

# SQL Subqueries

COMS10012 Software Tools

# Scenario

Find all the lecturers in the same research group as Peter.

```
SELECT rgroup FROM Lecturer  
WHERE name = 'Peter';
```

→ 81

```
SELECT name FROM Lecturer  
WHERE rgroup = 81;
```

→ Peter, Charles, ...

Lecturer	
id	
name	
rgroup	

# SUBSELECT

Find all the lecturers in the same research group as Peter.

```
SELECT name FROM Lecturer
WHERE rgroup = (
    SELECT rgroup FROM Lecturer
    WHERE name = 'Peter'
);
```

# WHERE clause

**WHERE** <condition>

<condition> ::= <value> <op> <value>  
                  | ...

<value> ::= <literal>           -- *'Peter'*  
          | <column>           -- *name*  
          | <subselect>       -- *(SELECT ...)*  
          | <function>       -- *f(...)*

# IN with subselect

Which units are taught by lecturers in the hardware research group?

```
SELECT title FROM Unit WHERE director IN (
    SELECT id FROM Lecturer
    INNER JOIN RGroup
    ON RGroup.id = Lecturer.rgroup
    WHERE RGroup.name = 'Hardware'
);
```

# EXISTS

Which lecturers teach at least one unit?

```
SELECT name FROM Lecturer
WHERE EXISTS (
    SELECT id FROM Unit
    WHERE Unit.director = Lecturer.id
);
```

# ANY, ALL – quantifiers in SQL

Which student(s) got the top grade (e.g. joint rank 1)?

```
SELECT name FROM Student
WHERE grade >= ALL (
    SELECT grade FROM Student
);
```

# WITH

**WITH** <alias> **AS** ( ... ) **SELECT** ...;

```
WITH Uni AS (  
    SELECT name, title, Enrol.grade  
    FROM Student INNER JOIN Enrol  
    ON Enrol.student = Student.id  
    INNER JOIN Unit  
    ON Enrol.unit = Unit.id )  
SELECT name, title FROM Uni  
WHERE grade >= 40;
```

## Student

\*id  
name

## Enrol

\*student  
\*unit  
grade

## Unit

\*id  
title



# Subselect in FROM

```
SELECT name, title FROM (  
    SELECT name, title, Enrol.grade  
    FROM Student INNER JOIN Enrol  
    ON Enrol.student = Student.id  
    INNER JOIN Unit  
    ON Enrol.unit = Unit.id ) AS t  
WHERE grade >= 40;
```

## Student

\*id  
name

## Enrol

\*student  
\*unit  
grade

## Unit

\*id  
title

# Which one to use?

Make your queries

1. correct
2. clear
3. concise

in that order.

Don't use multiple queries where one would do.