SQL

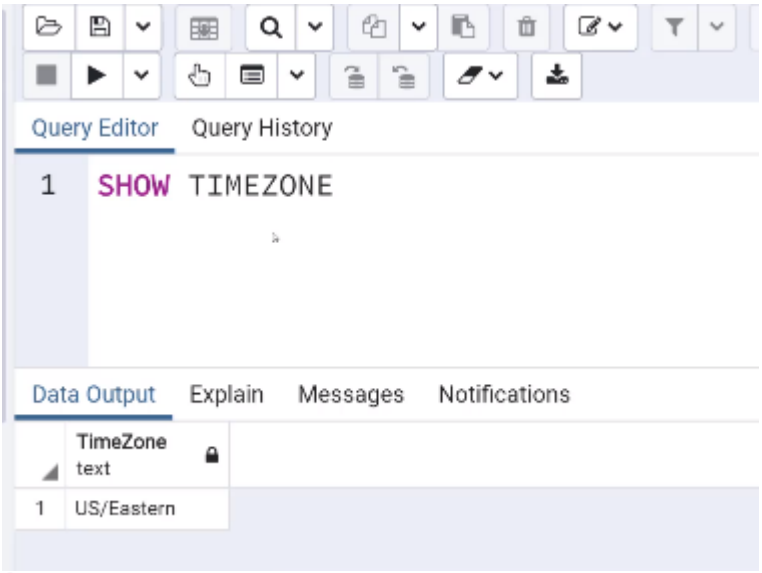
- We've already seen that PostgreSQL can hold date and time information:
  - **TIME** - Contains only time
  - **DATE** - Contains only date
  - **TIMESTAMP** - Contains date and time
  - **TIMESTAMPTZ** - Contains date,time, and timezone

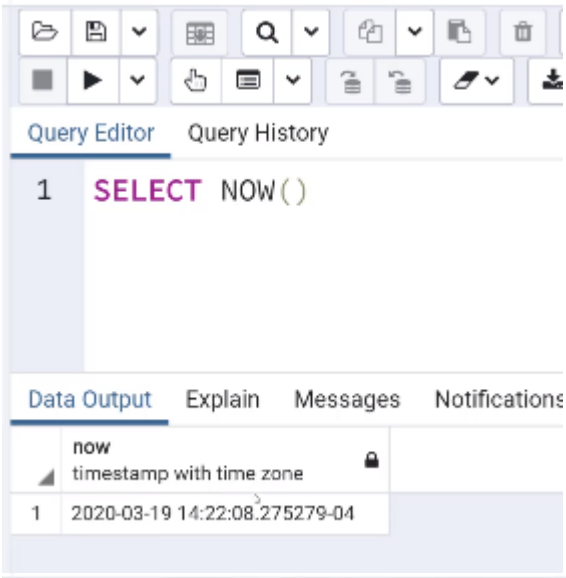
SQL

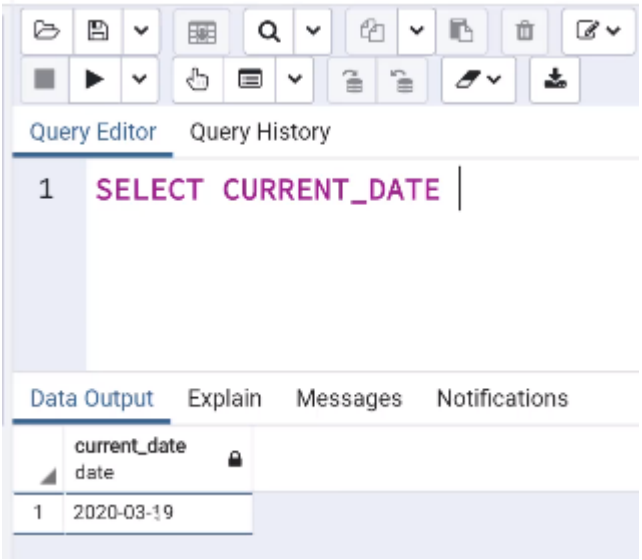
- Careful considerations should be made when designing a table and database and choosing a time data type.
- Depending on the situation you may or may not need the full level of TIMESTAMPTZ
- Remember, you can always remove historical information, but you can't add it!

SQL

- Let's explore functions and operations related to these specific data types:
  - TIMEZONE
  - NOW
  - TIMEOFDAY
  - CURRENT_TIME
  - CURRENT_DATE

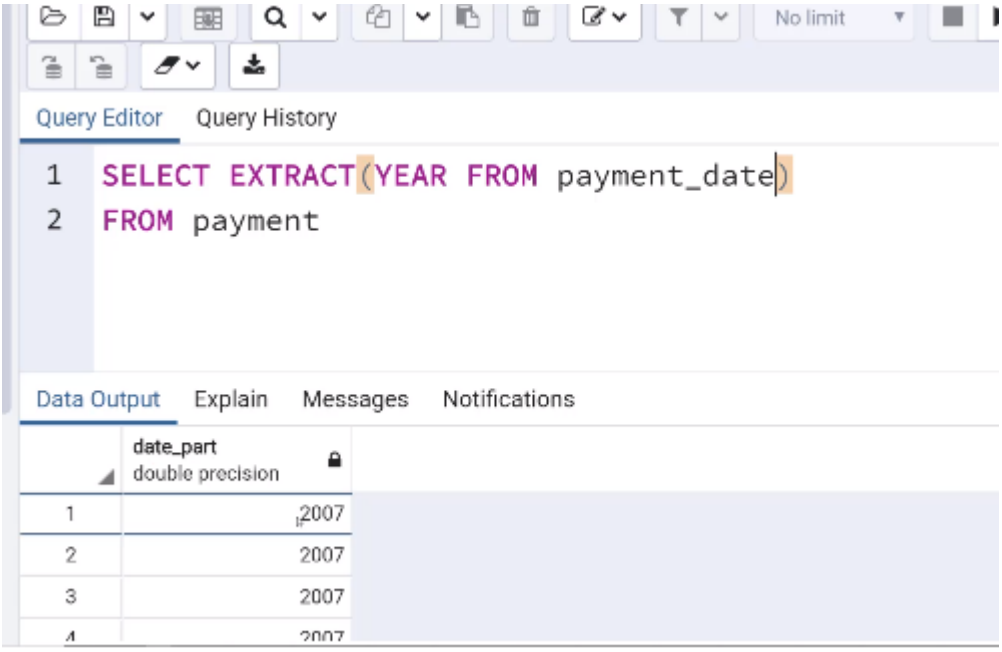

Query Editor
Query History
1
SHOW TIMEZONE
Data Output
Explain
Messages
Notifications
TimeZone
text
1
US/Eastern

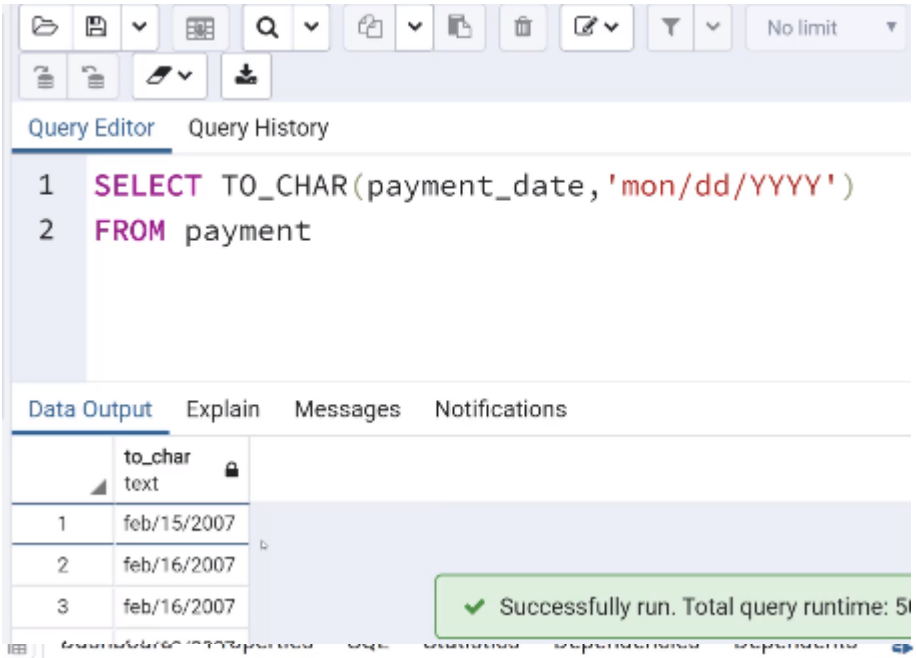

Query Editor
Query History
1
SELECT NOW()
Data Output
Explain
Messages
Notifications
now
timestamp with time zone
1
2020-03-19 14:22:08.275279-04

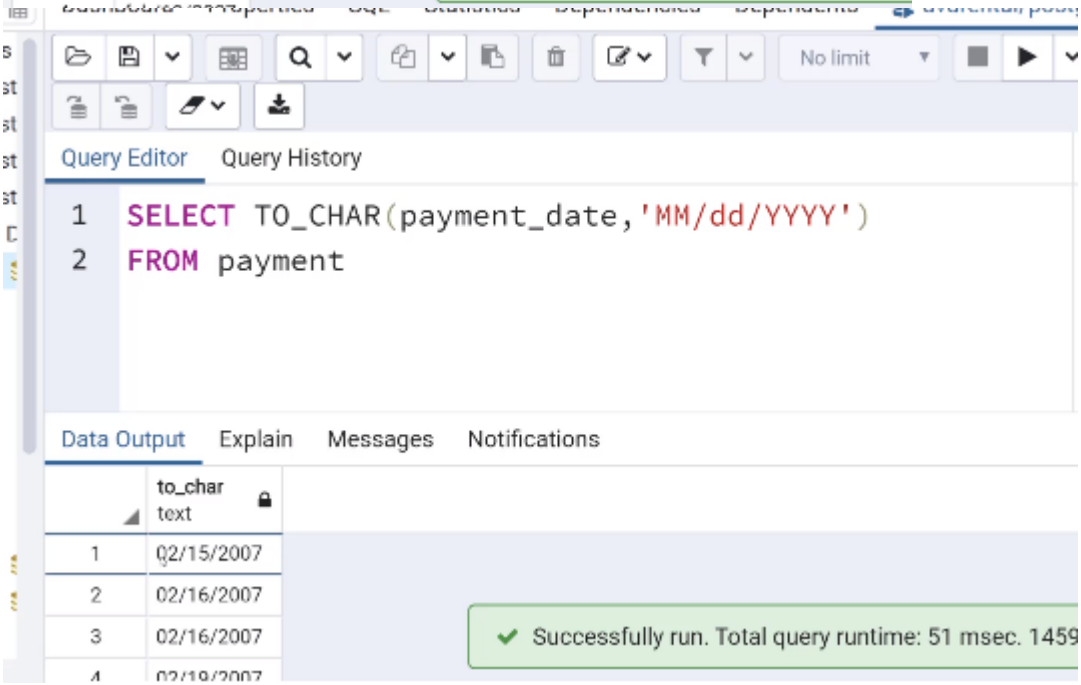

Query Editor
Query History
1
SELECT CURRENT_DATE
Data Output
Explain
Messages
Notifications
current_date
date
1
2020-03-19

- Let's explore extracting information from a time based data type using:
  - EXTRACT()
  - AGE()
  - TO_CHAR()

- EXTRACT()
  - Allows you to "extract" or obtain a sub-component of a date value
    - YEAR
    - MONTH
    - DAY
    - WEEK
    - QUARTER







Q & A:

SQL

- During which months did payments occur?
- Format your answer to return back the full month name.

- Expected Result

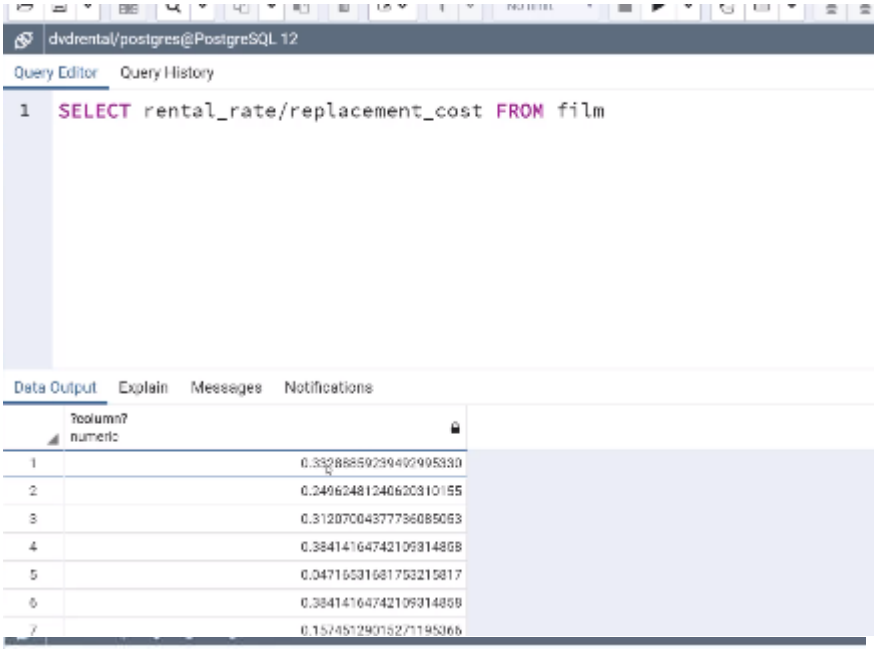
1	MARCH
2	MAY
3	FEBRUARY
4	APRIL

- Solution
- SELECT DISTINCT(TO_CHAR(payment_date,'MONTH')) FROM payment

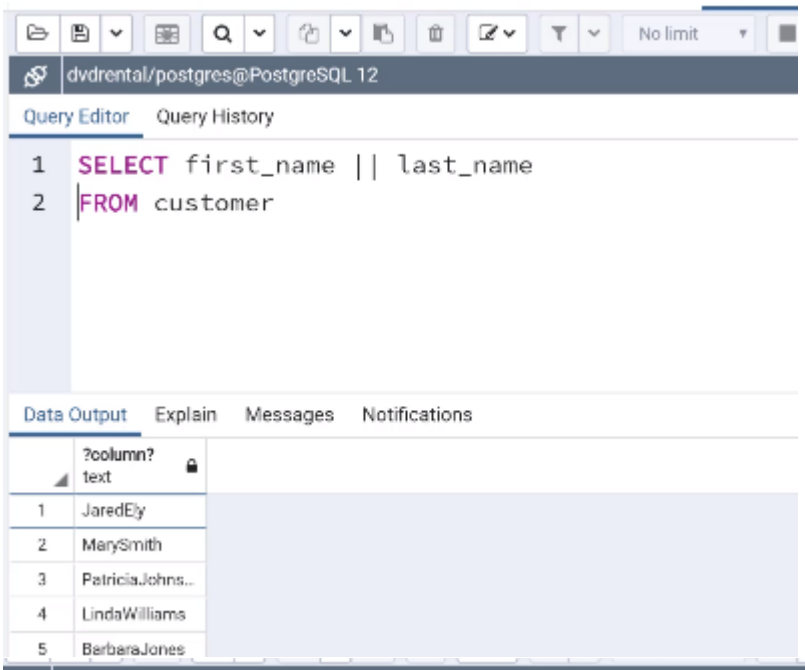
- How many payments occurred on a Monday?
- *NOTE: We didn't show you exactly how to do this, but use the documentation or Google to figure this out!*

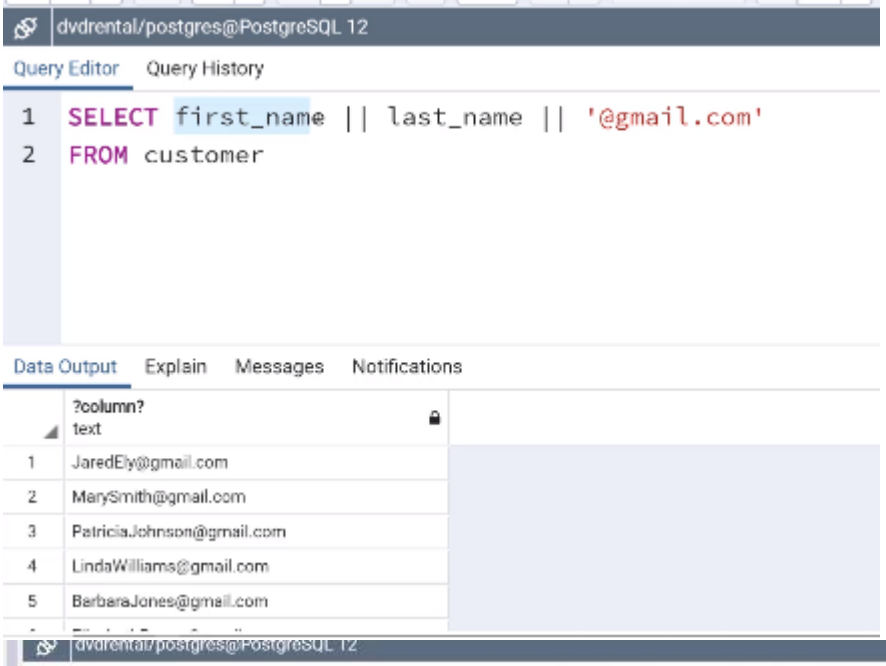
- Solution
- SELECT COUNT(*)
  FROM payment
  WHERE EXTRACT(dow FROM payment_date) = 1

MATHS & FUNCTIONS:



OPERATORS:


No limit
dvdrental/postgres@PostgreSQL 12
Query Editor
Query History
1 SELECT first_name || last_name
2 FROM customer
Data Output
Explain
Messages
Notifications
?column?
text
1 JaredEly
2 MarySmith
3 PatriciaJohns...
4 LindaWilliams
5 BarbaraJones


dvdrental/postgres@PostgreSQL 12
Query Editor
Query History
1 SELECT first_name || last_name || '@gmail.com'
2 FROM customer
Data Output
Explain
Messages
Notifications
?column?
text
1 JaredEly@gmail.com
2 MarySmith@gmail.com
3 PatriciaJohnson@gmail.com
4 LindaWilliams@gmail.com
5 BarbaraJones@gmail.com


Query Editor
Query History
Scratch
1 SELECT LOWER(LEFT(first_name,1)) || LOWER(last_name) || '@gmail.com'
2 FROM customer
Data Output
Explain
Messages
Notifications
?column?
text
1 jely@gmail.com
2 msmith@gma...
3 pjohnson@g...
4 lwilliams@gm...
5 bjones@gmail...
Successfully run. Total query runtime: 40 msec. 599 rows affe

SUBQUERY:

- *It looks like we need two steps, first get the average grade, then compare the rest of the table against it.*
  - SELECT AVG(grade)
    FROM test_scores

- The subquery is performed first since it is inside the parenthesis.
- We can also use the IN operator in conjunction with a subquery to check against multiple results returned.

- *A subquery can operate on a separate table:*
  - SELECT student,grade
    FROM test_scores
    WHERE student IN
    (SELECT student
    FROM honor_roll_table)

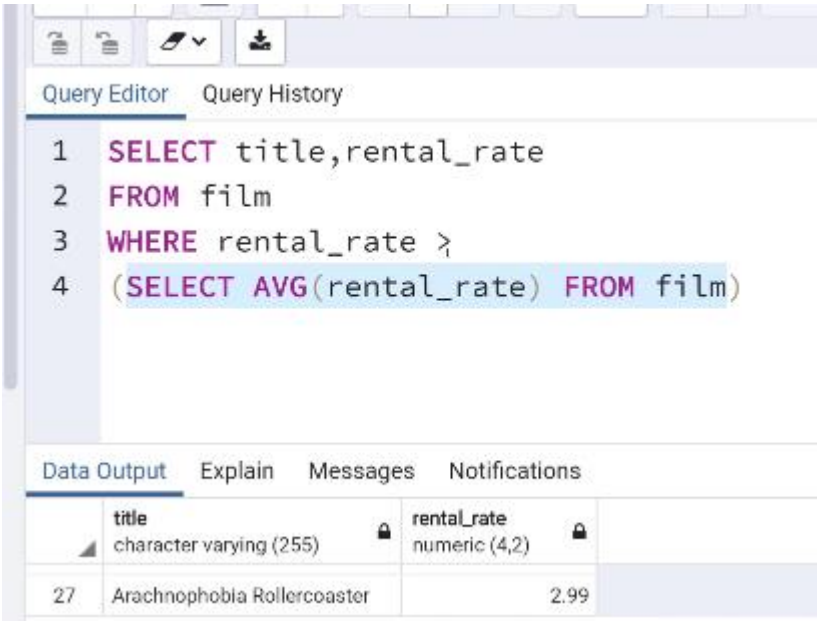
SQL

- *A subquery can operate on a separate table:*
  - SELECT student,grade
    FROM test_scores
    WHERE student IN
    (('Zach' , 'Chris' , 'Karissa'))

SQL

- Typical Syntax

  SELECT column_name
  FROM table_name
  WHERE EXISTS
  (SELECT column_name FROM
  table_name WHERE condition);



dvdrental/postgres@PostgreSQL 12

Query Editor | Query History

```
1  SELECT inventory.film_id
2  FROM rental
3  INNER JOIN inventory ON inventory.inventory_id = rental.inventory_id
4  WHERE return_date BETWEEN '2005-05-29' AND '2005-05-30'
```

Data Output | Explain | Messages | Notifications

	rental_id [PK] integer	rental_date timestamp without time zone	inventory_id integer	customer_id smallint	return_date timestamp without time zone	staff_ small
1	7	2005-05-24 22:11:53	2025	269	2005-05-29 20:34:53	

dvdrental/postgres@PostgreSQL 12

Query Editor | Query History

```
1  SELECT inventory.film_id
2  FROM rental
3  INNER JOIN inventory ON inventory.inventory_id = rental.inventory_id
4  WHERE return_date BETWEEN '2005-05-29' AND '2005-05-30'
```

Data Output | Explain | Messages | Notifications

	film_id smallint
1	15
2	19
3	45
4	50
5	52
6	54

Successfully run. Total query runtime: 51 msec. 83 rows

Query Editor | Query History

```
1  SELECT first_name,last_name
2  FROM customer AS c
3  WHERE EXISTS
4  (SELECT * FROM payment as p
5   WHERE p.customer_id = c.customer_id
6  AND amount > 11)
7
```

Data Output | Explain | Messages | Notifications

	first_name character varying (45)	last_name character varying (45)
6	Nicholas	Barfield
7	Kent	Arsenault
8	Terrance	Roush

SELF JOIN:

- A self-join is a query in which a table is joined to itself.
- Self-joins are useful for comparing values in a column of rows within the same table.

- The self join can be viewed as a join of two copies of the same table.
- The table is not actually copied, but SQL performs the command as though it were.
- There is no special keyword for a self join, its simply standard JOIN syntax with the same table in both parts.

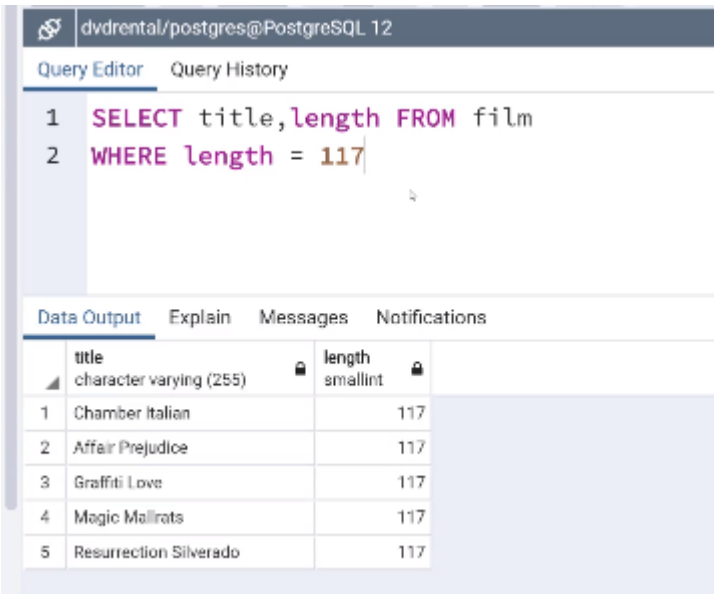
- Syntax
  - SELECT tableA.col, tableB.col
    FROM table AS tableA
    JOIN table AS tableB ON
    tableA.some_col = tableB.other_col

- We want results showing the employee name and their reports recipient name

EMPLOYEES		
emp_id	name	report_id
1	Andrew	3
2	Bob	3
3	Charlie	4
4	David	1

name	rep
Andrew	Charlie
Bob	Charlie
Charlie	David
David	Andrew

- Syntax
  - SELECT tableA.col, tableB.col
    FROM table AS tableA
    JOIN table AS tableB ON
    tableA.some_col = tableB.other_col



Query Editor Query History

```
1  SELECT f1.title , f2.title, f1.length
2  FROM film AS f1
3  INNER JOIN film AS f2 ON
4  f1.film_id != f2.film_id
5  AND f1.length = f2.length
```

Data Output Explain Messages Notifications

	title character varying (255)	title character varying (255)	length smallint
1	Chamber Italian	Resurrection Silverado	117
2	Chamber Italian	Magic Mallrats	117
3	Chamber Italian	Graffiti Love	117
4	Chamber Italian	Affair Prejudice	117
5	Grosse Wonderful	Hurricane Affair	49
6	Grosse Wonderful	Hook Chariots	49
7	Grosse Wonderful	Heavenly Gun	49

Q & A:

https://docs.google.com/document/d/1wiuYbTQslmfolQWgeVPB356csjK6yqOUBhgC7fM44o8/edit?usp=sharing

1. How can you retrieve all the information from the cd.facilities table?
   - **Expected Result should look similar to this (with more rows):**

Data Output Explain Messages Notifications

	facid [PK] integer	name character varying (100)	membercost numeric	guestcost numeric	initialoutlay numeric	monthlymaintenance numeric
1	0	Tennis Court 1	5	25	10000	200
2	1	Tennis Court 2	5	25	8000	200
3	2	Badminton Court	0	15.5	4000	50
4	3	Table Tennis	0	5	320	10

2. You want to print out a list of all of the facilities and their cost to members. How would you retrieve a list of only facility names and costs?

Data Output Explain Messages Notifications

	name character varying (100)	membercost numeric
1	Tennis Court 1	5
2	Tennis Court 2	5
3	Badminton Court	0
4	Table Tennis	0

3. How can you produce a list of facilities that charge a fee to members?
    - Expected Results should have just 5 rows:

Data Output | Explain | Messages | Notifications

	facid [PK] integer	name character varying (100)	membercost numeric	guestcost numeric	initialoutlay numeric	monthlymaintenance numeric
1	0	Tennis Court 1	5	25	10000	200
2	1	Tennis Court 2	5	25	8000	200
3	4	Massage Room 1	35	80	4000	3000
4	5	Massage Room 2	35	80	4000	3000
5	6	Squash Court	3.5	17.5	5000	80

4. How can you produce a list of facilities that charge a fee to members, and that fee is less than 1/50th of the monthly maintenance cost? Return the facid, facility name, member cost, and monthly maintenance of the facilities in question.
    - Result is just two rows:

Data Output | Explain | Messages | Notifications

	facid [PK] integer	name character varying (100)	membercost numeric	monthlymaintenance numeric
1	4	Massage Room 1	35	3000
2	5	Massage Room 2	35	3000

5. How can you produce a list of all facilities with the word 'Tennis' in their name?
    - **Expected Result is 3 rows**

Data Output | Explain | Messages | Notifications

	facid [PK] integer	name character varying (100)	membercost numeric	guestcost numeric	initialoutlay numeric	monthlymaintenance numeric
1	0	Tennis Court 1	5	25	10000	200
2	1	Tennis Court 2	5	25	8000	200
3	3	Table Tennis	0	5	320	10

6. How can you retrieve the details of facilities with ID 1 and 5? Try to do it without using the OR operator.
    - **Expected Result is 2 rows**

Data Output | Explain | Messages | Notifications

	facid [PK] integer	name character varying (100)	membercost numeric	guestcost numeric	initialoutlay numeric	monthlymaintenance numeric
1	1	Tennis Court 2	5	25	8000	200
2	5	Massage Room 2	35	80	4000	3000

7. How can you produce a list of members who joined after the start of September 2012? Return the memid, surname, firstname, and joindate of the members in question.
    - **Expected Result is 10 rows (not all are shown below)**

	memid [PK] integer	surname character varying (200)	firstname character varying (200)	joindate timestamp without time zone
1	24	Sarwin	Ramnaresh	2012-09-01 08:44:42
2	26	Jones	Douglas	2012-09-02 18:43:05
3	27	Rumney	Henrietta	2012-09-05 08:42:35
4	28	Farrell	David	2012-09-15 08:22:05
5	29	Worthington-Smyth	Henry	2012-09-17 12:27:15
6	30	Purview	Millicent	2012-09-18 19:04:01
7	33	Tupperware	Hyacinth	2012-09-18 19:32:05
8	35	Hunt	John	2012-09-19 11:32:45

8. How can you produce an ordered list of the first 10 surnames in the members table? The list must not contain duplicates.
    - **Expected Result should be 10 rows if you include GUEST as a last name**
    -

	surname character varying (200)
1	Bader
2	Baker
3	Boothe
4	Butters
5	Coplin
6	Crumpet
7	Dare
8	Farrell
9	Genting
10	GUEST

9. You'd like to get the signup date of your last member. How can you retrieve this information?
    - **Expected Result**
    - **2012-09-26 18:08:45**

10. Produce a count of the number of facilities that have a cost to guests of 10 or more.
    - **Expected Result**
    - **6**

11. Produce a list of the total number of slots booked per facility in the month of September 2012. Produce an output table consisting of facility id and slots, sorted by the number of slots.
    - **Expected Result is 9 rows**

	facid integer	Total Slots bigint
1	5	122
2	3	422
3	7	426
4	8	471
5	6	540
6	2	570
7	1	588
8	0	591
9	4	648

12. Produce a list of facilities with more than 1000 slots booked. Produce an output table consisting of facility id and total slots, sorted by facility id.
    - **Expected Result is 5 rows**

	facid integer	total_slots bigint
1	0	1320
2	1	1278
3	2	1209
4	4	1404
5	6	1104

13. How can you produce a list of the start times for bookings for tennis courts, for the date '2012-09-21'? Return a list of start time and facility name pairings, ordered by the time.
    - **Expected Result is 12 rows**

	start timestamp without time zone	name character varying (100)
1	2012-09-21 08:00:00	Tennis Court 1
2	2012-09-21 08:00:00	Tennis Court 2
3	2012-09-21 09:30:00	Tennis Court 1
4	2012-09-21 10:00:00	Tennis Court 2
5	2012-09-21 11:30:00	Tennis Court 2
6	2012-09-21 12:00:00	Tennis Court 1
7	2012-09-21 13:30:00	Tennis Court 1
8	2012-09-21 14:00:00	Tennis Court 2
9	2012-09-21 15:30:00	Tennis Court 1
10	2012-09-21 16:00:00	Tennis Court 2
11	2012-09-21 17:00:00	Tennis Court 1
12	2012-09-21 18:00:00	Tennis Court 2

14. How can you produce a list of the start times for bookings by members named 'David Farrell'?
    - **Expected result is 34 rows of timestamps**

ANSWERS:
https://docs.google.com/document/d/1swGZ0RG3KKqWqzmsI_qrMgjJ3lt39mtAJqRSMZy6Z-8/edit?usp=sharing