

BASIS DATA LANJUT

TUGAS 11



ADHE WIDYA GALIH KARTIKA

SIB 2C_03

244107060067

Jurusan Teknologi Informasi

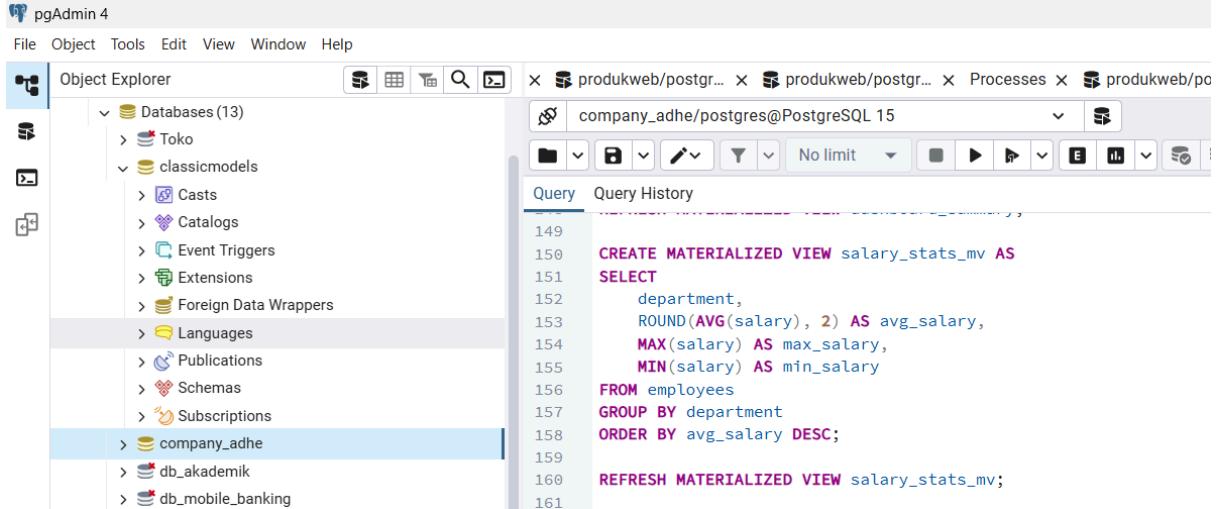
POLITEKNIK NEGERI MALANG

2025

TUGAS 1: IMPLEMENTASI FUNGSI AGREGAT PADA WEB

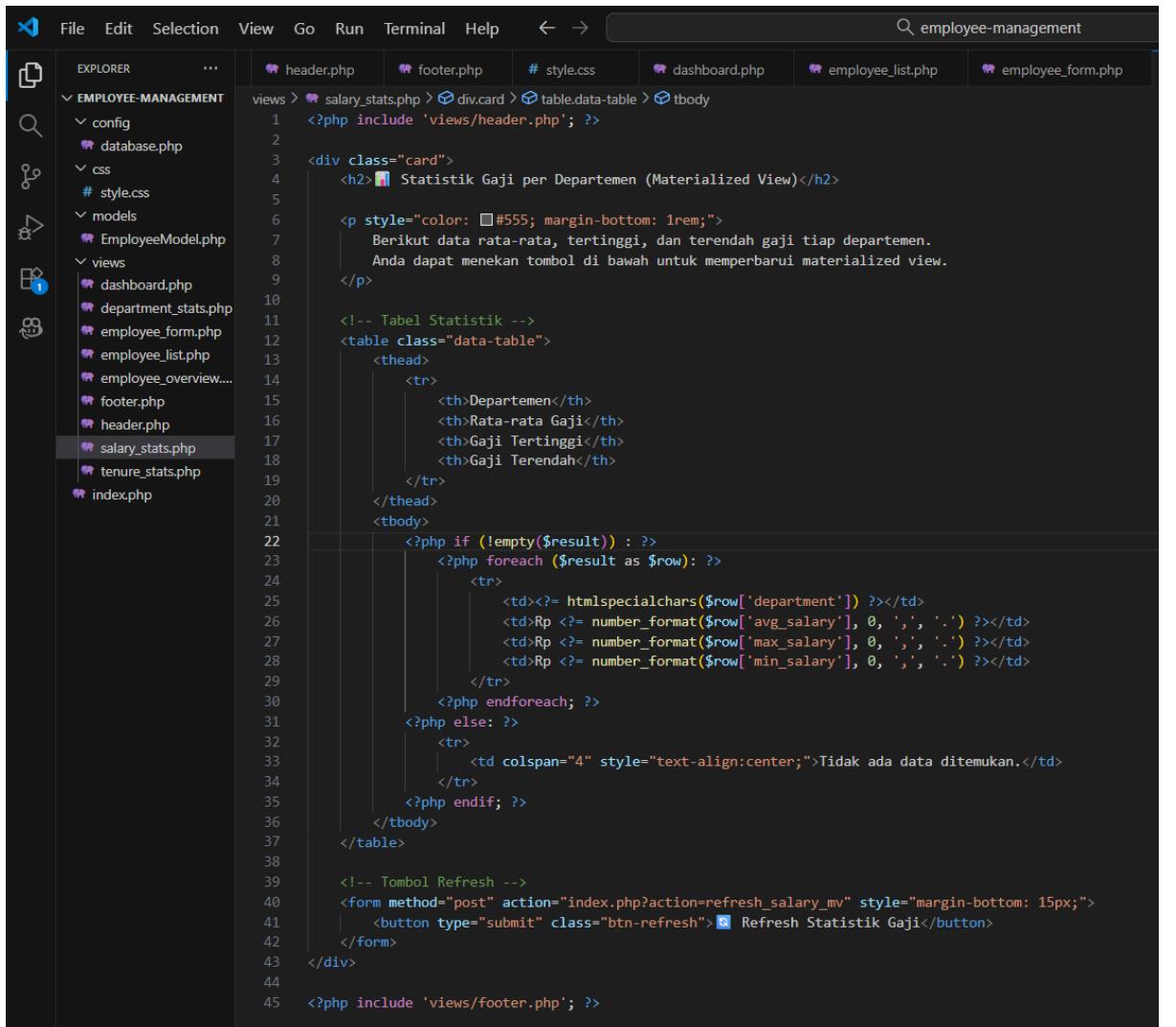
1. Halaman Statistik Gaji (salary_stats.php)

- Tampilkan: Rata-rata gaji, gaji tertinggi, gaji terendah per departemen
- Gunakan fungsi: AVG(), MAX(), MIN(), GROUP BY



```
CREATE MATERIALIZED VIEW salary_stats_mv AS
SELECT
    department,
    ROUND(AVG(salary), 2) AS avg_salary,
    MAX(salary) AS max_salary,
    MIN(salary) AS min_salary
FROM employees
GROUP BY department
ORDER BY avg_salary DESC;

REFRESH MATERIALIZED VIEW salary_stats_mv;
```



```
<?php if (!empty($result)) : ?>
<?php foreach ($result as $row): ?>
<tr>
    <td><?= htmlspecialchars($row['department']) ?></td>
    <td>Rp <?= number_format($row['avg_salary'], 0, ',', '.') ?></td>
    <td>Rp <?= number_format($row['max_salary'], 0, ',', '.') ?></td>
    <td>Rp <?= number_format($row['min_salary'], 0, ',', '.') ?></td>
</tr>
<?php endforeach; ?>
<?php else: ?>
    <tr>
        <td colspan="4" style="text-align:center;">Tidak ada data ditemukan.</td>
    </tr>
<?php endif; ?>
</tbody>
</table>


<form method="post" action="index.php?action=refresh_salary_mv" style="margin-bottom: 15px;">
    <button type="submit" class="btn-refresh"> Refresh Statistik Gaji</button>
</form>
```

Sistem Manajemen Karyawan

Aplikasi CRUD Sederhana dengan PostgreSQL & PHP

[Dashboard](#) [Data Karyawan](#) [Tambah Karyawan](#) [Statistik Departemen](#) [Refresh Dashboard](#) [Statistik Gaji](#)

Statistik Gaji per Departemen (Materialized View)

Berikut data rata-rata, tertinggi, dan terendah gaji tiap departemen. Anda dapat menekan tombol di bawah untuk memperbarui materialized view.

Departemen	Rata-rata Gaji	Gaji Tertinggi	Gaji Terendah
IT	Rp 8.283.333	Rp 9.000.000	Rp 7.800.000
Operations	Rp 8.100.000	Rp 11.000.000	Rp 6.000.000
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
Marketing	Rp 6.375.000	Rp 7.000.000	Rp 5.800.000

[Refresh Statistik Gaji](#)

2. Halaman Masa Kerja (tenure_stats.php)

- Tampilkan: Karyawan berdasarkan masa kerja (Junior: <1 tahun, Middle: 1-3 tahun, Senior: >3 tahun)
- Gunakan fungsi: COUNT(), CASE WHEN, GROUP BY

```

CREATE MATERIALIZED VIEW tenure_stats_mv AS
SELECT
    CASE
        WHEN AGE(CURRENT_DATE, hire_date) < INTERVAL '1 year' THEN 'Junior'
        WHEN AGE(CURRENT_DATE, hire_date) BETWEEN INTERVAL '1 year' AND INTERVAL '3 years' THEN 'Middle'
        ELSE 'Senior'
    END AS tenure_level,
    COUNT(*) AS total_employees,
    STRING_AGG(first_name || ' ' || last_name, ', ') AS employee_names
FROM employees
GROUP BY tenure_level
ORDER BY total_employees DESC;

```

```

1  <?php
2  /**
3   * FILE: views/tenure_stats.php
4   * FUNGSI: Menampilkan statistik masa kerja karyawan (Junior, Middle, Senior)
5   */
6  include 'views/header.php';
7  ?>
8
9  <h2>Statistik Masa Kerja Karyawan</h2>
10
11 <p style="margin-bottom: 2rem; color: #666;">
12 | Data berikut diambil dari <code>tenure_stats_mv</code> (Materialized View) di database PostgreSQL.
13 </p>
14
15 <?php if (!empty($result)): ?>
16 | <!-- Hitung total -->
17 | <?php
18 | | $total_employees = array_sum(array_column($result, 'total_employees'));
19 | ?>
20
21 | <!-- Cards Summary -->
22 <div class="dashboard-cards">
23 | <div class="card">
24 | | <h3>Total Karyawan</h3>
25 | | <div class="number"><?php echo $total_employees; ?></div>
26 | </div>
27 | <div class="card">
28 | | <h3>Level Masa Kerja</h3>
29 | | <div class="number"><?php echo count($result); ?> Level</div>
30 | </div>
31 </div>
32
33 <!-- Tabel Statistik Detail -->
34 <table class="data-table">
35 | <thead>
36 | | <tr>
37 | | | <th>Tingkat Masa Kerja</th>
38 | | | <th>Jumlah Karyawan</th>
39 | | | <th>Nama Karyawan</th>
40 | | </tr>
41 | </thead>
42 | <tbody>
43 | | <?php foreach ($result as $row): ?>
44 | | <tr>
45 | | | <td>
46 | | | | <strong><?php echo htmlspecialchars($row['tenure_level']); ?></strong>
47 | | | </td>
48 | | | <td style="text-align: center;">
49 | | | | <span style="padding: 0.25rem 0.75rem; background: #667eea; color: white; border-radius: 20px;">
50 | | | | | <?php echo $row['total_employees']; ?>
51 | | | </span>
52 | | | <td>
53 | | | | <?php
54 | | | | | $names = explode(',', $row['employee_names']);
55 | | | | | echo "<ul style='margin: 0; padding-left: 20px;'>";
56 | | | | | foreach ($names as $name) {
57 | | | | | | echo "<li>" . htmlspecialchars(trim($name)) . "</li>";
58 | | | | | }
59 | | | | | echo "</ul>";
60 | | | </td>
61 | | | </td>
62 | | </tr>
63 | | <?php endforeach; ?>
64 | </tbody>
65 </table>
66
67

```

```

68     <!-- Tombol Refresh -->
69     <div style="text-align:center; margin-top: 30px;">
70         <a href="index.php?action=refresh_tenure_mv"
71             style="
72                 display: inline-block;
73                 background-color: #4a6cf7;
74                 color: #fff;
75                 padding: 10px 25px;
76                 border-radius: 8px;
77                 text-decoration: none;
78                 font-weight: 500;
79                 transition: background-color 0.3s ease;
80             "
81             onmouseover="this.style.backgroundColor='#3651c9'"
82             onmouseout="this.style.backgroundColor='#4a6cf7'>
83              Refresh Data
84         </a>
85     </div>
86
87     <?php else: ?>
88     <div style="text-align: center; padding: 3rem; background: #f8f9fa; border-radius: 8px;">
89         <p style="font-size: 1.2rem; color: #666;">Tidak ada data statistik masa kerja.</p>
90         <p style="color: #999;">Pastikan materialized view <code>tenure_stats_mv</code> sudah dibuat dan di-refresh.</p>
91         <a href="index.php?action=create" class="btn btn-primary" style="margin-top: 1rem;">Tambah Data Karyawan</a>
92     </div>
93     <?php endif; ?>
94
95     <div style="margin-top: 2rem; padding: 1rem; background: #e7f3ff; border-radius: 5px;">
96         <strong>Informasi:</strong>
97         Data ini diambil dari Materialized View PostgreSQL dengan fungsi agregat
98         <code>COUNT()</code> dan <code>STRING_AGG()</code> untuk mengelompokkan karyawan berdasarkan masa kerja.
99     </div>
100    <?php include 'views/footer.php'; ?>

```

Statistik Masa Kerja Karyawan

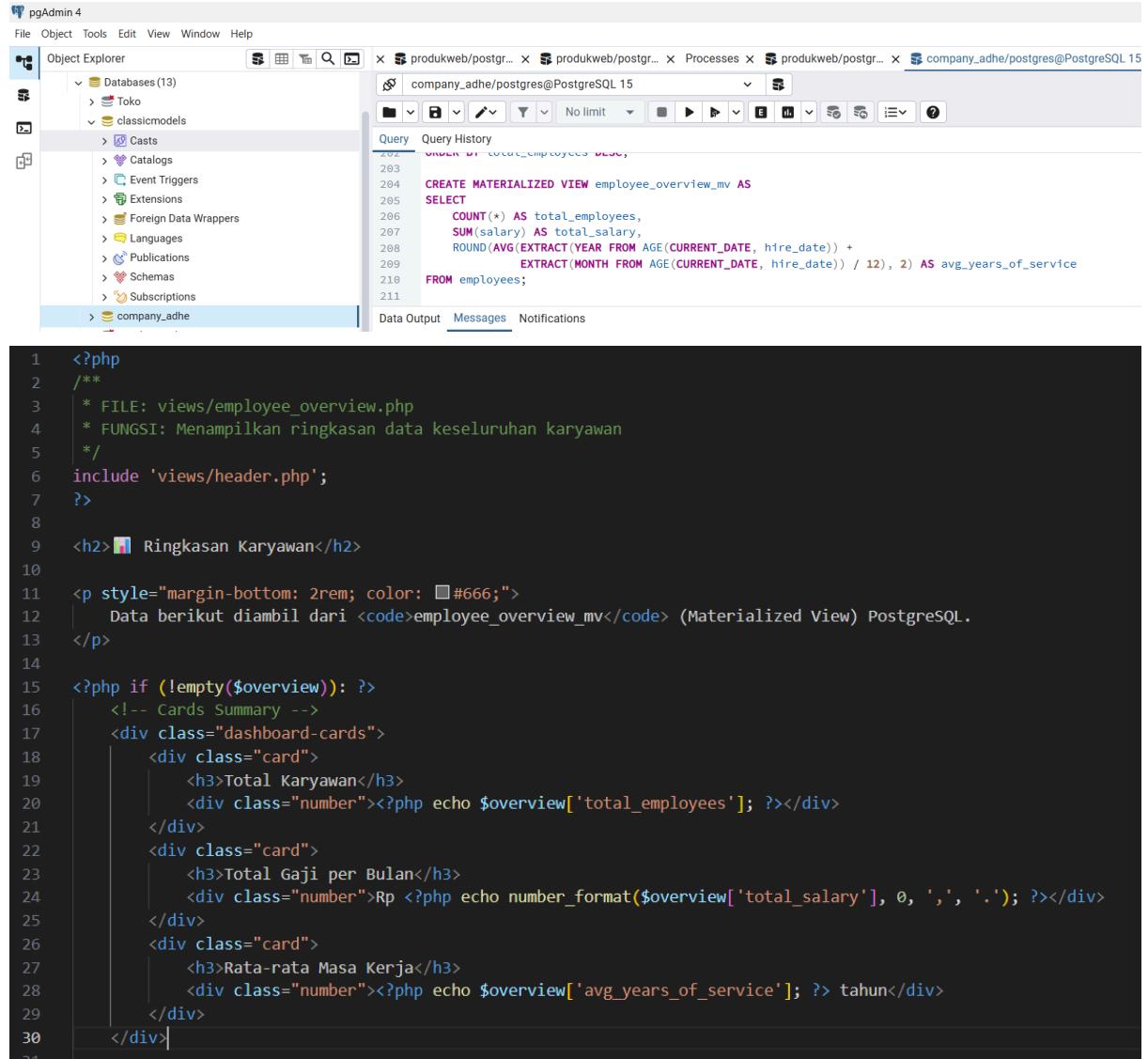
Data berikut diambil dari `tenure_stats_mv` (Materialized View) di database PostgreSQL.

Tingkat Masa Kerja	Jumlah Karyawan	Nama Karyawan
Middle	7	<ul style="list-style-type: none"> Dewi Anggraini Linda Permata Rina Wulandari Eko Supriyanto Fitri Handayani Gita Maharani Nina Zahra
Senior	13	<ul style="list-style-type: none"> Ahmad Hidayat Siti Rahayu Budi Santoso Rizki Pratama Maya Sari Joko Widodo Fajar Nugroho Hendra Kurniawan Dian Puspita Irfan Setiawan Kartika Dewi Lukman Hakim Oscar Fernando

Informasi: Data ini diambil dari Materialized View PostgreSQL dengan fungsi agregat `COUNT()` dan `STRING_AGG()` untuk mengelompokkan karyawan berdasarkan masa kerja.

3. Halaman Ringkasan Karyawan (employee_overview.php)

- Tampilkan: Total karyawan, total gaji per bulan, rata-rata masa kerja
- Gunakan fungsi: COUNT(), SUM(), AVG()



The screenshot shows the pgAdmin 4 interface. On the left, the Object Explorer displays a database structure with 'company_adhe' selected. In the center, a query editor window is open with the following content:

```
202 ORDER BY total_employees DESC;
203
204 CREATE MATERIALIZED VIEW employee_overview_mv AS
205 SELECT
206     COUNT(*) AS total_employees,
207     SUM(salary) AS total_salary,
208     ROUND(AVG(EXTRACT(YEAR FROM AGE(CURRENT_DATE, hire_date)) +
209             EXTRACT(MONTH FROM AGE(CURRENT_DATE, hire_date)) / 12), 2) AS avg_years_of_service
210
211 FROM employees;
```

Below the query editor, a code editor window displays the PHP file 'views/employee_overview.php' with the following code:

```
1 <?php
2 /**
3  * FILE: views/employee_overview.php
4  * FUNGSI: Menampilkan ringkasan data keseluruhan karyawan
5  */
6 include 'views/header.php';
7 ?>
8
9 <h2>Ringkasan Karyawan</h2>
10
11 <p style="margin-bottom: 2rem; color: #666;">
12 | Data berikut diambil dari <code>employee_overview_mv</code> (Materialized View) PostgreSQL.
13 </p>
14
15 <?php if (!empty($overview)): ?>
16 | <!-- Cards Summary -->
17 | <div class="dashboard-cards">
18 | | <div class="card">
19 | | | <h3>Total Karyawan</h3>
20 | | | <div class="number"><?php echo $overview['total_employees']; ?></div>
21 | | </div>
22 | | <div class="card">
23 | | | <h3>Total Gaji per Bulan</h3>
24 | | | <div class="number">Rp <?php echo number_format($overview['total_salary'], 0, ',', '.'); ?></div>
25 | | </div>
26 | | <div class="card">
27 | | | <h3>Rata-rata Masa Kerja</h3>
28 | | | <div class="number"><?php echo $overview['avg_years_of_service']; ?> tahun</div>
29 | | </div>
30 | </div>|
```

```

32  <!-- Tombol Refresh -->
33  <div style="text-align:center; margin-top: 30px;">
34      <a href="index.php?action=refresh_employee_mv"
35          style="
36              display: inline-block;
37              background-color: #4a6cf7;
38              color: #fff;
39              padding: 10px 25px;
40              border-radius: 8px;
41              text-decoration: none;
42              font-weight: 500;
43              transition: background-color 0.3s ease;
44          "
45          onmouseover="this.style.backgroundColor= '#3651c9'"
46          onmouseout="this.style.backgroundColor= '#4a6cf7'>
47           Refresh Data
48      </a>
49  </div>
50
51 <?php else: ?>
52     <div style="text-align: center; padding: 3rem; background: #f8f9fa; border-radius: 8px;">
53         <p style="font-size: 1.2rem; color: #666;">Tidak ada data ringkasan karyawan.</p>
54         <p style="color: #999;">Pastikan materialized view <code>employee_overview_mv</code> sudah dibuat dan di-refresh.</p>
55     </div>
56 <?php endif; ?>
57
58 <div style="margin-top: 2rem; padding: 1rem; background: #e7f3ff; border-radius: 5px;">
59     <strong>Informasi:</strong>
60     Data ini dihitung menggunakan fungsi agregat <code>COUNT()</code>, <code>SUM()</code>, dan <code>AVG()</code> untuk menampilkan total karyawan,
61 </div>
62
63 <?php include 'views/footer.php'; ?>

```

The screenshot shows the dashboard of the "Sistem Manajemen Karyawan" application. At the top, there is a purple header bar with the title "Sistem Manajemen Karyawan" and a subtitle "Aplikasi CRUD Sederhana dengan PostgreSQL & PHP". Below the header, there is a navigation bar with links: Dashboard, Data Karyawan, Tambah Karyawan, Statistik Departemen, Refresh Dashboard, Statistik Gaji, Statistik Masa Kerja, and Ringkasan Karyawan. The main content area features three summary cards:

- Total Karyawan:** 20
- Total Gaji per Bulan:** Rp 152.300.000
- Rata-rata Masa Kerja:** 3.42 tahun

Below these cards is a blue "Refresh Data" button. A note at the bottom states: "Informasi: Data ini dihitung menggunakan fungsi agregat COUNT(), SUM(), dan AVG() untuk menampilkan total karyawan, total gaji, serta rata-rata masa kerja." At the very bottom of the page, there is a footer note: "© 2025 Sistem Manajemen Karyawan. All rights reserved."

TUGAS 2: BUAT TABLE FUNCTION POSTGRESQL

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

```

CREATE OR REPLACE FUNCTION get_employees_by_salary_range(
    min_salary DECIMAL,
    max_salary DECIMAL
)
RETURNS TABLE (
    id INT,
    full_name VARCHAR(100),
    department VARCHAR(50),
    "position" VARCHAR(50),
    salary DECIMAL
)
AS $$ 
BEGIN
    RETURN QUERY
    SELECT
        e.id,
        (e.first_name || ' ' || e.last_name)::VARCHAR(100) AS full_name,
        e.department,
        e."position",
        e.salary
    FROM employees e
    WHERE e.salary BETWEEN min_salary AND max_salary
    ORDER BY e.salary;
END;
$$ LANGUAGE plpgsql;

```

```

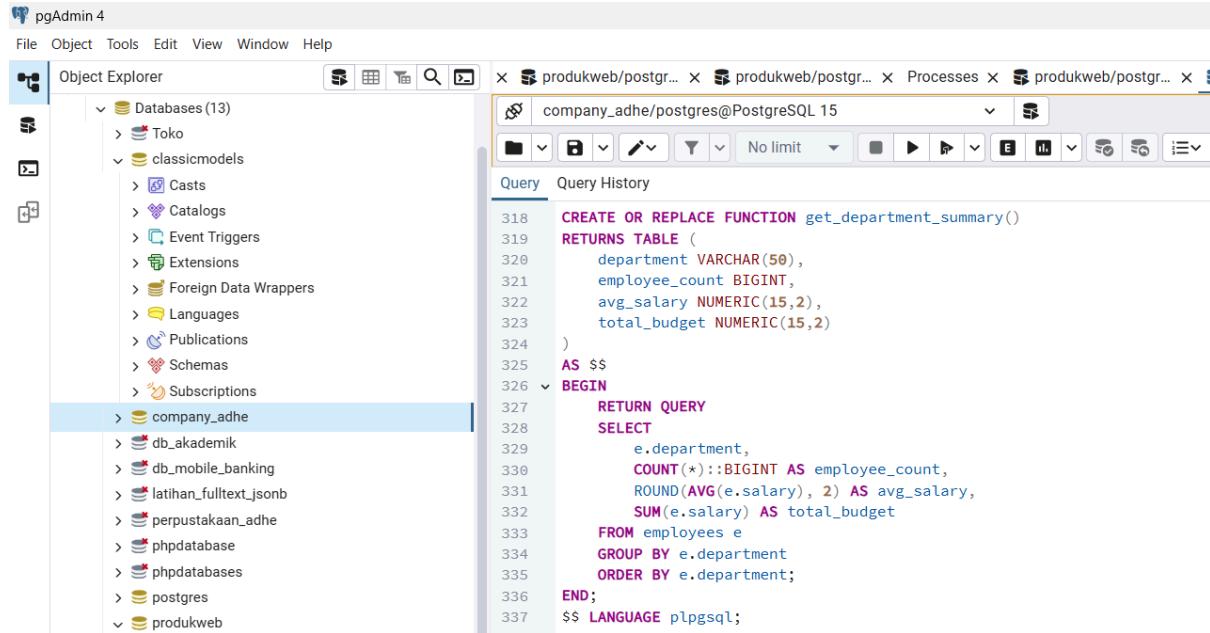
SELECT * FROM get_employees_by_salary_range(3000000, 8000000);

```

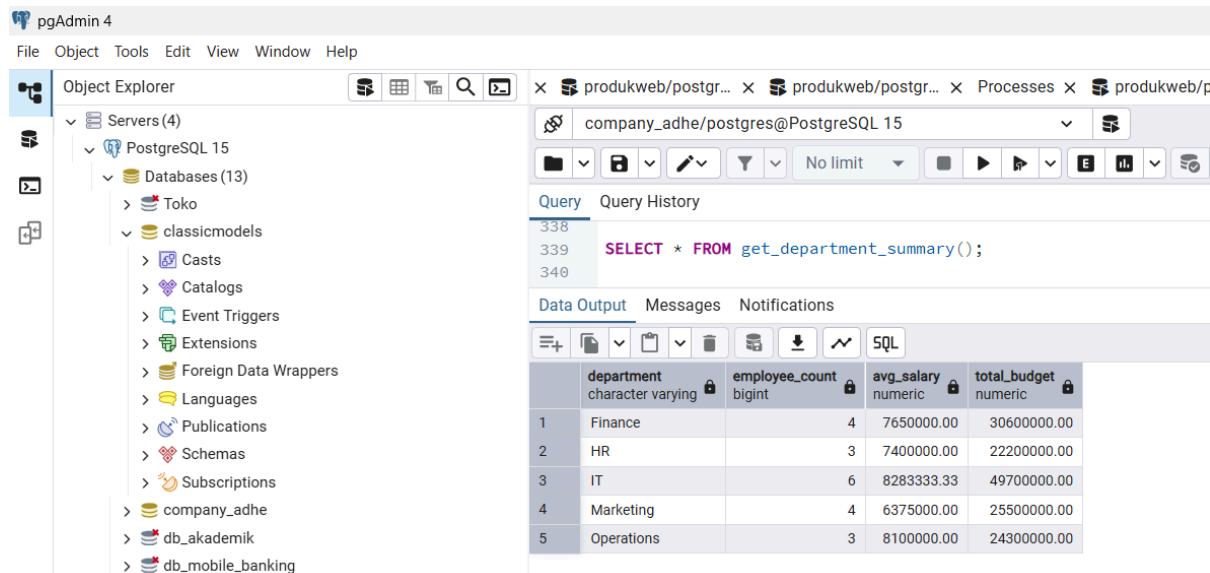
	id	full_name	department	position	salary
1	14	Fitri Handayani	Marketing	Content	5800000.00
2	19	Nina Zahra	Marketing	Social Media	5900000.00
3	13	Eko Supriyanto	Operations	Logistics	6000000.00
4	15	Gita Maharani	HR	Training Officer	6200000.00
5	10	Rina Wulandari	HR	Recruitment	6500000.00
6	8	Linda Permata	Marketing	Digital	6800000.00
7	4	Dewi Anggraini	Marketing	Marketing	7000000.00
8	11	Hendra Kurniawan	Finance	Tax	7200000.00
9	18	Lukman Hakim	Operations	Warehouse	7300000.00
10	3	Budi Santoso	Finance	Accountant	7500000.00
11	17	Kartika Dewi	Finance	Auditor	7700000.00
12	9	Fajar Nugroho	IT	Web Developer	7800000.00
13	5	Rizki Pratama	IT	System Administrator	8000000.00

2. Function: get_department_summary()

- Mengembalikan: ringkasan statistik per departemen
- Kolom: department, employee_count, avg_salary, total_budget



```
CREATE OR REPLACE FUNCTION get_department_summary()
RETURNS TABLE (
    department VARCHAR(50),
    employee_count BIGINT,
    avg_salary NUMERIC(15,2),
    total_budget NUMERIC(15,2)
)
AS $$
BEGIN
    RETURN QUERY
    SELECT
        e.department,
        COUNT(*)::BIGINT AS employee_count,
        ROUND(AVG(e.salary), 2) AS avg_salary,
        SUM(e.salary) AS total_budget
    FROM employees e
    GROUP BY e.department
    ORDER BY e.department;
END;
$$ LANGUAGE plpgsql;
```



	department	employee_count	avg_salary	total_budget
1	Finance	4	7650000.00	30600000.00
2	HR	3	7400000.00	22200000.00
3	IT	6	8283333.33	49700000.00
4	Marketing	4	6375000.00	25500000.00
5	Operations	3	8100000.00	24300000.00