Payroll Management System Database Design

Nicolás Guevara Herrán

Systems Engineering School  
*Universidad Distrital Francisco José de Caldas*   
Bogotá D.C, Colombia

[nguevarah@udistrital.edu.co](mailto:nguevarah@udistrital.edu.co)

***Abstract—This document will give shape to the formulation and development of a project, which aims to solve a legal problem presented by the Trimeca company, industrial and mechanical works, where the main object is the administrative management of both consultations. as an edition of the payroll and everything that it brings with it. Its purpose is to propose and execute the theoretical and practical solution to the problem presented, through specific objectives such as the creation of relational models and everything that this entails, as well as the use of relational algebra to raise possible queries that may arise, whether for consultation or editing, and so on until reaching a concrete solution.***

***Keywords— Payroll Management System, Database Design, Compliance***

# Project Description

For this project, we are presented with a problem related to the mismanagement of information adjacent to the hiring, as well as what this brings with it for each individual such as the position, salary allocation, type of contract, contract time, as well Underlying the mishandling of this, the government has made a legal request towards the company Trimeca SA in the name of the company's lack of compensation to its employees for the hours required by Law 50, which states:

"ARTICLE 21. Regulated by Decree 1127 of 1991. Add the following article to Chapter II of Title VI, Part One of the Substantive Labor Code:

Exclusive dedication to certain activities. In companies with more than fifty (50) workers who work forty-eight (48) hours a week, they will have the right to have two (2) hours of said day, at the expense of the employer, be dedicated exclusively to recreational activities, cultural, sports or training.”

being clear about article 21 of Law 50, the Trimeca company has raised the need for monetary compensation for the hours not given to employees through monetary payments corresponding to individual salary assignments, taking into account that in a month there are approximately 8 hours, which is equivalent to a working day, the accounts are made on this and in compensation the units will be days, that is, the total number of law 50 hours that must be divided into 8 multiplied by the equivalent daily salary allocation of each employee respectively, they will give us the corresponding monetary compensation.

To carry out this task and the entire general operation, data compendiums managed by the company in Excel will be used, making available the existing contracting data through our program that manages all the data from the entry and exit of a employee, the position, the salary assignment, giving medina formulation outputs so that he has the legal benefits, in addition to providing the monetary compensation for the 50 hours of law not given to the employee through the contracted time and the salary adjustment

# User Stories

* As an HR manager, I want to see a list of all employees with their position and department, so that I can better understand the organizational structure.
* As a payroll manager, I want to see all allowances for a specific employee, so that I can ensure they are being paid correctly.
* As a payroll manager, I want to see all deductions for a specific employee, so that I can ensure they are being applied correctly.
* As a payroll administrator, I want to see all payrolls created within a date range, so that I can review the payment history.
* As an HR manager, I want to see a summary of an employee’s payroll, including wages, allowances, and deductions, so that I can evaluate their total compensation.
* As the HR director, I want to see a report of departments with the number of employees and their average salary, so that I can identify areas with high salary costs.
* As a supervisor, I want to see a list of employees with their overtime hours and the total amount paid for these hours within a specific date range, so that I can evaluate performance and additional costs.
* As a payroll analyst, I want to see a report of compensations and deductions by payroll type for all employees, so that I can perform financial analysis.
* As an employee, I want to see my payment history, including attendance, absences, wages, allowances, and deductions, so that I can review my payroll records.
* As a system administrator, I want to see a list of all users with their respective roles, so that I can manage permissions and access.
* As a system administrator, I want to see the number of users per role, so that I can ensure the role distribution is appropriate.
* As an HR manager, I want to see the number of employees by each status, so that I can understand the distribution of statuses and manage the workforce efficiently.

Updates

* As an HR manager, I want to update an employee’s position, so that I can reflect their promotion in the database.
* As a payroll manager, I want to update an employee’s salary, so that their new compensation is accurately recorded.
* As an administrator, I want to change an employee’s status to ‘on leave’, so that their leave period is documented correctly.
* As an employee, I want to update my email address, so that I can receive important notifications and information.
* As an administrator, I want to update a user’s role from ‘user’ to ‘admin’, so that they have the necessary permissions to manage the system.
* As a payroll manager, I want to update the number of extra hours an employee has worked, so that their overtime pay is calculated correctly.
* As an employee, I want to change my phone number in the system, so that my contact information is current.
* As HR manager, I want to correct a typo in the job title of a position, so that all records are accurate and professional.

# Conceptual Model

## Step 0. Components

## User, Role, Employee, Status, Allowance, Payroll, Deductions, Position, Department.

## Step 1. Entities

## Employee, Payroll, Department, Position, Allowances, Deductions, Employee Allowances, Employee Deductions, User, Role, Pay Slip, Status, Payroll Type, Employee\_Extra\_Hours

## Step 2. Attributes

## E1. Employee: UUID, employee\_code, name, department\_FK, position\_FK, salary, email, status\_FK.

## E2. Payroll: ID, reference\_number, date\_from, date\_to, payroll\_type\_FK, status, date\_created.

## E3. Department: ID, name, description.

## E4. Position: ID, department\_FK, name, description.

## E5. Allowance: ID, deduction\_name, description.

## E6. Deduction: ID, deduction\_name, description.

## E7. Employee\_Allowances: ID, employee\_FK, Allowance\_FK, Payroll\_Type\_FK, amount, effective\_date, date\_created.

## E8. Employee\_Deduction: ID, employee\_FK, deduction\_FK, payroll\_type\_FK, amount, effective\_date, date\_created.

## E9. User: ID, name, username, password, role\_FK

## E10. Role: ID, name, permissions.

## E11. PaySlip: ID, payroll\_FK, employee\_FK, present, absent, salary, allowance\_amount, deduction, deduction\_amount, net, date\_created.

## E12. Status: ID, name, comments.

## E13. Payroll\_type: ID, name.

## E14. Employee\_Extra\_Hours: ID, Employee\_FK, hours, Payroll\_Type\_FK, amount, Effective\_Date, Date\_Created

## Step 3. Relations

## Step 4. Relationships Types

## E1 nx-x1 E3 E2 nx-x1 E13

## E1 nx-x1 E4 E3 1x-xn E4

## E1 1x-xn E7 E5 1x-xn E7

## E1 1x-xn E8 E6 1x-xn E8

## E1 1x-xn E11 E7 nx-x1 E13

## E1 nx-x1 E12 E8 nx-x1 E13

## E2 1x-xn E11 E9 nx-x1 E10

## E1 1x-xn E14 E13 1x-xn E14

## 

# Relational Algebra Queries

## This is the start of the body text of your paper. You can use headings like the one above to divide your paper into sub-topics. Use level 1 headings first, then level

## project managers

## Coordinators

## Assistants

## employees for work

## total salary earned

# Data Sources

## This is the start of the body text of your paper. You can use headings like the one above to divide your paper into sub-topics. Use level 1 headings first, then level

## 

## 