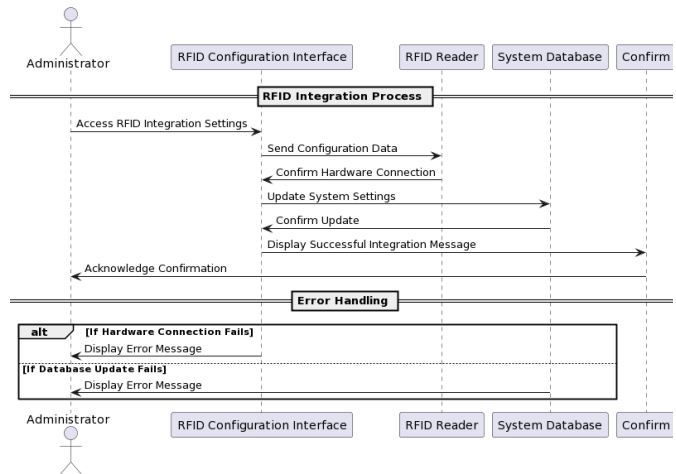


Fig. 5 Sequence Diagram of RFID Integration

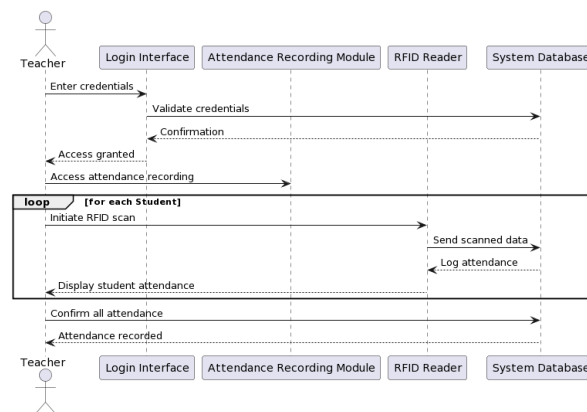


Fig. 6 Sequence Diagram of Attendance Recording

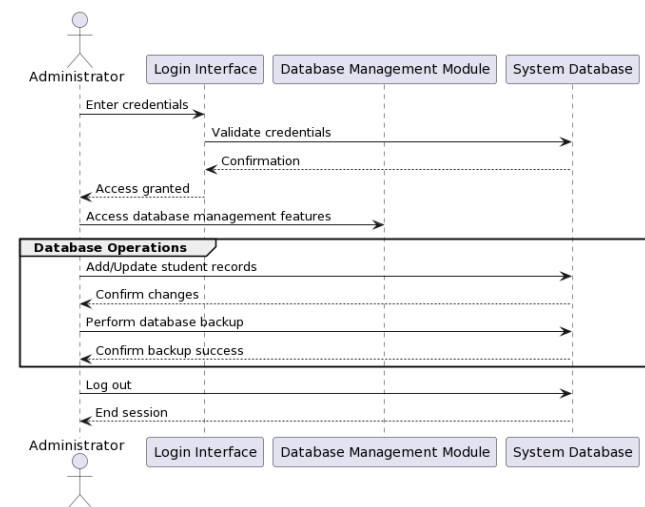


Fig. 7 Sequence Diagram of Database Management

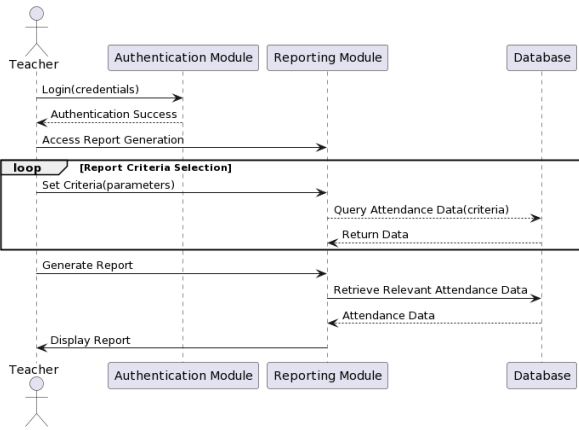


Fig. 8 Sequence Diagram of Generate Report

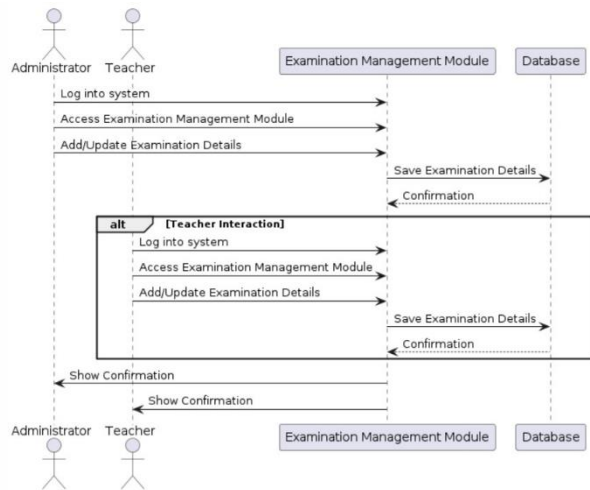


Fig. 9 Sequence Diagram of Examination Management

The activity diagrams provided illustrate the key operations and workflows within the RFID-based Attendance Management System. Fig. 10 depicts the activities involved in managing user accounts, including the creation, updating, and deletion processes executed by an administrator. Fig. 11 outlines the workflow for integrating and configuring RFID settings. Fig. 12 demonstrates the steps teachers follow to record student attendance using RFID technology, from scanning IDs to logging attendance data. Fig. 13 details the activities related to database management, such as updating records and performing backups. Fig. 14 shows the steps teachers take to generate attendance reports, including setting report criteria and retrieving relevant data. Finally, Fig. 15 illustrates the activities involved in managing examination details, including adding or updating exam information and confirming the changes. These diagrams collectively provide a comprehensive overview of the system's workflows and processes.

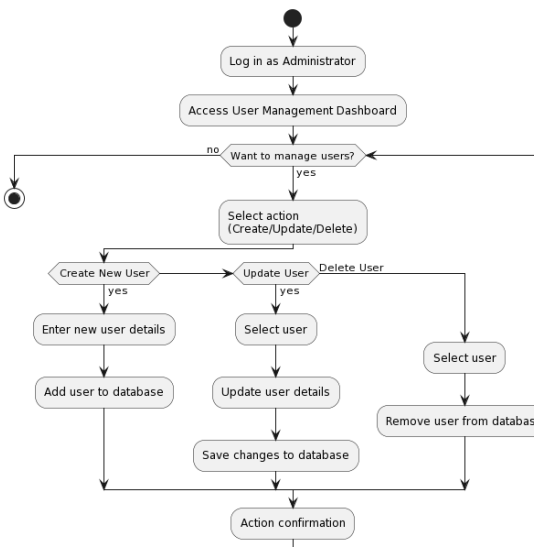


Fig. 10 Activity Diagram of Manage Users

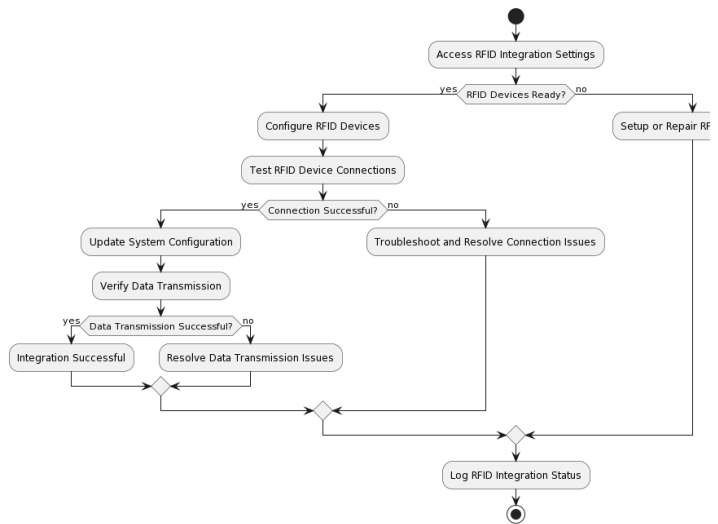


Fig. 11 Activity Diagram of RFID Integration

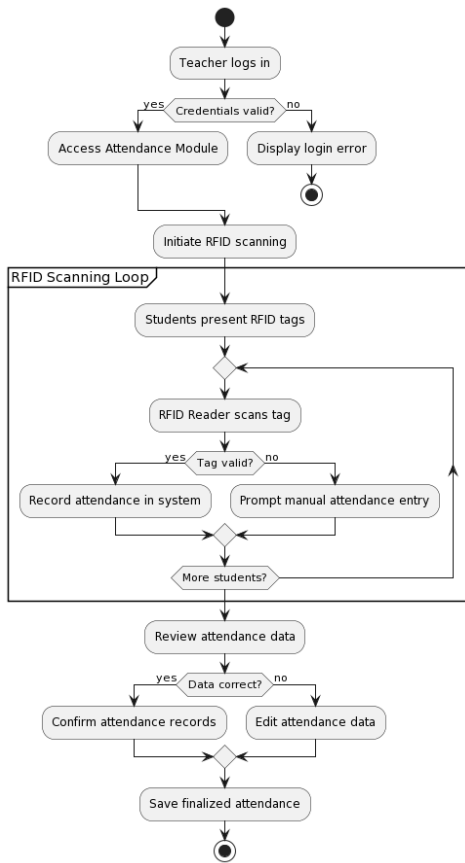


Fig. 12 Activity Diagram of Attendance Recording

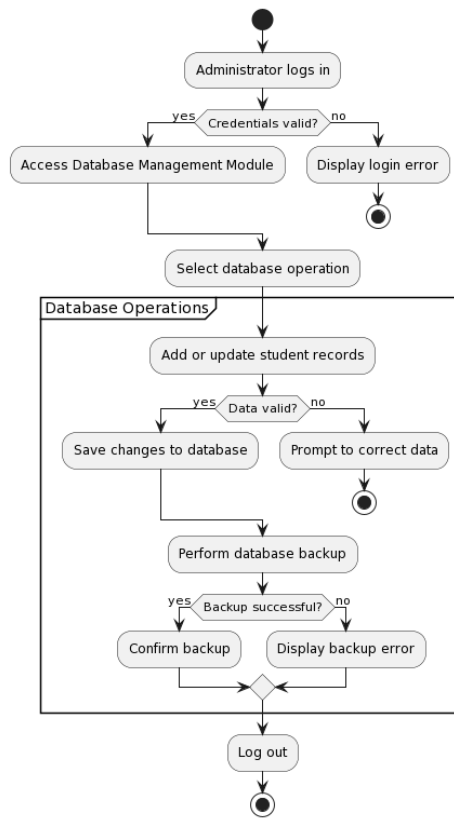


Fig. 13 Activity Diagram of Database Management

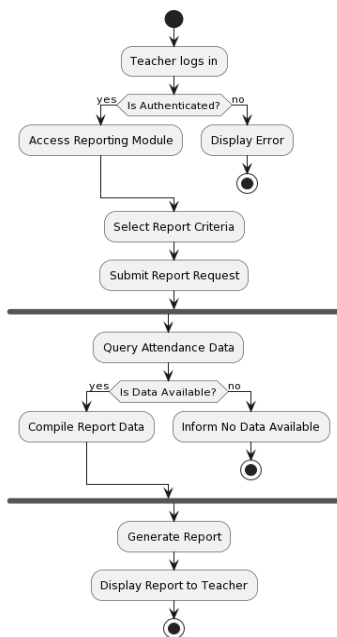


Fig. 14 Activity Diagram of Generate Report

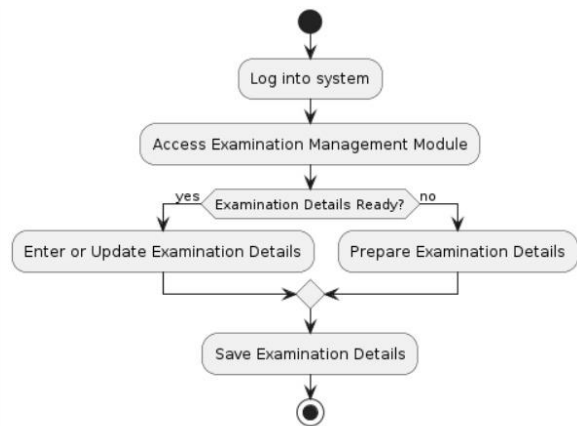
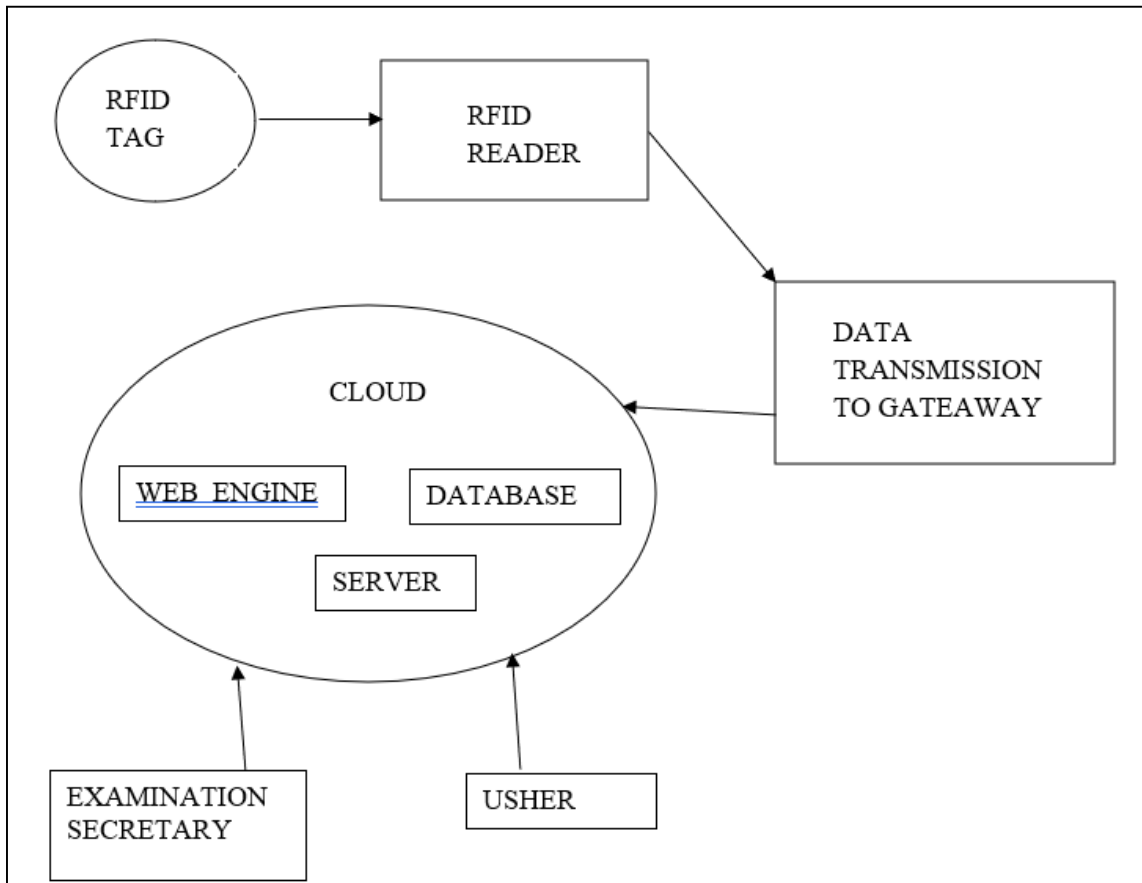


Fig. 15 Activity Diagram of Examination Management

This system architecture diagram will provide a high-level view of how different components of the system are organized and interact with each other.



**Fig. 16** Block diagram of the Examination Attendance Tracking System by Using RFID Technology adapted from Rakhi Joshi (2015)

### 3.4 Database Design

This part of the design focuses on the database tables, and data dictionary. It ensures efficient data management and retrieval, a cornerstone for the system's functionality.

**Table 6** Users Table

Attributes	Data Type	Size	Key	Descriptions
id	INT	-	PK	A unique identifier for each user account
username	VARCHAR	100	None	The chosen username for system access

password	VARCHAR	100	None	Encrypted password for user account security
----------	---------	-----	------	--

**Table 7** Teachers Table

Attributes	Data Type	Size	Key	Descriptions
id	INT	-	PK	Unique identifier for each teacher account
username	VARCHAR	100	None	The chosen username for system access
password	VARCHAR	100	None	Encrypted password for teacher account security
fullname	VARCHAR	100	None	Full name of the teacher
phone	VARCHAR	100	None	Contact phone number of the teacher

**Table 8** Students Table

Attributes	Data Type	Size	Key	Descriptions
studentid	VARCHAR	100	PK	Unique identifier for the student, also used as the RFID tag ID
name	VARCHAR	100	None	Full name of the student
gender	VARCHAR	100	None	Gender of the student
email	VARCHAR	100	None	Email address of the student
mobile	VARCHAR	100	None	Contact mobile number of the student
scanned	BOOLEAN	-	None	Status if the student has been scanned

**Table 9** Exam Table

Attributes	Data Type	Size	Key	Descriptions
examid	INT	-	PK	Unique identifier for each exam
name	VARCHAR	100	None	Name of the exam
subject	VARCHAR	100	None	Subject of the exam
date	DATE	-	None	Date of the exam
duration	VARCHAR	50	None	Duration of the exam
venue	VARCHAR	100	None	Venue where the exam will be conducted

**Table 10** ExamStudents Table

Attributes	Data Type	Size	Key	Descriptions
assignid	INT	-	PK	Unique identifier for each assignment
studentid	VARCHAR	100	FK	Unique identifier for the student
examid	INT	-	FK	Unique identifier for the exam
attend	VARCHAR	10	None	Attendance status (Present/Absent)

## 4. Result and Discussion

This section focuses on the implementation and testing of the RFID-based Attendance Management System for Form 6 students. It covers the implementation of key functionalities, including user management, RFID integration, attendance recording, database management, reporting, and examination management modules. Additionally, it discusses the comprehensive functional testing conducted to evaluate the system's performance and reliability.

### 4.1 Implementation

This section describes the development of functional modules in a system. Program code is provided to aid clarification.

### 4.1.1 User Management Module

The User Management Module allows administrators to create, modify, and manage user accounts efficiently. Figures 17 and 18 show the source code and the user interface for this module.

```

13 function addTeacher($username, $password, $fullname, $phone) {
14     $pdo = Database::connect();
15     $sql = "INSERT INTO teachers (username, password, fullname, phone) VALUES (?, ?, ?, ?)";
16     $q = $pdo->prepare($sql);
17     $q->execute(array($username, $password, $fullname, $phone));
18     Database::disconnect();
19 }
20
21 function deleteTeacher($id) {
22     $pdo = Database::connect();
23     $sql = "DELETE FROM teachers WHERE id = ?";
24     $q = $pdo->prepare($sql);
25     $q->execute(array($id));
26     Database::disconnect();
27 }
28
29 function editTeacher($id, $username, $password, $fullname, $phone) {
30     $pdo = Database::connect();
31     $sql = "UPDATE teachers SET username = ?, password = ?, fullname = ?, phone = ? WHERE id = ?";
32     $q = $pdo->prepare($sql);
33     $q->execute(array($username, $password, $fullname, $phone, $id));
34     Database::disconnect();
35 }

```

**Fig. 17** User Management Source Code

The PHP code in Figure 17 handles user management by receiving inputs for username, password, full name, and phone, constructing a SQL INSERT query, and storing the data in the MySQL database.

The screenshot shows an 'Administrator Dashboard' with a navigation menu including Home, Student Data, Registration, Read Tag ID, Manage Teachers, Examination Details, and Logout. The main content area is titled 'Teacher Management' and contains a form with input fields for Full Name, Username, Password, and Phone, along with an 'Add Teacher' button. Below the form is a table titled 'Teachers' with columns for ID, USERNAME, FULL NAME, PHONE, and ACTIONS.

**Fig. 18** User Management Interface

Figure 18 illustrates the user interface, which includes input fields for user details and buttons for adding, updating, and deleting user accounts.

### 4.1.2 RFID Integration Module

The RFID Integration Module retrieves and validates student data based on RFID tag IDs. Figures 19 and 20 show the source code and user interface.

```

$pdo = Database::connect();
$pdo->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);
$sql = "SELECT * FROM students where id = ?";
$q = $pdo->prepare($sql);
$q->execute(array($id));
$data = $q->fetch(PDO::FETCH_ASSOC);

if (!is_array($data)) {
    $msg = "The ID of your Card / KeyChain is not registered !!!";
    $data = [
        'id' => $id,
        'name' => "-----",
        'gender' => "-----",
        'email' => "-----",
        'mobile' => "-----"
    ];
} else {
    $msg = null;
}

```

**Fig. 19** RFID Integration Source Code

The PHP code connects to the database, fetches student information based on RFID tag ID, and displays an error message if the ID is not found.

The screenshot displays the 'Administrator Dashboard' with a navigation menu including Home, Student Data, Registration, Read Tag ID, Manage Teachers, Examination Details, and Logout. The main content area is titled 'Registration Form' and contains the following fields:

- ID:** A text input field with a placeholder 'Please Scan your Card / Key Chain to display ID' and a dropdown arrow.
- NAME:** A text input field.
- GENDER:** A text input field with the value 'Male'.
- EMAIL ADDRESS:** A text input field.
- MOBILE NUMBER:** A text input field.

A green 'Save' button is located at the bottom of the form. The footer of the page reads '© 2024 Attendance Tracking System'.

**Fig. 20** RFID Integration Interface

Figure 20 shows the registration form, which displays student information retrieved from the RFID tag.

### 4.1.3 Attendance Recording Module

The Attendance Recording Module tracks student attendance using RFID technology. Figures 21 and 22 show the source code and user interface.

```
C:\laragon > www > Den > read tag.php
4 <head>
10 <script>
11     $(document).ready(function(){
12         $("#getUID").load("UIDContainer.php");
13         setInterval(function() {
14             $("#getUID").load("UIDContainer.php");
15         }, 500);
16     });
17
18     var myVar = setInterval(myTimer, 1000);
19     var myVar1 = setInterval(myTimer1, 1000);
20     var oldID = "";
21     clearInterval(myVar1);
22
23     function myTimer() {
24         var getID = document.getElementById("getUID").textContent;
25         oldID = getID;
26         if (getID !== "") {
27             myVar1 = setInterval(myTimer1, 500);
28             showUser(getID);
29             clearInterval(myVar);
30         }
31     }
32
33     function myTimer1() {
34         var getID = document.getElementById("getUID").textContent;
35         if (oldID !== getID) {
36             myVar = setInterval(myTimer, 500);
37             clearInterval(myVar1);
38         }
39     }
40
41     function showUser(str) {
42         if (str === "") {
43             document.getElementById("show_user_data").innerHTML = "";
44             return;
45         } else {
46             // Fetch user details from database
47         }
48     }
49 }
```

Fig. 21 Attendance Recording Source Code

PHP code sets up an event listener to load RFID tag data and fetches user information from the database.

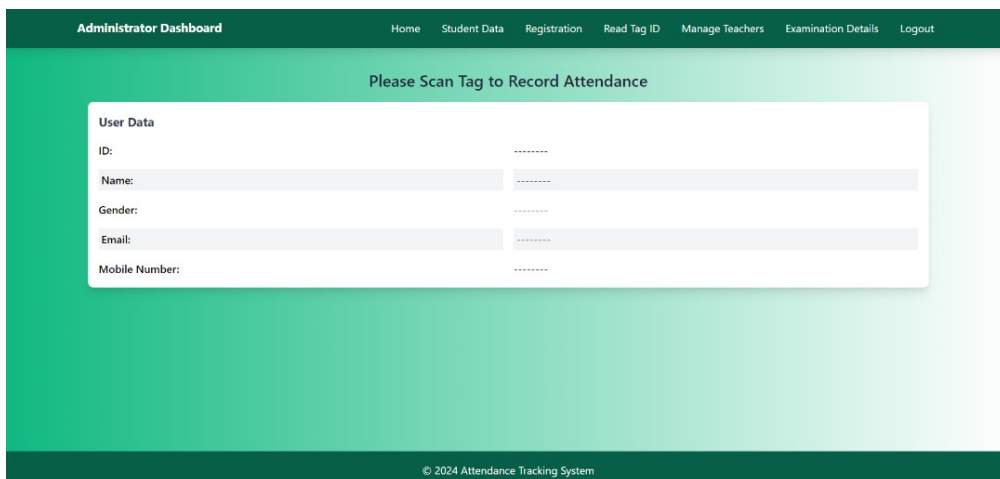


Fig. 22 Attendance Recording Interface

The Figure 22 displays fields for user details, updating them when an RFID tag is scanned.

#### 4.1.4 Database Management Module

The Database Management Module handles secure storage and retrieval of data. Figures 23 and 24 show the source code and user interface.

```

<?php
class Database
{
    private static $dbName = 'den' ;
    private static $dbHost = 'localhost' ;
    private static $dbUsername = 'root';
    private static $dbUserPassword = '';

    private static $cont = null;

    public function __construct() {
        die('Init function is not allowed');
    }

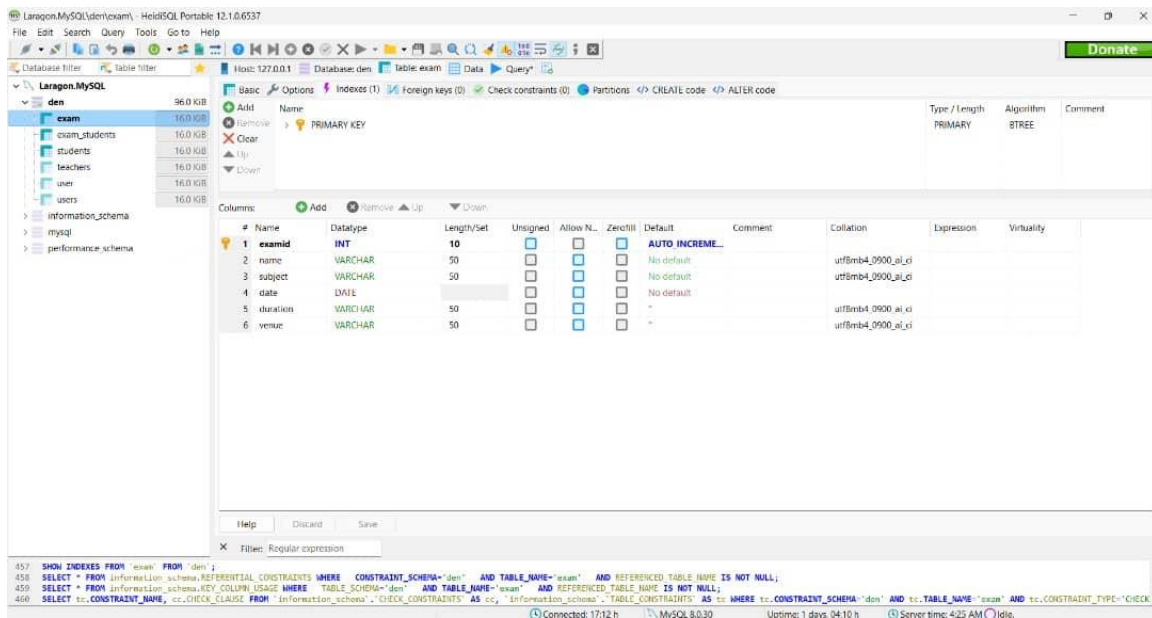
    public static function connect()
    {
        // One connection through whole application
        if ( null == self::$cont )
        {
            try
            {
                self::$cont = new PDO( "mysql:host=".self::$dbHost.";". "dbname=".self::$dbName, self::$dbUsername, self::$dbUserPassword);
            }
            catch(PDOException $e)
            {
                die($e->getMessage());
            }
        }
        return self::$cont;
    }

    public static function disconnect()
    {
        self::$cont = null;
    }
}

```

**Fig. 23 Database Management Source Code**

The PHP code establishes a database connection and includes methods to connect and disconnect from the database.



**Fig. 24 Database Management Interface**

Figure 24 shows the database schema view, allowing administrators to manage records directly.

### 4.1.5 Reporting and Analytics Module

The Reporting and Analytics Module generates reports on student attendance. Figures 25 and 26 show the source code and user interface.

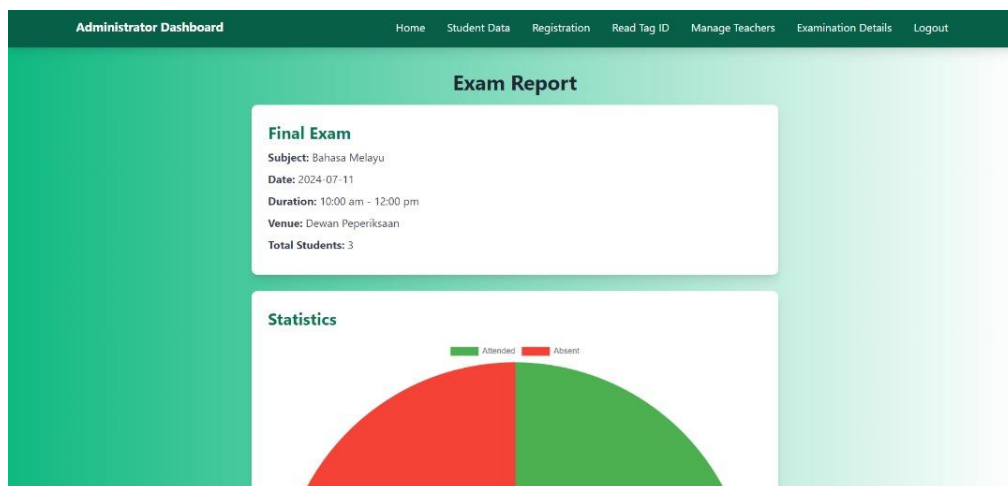
```

1  <?php
2  session_start();
3  include 'database.php'; // Include the database connection file
4
5  $conn = Database::connect();
6  $examid = isset($_GET['examid']) ? intval($_GET['examid']) : 0;
7
8  // Fetch exam details and total students
9  $sql_exam_details = "
10     SELECT e.examid, e.name, e.subject, e.date, e.duration, e.venue,
11           COUNT(es.studentid) AS total_students
12     FROM exam e
13     LEFT JOIN exam_students es ON e.examid = es.examid
14     WHERE e.examid = :examid
15     GROUP BY e.examid, e.name, e.subject, e.date, e.duration, e.venue
16 ";
17 $stmt = $conn->prepare($sql_exam_details);
18 $stmt->execute([':examid' => $examid]);
19 $exam = $stmt->fetch(PDO::FETCH_ASSOC);
20
21 // Fetch attendance details
22 $sql_attendance = "
23     SELECT
24         SUM(CASE WHEN attend = 'attended' THEN 1 ELSE 0 END) AS attended,
25         SUM(CASE WHEN attend = 'absent' THEN 1 ELSE 0 END) AS absent
26     FROM exam_students
27     WHERE examid = :examid
28 ";
29 $stmt_attendance = $conn->prepare($sql_attendance);
30 $stmt_attendance->execute([':examid' => $examid]);
31 $attendance = $stmt_attendance->fetch(PDO::FETCH_ASSOC);
32

```

**Fig. 25** Reporting and Analytics Source Code

The PHP code fetches and displays exam reports by executing SQL queries to retrieve exam and attendance details.



**Fig. 26** Reporting and Analytics Interface

Figure 26 displays detailed exam information and attendance statistics, often in chart format.

#### 4.1.6 Examination Management Module

The Examination Management Module manages examination details. Figures 27 and 28 show the source code and user interface.

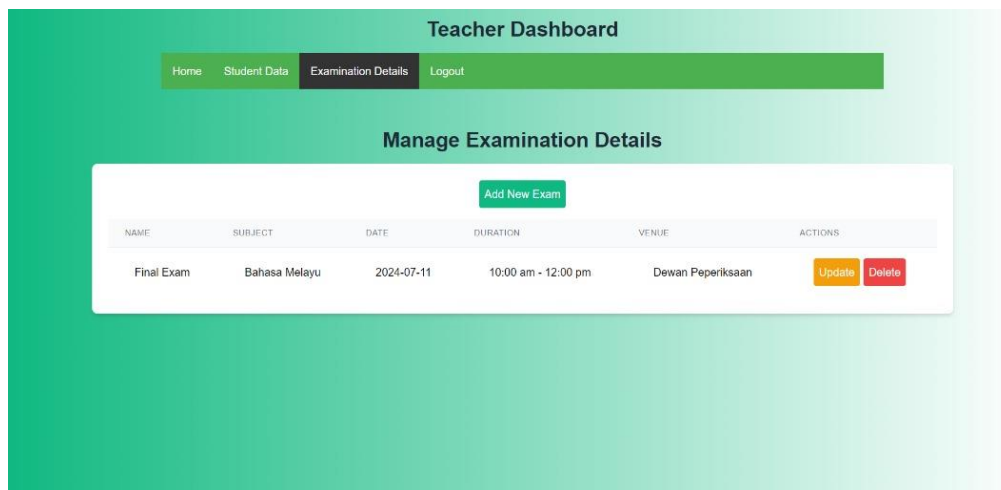
```

1 <?php
2 session_start();
3 include 'database.php'; // Include the database connection file
4
5 $conn = Database::connect();
6
7 if ($_SERVER['REQUEST_METHOD'] == 'POST') {
8     if (isset($_POST['add_exam'])) {
9         // Add new exam
10        $name = $_POST['name'];
11        $subject = $_POST['subject'];
12        $date = $_POST['date'];
13        $duration = $_POST['duration'];
14        $venue = $_POST['venue'];
15
16        $sql = "INSERT INTO exam (name, subject, date, duration, venue) VALUES (?, ?, ?, ?, ?)";
17        $stmt = $conn->prepare($sql);
18        if ($stmt->execute([$name, $subject, $date, $duration, $venue])) {
19            $_SESSION['message'] = 'Exam added successfully!';
20        } else {
21            $_SESSION['error'] = 'Failed to add exam!';
22        }
23        header("Location: {$_SERVER['PHP_SELF']}");
24        exit();
25    } elseif (isset($_POST['update_exam'])) {
26        // Update existing exam
27        $examId = $_POST['examId'];
28        $name = $_POST['name'];
29        $subject = $_POST['subject'];
30        $date = $_POST['date'];
31        $duration = $_POST['duration'];
32        $venue = $_POST['venue'];
33
34        $sql = "UPDATE exam SET name=?, subject=?, date=?, duration=?, venue=? WHERE examId=?";
35        $stmt = $conn->prepare($sql);
36        if ($stmt->execute([$name, $subject, $date, $duration, $venue, $examId])) {

```

**Fig. 27 Examination Management Source Code**

The PHP code handles inputs for exam details, constructs a SQL INSERT query, and stores the data in the database.



**Fig. 28 Examination Management Interface**

Figure 28 shows the interface for managing exam details, including input fields and buttons for adding, updating, and deleting exams.

## 5. Conclusion

In summary, this RFID-based system for tracking attendance addresses the manual challenges faced by Form 6 educators. The approach taken to develop this system ensures that it meets the specific requirements of the institution, simplifying attendance procedures, and allowing for more focused academic engagement. Designed to be adaptable, this system is a step forward in integrating technology within educational settings for better management practices.

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## Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

## Author Contribution

This journal requires that all authors take public responsibility for the content of the work submitted for review. The contributions of all authors must be described in the following manner:

*The authors confirm contribution to the paper as follows: **study conception and design:** Danish Hossman Bin Abd Rahman, Mohd Zaki Bin Mohd Salikon; **data collection:** Danish Hossman Bin Abd Rahman, Mohd Zaki Bin Mohd Salikon; **analysis and interpretation of results:** Danish Hossman Bin Abd Rahman, Mohd Zaki Bin Mohd Salikon; **draft manuscript preparation:** Danish Hossman Bin Abd Rahman, Mohd Zaki Bin Mohd Salikon. All authors reviewed the results and approved the final version of the manuscript.*

An author name can appear multiple times, and each author name must appear at least once. For single authors, use the following wording:

*The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.*

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