7qz2gvh4w

January 4, 2025

```python
[1]: import sqlite3
     import pandas as pd
     from IPython.display import display, clear_output
```

```python
[2]: db_path = 'Chinook_Sqlite.sqlite'
     conn = sqlite3.connect(db_path)
     cursor = conn.cursor()
     cursor.execute("SELECT name FROM sqlite_master WHERE type='table';")
     cursor.fetchall()
```

```
[2]: [('Album',),
      ('Artist',),
      ('Customer',),
      ('Employee',),
      ('Genre',),
      ('Invoice',),
      ('InvoiceLine',),
      ('MediaType',),
      ('Playlist',),
      ('PlaylistTrack',),
      ('Track',)]
```

```python
[3]: def sql_command(command):
         cursor.execute(command)
         if cursor.description:
             column_names = [description[0] for description in cursor.description]
             display(pd.DataFrame(cursor.fetchall(), columns = column_names))
```

```python
[4]: sql_command("SELECT * FROM Customer LIMIT 5;")
     sql_command('select * from invoice LIMIT 5;')
     sql_command('select * from invoiceLine LIMIT 5;')
     sql_command('select * from Track LIMIT 5;')
```

```
   CustomerId  FirstName    LastName  \
0           1       Luís   Gonçalves
1           2     Leonie      Köhler
2           3   François    Tremblay
3           4      Bjørn      Hansen
```

```
4          5  František  Wichterlová


                                           Company  \
0  Embraer - Empresa Brasileira de Aeronáutica S.A.
1                                             None
2                                             None
3                                             None
4                                  JetBrains s.r.o.


                        Address              City State        Country  \
0  Av. Brigadeiro Faria Lima, 2170  São José dos Campos    SP          Brazil
1          Theodor-Heuss-Straße 34         Stuttgart  None         Germany
2               1498 rue Bélanger          Montréal    QC          Canada
3               Ullevålsveien 14              Oslo  None          Norway
4                  Klanova 9/506            Prague  None  Czech Republic


  PostalCode              Phone                 Fax  \
0  12227-000  +55 (12) 3923-5555  +55 (12) 3923-5566
1      70174     +49 0711 2842222                None
2    H2G 1A7    +1 (514) 721-4711                None
3       0171      +47 22 44 22 22                None
4      14700     +420 2 4172 5555    +420 2 4172 5555


                    Email  SupportRepId
0       luisg@embraer.com.br            3
1      leonekohler@surfeu.de            5
2       ftremblay@gmail.com            3
3      bjorn.hansen@yahoo.no            4
4  frantisekw@jetbrains.com            4

   InvoiceId  CustomerId          InvoiceDate             BillingAddress  \
0          1           2  2009-01-01 00:00:00  Theodor-Heuss-Straße 34
1          2           4  2009-01-02 00:00:00         Ullevålsveien 14
2          3           8  2009-01-03 00:00:00          Grétrystraat 63
3          4          14  2009-01-06 00:00:00           8210 111 ST NW
4          5          23  2009-01-11 00:00:00           69 Salem Street

  BillingCity BillingState BillingCountry BillingPostalCode  Total
0   Stuttgart         None        Germany            70174   1.98
1        Oslo         None         Norway             0171   3.96
2    Brussels         None        Belgium             1000   5.94
3    Edmonton           AB         Canada           T6G 2C7   8.91
4      Boston           MA            USA             2113  13.86

   InvoiceLineId  InvoiceId  TrackId  UnitPrice  Quantity
0              1          1        2       0.99         1
1              2          1        4       0.99         1
2              3          2        6       0.99         1
3              4          2        8       0.99         1
```

```
4             5         2       10       0.99         1
```

	TrackId	Name	AlbumId	MediaTypeId
0	1	For Those About To Rock (We Salute You)	1	1
1	2	Balls to the Wall	2	2
2	3	Fast As a Shark	3	2
3	4	Restless and Wild	3	2
4	5	Princess of the Dawn	3	2

	GenreId	Composer	Milliseconds
0	1	Angus Young, Malcolm Young, Brian Johnson	343719
1	1	None	342562
2	1	F. Baltes, S. Kaufman, U. Dirkscneider & W. Ho…	230619
3	1	F. Baltes, R.A. Smith-Diesel, S. Kaufman, U. D…	252051
4	1	Deaffy & R.A. Smith-Diesel	375418

	Bytes	UnitPrice
0	11170334	0.99
1	5510424	0.99
2	3990994	0.99
3	4331779	0.99
4	6290521	0.99

1 Requirment 1:

```
[5]: sql_command('''
            with invoiceCountItems as (
                select
                    invoice.*,
                    count(invoiceline.InvoiceId) as NumberOfItems
                from
                    invoice
                left join
                    invoiceline on invoice.invoiceid = invoiceline.invoiceid
                GROUP BY
                    invoice.InvoiceId
            ),
            profit_per_customer as (
                select
                    customer.CustomerId,
                    concat( customer.FirstName, ' ', customer.LastName) as↵
    ↪FullName,
                    count(invoiceCountItems.CustomerId) as NumberOfInvoices,
                    sum(invoiceCountItems.Total) as TotalPerCustomer,
                    sum(invoiceCountItems.NumberOfItems) as NumberOfItems
                from
                    customer
```

```
                 inner join
                     invoiceCountItems on customer.CustomerId =␣
↪invoiceCountItems.CustomerId
                 GROUP BY customer.CustomerId
                 )

             select * from profit_per_customer
             order by TotalPerCustomer desc
             limit 10
             ;''')
```

```
   CustomerId            FullName  NumberOfInvoices  TotalPerCustomer  \
0           6         Helena Holý                 7             49.62
1          26  Richard Cunningham                 7             47.62
2          57         Luis Rojas                  7             46.62
3          45     Ladislav Kovács                 7             45.62
4          46       Hugh O'Reilly                 7             45.62
5          24       Frank Ralston                 7             43.62
6          28       Julia Barnett                 7             43.62
7          37     Fynn Zimmermann                 7             43.62
8           7        Astrid Gruber                7             42.62
9          25       Victor Stevens               7             42.62

   NumberOfItems
0             38
1             38
2             38
3             38
4             38
5             38
6             38
7             38
8             38
9             38
```

1.0.1 Requirment 2:

```
[6]: sql_command(""" with invoiceline_trackname as (
                     select
                         track.trackid,
                         track.name,
                         sum(invoiceline.unitprice * invoiceline.quantity )␣
↪as Total,
                         count(invoiceline.quantity) as quantitysold
                     from
                         invoiceline
                     inner join
```

```
                        track on invoiceline.TrackId = track.TrackId
                    group by
                        track.trackid
                )
            select
                TrackId,
                Name,
                Total,
                quantitysold,
                rank() over(order by quantitysold desc)
                        as salesRank
            from
                invoiceline_trackname
            order by salesRank asc
            LIMIT 10;
        """)
```

```
    trackid                        name  Total  quantitysold  salesRank
0         2         Balls to the Wall   1.98             2          1
1         8          Inject The Venom   1.98             2          1
2         9                Snowballed   1.98             2          1
3        20                  Overdose   1.98             2          1
4        32          Deuces Are Wild    1.98             2          1
5        48          Not The Doctor     1.98             2          1
6        66         Por Causa De Você   1.98             2          1
7        84  Welcome Home (Sanitarium)   1.98             2          1
8       161                 Snowblind   1.98             2          1
9       162                Cornucopia   1.98             2          1
```

1.0.2 Requirment 3:

```
[7]: db_path = 'Chinook_Sqlite.sqlite'
     conn = sqlite3.connect(db_path)
     cursor = conn.cursor()
     sql_command('''
         explain
         select
             customerid,
             sum(total) as totalsales
         from
             invoice
         group by
             customerid;
                 ''')
     sql_command('''
         create index if not exists idx_invoice_customerid on invoice(customerid);
                 ''')
```

```
sql_command('''
    explain
    select
        customerid,
        sum(total) as totalsales
    from
        invoice
    group by
        customerid;
        ''')
```

	addr	opcode	p1	p2	p3	p4	p5	comment
0	0	Init	0	37	0	None	0	None
1	1	Noop	1	2	0	None	0	None
2	2	Integer	0	2	0	None	0	None
3	3	Null	0	5	5	None	0	None
4	4	Gosub	4	33	0	None	0	None
5	5	OpenRead	0	396	0	9	0	None
6	6	OpenRead	2	2	0	k(2,,)	0	None
7	7	Rewind	2	22	7	0	0	None
8	8	DeferredSeek	2	0	0	None	0	None
9	9	Column	2	0	6	None	0	None
10	10	Compare	5	6	1	k(1,B)	0	None
11	11	Jump	12	16	12	None	0	None
12	12	Move	6	5	1	None	0	None
13	13	Gosub	3	26	0	None	0	None
14	14	IfPos	2	36	0	None	0	None
15	15	Gosub	4	33	0	None	0	None
16	16	Column	0	8	10	None	0	None
17	17	AggStep	0	10	9	sum(1)	1	None
18	18	If	1	20	0	None	0	None
19	19	Column	2	0	7	None	0	None
20	20	Integer	1	1	0	None	0	None
21	21	Next	2	8	0	None	1	None
22	22	Gosub	3	26	0	None	0	None
23	23	Goto	0	36	0	None	0	None
24	24	Integer	1	2	0	None	0	None
25	25	Return	3	0	0	None	0	None
26	26	IfPos	1	28	0	None	0	None
27	27	Return	3	0	0	None	0	None
28	28	AggFinal	9	1	0	sum(1)	0	None
29	29	Copy	7	11	0	None	0	None
30	30	Copy	9	12	0	None	0	None
31	31	ResultRow	11	2	0	None	0	None
32	32	Return	3	0	0	None	0	None
33	33	Null	0	7	9	None	0	None
34	34	Integer	0	1	0	None	0	None

	addr	opcode	p1	p2	p3	p4	p5	comment
35	35	Return	4	0	0	None	0	None
36	36	Halt	0	0	0	None	0	None
37	37	Transaction	0	0	65	0	1	None
38	38	Goto	0	1	0	None	0	None

	addr	opcode	p1	p2	p3	p4	p5	comment
0	0	Init	0	37	0	None	0	None
1	1	Noop	1	2	0	None	0	None
2	2	Integer	0	2	0	None	0	None
3	3	Null	0	5	5	None	0	None
4	4	Gosub	4	33	0	None	0	None
5	5	OpenRead	0	396	0	9	0	None
6	6	OpenRead	2	2	0	k(2,,)	0	None
7	7	Rewind	2	22	7	0	0	None
8	8	DeferredSeek	2	0	0	None	0	None
9	9	Column	2	0	6	None	0	None
10	10	Compare	5	6	1	k(1,B)	0	None
11	11	Jump	12	16	12	None	0	None
12	12	Move	6	5	1	None	0	None
13	13	Gosub	3	26	0	None	0	None
14	14	IfPos	2	36	0	None	0	None
15	15	Gosub	4	33	0	None	0	None
16	16	Column	0	8	10	None	0	None
17	17	AggStep	0	10	9	sum(1)	1	None
18	18	If	1	20	0	None	0	None
19	19	Column	2	0	7	None	0	None
20	20	Integer	1	1	0	None	0	None
21	21	Next	2	8	0	None	1	None
22	22	Gosub	3	26	0	None	0	None
23	23	Goto	0	36	0	None	0	None
24	24	Integer	1	2	0	None	0	None
25	25	Return	3	0	0	None	0	None
26	26	IfPos	1	28	0	None	0	None
27	27	Return	3	0	0	None	0	None
28	28	AggFinal	9	1	0	sum(1)	0	None
29	29	Copy	7	11	0	None	0	None
30	30	Copy	9	12	0	None	0	None
31	31	ResultRow	11	2	0	None	0	None
32	32	Return	3	0	0	None	0	None
33	33	Null	0	7	9	None	0	None
34	34	Integer	0	1	0	None	0	None
35	35	Return	4	0	0	None	0	None
36	36	Halt	0	0	0	None	0	None
37	37	Transaction	0	0	65	0	1	None
38	38	Goto	0	1	0	None	0	None

[ ]: