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Attendance Management system using RFID Technology

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Abstract: Attendance management is a problem commonly faced by companies, management using a manual system still causes problems. The problem that is often faced is the difference in employee attendance data reports because they have not been well integrated. The purpose of this study was to design an employee attendance information system at PT. Kartika Utama Semarang. From the above problems, a system is needed to integrate these needs automatically and is managed entirely by a computer using an RFID system in it so that the leadership can monitor attendance and payroll in real time. The application of the author's research and development (R&D) research method in this study. This research resulted in an information system application to facilitate the management of attendance and payroll of PT. Kartika Utama Semarang.

Keywords: Information System, Attendance, Payroll, RFID

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1. Introduction

Technological developments are step forward from in the era of globalization where is science and technology. Science and Technology is highly relied upon by the world community in any field today. This is due to the growing development of human thinking about technology so that humans are able to create technological innovations like today which are useful for helping humans to make it easier to deal with problems related to science and technology [1]. The rapid development of computer technology as a means of processing data and information is used in almost all fields, make information and data processing as part of an organization that is fast, accurate and has data storage features that are supported by guaranteed data security with an efficient computer system so as to produce a fast and reliable information data [2]. Over time, Radio Frequency Identification (RFID) was developed as one of the many new technologies to make it easier for humans to identify various things. This technology consists of a special chip-shaped tag with a unique information code and a reader that reads the tag code. This system was originally designed to replace product barcode technology, but as it develops, it can be applied in other areas and adopted as a method that will be used in large numbers in the future [3].

Every institution engaged in the industrial sector, the increasing use of information in all fields is strongly influenced by the rapid development of information technology today, one of which is at PT. Kartika Utama Semarang. PT. Kartika Utama Semarang is a fishery company that produces canned crab

products for the United States, European Union and Japan target markets. PT. Kartika Utama Semarang is a fairly large company with a large number of employees. The company is run by a factory manager who oversees seven departments, seven of which are run by managers assisted by staff.

The condition faced by this company is that all activities related to attendance, performance appraisal and payroll have not been computerized properly. The process of recording employee attendance and payroll at PT. Kartika Utama Semarang still uses manual attendance, employees arrive before 08.00 am and finish after 04.00pm beyond that hour, the employee is calculated overtime with overtime wages of Rp.8.000/hour. The employee performs the process by taking the timesheet on the timesheet rack next to the attendance machine, then inserting the card into the attendance machine slot for processing which will produce information on when the employee enters and leaves work. If the card is not filled in on time, the card will be printed in red ink as a sign of delay.

The use of the attendance machine which is still manual using this machine is also sometimes damaged, and while the attendance machine is under repair, each employee takes attendance by writing his name and signature on a piece of paper. As a result, the calculation of working hours and overtime hours is not accurate. Periodically the administration section takes attendance card sheets and combines the data into a spreadsheet on the computer. Each of these processes is repeated without making many changes to the attendance and payroll processes. A fully automated reporting process like this is actually very suitable for management with computers that are integrated by an RFID system in it so that managers can monitor attendance and payroll reports in real time per company branch [4].

2. Method

2.1. Information System

In general, an information system is defined as a system consisting of a series of information subsystems from data processing tests to produce useful information for the decision-making process [5]. Information Systems is a system inside organization which is a combination of person, facilities, technology, media, procedure, and control which aim for look after communication line main, processing type certain routine transactions, signalling managerial and soon as a result of a past event Sending important external factors to external events for the purpose internal and other and provide base information for decisions that appropriate [6]. Information system terms refers to use of computer technology in a organization for provide information to user. Information Systems "Computer Based" is a collection of hardware and software designed to transform data into useful information useful. Information Systems is gathering subsystem physical and non-physical mutually related, functioning in harmony, which achieves one purpose processing data into information useful. Consists of building block components consisting of block input, block model, block outputs, block technology, block database, and block control. Six blocks must interact to achieve destination in one units [6]. Figure 1 is an information system block that interacts with each other.

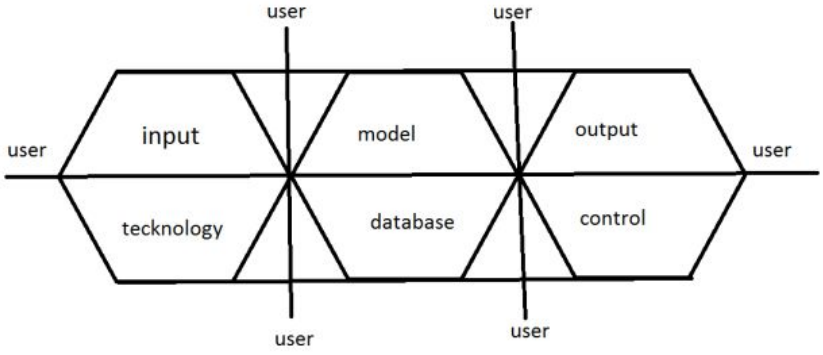


Figure 1. Building Block

2.2. Attendance

Attendance is data collection that is used as evidence of employee attendance at work. According to the Big Indonesian Dictionary, absenteeism is absence or absence. As proof of employee attendance at work, it is mandatory for employees to register attendance times independently on the form available when arriving and returning from work [6]. Absence is also a routine pattern of absence from duties or obligations. Absenteeism has long been a violation of an implicit contract between employer and employee and as an indicator of lazy individual performance. Absence can be considered as an administrative problem from an economic point of view [7].

2.3. Radio Frequency Identification (RFID)

Radio Frequency Identification (RFID) is a wireless identification system that can process non-contact data such as barcodes and magnetic cards such as ATMs. Figure 2 shows an example of RFID JT308 Card Reader USB 125KHz. RFID technology is suitable for automated processes because it is easy to use. RFID combines advantages not found in other identification technologies [8].

Figure 2. RFID JT308 Card Reader USB 125KHz.

Close object identification relation with data collection. One of the most advantageous identification methods is Auto-ID or automatic identification. That is, the collection procedure data with identify objects automatically without human involvement [9]. Auto-ID automatically works to increase efficiency and minimize data entry errors. Human resources can be focused on other areas because Auto-ID can work automatically. Technologies that utilize the Auto-ID method include barcodes, smart cards, voice recognition, biometric identification such as retinal scans, Optical Character Recognition (OCR) and Radio Frequency Identification (RFID) [10]. *Radio Frequency Identification* (RFID) is a method of identification with radio waves. The identification process includes an RFID reader and an RFID transporter (RFID tag). An RFID tag is embedded in the object to be identified. Each RFID tag has a unique identification number (ID number). It is certain that there are no RFID tags with the same ID number. How it works RFID reader reads the ID number contained in the RFID tag to identify object items [11]. Generally, the RFID system consists of 3 parts, namely:

1. RFID Tags

   Tags RFID available in the form of decal, paper, or plastic and is available in various size. Every tag containing chips and antenna which could keep number ID and some information certain.
2. Antenna

   Used for send radio frequency signal between reader RFID and RFID tags. because of the tag RFID and reader's RFID is a transceiver, tags RFID and reader RFID each have an antenna internal itself.
3. RFID reader

   Radio Frequency Identification (RFID) read number ID and information other saved by RFID tags. Reader RFID must be compatible with tags RFID to read tithe author uses RFID special to detect tags Low frequency passive RFID. This is reader RFID125 KHz.

2.4. Development style

In developing employee attendance information systems requires careful preparation and planning. The development of this information system refers to the development model Research and Development (R & D) as the basis for product development. Design Development R & D has a goal for product development and validation. According to steps to implement the R&D strategy are carried out to test the effectiveness of the product [12]. The research and development steps are as follows: (1) Potential and Problems, (2) Data collection, (3) Product Design, (4) Design Validation, (5) Design Revision, (6) Product Test. The chart of research steps used in product development is shown in Figure 3. From the scheme above, the author makes a work plan taken from Borg and Gall methods, including:

1. Analyzing the potential and problems contained in PT. Kartika Utama Semarang.
2. Carry out data collection using several approaches.
3. Designing the initial design of the system development to be developed.
4. Submission of the system design that the author made which can then be validated by experts/experts.
5. Revision of the system design that has been designed based on input and suggestions from experts/experts.
6. The system trial is in the form of an application that has been made by the author by the user, the intended user is an authorized device at PT. Kartika Utama Semarang.

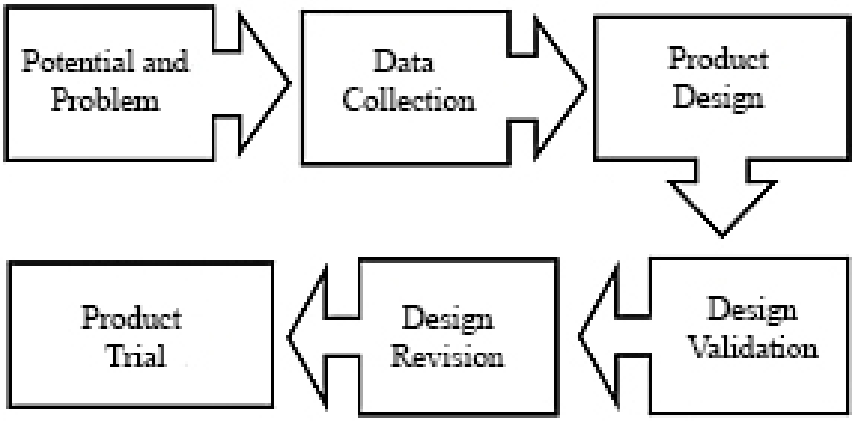


Figure 3. Product Development Procedure

3. Results & Discussion

The Design of this system aim of developing an old system that is customized to the needs company related to problems that faced by the company. In designing the new system, several main steps need to be taken, namely conducting data analysis and evaluating the system that has been used by the company.

3.1. ERD (Entity Relationship Diagram)

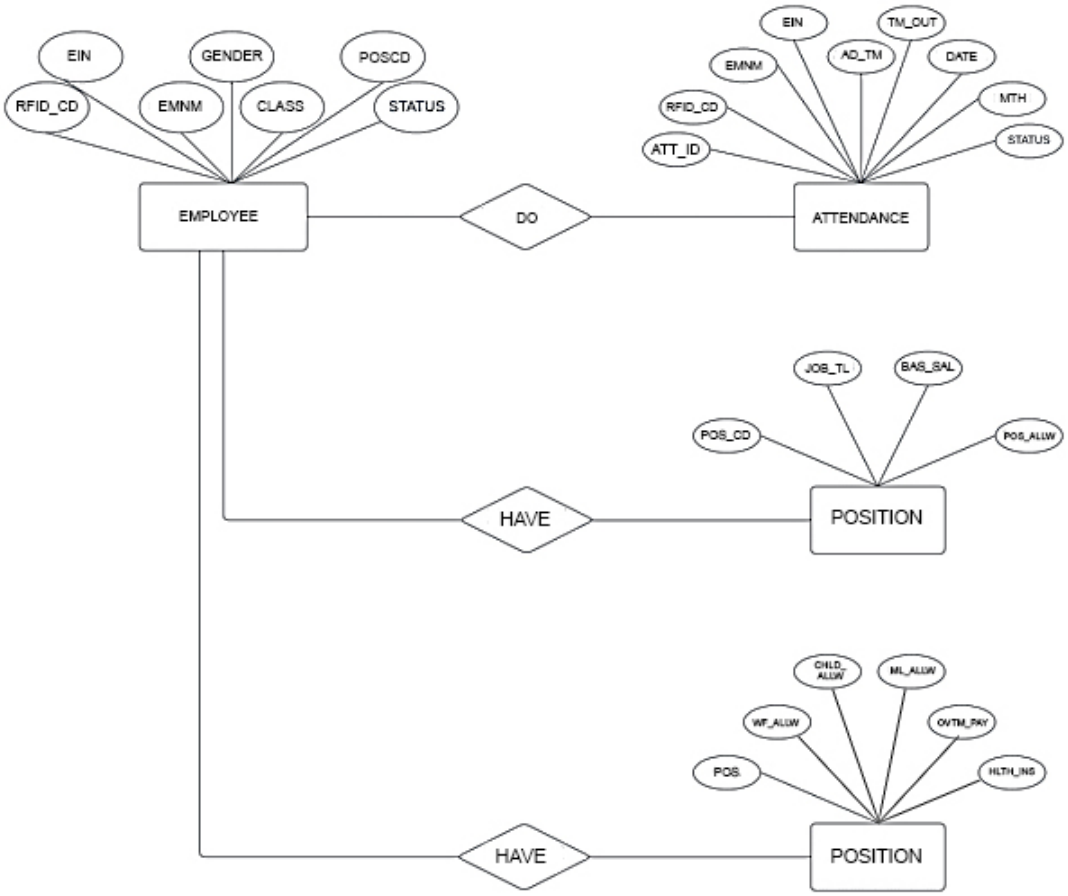


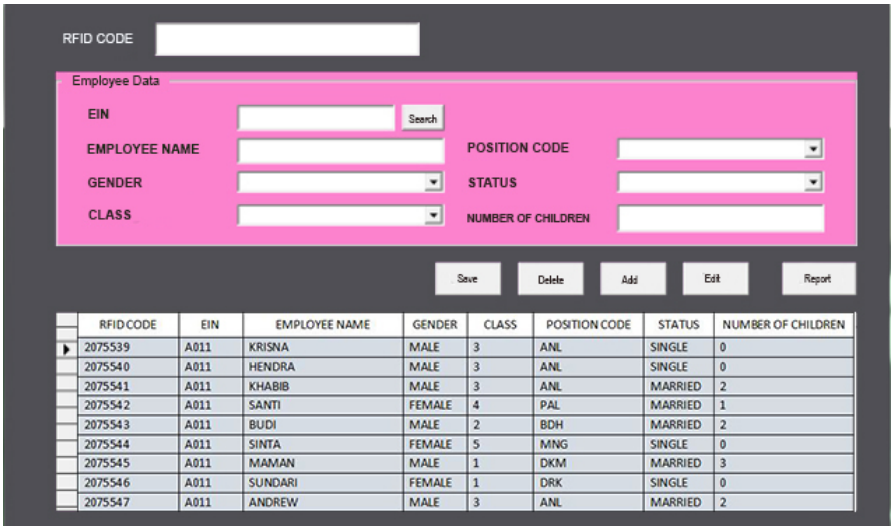
Figure 4. Entity Relationship Diagram

Figure 4 shows the Entity Relationship Diagram (ERD) which is a data modelling design or system in databases. The function of ERD is to model structures and relationships among very complex data on the system created by PT. Kartika Utama Semarang. The existence of an ERD system is very important for companies to manage attendance employee data.

3.2. System Implementation

From the results of the system design that has been carried out, the implementation of the Project Evaluation and Review Technique can be implemented as follows. Figure 5 shows the login page. Figure 6, 7 and 8 show the employee data input page, employee class page and employee job page, respectively. On the other hand, the attendance form page is shown in Figure 9.

Figure 5. Login Page



RFID CODE	EIN	EMPLOYEE NAME	GENDER	CLASS	POSITION CODE	STATUS	NUMBER OF CHILDREN
2075539	A011	KRISNA	MALE	3	ANL	SINGLE	0
2075540	A011	HENDRA	MALE	3	ANL	SINGLE	0
2075541	A011	KHABIB	MALE	3	ANL	MARRIED	2
2075542	A011	SANTI	FEMALE	4	PAL	MARRIED	1
2075543	A011	BUDI	MALE	2	BDH	MARRIED	2
2075544	A011	SINTA	FEMALE	5	MNG	SINGLE	0
2075545	A011	MAMAN	MALE	1	DKM	MARRIED	3
2075546	A011	SUNDARI	FEMALE	1	DRK	SINGLE	0
2075547	A011	ANDREW	MALE	3	ANL	MARRIED	2

Figure 6. Employee Data Input Page

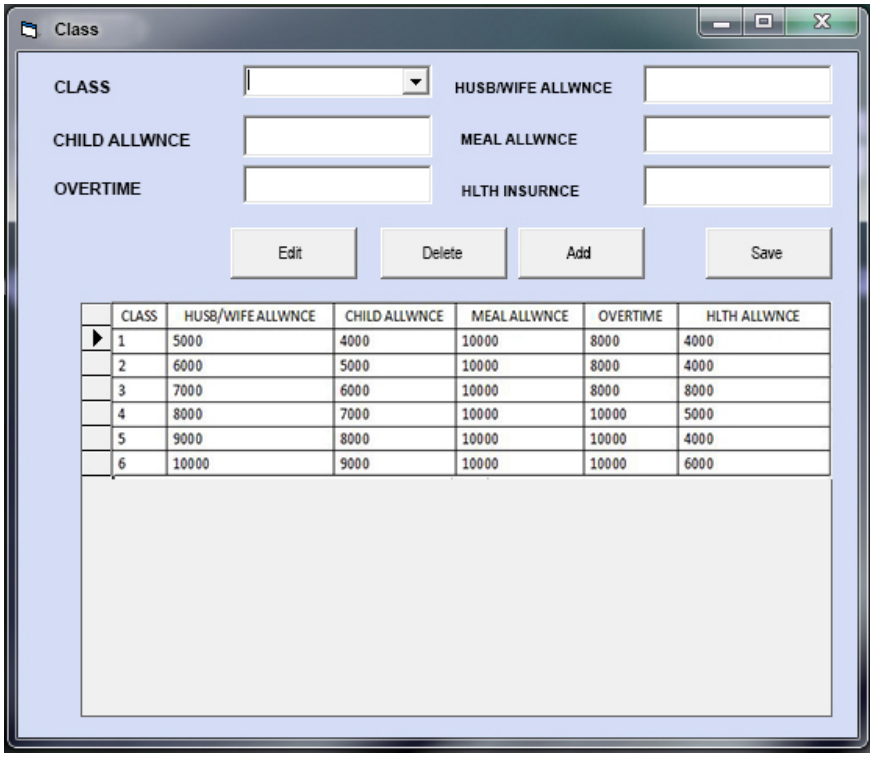


Figure 7. Employee Class Page

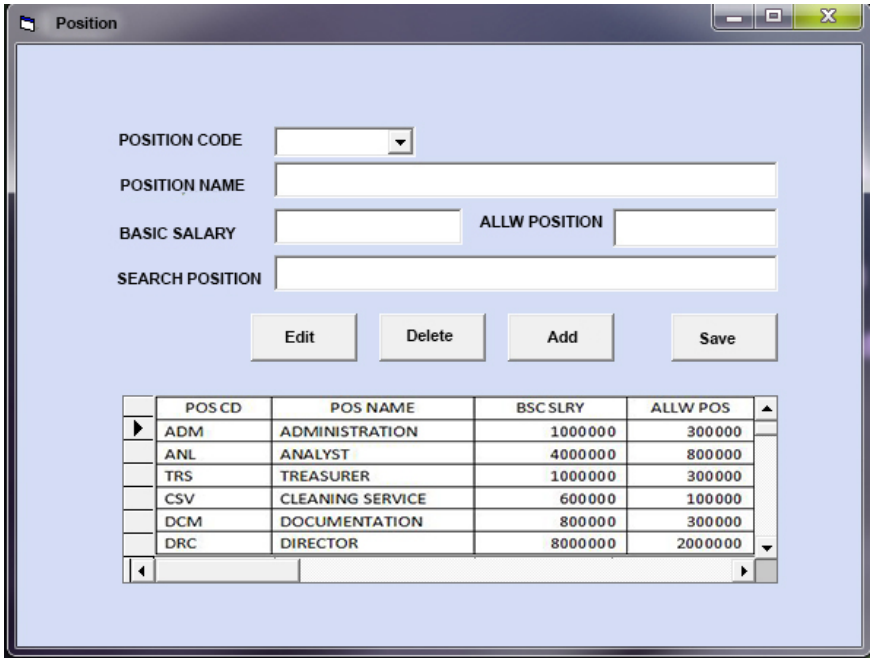


Figure 8. Employee Job Page

Figure 9. Attendance Form Page

3.3. System Testing

Test run for verify that systems are designed and built to meet the specifications pre-set. This test uses the method by running the system directly from a multi-user PC/laptop and using Visual Basic6.0 to access the information system. In attendance system, the stages used are input, process and outputs. Administrator or employee are required to login first to be able to access the system. After logging in, administrators or employees can access several menus including employee data input, incoming attendance, outgoing attendance.

4. Conclusion

Employee attendance information system developed with RFID can facilitate attendance employee in PT. Kartika Utama Semarang. This multiuser attendance information system makes it easier for leaders to monitor attendance in real time, so that the employee attendance system can run effectively and efficiently.

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