JOBSHEET 2

MATA KULIAH DATA WAREHOUSE

DATA OPERASIONAL

OLEH :

KARTIKA TRI JULIANA
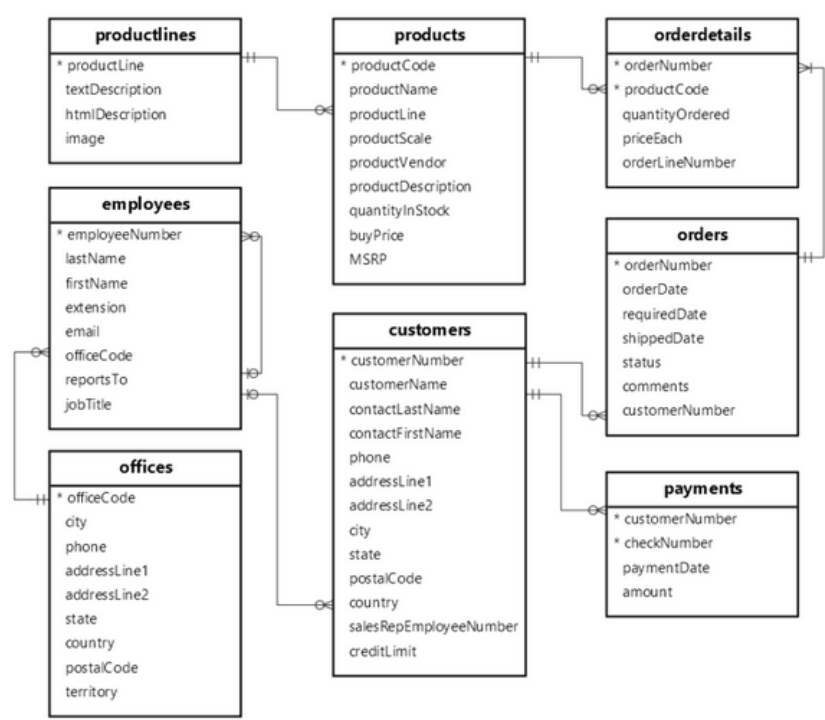
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PROGRAM STUDI SISTEM INFORMASI BISNIS

JURUSAN TEKNOLOGI INFORMASI

POLITEKNIK NEGERI MALANG

TAHUN 2025

Tugas 1

1. Import data perusahaan tersebut pada DBMS MySQL!

2. Analisa struktur data dari database perusahaan tersebut, dalam bentuk tabel, analisa hubungan setiap tabel nya!

Tabel 1	Tabel 2	Jenis Relasi
productlines	products	One to Many
offices	employees	One to Many
employees	employees	Self-Referencing
customers	orders	One to Many
orders	orderdetails	One to Many
orderdetails	products	Many to One
customers	payments	One to Many

3. Analisa jumlah field pada setiap tabel!

Nama Tabel	Jumlah Field
Productlines	4
Products	9
Offices	9
Employees	8
Customers	13
Payments	4
Orders	7
Orderdetails	5

PRAKTIKUM 1

1. Jalankan query berikut pada DBMS MySql yang telah tersedia data Perusahaan LegendVehicle.

```
1   SELECT *
2   FROM employees employe, employes manager, customer cust
3   WHERE employee.reportsTo=manager.employeeNumber
4   AND employee.employeeNumber=cust.salesRepEmployeeNumber;
```

maka hasil dari query tersebut adalah data Employee beserta Manajernya dan Customer yang ia miliki. perhatikan hasil data dengan seksama.

Error

SQL query: Copy ⊚

```
SELECT *
FROM employees employe, employees manager, customer cust
WHERE employe.reportsTo = manager.employeeNumber
AND employe.employeeNumber = cust.salesRepEmployeeNumber LIMIT 0, 25
```

MySQL said: ⊚

#1046 - No database selected

Hasilnya menjadi error karena object employee invalid

Perbaikan :

```
SELECT *
FROM employees employe, employees manager, customers cust
WHERE employe.reportsTo = manager.employeeNumber
AND employe.employeeNumber = cust.salesRepEmployeeNumber;
```

employeeNumber	lastName	firstName	extension	email	officeCode	reportsTo	jobTitle	employeeNumber	lastName	firstName	extension	email	officeCode
1165	Jennings	Leslie	x3291	ljennings@classicmodelcars.com	1	1143	Sales Rep	1143	Bow	Anthony	x5428	abow@classicmodelcars.com	1
1165	Jennings	Leslie	x3291	ljennings@classicmodelcars.com	1	1143	Sales Rep	1143	Bow	Anthony	x5428	abow@classicmodelcars.com	1
1165	Jennings	Leslie	x3291	ljennings@classicmodelcars.com	1	1143	Sales Rep	1143	Bow	Anthony	x5428	abow@classicmodelcars.com	1
1165	Jennings	Leslie	x3291	ljennings@classicmodelcars.com	1	1143	Sales Rep	1143	Bow	Anthony	x5428	abow@classicmodelcars.com	1
1165	Jennings	Leslie	x3291	ljennings@classicmodelcars.com	1	1143	Sales Rep	1143	Bow	Anthony	x5428	abow@classicmodelcars.com	1
1165	Jennings	Leslie	x3291	ljennings@classicmodelcars.com	1	1143	Sales Rep	1143	Bow	Anthony	x5428	abow@classicmodelcars.com	1
1166	Thompson	Leslie	x4065	lthompson@classicmodelcars.com	1	1143	Sales Rep	1143	Bow	Anthony	x5428	abow@classicmodelcars.com	1

2. Buka tab baru pada browser untuk melakukan eksekusi query berikut:

```
1   SELECT manager.employeeNumber as id_manager,
2   CONCAT(manager.firstName," ,manager.lastName) as Manager,
3   employee.employeeNumber as id_staff,
4   CONCAT(employee.firstName," ",employee.lastName) as staff
5   FROM employees employee, employees manager
6   WHERE employee.reportsTo=manager.employeeNumber
7   ORDER BY manager.firstName;
```

dari hasil query diatas maka akan ditemukan atasan dari setiap pegawai.

id_manager	Manager	id_staff	staff
1143	Anthony Bow	1165	Leslie Jennings
1143	Anthony Bow	1166	Leslie Thompson
1143	Anthony Bow	1188	Julie Firrelli
1143	Anthony Bow	1216	Steve Patterson
1143	Anthony Bow	1286	Foon Yue Tseng
1143	Anthony Bow	1323	George Vanauf
1002	Diane Murphy	1056	Mary Patterson
1002	Diane Murphy	1076	Jeff Firrelli
1102	Gerard Bondur	1337	Loui Bondur
1102	Gerard Bondur	1370	Gerard Hernandez
1102	Gerard Bondur	1401	Pamela Castillo
1102	Gerard Bondur	1501	Larry Bott
1102	Gerard Bondur	1504	Barry Jones
1102	Gerard Bondur	1702	Martin Gerard
1621	Mami Nishi	1625	Yoshimi Kato

TUGAS 2

1. Gambarlah hirarki organisasi berdasarkan atasan dari setiap pegawai sesuai dengan hasil praktikum diatas!

= agar lebih jelas, saya berikan kode untuk mengetahui jabatan yag signifikan


```sql
SELECT
    manager.employeeNumber AS id_manager,
    CONCAT(manager.firstName, ' ', manager.lastName) AS Manager,
    manager.jobTitle AS Manager_Position,
    employee.employeeNumber AS id_staff,
    CONCAT(employee.firstName, ' ', employee.lastName) AS Staff,
    employee.jobTitle AS Staff_Position
FROM employees employee
LEFT JOIN employees manager ON employee.reportsTo = manager.employeeNumber
ORDER BY manager.employeeNumber, employee.employeeNumber;
```

id_manager	Manager	Manager_Position	id_staff	Staff	Staff_Position
NULL	NULL	NULL	1002	Diane Murphy	President
1002	Diane Murphy	President	1056	Mary Patterson	VP Sales
1002	Diane Murphy	President	1076	Jeff Firrelli	VP Marketing
1056	Mary Patterson	VP Sales	1088	William Patterson	Sales Manager (APAC)
1056	Mary Patterson	VP Sales	1102	Gerard Bondur	Sale Manager (EMEA)
1056	Mary Patterson	VP Sales	1143	Anthony Bow	Sales Manager (NA)
1056	Mary Patterson	VP Sales	1621	Mami Nishi	Sales Rep
1088	William Patterson	Sales Manager (APAC)	1611	Andy Fixter	Sales Rep
1088	William Patterson	Sales Manager (APAC)	1612	Peter Marsh	Sales Rep
1088	William Patterson	Sales Manager (APAC)	1619	Tom King	Sales Rep
1102	Gerard Bondur	Sale Manager (EMEA)	1337	Loui Bondur	Sales Rep
1102	Gerard Bondur	Sale Manager (EMEA)	1370	Gerard Hernandez	Sales Rep
1102	Gerard Bondur	Sale Manager (EMEA)	1401	Pamela Castillo	Sales Rep
1102	Gerard Bondur	Sale Manager (EMEA)	1501	Larry Bott	Sales Rep
1102	Gerard Bondur	Sale Manager (EMEA)	1504	Barry Jones	Sales Rep
1102	Gerard Bondur	Sale Manager (EMEA)	1702	Martin Gerard	Sales Rep
1143	Anthony Bow	Sales Manager (NA)	1165	Leslie Jennings	Sales Rep
1143	Anthony Bow	Sales Manager (NA)	1166	Leslie Thompson	Sales Rep
1143	Anthony Bow	Sales Manager (NA)	1188	Julie Firrelli	Sales Rep
1143	Anthony Bow	Sales Manager (NA)	1216	Steve Patterson	Sales Rep
1143	Anthony Bow	Sales Manager (NA)	1286	Foon Yue Tseng	Sales Rep
1143	Anthony Bow	Sales Manager (NA)	1323	George Vanauf	Sales Rep

2. Buka tab baru pada browser untuk melakukan eksekusi query berikut:

```sql
SELECT manager.employeeNumber as id_manager,
concat(manager.firstName," ",manager.lastName) as Manager,
employee.employeeNumber as id_staff, concat(employee.firstName,"
",employee.lastName) as staff,
count(cust.customerNumber) as total_cust
FROM employees employee join employees manager on
employee.reportsTomanager.employeeNumber
left join customers cust on
employee.employeeNumber=cust.salesRepEmployeeNumber
GROUP BY employee.employeeNumber
ORDER BY manager.firstName;
```

id_manager	Manager	id_staff	staff	total_cust
1143	Anthony Bow	1165	Leslie Jennings	6
1143	Anthony Bow	1166	Leslie Thompson	6
1143	Anthony Bow	1188	Julie Firrelli	6
1143	Anthony Bow	1216	Steve Patterson	6
1143	Anthony Bow	1286	Foon Yue Tseng	7
1143	Anthony Bow	1323	George Vanauf	8
1002	Diane Murphy	1056	Mary Patterson	0
1002	Diane Murphy	1076	Jeff Firrelli	0
1102	Gerard Bondur	1337	Loui Bondur	6
1102	Gerard Bondur	1370	Gerard Hernandez	7
1102	Gerard Bondur	1401	Pamela Castillo	10
1102	Gerard Bondur	1501	Larry Bott	8
1102	Gerard Bondur	1504	Barry Jones	9
1102	Gerard Bondur	1702	Martin Gerard	6
1621	Mami Nishi	1625	Yoshimi Kato	0
1056	Mary Patterson	1088	William Patterson	0
1056	Mary Patterson	1102	Gerard Bondur	0
1056	Mary Patterson	1143	Anthony Bow	0

dari query tersebut menghasilkan jumlah customer dari setiap staff.
Jika perusahaan tersebut memiliki KPI (Key Performances Indicator) "Jumlah customer yang bertransaksi" maka jawablah pertanyaan-pertanyaan berikut!

TUGAS 3

1. Siapakah staff dengan hirarki paling bawah yang berprestasi dilihat dari jumlah customer terbanyak?

```
1  SELECT
2      e.employeeNumber,
3      CONCAT(e.firstName, " ", e.lastName) AS employee_name,
4      COUNT(c.customerNumber) AS total_customers
5  FROM employees e
6  LEFT JOIN customers c ON e.employeeNumber = c.salesRepEmployeeNumber
7  WHERE e.employeeNumber NOT IN (SELECT DISTINCT reportsTo FROM employees WHERE reportsTo IS NOT NULL)
8  GROUP BY e.employeeNumber
9  ORDER BY total_customers DESC;
10
```

employeeNumber	employee_name	total_customers ▾ 1
1401	Pamela Castillo	10
1504	Barry Jones	9
1323	George Vanauf	8
1501	Larry Bott	8
1286	Foon Yue Tseng	7
1370	Gerard Hernandez	7
1165	Leslie Jennings	6
1166	Leslie Thompson	6
1188	Julie Firrelli	6
1216	Steve Patterson	6
1337	Loui Bondur	6
1702	Martin Gerard	6
1611	Andy Fixter	5
1612	Peter Marsh	5
1076	Jeff Firrelli	0
1619	Tom King	0

2. Jika KPI atasan dihitung dari customer yang dimilikinya dijumlah dengan customer dari staff dibawahnya, urutkan ranking prestasi keseluruhan pegawai beserta keterangan jumlah customer yang dimilikinya!

```
1   WITH RECURSIVE EmployeeHierarchy AS (
2       SELECT
3       employeeNumber, reportsTo, firstName, lastName
4       FROM employees
5       WHERE reportsTo IS NOT NULL
6       UNION ALL
7       SELECT
8       e.employeeNumber, e.reportsTo, e.firstName, e.lastName
9       FROM employees e
10      INNER JOIN EmployeeHierarchy eh ON e.reportsTo = eh.employeeNumber
11  )
12  SELECT
13      e.employeeNumber AS id_employee,
14      CONCAT(e.firstName, " ", e.lastName) AS Employee,
15      COUNT(c.customerNumber) AS direct_customers,
16      (COUNT(c.customerNumber) + COALESCE(SUM(sub.total_cust), 0)) AS total_kpi_customers
17      FROM employees e
18      LEFT JOIN customers c ON e.employeeNumber = c.salesRepEmployeeNumber
19      LEFT JOIN (
20      SELECT salesRepEmployeeNumber, COUNT(customerNumber) AS total_cust
21      FROM customers
22      GROUP BY salesRepEmployeeNumber
23      ) sub ON e.employeeNumber = sub.salesRepEmployeeNumber
24      GROUP BY e.employeeNumber, e.firstName, e.lastName
25      ORDER BY total_kpi_customers DESC;
```

id_employee	Employee	direct_customers	total_kpi_customers
1401	Pamela Castillo	10	110
1504	Barry Jones	9	90
1323	George Vanauf	8	72
1501	Larry Bott	8	72
1286	Foon Yue Tseng	7	56
1370	Gerard Hernandez	7	56
1165	Leslie Jennings	6	42
1166	Leslie Thompson	6	42
1188	Julie Firrelli	6	42
1216	Steve Patterson	6	42
1337	Loui Bondur	6	42
1702	Martin Gerard	6	42
1611	Andy Fixter	5	30
1612	Peter Marsh	5	30
1621	Mami Nishi	5	30
1002	Diane Murphy	0	0
1056	Mary Patterson	0	0
1076	Jeff Firrelli	0	0
1088	William Patterson	0	0
1102	Gerard Bondur	0	0
1143	Anthony Bow	0	0
1619	Tom King	0	0
1625	Yoshimi Kato	0	0

3. Analisa kembali data LegendVehicle untuk mendapatkan ranking pegawai berdasarkan KPI "Jumlah omset yang didapat". Urutkan ranking pegawai beserta keterangan dana yang didapat!

```sql
1  SELECT
2      e.employeeNumber,
3      CONCAT(e.firstName, " ", e.lastName) AS employee_name,
4      SUM(od.quantityOrdered * od.priceEach) AS total_sales
5  FROM employees e
6  JOIN customers c ON e.employeeNumber = c.salesRepEmployeeNumber
7  JOIN orders o ON c.customerNumber = o.customerNumber
8  JOIN orderdetails od ON o.orderNumber = od.orderNumber
9  GROUP BY e.employeeNumber
10 ORDER BY total_sales DESC;
11
```

employeeNumber	employee_name	total_sales ▾ 1
1370	Gerard Hernandez	1258577.81
1165	Leslie Jennings	1081530.54
1401	Pamela Castillo	868220.55
1501	Larry Bott	732096.79
1504	Barry Jones	704853.91
1323	George Vanauf	669377.05
1612	Peter Marsh	584593.76
1337	Loui Bondur	569485.75
1611	Andy Fixter	562582.59
1216	Steve Patterson	505875.42
1286	Foon Yue Tseng	488212.67
1621	Mami Nishi	457110.07
1702	Martin Gerard	387477.47
1188	Julie Firrelli	386663.20
1166	Leslie Thompson	347533.03

4. Jika KPI yang pertama merupakan "Jumlah customer yang bertransaksi" sedangkan KPI yang kedua "Jumlah omset yang didapat". Maka, berapakah jumlah field yang dibutuhkan untuk mendapatkan informasi tersebut?

KPI	Jumlah KPI	Detail
Jumlah customer yang bertransaksi berapa field	3	• employeeNumber → ID pegawai. • employee_name → Nama pegawai. • total_customers → Jumlah pelanggan yang telah

		melakukan transaksi
Jumlah omset yang didapat	3	• employeeNumber → ID pegawai. • employee_name → Nama pegawai. • total_sales → Total nilai transaksi yang dihasilkan.

5. Buatlah report pertahun untuk KPI "Jumlah omset yang didapat" pada Foon Yue Tseng dan Pamela Castillo. Serta gambarkan grafiknya (grafik garis)

```sql
1  SELECT e.employeeNumber, e.firstName, e.lastName, YEAR(o.orderDate) AS tahun,
2      SUM(od.quantityOrdered * od.priceEach) AS total_sales
3  FROM employees e
4  JOIN customers c ON e.employeeNumber = c.salesRepEmployeeNumber
5  JOIN orders o ON c.customerNumber = o.customerNumber
6  JOIN orderdetails od ON o.orderNumber = od.orderNumber
7  WHERE e.firstName IN ('Foon Yue', 'Pamela') AND e.lastName IN ('Tseng', 'Castillo')
8  GROUP BY e.employeeNumber, tahun
9  ORDER BY tahun, e.firstName;
10
```

employeeNumber	firstName	lastName	tahun ▲ 1	total_sales
1286	Foon Yue	Tseng	2003	221887.03
1401	Pamela	Castillo	2003	317104.78
1286	Foon Yue	Tseng	2004	237255.26
1401	Pamela	Castillo	2004	409910.07
1286	Foon Yue	Tseng	2005	29070.38
1401	Pamela	Castillo	2005	141205.70
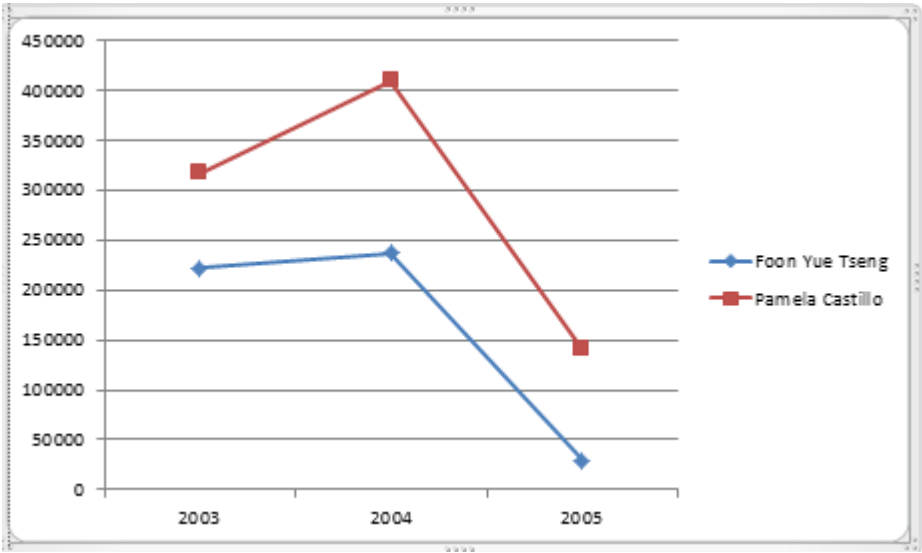
Pak Huhut merupakan pemegang saham LegendVehicle. dia membutuhkan dashboard untuk melihat perkembangan penjualan (omset) disetiap cabang di tiap tahunnya. Dikarenakan perusahaan tersebut belum merekrut Data Engineer maka, penarikan informasi hanya bisa dilakukan melaluai OLTP yang ada.

Hasil report yang diinginkan adalah grafik berdasarkan tabel berikut:

Nama Cabang	2003	2004	2005
...			
...			

Analisalah terlebih dahulu:

1. Field apa saja yang diperlukan untuk menampilkan penjualan di setiap cabang.
   - **Offices :** Berisi informasi kode kantor (officeCode) dan kota (city).
   - **Employees :** Menghubungkan kantor dengan salesRepEmployeeNumber.
   - **Customers :** Menyimpan informasi pelanggan yang memiliki salesRepEmployeeNumber.
   - **Payments** : Berisi tanggal pembayaran (paymentDate), ID pembayaran (customerNumber), dan jumlah pembayaran (amount).
   - **orders dan orderdetails :** Menyimpan informasi pesanan, tetapi untuk omset lebih baik langsung mengambil dari payments.

2. Bentuk query dengan memperhatikan relasi antar tabel
   - **o.city** sebagai Nama_Cabang dan Kota.
   - **YEAR(p.paymentDate)** untuk mendapatkan Tahun transaksi.
   - **c.customerNumber** sebagai Id_payment.
   - **SUM(p.amount)** untuk menghitung total Omset per cabang dan tahun.
   - **payments** dihubungkan dengan **customers** melalui **customerNumber**.
   - **customers** dihubungkan dengan **employees** melalui **salesRepEmployeeNumber**.
   - **employees** dihubungkan dengan **offices** melalui **officeCode**..

- **Kode sql :**

```sql
SELECT
    o.city AS Nama_Cabang,
    o.city AS Kota,
    YEAR(p.paymentDate) AS Tahun,
    SUM(p.amount) AS Total_Omset
FROM payments p
JOIN customers c ON p.customerNumber = c.customerNumber
JOIN employees e ON c.salesRepEmployeeNumber = e.employeeNumber
JOIN offices o ON e.officeCode = o.officeCode
GROUP BY o.city, YEAR(p.paymentDate)
ORDER BY o.city, Tahun;
```

- **Hasil kode :**

Nama_Cabang	Kota	Tahun ▲ 2	Total_Omset
Boston	Boston	2003	301781.38
Boston	Boston	2004	467177.07
Boston	Boston	2005	66923.88
London	London	2003	505384.85
London	London	2004	674815.75
London	London	2005	144125.30
NYC	NYC	2003	391175.53
NYC	NYC	2004	623872.78
NYC	NYC	2005	57571.16
Paris	Paris	2003	969959.90
Paris	Paris	2004	1368458.96
Paris	Paris	2005	480750.04
San Francisco	San Francisco	2003	532681.13
San Francisco	San Francisco	2004	517408.62
San Francisco	San Francisco	2005	287349.83
Sydney	Sydney	2003	281985.51
Sydney	Sydney	2004	509833.62
Sydney	Sydney	2005	215473.85
Tokyo	Tokyo	2003	267249.40
Tokyo	Tokyo	2004	151761.45
Tokyo	Tokyo	2005	38099.22

	2003	2004	2005
Boston	301781.38	467177.07	66923.88
London	505384.85	674815.75	144125.3
NYC	391175.53	623872.78	57571.16
Paris	969959.9	1368458.96	480750.04
San Francisno	532681.13	517408.62	287349.83
Sydney	281985.51	509833.62	215473.85
Tokyo	267249.4	151761.45	38099.22
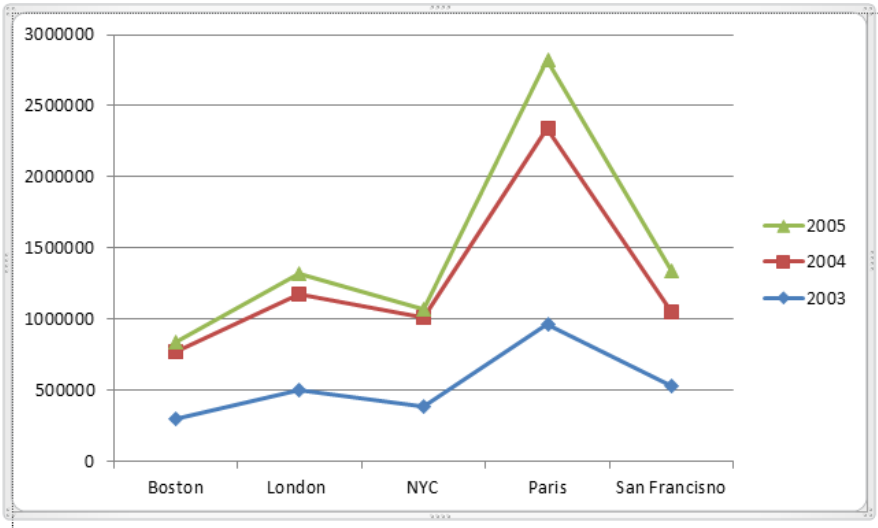
SOAL BONUS: buatlah report lain dengan sumber data OLTP yang sama, analisa field yang digunakan, bentuk struktur query dan tuliskan dalam tabel serta grafiknya.

1. **Field yang digunakan :**
   - **employees.employeeNumber** = ID Employee (Sales Rep)
   - **employees.firstName** = Nama Depan Employee
   - **employees.lastName** = Nama Belakang Employee
   - **payments.amount** = Jumlah pembayaran dari pelanggan
   - **customers.salesRepEmployeeNumber** = Menghubungkan pelanggan dengan employee
   - **payments.paymentDate** = Tahun transaksi (untuk melihat omset per tahun)

2. **Analisis hubungan dan kode**
   - Mengambil **ID dan Nama Employee** dari tabel employees.
   - Mengambil **Tahun** dari paymentDate di tabel payments.
   - Menggunakan SUM(p.amount) untuk menghitung **total omset** per employee.
   - GROUP BY e.employeeNumber, Nama_Employee, YEAR(p.paymentDate) agar omset dihitung per employee dan per tahun.
   - **Mengurutkan hasil (ORDER BY) berdasarkan employee dan tahun**.

```
1  SELECT
2      e.employeeNumber AS Employee_ID,
3      CONCAT(e.firstName, ' ', e.lastName) AS Nama_Employee,
4      YEAR(p.paymentDate) AS Tahun,
5      SUM(p.amount) AS Total_Omset
6  FROM payments p
7  JOIN customers c ON p.customerNumber = c.customerNumber
8  JOIN employees e ON c.salesRepEmployeeNumber = e.employeeNumber
9  GROUP BY e.employeeNumber, Nama_Employee, YEAR(p.paymentDate)
10 ORDER BY e.employeeNumber, Tahun;
11
```

Employee_ID	Nama_Employee	Tahun ▲ 2	Total_Omset
1165	Leslie Jennings	2003	413219.85
1165	Leslie Jennings	2004	332370.22
1165	Leslie Jennings	2005	244316.48
1166	Leslie Thompson	2003	119461.28
1166	Leslie Thompson	2004	185038.40
1166	Leslie Thompson	2005	43033.35
1188	Julie Firrelli	2003	220116.97
1188	Julie Firrelli	2004	129916.12
1188	Julie Firrelli	2005	36630.11
1216	Steve Patterson	2003	81664.41
1216	Steve Patterson	2004	337260.95
1216	Steve Patterson	2005	30293.77
1286	Foon Yue Tseng	2003	221887.03
1286	Foon Yue Tseng	2004	237255.26
1286	Foon Yue Tseng	2005	29070.38

3. Grafik

	2003	2004	2005
Leslie Jennings	413219.85	332370.22	244316.48
Leslie Thompson	119461.28	185038.4	43033.35
Julie Firrelli	220116.97	129916.12	36630.11
Steve Patterson	81664.41	337260.95	30293.77
Foon Yue Tseng	221887.03	237255.26	29070.38