

# THE 90's SQL BASED DATA ANALYSIS PROJECT

## Music Store Analytics

DEVELOPED BY:

SUYASH BIRANJE

# ABSTRACT

This project demonstrates how SQL can be used to perform business analytics on a music store database.

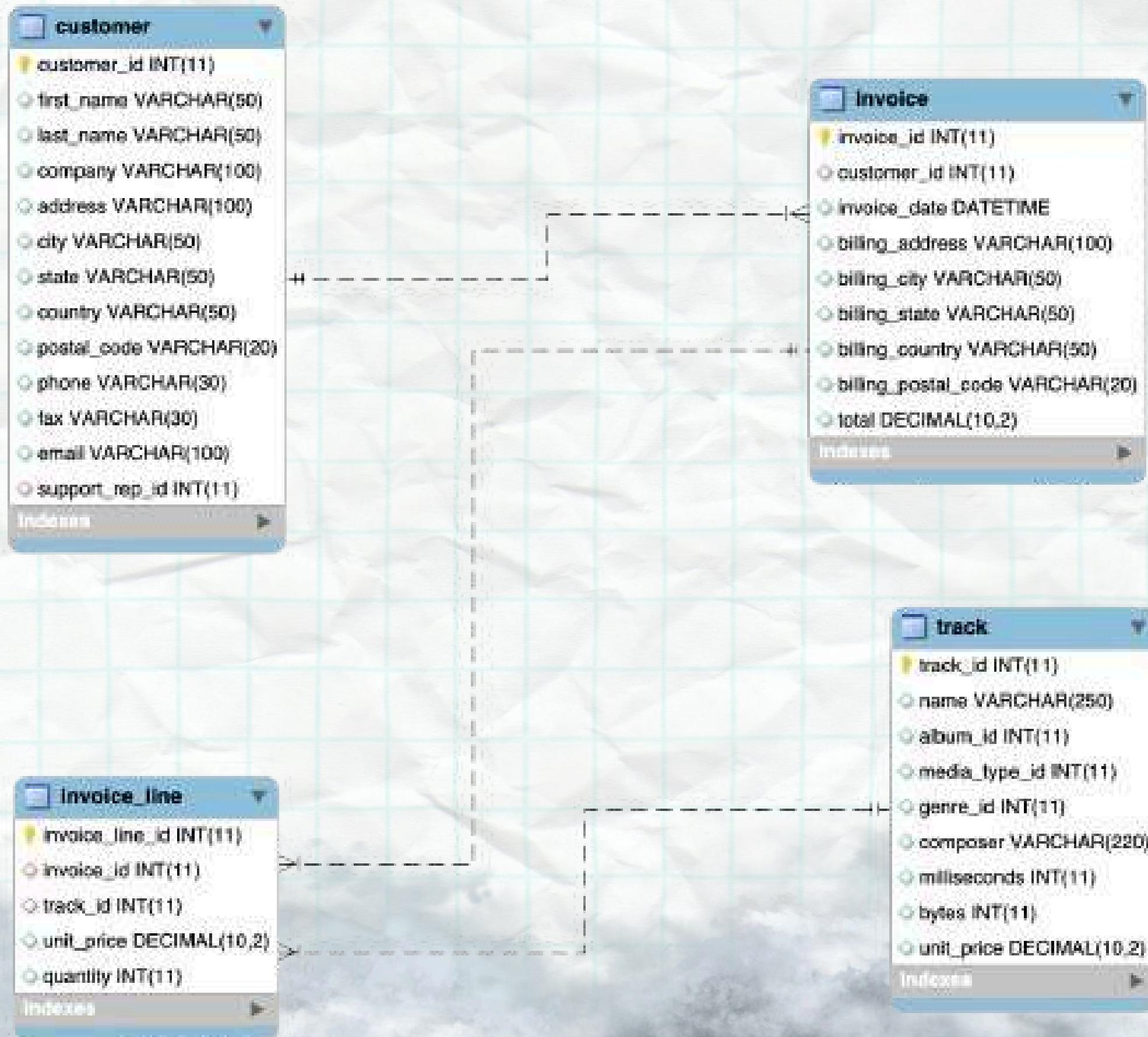
By analyzing customer purchases, sales revenue, and popular tracks, we gain insights into customer behavior, top-performing music genres, and geographical sales patterns. The analysis uses SQL concepts such as JOINs, aggregate functions, subqueries, and views to transform raw transactional data into actionable insights.



# E-R DIAGRAM

## The Entity-Relationship (ER)

diagram illustrates the logical structure of the music store database. It shows how customers, invoices, invoice lines, and tracks are interconnected.



# TABLE STRUCTURE

## CUSTOMER TABLE

```
describe customer;
```

Field	Type	Null	Key	Default	Extra
customer_id	int(11)	NO	PRI	NULL	
first_name	varchar(50)	YES		NULL	
last_name	varchar(50)	YES		NULL	
company	varchar(100)	YES		NULL	
address	varchar(100)	YES		NULL	
city	varchar(50)	YES		NULL	
state	varchar(50)	YES		NULL	
country	varchar(50)	YES		NULL	
postal_code	varchar(20)	YES		NULL	
phone	varchar(30)	YES		NULL	
fax	varchar(30)	YES		NULL	
email	varchar(100)	YES		NULL	
support_re...	int(11)	YES	MUL	NULL	

*Stores customer details such as name, address, and country.*

*Key Columns: customer\_id, first\_name, last\_name, email, country*

# TABLE STRUCTURE

## INVOICE TABLE

```
describe invoice;
```

Field	Type	Null	Key	Default	Extra
invoice_id	int(11)	NO	PRI	NULL	
customer_id	int(11)	YES	MUL	NULL	
invoice_date	datetime	YES		NULL	
billing_address	varchar(100)	YES		NULL	
billing_city	varchar(50)	YES		NULL	
billing_state	varchar(50)	YES		NULL	
billing_country	varchar(50)	YES		NULL	
billing_postal_code	varchar(20)	YES		NULL	
total	decimal(10,2)	YES		NULL	

*Contains sales transaction details including invoice date and total amount.  
Key Columns: invoice\_id, customer\_id, invoice\_date, billing\_country, total*

# TABLE STRUCTURE

## INVOICE\_LINE

```
describe invoice_line;
```

Field	Type	Null	Key	Default	Extra
invoice_line_id	int(11)	NO	PRI	NULL	
invoice_id	int(11)	YES	MUL	NULL	
track_id	int(11)	YES	MUL	NULL	
unit_price	decimal(10,2)	YES		NULL	
quantity	int(11)	YES		NULL	

**Stores details of each item purchased in an invoice.**

**Key Columns: invoice\_line\_id, invoice\_id, track\_id, unit\_price, quantity**

# TABLE STRUCTURE

**TRACK**

```
describe track;
```

Field	Type	Null	Key	Default	Extra
track_id	int(11)	NO	PRI	NULL	
name	varchar(250)	YES		NULL	
album_id	int(11)	YES		NULL	
media_type_id	int(11)	YES		NULL	
genre_id	int(11)	YES		NULL	
composer	varchar(220)	YES		NULL	
milliseconds	int(11)	YES		NULL	
bytes	int(11)	YES		NULL	
unit_price	decimal(10,2)	YES		NULL	

Contains music track information such as title, composer, and price.  
Key Columns: **track\_id, name, composer, unit\_price**

# CONTENTS OF TABLE

`select * from customer ;`

customer_id	first_name	last_name	company	address	city	state	country	postal_code	phone	fax	email	support
1	Luís	Gonçalves	Embraer - Empresa Brasileira de Aeronáutica S.A.	Av. Brigadeiro Faria Lima, 2170 Theodor-Heuss-Straße 34	São José dos Campos Stuttgart	SP NULL	Brazil Germany	12227-000 70174	+55 (12) 3923-5555 +49 0711 2842222	+55 (12) 3923-55	luisg@embraer.com.br	3
2	Leonie	Köhler	NULL	1498 rue Bélanger	Montréal	QC	Canada	H2G 1A7	+1 (514) 721-4711	NULL	leonekohler@surfeu.de	5
3	François	Tremblay	NULL	Ullevålsveien 14	Oslo	NULL	Norway	171	+47 22 44 22 22	NULL	tremblay@gmail.com	3
4	Bjørn	Hansen	NULL	Klanova 9/506	Prague	NULL	Czech Republic	14700	+420 2 4172 5555	+420 2 4172 5555	bjorn.hansen@yahoo.no	4
5	František	Wichterlová	JetBrains s.r.o.	Rilská 3174/6	Prague	NULL	Czech Republic	14300	+420 2 4177 0449	NULL	frantisekw@jetbrains.com	4
6	Helena	Holý	NULL	Rotenturmstraße 4, 1010 Innere Stadt	Vienne	NULL	Austria	1010	+43 01 5134505	NULL	hholym@gmail.com	5
7	Astrid	Gruber	NULL	Grétrystraat 63	Brussels	NULL	Belgium	1000	+32 02 219 03 03	NULL	astrid.gruber@apple.at	5
8	Daan	Peeters	NULL	Sønder Boulevard 51	Copenhagen	NULL	Denmark	1720	+453 3331 9991	NULL	daan_peeters@apple.be	4
9	Kara	Nielsen	NULL	Rua Dr. Falcão Filho, 155	São Paulo	SP	Brazil	01007-010	+55 (11) 3033-5446	+55 (11) 3033-45	eduardo@woodstock.com.br	4
10	Eduardo	Martins	Woodstock Discos	Av. Paulista, 2022	São Paulo	SP	Brazil	01310-200	+55 (11) 3055-3278	+55 (11) 3055-81	alero@uol.com.br	5
11	Alexandre	Rocha	Banco do Brasil S.A.	Praça Pio X, 119	Rio de Janeiro	RJ	Brazil	20040-020	+55 (21) 2271-7000	+55 (21) 2271-70	roberto.almeida@riotur.gov.br	3
12	Roberto	Almeida	Riotur	Qe 7 Bloco G	Brasília	DF	Brazil	71020-677	+55 (61) 3363-5547	+55 (61) 3363-78	fernadaramos4@uol.com.br	4
13	Fernanda	Ramos	NULL	8210 111 ST NW	Edmonton	AB	Canada	T6G 2C7	+1 (780) 434-4554	+1 (780) 434-556	mphilips12@shaw.ca	5
14	Mark	Philips	Telus	700 W Pender Street	Vancouver	BC	Canada	V6C 1G8	+1 (604) 688-2255	+1 (604) 688-875	jenniferp@rogers.ca	3
15	Jennifer	Peterson	Rogers Canada	1600 Amphitheatre Parkway	Mountain View	CA	USA	94043-1351	+1 (650) 253-0000	+1 (650) 253-000	fharris@google.com	4
16	Frank	Harris	Google Inc.	1 Microsoft Way	Redmond	WA	USA	98052-8300	+1 (425) 882-8080	+1 (425) 882-808	jacksmith@microsoft.com	5
17	Jack	Smith	Microsoft Corporation	627 Broadway	New York	NY	USA	10012-2612	+1 (212) 221-3546	+1 (212) 221-467	michelleb@aol.com	3
18	Michelle	Brooks	NULL	1 Infinite Loop	Cupertino	CA	USA	95014	+1 (408) 996-1010	+1 (408) 996-101	tgoyer@apple.com	3
19	Tim	Goyer	Apple Inc.	541 Del Medio Avenue	Mountain View	CA	USA	94040-111	+1 (650) 644-3358	NULL	dmiller@comcast.com	4
20	Dan	Miller	NULL	801 W 4th Street	Reno	NV	USA	89503	+1 (775) 223-7665	NULL	kachase@hotmail.com	5
21	Kathy	Chase	NULL	120 S Orange Ave	Orlando	FL	USA	32801	+1 (407) 999-7788	NULL	hleacock@gmail.com	4
22	Heather	Leacock	NULL	69 Salem Street	Boston	MA	USA	2113	+1 (617) 522-1333	NULL	johnmorgan22@yahoo.com	4
23	John	Gordon	NULL	162 E Superior Street	Chicago	IL	USA	60611	+1 (312) 332-3232	NULL	ralston@gmail.com	3
24	Frank	Ralston	NULL	319 N. Frances Street	Madison	WI	USA	53703	+1 (608) 257-0597	NULL	vsteven@yahoo.com	5
25	Victor	Stevens	NULL	2211 W Berry Street	Fort Worth	TX	USA	76110	+1 (817) 924-7272	NULL	ricunningham@hotmail.com	4
26	Richard	Cunningham	NULL	1033 N Park Ave	Tucson	AZ	USA	85719	+1 (520) 622-4200	NULL	patrick.gray@aol.com	4
27	Patrick	Gray	NULL	302 S 700 E	Salt Lake City	UT	USA	84102	+1 (801) 531-7272	NULL	jubarnett@gmail.com	5
28	Julia	Barnett	NULL	796 Dundas Street West	Toronto	ON	Canada	M6J 1V1	+1 (416) 363-8888	NULL	robbrown@shaw.ca	3
29	Robert	Brown	NULL	230 Elgin Street	Ottawa	ON	Canada	K2P 1L7	+1 (613) 234-3322	NULL	edfrancis@yahoo.ca	3
30	Edward	Francis	NULL								edfrancis@yahoo.ca	3



# CONTENTS OF TABLE

```
select * from invoice ;
```

invoice_id	customer_id	invoice_date	billing_address	billing_ci...	billing_sta...	billing_coun...	billing_postal_co...	total
1	18	2017-01-03 00:00:00	627 Broadway	New York	NY	USA	10012-2612	15.84
2	30	2017-01-03 00:00:00	230 Elgin Street	Ottawa	ON	Canada	K2P 1L7	9.90
3	40	2017-01-05 00:00:00	8, Rue Hanovre	Paris	None	France	75002	1.98
4	18	2017-01-06 00:00:00	627 Broadway	New York	NY	USA	10012-2612	7.92
5	27	2017-01-07 00:00:00	1033 N Park Ave	Tucson	AZ	USA	85719	16.83
6	31	2017-01-10 00:00:00	194A Chain Lake Drive	Halifax	NS	Canada	B3S 1C5	1.98
7	49	2017-01-12 00:00:00	Ordynacka 10	Warsaw	None	Poland	00-358	10.89
8	59	2017-01-13 00:00:00	3,Raj Bhavan Road	Bangalore	None	India	560001	9.90
9	18	2017-01-18 00:00:00	627 Broadway	New York	NY	USA	10012-2612	8.91
10	31	2017-01-18 00:00:00	194A Chain Lake Drive	Halifax	NS	Canada	B3S 1C5	1.98
11	38	2017-01-20 00:00:00	Barbarossastraße 19	Berlin	None	Germany	10779	10.89
12	42	2017-01-21 00:00:00	9, Place Louis Barthou	Bordeaux	None	France	33000	3.96
13	35	2017-01-22 00:00:00	Rua dos Campeões...	Porto	None	Portugal	None	0.99
14	25	2017-01-23 00:00:00	319 N. Frances Street	Madison	WI	USA	53703	0.99
15	44	2017-01-25 00:00:00	Porthaninkatu 9	Helsinki	None	Finland	00530	3.96
16	1	2017-01-26 00:00:00	Av. Brigadeiro Faria L...	São Jos...	SP	Brazil	12227-000	8.91
17	20	2017-01-28 00:00:00	541 Del Medio Avenue	Mountai...	CA	USA	94040-111	10.89
18	24	2017-02-02 00:00:00	162 E Superior Street	Chicago	IL	USA	60611	4.95
19	10	2017-02-06 00:00:00	Rua Dr. Falcão Filho,...	São Paulo	SP	Brazil	01007-010	6.93
20	43	2017-02-06 00:00:00	68, Rue Jouvence	Dijon	None	France	21000	9.90

# CONTENTS OF TABLE

```
select * from invoice_line ;
```

invoice_line_id	invoice_id	track_id	unit_price	quantity
1	1	1158	0.99	1
2	1	1159	0.99	1
3	1	1160	0.99	1
4	1	1161	0.99	1
5	1	1162	0.99	1
6	1	1163	0.99	1
7	1	1164	0.99	1
8	1	1165	0.99	1
9	1	1166	0.99	1
10	1	1167	0.99	1
11	1	1168	0.99	1
12	1	1169	0.99	1
13	1	1170	0.99	1
14	1	1171	0.99	1
15	1	1172	0.99	1
16	1	1173	0.99	1
17	2	3476	0.99	1
18	2	482	0.99	1
19	2	2701	0.99	1
20	2	1641	0.99	1

# CONTENTS OF TABLE

```
select * from track ;
```

Field	Type	Null	Key	Default	Extra
track_id	int(11)	NO	PRI	NULL	
name	varchar(250)	YES		NULL	
album_id	int(11)	YES		NULL	
media_type_id	int(11)	YES		NULL	
genre_id	int(11)	YES		NULL	
composer	varchar(220)	YES		NULL	
milliseconds	int(11)	YES		NULL	
bytes	int(11)	YES		NULL	
unit_price	decimal(10,2)	YES		NULL	

# Aggregate Functions

Aggregate functions are used to perform calculations on a group of values and return a single summarized result, helping you analyze data such as totals, averages, counts, minimums, or maximums within a query.

# SQL ANALYTICS & BUSINESS INSIGHTS

Total sales amount from all invoices

```
select sum(total) as total_sales from invoice;
```

total_sales
4709.43

Conclusion: The total sales reflects the store's overall earnings from music sales.

# Average invoice total

```
select avg(total) as avg_invoice_total from invoice;
```

avg\_invoice\_to...

7.670081

Conclusion: The total sales reflects the store's overall earnings from music sales.

# Find the total number of customers

```
select count(*) as total_customers from customer;
```

total_customers
59

Conclusion: The result shows how many customers exist in the system.

# JOINS FUNCTION

A join is used to combine rows from two or more tables based on a related column, allowing you to retrieve data from multiple tables in a single query.

# Display each customer along with their invoice details.

```
select first_name, last_name, invoice_id, total  
from customer  
join invoice on customer.customer_id = invoice.customer_id;
```

first_name	last_name	invoice_id	total
Luís	Gonçalves	16	8.91
Luís	Gonçalves	77	5.94
Luís	Gonçalves	149	8.91
Luís	Gonçalves	153	13.86
Luís	Gonçalves	182	5.94
Luís	Gonçalves	184	0.99
Luís	Gonçalves	223	17.82
Luís	Gonçalves	270	10.89
Luís	Gonçalves	296	12.87
Luís	Gonçalves	442	3.96
Luís	Gonçalves	464	3.96
Luís	Gonçalves	536	5.94
Luís	Gonçalves	544	8.91
Leonie	Köhler	69	13.86
Leonie	Köhler	131	2.97
Leonie	Köhler	134	7.92
Leonie	Köhler	162	8.91
Leonie	Köhler	210	10.89
Leonie	Köhler	222	1.98
Leonie	Köhler	343	5.94
Leonie	Köhler	507	0.99
Leonie	Köhler	549	10.89

Result 6

Conclusion: This shows each customer's purchases along with invoice totals, helping analyze customer-wise sales.

# Show all the invoice line details (unit price & quantity) for each invoice.

```
select invoice.invoice_id, unit_price, invoice_line.quantity  
from invoice  
join invoice_line on invoice.invoice_id = invoice_line.invoice_id;
```

**Conclusion:** This provides a detailed breakdown of items sold in each invoice.

# Display all customers even if they have never made an invoice.

```
select customer.first_name, customer.last_name, invoice.invoice_id  
from customer  
left join invoice on customer.customer_id = invoice.customer_id;
```

first_name	last_name	invoice_id
Luís	Gonçalves	16
Luís	Gonçalves	77
Luís	Gonçalves	149
Luís	Gonçalves	153
Luís	Gonçalves	182
Luís	Gonçalves	184
Luís	Gonçalves	223
Luís	Gonçalves	270
Luís	Gonçalves	296
Luís	Gonçalves	442
Luís	Gonçalves	464
Luís	Gonçalves	536
Luís	Gonçalves	544
Leonie	Köhler	69
Leonie	Köhler	131
Leonie	Köhler	134
Leonie	Köhler	162
Leonie	Köhler	210
Leonie	Köhler	222
Leonie	Köhler	343
Leonie	Köhler	507
Leonie	Köhler	549

Result 13

Conclusion: This helps identify inactive customers or those who have not made any purchases yet.

# WINDOW FUNCTIONS

A Window Function (also known as an Analytic Function) in SQL performs a calculation across a set of table rows that are related to the current row.

The key distinction from a standard aggregate function (like a `SUM()` or `AVG()` used with a `GROUP BY` clause) is that a window function does not collapse the rows into a single output row. Instead, it computes the aggregate-like value and returns a result for each original row in the query result set.

# Rank invoices by total within each billing country.

```
select first_name, last_name, invoice_id, total  
from customer  
join invoice on customer.customer_id = invoice.customer_id;
```

**Conclusion:** This query performs a competitive ranking within subgroups. The **PARTITION BY** clause resets the ranking counter for every new country, allowing you to identify the top-value invoices per country.

# Find average invoice total per country using a window.

```
select invoice_id, billing_country, total,  
       AVG(total) OVER (PARTITION BY billing_country) AS avg_per_country  
  FROM invoice;
```

invoice_id	billing_coun...	total	avg_per_coun...
381	Argentina	12.87	7.920000
380	Argentina	9.90	7.920000
304	Argentina	6.93	7.920000
218	Argentina	8.91	7.920000
535	Argentina	0.99	7.920000
427	Australia	14.85	8.118000
555	Australia	1.98	8.118000
586	Australia	10.89	8.118000
26	Australia	1.98	8.118000
90	Australia	10.89	8.118000
356	Australia	6.93	8.118000
430	Australia	1.98	8.118000
99	Australia	17.82	8.118000
450	Australia	6.93	8.118000
610	Australia	6.93	8.118000
225	Austria	5.94	7.700000
553	Austria	4.95	7.700000
488	Austria	13.86	7.700000
337	Austria	9.90	7.700000
251	Austria	6.93	7.700000

Conclusion: This query calculates the group average while preserving all the original detail rows. It allows for the direct, row-by-row comparison of an individual invoice's total against the overall average for its country, without having to collapse the data using GROUP BY.

# SUBQUERY

A subquery is a query nested inside another query, used to return a result that is then used by the outer query, often in a WHERE, HAVING, or FROM clause.

# Customers with invoices > \$20

```
select * from customer
where customer_id in (
    select customer_id from invoice where total > 20
);
```

customer_id	first_name	last_name	company	address	city	state	country	postal_code	phone	fax	email	support_rep...
42	Wyatt	Girard	NULL	9, Place Louis Barthou	Bordeaux	NULL	France	33000	+33 05 56 96 96 96	NULL	wyatt.girard@yahoo.fr	3

Conclusion: Identifies high-value customers.

# Customers with more than 5 invoices

```
select * from customer
where customer_id in (
    select customer_id from invoice
group by customer_id
    having COUNT(*) > 5
);
```

customer_id	first_name	last_name	company	address	city	state	country	postal_code	phone	fax
1	Luís	Gonçalves	Embraer - Empresa Brasileira de Aeronáutica S.A.	Av. Brigadeiro Faria Lima, 2170	São José dos Campos	SP	Brazil	12227-000	+55 (12) 3923-5555	+55 (12) 3923-55
2	Leonie	Köhler	HULL	Theodor-Heuss-Straße 34	Stuttgart	NULL	Germany	70174	+49 0711 2842222	NULL
3	François	Tremblay	HULL	1498 rue Bélanger	Montréal	QC	Canada	H2G 1A7	+1 (514) 721-4711	NULL
4	Bjørn	Hansen	HULL	Ullevålsveien 14	Oslo	NULL	Norway	171	+47 22 44 22 22	NULL
5	František	Wichterlová	JetBrains s.r.o.	Klanova 9/506	Prague	NULL	Czech Republic	14700	+420 2 4172 5555	+420 2 4172 5555
6	Helena	Holý	HULL	Rilská 3174/6	Prague	NULL	Czech Republic	14300	+420 2 4177 0449	NULL
7	Astrid	Gruber	HULL	Rotenturmstraße 4, 1010 Innere Stadt	Vienne	NULL	Austria	1010	+43 01 5134505	NULL
8	Daan	Peeters	HULL	Grétrystraat 63	Brussels	NULL	Belgium	1000	+32 02 219 03 03	NULL
9	Kara	Nielsen	HULL	Sønder Boulevard 51	Copenhagen	NULL	Denmark	1720	+453 3331 9991	NULL
10	Eduardo	Martins	Woodstock Discos	Rua Dr. Falcão Filho, 155	São Paulo	SP	Brazil	01007-010	+55 (11) 3033-5446	+55 (11) 3033-45
11	Alexandre	Rocha	Banco do Brasil S.A.	Av. Paulista, 2022	São Paulo	SP	Brazil	01310-200	+55 (11) 3055-3278	+55 (11) 3055-81
12	Roberto	Almeida	Riotur	Praça Pio X, 119	Rio de Janeiro	RJ	Brazil	20040-020	+55 (21) 2271-7000	+55 (21) 2271-70
13	Fernanda	Ramos	HULL	Qe 7 Bloco G	Brasília	DF	Brazil	71020-677	+55 (61) 3363-5547	+55 (61) 3363-78
14	Mark	Philips	Telus	8210 111 ST NW	Edmonton	AB	Canada	T6G 2C7	+1 (780) 434-4554	+1 (780) 434-556
15	Jennifer	Peterson	Rogers Canada	700 W Pender Street	Vancouver	BC	Canada	V6C 1G8	+1 (604) 688-2255	+1 (604) 688-875
16	Frank	Harris	Google Inc.	1600 Amphitheatre Parkway	Mountain View	CA	USA	94043-1351	+1 (650) 253-0000	+1 (650) 253-000
17	Jack	Smith	Microsoft Corporation	1 Microsoft Way	Redmond	WA	USA	98052-8300	+1 (425) 882-8080	+1 (425) 882-808
18	Michelle	Brooks	HULL	627 Broadway	New York	NY	USA	10012-2612	+1 (212) 221-3546	+1 (212) 221-467
19	Tim	Goyer	Apple Inc.	1 Infinite Loop	Cupertino	CA	USA	95014	+1 (408) 996-1010	+1 (408) 996-101
20	Dan	Miller	HULL	541 Del Medio Avenue	Mountain View	CA	USA	94040-111	+1 (650) 644-3358	NULL
21	Kathy	Chase	HULL	801 W 4th Street	Reno	NV	USA	89503	+1 (775) 223-7665	NULL
22	Heather	Leacock	HULL	120 S Orange Ave	Orlando	FL	USA	32801	+1 (407) 999-7788	NULL

customer 19

App

Conclusion: Shows highly engaged customers.

# Highest invoice

```
select * from invoice  
where total = (select max(total) from invoice);
```

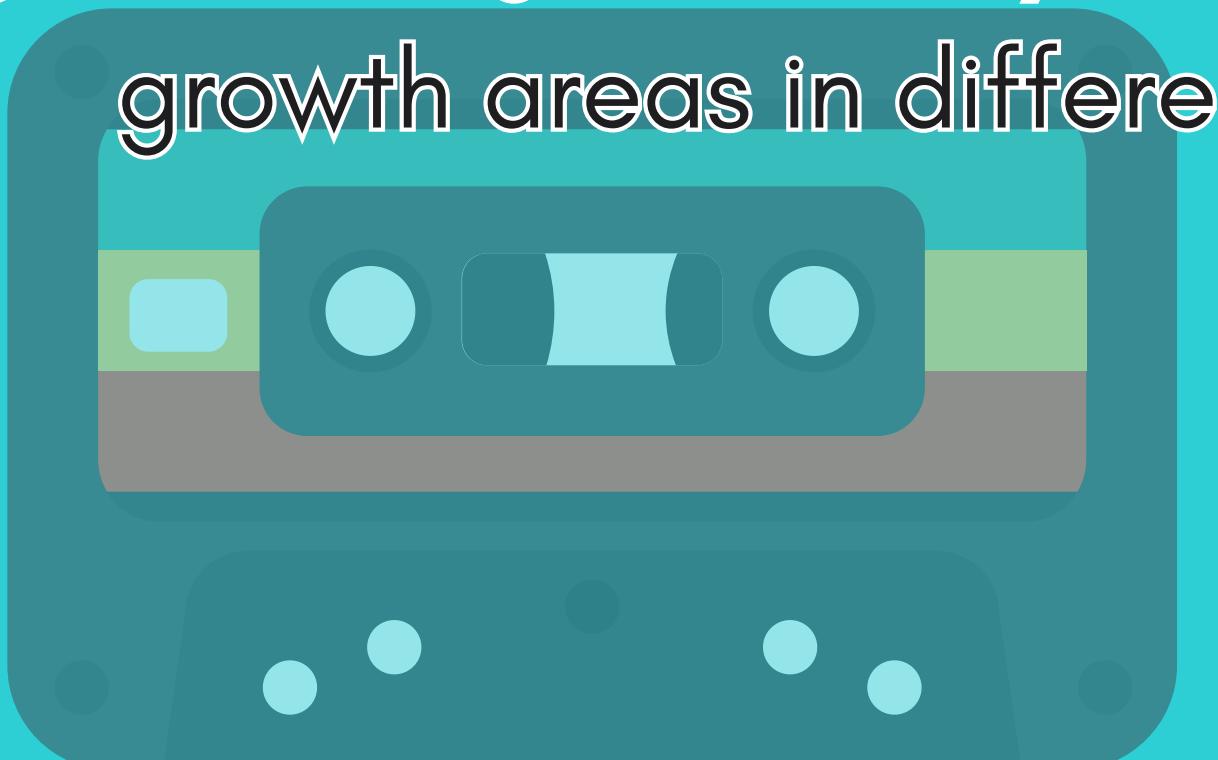
invoice_id	customer_id	invoice_date	billing_address	billing_ci...	billing_sta...	billing_coun...	billing_postal_co...	total
183	42	2018-02-09 00:00:00	9, Place Louis Barthou	Bordeaux	None	France	33000	23.76
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Conclusion: Identifies single largest sale.

# Conclusion

The Music Store SQL analytics project provides a clear understanding of customer preferences, top-selling tracks, and country-wise revenue distribution.

By leveraging SQL joins, subqueries, and views, the project enables dynamic reporting and decision-making. Insights from this data can help optimize marketing strategies, manage inventory efficiently, and identify potential growth areas in different regions.



THE TWO'S

# MUSIC STORE ANALYTICS

# THANK YOU

"Behind every album bought, there's a detailed chart of trends written by sales data."