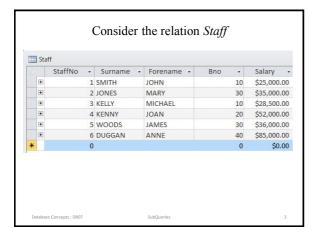
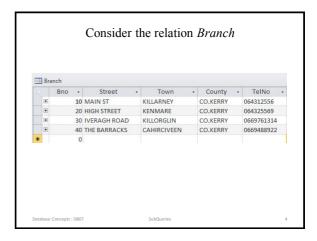


Some SQL queries can have a complete SELECT statement *embedded* within them.

• INNER SELECT
• OUTER SELECT

The result of the INNER SELECT is used in the OUTER SELECT to get the final result.



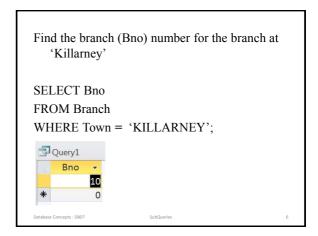


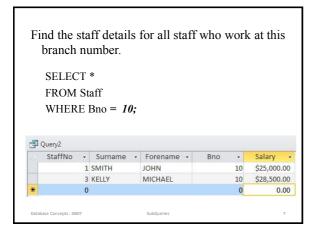
List all staff who work at the branch at 'Killarney.

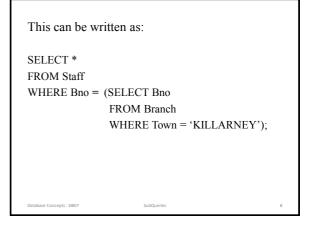
There are two parts to this query

1. Find the branch (Bno) number for the branch at 'Killarney'

2. Find the staff details for all staff who work at this branch number







The *inner* SELECT finds the branch number of the branch at 'Killarney' (assume there is only one) - 10

The outer SELECT then uses the value returned by the inner select.

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The sub-query is *always* enclosed in parenthesis.

A sub-query can be used immediately following a relational operator (=,>,< <>, e.t.c) in a WHERE or HAVING clause.

## Some Examples

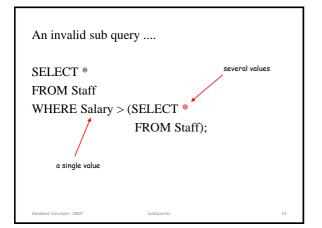
List all staff whose salary is greater than the average salary.

SELECT \*
FROM Staff
WHERE Salary > (SELECT AVG(salary)
FROM staff);

An **ORDER BY** clause can not be used in a subquery but can be used in the outer query.

The sub-query **SELECT** list must have a single column name or expression EXCEPT for sub-queries that use the keyword **EXISTS**.

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A valid sub query ....

SELECT \*
FROM Staff
WHERE Salary EXISTS (SELECT \*
FROM Staff);

EXISTS not used very often!

An invalid sub query:

SELECT \*

FROM Staff

WHERE (SELECT AVG(salary)

FROM Staff) < Salary;

Nested query must be on  $\underline{\mathbf{RHS}}$  of relational operator.

Database Concepts : DB07

SubQueries

## The IN Operator

The IN operator may be used when you wish to select rows from a table for which there may be more than one satisfying value.

List the properties that are handled by staff working at the branch at 'Killarney'.

Database Concepts : DB07

SubQueries

- 1. Find the branch number *Bno* for branch at Killarney.
- 2. Find all staff who work at this branch.
- 3. Find the properties overseen by all of these staff

Database Concepts : DB07

SubQueries

1. To find the branch number for branch at Killarney.

SELECT Bno

FROM Branch

WHERE Town = 'Killarney';

In our example, this returns a single value.

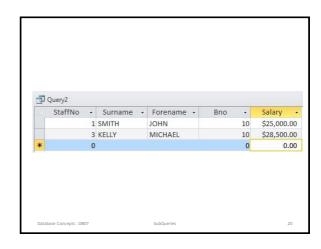
Bno = 10.

Database Concepts : DB07

bQueries

## 2. Find all staff who work at this branch (10). SELECT \* FROM Staff WHERE Bno = (SELECT Bno FROM Branch WHERE Town = 'Killarney');

This returns the following records:

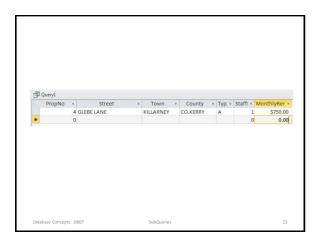


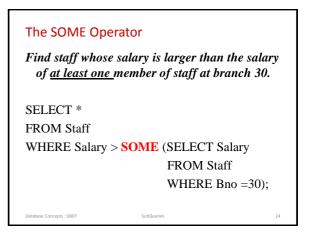
We are only interested in the *StaffNo* so the query should be written:

SELECT **StaffNo**FROM Staff
WHERE Bno = (SELECT Bno
FROM Branch
WHERE Town = 'Killarney');

3. Find the properties overseen by the staff at this branch.

SELECT \*
FROM Properties
WHERE StaffNo IN (SELECT StaffNo
FROM Staff
WHERE Bno = (SELECT Bno
FROM branch
WHERE Town = Killarney'));





You could solve this by finding

- the minimum salary in branch 30
- then find all staff earning more than this minimum salary.

SELECT \*

FROM Staff

WHERE Salary > (SELECT MIN(Salary)

FROM Staff

WHERE Bno =30);

Database Concepts: DB07

## The ALL Operator

Find staff whose salary is larger than the salary of every member of staff at branch 30.

SELECT \*

FROM Staff

WHERE Salary > **ALL** (SELECT Salary

FROM Staff

WHERE Bno =30);

Database Concepts: DB07

SubOuerie

You could solve this by finding

- the maximum salary in branch 30
- then find all staff earning more than this minimum salary.

SELECT \*

FROM Staff

WHERE Salary > (SELECT MAX(Salary)

FROM Staff

SubQueries

WHERE Bno =30);

Database Concepts : DB07