

# Music Database

## Specifications

The music database stores information about songs, artists, albums, and various other entities involved in the music industry. It enables the end-user to add, remove, update and query information related to music.

Requirements:

- Songs are identified by the TrackID, and include attributes such as trackName, duration, NumberOfStreams.
- Each album can contain multiple songs.
- Artists are identified by the ArtistID, and the database must record the ArtistName, DOB and Nationality.
- Every artist can compose multiple songs, and every song can have multiple artists.
- Record labels are identified by the LabelID, and include attributes such as the LabelName, Address, and PhoneNumber.
- Record labels can produce multiple songs for multiple artists.
- Albums are identified by the AlbumID, and include attributes such as AlbumName, and ReleaseDate,
- Each album can only have one artist. If an artist is removed from the database, the album is also removed.
- Genres are identified by the GenreID, and the database must record the genreName and origin.
- A song can belong to a single genre, however each genre can have many songs.
- Streaming platforms are identified by the PlatformID, and the database must record the PlatformName, SubscriptionFee, TotalSubscribers.
- A streaming platform can stream multiple songs, and songs can be streamed on multiple platforms.

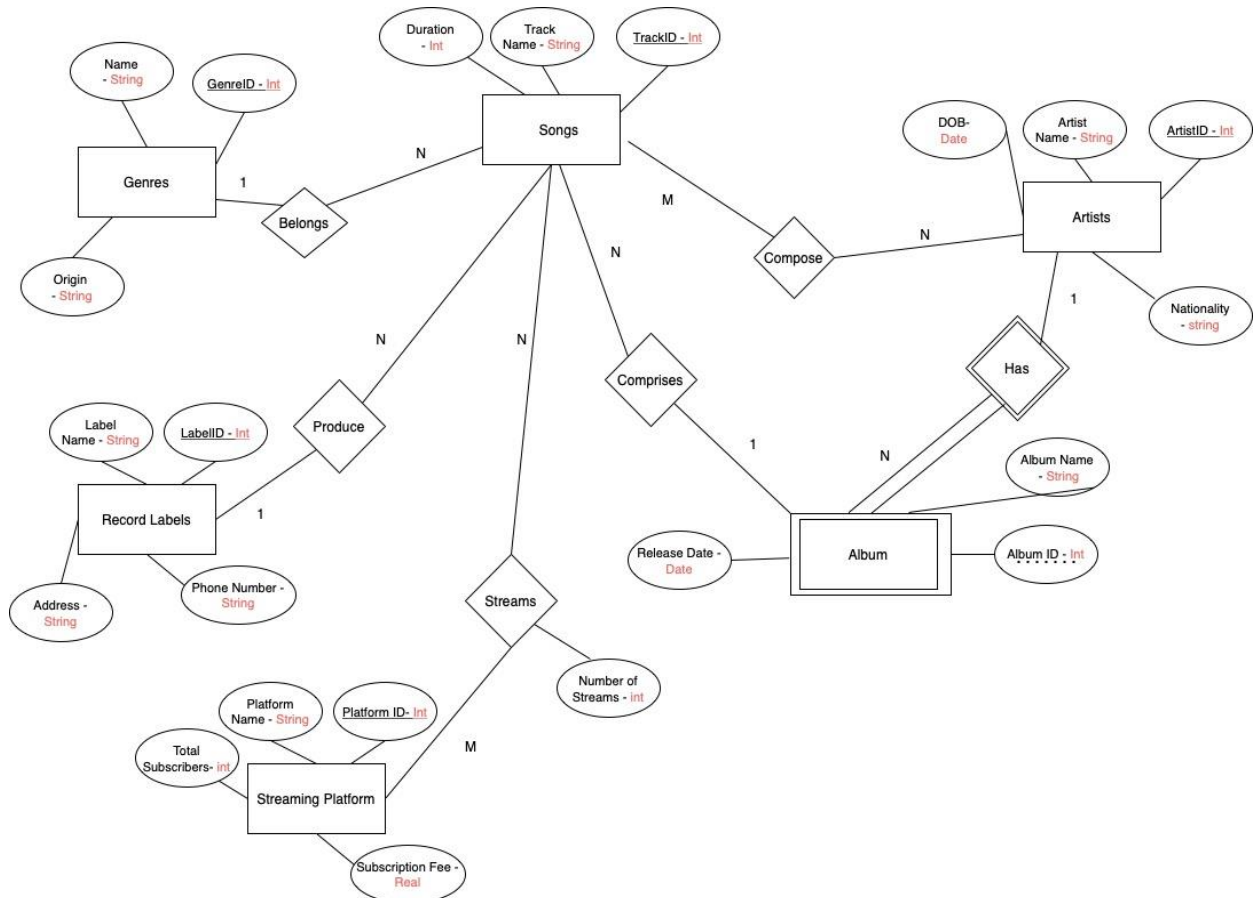
## Entities

1. **Songs** (TrackID, TrackName, Duration)
2. **Artists** (ArtistID, ArtistName, Nationality)
3. **Genres** (GenreID, GenreName, Origin)
4. **Record Labels** (LabelID, LabelName, Address, PhoneNumber)
5. **Albums** (AlbumID, AlbumName, ReleaseDate)
6. **Streaming Platforms** (PlatformID, PlatformName, SubscriptionFee, TotalSubscribers)

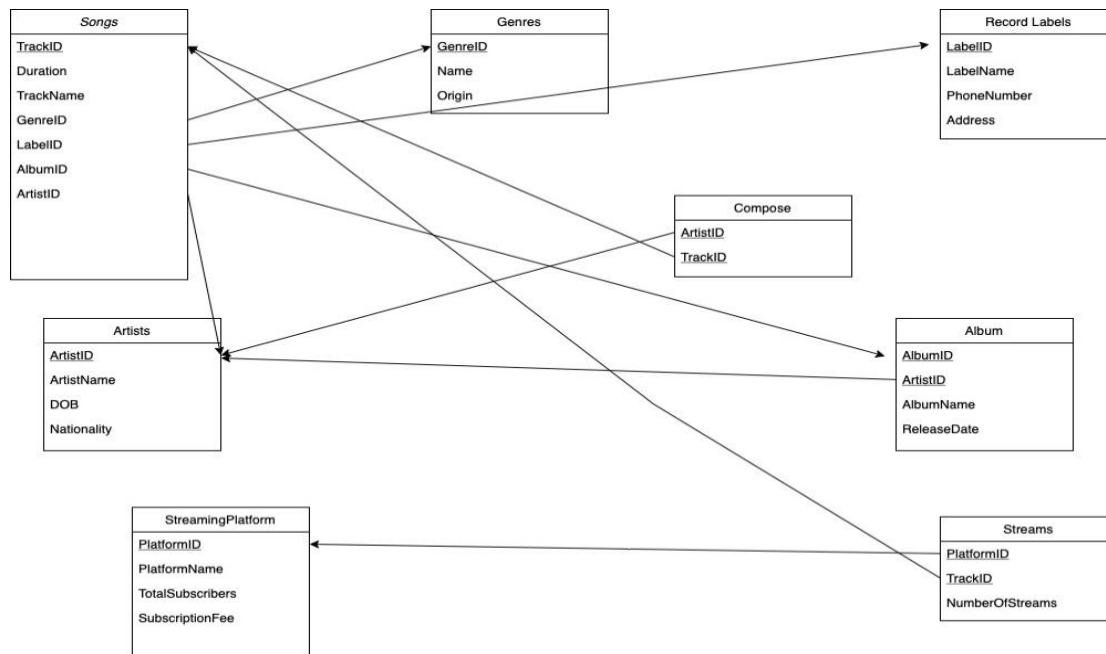
## Relationships

1. **Compose** (Artists, Songs)
2. **Has** (Artists, Albums) - identifying relationship
3. **Streams** (Platforms, Songs)
4. **Belongs to** (Genres, Songs)
5. **Produces** (Labels, Songs)
6. **Comprises** (Albums, Songs)

## Conceptual Database Design (ER Diagram)



## Logical Database Design (Relational Schema Diagram)



## Data Sources

The following dataset from Kaggle was used to get the majority of the attributes:

<https://www.kaggle.com/datasets/joebeachcapital/top-10000-spotify-songs-1960-now>

Attributes covered in the dataset:

**Songs:** TrackName, Duration, ReleaseDate

**Artists:** ArtistID, ArtistName

**Albums:** AlbumID, AlbumName, ReleaseDate

**Streams:** NumberOfStreams

**Record Labels:** LabelName

**Genres:** Name

Randomly generated attributes:

**Artists:** DOB, Nationality

**Albums:** ReleaseDate

**Genres:** Origin

**Record Labels:** Address, PhoneNumber

**Streaming Platforms:** PlatformName, SubscriptionFee, TotalSubscribers

## Queries

1. List the number of songs by each artist with a duration of less than 5 minutes

```
SELECT A.ArtistName, COUNT(S.TrackID) AS NumSongs  
FROM Songs AS S INNER JOIN Artists AS A ON S.ArtistID = A.ArtistID  
WHERE S.Duration < 300  
GROUP BY ArtistName;
```

Result of the SQL Query:

ArtistName	NumSongs
The KLF	5
Pitbull	20
The Kinks	11
Fleetwood Mac	13
benny blanco	3
Elton John	26
Foreigner	8
Shawn Mendes	26
Run-D.M.C.	4
3 Doors Down	7
The Monkees	12
Ed Sheeran	43
Nathaniel	5
Tina Charles	3
Glee Cast	16
The Soup Dragons	1
Sam Smith	25
Suzi Quatro	10

2. List record labels ordered by the number of streams of all produced songs in descending order

```
SELECT R.LabelName, SUM(St.NumberOfStreams) as NumStreams  
FROM RecordLabels AS R INNER JOIN Songs AS S ON R.LabelID = S.LabelID  
INNER JOIN Streams AS St ON S.TrackID = St.TrackID  
GROUP BY R.LabelName  
ORDER BY NumStreams DESC;
```

Result of the SQL Query:

LabelName	NumStreams
Universal Music Group	65882680016
Columbia	38316346223
RCA Records Label	24159763588
Sony Music Entertainment	23382650914
WM Australia	21557641610
Universal Music Australia Pty. Ltd.	21176473665
Parlophone UK	20742940619
Epic	17473188306
Capitol Records	16917210958
Warner Records	13625126109
Atlantic Records	12171004085
Rhino	9546291452
Virgin Records	8742870413
Rhino Atlantic	8481497567
Atlantic Records UK	8030412789
Arista	6741220878
Rhino/Warner Records	6738223120

3. List the top 10 artists with the greatest number of songs in descending order

```

SELECT A.ArtistName, COUNT(C.TrackID) AS NumSongs
FROM Compose AS C INNER JOIN Artists AS A ON C.ArtistID = A.ArtistID
GROUP BY A.ArtistName
ORDER BY NumSongs DESC
LIMIT 10;

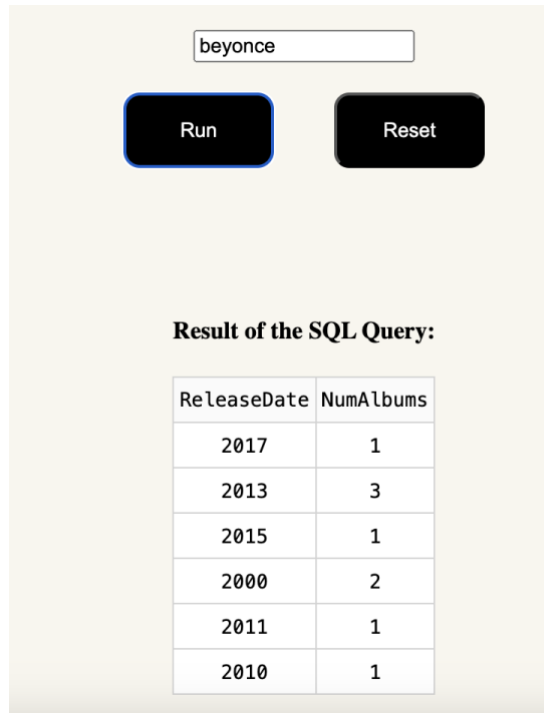
```

Result of the SQL Query:

ArtistName	NumSongs
P!nk	49
Elvis Presley	47
Ed Sheeran	47
Maroon 5	41
Madonna	40
Justin Bieber	40
U2	40
The Beatles	37
Katy Perry	36
David Guetta	35

4. List the number of albums recorded each year by a particular artist

```
SELECT YEAR(A.ReleaseDate) AS ReleaseDate, COUNT(A.AlbumID) AS NumAlbums  
FROM Albums AS A INNER JOIN Artists AS Ar ON A.ArtistID = Ar.ArtistID  
WHERE Ar.ArtistName = <ARTIST_NAME>  
GROUP BY YEAR(A.ReleaseDate);
```



The screenshot shows a web interface with a text input field containing 'beyonce', a 'Run' button, and a 'Reset' button. Below the buttons, the text 'Result of the SQL Query:' is displayed above a table. The table has two columns: 'ReleaseDate' and 'NumAlbums'. The data rows are as follows:

ReleaseDate	NumAlbums
2017	1
2013	3
2015	1
2000	2
2011	1
2010	1

5. List the artist and album for which there are no songs with more than 200000 streams

```
SELECT Ar.ArtistName, A.AlbumName  
FROM Artists AS Ar INNER JOIN Albums AS A ON Ar.ArtistID = A.ArtistID  
WHERE Ar.ArtistID IN  
    (SELECT S.ArtistID  
      FROM Streams AS St INNER JOIN Songs AS S ON St.TrackID = S.TrackID  
      WHERE NumberOfStreams < 200000);
```

Result of the SQL Query:

ArtistName	AlbumName
Pitbull	Pitbull Starring In Rebelution
Britney Spears	...Baby One More Time (Digital Deluxe Version)
The Kinks	Lola vs. Powerman and the Moneygoround, Pt. One + Percy (Super Deluxe)
Fleetwood Mac	Rumours
Elton John	Candle In The Wind 1997 / Something About ...
Foreigner	4 (Expanded)
Shawn Mendes	Illuminate (Deluxe)
Run-D.M.C.	The Greatest Hits
The Monkees	The Best of The Monkees
Wings	London Town
Ed Sheeran	x (Deluxe Edition)
Tina Charles	Dance Little Lady
Glee Cast	Landslide (Glee Cast Version) (feat. Gwyneth Paltrow)
Sam Smith	Writing's On The Wall
Suzi Quatro	If You Knew Suzi... (2017 Remaster)
Troye Sivan	Take Yourself Home

6.List the genres sorted by the average number of streams per song in that genre

```
SELECT G.Name, AVG(St.NumberOfStreams) AS AvgNumStreams
FROM Genres AS G INNER JOIN Songs AS S ON G.GenreID = S.GenreID
INNER JOIN Streams AS St ON S.TrackID = St.TrackID
GROUP BY G.Name;
```

Result of the SQL Query:

Name	AvgNumStreams
acid house	4967866.8333
dance pop	5039185.9282
album rock	5087990.2375
pop	5005523.8764
glam rock	5053853.1556
australian pop	5128894.2099
disco	5047853.1482
glee club	5022463.5
britpop	5100276.8135
brill building pop	5193339.9435
adult standards	5009019.5161
australian dance	5071990.015
classic rock	5073014.1672
neo mellow	5038664.3198
complextro	5246916.35
alternative rock	5086310.2418
australian indigenous	5141132.9964

7. List the number of songs per genre grouped by artist

```
SELECT Ar.ArtistName, G.Name AS GenreName, COUNT(S.TrackID) AS NumSongs  
FROM Artists AS Ar INNER JOIN Songs as S on Ar.ArtistID = S.ArtistID  
INNER JOIN Genres AS G ON S.GenreID = G.GenreID  
GROUP BY Ar.ArtistName, G.Name;
```

**Result of the SQL Query:**

ArtistName	GenreName	NumSongs
The KLF	acid house	5
S'Express	acid house	1
Pitbull	dance pop	20
Britney Spears	dance pop	29
P!nk	dance pop	49
Timbaland	dance pop	7
Sugababes	dance pop	5
Dua Lipa	dance pop	26
Sean Paul	dance pop	3
Flo Rida	dance pop	23
Olly Murs	dance pop	17
Mandy Moore	dance pop	3
Mariah Carey	dance pop	28
Ja Rule	dance pop	7
Train	dance pop	11
Colbie Caillat	dance pop	3
Whitney Houston	dance pop	18
Bruno Mars	dance pop	24
Nick Jonas	dance pop	7
Melanie C	dance pop	3

8. List the number of albums where number of songs are greater than 10 for a given genre

```
SELECT COUNT(B.AlbumID) AS NumAlbums FROM  
(SELECT A.AlbumID, COUNT(S.TrackID) AS NumSongs  
FROM Albums AS A INNER JOIN Songs AS S ON A.AlbumID = S.AlbumID  
INNER JOIN Genres AS G ON G.GenreID = S.GenreID  
WHERE G.Name = <GENRE_NAME>  
GROUP BY A.AlbumID  
HAVING NumSongs > 10) AS B;
```



Run

Reset

**Result of the SQL Query:**

NumAlbums
1

9. List the number of songs for an artist on different streaming platforms along with their average duration and number of streams

```

SELECT P.PlatformName, COUNT(S.TrackID) AS NumSongs, AVG(S.Duration) AS
AvgDuration, SUM(St.NumberOfStreams) AS TotalStreams
FROM StreamingPlatforms AS P INNER JOIN Streams AS St ON P.PlatformID = St.PlatformID
INNER JOIN Songs AS S ON S.TrackID = St.TrackID
INNER JOIN Artists AS A ON A.ArtistID = S.ArtistID
WHERE A.ArtistName = <ARTIST_NAME>
GROUP BY P.PlatformName;

```

Run

Reset

**Result of the SQL Query:**

PlatformName	NumSongs	AvgDuration	TotalStreams
Spotify	18	241.4444	91921942
Apple Music	18	241.4444	87929503
Amazon Music	18	241.4444	70437771
YouTube Music	18	241.4444	68136780
Tidal	18	241.4444	93935853
Pandora	18	241.4444	83875138
Deezer	18	241.4444	94216509
SoundCloud	18	241.4444	89412738
iHeartRadio	18	241.4444	66565408
Napster	18	241.4444	88337087
Google Play Music	18	241.4444	89067145
Qobuz	18	241.4444	103885714
Bandcamp	18	241.4444	89718942
Audiomack	18	241.4444	68382520

10. List the number of albums released each year sorted in ascending order

```
SELECT YEAR(ReleaseDate) AS YearOfRelease, COUNT(AlbumID) AS NumAlbums  
FROM Albums  
GROUP BY YearOfRelease  
ORDER BY COUNT(AlbumID);
```

**Result of the SQL Query:**

YearOfRelease	NumAlbums
2020	4
2011	293
2008	305
2009	309
2018	313
2000	317
2014	323
2006	324
2004	327
2007	328
2019	329
2010	330
2002	332
2015	332
2005	339
2003	342

11. List the 5 youngest artists with greater than 15 songs and greater than 2 albums

```
SELECT A.ArtistName, A.DOB, COUNT(S.TrackID) as NumSongs,  
COUNT(DISTINCT(S.AlbumID)) AS NumAlbums  
FROM Artists AS A INNER JOIN Songs AS S ON A.ArtistID = S.ArtistID  
GROUP BY A.ArtistName, A.DOB  
HAVING NumSongs > 15 and NumAlbums > 2  
ORDER BY A.DOB DESC  
LIMIT 5;
```

**Result of the SQL Query:**

ArtistName	DOB	NumSongs	NumAlbums
Jessica Mauboy	1999-10-04	30	13
Coldplay	1999-06-27	22	11
Beyoncé	1998-12-05	19	9
Nelly	1996-02-21	18	12
Alicia Keys	1995-08-04	22	10