Answering Business Questions for Chinook Using SQL

Introduction:

The Chinook record store has just signed a deal with a new record label, and I've been tasked with selecting the first three albums that will be added to the store, from a list of four. All four albums are by artists that don't have any tracks in the store right now - we have the artist names, and the genre of music they produce:

Artist Name	Genre
Regal	Hip-Hop
Red Tone	Punk
Meteor and the Girls	Pop
Slim Jim Bites	Blues

The record label specializes in artists from the USA, and they have given Chinook some money to advertise the new albums in the USA, so we're interested in finding out which genres sell the best in the USA.

Loading in the database and exploring the database:

In [1]:
```
%%capture
%load_ext sql
%sql sqlite:///chinook.db
```

Out[1]:
```
'Connected: None@chinook.db'
```

In [2]:
```
%%sql
```

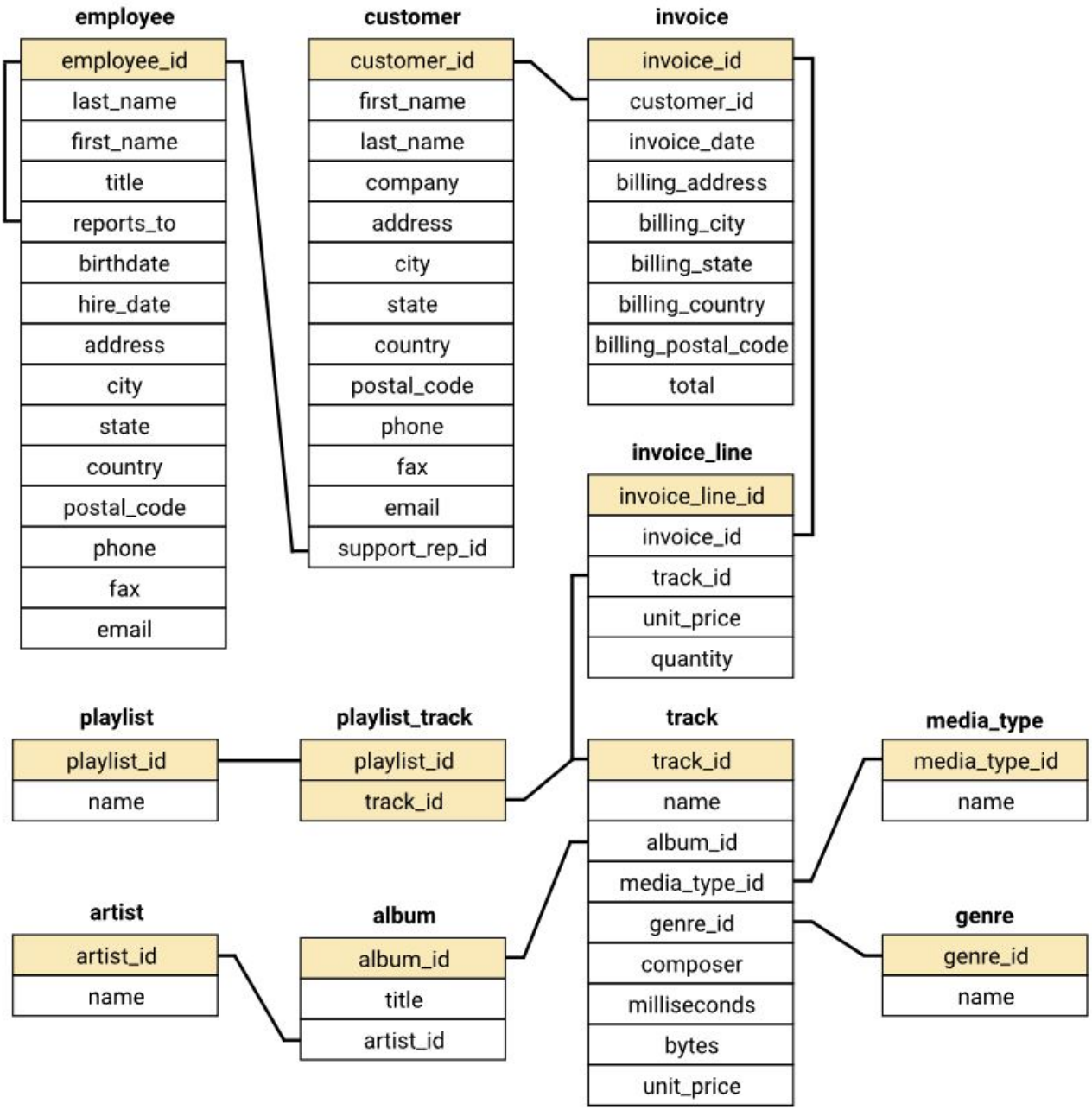
```
SELECT
    name,
    type
FROM sqlite_master
WHERE type IN ("table","view");
```

```
Done.
```

Out[2]:

name	type
album	table
artist	table
customer	table
employee	table
genre	table
invoice	table
invoice_line	table
media_type	table
playlist	table
playlist_track	table
track	table
country_data	view

The schema of the database:



Selecting Albums to Purchase:

In [3]:

```
%%sql

WITH
     usa_customers AS
     (SELECT *
       FROM customer AS c
      INNER JOIN invoice AS i
            ON i.customer_id = c.customer_id
      INNER JOIN invoice_line AS il
            ON il.invoice_id = i.invoice_id
      WHERE i.billing_country = 'USA')

SELECT gn.name AS Genre,
       billing_country,
       COUNT(total) AS track_sold,
       ROUND(CAST (COUNT(usa_customers.invoice_line_id) AS FLOAT) / (
        SELECT COUNT(*)
          FROM usa_customers) *100 ,1) AS percentage
  FROM usa_customers
```

```
INNER JOIN track AS t
      ON t.track_id = usa_customers.track_id
INNER JOIN genre AS gn
      ON gn.genre_id = t.genre_id
GROUP BY Genre
ORDER BY track_sold DESC;
```

```
Done.
```

Out[3]:

Genre	billing_country	track_sold	percentage
Rock	USA	561	53.4
Alternative & Punk	USA	130	12.4
Metal	USA	124	11.8
R&B/Soul	USA	53	5.0
Blues	USA	36	3.4
Alternative	USA	35	3.3
Latin	USA	22	2.1
Pop	USA	22	2.1
Hip Hop/Rap	USA	20	1.9
Jazz	USA	14	1.3
Easy Listening	USA	13	1.2
Reggae	USA	6	0.6
Electronica/Dance	USA	5	0.5
Classical	USA	4	0.4
Heavy Metal	USA	3	0.3
Soundtrack	USA	2	0.2
TV Shows	USA	1	0.1

Top 3 Albums to purchase would be:

1) Red Tone's in the Punk genre as Punk is ranked number 2.

2) Slim Jim Bites in the Blues genre. Blues is ranked number 5.

3) Meteor and the Girls in the Pop genre. Pop is ranked number 8.

Regal is in the Hip-Hop Genre. Hip Hop is ranked number 9. Which is the lowest of the 4.

Analyzing Employee Sales Performance:

Chinook has asked for the performance of each sales employee to be analyzed. I will analyze the purchases of customers belonging to each employee to see if any sales support agent is performing either better or worse than the others.

In [4]:

```
%%sql

WITH
    total_sale AS
        (SELECT SUM(i.total)
```

```
FROM invoice AS i
  INNER JOIN customer AS cs
            ON cs.customer_id = i.customer_id)

SELECT em.first_name|| " " || em.last_name AS employee_name,
       em.title,
       em.hire_date as hire_date,
       ROUND(SUM(i.total)) AS total_sales,
       ROUND (CAST(SUM(i.total) AS FLOAT) /
            (SELECT * FROM total_sale)* 100, 1) AS total_pct,
       COUNT(i.customer_id) AS total_customers

  FROM employee AS em
  INNER JOIN customer AS cs
            ON cs.support_rep_id = em.employee_id
  INNER JOIN invoice AS i
            ON i.customer_id = cs.customer_id
  WHERE em.title = 'Sales Support Agent'
  GROUP BY employee_name
```

```
Done.
```

Out[4]:

employee_name	title	hire_date	total_sales	total_pct	total_customers
Jane Peacock	Sales Support Agent	2017-04-01 00:00:00	1732.0	36.8	212
Margaret Park	Sales Support Agent	2017-05-03 00:00:00	1584.0	33.6	214
Steve Johnson	Sales Support Agent	2017-10-17 00:00:00	1394.0	29.6	188

Summary of Employee Sales:

As we can see Jane Peacock is the top seller with 1,732 total sales with a 36.8% total sales percent. Margaret Park is in second place and Steve Johnson is in last place.

There is not much data to support the difference between employee performance besides start date. Jane has the most time on the job by 6 months compared to Steve Johnson.

Many factors can impact performance that we are missing data on. Such as the time the employee works, the hours a week worked, etc.

Analyzing Sales by Country:

Chinook has now asked for the sales data for customers in each country. Specifically they want to calculate data, for each country, on the:

- Total number of customers
- Total value of sales
- Average value of sales per customer
- Average order value

Because there are a number of countries with only one customer, Chinook wants these to be grouped as "Other". As they are more interested in countries with more than one customer.

In [5]:

```
%%sql

WITH

countries_count AS
    (SELECT c.country AS country, COUNT(c.customer_id) AS total_customers
```

```
        FROM customer AS c
      GROUP BY c.country
      ORDER BY total_customers DESC),

sales_data AS
      (SELECT c.country AS country, ROUND(SUM(i.total), 2) AS total_sales,
              COUNT(i.invoice_id) AS num_sales
         FROM customer AS c
         JOIN invoice AS i
           ON c.customer_id = i.customer_id
        GROUP BY c.country),

other_countries AS
      (SELECT CASE WHEN countries_count.total_customers = 1 THEN 'Others'
                                  ELSE countries_count.country END AS country_name,
                           SUM(countries_count.total_customers) AS total_customers,
                           SUM(sales_data.total_sales) AS total_sales,
                           SUM(sales_data.num_sales) AS number_sales
                      FROM countries_count
                      JOIN sales_data
                        ON countries_count.country = sales_data.country
                     GROUP BY 1)

SELECT country_name,
       total_customers,
       total_sales,
       ROUND(total_sales / number_sales, 2) AS avg_order_value,
       ROUND(total_sales / total_customers, 2) AS avg_sales_per_customer
  FROM (SELECT *,
          CASE WHEN country_name = 'Others' THEN 1
          ELSE 0
           END AS sort
          FROM other_countries)
  ORDER BY sort, total_customers DESC;
```

```
Done.
```

Out[5]:

country_name	total_customers	total_sales	avg_order_value	avg_sales_per_customer
USA	13	1040.49	7.94	80.04
Canada	8	535.59	7.05	66.95
Brazil	5	427.68	7.01	85.54
France	5	389.07	7.78	77.81
Germany	4	334.62	8.16	83.66
United Kingdom	3	245.52	8.77	81.84
Czech Republic	2	273.24	9.11	136.62
India	2	183.15	8.72	91.58
Portugal	2	185.13	6.38	92.56
Others	15	1094.94	7.45	73.0

The USA has the most customers and total sales. The country with the highest average sales per and average order price per customer is the Czech Republic.

The results are a bit skewed with the Czech Republic since the sample size is only 2 customers.

Albums vs Individual Tracks

The management of Chinook is currently considering changing their purchasing strategy to save money. The strategy they are considering is to purchase only the most popular tracks from each album from record companies, instead of purchasing every track from an album.

We have been asked to find out what percentage of purchases are individual tracks vs whole albums, so that Chinook management can use this data to understand the effect this decision might have on overall revenue.

In [32]:
```
%%sql

WITH
   il_table AS
    (SELECT il.invoice_id, t.album_id
       FROM invoice_line AS il
       LEFT JOIN track as t
             ON t.track_id =il.track_id
       LEFT JOIN album as al
             ON al.album_id = t.album_id
       GROUP BY invoice_id),

except_table AS
    (SELECT CASE WHEN
    (SELECT track_id
       FROM invoice_line AS il
      WHERE il_table.invoice_id = il.invoice_id
     EXCEPT
     SELECT track_id
       FROM track
      WHERE track.album_id = il_table.album_id) IS NULL

      AND

     (SELECT track_id
        FROM track
       WHERE track.album_id = il_table.album_id
      EXCEPT
      SELECT track_id
        FROM invoice_line AS il
       WHERE il_table.invoice_id = il.invoice_id) IS NULL

       THEN 'Yes'
       ELSE 'No'
       END AS 'Purchased_Album'
       FROM il_table)

SELECT Purchased_Album,
       COUNT(Purchased_Album) AS invoices,

        ROUND(CAST(COUNT(Purchased_Album) * 100 AS FLOAT) /
       (SELECT COUNT(Purchased_Album)
         FROM except_table),1) AS PCT_of_Invoices

  FROM except_table
 GROUP BY Purchased_Album
 ORDER BY Purchased_Album DESC;
```

Done.

Out[32]:

Purchased_Album	invoices	PCT_of_Invoices
Yes	114	18.6
No	500	81.4

The purchases of albums is about 18.6% of all purchases made. Even though 81% of purchases come from individual tracks this would be a significant decrease in revenue if they remove album purchases.

Conclusion:

In this project we have succesfully answered 4 questions from Chinook:

- The top 3 albums to purchase for Chinook Record Store
- Analyzed the performance of employees
- Analyzed sales by Country.
- Explored the option of purchasing individual tracks vs Albums.