ONLINE MUSIC APPLICATION DATABASE

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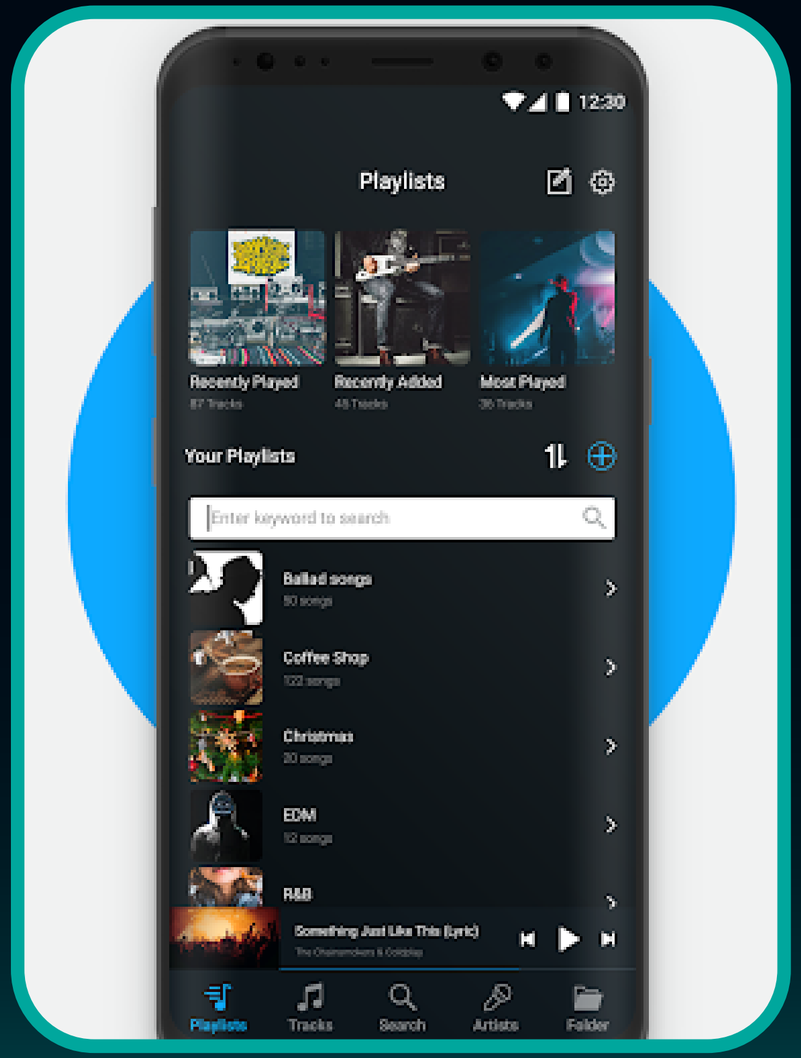
Contents

Overview



"The best music is essentially there to provide you something to face the world with."
Everyone has their own personal tastes and preferences when it comes to choosing thee right music.

Therefore, here we bring our database of the online streaming music application, so that it's easy to find the right music for every moment on your phone, your computer, your tablet and more. So whether you're behind the wheel, working out, or relaxing, the right music is always at your fingertips.

Choose what you want to listen to.

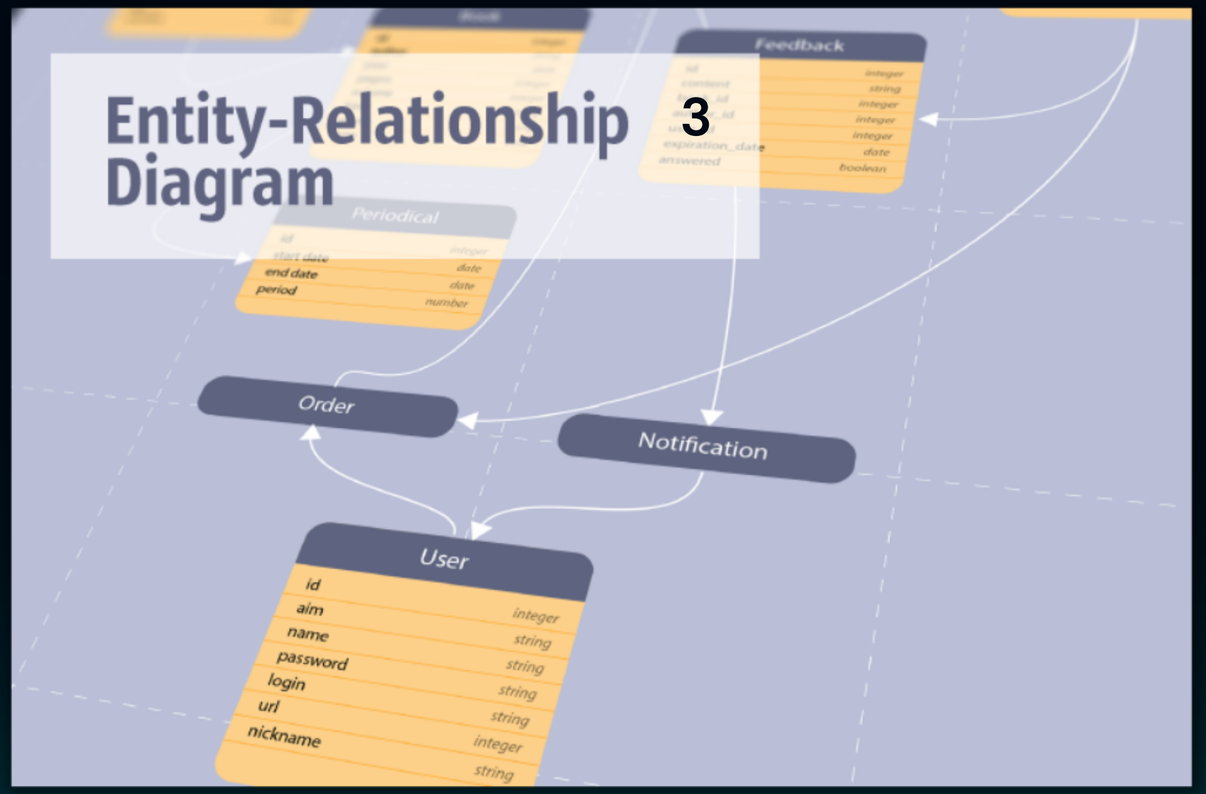
Usefulness

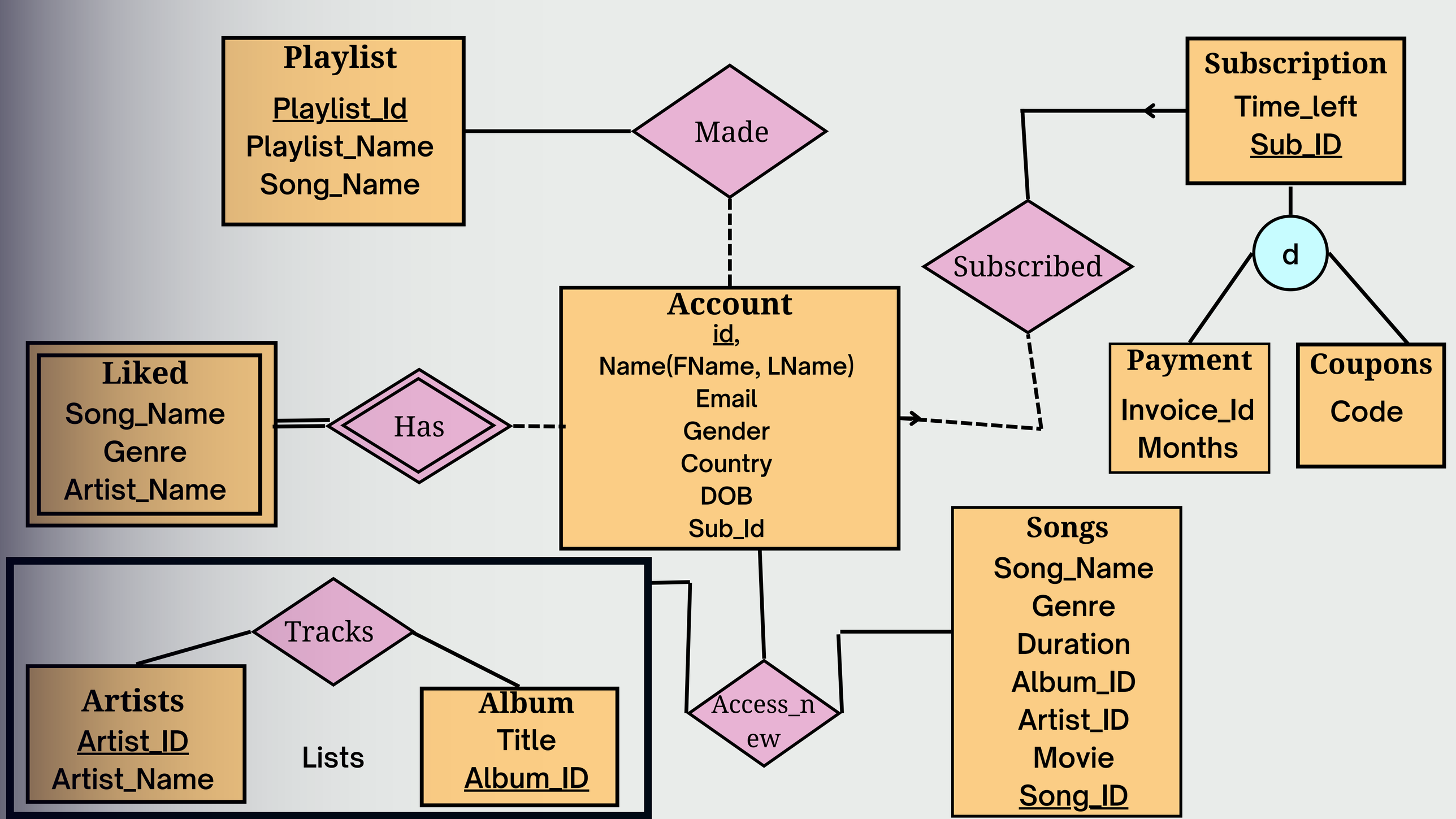
1. It will help the users to get an exposure to a vast variety of music.
2. It will Facilitate Easy Distribution of Music. The streaming platforms allow artists to distribute their new songs, albums, remixes, etc. through different channels in the network.
3. Accessing songs according to one's tastes would be easier through this database.
4. It is user- friendly as it provides various ways in which one can make the payment.
5. You don’t need to subscribe to multiple channels.

ER DIAGRAM

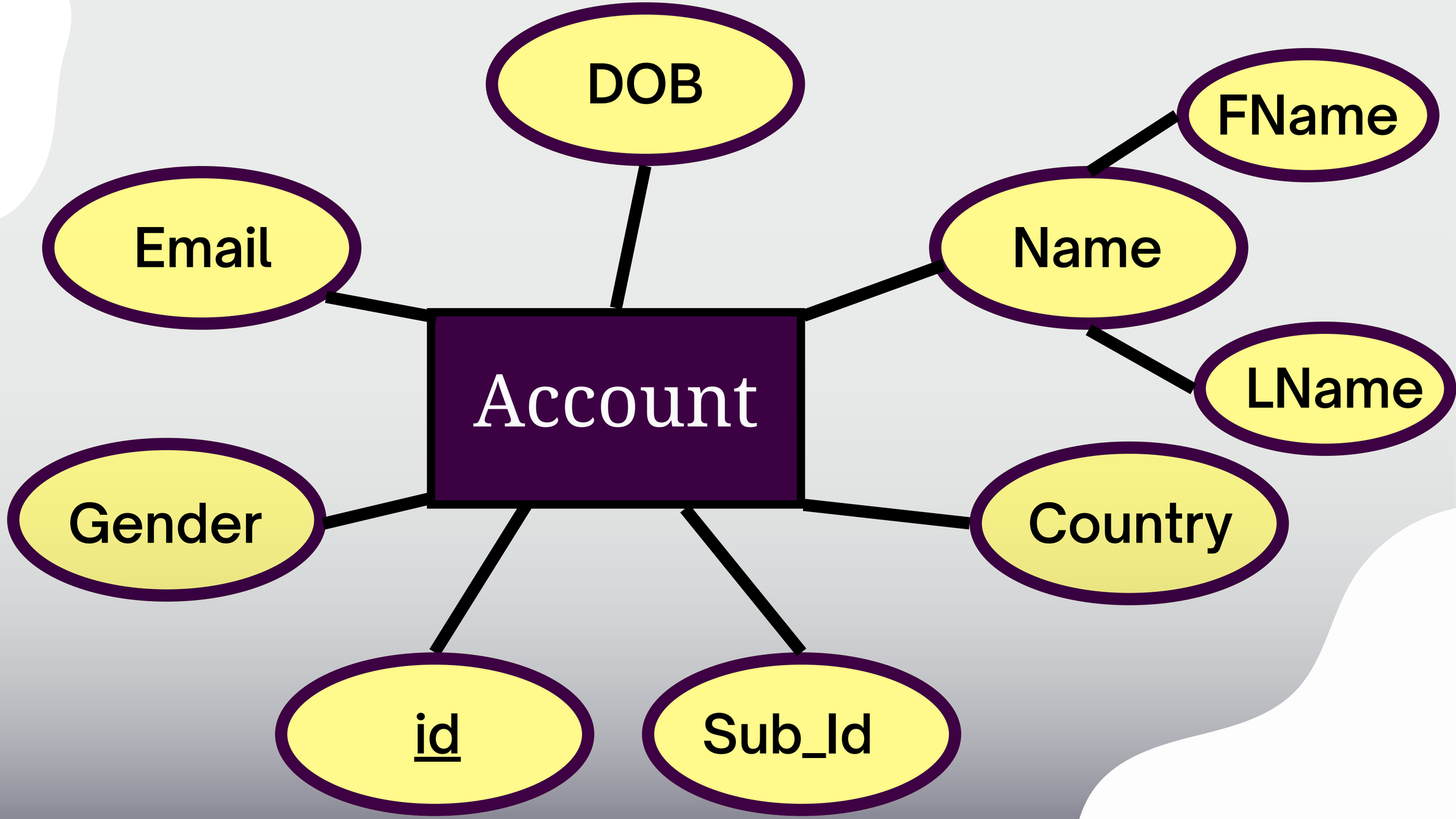
The ER data model was developed to facilitate database design by allowing specification of an enterprise schema that represents the overall logical structure of a database.

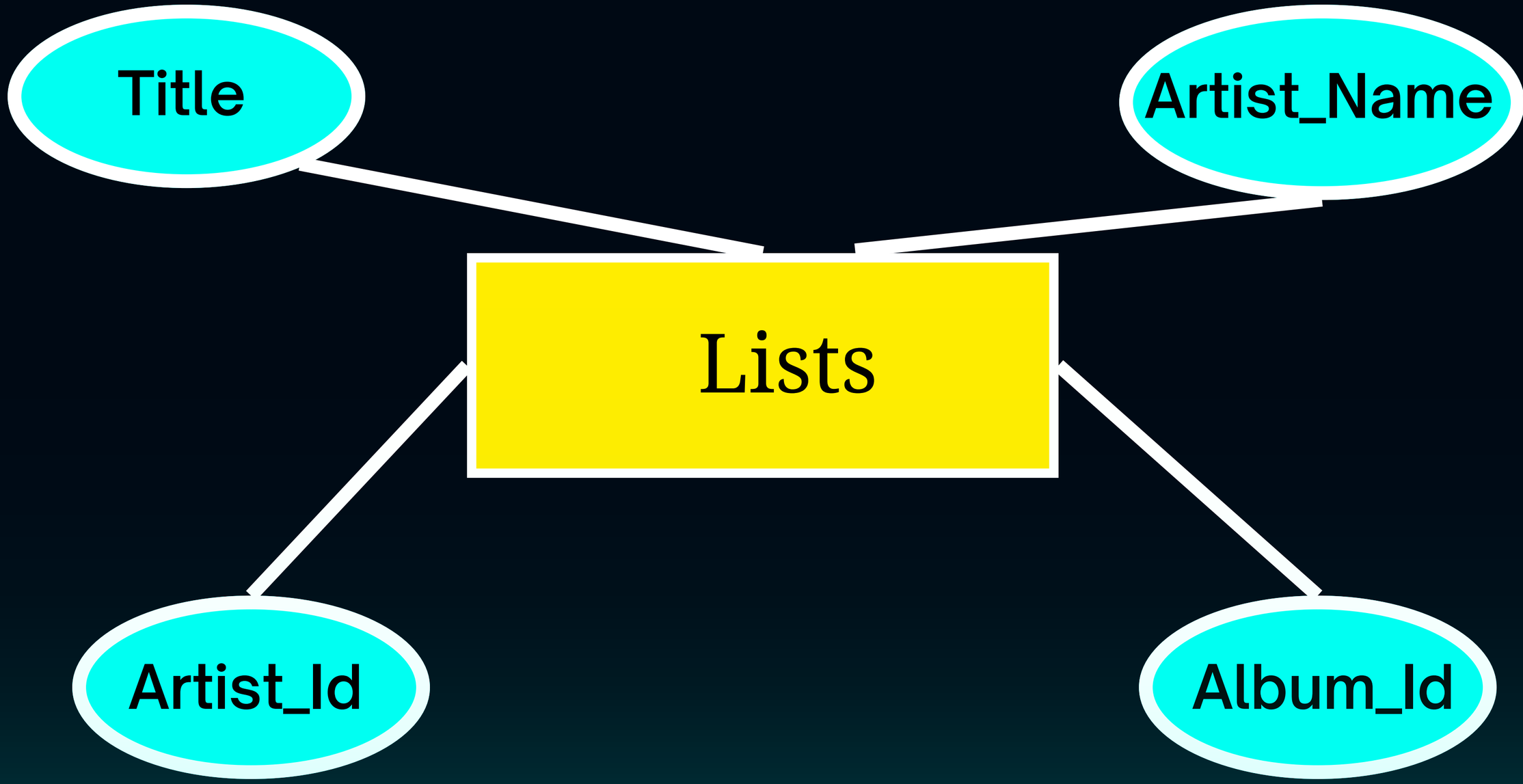
The ER model also has an associated diagrammatic representation, the ER diagram, which can express the **overall logical structure of a database graphically.**



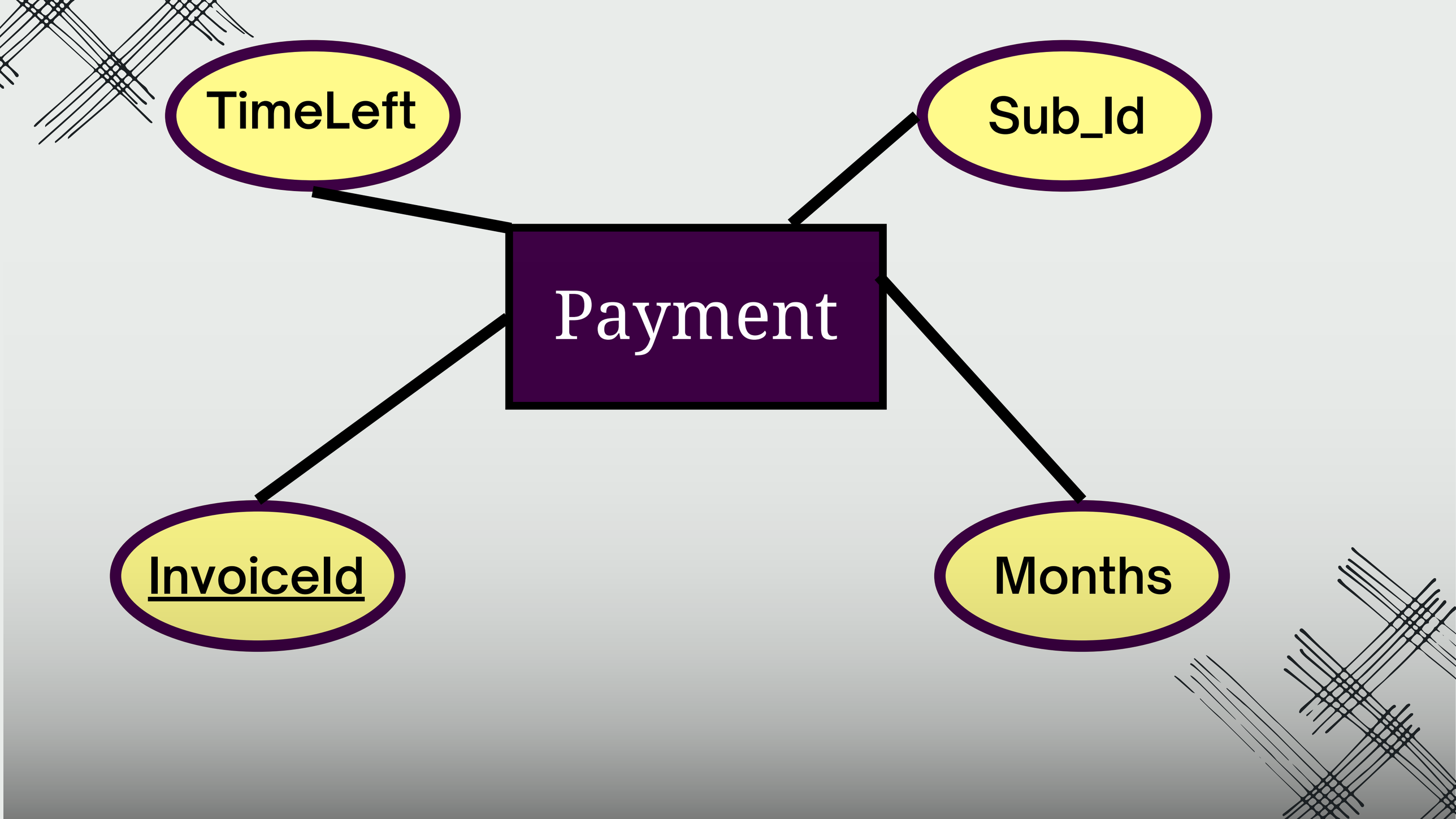

Playlist
Playlist_Id
Playlist_Name
Song_Name
Made
Subscription
Time_left
Sub_ID
Subscribed
d
Account
id,
Name(FName, LName)
Email
Gender
Country
DOB
Sub_Id
Liked
Song_Name
Genre
Artist_Name
Has
Payment
Invoice_Id
Months
Coupons
Code
Songs
Song_Name
Genre
Duration
Album_ID
Artist_ID
Movie
Song_ID
Tracks
Artists
Artist_ID
Artist_Name
Lists
Album
Title
Album_ID
Access_new

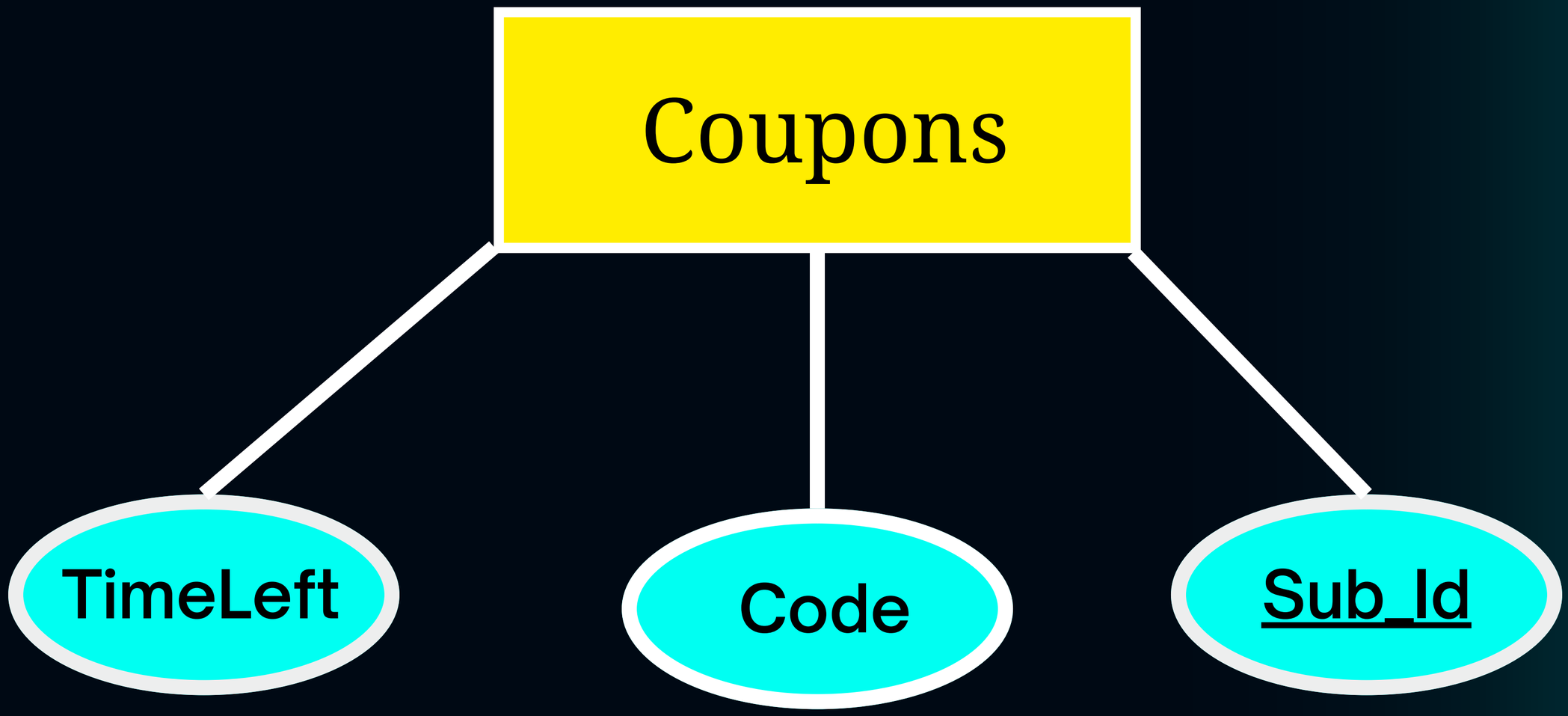
Entities And Attributes

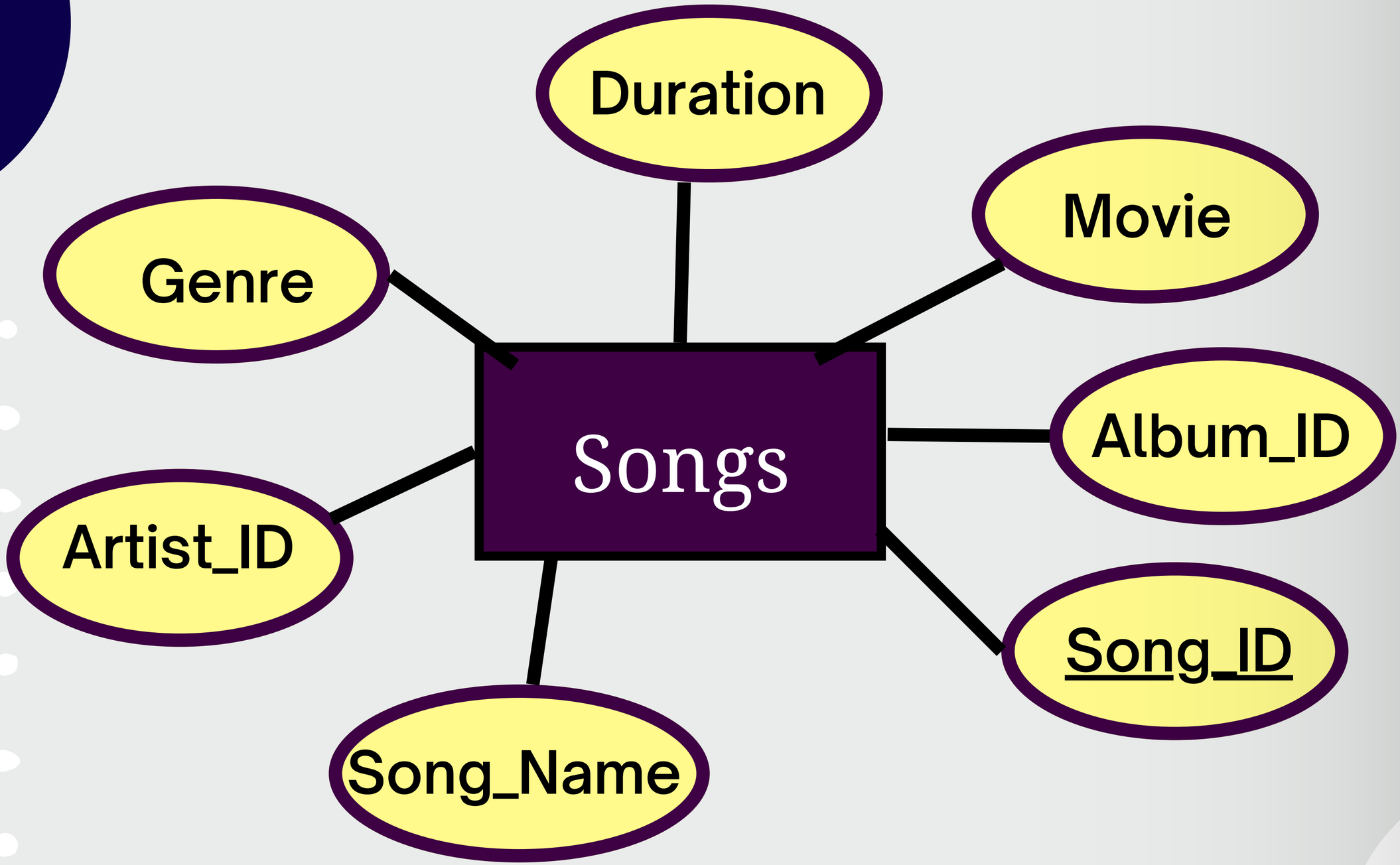

DOB
FName
Email
Name
Account
LName
Gender
Country
id
Sub_Id

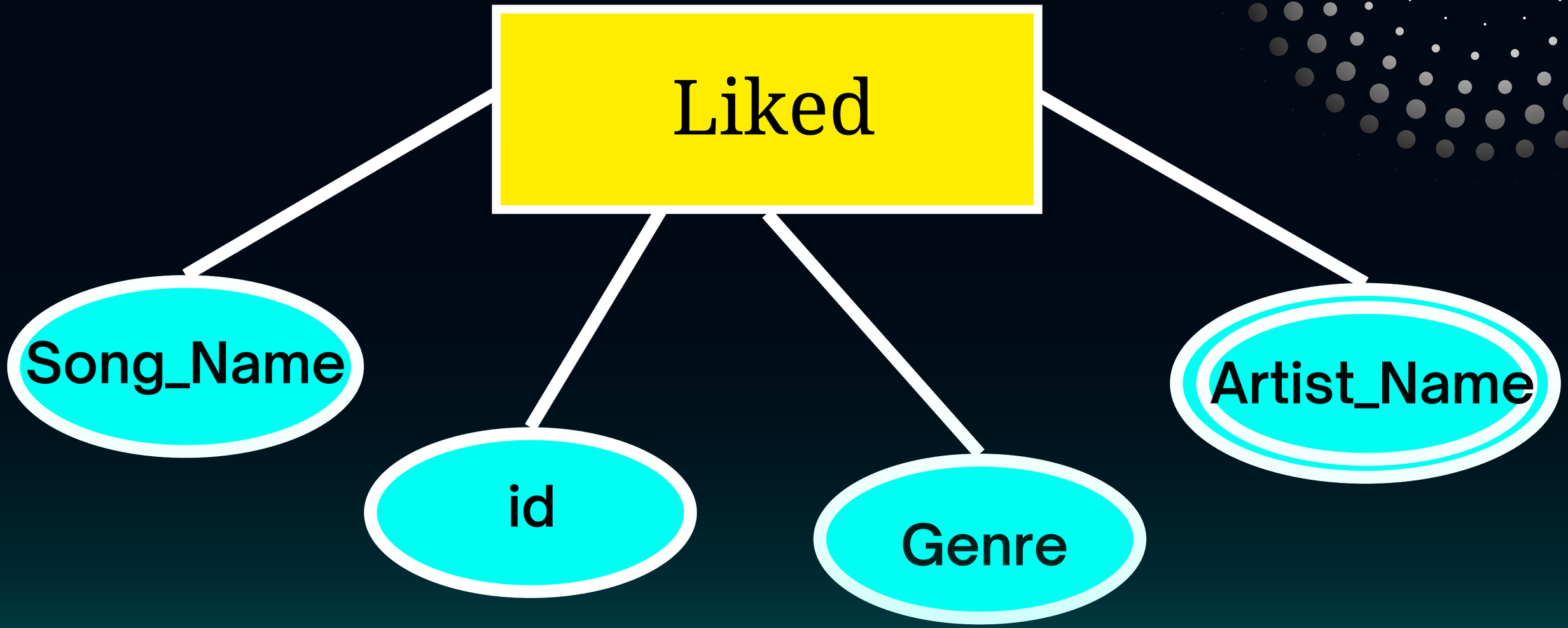


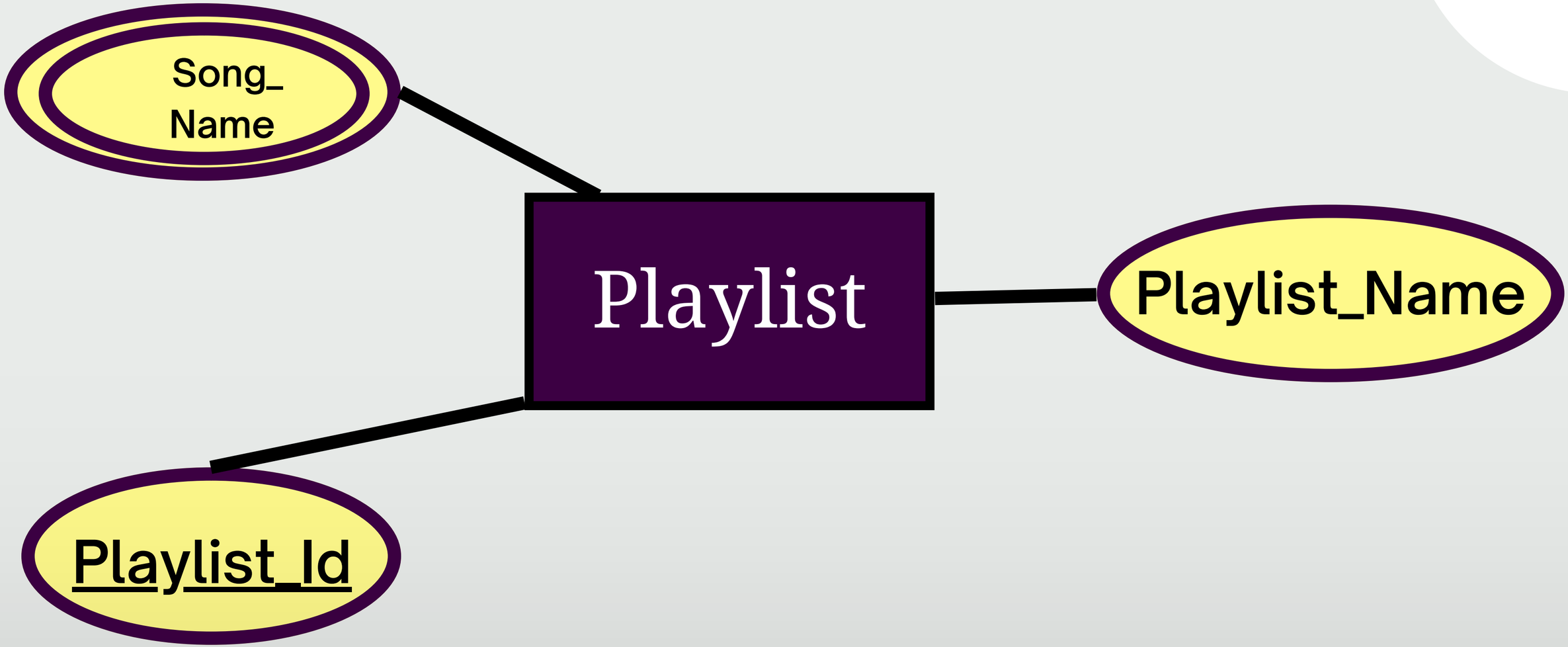
Composite key: {Artist_Id, Album_Id}


TimeLeft
Sub_Id
Payment
InvoiceId
Months

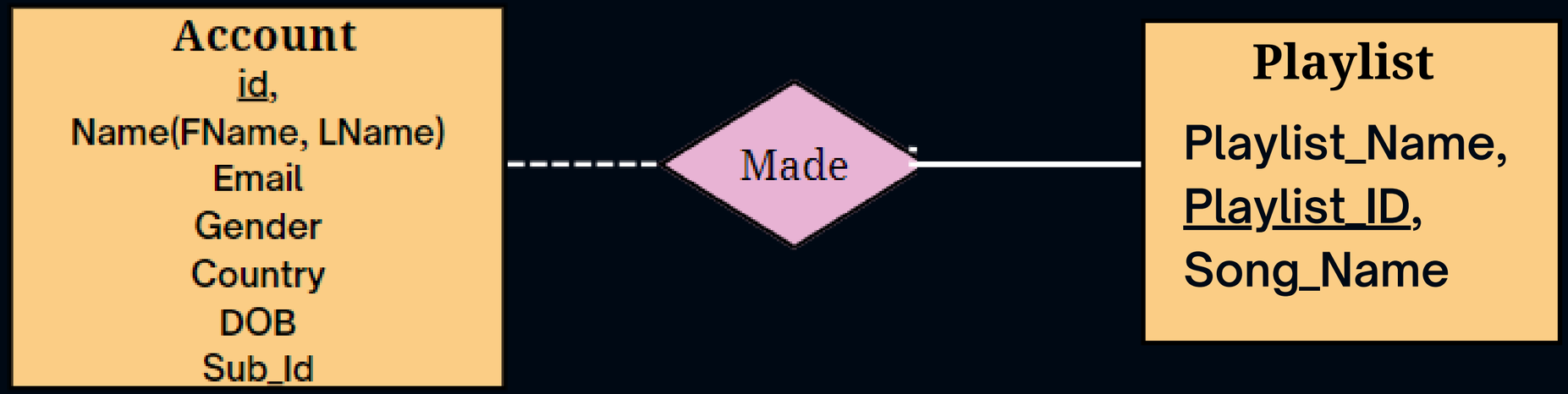

Coupons
TimeLeft
Code
Sub_Id


Duration
Genre
Movie
Songs
Album_ID
Artist_ID
Song_ID
Song_Name


Liked
Song_Name
id
Genre
Artist_Name

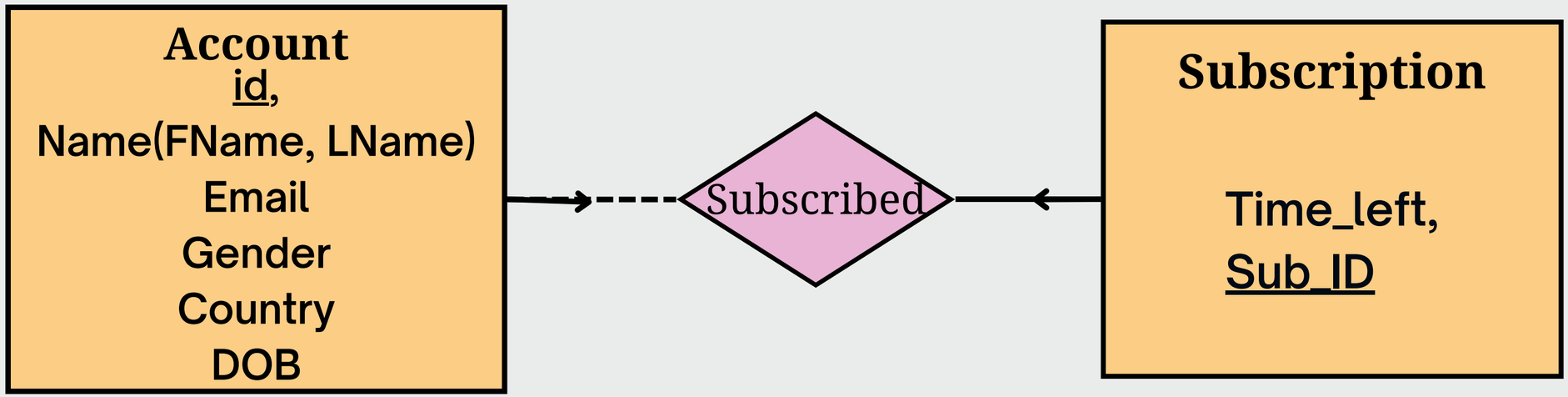

Song_
Name
Playlist
Playlist_Name
Playlist_Id

ER DIAGRAM TO TABLES



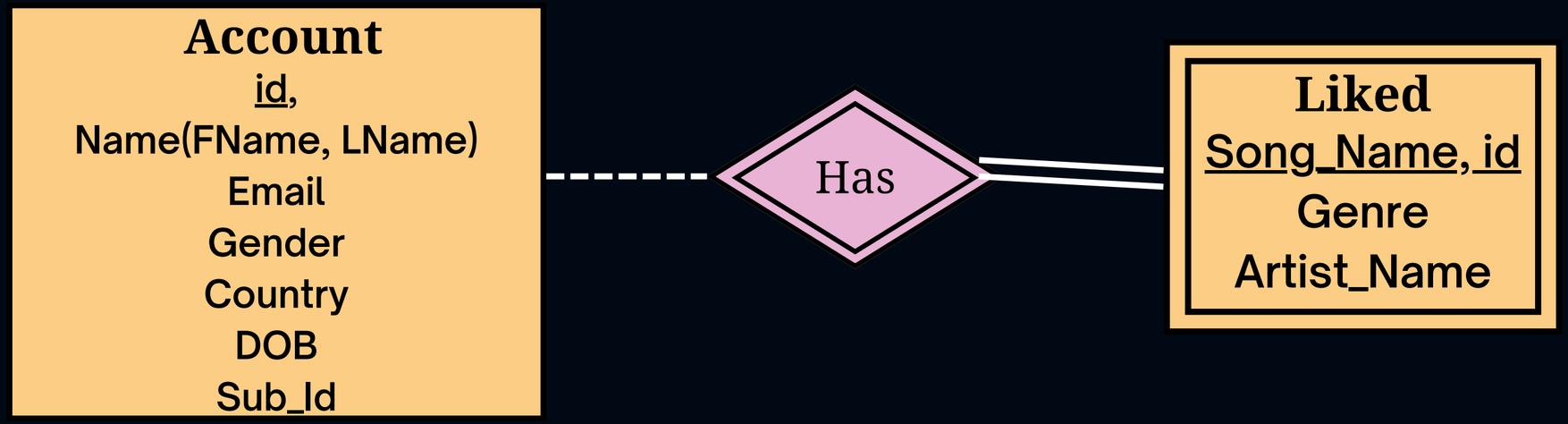
Schema: Made(Playlist_ID, id)

Composite key: Playlist_ID, id



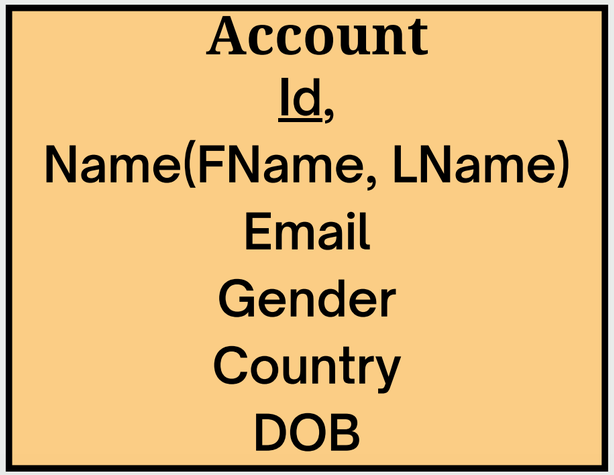
Schema: Subscribed(Sub_ID, id)

Primary Key: Can either be id or Sub_ID



Schema: Liked(Song_Name, id, Genre, Artist_Name)

Functional Dependencies: ID, Song_Name -> Song_Name, Genre, Artist_Name



Schema: Account(ID, FName, LName, Email, Gender, Country, DOB)

Functional Dependencies: ID -> Name(FName, LName) , E-mail, Gender, Country, DOB)

Schema: Album(Title, Album_ID)

Functional Dependencies : Album_ID -> Title

Schema: Songs(Song_Name, Genre, Duration, Album_ID, Artist_ID, Movie, Song_ID)

Functional Dependencies: Song_ID -> Song_Name, Genre, Duration, Album_ID, Artist_ID

Artists : (Artist_ID, Artist_Name)

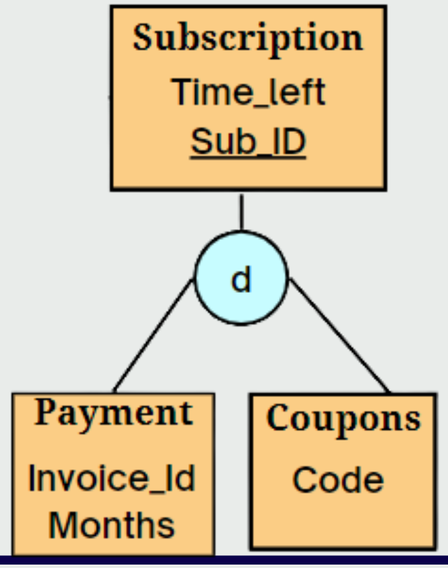
Functional Dependencies: Artist_ID -> Artist_Name

Schema: Playlist(Playlist_ID, Playlist_Name, Song_Name)

Functional Dependencies: Playlist_ID -> Playlist_Name, Song_Name

Subscription

Time_left,
Sub_ID



Subscription: Time_left, Sub_ID

Functional Dependencies: Sub_ID -> Time_left

Schema: Payments(Invoice_ID, Months, Time_left, Sub_ID)

Functional Dependencies :

Invoice_ID -> Months, Sub_ID, Time_left

Schema: Coupons(Code, Time_left, Sub_ID)

Functional Dependencies:

Sub_ID -> Code, Time_left

Relationship sets & Cardinality

Relationship Sets

- has :

(Song_Name, ID)

- Access:

(Song_ID, Artist_ID, Album_ID, ID)

- Made:

(ID, Playlist_ID)

- Subscribed:

(ID, sub_ID)

Cardinality

- It is a many to many relationship from liked to Account
- It is a many to many relationship from aggregate of Album and Artist to Account
- It is a many to many relationship from Playlist to Account
- It is a one to one relationship from Subscription to Account

Relationship sets and their cardinality:-

1) **Has : (Song_Name, genre, Artists, Id)**

‘Has’ is a Many to Many relationship from ‘Liked’ to ’Account’ as a song can be liked from several accounts

And a single account user may like many songs as well. Here Liked shows total participation and Account

Shows partial participation as many songs can be liked by one user and there is also a possibility that he doesn't like the song as well.

2) **Access_new : (Song_Id,Album_Id,Artist_Id,Id)**

‘Access_new’ is a many to many relationship that connects Entity Account, Songs and Aggregation

Lists. The aggregation ‘Lists’ contains two entities Albums and Artists.

***3)* Made**

‘Made’ is a Many to Many relationship from ‘Playlist’ to ‘Account’. As a Playlist can can be used by multiple

Accounts and an account can have multiple playlists as well. Here Playlist shows total participation

and Account shows partial participation as an account may or may not have a playlist.

***4)* Subscribed**

‘Subscribed’ is a one to one relationship from ‘Account’ to ‘Subscription’.Here account is having

Partial participation as an account may or may not take any subscription and Subscription is having

Total participation in the relationship Subscribed.


SQL
(Structured Query Language)

Account table

Table creation

```
CREATE TABLE Account (
FName varchar(100) NOT NULL,
LName varchar(100) NOT NULL,
Gender varchar(10),
Email varchar(50) NOT NULL,
Country varchar(15) NOT NULL,
DOB date NOT NULL,
id int PRIMARY KEY,
);
```

Output

Field	Type	Null	Key	Default
FName	varchar(100)	NO		NULL
LName	varchar(100)	YES		NULL
Country	varchar(25)	NO		NULL
id	char(100)	NO	PRI	NULL
DOB	date	NO		NULL
Email	varchar(50)	NO		NULL
Gender	varchar(10)	YES		NULL

Insertion

```
INSERT INTO Account VALUES('Harry', 'Potter', 'Male', 'harry@gmail.com', 'Britain', '2002-02-25', 100, 30);
INSERT INTO Account VALUES('Ram', 'Singh', 'Male', 'ram@gmail.com', 'India', '2002-01-31', 101, 999);
INSERT INTO Account VALUES('Shyam', 'Rathore', 'Male', 'Shyaam@gmail.com', 'India', '1999-11-30', 102, NULL);
INSERT INTO Account VALUES('Ana', 'Armas', 'Female', 'Ana@gmail.com', 'USA', '2004-03-18', 103, NULL);
INSERT INTO Account VALUES('Aditi', 'Mishra', 'Female', 'Aditi@gmail.com', 'India', '2001-02-16', 104, 263);
INSERT INTO Account VALUES('Rajiv', 'Singh', 'Male', 'rajiv@gmail.com', 'India', '2000-05-25', 105, 256);
INSERT INTO Account VALUES('Ishita', 'Shukla', 'Female', 'ishita@gmail.com', 'India', '2003-11-30', 106, NULL);
INSERT INTO Account VALUES('Alexia', 'Putellas', 'Female', 'alexia@gmail.com', 'Spain', '2002-05-13', 107, 2);
INSERT INTO Account VALUES('Luke', 'Jing', 'Male', 'luke@gmail.com', 'New Zealand', '1990-09-21', 108, 252);
INSERT INTO Account VALUES('Elssye', 'Perry', 'Female', 'elperry@gmail.com', 'Australia', '1992-12-25', 109, 955);
```

OUTPUT

FName	LName	Gender	Email	Country	DOB	id	Sub_Id
Harry	Potter	Male	harry@gmail.com	Britain	2002-02-25	100	30
Ram	Singh	Male	ram@gmail.com	India	2002-01-31	101	999
Shyam	Rathore	Male	Shyaam@gmail.com	India	1999-11-30	102	NULL
Ana	Armas	Female	Ana@gmail.com	USA	2004-03-18	103	NULL
Aditi	Mishra	Female	Aditi@gmail.com	India	2001-02-16	104	263
Rajiv	Singh	Male	rajiv@gmail.com	India	2000-05-25	105	256
Ishita	Shukla	Female	ishita@gmail.com	India	2003-11-30	106	NULL
Alexia	Putellas	Female	alexia@gmail.com	Spain	2002-05-13	107	2
Luke	Jing	Male	luke@gmail.com	New Zealand	1990-09-21	108	252
Elssye	Perry	Female	elperry@gmail.com	Australia	1992-12-25	109	955
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Account table

songs

Table creation

```
create table songs (
Song_Id int PRIMARY key,
Genre varchar(25) ,
Song_Name varchar(25) NOT NULL,
Movie varchar(25),
Duration varchar(15) NOT NULL
);
```

Output

Field	Type	Null	Key	Default
Song_Id	int	NO	PRI	NULL
Genre	varchar(25)	YES		NULL
Song_Name	varchar(25)	NO		NULL
Movie	varchar(25)	YES		NULL
Duration	varchar(15)	NO		NULL

Insertion

```
INSERT INTO songs VALUES(200, 'Rock', 'In
Dino','Interstellar', '00:02:59');
INSERT INTO songs VALUES(201, 'Rock', 'Bailando', Null,
'00:02:54');
INSERT INTO songs VALUES(202, 'Pop', 'Skyfall','Skyfall',
'00:03:54');
INSERT INTO songs VALUES(203, 'Jazz', 'No Lie', 'No Time',
'00:03:54');
INSERT INTO songs VALUES(204, 'Classical', 'Ilahi', 'Roy',
'00:02:54');
INSERT INTO songs VALUES(205, 'Blues', 'Tu Hi', 'Roy',
'00:03:22');
INSERT INTO songs VALUES(206, 'Classical', 'Duniyaa', Null,
'00:04:22');
INSERT INTO songs VALUES(207, 'Blues', 'Tum Ho', Null,
'00:04:29');
INSERT INTO songs VALUES(208, 'Ghazal', 'Garaj Baras',
'Insight', '00:01:59');
INSERT INTO songs VALUES(209, 'Ghazal', 'Badi Nazuk',
'Insight', '00:03:29');

select * from songs;
```

OUTPUT

Song_Id	Genre	Song_Name	Movie	Duration
200	Rock	In Dino	Interstellar	00:02:59
201	Rock	Bailando	NULL	00:02:54
202	Pop	Skyfall	Skyfall	00:03:54
203	Jazz	No Lie	No Time	00:03:54
204	Classical	Ilahi	Roy	00:02:54
205	Blues	Tu Hi	Roy	00:03:22
206	Classical	Duniyaa	NULL	00:04:22
207	Blues	Tum Ho	NULL	00:04:29
208	Ghazal	Garaj Baras	Insight	00:01:59
209	Ghazal	Badi Nazuk	Insight	00:03:29
NULL	NULL	NULL	NULL	NULL

Payments

Table creation

```
create table Payments(
 Time_Left int NOT NULL,
 Invoice_Id varchar(100) ,
Sub_Id varchar(100) NOT NULL,
 Months int NOT NULL);
```

Outputs

Result Grid | Filter Rows: | Export: | W

Field	Type	Null	Key	Default	Extra
Time_Left	int	NO		NULL	
Invoice_Id	varchar(100)	NO	PRI	NULL	
Sub_Id	varchar(100)	NO		NULL	
Months	int	NO		NULL	

Insertion

```
insert into Payments values( 4, '123', '091', 5);
insert into Payments values( 5, '780', '782', 10);
insert into Payments values( 1, '230', '112', 7);
insert into Payments values( 4, '333', '111', 9 );
insert into Payments values( 3, '112', '234', 12);
insert into Payments values( 2 , '300', '235', 12 );
insert into Payments values( 5, '145', '671', 10 );
insert into Payments values( 1, '545', '187', 2 );
insert into Payments values( 3, '672', '441', 10 );
insert into Payments values( 3, '705', '342', 4 );
select * from Payments;
```

Output

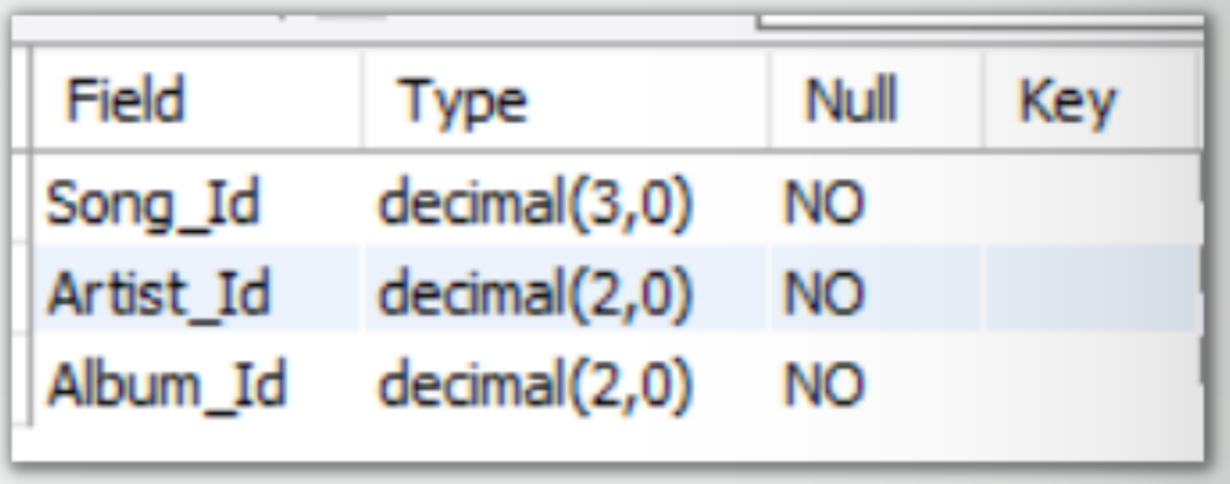
	Time_Left	Invoice_Id	Sub_Id	Months
▶	125	1	0	10
	3	112	234	12
	4	123	091	5
	5	145	671	10
	1	230	112	7
	2	300	235	12
	4	333	111	9
	1	545	187	2
	697	6	3	12
	3	672	441	10
	3	705	342	4
	5	780	782	10
	347	9	4	5

Access_new

Table creation

```
create table Access_new
( Song_Id numeric(3,0)
NOT NULL,
  Artist_Id numeric(2,0)
NOT NULL,
  Album_Id numeric(2,0)
NOT NULL );
```

Output



Field	Type	Null	Key
Song_Id	decimal(3,0)	NO	
Artist_Id	decimal(2,0)	NO	
Album_Id	decimal(2,0)	NO	

Insertion

```
insert into Access_new values( 200 , 10 , 50 );
insert into Access_new values( 201 , 11 , 51 );
insert into Access_new values( 202 , 12 , 52 );
insert into Access_new values( 203 , 12 , 53 );
insert into Access_new values( 204 , 13 , 54 );
insert into Access_new values( 205 , 13 , 54 );
insert into Access_new values( 206 , 15 , 55 );
insert into Access_new values( 207 , 13 , 55 );
insert into Access_new values( 208 , 18 , 56 );
insert into Access_new values( 209 , 18 , 56 );
```

Output

Song_Id	Artist_Id	Album_Id
200	10	50
200	10	50
201	11	51
202	12	52
203	12	53
204	13	54
205	13	54
206	15	55
207	13	55
208	18	56
209	18	56

Playlists

Table creation

```
create table playlists
( playlist_Id  numeric(3,0) NOT NULL,
  song varchar(100) NOT NULL,
  playlist_name varchar(100) NOT NULL);
```

Output

Field	Type	Null	Key	Default
playlist_Id	decimal(3,0)	NO		NULL
song	varchar(100)	NO		NULL
playlist_name	varchar(100)	NO		NULL

Insertion

```
insert into playlists values( 400 , "Bailando" , "P10");
insert into playlists values( 400 , "In Dino" , "P10");
insert into playlists values( 401 , "In Dino" , "P11");
insert into playlists values( 402 , "Badi Nazuk" , "P13");
insert into playlists values( 402 , "Garaj Baras" , "P13");
insert into playlists values( 403 , "Bailando" , "P15");
insert into playlists values( 403 , "Skyfall" , "P15");
insert into playlists values( 404 , "Bailando" , "P14");
insert into playlists values( 405 , "Tum ho" , "P16");
insert into playlists values( 406 , "Duniya" , "P17");
insert into playlists values( 407 , "Duniya" , "P18");
insert into playlists values( 407 , "Ilahi" , "P18");
insert into playlists values( 407 , "No lie" , "P18");
```

Output

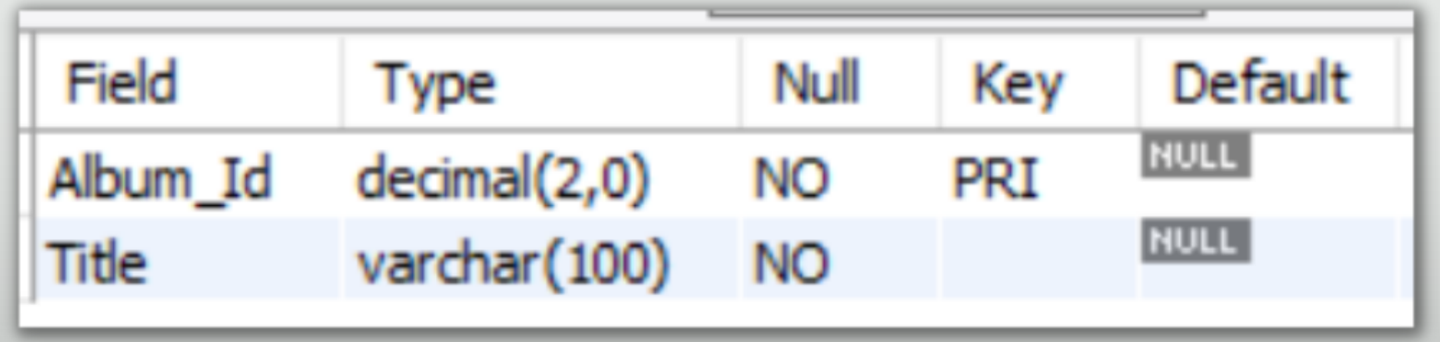
playlist_Id	song	playlist_name
400	Bailando	P10
400	In Dino	P10
401	In Dino	P11
402	Badi Nazuk	P13
402	Garaj Baras	P13
403	Bailando	P15
403	Skyfall	P15
404	Bailando	P14
405	Tum ho	P16
406	Duniya	P17
407	Duniya	P18
407	Ilahi	P18
407	No lie	P18

Album

Table creation

```
create table Album
( Album_Id numeric(2,0)
PRIMARY KEY,
 Title Varchar(100) NOT
NULL );
```

Output



Field	Type	Null	Key	Default
Album_Id	decimal(2,0)	NO	PRI	NULL
Title	varchar(100)	NO		NULL

Insertion

```
insert into Album values( 50, "Hello");
insert into Album values( 51, "Hind");
insert into Album values( 52, "Bird");
insert into Album values( 53, "Crow");
insert into Album values( 54, "Fifty");
insert into Album values( 55, "Visca barka");
insert into Album values( 56, "Viral");
```

Output

Album_Id	Title
50	Hello
51	Hind
52	Bird
53	Crow
54	Fifty
55	Visca barka
56	Viral

Artists

Table creation

```
create table Artists (
Artist_ID varchar(15) Primary key,
Artist_name varchar(25) NOT NULL
);
```

Output

	Field	Type	Null	Key	Default
▶	Artist_ID	varchar(15)	NO	PRI	NULL
	Artist_name	varchar(25)	NO		NULL

Insertion

```
INSERT INTO Artists VALUES('46a1', 'Adele');
INSERT INTO Artists VALUES('45d6', 'Enrique Iglesias');
INSERT INTO Artists VALUES('48b7', 'Sonu Nigam');
INSERT INTO Artists VALUES('4aab', 'KK');
INSERT INTO Artists VALUES('4aab', 'Asha Bhosle');
INSERT INTO Artists VALUES('4aab', 'Jagjit Singh');


select * from Artist;
```

Output

Artist_ID	Artist_name
45d6	Enrique Iglesias
46a1	Adele
48b7	Sonu Nigam
4aab	KK
4da1	Adele
NULL	NULL

Coupon

Table creation code

```
create table Coupons (
Time_Left int NOT NULL,
Sub_Id int PRIMARY KEY,
Codee varchar(20) NOT NULL
);
insert into Coupons values (6,30,'AED23');
insert into Coupons values (7,252,'LLL23');
insert into Coupons values (3,256,'AED23');
insert into Coupons values (3,263,'KK233');

select * from coupon;
```

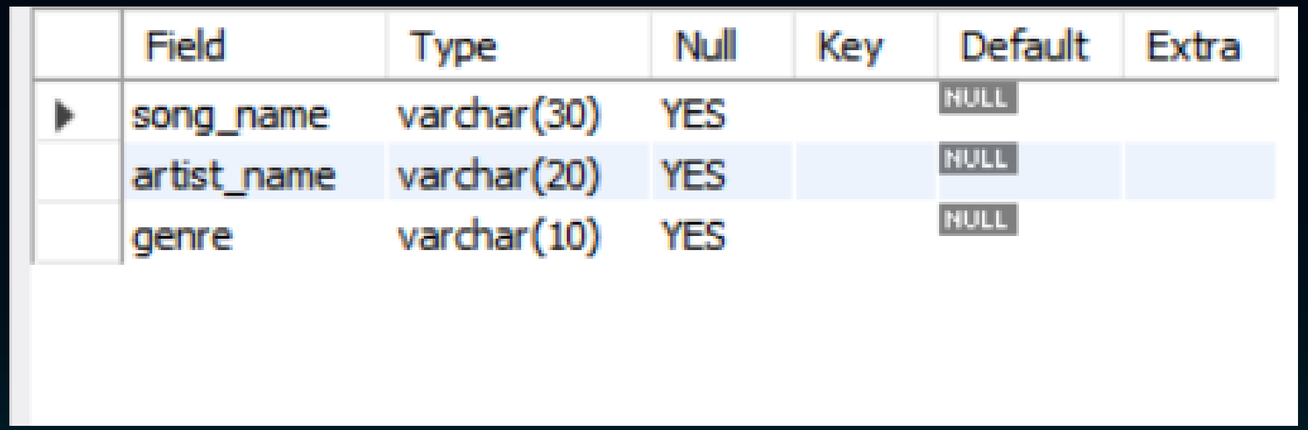
Output

Field	Type	Null	Key	Default
Time_Left	int	NO		NULL
Sub_Id	int	NO	PRI	NULL
Codee	varchar(20)	NO		NULL

Time_Left	Sub_Id	Codee
6	30	AED23
7	252	LLL23
3	256	AED23
3	263	KK233
NULL	NULL	NULL

liked

```
create table liked
(
    song_name varchar(30),
    artist_name varchar (20),
    genre  varchar (10)
);
```



Field	Type	Null	Key	Default	Extra
song_name	varchar(30)	YES		NULL	
artist_name	varchar(20)	YES		NULL	
genre	varchar(10)	YES		NULL	

Insertion

```
insert into liked values ( 'In dino ', ' Adele ', 'Rock ' );
insert into liked values ( 'In dino ', ' Adele ', 'Rock ' );
insert into liked values ( 'Tu hi  ', ' KK ', 'Blues ' );
insert into liked values ( 'Badi Najuk  ', ' Jagjit Singh  ', 'Ghajal ' );
insert into liked values ( 'Tu hi  ', ' KK', 'Blues  ' );
insert into liked values ( 'In dino ', ' Adele ', 'Rock ' );
insert into liked values ( 'Tu hi  ', ' KK ', 'Blues ' );
insert into liked values ( 'Ilahi  ', ' KK', 'Blues ' );
insert into liked values ( 'Ilahi  ', ' KK', 'Blues ' );
insert into liked values ( ' Tum ho   ', ' Adele ', 'Rock ' );
insert into liked values ( ' Garaj baras  ', ' Jagjit singh  ', 'Ghazal ' );
insert into liked values ( ' Badi Nazuk   ', ' Jagjit singh  ', 'Ghazal ' );
insert into liked values ( ' Duniya  ', ' Asha Bhosle  ', 'classical ' );
insert into liked values ( ' Sky Fall  ', ' Sonu Nigam   ', 'Pop ' );
insert into liked values ( ' Bailnaldo   ', ' Enrique Iglesias  ', 'Rock  ' );
insert into liked values ( ' Duniya  ', ' Asha Bhosle  ', 'classical ' );
select * from liked ;
```

Output

song_name	artist_name	genre
Duniya	Asha Bhosle	classical
In dino	Adele	Rock
In dino	Adele	Rock
Tu hi	KK	Blues
Badi Najuk	Jagjit Singh	Ghajal
Tu hi	KK	Blues
In dino	Adele	Rock
Tu hi	KK	Blues
Ilahi	KK	Blues
Ilahi	KK	Blues
Tum ho	Adele	Rock
Garaj baras	Jagjit singh	Ghazal
Badi Nazuk	Jagjit singh	Ghazal
Duniya	Asha Bhosle	classical
Sky Fall	Sonu Nigam	Pop
Bailnaldo	Enrique Igle…	Rock
Duniya	Asha Bhosle	classical

Made

Made

```
create table Made
( Playlist_Id numeric(3,0)
NOT NULL,
  Id numeric(3,0) );
```

Output

Field	Type	Null	Key
Playlist_Id	decimal(3,0)	NO	
Id	decimal(3,0)	YES	

Insertion

```
insert into Made values( 400 , 100);
insert into Made values( 401 , 100);
insert into Made values( 402 , 101);
insert into Made values( 403 , 102);
insert into Made values( 404 , 103);
insert into Made values( 405 , 103);
insert into Made values( 406 , 106);
insert into Made values( 407 , 109);
```

Output

Playlist_Id	Id
400	100
401	100
402	101
403	102
404	103
405	103
406	106
407	109

Normalisation

Lists

Lists (Artist_Id, Artist_Name, Album_Id,Title)

Primary Key : {Artist_Id, Album_Id}
FD : Album_Id → Title
Artist_Id → Artist_Name
Album_Id, Artist_Id →Title, Artist_Name

Step 1: Assuming all the attributes have an atomic domain, the schema is in 1NF.

Step 2: Title is depending on Album_Id and Artist_Name depending on Artist_Id. Hence, there is partial dependency as part of the primary key determines non-prime attributes.

So, on decomposing we get,

Artists (Artist_Id, Artist_name)

Album (Album_Id, title)

Step 3: In the first entity there are no non-prime attributes so transitive dependency is not possible.
And in second primary key determines both the non-prime attributes so, transitive Dependency is not there. Therefore, both the entities are in 3NF.

Step 4: As in both the entities Primary keys are on the left hand side. Therefore, The schema is in BCNF form.

Liked

Liked (Genre, Song_Name, Artists, Id)

Primary Key : {Id, Song_Name}
Discriminator : Song_Name
FD : Id, Song_Name → Genre, Artists
Step 1: Assuming all the attributes have an atomic domain, the schema is in 1NF.
Step 2: As all the attributes of the weak entity are in the primary key, there is no partial dependency.

So, the schema is 2NF.

Step 3: There are no non-prime attributes so transitive dependencies do not exist. So, the schema
Is in 3NF.
Step 4: As in all FD's the left-hand side is the super key. So the schema is also in BCNF form

Coupon

Coupon (Time_Left, Sub_Id, Code)

Primary Key : Sub_Id

FD :

Sub_Id → Code, Time_Left

Step 1: Assuming all the attributes have an atomic domain, the schema is in 1NF.

Step 2: As Sub_Id is a simple key. So, the schema is also in 2NF.

Sub_Id → all attributes

Step 3: As no transitive dependencies between non-prime attributes exist. So, the schema is in 3NF too.

Step 4: As in all FD's the left-hand side is the super key. So the schema is also in BCNF form

Payments

Payments (Time_Left, Invoice_Id, Sub_Id, Months)

Primary Key : Invoice_Id

FD : Invoice_Id → Months, Time_Left, Sub_Id

Sub_Id → Months, Time_Left

Step 1: Assuming all the attributes have an atomic domain, the schema is in 1NF.

Step 2: As Id is a simple key. So, the schema is also in 2NF.

Step 3: As no transitive dependencies between non-prime attributes exist. So, the schema is in 3NF too.

Step 4: As in all FD's the left-hand side is the super key. So the schema is also in BCNF form

Songs

Songs (Duration, Song_Id, Movie, Genre, Song_Name)

Primary Key : Song_Id
FD : Song_Id → Duration, Movie, Genre, Song_Name

Step 1: Assuming all the attributes have an atomic domain, the schema is in 1NF.
Step 2: As Id is a simple key. So, the schema is also in 2NF.
Song_Id → all attributes
Step 3: As no transitive dependencies between non-prime attributes exist. So, the schema is in 3NF too.
Step 4: As in all FD's the left-hand side is the super key. So now both the schemas a in BCNF form.

Playlist

Playlist (Song, Playlist_Id, Playlist_Name)

Primary key : {Playlist_Id, Song}
FD: Playlist_Id, Song→ Playlist_Name

Step 1: Assuming all the attributes have an atomic domain, the schema is in 1NF.
Step 2: As playlist_Id is a simple key. So, the schema is also in 2NF.
playlist_Id, Song→ all attributes
Step 3: As no transitive dependencies between non-prime attributes exist. So, the schema is in 3NF too.
Step 4: As in above FD the left-hand side is the super key. So the schema is also in BCNF form

Account

Account (Id, DOB,Gender, Email, L_Name, F_Name, Country, Sub_Id)

Primary Key : Id

Foreign Key : Sub_Id

FD: Id → DOB, Gender, Email, L_Name, F_Name, Country, Sub_Id

Step 1: Assuming all the attributes have an atomic domain, the schema is in 1NF.

Step 2: As Id is a simple key. So, the schema is also in 2NF.

Id → all attributes

Step 3: As no transitive dependencies between non-prime attributes exist. So, the schema is in 3NF too.

Step 4: As in all FD's the left-hand side is the super key. So the schema is also in BCNF form

Made

Made (Id, Playlist Id)

Primary Key : Playlist_Id

FD: Playlist_Id → Id

Step 1: Assuming both the attributes have an atomic domain, the schema is in 1NF.

Step 2: As Playlist_Id is a simple key. So, the schema is also in 2NF.

Playlist_Id → Id

Step 3: As there is only one non-prime attribute so no transitive dependency can exist. Therefore,

The schema is in 3NF form.

Step 4: As in the given FD the left-hand side is the Primary key. So the schema is also in BCNF form.

Access_new

Access_new(Song_Id, Artist_Id, Album_Id, Id)

Primary Key : {Song_Id, Id}

FD : Song_Id → Artist_Id, Album_Id

Song_Id,Id → Artist_Id, Album_Id

Step 1: Assuming all the attributes have an atomic domain, the schema is in 1NF.

Step 2: As part of the primary key determines non-prime attributes. So, there is partial dependency And therefore it is not in 2NF.

Now on decomposing entity we get:

Access_new (Song_Id, Id) ,

Access_new1(Song_Id, Artist_Id, Album_Id)

Now, both the entities are in 2NF.

Step 3: In the first entity there are no non-prime attributes so transitive dependency is not possible.

And in second primary key determines both the non-prime attributes so, transitive Dependency is not there. Therefore, both the entities are in 3NF.

Step 4: As in both the entities Primary keys are on the left hand side. Therefore, The schema Is in BCNF form.

SQL Queries

Query 1

- Find the names of the most liked artist.

```
mysql> select artists, max(total) as liked_by
    -> from ( select artists, count(artists) as total
    -> from liked
    -> group by artists
    -> order by count(artists) desc
     > ) as a;
+---------+----------+
| artists | liked_by |
+---------+----------+
| KK      |        6 |
+---------+----------+
```

Query 2

- Find all the songs in the playlist made by “Elssye Perry”.

```
mysql> select playlist.song
    -> from playlist,made, account
    -> where account.Fname="Elssye" and account.Lname="Perry" and account.id=made.id and made.playlist_id=playlist.playlist_id;
+---------+
| song    |
+---------+
| Duniyaa |
| Ilahi   |
| No Lie  |
+---------+
```

Query 3

- Name of people who use “AED23” as code for subscription.

```
mysql> select account.Fname, account.Lname
    -> from coupon, account
    -> where coupon.code="AED23" and coupon.Sub_Id=account.Sub_Id;
+-------+--------+
| Fname | Lname  |
+-------+--------+
| Harry | Potter |
| Rajiv | Singh  |
+-------+--------+
```

Query 4

- Name other songs of the album “Viral” other than song “Garaj Baras”.

```
mysql> select Song_Name
    -> from( select Song_name
    -> from access_new, songs, album
    -> where Title="Viral" and album.Album_Id=Access_new.Album_Id
    -> and access_new.Song_Id=songs.Song_Id) as a
    -> where Song_Name != "Garaj Baras";
+-------------+
| Song_name   |
+-------------+
| Badi Nazuk |
+-------------+
```

Query 5

- Name all the songs and their description, which starts with “B” and ends with “O”.

```
mysql> select *
    -> from Songs
    -> where Song_Name Like "B%O";
+---------+-------+-----------+-------+----------+
| Song_Id | Genre | Song_Name | Movie | Duration |
+---------+-------+-----------+-------+----------+
|     201 | Rock  | Bailando  | NULL  | 00:02:54 |
+---------+-------+-----------+-------+----------+
```

Relational Algrebra

Query 1:

- *Find the names and sub_id of the customers belonging to India.*

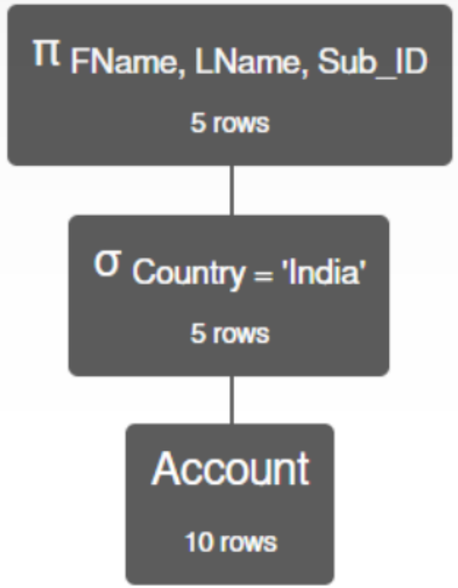
Input

Account (Id, DOB, Gender, E-mail, L_name,F_name,Country,Sub_Id)

Output:

π FName, LName, Sub_Id (σ Country = 'India' (Account))

Output



$$\pi_{\text{FName, LName, Sub\_ID}} (\sigma_{\text{Country = 'India'}} (\text{Account}))$$

Execution time: 0 ms

Account.FName	Account.LName	Account.Sub_ID
'Ram'	'Singh'	'999'
'Shyam'	'Singh'	'NULL'
'Aditi'	'Mishra'	'263'
'Rajiv'	'Singh'	'256'
'Ishita'	'Shukla'	'NULL'

Query 2:

- Find the E-mail IDs of the customers whose subscribed time is less than 5 days.

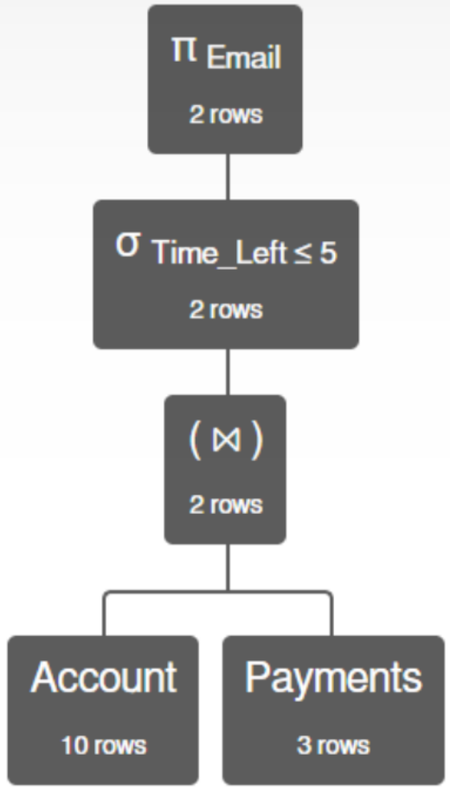
Input

Account (Id, DOB, Gender, E-mail,L-name,F-name,Country,Sub-Id)
Payment(Time_Left, Invoice_ID,Sub_Id,,Months)

Output

$$\pi \text{ Email } (\sigma \text{ Time\_Left} \leq 5 \text{ (Account Payments))}$$

Output



$\pi_{Email}(\sigma_{Time\_Left \leq 5}(Account \bowtie Payments))$

Execution time: 1 ms

Account.Email
'ram@gmail.com'
'alexi@gmail.com'

Query 3:

- List the names of the songs and their artists and the DOB of the female users who have 'liked' the songs.

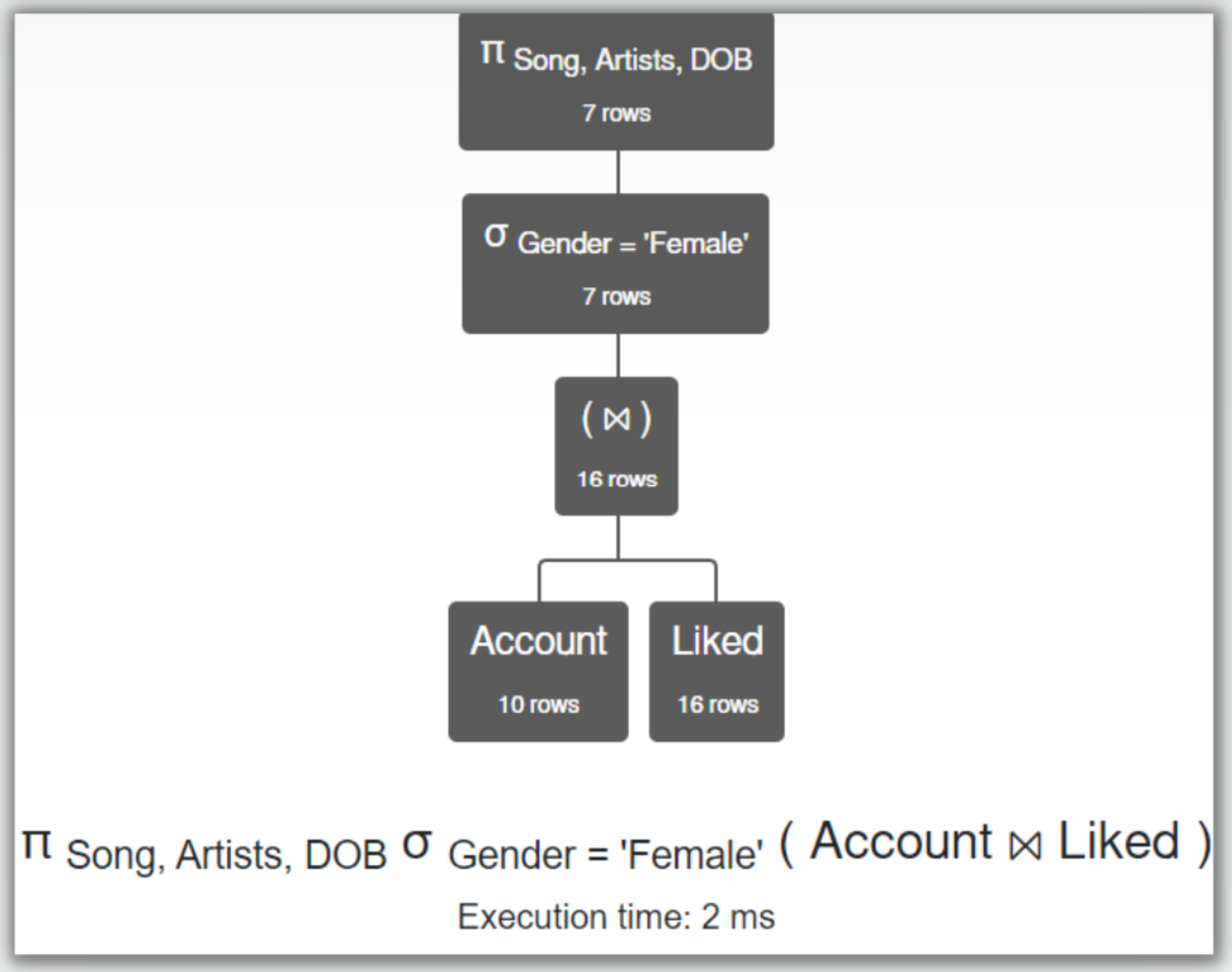
Input

Account(Id, DOB, Gender,E-mail,L_name,F_name,Country,Sub_Id)

Output

π Song, Artists, DOB σ Gender = 'Female' (Account Liked)

Output



Liked.Song	Liked.Artists	Account.DOB
'In Dino'	'Adele'	'2002-01-30'
'Tu Hi'	'KK'	'2002-01-30'
'Ilahi'	'KK'	'2003-02-06'
'Garaj Baras'	'Jagjit Singh'	'2000-02-06'
'Badi Nazuk'	'Jagjit Singh'	'2002-01-14'
'Duniyaa'	'Asha Bhosle'	'2002-01-14'
'Skyfall'	'Sonu Nigam'	'2002-01-14'

Query 4:

- Find the Song_Id, Album_Id, and Song_Name of Songs have been sung by Jagjit Singh .

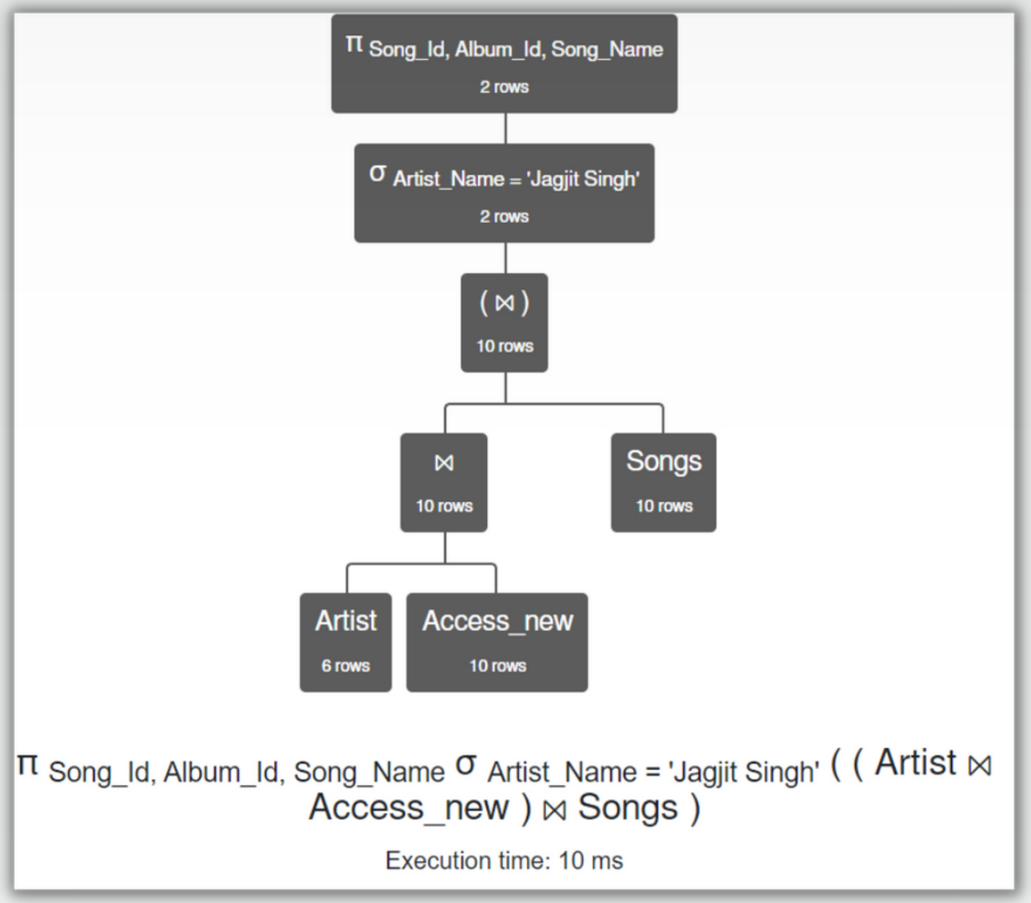
Input

- Artists : (Artist_ID, Artist_Name)
- Songs: (Song_Name, Genre, Duration, Album_ID, Artist_ID, Movie, Song_ID)
- Access_new: (Song_id, artist_id, Album_Id)

Output

π Song_Id, Album_Id, Song_Name σ Artist_Name = 'Jagjit Singh' (Artists Access_new Songs)

Output



Access_new.Song_Id	Access_new.Album_Id	Songs.Song_Name
'208'	'56'	'Garaj Baras'
'209'	'56'	'Badi Nazuk'

Query 5:

- List the song_Name and Genre of Songs in Playlist P2.

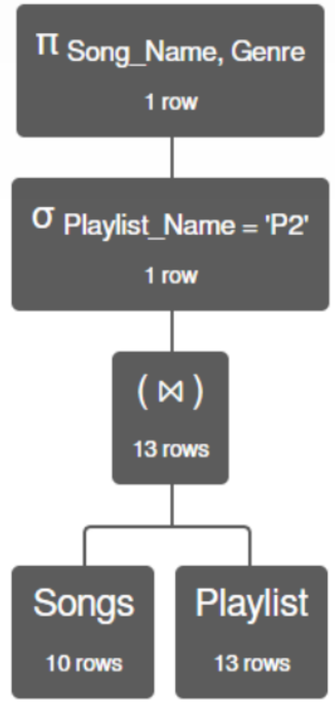
Input

- Songs (Song_Id, Genre, Song_Name, Movie, Duration)
- Playlists (playlist_Id, Song_Name, Playlist_Name)

Output

π Song_Name, Genre (σ Playlist_Name = 'P2' (Songs Playlist))

Output



π Song_Name, Genre σ Playlist_Name = 'P2' (Songs ⋈ Playlist)

Execution time: 1 ms

Songs.Song_Name	Songs.Genre
'In Dino'	'Rock'


Thank
you!