

# **CPSC 304 Project Cover Page**

Milestone #: 4

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Group Number: 53

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

## **1. A short description of the final project, and what it accomplished.**

Our database application allows users to manage and organize the products, events, and other business endeavors of rock/pop bands. This application can be used by people who work in the record label industry, bands and their management team, or music fans in general. The main purpose of the application is to keep track of all the revenue streams of a band which includes their songs, albums, concerts, merchandise, as well as the streaming platforms they can be found on.

The following are functionalities that we have accomplished in our application:

- Users can log in to the database with a username and password
- Users can add a band to the database
- Users can delete a band from the database
- Users can edit a band's information (ex. the record label that the band is signed to)
- Users can get details about songs, albums, or concerts that have generated over a certain amount of total sales revenue
- Users can get details about a band's concert history
- Users can search for songs that a band never performed in concert
- Users can search for the total sales revenue of each band's top grossing song or album
- Users can search for the bands that have earned more than a certain amount in total concert revenue
- Users can find the total sales revenue of albums for each band where the total sales revenue is greater than the average sales revenue across all band albums
- Users can search for bands that stream on all streaming platforms
- Users can view all the band information that they have in their database
  - Band information includes band names, band ratings on the artist charts, and record labels that bands are signed to

## **2. A description of how your final schema differed from the schema you turned in.**

- Changed Date attribute to DatePlayed in Past\_Concerts\_2 and Played\_At because Date is a reserved keyword in SQL
- Venue Char(20) changed to Venue Char(30) under Past\_Concerts\_2 and Played\_At because we found that venue names can get quite long, ex. "The Gorge Amphitheatre" is more than 20 characters
- Attribute name #ofStreams in Released\_On changed to NumberOfStreams because using special characters (ex. #) in attribute names was creating syntax errors

3. A copy of the schema and screenshots that show what data is present in each relation after the SQL script is run.

Relational Schema:

**Attribute** = Primary key

Attribute = Foreign key

No candidate keys present

Band ( **BandName**: CHAR(20), ChartsRating: INTEGER, RecordLabel: CHAR(20))

Record\_Label ( **RecordLabelName**: CHAR(20))

Sold\_Merchandise\_1 ( **MerchandiseType**: CHAR(10), Price: INTEGER)

Sold\_Merchandise\_2 ( MerchandiseType: CHAR(10), **MerchandiseID**: INTEGER, Band: CHAR(20))

Past\_Concerts\_1 ( **TicketsSold**: INTEGER, **PricePerTicket**: INTEGER, ConcertRevenue: INTEGER)

Past\_Concerts\_2 ( **DatePlayed**: INTEGER, **Time**: INTEGER, **Venue**: CHAR(30), BandPlayed: CHAR(20), TicketsSold: INTEGER, PricePerTicket: INTEGER)

Albums ( **AlbumName**: CHAR(20), ReleaseDate: INTEGER, TotalSalesRevenue: INTEGER, Band : CHAR(20))

Songs ( **SongName**: CHAR(30), ReleaseDate: INTEGER, TotalSalesRevenue: INTEGER, Band: CHAR(20), Album: CHAR(20))

Streaming\_Platform ( **StreamingPlatformName**: CHAR(20), RevenuePerStream: DECIMAL(5,4))

Released\_On ( NumberOfStreams: INTEGER, SongName: CHAR(30), **BandName**: CHAR(20), StreamingPlatform: CHAR(20))

Played\_At ( DatePlayed: INTEGER, Time: INTEGER, Venue: CHAR(30), SongName: CHAR(30), BandName: CHAR(20))

Consists\_Of (Band: CHAR(20), **BandMemberName**: CHAR(25), **BandMemberBirthDate**: INTEGER)

Contains ( AlbumName: CHAR(20), SongName: CHAR(30), BandName: CHAR(20))

BandMembers ( **BandMemberName**: CHAR(25), **BirthDate**: INTEGER)

Vocalist ( **BandMemberName**: CHAR(25), **BirthDate**: INTEGER)

Drummer ( **BandMemberName**: CHAR(25), **BirthDate**: INTEGER)

Guitarist ( **BandMemberName**: CHAR(25), **BirthDate**: INTEGER)

Bassist ( **BandMemberName**: CHAR(25), **BirthDate**: INTEGER)

Pianist ( **BandMemberName**: CHAR(25), **BirthDate**: INTEGER)

Record\_Label

```
RECORDLABELNAME
-----
Apple Records
Atlantic Records
EMI
Interscope Records
Warner Records
```

Band

BANDNAME	CHARTSRATING	RECORDLABEL
AC/DC	65	Atlantic Records
Queen	57	EMI
The Beatles	80	Apple Records
Fleetwood Mac	20	Warner Records
Imagine Dragons	28	Interscope Records
One Republic	26	Interscope Records

6 rows selected.

### Sold\_Merchandise\_1

MERCHANDIS	PRICE
Hoodie	59
T-Shirt	30
Poster	10
Vinyl	23
CD	22

### Sold\_Merchandise\_2

MERCHANDIS	MERCHANDISEID	BAND
Hoodie	14	AC/DC
Poster	29	AC/DC
T-Shirt	1002	Queen
Poster	1003	Queen
Vinyl	1004	Queen
T-Shirt	2054	The Beatles
Vinyl	2055	The Beatles
T-Shirt	3011	Fleetwood Mac
Hoodie	4225	Imagine Dragons
Poster	4222	Imagine Dragons
CD	5008	One Republic

11 rows selected.

### Past\_Concerts\_1

TICKETSSOLD	PRICEPERTICKET	CONCERTREVENUE
19223	100	1922300
20000	129	2580000
20000	119	2380000
5272	140	738080
5200	50	260000
18533	75	1389975
6008	70	420560
5724	70	400680

8 rows selected.

## Past\_Concerts\_2

DATEPLAYED	TIME	VENUE	BANDPLAYED
TICKETSSOLD	PRICEPERTICKET		
21062013 19223	1900 100	Rogers Arena	AC/DC
4072015 20000	1830 129	02 Arena	Queen
16082007 20000	2000 119	The Gorge Amphitheater	The Beatles

DATEPLAYED	TIME	VENUE	BANDPLAYED
TICKETSSOLD	PRICEPERTICKET		
6112009 5272	1930 140	Royal Albert Hall	The Beatles
20122018 5200	1800 50	Royal Albert Hall	Fleetwood Mac
9012022 18533	1800 75	02 Arena	Imagine Dragons

DATEPLAYED	TIME	VENUE	BANDPLAYED
TICKETSSOLD	PRICEPERTICKET		
9062018 6008	1800 70	PNE Amphitheater	Imagine Dragons
8062018 5724	1800 70	PNE Amphitheater	One Republic

## Albums

ALBUMNAME	RELEASEDATE	TOTALSALES	REVENUE	BAND
Highway to Hell	27071979	1400000	AC/DC	
Iron Man 2	19042010	200000	AC/DC	
Back To Black	25071980	1000000	AC/DC	
A Night at the Opera	12121975	9000000	Queen	
News of the World	28101977	1800000	Queen	
Abbey Road	5071969	5000000	The Beatles	
Revolver	5081966	200000	The Beatles	
Help!	6081965	200000	The Beatles	
Rumours	11041977	850000	Fleetwood Mac	
Tusk	12101979	54321	Fleetwood Mac	
Night Visions	10082012	4000000	Imagine Dragons	

ALBUMNAME	RELEASEDATE	TOTALSALES	REVENUE	BAND
Waking Up	15022009	300500	One Republic	
Human	27082021	95000	One Republic	

13 rows selected.

## Songs

SONGNAME		RELEASEDATE	TOTALSALES	REVENUE
BAND	ALBUM			
Walk All Over You		27071979	180000	
AC/DC	Highway to Hell			
Guns For Hire		19042010	6000	
AC/DC	Iron Man 2			
Hell Bells		25071980	33333	
AC/DC	Back To Black			
SONGNAME		RELEASEDATE	TOTALSALES	REVENUE
BAND	ALBUM			
Bohemian Rhapsody		12121975	7654321	
Queen	A Night at the Opera			
We Will Rock You		28101977	250000	
Queen	News of the World			
Face It Alone		16081985	3000	
Queen				
SONGNAME		RELEASEDATE	TOTALSALES	REVENUE
BAND	ALBUM			
Here Comes The Sun		5071969	2222222	
The Beatles	Abbey Road			
Taxman		5081966	45000	
The Beatles	Revolver			
Another Girl		6081965	27500	
The Beatles	Help!			
SONGNAME		RELEASEDATE	TOTALSALES	REVENUE
BAND	ALBUM			
The Chain		11041977	111111	
Fleetwood Mac	Rumours			
Storms		12101979	4000	
Fleetwood Mac	Tusk			
Radioactive		10082012	1650000	
Imagine Dragons	Night <u>Visions</u>			
SONGNAME		RELEASEDATE	TOTALSALES	REVENUE
BAND	ALBUM			
Good Life		15022009	75000	
One Republic	Waking Up			
Someday		27082021	5555	
One Republic	Human			

## Streaming\_Platform

STREAMINGPLATFORM	NAM	REVENUEPERSTREAM
<hr/>		
Youtube Music		.002
Apple Music		.001
Spotify		.0025
iHeartRadio		.001
Amazon Music		.0015

## Released\_On

NUMBEROFSLEADS	SONGNAME	BANDNAME
<hr/>		
STREAMINGPLATFORM		
Spotify	1000000000 Bohemian Rhapsody	Queen
Amazon Music	1000000000 Bohemian Rhapsody	Queen
Apple Music	1000000000 Bohemian Rhapsody	Queen
NUMBEROFSLEADS	SONGNAME	BANDNAME
<hr/>		
STREAMINGPLATFORM		
iHeartRadio	1000000000 Bohemian Rhapsody	Queen
Youtube Music	1000000000 Bohemian Rhapsody	Queen
Apple Music	700938212 Here Comes The Sun	The Beatles
NUMBEROFSLEADS	SONGNAME	BANDNAME
<hr/>		
STREAMINGPLATFORM		
Amazon Music	1571220 The Chain	Fleetwood Mac
iHeartRadio	1300086234 Radioactive	Imagine Dragons
Youtube Music	200865412 Good Life	One Republic

## Played\_At

DATEPLAYED	TIME	VENUE
<hr/>		
SONGNAME	BANDNAME	
4072015	1830	02 Arena
Bohemian Rhapsody		Queen
8062018	1800	PNE Amphitheater
Good Life		One Republic
9012022	1800	02 Arena
Radioactive		Imagine Dragons
DATEPLAYED	TIME	VENUE
<hr/>		
SONGNAME	BANDNAME	
16082007	2000	The Gorge Amphitheater
Here Comes The Sun		The Beatles
20122018	1800	Royal Albert Hall
The Chain		Fleetwood Mac
21062013	1900	Rogers Arena
Walk All Over You		AC/DC

6 rows selected.

## Consists\_Of

BAND	BANDMEMBERNAME	BANDMEMBERBIRTHDATE
<hr/>		
AC/DC	Chris Slade	30101946
Fleetwood Mac	Lindsey Buckingham	3101949
Imagine Dragons	Ben McKee	7041985
One Republic	Ryan Tedder	26061979
Queen	Freddie Mercury	5091946
The Beatles	John Lennon	9101940

6 rows selected.

Contains

ALBUMNAME	SONGNAME	BANDNAME
A Night at the Opera	Bohemian Rhapsody	Queen
Abbey Road	Here Comes The Sun	The Beatles
Highway to Hell	Walk All Over You	AC/DC
Night Visions	Radioactive	Imagine Dragons
Rumours	The Chain	Fleetwood Mac
Waking Up	Good Life	One Republic

6 rows selected.

BandMembers

BANDMEMBERNAME	BIRTHDATE
Ben McKee	7041985
Brent Kutzle	3081985
Brian May	19071947
Chris Slade	30101946
Christine McVie	12071943
Cliff Williams	14121949
Daniel Platzman	28091986
Freddie Mercury	5091946
John Lennon	9101940
Lindsey Buckingham	3101949
Mick Fleetwood	24061947

BANDMEMBERNAME	BIRTHDATE
Paul McCartney	18061942
Phil Rudd	19051954
Ringo Starr	7071940
Ryan Tedder	26061979

15 rows selected.

Vocalist

BANDMEMBERNAME	BIRTHDATE
Freddie Mercury	5091946
John Lennon	9101940
Lindsey Buckingham	3101949
Paul McCartney	18061942
Ryan Tedder	26061979

Drummer

BANDMEMBERNAME	BIRTHDATE
Chris Slade	30101946
Daniel Platzman	28091986
Mick Fleetwood	24061947
Phil Rudd	19051954
Ringo Starr	7071940

Guitarist

BANDMEMBERNAME	BIRTHDATE
Brian May	19071947
Daniel Platzman	28091986
John Lennon	9101940
Lindsey Buckingham	3101949
Ryan Tedder	26061979

Bassist

BANDMEMBERNAME	BIRTHDATE
Ben McKee	7041985
Brent Kutzle	3081985
Cliff Williams	14121949
Paul McCartney	18061942
Ryan Tedder	26061979

Pianist

BANDMEMBERNAME	BIRTHDATE
Ben McKee	7041985
Christine McVie	12071943
Freddie Mercury	5091946
John Lennon	9101940
Ryan Tedder	26061979

4. A list of all SQL queries used. For SQL query requirements, check the rubric listed on Canvas for Milestone 4.

Query type	Name of function + SQL	User required fields
INSERT	<pre>addBand()  INSERT INTO Band (BandName) VALUES \$newBand</pre>	\$newBand
DELETE	<pre>deleteBand()  DELETE FROM Band WHERE BandName = \$delete_name</pre>	\$delete_name
UPDATE	<pre>editBand()  UPDATE Band SET ChartsRating = \$newChartsRating , RecordLabel = \$newRecordLabel WHERE BandName = \$bandName</pre>	\$bandName \$newChartsRating \$newRecordLabel
SELECTION	<pre>selectConcerts()  SELECT \$attributeValue FROM \$tableValue WHERE TotalSalesRevenue &gt; \$concertRevenueThreshold</pre>	\$attributeValue \$tableValue \$concertRevenueThreshold

PROJECTION	<pre>concertHistory()  SELECT \$string  FROM Past_Concerts_1 p1, Past_Concerts_2 p2  WHERE p1.TicketsSold = p2.TicketsSold and p1.PricePerTicket = p2.PricePerTicket and p2.BandPlayed = \$bandName</pre>	\$string (derived from user inputs \$DatePlayed, \$Venue, \$TicketsSold and \$ConcertRevenue)  \$bandName
JOIN	<pre>songsNeverPlayed()  SELECT s1.SongName  FROM Songs s1  WHERE (s1.Band = \$bandName and s1.SongName  NOT IN  (SELECT s2.SongName  FROM Songs s2, Played_At pa  WHERE pa.BandName = s2.Band and pa.SongName = s2.SongName) )</pre>	\$bandName
GROUP BY AGGREGATE	groupByAggregate()	Radio input type used by user to determine which query to execute

```
SELECT Band,
MAX(TotalSalesRevenue)

FROM Albums

GROUP BY Band
```

OR

```
SELECT Band,
MAX(TotalSalesRevenue)

FROM Songs

GROUP BY Band
```

HAVING  
AGGREGATE

```
bandsHaving()

SELECT BandPlayed,
SUM(ConcertRevenue)

FROM Past_Concerts_1 pc1,
Past_Concerts_2 pc2

WHERE pc1.TicketsSold =
pc2.TicketsSold and
pc1.PricePerTicket =
pc2.PricePerTicket

GROUP BY pc2.BandPlayed

HAVING SUM(ConcertRevenue) >
$totalconcertRevenueThreshold
```

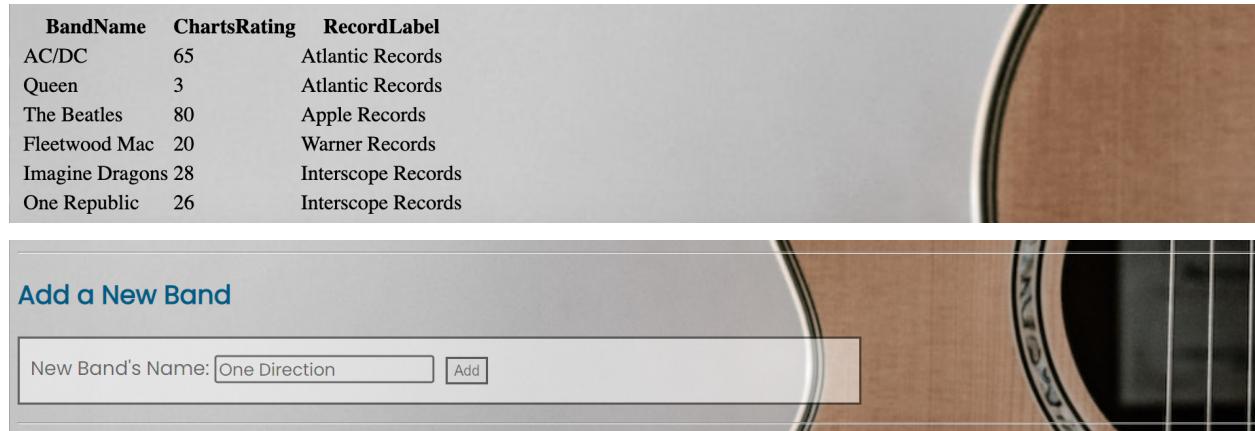
\$totalConcertRevenueThre
shold

NESTED GROUP BY AGGREGATE	<pre> nestedGroupByAggregate() SELECT Band, SUM(TotalSalesRevenue)  FROM Albums  GROUP BY Band  HAVING(SUM(TotalSalesRevenue)) &gt; (SELECT AVG(TotalSalesRevenue)  FROM Albums) </pre>	
DIVISION	<pre> bandsOnAllStreamingPlatforms()  Select BandName  From Band B  Where Not Exists  Select S.StreamingPlatformName  From Streaming_Platform S  Minus  Select r.StreamingPlatform  From Released_On r  where r.BandName = B.BandName) </pre>	

## 5. Screenshots of the sample output of the queries using the GUI.

### INSERT QUERY:

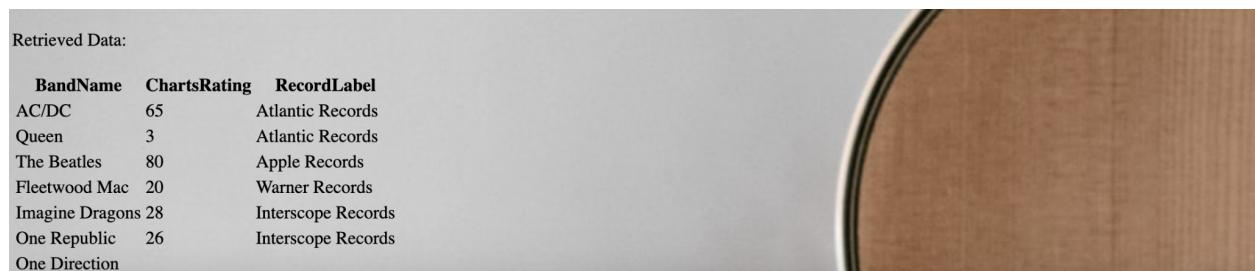
\*Note that you can insert a band with any name and it will be initialized with null attributes, to edit the new band's attributes you can do that with the update query



<b>BandName</b>	<b>ChartsRating</b>	<b>RecordLabel</b>
AC/DC	65	Atlantic Records
Queen	3	Atlantic Records
The Beatles	80	Apple Records
Fleetwood Mac	20	Warner Records
Imagine Dragons	28	Interscope Records
One Republic	26	Interscope Records

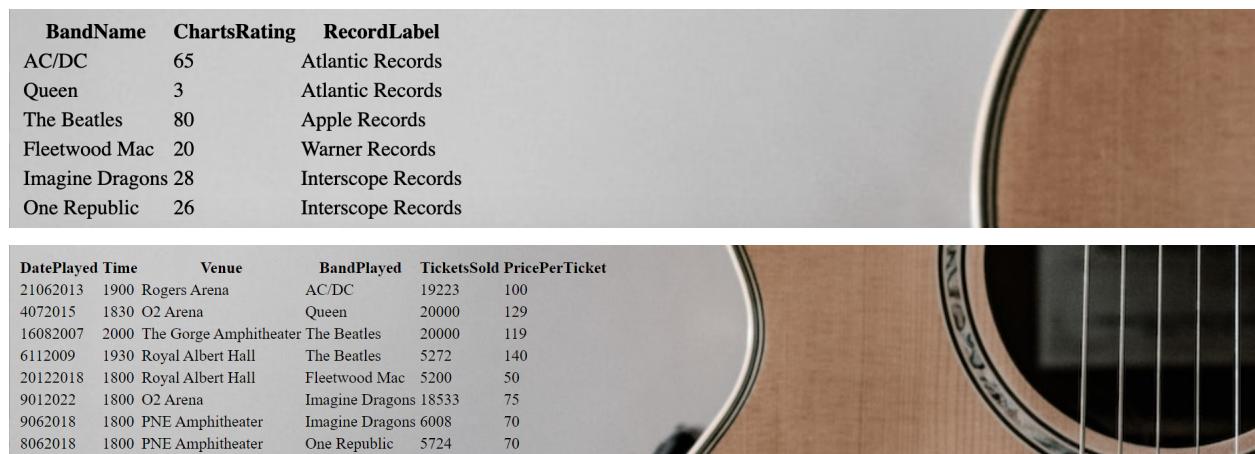
Add a New Band	
New Band's Name:	<input type="text" value="One Direction"/>
<input type="button" value="Add"/>	



Retrieved Data:

<b>BandName</b>	<b>ChartsRating</b>	<b>RecordLabel</b>
AC/DC	65	Atlantic Records
Queen	3	Atlantic Records
The Beatles	80	Apple Records
Fleetwood Mac	20	Warner Records
Imagine Dragons	28	Interscope Records
One Republic	26	Interscope Records
One Direction		

### DELETE QUERY:



<b>BandName</b>	<b>ChartsRating</b>	<b>RecordLabel</b>
AC/DC	65	Atlantic Records
Queen	3	Atlantic Records
The Beatles	80	Apple Records
Fleetwood Mac	20	Warner Records
Imagine Dragons	28	Interscope Records
One Republic	26	Interscope Records

<b>DatePlayed</b>	<b>Time</b>	<b>Venue</b>	<b>BandPlayed</b>	<b>TicketsSold</b>	<b>PricePerTicket</b>
21062013	1900	Rogers Arena	AC/DC	19223	100
4072015	1830	O2 Arena	Queen	20000	129
16082007	2000	The Gorge Amphitheater	The Beatles	20000	119
6112009	1930	Royal Albert Hall	The Beatles	5272	140
20122018	1800	Royal Albert Hall	Fleetwood Mac	5200	50
9012022	1800	O2 Arena	Imagine Dragons	18533	75
9062018	1800	PNE Amphitheater	Imagine Dragons	6008	70
8062018	1800	PNE Amphitheater	One Republic	5724	70

**Delete a Band**

Name of Band to Delete:	<input type="text" value="Queen"/>	<input type="button" value="Delete"/>
-------------------------	------------------------------------	---------------------------------------

BandName	ChartsRating	RecordLabel
AC/DC	65	Atlantic Records
The Beatles	80	Apple Records
Fleetwood Mac	20	Warner Records
Imagine Dragons	28	Interscope Records
One Republic	26	Interscope Records

DatePlayed	Time	Venue	BandPlayed	TicketsSold	PricePerTicket
21062013	1900	Rogers Arena	AC/DC	19223	100
16082007	2000	The Gorge Amphitheater	The Beatles	20000	119
6112009	1930	Royal Albert Hall	The Beatles	5272	140
20122018	1800	Royal Albert Hall	Fleetwood Mac	5200	50
9012022	1800	O2 Arena	Imagine Dragons	18533	75
9062018	1800	PNE Amphitheater	Imagine Dragons	6008	70
8062018	1800	PNE Amphitheater	One Republic	5724	70

## UPDATE QUERY:

BandName	ChartsRating	RecordLabel
AC/DC	65	Atlantic Records
Queen	3	Atlantic Records
The Beatles	80	Apple Records
Fleetwood Mac	20	Warner Records
Imagine Dragons	28	Interscope Records
One Republic	26	Interscope Records

**Edit Band Information**

Name of Band to Edit:	<input type="text" value="Queen"/>
New Charts Rating:	<input type="text" value="12"/>
New Record Label Name:	<input type="text" value="Warner Records"/> <input type="button" value="Apply Changes"/>

BandName	ChartsRating	RecordLabel
AC/DC	65	Atlantic Records
Queen	12	Warner Records
The Beatles	80	Apple Records
Fleetwood Mac	20	Warner Records
Imagine Dragons	28	Interscope Records
One Republic	26	Interscope Records

## SELECTION QUERY:

\*Note that the user can choose different tables and attributes here using the drop-down lists

Show Songs, Albums, or Concerts That Generated Over X Dollars

Choose between Songs, Albums, or Concerts:

Choose detail to view:

Input an X value:

Songs that generated over 10000 dollars:

**SongName**

Walk All Over You  
Bohemian Rhapsody  
Here Comes The Sun  
The Chain  
Radioactive  
Good Life

## PROJECTION QUERY:

\*Note that the user can select up to 4 concert details that they want to see

Show a Band's Concert History

Name of Band:

DatePlayed  
 Venue  
 TicketsSold  
 ConcertRevenue

Past Concerts

**p2.DatePlayed, p1.ConcertRevenue**

9012022	1389975
9062018	420560

## JOIN QUERY:

Show Songs that a Band Never Performed in Concert

Name of Band:

Songs that a band has never played in concert:  
**Song Name**  
Face It Alone

## GROUP BY AGGREGATE QUERY:

\*Note the user can pick between songs or albums

Show Revenue of Every Band's Top Grossing Album or Top Grossing Song

Top Grossing Songs  
 Top Grossing Albums

Each band's top grossing album:

Band	Total Sales Revenue
Imagine Dragons	52987543
One Republic	39546903
Fleetwood Mac	8429019
AC/DC	90890023
The Beatles	189623765
Queen	129849085

Show Revenue of Every Band's Top Grossing Album or Top Grossing Song

Top Grossing Songs  
 Top Grossing Albums

Each band's top grossing song:

Band	Total Sales Revenue
Imagine Dragons	1653112
One Republic	1186534
Fleetwood Mac	102948
AC/DC	827300
The Beatles	3024365
Queen	9986831

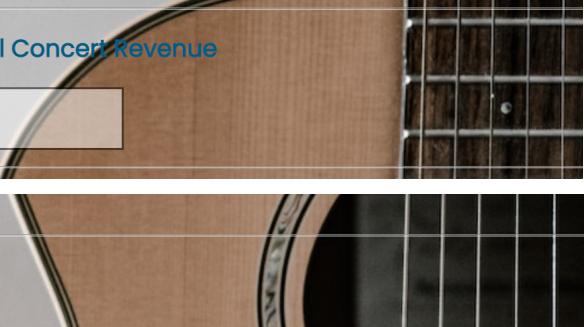
## HAVING AGGREGATE QUERY:

Bands That Have Earned More than Y Dollars From Total Concert Revenue

Input a Y Value:

Bands that have earned more than 2000000 dollars from total concert revenue:

Band	Total Concert Revenue
The Beatles	3118080
Queen	2580000



## NESTED GROUP BY AGGREGATE QUERY:

Cool Search 1: Find the total sales revenue of albums for each band where the total sales revenue is greater than the average sales revenue across all band albums

Total sales revenue of albums for each band where the total revenue is greater than the average sales revenue across all band albums:

Band	Total Sales Revenue
AC/DC	90890023
The Beatles	189623765
Queen	129849085



## DIVISION QUERY:

Cool Search 2: Find the bands that stream on all streaming platforms

Bands that stream on all platforms:

**BandName**

Queen

The Beatles

