

SQL interview Preparation

- 6 important SQL questions for goods hands on including joins, filter, cte and windows function

```
In [2]: # Installing db-sqlite3
# !pip install db-sqlite3
```

```
In [3]: import pandas as pd
import sqlite3
from datetime import date
```

```
In [4]: #connecting and creating with the database.
db = sqlite3.connect("testing.db")
db.execute("drop table if exists results")
```

```
Out[4]: <sqlite3.Cursor at 0x7fe47d75a110>
```

1. Derrive points table for ICC tournaments

```
In [5]: # Create table
try:
    db.execute("create table icc_world_cup(Team_1 Varchar(20),Team_2 Varchar(20),Winner Varchar(20))")
except:
    print("Already table existed !!")
# Insert values
input = [
    "INSERT INTO icc_world_cup values('India','SL','India');",
    "INSERT INTO icc_world_cup values('SL','Aus','Aus');",
    "INSERT INTO icc_world_cup values('SA','Eng','Eng');",
    "INSERT INTO icc_world_cup values('Eng','NZ','NZ');",
    "INSERT INTO icc_world_cup values('Aus','India','India');"]
for i in input:
    db.execute(i)
    db.commit()
```

```
In [6]: qry = """
select * from icc_world_cup;
"""
pd.read_sql_query(qry, db)
```

```
Out[6]:
```

	Team_1	Team_2	Winner
0	India	SL	India
1	SL	Aus	Aus
2	SA	Eng	Eng
3	Eng	NZ	NZ
4	Aus	India	India

Expected Output:

	team_name	no_of_matches_played	no_of_matches_won	no_of_matches_loss
0	Aus	2	1	1
1	Eng	2	1	1
2	India	2	2	0
3	NZ	1	1	0
4	SA	1	0	1
5	SL	2	0	2

```
In [7]: qry = """
select
team_name,
count(1) as no_of_matches_played,
sum(winner_flag) as no_of_matches_won,
count(1)-sum(winner_flag) as no_of_matches_loss
from
(select
Team_1 as team_name,
case when Winner=Team_1 then 1 else 0 end as winner_flag
from icc_world_cup
union all
select
Team_2 as team_name,
case when Winner=Team_2 then 1 else 0 end as winner_flag
from icc_world_cup) A
group by 1
"""
pd.read_sql_query(qry, db)
```

```
Out[7]:
```

	team_name	no_of_matches_played	no_of_matches_won	no_of_matches_loss
0	Aus	2	1	1
1	Eng	2	1	1
2	India	2	2	0
3	NZ	1	1	0
4	SA	1	0	1
5	SL	2	0	2

2. Find new and repeat customers

```
In [8]: # Create table
try:
    db.execute("""create table customer_orders (
order_id integer,
```

```
customer_id integer,
order_date datetime,
order_amount integer
);"""
except:
    print("Already table existed !!")
# Insert values
input = [
    """insert into customer_orders values
    (1,100,date('2022-01-01'),2000),
    (2,200,date('2022-01-01'),2500),
    (3,300,date('2022-01-01'),2100),
    (4,100,date('2022-01-02'),2000),
    (5,400,date('2022-01-02'),2200),
    (6,500,date('2022-01-02'),2700),
    (7,100,date('2022-01-03'),3000),
    (8,400,date('2022-01-03'),1000),
    (9,600,date('2022-01-03'),3000)
    ;"""
]
for i in input:
    db.execute(i)
    db.commit()
```

```
In [9]: qry = """
select * from customer_orders;
"""
pd.read_sql_query(qry, db)
```

```
Out[9]:
```

	order_id	customer_id	order_date	order_amount
0	1	100	2022-01-01	2000
1	2	200	2022-01-01	2500
2	3	300	2022-01-01	2100
3	4	100	2022-01-02	2000
4	5	400	2022-01-02	2200
5	6	500	2022-01-02	2700
6	7	100	2022-01-03	3000
7	8	400	2022-01-03	1000
8	9	600	2022-01-03	3000

Expected Output:

	order_date	no_of_new_customers	no_of_repeat_customers
0	2022-01-01	3	0
1	2022-01-02	2	1
2	2022-01-03	1	2

```
In [10]: qry = """
with first_visit as (
select
customer_id,
min(order_date) as first_visit_date
from customer_orders
group by 1
),

visit_flag as (
select
co.*, first_visit_date,
case when co.order_date=fv.first_visit_date then 1 else 0 end as first_visit_flag ,
case when co.order_date=fv.first_visit_date then 1 else 0 end as repeat_visit_flag
from customer_orders co
inner join first_visit fv
on co.customer_id=fv.customer_id
)

select
order_date,
sum(first_visit_flag) as no_of_new_customers,
sum(repeat_visit_flag) as no_of_repeat_customers
from visit_flag
group by 1
"""
pd.read_sql_query(qry, db)
```

```
Out[10]:
```

	order_date	no_of_new_customers	no_of_repeat_customers
0	2022-01-01	3	0
1	2022-01-02	2	1
2	2022-01-03	1	2

3. Scenario based question

```
In [11]: # Create table
try:
    db.execute("""
    create table entries (
    name varchar(20),
    address varchar(20),
    email varchar(20),
    floor int,
    resources varchar(10));
    """)
except:
    print("Already table existed !!")
# Insert values
input = ["""
insert into entries values
('A','Bangalore','A@gmail.com',1,'CPU'),
('A','Bangalore','A1@gmail.com',1,'CPU'),
('A','Bangalore','A2@gmail.com',2,'DESKTOP'),
"""]
```

```

('B','Bangalore','B@gmail.com',2,'DESKTOP'),
('B','Bangalore','B1@gmail.com',2,'DESKTOP'),
('B','Bangalore','B2@gmail.com',1,'MONITOR')
"""
for i in input:
    db.execute(i)
    db.commit()

```

```

In [12]: qry = """
select
*
from entries
"""
pd.read_sql_query(qry, db)

```

```

Out[12]:
  name  address  email  floor  resources
0    A  Bangalore  A@gmail.com    1    CPU
1    A  Bangalore  A1@gmail.com    1    CPU
2    A  Bangalore  A2@gmail.com    2  DESKTOP
3    B  Bangalore  B@gmail.com    2  DESKTOP
4    B  Bangalore  B1@gmail.com    2  DESKTOP
5    B  Bangalore  B2@gmail.com    1  MONITOR

```

Expected Output:

	name	most_visited_floor	total_visits	used_resources
0	A	1	3	CPU_DESKTOP
1	B	2	3	DESKTOP_MONITOR

```

In [13]: qry = """
with floor_visit as(
select
name, floor, count(1) as no_of_floor_visits,
rank() over(partition by name order by count(1) desc) as rn
from entries
group by 1,2
),
total_visit as(
select
name,
count(1) as total_visits,
group_concat(resources,',' ) as resouces_uses
from entries group by 1
),
distinct_resources as(
select
distinct name,
resources from entries
),
agg_resources as (
select
name,
group_concat(resources,',' ) as used_resouces
from distinct_resources
group by 1
)

select
fv.name,
fv.floor as most_visited_floor,
tv.total_visits,
ar.used_resources
from floor_visit fv
inner join total_visit tv
on fv.name = tv.name
inner join agg_resources ar
on fv.name = ar.name
where fv.rn=1
"""
pd.read_sql_query(qry, db)

```

```

Out[13]:
  name  most_visited_floor  total_visits  used_resources
0    A                   1             3    CPU_DESKTOP
1    B                   2             3  DESKTOP_MONITOR

```

4. Write a query to find PersonID, Name, number of friends, sum of marks of person who have friends with total score greater than 100

```

In [14]: import os
os.chdir('/content/drive/MyDrive/Interview Related Documents/SQL/Datasets')
os.getcwd()

```

```

Out[14]: '/content/drive/MyDrive/Interview Related Documents/SQL/Datasets'

```

```

In [15]: df_person = pd.read_excel("person.xlsx")
df_friend = pd.read_excel("friend.xls")
df_person.to_sql("person", db, if_exists='append', index=False)
df_friend.to_sql("friend", db, if_exists='append', index=False)

```

Expected Output:

	PersonID	Name	no_of_friends	total_friend_score
0	2	Bob	2	115
1	4	Tara	3	101

```

In [16]: qry = """
select * from person;
"""
pd.read_sql_query(qry, db)

```

Out[16]:

	PersonID	Name	Email	Score
0	1	Alice	alice2018@hotmail.com	88
1	2	Bob	bob2018@hotmail.com	11
2	3	Davis	davis2018@hotmail.com	27
3	4	Tara	tara2018@hotmail.com	45
4	5	John	john2018@hotmail.com	63

In [17]:

```
qry = """
select * from friend;
"""
pd.read_sql_query(qry, db)
```

Out[17]:

	PersonID	FriendID
0	1	2
1	1	3
2	2	1
3	2	3
4	3	5
5	4	2
6	4	3
7	4	5

In [26]:

```
qry = """
with score_details as (
select
f.PersonID,
count(1) as no_of_friends,
sum(P.Score) as total_friend_score
from friend f inner join person p
on f.friendID = p.PersonID
group by 1
having sum(P.Score)>100
)

select
s.PersonID,
p.Name,
s.no_of_friends,
s.total_friend_score
from score_details s inner join person p
on s.PersonID = p.PersonID
"""
# We used having for filter in aggregated columns
pd.read_sql_query(qry, db)
```

Out[26]:

	PersonID	Name	no_of_friends	total_friend_score
0	2	Bob	2	115
1	4	Tara	3	101

5. Pareto Principle (80/20 Rule)

- The Pareto Principle states that for many outcomes, roughly 80 % of consequences come from 20 % of causes.
- Examples:
 - 80 % of the productivity come from 20 % of the employee
 - 80 % of your sales come from 20 % of your clients
 - 80 % of your sales comes from 20 % of your product or services
- **Our goal is to find which are top 20 % products wwhich are giving 80 % of the sales.**

In [28]:

```
df_orders = pd.read_excel("Superstore_orders.xls")
df_orders.to_sql("orders", db, if_exists='append', index=False)
```

In [30]:

```
qry = """
select
*
from orders
"""
pd.read_sql_query(qry, db).head()
```

Out[30]:

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	Segment	Country/Region	City	...	Postal_Code	Region	Product_ID	Category	Sub_Category	Product_Name	Sales	Quantity	I
0	1	CA-2020-152156	2020-11-08 00:00:00	2020-11-11 00:00:00	Second Class	CG-12520	Claire Gute	Consumer	United States	Henderson	...	42420.0	South	FUR-BO-10001798	Furniture	Bookcases	Bush Somerset Collection Bookcase	261.9600	2	
1	2	CA-2020-152156	2020-11-08 00:00:00	2020-11-11 00:00:00	Second Class	CG-12520	Claire Gute	Consumer	United States	Henderson	...	42420.0	South	FUR-CH-10000454	Furniture	Chairs	Hon Deluxe Fabric Upholstered Stacking Chairs,...	731.9400	3	
2	3	CA-2020-138688	2020-06-12 00:00:00	2020-06-16 00:00:00	Second Class	DV-13045	Darrin Van Huff	Corporate	United States	Los Angeles	...	90036.0	West	OFF-LA-10000240	Office Supplies	Labels	Self-Adhesive Address Labels for Typewriters b...	14.6200	2	
3	4	US-2019-108966	2019-10-11 00:00:00	2019-10-18 00:00:00	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	Fort Lauderdale	...	33311.0	South	FUR-TA-10000577	Furniture	Tables	Bretford CR4500 Series Slim Rectangular Table	957.5775	5	
4	5	US-2019-108966	2019-10-11 00:00:00	2019-10-18 00:00:00	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	Fort Lauderdale	...	33311.0	South	OFF-ST-10000760	Office Supplies	Storage	Eldon Fold 'N Roll Cart System	22.3680	2	

5 rows × 21 columns

Expected Output: Top 20 % products which are contributing 80 % of the sales

Product_ID	
0	TEC-CO-10004722
1	OFF-BI-10003527
2	TEC-MA-10002412
3	FUR-CH-10002024
4	OFF-BI-10001359
...	...
408	TEC-MA-10002178
409	TEC-PH-10004434
410	TEC-PH-10001750
411	OFF-AP-10002311
412	TEC-MA-10004212

413 rows × 1 columns

```
In [43]: qry = """
with product_wise_sales as(
select
Product_ID,
sum(Sales) as product_sales
from orders
group by 1
order by product_sales desc
),
cal_sales as(
select
Product_ID,
product_sales,
sum(product_sales) over(order by product_sales desc rows between unbounded preceding and 0 preceding) as running_sales,
0.8*sum(product_sales) over() as total_sales
from product_wise_sales
)
select
Product_ID
from cal_sales
where running_sales <= total_sales
"""
pd.read_sql_query(qry, db)
```

```
Out[43]:
```

Product_ID	
0	TEC-CO-10004722
1	OFF-BI-10003527
2	TEC-MA-10002412
3	FUR-CH-10002024
4	OFF-BI-10001359
...	...
408	TEC-MA-10002178
409	TEC-PH-10004434
410	TEC-PH-10001750
411	OFF-AP-10002311
412	TEC-MA-10004212

413 rows × 1 columns

6. Trips and Users

- Write a SQL query to find the cancellation rate of requests with unbanned users (both client and driver must not be banned) each day between "2013-10-01" and "2013-10-03". Round cancellation Rate to two decimal points
- The cancelation rate is computed by dividing the number of canceled (by client or driver) requests with unbanned users by the total number of requests with unbanned users on that day

```
In [44]: # Create table
try:
    db.execute("""
    Create table Trips (id int, client_id int, driver_id int, city_id int, status varchar(50), request_at varchar(50));
    """)
    db.execute("""
    Create table Users (users_id int, banned varchar(50), role varchar(50));
    """)

except:
    print("Already table existed !!")

# Insert values
input_trips = [
    "insert into Trips (id, client_id, driver_id, city_id, status, request_at) values ('1', '1', '10', '1', 'completed', '2013-10-01');",
    "insert into Trips (id, client_id, driver_id, city_id, status, request_at) values ('2', '2', '11', '1', 'cancelled_by_driver', '2013-10-01');",
    "insert into Trips (id, client_id, driver_id, city_id, status, request_at) values ('3', '3', '12', '6', 'completed', '2013-10-01');",
    "insert into Trips (id, client_id, driver_id, city_id, status, request_at) values ('4', '4', '13', '6', 'cancelled_by_client', '2013-10-01');",
    "insert into Trips (id, client_id, driver_id, city_id, status, request_at) values ('5', '1', '10', '1', 'completed', '2013-10-02');",
    "insert into Trips (id, client_id, driver_id, city_id, status, request_at) values ('6', '2', '11', '6', 'completed', '2013-10-02');",
    "insert into Trips (id, client_id, driver_id, city_id, status, request_at) values ('7', '3', '12', '6', 'completed', '2013-10-02');",
    "insert into Trips (id, client_id, driver_id, city_id, status, request_at) values ('8', '2', '12', '12', 'completed', '2013-10-03');",
    "insert into Trips (id, client_id, driver_id, city_id, status, request_at) values ('9', '3', '10', '12', 'completed', '2013-10-03');",
    "insert into Trips (id, client_id, driver_id, city_id, status, request_at) values ('10', '4', '13', '12', 'cancelled_by_driver', '2013-10-03');"
]

for i in input_trips:
    db.execute(i)
    db.commit()

input_users = [
    "insert into Users (users_id, banned, role) values ('1', 'No', 'client');",
    "insert into Users (users_id, banned, role) values ('2', 'Yes', 'client');",
    "insert into Users (users_id, banned, role) values ('3', 'No', 'client');",
    "insert into Users (users_id, banned, role) values ('4', 'No', 'client');",
    "insert into Users (users_id, banned, role) values ('10', 'No', 'driver');",
    "insert into Users (users_id, banned, role) values ('11', 'No', 'driver');",
    "insert into Users (users_id, banned, role) values ('12', 'No', 'driver');",
    "insert into Users (users_id, banned, role) values ('13', 'No', 'driver');"
]
```

```
for i in input_users:
    db.execute(i)
    db.commit()
```

```
In [45]: qry = """
select
*
from Trips
"""
pd.read_sql_query(qry, db)
```

```
Out[45]:
```

	id	client_id	driver_id	city_id	status	request_at
0	1	1	10	1	completed	2013-10-01
1	2	2	11	1	cancelled_by_driver	2013-10-01
2	3	3	12	6	completed	2013-10-01
3	4	4	13	6	cancelled_by_client	2013-10-01
4	5	1	10	1	completed	2013-10-02
5	6	2	11	6	completed	2013-10-02
6	7	3	12	6	completed	2013-10-02
7	8	2	12	12	completed	2013-10-03
8	9	3	10	12	completed	2013-10-03
9	10	4	13	12	cancelled_by_driver	2013-10-03

```
In [46]: qry = """
select
*
from Users
"""
pd.read_sql_query(qry, db)
```

```
Out[46]:
```

	users_id	banned	role
0	1	No	client
1	2	Yes	client
2	3	No	client
3	4	No	client
4	10	No	driver
5	11	No	driver
6	12	No	driver
7	13	No	driver

Expected Output:

	request_at	cancellation_rate
0	2013-10-01	33.333333
1	2013-10-02	0.000000
2	2013-10-03	50.000000

```
In [60]: qry = """
with unbanned_users_trips as(
select
*
from Trips t
inner join Users u on t.client_id = u.users_id
inner join Users d on t.driver_id = d.users_id
where u.banned = 'No' and d.banned = 'No'
),
cancelled_trips_cal as(
select
request_at,
count(case when status in ('cancelled_by_client', 'cancelled_by_driver') then 1 else null end) as cancelled_trips_count,
count(1) as total_trips
from unbanned_users_trips
group by 1
)
select
request_at,(cancelled_trips_count*1.0/total_trips)*100 as cancellation_rate
from cancelled_trips_cal
"""
pd.read_sql_query(qry, db)
```

```
Out[60]:
```

	request_at	cancellation_rate
0	2013-10-01	33.333333
1	2013-10-02	0.000000
2	2013-10-03	50.000000

Source:

- <https://www.youtube.com/playlist?list=PLBTZqjSKn0leKBQDjLmzisazhqQy4iGkb>

THE END