

Web-Based Payroll Application Design and Development Using Rapid Application Development

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Abstract

Payroll is a system used by a company to manage the payment of the employees. The payroll system makes it simpler for HR to pay all employees' salaries each month. It is challenging for employees who work from home (WFH) to be present due to the COVID-19 epidemic. The HR department needs help overseeing and monitoring employee absences and regulating compensation. In response to these issues, a web-based information system was developed to simplify employee attendance tracking and to aid the Human Resource Division's (HRD) supervision and management of staff tasks and compensation. The system has undergone testing in the employee attendance phase, the validation process by the HRD Division and checking the results of the test and several factors starting from logging in to the payroll reporting process and the results of the UAT test on average meet the success rate indicators to be implemented into the company.

Kata kunci: information system, payroll, rad, wfh, hrd

Abstrak

Payroll merupakan sistem penggajian yang dilakukan oleh perusahaan kepada karyawan. Sistem payroll memudahkan Human Resource Division (HRD) untuk mengelola gaji karyawan setiap bulannya. Dengan adanya pandemi COVID-19, karyawan yang bekerja secara Work from Home (WFH) mengalami kesulitan untuk melakukan absen dan divisi HRD juga kesulitan dalam memantau dan mengawasi ketidakhadiran karyawan, serta mengelola gaji karyawan. Dengan permasalahan tersebut, maka dibuatlah sistem informasi berbasis web yang dapat mempermudah pegawai dalam melakukan absensi serta dapat mempermudah HRD dalam mengawasi dan mengelola aktivitas dan gaji pegawai. Sistem yang dibangun ini telah menjalani pengujian pada fase karyawan melakukan absensi, proses validasi oleh divisi HRD. Pengujian dilakukan mulai dari login sampai proses pelaporan penggajian menggunakan UAT. Pengujian sistem dengan UAT menunjukkan hasil rata-rata memenuhi indikator tingkat keberhasilan untuk diimplementasikan ke dalam perusahaan.

Keywords: sistem informasi, payroll, rad, wfh, hrd

1. INTRODUCTION

In 2021, Indonesia deal with several problems as a result of the Covid-19 Pandemic, such as health, economic and social problems which greatly affect the atmosphere of human life.

Covid-19 was first discovered in Wuhan City, China, at the end of 2019. In Indonesia, there are more than 47,899 people infected with Covid-19 [1]. In the economic sector, work from home (WFH) is implemented during the outbreak of COVID19. However, WFH is said to have advantages and disadvantages that must be accepted by both the organization and its employees. Some benefits for employees are a balance life between work and family, reduced travel time and fuel savings, and the opportunity to set working hours and choose their work environment. Some benefits for the organization included increased morale, reduced laziness and absenteeism, and improved company image as a workplace that impacts employee performance during the Covid-19 pandemic. In the other side, employees are also found difficulties in communicating with their colleges, especially for some cases that cannot be solved by online meeting [2][4].

Information systems have been implemented not only in established companies but also in small companies. Information systems have become crucial for companies of all sizes to remain competitive and stay caught up to their rivals. Implementing information systems can affect all users within a company, from low-level employees to top management, who use the operating system daily [10]. These systems are used by small and large businesses alike to maintain their competitiveness in the ever-evolving technological landscape. Micro, Small, and Medium Enterprises (SMEs) play a significant role in the Indonesian economy, with the number of SMEs reaching 65.47 million units in 2019, an increase of 1.98% compared to the previous year's 64.19 million units [11].

PT Hartono Istana Teknologi is a private company located in Kudus that must comply with government regulations in carrying out work arrangements during the Covid-19 pandemic. The problem at PT Hartono Istana Teknologi was during the Covid-19 outbreak, it caused employees to do WFH and made it difficult for the company to monitor employees' attendance and productivities. Meanwhile, the employees used to do manual attendance by signing attendance paper. A web-based "payroll" information system is needed to make it easier for employees to take attendance online, which is directly integrated with employee salaries, and can make it easier for HRD to supervise and manage employee activities and payroll [5][9].

2. METHOD

2.1 Framework of thinking

Research stages are shown figure 1. The development process indicated software development stages [14]. Based on Figure 1, there are four research stages i.e., requirements planning, RAD design workshop, instruction, dan implementation.

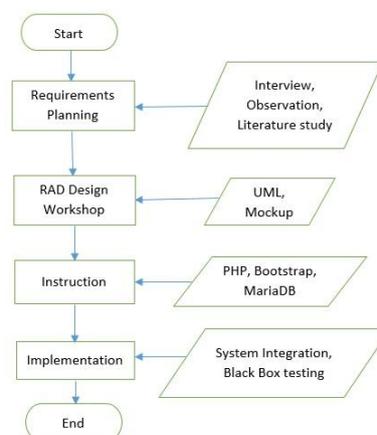


Figure 1. Framework of thinking

Requirements Planning

System and user analysts should be brought together. In conjunction with the problem orientation, the objectives and requirements of the system are determined. An idea and solution are presented to address the problems of PT Hartono Istana Teknologi through a web-based information system that can facilitate HRD to monitor and control employee actions and compensation.

RAD Design Workshop

As a team, systems analysts and programmers build a system that will be created from the outcomes of system requirements in the earlier stage. Visual representations and patterns of how the system works are the outcomes. The results are presented as prototypes (mockups), ER Diagrams, and UML. Before going on to the next step, the user reacts to the system to obtain results for design improvement.

Instruction

The proposed web-based payroll application is designed by using ER Diagrams, UML, and mockups. To generate the database, and ER Diagram will be used with SQL. UML and mockups are implemented using the PHP and Bootstrap programming frameworks as well as a selection of libraries the PHP and bootstrap programming frameworks and a selection of libraries, UML and mockups are implemented.

Implementation

Once system integrates each component of the application. Then, each software unit will be tested using the Black Box Testing; each application unit will be tested. Systems analysts, programmers, and users who work jointly on system usage training on system usage training involve systems analysts, programmers, and users [12], [13].

2.2 Rapid Application Development

The proposed web-based pay-roll development applied Rapid Application Development (RAD) method as shown in figure 2. The design process is created using use case diagrams, activity diagrams, mock-ups, and implementation [6]. RAD development phases in Figure 2 consists of requirements planning, RAD design workshop, instruction, dan implementation.

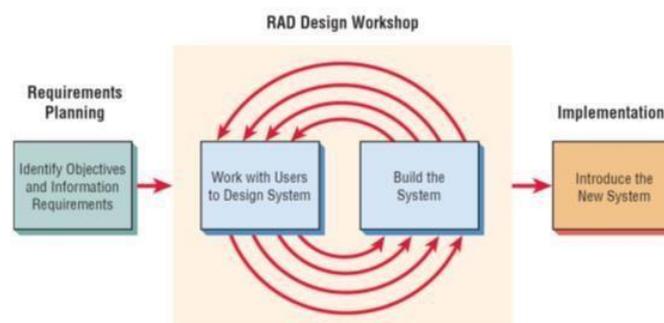


Figure 2. RAD development phases

Requirements Planning. This phase is done by interviewing Mr Adhi Krisna Dermawan as a supervisor at PT. Hartono Istana Teknologi to determine the requirements and features of the proposed application. **RAD Design Workshop** is developed by creating a workflow using use case diagrams, activity diagrams, and mockups. The results of the design then discussed with the user to get approval according to the flow of the system that has been made. This phase is continued by website development using JavaScript, Bootstrap, phpMyAdmin, and PHP. **Implementation** phase is conducted by implementing UAT test using the Black Box method to find out the input and output results of the system that had been built.

3. RESULT AND DISCUSSION

3.1 Requirements Planning

Based on the results of the conducted interviews, there were several problems as the impact of the COVID-19 pandemic. The first problem is that HRD needs to know employees' check-in and check-out time when employees do WFH and must manually crosscheck their attendance via WhatsApp. The second problem is the need to record employees' check-in and check-out time because currently HRD need to work hard in calculating the salary and overtime payment [6]. These requirements are divided into non-functional requirements and functional requirements as shown in table 1.

Table 1. Non-functional requirements and functional requirements

User Requirements		
Non-Functional Requirements		Functional Requirements
Operational Requirements	<ul style="list-style-type: none"> • Payroll system can run well using different browsers • Payroll system connected to MySQL database • Payroll system can import png, jpeg, jpg, and gif files • Payroll system can export pdf files 	Admin <ul style="list-style-type: none"> • Manage employee master data (Add, Edit, Delete) • Manage position master data (Add, Edit, Delete) • Manage allowance master data (Add, Edit, Delete) • Manage leave type master data (Add, Edit, Delete) • Add salary (Add, Delete, Print) • Perform absence / leave / permission validation • Display attendance reports (View, Print) • Display salary reports (View, Print)
Security Requirements	<ul style="list-style-type: none"> • Users cannot access other employees' personal data except user with admin access • Provide information on user errors and passwords if the user fills in the password or user incorrectly 	Employee <ul style="list-style-type: none"> • Do attendance check-in time (Add) • Do attendance check-out time (Add) • Application for sickness/permission / leave (Add) • Display payslips (View, Print)
Cultural and Political Requirements	<ul style="list-style-type: none"> • No special cultural and political requirements are anticipated 	

3.2 RAD Design Workshop

After being completed in the first phase and having been examined, it is next necessary to implement the Unified Modeling Language (UML) model, such as use case diagrams (Figure 3), activity diagrams, and class diagrams (Figure 8) for establishing the payroll process flow.

Figure 3 showed a use-case diagram of the payroll application system. In this diagram, two actors play a role in controlling or playing a role in using the payroll system for updating personal data, namely admin and employee. Admin has a role in managing employee master data, managing job master data, managing benefits master data, managing master leave types, add

salary, and validating absences. The employee’s role is to perform attendance, view attendance data, apply for leave or permission and view payroll data [3],[8].

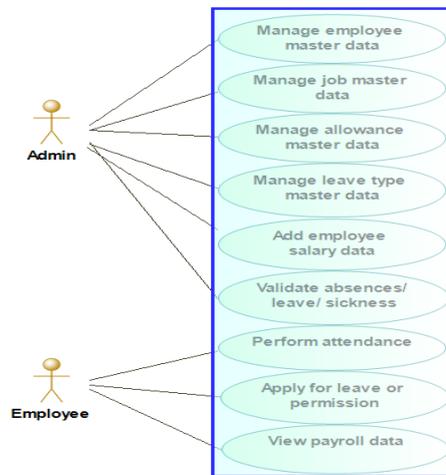


Figure 3. Use Case Diagram

Activity diagrams are used to describe the overall workflow of all processes in the system. Activity diagram of the proposed system consists of add salary (figure 4), employee attendance display (figure 5), check in (figure 6), and check out (figure 7).

Figure 4 showed the entire series of admin processes to increase employee salaries. In the first process, the admin selects the finance menu, goes to the employee payroll menu, displays all the allowance data, and presses Add Salary. When clicked, it will fill in the employee code and state the employee’s salary. The admin can only add a bonus if the data is stored in Artemis and the job data menu is displayed.

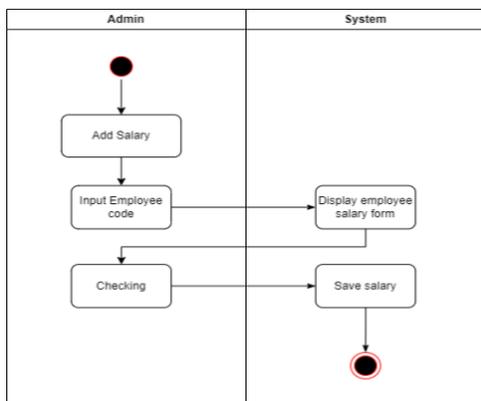


Figure 4. Activity diagram add salary

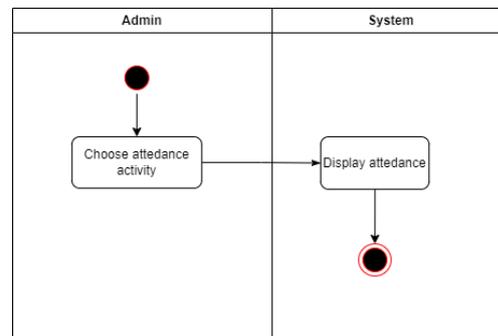


Figure 5. Activity employee attendance display

Figure 5 explained the entire series of admin processes to view or display all employee attendance. In the first process, the admin selects the attendance data menu and then displays all the missing data and the tasks r activities that company employees have carried out.

Figure 6 describes employees’ entire process doing absent entry/check-in. In the first process, the employee selects the missing data menu and displays the lacking data menu. The employee presses the absent entry, and the data will be stored in Artemis on the date and time the employee demands the missing access.

Figure 7 explain the whole process of employees doing attendance/checkout. In the first process, the employee selects the absent data menu, displays the missing data menu, and then presses the exit absent and fills in the activities carried out; the data will be stored in Artemis.

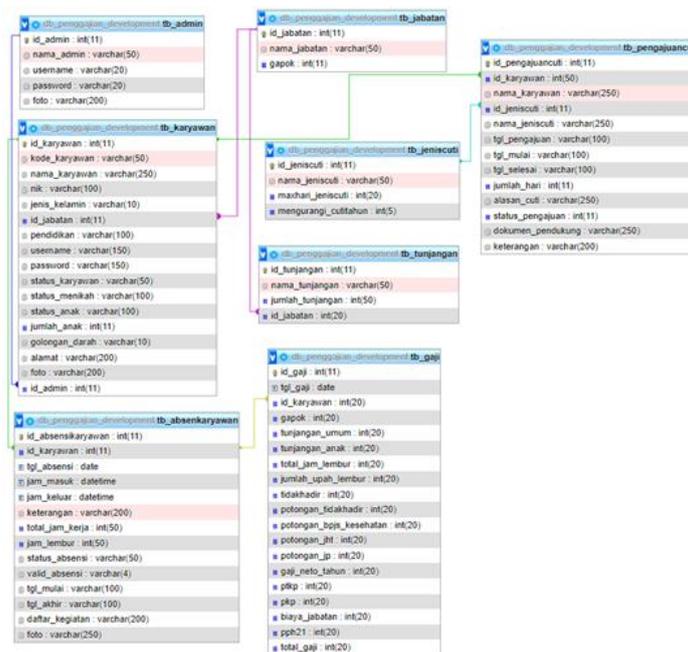


Figure 9. Relational table of web-based payroll system

3.4 System Implementation

In the final stage of RAD, the results of each application unit will be integrated and tested for each team. The implementation of web-based payroll system consists of two users access i.e., employee and admin.

Employee user access consists of login page (figure 10), salary management (figure 11), attendance management (figure 12), leave application (figure 15), and salary data (figure 16). Figure 10 showed mockup views of login page for admin and employee. Admin and employee have to input username and password to get the access into the system. Figure 11 showed payment data management including salary of the employees. Figure 12 showed attendance management to manage the attendance of the employees, such as check-in time (figure 13) and check-out time, overtime hours, and activities of the employees (figure 14). Employees' check-in time page on Figure 13 displayed employee code, name, date, and time of current attendance. The data will be stored in the database if the employee pressed the attendance button. Employees' activities page on Figure 14 indicated the check-out time and required the employees to write down the tasks that had been done during the day. The data will be stored to database system after the user pressed the submit button. Leave application page on Figure 15 is proposed in order to make the employees' leave permission easier by filling the employees' leave request form directly to the website including the explanation about the leave. Figure 16 showed the printed payment slip to be handed over the employees every month.

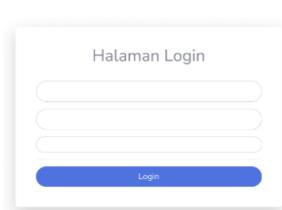


Figure 10. Employee login page

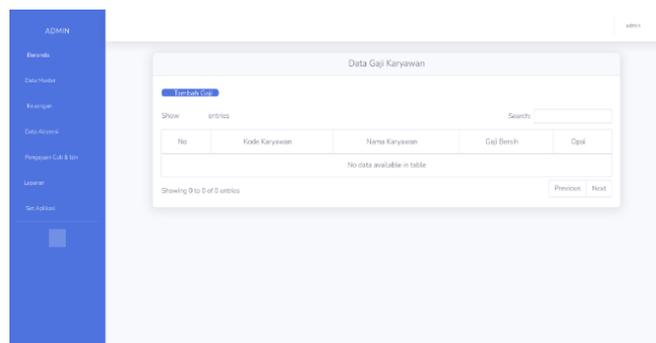


Figure 11. Salary data management

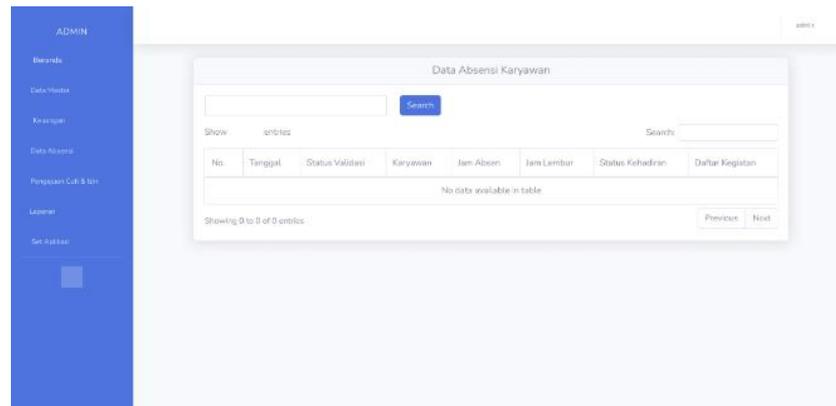


Figure 12. Attendance management

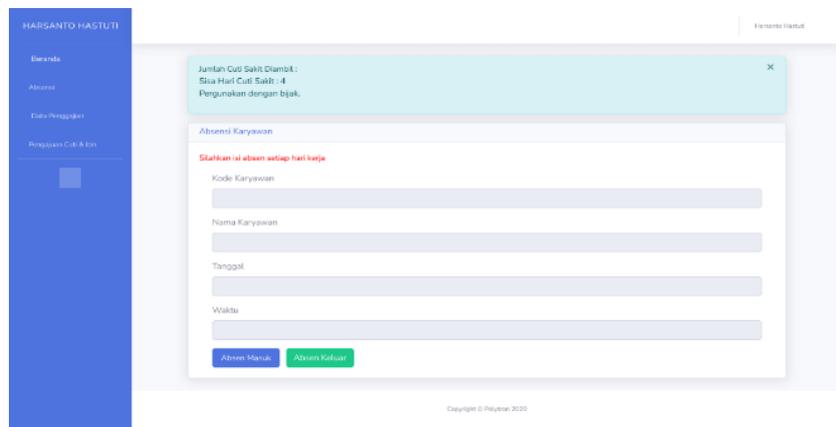


Figure 13. Employee check-in page

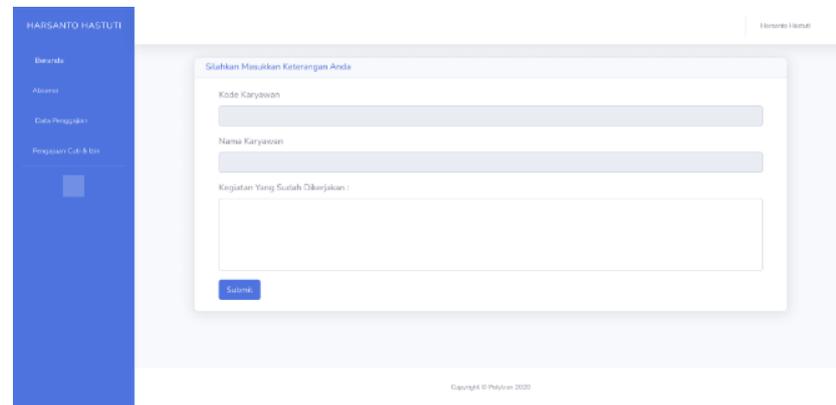


Figure 14. Employee activities



Figure 15. Leave application page

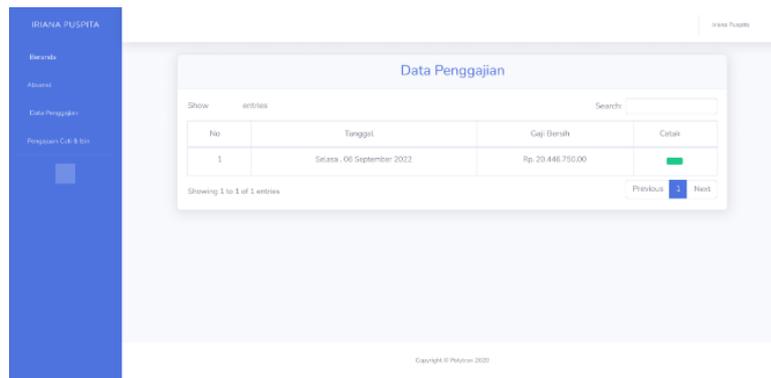


Figure 16. Printed payment slip

Admin user access consists of login page (figure 17), login role (figure 18), employee salary data (figure 19), add salary (figure 20), attendance data (figure 21), employees' check-in time (figure 22), employees' check-out time (figure 23), leave permission request (figure 24), printed payment slip (figure 25), salary information (figure 26).

Figure 16 showed the login page by entering user name, password and choosing login role on figure 17 (admin or employee) to get the system access. Figure 18 showed the admin page of employee salary data sub-menu in the added salary section; salary data consisted of employee code, name, net salary, and options in the form of salary detail information, edit and delete. Search box is also provided to search the employee code and name easily. Add salary page on figure 19 required the admin to enter employee code and the system will display the input form of the salary. Figure 20 is used when admin want to add new salary data. Attendance data can be seen in figure 21 including employee code, check-in and check-out time, overtime hours, attendance status, and employees' activities during the day. Figure 22 is the detail check-in time of the employee, while figure 23 is the detail of check-out time. Leave permission request can be seen in figure 24 including types of the leave application. Figure 25 is printed payment slip containing payment time, net salaries, information, and print button. Salary detail information provided in figure 26 including payment day, basic salary, allowances, total overtime hours, amount of overtime payment, and total compensation.

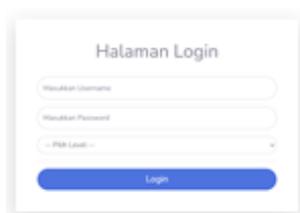


Figure 17. Admin login page



Figure 18. Login role

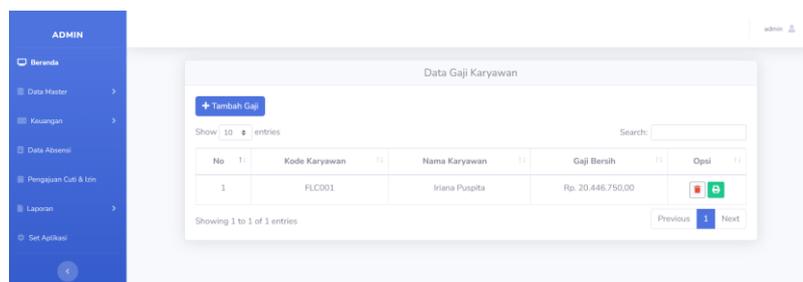


Figure 19. Admin page of salary data

The screenshot shows the 'Form Input Gaji Karyawan' interface. On the left is a blue sidebar menu with 'ADMIN' at the top and options like 'Beranda', 'Data Master', 'Keuangan', 'Data Absensi', 'Pengajuan Cuti & Izn', 'Laporan', and 'Set Aplikasi'. The main content area is titled 'Form Input Gaji Karyawan' and contains a search input field with the text 'Masukkan Kode Karyawan' and a green 'Cari' button.

Figure 20. Add salary

The screenshot shows the 'Data Absensi Karyawan' interface. It features a search bar with 'Pilih Kategori' and a 'Search' button. Below the search bar is a table with the following data:

No. #	Tanggal	Status Validasi	Karyawan	Jam Absen	Jam Lembur	Status Kehadiran	Daftar Kegiatan
1	Selasa, 06 September 2022	Valid	FLC009 Karimah Safitri	2022-09-06 20:25:02	0	Present	SQL dan PHP

At the bottom of the table, it says 'Showing 1 to 1 of 1 entries' and includes 'Previous' and 'Next' navigation buttons.

Figure 21. Attendance data

The screenshot shows the 'Absensi Karyawan' form for user Karimah Safitri. At the top, a notification box states: 'Jumlah Cuti Sakit Diambil: Sisa Hari Cuti Sakit: 4. Pengurangan dengan bijak.' Below this is the form title 'Absensi Karyawan' and a red instruction: 'Silahkan isi absen setiap hari kerja'. The form contains the following fields:

- Kode Karyawan: FLC009
- Nama Karyawan: Karimah Safitri
- Tanggal: 06-09-2022
- Waktu: 08:52:37pm

At the bottom of the form are two buttons: 'Absen Masuk' (blue) and 'Absen Keluar' (green). A copyright notice 'Copyright © Polytex 2022' is visible at the bottom of the page.

Figure 22. Employees' check-in time

The screenshot shows the 'Absensi Karyawan' form for user Karimah Safitri. It features a title 'Silahkan Masukkan Keterangan Anda' and the following fields:

- Kode Karyawan: FLC009
- Nama Karyawan: Karimah Safitri
- Kegiatan Yang Sudah Dikerjakan: (Large text area)

A 'Submit' button is located at the bottom of the form. A copyright notice 'Copyright © Polytex 2022' is visible at the bottom of the page.

Figure 23. Employees' check-out time

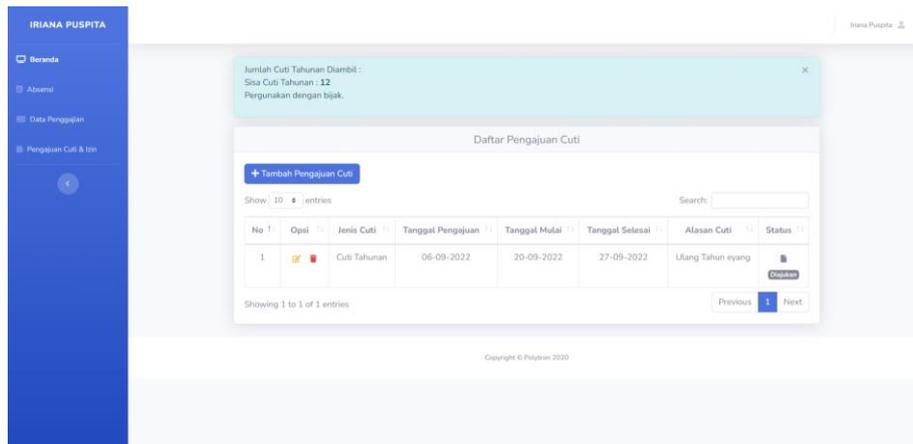


Figure 24. Employees' leave permission request



Figure 25. Employees' printed payment slip

Created: Selasa, 06 September 2022

Penerimaan	Nominal
Gaji Pokok	Rp. 19.000.000,00
Tunjangan Umum	Rp. 3.150.000,00
Tunjangan Anak	Rp. 600.000,00
Upah Lembur	Rp. 0,00
Pemotongan	Nominal
Ketidakhadiran	Rp. 250.000,00
Iuran BPJS Kesehatan	Rp. 190.000,00
Iuran JHT	Rp. 380.000,00
Iuran JP	Rp. 190.000,00
Perhitungan PPH21	Nominal
Gaji Neto Setahun	Rp. 257.880.000,00
PTKP	Rp. 67.500.000,00
Biaya Jabatan	Rp. 500.000,00
PKP	Rp. 190.380.000,00
PPH21/bulan	Rp. 793.250,00
Gaji Bersih	Rp. 20.446.750,00

Figure 26. Salary details information

3.5 Testing

Testing phase is conducted based on user experienced over the features of the developed web-based payroll system. Testing phase is done by implementing user acceptance test (UAT) with the black box method already shown in table 2 [7],[8].

Table 2. User acceptance testing (UAT) results

Test Scenario	Test Case	Test Step	Expected Result	Status
Admin access employee payroll report data	Admin sees report data for all employee salaries on the employee payroll report page	1. Admin is on the employee attendance report data page 2. Input start date 3. Input end date	Displays current employee payroll reports in PDF format	OK
The admin validates employee absences	Admin approves employee absences	1. Admin is on the employee attendance data page 2. Select approve	Displays an alert "Attendance successfully validated."	OK
	Admin rejects employee absences	1. Admin is on the employee attendance data page 2. Select rejected	Displays an alert "Attendance successfully validated."	OK
Employees check-in	Employees check in on the attendance page.	1. Employees are on the attendance page 2. Employees press absences	Displays the alert "Data saved successfully."	OK
	Employees check in on the attendance page twice.	1. Employees are on the attendance page 2. The employee presses absences re-enters	Displays an alert "Absent entry has been filled."	OK

4. CONCLUSION AND SUGGESTIONS

The process of analyzing and designing a web-based payroll system at PT Hartono Istana Teknologi is carried out by considering the requirements and problems faced by PT Hartono Istana Teknologi, such as taking attendance by using WA application and record it in an excel file. The developed system is designed by using UML, which consists of use case diagrams, activity diagrams, and class diagrams. Web-based payroll system covered some features such as add salary, check-in and check-out time, request of leave application, salary reports and attendance reports. The dashboard view menu contains shortcuts for examples of payroll features; the admin page can display the number of employees who are present and find out the number of employees who are on leave. This information system makes the payroll data management process more effective and efficient and produces more accurate payroll reports. Supported by several tests so that it is feasible to be implemented in the company.

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