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Database Programming with SQL

6-3

Inner versus Outer Joins

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Objectives

- This lesson covers the following objectives:
  - Compare and contrast an inner and an outer join
  - Construct and execute a query to use a left outer join
  - Construct and execute a query to use a right outer join
  - Construct and execute a query to use a full outer join

Purpose

- Up to now, all of the joins returned data that matched the join condition
- Sometimes, however, we want to retrieve both the data that meets the join condition, and the data that does not meet the join condition
- The outer joins in ANSI-99 SQL allow this functionality

INNER And OUTER Joins

- In ANSI-99 SQL, a join of two or more tables that returns only the matched rows is called an inner join
- When a join returns the unmatched rows as well as the matched rows, it is called an outer join
- Outer join syntax uses the terms "left, full, and right"
- These names are associated with the order of the table names in the FROM clause of the SELECT statement

NATURAL JOIN, JOIN ON and JOIN USING are types of inner joins.

LEFT and RIGHT OUTER Joins

- In the example shown of a left outer join, note that the table name listed to the left of the words "left outer join" is referred to as the "left table."

```
SELECT e.last_name, d.department_id,
d.department_name
FROM employees e LEFT OUTER JOIN
departments d
ON (e.department_id =
d.department_id);
```

LAST_NAME	DEPT_ID	DEPT_NAME
Whalen	10	Administration
Fay	20	Marketing
…		
Zlotkey	80	Sales
De Haan	90	Executive
Kochhar	90	Executive
King	90	Executive
Gietz	110	Accounting
Higgins	110	Accounting
Grant	-	-

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Column names in sample output have been abbreviated in order to fit on the slide.

LEFT and RIGHT OUTER Joins

- This query will return all employee last names, both those that are assigned to a department and those that are not

```
SELECT e.last_name, d.department_id,
d.department_name
FROM employees e LEFT OUTER JOIN
departments d
ON (e.department_id =
d.department_id);
```

LAST_NAME	DEPT_ID	DEPT_NAME
Whalen	10	Administration
Fay	20	Marketing
…		
Zlotkey	80	Sales
De Haan	90	Executive
Kochhar	90	Executive
King	90	Executive
Gietz	110	Accounting
Higgins	110	Accounting
Grant	-	-

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Column names in sample output have been abbreviated in order to fit on the slide.

LEFT and RIGHT OUTER Joins

- This right outer join would return all department IDs and department names, both those that have employees assigned to them and those that do not

```
SELECT e.last_name, d.department_id,
d.department_name
FROM employees e RIGHT OUTER JOIN
departments d
ON (e.department_id =
d.department_id);
```

LAST_NAME	DEPT_ID	DEPT_NAME
Whalen	10	Administration
Hartstein	20	Marketing
…		
King	90	Executive
Kochhar	90	Executive
De Haan	90	Executive
Higgins	110	Accounting
Gietz	110	Accounting
-	190	Contracting

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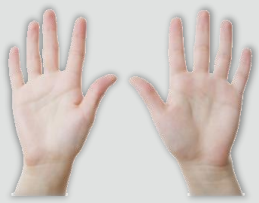
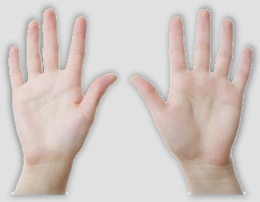
Column names in sample output have been abbreviated in order to fit on the slide.

FULL OUTER Join

- It is possible to create a join condition to retrieve all matching rows and all unmatched rows from both tables
- Using a full outer join solves this problem
- The result set of a full outer join includes all rows from a left outer join and all rows from a right outer join combined together without duplication



FULL OUTER Join Example



- The example shown is a full outer join

```
SELECT e.last_name, d.department_id, d.department_name
FROM employees e FULL OUTER JOIN departments d
ON (e.department_id = d.department_id);
```

LAST_NAME	DEPT_ID	DEPT_NAME
King	90	Executive
Kochhar	90	Executive
…		
Taylor	80	Sales
Grant	-	-
Mourgos	50	Shipping
…		
Fay	20	Marketing
-	190	Contracting

Column names in sample output have been abbreviated in order to fit on the slide.

Join Scenario

- Construct a join to display a list of employees, their current job_id and any previous jobs they may have held
- The job_history table contains details of an employee's previous jobs

```
SELECT last_name, e.job_id AS "Job", jh.job_id AS "Old job",
end_date
FROM employees e LEFT OUTER JOIN job_history jh
  ON(e.employee_id = jh.employee_id);
```

LAST_NAME	Job	Old job	END_DATE
King	AD_PRES	-	-
Kochhar	AD_VP	AC_MGR	15-Mar-1997
Kochhar	AD_VP	AC_ACCOUNT	27-Oct-1993
De Haan	AD_VP	IT_PROG	24-Jul-1998
Whalen	AD_ASST	AD_ASST	17-Jun-1993
Whalen	AD_ASST	AC_ACCOUNT	31-Dec-1998
Higgins	AC_MGR	-	-

Terminology

- Key terms used in this lesson included:
  - FULL OUTER JOIN
  - Inner join
  - LEFT OUTER JOIN
  - Outer join
  - RIGHT OUTER JOIN

Summary

- In this lesson, you should have learned how to:
  - Compare and contrast an inner and an outer join
  - Construct and execute a query to use a left outer join
  - Construct and execute a query to use a right outer join
  - Construct and execute a query to use a full outer join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