Mata Kuliah	:	Basis Data Lanjut (BDL)
Program Studi	:	D4 – Teknik Informatika
Semester	:	3

Kelas	:	2A
NIM	:	244107020030
Nama	:	Athaulla Hafizh
Jobsheet Ke-	:	11

Laporan Jobsheet

LANGKAH 1: PERSIAPAN DATABASE

1.1 Membuat Database dan Tabel

Langkah	Jawaban/Deskripsi
1	Membuat tabel employees

Name	Value
Updated Rows	0
Execute time	0.1s
Start time	Tue Nov 04 15:17:26 WIB 2025
Finish time	Tue Nov 04 15:17:26 WIB 2025
Query	create table employees (

```
create table employees (
    id serial primary key,
    first_name varchar(50) not null,
    last_name varchar(50) not null,
    email varchar(100) unique not null,
    department varchar(50),
    position varchar(50),
    salary decimal(10,2),
    hire_date date,
    created_at timestamp default current_timestamp
)
```

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2	Membuat tabel projects

Name	Value
Updated Rows	0
Execute time	0.0s
Start time	Tue Nov 04 15:18:18 WIB 2025
Finish time	Tue Nov 04 15:18:18 WIB 2025
Query	create table projects (

```
create table projects (
    id serial primary key,
    project_name varchar(100) not null,
    department varchar(50),
    budget decimal(12,2),
    start_date date,
    end_date date,
    status varchar(20) default 'Active'
)
```

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1.2 Mengisi Data Sample (Minimal 20 Records)

Pertanyaan	Jawaban/Deskripsi
1	Mengisi data employees (20 records)

Name	Value
Updated Rows	20
Execute time	0.0s
Start time	Tue Nov 04 15:23:06 WIB 2025
Finish time	Tue Nov 04 15:23:06 WIB 2025
Query	insert into employees (first_name, last_name, email, department, position, salary, hire_date) values ('Ahmad', 'Hidayat', 'ahmad.hidayat@company.com', 'IT', 'Software Engineer', 8500000, '2022-01-15'), ('Siti', 'Rahayu', 'siti.rahayu@company.com', 'HR', 'HR Manager', 9500000, '2021-03-20'), ('Budi', 'Santoso', 'budi.santoso@company.com', 'Finance', 'Accountant', 7500000, '2022-06-10'), ('Dewi', 'Anggraini', 'dewi.anggraini@company.com', 'Marketing', 'Marketing Specialist', 7000000, '2023-02-01'), ('Rizki', 'Pratama', 'rizki.pratama@company.com', 'IT', 'System Administrator', 8000000, '2021-11-05'), ('Maya', 'Sari', 'maya.sari@company.com', 'Finance', 'Financial Analyst', 8200000, '2022-08-15'), ('Joko', 'Widodo', 'joko.widodo@company.com', 'Operations', 'Operations Manager', 11000000, '2020-05-12'), ('Linda', 'Permata', 'linda.permata@company.com', 'Marketing', 'Digital Marketer', 6800000, '2023-01-30'), ('Fajar', 'Nugroho', 'fajar.nugroho@company.com', 'IT', 'Web Developer', 7800000, '2022-09-22'), ('Rina', 'Wulandari', 'rina.wulandari@company.com', 'HR', 'Recruitment Specialist', 6500000, '2023-03-10'), ('Hendra', 'Kurniawan', 'hendra.kurniawan@company.com', 'Finance', 'Tax Officer', 7200000, '2022-04-18'), ('Dian', 'Puspita', 'dian.puspita@company.com', 'IT', 'Database Administrator', 9000000, '2021-07-25'), ('Eko', 'Supriyanto', 'eko.supriyanto@company.com', 'Operations', 'Logistics Coordinator', 6000000, '2023-05-05'), ('Fitri', 'Handayani', 'fitri.handayani@company.com', 'Marketing', 'Content Creator', 5800000, '2023-04-12'), ('Gita', 'Maharani', 'gita.maharani@company.com', 'HR', 'Training Officer', 6200000, '2022-12-01'), ('Irfan', 'Setiawan', 'irfan.setiawan@company.com', 'IT', 'Network Engineer', 8300000, '2021-09-14'), ('Kartika', 'Dewi', 'kartika.dewi@company.com', 'Finance', 'Auditor', 7700000, '2022-03-08'), ('Lukman', 'Hakim', 'lukman.hakim@company.com', 'Operations', 'Warehouse Manager', 7300000, '2021-12-20'), ('Nina', 'Zahra', 'nina.zahra@company.com', 'Marketing', 'Social Media Specialist', 5900000, '2023-06-25'), ('Oscar', 'Fernando', 'oscar.fernando@company.com', 'IT', 'Mobile Developer', 8100000, '2022-11-11')

Pertanyaan	Jawaban/Deskripsi
2	Mengisi data projects (10 records)

Name	Value
Updated Rows	10
Execute time	0.0s
Start time	Tue Nov 04 15:24:33 WIB 2025
Finish time	Tue Nov 04 15:24:33 WIB 2025
Query	insert into projects (project_name, department, budget, start_date, end_date, status) values ('Website Redesign', 'IT', 150000000, '2024-01-01', '2024-06-30', 'Active'), ('Employee Training Program', 'HR', 75000000, '2024-02-01', '2024-05-31', 'Active'), ('Financial System Upgrade', 'Finance', 200000000, '2024-03-01', '2024-08-31', 'Planning'), ('Digital Marketing Campaign', 'Marketing', 120000000, '2024-01-15', '2024-04-30', 'Active'), ('Warehouse Optimization', 'Operations', 90000000, '2024-02-20', '2024-07-15', 'Active'), ('Mobile App Development', 'IT', 180000000, '2024-03-10', '2024-09-30', 'Planning'), ('Recruitment Drive 2024', 'HR', 50000000, '2024-04-01', '2024-06-30', 'Active'), ('Customer Satisfaction Survey', 'Marketing', 40000000, '2024-03-15', '2024-05-31', 'Active'), ('Network Infrastructure', 'IT', 220000000, '2024-05-01', '2024-12-31', 'Planning'), ('Annual Audit Preparation', 'Finance', 60000000, '2024-04-15', '2024-07-31', 'Active')

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1.3 Membuat View dan Materialized View

Langkah	Jawaban/Deskripsi
1	Membuat view 1
2	Membuat view 2

Tabel detail untuk Langkah 1:

Name	Value
Updated Rows	0
Execute time	0.0s
Start time	Tue Nov 04 15:25:59 WIB 2025
Finish time	Tue Nov 04 15:25:59 WIB 2025
Query	create view employee_summary as

```
create view employee_summary as
select
    id,
    concat(first_name, ' ', last_name) as full_name,
    department,
    position,
    salary,
    extract(year from age(current_date, hire_date)) as years_of_service,
    case
        when extract(year from age(current_date, hire_date)) >= 3 then 'Senior'
        when extract(year from age(current_date, hire_date)) >= 1 then 'Intermediate'
        else 'Junior'
    end as experience_level
from employees
order by department, salary desc
```

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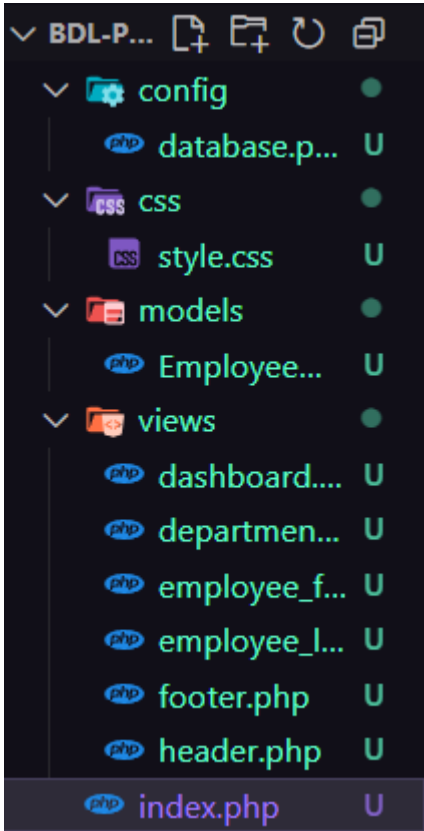
Name	Value
Updated Rows	0
Execute time	0.0s
Start time	Tue Nov 04 15:41:21 WIB 2025
Finish time	Tue Nov 04 15:41:21 WIB 2025
Query	create view department_stats as

```
create view department_stats as
select
    department,
    count(*) as total_employees,
    round(avg(salary), 2) as avg_salary,
    min(salary) as min_salary,
    max(salary) as max_salary,
    sum(salary) as total_salary_budget
from employees
group by department
order by total_employees desc
```

| 3 | Membuat materialized view 1 |

Name	Value
Updated Rows	1
Execute time	0.0s
Start time	Tue Nov 04 15:42:58 WIB 2025
Finish time	Tue Nov 04 15:42:58 WIB 2025
Query	create materialized view dashboard_summary as

```
create materialized view dashboard_summary as
select
    -- Total counts
    (select count(*) from employees) as total_employees,
    (select count(*) from projects) as total_projects,
    (select count(distinct department) from employees) as total_departments,
    -- Salary statistics
    (select round(avg(salary), 2) from employees) as company_avg_salary,
    (select max(salary) from employees) as highest_salary,
    (select min(salary) from employees) as lowest_salary,
    -- Project statistics
    (select sum(budget) from projects) as total_project_budget,
    (select count(*) from projects where status = 'Active') as active_projects,
    (select count(*) from projects where status = 'Planning') as planning_projects,
    -- Employee tenure
    (select round(avg(extract(year from age(current_date, hire_date))), 1) from employees) as avg_years_service
```

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4	Membuat refresh materialized view

Name	Value
Updated Rows	0
Execute time	0.0s
Start time	Tue Nov 04 15:43:44 WIB 2025
Finish time	Tue Nov 04 15:43:44 WIB 2025
Query	refresh materialized view dashboard_summary

LANGKAH 2: STRUKTUR PROJECT PHP

Pertanyaan	Jawaban/Deskripsi
1	Membuat struktur folder

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LANGKAH 3: IMPLEMENTASI KODE PHP

Langkah	Jawaban/Deskripsi
3.1	config/database.php - Koneksi Database
3.2	models/EmployeeModel.php - Model untuk Operasi Data

```php
<?php
/**
 * FILE: config/database.php
 * FUNGSI: Membuat koneksi ke database PostgreSQL
 */
class Database {
    // Informasi koneksi database
    private $host = "localhost";
    private $port = "5432"; // GANTI dengan settingan lokal Anda
    private $db_name = "company_db";
    private $username = "postgres"; // Default username PostgreSQL
    private $password = "password123"; // Ganti dengan password PostgreSQL Anda
    public $conn;

    // Method untuk mendapatkan koneksi
    public function getConnection() {
        $this->conn = null;
        try {
            // Membuat koneksi PDO ke PostgreSQL
            $dsn = "pgsql:host=" . $this->host . ";port=" . $this->port . ";dbname=" . $this->db_name;
            $this->conn = new PDO($dsn, $this->username, $this->password);

            // Set error mode ke exception untuk handling error yang lebih baik
            $this->conn->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);
            // echo "Koneksi database berhasil!";
        } catch (PDOException $exception) {
            echo "Error koneksi database: " . $exception->getMessage();
        }
        return $this->conn;
    }
}
?>
```

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```php
models > 🐘 EmployeeModel.php > ...
1   <?php
2   /**
3    * FILE: models/EmployeeModel.php
4    * FUNGSI: Berisi semua operasi database untuk tabel employees
5    */
    Windsurf: Refactor | Explain
6   class EmployeeModel {
7       private $conn;
8       private $table_name = "employees";
9
10      // Constructor
        Windsurf: Refactor | Explain | ✕
11      public function __construct($db) {
12          $this->conn = $db;
13      }
14
15      // METHOD 1: Read semua employees
        Windsurf: Refactor | Explain | ✕
16      public function getAllEmployees() {
17          $query = "select * from " . $this->table_name . " order by id desc";
18          $stmt = $this->conn->prepare($query);
19          $stmt->execute();
20          return $stmt;
21      }
22
23      // METHOD 2: Create employee baru
        Windsurf: Refactor | Explain | ✕
24      public function createEmployee($data) {
25          $query = "insert into " . $this->table_name .
26                      " (first_name, last_name, email, department, position, salary, hire_date) values
27                       (:first_name, :last_name, :email, :department, :position, :salary, :hire_date)";
28
29          $stmt = $this->conn->prepare($query);
30
31          // Bind parameters untuk keamanan (mencegah SQL injection)
32          $stmt->bindParam(":first_name", $data['first_name']);
33          $stmt->bindParam(":last_name", $data['last_name']);
34          $stmt->bindParam(":email", $data['email']);
35          $stmt->bindParam(":department", $data['department']);
36          $stmt->bindParam(":position", $data['position']);
37          $stmt->bindParam(":salary", $data['salary']);
38          $stmt->bindParam(":hire_date", $data['hire_date']);
39
40          return $stmt->execute();
41      }
```

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```php
43          // METHOD 3: Update employee
            Windsurf: Refactor | Explain | X
44          public function updateEmployee($id, $data) {
45              $query = "update " . $this->table_name . "
46                          set first_name = :first_name, last_name = :last_name,
47                              email = :email, department = :department,
48                              position = :position, salary = :salary, hire_date = :hire_date
49                          where id = :id";
50
51              $stmt = $this->conn->prepare($query);
52
53              $stmt->bindParam(":id", $id);
54              $stmt->bindParam(":first_name", $data['first_name']);
55              $stmt->bindParam(":last_name", $data['last_name']);
56              $stmt->bindParam(":email", $data['email']);
57              $stmt->bindParam(":department", $data['department']);
58              $stmt->bindParam(":position", $data['position']);
59              $stmt->bindParam(":salary", $data['salary']);
60              $stmt->bindParam(":hire_date", $data['hire_date']);
61
62              return $stmt->execute();
63          }
64
65          // METHOD 4: Delete employee
            Windsurf: Refactor | Explain | X
66          public function deleteEmployee($id) {
67              $query = "delete from " . $this->table_name . " where id = :id";
68              $stmt = $this->conn->prepare($query);
69              $stmt->bindParam(":id", $id);
70              return $stmt->execute();
71          }
72
73          // METHOD 5: Get single employee by ID
            Windsurf: Refactor | Explain | X
74          public function getEmployeeById($id) {
75              $query = "select * from " . $this->table_name . " where id = :id";
76              $stmt = $this->conn->prepare($query);
77              $stmt->bindParam(":id", $id);
78              $stmt->execute();
79              return $stmt->fetch(PDO::FETCH_ASSOC);
80          }
81
82          // METHOD 6: Get data dari VIEW employee_summary
            Windsurf: Refactor | Explain | X
83          public function getEmployeeSummary() {
84              $query = "select * from employee_summary";
85              $stmt = $this->conn->prepare($query);
86              $stmt->execute();
87              return $stmt;
88          }
```

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```php
        // METHOD 7: Get data dari VIEW department_stats
        Windsurf: Refactor | Explain | ×
        public function getDepartmentStats() {
            $query = "select * from department_stats";
            $stmt = $this->conn->prepare($query);
            $stmt->execute();
            return $stmt;
        }

        // METHOD 8: Get data dari MATERIALIZED VIEW dashboard_summary
        Windsurf: Refactor | Explain | ×
        public function getDashboardSummary() {
            $query = "select * from dashboard_summary";
            $stmt = $this->conn->prepare($query);
            $stmt->execute();
            return $stmt->fetch(PDO::FETCH_ASSOC);
        }

        // METHOD 9: Refresh materialized view
        Windsurf: Refactor | Explain | ×
        public function refreshDashboard() {
            $query = "refresh materialized view dashboard_summary";
            $stmt = $this->conn->prepare($query);
            return $stmt->execute();
        }
    }
?>
```

3.3	views/header.php dan views/footer.php- Template Header

header.php

```html
views > ⬡ header.php > ⬡ html > ⬡ body > ⬡ div.container > ⬡ main.main-content
    <!DOCTYPE html>
    <html lang="id">
    <head>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
        <title>Sistem Manajemen Karyawan</title>
        <link rel="stylesheet" href="css/style.css">
    </head>
    <body>
        <div class="container">
            <header class="header">
                <h1>Sistem Manajemen Karyawan</h1>
                <p>Aplikasi CRUD Sederhana dengan PostgreSQL & PHP</p>
            </header>
            <nav class="navbar">
                <a href="index.php?action=dashboard" class="nav-link">Dashboard</a>
                <a href="index.php?action=list" class="nav-link">Data Karyawan</a>
                <a href="index.php?action=create" class="nav-link">Tambah Karyawan</a>
                <a href="index.php?action=department_stats" class="nav-link">Statistik Departemen</a>
                <a href="index.php?action=refresh" class="nav-link">Refresh Dashboard</a>
            </nav>
            <main class="main-content">
```

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footer.php

```php
views > 🐘 footer.php > ...
1   <?php
2   /**
3    * FILE: views/footer.php
4    * FUNGSI: Menutup tag HTML yang dibuka di header.php
5    */
6   ?>
7           </main>
8           <footer class="footer">
9               <p>&copy; <?php echo date('Y'); ?> Sistem Manajemen Karyawan. All rights reserved.</p>
10          </footer>
11      </div>
12  </body>
13  </html>
```

3.4	css/style.css - Styling Dasar

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3.5	views/dashboard.php - Halaman Dashboard

```php
views > dashboard.php > ...
1    <?php
2    /**
3     * FILE: views/dashboard.php
4     * FUNGSI: Menampilkan dashboard dengan data statistik
5     */
6    include 'views/header.php';
7    ?>
8    <h2>Dashboard Overview</h2>
9    <div class="dashboard-cards">
10       <div class="card">
11           <h3>Total Karyawan</h3>
12           <div class="number"><?php echo $dashboard['total_employees']; ?></div>
13       </div>
14       <div class="card">
15           <h3>Departemen</h3>
16           <div class="number"><?php echo $dashboard['total_departments']; ?></div>
17       </div>
18       <div class="card">
19           <h3>Proyek Aktif</h3>
20           <div class="number"><?php echo $dashboard['active_projects']; ?></div>
21       </div>
22       <div class="card">
23           <h3>Total Proyek</h3>
24           <div class="number"><?php echo $dashboard['total_projects']; ?></div>
25       </div>
26   </div>
27
28   <div style="display: grid; grid-template-columns: repeat(auto-fit, minmax(300px, 1fr)); gap: 1rem; margin: 2rem 0;">
29       <div class="card">
30           <h3>Gaji Rata-rata</h3>
31           <div class="number">Rp <?php echo number_format($dashboard['company_avg_salary'], 0, ',', '.'); ?></div>
32       </div>
33       <div class="card">
34           <h3>Gaji Tertinggi</h3>
35           <div class="number">Rp <?php echo number_format($dashboard['highest_salary'], 0, ',', '.'); ?></div>
36       </div>
37       <div class="card">
38           <h3>Gaji Terendah</h3>
39           <div class="number">Rp <?php echo number_format($dashboard['lowest_salary'], 0, ',', '.'); ?></div>
40       </div>
41       <div class="card">
42           <h3>Masa Kerja Rata-rata</h3>
43           <div class="number"><?php echo $dashboard['avg_years_service']; ?> tahun</div>
44       </div>
45   </div>
46
47   <div class="card">
48       <h3>Total Budget Proyek</h3>
49       <div class="number" style="font-size: 1.5rem;">
50           Rp <?php echo number_format($dashboard['total_project_budget'], 0, ',', '.'); ?>
51       </div>
52       <p style="margin-top: 0.5rem; color: #666;">
53           <?php echo $dashboard['active_projects']; ?> proyek aktif |
54           <?php echo $dashboard['planning_projects']; ?> proyek dalam perencanaan
55       </p>
56   </div>
57   <?php include 'views/footer.php'; ?>
```

3.6	views/employee_list.php – Menampilkan semua karyawan

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```php
views > 🔷 employee_list.php > 🔷 table.data-table > 🔷 thead > 🔷 tr
1   <?php
2   /**
3    * FILE: views/employee_list.php
4    * FUNGSI: Menampilkan daftar semua karyawan dalam bentuk tabel
5    */
6   include 'views/header.php';
7   ?>
8   <h2>Daftar Karyawan</h2>
9
10  <?php if (isset($_GET['message'])): ?>
11      <div class="alert alert-success">
12          <?php
13          $messages = [
14              'created' => 'Karyawan berhasil ditambahkan!',
15              'updated' => 'Data karyawan berhasil diupdate!',
16              'deleted' => 'Karyawan berhasil dihapus!',
17              'refreshed' => 'Dashboard berhasil di-refresh!'
18          ];
19          echo $messages[$_GET['message']] ?? 'Operasi berhasil!';
20          ?>
21      </div>
22  <?php endif; ?>
23
24  <div style="margin-bottom: 1rem;">
25      <a href="index.php?action=create" class="btn btn-primary">Tambah Karyawan Baru</a>
26  </div>
27
28  <table class="data-table">
29      <thead>
30          <tr>
31              <th>ID</th>
32              <th>Nama Lengkap</th>
33              <th>Email</th>
34              <th>Departemen</th>
35              <th>Posisi</th>
36              <th>Gaji</th>
37              <th>Tanggal Mulai</th>
38              <th>Aksi</th>
39          </tr>
40      </thead>
41      <tbody>
42          <?php if ($employees->rowCount() > 0): ?>
43              <?php while ($row = $employees->fetch(PDO::FETCH_ASSOC)): ?>
44                  <tr>
45                      <td><?php echo htmlspecialchars($row['id']); ?></td>
46                      <td>
47                          <strong><?php echo htmlspecialchars($row['first_name'] . ' ' . $row['last_name']); ?></strong>
48                      </td>
49                      <td><?php echo htmlspecialchars($row['email']); ?></td>
50                      <td>
51                          <span style="padding: 0.25rem 0.5rem; background: #e9ecef; border-radius: 4px;">
52                              <?php echo htmlspecialchars($row['department']); ?>
53                          </span>
54                      </td>
55                      <td><?php echo htmlspecialchars($row['position']); ?></td>
56                      <td>
57                          <strong>Rp <?php echo number_format($row['salary'], 0, ',', '.'); ?></strong>
```

```php
                      </td>
                      <td><?php echo date('d/m/Y', strtotime($row['hire_date'])); ?></td>
                      <td>
                          <div style="display: flex; gap: 0.5rem;">
                              <a href="index.php?action=edit&id=<?php echo $row['id']; ?>" class="btn btn-edit" title="Edit karyawan">
                                  Edit
                              </a>
                              <a href="index.php?action=delete&id=<?php echo $row['id']; ?>" class="btn btn-delete" title="Hapus karyawan" onclick="return confirm('Apakah Anda yakin ingin menghapus karyawan <?php echo htmlspecialchars($row['first_name'] . ' ' . $row['last_name']); ?>?')">
                                  Hapus
                              </a>
                          </div>
                      </td>
                  </tr>
              <?php endwhile; ?>
          <?php else: ?>
              <tr>
                  <td colspan="8" style="text-align: center; padding: 2rem;">
                      <p>Tidak ada data karyawan.</p>
                      <a href="index.php?action=create" class="btn btn-primary">Tambah Karyawan Pertama</a>
                  </td>
              </tr>
          <?php endif; ?>
      </tbody>
  </table>

  <div style="margin-top: 1rem; padding: 1rem; background: #f0f0fa; border-radius: 5px;">
      <strong>Total Data:</strong> <?php echo $employees->rowCount(); ?> karyawan
  </div>
  <?php include 'views/footer.php'; ?>
```

3.7	views/employee_form.php – Mengedit data karyawan

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```php
views > ⬡ employee_form.php > ...
1   <?php
2   /**
3    * FILE: views/employee_form.php
4    * FUNGSI: Form untuk menambah atau mengedit data karyawan
5    */
6   include 'views/header.php';
7
8   // Tentukan mode (edit atau create)
9   $is_edit = isset($employee) && $employee;
10  $form_title = $is_edit ? 'Edit Data Karyawan' : 'Tambah Karyawan Baru';
11  $button_text = $is_edit ? 'Update Data' : 'Simpan Data';
12  $form_action = $is_edit ? "index.php?action=edit&id={$employee['id']}" : "index.php?action=create";
13  ?>
14  <h2><?php echo $form_title; ?></h2>
15
16  <?php if (isset($error)): ?>
17      <div class="alert alert-error">
18          <?php echo $error; ?>
19      </div>
20  <?php endif; ?>
21
22  <form method="POST" action="<?php echo $form_action; ?>">
23
24      <?php if ($is_edit): ?>
25          <input type="hidden" name="id" value="<?php echo $employee['id']; ?>">
26      <?php endif; ?>
27
28      <div class="form-group">
29          <label for="first_name" class="form-label">Nama Depan *</label>
30          <input type="text" id="first_name" name="first_name" class="form-input"
31              value="<?php echo $is_edit ? htmlspecialchars($employee['first_name']) : ''; ?>" required placeholder="Masukkan nama depan">
32      </div>
33
34      <div class="form-group">
35          <label for="last_name" class="form-label">Nama Belakang *</label>
36          <input type="text" id="last_name" name="last_name" class="form-input"
37              value="<?php echo $is_edit ? htmlspecialchars($employee['last_name']) : ''; ?>" required placeholder="Masukkan nama belakang">
38      </div>
39
40      <div class="form-group">
41          <label for="email" class="form-label">Email *</label>
42          <input type="email" id="email" name="email" class="form-input"
43              value="<?php echo $is_edit ? htmlspecialchars($employee['email']) : ''; ?>" required placeholder="contoh@company.com">
44      </div>
45
46      <div class="form-group">
47          <label for="department" class="form-label">Departemen *</label>
48          <select id="department" name="department" class="form-input" required>
49              <option value="">Pilih Departemen</option>
50              <option value="IT" <?php echo ($is_edit && $employee['department'] == 'IT') ? 'selected' : ''; ?>>IT</option>
51              <option value="HR" <?php echo ($is_edit && $employee['department'] == 'HR') ? 'selected' : ''; ?>>HR</option>
52              <option value="Finance" <?php echo ($is_edit && $employee['department'] == 'Finance') ? 'selected' : ''; ?>>Finance</option>
53              <option value="Marketing" <?php echo ($is_edit && $employee['department'] == 'Marketing') ? 'selected' : ''; ?>>Marketing</option>
54              <option value="Operations" <?php echo ($is_edit && $employee['department'] == 'Operations') ? 'selected' : ''; ?>>Operations</option>
55              <option value="Sales" <?php echo ($is_edit && $employee['department'] == 'Sales') ? 'selected' : ''; ?>>Sales</option>
56          </select>
57      </div>
58
59      <div class="form-group">
60          <label for="position" class="form-label">Posisi *</label>
61          <input type="text" id="position" name="position" class="form-input"
62              value="<?php echo $is_edit ? htmlspecialchars($employee['position']) : ''; ?>" required placeholder="Masukkan posisi/jabatan">
63      </div>
64
65      <div class="form-group">
66          <label for="salary" class="form-label">Gaji (Rp) *</label>
67          <input type="number" id="salary" name="salary" class="form-input"
68              value="<?php echo $is_edit ? $employee['salary'] : ''; ?>" required min="0" step="100000" placeholder="Contoh: 5000000">
69          <small style="color: #666;">Isikan angka tanpa titik (contoh: 5000000 untuk 5 juta)</small>
70      </div>
71
72      <div class="form-group">
73          <label for="hire_date" class="form-label">Tanggal Mulai Bekerja *</label>
74          <input type="date" id="hire_date" name="hire_date" class="form-input"
75              value="<?php echo $is_edit ? $employee['hire_date'] : ''; ?>" required>
76      </div>
```

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3.8	views/department_stats.php – Mengedit data karyawan

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```php
<div style="margin-top: 3rem;">
    <h3>Visualisasi Data</h3>

    <div style="background: white; padding: 1.5rem; border-radius: 8px; margin: 1rem 0; border-left: 4px solid #667eea;">
        <h4>Gaji Rata-rata per Departemen</h4>
        <?php
        $max_avg_salary = max(array_column($all_stats, 'avg_salary'));
        foreach ($all_stats as $dept):
            $width_percent = ($max_avg_salary > 0) ? ($dept['avg_salary'] / $max_avg_salary * 100) : 0;
        ?>
            <div style="margin: 0.5rem 0;">
                <div style="display: flex; justify-content: space-between; margin-bottom: 0.25rem;">
                    <span><?php echo htmlspecialchars($dept['department']); ?></span>
                    <span>Rp <?php echo number_format($dept['avg_salary'], 0, ',', '.'); ?></span>
                </div>
                <div style="background: #f0f0f0; border-radius: 4px; height: 20px;">
                    <div style="background: #667eea; height: 100%; border-radius: 4px; width: <?php echo $width_percent; ?>%;"></div>
                </div>
            </div>
        <?php endforeach; ?>
    </div>
```

```php
    <div style="background: white; padding: 1.5rem; border-radius: 8px; margin: 1rem 0; border-left: 4px solid #27ae60;">
        <h4>Jumlah Karyawan per Departemen</h4>
        <?php
        $max_total_employees = max(array_column($all_stats, 'total_employees'));
        foreach ($all_stats as $dept):
            $width_percent = ($max_total_employees > 0) ? ($dept['total_employees'] / $max_total_employees * 100) : 0;
        ?>
            <div style="margin: 0.5rem 0;">
                <div style="display: flex; justify-content: space-between; margin-bottom: 0.25rem;">
                    <span><?php echo htmlspecialchars($dept['department']); ?></span>
                    <span><?php echo $dept['total_employees']; ?> orang</span>
                </div>
                <div style="background: #f0f0f0; border-radius: 4px; height: 20px;">
                    <div style="background: #27ae60; height: 100%; border-radius: 4px; width: <?php echo $width_percent; ?>%;"></div>
                </div>
            </div>
        <?php endforeach; ?>
    </div>
</div>
<?php else: ?>
    <div style="text-align: center; padding: 3rem; background: #f8f9fa; border-radius: 8px;">
        <p style="font-size: 1.2rem; color: #666;">Tidak ada data statistik departemen.</p>
        <p style="color: #999;">Pastikan sudah ada data karyawan dan VIEW <code>department_stats</code> sudah dibuat di database.</p>
        <a href="index.php?action=create" class="btn btn-primary" style="margin-top: 1rem;">Tambah Data Karyawan</a>
    </div>
<?php endif; ?>

<div style="margin-top: 2rem; padding: 1rem; background: #e7f3ff; border-radius: 5px;">
    <strong>Informasi:</strong>
    Data ini di-generate secara real-time dari VIEW PostgreSQL yang menggunakan fungsi agregat <code>count()</code>, <code>avg()</code>, <code>min()</code>, <code>max()</code>, dan <code>sum()</code>.
</div>
<?php include 'views/footer.php'; ?>
```

3.9	index.php - Main Controller

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```php
index.php > ...
1   <?php
2   /**
3    * FILE: index.php
4    * FUNGSI: Controller utama yang menangani semua request
5    */
6
7   // Include file yang diperlukan
8   require_once 'config/database.php';
9   require_once 'models/EmployeeModel.php';
10
11  // Inisialisasi database dan model
12  $database = new Database();
13  $db = $database->getConnection();
14  $employeeModel = new EmployeeModel($db);
15
16  // Tangani action dari URL
17  $action = isset($_GET['action']) ? $_GET['action'] : 'dashboard';
18
19  switch ($action) {
20      case 'dashboard':
21          $dashboard = $employeeModel->getDashboardSummary();
22          include 'views/dashboard.php';
23          break;
24
25      case 'list':
26          $employees = $employeeModel->getAllEmployees();
27          include 'views/employee_list.php';
28          break;
29
30      case 'create':
31          if ($_POST) {
32              // Proses form submission
33              $data = [
34                  'first_name' => $_POST['first_name'],
35                  'last_name' => $_POST['last_name'],
36                  'email' => $_POST['email'],
37                  'department' => $_POST['department'],
38                  'position' => $_POST['position'],
39                  'salary' => $_POST['salary'],
40                  'hire_date' => $_POST['hire_date']
41              ];
42
43              if ($employeeModel->createEmployee($data)) {
44                  header("Location: index.php?action=list&message=created");
45              } else {
46                  $error = "Gagal menambah karyawan";
47                  include 'views/employee_form.php';
48              }
49          } else {
50              include 'views/employee_form.php';
51          }
52          break;
53
54      case 'edit':
55          $id = $_GET['id'];
56          if ($_POST) {
57              $data = [
58                  'first_name' => $_POST['first_name'],
59                  'last_name' => $_POST['last_name'],
60                  'email' => $_POST['email'],
61                  'department' => $_POST['department'],
62                  'position' => $_POST['position'],
63                  'salary' => $_POST['salary'],
64                  'hire_date' => $_POST['hire_date']
65              ];
66
67              if ($employeeModel->updateEmployee($id, $data)) {
68                  header("Location: index.php?action=list&message=updated");
69              } else {
70                  $error = "Gagal mengupdate karyawan";
71                  $employee = $employeeModel->getEmployeeById($id); // ambil data lama untuk form
72                  include 'views/employee_form.php';
73              }
74          } else {
75              $employee = $employeeModel->getEmployeeById($id);
76              include 'views/employee_form.php';
77          }
78          break;
```

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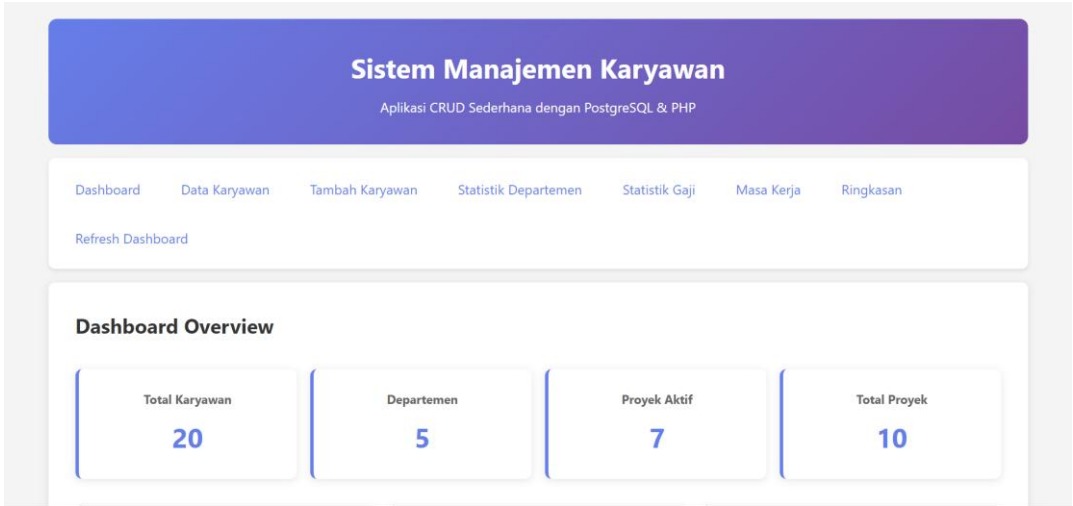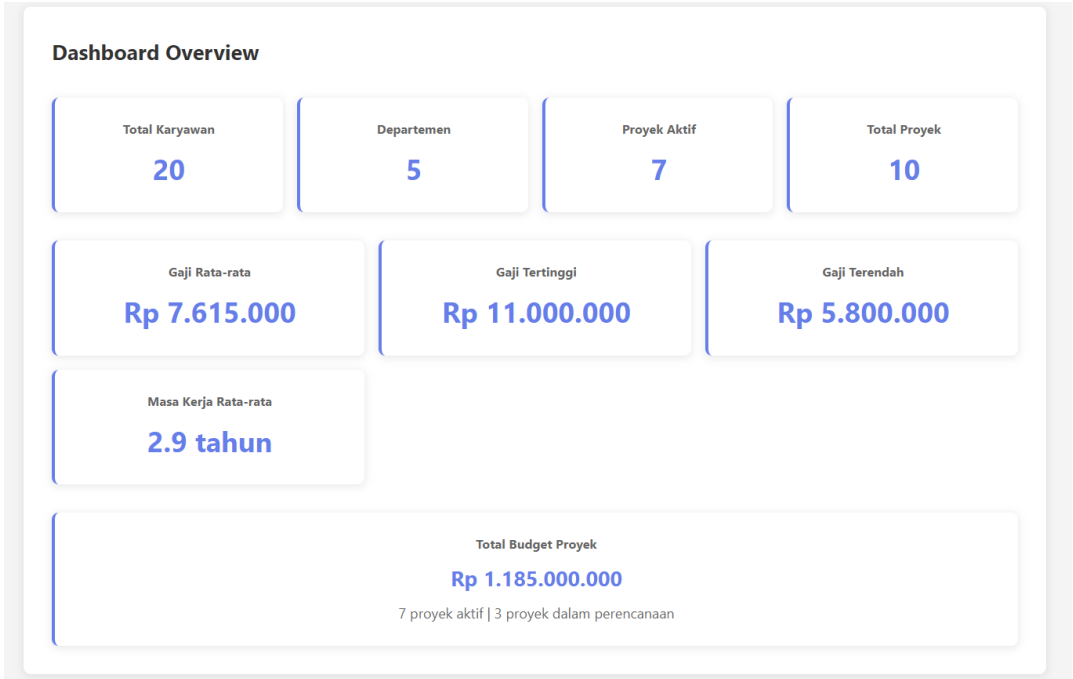
```php
case 'delete':
    $id = $_GET['id'];
    if ($employeeModel->deleteEmployee($id)) {
        header("Location: index.php?action=list&message=deleted");
    } else {
        header("Location: index.php?action=list&message=delete_error");
    }
    break;

case 'department_stats':
    $stats = $employeeModel->getDepartmentStats();
    include 'views/department_stats.php';
    break;

case 'refresh':
    $employeeModel->refreshDashboard();
    header("Location: index.php?action=dashboard&message=refreshed");
    break;

default:
    $dashboard = $employeeModel->getDashboardSummary();
    include 'views/dashboard.php';
    break;
}
?>
```

Output

Sistem Manajemen Karyawan

Aplikasi CRUD Sederhana dengan PostgreSQL & PHP

Dashboard   Data Karyawan   Tambah Karyawan   Statistik Departemen   Refresh Dashboard

Dashboard Overview

Total Karyawan	Departemen	Proyek Aktif	Total Proyek
20	5	7	10

Gaji Rata-rata	Gaji Tertinggi	Gaji Terendah
Rp 7.615.000	Rp 11.000.000	Rp 5.800.000

Masa Kerja Rata-rata
2.9 tahun

Total Budget Proyek
Rp 1.185.000.000
7 proyek aktif | 3 proyek dalam perencanaan

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LANGKAH 4: TESTING APLIKASI

Pertanyaan	Jawaban/Deskripsi
4.1	Checklist Testing Koneksi Database: Buka index.php, pastikan tidak ada error
	Dashboard: Akses index.php?action=dashboard, lihat statistic
	List Karyawan: Akses index.php?action=list, pastikan 20 data muncul

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Daftar Karyawan

Tambah Karyawan Baru

ID	Nama Lengkap	Email	Departemen	Posisi	Gaji	Tanggal Mulai	Aksi
20	Oscar Fernando	oscar.fernando@company.com	IT	Mobile Developer	Rp 8.100.000	11/11/2022	Edit Hapus
19	Nina Zahra	nina.zahra@company.com	Marketing	Social Media Specialist	Rp 5.900.000	25/06/2023	Edit Hapus
18	Lukman Hakim	lukman.hakim@company.com	Operations	Warehouse Manager	Rp 7.300.000	20/12/2021	Edit Hapus
17	Kartika Dewi	kartika.dewi@company.com	Finance	Auditor	Rp 7.700.000	08/03/2022	Edit Hapus
16	Irfan Setiawan	irfan.setiawan@company.com	IT	Network Engineer	Rp 8.300.000	14/09/2021	Edit Hapus
15	Gita Maharani	gita.maharani@company.com	HR	Training Officer	Rp 6.200.000	01/12/2022	Edit Hapus
14	Fitri Handayani	fitri.handayani@company.com	Marketing	Content Creator	Rp 5.800.000	12/04/2023	Edit Hapus
13	Eko Supriyanto	eko.supriyanto@company.com	Operations	Logistics Coordinator	Rp 6.000.000	05/05/2023	Edit Hapus
12	Dian Puspita	dian.puspita@company.com	IT	Database Administrator	Rp 9.000.000	25/07/2021	Edit Hapus
11	Hendra Kurniawan	hendra.kurniawan@company.com	Finance	Tax Officer	Rp 7.200.000	18/04/2022	Edit Hapus
10	Rina Wulandari	rina.wulandari@company.com	HR	Recruitment Specialist	Rp 6.500.000	10/03/2023	Edit Hapus
9	Fajar Nugroho	fajar.nugroho@company.com	IT	Web Developer	Rp 7.800.000	22/09/2022	Edit Hapus
8	Linda Permata	linda.permata@company.com	Marketing	Digital Marketer	Rp 6.800.000	30/01/2023	Edit Hapus
7	Joko Widodo	joko.widodo@company.com	Operations	Operations Manager	Rp 11.000.000	12/05/2020	Edit Hapus
6	Maya Sari	maya.sari@company.com	Finance	Financial Analyst	Rp 8.200.000	15/08/2022	Edit Hapus
5	Rizki Pratama	rizki.pratama@company.com	IT	System Administrator	Rp 8.000.000	05/11/2021	Edit Hapus
4	Dewi Anggraini	dewi.anggraini@company.com	Marketing	Marketing Specialist	Rp 7.000.000	01/02/2023	Edit Hapus
3	Budi Santoso	budi.santoso@company.com	Finance	Accountant	Rp 7.500.000	10/06/2022	Edit Hapus
2	Siti Rahayu	siti.rahayu@company.com	HR	HR Manager	Rp 9.500.000	20/03/2021	Edit Hapus
1	Ahmad Hidayat	ahmad.hidayat@company.com	IT	Software Engineer	Rp 8.500.000	15/01/2022	Edit Hapus

Total Data: 20 karyawan

Tambah Karyawan: Coba tambah karyawan baru

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Daftar Karyawan

Karyawan berhasil ditambahkan!

Tambah Karyawan Baru

ID	Nama Lengkap	Email	Departemen	Posisi	Gaji	Tanggal Mulai	Aksi
21	Athaulla Hafizh	athafhafizh@gmail.com	IT	Network Engineer	Rp 10.000.000	06/11/2025	Edit Hapus

Edit Karyawan: Edit data karyawan yang sudah ada

Daftar Karyawan

Data karyawan berhasil diupdate!

Tambah Karyawan Baru

ID	Nama Lengkap	Email	Departemen	Posisi	Gaji	Tanggal Mulai	Aksi
21	Athaulla Hafizh	athafhafizh@gmail.com	IT	Network Engineer	Rp 1.200.000.000	06/11/2025	Edit Hapus

Hapus Karyawan: Hapus satu karyawan (pastikan konfirmasi)

localhost says

Apakah Anda yakin ingin menghapus karyawan Athaulla Hafizh?

OK   Cancel

Daftar Karyawan

Karyawan berhasil dihapus!

Tambah Karyawan Baru

ID	Nama Lengkap	Email	Departemen	Posisi	Gaji	Tanggal Mulai	Aksi
20	Oscar Fernando	oscar.fernando@company.com	IT	Mobile Developer	Rp 8.100.000	11/11/2022	Edit Hapus

Statistik Departemen: Lihat halaman statistic

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Statistik Departemen

Data statistik berikut diambil dari VIEW department_stats di database PostgreSQL.

Total Departemen	Total Karyawan	Total Budget Gaji	Rata-rata Gaji
5	20	Rp 152.300.000	Rp 7.615.000

Departemen	Jumlah Karyawan	Gaji Rata-rata	Gaji Terendah	Gaji Tertinggi	Total Budget
IT	6	Rp 8.283.333	Rp 7.800.000	Rp 9.000.000	Rp 49.700.000
Marketing	4	Rp 6.375.000	Rp 5.800.000	Rp 7.000.000	Rp 25.500.000
Finance	4	Rp 7.650.000	Rp 7.200.000	Rp 8.200.000	Rp 30.600.000
Operations	3	Rp 8.100.000	Rp 6.000.000	Rp 11.000.000	Rp 24.300.000
HR	3	Rp 7.400.000	Rp 6.200.000	Rp 9.500.000	Rp 22.200.000
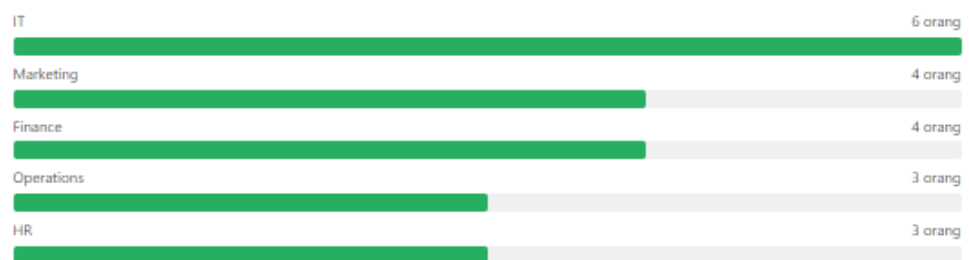
Visualisasi Data

Gaji Rata-rata per Departemen

IT	Rp 8.283.333
Marketing	Rp 6.375.000
Finance	Rp 7.650.000
Operations	Rp 8.100.000
HR	Rp 7.400.000

Jumlah Karyawan per Departemen

IT	6 orang
Marketing	4 orang
Finance	4 orang
Operations	3 orang
HR	3 orang

Informasi: Data ini di-generate secara real-time dari VIEW PostgreSQL yang menggunakan fungsi agregat count(), avg(), min(), max(), dan sum().

Refresh Dashboard: Test fungsi refresh materialized view

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Sebelum   :
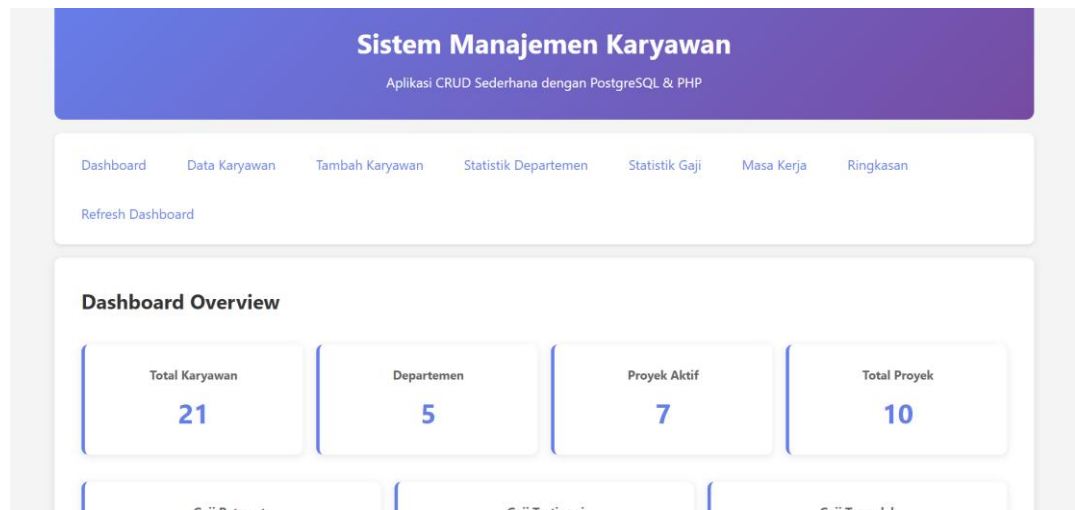
Sesudah   :
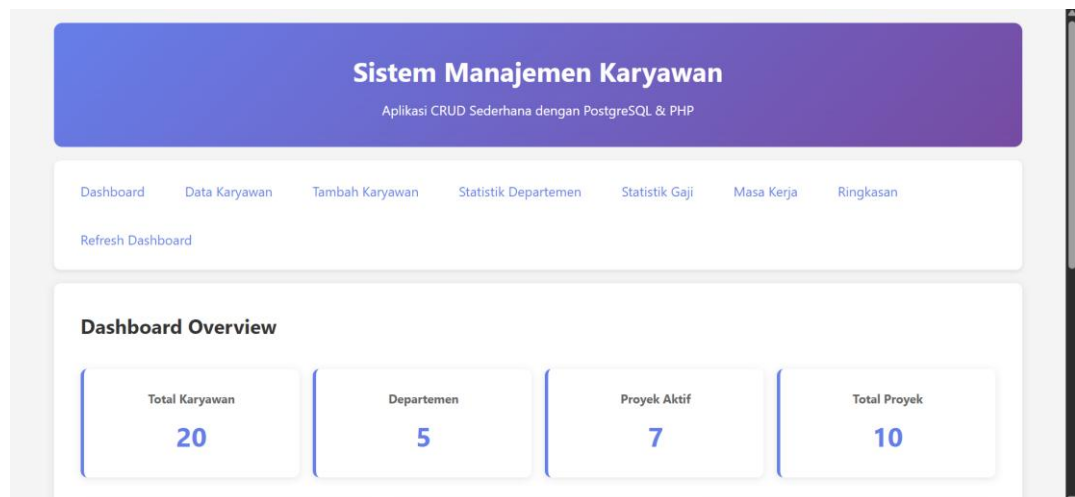
TUGAS 1: IMPLEMENTASI FUNGSI AGREGAT PADA WEB

Langkah	Jawaban/Deskripsi
1	Halaman Statistik Gaji (salary_stats.php) • Tampilkan: Rata-rata gaji, gaji tertinggi, gaji terendah per departemen • Gunakan fungsi: AVG(), MAX(), MIN(), GROUP BY

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Statistik Gaji per Departemen

Menampilkan rata-rata, gaji tertinggi, dan gaji terendah untuk setiap departemen.

Departemen	Gaji Rata-rata	Gaji Tertinggi	Gaji Terendah
Finance	Rp 7.650.000	Rp 8.200.000	Rp 7.200.000
HR	Rp 7.400.000	Rp 9.500.000	Rp 6.200.000
IT	Rp 8.283.333	Rp 9.000.000	Rp 7.800.000
Marketing	Rp 6.375.000	Rp 7.000.000	Rp 5.800.000
Operations	Rp 8.100.000	Rp 11.000.000	Rp 6.000.000

2	Halaman Masa Kerja (tenure_stats.php)
	• Tampilkan: Karyawan berdasarkan masa kerja (Junior: 3 tahun)
	• Gunakan fungsi: COUNT(), CASE WHEN, GROUP BY

Statistik Masa Kerja Karyawan

Menampilkan jumlah karyawan berdasarkan kelompok masa kerja (tenure).

Level Pengalaman (Masa Kerja)	Jumlah Karyawan
Middle (1-3 tahun)	15 orang
Senior (> 3 tahun)	5 orang

3	Halaman Ringkasan Karyawan (employee_overview.php)
	• Tampilkan: Total karyawan, total gaji per bulan, rata-rata masa kerja
	• Gunakan fungsi: COUNT(), SUM(), AVG()

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TUGAS 2: BUAT TABLE FUNCTION POSTGRESQL

Langkah	Jawaban/Deskripsi

1	Function: get_employees_by_salary_range(min_salary DECIMAL, max_salary DECIMAL)
	
	 • Mengembalikan: karyawan dengan gaji dalam range tertentu
	
	 • Kolom: id, full_name, department, position, salary
	
	 <code>create or replace function get_employees_by_salary_range(min_salary decimal, max_salary decimal)
	returns table(
	    id int,
	    full_name text,
	    department varchar,
	    employee_position varchar,
	    salary decimal
	)
	language plpgsql
	as \$\$
	begin
	    return query
	    select
	        e.id,
	        concat(e.first_name, ' ', e.last_name) as full_name,
	        e.department,
	        e.position as employee_position,
	        e.salary
	    from employees e
	    where e.salary >= min_salary and e.salary <= max_salary
	    order by e.salary;
	end;
	\$\$;</code>

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Name	Value
Updated Rows	0
Execute time	0.0s
Start time	Thu Nov 06 10:40:56 WIB 2025
Finish time	Thu Nov 06 10:40:56 WIB 2025
Query	create or replace function get_employees_by_salary_range(min_salary decimal, max_salary decimal)

```sql
create or replace function get_employees_by_salary_range(min_salary decimal, max_salary decimal)
returns table(
    id int,
    full_name text,
    department varchar,
    employee_position varchar,
    salary decimal
)
language plpgsql
as $$
begin
    return query
    select
        e.id,
        concat(e.first_name, ' ', e.last_name) as full_name,
        e.department,
        e.position as employee_position,
        e.salary
    from employees e
    where e.salary >= min_salary and e.salary <= max_salary
    order by e.salary;
end;
$$
```

2	Function: get_department_summary()
	
	• Mengembalikan: ringkasan statistik per departemen
	
	• Kolom: department, employee_count, avg_salary, total_budget
	
	<pre>create or replace function get_department_summary()
	returns table(
	    department varchar,
	    employee_count bigint,
	    avg_salary numeric,
	    total_budget numeric
	)
	language plpgsql
	as $$
	begin
	    return query
	    select
	        e.department,
	        count(e.id) as employee_count,
	        round(avg(e.salary), 2) as avg_salary,
	        sum(e.salary) as total_budget
	    from employees e
	    group by e.department
	    order by e.department;
	end;
	$$;</pre>

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```
Updated Rows    0
Execute time    0.0s
Start time      Thu Nov 06 10:42:00 WIB 2025
Finish time     Thu Nov 06 10:42:00 WIB 2025
Query           create or replace function get_department_summary()
                returns table(
                    department varchar,
                    employee_count bigint,
                    avg_salary numeric,
                    total_budget numeric
                )
                language plpgsql
                as $$
                begin
                  return query
                  select
                      e.department,
                      count(e.id) as employee_count,
                      round(avg(e.salary), 2) as avg_salary,
                      sum(e.salary) as total_budget
                  from employees e
                  group by e.department
                  order by e.department;
                end;
                $$
```