

# Multiple table queries: joins

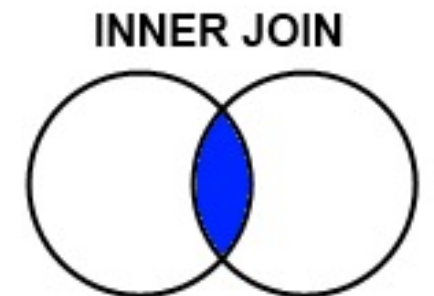
# Multiple Table Queries - Join

- SQL query can be used to link tables - for tables where relationships exist
- Relationships between tables are established through PK and FK
- Refers to the common columns in each table by comparison
- **Join** – an operation which brings together the data from two or more related tables into one result table
- Types of joins – equijoins (inner join), natural joins and outer joins: right outer join & left outer join.

# Equijoin/inner join

- Joining condition based on equality between values on common tables.
- Query lists the properties managed by branch

```
SELECT branch.bno, property_for_rent.bno, property_for_rent.street  
FROM branch, property_for_rent  
WHERE branch.bno=property_for_rent.bno  
ORDER BY branch.bno;
```



# Equijoin/inner join explained

branch

Bno	Street	Area	City	Pcode	TelNo	FaxNo
B2	56 Clover Dr		London	NW10 6EU	0181-963-1030	0181-453-7992
B3	163 Main Street	Partick	Glasgow	G11 9QX	0141 339 2178	0141-033-9049
B4	32 Manse Road	Leigh	Bristol	BS99 1NZ	0117-916-1170	0117-776-1114
B5	22 Deer Street	Sidcup	London	SW1 4EH	0171-886-1212	0171-886-1214
B7	16 Argyll Street	Dyce	Aberdeen	AB2 3SU	01234 67125	01234-671-5611

```
SELECT branch.bno, property_for_rent.bno, property_for_rent.street
FROM branch, property_for_rent
WHERE branch.bno=property_for_rent.bno
ORDER BY branch.bno;
```

property\_for\_rent

Pno	Street	Area	City	Pcode	Type	Rooms	Rent	Ono	Sno	Bno
PA14	16 Holhead	Dee	Aberdeen	AB7 5SU	House	6	£650.00	CO46	SA9	B7
PG16	5 Novar Dr	Hyndland	Glasgow	G12 9AX	Flat	4	£450.00	CO93	SG14	B3
PG21	18 Dale Rd	Hyndland	Glasgow	G12	House	5	£600.00	CO87	SG37	B3
PG36	2 Manor Rd		Glasgow	G32 4QX	Flat	3	£375.00	CO93	SG37	B3
PG4	6 Lawrence St	Partick	Glasgow	G11 9QX	Flat	3	£350.00	CO40	SG14	B3
PL94	6 Argyll St	Kilburn	London	NW2	Flat	4	£400.00	CO87	SL41	B5

result

branch.bno	property_bno	street
B3	B3	6 Lawrence St
B3	B3	2 Manor Rd
B3	B3	18 Dale Rd
B3	B3	5 Novar Dr
B5	B5	6 Argyll St
B7	B7	16 Holhead

branch.bno order

branch

Bno
B2
B3
B4
B5
B7

property\_for\_rent

Bno
B7
B3
B3
B3
B3
B5

Where bno number is a match in the two tables

# Natural join explained

- Same as an equijoin except the duplicate columns are eliminated.
- Works if the columns you are joining have the same name in both tables

```
SELECT branch.bno, property_for_rent.bno
```

```
FROM branch
```

```
NATURAL JOIN property_for_rent;
```

NOTE: Access does not support NATURAL JOIN command. Use equijoin and DISTINCT to eliminate duplicates. Check your system dialect.

result

Branch.bno	property_for_rent.bno
B3	B3
B5	B5
B7	B7

# Right outer join

- Returns all records from the right table (**table1**), and the matched records from the left table (**table2**).

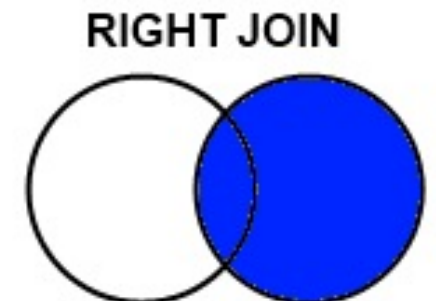
```
SELECT column_name(s)  
FROM table1  
RIGHT JOIN table2  
ON table1.column_name=table2.column_name;
```

Right table  
(table1)

or

```
SELECT column_name(s)  
FROM table1  
RIGHT OUTER JOIN table2  
ON table1.column_name=table2.column_name;
```

Left table  
(table2)



# Right outer join explained

## QUERY ONE:

```
SELECT property_for_rent.pno, property_for_rent.pcode, property_for_rent.type,  
viewing.date  
FROM property_for_rent  
RIGHT JOIN viewing  
ON property_for_rent.pno= viewing.pno;
```

Right table  
(property\_for\_rent)

pno	pcode	type	date
PA14	AB7 5SU	House	24-May-98
PG36	G32 4QX	Flat	28-Apr-98
PG4	G11 9QX	Flat	26-May-98
PA14	AB7 5SU	House	14-May-98
PG4	G11 9QX	Flat	20-Apr-98

## QUERY TWO:

```
SELECT property_for_rent.pno, property_for_rent.pcode, property_for_rent.type,  
viewing.date  
FROM viewing  
RIGHT JOIN property_for_rent  
ON property_for_rent.pno= viewing.pno;
```

Right table (viewing)

pno	pcode	type	date
PL94	NW2	Flat	
PG4	G11 9QX	Flat	20-Apr-98
PG4	G11 9QX	Flat	26-May-98
PG36	G32 4QX	Flat	28-Apr-98
PG21	G12	House	
PG16	G12 9AX	Flat	
PA14	AB7 5SU	House	14-May-98
PA14	AB7 5SU	House	24-May-98

# Right outer join: Query one

- The right outer join compares the right table against the left table
- Comparing property\_for\_rent against viewing table and listing the values that do not match.

```
SELECT property_for_rent.pno, property_for_rent.pcode,  
property_for_rent.type, viewing.date  
FROM property_for_rent  
RIGHT JOIN viewing  
ON property_for_rent.pno= viewing.pno;
```

Right table  
(property for  
rent)

Left table  
(viewing)

result

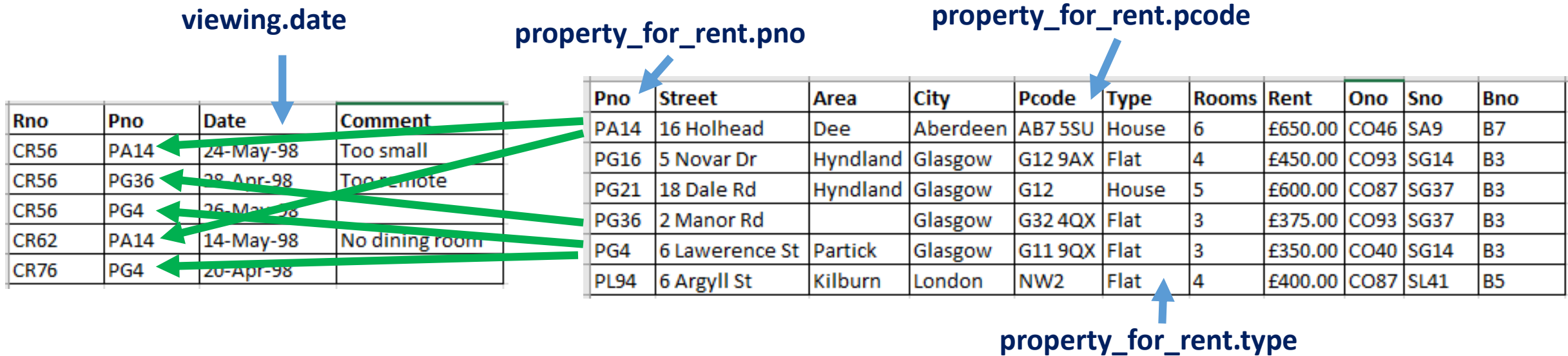
pno	pcode	type	date
PA14	AB7 5SU	House	24-May-98
PG36	G32 4QX	Flat	28-Apr-98
PG4	G11 9QX	Flat	26-May-98
PA14	AB7 5SU	House	14-May-98
PG4	G11 9QX	Flat	20-Apr-98

!It's all about the order of the tables!



# Right outer Join

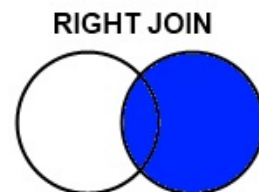
- Returns all records from the right table (property\_for\_rent), and the matched records from the left table (viewing).



```

SELECT property_for_rent.pno,
property_for_rent.pcode, property_for_rent.type,
viewing.date
FROM property_for_rent
RIGHT JOIN viewing
ON property_for_rent.pno= viewing.pno;

```



result

pno	pcode	type	date
PA14	AB7 5SU	House	24-May-98
PG36	G32 4QX	Flat	28-Apr-98
PG4	G11 9QX	Flat	26-May-98
PA14	AB7 5SU	House	14-May-98
PG4	G11 9QX	Flat	20-Apr-98

# Right outer join: Query two

```
SELECT property_for_rent.pno, property_for_rent.pcode,  
property_for_rent.type, viewing.date  
FROM viewing  
RIGHT JOIN property_for_rent  
ON property_for_rent.pno= viewing.pno;
```

Right table  
(viewing)

Left table  
(property for  
rent)

!It's all about the order of the tables!

result

pno	pcode	type	date
PA14	AB7 5SU	House	24-May-98
PA14	AB7 5SU	House	14-May-98
PG16	G12 9AX	Flat	
PG21	G12	House	
PG36	G32 4QX	Flat	28-Apr-98
PG4	G11 9QX	Flat	26-May-98
PG4	G11 9QX	Flat	20-Apr-98
PL94	NW2	Flat	

# Right outer join: Query two

- Returns all records from the right table (viewing), and the matched records from the left table (property\_for\_rent). EVEN IF THERE ARE NO MATCHES IN THE LEFT TABLE THE RESULT WILL BE RETURNED.

property\_for\_rent.pno    property\_for\_rent.pcode

Pno	Street	Area	City	Pcode	Type	Rooms	Rent	Ono	Sno	Bno
PA14	16 Holthead	Dee	Aberdeen	AB7 5SU	House	6	£650.00	CO46	SA9	B7
PG16	5 Newar Dr	Hyndland	Glasgow	G12 9AX	Flat	4	£450.00	CO93	SG14	B3
PG21	18 Dale Rd	Hyndland	Glasgow	G12	House	5	£600.00	CO87	SG37	B3
PG36	Manor Rd		Glasgow	G32 4QX	Flat	3	£375.00	CO93	SG37	B3
PG4	5 Lawrence St	Partick	Glasgow	G11 9QX	Flat	3	£350.00	CO40	SG14	B3
PL94	6 Argyll St	Kilburn	London	NW2	Flat	4	£400.00	CO87	SL41	B3

viewing.date

Rno	Pno	Date	Comment
CR56	PA14	24-May-98	Too small
CR56	PG36	28-Apr-98	Too remote
CR56	PG4	26-May-98	
CR62	PA14	14-May-98	No dining room
CR76	PG4	20-Apr-98	

property\_for\_rent.type

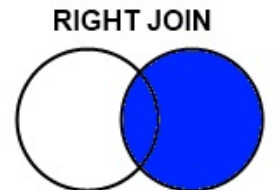
result

pno	pcode	type	date
PA14	AB7 5SU	House	24-May-98
PA14	AB7 5SU	House	14-May-98
PG16	G12 9AX	Flat	No match
PG21	G12	House	No match
PG36	G32 4QX	Flat	28-Apr-98
PG4	G11 9QX	Flat	26-May-98
PG4	G11 9QX	Flat	20-Apr-98
PL94	NW2	Flat	No match

```

SELECT property_for_rent.pno,
property_for_rent.pcode,
property_for_rent.type, viewing.date
FROM viewing
RIGHT JOIN property_for_rent
ON property_for_rent.pno= viewing.pno;

```



# Left outer join

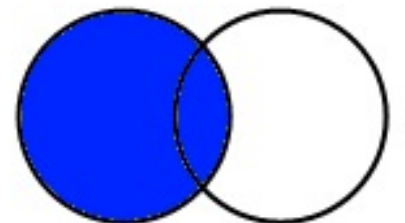
- All rows in the left table (viewing) which match the rows in the right table (property\_for\_rent).
- Useful if left table and right table have one-to-many relationship.

```
SELECT property_for_rent.pno,  
property_for_rent.pcode, property_for_rent.type,  
viewing.date  
FROM viewing  
LEFT JOIN property_for_rent  
ON property_for_rent.pno= viewing.pno;
```

Left table  
(viewing)

Right table  
(property for rent)

LEFT JOIN



# Left outer join

Rno	Pno	Date	Comment
CR56	PA14	24-May-98	Too small
CR56	PG36	28-Apr-98	Too remote
CR56	PG4	26-May-98	
CR62	PA14	14-May-98	No dining room
CR76	PG4	20-Apr-98	

Pno	Street	Area	City	Pcode	Type	Rooms	Rent	Ono	Sno	Bno
PA14	16 Holhead	Dee	Aberdeen	AB7 5SU	House	6	£650.00	CO46	SA9	B7
PG16	5 Novar Dr	Hyndland	Glasgow	G12 9AX	Flat	4	£450.00	CO93	SG14	B3
PG21	18 Dale Rd	Hyndland	Glasgow	G12	House	5	£600.00	CO87	SG37	B3
PG36	2 Manor Rd		Glasgow	G32 4QX	Flat	3	£375.00	CO93	SG37	B3
PG4	6 Lawrence St	Partick	Glasgow	G11 9QX	Flat	3	£350.00	CO40	SG14	B3
PL94	6 Argyll St	Kilburn	London	NW2	Flat	4	£400.00	CO87	SL41	B5

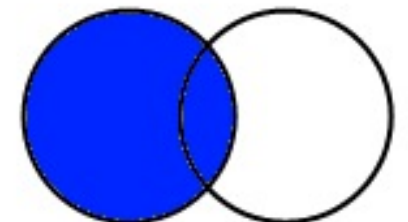
- All rows in the left table (viewing) which match the rows in the right table (property\_for\_rent).

```
SELECT property_for_rent.pno, property_for_rent.pcode,  
property_for_rent.type, viewing.date  
FROM viewing  
LEFT JOIN property_for_rent  
ON property_for_rent.pno= viewing.pno;
```

result

pno	pcode	type	date
PA14	AB7 5SU	House	24-May-98
PG36	G32 4QX	Flat	28-Apr-98
PG4	G11 9QX	Flat	26-May-98
PA14	AB7 5SU	House	14-May-98
PG4	G11 9QX	Flat	20-Apr-98

LEFT JOIN



# References

- Carter, J. (2002) Database Design and Programming. 2nd ed. Berkshire: McGraw Hill.
- McFadden, F.R., Hoffer, J.A. and Prescott, M.B. (1999) *Modern Database Management*. 5th ed. Harlow: Addison-Wesley.