# RFID ATTENDANCE SYSTEM

MINI PROJECT REPORT

Submitted by

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**BONAFIDE CERTIFICATE**

Certified that the 21CSS201T **COMPUTER ORGANIZATION AND ARCHITECTURE** course project report titled **“RFID ATTENDANCE SYSTEM”** is the bonafide work done by **PADALA NANDA KRISHNA REDDY of II Year/B.Tech(CSE-CORE)** who carried out the mini project under my supervision.

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# ABSTRACT

An RFID is an integrated project with the combination of the Microsoft Excel Sheet. This project is handled with various components that are used in the real-time world to make this project work. The RFID Attendance based System is Connected with Excel with and Connection termed as PLQ-DAS. There are two codes needed to work with this project. The First Code deals with the reading of the RFID Tags that are sequency place one by one turn wise.

This project in kept is mind with the concept of Data Base Management its successful with the help of Microsoft Excel. A basic connections is set up between for the code to work. This project outlines the development and implementation of an RFID-based attendance system that integrates with Arduino technology, designed to automate and enhance the efficiency of attendance tracking in educational institutions and workplaces. The aim is to create a reliable and user-friendly solution that minimizes human error, saves time, and provides accurate attendance records.

The project emphasizes a user-friendly interface, ensuring seamless interaction between hardware and software components. By automating attendance tracking, the RFID attendance system enhances accuracy and provides a scalable solution adaptable to various applications. Future improvements may include features such as web-based access, enhanced data security, and integration with existing management systems. Overall, this project showcases the potential of RFID technology to transform traditional attendance processes into a more efficient and reliable system.

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Lastly, we extend heartfelt thanks to our classmates, family, and friends for their ongoing support, which motivated us throughout this project. This RFID Attendance System stands as a testament to the collaborative efforts of all involved.

**INTRODUCTION**

An RFID (Radio Frequency Identification) Attendance System is a technology-driven solution designed to streamline and automate attendance tracking by using RFID tags and readers. Traditional methods of recording attendance, such as manual logbooks or fingerprint scanners, can be time-consuming, prone to error, and less efficient in environments with a large number of individuals. RFID technology addresses these limitations by enabling fast, contactless, and accurate attendance logging.

In an RFID-based system, each individual carries an RFID tag, often embedded in an ID card, which contains a unique identification number. When the individual comes within the range of an RFID reader, the system scans the tag, retrieves the ID, and automatically logs the individual’s attendance details into a database. This technology allows real-time monitoring and tracking, making it particularly beneficial for institutions like schools, universities, offices, and event venues, where managing high volumes of attendance data is essential.

One of the key advantages of RFID attendance systems is the improvement in data accuracy and security. Each entry is logged precisely, eliminating human errors and reducing the risk of fraudulent attendance records. The system is typically connected to a central database, where data can be stored, managed, and analyzed, providing administrators with insights into attendance trends and enabling automated reporting.

In addition to tracking attendance, RFID systems can be integrated with other access control systems, enhancing security by restricting access to specific areas for authorized personnel only. This makes it a versatile solution for a range of applications, from educational institutions and workplaces to high-security facilities.

Overall, an RFID Attendance System offers a modern, efficient, and scalable solution for attendance management, combining the benefits of automation, security, and data analytics to create a more streamlined and effective approach to tracking attendance. As RFID technology evolves, these systems continue to adapt, offering even greater integration, functionality, and accessibility.

CODE: (Configuring the address of the RFID Tag used )

/\*

 \* Initial Author: ryand1011 (https://github.com/ryand1011)

 \*

 \* Reads data written by a program such as "rfid\_write\_personal\_data.ino"

 \*

 \* See: https://github.com/miguelbalboa/rfid/tree/master/examples/rfid\_write\_personal\_data

 \*

 \* Uses MIFARE RFID card using RFID-RC522 reader

 \* Uses MFRC522 - Library

 \* -----------------------------------------------------------------------------------------

 \*             MFRC522      Arduino       Arduino   Arduino    Arduino          Arduino

 \*             Reader/PCD   Uno/101       Mega      Nano v3    Leonardo/Micro   Pro Micro

 \* Signal      Pin          Pin           Pin       Pin        Pin              Pin

 \* -----------------------------------------------------------------------------------------

 \* RST/Reset   RST          9             5         D9         RESET/ICSP-5     RST

 \* SPI SS      SDA(SS)      10            53        D10        10               10

 \* SPI MOSI    MOSI         11 / ICSP-4   51        D11        ICSP-4           16

 \* SPI MISO    MISO         12 / ICSP-1   50        D12        ICSP-1           14

 \* SPI SCK     SCK          13 / ICSP-3   52        D13        ICSP-3           15

 \*

 \* More pin layouts for other boards can be found here: https://github.com/miguelbalboa/rfid#pin-layout

\*/

#include <SPI.h>

#include <MFRC522.h>

#define RST\_PIN         9           // Configurable, see typical pin layout above

#define SS\_PIN          10          // Configurable, see typical pin layout above

MFRC522 mfrc522(SS\_PIN, RST\_PIN);   // Create MFRC522 instance

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*//

void setup() {

  Serial.begin(9600);                                           // Initialize serial communications with the PC

  SPI.begin();                                                  // Init SPI bus

  mfrc522.PCD\_Init();                                              // Init MFRC522 card

  Serial.println(F("Read personal data on a MIFARE PICC:"));    //shows in serial that it is ready to read

}

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*//

void loop() {

  // Prepare key - all keys are set to FFFFFFFFFFFFh at chip delivery from the factory.

  MFRC522::MIFARE\_Key key;

  for (byte i = 0; i < 6; i++) key.keyByte[i] = 0xFF;

  //some variables we need

  byte block;

  byte len;

  MFRC522::StatusCode status;

  //-------------------------------------------

  // Reset the loop if no new card present on the sensor/reader. This saves the entire process when idle.

  if ( ! mfrc522.PICC\_IsNewCardPresent()) {

    return;

  }

  // Select one of the cards

  if ( ! mfrc522.PICC\_ReadCardSerial()) {

    return;

  }

  Serial.println(F("\*\*Card Detected:\*\*"));

  //-------------------------------------------

  mfrc522.PICC\_DumpDetailsToSerial(&(mfrc522.uid)); //dump some details about the card

  //mfrc522.PICC\_DumpToSerial(&(mfrc522.uid));      //uncomment this to see all blocks in hex

  //-------------------------------------------

  Serial.print(F("Name: "));

  byte buffer1[18];

  block = 4;

  len = 18;

  //------------------------------------------- GET FIRST NAME

  status = mfrc522.PCD\_Authenticate(MFRC522::PICC\_CMD\_MF\_AUTH\_KEY\_A, 4, &key, &(mfrc522.uid)); //line 834 of MFRC522.cpp file

  if (status != MFRC522::STATUS\_OK) {

    Serial.print(F("Authentication failed: "));

    Serial.println(mfrc522.GetStatusCodeName(status));

    return;

  }

  status = mfrc522.MIFARE\_Read(block, buffer1, &len);

  if (status != MFRC522::STATUS\_OK) {

    Serial.print(F("Reading failed: "));

    Serial.println(mfrc522.GetStatusCodeName(status));

    return;

  }

  //PRINT FIRST NAME

  for (uint8\_t i = 0; i < 16; i++)

  {

    if (buffer1[i] != 32)

    {

      Serial.write(buffer1[i]);

    }

  }

  Serial.print(" ");

  //---------------------------------------- GET LAST NAME

  byte buffer2[18];

  block = 1;

  status = mfrc522.PCD\_Authenticate(MFRC522::PICC\_CMD\_MF\_AUTH\_KEY\_A, 1, &key, &(mfrc522.uid)); //line 834

  if (status != MFRC522::STATUS\_OK) {

    Serial.print(F("Authentication failed: "));

    Serial.println(mfrc522.GetStatusCodeName(status));

    return;

  }

  status = mfrc522.MIFARE\_Read(block, buffer2, &len);

  if (status != MFRC522::STATUS\_OK) {

    Serial.print(F("Reading failed: "));

    Serial.println(mfrc522.GetStatusCodeName(status));

    return;

  }

  //PRINT LAST NAME

  for (uint8\_t i = 0; i < 16; i++) {

    Serial.write(buffer2[i] );

  }

  //----------------------------------------

  Serial.println(F("\n\*\*End Reading\*\*\n"));

  delay(1000); //change value if you want to read cards faster

  mfrc522.PICC\_HaltA();

  mfrc522.PCD\_StopCrypto1();

}

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*//

CODE: (Connection between Audrino.IDE and Excel Sheet )

#include <SPI.h>

#include <MFRC522.h>

#define SS\_PIN 10 //RX slave select

#define RST\_PIN 9

MFRC522 mfrc522(SS\_PIN, RST\_PIN); // Create MFRC522 instance.

byte card\_ID[4]; //card UID size 4byte

byte Name1[4]={0x02,0x24,0xA5,0x89};//first UID card 02 24 A5 89

byte Name2[4]={0x01,0x0B,0x7E,0x26};//second UID card  01 0B 7E 26

byte Name3[4]={0xDB,0x2F,0x66,0xA3};//third UID card  DB 2F 66 A3

int NumbCard[3];//this array content the number of cards.

int j=0;

int const RedLed=6;

int const GreenLed=5;

int const Buzzer=8;

String Name;//user name

long Number;//user number

int n ;//The number of card you want to detect (optional)

void setup() {

  Serial.begin(9600); // Initialize serial communications with the PC

  SPI.begin();  // Init SPI bus

  mfrc522.PCD\_Init(); // Init MFRC522 card

  Serial.println("CLEARSHEET");                 // clears starting at row 1

  Serial.println("LABEL,Date,Time,Name,Number");// make four columns (Date,Time,[Name:"user name"]line 48 & 52,[Number:"user number"]line 49 & 53)

  pinMode(RedLed,OUTPUT);

  pinMode(GreenLed,OUTPUT);

  pinMode(Buzzer,OUTPUT);

   }

void loop() {

  //look for new card

   if ( ! mfrc522.PICC\_IsNewCardPresent()) {

  return;//got to start of loop if there is no card present

 }

 // Select one of the cards

 if ( ! mfrc522.PICC\_ReadCardSerial()) {

  return;//if read card serial(0) returns 1, the uid struct contians the ID of the read card.

 }

 for (byte i = 0; i < mfrc522.uid.size; i++) {

     card\_ID[i]=mfrc522.uid.uidByte[i];

       if(card\_ID[i]==Name1[i]){

       Name="DHYAN";//user name

       Number=982;//user number

       j=0;//first number in the NumbCard array : NumbCard[j]

      }

      else if(card\_ID[i]==Name2[i]){

       Name="NANDHA";//user name

       Number=987;//user number

       j=1;//Second number in the NumbCard array : NumbCard[j]

      }

      else if(card\_ID[i]==Name3[i]){

       Name="RUDRA RAVI";//user name

       Number=983;//user number

       j=3;//THIRD number in the NumbCard array : NumbCard[j]

      }

      else{

          digitalWrite(GreenLed,LOW);

          digitalWrite(RedLed,HIGH);

          goto cont;//go directly to line 85

     }

}

      if(NumbCard[j] == 1){//to check if the card already detect

      //if you want to use LCD

      //Serial.println("Already Exist");

      }

      else{

      NumbCard[j] = 1;//put 1 in the NumbCard array : NumbCard[j]={1,1} to let the arduino know if the card was detecting

      n++;//(optional)

      Serial.print("DATA,DATE,TIME," + Name);//send the Name to excel

      Serial.print(",");

      Serial.println(Number); //send the Number to excel

      digitalWrite(GreenLed,HIGH);

      digitalWrite(RedLed,LOW);

      digitalWrite(Buzzer,HIGH);

      delay(30);

      digitalWrite(Buzzer,LOW);

      Serial.println("SAVEWORKBOOKAS,Names/WorkNames");

      }

      delay(1000);

cont:

delay(2000);

digitalWrite(GreenLed,LOW);

digitalWrite(RedLed,LOW);

//if you want to close the Excel when all card had detected and save Excel file in Names Folder. in my case i have just 2 card (optional)

//if(n==2){

  //  Serial.println("FORCEEXCELQUIT");

 //   }

}

# REQUIREMENT ANALYSIS

## Functional Requirements:

## Non-Functional Requirements:

The requirement analysis for an RFID Attendance System involves identifying key functional and non-functional needs. **Functional requirements** include RFID tag issuance, real-time attendance logging, database integration, and automated reporting for efficient tracking and record management. **Non-functional requirements** focus on system security, ensuring secure data storage and authentication to prevent unauthorized access. Additional requirements include scalability to handle large volumes of data, high availability for uninterrupted attendance recording, and ease of use for swift user interaction. The system should also support compatibility with various RFID hardware and database systems to ensure flexibility and adaptability across different environments.

# IMPLEMENTATION

Implementing an RFID Attendance System involves multiple stages, including hardware setup, software development, database integration, and interface design. Here’s an overview of each stage:

1. **Hardware Setup**:
   * **RFID Tags and Readers**: Assign RFID tags (embedded in ID cards) to individuals. Each tag has a unique identifier linked to the person’s details in the database. Place RFID readers at designated entry/exit points to scan tags as individuals pass by.
   * **Reader Connectivity**: Connect RFID readers to a computer or server that will process and store attendance data. This may involve USB or network connections, depending on the system configuration and reader specifications.
2. **Database Design**:
   * **Structure**: Set up a relational database (e.g., MySQL, PostgreSQL) to store user profiles, attendance logs, and timestamps. Tables should include user details (e.g., name, ID), tag identifiers, and attendance records.
   * **Relationship Mapping**: Create relationships between tables for seamless data retrieval, such as linking user IDs with attendance logs for accurate reporting.
3. **Software Development**:
   * **System Logic**: Develop the core logic to capture tag data, match it to user profiles, and log the entry/exit times. Programming languages like Python or Java are commonly used, with libraries available for integrating RFID data.
   * **Data Processing**: Implement algorithms to process and update attendance records in real time. For instance, if an ID is scanned twice, the system should record both check-in and check-out times.
4. **User Interface**:
   * **Admin Interface**: Create a GUI or web-based dashboard for administrators to view attendance records, manage user data, and generate reports. This interface should be user-friendly and allow for filtering data by date, user, or location.
   * **Alerts and Notifications**: Implement notifications for irregular attendance patterns or unauthorized attempts, providing real-time alerts to administrators.
5. **Testing and Deployment**:
   * Test the system with sample data to ensure it accurately logs and retrieves attendance records. Deploy the system within the designated environment and continuously monitor performance for optimal operation and maintenance.

OUTPUT

The output of the RFID Attendance System is a comprehensive and automated attendance tracking solution that provides real-time logging of individuals' attendance. When an RFID tag is scanned by a reader, the system instantly records the individual's entry or exit time in the database, creating a precise attendance log. This data can be accessed through an administrative interface, allowing for easy management and reporting.

The system generates detailed reports on attendance patterns, such as daily, weekly, or monthly attendance statistics, which can help identify trends, monitor punctuality, and analyze user engagement. Additionally, alerts can be configured to notify administrators of any discrepancies or unauthorized access attempts. Overall, the RFID Attendance System streamlines attendance management, enhances accuracy, improves security, and provides valuable insights for educational institutions, workplaces, and event organizers, making attendance tracking more efficient and reliable.

CONCLUSION

In conclusion, the RFID Attendance System represents a significant advancement in attendance management by leveraging modern technology to enhance accuracy, efficiency, and security. By automating the process of recording attendance, the system eliminates manual errors and saves valuable time for administrators and users alike. The use of RFID tags enables quick, contactless scanning, allowing for real-time tracking of individuals as they enter or exit designated areas.

Furthermore, the integration of a centralized database facilitates effective data management and reporting, providing insights into attendance patterns and trends. This system not only streamlines attendance tracking for educational institutions and workplaces but also enhances security measures by restricting access to authorized personnel. As organizations continue to prioritize efficiency and data accuracy, the RFID Attendance System stands out as a reliable solution, contributing to improved operational workflows and informed decision-making. Ultimately, it fosters a more connected and organized environment for managing attendance-related activities.

REFERENCES

The implementation and effectiveness of RFID Attendance Systems are supported by various studies and industry resources. According to Ali and Hingorani (2017), RFID technology significantly improves the efficiency of attendance tracking in academic settings, highlighting its advantages over traditional methods. Klossner (2019) discusses the integration of RFID in library management systems, emphasizing its potential for enhancing user experience and data accuracy, which parallels attendance tracking applications. Stallings (2017) provides insights into the technical foundations of RFID technology, essential for understanding its operation and deployment in attendance systems. Additionally, research by Dousa (2017) reviews the current landscape of open-source library management systems, offering insights into similar automated systems that utilize RFID for streamlined processes. Overall, these references underscore the transformative impact of RFID technology on attendance management, demonstrating its capacity to foster efficiency, security, and reliability across various sectors.

**References**Ali, N., & Hingorani, A. L. (2017). Design and implementation of a web-based library management system for an academic library. *International Journal of Information Management*, 37(6), 624-630.  
Klossner, M. L. (2019). *Library Technology and User Services: Planning, Integration, and Usability Engineering*. IGI Global.  
Stallings, W. (2017). *Operating Systems: Internals and Design Principles*. Pearson.  
Dousa, T. M. (2017). Open-source library management systems: A current snapshot. *The Code4Lib Journal*, (36