

Database Development and Design

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Developing and Design of databases
using PostgreSQL - Powerful, open-
source object-relational database



Agenda



- Session 3
 - Quiz
 - Filtering by grouped data
 - Workshop
 - Grouping functions
 - Aggregate functions (Min, Max, Sum, Avg, Count)
 - Workshop
 - Views
 - Workshop
 - Knowledge check (Discussion, Homework)



Grouping functions

Max, Min, Sum, Avg, Count, String_agg

Grouping functions



- With grouped queries, you can arrange the rows you're querying in groups and apply data analysis computations like aggregate functions against those groups.
- A query becomes a grouped query when you use a group function, a GROUP BY clause, or both.
- A query that invokes a group function but doesn't have an explicit GROUP BY clause arranges all rows in one group. Consider the following query as an example:

```
SELECT COUNT(*) as Total
FROM Artist
```

```
SELECT is_married, COUNT(*) as
total_married
FROM artist_details
GROUP BY is_married
```

Aggregate functions



- Numeric aggregation functions
 - COUNT
 - SUM
 - AVG
 - MAX
 - MIN
- String aggregation functions
 - STRING_AGG

Aggregate functions



- COUNT
 - `count(*)` or `count(expression)` – returns number of input rows or the number of input rows when the value of expression is not null
- SUM
 - `sum(expression)` – returns sum of expression across all non-null input values
- AVG
 - `avg(expression)` – returns the average (arithmetic mean) of all non-null input values

Aggregate functions



- MAX
 - `max(expression)` – returns the maximum value of expression across all non-null input values
- MIN
 - `min(expression)` – returns the minimum value of expression across all non-null input values
- STRING_AGG
 - `string_agg(expression, delimiter)` – non-null input values concatenated into a string, separated by a delimiter

Grouping functions - Workshop



- Count total number of movies
- Count number of actors per nationality
- Count number of movies per director
- Count number of movies per genre
- Count number of reviews per movie
- Count number of movies per production company
- Count number of movies per year
- Count number of movies per rating
- Count number of awards per actor
- Count number of movies per rating
- Count number of awards per actor

Grouping functions - Workshop



- Find highest budget per genre
- Find longest movie duration per director
- Find highest domestic revenue per year
- Find highest rating per genre
- Find highest investment per production company
- Find lowest budget per year
- Find shortest movie duration per genre
- Find lowest rating per movie
- Find lowest revenue per rating category
- Find lowest investment per year

Grouping functions - Workshop



- Calculate average movie duration per genre
- Calculate average movie budget per year
- Calculate average rating per movie
- Calculate average revenue per genre
- Calculate average investment per production company
- Calculate total budget per genre
- Calculate total revenue per year
- Calculate total investment per production company
- Calculate total domestic and international revenue per rating
- Calculate total budget per director



Filtering by grouped data

HAVING operator

Grouping functions – filtering by grouped data



- Very often we need to perform search operations on an already aggregated data
- WHERE expression filters the result set before grouping
- HAVING operator is used to filter data after grouping
- Example:

```
SELECT Column1, fn(ColumnN)
FROM Table1
WHERE ColumnN condition
GROUP BY Column1
HAVING fn(ColumnN) condition
```

Grouping functions filtering - Workshop



- Find directors who have directed more than 2 movies
- Find genres that have more than 3 movies
- Find movies that have received more than 2 reviews
- Find actors who have won more than 1 award
- Find production companies that have produced more than 2 movies
- Find countries where more than 3 movies were filmed
- Find years when more than 5 movies were released
- Find ratings that have been given to more than 4 movies
- Find nationalities with more than 2 actors
- Find cities where more than 2 movies were filmed

Grouping functions filtering - Workshop



- Find genres where the highest budget exceeds 100 million
- Find directors whose longest movie exceeds 180 minutes
- Find genres with highest rating above 8
- Find production companies with highest investment above 50 million
- Find years with highest revenue above 500 million
- Find genres where shortest movie is less than 90 minutes
- Find directors where lowest budget movie is under 1 million
- Find movies with minimum rating below 3
- Find production companies with minimum investment under 100000
- Find ratings with minimum revenue under 1 million

Grouping functions filtering - Workshop



- Find genres with average duration over 150 minutes
- Find directors with average budget over 50 million
- Find movies with average rating above 7
- Find production companies with average investment over 10 million
- Find years with average revenue above 200 million
- Find genres with total budget over 500 million
- Find directors with total revenue over 1 billion
- Find production companies with total investment over 300 million
- Find ratings with total revenue over 2 billion
- Find years with total budget over 1 billion



Views

View definition



- With views you can present the contents of one or more base data tables to users, and you can encapsulate complex logic such as joins and filters so that the user does not need to remember them.
- To create a view, you name the view and then specify the **SELECT** statement that will constitute the view.
- Syntax:

```
CREATE VIEW ViewName  
AS  
SELECT Column1,Column2,... ColumnN  
FROM TableName
```

Views – workshop



- Create a view to display the total duration of songs in each playlist
- Create a view to display the number of songs in each genre



Homework 3

Homework requirements 1/2



- Find all genres that have more than 3 movies with a rating of 'R'
- Find directors who have made movies with total revenue over 500 million and have directed at least 2 movies
- Find actors who have appeared in more than 2 different genres and have won at least 1 award
- Find movies that have received more than 3 reviews with an average rating above 7
- Find production companies that have invested more than 100 million in movies released after 2015
- Find countries where more than 2 movies were filmed with a total budget exceeding 150 million
- Find genres where the average movie duration is over 120 minutes and at least one movie has won an Oscar
- Find years where more than 3 movies were released with an average budget over 50 million
- Find actors who have played lead roles in more than 2 movies with a total revenue exceeding 200 million

Homework requirements 2/2



- Create a view that shows top-rated movies. Include: movie title, average rating, review count, director name
- Create a view for movie financial performance. Include: movie title, budget, total revenue, profit, ROI
- Create a view for actor filmography. Include: actor name, movie count, genre list, total revenue
- Create a view for genre statistics. Include: genre name, movie count, average rating, total revenue
- Create a view for production company performance. Include: company name, movie count, total investment, total revenue



Questions?

Trainer Name

Trainer mail

Assistant Name

Assistant mail