Only the **first 2 tabs in blue** are graded.
-Algebra_Graded
-Joins_Graded

The additional 2 tabs provides additional practice opportunities but are **not graded** towards Exercise
-Algebra Additional Practice
-Joins Additional Practice

SELECT & PROJECT

ProductID	ProductName	Category	Price	Quantity
1	Dog Food	Food	$20.99	50
2	Cat Food	Food	$18.49	40
3	Hamster Cage	Cages	$35.99	20
4	Fish Tank	Aquariums	$75.00	10
5	Leash	Accessories	$8.95	100
6	Cat Toy	Toys	$5.99	75
7	Bird Seed	Food	$12.50	30
8	Reptile Heat	Heating	$22.75	15
9	Dog Bed	Beds	$30.00	25
10	Litter Box	Accessories	$15.25	50

UNION

* NOTE UNION COMPATIBILITY for both UNION and DIFF

Ex. 1

EmployeeID	FirstName	LastName	Department
1	John	Smith	HR
2	Jane	Doe	IT
3	Michael	Johnson	Sales

ContractorID	FirstName
101	Laura
102	David
103	Emma

Ex. 2

OrderID	Product	Quantity
1	Laptop	2
2	Smartphone	3

OrderID	Product
3	Tablet
4	Headphones

3	Tablet	1		5	Laptop

* NOTE UNION COMPATIBILITY for both UNION and DIFF

Ex. 1

EmployeeID	FirstName	LastName	Department
1	John	Smith	HR
2	Jane	Doe	IT
3	Michael	Johnson	Sales

EmployeeID	FirstName
2	Jane
4	Sarah

ProductID	ProductName	Category
1	Laptop	Electronics
2	Smartphone	Electronics
3	Desk	Furniture

ProductID	ProductName
2	Smartphone
4	Chair

PRODUCT

StudentID	FirstName	LastName	Department
1	Alice	Johnson	Biology
2	Bob	Smith	Physics
3	Carol	Williams	History

CourseID	CourseName
101	Biology 101
102	Physics 101
103	History 101

DIVISION

StudentID	FirstName	LastName	CourseID	CourseName		CourseID
1	Alice	Johnson	101	Biology 101		101
2	Bob	Smith	101	Biology 101		102
3	Carol	Williams	101	Biology 101		103
1	Alice	Johnson	102	Physics 101		
3	Carol	Williams	103	History 101		
1	Alice	Johnson	103	History 101		

What kind of SELECT can you perform? What's the Output?

e.g. Select top 5

ProductID	ProductName	Category	Price	Quantity
1	Dog Food	Food	$20.99	50
2	Cat Food	Food	$18.49	40
3	Hamster C	Cages	$35.99	20
4	Fish Tank	Aquariums	$75.00	10
5	Leash	Accessories	$8.95	100

What kind of PROJECT can you perform? What's the Output?

e.g. Project top 2

ProductID	ProductName
1	Dog Food
2	Cat Food
3	Hamster Cage
4	Fish Tank
5	Leash
6	Cat Toy
7	Bird Seed
8	Reptile Heat
9	Dog Bed
10	Litter Box

LastName	Department
Lee	IT
Brown	Finance
White	HR

Employee Union contractor

EmployeeID	FirstName	LastName
1	John	Smith
2	Jane	Doe
3	Michael	Johnson
101	Laura	Lee
102	David	Brown
103	Emma	White

Quantity
1
5

OrderID	Product	Quantity
1	Laptop	2
2	Smartphon	3

	2

	3	Tablet	1
	4	Headphon	5
	5	Laptop	2

LastName	Department
Doe	IT
Brown	Finance

EmployeeID	FirstName	LastName
1	John	Smith
3	Michael	Johnson

Category
Electronics
Furniture

ProductID	ProductNa	Category
1	Laptop	Electronics
3	Desk	Furniture

Department
Biology
Physics
History

StudentID	FirstName	LastName	Departmer
1	Alice	Johnson	Biology
2	Bob	Smith	Physics
3	Carol	Williams	History
1	Alice	Johnson	Biology
2	Bob	Smith	Physics
3	Carol	Williams	History
1	Alice	Johnson	Biology
2	Bob	Smith	Physics
3	Carol	Williams	History

CourseName
Biology 101
Physics 101
History 101

StudentID	FirstName	LastName
1	Alice	Johnson

Department
HR
IT
Sales
IT
Finance
HR

Contractor union employee

Contractor	FirstName	LastName	Department
1	John	Smith	HR
2	Jane	Doe	IT
3	Michael	Johnson	Sales
101	Laura	Lee	IT
102	David	Brown	Finance
103	Emma	White	HR

Department
HR
Sales

EmployeeID	FirstName	LastName	Department
4	Sarah	Brown	Finance

ProductID	ProductName	Category
4	Chair	Furniture

CourseID	CourseName	Department
101	Biology 10	Biology
101	Biology 10	Biology
101	Biology 10	Biology
102	Physics 10	Physics
102	Physics 10	Physics
102	Physics 10	Physics
103	History 10	History
103	History 10	History
103	History 10	History

Orders

OrderID	CustomerID	OrderDate
10308	2	9/18/1996
10309	3	9/19/1996
10310	77	9/20/1996

Customers

CustomerID
1
2
3

Natural Join   Step 1 - Product

OrderID	CustomerID	OrderDate	CustomerID	Column1	Column2
10308	2	9/18/1996	1	Alfreds Futterkist	Maria Anders
10309	3	9/19/1996	1	Alfreds Futterkist	Maria Anders
10310	77	9/20/1996	1	Alfreds Futterkist	Maria Anders
10308	2	9/18/1996	2	Ana Trujillo Empa	Ana Trujillo
10309	3	9/19/1996	2	Ana Trujillo Empa	Ana Trujillo
10310	77	9/20/1996	2	Ana Trujillo Empa	Ana Trujillo
10308	2	9/18/1996	3	Antonio Moreno	Antonio Moreno
10309	3	9/19/1996	3	Antonio Moreno	Antonio Moreno
10310	77	9/20/1996	3	Antonio Moreno	Antonio Moreno

Outer Join   Outer Joins goes through similar 3 step process as natural, inner join
The difference occurs in step 2 SELECT. Where the left/right/both unique reco

Left Outer

10308		9/18/1996	2	Ana Trujillo	Ana Trujillo	Mexico
10309		9/19/1996	3	Antonio Mor	Antonio Moreno	Mexico
10310	77	9/20/1996	null	null	null	

Full Outer Join

10308		9/18/1996	2	Ana Trujillo	Ana Trujillo	Mexico
10309		9/19/1996	3	Antonio Mor	Antonio Moreno	Mexico
10310	77	9/20/1996	null	null	null	
null	null		1	Alfreds Futte	Maria Anders	Germany

CustomerName	ContactName	Country
Alfreds Futterkiste	Maria Anders	Germany
Ana Trujillo Emparedados y helados	Ana Trujillo	Mexico
Antonio Moreno Taquería	Antonio Moreno	Mexico

Step 2 - Select   Equi Join

Column3			10308	2	9/18/1996	2
Germany			10309	3	9/19/1996	3
Germany						
Germany						
Mexico						
Mexico			Step 3 - Project Inner Join			
Mexico			10308	9/18/1996	2 Ana Trujillo	
Mexico			10309	9/19/1996	3 Antonio Mor	
Mexico						
Mexico						

...ords from the original table(s) remains "SELECTED", and nulls are entered to indicate non-matching

Right Outer

	10308	9/18/1996	2 Ana Trujillo
	10309	9/19/1996	3 Antonio Mor
null		*null*	1 Alfreds Futter

| Ana Trujillo Emparedados y helados | Ana Trujillo | Mexico |
| Antonio Moreno Taquería | Antonio Moreno | Mexico |

| Ana Trujillo | Mexico |
| Antonio Moreno | Mexico |

Ana Trujillo	Mexico
Antonio Moreno	Mexico
Maria Anders	Germany

ItemID	ItemName	Category	StockQuantity
1	Steak	Main Course	20
2	Pasta	Main Course	25
3	Salad	Appetizer	30
4	Soup	Appetizer	15
5	Burger	Main Course	18
6	French Fries	Side Dish	40
7	Pizza	Main Course	12
8	Sushi	Main Course	10
9	Ice Cream	Dessert	22
10	Chicken Wings	Appetizer	28
11	Fried Rice	Main Course	16
12	Caesar Salad	Appetizer	14
13	Tiramisu	Dessert	20
14	Grilled Salmon	Main Course	9
15	Mozzarella Sticks	Appetizer	24

StudentID	FirstName	LastName	Major		AlumniID
1	Alice	Johnson	Biology		101
2	Bob	Smith	Physics		102
3	Carol	Williams	History		103

CustomerID	FirstName	LastName	City
1	John	Smith	New York
2	Jane	Doe	Los Angeles
3	Michael	Johnson	Chicago

CustomerID
2
4

PRODUCT

EmployeeID	FirstName	LastName	Department
1	John	Smith	HR
2	Jane	Doe	IT

ProjectID	ProjectName
101	Project A
102	Project B

DIVISION

OrderID	ProductName
1	Item A
1	Item B
2	Item A
3	Item C
3	Item D
4	Item A
4	Item B
4	Item D

ProductName
Item A
Item B

What kind of SELECT can you perform? What's the Output?

What kind of PROJECT can you perform? What's the Output?

FirstName	LastName	Major
James	Brown	Chemistry
Sarah	Lee	Physics
Michael	Davis	Biology

FirstName	LastName	City
Jane	Doe	Los Angeles
Sarah	Brown	Miami

ManagerID
1
2

Employees

EmployeeID	LastName	FirstName	BirthDate	Photo
1	Davolio	Nancy	12/8/1968	EmpID1.pic
2	Fuller	Andrew	2/19/1952	EmpID2.pic
3	Leverling	Janet	8/30/1963	EmpID3.pic

Orders

OrderID	CustomerID
10308	2
10309	37
10310	77

Natural Join Step 1 - Product

Outer Join

Left Outer

Full Outer Join

EmployeeID	OrderDate	ShipperID
7	9/18/1996	3
3	9/19/1996	1
8	9/20/1996	2

Step 2 - Select

Step 3 - Project

Right Outer