

Databases - 3

Null, Cartesian Product and Join

Null

Null is a value that we use when

Something will never have a value

Something will have a value in the future

Something had a value but doesn't at the moment

Null

Null is a reserved word in SQL and has special meaning

It is NOT the same as zero...

...consider the **COMM** attribute in the emp relation

| EMPNO | ENAME | JOB | MGR | HIREDATE | SAL | COMM | DEPTNO |
|-------|-------|---------|-----|------------|-------|------|--------|
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 |

Null

Access uses a blank cell to indicate a NULL

| EMPNO | ENAME | JOB | MGR | HIREDATE | SAL | COMM | DEPTNO |
|-------|---------|-----------|-----|------------|-------|------|--------|
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 |
| 818 | POLLARD | MANAGER | 875 | 14/05/2000 | 34500 | | 1 |
| 824 | REES | ANALYST | 602 | 05/03/2000 | 40000 | | 2 |
| 875 | PARKER | PRESIDENT | | 09/07/2002 | 60000 | | 1 |
| 880 | TURNER | SALES | 734 | 04/06/2001 | 25000 | 0 | |
| 912 | HAYES | ADMIN | 824 | 04/06/2001 | 21000 | | 2 |
| 936 | CASSY | ADMIN | 734 | 23/07/2002 | 19500 | | 3 |
| 938 | GIBSON | ANALYST | 602 | 05/12/1997 | 40000 | | 2 |
| 970 | BLACK | ADMIN | 818 | 21/11/1997 | 23000 | | 1 |

Note how **Turner** is allowed to earn commission, but hasn't yet

Null

Problems arise when we try to perform mathematical operations on NULL in SQL

Find the total earnings (salary + commission) for staff

```
select ename, sal, comm, sal+comm
from emp
```

table name goes here

projection expressions go here

Null

Find the total earnings (salary + commission) for staff

```
select ename, sal, comm, sal+comm
from emp
```

| ename | sal | comm | sal+comm |
|---------|-------|------|----------|
| BYRNE | 26000 | 300 | 26300 |
| BELL | 22500 | 500 | 23000 |
| BIRD | 39750 | NULL | NULL |
| AHMAD | 22500 | 1400 | 23900 |
| COX | 38500 | NULL | NULL |
| POLLARD | 34500 | NULL | NULL |
| REES | 40000 | NULL | NULL |
| PARKER | 60000 | NULL | NULL |
| TURNER | 25000 | 0 | 25000 |
| HAYES | 21000 | NULL | NULL |
| CASSY | 19500 | NULL | NULL |
| GIBSON | 40000 | NULL | NULL |
| BLACK | 23000 | NULL | NULL |
| MARCH | 18000 | NULL | NULL |

Problem:

any value + null returns null

18000 + null returns null

Null

Solution: `isnull(attribute)` function

Returns either `true` or `false` if the corresponding attribute is `null`

`true` often represented as `1`
`false` often represented as `0`

isnull

```
SELECT comm, isnull(comm)
FROM emp
```

| comm | isnull(comm) |
|------|--------------|
| 300 | 0 |
| 500 | 0 |
| NULL | 1 |
| 1400 | 0 |
| NULL | 1 |
| NULL | 1 |
| NULL | 1 |
| NULL | 1 |
| 0 | 0 |
| NULL | 1 |
| NULL | 1 |
| NULL | 1 |
| NULL | 1 |
| NULL | 1 |

Need to combine it with the `if` function

if

`if(condition, true_result, false_result)`

Returns either `true_result` or `false_result` depending on the condition

Null

Find the total earnings (salary + commission) for staff

```
select ename, sal, comm, sal+ if(isnull(comm), 0,comm)
from emp
```

| ename | sal | comm | sal+ if(isnull(comm), 0,comm) |
|---------|-------|------|-------------------------------|
| BYRNE | 26000 | 300 | 26300 |
| BELL | 22500 | 500 | 23000 |
| BIRD | 39750 | NULL | 39750 |
| AHMAD | 22500 | 1400 | 23900 |
| COX | 38500 | NULL | 38500 |
| POLLARD | 34500 | NULL | 34500 |
| REES | 40000 | NULL | 40000 |
| PARKER | 60000 | NULL | 60000 |
| TURNER | 25000 | 0 | 25000 |
| HAYES | 21000 | NULL | 21000 |
| CASSY | 19500 | NULL | 19500 |
| GIBSON | 40000 | NULL | 40000 |
| BLACK | 23000 | NULL | 23000 |
| MARCH | 18000 | NULL | 18000 |

Relational Algebra operations

| | |
|-------------------|-----------|
| Selection | σ |
| Projection | π |
| Cartesian Product | \times |
| Union | \cup |
| Set Difference | $-$ |
| Join | \bowtie |
| Intersection | \cap |
| Division | \div |

Choose particular columns

PROJECTION

Gives us particular columns of interest

SELECTION

Gives us particular rows of interest

problem ...

What if the information required in a query is in more than one relation/table?

List all staff along with the location where they work

Requires information in two relations tables to be combined

emp table

| EMPNO | ENAME | JOB | MGR | HIREDATE | SAL | COMM | DEPTNO |
|-------|---------|-----------|-----|------------|-------|------|--------|
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 |
| 818 | POLLARD | MANAGER | 875 | 14/05/2000 | 34500 | | 1 |
| 824 | REES | ANALYST | 602 | 05/03/2000 | 40000 | | 2 |
| 875 | PARKER | PRESIDENT | | 09/07/2002 | 60000 | | 1 |
| 880 | TURNER | SALES | 734 | 04/06/2001 | 25000 | 0 | 3 |
| 912 | HAYES | ADMIN | 824 | 04/06/2001 | 21000 | | 2 |
| 936 | CASSY | ADMIN | 734 | 23/07/2002 | 19500 | | 3 |
| 938 | GIBSON | ANALYST | 602 | 05/03/1997 | 40000 | | 2 |
| 970 | BLACK | ADMIN | 818 | | | | 1 |

dept table

| DEPTNO | DNAME | LOC |
|--------|------------|------------|
| 1 | ACCOUNTING | LONDON |
| 2 | RESEARCH | YORK |
| 3 | SALES | BIRMINGHAM |
| 4 | OPERATIONS | LEEDS |

Relational Algebra operations

| | |
|-------------------|-----------|
| Selection | σ |
| Projection | π |
| Cartesian Product | \times |
| Union | \cup |
| Set Difference | $-$ |
| Join | \bowtie |
| Intersection | \cap |
| Division | \div |

Combine relations

CARTESIAN PRODUCT

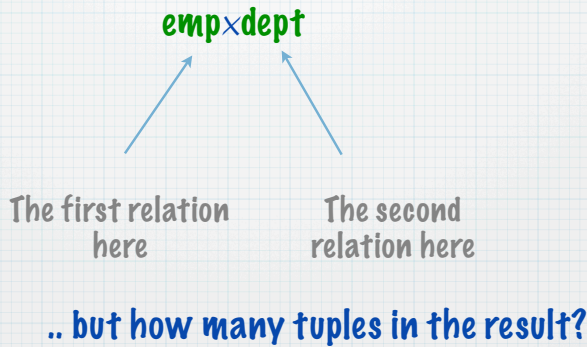
$R \times S$

The Cartesian product operation defines a relation that is the concatenation of every tuple of relation R with every tuple of relation S

Everything in the 'first' table is combined with everything in the 'second' table

CARTESIAN PRODUCT example

Combine the emp relation with the $dept$ relation



CARTESIAN PRODUCT example

$emp \times dept$ not really what we were looking for ...

| EMPNO | ENAME | JOB | MGR | HIREDATE | SAL | COMM | emp.DEPTN | deptL.DEPTN | DNAME | LOC |
|-------|---------|---------|-----|------------|-------|------|-----------|-------------|------------|------------|
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 | 1 | ACCOUNTING | LONDON |
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 | 2 | RESEARCH | YORK |
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 | 3 | SALES | BIRMINGHAM |
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 | 4 | OPERATIONS | LEEDS |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 | 1 | ACCOUNTING | LONDON |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 | 2 | RESEARCH | YORK |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 | 3 | SALES | BIRMINGHAM |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 | 4 | OPERATIONS | LEEDS |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 | 1 | ACCOUNTING | LONDON |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 | 2 | RESEARCH | YORK |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 | 3 | SALES | BIRMINGHAM |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 | 4 | OPERATIONS | LEEDS |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 | 1 | ACCOUNTING | LONDON |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 | 2 | RESEARCH | YORK |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 | 3 | SALES | BIRMINGHAM |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 | 4 | OPERATIONS | LEEDS |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 | 1 | ACCOUNTING | LONDON |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 | 2 | RESEARCH | YORK |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 | 3 | SALES | BIRMINGHAM |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 | 4 | OPERATIONS | LEEDS |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 | 1 | ACCOUNTING | LONDON |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 | 2 | RESEARCH | YORK |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 | 3 | SALES | BIRMINGHAM |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 | 4 | OPERATIONS | LEEDS |
| 818 | POLLARD | MANAGER | | | | | | | | |
| 818 | POLLARD | MANAGER | | | | | | | | |

.. with many more rows not shown here...

Why?

Its in the definition of cartesian product

CARTESIAN PRODUCT

R x S

The Cartesian product operation defines a relation that is the concatenation of every tuple of relation R with every tuple of relation S

Everything in the 'first' table is combined with everything in the 'second' table

emp table 14 rows

| EMPNO | ENAME | JOB | MGR | HIREDATE | SAL | COMM | DEPTNO |
|-------|---------|-----------|-----|------------|-------|------|--------|
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 |
| 818 | POLLARD | MANAGER | 875 | 14/05/2000 | 34500 | | 1 |
| 824 | REES | ANALYST | 602 | 05/03/2000 | 40000 | | 2 |
| 875 | PARKER | PRESIDENT | | 09/07/2002 | 60000 | | 1 |
| 880 | TURNER | SALES | 734 | 04/06/2001 | 25000 | 0 | 3 |
| 912 | HAYES | ADMIN | 824 | 04/06/2001 | 21000 | | 2 |
| 936 | CASSY | ADMIN | 734 | 23/07/2002 | 19500 | | 3 |
| 938 | GIBSON | ANALYST | 602 | 05/03/2000 | 40000 | | 2 |
| 970 | BLACK | ADMIN | 818 | | | | 1 |

dept table 4 rows

| DEPTNO | DNAME | LOC |
|--------|------------|------------|
| 1 | ACCOUNTING | LONDON |
| 2 | RESEARCH | YORK |
| 3 | SALES | BIRMINGHAM |
| 4 | OPERATIONS | LEEDS |

14 * 4 = 56 rows in the result

emp x dept

Many incorrectly matched rows

| EMPNO | ENAME | JOB | MGR | HIREDATE | SAL | COMM | emp.DEPTNO | dept.DEPTNO | DNAME | LOC |
|-------|---------|---------|-----|------------|-------|------|------------|-------------|------------|------------|
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 | 1 | ACCOUNTING | LONDON |
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 | 2 | RESEARCH | YORK |
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 | 3 | SALES | BIRMINGHAM |
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 | 4 | OPERATIONS | LEEDS |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 | 1 | ACCOUNTING | LONDON |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 | 2 | RESEARCH | YORK |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 | 3 | SALES | BIRMINGHAM |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 | 4 | OPERATIONS | LEEDS |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 | 1 | ACCOUNTING | LONDON |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 | 2 | RESEARCH | YORK |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 | 3 | SALES | BIRMINGHAM |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 | 4 | OPERATIONS | LEEDS |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 | 1 | ACCOUNTING | LONDON |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 | 2 | RESEARCH | YORK |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 | 3 | SALES | BIRMINGHAM |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 | 4 | OPERATIONS | LEEDS |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 | 1 | ACCOUNTING | LONDON |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 | 2 | RESEARCH | YORK |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 | 3 | SALES | BIRMINGHAM |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 | 4 | OPERATIONS | LEEDS |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 | 1 | ACCOUNTING | LONDON |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 | 2 | RESEARCH | YORK |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 | 3 | SALES | BIRMINGHAM |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 | 4 | OPERATIONS | LEEDS |
| 818 | POLLARD | MANAGER | 875 | 14/05/2000 | 34500 | | 1 | 1 | ACCOUNTING | LONDON |
| 818 | POLLARD | MANAGER | 875 | 14/05/2000 | 34500 | | 1 | 2 | RESEARCH | YORK |

Joining tables

We have to indicate how the tables should be correctly connected

There may be many choices

...consider the deptno attributes in the result set

| emp.DEPTNO | dept.DEPTNO | |
|------------|-------------|----|
| 2 | 1 | AC |
| 2 | 2 | RE |
| 2 | 3 | SA |
| 2 | 4 | OF |
| 300 | 1 | AC |
| 300 | 2 | RE |
| 300 | 3 | SA |
| 300 | 4 | OF |
| 500 | 1 | AC |
| 500 | 2 | RE |
| 500 | 3 | SA |
| 500 | 4 | OF |
| 2 | 1 | AC |
| 2 | 2 | RE |
| 2 | 3 | SA |

We only want to include results where the deptno is the same in both relations/tables

$emp.deptno = dept.deptno$

This can be done with a selection

| emp.DEPTNO | dept.DEPTNO | |
|------------|-------------|------|
| 2 | 1 | AC |
| 2 | 2 | RE |
| 2 | 3 | SA |
| 2 | 4 | OF |
| 300 | 3 | 1 AC |
| 300 | 3 | 2 RE |
| 300 | 3 | 3 SA |
| 300 | 3 | 4 OF |
| 500 | 3 | 1 AC |
| 500 | 3 | 2 RE |
| 500 | 3 | 3 SA |
| 500 | 3 | 4 OF |
| 2 | 1 | AC |
| 2 | 2 | RE |
| 2 | 3 | SA |

Combine the tables using a cartesian product

$emp \times dept$

Add an appropriate condition

$\sigma_{predicate}(emp \times dept)$

$\sigma_{emp.deptno=dept.deptno}(emp \times dept)$

| EMPNO | ENAME | JOB | MGR | HIREDATE | SAL | COMM | emp.DEPTNO | dept.DEPTNO | DNAME | LOC |
|-------|---------|-----------|-----|------------|-------|------|------------|-------------|------------|------------|
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 | 2 | RESEARCH | YORK |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 | 3 | SALES | BIRMINGHAM |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 | 3 | SALES | BIRMINGHAM |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 | 2 | RESEARCH | YORK |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 | 3 | SALES | BIRMINGHAM |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 | 3 | SALES | BIRMINGHAM |
| 818 | POLLARD | MANAGER | 875 | 14/05/2000 | 34500 | | 1 | 1 | ACCOUNTING | LONDON |
| 824 | REES | ANALYST | 602 | 05/03/2000 | 40000 | | 2 | 2 | RESEARCH | YORK |
| 875 | PARKER | PRESIDENT | | 09/07/2002 | 60000 | | 1 | 1 | ACCOUNTING | LONDON |
| 880 | TURNER | SALES | 734 | 04/06/2001 | 25000 | 0 | 3 | 3 | SALES | BIRMINGHAM |
| 912 | HAYES | ADMIN | 824 | 04/06/2001 | 21000 | | 2 | 2 | RESEARCH | YORK |
| 936 | CASSY | ADMIN | 734 | 23/07/2002 | 19500 | | 3 | 3 | SALES | BIRMINGHAM |
| 938 | GIBSON | ANALYST | 602 | 05/12/1997 | 40000 | | 2 | 2 | RESEARCH | YORK |
| 970 | BLACK | ADMIN | 818 | 21/11/1997 | 23000 | | 1 | 1 | ACCOUNTING | LONDON |

$\sigma_{emp.deptno=dept.deptno} (emp \times dept)$

Note how we refer to the two deptno attributes using **tablename.columnname**

This operation is performed so frequently that it has its own name - an **Inner Join**

So: how do we do cartesian product in SQL?

SQL always looks like this:

select * or expression
from relations ← add tables here
where expression separated by
commas

Cartesian Product/Inner Join example

List staff along with where they work

select *
from emp, dept
where emp.deptno=dept.deptno

the particular columns we require go here

table names go here

the predicate goes here

We add a condition to turn the CP into a Join

List staff along with where they work

```
select *  
from emp, dept  
where emp.deptno=dept.deptno
```

| EMPNO | ENAME | JOB | MGR | HIREDATE | SAL | COMM | emp.DEPTNO | dept.DEPTNO | DNAME | LOC |
|-------|---------|-----------|-----|------------|-------|------|------------|-------------|------------|------------|
| 405 | MARCH | ADMIN | 938 | 13/06/1997 | 18000 | | 2 | 2 | RESEARCH | YORK |
| 535 | BYRNE | SALES | 734 | 15/08/1997 | 26000 | 300 | 3 | 3 | SALES | BIRMINGHAM |
| 557 | BELL | SALES | 734 | 26/03/2000 | 22500 | 500 | 3 | 3 | SALES | BIRMINGHAM |
| 602 | BIRD | MANAGER | 875 | 31/10/1997 | 39750 | | 2 | 2 | RESEARCH | YORK |
| 690 | AHMAD | SALES | 734 | 05/12/1997 | 22500 | 1400 | 3 | 3 | SALES | BIRMINGHAM |
| 734 | COX | MANAGER | 875 | 11/06/2002 | 38500 | | 3 | 3 | SALES | BIRMINGHAM |
| 818 | POLLARD | MANAGER | 875 | 14/05/2000 | 34500 | | 1 | 1 | ACCOUNTING | LONDON |
| 824 | REES | ANALYST | 602 | 05/03/2000 | 40000 | | 2 | 2 | RESEARCH | YORK |
| 875 | PARKER | PRESIDENT | | 09/07/2002 | 60000 | | 1 | 1 | ACCOUNTING | LONDON |
| 880 | TURNER | SALES | 734 | 04/06/2001 | 25000 | 0 | 3 | 3 | SALES | BIRMINGHAM |
| 912 | HAYES | ADMIN | 824 | 04/06/2001 | 21000 | | 2 | 2 | RESEARCH | YORK |
| 936 | CASSY | ADMIN | 734 | 23/07/2002 | 19500 | | 3 | 3 | SALES | BIRMINGHAM |
| 938 | GIBSON | ANALYST | 602 | 05/12/1997 | 40000 | | 2 | 2 | RESEARCH | YORK |
| 970 | BLACK | ADMIN | 818 | 21/11/1997 | 23000 | | 1 | 1 | ACCOUNTING | LONDON |

Extra projections or selections can be added as necessary

```
select *  
from emp, dept  
where emp.deptno=dept.deptno
```

the particular
columns we
require go here

extra conditions
go here with an
AND or OR

Example 2: Cartesian Product/Inner Join

List staffname, dname and location for staff who
earn more than £30000

```
select ename, dname, loc  
from emp, dept  
where emp.deptno=dept.deptno  
and sal>30000
```