



Restricting and Sorting Data

Objectives

After completing this lesson, you should be able to do the following:

- **Limit the rows retrieved by a query**
- **Sort the rows retrieved by a query**

Limiting Rows Using a Selection

EMPLOYEES

EMPLOYEE_ID	LAST_NAME	JOB_ID	DEPARTMENT_ID
100	King	AD_PRES	90
101	Kochhar	AD_VP	90
102	De Haan	AD_VP	90
103	Hunold	IT_PROG	60
104	Ernst	IT_PROG	60
107	Lorentz	IT_PROG	60
124	Mourgos	ST_MAN	50

...

20 rows selected.

**“retrieve all
employees
in department 90”**



EMPLOYEE_ID	LAST_NAME	JOB_ID	DEPARTMENT_ID
100	King	AD_PRES	90
101	Kochhar	AD_VP	90
102	De Haan	AD_VP	90

Limiting the Rows Selected

- Restrict the rows returned by using the **WHERE** clause.

```
SELECT    * | { [DISTINCT] column | expression [alias] , ... }  
FROM      table  
[WHERE    condition(s) ] ;
```

- The **WHERE** clause follows the **FROM** clause.

Using the WHERE Clause

```
SELECT employee_id, last_name, job_id, department_id
FROM   employees
WHERE  department_id = 90 ;
```

EMPLOYEE_ID	LAST_NAME	JOB_ID	DEPARTMENT_ID
100	King	AD_PRES	90
101	Kochhar	AD_VP	90
102	De Haan	AD_VP	90

Character Strings and Dates

- Character strings and date values are enclosed in single quotation marks.
- Character values are case sensitive, and date values are format sensitive.
- The default date format is YYYY-MM-DD.

```
SELECT last_name, job_id, department_id
FROM   employees
WHERE  last_name = 'Whalen';
```

Comparison Conditions

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

Using Comparison Conditions

```
SELECT last_name, salary
FROM   employees
WHERE  salary <= 3000;
```

LAST_NAME	SALARY
Matos	2600
Vargas	2500

Other Comparison Conditions

Operator	Meaning
BETWEEN ...AND...	Between two values (inclusive),
IN (set)	Match any of a list of values
LIKE	Match a character pattern
IS NULL	Is a null value

Using the BETWEEN Condition

Use the BETWEEN condition to display rows based on a range of values.

```
SELECT last_name, salary
FROM employees
WHERE salary BETWEEN 2500 AND 3500;
```

Lower limit

Upper limit

LAST_NAME	SALARY
Rajs	3500
Davies	3100
Matos	2600
Vargas	2500

Using the IN Condition

Use the IN membership condition to test for values in a list.

```
SELECT employee_id, last_name, salary, manager_id
FROM   employees
WHERE  manager_id IN (100, 101, 201);
```

EMPLOYEE_ID	LAST_NAME	SALARY	MANAGER_ID
202	Fay	6000	201
200	Whalen	4400	101
205	Higgins	12000	101
101	Kochhar	17000	100
102	De Haan	17000	100
124	Mourgos	5800	100
149	Zlotkey	10500	100
201	Hartstein	13000	100

8 rows selected.

Using the LIKE Condition

- Use the `LIKE` condition to perform wildcard searches of valid search string values.
- Search conditions can contain either literal characters or numbers:
 - `%` denotes zero or many characters.
 - `_` denotes one character.

```
SELECT    first_name
FROM      employees
WHERE     first_name LIKE 'S%';
```

Using the LIKE Condition

- You can combine pattern-matching characters.

```
SELECT last_name  
FROM employees  
WHERE last_name LIKE '_o%';
```

LAST_NAME
Kochhar
Lorentz
Mourgos

- You can use the ESCAPE identifier to search for the actual % and _ symbols.

Using the NULL Conditions

Test for nulls with the IS NULL operator.

```
SELECT last_name, manager_id
FROM   employees
WHERE  manager_id IS NULL;
```

LAST_NAME	MANAGER_ID
King	

Logical Conditions

Operator	Meaning
AND	Returns TRUE if <i>both</i> component conditions are true
OR	Returns TRUE if <i>either</i> component condition is true
NOT	Returns TRUE if the following condition is false

Using the AND Operator

AND requires both conditions to be true.

```
SELECT employee_id, last_name, job_id, salary
FROM   employees
WHERE  salary >=10000
AND    job_id LIKE '%MAN%';
```

EMPLOYEE_ID	LAST_NAME	JOB_ID	SALARY
149	Zlotkey	SA_MAN	10500
201	Hartstein	MK_MAN	13000

Using the OR Operator

OR requires either condition to be true.

```
SELECT employee_id, last_name, job_id, salary
FROM   employees
WHERE  salary >= 10000
OR     job_id LIKE '%MAN%';
```

EMPLOYEE_ID	LAST_NAME	JOB_ID	SALARY
100	King	AD_PRES	24000
101	Kochhar	AD_VP	17000
102	De Haan	AD_VP	17000
124	Mourgos	ST_MAN	5800
149	Zlotkey	SA_MAN	10500
174	Abel	SA_REP	11000
201	Hartstein	MK_MAN	13000
205	Higgins	AC_MGR	12000

8 rows selected.

Using the NOT Operator

```
SELECT last_name, job_id
FROM   employees
WHERE  job_id
       NOT IN ('IT_PROG', 'ST_CLERK', 'SA_REP');
```

LAST_NAME	JOB_ID
King	AD_PRES
Kochhar	AD_VP
De Haan	AD_VP
Mourgos	ST_MAN
Zlotkey	SA_MAN
Whalen	AD_ASST
Hartstein	MK_MAN
Fay	MK_REP
Higgins	AC_MGR
Gietz	AC_ACCOUNT

10 rows selected.

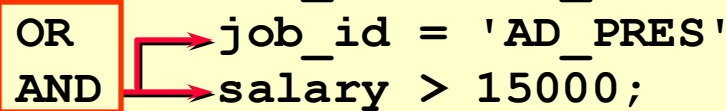
Rules of Precedence

Order Evaluated	Operator
1	Arithmetic operators
2	Concatenation operator
3	Comparison conditions
4	IS [NOT] NULL, LIKE, [NOT] IN
5	[NOT] BETWEEN
6	NOT logical condition
7	AND logical condition
8	OR logical condition

Override rules of precedence by using parentheses.

Rules of Precedence

```
SELECT last_name, job_id, salary
FROM   employees
WHERE  job_id = 'SA_REP'
OR     job_id = 'AD_PRES'
AND    salary > 15000;
```

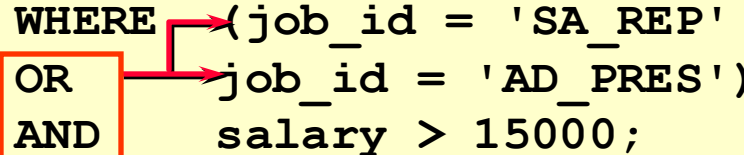


LAST_NAME	JOB_ID	SALARY
King	AD_PRES	24000
Abel	SA_REP	11000
Taylor	SA_REP	8600
Grant	SA_REP	7000

Rules of Precedence

Use parentheses to force priority.

```
SELECT last_name, job_id, salary
FROM employees
WHERE (job_id = 'SA_REP'
OR job_id = 'AD_PRES')
AND salary > 15000;
```



LAST_NAME	JOB_ID	SALARY
King	AD_PRES	24000

ORDER BY Clause

- Sort rows with the ORDER BY clause
 - ASC: ascending order, default
 - DESC: descending order
- The ORDER BY clause comes last in the SELECT statement.

```
SELECT last_name, job_id, department_id, hire_date
FROM employees
ORDER BY hire_date ;
```

LAST_NAME	JOB_ID	DEPARTMENT_ID	HIRE_DATE
King	AD_PRES	90	17-JUN-87
Whalen	AD_ASST	10	17-SEP-87
Kochhar	AD_VP	90	21-SEP-89
Hunold	IT_PROG	60	03-JAN-90
Ernst	IT_PROG	60	21-MAY-91

...

20 rows selected.

Sorting in Descending Order

```
SELECT    last_name, job_id, department_id, hire_date
FROM      employees
ORDER BY  hire_date DESC ;
```

LAST_NAME	JOB_ID	DEPARTMENT_ID	HIRE_DATE
Zlotkey	SA_MAN	80	29-JAN-00
Mourgos	ST_MAN	50	16-NOV-99
Grant	SA_REP		24-MAY-99
Lorentz	IT_PROG	60	07-FEB-99
Vargas	ST_CLERK	50	09-JUL-98
Taylor	SA_REP	80	24-MAR-98
Matos	ST_CLERK	50	15-MAR-98
Fay	MK_REP	20	17-AUG-97
Davies	ST_CLERK	50	29-JAN-97

...

20 rows selected.

Sorting by Column Alias

```
SELECT employee_id, last_name, salary*12 annsal  
FROM employees  
ORDER BY annsal;
```

EMPLOYEE_ID	LAST_NAME	ANNSAL
144	Vargas	30000
143	Matos	31200
142	Davies	37200
141	Rajs	42000
107	Lorentz	50400
200	Whalen	52800
124	Mourgos	69600
104	Ernst	72000
202	Fay	72000
178	Grant	84000

...

20 rows selected.

Sorting by Multiple Columns

- The order of ORDER BY list is the order of sort.

```
SELECT last_name, department_id, salary
FROM employees
ORDER BY department_id, salary DESC;
```

LAST_NAME	DEPARTMENT_ID	SALARY
Whalen	10	4400
Hartstein	20	13000
Fay	20	6000
Mourgos	50	5800
Rajs	50	3500
Davies	50	3100
Matos	50	2600
Vargas	50	2500

...

20 rows selected.

- You can sort by a column that is not in the SELECT list.

Summary

In this lesson, you should have learned how to:

- Use the **WHERE** clause to restrict rows of output
 - Use the comparison conditions
 - Use the **BETWEEN**, **IN**, **LIKE**, and **NULL** conditions
 - Apply the logical **AND**, **OR**, and **NOT** operators
- Use the **ORDER BY** clause to sort rows of output

```
SELECT      * | { [DISTINCT] column | expression [alias], ... }  
FROM        table  
[WHERE      condition(s)]  
[ORDER BY   {column, expr, alias} [ASC|DESC]];
```

Practice 2 Overview

This practice covers the following topics:

- **Selecting data and changing the order of rows displayed**
- **Restricting rows by using the `WHERE` clause**
- **Sorting rows by using the `ORDER BY` clause**

