THE DESIGN Of STUDENT ATTENDANCE-BASED RFID DEVICES (Radio Frequency Identification) With INTEGRATED SCHEDULING SYSTEM In COLLEGE

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ABSTRACT

The student attendance logging system at the moment is often conducted by using conventional presence form filled out by lecturers as well as students. The presence of conventional system has weaknesses at the time of reporting attendance data recap at the end of semester i.e. Recaps attendance manually. Note the System RFID (Radio Frequency Identification) is a device-based radio frequency identification which consists of three main components, namely tag or transponder, reader, and database. Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source such as a battery and may operate at hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method for Automatic Identification and Data Capture (AIDC). Because RFID has the main component is the database, then the purpose of the research is how to make the system a presence information integrated with RFID devices and scheduling system in college. The design is built using RFID devices are integrated with the Arduino Microcontroller as a data processing before sent to the server and applications built using PHP programming and mysql database by using the method of the SDLC (System Development Life Cycle). Research results in the form of a device of RFID integrated Microcontroller with Arduino and attendance information system application and scheduling a lecture.

Keywords: Microcontroller, Arduino, RFID Information Systems, Scheduling, Attendance In College.

I. INTRODUCTION

The current technological developments are so rapidly, so that the emergence of a new technology increasingly indulgent human beings. Even the sentence any Automation increasingly familiar in our ears, it does indicate that the devastating human intervention in doing a routine activity in day-to-day activities. Automation system that currently starts penetrating into the education system known as 'Smart Classroom' (Intelligent Classroom).

Conventional classroom system is usually identified with the manual attendance system regulated by a lecturer with a call on the name of each student and noted its attendance at the book. Likewise, in the system the use of the classroom, usually there are officers who serve to open classrooms which started from the early hours of tuition up to the end of the hour lecture that is locking the Lecture Hall as a classroom safety rules. And also

in the utilization and management of electric power energy wastage occurs frequently in both the use of lights and air conditioner that sometimes those devices be left switched on from the beginning of the hour lecture hours, until the end of the lecture, both in the circumstances there was no class hour lecture or lecture there.

Therefore required a smart classroom management system that integrates information and automation system in efficiency attendance, security and energy in the activity room. Information systems in regard of this research are focused to the student attendance information system integrated automation system based RFID (Radio Frequency Identification).

RFID is a technology that utilizes radio frequency automatic identification as against an object. RFID can be seen as one way of labeling an object explicitly by using the computer equipment. In other words, RFID is technology catching up data that can be used electronically to identify, track and store information that is stored in the RFID tags [4].

According to Ahson [1] that the advantages of RFID with bar code are a unique Identifier in the RFID can serve as a pointer towards the entry database which stores much of the history of transactions for individual items and RFID can be read without a contact line-of-sight and without placement precision. An RFID reader can perform scans against RFID tags as much as hundreds per second.

While according to Bhudtani [2] that "the outline of an RFID system consists of three main components, namely, tag, reader and database (as seen in Figure 2.1)". In summary, the working mechanisms that occur in an RFID system is that a reader conduct the radio frequency scanning against the data stored in the tag, and then sends that information to a database that stores the data contained in the tag. The main components of an RFID system can be seen in Figure 1

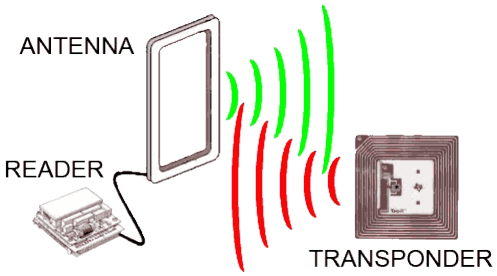


Figure 1. The Main Components Of An RFID System

An RFID tag or transponder consists of a microchip and an antenna, (as seen in Figure 2). The microchip itself can be sized as small as a grain of sand, about 0.4 mm. Chip storing a unique serial number or other information depending on the type of memory. Type of memory itself can be read-only, read-write, or write-once read-many. The antenna attached microchip send information to the RFID reader. The reading range is typically indicated by the magnitude of the antenna. A larger antenna as indicating further reading range. The tag is attached or embedded in the object to be identified. The tag can be scanned with RFID reader is moving or stationary.

Figure 2. RFID tags or Transponders

According to Milles [5] in order to proper functioning of the RFID system, that needed a reader or a scanning tool can read the tags correctly and communicate the results to an existing database. A reader uses its own antenna to communicate with the tag. When the reader emits radio waves, all tags which are designed for the frequency as well as be in the range of reading will give you a response.

A reader can also communicate with the tag without a direct line of sight, depending upon type and radio-frequency tag (active, passive or semipasif) is used. The reader can process many items at once. According to its form, the reader can be a reader moves like handheld equipment, or stationary equipment such as point-of-sale in the supermarket. Its storage capacity is based on distinguished reader, that processed the capabilities, as well as the frequency which can be read. In a reader, there is a chip that functions as the antenna of the reader. One of the frequently used chips is a chip ID-12 Innovations as shown in Figure 3.

Figure 3. Innovations ID-12 Device as RFID Reader

Information systems course at this point has conducted a lot of research on them is the system the presence of professors who could provide information services to the academic part of the professor's presence and students. System information service the presence of the professors built desktop and web-based, so the information is very easy to access. The system was developed by I Gusti Agung Rai Sugiarta and Ni Nyoman Harini Puspita from STIKOM-Bali [4].

Beside that, there is research that has been developed that is, a student attendance system in a case study on College Mathali'ul Falah Islamic Party, Central Java with the result that is the system that is built can be a good information center for teachers, administrative

part, counseling, as well as the parties that requires absences students to search for information. The information generated from the system that is built can be accessed by anyone who has the authority of the system and can be accessed from the work unit or section respectively. By using the database as a data storage Center, then attendance information is recorded into the system can easily be shown again using the filter parameter of the specified data. Triwahyuni [7].

Unlike the research that has been conducted by the University of Kristen Maranatha where attendance system Design is the application of computer lab course using the system user verification at Kristen Maranatha University, where the result obtained is the system can store student information consisting of name and student number student computer information, store consisting of computer's IP and the name of the computer, computer usage information, can block access by users who do not have or are not listed. A system developed by Radiant Victor Imbar and Robby Kurniawan [6].

II. THE METHODOLOGY

Attendance information system built by using an RFID system with reports of attendance - based on android applications. This system consists of the information system of student absences and attendance system where professors identified the presence of using RFID cards from each of the participants of the lecture both students and lecturers. Identification of data placed on a database server that has been integrated with the information system based on Java technology is built. Reports results as can be seen on the side of the admin or the attendance information system operators on the server side or by the lecturer through the web. Information systems student attendance in Flowmap-based RFID can be seen in Figure 4.

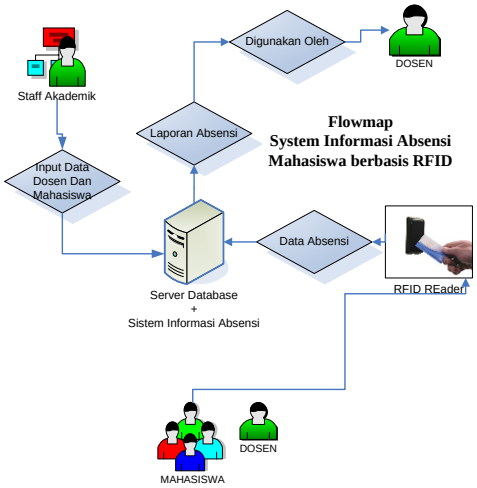


Figure 4. The Student Flowmap Information systems attendance based on RFID

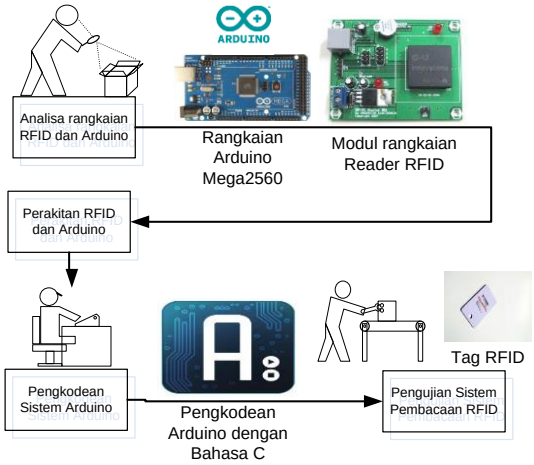


Figure 5. The analysis and design flow system of RFID based on microcontroller

The design of system for attendance information system generated in the form of context diagram as shown in Figure 6. It can be explained that the system generally only implemented by three users, including academic staff, students and lecturers. From the academic staff responsible for input data units, courses, professors, students, space and schedule, while student attendance data input using RFID tags. Next up on the side of the lecturer just access the data report absences.

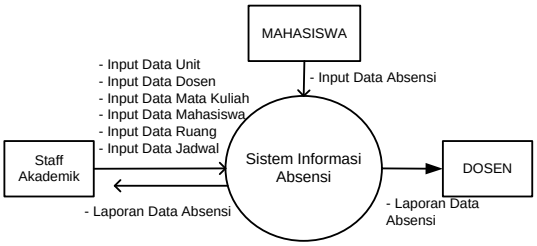


Figure 6. Context Diagram

The next design is the design of the Diagram Rekationship Entity can be seen in Figure 7 can be explained that the entities in the system has a relationship between other entities as well as Entity Relationship Diagram in Figure 5. There is a State of interconnected tables include tables of Prodi, table spaces, tables, table of courses, academic year table, table, user table, the lecturer's table to grab the schedule and schedule table.

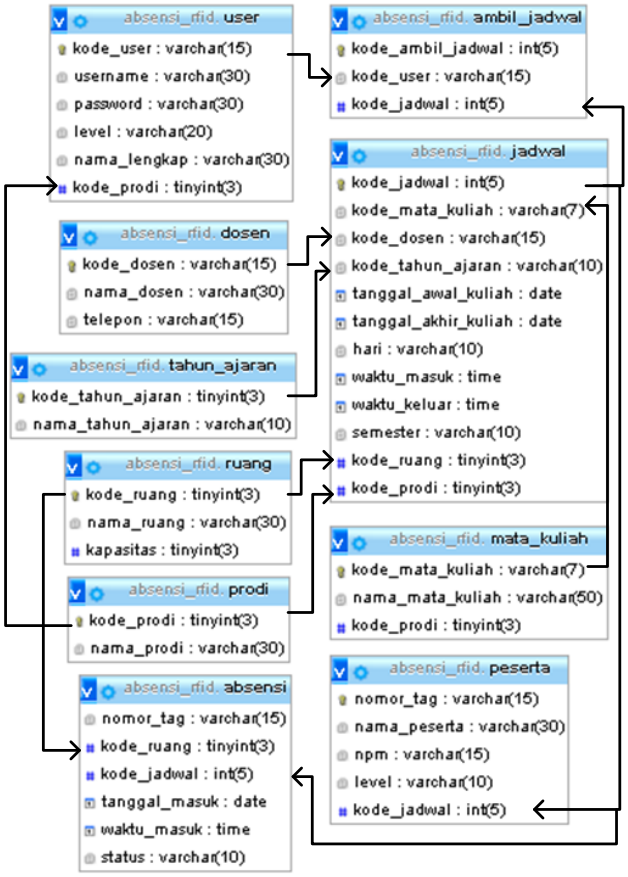


Figure 7. Entity Relationship Diagram

III. RESULTS

RFID reader system design results associated with the Arduino microcontroller can be seen in Figure 8. On the system of data storage systems the user stored on the EEPROM. RFID tags that are read by an RFID reader will be confused with user id data that has been stored in EEPROM, if there is no similarity Tag id and user id found in the Microcontroller's data means attendance success saved.

Figure 8. The Results Of The RFID System Design

The attendance and scheduling information systems of the College has been built with the results and discussion as follows. Results and discussion the results page is divided into input data and reports page.

On the page lists of the lecture schedule, user data are input school year, tuition schedules. Data is duly stored by pressing the save button. The stored results will be shown on the page view is located beside the form filling. To perform the update and delete them on page view there is the edit button and remove it. On the data before the update action will be shown in the form of updates and user instead of just the data you want to be updated, if it has been completed then the user can press the update. The results was updated can be seen on the display view. This page can be seen in Figure 9.

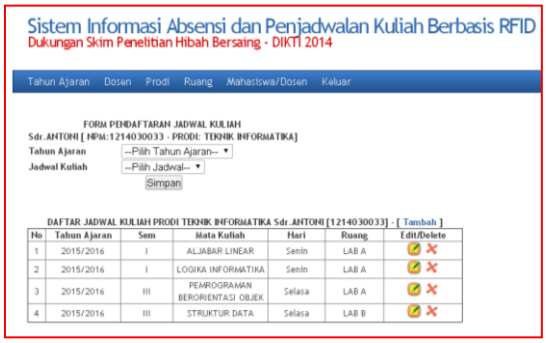


Figure 9. Lecture Schedule registration page

On the schedule page, the user will input the data of the academic year, semester, courses, professors, College start date, end date, days, time entry, time out and spacious.

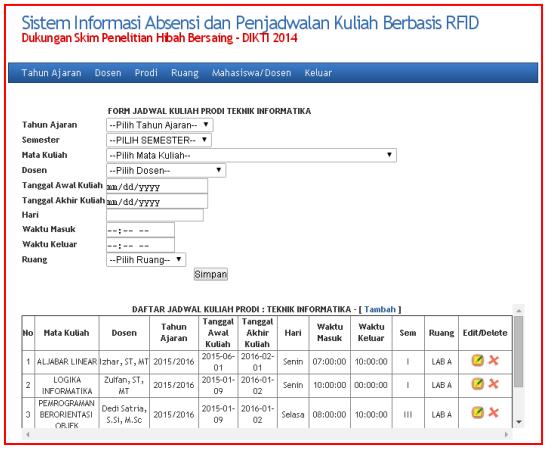
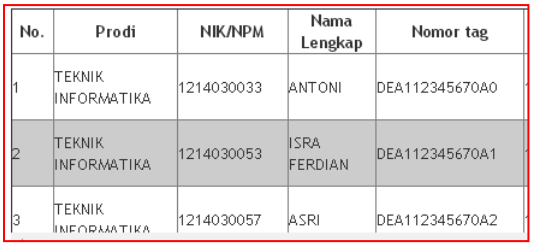


Figure 10. Lecture Schedule page per Prodi

Reports results as seen in Figure 11. With ordinal number information, Prodi, NIK, full name and RFID tag number.



No.	Prodi	NIK/NPM	Nama Lengkap	Nomor tag
1	TEKNIK INFORMATIKA	1214030033	ANTONI	DEA112345670A0
2	TEKNIK INFORMATIKA	1214030053	ISRA FERDIAN	DEA112345670A1
3	TEKNIK INFORMATIKA	1214030057	ASRI	DEA112345670A2

Figure 11. Attendance Report

IV. Conclusion

The conclusions of the design of a system of absentee by using their RFID has been successfully designed by integrating information systems lecture attendance and scheduling system with RFID tag readers. The results of the design of the system in the form of form data is prodi, form data, data form data form, participants of courses, academic year form, form lecturer, form user, form took the schedule and schedule form. The entirely of a Web-based interface built with PHP programming and mysql database through data storage.

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