

What is an Oracle database?

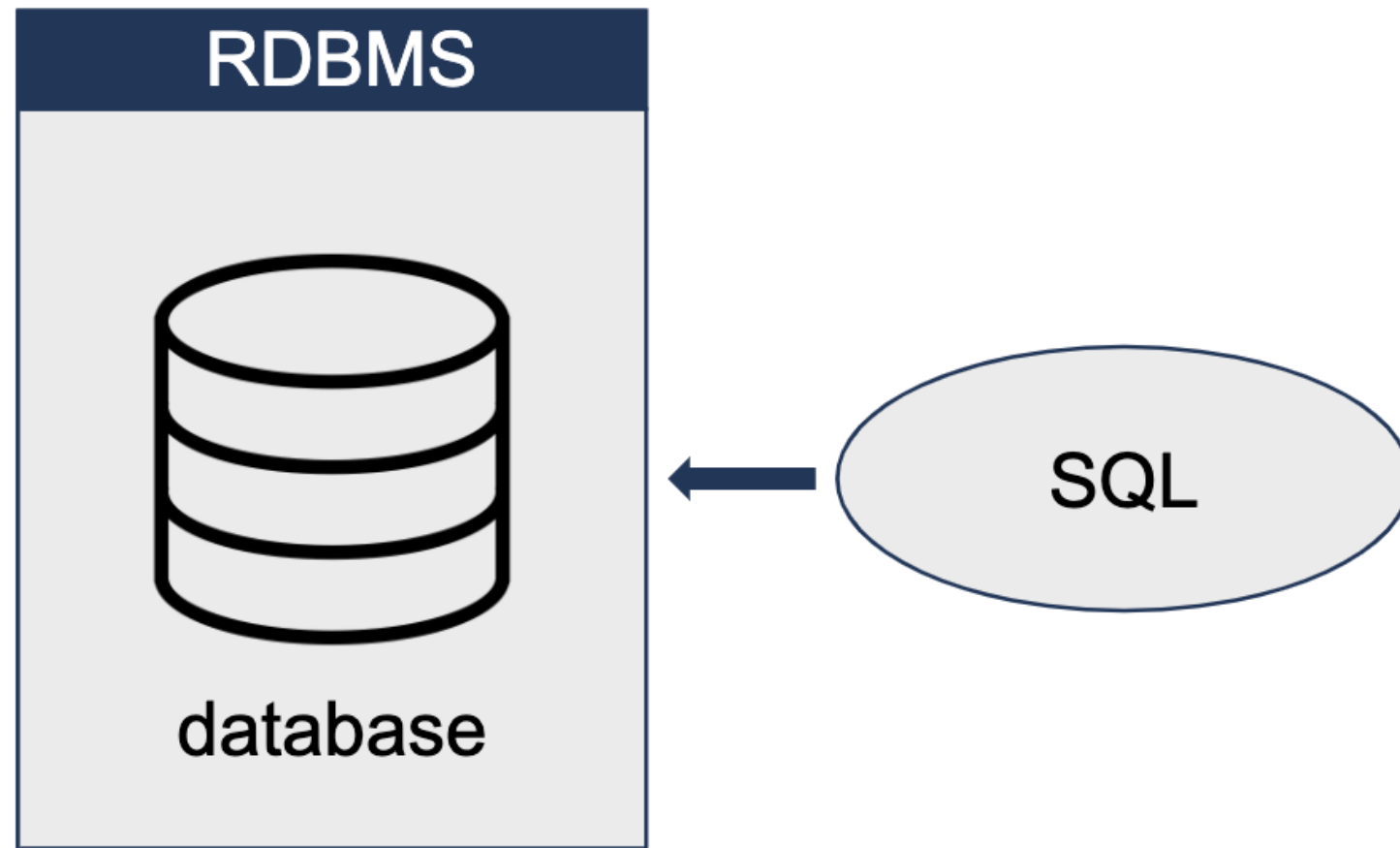
INTRODUCTION TO ORACLE SQL



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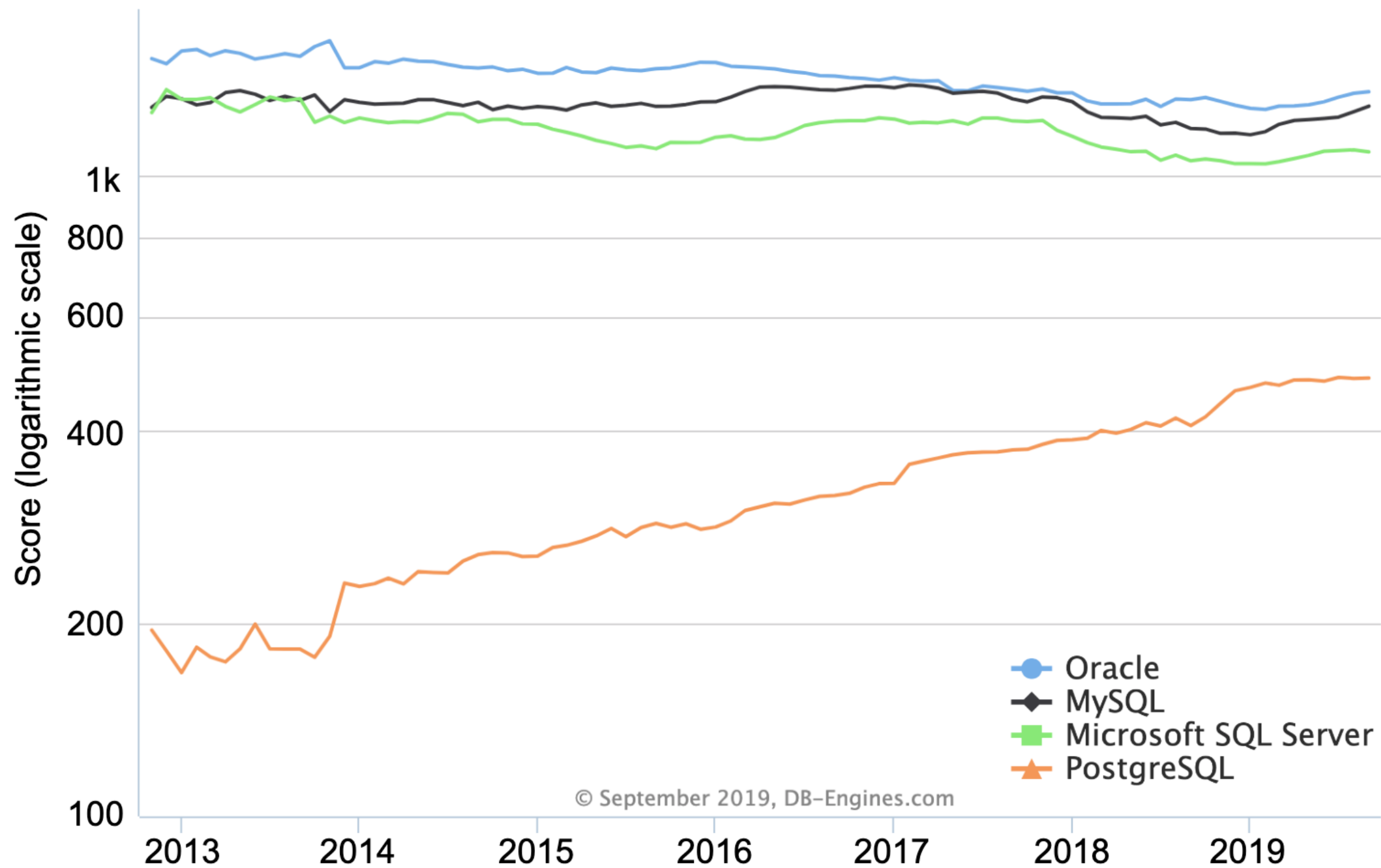
Oracle SQL



ORACLE®

- **Oracle Database:** relational database management system developed by Oracle
- **PL/SQL (Procedural Language/SQL):** Oracle's implementation of SQL, with additional functionality

DB-Engines Ranking



Oracle SQL

Advantages

- Great for large databases
- Easy to use
- Well-written documentation
- Amazing new features

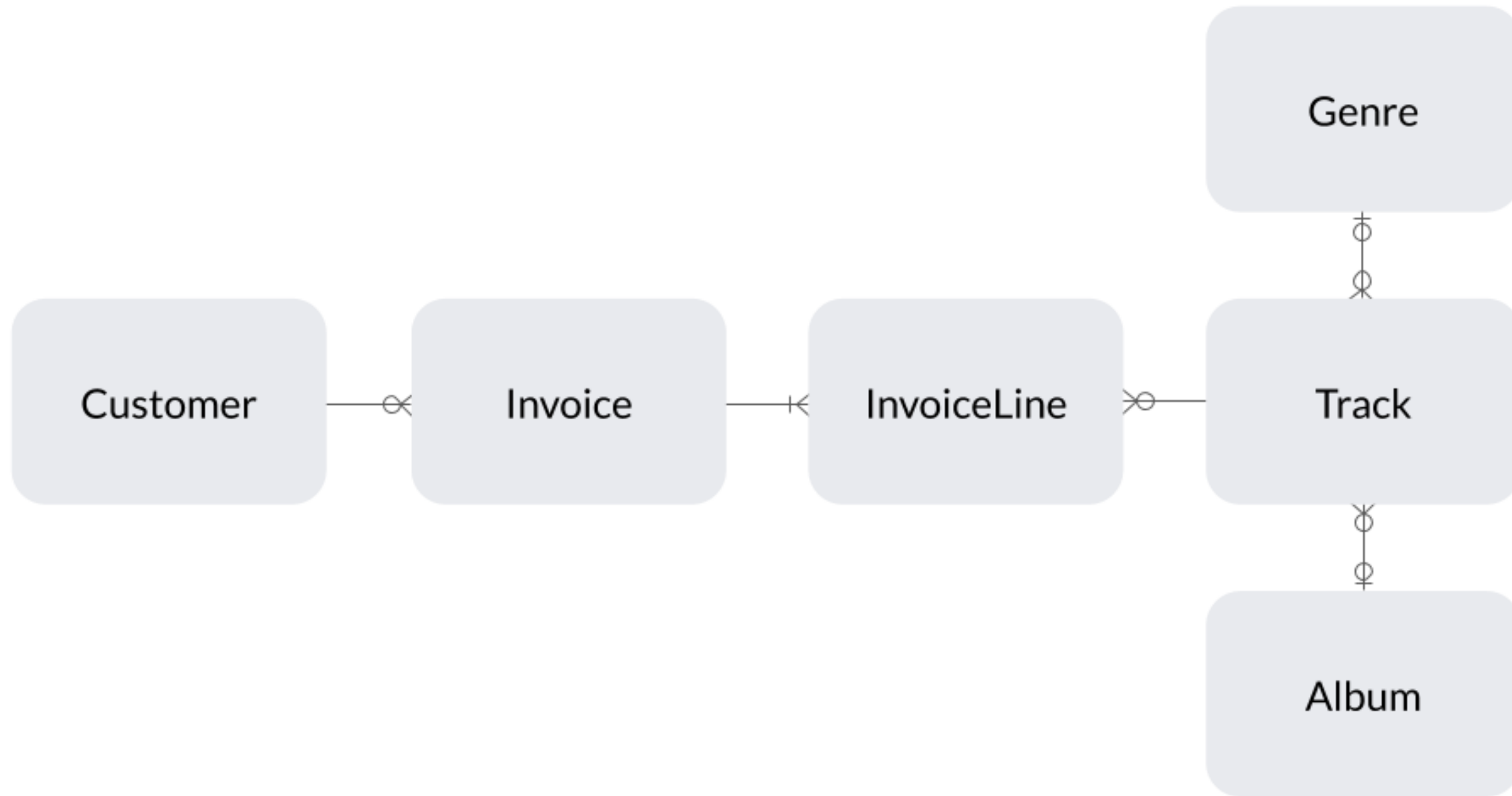
Disadvantages

- Cost

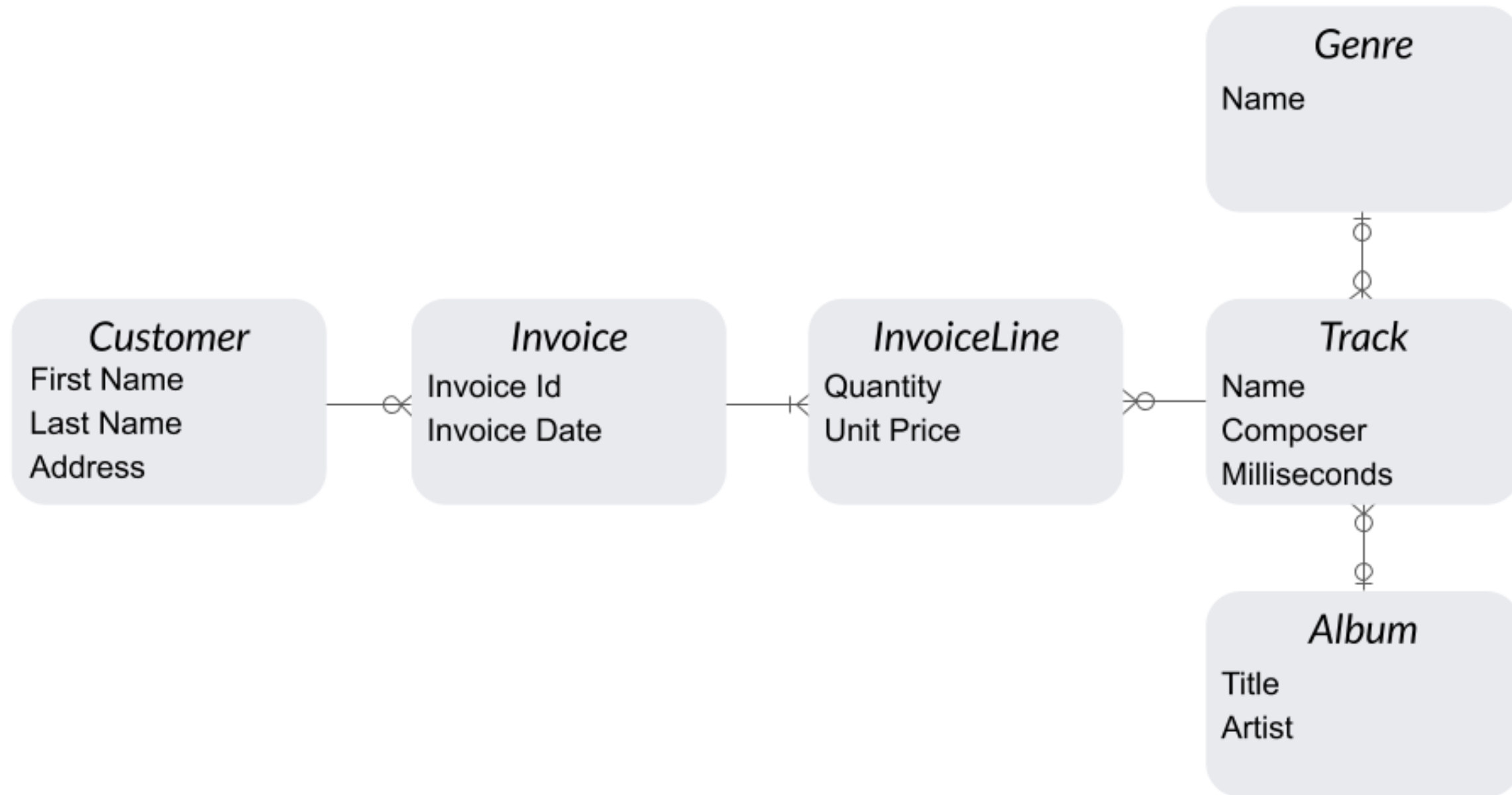
Entity-Relationship Diagram (ERD)

- Databases support existing real-world systems
- ERD
 - tool to model a real-world system
 - graphical representation of the relationships among different entities

Entity-Relationship Diagram (ERD)



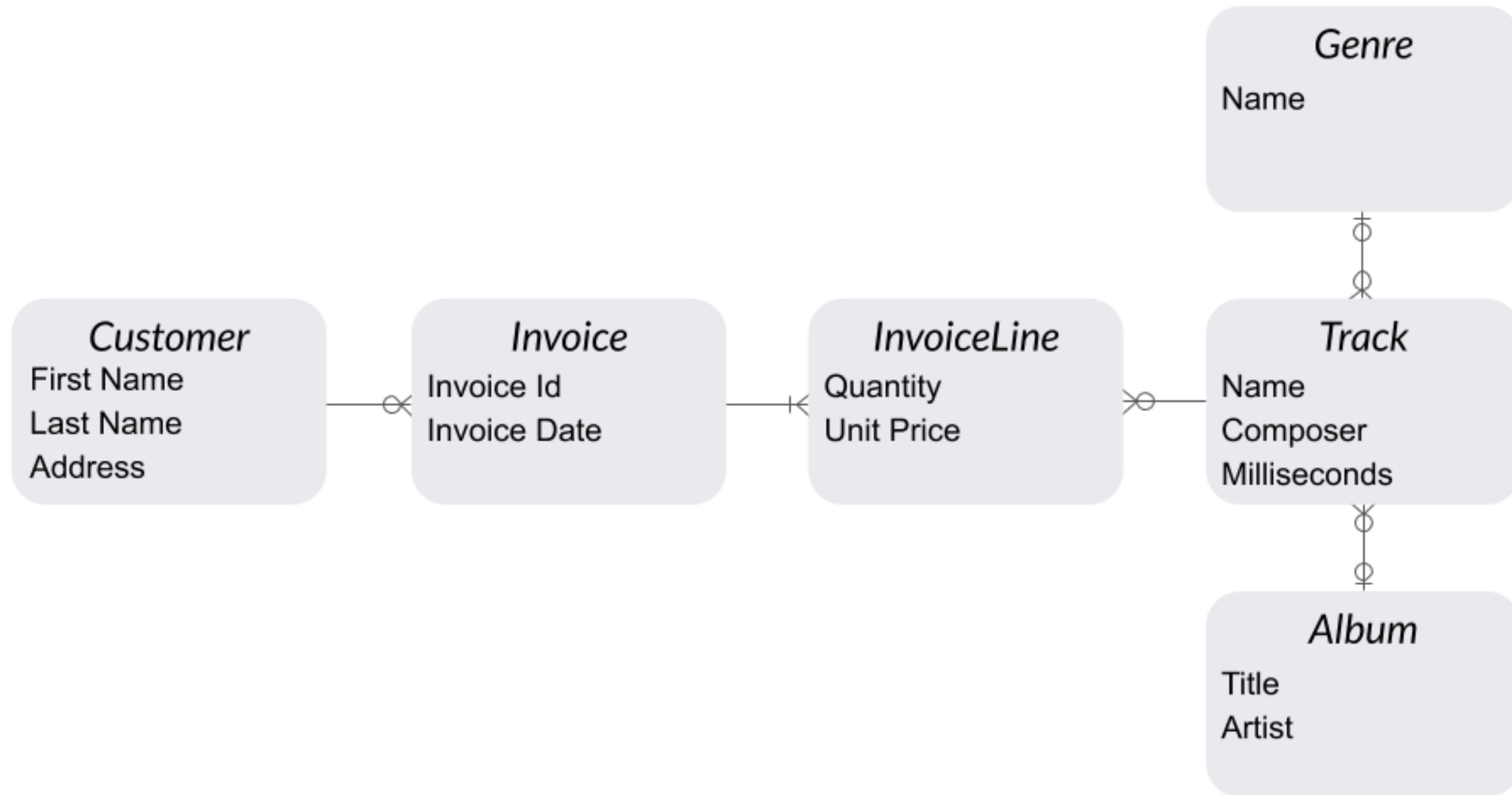
Entity-Relationship Diagram (ERD)



Relational database

CustomerId	FirstName	LastName	Address
1	Jack	Smith	1 Microsoft Way
2	Marc	Dubois	11, Place Bellecour
3	Lucas	Mancini	Via Degli Scipioni, 43

Relational database



SQL

SQL is a language to:

- Create databases and the objects within them
- Store data in those databases
- Change and analyze that data
- Get that data back out in reports, web pages, etc.

Retrieving data

```
SELECT TrackName, Composer, Milliseconds
FROM Track
```

TrackName	Composer	Milliseconds
-----	-----	-----
Killer Queen	Mercury, Freddie	182099
Smells Like Teen Spirit	Kurt Cobain	301296
The Star Spangled Banner	Hendrix, Jimi	43232
With Or Without You	U2	299023

Let's practice!

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Retrieving data

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Customizing output



- Suppress duplicates
- Manipulate strings
- Arithmetic expressions
- Order data

DISTINCT

```
SELECT BillingCountry  
FROM Invoice
```

```
| BillingCountry |  
|-----|  
| Germany      |  
| Germany      |  
| USA          |  
| Norway       |  
| ...         |
```

** 412 rows selected*

```
SELECT DISTINCT BillingCountry  
FROM Invoice
```

```
| BillingCountry |  
|-----|  
| Germany      |  
| Norway       |  
| USA          |  
| ...         |
```

** 24 rows selected*

Manipulating strings - Concatenation operator

```
SELECT FirstName || LastName  
FROM Customer
```

```
| FirstName || LastName |  
|-----|  
| FrankHarris          |  
| HannahSchneider      |  
| LucasMancini         |  
| ...                  |
```

Manipulating strings - Literal character strings

```
SELECT 'Full name: ' || FirstName || ' ' || LastName
FROM Customer
```

```
| 'Full name: ' || FirstName || ' ' || LastName |
|-----|
| Full name: Frank Harris |
| Full name: Hannah Schneider |
| Full name: Lucas Mancini |
| ... |
```

Manipulating strings - Alternative quote operator

```
SELECT LastName || ': This employee's title is: ' || Title  
FROM Employee
```

```
syntax error at or near "title"
```

```
LINE 1: SELECT LastName || ': This employee's title is: ' || Title
```

Manipulating strings - Alternative quote operator

```
SELECT LastName || q'[: This employee's title is: ]' || Title
FROM Employee
```

```
| LastName || q'[, this employee's title is: ]' || Title |
|-----|
| Adams: This employee's title is: General Manager      |
| Edwards: This employee's title is: Sales Manager       |
| Park: This employee's title is: Sales Support Agent    |
| King: This employee's title is: IT Staff               |
| ...                                                    |
```

Arithmetic expressions

Create expressions with *number* and *date* values by using arithmetic operators.

Operator	Description
+	Add
-	Subtract
*	Multiply
/	Divide

Arithmetic expressions

```
SELECT TrackName, Milliseconds, Milliseconds / 1000
FROM Track
```

TrackName	Milliseconds	Milliseconds / 1000
-----	-----	-----
Killer Queen	182099	182.099
Smells Like Teen Spirit	301296	301.296
The Star Spangled Banner	43232	43.232
With Or Without You	299023	299.023

Ordering rows

```
SELECT LastName, Title, City, HireDate
FROM Employee
ORDER BY HireDate
```

LastName	Title	City	HireDate
Peacock	Sales Support Agent	Calgary	2002-04-01 00:00:00
Edwards	Sales Manager	Calgary	2002-05-01 00:00:00
Adams	General Manager	Edmonton	2002-08-14 00:00:00
Park	Sales Support Manager	Calgary	2003-05-03 00:00:00
Johnson	Sales Support Agent	Calgary	2003-10-17 00:00:00
Mitchell	IT Manager	Calgary	2003-10-17 00:00:00
King	IT Staff	Lethbridge	2004-01-02 00:00:00
Callahan	IT Staff	Lethbridge	2004-03-04 00:00:00

Ordering rows

Order in descending order:

```
SELECT LastName, Title, City, HireDate
FROM Employee
ORDER BY HireDate DESC
```

Order by multiple columns:

```
SELECT LastName, Title, City, HireDate
FROM Employee
ORDER BY City, HireDate
```


Let's practice!

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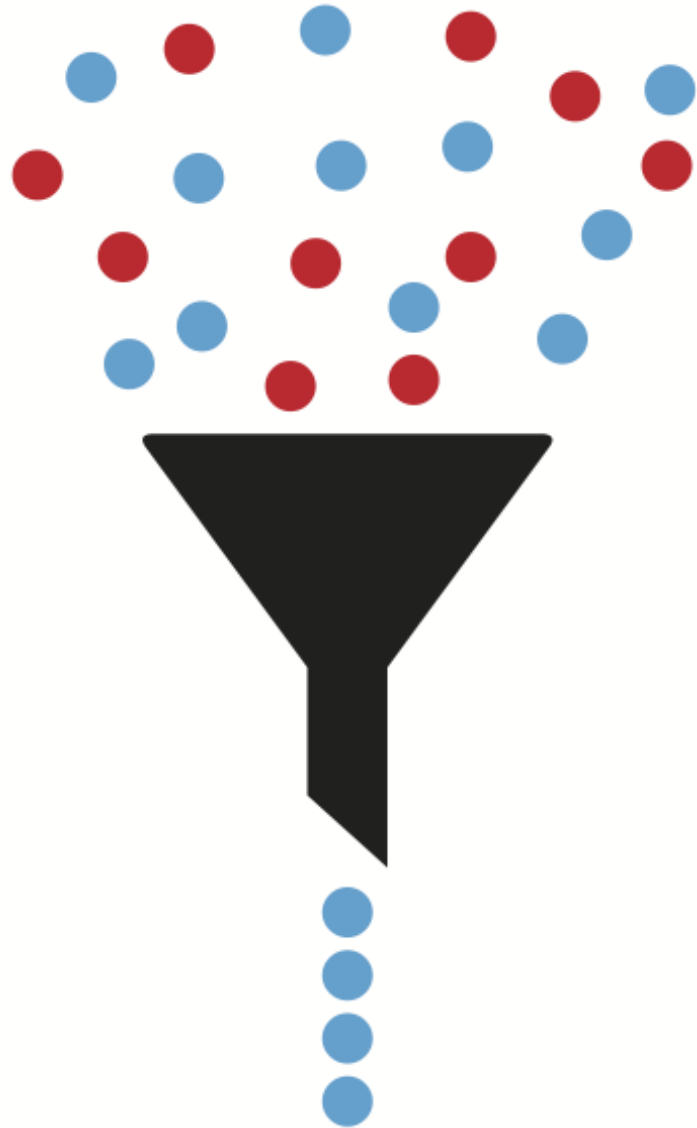
Restricting data

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Filtering rows



- Comparison operators
- Comparison keywords
- Logical operators

WHERE

```
SELECT FirstName, LastName, Country
FROM Customer
WHERE Country = 'Portugal'
```

```
| FirstName | LastName | Country |
|-----|-----|-----|
| João      | Fernandes | Portugal |
| Madalena  | Sampaio   | Portugal |
```

Comparison operators

Operator	Description
>	Greater than
>=	Greater than or equal to
<	Less than
<=	Less than or equal to
=	Equal
<>	Not equal

```
SELECT UnitPrice
FROM Track
WHERE UnitPrice <> 0.99
```

Comparison keywords

BETWEEN

IN

LIKE

Comparison keywords - BETWEEN

```
SELECT Name, Milliseconds
FROM Track
WHERE Milliseconds BETWEEN 100000 AND 200000
```

Name	Milliseconds
-----	-----
Perfect	188133
Right Through You	176117
We Die Young	152084
Put You Down	196231
...	

Comparison keywords - IN

```
SELECT EmployeeId, LastName, Title
FROM Employee
WHERE EmployeeId IN (4, 5, 6)
```

EmployeeId	LastName	Title
4	Park	Sales Support Agent
5	Johnson	Sales Support Agent
6	Mitchell	IT Manager

Comparison keywords - LIKE

Select rows that match a character pattern by using `LIKE`

Symbol	Description
<code>%</code>	Represents any sequence of zero or more characters
<code>_</code>	Represents any single character

Comparison keywords - LIKE

```
SELECT LastName  
FROM Employee  
WHERE LastName LIKE '_a%'
```

```
| LastName |  
|-----|  
| Park    |  
| Callahan|
```

Logical operators

AND

OR

NOT

Logical operators - AND

```
SELECT InvoiceId, BillingCountry, Total
FROM Invoice
WHERE BillingCountry = 'Australia'
      AND Total > 4
```

InvoiceId	BillingCountry	Total
66	Australia	5.94
250	Australia	13.86
305	Australia	8.91

Logical operators - OR

```
SELECT InvoiceId, BillingCountry, Total
FROM Invoice
WHERE BillingCountry = 'Australia'
      OR Total > 4
```

InvoiceId	BillingCountry	Total
3	Belgium	5.94
4	Canada	8.91
5	USA	13.86
10	Ireland	5.94
...		

Logical operators - NOT

```
SELECT InvoiceId, BillingCountry, Total
FROM Invoice
WHERE BillingCountry NOT IN ('Australia', 'Canada', 'United Kingdom')
```

InvoiceId	BillingCountry	Total
1	Germany	1.98
2	Norway	3.96
3	Belgium	5.94
5	USA	13.86
...		

Recap

`WHERE` : filter rows based on a condition

- Comparison operators: `=` , `<` , `>` , `<=` , `>=` , `<>`
- Comparison keywords: `BETWEEN` , `IN` , `LIKE`
- Logical operators: `AND` , `OR` , `NOT`

Let's practice!

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