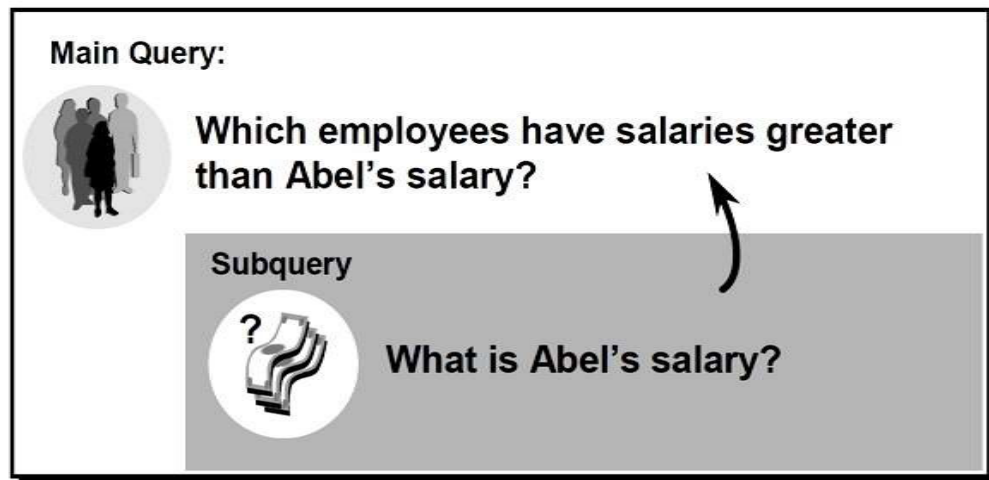# Subqueries

Topics:
- ▶ Using a Subquery to Solve a Problem
- ▶ Subquery Syntax
- ▶ Single-Row Subqueries
- ▶ Executing Single-Row Subqueries
- ▶ Using Group Functions in a Subquery

**Who has a salary greater than Abel's?**



Main Query:

Which employees have salaries greater than Abel's salary?

Subquery

What is Abel's salary?

**Using a Subquery**

```
SELECT last_name
FROM employees
WHERE salary >(SELECT salary
            FROM employees
            WHERE last_name = 'Abel');
```

| LAST_NAME |
|---|
| King |
| Kochhar |
| De Haan |
| Hartstein |
| Higgins |

Single-Row Subqueries

- ▶ Return only one row
- ▶ Use single-row comparison operators

| Operator | Meaning |
|----------|---------|
| = | Equal to |
| > | Greater than |
| >= | Greater than or equal to |
| < | Less than |
| <= | Less than or equal to |
| <> | Not equal to |

**Executing Single-Row Subqueries**

```
SELECT last_name, job_id, salary
FROM employees
WHERE job_id =
            (SELECT job_id
             FROM employees
             WHERE employee_id = 141)
AND salary >
            (SELECT salary
             FROM employees
             WHERE employee_id = 143);
```

| LAST_NAME | JOB_ID | SALARY |
|-----------|--------|--------|
| Rajs | ST_CLERK | 3500 |
| Davies | ST_CLERK | 3100 |

Using Group Functions in a Subquery

```
SELECT last_name, job_id, salary
FROM employees
WHERE salary =
            (SELECT MIN(salary)
             FROM employees);
```

| LAST_NAME | JOB_ID | SALARY |
|-----------|--------|--------|
| Vargas | ST_CLERK | 2500 |

**Activity 01:**

Write a query to display the last name and hire date of any employee in the same department as Zlotkey. Exclude Zlotkey.

| LAST_NAME | HIRE_DATE |
|-----------|-----------|
| Abel | 11-MAY-96 |
| Taylor | 24-MAR-98 |

**Activity 02:**

Create a query to display the employee numbers and last names of employees who earn more than the average salary. Sort the results in ascending order of salary.
.

| EMPLOYEE_ID | LAST_NAME | SALARY |
|---|---|---|
| 103 | Hunold | 9000 |
| 149 | Zlotkey | 10500 |
| 174 | Abel | 11000 |
| 205 | Higgins | 12000 |
| 201 | Hartstein | 13000 |
| 101 | Kochhar | 17000 |
| 102 | De Haan | 17000 |
| 100 | King | 24000 |

CSE 311L(Database Management System)

LAB-Week 06 (Lecture 2)

Topics:
► Single-row operator with multiple-row subquery
► Multiple-Row Subqueries
► Using the ANY Operator
► Using the ALL Operator

## Subqueries

**What is Wrong with this Statement?**

SELECT employee_id, last_name
FROM employees
WHERE salary =
              (SELECT MIN(salary)

              FROM employees  GROUP BY department_id);

**Multiple-Row Subqueries**
► Return more than one row
► Use multiple-row comparison operators

| Operator | Meaning |
|---|---|
| IN | Equal to any member in the list |
| ANY | Compare value to each value returned by the subquery |
| ALL | Compare value to every value returned by the subquery |

## Using the ANY Operator

SELECT employee_id, last_name, job_id, salary
FROM employees
WHERE salary < ANY
        (SELECT salary
        FROM employees
         WHERE job_id = 'IT_PROG')
AND job_id <> 'IT_PROG';

| EMPLOYEE_ID | LAST_NAME | JOB_ID | SALARY |
|---|---|---|---|
| 124 | Mourgos | ST_MAN | 5800 |
| 141 | Rajs | ST_CLERK | 3500 |
| 142 | Davies | ST_CLERK | 3100 |
| 143 | Matos | ST_CLERK | 2600 |
| 144 | Vargas | ST_CLERK | 2500 |

## Using the ALL Operator

SELECT employee_id, last_name, job_id, salary
FROM employees
WHERE salary < ALL
        (SELECT salary
        FROM employees
         WHERE job_id = 'IT_PROG')
AND job_id <> 'IT_PROG';

| EMPLOYEE_ID | LAST_NAME | JOB_ID | SALARY |
|---|---|---|---|
| 141 | Rajs | ST_CLERK | 3500 |
| 142 | Davies | ST_CLERK | 3100 |
| 143 | Matos | ST_CLERK | 2600 |
| 144 | Vargas | ST_CLERK | 2500 |

Activity 01:

Display the last name and salary of every employee who reports to King.

| LAST_NAME | SALARY |
|---|---|
| Kochhar | 17000 |
| De Haan | 17000 |
| Mourgos | 5800 |
| Zlotkey | 10500 |
| Hartstein | 13000 |

## Activity 02:

Write a query to display the employee numbers, last names, and salaries of all employees who earn more than the average salary and who work in a department with any employee with a u in their name.

| EMPLOYEE_ID | LAST_NAME | SALARY |
|---|---|---|
| 103 | Hunold | 9000 |