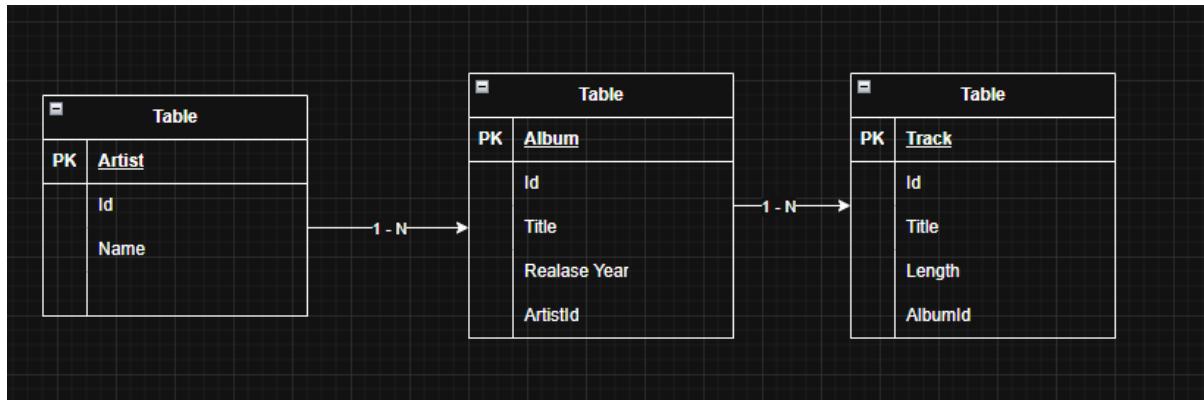


ER-Diagram



Database security:

Secure access to a database is important to protect information and to ensure that data is not read/modified by unauthorized users.

Authentication is used to verify the user's identity. One way is by using username and password. It also tells the database what kind of authorization the user has, and that will tell the database what kind of actions they can take, for example, change/delete or add.

In backend projects sensitive data should always be protected by using encryption at rest of transfers between systems. the access to the database should be restricted to the least amount of people you can. By using secure connections and proper config backend systems can be made more secure and robust.

Version Control:

It's important to use database development because it allows changes in the scripts to be tracked over time. By using version control, it is easy to revert to earlier versions if an error occurs. Overall, version control improves structure and control during database development.

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Databas

SQL

Here is all the SQL code used:

```
INSERT INTO Artist (Name) VALUES
```

```
('mico');
```

```
CREATE DATABASE musicBase
```

```
-- Creating all the diffrent tables
```

```
-- using IDENTITY (1,1) for auto-incremented ID, it atomatically increses the ID nr.
```

```
-- using NVARCHAR(200) because it use UNICORD so it also reads in ☺☺☺. 200 is maximum amount of characters
```

```
-- Create the Artist table
```

```
-- This table stores information about music artists
```

```
CREATE TABLE Artist (
```

```
    Id INT IDENTITY(1,1) PRIMARY KEY, -- Primary key, auto-incremented unique ID for each artist
```

```
    Name NVARCHAR(200) NOT NULL -- Artist name, must always have a value
```

```
);
```

```
-- Create the Album table
```

```
-- Each album belongs to one artist
```

```
CREATE TABLE Album (
```

```
    Id INT IDENTITY(1,1) PRIMARY KEY, -- Primary key, auto-incremented unique ID for each album
```

```
    Title NVARCHAR(200) NOT NULL, -- Album title, required
```

```
    ReleaseYear INT, -- Year the album was released must be numbers
```

```
    ArtistId INT NOT NULL, -- Foreign key that links the album to an artist
```

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Databas

SQL

```
FOREIGN KEY (ArtistId) REFERENCES Artist(Id) -- ArtistId must match an existing
Artist.Id
```

);

-- Create the Track table

-- Each track belongs to one album

```
CREATE TABLE Track (
```

```
Id INT IDENTITY(1,1) PRIMARY KEY, -- Primary key, auto-incremented unique ID for
each track
```

```
Title NVARCHAR(200) NOT NULL, -- Track title, required
```

```
Length INT NOT NULL, -- Length of the track in seconds
```

```
AlbumId INT NOT NULL, -- Foreign key that links the track to an album
```

```
FOREIGN KEY (AlbumId) REFERENCES Album(Id) -- AlbumId must match an existing
Album.Id
```

);

-- Delete remove artist

```
DELETE FROM Artist
```

```
WHERE Id = 12;
```

```
INSERT INTO Artist (Name) VALUES
```

```
('Imagine Dragons'),
```

```
('Adele'),
```

```
('Coldplay'),
```

```
('Ed Sheeran'),
```

```
('Taylor Swift'),
```

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Databas

SQL

('The Weeknd'),

('Bruno Mars'),

('Billie Eilish'),

('Linkin Park'),

('Eminem');

INSERT INTO Album (Title, ReleaseYear, ArtistId) VALUES

('Night Visions', 2012, 1), -- Imagine Dragons

('25', 2015, 2), -- Adele

('Parachutes', 2000, 3), -- Coldplay

('Divide', 2017, 4), -- Ed Sheeran

('1989', 2014, 5), -- Taylor Swift

('After Hours', 2020, 6), -- The Weeknd

('24K Magic', 2016, 7), -- Bruno Mars

('When We All Fall Asleep', 2019, 8), -- Billie Eilish

('Hybrid Theory', 2000, 9), -- Linkin Park

('The Eminem Show', 2002, 10); -- Eminem

INSERT INTO Track (Title, Length, AlbumId) VALUES

-- Night Visions

('Radioactive', 186, 1),

('Demons', 177, 1),

('On Top of the World', 202, 1),

-- 25

('Hello', 295, 2),

('Send My Love', 223, 2),

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SQL

('Water Under the Bridge', 240, 2),

-- Parachutes

('Yellow', 270, 3),

('Shiver', 299, 3),

('Trouble', 270, 3),

-- Divide

('Shape of You', 234, 4),

('Castle on the Hill', 261, 4),

('Perfect', 263, 4),

-- 1989

('Blank Space', 231, 5),

('Shake It Off', 242, 5),

('Style', 231, 5),

-- After Hours

('Blinding Lights', 200, 6),

('Save Your Tears', 215, 6),

('In Your Eyes', 239, 6),

-- 24K Magic

('24K Magic', 227, 7),

('Chunky', 210, 7),

('That's What I Like', 247, 7),

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SQL

-- When We All Fall Asleep

('Bad Guy', 194, 8),

('Bury a Friend', 193, 8),

('When the Party's Over', 199, 8),

-- Hybrid Theory

('In the End', 216, 9),

('Crawling', 203, 9),

('Papercut', 184, 9),

-- The Eminem Show

('Without Me', 290, 10),

('Cleanin Out My Closet', 297, 10),

('Sing for the Moment', 339, 10);

-- select_basic.sql

-- using of WHERE, ORDER BY, LIKE, GROUP BY

-- 1. WHERE: Find all artists whose names start with 'E'

SELECT *

FROM Artist

WHERE Name LIKE 'E%';

-- 2. ORDER BY: List albums sorted by release year (oldest first)

SELECT Title, ReleaseYear

FROM Album

ORDER BY ReleaseYear ASC;

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Databas

SQL

-- 3. LIKE: Find tracks containing the word 'Love'

SELECT Title

FROM Track

WHERE Title LIKE '%Love%';

-- 4. WHERE + ORDER BY: Albums released after 2010 sorted alphabetically

SELECT Title, ReleaseYear

FROM Album

WHERE ReleaseYear > 2010

ORDER BY Title;

-- 5. GROUP BY: Count how many albums each artist has

SELECT ArtistId, COUNT(*) AS AlbumCount

FROM Album

GROUP BY ArtistId;

-- 6. GROUP BY (sum): Calculate total track length per album

SELECT AlbumId, SUM(Length) AS TotalAlbumLength

FROM Track

GROUP BY AlbumId;

-- 7. Find all tracks where the title starts with 'B'

SELECT Title

FROM Track

WHERE Title LIKE 'B%';

-- THE QUERY shows all artist and their albums

-- it also counts the tracks in each album

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Databas

SQL

-- LEFT JOIN is used to show artists and albums even without tracks

-- 'ON' "Join each album to the artist where the album's ArtistId matches the artist's Id."

SELECT

Album.Title, -- The title of the album

Artist.Name, -- The name of the artist

COUNT(Track.Id) AS TrackCount -- Number of tracks per album

FROM Artist -- Start from the Artist table

LEFT JOIN Album

ON Album.ArtistId = Artist.Id -- Connect albums to their artist

LEFT JOIN Track

ON Track.AlbumId = Album.Id -- Connect tracks to their album

GROUP BY

Album.Title, -- Group results by album

Artist.Name; -- Group results by artist

-- THE QUERY shows all artist and their albums

-- it also counts the tracks in each album

-- INNER JOIN is used so only albums that have artist and tracks will show

SELECT

Album.Title, -- The title of the album

Artist.Name, -- The name of the artist

COUNT(Track.Id) AS TrackCount -- Number of tracks in the album

FROM Album -- Start from the Album table

INNER JOIN Artist

ON Album.ArtistId = Artist.Id -- Match albums to their artist (foreign key → primary key)

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SQL

INNER JOIN Track

ON Track.AlbumId = Album.Id -- Match tracks to their album (foreign key → primary key)

GROUP BY

Album.Title, -- Group rows by album title

Artist.Name; -- Group rows by artist name

-- UPDATES Statements that modify existing data

-- Change the name of an artist

-- This updates the artist with Id = 1 and sets a new name

UPDATE Artist

SET Name = 'Imagine Dragons (Updated)'

WHERE Id = 1;

-- Update the release year of an album

-- This changes the release year for a specific album

UPDATE Album

SET ReleaseYear = 2013

WHERE Title = 'Night Visions';

SQL vs LINQ

SQL	LINQ
SELECT * FROM Artist WHERE Name LIKE 'B%';	var artists = dbContext.Artists .Where(a => a.Name.StartsWith("B")) .ToList();
Mapping:	
FROM Artist	DbContext.Artist

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SQL

WHERE Name LIKE 'B%'	.Where(a => a.Name.StartsWith("B"))
SELECT*	Selects all columns automatically in LINQ

Sql returns rows where LINQ returns object.

SQL	LINQ
SELECT Title, ReleaseYear FROM Album ORDER BY ReleaseYear;	var albums = dbContext.Albums .OrderBy(a => a.ReleaseYear) .Select(a => new { a.Title, a.ReleaseYear }) .ToList();
mapping	
FROM Album	dbContext.Albums
ORDER BY	.OrderBY()
-	.Select(a => new { a.Title, a.ReleaseYear })

SQL	LINQ
SELECT Title FROM Track WHERE Title LIKE '%Love%';	var tracksWithLove = dbContext.Tracks .Where(t => t.Title.Contains("Love")) .Select(t => t.Title) .ToList();
FROM Track	DbContext.Tracks
WHERE	.Where()
LIKE '%Love%'	.Contains("Love")
SELECT Title	.Select(t => t.Title)

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SQL

Sql returns rows where LINQ returns a list of values

REFELCTION

I have had a general struggle with the understanding. So there has been alot of asking ai, watching videos, reading material and googleing.

I feel like i now have a better understanding of how the DB works and how it translates into c#.

I dont really know how to make it better then me coding even more.

I need to use it more in diffrent context to have an even better understanding of it.

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Databas

SQL