SQL
Subqueries

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Subqueries

- `SELECT` queries return sets of results, that we can use in other parts of the queries
- Subqueries can be used in SELECT, FROM or WHERE clauses
- They can either substitute a single value, or a set of values
- In the second form they can be treated as a temporary table

Subquery in WHERE

Movies

movie_id	title	year	price
1	Anchorman	2004	10
2	Ghostbusters	1984	5.50
3	Terminator	1984	8.50

```
SELECT title
FROM movies
WHERE price = (SELECT MIN(price) FROM movies);

title
--------------
Ghostbusters
(1 row)
```

Subquery in WHERE

Movies

movie_id	title	year	price
1	Anchorman	2004	10
2	Ghostbusters	1984	5.50
3	Terminator	1984	8.50

Copies

copy_id	movie_id	available
1	1	true
2	1	false
3	2	true
4	3	true
5	3	false

```
SELECT copy_id
FROM copies
WHERE movie_id IN (SELECT movie_id FROM movies WHERE price > 8);

copy_id
--------------
1
2
4
5
(4 rows)
```

Subquery in WHERE

Employees

employee_id	first_name	last_name	city	salary
1	John	Smith	New York	150
2	Ben	Johnson	New York	250
3	Louis	Armstrong	New Orleans	75
4	John	Lennon	London	300
5	Peter	Gabriel	London	100

```
SELECT last_name
FROM employees
WHERE salary > ANY (SELECT salary FROM employees WHERE city = '
    London');

last_name
-------------
Smith
Johnson
Lennon
(3 rows)
```

Subquery in WHERE

Employees

employee_id	first_name	last_name	city	salary
1	John	Smith	New York	150
2	Ben	Johnson	New York	250
3	Louis	Armstrong	New Orleans	75
4	John	Lennon	London	300
5	Peter	Gabriel	London	100

```
SELECT last_name
FROM employees
WHERE salary > ALL (SELECT salary FROM employees WHERE city = '
    New York');

last_name
--------------
Lennon
(1 row)
```

Subquery in Having

Employees

employee_id	first_name	last_name	city	salary
1	John	Smith	New York	150
2	Ben	Johnson	New York	250
3	Louis	Armstrong	New Orleans	75
4	John	Lennon	London	300
5	Peter	Gabriel	London	100

```
SELECT city, AVG(salary) AS salary
FROM employees
GROUP BY city
HAVING AVG(salary) > (SELECT AVG(salary) FROM employees);

city     | salary
---------+----
New York | 200
London   | 200
(2 rows)
```

Subquery in From

Employees

employee_id	first_name	last_name	city	salary
1	John	Smith	New York	150
2	Ben	Johnson	New York	250
3	Louis	Armstrong	New Orleans	75
4	John	Lennon	London	300
5	Peter	Gabriel	London	100

```
SELECT last_name, cities.city, salary, maximum
FROM employees
JOIN (SELECT city, MAX(salary) AS maximum FROM employees GROUP BY
     city) AS cities
  ON cities.city = employees.city

last_name | city        | salary | maximum
----------+-------------+--------+--------
Smith     | New York    | 150    | 250
Johnson   | New York    | 250    | 250
Armstrong | New Orleans | 75     | 75
Lennon    | London      | 300    | 300
Gabriel   | London      | 100    | 300
(5 rows)
```

Subquery in From

Employees

employee_id	first_name	last_name	city	salary
1	John	Smith	New York	150
2	Ben	Johnson	New York	250
3	Louis	Armstrong	New Orleans	75
4	John	Lennon	London	300
5	Peter	Gabriel	London	100

```
SELECT last_name, city, salary
FROM employees AS e1
WHERE salary > (SELECT AVG(salary) FROM employees WHERE city = e1
    .city);

last_name | city        | salary
----------+-------------+--------
Johnson   | New York    | 250
Lennon    | London      | 300
(2 rows)
```

Subquery in From

Employees

employee_id	first_name	last_name	city	salary
1	John	Smith	New York	150
2	Ben	Johnson	New York	250
3	Louis	Armstrong	New Orleans	75
4	John	Lennon	London	300
5	Peter	Gabriel	London	100

```
SELECT DISTINCT city, (SELECT last_name FROM employees WHERE
    salary = (SELECT MAX(salary) FROM employees WHERE city = e1.
    city)) AS best
FROM employees e1;

 city        | best
-------------+-----------
 New York    | Johnson
 London      | Lennon
 New Orleans | Armstrong
(3 rows)
```

Subquery in From

Employees

employee_id	first_name	last_name	city	salary
1	John	Smith	New York	150
2	Ben	Johnson	New York	250
3	Louis	Armstrong	New Orleans	75
4	John	Lennon	London	300
5	Peter	Gabriel	London	100

```
SELECT DISTINCT city
FROM employees e1
WHERE EXISTS (SELECT * FROM employees WHERE salary > 200 AND e1.
    city = city);

 city
-------------
 New York
 London
(2 rows)
```