

Backend Development

```
SELECT * FROM playlists INNER JOIN tracks ON tracks.playlist_id = playlists.id  
UPDATE tracks SET name = "Dance Party" WHERE id = 1  
INSERT INTO activities VALUES("2023-04-16", "W
```

REST API?

REST API is an application programming interface (API or web API) that conforms to the constraints of REST architectural style and allows for interaction with RESTful web services using HTTP Methods.

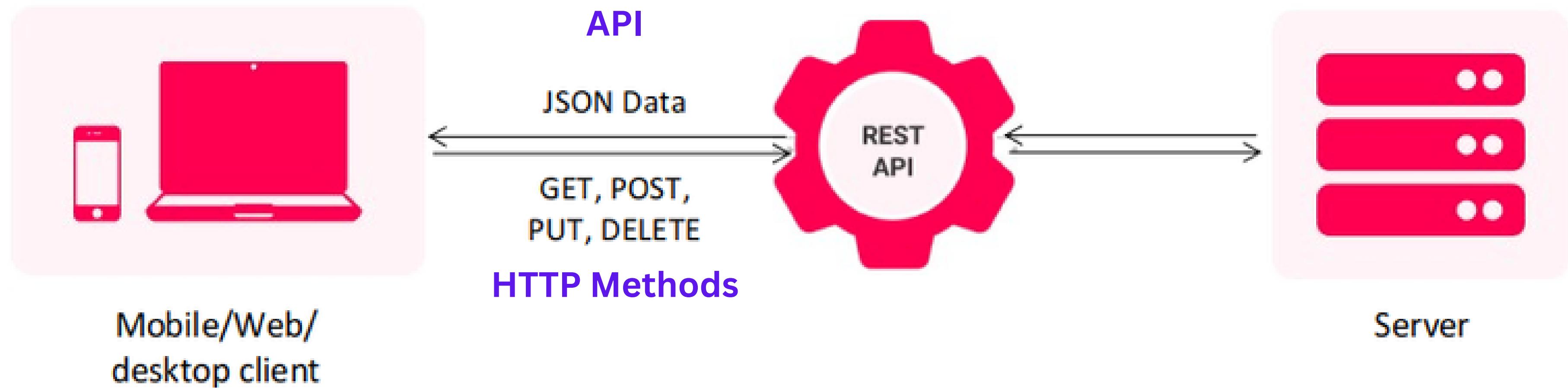
What is API?

API is a set of definitions and protocols for building and integrating application software.

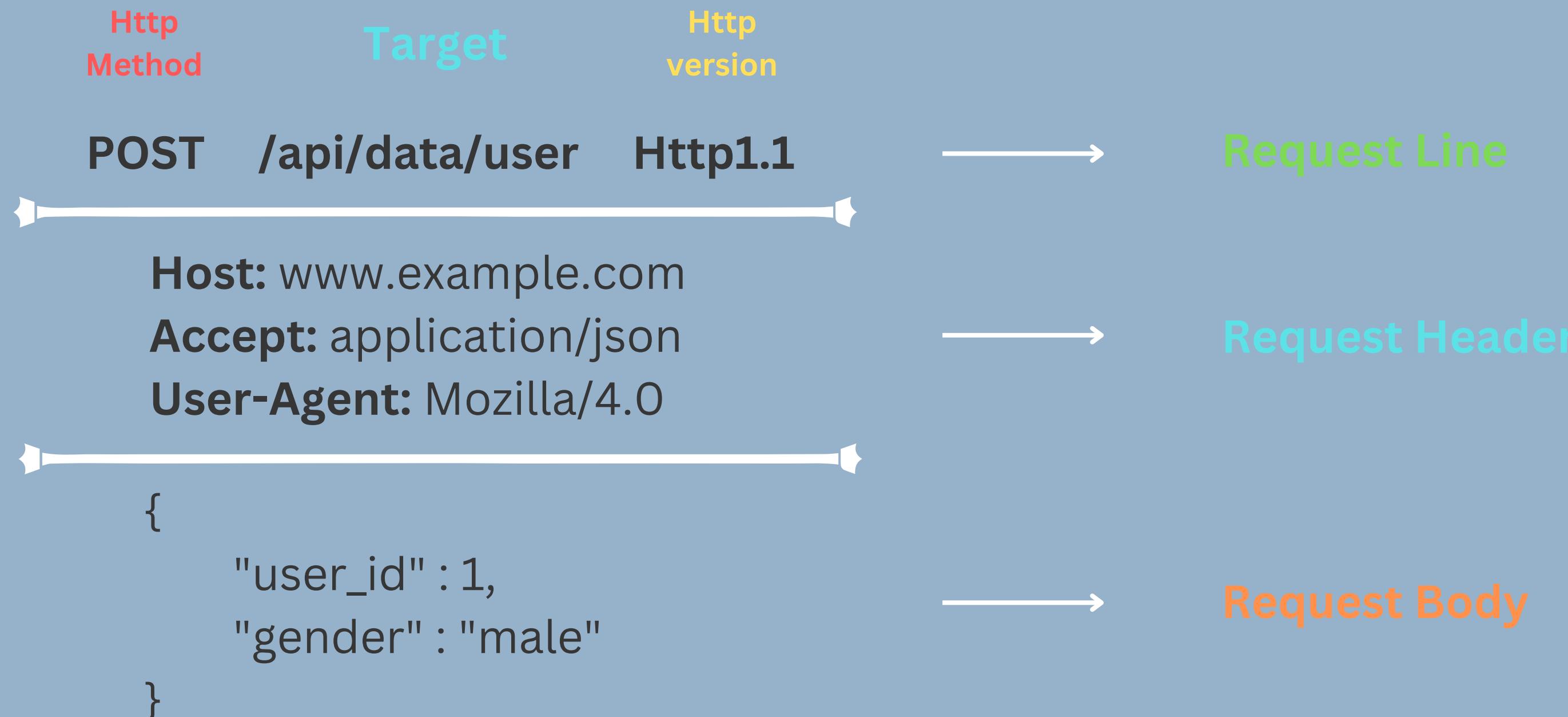
For example:

- Representational state transfer (REST)
- WebSocket (WS)
- GraphQL

REST API Model



HTTP Request sample structure



HTTP Methods

GET

Retrieve data from the server

PUT

Handles updates by replacing the entire entity

POST

Create data

PATCH

Only updates the fields that you give it

DELETE

Delete data

(Postman)

Example

See You Next Monday

SQL

what is SQL?

SQL or Structured Query Language, abbreviated as SQL, is a domain-specific language used in programming and designed for managing data held in a relational database management system, or for stream processing in a relational data stream management system.

SQL Commands

- **SELECT** - extracts data from a database
- **UPDATE** - updates data in a database
- **DELETE** - deletes data from a database
- **INSERT INTO** - inserts new data into a database
- **CREATE DATABASE** - creates a new database
- **ALTER DATABASE** - modifies a database
- **CREATE TABLE** - creates a new table
- **ALTER TABLE** - modifies a table
- **DROP TABLE** - deletes a table
- **CREATE INDEX** - creates an index (search key)
- **DROP INDEX** - deletes an index

Alert

*****SQL keywords are NOT case sensitive: select is the same as SELECT*****

SQL SELECT Statement

Syntax

```
SELECT column1, column2, ...  
FROM table_name;
```

```
SELECT * FROM table_name;
```

If you want to select all the fields available in the table, use the following syntax

EXAMPLE

Find all name and album in table lv1_tracks.

	album	artist	artwork_url	duration	popularity	explicit
3	Remember Me	Chris Mann	https://i.scdn.co/image/ab67616d0000b2736239d02316cf401e724bbec1	257880	25	0
4	can you hear me?	Munn	https://i.scdn.co/image/ab67616d0000b2731d8801ae75f76b5ee0bae17b	185600	63	0
5	Love For Days	Mimoza	https://i.scdn.co/image/ab67616d0000b273437d9ca484f4681fdf085cd2	215649	32	0
6	pretty sad	XYLØ	https://i.scdn.co/image/ab67616d0000b273c2f0523ec109cf7eb920822e	199221	29	0
7	Infrared	Em Behold	https://i.scdn.co/image/ab67616d0000b2732ab89aa8f377852f4366b67c	191087	39	0
8	DUALITY	WE ARE FURY	https://i.scdn.co/image/ab67616d0000b273591240b0211aa293914147e0	178539	28	0
9	Stay By Your Side	Diviners	https://i.scdn.co/image/ab67616d0000b2730c2e9f3033019f62157072b1	205068	26	0
10	My Strange Addiction	Plot Twist	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb	162250	27	0

```
SELECT name, album FROM lv1_tracks;
```

	name	album
1	I'll Be There	To My Star (Original Webdrama Soundtrack)
2	i would rather die than live forever	Everything Makes Me Cry
3	Remember Me	Remember Me
4	can you hear me?	can you hear me?
5	Love For Days	Love For Days
6	Pretty Sad	pretty sad
7	Not Who We Were	Infrared
8	Broken	DUALITY
9	Stay By Your Side	Stay By Your Side
10	My Strange Addiction	My Strange Addiction

EXAMPLE

If you want to select all the fields available in the table (lv1_tracks) .

	album	artist	artwork_url	duration	popularity	explicit
3	Remember Me	Chris Mann	https://i.scdn.co/image/ab67616d0000b2736239d02316cf401e724bbec1	257880	25	0
4	can you hear me?	Munn	https://i.scdn.co/image/ab67616d0000b2731d8801ae75f76b5ee0bae17b	185600	63	0
5	Love For Days	Mimoza	https://i.scdn.co/image/ab67616d0000b273437d9ca484f4681fdf085cd2	215649	52	0
6	pretty sad	XYLØ	https://i.scdn.co/image/ab67616d0000b273c2f0523ec109cf7eb920822e	199221	29	0
7	Infrared	Em Behold	https://i.scdn.co/image/ab67616d0000b2732ab89aa8f377852f4366b67c	191087	39	0
8	DUALITY	WE ARE FURY	https://i.scdn.co/image/ab67616d0000b273591240b0211aa293914147e0	178539	28	0
9	Stay By Your Side	Diviners	https://i.scdn.co/image/ab67616d0000b2730c2e9f3033019f62157072b1	205068	26	0
10	My Strange Addiction	Plot Twist	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb	162250	27	0

```
SELECT * FROM lv1_tracks;
```

	id	spotify_id	name	album	artist	artwork_url
1	1	044BWbz4tm6H0c3nqqUyCX	I'll Be There	To My Star (Original Webdrama Soundtrack)	Johnny	https://i.scdn.co/image/ab67616d0000b2735f9c341a556a1548abef0622
2	4	4DU016T7y3LT9g4MbN2qMs	i would rather die than live forever	Everything Makes Me Cry	Sam Creighton	https://i.scdn.co/image/ab67616d0000b2736c49aaefd6237a3fc0a78dfb
3	87	3NmI70LLRgEQm1zDQq7Hoa	Remember Me	Remember Me	Chris Mann	https://i.scdn.co/image/ab67616d0000b2736239d02316cf401e724bbec1
4	89	20ZNEa3tW5HKAAaQqnJope	can you hear me?	can you hear me?	Munn	https://i.scdn.co/image/ab67616d0000b2731d8801ae75f76b5ee0bae17b
5	92	5nAEhdAwQSbAl0G2yJPHBf	Love For Days	Love For Days	Mimoza	https://i.scdn.co/image/ab67616d0000b273437d9ca484f4681fdf085cd2
6	99	46gwMD8DJ08B6jy2C3hEeZ	Pretty Sad	pretty sad	XYLØ	https://i.scdn.co/image/ab67616d0000b273c2f0523ec109cf7eb920822e
7	102	0ygpggMdX083BG62ooY02F	Not Who We Were	Infrared	Em Behold	https://i.scdn.co/image/ab67616d0000b2732ab89aa8f377852f4366b67c
8	105	0xyCi5b7EB4iAw875dunR0	Broken	DUALITY	WE ARE FURY	https://i.scdn.co/image/ab67616d0000b273591240b0211aa293914147e0
9	108	6LLmygGpqhftP5NpvIIYqk	Stay By Your Side	Stay By Your Side	Diviners	https://i.scdn.co/image/ab67616d0000b2730c2e9f3033019f62157072b1
10	111	4ILn5zbdVVnHjmicWzwOzs	My Strange Addiction	My Strange Addiction	Plot Twist	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb

SQL WHERE Clause

The WHERE clause is used to filter records.

It is used to extract only those records that fulfill a specified condition.

Syntax

```
SELECT column1, column2, ...
FROM table_name
WHERE condition;
```

The SQL AND, OR and NOT Operators

The WHERE clause can be combined with AND, OR, and NOT operators.

The AND and OR operators are used to filter records based on more than one condition:

- The AND operator displays a record if all the conditions separated by AND are TRUE.
- The OR operator displays a record if any of the conditions separated by OR is TRUE.

The NOT operator displays a record if the condition(s) is NOT TRUE.

AND

```
SELECT column1, column2, ...
FROM table_name
WHERE condition1 AND condition2 AND condition3 ...;
```

NOT

```
SELECT column1, column2, ...
FROM table_name
WHERE NOT condition;
```

OR

```
SELECT column1, column2, ...
FROM table_name
WHERE condition1 OR condition2 OR condition3 ...;
```

EXAMPLE

Find all tracks from the artist name "July".

	id	spotify_id	name	album	artist
166	1001	4iZSFXNiB1Q4bBVwwBFrdK	Already Written	We Only Have Forever	Justin Garner
167	414	5XjqpnwsUoXyq52VwvIeK4	January Rain	January Rain	July
168	396	5hvdiQLR2CfqXaPNnót2zp	Revert to the Past Times	Spring again	July
169	384	1lSyCsm5YaVf7lKSyhZwql	Revert	The Singles Collection, Vol. 1	July
170	370	1VabutDtVBrowM30zPChGj	Love Theme	In Love	July
171	369	3HXltK9kf8izTVcs9GGFxt	The Last Resolution	Time	July
172	2448	6nIcGJK6Pj1ThzCór808hA	Leave (Get Out) - 2018	JoJo (2018)	JoJo
173	795	3hc7PLcmuZbJGPjhIore1i	Too Little Too Late - 2018	The High Road (2018)	JoJo
174	1	044BWbz4tm6H0c3nqqUyCX	I'll Be There	To My Star (Original Webdrama Soundtrack)	Johnny
175	2016	7rwDyN3nbvpDOAt58pw8Na	Standing Still	Standing Still	Joakim Molitor

```
SELECT * FROM lv1_tracks  
WHERE artist='July';
```

	id	spotify_id	name	album	artist	artwork_url	duration_ms
1	369	3HXltK9kf8izTVcs9GGFxt	The Last Resolution	Time	July	https://i.scdn.co/image/ab67616d0000b2735c9a8607df7a8c5fb461e1ae	140000
2	370	1VabutDtVBrowM30zPChGj	Love Theme	In Love	July	https://i.scdn.co/image/ab67616d0000b2737d92bfef4fcabfe19d10865	140000
3	384	1lSyCsm5YaVf7lKSyhZwql	Revert	The Singles Collection, Vol. 1	July	https://i.scdn.co/image/ab67616d0000b273729c09d35ade21cbe350e4ca	140000
4	396	5hvdiQLR2CfqXaPNnót2zp	Revert to the Past Times	Spring again	July	https://i.scdn.co/image/ab67616d0000b27390bed5c5f4407cc2724bd362	140000
5	414	5XjqpnwsUoXyq52VwvIeK4	January Rain	January Rain	July	https://i.scdn.co/image/ab67616d0000b273b647d914f95eb8b01d7257bc	140000

EXAMPLE

Find song from id "818 " and display all attributes.

	id	spotify_id	name	album	artist
189	1005	6REggZ9bXP4wLfnQPgE69z	Hope of Morning	Icon for Hire	Icon For Hire
190	892	3s0Kyw1jk1mYzgpCeshiWu	Liar	Liar (From Original Motion Picture Soundtrack High Strung Free Dan...)	Hooked Like Helen
191	768	2LYhS0VbCzbE6alAI3Q70t	Call Your Name	TV Anime "Attack on Titan" Original Soundtrack	Hiroyuki Sawano
192	1449	4gbXhX6WY02U3oC2KTWLCa	Call your name <Gv>	「進撃の巨人」Season3 オリジナルサウンドトラック	Hiroyuki Sawano
193	2541	2TKFs0HcpRs0ZVK0w7v0sS	The Best For You	The Best For You	Hikaru Station
194	818	1W736gzUl0sk3NIjho5Pib	Breaking	Breaking	HIGHST
195	3609	410smJMzhna1ADC2ldqVHu	Hoodie	From The Outside	Hey Violet
196	140	4LYE6s4z2oDb659yg1r0DC	It's Your Eyes I See	The Art of Growing Up	Hanne Leland
197	906	1xex0MaR9Qlpb3X33PgVGS	The Woods	The Woods - EP	Hailey Gardiner
198	3406	16geeCnXrbiomV1IZ8Kudc	Back to Life - from "Bumblebee"	Back to Life (from "Bumblebee")	Hailee Steinfeld
199	522	27aFdnaVKS3wU4vKcNSLLu	Waking Up	Waking Up	Grumbae
200	529	6U0LQ39hMpz7NyXR9fSDHp	STOP	STOP	Grace Blue
201	3811	1uRmdmSS0PcdHLsgXG0XiN	Medicate	Medicate	Gavrielle
202	747	6mUclBcq0p65gfLMeu2UWR	ໄຟ້ມີເຄວົາໄຟ້ມີຕາຍ	ໄຟ້ມີເຄວົາໄຟ້ມີຕາຍ (Feat.TWOPEE)	Gam Wichayanee
203	2719	140WlpPcJxsBvSGI4W65Hl	No Matter - Acoustic	No Matter (Acoustic)	Frances
204	3199	3lpwEHECMgTD025SJh5ovq	In The Shadow	In The Shadow	Florina
205	1077	177WLZMxcD4DG6u9yC7Mv6	Take Me With You	Take Me With You	Fleurie

```
SELECT * FROM lv1_tracks  
WHERE id=818;
```

	id	spotify_id	name	album	artist	artwork_url	duration
1	818	1W736gzUl0sk3NIjho5Pib	Breaking	Breaking	HIGHST	https://i.scdn.co/image/ab67616d0000b273db9a2cff28242f9cf8c3e28b	

EXAMPLE

Search songs by the artist "TAEYEON" in the album "Four Seasons" and display all features.

	id	spotify_id	name	album	artist	artwork_url
198	2482	6CdUgvL597jWmW4w8P5kHs	Fine	My Voice - The 1st Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
199	798	3R8iyJpmhI9ABDmTpetV2D	Blue	Four Seasons	TAEYEON	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
200	802	1HVjqP22I8rGY1gyEqrEvy	Circus	Something New - The 3rd Mini Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
201	1903	7j2FhVH4n7X7D669o8T87z	Fire	My Voice - The 1st Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
202	725	2Bgjj3t5b0h34DfENfgYUY	Wine	Purpose - The 2nd Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
203	996	3bgUx9RWF6J9QmXNRxCG0U	Queen (Soft Edit Ver.)	Backstroke Fish	Taibian	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
204	2526	18Gwt626IbnNjEaSVdeBkp	Sweat On Me	The Winner	Tape Machines	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
205	1349	4HPmrbiQnN5AGZ7H16E7Pi	Therapy	Therapy	Taylor Acorn	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
206	1243	3lKZf71jeNi14vdIFPJ29V	I Knew You Were Trouble.	Red (Deluxe Edition)	Taylor Swift	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
207	3513	1bDLMtY69Cx6inNN9kaYkk	Numbers	Lock Me Up	The Cab	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
208	595	3y3CBAMpFNUTQmTIXGLIVa	Make It Right	Make It Right	The George Twins	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
209	574	1nbIkhsYmrónyy0smL0vliF	Cry Wolf	Negatives	The Girl and The Dreamcatcher	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04
210	564	3iFfvnDVRn3kv0KhóTl6DR	Monster	Negatives	The Girl and The Dreamcatcher	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04

```
SELECT * FROM lv1_tracks  
WHERE artist='TAEYEON' and album='Four Seasons';
```

	id	spotify_id	name	album	artist	artwork_url	duration
1	798	3R8iyJpmhI9ABDmTpetV2D	Blue	Four Seasons	TAEYEON	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04	151200

EXAMPLE

Display all attributes of songs by the artist "TAEYEON" or an album name that starts with "Red".

198	2482	6CdUgvL597jWmW4w8P5kHs	Fine	My Voice - The 1st Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b273b87c0d76ed9c7b1654b390d0	237265
199	798	3R8iyJpmhI9ABDmTpctV2D	Blue	Four Seasons	TAEYEON	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04	212842
200	802	1HVjqP22I8rGY1gyEqrEuy	Circus	Something New - The 3rd Mini Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b273b4c6cba427ce87604af348df	234026
201	1903	7j2FhVH4n7X7D669o8T87z	Fire	My Voice - The 1st Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b273254c8a09649551438b20f4c0	219720
202	725	2Bgjj3t5b0h34DfENfguyUy	Wine	Purpose - The 2nd Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	187326
203	996	3bgUx9RWF6J9QmXNRxCGOU	Queen (Soft Edit Ver.)	Backstroke Fish	Taibian	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	209157
204	2526	18Gwt626IbnNjEaSVdeBkp	Sweat On Me	The Winner	Tape Machines	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	234026
205	1349	4HPmrbiQnN5AGZ7H16E7Pi	Therapy	Therapy	Taylor Acorn	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	212842
206	1243	3lKZf71jeNi14udIFPJ29V	I Knew You Were Trouble.	Red (Deluxe Edition)	Taylor Swift	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	234026
207	3513	1bDLMtY69Cx6inNN9kaYkk	Numbers	Lock Me Up	The Cab	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	212842
208	595	3y3CBAMpFNutQmTIXGLIVA	Make It Right	Make It Right	The George Twins	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	234026
209	574	1nbIksYmrónyy0sm10vLiF	Cry Wolf	Negatives	The Girl and The Dreamcatcher	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	212842
210	564	3iEfvoDVRn3kyoKh6Tl6DR	Monster	Negatives	The Girl and The Dreamcatcher	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	234026

```
SELECT * FROM lv1_tracks  
WHERE artist='TAEYEON' or album like 'Red%';
```

1	725	2Bgjj3t5b0h34DfENfguyUy	Wine	Purpose - The 2nd Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b273b87c0d76ed9c7b1654b390d0	237265		
2	798	3R8iyJpmhI9ABDmTpctV2D	Blue	Four Seasons	TAEYEON	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04	212842		
3	802	1HVjqP22I8rGY1gyEqrEuy	Circus	Something New - The 3rd Mini Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b273b4c6cba427ce87604af348df	234026		
4	1243	3lKZf71jeNi14udIFPJ29V	I Knew You Were Trouble.	Red (Deluxe Edition)	Taylor Swift	https://i.scdn.co/image/ab67616d0000b273254c8a09649551438b20f4c0	219720		
5	1903	7j2FhVH4n7X7D669o8T87z	Fire	My Voice - The 1st Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	187326		
6	2482	6CdUgvL597jWmW4w8P5kHs	Fine	My Voice - The 1st Album	TAEYEON	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	209157		

EXAMPLE

Display all attributes of songs that ID not equal 1

	id	spotify_id	name	album	artist	artwork_url
1	1	044BWBz4tm6H0c3nqqUyCX	I'll Be There	To My Star (Original Webdrama Soundtrack)	Johnny	https://i.scdn.co/image/ab67616d0000b2736c49aaef6237a3fc0a78dfb
2	4	4DU01GT7y3lT9g4MbN2qMs	i would rather die than live forever	Everything Makes Me Cry	Sam Creighton	https://i.scdn.co/image/ab67616d0000b2736239d02316cf401e724bbec1
3	87	3NmI70LlRgEQm1zDQq7Hoa	Remember Me	Remember Me	Chris Mann	https://i.scdn.co/image/ab67616d0000b2731d8801ae75f76b5ee0bae17b
4	89	20ZNEa3tW5HKAAQqnJope	can you hear me?	can you hear me?	Munn	https://i.scdn.co/image/ab67616d0000b273437d9ca484f4681fdf085cd2
5	92	5nAEhdAwQSBaL0G2yJPHBf	Love For Days	Love For Days	Mimoza	https://i.scdn.co/image/ab67616d0000b273c2f0523ec109cf7eb920822e
6	99	46gwMD8DJ08B6jy2C3hEeZ	Pretty Sad	pretty sad	XYLØ	https://i.scdn.co/image/ab67616d0000b273ab89aa8f377852f4366b67c
7	102	0ygpggMDX083BG62ooY02F	Not Who We Were	Infrared	Em Behold	https://i.scdn.co/image/ab67616d0000b273591240b0211aa293914147e0
8	105	0XyCi5b7EB4iAw875dunR0	Broken	DUALITY	WE ARE FURY	https://i.scdn.co/image/ab67616d0000b273591240b0211aa293914147e0
9	108	6LLmygGpqhftP5NpvIIYqk	Stay By Your Side	Stay By Your Side	Diviners	https://i.scdn.co/image/ab67616d0000b2730c2e9f3033019f62157072b1
10	111	4ILn5zbdVVnHjmicWzwOzs	My Strange Addiction	My Strange Addiction	Plot Twist	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb
11	112	6V6XL83Hvg0V8bPEJ1CIom	Runaway	Runaway	Eian	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb
12	115	6fXH1pnZX2BS4o0orPFVpA	The Grave	Someone I'm Proud Of	Kate Vogel	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb
13	118	51ViS1GGhr7VfftaFTBgsh	Walk Through the Fire	Golden Age	Zayde Wølf	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb
14	122	3sRsyb2N8oDbjVkBvHz	mistake	STAGES OF LOVE & HEARTBREAK	Marisa Maino	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb
15	125	5Zi0uHr7x99kf369iNlNqH	Welcome to Wonderland	Welcome to Wonderland	Scarlett Rose	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb
16	130	4ZjZBbFG9SCduaghVnKr5	Wish I Never Loved You	Wish I Never Loved You	Bolshiee	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb
17	133	11lp0WLpPrpAtUjPnETQ05	Dopamine	Dopamine	Elle Vee	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb
18	136	00Wwww7kiJ0h3bv2fud5TVT	Beautiful - Remix	Beautiful (Remix)	Emilia Ali	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb

```
SELECT * FROM lv1_tracks  
WHERE not id = 1;
```

	id	spotify_id	name	album	artist	artwork_url
1	4	4DU01GT7y3lT9g4MbN2qMs	i would rather die than live forever	Everything Makes Me Cry	Sam Creighton	https://i.scdn.co/image/ab67616d0000b2736c49aaef6237a3fc0a78dfb
2	87	3NmI70LlRgEQm1zDQq7Hoa	Remember Me	Remember Me	Chris Mann	https://i.scdn.co/image/ab67616d0000b2736239d02316cf401e724bbec1
3	89	20ZNEa3tW5HKAAQqnJope	can you hear me?	can you hear me?	Munn	https://i.scdn.co/image/ab67616d0000b2731d8801ae75f76b5ee0bae17b
4	92	5nAEhdAwQSBaL0G2yJPHBf	Love For Days	Love For Days	Mimoza	https://i.scdn.co/image/ab67616d0000b273c2f0523ec109cf7eb920822e
5	99	46gwMD8DJ08B6jy2C3hEeZ	Pretty Sad	pretty sad	XYLØ	https://i.scdn.co/image/ab67616d0000b273ab89aa8f377852f4366b67c
6	102	0ygpggMDX083BG62ooY02F	Not Who We Were	Infrared	Em Behold	https://i.scdn.co/image/ab67616d0000b273591240b0211aa293914147e0
7	105	0XyCi5b7EB4iAw875dunR0	Broken	DUALITY	WE ARE FURY	https://i.scdn.co/image/ab67616d0000b273591240b0211aa293914147e0
8	108	6LLmygGpqhftP5NpvIIYqk	Stay By Your Side	Stay By Your Side	Diviners	https://i.scdn.co/image/ab67616d0000b2730c2e9f3033019f62157072b1
9	111	4ILn5zbdVVnHjmicWzwOzs	My Strange Addiction	My Strange Addiction	Plot Twist	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb
10	112	6V6XL83Hvg0V8bPEJ1CIom	Runaway	Runaway	Eian	https://i.scdn.co/image/ab67616d0000b27331552464e198701b0d70a3cb

SQL ORDER BY Keyword

- The ORDER BY keyword is used to sort the result-set in ascending or descending order.
- The ORDER BY keyword sorts the records in ascending order by default. To sort the records in descending order, use the DESC keyword.

Syntax

```
SELECT column1, column2, ...
FROM table_name
ORDER BY column1, column2, ... ASC|DESC;
```

EXAMPLE

```
SELECT * FROM Customers
ORDER BY Country;
```

SQL INSERT INTO Statement

- The INSERT INTO statement is used to insert new records in a table.

Syntax

```
INSERT INTO table_name (column1, column2, column3, ...)
VALUES (value1, value2, value3, ...);
```

EXAMPLE

inserts a new record in the "lv1_tracks" table

	spotify_id	name	album	artist	artwork_url
1	044BWbz4tm6H0c3nqqUyCX	I'll Be There	To My Star (Original Webdrama Soundtrack)	Johnny	https://i.scdn.co/v1/artwork/044BWbz4tm6H0c3nqqUyCX
2	4DU01GT7y3lT9g4MbN2qMs	i would rather die than live forever	Everything Makes Me Cry	Sam Creighton	https://i.scdn.co/v1/artwork/4DU01GT7y3lT9g4MbN2qMs
3	87 3NmI70LlRgEQm1zDQq7Hoa	Remember Me	Remember Me	Chris Mann	https://i.scdn.co/v1/artwork/87 3NmI70LlRgEQm1zDQq7Hoa
4	89 20ZNEa3tW5HKAaAQqnJope	can you hear me?	can you hear me?	Munn	https://i.scdn.co/v1/artwork/89 20ZNEa3tW5HKAaAQqnJope
5	92 5nAEhdAwQSbALOG2yJPHBf	Love For Days	Love For Days	Mimoza	https://i.scdn.co/v1/artwork/92 5nAEhdAwQSbALOG2yJPHBf
6	99 46gwMD8DJ08B6jy2C3hEeZ	Pretty Sad	pretty sad	XYLØ	https://i.scdn.co/v1/artwork/99 46gwMD8DJ08B6jy2C3hEeZ
7	102 0ygpggMdX083BG62ooY02F	Not Who We Were	Infrared	Em Beihold	https://i.scdn.co/v1/artwork/102 0ygpggMdX083BG62ooY02F
8	105 0XyCi5b7EB4iAw875dunR0	Broken	DUALITY	WE ARE FURY	https://i.scdn.co/v1/artwork/105 0XyCi5b7EB4iAw875dunR0
9	108 6LLmygGpqhftP5NpvIIYqk	Stay By Your Side	Stay By Your Side	Diviners	https://i.scdn.co/v1/artwork/108 6LLmygGpqhftP5NpvIIYqk
10	111 4ILn5zbdbVVnHjmicWzwOzs	My Strange Addiction	My Strange Addiction	Plot Twist	https://i.scdn.co/v1/artwork/111 4ILn5zbdbVVnHjmicWzwOzs
11	112 6V6XL83Hvg0V8bPEJ1CIom	Runaway	Runaway	Eian	https://i.scdn.co/v1/artwork/112 6V6XL83Hvg0V8bPEJ1CIom
12	115 6fxH1pnZX2BS4o0orPFVpA	The Grave	Someone I'm Proud Of	Kate Vogel	https://i.scdn.co/v1/artwork/115 6fxH1pnZX2BS4o0orPFVpA
13	118 51ViSLGGhr7VfftaFTBgs	Walk Through the Fire	Golden Age	Zayde Wølf	https://i.scdn.co/v1/artwork/118 51ViSLGGhr7VfftaFTBgs

```
INSERT INTO lv1_tracks (id, spotify_id, name, album, artist, artwork_url,duration,popularity,explicit,year,count)
VALUES (2, 'WASDZXCQWER', 'Aimai de iiyo', 'Aimai de iiyo', 'Hitsujibungaku','null',0,0,0,0,0);
```

	WHERE				
	id	spotify_id	name	album	artist
1	1	044BWbz4tm6H0c3nqqUyCX	I'll Be There	To My Star (Original Webdrama Soundtrack)	Johnny
2	2	WASDZXCQWER	Aimai de iiyo	Aimai de iiyo	Hitsujibungaku
3	4	4DU01GT7y3lT9g4MbN2qMs	i would rather die than live forever	Everything Makes Me Cry	Sam Creighton
4	87	3NmI70LlRgEQm1zDQq7Hoa	Remember Me	Remember Me	Chris Mann
5	89	20ZNEa3tW5HKAaAQqnJope	can you hear me?	can you hear me?	Munn
6	92	5nAEhdAwQSbALOG2yJPHBf	Love For Days	Love For Days	Mimoza
7	99	46gwMD8DJ08B6jy2C3hEeZ	Pretty Sad	pretty sad	XYLØ
8	102	0ygpggMdX083BG62ooY02F	Not Who We Were	Infrared	Em Beihold
9	105	0XyCi5b7EB4iAw875dunR0	Broken	DUALITY	WE ARE FURY
10	108	6LLmygGpqhftP5NpvIIYqk	Stay By Your Side	Stay By Your Side	Diviners
11	111	4ILn5zbdbVVnHjmicWzwOzs	My Strange Addiction	My Strange Addiction	Plot Twist

SQL UPDATE Statement

- The UPDATE statement is used to modify the existing records in a table.

Syntax

```
UPDATE table_name  
SET column1 = value1, column2 = value2, ...  
WHERE condition;
```

EXAMPLE

```
UPDATE lv1_tracks  
SET name = '1999', album= '1999'  
WHERE id = 2;
```

SQL DELETE Statement

- The DELETE statement is used to delete existing records in a table.

Syntax

```
DELETE FROM table_name WHERE condition;
```

EXAMPLE

```
DELETE FROM lv1_tracks  
WHERE name='1999';
```

SQL COUNT(), AVG() and SUM() Functions

- The COUNT() function returns the number of rows that matches a specified criterion.

Syntax

```
SELECT COUNT(column_name)
FROM table_name
WHERE condition;
```

EXAMPLE

```
SELECT COUNT(artist)
FROM lv1_tracks
WHERE artist='TAEYEON';
```

- The AVG() function returns the average value of a numeric column.

Syntax

```
SELECT AVG(column_name)
FROM table_name
WHERE condition;
```

EXAMPLE

```
SELECT AVG(duration)
FROM lv1_tracks
WHERE artist='TAEYEON';
```

- The SUM() function returns the total sum of a numeric column.

Syntax

```
SELECT SUM(column_name)
FROM table_name
WHERE condition;
```

EXAMPLE

```
SELECT SUM(popularity)
FROM lv1_tracks
WHERE artist = 'TAEYEON';
```

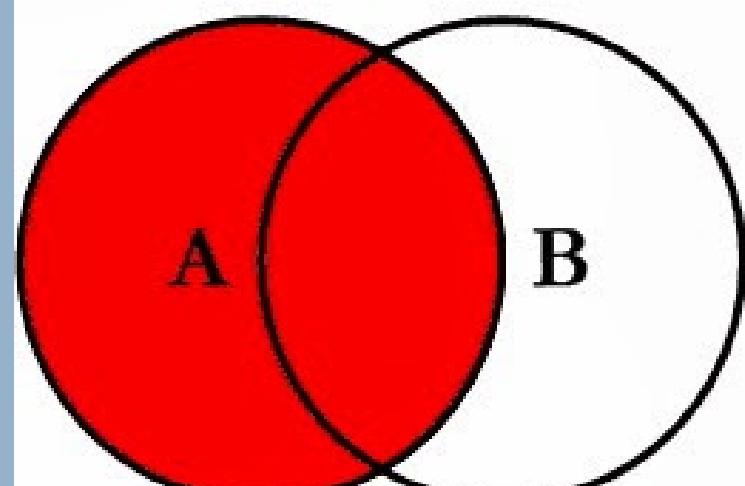
SQL Joins

A JOIN clause is used to combine rows from two or more tables, based on a related column between them.

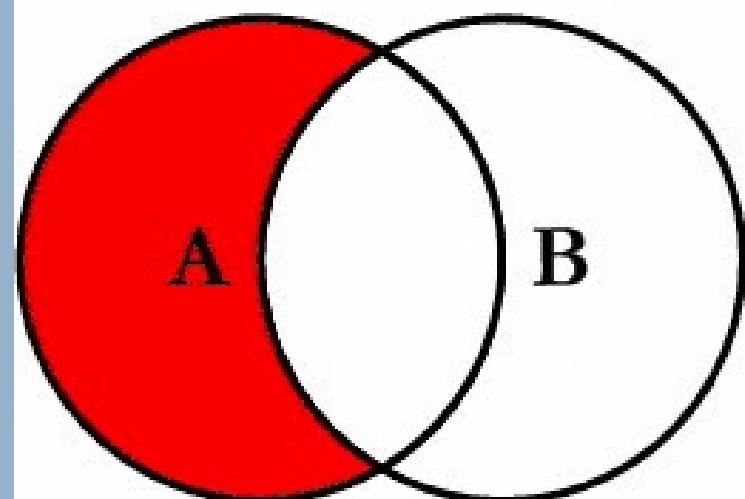
```
query = """
    SELECT o.Name AS Owner_Name, p.Name AS Pet_Name
    FROM `bigquery-public-data.pet_records.owners` AS o
    INNER JOIN `bigquery-public-data.pet_records.pets` AS p
        ON p.ID = o.Pet_ID
    """
```

Owner_Name	Pet_Name
Aubrey Little	Dr. Harris Bonkers
Magnus Burnsides	Moon
Chett Crawfish	Ripley
Jules Spinner	Tom

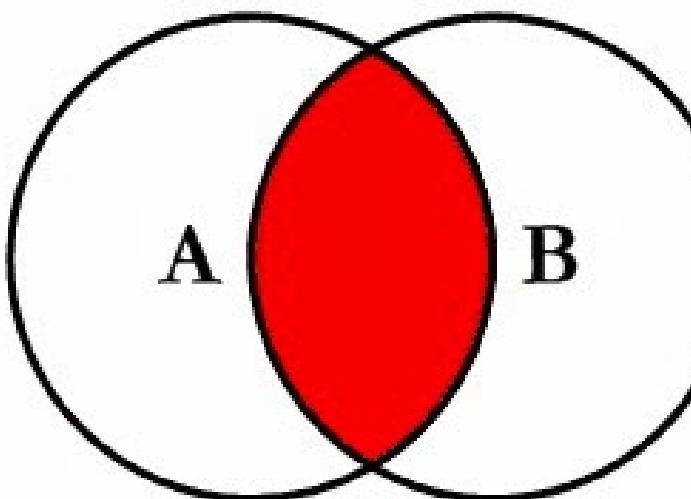
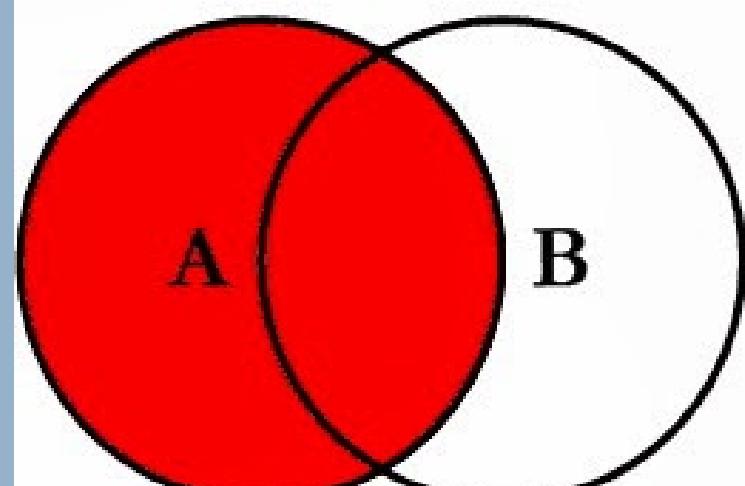
SQL JOINS



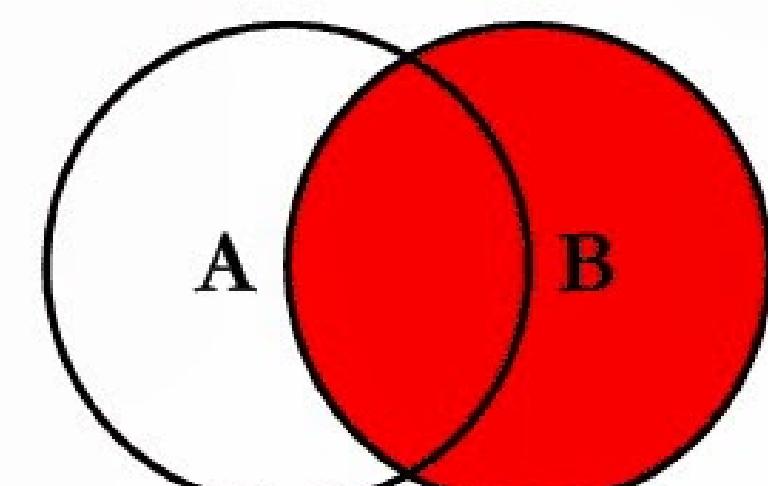
```
SELECT <select_list>
FROM TableA A
LEFT JOIN TableB B
ON A.Key = B.Key
```



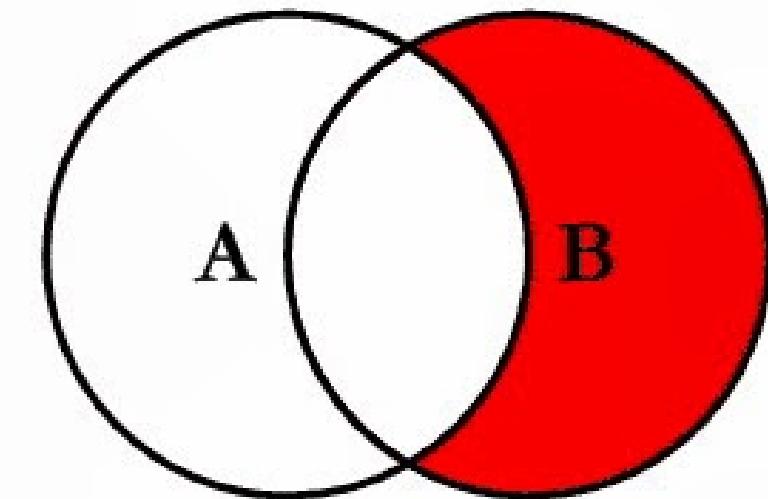
```
SELECT <select_list>
FROM TableA A
LEFT JOIN TableB B
ON A.Key = B.Key
WHERE B.Key IS NULL
```



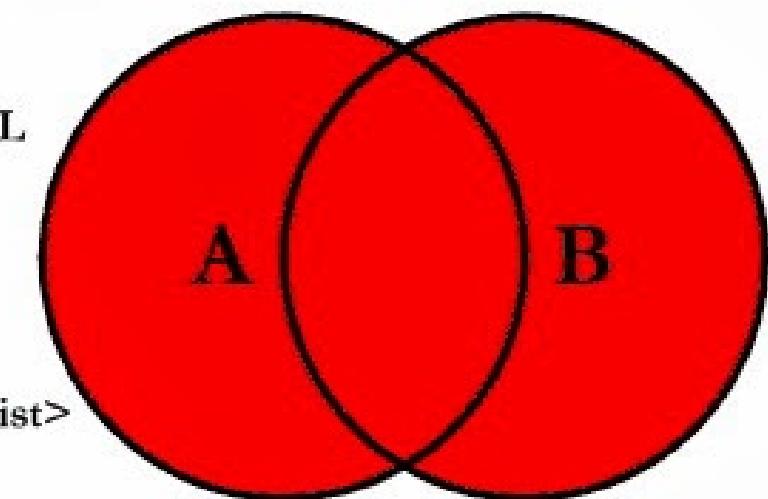
```
SELECT <select_list>
FROM TableA A
INNER JOIN TableB B
ON A.Key = B.Key
```



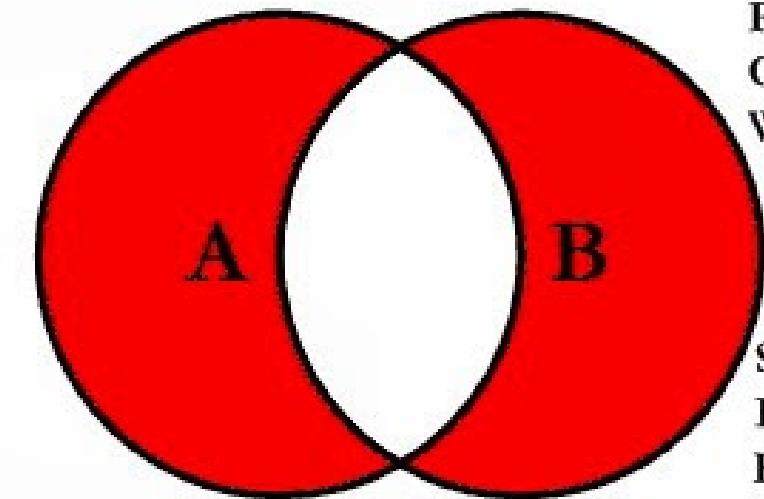
```
SELECT <select_list>
FROM TableA A
RIGHT JOIN TableB B
ON A.Key = B.Key
```



```
SELECT <select_list>
FROM TableA A
RIGHT JOIN TableB B
ON A.Key = B.Key
WHERE A.Key IS NULL
```

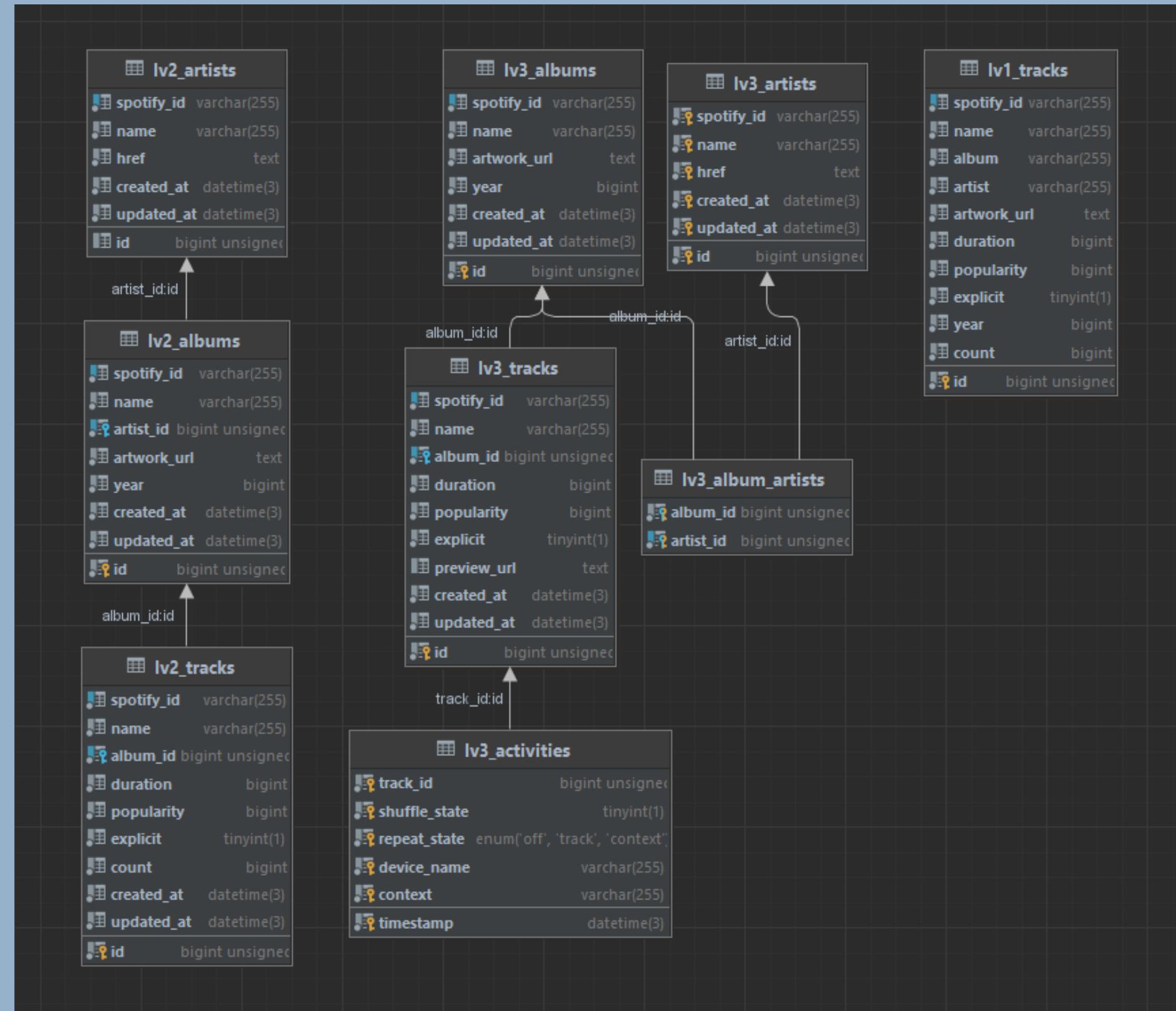


```
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
```



```
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
WHERE A.Key IS NULL
OR B.Key IS NULL
```

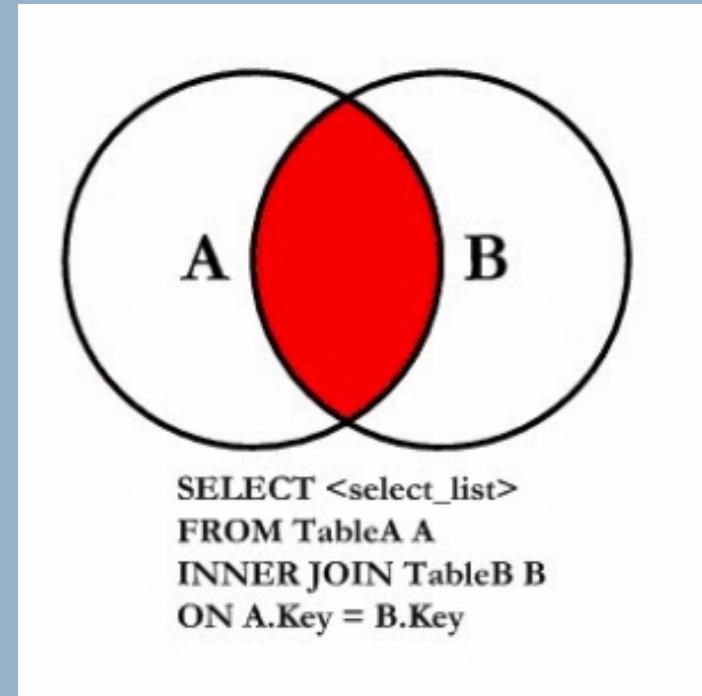
Database schema



SQL Inner Joins

Find all songs by artist name "TAEYEON" (by join table lv2_albums and lv2_tracks)

```
SELECT *
from lv2_tracks
inner join lv2_albums on lv2_tracks.album_id = lv2_albums.id
inner join lv2_artists on lv2_albums.artist_id = lv2_artists.id
where lv2_artists.name = 'TAEYEON'
```



Output Result 22 ×

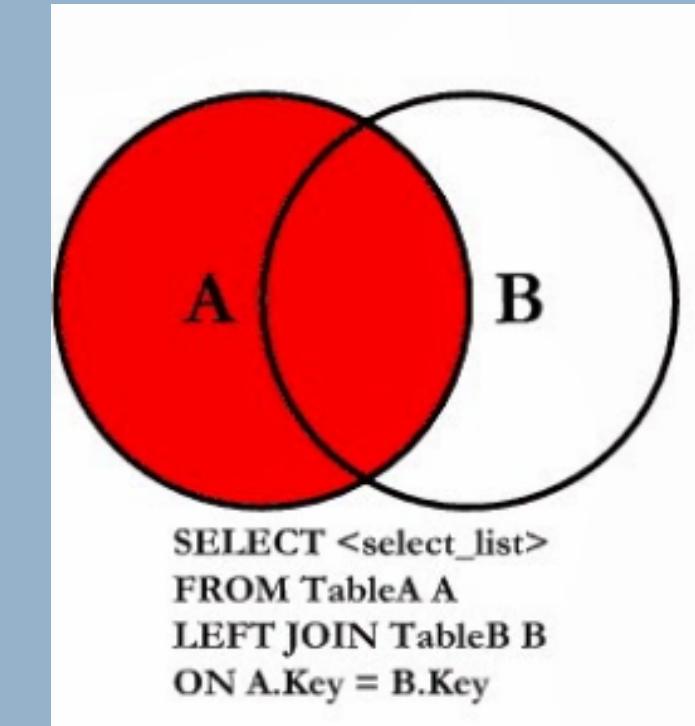
5 rows ▾

	lv2_tracks.id	lv2_tracks.spotify_id	lv2_tracks.name	album_id	duration	popularity	explicit	count	lv2_tracks.created_at
1	725	2Bgjj3t5b0h34DfENfgUY	Wine	83	237265	42	0	4	2023-03-28 04:5
2	798	3R8iyJpmhI9ABDmTpctV2D	Blue	98	212842	50	0	4	2023-03-29 16:3
3	802	1HVjqP22I8rGY1gyEqrEuy	Circus	99	234026	47	0	20	2023-03-29 16:4
4	1903	7j2FhVH4n7X7D669o8T87z	Fire	165	187326	36	0	9	2023-04-01 09:1
5	2482	6CdUgvL597jWmW4w8P5kHs	Fine	165	209157	68	0	25	2023-04-04 05:2

SQL LEFT JOIN

Find all songs THAT track name start with "The" (by join table lv2_albums and lv2_tracks)

```
SELECT lv2_tracks.name, lv2_albums.name  
FROM lv2_tracks  
LEFT JOIN lv2_albums on lv2_tracks.album_id = lv2_albums.id  
WHERE lv2_tracks.name like 'The%';
```



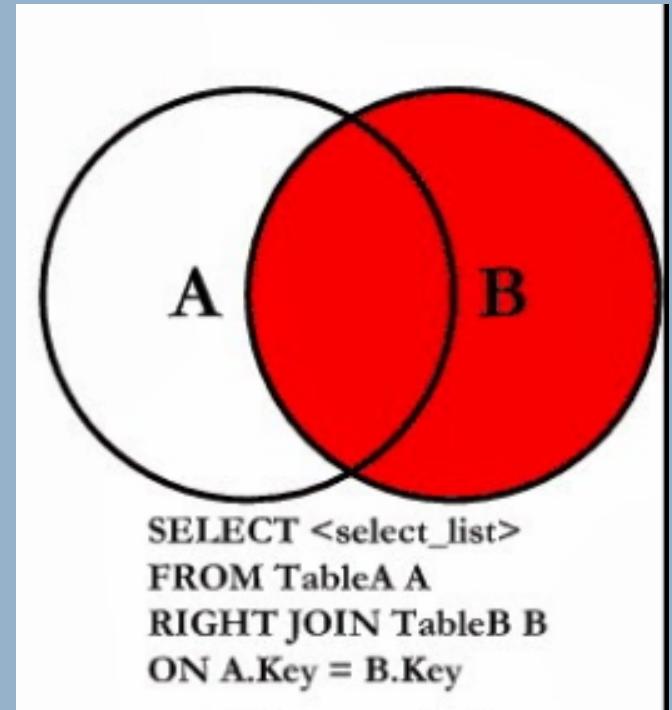
lv2_tracks.name	lv2_albums.name
1 The Grave	Someone I'm Proud Of
2 Therapy	Therapy
3 The Last Resolution	Time
4 The beginning and the end	僕のいた時間 オリジナルサウンドトラック
5 There is a will, there is a way	僕のいた時間 オリジナルサウンドトラック
6 The Woods	The Woods - EP
7 Therapy	Therapy
8 The Best For You	The Best For You
9 The Valley of Stars	Immortalys
10 The Spring	The Spring (Original Score)

SQL RIGHT JOIN

Find all songs THAT album name start with "The" (by join table lv2_albums and lv2_tracks)

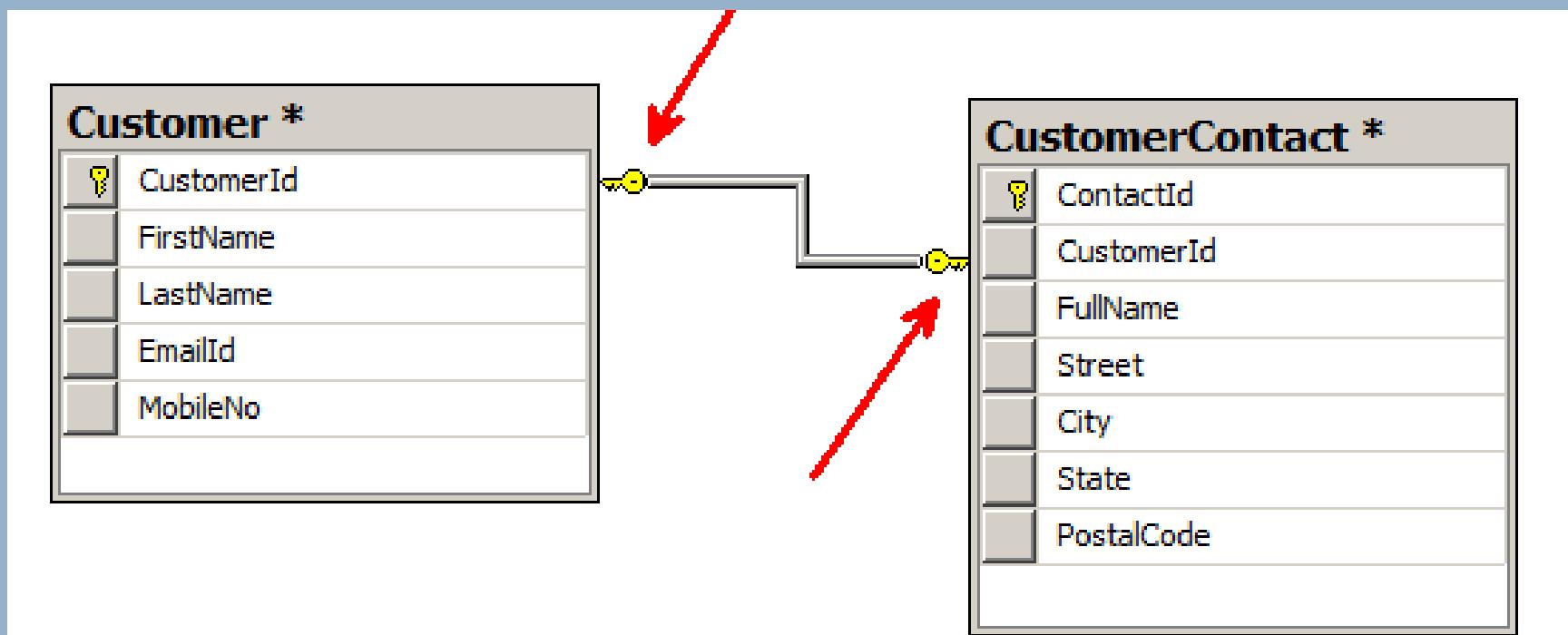
```
SELECT lv2_tracks.name, lv2_albums.name  
FROM lv2_tracks  
RIGHT JOIN lv2_albums on lv2_tracks.album_id = lv2_albums.id  
WHERE lv2_albums.name like 'The%';
```

lv2_tracks.name	lv2_albums.name
1 It's Your Eyes I See	The Art of Growing Up
2 Therapy	Therapy
3 Beautiful Girl	The Eyes of Tomorrow
4 Revert	The Singles Collection, Vol. 1
5 Dunkmaster Darius (From League of Legends: Season 4)	The Music of League of Legends: Season 4 (Original Game Soundtrack)
6 Too Little Too Late - 2018	The High Road (2018)
7 A Ceasefire	The Native Architects EP
8 Space Talk	The Native Architects EP
9 The Woods	The Woods - EP
10 Therapy	Therapy
11 새벽 별과 소년의 노래 Dawn Star And Boy'S Song	The Serenade
12 Sweat On Me	The Winner
13 The Best For You	The Best For You
14 The Spring	The Spring (Original Score)



Reletionships

SQL One To One

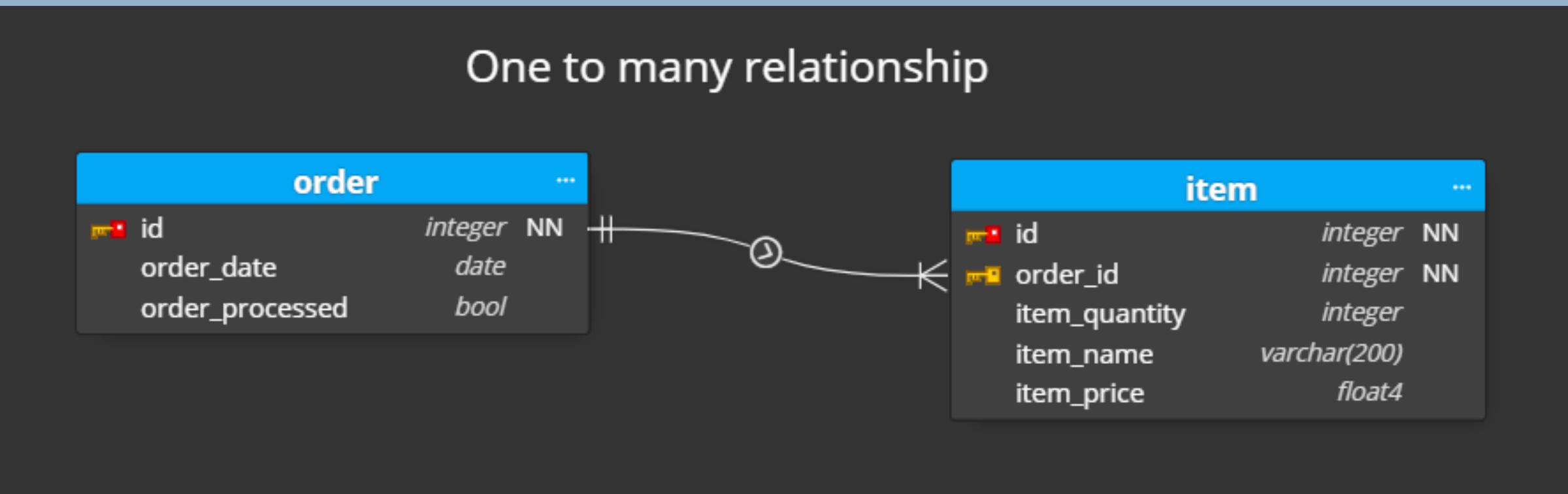


```
SELECT DISTINCT l2a.name, a.name  
FROM lv2_artists a  
INNER JOIN lv2_albums l2a on a.id = l2a.id
```

l2a.name	a.name
67 Bedroom	Felix Jaehn
68 Negatives	Ryos
69 Combien	Overhead, The Albatross
70 The Music of League of Legends: Season 4 (Original Game Soundtrack)	Tone Damli
71 All For Love	Emmelie de Forest
72 1st Digital Single [Paradise]	J.UNA
73 I Should Have Known	TAEYEON
74 僕のいた時間 オリジナルサウンドトラック	Lauv
75 Major Tit Right	Reconnecter

SQL One To Many

One to many relationship

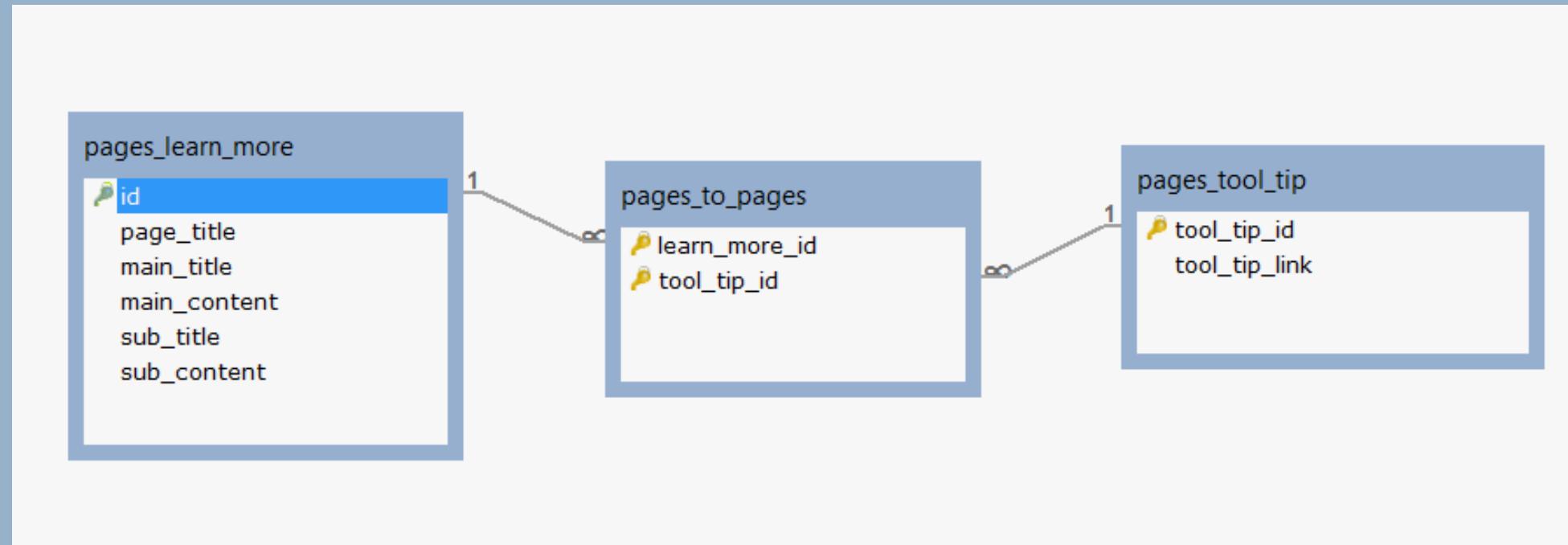


```
SELECT DISTINCT device_name, name
FROM lv3_activities a
INNER JOIN lv3_tracks l3t on a.track_id = l3t.id
WHERE device_name = 'Thun's MacBook Pro';
```

The screenshot shows a database query output window. The query selected distinct device names and track names where the device name is 'Thun's MacBook Pro'. The results are as follows:

	device_name	name
1	Thun's MacBook Pro	I'll Be There
2	Thun's MacBook Pro	i would rather die than live forever
3	Thun's MacBook Pro	Remember Me
4	Thun's MacBook Pro	ไม่มีเธอไม่ด้วย
5	Thun's MacBook Pro	Fathers Eyes
6	Thun's MacBook Pro	红昭愿 - 高音质版

SQL Many To Many



```
SELECT *
FROM lv3_album_artists
join lv3_albums l3a on l3a.id = lv3_album_artists.album_id
join lv3_artists l on l.id = lv3_album_artists.artist_id
where l.name = 'TAEYEON';
```

	album_id	artist_id	l3a.id	l3a.spotify_id	l3a.name	artwork_url	year	l3a.created_at	l3a.updated_at	l.id	l.spotify_id
1	83	90	83	0h6wCpdgpSOAbYDDYJVuwr	Purpose - The 2nd Album	https://i.scdn.co/image/ab67616d0000b273b87c0d76ed9c7b1654b390d0	2019	2023-03-28 04:55:10.058	2023-03-28 04:55:10.058	90	3qNVuliS40BLgXGxhdBdqu
2	98	90	98	3ublKZHui1qjU9ujf9A4zhH	Four Seasons	https://i.scdn.co/image/ab67616d0000b2737de8f56a39ec67a091457d04	2019	2023-03-29 16:36:05.442	2023-03-29 16:36:05.442	90	3qNVuliS40BLgXGxhdBdqu
3	99	90	99	0xYQcPVyEEegJLTLTtWUx	Something New - The 3rd Mini Album	https://i.scdn.co/image/ab67616d0000b273b4c6cba427ce87604af348df	2018	2023-03-29 16:40:03.686	2023-03-29 16:40:03.686	90	3qNVuliS40BLgXGxhdBdqu
4	165	90	165	6DlCl3hBP1Gwhn0tgtitGFn	My Voice - The 1st Album	https://i.scdn.co/image/ab67616d0000b2738c7e7f435fdcc70772c5555e	2017	2023-04-01 09:12:06.201	2023-04-01 09:12:06.201	90	3qNVuliS40BLgXGxhdBdqu

Next Quiz 27/4/23