



Design and Build Online Attendance System Using NFC Based on IoT

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ABSTRACT

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This research designs the Hardware Platform: (1) Arduino Mega 2560 (2) NFC Sensor PN 532 (3) Buzzer (4) LCD i2C (5) Ethernet shield module, and Software: (1) Windows 10 (2) Arduino IDE 1.8 (2) XAMPP 3.2 (3) PHP (4) MySQL (5) Visual Studio Code 1.5. The system is connected to the Internet Network; the data stream will be stored into a MySQL-based database in the NCC Lab. Student data obtained from reading the NFC reader will be streamed through the Internet network, where the use of the ethernet shield module can integrate attendance equipment on a computer with a local MySQL database. Integration of Hardware and Software components produces an online attendance system for solutions at SLB ABCD Fitria Bogor. Hardware, software, and online attendance system services have been tested, with the following results: (1) the success of the system feature test, can refer to the black box test attachment (2) efficiency of attendance administration (3) improve the reporting performance of user agencies. This system solution has never been implemented in SLB ABCD Fitria Bogor schools and probably in many other special schools in Indonesia, which have service features and hardware and software systems that are simple, reliable and easy to implement, so that they can be added value for users, for further research can improve responsive websites.

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1. Introduction

In the world of education, the level of discipline is prioritized so that the teaching and learning process can take place according to a predetermined schedule, especially in education with no student delays in attending lessons. The problem that often arises in education today is that many students are late. Attendance is a very important data in every educational activity, especially at SLB-ABCD Fitria which is located on Jl Rulita RT.01/RW.07, Harjasari, Kec. Bogor Sel., Bogor City, West Java with a total of 76 students. However, often these attendance data are not given much attention in conditions like this, of course, very prone to errors so that the resulting information is still questionable. Before students start learning activities, students will take attendance by pasting the registered id, to make it easier for students to take attendance and not have to do attendance manually. So we need a tool that works for the attendance system.

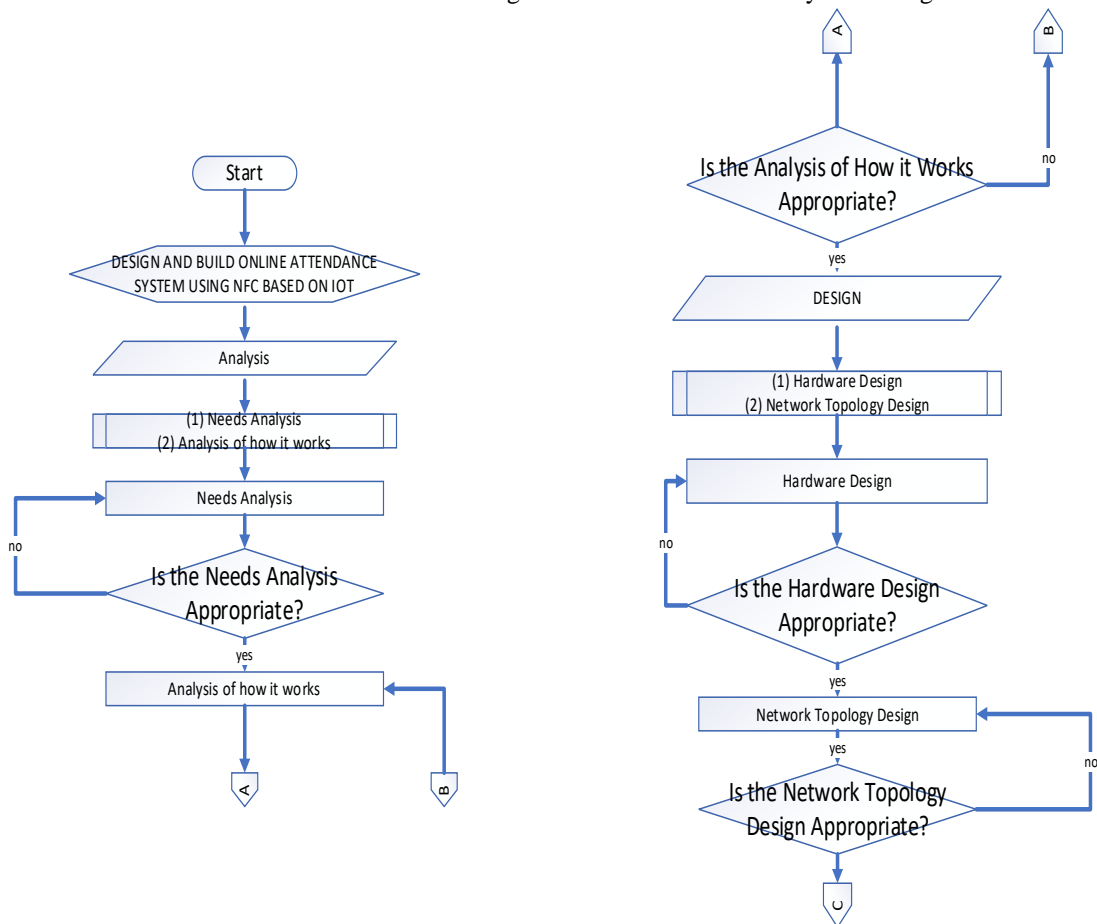
Attendance services at schools in processing student attendance attendance are still not perfect because in the previous attendance system, students were required to fill out an attendance form with their initials or signatures at the time of learning events [11]-[12]. The process of inputting and processing student attendance data is still in the manual attendance system has various shortcomings such as cheating, requires a lot of paper and ink, requires a lot of space as a storage area. These shortcomings can be overcome by utilizing semiconductor technology. In addition, the process that is carried out is quite time-consuming and energy-consuming so that this system is less effective. In this problem, the compiler will make a study and design an attendance model using the Arduino Mega microcontroller as its control module and as its input for reading



attendance, the NFC sensor PN532 is used for student attendance, when the sensor reads the student ID, if the ID matches the ID determined by the student, it is declared to be entered by the system. The formulation of this research is (1) How to design and implement a series of tools for the attendance system using NFC. (2) How to display student attendance information on the Web and test student attendance tools. The aims of this study were (1) to obtain the results of the design and implementation of a student attendance system using NFC. (2) Can display student attendance information on the Web and the results of testing tools on student attendance.

2. Research Method

The research method in research on the design of an online attendance system using IOT-based NFC



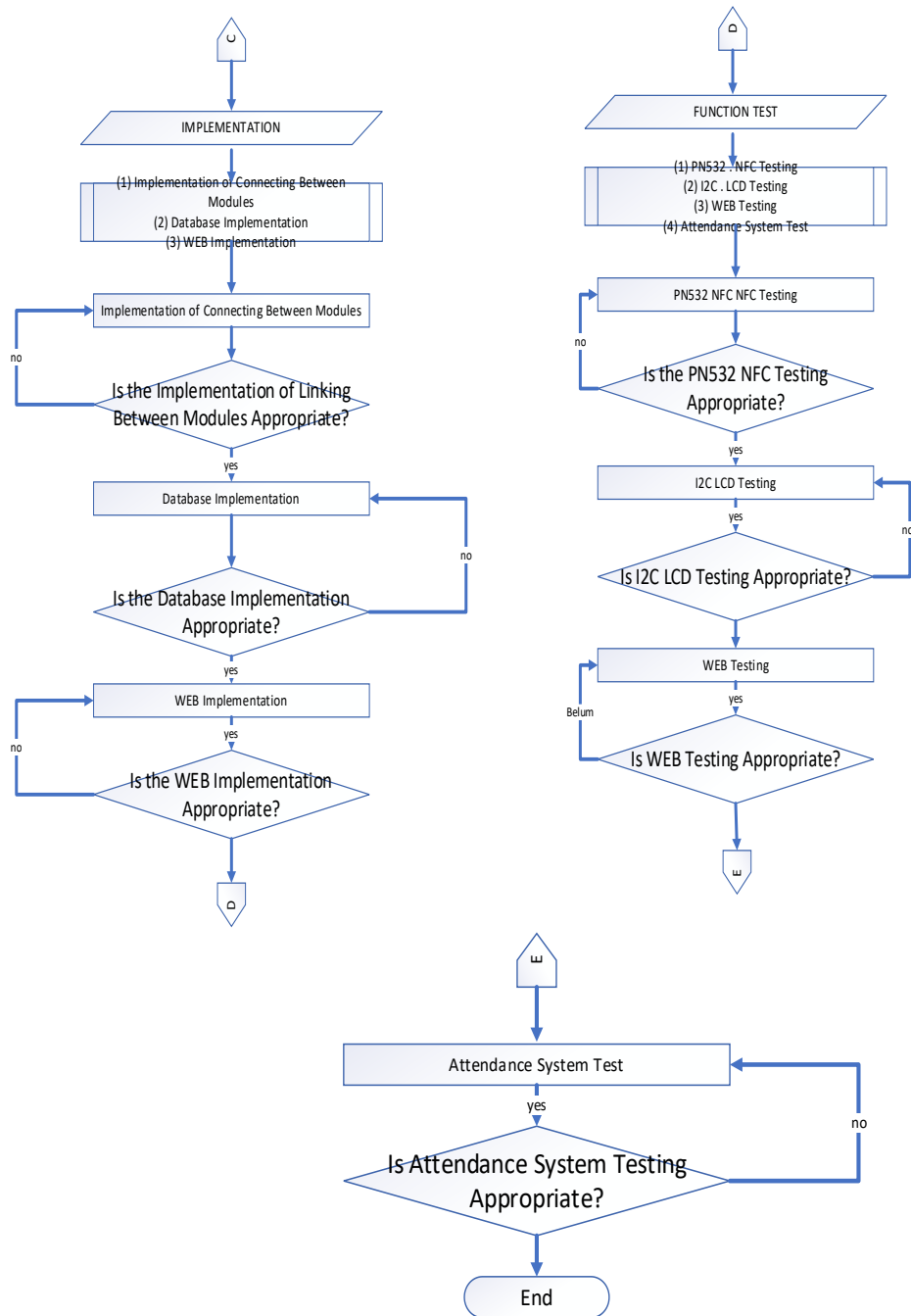


Fig 1. Research Methodology

3. Result and Discussion

3.1 Alysis of how it works

In the process of analyzing how it works, it will explain how the system works in this study. The following figure will explain the analysis of how this system works:



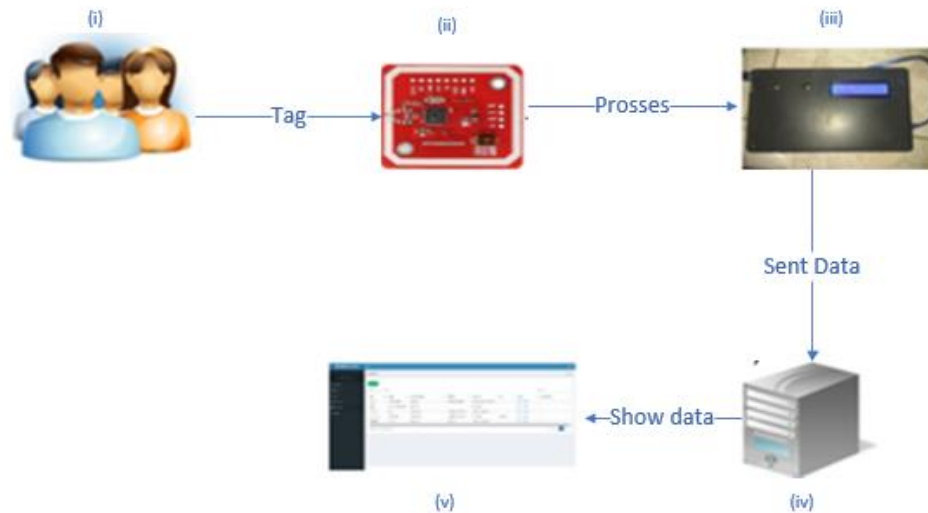


Fig 2. Analysis of how it works

Figure 2 explains how the system works in this study starting with (i) students doing attendance with id tags to (ii) NFC PN532 reading id based on student name input, then NFC PN532 will send commands to (iii) Microcontroller to receive input and then process a data that received and sends it to (iv) server as a database to manage data and then displays the data into (v) WEB Attendance to provide information to managers or users

3.2 Design

In Figure 3 it is explained that the NFC PN532 is an input, and Arduino is a process and is directly forwarded to the LCD, in Figure 3 it is explained that the NFC PN532 is for reading student attendance.



Fig 3. Overall Block Diagram

3.2 Implementation

At the implementation stage, namely the assembly or installation of all components carried out previously, they were implemented in a real system. The following are the stages of implementation that will be carried out using a flowchart as follows.

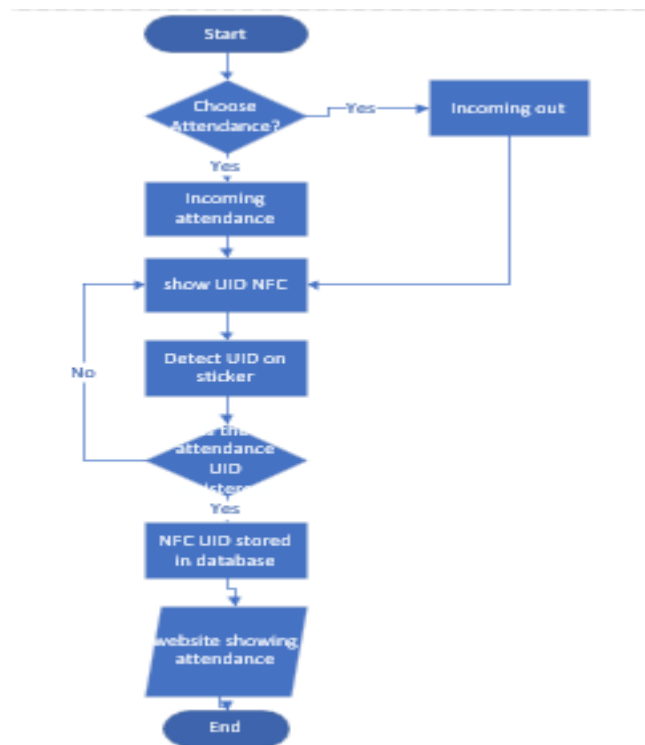


Fig 4. Flowchart of how the system works

3.4 Testing

This stage performs function testing on the NFC PN532. This test is carried out by attaching several Id Cards to the NFC PN532 which then the ID identity will appear on the serial monitor in the Arduino IDE application.

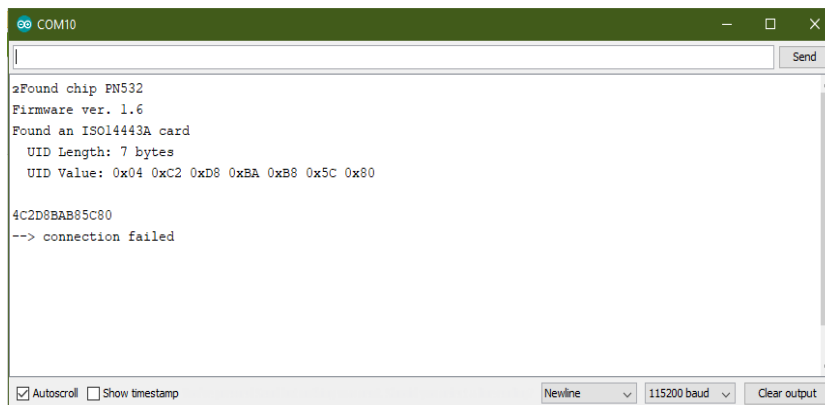


Fig 5. Serial Monitor DisplayTest results from several Id Cards on an online Attendance system using NFC PN532



Table 1
Near Field Communication Sensor Test Results

No	Card Type	ID	Read or Can Not Be Read
1	RFID Key Chain	1A9DE881	Read
2	RFID Card (Mifare)	1A9DE881	Read
3	Sticker NFC	4ECD8BAB85C80	Read
4	Sticker NFC	4E8D8BAB85C80	Read
5	E-Toll	2b345c4	Read

Table 2
Test Results for Card Type and Tapping Distance

No	Card Type	Distance	Read or Can Not Be Read
1	RFID Key Chain	1-2 cm	Read
2	RFID Card (Mifare)	1-2 cm	Read
3	RFID Card (Mifare)	3-4 cm	Can Not Be Read
4	Stiker NFC	1-2 cm	Read
5	Stiker NFC	3-4 cm	Can Not Be Read
6	E-Toll	1-2 cm	Read
7	E-Toll	3-4 cm	Can Not Be Read

4. Conclusion

Based on the research conducted, the following conclusions can be drawn (1) The student attendance information system device has been designed and implemented by connecting all modules including NFC PN532, LCD I2C, Push Button and Arduino Mega 2560. In testing this information system device it can be connected to the database and can send data of students who attend with NFC PN532 as their identity. (2) From all WEB testing using Black Box which consists of four tests including login page testing, student table page testing, class page testing, attendance page testing and overall attendance page testing obtained the appropriate results.

5. References

- [1] Fisika, D., Matematika, F., Ilmu, D. A. N., Alam, P., & Utara, U. S. (2016). *Universitas Sumatera Utara - Beranda*. <https://www.usu.ac.id/id/>
- [2] Subiantoro, & Sardiarinto. (2018). Perancangan Sistem Absensi Pegawai Berbasis Web. *Jurnal Swabumi*, 6(2), 184–189.
- [3] Savira, F., & Suharsono, Y. (2013). 濟無 No Title No Title. *Journal of Chemical Information and Modeling*, 01(01), 1689–1699.
- [4] Yahya, R., Setiyadi, A., Kom, S., Kom, M., & Bandung, J. D. (1989). *Nfc (Near Field Communication) Di Smk Icb Ct*.
- [5] Supegina, F., & Sukindar, D. (2014). Perancangan Robot Pencapit Untuk Penyotir Barang Berdasarkan Warna Led Rgb Dengan Display Lcd Berbasis Arduino Uno. *Jurnal Teknologi Elektro*, 5(1), 9–17. <https://doi.org/10.22441/jte.v5i1.758>
- [6] Education, I., Handicapped, A., & Act, C. (2019). 郑伟 1 , 张茂聪 2 , 侯洁 3. 2(7), 99–106.
- [7] Afrizal Subhan, A. (2017). Rancang Bangun Aplikasi Pembelajaran Dasar Pemrograman Berbasis Mobile Phone. *Jurnal Teknik Informatika Politeknik Sekayu (TIPS)*, 6(1), 4–19.
- [8] Claunisa, Z. C. (2019). *Pemrograman 1*. <https://doi.org/10.31219/osf.io/hs648>
- [9] Education, I., Handicapped, A., & Act, C. (2019). 郑伟 1 , 张茂聪 2 , 侯洁 3. 2(7), 99–106.
- [10] Saniman, Mukhlis Ramadhan, I. Z. (2020). Rancang Bangun Smart Glass Telemetry Tegangan Menggunakan Teknik Simplex Berbasis Arduino Nano. *J-Sisko Tech, Vol. 3*(1), 12–18.
- [11] Juhariansyah, J., Ritzkal, R. and Hendrawan, A.H., 2020. Design Of An Automatic Bell Warning System For Prayer Times In A Net Centric Computing Lab. *Journal of Robotics and Control (JRC)*, 1(3), pp.92-95.
- [12] Astuti, N.P., Ritzkal, R., Hendrawan, A.H. and Prakosa, B.A., 2020. Vehicle Security System using Short Message Service (SMS) as a Danger Warning in Motorcycle Vehicles. *Journal of Robotics and Control (JRC)*, 1(6), pp.224-228.

