SQL Joins

In order to run a query that retrieves data from multiple tables, we must JOIN those tables

Joining two tables requires that the two tables have a common key (typically a foreign key relationship) that appears in both tables

The common key columns need NOT have the same name, but must be of the same data type and length.

A JOIN is one of the more resource intensive activities one can do in a relational database.

SQL Joins

Basic Example: joining Orders to Employees

OrderID	CustomerID	EmployeeID	OrderDate	RequiredDate	ShippedDate	ShipVia	Freight	ShipName	ShipAddress	ShipCity
10270	WARTH	1	1996-08-01 00:00:00	1996-08-29 00:00:00	1996-08-02 00:00:00	1	136.54	Wartian Herkku	Torikatu 38	Oulu
10271	SPLIR	6	1996-08-01 00:00:00	1996-08-29 00:00:00	1996-08-30 00:00:00	2	4.54	Split Rail Beer & Ale	P.O. Box 555	Lander
10272	RATTC	6	1996-08-02 00:00:00	1996-08-30 00:00:00	1996-08-06 00:00:00	2	98.03	Rattlesnake Canyon Grocery	2817 Milton Dr.	Albuquerque
10273	QUICK	3	1996-08-05 00:00:00	1996-09-					Taucherstraße 10	Cunewalde
10274	VINET	6	1996-08-06 00:00:00	1996-09-				Chevalier	59 rue de lAbbaye	Reims
10275	MAGAA	1	1996-08-07 00:00:00	1996-09-				entari Riuniti	Via Ludovico il Moro 22	Bergamo
10276	TORTU	8	1996-08-08 00:00:00	1996-08-				rante	Avda. Azteca 123	México D.F.
10277	MORGK	2	1996-08-09 00:00:00	1996-09-				esundkost	Heerstr. 22	Leipzig
10278	BERGS	8	1996-08-12 00:00:00	1996-09-				bköp	Berguvsvägen 8	Luleå
10279	LEHMS	8	1996-08-13 00:00:00	1996-09-				tstand	Magazinweg 7	Frankfurt a.M.
10280	BERGS	2	1996-08-14 00:00:00	1996-09-11 00:00:00	1996-09-12 00:00:00	1	8.98	Berglunds snabbköp	Berguvsvägen 8	Luleå
10281	ROMEY	4	1996-08-14 00:00:00	1996-08-28 00:00:00	1996-08-21 00:00:00	1	2.94	Romero y tomillo	Gran Vía 1	Madrid
10282	ROMEY	4	1996-08-15 00:00:00	1996-09-12 00:00:00	1996-08-21 00:00:00	1	12.69	Romero y tomillo	Gran Vía 1	Madrid

Orders

employeeid	lastname	firstname	title	birthdate	hiredate	address
1	Davolio	Nancy	Sales Representative	1978-12-08 00:00:00	2012-05-01 00:00:00	507 - 20th Ave. E. Apt. 2A
2	Fuller	Andrew	Vice President of Sales	1982-02-19 00:00:00	2012-08-14 00:00:00	908 W. Capital Way
3	Leverling	Janet				
4	Peacock	Marga				
5	Buchanan	Steve				
6	Suyama	Micha				
7	King	Rober				y
8	Callahan	Laura				
9	Dodsworth	Anne	Sales Representative	1976-01-27 00:00:00	2004-11-15 00:00:00	7 Houndstooth Rd.

Employees

SQL Joins

Basic Example: joining Orders to Employees

OrderID	CustomerID	EmployeeID	OrderDate	RequiredDate	ShippedDate	ShipVia	Freight	ShipName	ShipAddress	ShipCity
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10277	MORGK	2	1996-08-09 00:00:00	1996-09-				esundkost	Heerstr. 22	Leipzig
10278	BERGS	8	1996-08-12 00:00:00	1996-09-				bköp	Berguvsvägen 8	Luleå
10279	LEHMS	8	1996-08-13 00:00:00	1996-09-				ktstand	Magazinweg 7	Frankfurt a.M.
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Orders

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4	Peacock	Marga				
5	Buchanan	Steve				
6	Suyama	Micha				
7	King	Rober				y
8	Callahan	Laura				
9	Dodsworth	Anne	Sales Representative	1976-01-27 00:00:00	2004-11-15 00:00:00	7 Houndstooth Rd.

Employees

SQL Joins - Basic Example

Let’s join Orders to Employees

- Orders has 830 rows, each with an EmployeeID
- Employees has 9 rows, each with an EmployeeID
- They have a common key: EmployeeID

  (primary key in Employees; foreign key in Orders)
- We want SQL to join the rows in Employees and Orders where the EmployeeID matches
- This is called an "Inner Join" or "Equijoin"

SQL Joins - Basic Example

Provide a listing showing Northwinds employees and a count of each employee's orders sorted from highest to lowest

```
SELECT LastName, Firstname, count(OrderID) as "Order Total"
   from "alanparadise/nw"."employees",
        "alanparadise/nw"."orders"
   where "alanparadise/nw"."employees"."employeeid"  =
   "alanparadise/nw"."orders"."employeeid"
   GROUP BY LastName, FirstName
   Order By 3 desc;
```

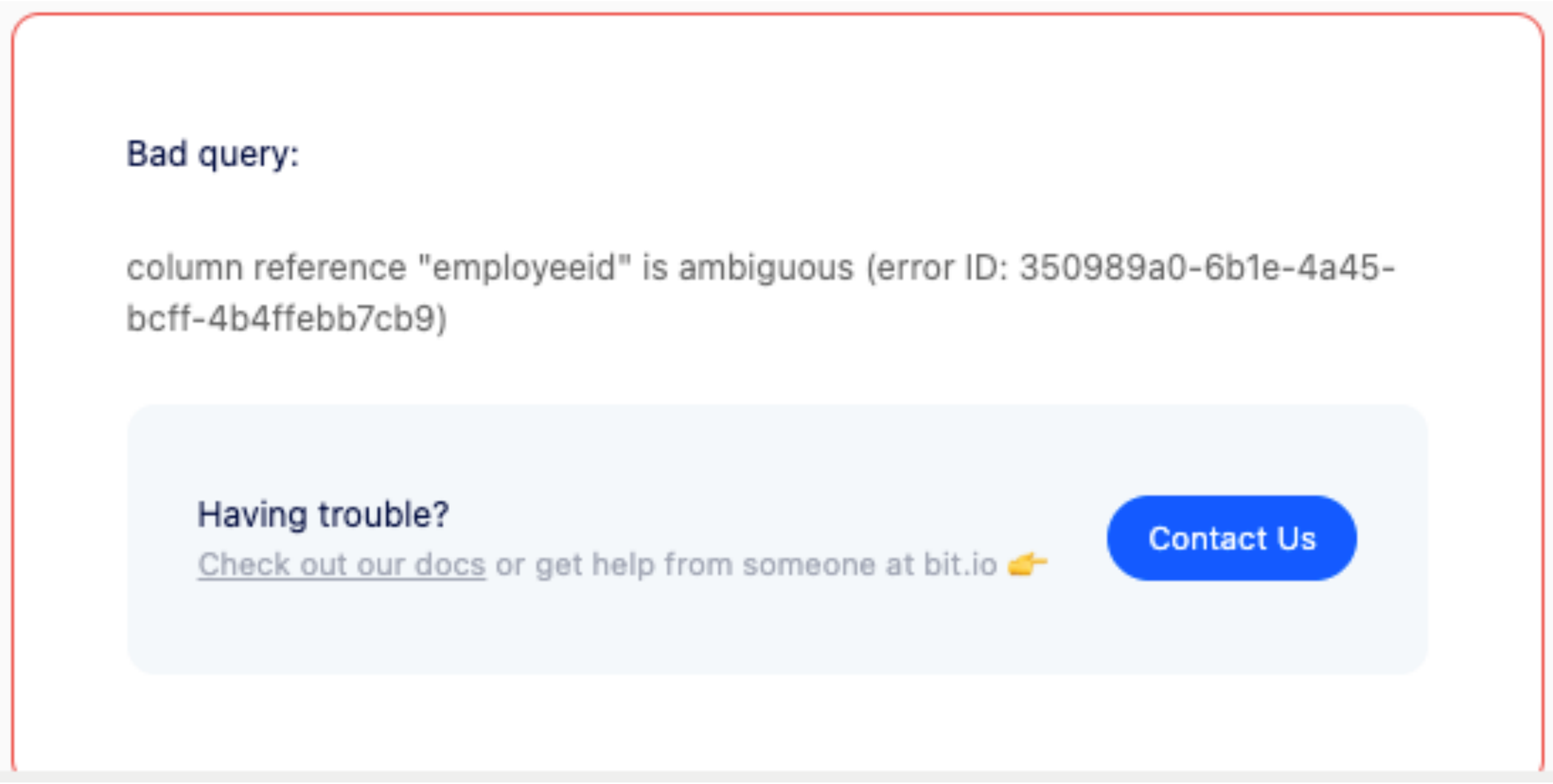
SQL Joins - Basic Example

Add the EmployeeID to the answer set:

```
SELECT employeeid, LastName, Firstname, count(OrderID) as "Order Total"
   from "alanparadise/nw"."employees",
        "alanparadise/nw"."orders"
   where "alanparadise/nw"."employees"."employeeid"  =
   "alanparadise/nw"."orders"."employeeid"
   GROUP BY LastName, FirstName
   Order By 3 desc;
```

What happens?

SQL Joins - Basic Example



SQL Joins – Qualifying Column Names

- “EmployeeID” exists in BOTH tables in this query.
- We need to tell SQL which table to get it from.
- We prefix the table name in front of the column name separated by a “ . ”
- Failure to fully qualify the column name will result in an “ambiguous column” error
- (We must also add it to the Group By...)

SQL Joins - Qualifying Column Names

Add EmployeeID to the answer set:

```
SELECT "alanparadise/nw"."employees".employeeid, LastName, Firstname,
       count(OrderID) as "Order Total"
   from "alanparadise/nw"."employees",
        "alanparadise/nw"."orders"
   where "alanparadise/nw"."employees"."employeeid"  =
"alanparadise/nw"."orders"."employeeid"
   GROUP BY "alanparadise/nw"."employees".employeeid, LastName, FirstName
   Order By 3 desc;
```

SQL Joins – Table Alias

To save typing, we can define an “alias” for each table.

We can temporarily – only for the duration of this query -- rename the employees table “E”, and rename the orders table “O”.

```
SELECT LastName, Firstname, count(OrderID) as "Order Total"
   from "alanparadise/nw"."employees" E,
        "alanparadise/nw"."orders" O
   where E.employeeid  =  O.employeeid
   GROUP BY LastName, FirstName
   Order By 3 desc;
```

SQL Implicit and Explicit

SQL has two types of inner joins: Implicit and Explicit

Implicit inner join:

```
SELECT LastName, Firstname, count(OrderID) as "Order Total"
    from "alanparadise/nw"."employees" E,
         "alanparadise/nw"."orders" O
    where E.employeeid  =  O.employeeid
    GROUP BY LastName, FirstName
    Order By 3 desc;
```

SQL Joins – Alternate Syntax

Explicit Join

Uses the JOIN ... ON clause.

SQL Implicit and Explicit

SQL has two types of inner joins: Implicit and Explicit

Explicit inner join

```
SELECT LastName, Firstname, count(OrderID) as "Order Total"
    FROM "alanparadise/nw"."employees" E JOIN
         "alanparadise/nw"."orders" O
    on E.employeeid  =  O.employeeid
    GROUP BY LastName, FirstName
    Order By 3 desc;
```

SQL Joins – Alternate Syntax

Explicit or Implicit,

The choice is YOURS !

BUT – not with the OUTER JOIN...