A payroll system typically involves multiple tables to manage various aspects of employee compensation, taxation, and related information.

Here are five common tables you might find in a payroll system:

1. **Employee Information Table:** This table stores basic details about each employee, such as their name, employee ID, contact information, job title, department, and hire date. It serves as a central repository of employee data.
2. **Salary and Compensation Table:** This table tracks the compensation details for each employee. It includes information about their salary or hourly wage, pay grade, overtime rates, bonuses, and other forms of compensation.
3. **Time and Attendance Table:** This table records the hours worked by employees. It includes details about regular hours, overtime hours, time off taken (such as vacation or sick leave), and any other attendance-related data. This information is crucial for accurate salary calculation.
4. **Tax and Deductions Table:** Here, tax-related information for each employee is stored. This includes tax withholding details, such as federal, state, and local tax rates, as well as other deductions like health insurance premiums, retirement contributions, and other voluntary deductions.
5. **Payroll Processing Log Table:** This table maintains a log of payroll processing activities. It includes records of each payroll run, including the date, pay period covered, total wages, taxes withheld, deductions, and net pay for each employee. Keeping a history of payroll runs is vital for auditing and reporting purposes.

These are just a few examples of tables that might exist in a payroll system. Depending on the complexity of the organization and its payroll needs, there could be additional tables for more specialized information, such as employee benefits, pension plans, or even integration with external systems for financial reporting.

**create database payroll\_functions\_db;**

**use payroll\_functions\_db;**

**-- Employee Information Table**

**CREATE TABLE Employee (**

**employee\_id INT PRIMARY KEY,**

**first\_name VARCHAR(50),**

**last\_name VARCHAR(50),**

**contact\_number VARCHAR(15),**

**job\_title VARCHAR(100),**

**department VARCHAR(100),**

**hire\_date DATE**

**);**

**-- Salary and Compensation Table**

**CREATE TABLE Compensation (**

**compensation\_id INT PRIMARY KEY,**

**employee\_id INT,**

**base\_salary DECIMAL(10, 2),**

**overtime\_rate DECIMAL(5, 2),**

**bonus DECIMAL(10, 2),**

**FOREIGN KEY (employee\_id) REFERENCES Employee(employee\_id)**

**);**

**-- Time and Attendance Table**

**CREATE TABLE Attendance (**

**attendance\_id INT PRIMARY KEY,**

**employee\_id INT,**

**work\_date DATE,**

**regular\_hours DECIMAL(5, 2),**

**overtime\_hours DECIMAL(5, 2),**

**time\_off\_hours DECIMAL(5, 2),**

**FOREIGN KEY (employee\_id) REFERENCES Employee(employee\_id)**

**);**

**-- Tax and Deductions Table**

**CREATE TABLE Deductions (**

**deduction\_id INT PRIMARY KEY,**

**employee\_id INT,**

**federal\_tax\_rate DECIMAL(5, 2),**

**state\_tax\_rate DECIMAL(5, 2),**

**health\_insurance DECIMAL(10, 2),**

**retirement\_contribution DECIMAL(10, 2),**

**FOREIGN KEY (employee\_id) REFERENCES Employee(employee\_id)**

**);**

**-- Payroll Processing Log Table**

**CREATE TABLE PayrollLog (**

**payroll\_id INT PRIMARY KEY,**

**payroll\_date DATE,**

**pay\_period\_start DATE,**

**pay\_period\_end DATE,**

**employee\_id INT,**

**total\_wages DECIMAL(10, 2),**

**taxes\_withheld DECIMAL(10, 2),**

**deductions DECIMAL(10, 2),**

**net\_pay DECIMAL(10, 2),**

**FOREIGN KEY (employee\_id) REFERENCES Employee(employee\_id)**

**);**

**INSERT INTO Employee (employee\_id, first\_name, last\_name, contact\_number, job\_title, department, hire\_date)**

**VALUES**

**(1, 'John', 'Doe', '123-456-7890', 'Sales Manager', 'Sales', '2022-01-15'),**

**(2, 'Jane', 'Smith', '987-654-3210', 'Marketing Specialist', 'Marketing', '2021-08-20'),**

**(3, 'Michael', 'Johnson', '555-123-4567', 'Software Engineer', 'Engineering', '2022-03-10'),**

**(4, 'Sarah', 'Williams', '333-555-8888', 'HR Specialist', 'HR', '2021-11-05'),**

**(5, 'David', 'Miller', '444-222-1111', 'Financial Analyst', 'Finance', '2021-12-02'),**

**(6, 'Emily', 'Brown', '222-333-4444', 'Senior Designer', 'Design', '2021-10-18'),**

**(7, 'Daniel', 'Wilson', '666-777-8888', 'Marketing Manager', 'Marketing', '2022-04-25'),**

**(8, 'Olivia', 'Martinez', '111-222-3333', 'Sales Representative', 'Sales', '2022-05-12'),**

**(9, 'Aiden', 'Lee', '888-777-5555', 'Software Developer', 'Engineering', '2021-09-08'),**

**(10, 'Sophia', 'Garcia', '555-666-9999', 'Finance Manager', 'Finance', '2022-06-30'),**

**(11, 'Liam', 'Nguyen', '666-555-4444', 'HR Coordinator', 'HR', '2022-02-15'),**

**(12, 'Isabella', 'Rodriguez', '222-444-6666', 'Designer', 'Design', '2021-07-11'),**

**(13, 'Mason', 'Gonzalez', '333-222-5555', 'Software Engineer', 'Engineering', '2021-03-28'),**

**(14, 'Ava', 'Lopez', '444-555-6666', 'Sales Associate', 'Sales', '2022-07-05'),**

**(15, 'Noah', 'Perez', '555-444-3333', 'Marketing Coordinator', 'Marketing', '2021-04-22'),**

**(16, 'Emma', 'Hernandez', '111-333-5555', 'Designer', 'Design', '2022-03-10'),**

**(17, 'Sophia', 'Gonzalez', '777-888-4444', 'HR Manager', 'HR', '2021-01-02'),**

**(18, 'Jackson', 'Johnson', '666-555-2222', 'Software Developer', 'Engineering', '2022-02-18'),**

**(19, 'Oliver', 'Smith', '333-222-7777', 'Financial Analyst', 'Finance', '2022-06-15'),**

**(20, 'Lucas', 'Lee', '555-777-9999', 'Designer', 'Design', '2021-09-30');**

**INSERT INTO Compensation (compensation\_id, employee\_id, base\_salary, overtime\_rate, bonus)**

**VALUES**

**(1, 1, 75000.00, 1.5, 5000.00),**

**(2, 2, 60000.00, 1.25, 3000.00),**

**(3, 3, 80000.00, 2.0, 7000.00),**

**(4, 4, 55000.00, 1.2, 2000.00),**

**(5, 5, 65000.00, 1.3, 4000.00),**

**(6, 6, 70000.00, 1.4, 3500.00),**

**(7, 7, 72000.00, 1.5, 4200.00),**

**(8, 8, 58000.00, 1.2, 2500.00),**

**(9, 9, 85000.00, 1.6, 6000.00),**

**(10, 10, 68000.00, 1.3, 3800.00),**

**(11, 11, 52000.00, 1.1, 1800.00),**

**(12, 12, 70000.00, 1.4, 3200.00),**

**(13, 13, 75000.00, 1.5, 4500.00),**

**(14, 14, 62000.00, 1.25, 2700.00),**

**(15, 15, 60000.00, 1.3, 3300.00),**

**(16, 16, 68000.00, 1.35, 3900.00),**

**(17, 17, 50000.00, 1.1, 1600.00),**

**(18, 18, 80000.00, 1.6, 5200.00),**

**(19, 19, 72000.00, 1.4, 3700.00),**

**(20, 20, 67000.00, 1.3, 3400.00);**

**INSERT INTO Attendance (attendance\_id, employee\_id, work\_date, regular\_hours, overtime\_hours, time\_off\_hours)**

**VALUES**

**(1, 1, '2023-08-01', 8.0, 2.0, 0.0),**

**(2, 2, '2023-08-01', 8.0, 1.5, 0.0),**

**(3, 3, '2023-08-01', 8.0, 3.0, 0.0),**

**(4, 4, '2023-08-01', 8.0, 1.0, 0.0),**

**(5, 5, '2023-08-01', 8.0, 1.0, 0.0),**

**(6, 6, '2023-08-01', 8.0, 0.0, 0.0),**

**(7, 7, '2023-08-01', 8.0, 1.5, 0.0),**

**(8, 8, '2023-08-01', 8.0, 1.0, 0.0),**

**(9, 9, '2023-08-01', 8.0, 2.5, 0.0),**

**(10, 10, '2023-08-01', 8.0, 1.5, 0.0),**

**(11, 11, '2023-08-01', 8.0, 0.5, 0.0),**

**(12, 12, '2023-08-01', 8.0, 1.0, 0.0),**

**(13, 13, '2023-08-01', 8.0, 2.0, 0.0),**

**(14, 14, '2023-08-01', 8.0, 1.0, 0.0),**

**(15, 15, '2023-08-01', 8.0, 1.5, 0.0),**

**(16, 16, '2023-08-01', 8.0, 1.0, 0.0),**

**(17, 17, '2023-08-01', 8.0, 0.5, 0.0),**

**(18, 18, '2023-08-01', 8.0, 2.5, 0.0),**

**(19, 19, '2023-08-01', 8.0, 1.0, 0.0),**

**(20, 20, '2023-08-01', 8.0, 1.5, 0.0);**

**INSERT INTO Deductions (deduction\_id, employee\_id, federal\_tax\_rate, state\_tax\_rate, health\_insurance, retirement\_contribution)**

**VALUES**

**(1, 1, 0.15, 0.05, 100.00, 200.00),**

**(2, 2, 0.12, 0.04, 80.00, 150.00),**

**(3, 3, 0.18, 0.06, 120.00, 250.00),**

**(4, 4, 0.10, 0.03, 70.00, 130.00),**

**(5, 5, 0.14, 0.04, 90.00, 180.00),**

**(6, 6, 0.15, 0.05, 95.00, 200.00),**

**(7, 7, 0.16, 0.05, 100.00, 210.00),**

**(8, 8, 0.11, 0.03, 75.00, 140.00),**

**(9, 9, 0.20, 0.07, 130.00, 270.00),**

**(10, 10, 0.13, 0.04, 85.00, 170.00),**

**(11, 11, 0.09, 0.03, 60.00, 120.00),**

**(12, 12, 0.15, 0.05, 100.00, 190.00),**

**(13, 13, 0.17, 0.05, 110.00, 220.00),**

**(14, 14, 0.12, 0.04, 80.00, 160.00),**

**(15, 15, 0.14, 0.04, 90.00, 180.00),**

**(16, 16, 0.13, 0.04, 85.00, 170.00),**

**(17, 17, 0.08, 0.02, 50.00, 100.00),**

**(18, 18, 0.19, 0.06, 125.00, 260.00),**

**(19, 19, 0.16, 0.05, 100.00, 200.00),**

**(20, 20, 0.14, 0.04, 90.00, 180.00);**

**INSERT INTO PayrollLog (payroll\_id, payroll\_date, pay\_period\_start, pay\_period\_end, employee\_id, total\_wages, taxes\_withheld, deductions, net\_pay)**

**VALUES**

**(1, '2023-08-31', '2023-08-16', '2023-08-31', 1, 5000.00, 800.00, 400.00, 3800.00),**

**(2, '2023-08-31', '2023-08-16', '2023-08-31', 2, 4000.00, 600.00, 300.00, 3100.00),**

**(3, '2023-08-31', '2023-08-16', '2023-08-31', 3, 5500.00, 900.00, 450.00, 4150.00),**

**(4, '2023-08-31', '2023-08-16', '2023-08-31', 4, 3800.00, 560.00, 280.00, 2960.00),**

**(5, '2023-08-31', '2023-08-16', '2023-08-31', 5, 4500.00, 720.00, 360.00, 3420.00),**

**(6, '2023-08-31', '2023-08-16', '2023-08-31', 6, 4800.00, 800.00, 400.00, 3600.00),**

**(7, '2023-08-31', '2023-08-16', '2023-08-31', 7, 5200.00, 850.00, 425.00, 3925.00),**

**(8, '2023-08-31', '2023-08-16', '2023-08-31', 8, 4100.00, 610.00, 305.00, 3185.00),**

**(9, '2023-08-31', '2023-08-16', '2023-08-31', 9, 6000.00, 1000.00, 500.00, 4500.00),**

**(10, '2023-08-31', '2023-08-16', '2023-08-31', 10, 4700.00, 730.00, 365.00, 3605.00),**

**(11, '2023-08-31', '2023-08-16', '2023-08-31', 11, 3500.00, 520.00, 260.00, 2720.00),**

**(12, '2023-08-31', '2023-08-16', '2023-08-31', 12, 4800.00, 800.00, 400.00, 3600.00),**

**(13, '2023-08-31', '2023-08-16', '2023-08-31', 13, 5200.00, 850.00, 425.00, 3925.00),**

**(14, '2023-08-31', '2023-08-16', '2023-08-31', 14, 3900.00, 570.00, 285.00, 3045.00),**

**(15, '2023-08-31', '2023-08-16', '2023-08-31', 15, 4000.00, 600.00, 300.00, 3100.00),**

**(16, '2023-08-31', '2023-08-16', '2023-08-31', 16, 4600.00, 740.00, 370.00, 3490.00),**

**(17, '2023-08-31', '2023-08-16', '2023-08-31', 17, 3300.00, 480.00, 240.00, 2580.00),**

**(18, '2023-08-31', '2023-08-16', '2023-08-31', 18, 5800.00, 920.00, 460.00, 4420.00),**

**(19, '2023-08-31', '2023-08-16', '2023-08-31', 19, 5100.00, 810.00, 405.00, 3885.00),**

**(20, '2023-08-31', '2023-08-16', '2023-08-31', 20, 4800.00, 800.00, 400.00, 3600.00);**

**Exercise 1: Question: Calculate the total number of employees in the "Employee" table.**

**Exercise 2: Question: Find the highest base salary in the "Compensation" table.**

**Exercise 3: Question: Determine the average regular hours worked by employees in the "Attendance" table.**

**Exercise 4: Question: Calculate the total time off hours taken by all employees from the "Attendance" table.**

**Exercise 5: Question: Find the lowest federal tax rate in the "Deductions" table.**

**Exercise 6: Question: Determine the average total wages from the "PayrollLog" table.**

**Exercise 7: Question: Calculate the total overtime hours worked by all employees from the "Attendance" table.**

**Exercise 8: Question: Find the highest total net pay in the "PayrollLog" table.**

**Exercise 9: Question: Determine the average health insurance deductions from the "Deductions" table.**

**Exercise 10: Question: Calculate the total bonus amount for all employees from the "Compensation" table.**

**Exercise 11: Question: Calculate the total number of employees in each department from the "Employee" table.**

**Exercise 12: Question: Determine the average base salary for each job title from the "Compensation" table. (Note: You can do once after finishing the joins concept).**

**Exercise 13: Question: Find the highest overtime hours worked for each employee from the "Attendance" table.**

**Exercise 14: Question: Calculate the total time off hours taken for each employee from the "Attendance" table.**

**Exercise 15: Question: Determine the average federal tax rate for each employee from the "Deductions" table.**

**Exercise 16: Question: Find the highest retirement contribution for each employee from the "Deductions" table.**

**Exercise 17: Question: Calculate the total net pay for each payroll entry from the "PayrollLog" table.**

**Exercise 18: Question: Determine the average regular hours worked for each employee from the "Attendance" table.**

**Exercise 19: Question: Find the lowest state tax rate for each employee from the "Deductions" table.**

**Exercise 20: Question: Calculate the total deductions for each employee from the "Deductions" table.**

**Exercise 21: Question: Calculate the total number of employees in each department from the "Employee" table, only for the "Sales" department.**

**Exercise 22: Question: Determine the average base salary for each job title from the "Compensation" table, only for employees with job title "Manager".**

**Exercise 23: Question: Find the highest overtime hours worked for each employee from the "Attendance" table, only for employees with employee IDs 101 and 102.**

**Exercise 24: Question: Calculate the total time off hours taken for each employee from the "Attendance" table, only for employees hired after January 1, 2022.**

**Exercise 25: Question: Determine the average federal tax rate for each employee from the "Deductions" table, only for employees with employee IDs 201 and 202.**

**Exercise 26: Question: Find the highest retirement contribution for each employee from the "Deductions" table, only for employees with health insurance deductions greater than $100.**

**Exercise 27: Question: Calculate the total net pay for each payroll entry from the "PayrollLog" table, only for payroll entries after June 30, 2022.**

**Exercise 28: Question: Determine the average regular hours worked for each employee from the "Attendance" table, only for employees in the "Engineering" department.**

**Exercise 29: Question: Find the lowest state tax rate for each employee from the "Deductions" table, only for employees with federal tax rates greater than 10%.**

**Exercise 30: Question: Calculate the total deductions for each employee from the "Deductions" table, only for employees with base salaries above $60,000.**

**Exercise 31: Question: Calculate the average base salary for each department from the "Employee" table.**

**Exercise 32: Question: Determine the total time off hours taken for each employee from the "Attendance" table, only for time off hours greater than 8.**

**Exercise 33: Question: Calculate the average total wages for each month from the "PayrollLog" table.**

**Exercise 34: Question: Find the employee with the highest average overtime hours from the "Attendance" table.**

**Exercise 35: Question: Calculate the average net pay for employees who have worked more than 160 regular hours from the "PayrollLog" and "Attendance" tables.**

**Exercise 36: Question: Determine the employee with the highest average base salary from the "Employee" and "Compensation" tables.**

**Exercise 37: Question: Calculate the total bonus amount for each department from the "Employee" and "Compensation" tables.**

**Exercise 38: Question: Find the average federal tax rate for employees who have taken time off in the "Attendance" and "Deductions" tables.**

**Exercise 39: Question: Calculate the total time off hours taken by employees in the "Sales" department from the "Attendance" table.**

**Exercise 40: Question: Determine the average total deductions for employees with health insurance deductions above $50 from the "Deductions" table.**