# WEEK 4

THE RELATIONAL ALGEBRA BINARY OPERATION OF OUTER JOINS (FULL, RIGHT AND LEFT)

CS3319

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# STUDENT OBJECTIVES

- Upon completion of this video, you should be able to:
  - Identify the symbols for FULL, LEFT and RIGHT outer joins.
  - Write a relational algebra expression that uses OUTER JOINS given two tables based on a given query.
  - Given 2 tables and an OUTER JOIN relational algebra expression, show the new table that would be returned once the expression is performed.
  - Given an OUTER JOIN relational algebra expression and two tables, explain in simple English what query is answered by the expression.

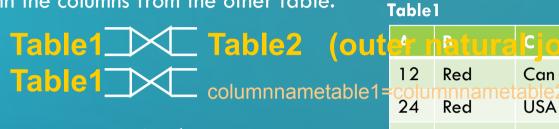
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### **FULL OUTER JOIN**

• A full outer join is similar to a join except that it includes all the rows from both tables even if they don't have a matching value in the column that you are joining. If there is no match, put nulls in the columns from the other table.

Blue

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ANSWER FOR Table 1 Table 2

ANSWER FOR Table1 D=G Table2

	43 Bloc Mex 88			kea	Dog	1	
	<u> </u>			F	Oran	ge Bird	
A	Table1.B	С	D	Table2.B	F	G	
12	Red	Can	24	Red	Dog	24	
24	Red	USA	33	Red	Cat	33	
24	Red	USA	33	Orange	Bird	33	
45	Blue	Mex	33	Red	Cat	33	
45	Blue	Mex	33	Orange	Bird	33	
Null	Null	Null	Null	Yellow	Cat	22	
Null	Null	Null	Null	Green	Dog	44	

Mex

33

33

G

22

24

33

Yellow

Green

Cat

Dog

Dog

# **EULL OUTER JOIN**

• A full outer join is similar to a join except that it includes all the rows from both tables even if they don't have a matching value in the column that you are joining. If there is no match, put nulls in the columns from the other table.

Table1



ANSWER FOR Table 1 Table 2

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(out		atura	Cjoin	D
otoblo1=	12	Red	Can T	attle2
etable1=	24	Red	USA	33
	45	Blue	Mex	33

G

22

24

33

Cat

Dog

Dog

Bird

Yellow

Green

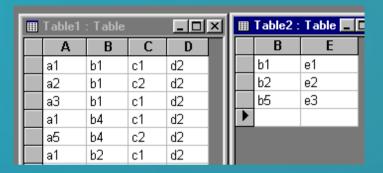
Red

A	В	С	D	F	G	Orange
12	Red	Can	24	Cat	33	
12	Red	Can	24	Dog	24	
24	Red	USA	33	Cat	33	
24	Red	USA	33	Dog	24	
45	Blue	Mex	33	Null	Null	
Null	Yellow	Null	Null	Cat	22	
Null	Green	Null	Null	Dog	44	
Null	Orange	Null	Null	Bird	33	

- Full Outer Join: R S: a join in which tuples from R that do not have matching (equal) values in the common columns of S still appear and tuples in S that do not have matching values in the common columns of R still appear in the resulting relation (padding the fields with nulls)
- Left Outer Join: R S: a join in which tuples from R that do not have matching values in the common columns of S still appear in the resulting relation
- Right Outer Join: R

  S: tuples in S that do not have matching values in the common columns of R still appear in the resulting relation.

#### **Example: Outer Join**



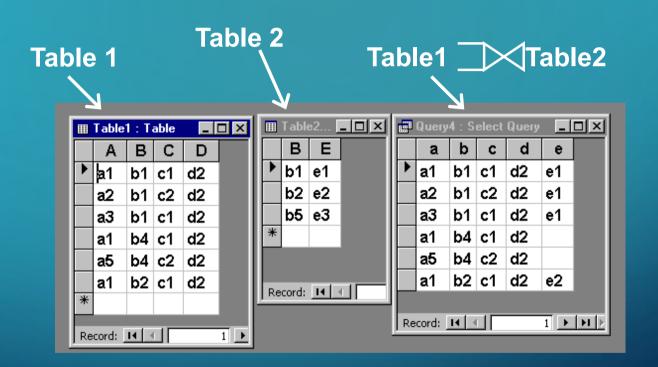
**QUESTION:** What will the following expression result in?

Table1 Table2

4	Α -	В 🕶	C +	D →	E ▼
		b5			e3
	a1	b1	c1	d2	e1
	a2	b1	c2	d2	e1
	a3	b1	c1	d2	e1
	a1	b4	c1	d2	
	a5	b4	c2	d2	
	a1	b2	c2	d2	e2

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#### **Example: Left Outer Join**

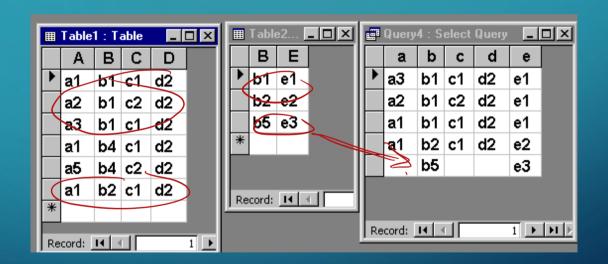


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#### **Example: Right Outer Join**

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# Table1 Table2



Might use an outer join for example in a situation like:

Find the name of all employees and list the department name if they also manage a department.

QUESTION: Write the relational algebra for the above situation:

TEMP  $\leftarrow$  Department  $\searrow$   $\searrow$   $_{ManagerEmpID=EmpID}$  Employee ANSWER  $\leftarrow$   $\pi$   $_{FirstName,LastName,DeptName}$  (TEMP)

