

# Attadance system in the teaching and learning process using RFID smart cards

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**Abstract.**The use of Electronic Cards for Student Attadance "aims to design and build a system based on Arduino Uno microcontrollers and RFID modules. The system is expected to be able to facilitate lecturers in conducting attendance, reduce the attendance habits carried out by students, and increase the intensity of the use of student sign cards. The Attadance System based on the Arduino Uno microcontroller and RFID module is designed and built through several stages, namely: (1) analysis along with identification of the needs of components and other auxiliary equipment that support the success of system design; (2) designing components and mechanical design as component containers; (3) system implementation; (4) system testing and overall system evaluation. System testing shows the results in the form of a system performance that shows the student's name, student's master number, time of entry and when the student exits from the room. This system is equipped with a person counting device in the room, so it can be ascertained that there will not be an incident entrusted because the number of cards scanned can be matched with the number of students in the room.

## 1. Introduction

This academic code of ethics is one of the guidelines for what should be done by academics including students in relation to the problem of science in higher education. There are a lot of problems that exist in the college and the most prominent is about the code of ethics. There are many acts of dishonesty students in the world of lectures, for example, are as follows: (1) Enter attadance or more popularly called attendance. This fake signature is often found in the world of lectures. The indicator is the number of students in the class is different from the number of signatures at attendance. (2) cheating behavior. This cheating behavior has a negative impact because the lecturers cannot know the original abilities of the students who cheat. (3) Plagiarism. This Plagiarism phenomenon is often found among students. This plagiarism can be realized or not realized by the students themselves. The plagiarism action that is often encountered is copy paste in working on tasks.

During the 4.0 industrial revolution, of course there are a lot of technologies that are developing and of course very much needed in everyday life. Seeing the problems in point 1, which is presenting the attadance or the attadance, the author has an idea or idea to make attendance tools using an electronic card as a student sign card. This tool is also equipped with a sensor counting number of people who are in class. So it is very likely that the problem of being present or being present can be



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overcome using this tool. So there needs to be an automation system developed so that everything becomes optimal to support online learning systems [1]. Automation system technology in this attendance can also be used as a media for learning [2].

The automation technique can be supported through the use of sensors [3]. One type of sensor is RFID. The use of Radio Frequency Identification (RFID) is an alternative. RFID technology is a technology that utilizes electromagnetic fields that automatically identify and track tags on an object [4].

With these problems, a device that has a built-in RFID reader is needed. One mobile device that has these criteria is a handheld telepong that has been equipped with Near Field Communication (NFC) technology. NFC is a technology that utilizes short-range wireless communication and operates at a wave of 13.56 MHz in a distance of less than 10cm [5].

RFID applications for Attendance Systems can make it easier for users to carry out activity attendance because RFID readers are integrated directly with Android devices [6].

The implementation and development of teaching and learning Attendance Systems using RFID has been conducted at the Faculty of Information and Computer Systems, King Abdul Aziz University [7]. In this implementation, through RFID cards carried by students, the identity and attendance of students can be identified.

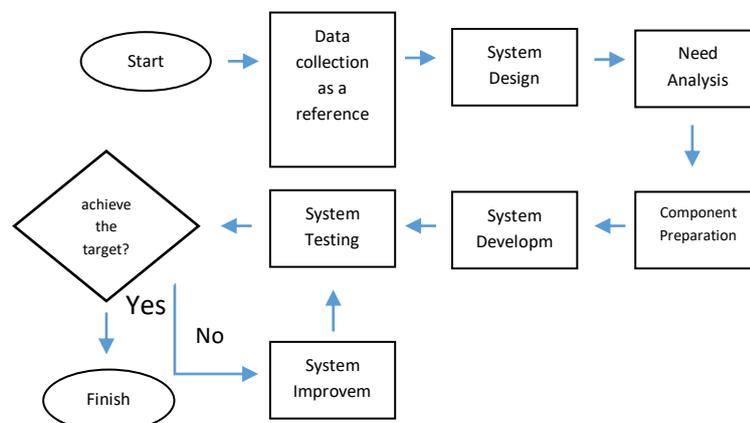
RFID technology has been used to identify objects in the fields of business and manufacturing, for example on objects that are installed in warehouses and the process of identifying goods passing [8].

## 2. Method

In this study an investigation was conducted on students in a classroom about attendance, namely the amount of data entered and the number of students in the room. Data processing in this Attendance System uses Arduino Uno R3 and Microsoft Excel. The means used to communicate between Arduino Uno R3 and Microsoft Excel is the PLX-DAQ-v2.11 software. The preparation of this tool through several steps, starting from the identification and analysis of the needs of the tool, the design of the tool, and the last is the implementation.

This Attendance System uses several main components, namely (a) Arduino Uno R3 microcontroller, used for programming and processing data, (b) RFID modules, which consist of reader and tags, (c) Microsoft Excel software, which is used to view student data, (d) PLX-DAQ-v2.11 software, which is used to communicate between Arduino Uno R3 and Microsoft Excel.

In addition to the main components, there are supporting components, namely (1) Liquid Crystal Display (LCD), used to display student data, (2) Printed Circuit Board (PCB), used to simplify the process of designing tools, (3) Jumper cables, useful for connecting several components, (4) Light Emitting Diode (LED), used for markers. Figure 1 shows the flow chart of the system in this study.



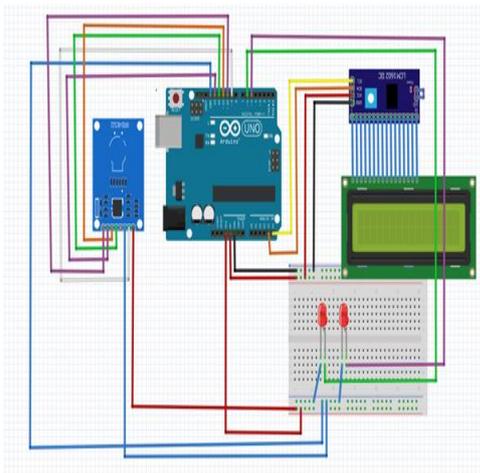
**Figure 1.** Flow chart Attendance System.

In accordance with the flowchart or flow chart above the beginning of making this tool, namely the intention to start after collecting data for reference to making tools, the more references the better because for comparison. Designing tools is the next activity, this design is in the form of design tools, components and others. Then analyze what needs are needed in making tools. After analyzing, then prepare the components according to the needs analysis and then make the tools. Test the tool when it's done, if an error occurs then fix it again, but if there are no errors then the tool is successful.

The following are steps in testing Attadance Systems: (a) Prepare tools and laptops. (b) Connect the device with the laptop through Arduino. (c) Connect also with the PLX-DAQ-v2.11 application which functions to enter data into Microsoft Excel. (d) If everything is ready, start scanning the student card to the RFID sensor. (e) After scanning student data, it will appear in Microsoft Excel. (f) Note: If the LED is red, then the student card has not been registered and has left the room while if it is green then the student card has registered the data and will enter the data into Microsoft Excel.

### 3. Results and discussion

Figure 2 shows the design of the Attadance System circuit using RFID. The series of Attadance Systems using RFID consists of an Arduino microcontroller data processing system, RFID attorney card and LCD output viewer.



**Figure 2.** Series of Overall Attadance Systems



**Figure 3.** Design of the Precision System Tool

While Figure 3 shows the outer appearance of the mechanical box on the Attadance System using RFID. The outer appearance of the mechanical box is an LCD screen and an RFID card reader.

Testing the microcontroller-based Attadance System is done by scanning the RFID card containing the student's identity and then looking at the table, whether the data is correct or not, the time can also be seen, if the card has student data the LED will turn green, if the student already scanned the card again, the LED will light red and most importantly can match the number of cards scanned by the number of people in the testing room. The following is a table of results of testing tools:

From the results of testing the table above, it can be seen that the number of student cards scanned is 20 student cards, when all students scan the green led cards, this indicates that the student data is correct and filled and students have entered the room. The number of people in the room also noted that there were 21 people in the room. 20 people are students and the other 1 is the lecturer who teaches the class. This indicates that all students depart and scan their own cards without anyone leaving the card to other students.

**Table 1.** Data on 20 students entering the room

Date	Name	Identity	Enter Time	LED
July 7, 2019	M.Galih W.L	16506134007	06:30	Green
July 7, 2019	Dhiyaa Yumnaa S.	16506134020	06:45	Green
July 7, 2019	Hegar Hartarto	16506134027	06:45	Green
July 7, 2019	Tri Gustian	16506134011	06:45	Green
July 7, 2019	Ardi Hartanto	16506134015	06:45	Green
July 7, 2019	M.Afrizal H.	16506134022	06:46	Green
July 7, 2019	M.Zahroni	16506134002	06:47	Green
July 7, 2019	Aprilia Pratama P.	16506134001	06:47	Green
July 7, 2019	Rizki Hermawan	16506134024	06:48	Green
July 7, 2019	Laduni Aura A.	16506134031	06:48	Green
July 7, 2019	Ludhi Prasetyo	16506134009	06:48	Green
July 7, 2019	Abdul Cholil A.U	16506134013	07:00	Green
July 7, 2019	Gito Syahril F	16506134005	07:00	Green
July 7, 2019	Amalah	16506134014	07:00	Green
July 7, 2019	Jodi Rahmanto	16506134004	07:00	Green
July 7, 2019	Ilham Rifqi R	16506134003	07:01	Green
July 7, 2019	Muchlis Abdillah	16506134010	07:03	Green
July 7, 2019	Amriani Amelia F	16506134018	07:03	Green
July 7, 2019	Jimmy Luthfi A.	16506134016	07:04	Green
July 7, 2019	Afrian Akbar I.	16506134021	07:04	Green

The next test result is a test when the student has finished running the course and out of the lecture room. The following is a test result table:

**Table 2.** Data of 20 students who left the room

Date	Name	Identity	Time Out	LED
July 7, 2019	M.Galih W.L	16506134007	11:00	Red
July 7, 2019	Dhiyaa Yumnaa S.	16506134020	11:00	Red
July 7, 2019	Hegar Hartarto	16506134027	11:00	Red
July 7, 2019	Tri Gustian	16506134011	11:01	Red
July 7, 2019	Ardi Hartanto	16506134015	11:01	Red
July 7, 2019	M.Afrizal H.	16506134022	11:02	Red
July 7, 2019	M.Zahroni	16506134002	11:04	Red
July 7, 2019	Aprilia Pratama P.	16506134001	11:04	Red
July 7, 2019	Rizki Hermawan	16506134024	11:04	Red
July 7, 2019	Laduni Aura A.	16506134031	11:05	Red
July 7, 2019	Ludhi Prasetyo	16506134009	11:05	Red
July 7, 2019	Abdul Cholil A.U	16506134013	11:05	Red
July 7, 2019	Gito Syahril F	16506134005	11:07	Red
July 7, 2019	Amalah	16506134014	11:07	Red
July 7, 2019	Jodi Rahmanto	16506134004	11:07	Red
July 7, 2019	Ilham Rifqi R	16506134003	11:07	Red
July 7, 2019	Muchlis Abdillah	16506134010	11:07	Red
July 7, 2019	Amriani Amelia F	16506134018	11:08	Red
July 7, 2019	Jimmy Luthfi A.	16506134016	11:08	Red
July 7, 2019	Afrian Akbar I.	16506134021	11:08	Red

From the results of testing the advanced table above, it can be seen the number of student cards scanned at the time of the exit amounting to 20 student cards, when all students scan the red led cards,

this indicates that the student data is correct and filled and the students are out of room. The number of people in the room also noted that there were 0 people in the room. This indicates that all students have scanned their cards and are already out of the room.

#### 4. Conclusion

(1) Attendance System tools based on microcontrollers consist of Arduino UNO R3 series, RFID Modules (Reader and Card), 16x2 LCD, and LED. (2) When the student enters the room and scans the card, the LED lights up green, this indicates the data entered in Microsoft Excel according to the student's identity and the student has entered the room and the student's time is entered when entering the room. (3) When the student exits the room and scans the card, the LED lights up in red, indicating that the student has scanned the card when exiting the room and can be seen the time when they leave the room. (4) The number of cards scanned is 20, the number of people in the room is 21. 21 consisting of 20 students and 1 lecturer. So it can be concluded that all students leave and enter the room, no one has given their friends the attendance .

#### 5. References

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