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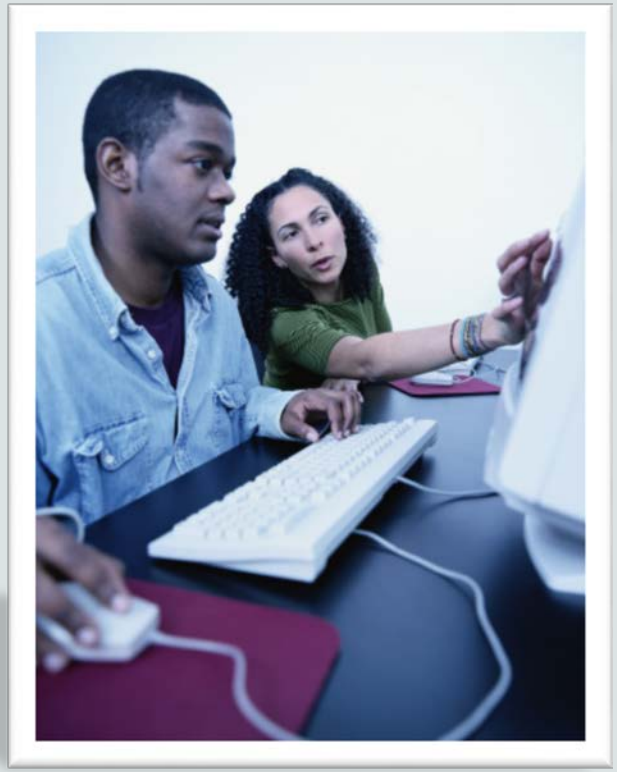
ACADEMY

Database Programming with SQL

6-1
Cross Joins and Natural Joins



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Objectives

This lesson covers the following objectives:

- Construct and execute a natural join using ANSI-99 SQL join syntax
- Create a cross join using ANSI-99 SQL join syntax
- Explain the importance of having a standard for SQL as defined by ANSI
- Describe a business need for combining information from multiple data sources

Purpose

- Up to now, your experience using SQL has been limited to querying and returning information from one database table at a time.
- This would not be a problem if all data in the database were stored in only one table.

Obtaining Data from Multiple Tables

EMPLOYEE_ID	DEPT_ID	DEPT_NAME
200	10	Administration
201	20	Marketing
202	20	Marketing
…		
102	90	Executive
205	110	Accounting
206	110	Accounting

EMPLOYEES

EMPLOYEE_ID	LAST_NAME	DEPT_ID
100	King	90
101	Kochhar	90
…		
202	Fay	20
205	Higgins	110
206	Gietz	110

DEPARTMENTS

DEPARTMENT_ID	DEPT_NAME	LOCATION_ID
10	Administration	1700
20	Marketing	1800
…		
110	Accounting	1700
190	Contracting	1700

Purpose

- But you know from data modeling that separating data into individual tables and being able to associate the tables with one another is the heart of relational database design.

Obtaining Data from Multiple Tables

EMPLOYEE_ID	DEPT_ID	DEPT_NAME
200	10	Administration
201	20	Marketing
202	20	Marketing
…		
102	90	Executive
205	110	Accounting
206	110	Accounting

EMPLOYEES

EMPLOYEE_ID	LAST_NAME	DEPT_ID
100	King	90
101	Kochhar	90
…		
202	Fay	20
205	Higgins	110
206	Gietz	110

DEPARTMENTS

DEPARTMENT_ID	DEPT_NAME	LOCATION_ID
10	Administration	1700
20	Marketing	1800
…		
110	Accounting	1700
190	Contracting	1700

Purpose

- Fortunately, SQL provides join conditions that enable information to be queried from separate tables and combined in one report.

Obtaining Data from Multiple Tables

EMPLOYEE_ID	DEPT_ID	DEPT_NAME
200	10	Administration
201	20	Marketing
202	20	Marketing
…		
102	90	Executive
205	110	Accounting
206	110	Accounting

EMPLOYEES

EMPLOYEE_ID	LAST_NAME	DEPT_ID
100	King	90
101	Kochhar	90
…		
202	Fay	20
205	Higgins	110
206	Gietz	110

DEPARTMENTS

DEPARTMENT_ID	DEPT_NAME	LOCATION_ID
10	Administration	1700
20	Marketing	1800
…		
110	Accounting	1700
190	Contracting	1700

Join Commands

- There are two sets of commands or syntax which can be used to make connections between tables in a database:
  - Oracle proprietary joins
  - ANSI/ISO SQL 99 compliant standard joins
- In this course, you will learn to use both sets of join commands.
- Oracle proprietary joins will be covered later in the course.

ANSI

- ANSI stands for American National Standards Institute.
- Founded in 1918, ANSI is a private, non-profit organization that administers and coordinates the U.S. voluntary standardization and conformity assessment system.
- The Institute's mission is to enhance both the global competitiveness of U.S. business and the U.S. quality of life by promoting and facilitating voluntary consensus standards and conformity assessment systems, and safeguarding their integrity.

SQL

- Structured Query Language (SQL) is the information-processing industry-standard language of relational database management systems (RDBMS).
- The language was originally designed by IBM in the mid 1970s, came into widespread use in the early 1980s, and became an industry standard in 1986 when it was adopted by ANSI.

SQL

- So far there have been three ANSI standardizations of SQL, each one building on the previous one.
- They are named after the year in which they were first proposed, and are widely known by their short names: ANSI-86, ANSI-92 and ANSI-99.

NATURAL JOIN

- A SQL join clause combines fields from 2 (or more) tables in a relational database.
- A natural join is based on all columns in two tables that have the same name and selects rows from the two tables that have equal values in all matched columns.

NATURAL JOIN

- The employees table has a job_id column.
- This is a reference to the column of the same name in the jobs table.

employees

EMPLOYEE_ID	LAST_NAME	JOB_ID
100	King	AD_PRES
101	Kochhar	AD_VP
…		
202	Fay	MK_REP
205	Higgins	AC_MGR
206	Gietz	AC_ACCOUNT

jobs

JOB_ID	JOB_TITLE
AD_PRES	President
AD_VP	Administration Vice President
AD_ASST	Administration Assistant
AC_MGR	Accounting Manager
AC_ACCOUNT	Public Accountant
SA_MAN	Sales Manager

NATURAL JOIN

- As shown in the sample code, when using a natural join, it is possible to join the tables without having to explicitly specify the columns in the corresponding table.
- However, the names and data types of both columns must be the same.

```
SELECT first_name, last_name, job_id, job_title
FROM employees NATURAL JOIN jobs
WHERE department_id > 80;
```

- This join will return columns from the employees table and their related job_title from the jobs table based on the common column job_id.

NATURAL JOIN

```
SELECT first_name, last_name, job_id, job_title
FROM employees NATURAL JOIN jobs
WHERE department_id > 80;
```

FIRST_NAME	LAST_NAME	JOB_ID	JOB_TITLE
Steven	King	AD_PRES	President
Neena	Kochhar	AD_VP	Administration Vice President
Lex	De Haan	AD_VP	Administration Vice President
Shelley	Higgins	AC_MGR	Accounting Manager
William	Gietz	AC_ACCOUNT	Public Accountant

NATURAL JOIN

- Here is another example:

```
SELECT department_name, city
FROM departments NATURAL JOIN locations;
```

- The departments and locations table both have a column, location_id, which is used to join the two tables.
- Notice that the natural join column does not have to appear in the SELECT clause.

DEPARTMENT_NAME	CITY
Marketing	Toronto
Sales	Oxford
IT	Southlake
Shipping	South San Francisco
Administration	Seattle
Executive	Seattle
Accounting	Seattle
Contracting	Seattle

CROSS JOIN

- The ANSI/ISO SQL: 1999 SQL CROSS JOIN joins each row in one table to every row in the other table.
- The result set represents all possible row combinations from the two tables.
- This could potentially be very large!
- If you CROSS JOIN a table with 20 rows with a table with 100 rows, the query will return 2000 rows.

Cross Join Example

- The employees table contains 20 rows and the departments table has 8 rows.
- Performing a CROSS JOIN will return 160 rows.

```
SELECT last_name, department_name
FROM employees CROSS JOIN departments;
```

LAST_NAME	DEPARTMENT_NAME
Abel	Administration
Davies	Administration
De Haan	Administration
Ernst	Administration
Fay	Administration
Gietz	Administration
Grant	Administration
Hartstein	Administration
Higgins	Administration
Hunold	Administration

Terminology

Key terms used in this lesson included:

- Cross join
- Natural join

Summary

In this lesson, you should have learned how to:

- Construct and execute a natural join using ANSI-99 SQL join syntax
- Create a cross join using ANSI-99 SQL join syntax
- Explain the importance of having a standard for SQL as defined by ANSI
- Describe a business need for combining information from multiple data sources


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