

Oracle SQL

Joining Data from Multiple Tables

Objectives

- Identify a Cartesian join
- Create an equality join using the WHERE clause
- Create an equality join using the JOIN keyword
- Create a non-equality join using the WHERE clause
- Create a non-equality join using the JOIN...ON approach

Objectives (continued)

- Create a self-join using the WHERE clause
- Create a self-join using the JOIN keyword
- Distinguish an inner join from an outer join
- Create an outer join using the WHERE clause
- Create an outer join using the OUTER keyword
- Use set operators to combine the results of multiple queries

Purpose of Joins

- Joins are used to link tables and reconstruct data in a relational database
- Joins can be created through:
 - Conditions in a WHERE clause
 - Use of JOIN keywords in FROM clause

Cartesian Joins

- Created by omitting joining condition in the WHERE clause or through CROSS JOIN keywords in the FROM clause
- Results in every possible row combination ($m * n$)

Cartesian Join Example: Omitted Condition

Enter SQL Statement:

```
SELECT title, name  
FROM books, publisher;
```

Results Script Output Explain Autotrace DBMS Output OWA Output

Results:

	TITLE	NAME
1	BODYBUILD IN 10 MINUTES A DAY	PRINTING IS US
2	REVENGE OF MICKEY	PRINTING IS US
3	BUILDING A CAR WITH TOOTHPICKS	PRINTING IS US
4	DATABASE IMPLEMENTATION	PRINTING IS US
5	COOKING WITH MUSHROOMS	PRINTING IS US
6	HOLY GRAIL OF ORACLE	PRINTING IS US
7	HANDCRANKED COMPUTERS	PRINTING IS US
8	E-BUSINESS THE EASY WAY	PRINTING IS US
9	PAINLESS CHILD-REARING	PRINTING IS US
10	THE WOK WAY TO COOK	PRINTING IS US
11	BIG BEAR AND LITTLE DOVE	PRINTING IS US
12	HOW TO GET FASTER PIZZA	PRINTING IS US
13	HOW TO MANAGE THE MANAGER	PRINTING IS US
14	SHORTEST POEMS	PRINTING IS US
15	BODYBUILD IN 10 MINUTES A DAY	PUBLISH OUR WAY

Partial output shown

Equality Joins

- Link rows through equivalent data that exists in both tables
- Created by:
 - Creating equivalency condition in the WHERE clause
 - Using NATURAL JOIN, JOIN...USING, or JOIN...ON keywords in the FROM clause

Equality Joins: WHERE Clause Example

Enter SQL Statement:

```
SELECT title, name  
FROM books, publisher  
WHERE books.pubid = publisher.pubid;
```

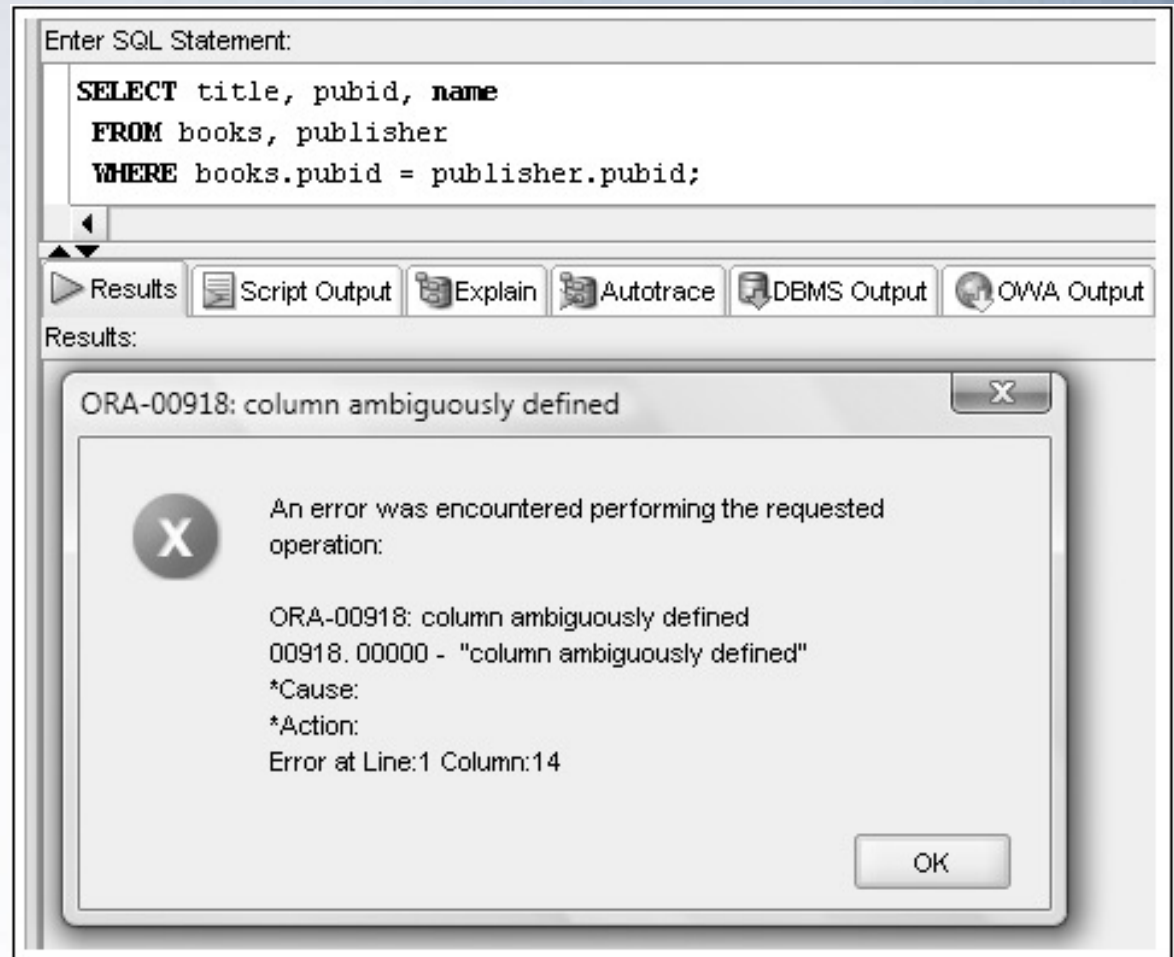
Results Script Output Explain Autotrace DBMS Output OWA Output

Results:

	TITLE	NAME
1	BODYBUILD IN 10 MINUTES A DAY	READING MATERIALS INC.
2	REVENGE OF MICKEY	PRINTING IS US
3	BUILDING A CAR WITH TOOTHPICKS	PUBLISH OUR WAY
4	DATABASE IMPLEMENTATION	AMERICAN PUBLISHING
5	COOKING WITH MUSHROOMS	READING MATERIALS INC.
6	HOLY GRAIL OF ORACLE	AMERICAN PUBLISHING
7	HANDCRANKED COMPUTERS	AMERICAN PUBLISHING
8	E-BUSINESS THE EASY WAY	PUBLISH OUR WAY
9	PAINLESS CHILD-REARING	REED-N-RITE
10	THE WOK WAY TO COOK	READING MATERIALS INC.
11	BIG BEAR AND LITTLE DOVE	REED-N-RITE
12	HOW TO GET FASTER PIZZA	READING MATERIALS INC.
13	HOW TO MANAGE THE MANAGER	PRINTING IS US
14	SHORTEST POEMS	REED-N-RITE

Qualifying Column Names

- Columns in both tables must be qualified



WHERE Clause Supports Join and Other Conditions

Enter SQL Statement:

```
SELECT title, books.pubid, name
FROM books, publisher
WHERE books.pubid = publisher.pubid
AND publisher.pubid = 4;
```

Results Script Output Explain Autotrace DBMS Output OWA Output

Results:

	TITLE	PUBID	NAME
1	BODYBUILD IN 10 MINUTES A DAY	4	READING MATERIALS INC.
2	COOKING WITH MUSHROOMS	4	READING MATERIALS INC.
3	THE WOK WAY TO COOK	4	READING MATERIALS INC.
4	HOW TO GET FASTER PIZZA	4	READING MATERIALS INC.

Joining More Than Two Tables

- Joining four tables requires three join conditions

Enter SQL Statement:

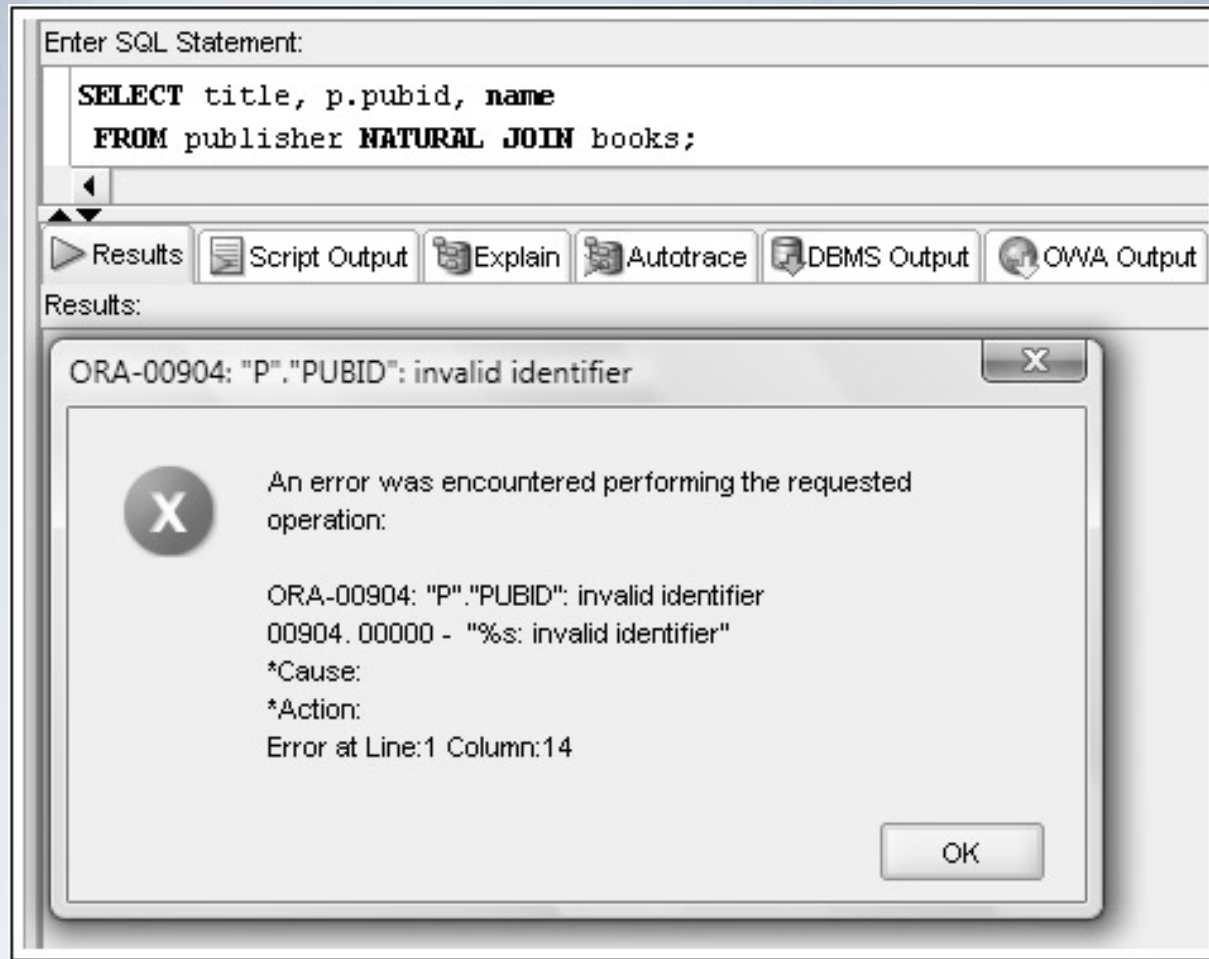
```
SELECT c.lastname, c.firstname, b.title
FROM customers c, orders o, orderitems oi, books b
WHERE c.customer# = o.customer#
      AND o.order# = oi.order#
      AND oi.isbn = b.isbn
ORDER BY lastname, firstname;
```

Equality Joins: NATURAL JOIN

Enter SQL Statement:

```
SELECT title, pubid, name  
FROM publisher NATURAL JOIN books;
```

No Qualifiers with a NATURAL JOIN



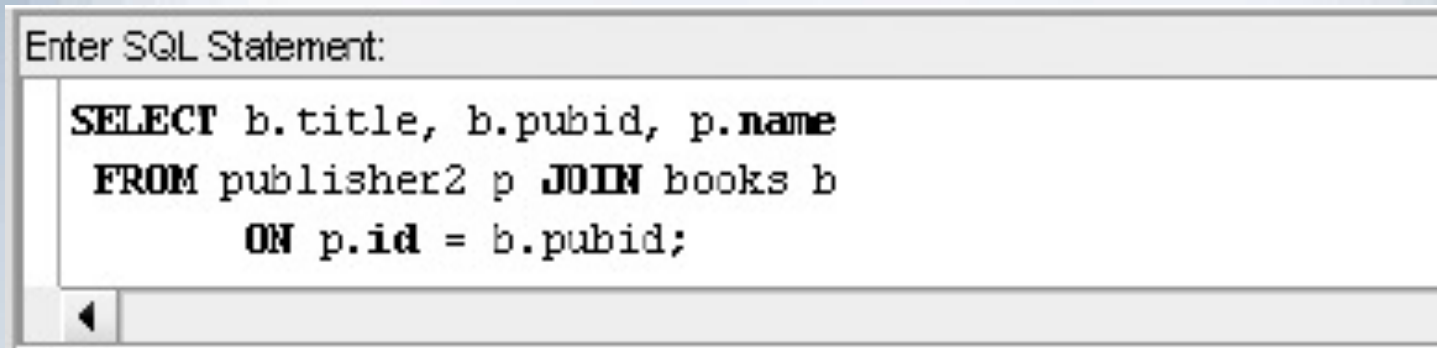
Equality Joins: JOIN...USING

Enter SQL Statement:

```
SELECT b.title, pubid, p.name  
FROM publisher p JOIN books b  
      USING (pubid);
```

Equality Joins: JOIN...ON

- Required if column names are different

A screenshot of a SQL query editor window. The window has a title bar and a text area. The text area contains the following SQL query:

```
Enter SQL Statement:  
  
SELECT b.title, b.pubid, p.name  
FROM publisher2 p JOIN books b  
ON p.id = b.pubid;
```

The query is written in a monospaced font. The window has a scrollbar on the right side.

JOIN Keyword Overview

- Use JOIN...USING when tables have one or more columns in common
- Use JOIN...ON when same named columns are not involved or a condition is needed to specify a relationship other than equivalency (next section)
- Using the JOIN keyword frees the WHERE clause for exclusive use in restricting rows