LAPORAN AKHIR

UAS DATA WAREHOUSE

CAR SALES

Disusun Oleh:

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Jurusan Teknologi Informasi

D4 Sistem Informasi Bisnis

Politeknik Negeri Malang

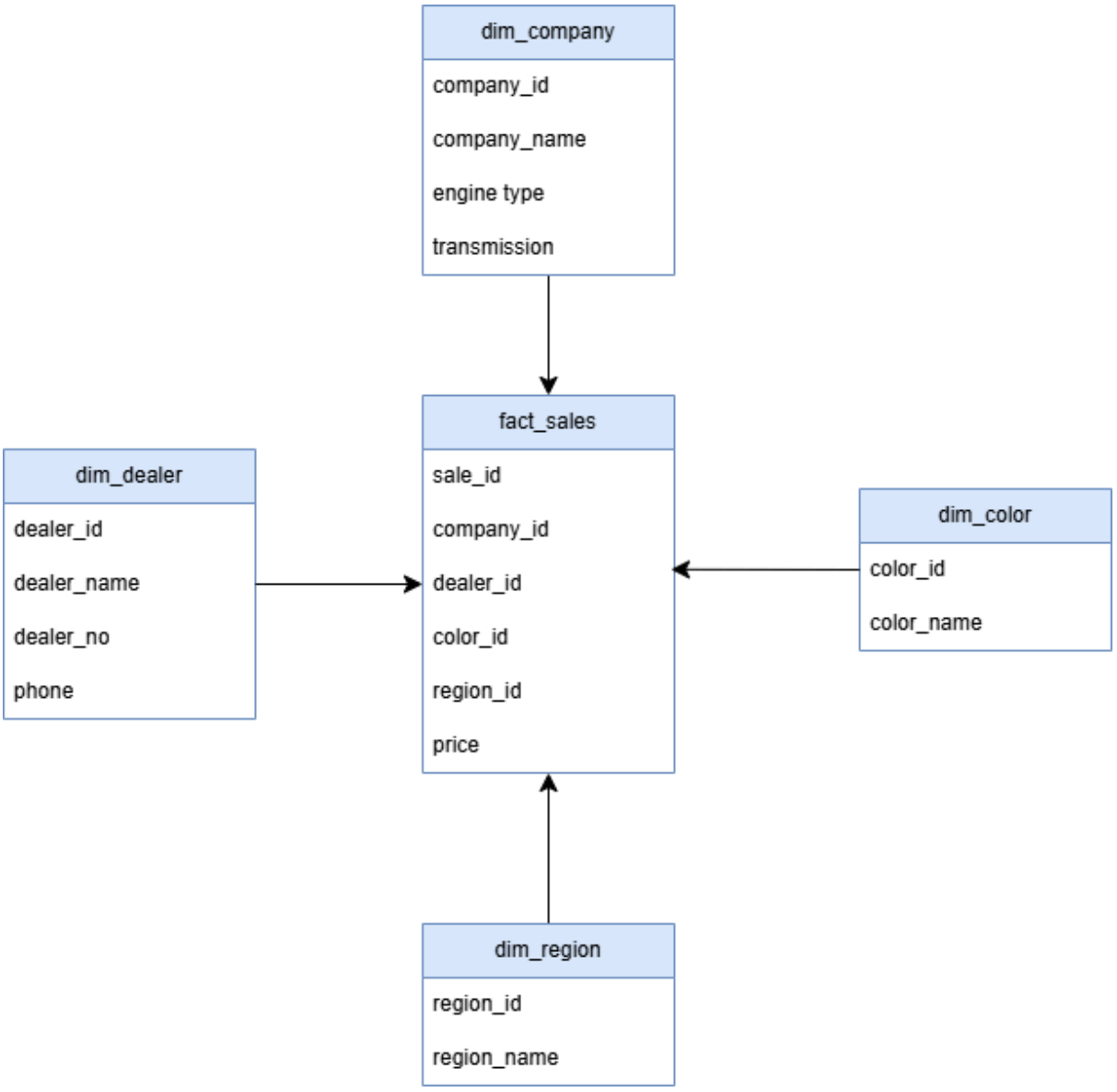
2024

Link Dataset :
https://www.kaggle.com/datasets/missionjee/car-sales-report

Studi Kasus :

- Mengetahui berapa banyak mobil dari masing-masing merek (Company) yang terjual.
- Menghitung total pendapatan (Price) untuk tiap Dealer Name
- Mobil warna apa yang paling banyak terjual?
- Mengetahui wilayah dengan penjualan terbanyak.
- Mengetahui rata-rata harga jual mobil dari setiap perusahaan (company)

Star Schema



Langkah - langkah Proses ETL

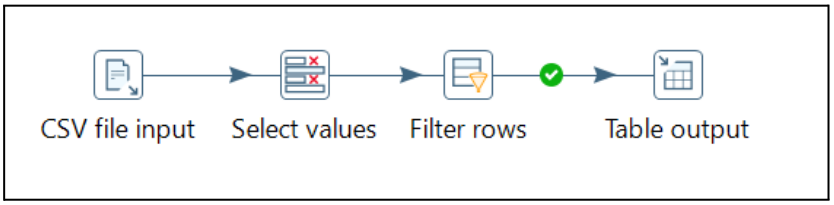
1. ***Create Database Dw_Car (OLAP)***

```
-- Tabel Dimensi: Region
CREATE TABLE dim_region (
    region_id INT AUTO_INCREMENT PRIMARY KEY,
    region_name VARCHAR(100)
);

-- Tabel Dimensi: Dealer
CREATE TABLE dim_dealer (
    dealer_id INT AUTO_INCREMENT PRIMARY KEY,
    dealer_name VARCHAR(150),
    dealer_no VARCHAR(20),
    phone VARCHAR(20),
);

-- Tabel Dimensi: Company (Merek Mobil)
CREATE TABLE dim_company (
    company_id INT AUTO_INCREMENT PRIMARY KEY,
    company_name VARCHAR(100),
    model VARCHAR(100),
    engine_type VARCHAR(100),
    transmission VARCHAR(50)
);

-- Tabel Dimensi: Warna Mobil
CREATE TABLE dim_color (
    color_id INT AUTO_INCREMENT PRIMARY KEY,
    color_name VARCHAR(50)
);

-- Tabel Fakta: Penjualan Mobil
CREATE TABLE fact_sales (
    sale_id INT AUTO_INCREMENT PRIMARY KEY,
    company_id INT,
    dealer_id INT,
    color_id INT,
    region_id INT,
    price DECIMAL(12,2)

    FOREIGN KEY (company_id) REFERENCES dim_company(company_id),
    FOREIGN KEY (dealer_id) REFERENCES dim_dealer(dealer_id),
    FOREIGN KEY (color_id) REFERENCES dim_color(color_id),
    FOREIGN KEY (region_id) REFERENCES dim_region(region_id)
);
```

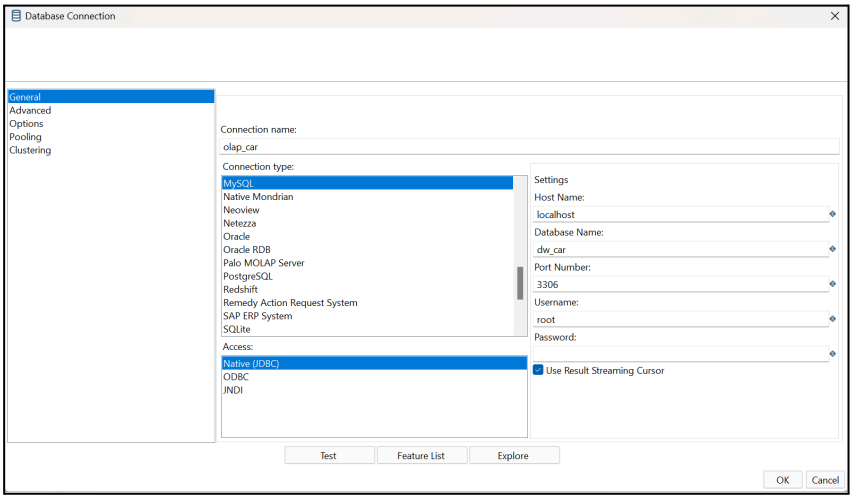
2. ***Create Dimensi Table***

a. Table Dimensi Company

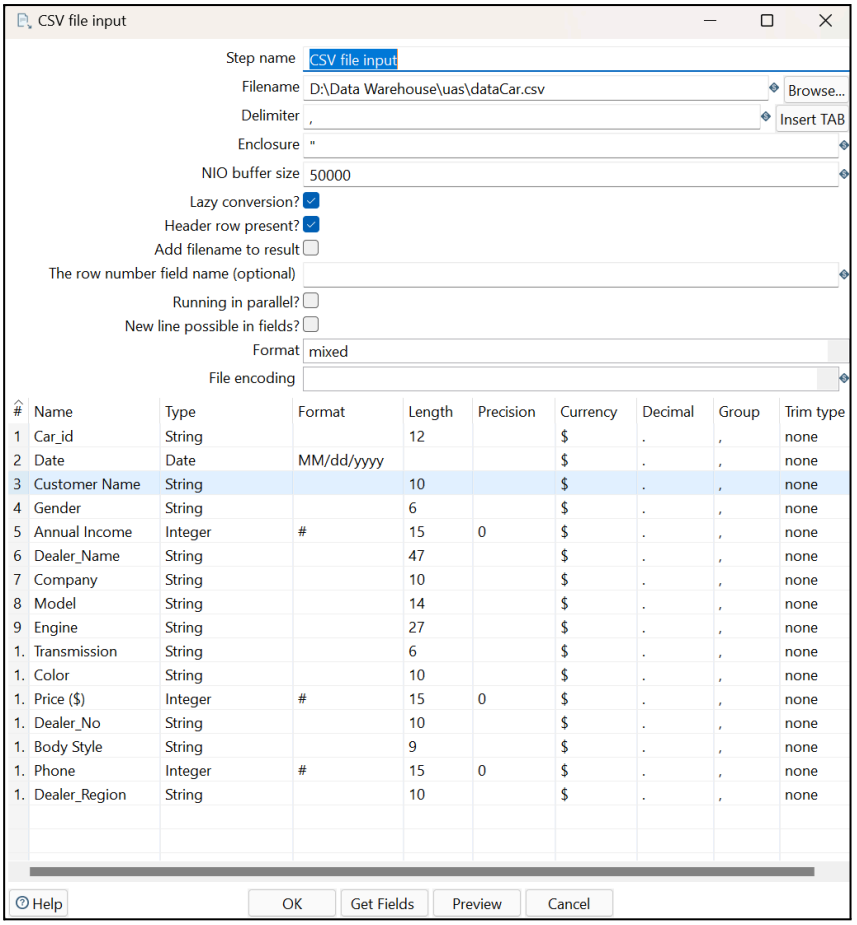
Elemen yang dibutuhkan:



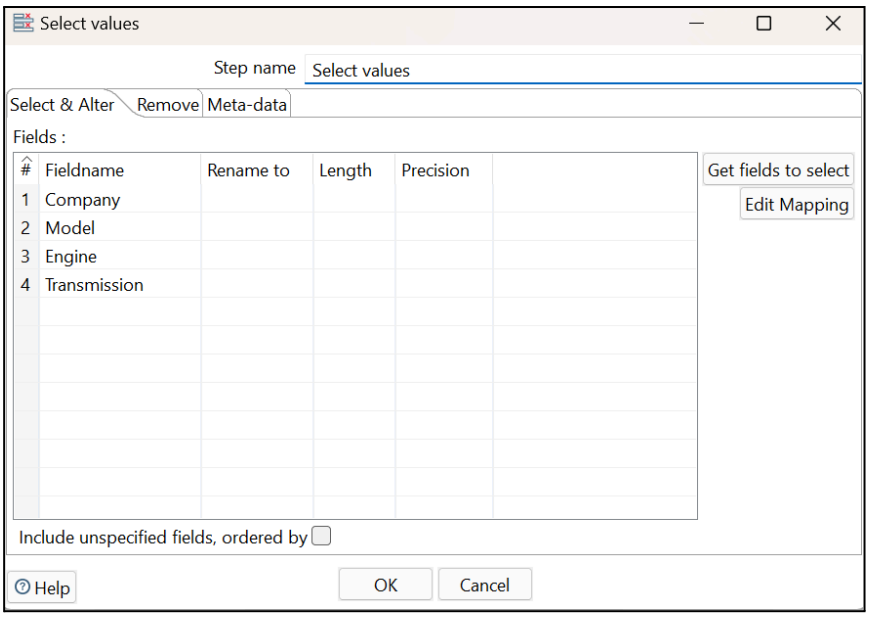
Tambahkan Connection ke Database Dw_Car:



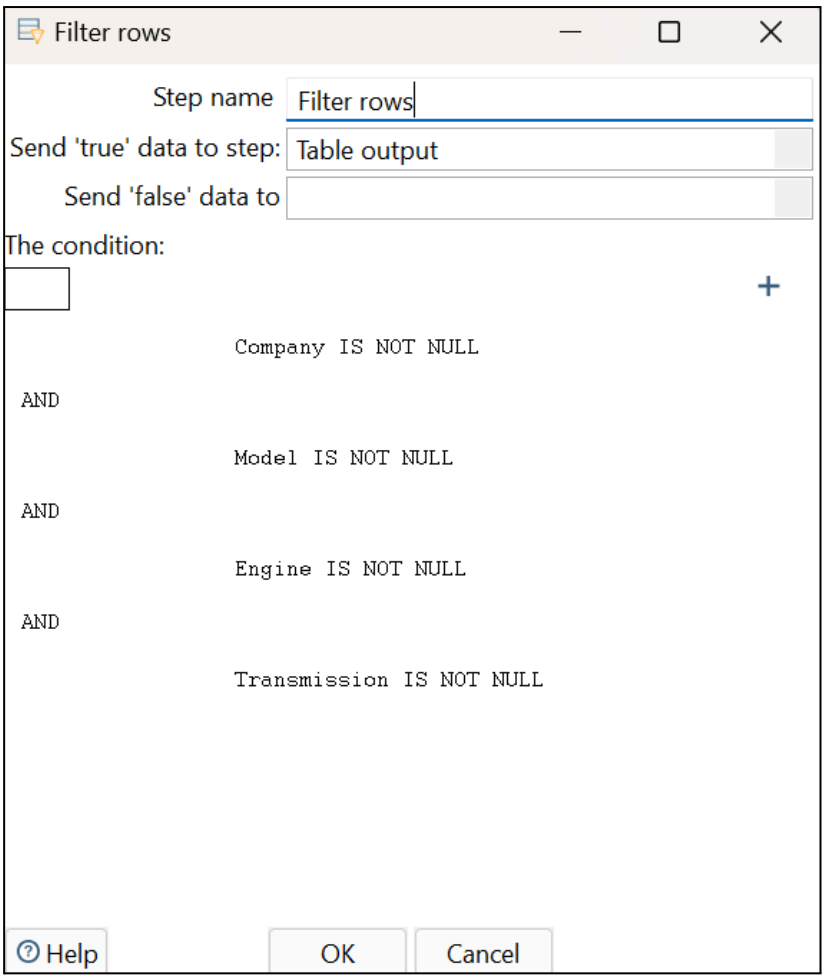
Masukkan file datasaet ke table input:



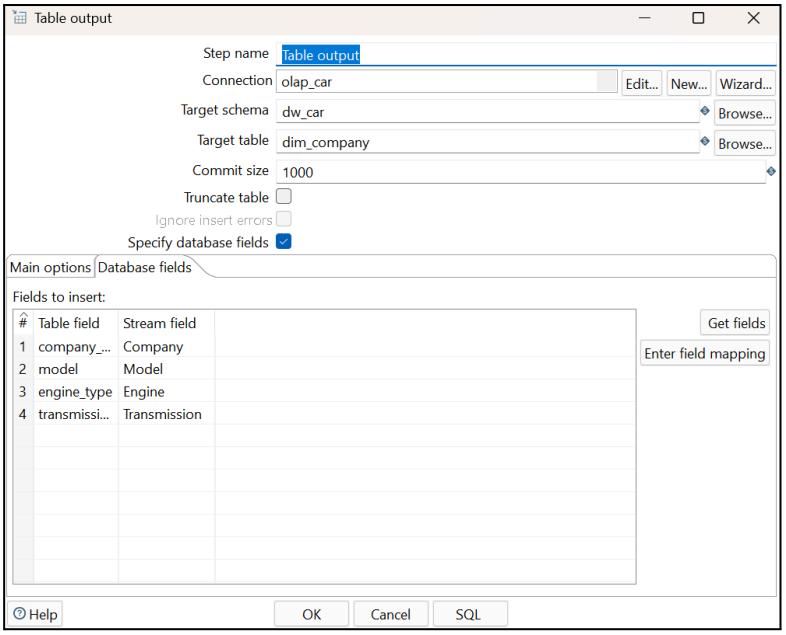
Setting kolom yang akan digunakan pada elemen select value yaitu company, model, engine dan transmission untuk dim_company:



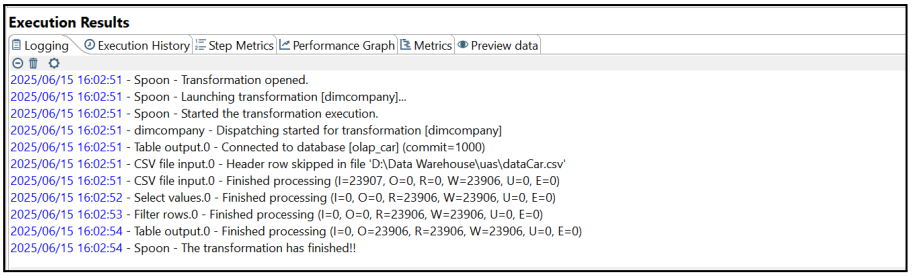
Atur filter rows untuk membersihkan data dan atur kolom yang telah dipilih sebagai *is not null* untuk memastikan data tidak ada yang kosong:



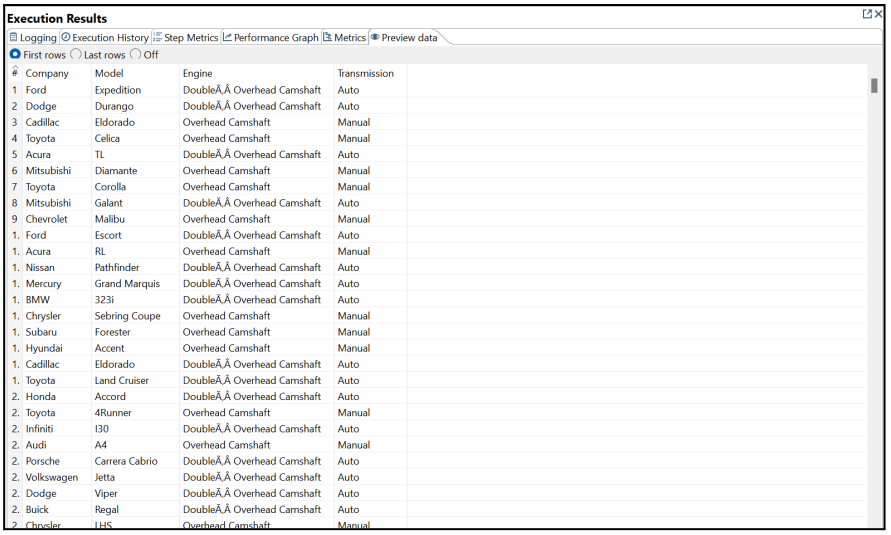
Atur Table output untuk menyimpan hasil pada database Dw_Car pada table dim_company dan singkronisasi table yang digunakan:



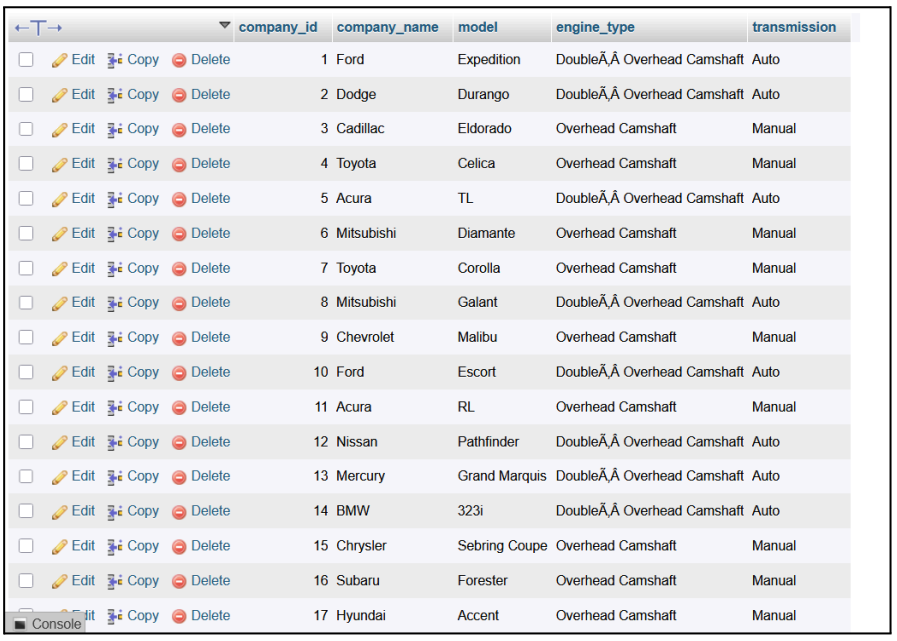
Jalankan transformasi dan pastikan tidak ada error pada hasil eksekusi



Lihat pada priview data untuk memastikan data sudah berhasil



Cek pada database Dw_Car pada table dim_company

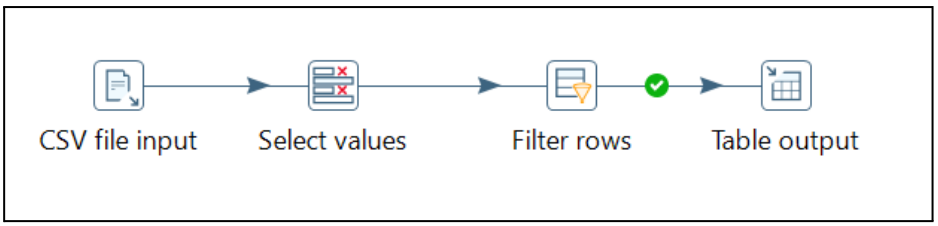


	company_id	company_name	model	engine_type	transmission
Edit Copy Delete	1	Ford	Expedition	DoubleÃ‚Â Overhead Camshaft	Auto
Edit Copy Delete	2	Dodge	Durango	DoubleÃ‚Â Overhead Camshaft	Auto
Edit Copy Delete	3	Cadillac	Eldorado	Overhead Camshaft	Manual
Edit Copy Delete	4	Toyota	Celica	Overhead Camshaft	Manual
Edit Copy Delete	5	Acura	TL	DoubleÃ‚Â Overhead Camshaft	Auto
Edit Copy Delete	6	Mitsubishi	Diamante	Overhead Camshaft	Manual
Edit Copy Delete	7	Toyota	Corolla	Overhead Camshaft	Manual
Edit Copy Delete	8	Mitsubishi	Galant	DoubleÃ‚Â Overhead Camshaft	Auto
Edit Copy Delete	9	Chevrolet	Malibu	Overhead Camshaft	Manual
Edit Copy Delete	10	Ford	Escort	DoubleÃ‚Â Overhead Camshaft	Auto
Edit Copy Delete	11	Acura	RL	Overhead Camshaft	Manual
Edit Copy Delete	12	Nissan	Pathfinder	DoubleÃ‚Â Overhead Camshaft	Auto
Edit Copy Delete	13	Mercury	Grand Marquis	DoubleÃ‚Â Overhead Camshaft	Auto
Edit Copy Delete	14	BMW	323i	DoubleÃ‚Â Overhead Camshaft	Auto
Edit Copy Delete	15	Chrysler	Sebring Coupe	Overhead Camshaft	Manual
Edit Copy Delete	16	Subaru	Forester	Overhead Camshaft	Manual
Edit Copy Delete	17	Hyundai	Accent	Overhead Camshaft	Manual

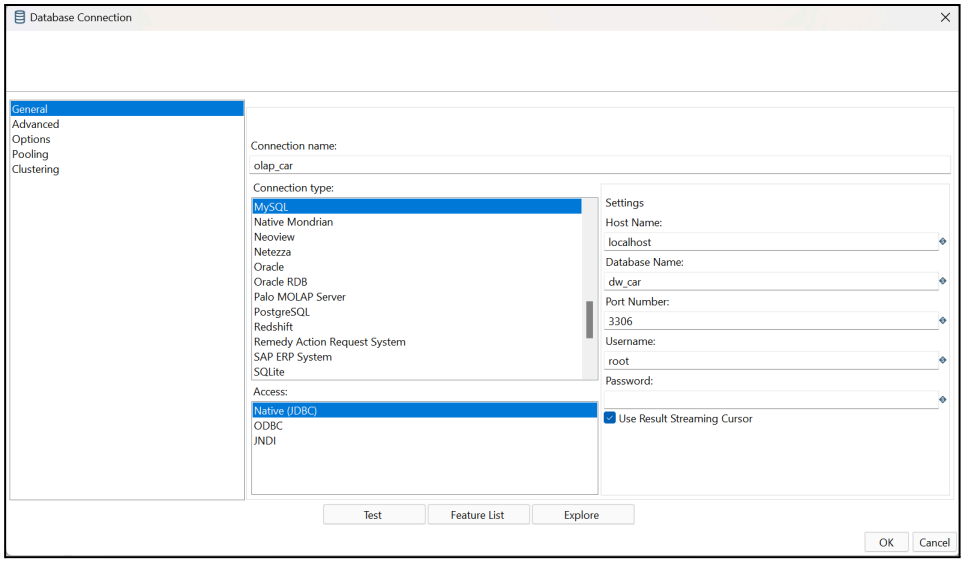
Console

b. Table Dimensi Dealer

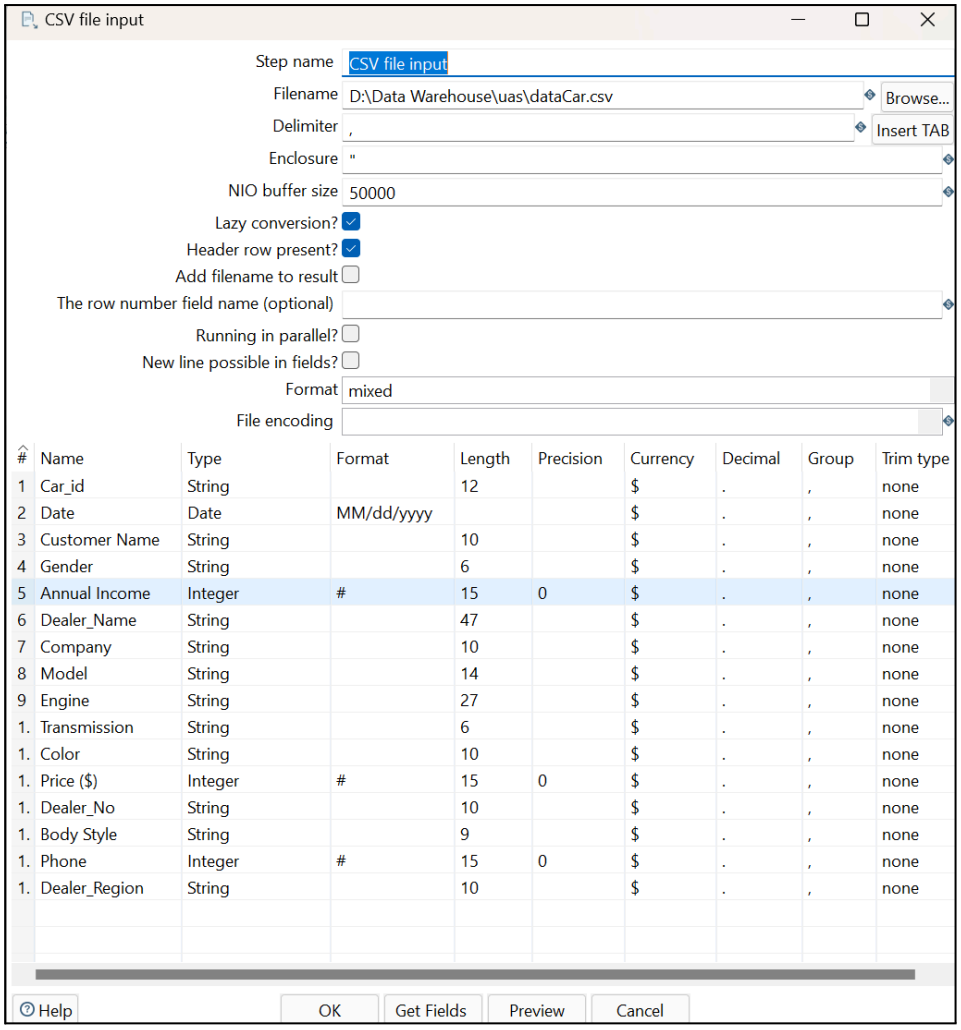
Elemen yang dibutuhkan :



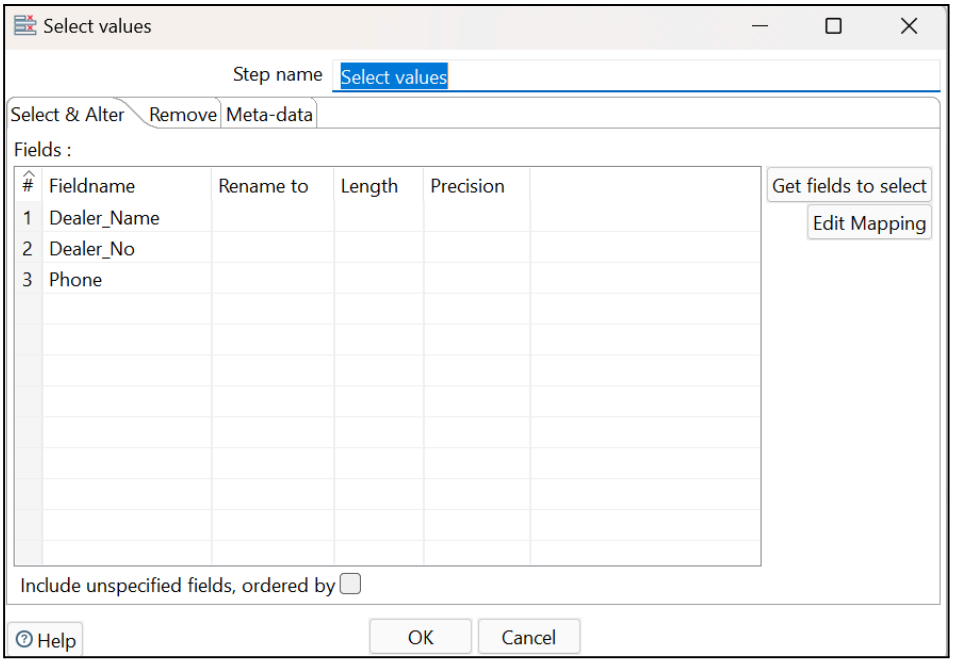
Tambah connection ke database Dw_Car:



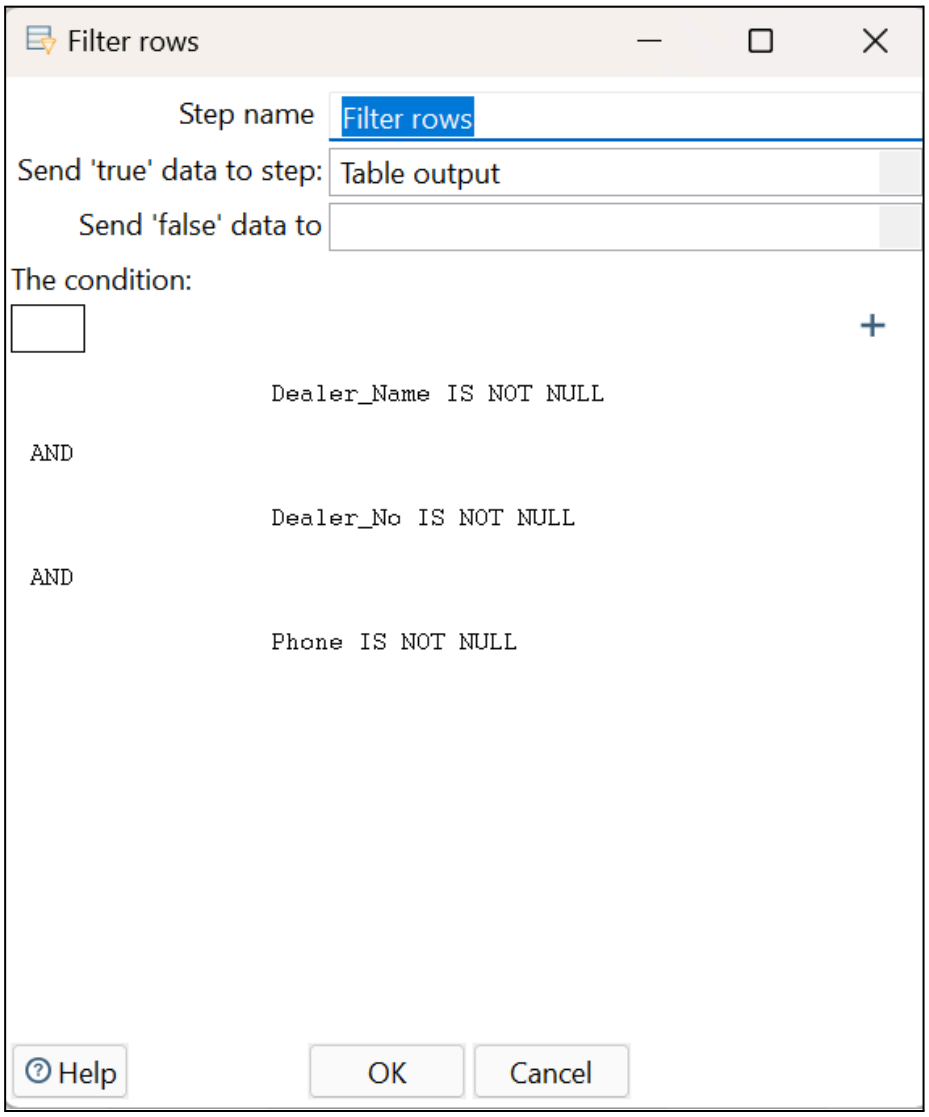
Masukkan dataset ke table input:



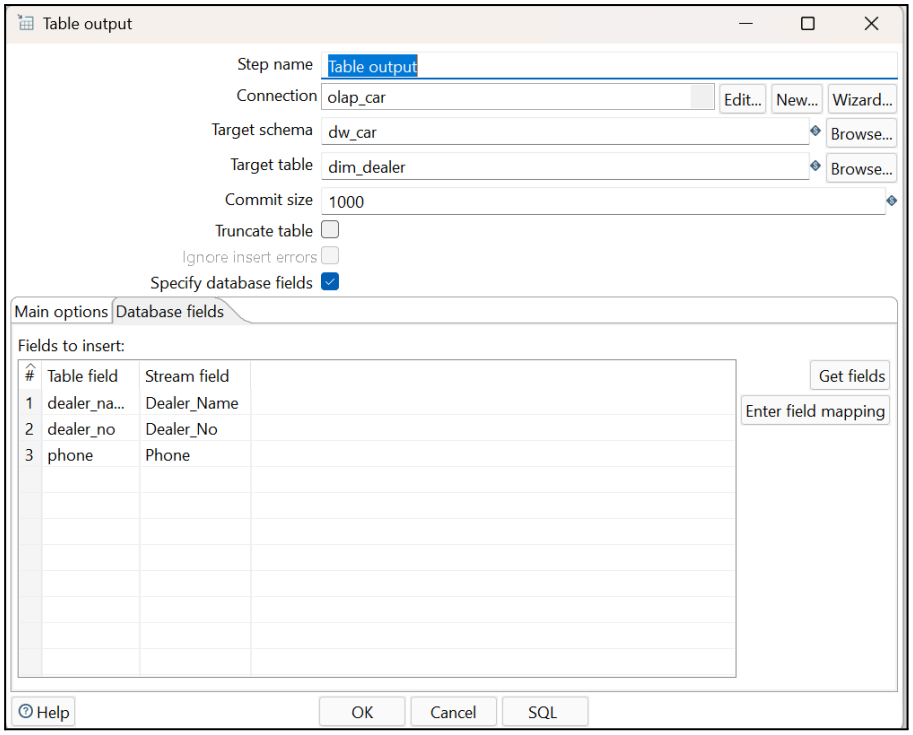
Setting kolom yang akan digunakan pada elemen select value yaitu dealer_name, dealer_no dan phone untuk dim_dealer



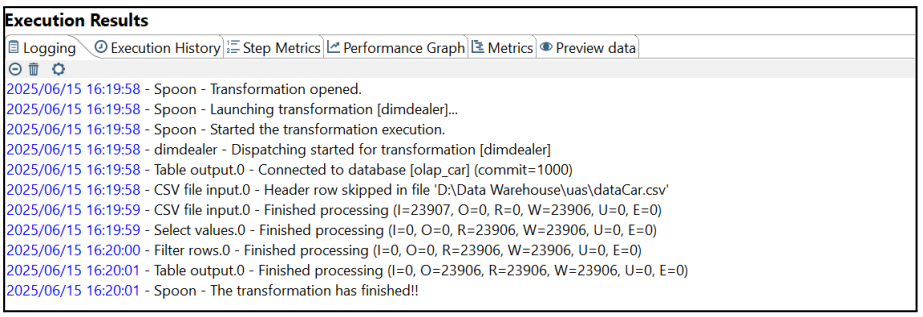
Atur filter rows untuk membersihkan data dan atur colom yang telah dipilih sebagai *is not null* untuk memastika data tidak ada yang kosong



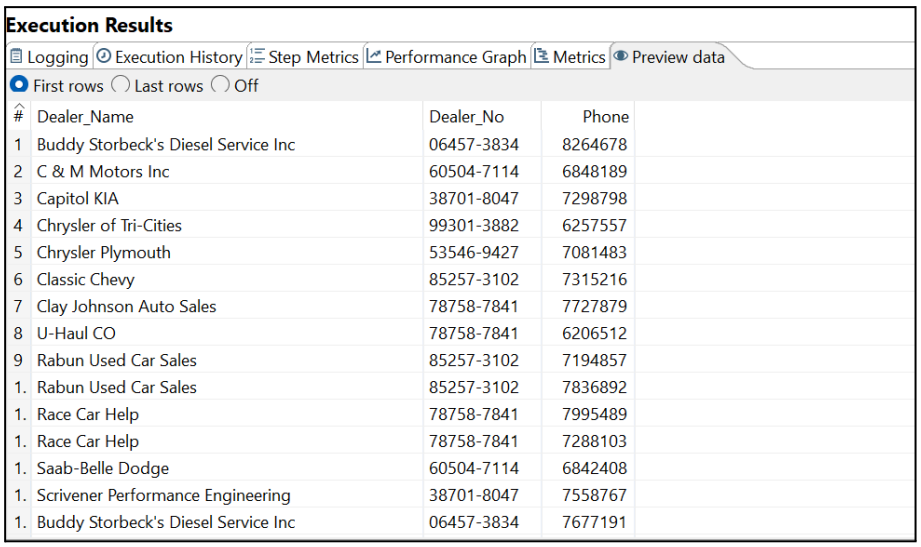
Atur Table output untuk menyimpan hasil pada database Dw_Car pada table dim_dealer dan singkronisasi table yang digunakan



Jalankan transformasi dan pastikan tidak ada error pada hasil eksekusi



Lihat pada preview data untuk memastikan data sudah berhasil



#	Dealer_Name	Dealer_No	Phone
1	Buddy Storbeck's Diesel Service Inc	06457-3834	8264678
2	C & M Motors Inc	60504-7114	6848189
3	Capitol KIA	38701-8047	7298798
4	Chrysler of Tri-Cities	99301-3882	6257557
5	Chrysler Plymouth	53546-9427	7081483
6	Classic Chevy	85257-3102	7315216
7	Clay Johnson Auto Sales	78758-7841	7727879
8	U-Haul CO	78758-7841	6206512
9	Rabun Used Car Sales	85257-3102	7194857
1.	Rabun Used Car Sales	85257-3102	7836892
1.	Race Car Help	78758-7841	7995489
1.	Race Car Help	78758-7841	7288103
1.	Saab-Belle Dodge	60504-7114	6842408
1.	Scrivener Performance Engineering	38701-8047	7558767
1.	Buddy Storbeck's Diesel Service Inc	06457-3834	7677191

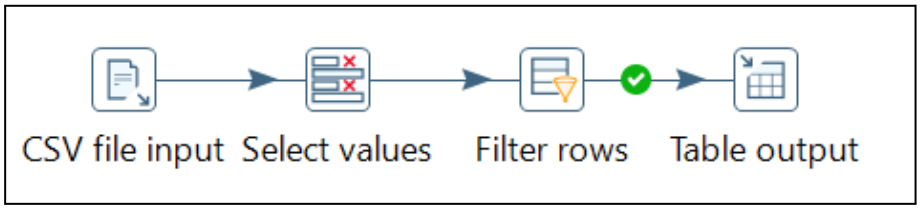
Cek pada database Dw_Car pada tabel dim_dealer

	dealer_id	dealer_name	dealer_no	phone
Edit Copy Delete	1	Buddy Storbeck's Diesel Service Inc	06457-3834	8264678
Edit Copy Delete	2	C & M Motors Inc	60504-7114	6848189
Edit Copy Delete	3	Capitol KIA	38701-8047	7298798
Edit Copy Delete	4	Chrysler of Tri-Cities	99301-3882	6257557
Edit Copy Delete	5	Chrysler Plymouth	53546-9427	7081483
Edit Copy Delete	6	Classic Chevy	85257-3102	7315216
Edit Copy Delete	7	Clay Johnson Auto Sales	78758-7841	7727879
Edit Copy Delete	8	U-Haul CO	78758-7841	6206512
Edit Copy Delete	9	Rabun Used Car Sales	85257-3102	7194857
Edit Copy Delete	10	Rabun Used Car Sales	85257-3102	7836892
Edit Copy Delete	11	Race Car Help	78758-7841	7995489
Edit Copy Delete	12	Race Car Help	78758-7841	7288103
Edit Copy Delete	13	Saab-Belle Dodge	60504-7114	6842408
Edit Copy Delete	14	Scrivener Performance Engineering	38701-8047	7558767
Edit Copy Delete	15	Buddy Storbeck's Diesel Service Inc	06457-3834	7677191
Edit Copy Delete	16	C & M Motors Inc	60504-7114	8431908
Edit Copy Delete	17	Capitol KIA	38701-8047	7814646

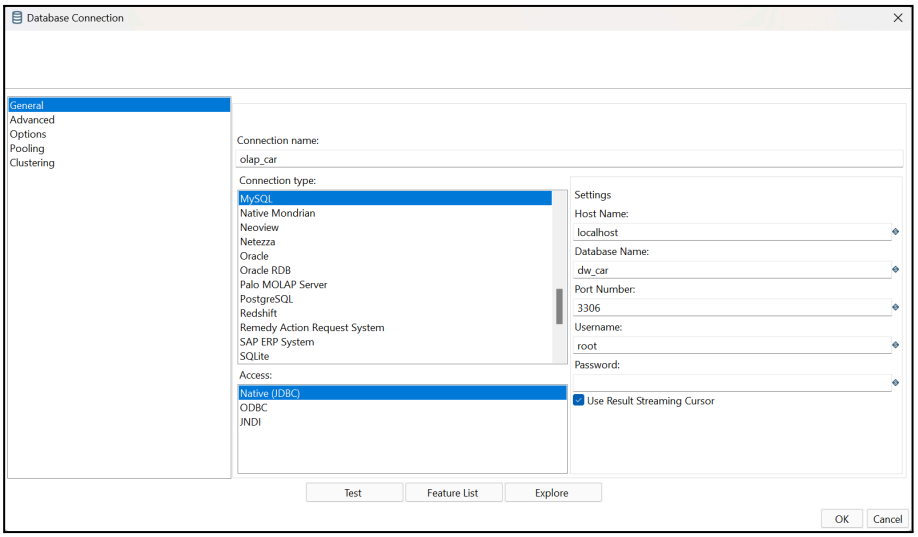
c. Tabel Dimensi Region

Elemen yang dibutuhkan :

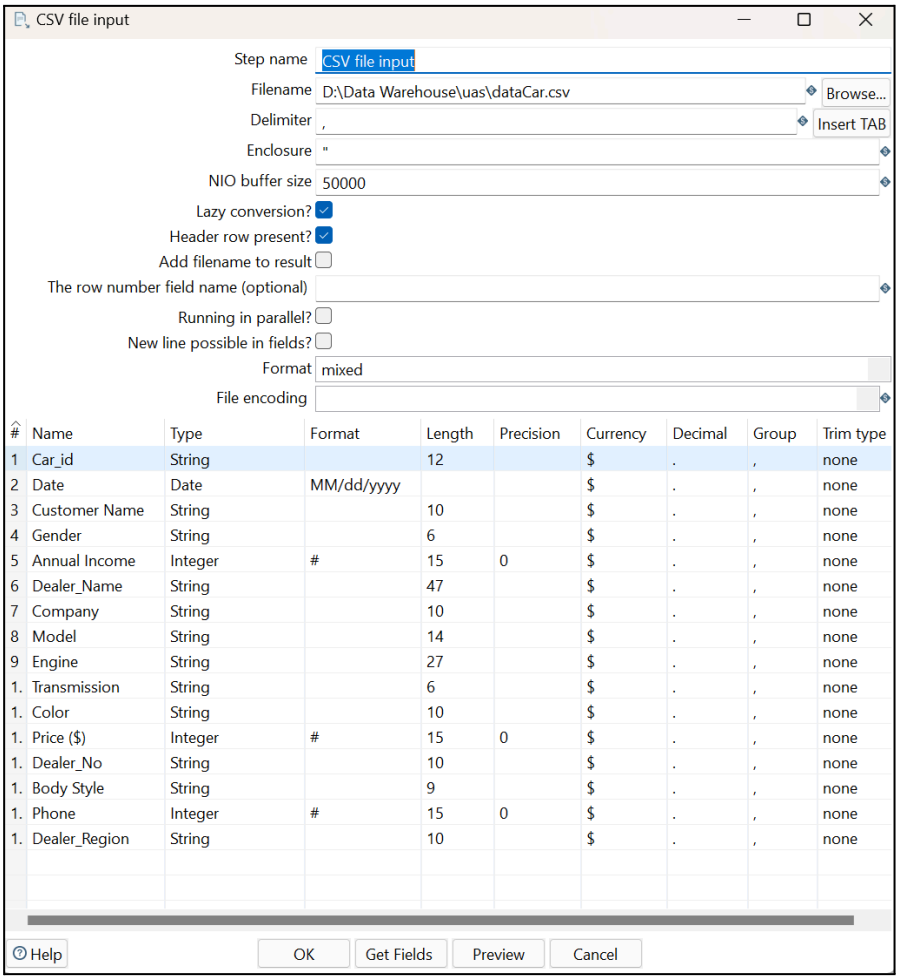
Tambahkan Connection ke Database Dw_Car



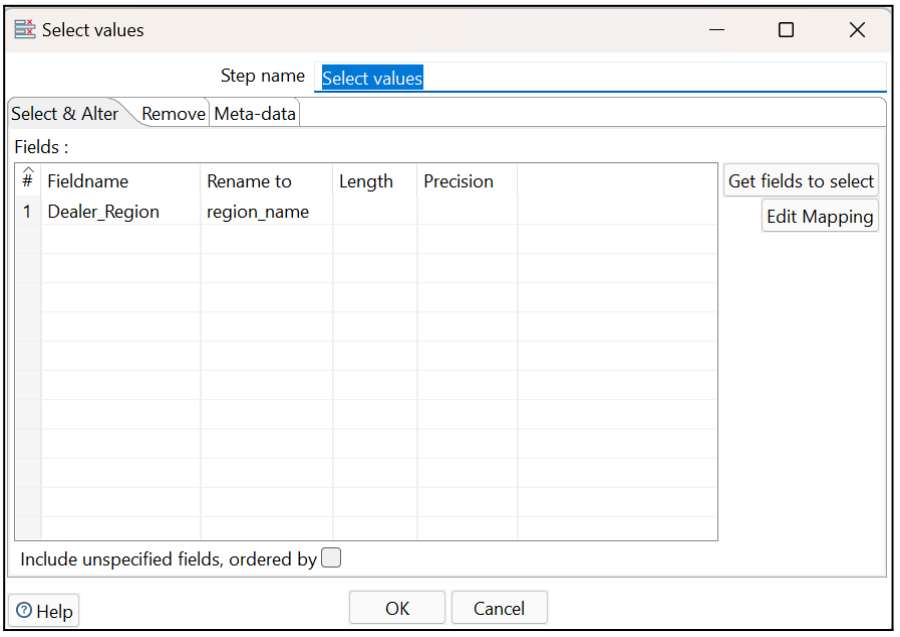
Tambah connection ke database Dw_Car:



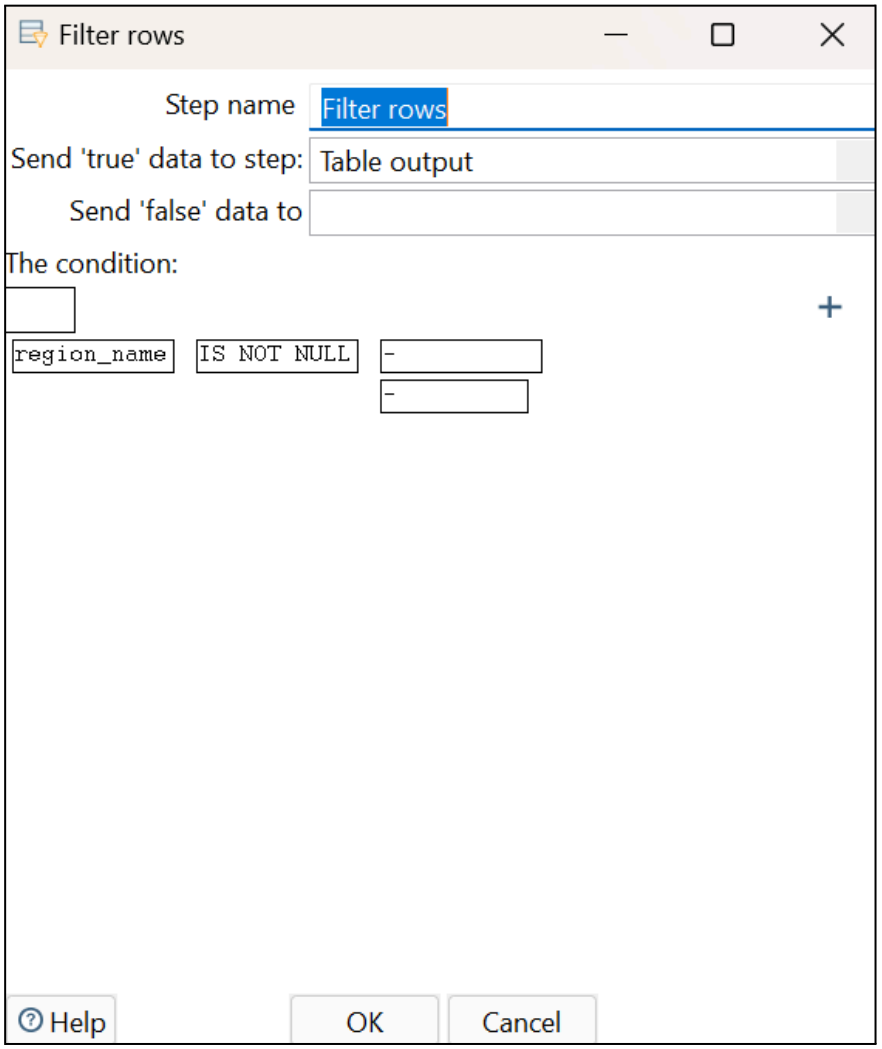
Masukkan file dataset ke tabel input



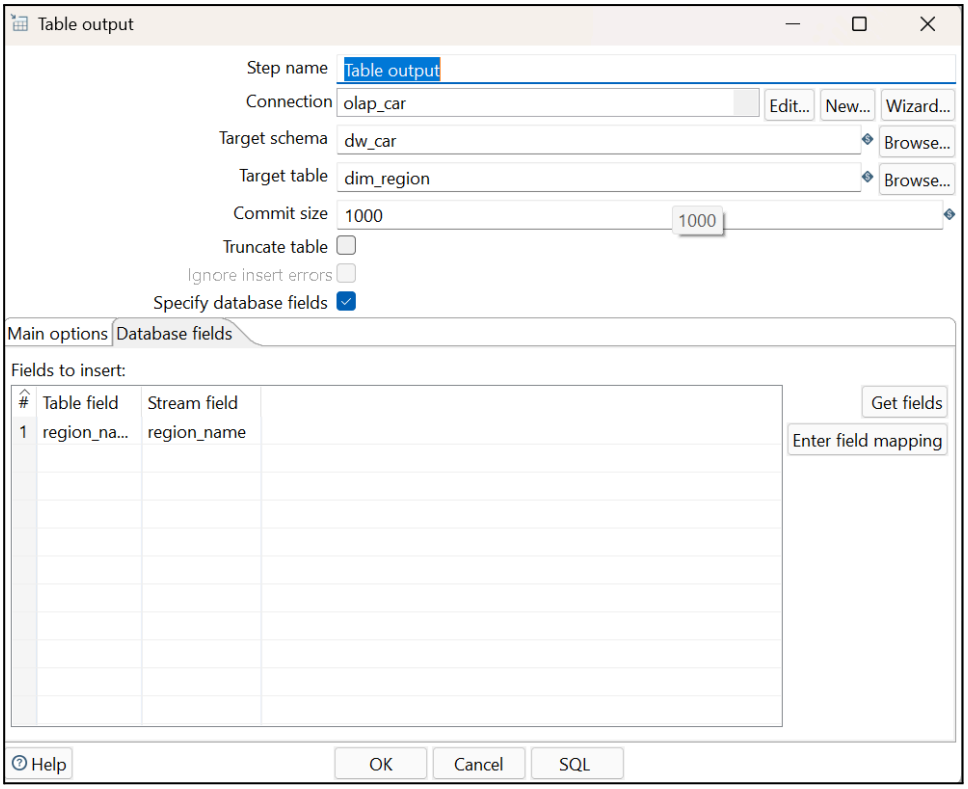
Setting kolom yang akan digunakan pada elemen select value yaitu dealer_region untuk dim_region



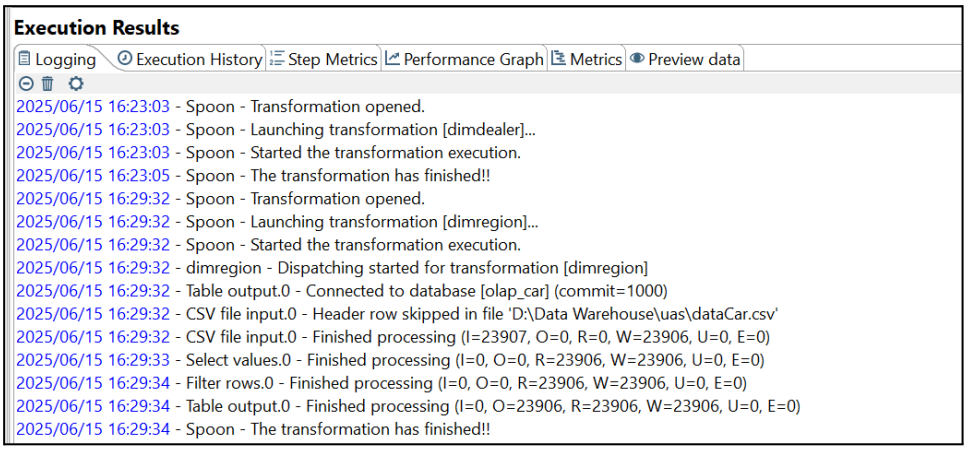
Atur filter rows untuk membersihkan data dan atur kolom yang telah dipilih sebagai *is not null* untuk memastikan data tidak ada yang kosong



Atur Table output untuk menyimpan hasil pada database Dw_Car pada table dim_dealer dan sinkronisasi table yang digunakan



Jalankan transformasi dan pastikan tidak ada error pada hasil eksekusi



Lihat pada preview data untuk memastikan data sudah berhasil

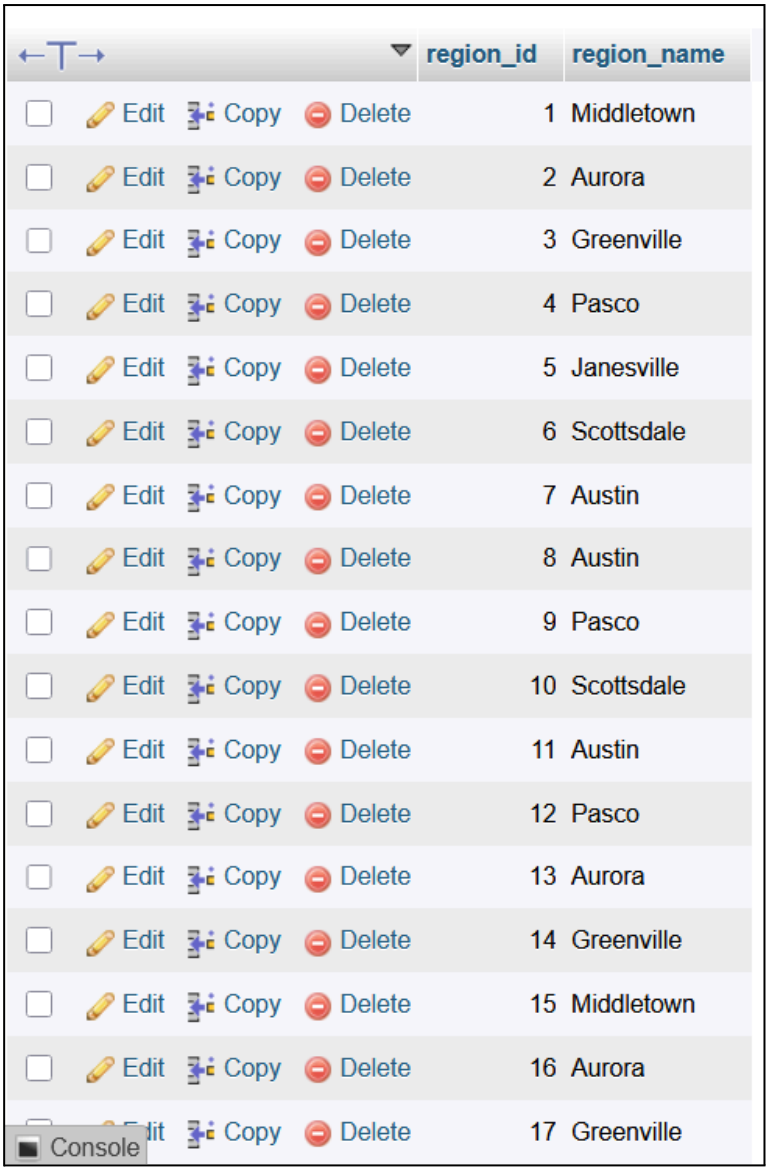
Execution Results

Logging | Execution History | Step Metrics | Performance Graph | Metrics | Preview data

First rows | Last rows | Off

#	region_name
1	Middletown
2	Aurora
3	Greenville
4	Pasco
5	Janesville
6	Scottsdale
7	Austin
8	Austin
9	Pasco
1.	Scottsdale
1.	Austin
1.	Pasco
1.	Aurora
1.	Greenville
1.	Middletown
1.	Aurora
1.	Greenville
1.	Pasco
1.	Janesville
2.	Scottsdale
2.	Austin
2.	Austin
2.	Middletown
2.	Pasco
2.	Janesville
2.	Scottsdale
2.	Austin
2.	Janesville

Cek pada database Dw_Car pada tabel dim_region

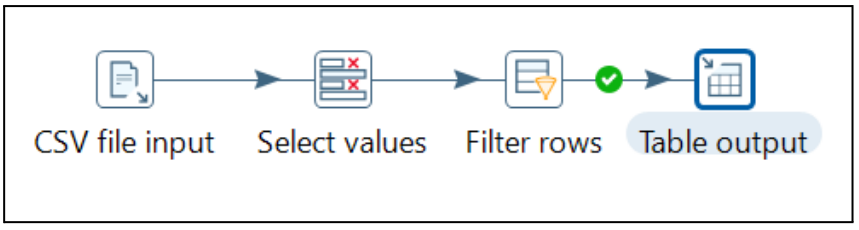


	region_id	region_name
Edit Copy Delete	1	Middletown
Edit Copy Delete	2	Aurora
Edit Copy Delete	3	Greenville
Edit Copy Delete	4	Pasco
Edit Copy Delete	5	Janesville
Edit Copy Delete	6	Scottsdale
Edit Copy Delete	7	Austin
Edit Copy Delete	8	Austin
Edit Copy Delete	9	Pasco
Edit Copy Delete	10	Scottsdale
Edit Copy Delete	11	Austin
Edit Copy Delete	12	Pasco
Edit Copy Delete	13	Aurora
Edit Copy Delete	14	Greenville
Edit Copy Delete	15	Middletown
Edit Copy Delete	16	Aurora
Edit Copy Delete	17	Greenville

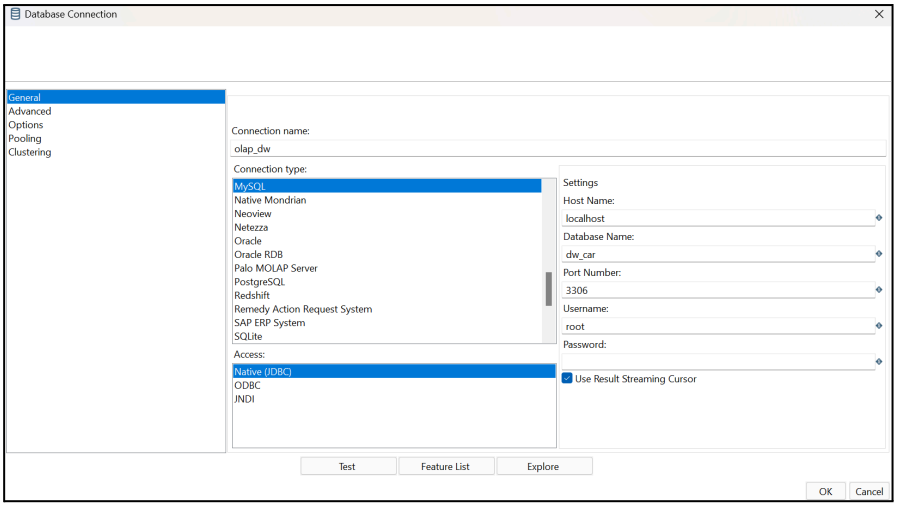
Console

d. Tabel Dimensi Color

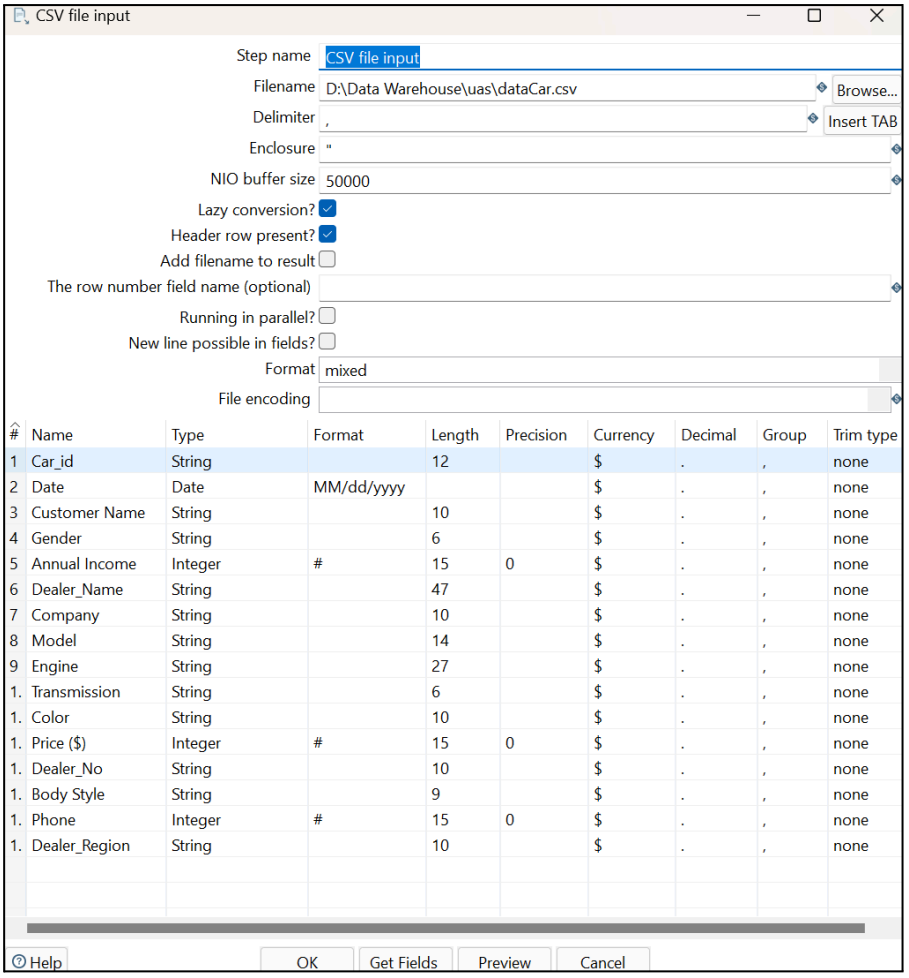
Elemen yang dibutuhkan :



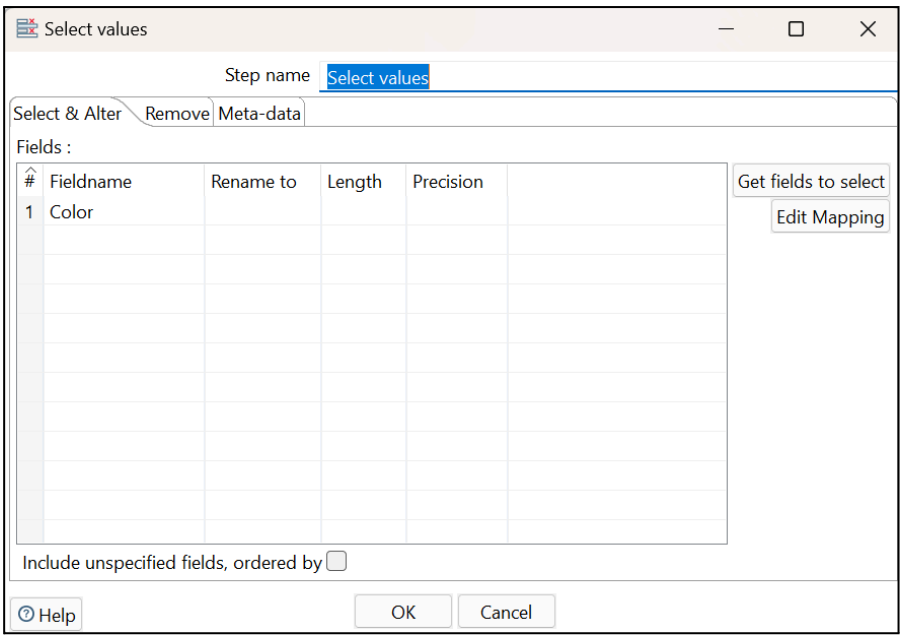
Tambah connection ke database Dw_Car



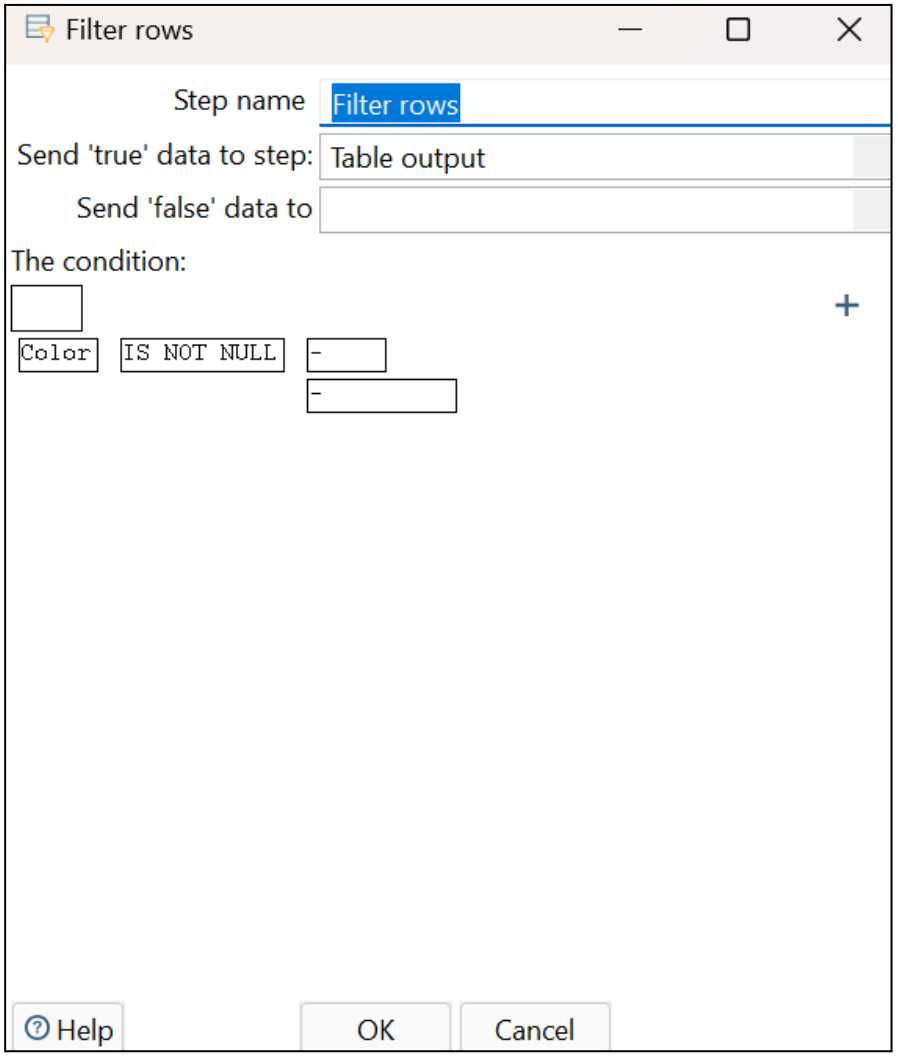
Memasukkan dataset ke tabel input



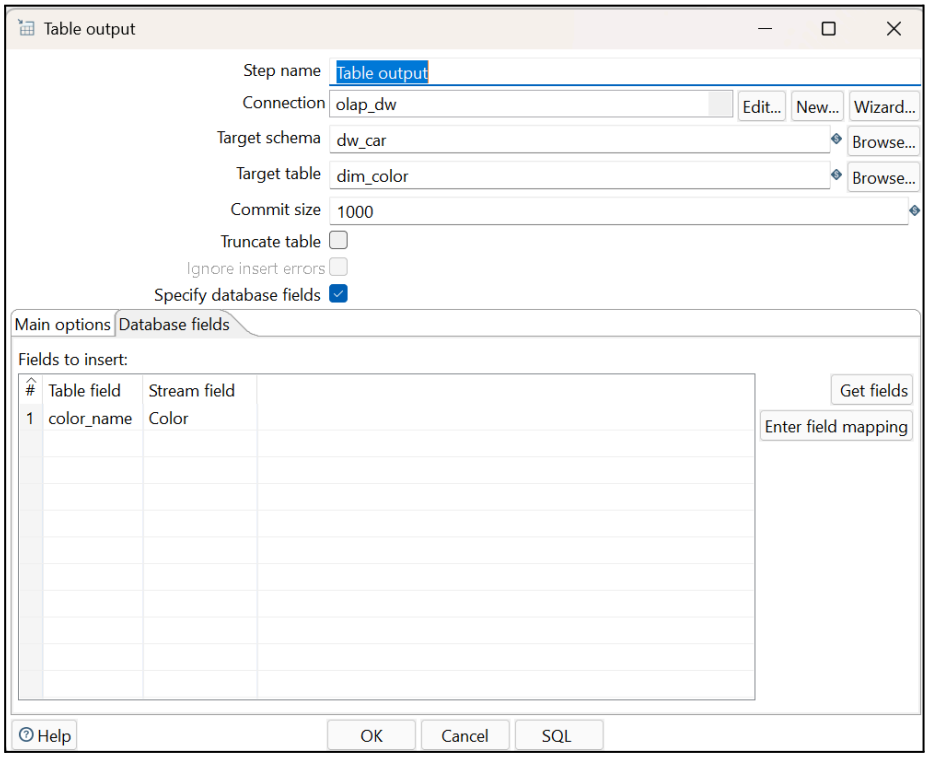
Setting kolom yang akan digunakan pada elemen select value yaitu color untuk dim_color



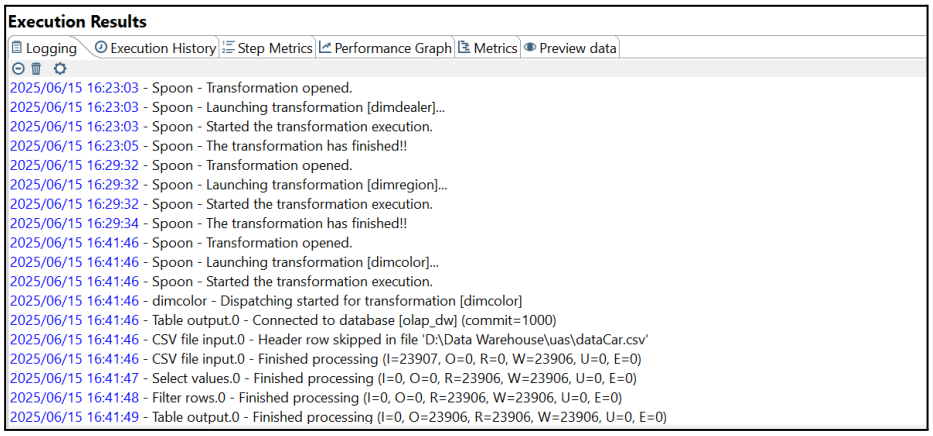
Atur filter rows untuk membersihkan data dan atur kolom yang telah dipilih sebagai *is not null* untuk memastikan data tidak ada yang kosong



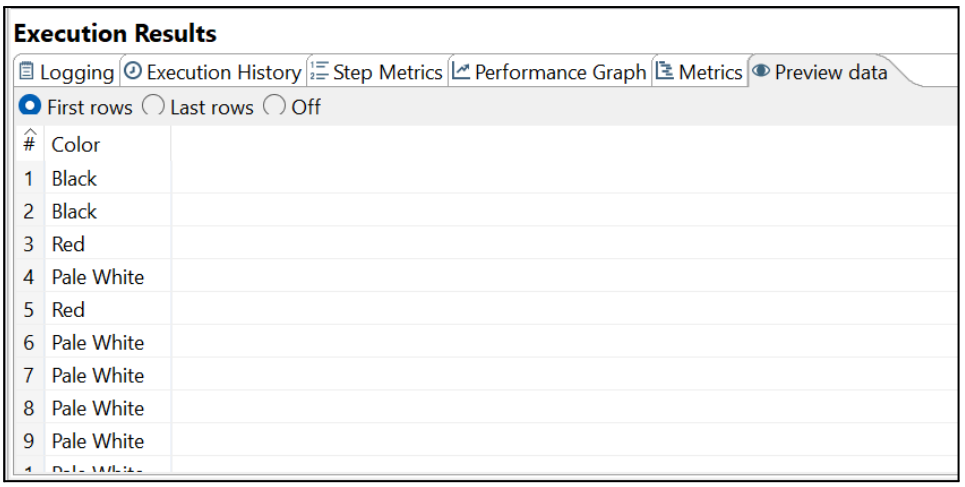
Atur Table output untuk menyimpan hasil pada database Dw_Car pada table dim_color dan sinkronisasi tabel yang digunakan



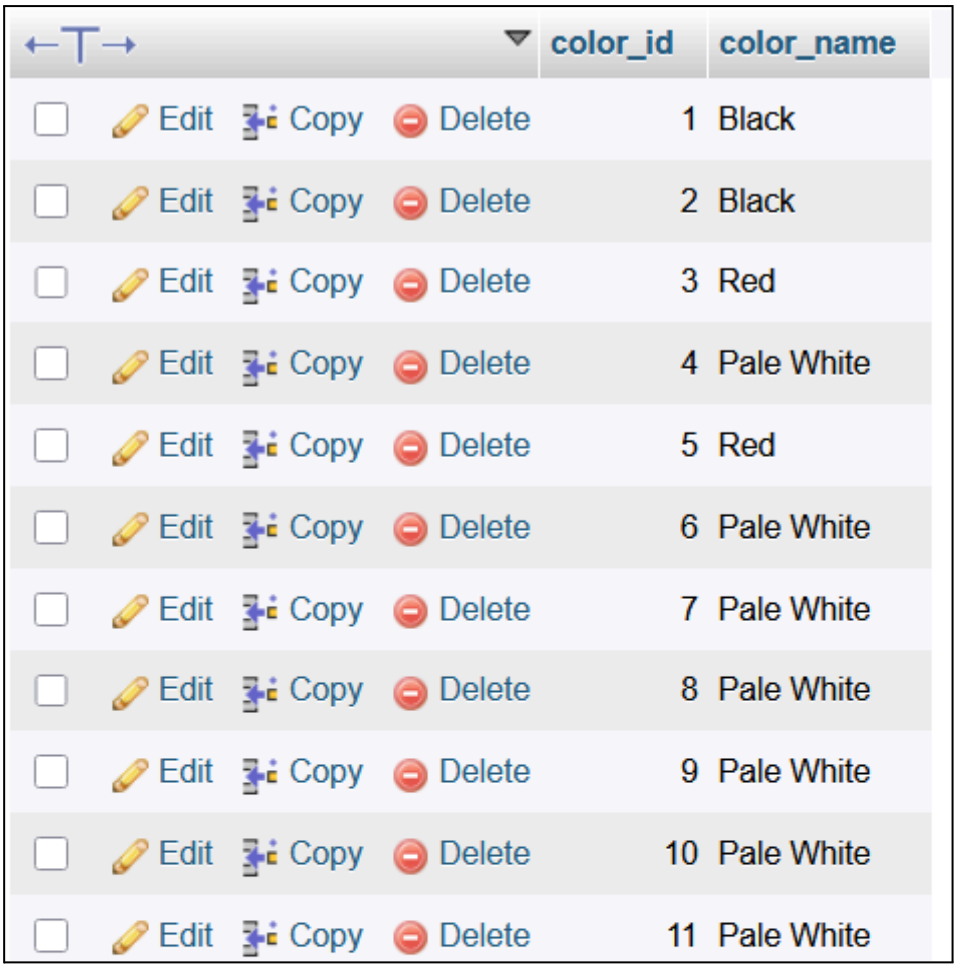
Jalankan transformasi dan pastikan tidak ada error pada hasil eksekusi



Lihat pada preview data untuk memastikan data sudah berhasil

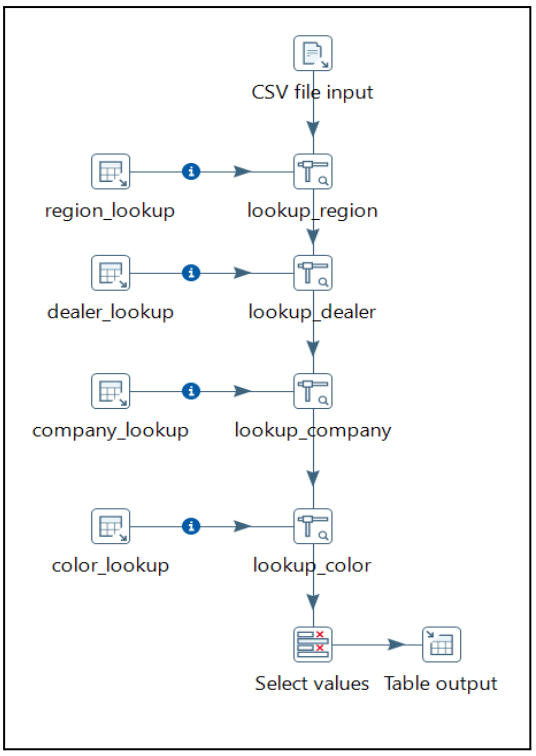


Cek pada database Dw_Car pada tabel dim_region

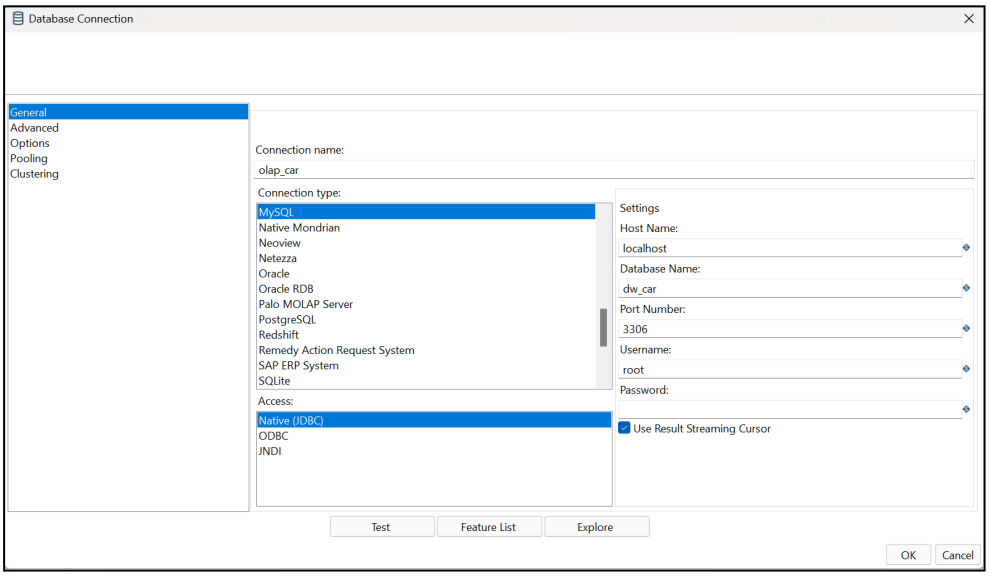


3. ***Create Fact Table***

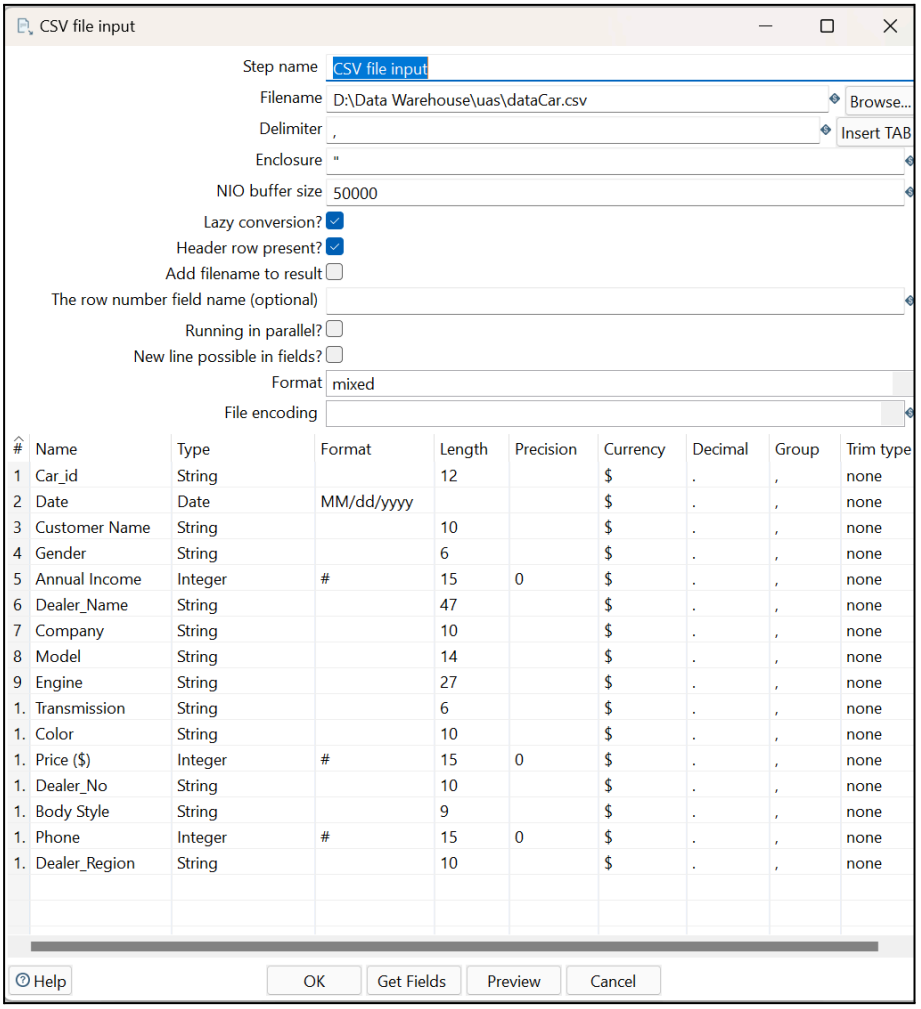
   Elemen yang dibutuhkan :



Tambahkan Koneksi untuk menuju ke database Dw_Car

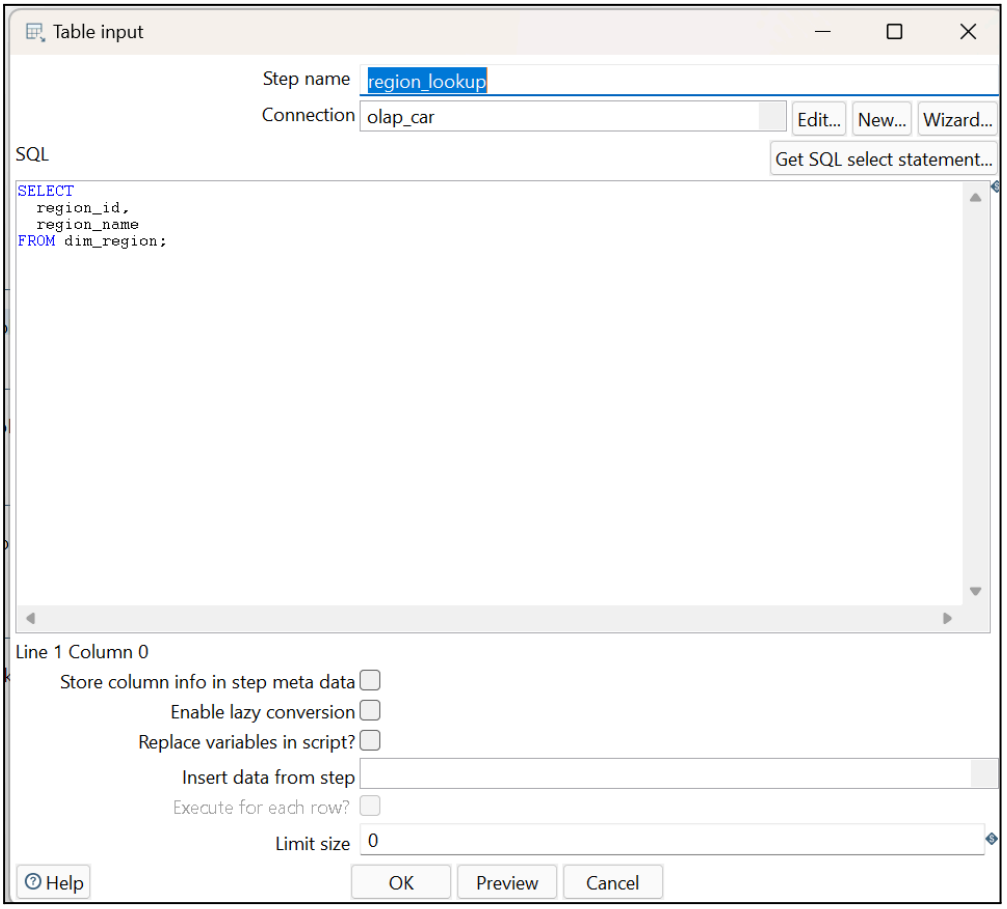


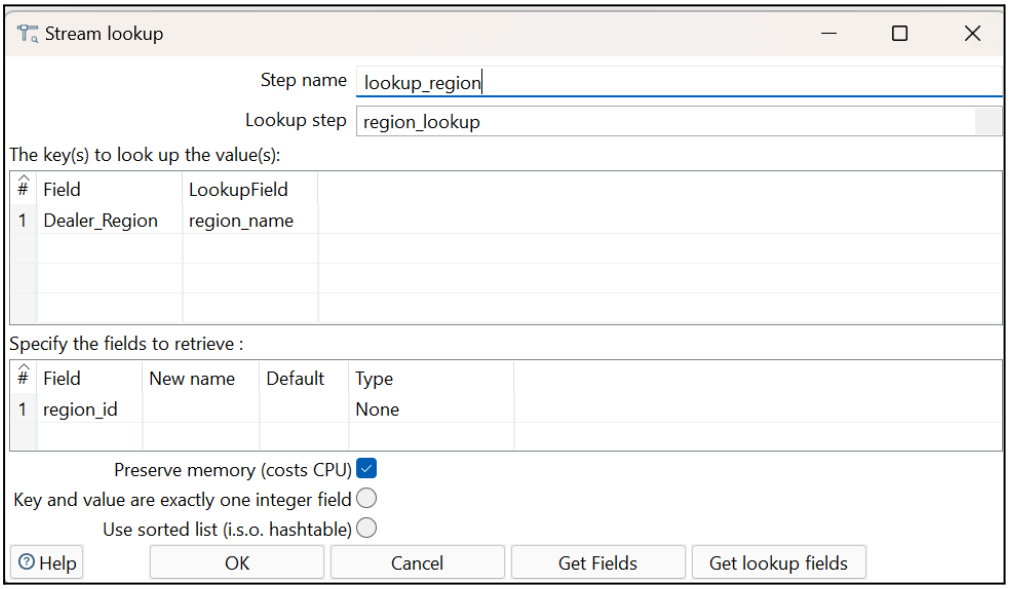
Membaca data mentah penjualan mobil dari file csv



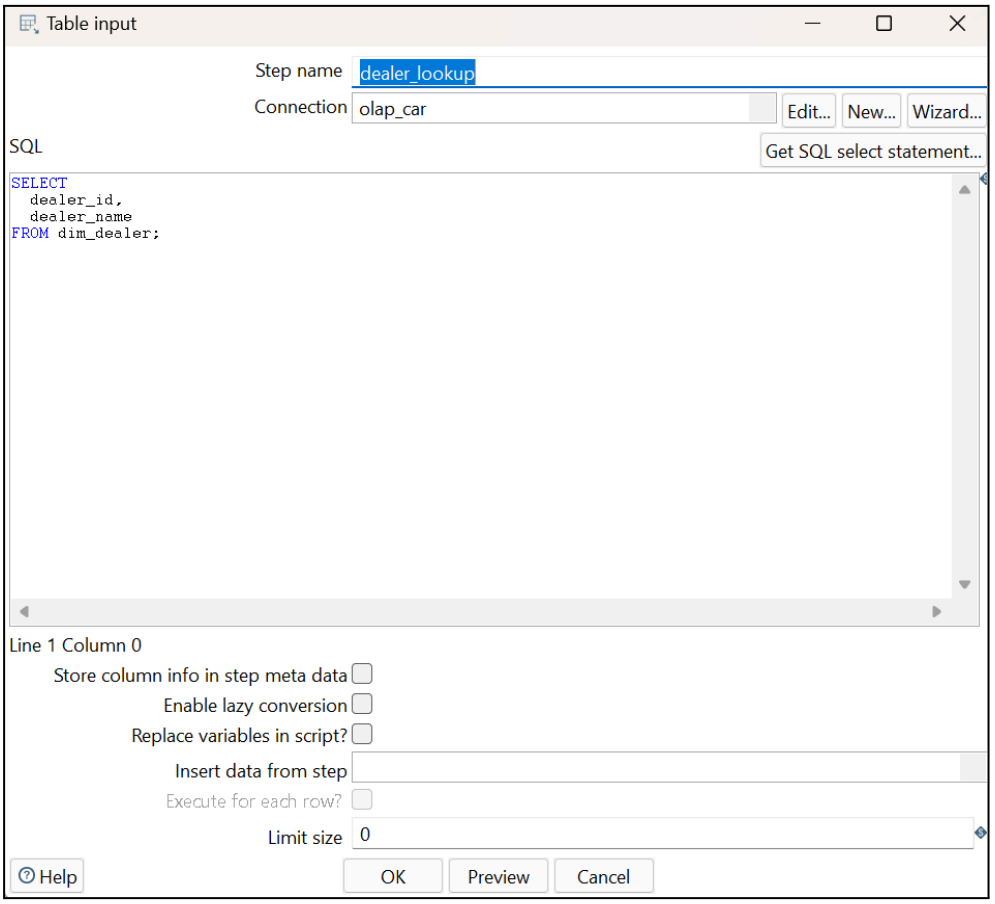
#	Name	Type	Format	Length	Precision	Currency	Decimal	Group	Trim type
1	Car_id	String		12		$	.	,	none
2	Date	Date	MM/dd/yyyy			$	.	,	none
3	Customer Name	String		10		$	.	,	none
4	Gender	String		6		$	.	,	none
5	Annual Income	Integer	#	15	0	$	.	,	none
6	Dealer_Name	String		47		$	.	,	none
7	Company	String		10		$	.	,	none
8	Model	String		14		$	.	,	none
9	Engine	String		27		$	.	,	none
1.	Transmission	String		6		$	.	,	none
1.	Color	String		10		$	.	,	none
1.	Price ($)	Integer	#	15	0	$	.	,	none
1.	Dealer_No	String		10		$	.	,	none
1.	Body Style	String		9		$	.	,	none
1.	Phone	Integer	#	15	0	$	.	,	none
1.	Dealer_Region	String		10		$	.	,	none

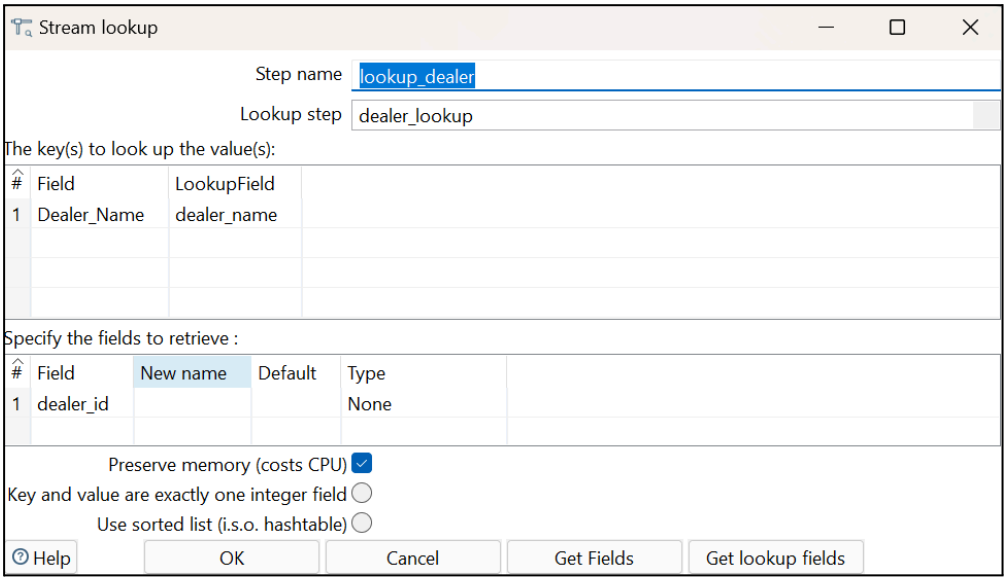
Mencari ID wilayah dari dim_region



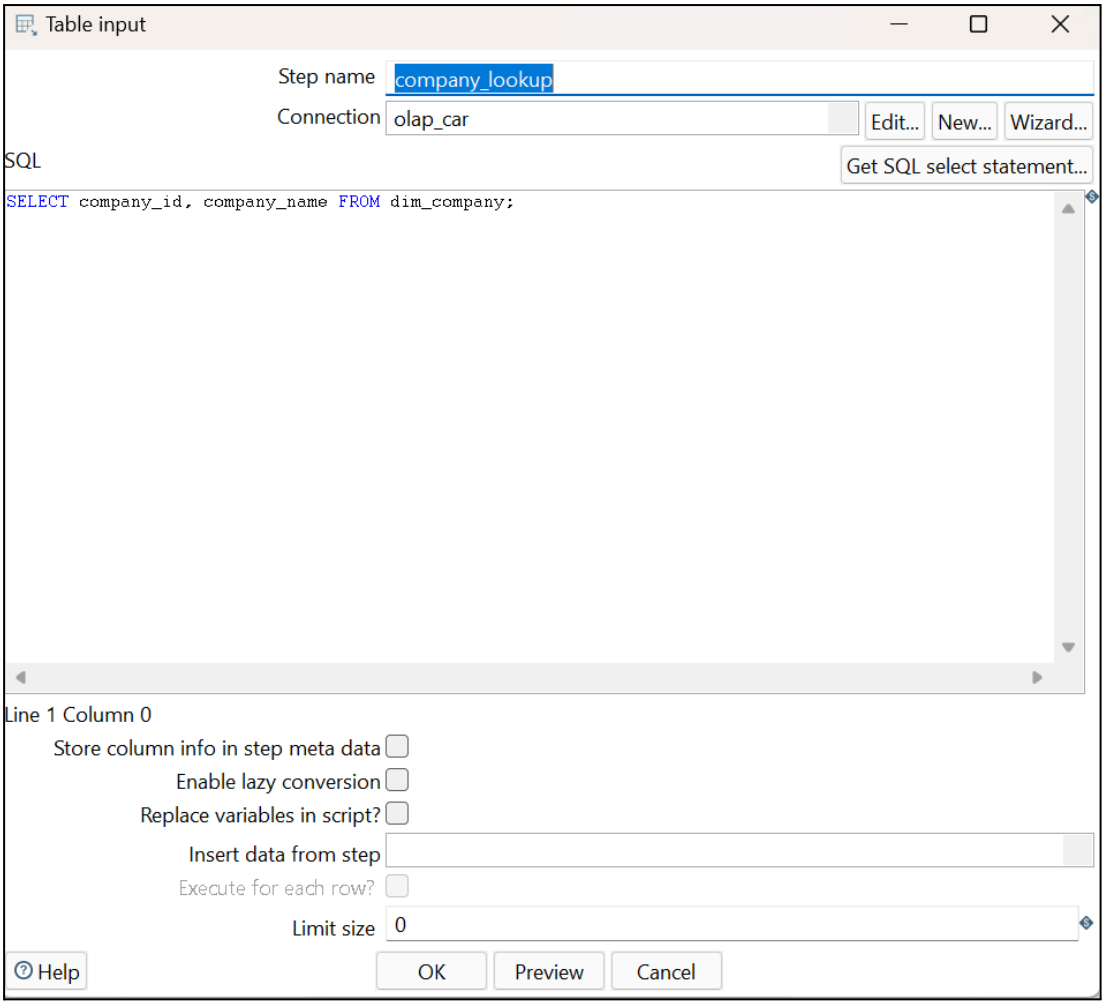


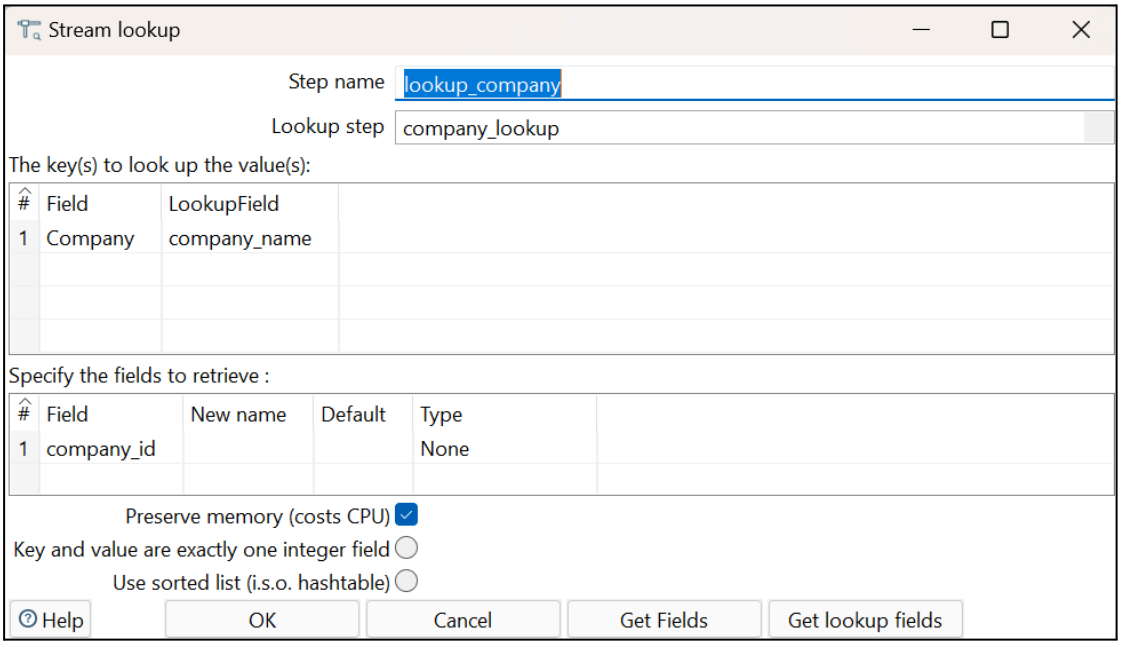
Mencari ID dealer dari dim_dealer



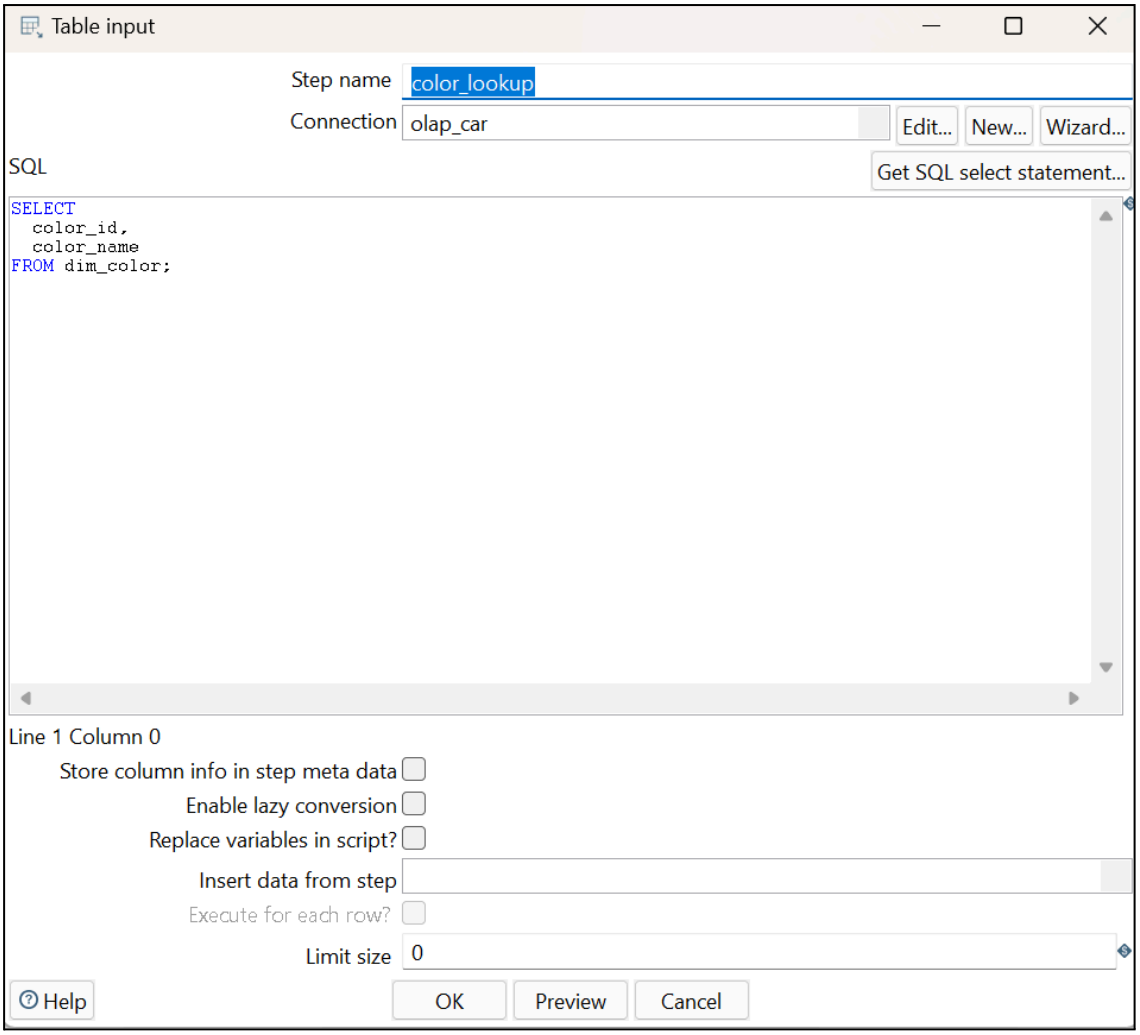


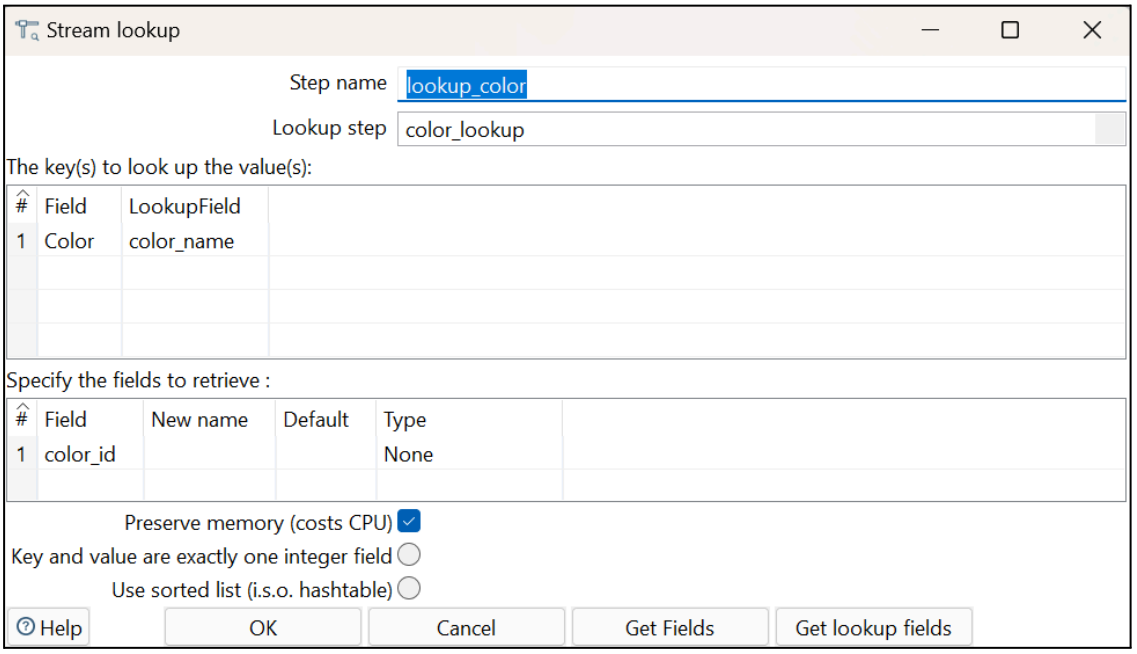
Mencari ID perusahaan dari tabel dim_company



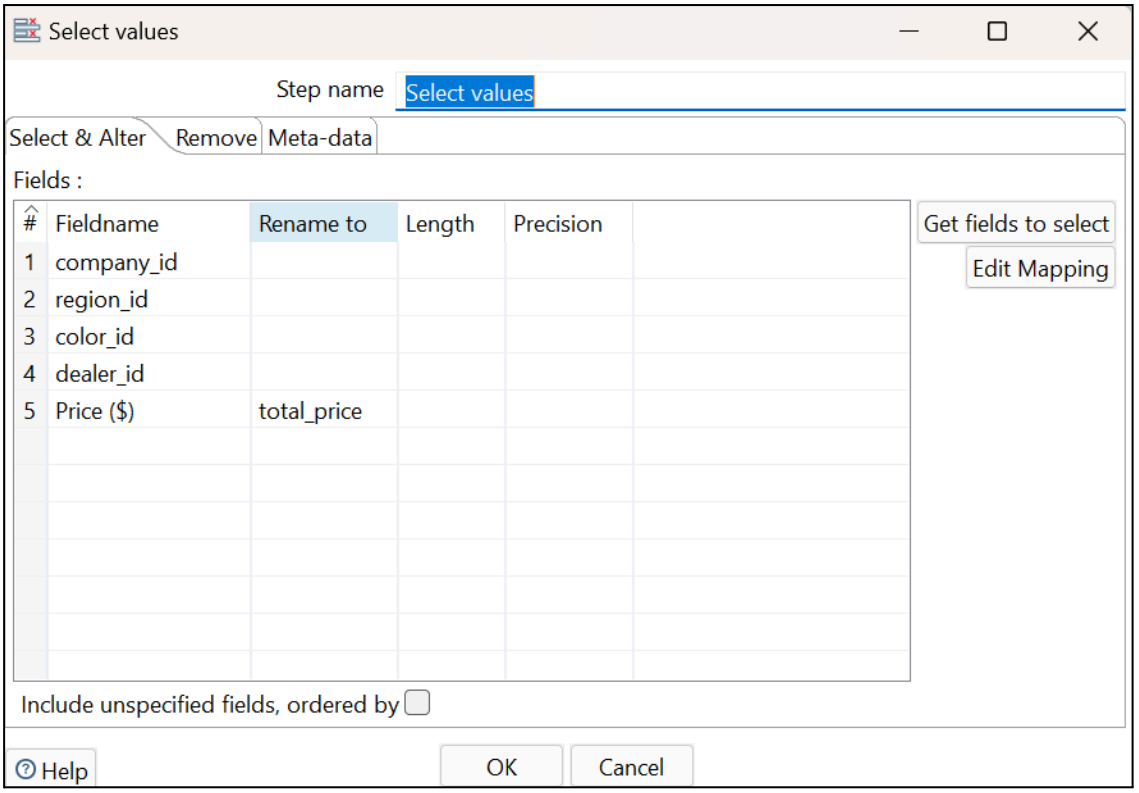


Mencari ID warna dari dim_color

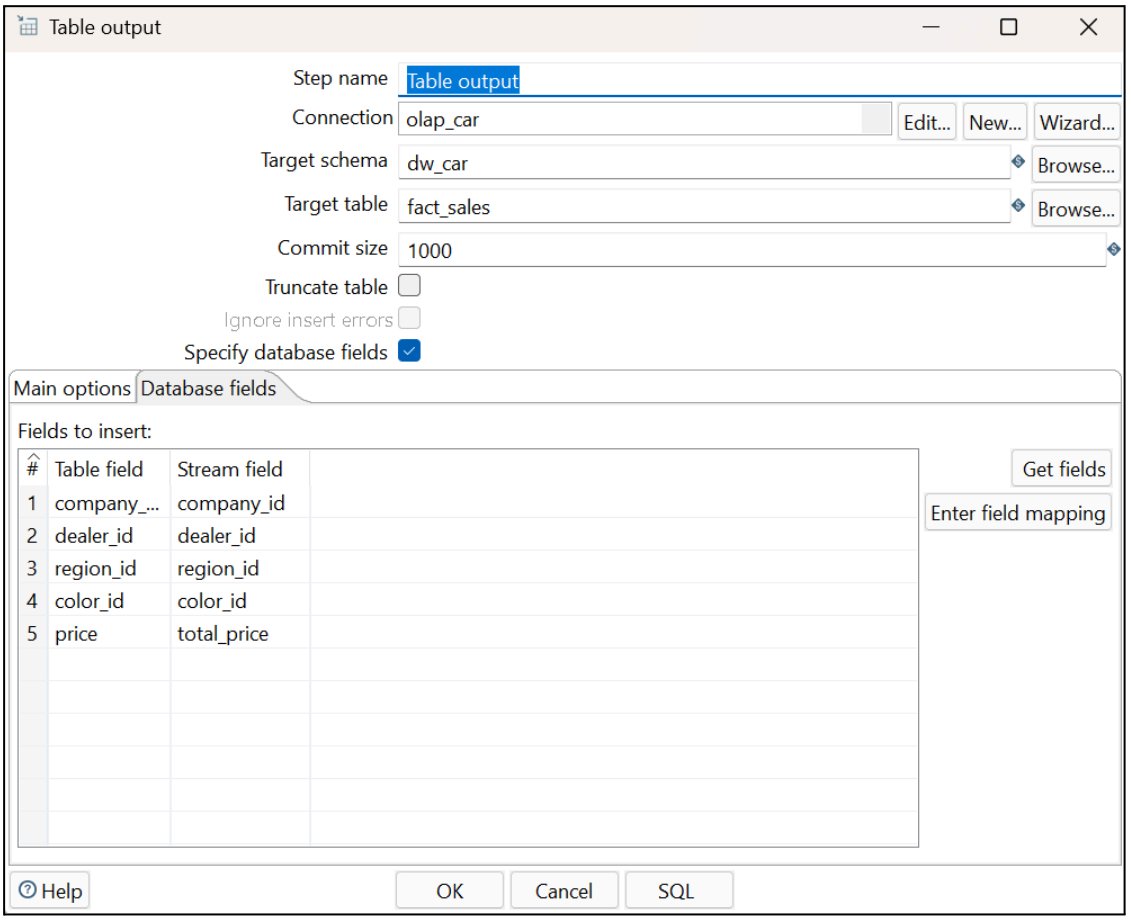




Memilih hasil akhir untuk disimpan ke tabel fact, kolom yang diambil disesuaikan dengan tabel fakta



Menyimpan data hasil transformasi ke database Dw_Car tabel fact_sales melalui koneksi database



Jalankan transformasi dan pastikan tidak ada error pada hasil eksekusi

Execution Results

Logging | Execution History | Step Metrics | Performance Graph | Metrics | Preview data

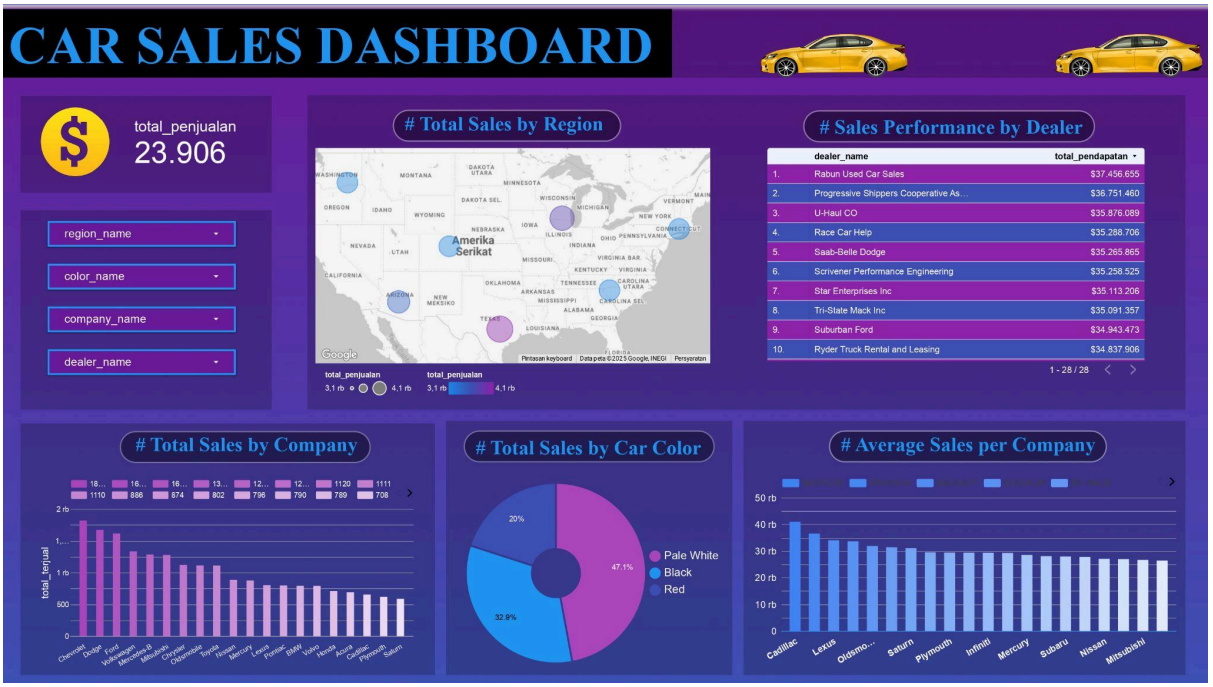
```
2025/06/15 16:42:36 - Spoon - Transformation opened.
2025/06/15 16:42:36 - Spoon - Launching transformation [dimcolor]...
2025/06/15 16:42:36 - Spoon - Started the transformation execution.
2025/06/15 16:42:39 - Spoon - The transformation has finished!!
2025/06/15 17:32:18 - Spoon - Transformation opened.
2025/06/15 17:32:18 - Spoon - Launching transformation [factsales]...
2025/06/15 17:32:18 - Spoon - Started the transformation execution.
2025/06/15 17:32:18 - factsales - Dispatching started for transformation [factsales]
2025/06/15 17:32:18 - Table output.0 - Connected to database [olap_car] (commit=1000)
2025/06/15 17:32:18 - CSV file input.0 - Header row skipped in file 'D:\Data Warehouse\uas\dataCar.csv'
2025/06/15 17:32:18 - dealer_lookup.0 - Finished reading query, closing connection
2025/06/15 17:32:18 - dealer_lookup.0 - Finished processing (I=23906, O=0, R=0, W=23906, U=0, E=0)
2025/06/15 17:32:19 - company_lookup.0 - Finished reading query, closing connection
2025/06/15 17:32:19 - region_lookup.0 - Finished reading query, closing connection
2025/06/15 17:32:19 - company_lookup.0 - Finished processing (I=47812, O=0, R=0, W=47812, U=0, E=0)
2025/06/15 17:32:19 - region_lookup.0 - Finished processing (I=47812, O=0, R=0, W=47812, U=0, E=0)
2025/06/15 17:32:19 - color_lookup.0 - linenr 50000
2025/06/15 17:32:19 - color_lookup.0 - Finished reading query, closing connection
2025/06/15 17:32:19 - color_lookup.0 - Finished processing (I=71718, O=0, R=0, W=71718, U=0, E=0)
2025/06/15 17:32:19 - lookup_region.0 - linenr 50000
2025/06/15 17:32:19 - lookup_company.0 - linenr 50000
2025/06/15 17:32:19 - CSV file input.0 - Finished processing (I=23907, O=0, R=0, W=23906, U=0, E=0)
2025/06/15 17:32:19 - lookup_region.0 - Finished processing (I=0, O=0, R=71718, W=23906, U=0, E=0)
2025/06/15 17:32:19 - lookup_dealer.0 - Finished processing (I=0, O=0, R=47812, W=23906, U=0, E=0)
2025/06/15 17:32:19 - lookup_company.0 - Finished processing (I=0, O=0, R=71718, W=23906, U=0, E=0)
2025/06/15 17:32:19 - lookup_color.0 - Finished processing (I=0, O=0, R=95624, W=23906, U=0, E=0)
2025/06/15 17:32:20 - Select values.0 - Finished processing (I=0, O=0, R=23906, W=23906, U=0, E=0)
2025/06/15 17:32:21 - Table output.0 - Finished processing (I=0, O=23906, R=23906, W=23906, U=0, E=0)
2025/06/15 17:32:21 - Spoon - The transformation has finished!!
```

Cek pada database Dw_Car pada tabel dim_region

	sale_id	company_id	dealer_id	color_id	region_id	price
Edit Copy Delete	1	47807	23901	71717	47812	26000.00
Edit Copy Delete	2	47803	23902	71717	47806	19000.00
Edit Copy Delete	3	47759	23813	71716	47807	31500.00
Edit Copy Delete	4	47795	23904	71718	47808	14000.00
Edit Copy Delete	5	47793	23905	71716	47799	24500.00
Edit Copy Delete	6	47801	23816	71718	47810	12000.00
Edit Copy Delete	7	47795	23817	71718	47811	14000.00
Edit Copy Delete	8	47801	23900	71718	47811	42000.00
Edit Copy Delete	9	47811	23899	71718	47808	82000.00
Edit Copy Delete	10	47807	23899	71718	47810	15000.00
Edit Copy Delete	11	47793	23872	71718	47811	31000.00
Edit Copy Delete	12	47685	23872	71718	47808	46000.00
Edit Copy Delete	13	47802	23891	71717	47806	9000.00
Edit Copy Delete	14	47810	23881	71718	47807	15000.00
Edit Copy Delete	15	47766	23901	71718	47812	26000.00
Edit Copy Delete	16	47780	23902	71718	47806	17000.00
Edit Copy Delete	17	47652	23813	71717	47807	18000.00

Console

4. ***Implementasi Studi Kasus :***

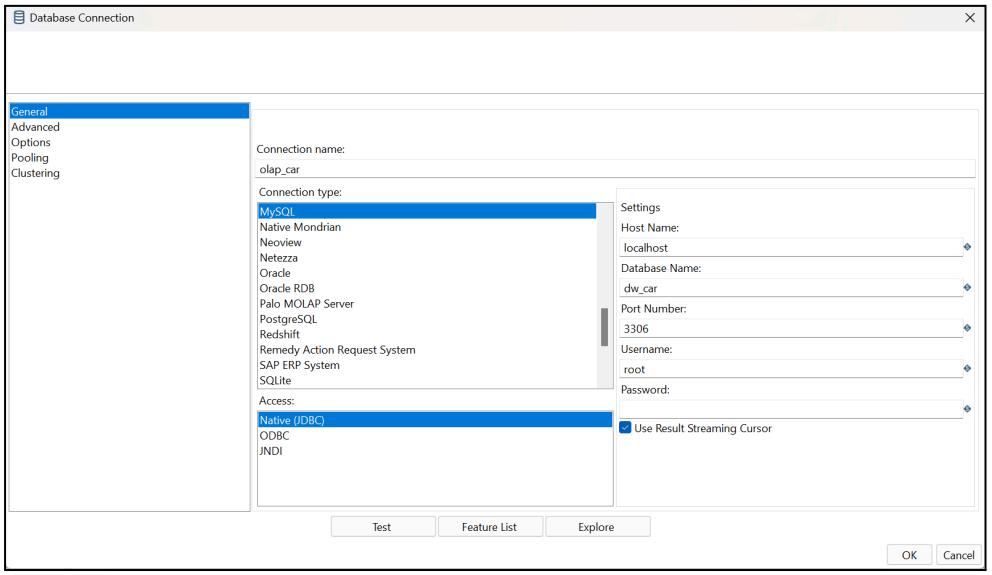


1. Mengetahui berapa banyak mobil dari masing-masing merek (Company) yang terjual

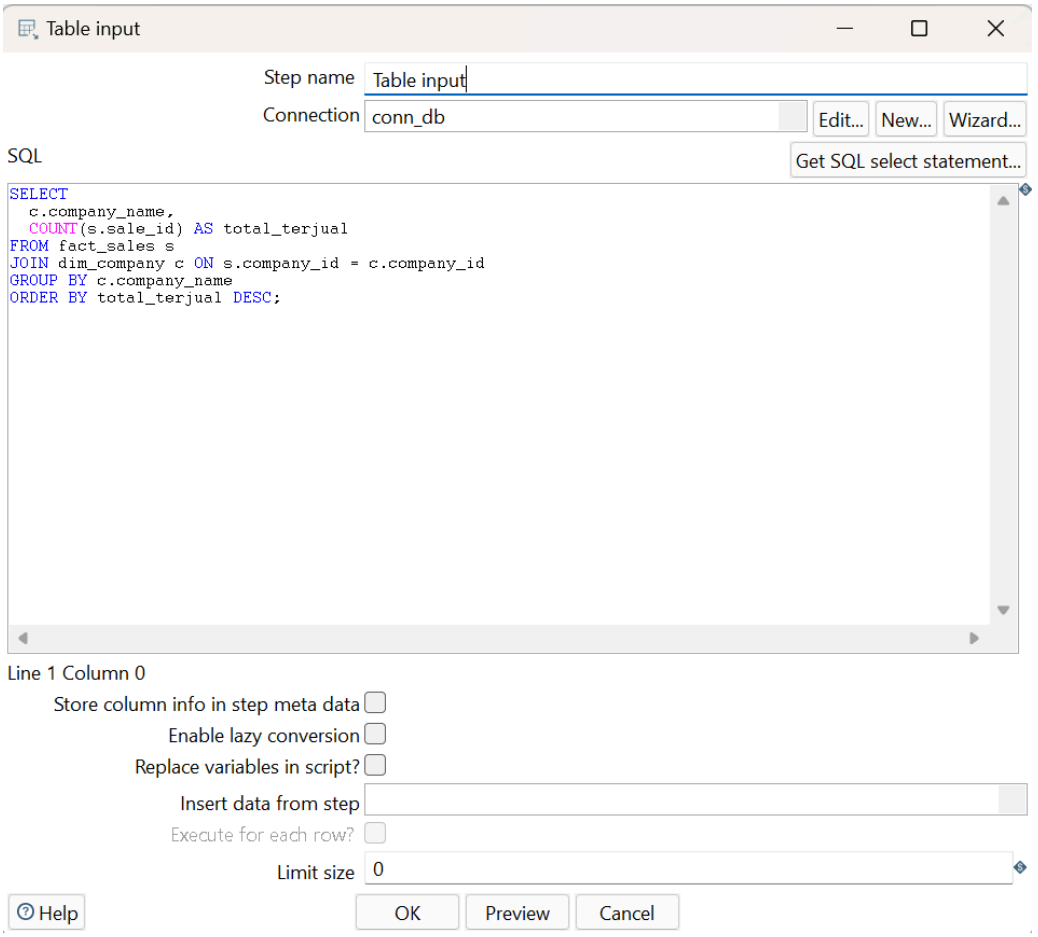
```
SELECT
        c.company_name,
        COUNT(s.sale_id) AS total_terjual
FROM fact_sales s
JOIN dim_company c ON s.company_id = c.company_id
GROUP BY c.company_name
ORDER BY total_terjual DESC;
```

Elemen yang dibutuhkan :

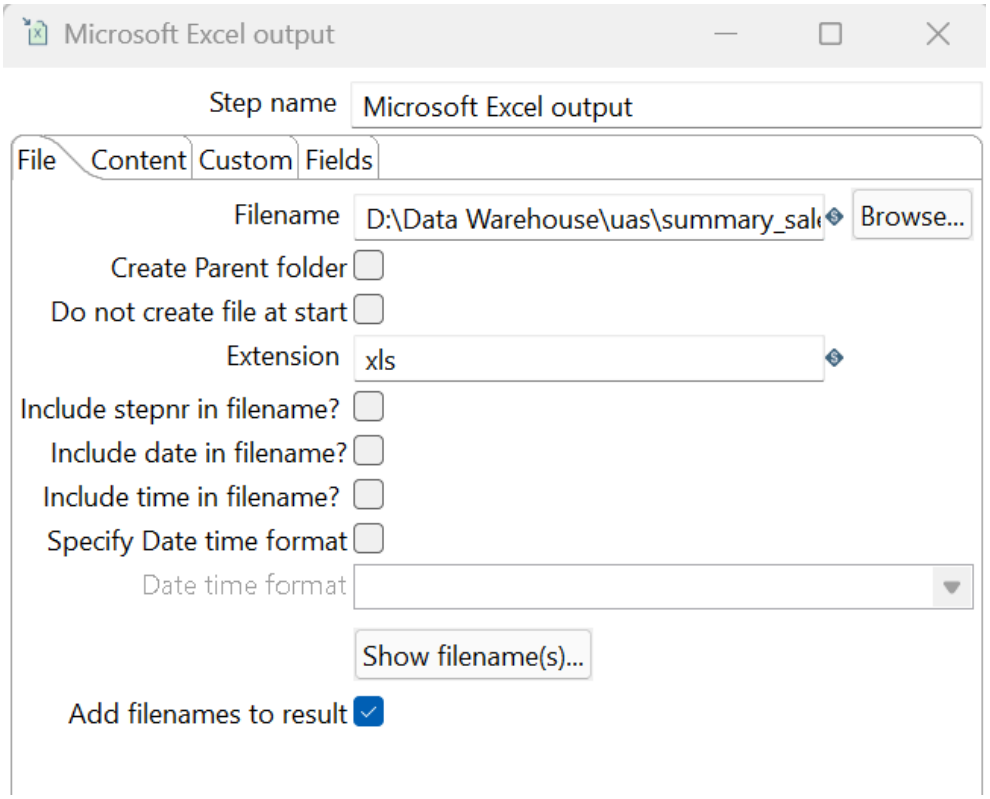
Tambahkan Koneksi untuk menuju ke database Dw_Car



Inputkan query ke tabel input



Save data pada excel



Cek hasil di excel

	company_	total_terjual
2	Chevrolet	1819
3	Dodge	1671
4	Ford	1614
5	Volkswage	1333
6	Mercedes-	1285
7	Mitsubishi	1277
8	Chrysler	1120
9	Oldsmobile	1111
10	Toyota	1110
11	Nissan	886
12	Mercury	874
13	Lexus	802
14	Pontiac	796
15	BMW	790

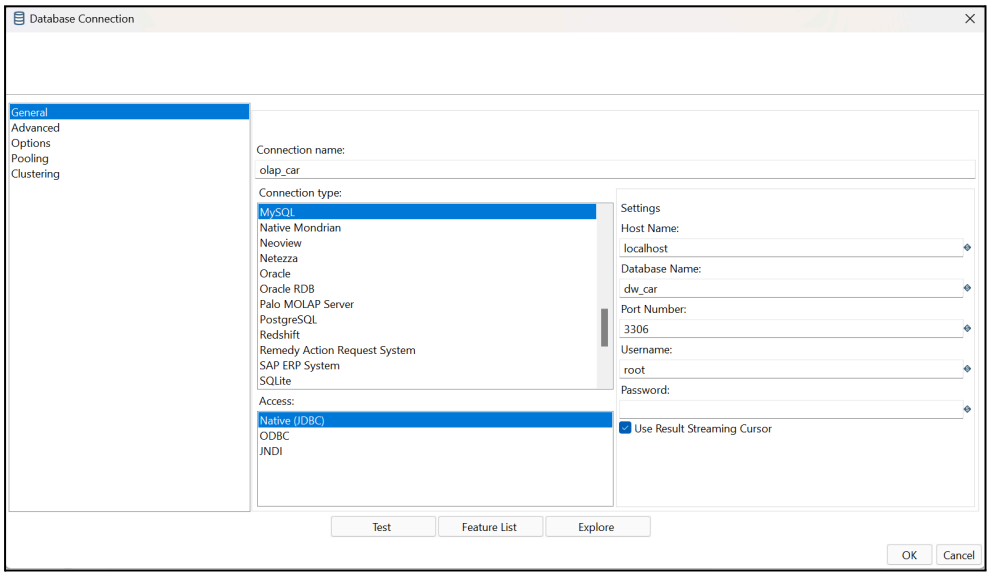
2. Menghitung total pendapatan (Price) untuk tiap Dealer Name

```
SELECT
        d.dealer_name,
```

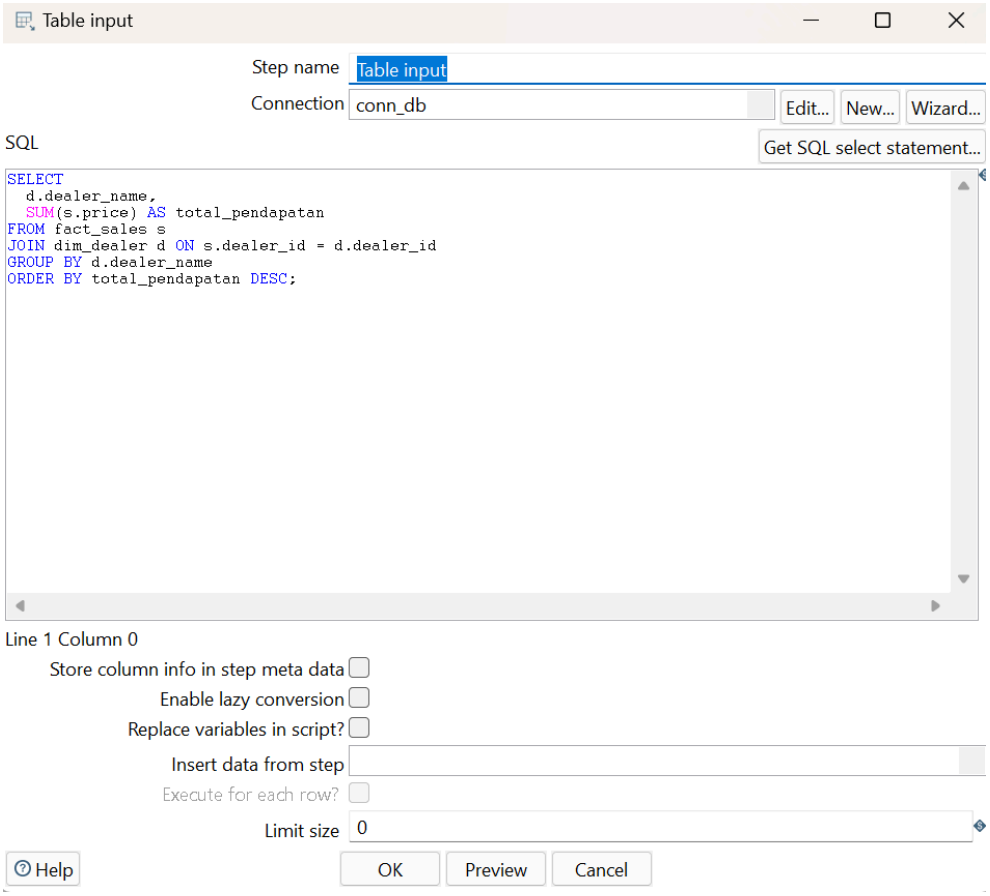
```
        SUM(s.price) AS total_pendapatan
FROM fact_sales s
JOIN dim_dealer d ON s.dealer_id = d.dealer_id
GROUP BY d.dealer_name
ORDER BY total_pendapatan DESC;
```

Elemen yang dibutuhkan :

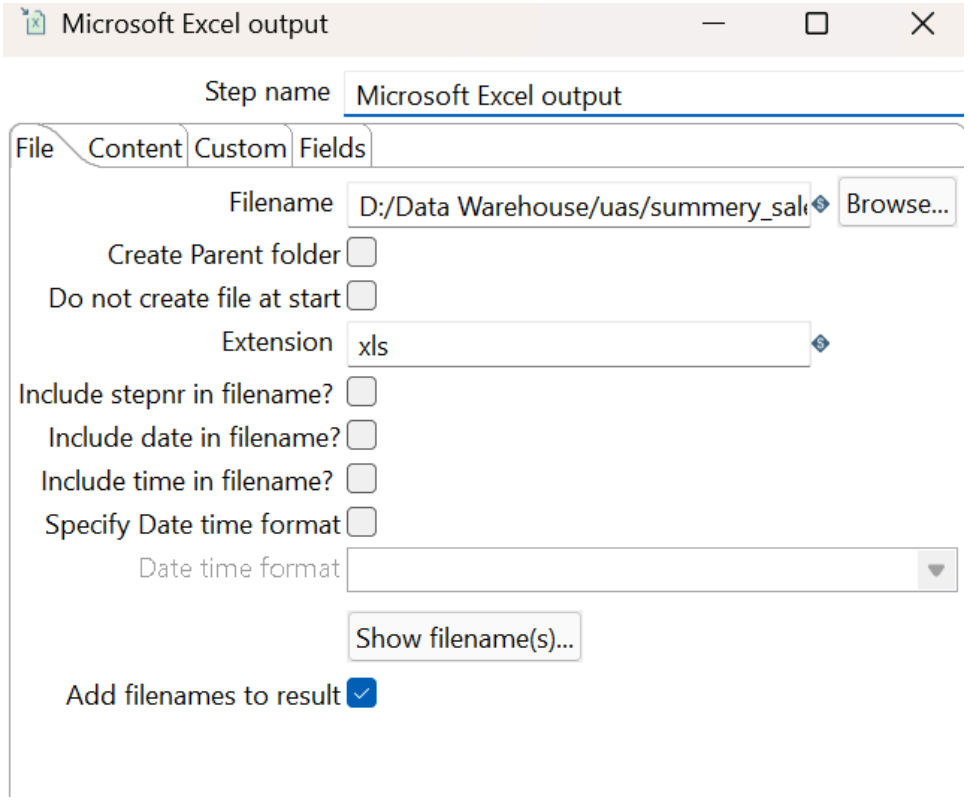
Tambahkan Koneksi untuk menuju ke database Dw_Car



Inputkan query ke tabel input



Save data pada excel



Cek hasil di excel

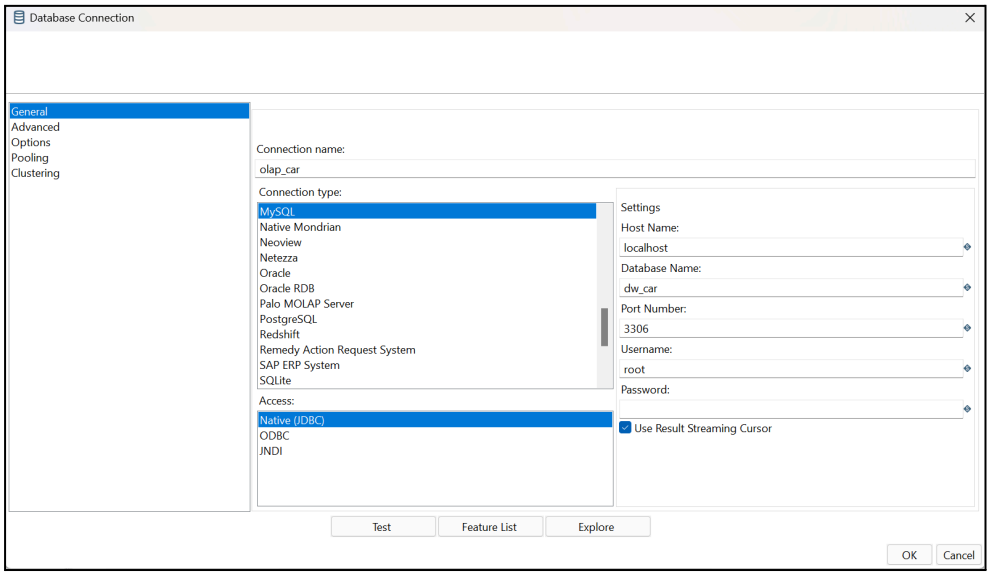
	A	B
1	dealer_name	total_pendapatan
2	Rabun Used Car Sales	37,456,655.00
3	Progressive Shippers Coop	36,751,460.00
4	U-Haul CO	35,876,089.00
5	Race Car Help	35,288,706.00
6	Saab-Belle Dodge	35,265,865.00
7	Scrivener Performance Eng	35,258,525.00
8	Star Enterprises Inc	35,113,206.00
9	Tri-State Mack Inc	35,091,357.00
10	Suburban Ford	34,943,473.00
11	Ryder Truck Rental and Le	34,837,906.00
12	Iceberg Rentals	17,883,895.00
13	Classic Chevy	17,819,055.00
14	Gartner Buick Hyundai Saa	17,739,506.00
15	Capitol KIA	17,703,134.00
16	Enterprise Rent A Car	17,695,363.00
17	Pars Auto Sales	17,648,228.00
18	Nebo Chevrolet	17,609,357.00
19	Chrysler of Tri-Cities	17,605,055.00
20	C & M Motors Inc	17,569,847.00
21	New Castle Ford Lincoln M	17,528,426.00
22	Hatfield Volkswagen	17,519,985.00

3. Mobil warna apa yang paling banyak terjual

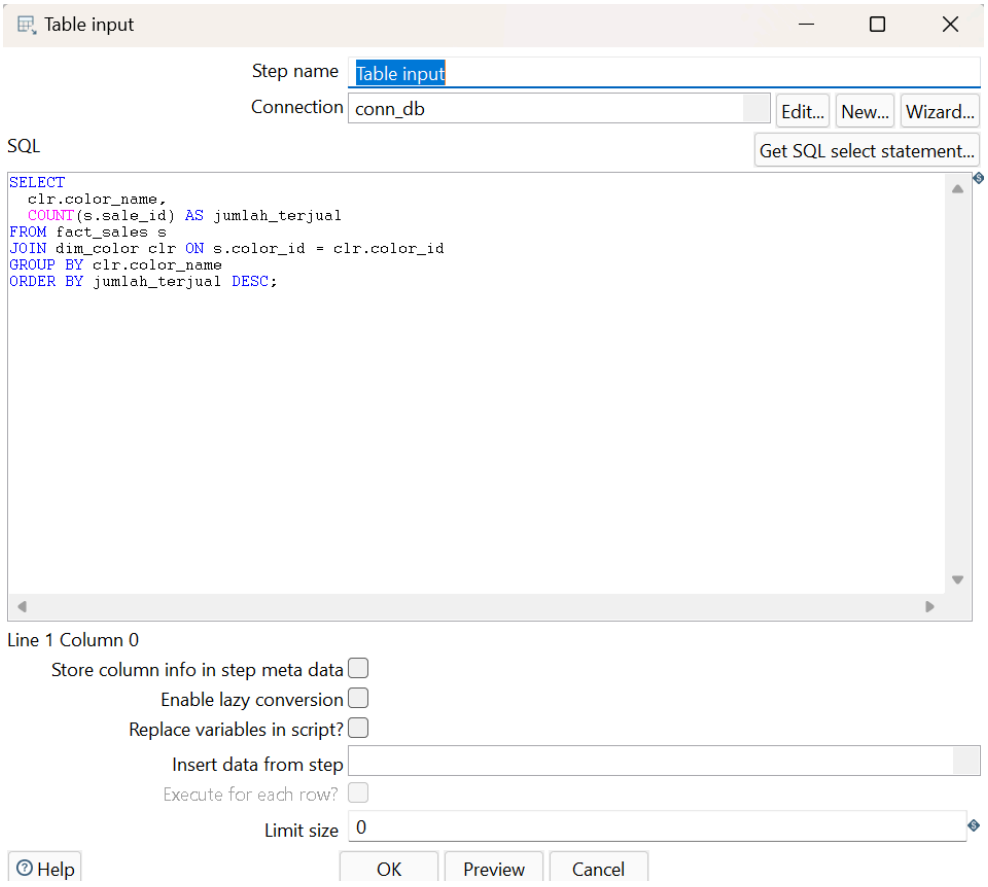
```
SELECT
        clr.color_name,
        COUNT(s.sale_id) AS jumlah_terjual
FROM fact_sales s
JOIN dim_color clr ON s.color_id = clr.color_id
GROUP BY clr.color_name
ORDER BY jumlah_terjual DESC
LIMIT 1;
```

Elemen yang dibutuhkan :

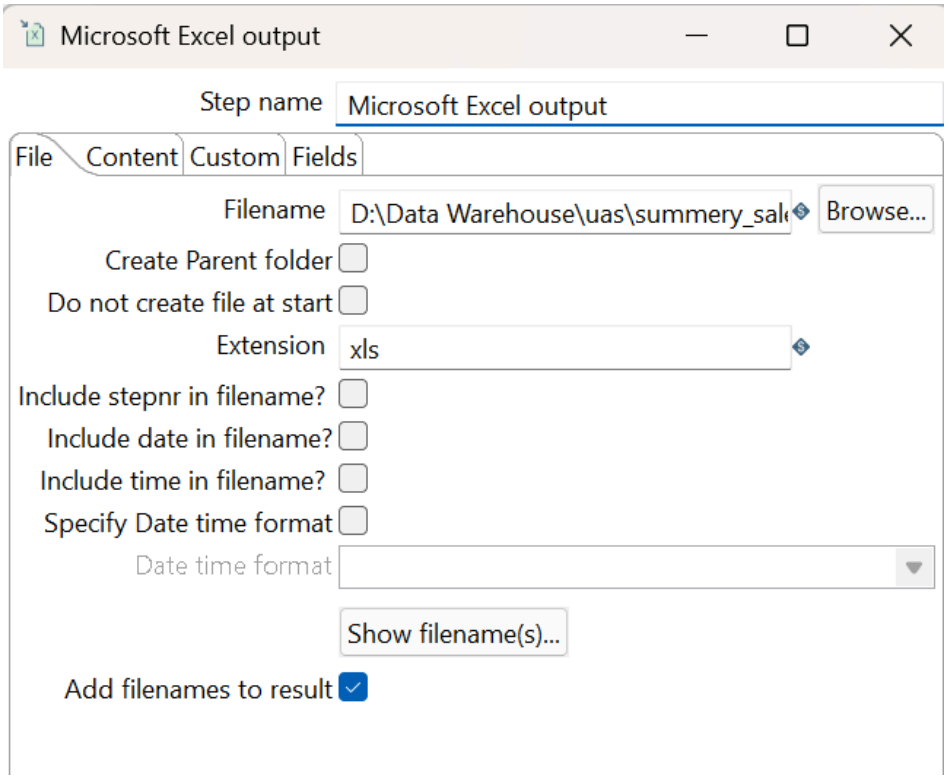
Tambahkan Koneksi untuk menuju ke database Dw_Car



Inputkan query ke tabel input



Save data pada excel



Cek hasil di excel

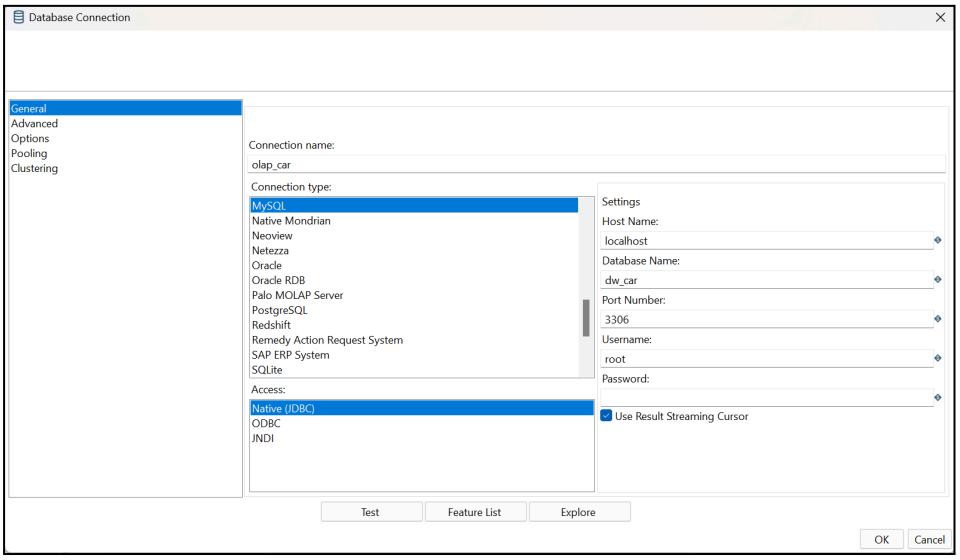
color_nam	jumlah_terjual
Pale White	11,256.00
Black	7,857.00
Red	4,793.00

4. Mengetahui wilayah dengan penjualan terbanyak

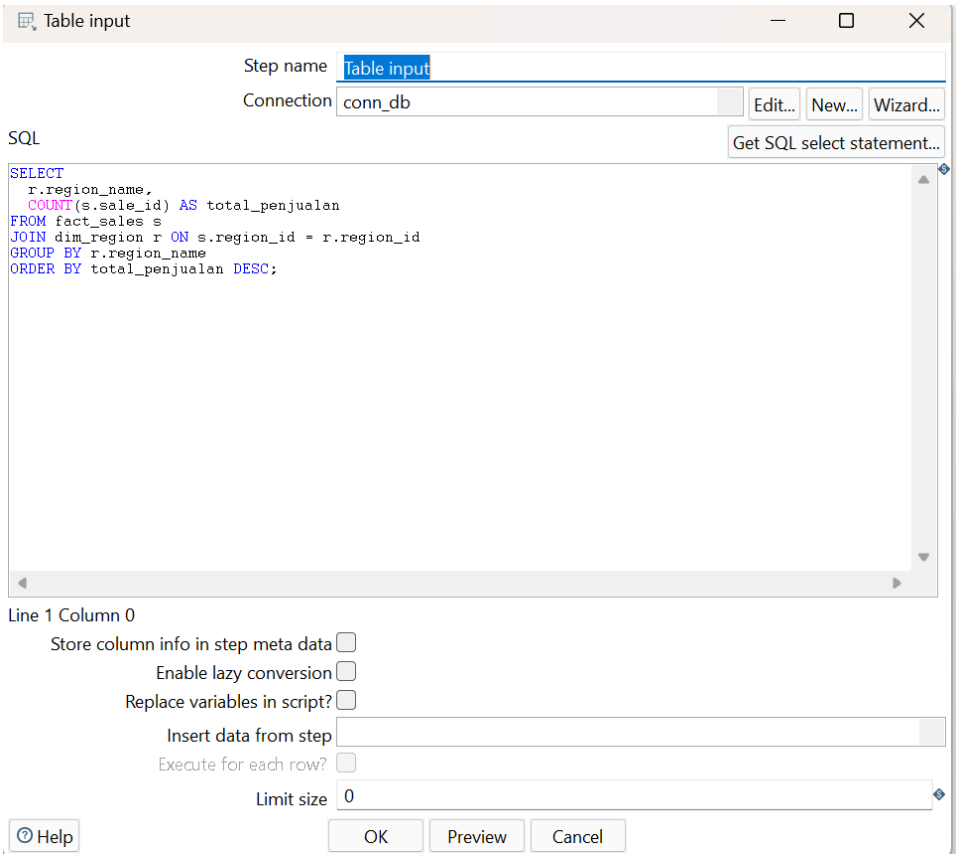
```
SELECT
        r.region_name,
        COUNT(s.sale_id) AS total_penjualan
FROM fact_sales s
JOIN dim_region r ON s.region_id = r.region_id
GROUP BY r.region_name
ORDER BY total_penjualan DESC;
```

Elemen yang dibutuhkan :

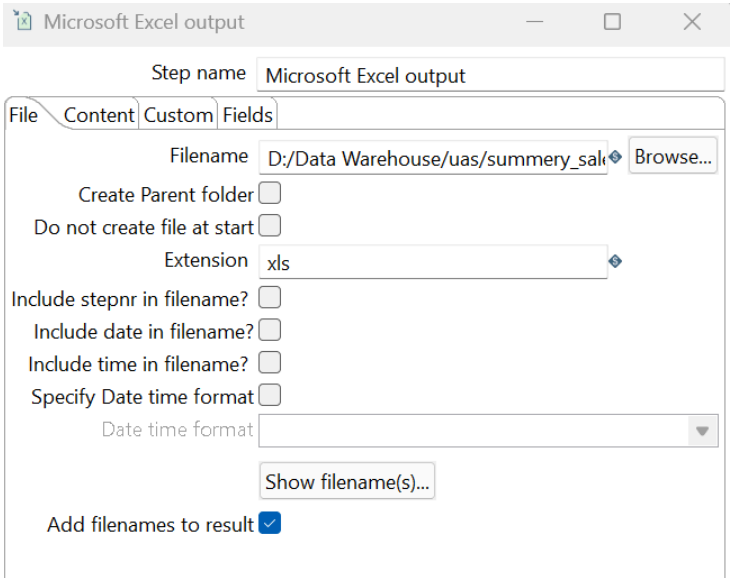
Tambahkan Koneksi untuk menuju ke database Dw_Car



Inputkan query ke tabel input



Save data pada excel



Cek hasil di excel

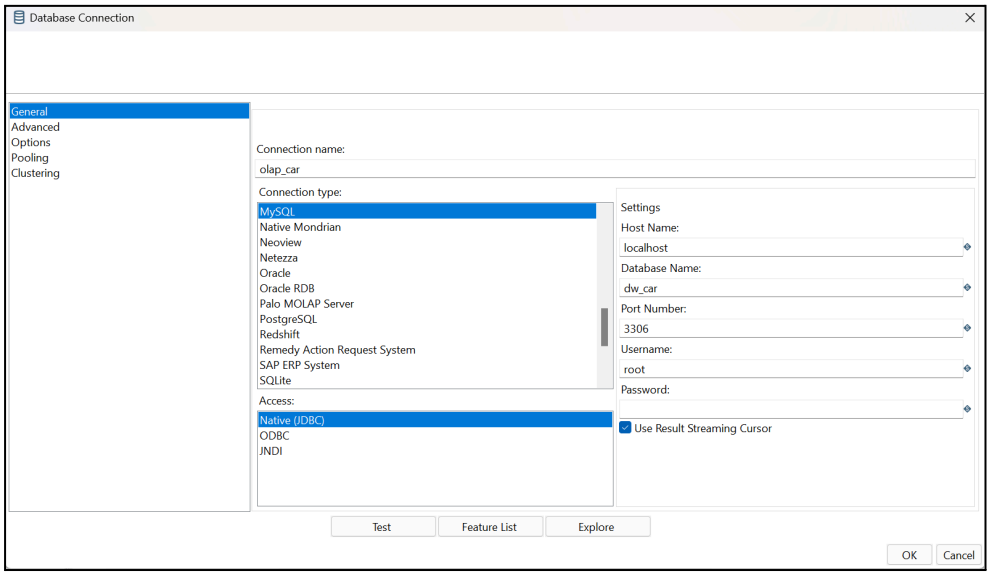
region_name	total_penjualan
Austin	4,135.00
Janesville	3,821.00
Scottsdale	3,433.00
Pasco	3,131.00
Aurora	3,130.00
Greenville	3,128.00
Middletown	3,128.00

5. Mengetahui rata-rata harga jual mobil dari setiap perusahaan (company)

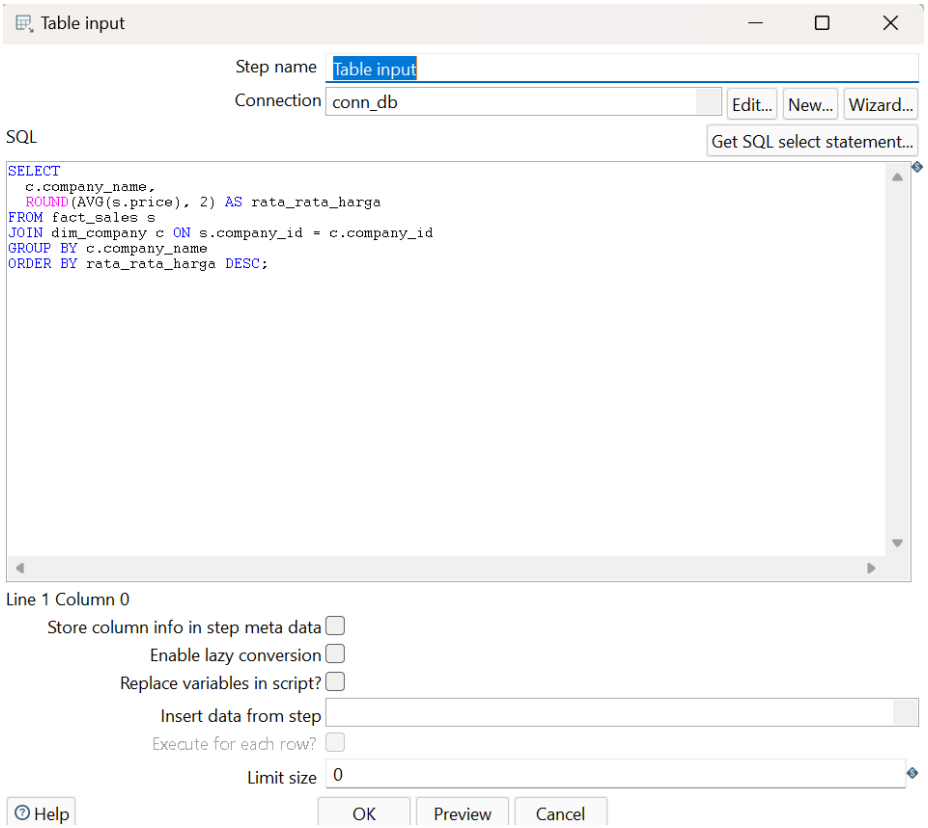
```
SELECT
        c.company_name,
        ROUND(AVG(s.price), 2) AS rata_rata_harga
FROM fact_sales s
JOIN dim_company c ON s.company_id = c.company_id
GROUP BY c.company_name
ORDER BY rata_rata_harga DESC;
```

Elemen yang dibutuhkan :

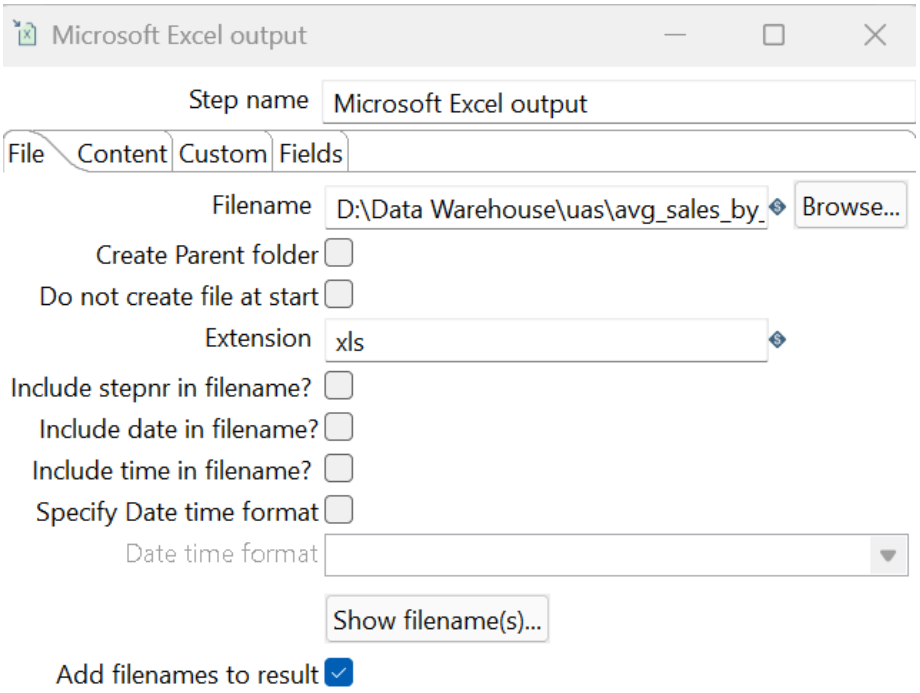
Tambahkan Koneksi untuk menuju ke database Dw_Car



Inputkan query ke tabel input



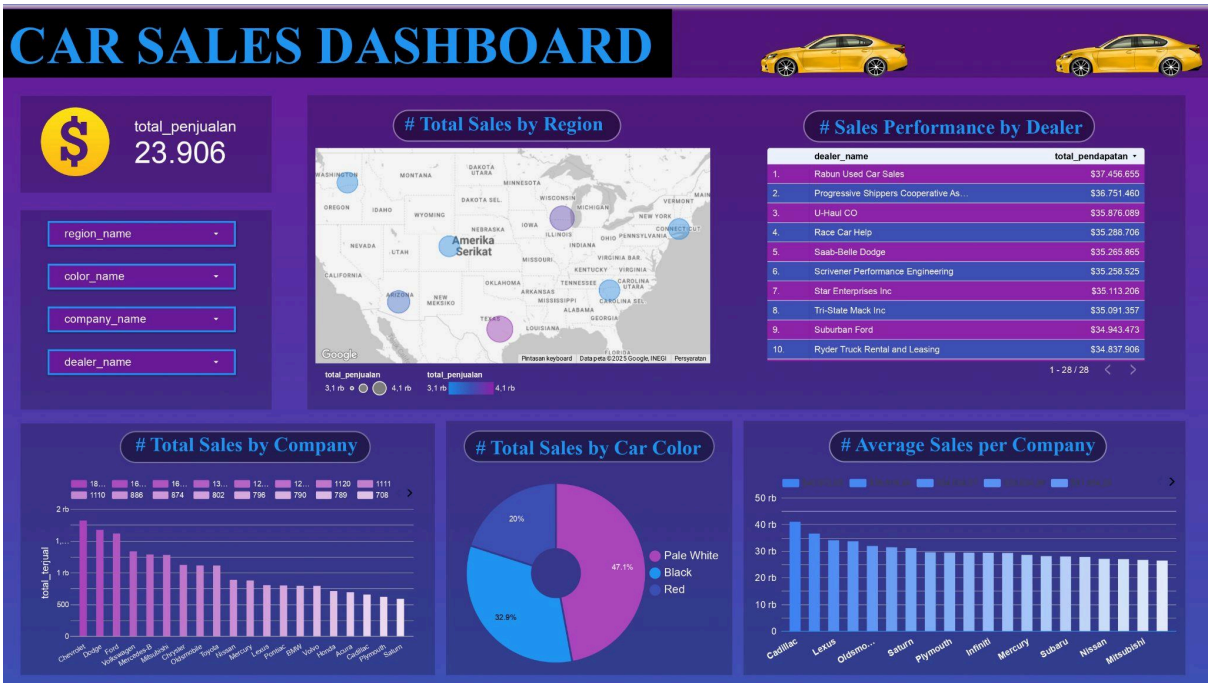
Save data pada excel



Cek hasil di excel

company_	rata_rata_harga
Cadillac	40,972.09
Saab	36,516.34
Lexus	34,024.57
Buick	33,634.36
Oldsmobile	31,894.25
Lincoln	31,407.04
Saturn	31,092.61
Toyota	29,513.12
Plymouth	29,404.98
Pontiac	29,358.30

Implementasi pada Google Looker Studio:



https://lookerstudio.google.com/u/0/reporting/895e0a2b-5198-4680-a748-9fc69b6a0dc3/page/5g9NF/edit