
--Single-Row Subqueries - Where

```
SELECT * FROM employees
WHERE salary > (SELECT AVG(salary) FROM employees)
```

```
SELECT title, length, rating
FROM film
WHERE length = (SELECT length FROM film WHERE title = 'Godfather Diary')
```

```
SELECT title, length, rating
FROM film
WHERE (length, rating) =
      (SELECT length, rating FROM film WHERE title = 'Home Pity')
```

--Single-Row Subqueries - Column

```
SELECT
    first_name, last_name,
    department_name
FROM employees e
INNER JOIN departments d
    ON d.department_id = e.department_id;
```

```
SELECT
    first_name, last_name,
    (
        SELECT department_name FROM departments d
        WHERE d.department_id = e.department_id
    ) dep_name
FROM employees e;
```

--Single-Row Subqueries - Having

```
SELECT department_id,
    COUNT(*) as emp_num
FROM employees e
GROUP BY department_id
HAVING COUNT(*) >
    (
        SELECT COUNT(*)
        FROM employees
        WHERE department_id = 6
    )
```

--Multiple-Row Subqueries - FROM

```
select
  e.first_name, e.last_name,
  dl.department_name, dl.city, dl.state_province
from employees e,
(
  select
    d.department_id, d.department_name,
    l.city, l.state_province
  from departments d, locations l
  where d.location_id = l.location_id
) dl
where e.department_id = dl.department_id
```

--Multiple-Row Subqueries - IN

```
SELECT * FROM employees
WHERE job_id IN
(
  SELECT job_id FROM jobs
  WHERE 5000 between min_salary and max_salary
)
```

```
SELECT customer_id, first_name, last_name
FROM customer
WHERE address_id IN
(
  SELECT address_id FROM address WHERE city_id IN
  (
    SELECT city_id FROM city WHERE country_id = 50
  )
)
```

```
SELECT film_id, title, rating
FROM film
WHERE
  film_id IN
  (
    SELECT i.film_id
    FROM inventory i
    INNER JOIN rental r ON i.inventory_id = r.inventory_id
    WHERE
      r.rental_date BETWEEN '2005-05-25' AND '2005-05-26'
  );
```

--Multiple-Row Subqueries – IN (Multiple Columns)

```
SELECT title, rental_duration, length
FROM film gf
WHERE rating = 'G'
      AND (gf.rental_duration, gf.length) IN
      (
        SELECT lf.rental_duration, lf.length
        FROM film lf
        WHERE length > 170
      )
```

--Multiple-Row Subqueries – ANY

```
SELECT
  first_name, last_name, salary
FROM employees
WHERE salary < ANY
  (
    SELECT salary
    FROM employees
    WHERE job_id = 9
  )

SELECT category_id, MAX(length)
FROM film
INNER JOIN film_category USING(film_id)
GROUP BY category_id
ORDER BY 2

SELECT title, length
FROM film
WHERE length > ANY
  (
    SELECT MAX(length)
    FROM film
    INNER JOIN film_category USING(film_id)
    GROUP BY category_id
  );
```

--Multiple-Row Subqueries – ANY vs IN

```
SELECT title, category_id
FROM film f, film_category c
WHERE
  1=1
  AND f.film_id = c.film_id
  AND category_id = ANY
  (
    SELECT category_id
    FROM category
    WHERE name IN ('Animation', 'Games')
  );
```

--Multiple-Row Subqueries - ALL

```
SELECT first_name, last_name, salary
FROM employees
WHERE salary > ALL
    (
        SELECT salary
        FROM employees
        WHERE manager_id = 1
    )

SELECT film_id, title, length
FROM film
WHERE
    length <
    (
        SELECT MIN(avg_length) FROM
            (
                SELECT ROUND(AVG(length), 2) avg_length
                FROM film
                GROUP BY rating
            ) sb
    )
ORDER BY 3;
```

--EXISTS Operator

```
SELECT first_name, last_name
FROM customer c
WHERE
    EXISTS
    (
        SELECT 1
        FROM payment p
        WHERE p.customer_id = c.customer_id
    );

select * from departments d
where exists
    (
        select 1 from locations l
        where l.location_id = d.location_id
        and country_id in
            (
                select country_id from countries
                where country_name = 'Canada'
            )
    )
)
```

--NOT EXISTS Operator

```
SELECT * FROM employees e
WHERE NOT EXISTS
(
    SELECT 1 FROM jobs j
    WHERE LOWER(job_title) LIKE '%manager%'
    AND j.job_id = e.job_id
)
```

--EXERCISE ANSWERS

--Single-Row Subqueries - Where

```
SELECT city_id, city FROM city
WHERE country_id =
(
    SELECT country_id FROM country WHERE country = 'Japan'
);
```

--Single-Row Subqueries - Column

```
select first_name, last_name,
(
    select first_name || ' ' || last_name as parent_name
    from employees e
    where e.employee_id = d.employee_id
)
from dependents d
```

--Single-Row Subqueries - Having

```
select department_id,
(select department_name from departments ds
where ds.department_id = e.department_id) as dep_name,
count(*) as emp_num
from employees e
group by department_id
having count(*) >
(
    select count(*) from employees e
    where e. department_id = (select department_id
    from departments d where department_name = 'IT')
)
```

--Alternative

```
select e.department_id, department_name, count(*) as emp_num
from employees e
inner join departments ds on ds.department_id = e.department_id
group by e.department_id, department_name
having count(*) >
(
    select count(*) from employees e
    where e. department_id = (select department_id
    from departments d where department_name = 'IT')
)
```

--Multiple-Row Subqueries – IN

--Exercise-1

```
SELECT film_id, title, rating
FROM film
WHERE
    film_id IN
    (
        SELECT i.film_id
        FROM inventory i
        WHERE i.inventory_id IN
        (
            SELECT r.inventory_id FROM rental r
            WHERE
                rental_date BETWEEN '2005-05-25' AND '2005-05-26'
        )
    );
```

--Exercise-2

```
SELECT * FROM employees e
WHERE e.employee_id IN
(
    SELECT d.employee_id FROM dependents d
);
```

--Alternative

```
SELECT e.* FROM employees e
INNER JOIN dependents d ON e.employee_id = d.employee_id
```

--Multiple-Row Subqueries – ANY

```
SELECT
    first_name, last_name, salary
FROM employees
WHERE salary <
    (
        SELECT MAX(salary)
        FROM employees
        WHERE job_id = 9
    )
```

--Multiple-Row Subqueries – ALL

--Exercise-1

```
SELECT first_name, last_name, salary
FROM employees
WHERE salary >
    (
        SELECT MAX(salary)
        FROM employees
        WHERE manager_id = 100
    )
```

--Exercise-2

```
SELECT film_id, title, length
FROM film
WHERE
    length < ALL
    (
        SELECT ROUND(AVG(length), 2)
        FROM film
        GROUP BY rating
    )
ORDER BY 3 DESC;
```

--EXISTS Operator

--Exercise-1

```
SELECT first_name, last_name
FROM customer c
WHERE c.customer_id IN
    (
        SELECT p.customer_id
        FROM payment p
    );
```

--Exercise-2

```
SELECT * FROM employees
WHERE job_id IN
    (
        SELECT job_id FROM jobs
        WHERE LOWER(job_title) LIKE '%manager%'
    )

SELECT * FROM employees e
WHERE EXISTS
    (
        SELECT 1 FROM jobs j
        WHERE LOWER(job_title) LIKE '%manager%'
        AND j.job_id = e.job_id
    )
```