SQL CASE STUDY ON

Musems and paintings

SEPTEMBER 2024

BY :- Mrinal Singh

MYSELF MRINAL SINGH ,

AND I have used this dataset which i downloaded from Kaggle about museums and paintings.
I will perform some advanced queries which i learned during SQL .

Introduction

image link
work_id
url
thumbnail_small_url
thumbnail_large_url

subject *
work_id
subject

canvas size *
🔑 size_id
width
height
label

artist *
🔑 artist_id
full_name
first_name
middle_names
last_name
nationality
style
birth
death

work *
🔑 work_id
name
artist_id
style
museum_id

museum *
🔑 museum_id
name
address
city
state
postal
country
phone
url

product size *
work_id
size_id
sale_price
regular_price

museum hours *
museum_id
day
[open]
[close]

Query

```
--QUES. 1 Fetch all the paintings which are not displayed on any museums?

select *
from work
where museum_id is null
```

Sol.

	work_id	name	artist_id	style	museum_id
1	125752	Arabian Horses at Pasture	757	Baroque	NULL
2	125818	Count Halm on His Basedow Estate	757	Baroque	NULL
3	125763	Napoleon Before the Burning City of Smolensk	757	Baroque	NULL
4	125774	Peasants Resting in the Field	757	Baroque	NULL
5	125785	Portrait Oberleutnant Theodor Von Klein	757	Baroque	NULL
6	125796	The Rescue of Count Munnich	757	Baroque	NULL
7	125807	The Stable Yard	757	Baroque	NULL
8	24532	Jacob A. Stamler Departing Le Havre	563	NULL	NULL
9	124470	Kaleda off Le Havre	563	NULL	NULL

10,223 rows

```sql
--QUES. 2 Are there museums without any paintings?

    select *
    from museum m
    where m.museum_id in

        (
        select m.museum_id
        from museum m
        except
        select w.museum_id
        from work w )
```

Data got corrupted when i was deleting and updating , so i can't show the answer for this question

Query

JES. 3 How many paintings have an asking price of more than their regular pri

```sql
select *
from work w inner join product_size p
on w.work_id = p.work_id
where sale_price > regular_price
```

Sol.

work_id	name	artist_id	style	museum_id	work_id	size_id	sale_price	regular_price
26930	Capriccio with Ruins of the Roman Forum	537	Baroque	NULL	26930	6040	605	1135
26930	Capriccio with Ruins of the Roman Forum	537	Baroque	NULL	26930	7248	765	1455
26932	Coast View with the Abduction of Europa	537	Baroque	55	26932	6048	675	1275
26932	Coast View with the Abduction of Europa	537	Baroque	55	26932	6854	805	1535
26934	Embarkation of St. Paula	537	Baroque	NULL	26934	4860	675	1275
26934	Embarkation of St. Paula	537	Baroque	NULL	26934	5468	805	1535
26940	Landscape with Acis and Galatea	537	Baroque	40	26940	6048	675	1275
26940	Landscape with Acis and Galatea	537	Baroque	40	26940	6854	805	1535
26946	Landscape with Dancing Satyrs and Ny...	537	Baroque	NULL	26946	6048	675	1275
26946	Landscape with Dancing Satyrs and Ny...	537	Baroque	NULL	26946	6854	805	1535

26,996 rows

Query

```sql
--QUES. 4 Identify the paintings whose asking price is less than 50% of its regular price

    select *
    from work w inner join product_size p
    on w.work_id = p.work_id
    where convert(float,sale_price) < (0.5 * convert(float,regular_price))
```

Sol.

work_id	name	artist_id	style	museum_id	work_id	size_id	sale_price	regular_price
198417	Disrobing of Christ (Espolio)	553	Renaissance	51	198417	36	30	125
198417	Disrobing of Christ (Espolio)	553	Renaissance	51	198417	30	30	95
31974	Taking the Census	525	American Art	35	31974	24	30	85
17351	The Chalon Family in London	771	Romanticism	NULL	17351	24	10	85
17351	The Chalon Family in London	771	Romanticism	NULL	17351	30	10	95
17351	The Chalon Family in London	771	Romanticism	NULL	17351	36	10	125
30947	Ducks Resting in Sunshine	638	Baroque	35	30947	3024	285	575
30947	Ducks Resting in Sunshine	638	Baroque	35	30947	3226	305	645
23710	Portrait of Mr. and Mrs. Thomas Mifflin (Sarah M...	609	American Art	67	23710	30	20	95
23710	Portrait of Mr. and Mrs. Thomas Mifflin (Sarah M...	609	American Art	67	23710	24	20	85

58 rows

Query

```sql
--QUES. 5 Which canva size costs the most?

    select sub.size_id, sub.work_id, sub.sale_price
    from
    (
            select p.size_id ,
            p.sale_price ,
            p.work_id ,
            DENSE_RANK() over(order by sale_price desc) [ranks]

            from canvas_size c inner join product_size p
            on convert(varchar,c.size_id) = p.size_id inner join work w
            on p.work_id = w.work_id ) sub

    where sub.ranks = 1
    order by sub.sale_price desc
```

Sol.

size_id	work_id	sale_price
7248	22882	995
7248	22935	995
9648	4559	995
4896	4735	995

Query

```
--QUES. 7 Identify the museums with invalid city information in the given dataset

    select m.*
    from museum m
    where city = '% %' or city = '-' or city like '%"%' or city like '%[0-9]%'
```

Sol.

	museum_id	name	address	city	state	postal	country	phone	url
1	33	SÃ£o Paulo Museum of Art	"Av. Paulista	1578 - Bela Vista"	SÃ£o Paulo		01310-200	Brazil	+55 11 3149-5959,https://masp.org.br/
2	34	The State Hermitage Museum	Palace Square	2	Sankt-Peterburg	190000	Russia		7 812 710-90-79	https://www.hermitagemuseum.org/wps/portal/hermita
3	36	Museum Folkwang	Museumsplatz 1	45128	Essen			Germany	49 201 8845000	https://www.museum-folkwang.de/en
4	37	Museum of Grenoble	5 Pl. de Lavalette	38000	Grenoble			France	33 4 76 63 44 44	https://www.museedegrenoble.fr/1986-the-museum-in-
5	38	MusÃ©e des Beaux-Arts de Quimper	40 Pl. Saint-Corentin	29000	Quimper			France	33 2 98 95 45 20	https://www.mbaq.fr/en/home-3.html
6	40	MusÃ©e du Louvre	Rue de Rivoli	75001	Paris			France	33 1 40 20 50 50	https://www.louvre.fr/en
7	50	The Prado Museum	"C. de Ruiz de Alar...	23"	Madrid		28014	Spain	+34 913 30 28 00,https://www.museodelprado.es/en
8	54	"Museum of Fine Arts	Houston"	1001 Bissonnet St	Houston	TX	77005	USA	+1 713 639-7300,https://www.mfah.org/
9	56	Thussen-Bornemisza Museum	"P.Âº del Prado	8"	Madrid		28014	Spain	+ 34 917 91 13 70,https://www.museothyssen.org/en
10	70	Uffizi Gallery Italy	"Piazzale degli Uffizi	6"	Firenze	FL	50122	Italy	+39 055 294883,https://www.uffizi.it/en
11	74	KrÃ¶ller-MÃ¼ller Museum	Houtkampweg 6	6731 AW Otterlo				Netherla...	+31 318 591 241	https://krollermuller.nl/en

```sql
--QUES. 19. Identify the artist and the museum where the most expensive and least expensive
--painting is placed. Display the artist name, sale_price, painting name, museum
--name, museum city and canvas label


    select a.full_name, p.sale_price, w.name [painting_name], m.name [museum_name], m.city, c.label

    from artist a inner join work w
    on convert(varchar,a.artist_id) = convert(varchar,w.artist_id) inner join product_size p
    on convert(varchar,w.work_id) = convert(varchar,p.work_id) inner join museum m on
    convert(varchar,w.museum_id) = convert(varchar,m.museum_id) inner join canvas_size c
    on convert(varchar,p.size_id) = convert(varchar,c.size_id)

    where p.sale_price = ( select max(sale_price) from product_size )



    select top 1 a.full_name, p.sale_price, w.name [painting_name], m.name [museum_name], m.city, c.label

    from artist a inner join work w
    on convert(varchar,a.artist_id) = convert(varchar,w.artist_id) inner join product_size p
    on convert(varchar,w.work_id) = convert(varchar,p.work_id) inner join museum m on
    convert(varchar,w.museum_id) = convert(varchar,m.museum_id) inner join canvas_size c
    on convert(varchar,p.size_id) = convert(varchar,c.size_id)

    where p.sale_price = ( select min(sale_price) from product_size )
```

Query

```
--QUES. 9  Fetch the top 10 most famous painting subject

    select *
    from
        (
        select  subject, count(subject) [sub_count], rank() over(order by count(subject) desc) [ranks]
        from subject
        group by subject ) sub
    where ranks <= 10
```

Sol.

subject	sub_count	ranks
Portraits	1070	1
Nude	525	2
Landscape Art	495	3
Rivers/Lakes	480	4
Abstract/Modern Art	457	5
Flowers	457	5
Still-Life	395	7
Seascapes	324	8
Marine Art/Maritime	268	9
Horses	265	10

```
--QUES. 10 Identify the museums which are open on both Sunday and Monday. Display
--museum name, city.

    select distinct m.name, m.city
    from museum m inner join museum_hours mh
    on m.museum_id = mh.museum_id
    where day = 'Sunday'

    intersect

    select distinct m.name, m.city
    from museum m inner join museum_hours mh
    on m.museum_id = mh.museum_id
    where day = 'Monday'
```

Query

Query

```
--QUES. 11 How many museums are open every single day?

    select m.museum_id , m.[name] , count(day) [no_of_days]
    from museum_hours mh inner join museum m
    on mh.museum_id = m.museum_id
    group by m.museum_id , m.[name]
    having count(day) = 7
```

```sql
--QUES.15. Which museum is open for the longest during a day. Dispay museum name, state
--and hours open and which day?


    with fix_time
    as (
        select m.museum_id [ids], m.name [names], mh.day [days],
        cast(replace(replace([open] , ':AM' , ' AM') , ':PM' , ' PM') as time) [new_open_time] ,
        cast(replace(replace([close] , ':AM' , ' AM') , ':PM' , ' PM') as time) [new_close_time]

        from museum m
        inner join museum_hours mh
        on m.museum_id = mh.museum_id
    )


    select ids , names , days , hours_opened
    from
        (
        select ids, names , days , hours_opened , rank() over(order by hours_opened desc) [rn]
        from
            (
            select ids , names , days , DATEDIFF(hour, new_open_time , new_close_time) [hours_opened]
            from fix_time ) sub ) sub2
    where rn = 1;
```

```sql
--QUES.18 Display the country and the city with most no of museums. Output 2 seperate
--columns to mention the city and country. If there are multiple value, seperate them
--with comma.


    select top 1 m.country [countries],
    count(m.[name]) over(partition by country) [museum_in_country],
    m.city [cities],
    count(m.[name]) over(partition by city) [museum_in_city]
    from museum m          column country(varchar, null)

    where m.country not like '%[0-9]%'
      and m.city not like '%0-9%'
      and m.city not like '%-%'
      and m.city not like '%"%'

    group by m.country, m.city, m.name
    order by museum_in_country desc, museum_in_city desc
```

Query

Query

```sql
--QUES  21. Which are the 3 most popular and 3 least popular painting styles?

    select [Most Popular Styles] [Most popular and least popular] , count_of_style
    from
    (
        select style [Most Popular Styles], count_of_style
        from
          (
          select style ,  count(style) [count_of_style] , rank() over(order by count(style) desc) [rn]
          from work w
          where style is not null
          group by style ) sub
    where rn <= 3
    union all
    select  style [Least Popular Styles], count_of_style
    from
          (
          select  style ,  count(style) [count_of_style] , rank() over(order by count(style)) [rn]
          from work w
          where style is not null
          group by style ) sub
    where rn <= 3 ) sub2 ;
```

Thank you!