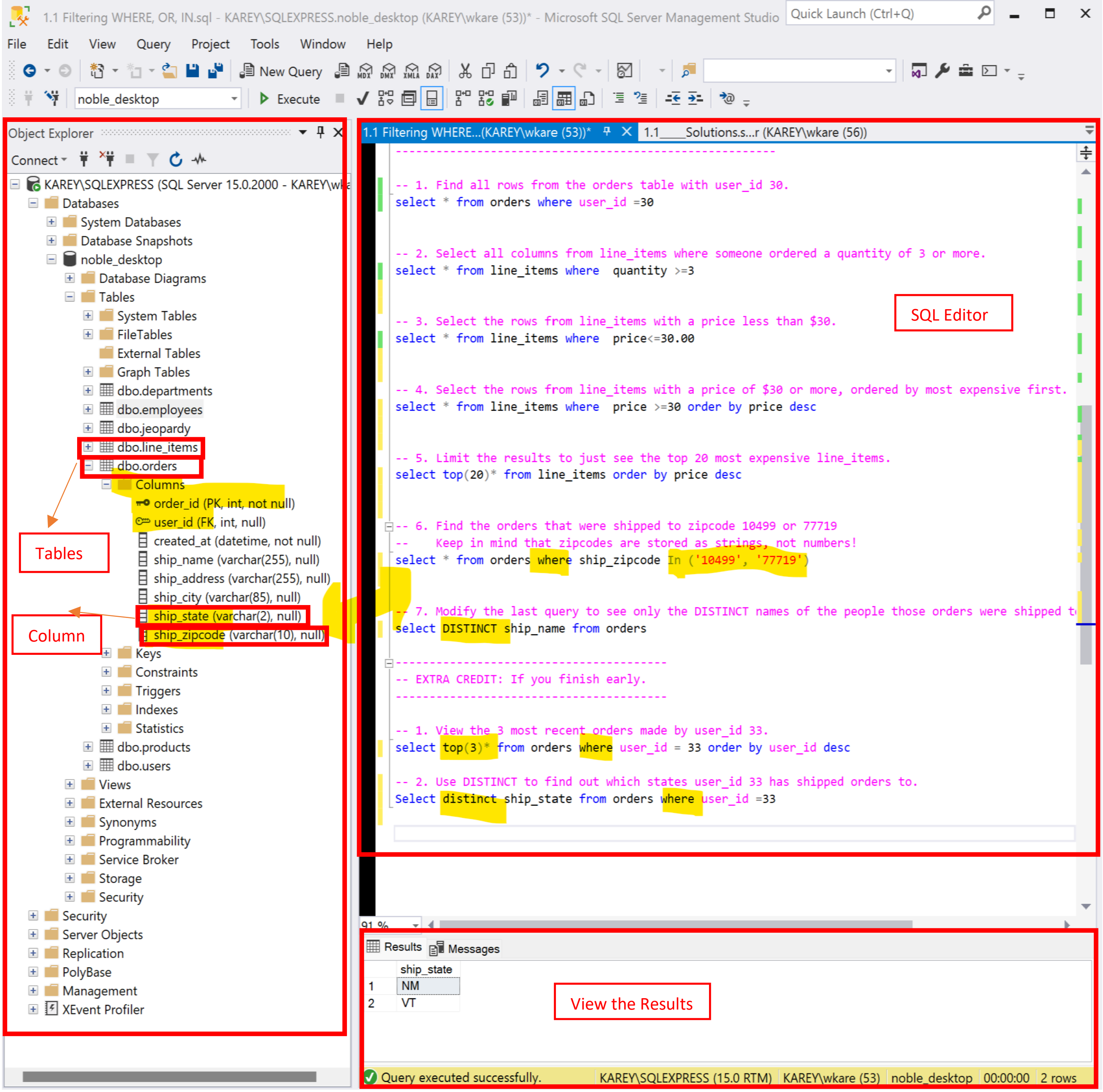
Where/ Distinct

SELECT * →DISTINCT → Top ( )* → From → Join → Where →Group By → Having → Order By



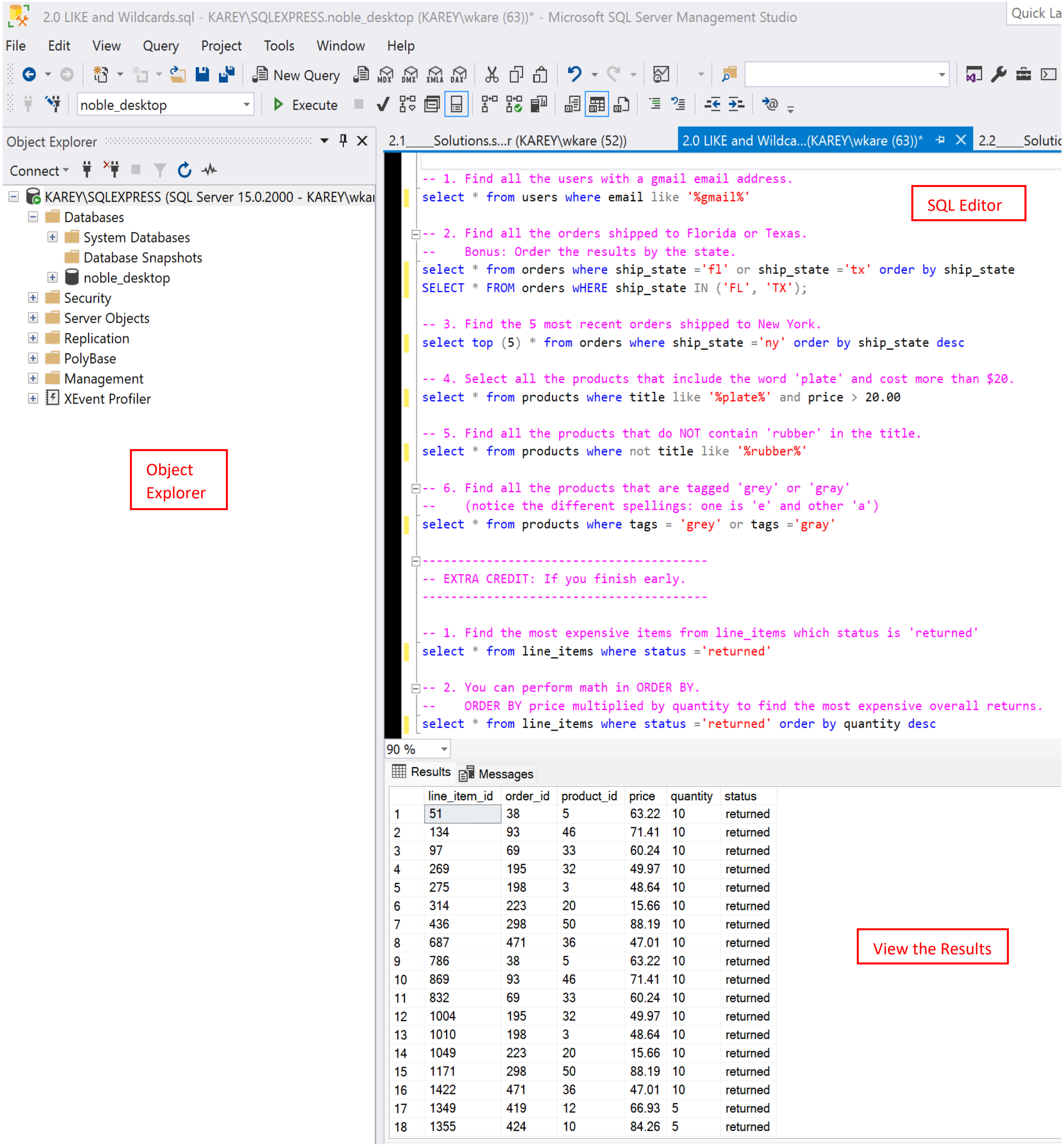
```
---------------------------------------------------------

-- 1. Find all rows from the orders table with user_id 30.
select * from orders where user_id =30


-- 2. Select all columns from line_items where someone ordered a quantity of 3 or more.
select * from line_items where  quantity >=3


-- 3. Select the rows from line_items with a price less than $30.
select * from line_items where  price<=30.00


-- 4. Select the rows from line_items with a price of $30 or more, ordered by most expensive first.
select * from line_items where  price >=30 order by price desc


-- 5. Limit the results to just see the top 20 most expensive line_items.
select top(20)* from line_items order by price desc


-- 6. Find the orders that were shipped to zipcode 10499 or 77719
--    Keep in mind that zipcodes are stored as strings, not numbers!
select * from orders where ship_zipcode In ('10499', '77719')


-- 7. Modify the last query to see only the DISTINCT names of the people those orders were shipped t
select DISTINCT ship_name from orders

----------------------------------------
-- EXTRA CREDIT: If you finish early.
----------------------------------------

-- 1. View the 3 most recent orders made by user_id 33.
select top(3)* from orders where user_id = 33 order by user_id desc

-- 2. Use DISTINCT to find out which states user_id 33 has shipped orders to.
Select distinct ship_state from orders where user_id =33
```

	ship_state
1	NM
2	VT

Query executed successfully. | KAREY\SQLEXPRESS (15.0 RTM) | KAREY\wkare (53) | noble_desktop | 00:00:00 | 2 rows

Wildcards/ Like

SELECT * → DISTINCT → Top ( )* → From → Join → Where → Group By → Having → Order By


2.0 LIKE and Wildcards.sql - KAREY\SQLEXPRESS.noble_desktop (KAREY\wkare (63))* - Microsoft SQL Server Management Studio
Quick La
File
Edit
View
Query
Project
Tools
Window
Help
New Query
noble_desktop
Execute
Object Explorer
Connect
KAREY\SQLEXPRESS (SQL Server 15.0.2000 - KAREY\wkar
Databases
System Databases
Database Snapshots
noble_desktop
Security
Server Objects
Replication
PolyBase
Management
XEvent Profiler
2.1___Solutions.s...r (KAREY\wkare (52))
2.0 LIKE and Wildca...(KAREY\wkare (63))*
2.2___Solutic
90 %
Results
Messages

SQL Editor

Object Explorer

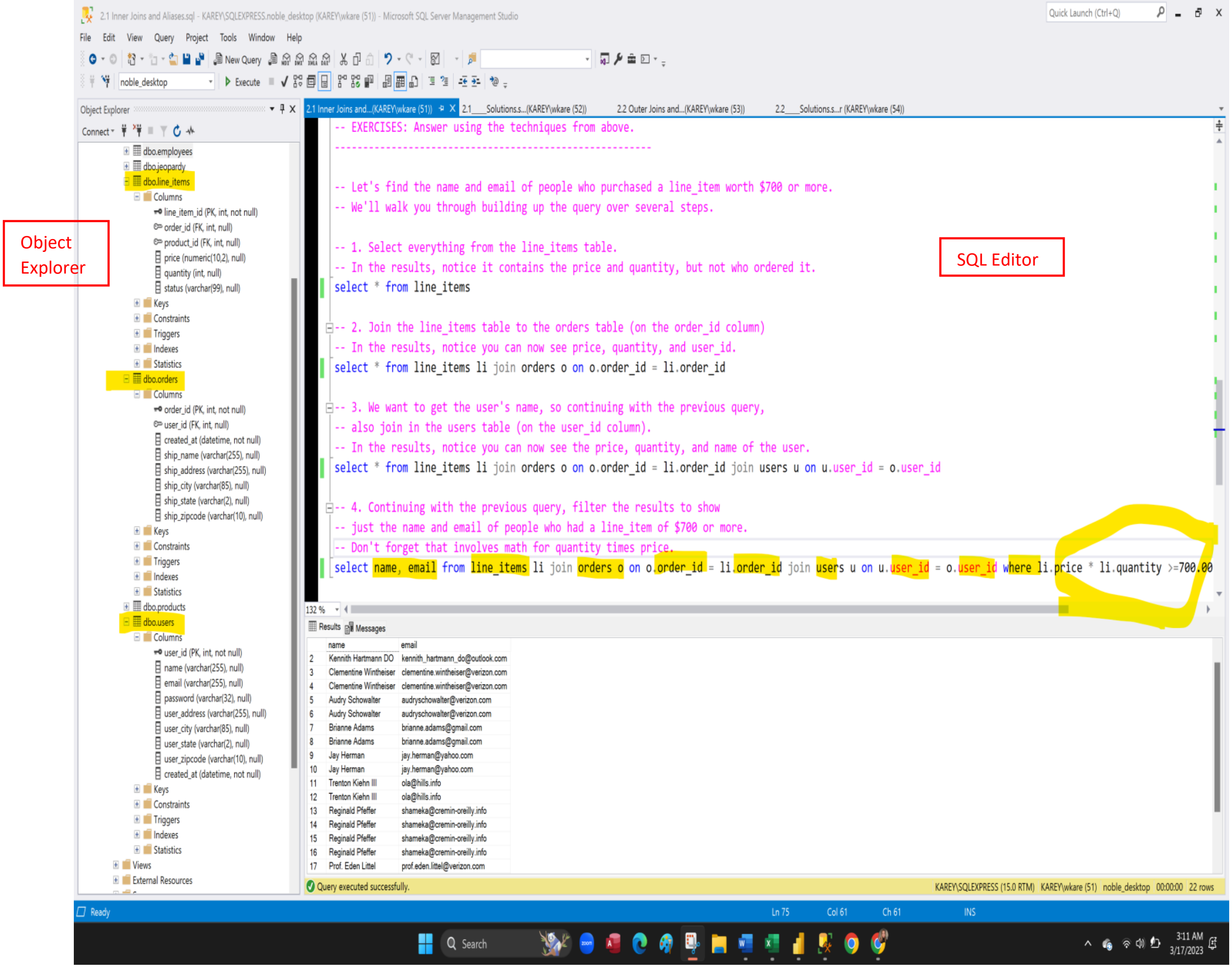
```
-- 1. Find all the users with a gmail email address.
select * from users where email like '%gmail%'

-- 2. Find all the orders shipped to Florida or Texas.
--    Bonus: Order the results by the state.
select * from orders where ship_state ='fl' or ship_state ='tx' order by ship_state
SELECT * FROM orders wHERE ship_state IN ('FL', 'TX');

-- 3. Find the 5 most recent orders shipped to New York.
select top (5) * from orders where ship_state ='ny' order by ship_state desc

-- 4. Select all the products that include the word 'plate' and cost more than $20.
select * from products where title like '%plate%' and price > 20.00

-- 5. Find all the products that do NOT contain 'rubber' in the title.
select * from products where not title like '%rubber%'

-- 6. Find all the products that are tagged 'grey' or 'gray'
--    (notice the different spellings: one is 'e' and other 'a')
select * from products where tags = 'grey' or tags ='gray'

----------------------------------------
-- EXTRA CREDIT: If you finish early.
----------------------------------------

-- 1. Find the most expensive items from line_items which status is 'returned'
select * from line_items where status ='returned'

-- 2. You can perform math in ORDER BY.
--    ORDER BY price multiplied by quantity to find the most expensive overall returns.
select * from line_items where status ='returned' order by quantity desc
```

	line_item_id	order_id	product_id	price	quantity	status
1	51	38	5	63.22	10	returned
2	134	93	46	71.41	10	returned
3	97	69	33	60.24	10	returned
4	269	195	32	49.97	10	returned
5	275	198	3	48.64	10	returned
6	314	223	20	15.66	10	returned
7	436	298	50	88.19	10	returned
8	687	471	36	47.01	10	returned
9	786	38	5	63.22	10	returned
10	869	93	46	71.41	10	returned
11	832	69	33	60.24	10	returned
12	1004	195	32	49.97	10	returned
13	1010	198	3	48.64	10	returned
14	1049	223	20	15.66	10	returned
15	1171	298	50	88.19	10	returned
16	1422	471	36	47.01	10	returned
17	1349	419	12	66.93	5	returned
18	1355	424	10	84.26	5	returned

View the Results

Inner Join/ Alias

SELECT * →DISTINCT → Top ( )* → From → Join → Where →Group By → Having → Order By


2.1 Inner Joins and Aliases.sql - KAREY\SQLEXPRESS.noble_desktop (KAREY\wkare (51)) - Microsoft SQL Server Management Studio
Quick Launch (Ctrl+Q)
File
Edit
View
Query
Project
Tools
Window
Help
New Query
noble_desktop
Execute
Object Explorer
Connect
2.1 Inner Joins and...(KAREY\wkare (51))
2.1___Solutions.s...(KAREY\wkare (52))
2.2 Outer Joins and...(KAREY\wkare (53))
2.2___Solutions.s...r (KAREY\wkare (54))
132 %
Results
Messages
Ready
Ln 75
Col 61
Ch 61
INS
Search
3:11 AM
3/17/2023

Object Explorer

SQL Editor

```
dbo.employees
dbo.jeopardy
dbo.line_items
  Columns
    line_item_id (PK, int, not null)
    order_id (FK, int, null)
    product_id (FK, int, null)
    price (numeric(10,2), null)
    quantity (int, null)
    status (varchar(99), null)
  Keys
  Constraints
  Triggers
  Indexes
  Statistics
dbo.orders
  Columns
    order_id (PK, int, not null)
    user_id (FK, int, null)
    created_at (datetime, not null)
    ship_name (varchar(255), null)
    ship_address (varchar(255), null)
    ship_city (varchar(85), null)
    ship_state (varchar(2), null)
    ship_zipcode (varchar(10), null)
  Keys
  Constraints
  Triggers
  Indexes
  Statistics
dbo.products
dbo.users
  Columns
    user_id (PK, int, not null)
    name (varchar(255), null)
    email (varchar(255), null)
    password (varchar(32), null)
    user_address (varchar(255), null)
    user_city (varchar(85), null)
    user_state (varchar(2), null)
    user_zipcode (varchar(10), null)
    created_at (datetime, not null)
  Keys
  Constraints
  Triggers
  Indexes
  Statistics
Views
External Resources
```

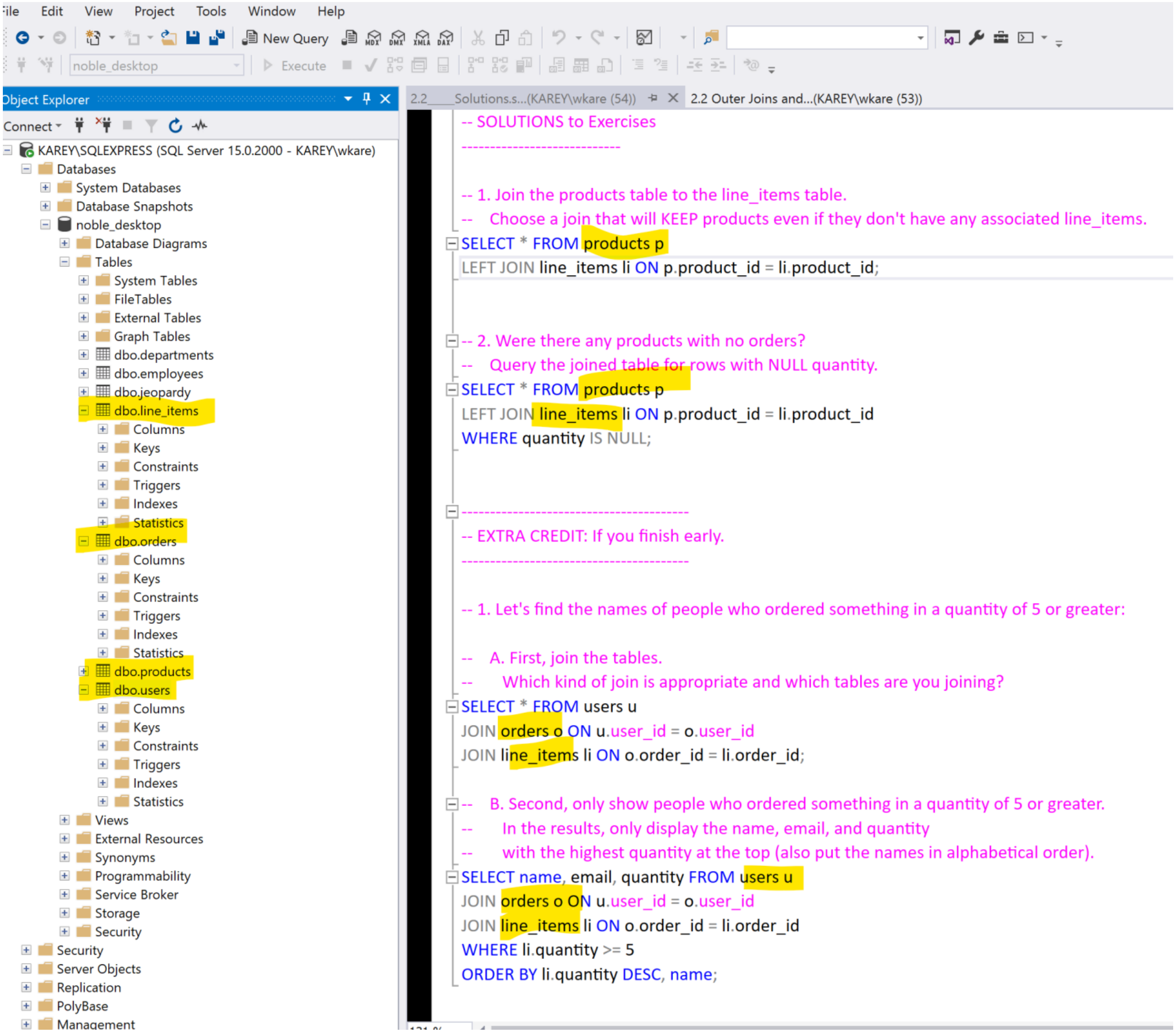
```sql
-- EXERCISES: Answer using the techniques from above.
--------------------------------------------------------


-- Let's find the name and email of people who purchased a line_item worth $700 or more.
-- We'll walk you through building up the query over several steps.

-- 1. Select everything from the line_items table.
-- In the results, notice it contains the price and quantity, but not who ordered it.
select * from line_items

-- 2. Join the line_items table to the orders table (on the order_id column)
-- In the results, notice you can now see price, quantity, and user_id.
select * from line_items li join orders o on o.order_id = li.order_id

-- 3. We want to get the user's name, so continuing with the previous query,
-- also join in the users table (on the user_id column).
-- In the results, notice you can now see the price, quantity, and name of the user.
select * from line_items li join orders o on o.order_id = li.order_id join users u on u.user_id = o.user_id

-- 4. Continuing with the previous query, filter the results to show
-- just the name and email of people who had a line_item of $700 or more.
-- Don't forget that involves math for quantity times price.
select name, email from line_items li join orders o on o.order_id = li.order_id join users u on u.user_id = o.user_id where li.price * li.quantity >=700.00
```

```
    name                    email
2   Kennith Hartmann DO     kennith_hartmann_do@outlook.com
3   Clementine Wintheiser   clementine.wintheiser@verizon.com
4   Clementine Wintheiser   clementine.wintheiser@verizon.com
5   Audry Schowalter        audryschowalter@verizon.com
6   Audry Schowalter        audryschowalter@verizon.com
7   Brianne Adams           brianne.adams@gmail.com
8   Brianne Adams           brianne.adams@gmail.com
9   Jay Herman              jay.herman@yahoo.com
10  Jay Herman              jay.herman@yahoo.com
11  Trenton Kiehn III       ola@hills.info
12  Trenton Kiehn III       ola@hills.info
13  Reginald Pfeffer        shameka@cremin-oreilly.info
14  Reginald Pfeffer        shameka@cremin-oreilly.info
15  Reginald Pfeffer        shameka@cremin-oreilly.info
16  Reginald Pfeffer        shameka@cremin-oreilly.info
17  Prof. Eden Littel       prof.eden.littel@verizon.com
```

```
Query executed successfully.    KAREY\SQLEXPRESS (15.0 RTM)  KAREY\wkare (51)  noble_desktop  00:00:00  22 rows
```

Outer Joins/ Nulls

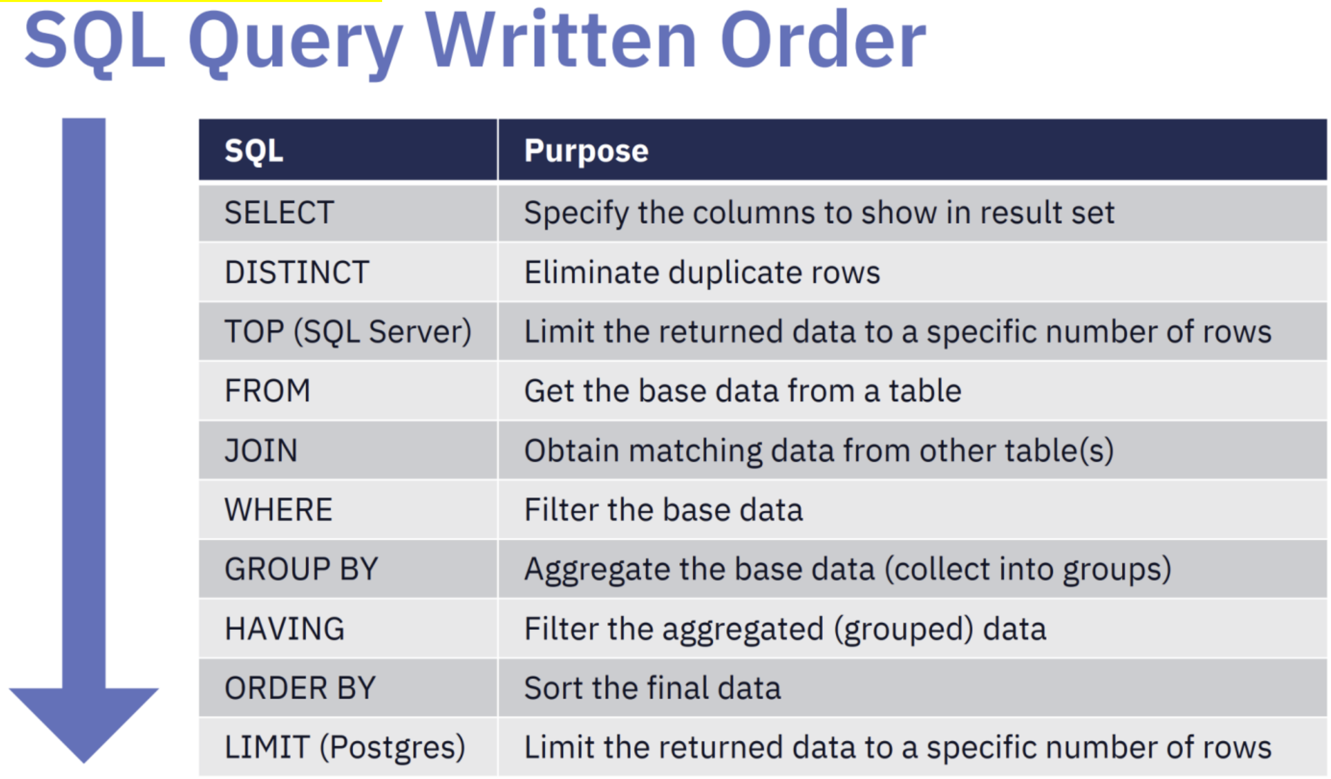
SELECT * → DISTINCT → Top ( )* → From → Join → Where → Group By → Having → Order By



```
-- SOLUTIONS to Exercises
---------------------------

-- 1. Join the products table to the line_items table.
--    Choose a join that will KEEP products even if they don't have any associated line_items.
SELECT * FROM products p
LEFT JOIN line_items li ON p.product_id = li.product_id;


-- 2. Were there any products with no orders?
--    Query the joined table for rows with NULL quantity.
SELECT * FROM products p
LEFT JOIN line_items li ON p.product_id = li.product_id
WHERE quantity IS NULL;


----------------------------------------
-- EXTRA CREDIT: If you finish early.
----------------------------------------

-- 1. Let's find the names of people who ordered something in a quantity of 5 or greater:

--    A. First, join the tables.
--       Which kind of join is appropriate and which tables are you joining?
SELECT * FROM users u
JOIN orders o ON u.user_id = o.user_id
JOIN line_items li ON o.order_id = li.order_id;

--    B. Second, only show people who ordered something in a quantity of 5 or greater.
--       In the results, only display the name, email, and quantity
--       with the highest quantity at the top (also put the names in alphabetical order).
SELECT name, email, quantity FROM users u
JOIN orders o ON u.user_id = o.user_id
JOIN line_items li ON o.order_id = li.order_id
WHERE li.quantity >= 5
ORDER BY li.quantity DESC, name;
```

FYIs

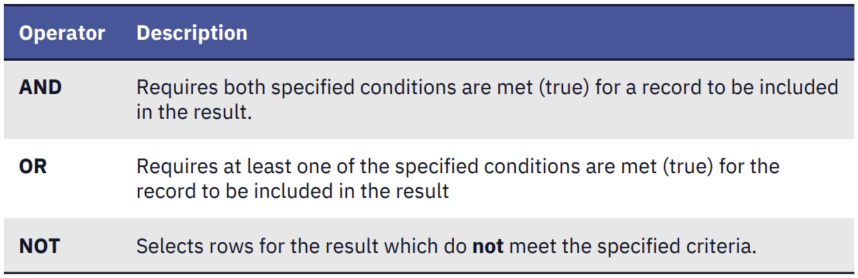
1. SQL Server case is insensitive



SQL Query Written Order

SQL	Purpose
SELECT	Specify the columns to show in result set
DISTINCT	Eliminate duplicate rows
TOP (SQL Server)	Limit the returned data to a specific number of rows
FROM	Get the base data from a table
JOIN	Obtain matching data from other table(s)
WHERE	Filter the base data
GROUP BY	Aggregate the base data (collect into groups)
HAVING	Filter the aggregated (grouped) data
ORDER BY	Sort the final data
LIMIT (Postgres)	Limit the returned data to a specific number of rows

2. Logical operators are used after a “WHERE” clause



Operator	Description
AND	Requires both specified conditions are met (true) for a record to be included in the result.
OR	Requires at least one of the specified conditions are met (true) for the record to be included in the result
NOT	Selects rows for the result which do **not** meet the specified criteria.

Instead of using “OR” clause, we can use “IN” clause

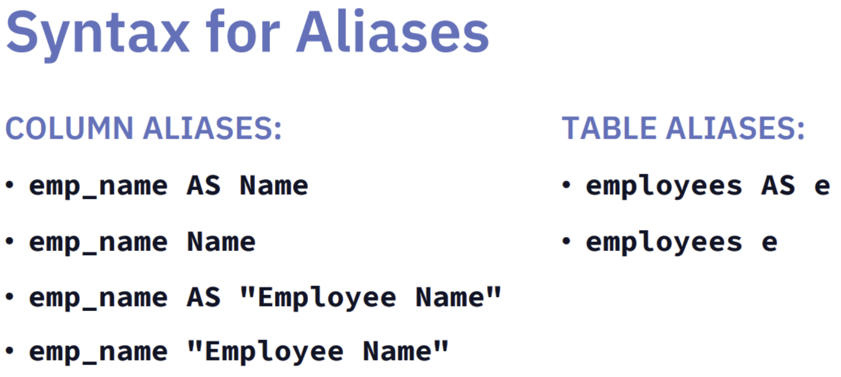
SELECT * FROM orders

WHERE ship_state = 'FL' **OR** ship_state = 'TX';

WHERE ship_state **IN** ('FL', 'TX');

SELECT * FROM products WHERE **NOT** title LIKE '%rubber%';

3. Alias- “AS” clause is optional when it comes to abbreviating table or column



Syntax for Aliases

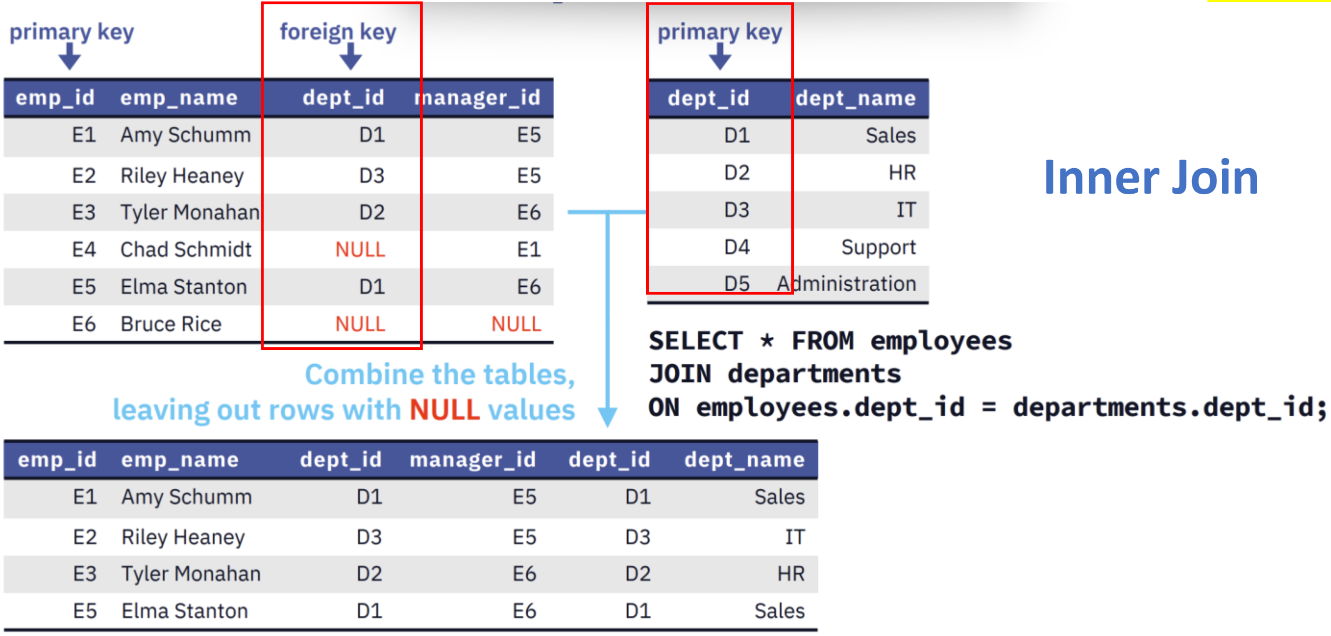
COLUMN ALIASES:

- **emp_name AS Name**
- **emp_name Name**
- **emp_name AS "Employee Name"**
- **emp_name "Employee Name"**

TABLE ALIASES:

- **employees AS e**
- **employees e**

4. A foreign key in one table, refers to a primary key in another table. However, 1 table can only have 1 primary key (aka unique identifier) at the same time. When multiple fields are used as a primary key, it is called a composite key.



emp_id	emp_name	dept_id	manager_id
E1	Amy Schumm	D1	E5
E2	Riley Heaney	D3	E5
E3	Tyler Monahan	D2	E6
E4	Chad Schmidt	NULL	E1
E5	Elma Stanton	D1	E6
E6	Bruce Rice	NULL	NULL

dept_id	dept_name
D1	Sales
D2	HR
D3	IT
D4	Support
D5	Administration

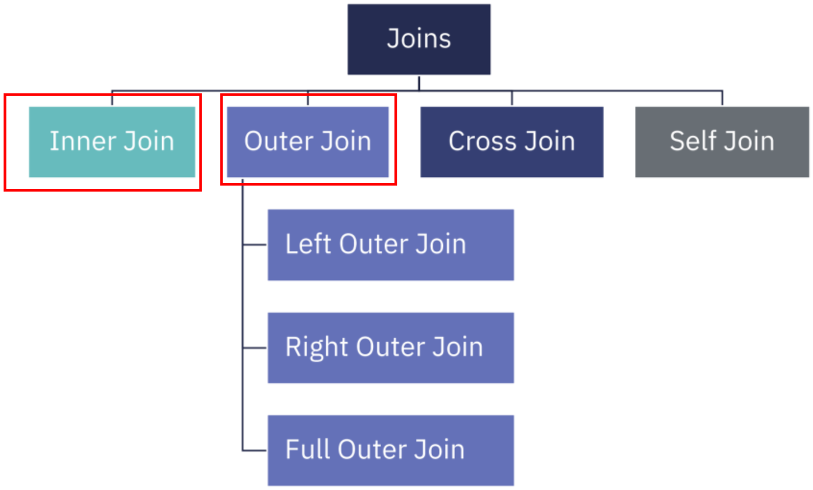
Combine the tables, leaving out rows with NULL values

```
SELECT * FROM employees
JOIN departments
ON employees.dept_id = departments.dept_id;
```

emp_id	emp_name	dept_id	manager_id	dept_id	dept_name
E1	Amy Schumm	D1	E5	D1	Sales
E2	Riley Heaney	D3	E5	D3	IT
E3	Tyler Monahan	D2	E6	D2	HR
E5	Elma Stanton	D1	E6	D1	Sales

Inner Join

5. A join combines data from multiple tables with or without using primary/foreign keys.

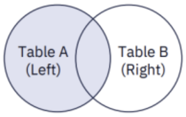


INNER JOIN: returns matching rows through the primary key (aka unique identifier)

OUTER JOIN: returns matching and non-matching rows (missing values appear as NULL).

The **Left, Right, Outer Joins** are all the same. They simply change the side where we keep unmatched rows. See below.

Outer Left Join



primary key — foreign key — primary key

emp_id	emp_name	dept_id	manager_id
E1	Amy Schumm	D1	E5
E2	Riley Heaney	D3	E5
E3	Tyler Monahan	D2	E6
E4	Chad Schmidt	NULL	E1
E5	Elma Stanton	D1	E6
E6	Bruce Rice	NULL	NULL

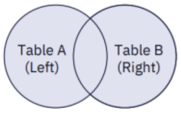
dept_id	dept_name
D1	Sales
D2	HR
D3	IT
D4	Support
D5	Administration

emp_id	emp_name	dept_id	manager_id	dept_id	dept_name
E1	Amy Schumm	D1	E5	D1	Sales
E2	Riley Heaney	D3	E5	D3	IT
E3	Tyler Monahan	D2	E6	D2	HR
E4	Chad Schmidt	NULL	E1	NULL	NULL
E5	Elma Stanton	D1	E6	D1	Sales
E6	Bruce Rice	NULL	NULL	NULL	NULL

```
SELECT * FROM employees e
LEFT JOIN departments d
ON e.dept_id = d.dept_id;
```

Combine the tables, keeping all rows from the left (first) table.

Full Outer Join



emp_id	emp_name	dept_id	manager_id
E1	Amy Schumm	D1	E5
E2	Riley Heaney	D3	E5
E3	Tyler Monahan	D2	E6
E4	Chad Schmidt	NULL	E1
E5	Elma Stanton	D1	E6
E6	Bruce Rice	NULL	NULL

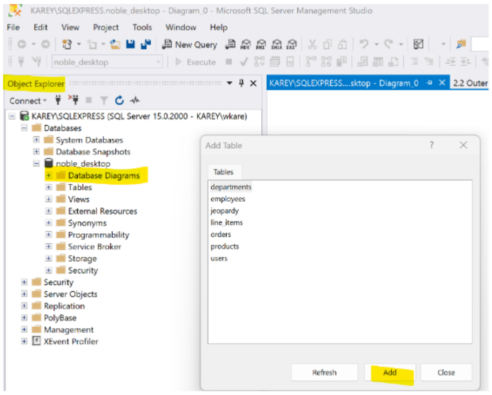
dept_id	dept_name
D1	Sales
D2	HR
D3	IT
D4	Support
D5	Administration

emp_id	emp_name	dept_id	manager_id	dept_id	dept_name
E1	Amy Schumm	D1	E5	D1	Sales
E2	Riley Heaney	D3	E5	D3	IT
E3	Tyler Monahan	D2	E6	D2	HR
E4	Chad Schmidt	NULL	E1	NULL	NULL
E5	Elma Stanton	D1	E6	D1	Sales
E6	Bruce Rice	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	D5	Administration
NULL	NULL	NULL	NULL	D4	Support

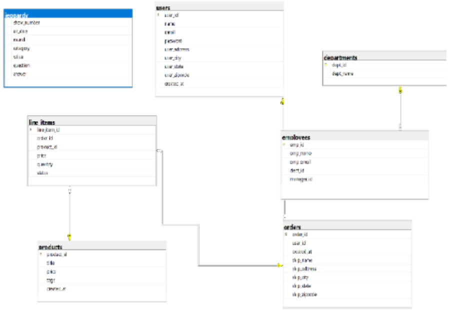
```
SELECT * FROM employees e
FULL JOIN departments d
ON e.dept_id = d.dept_id;
```

Combine the tables, keeping all rows from both tables.

6. Object Explorer→ Right Click Database→Create Database Diagram→Yes→Add->Close

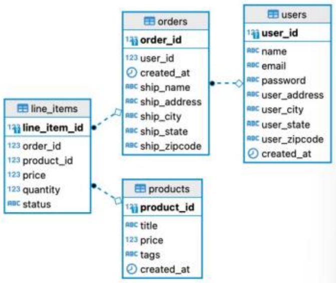


departments
employees
jeopardy
line_items
orders
products
users



Schema

- A database schema is a set of tables.
- The schema defines how data is organized, the relations among tables.


orders
order_id
user_id
created_at
ship_name
ship_address
ship_city
ship_state
ship_zipcode
users
user_id
name
email
password
user_address
user_city
user_state
user_zipcode
created_at
line_items
line_item_id
order_id
product_id
price
quantity
status
products
product_id
title
price
tags
created_at