

1. Refining Your Query:

The screenshot shows the pgAdmin 4 interface with the 'Query' tab selected. The query editor contains the following SQL:

```
1 SELECT film_id,  
2 title  
3 FROM film
```

The 'Data Output' tab displays the results of the query as a table with two columns: 'film_id' and 'title'. The table contains 17 rows of data.

film_id	title
123	Chamber Italian
384	Grosse Wonderful
8	Airport Police
98	Bright Encounters
1	Academy Dinosaur
2	Ace Goldfinger
3	Adaptation Holes
4	Affair Prejudice
5	African Egg
6	Agent Truman
7	Airplane Sierra
9	Alabama Devil
10	Aladdin Calendar
11	Alamo Videotape
12	Alaska Phantom
213	Date Speed
13	Alli Forever

Total rows: 1000 of 1000 Query complete 00:00:00.126 Ln 3, Col 10

The screenshot shows the pgAdmin 4 interface with the 'Query' tab selected. The query editor contains the following SQL:

```
1 EXPLAIN  
2 SELECT film_id,  
3 title  
4 FROM film
```

The 'Data Output' tab displays the 'QUERY PLAN' for the query. The plan shows a 'Seq Scan on film' operation.

QUERY PLAN
1 Seq Scan on film (cost=0.00..98.00 rows=1000 width=1...

Total rows: 1 of 1 Query complete 00:00:00.067

Successfully run. Total query runtime: 67 msec. 1 rows affected.

Ln 4, Col 10

pgAdmin 4

Object Explorer

- Servers
 - PostgreSQL 16
 - Databases (2)
 - Rockbuster
 - Cast
 - Catalogs
 - Event Triggers
 - Extensions
 - Foreign Data Wrappers
 - Languages
 - Publications
 - Schemas (1)
 - public
 - Aggregates
 - Collations
 - Domains
 - FTS Configurations
 - FTS Dictionaries
 - FTS Parsers
 - FTS Templates
 - Foreign Tables
 - Functions
 - Materialized Views
 - Operators
 - Procedures
 - Sequences
 - Tables (16)
 - actor
 - address
 - category
 - Columns (3)
 - category_id
 - name
 - last_update
 - Constraints
 - Indexes
 - RLS Policies
 - Rules
 - Triggers

Dashboard | Properties | SQL | Statistics | Dependencies | Processes | Rockbuster/postgres@PostgreSQL 16*

Query: EXPLAIN
SELECT *
FROM film

Query History

Scratch Pad

Data Output | Messages | Notifications

QUERY PLAN
text

1 Seq Scan on film (cost=0.00..98.00 rows=1000 width=38..)

Total rows: 1 of 1 Query complete 00:00:00.117 Ln 3, Col 10

The costs of the original query and the revised query appear to be the same. If the size of the database increase, then the time spent for the query to return also increases, making the revised query a more suitable option to save cost.

2. Ordering the Data:

pgAdmin 4

Object Explorer

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 - category_id
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 - Triggers

Dashboard | Properties | SQL | Statistics | Dependencies | Processes | Rockbuster/postgres@PostgreSQL 16*

Query: SELECT *
FROM film
ORDER BY title ASC,
release_year DESC,
rental_rate DESC

Query History

Scratch Pad

Data Output | Messages | Notifications

| film_id | title | description | release_year | language_id | rental_duration | rental_rate | length |
|---------|------------------|---|--------------|-------------|-----------------|-------------|--------|
| 1 | Academy Dinosaur | A Epic Drama of a Feminist And a Mad Scientist who must Battle a Teacher in The Canadian Rockies | 2006 | 1 | 6 | 0.99 | |
| 2 | Ace Goldfinger | A Antsounding Epistle of a Database Administrator And a Explorer who must Find a Car in Ancient China | 2006 | 1 | 3 | 4.99 | |
| 3 | Adaptation Holes | A Antsounding Reflection of a Lumberjack And a Car who must Sink a Lumberjack in A Baloon Factory | 2006 | 1 | 7 | 2.99 | |
| 4 | Attair Prejudice | A Fanciful Documentary of a Frisbee And a Lumberjack who must Chase a Monkey in A Shark Tank | 2006 | 1 | 5 | 2.99 | |
| 5 | African Egg | A Fast-Paced Documentary of a Pastry Chef And a Dentist who must Pursue a Forensic Psychologist in The Gulf of Mexico | 2006 | 1 | 6 | 2.99 | |
| 6 | Agent Truman | A Intrepid Panorama of a Robot And a Boy who must Escape a Sumo Wrestler in Ancient China | 2006 | 1 | 3 | 2.99 | |
| 7 | Airplane Sierra | A Touching Saga of a Hunter And a Butler who must Discover a Butler in A Jet Boat | 2006 | 1 | 6 | 4.99 | |
| 8 | Airport Pollock | A Epic Tale of a Moose And a Girl who must Confront a Monkey in Ancient India | 2006 | 1 | 6 | 4.99 | |
| 9 | Alabama Devil | A Thoughtful Panorama of a Database Administrator And a Mad Scientist who must Outgun a Mad Scientist in A Jet Boat | 2006 | 1 | 3 | 2.99 | |
| 10 | Aladdin Calendar | A Action-Packed Tale of a Man And a Lumberjack who must Reach a Feminist in Ancient China | 2006 | 1 | 6 | 4.99 | |
| 11 | Alamo Videotape | A Boring Epistle of a Butler And a Cat who must Fight a Pastry Chef in A MySQL Convention | 2006 | 1 | 6 | 0.99 | |
| 12 | Alaska Phantom | A Fanciful Saga of a Hunter And a Pastry Chef who must Vanquish a Boy in Australia | 2006 | 1 | 6 | 0.99 | |
| 13 | All Forever | A Action-Packed Drama of a Dentist And a Crocodile who must Battle a Feminist in The Canadian Rockies | 2006 | 1 | 4 | 4.99 | |
| 14 | Alice Fantasia | A Emotional Drama of a A Shark And a Database Administrator who must Vanquish a Pioneer in Soviet Georgia | 2006 | 1 | 6 | 0.99 | |
| 15 | Allen Center | A Brilliant Drama of a Cat And a Mad Scientist who must Battle a Feminist in A MySQL Convention | 2006 | 1 | 5 | 2.99 | |
| 16 | Alley Evolution | A Fast-Paced Drama of a Robot And a Composer who must Battle a Astronaut in New Orleans | 2006 | 1 | 6 | 2.99 | |

Total rows: 1000 of 1000 Query complete 00:00:00.209 Ln 5, Col 17

3. Grouping Data:

The screenshot shows the pgAdmin 4 interface. On the left is the Object Explorer showing the database structure for 'Rockbuster'. The main pane displays a SQL query and its results.

Query:

```

1 SELECT rating,
2 AVG (rental_rate) AS avg_rental_rate,
3 MIN (rental_duration) AS min_rental_duration,
4 MAX (rental_duration) AS max_rental_duration
5 FROM FTLM
6 GROUP BY rating

```

Data Output:

| rating | mpaa_rating | avg_rental_rate | min_rental_duration | max_rental_duration |
|--------|-------------|---------------------|---------------------|---------------------|
| | | numeric | smallint | smallint |
| 1 | PG | 3.0518556701030928 | 3 | 7 |
| 2 | R | 2.9387179487179487 | 3 | 7 |
| 3 | NC-17 | 2.9709523809523810 | 3 | 7 |
| 4 | PG-13 | 3.0348430493273543 | 3 | 7 |
| 5 | G | 2.88887640444943820 | 3 | 7 |

Total rows: 5 of 5 Query complete 00:00:00.092 Ln 6, Col 16

4. Database Migration:

The procedure to migrate data on user behavior from external database we will need to follow the ETL (Extract, Transform, Load). First, the data needs to be collected from the external source (Rockbuster Android app). Second, the collected data must be transformed and converted into the right format. Lastly, the extracted and formatted data should be loaded into a new database.

Data Engineers are responsible for data migration. But a data analyst should still be aware of the basic concept to coordinate this process to ensure the accuracy and consistency of the data.

Typical problems may include incorrect spelling, spacing, duplicate data, and incorrect format of data. This concludes the importance of data cleaning.