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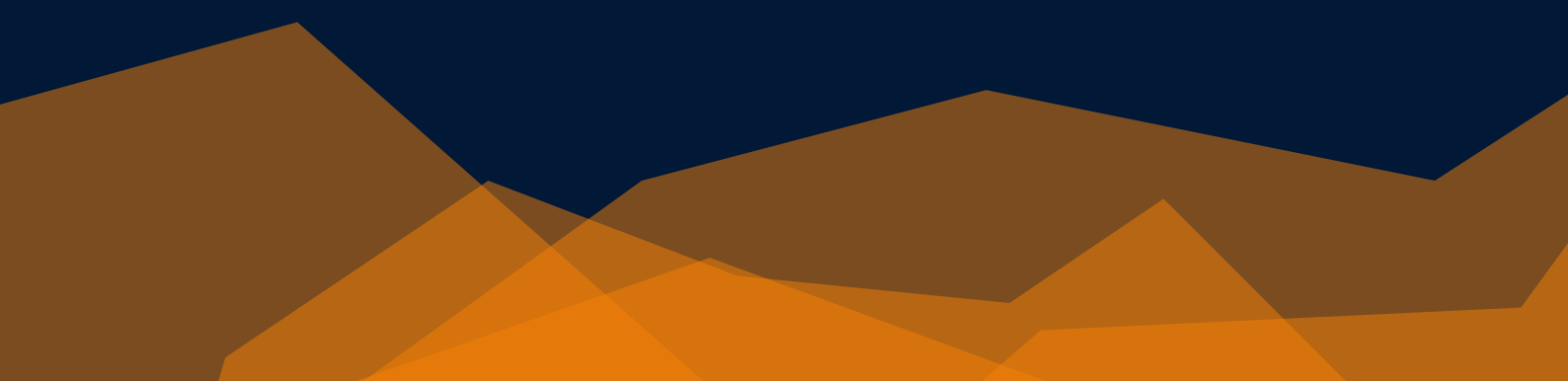
SQL

FOR

DATA SCIENCE

AN INTRODUCTION



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Let's start at the top...

SQL stands for **Structured Query Language**

Referred to as "**S-Q-L**" as well as "**Sequel**"

It is known to be the **easiest** programming language to learn & use due to the "common sense" nature of the commands

Used to store, extract & manipulate data in **relational databases**

Relational Database?

A **relational database** is a collection of tabular datasets (*think columns & rows*) that **relate** to each other through **shared** columns

country_populations

continent	country	population
Europe	UK	67,220,000
Europe	Germany	83,240,000
North America	USA	329,500,000
...	...	...

shared column

shared column

continent_areas

continent	area
Europe	UK
Europe	Germany
North America	USA
...	...

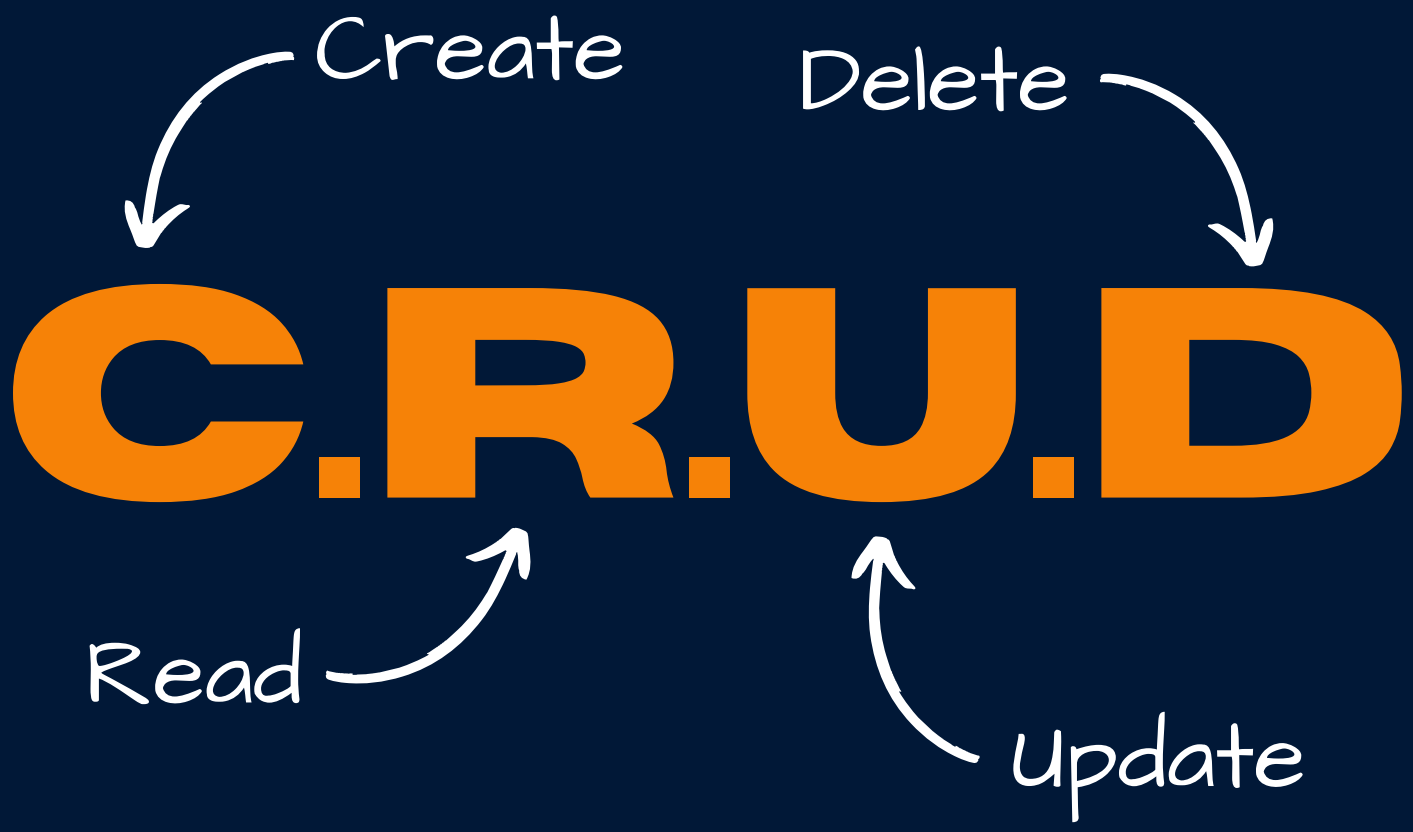
database

country_temps

country	max_temp
UK	38.7
Germany	41.2
USA	56.7
...	...

What can we do?

A good way to think about what we can using SQL is with the acronym **C.R.U.D**



While this might seem like a slightly informal acronym it's actually a really good way to describe the core functions or operations that can be performed on a relational database...

Let's take a look!

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C

CREATE: We can create **databases**, **schemas** (which are almost like a partitioned area to help keep things organised) and of course we can create **tables** as well!

R

READ: This is mainly about **querying** the data, so essentially **grabbing the relevant rows and columns** from tables that will provide us with the information we need

U

UPDATE: We can **add** more rows & columns to tables that already exist, as well as **modify** records within tables

D

DELETE: This is kinda what you'd expect - we can delete specific **rows and columns**, or we can delete whole **tables**, **schemas** and even **databases**!

SQL in Data Science I

While all of these C.R.U.D processes can be undertaken using SQL - Data Scientists and Data Analysts will typically spend most of their time in the "Read" area...

In a lot of companies the **management** of the databases themselves (so the Create, Update, and Delete functions) are often taken care of by a specific database team, or by Data Engineers.

In saying that however, a **great** Data Scientist or Analyst should have an understanding of how the data they're using is being imported & created as well as how it's being managed and changed over time - so knowing at least the fundamentals of the other functions can be very useful

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SQL in Data Science 2

In **Data Science** - common tasks that use **SQL** will be...

- Querying & exploring data to extract **useful business insights**
- Gathering & aggregating data for business **reporting**
- Selecting data for a **specific treatment**, e.g. selecting customers to receive a targeted promotion
- Extracting data for **Machine Learning** tasks or other predictive modelling

A simple code example...

We are the owner of **Rolex**, and we're looking for a new spokesperson for our very elite range of watches.

player_details

first_name	last_name	sport	net_worth
Roger	Federer	Tennis	$900m
Novak	Djokovic	Tennis	$220m
Sachin	Tendulkar	Cricket	$170m
Yao	Ming	Basketball	$120m
LeBron	James	Basketball	$500m
Lewis	Hamilton	Motorsport	$280m

For our simple example, we a single table of data called **player_details** that contains 6 famous sports people.

We want to create a shortlist of **names** who are worth **over $250m dollars** - we only want the wealthiest of athletes representing our product of course!

What would the SQL query for this look like?

A simple code example...

We use the **SELECT** statement to specify which **columns** from the original dataset we want returned. We only needed the names, so we've listed those columns with a comma seperating them

```
SELECT
    first_name,
    last_name

FROM
    player_details

WHERE
    net_worth > $250m;
```

We use the **FROM** statement to specify the name of the table that this information resides in

The **WHERE** statement is used to apply any row level filters. Our only requirement was to limited the results to sportspeople worth over $250m - so this is where we apply that rule!

A simple code example...

player_details

first_name	last_name	sport	net_worth
Roger	Federer	Tennis	$900m
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```
SELECT
    first_name,
    last_name

FROM
   player_details

WHERE
    net_worth > $250m;
```

first_name	last_name
Roger	Federer
LeBron	James
Lewis	Hamilton

Voila! Our shortlist of potential spokespeople for our new range of watches!

What else can we do?

Our example covered a **very simple** query - there is much, much more flexibility with SQL that means we can do a whole lot more in terms of processing and manipulating data, such as...

Task	SQL Clause
Find Unique Values	DISTINCT
Merge Multiple Tables	JOIN
Aggregation	SUM, MAX, COUNT (+ GROUP BY)
Appending	UNION, UNION ALL
Conditional Logic	CASE WHEN
Apply logic to a set of rows	RANK, NTILE, LAG, LEAD (Window Functions)

Do you want to **learn more** about this topic - and how to **apply it** in the real world?

Do you want to land an incredible role in the exciting, future-proof, and lucrative field of **Data Science**?

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Taught by former Amazon & Sony PlayStation Data Scientist **Andrew Jones**

What do **DSI** students say?

"I had over 40 interviews without an offer. After **DSI** I quickly got **7 offers** including one at **KPMG** and my amazing new role at **Deloitte**!"

- Ritesh

"The **best program** I've been a part of, hands down"

- Christian

"DSI is **incredible** - everything is taught in such a clear and simple way, even the more complex concepts!"

- Arianna

"**I got it!** Thank you so much for all your advice & help with preparation - it truly gave me the **confidence to go in and land the job!**"

- Marta

"I've taken a number of Data Science courses, and without doubt, DSI is the best"

- William

"One of the best purchases towards learning I have ever made"

- Scott

"I learned more than on any other course, or reading entire books!"

- Erick

"I started a bootcamp last summer through a well respected University, but I didn't learn half as much from them!"

- GA

"100% worth it, it is amazing. I have never seen such a good course and I have done plenty of them!"

- Khatuna

"This is a world-class Data Science experience. I would recommend this course to every aspiring or professional Data Scientist"

- David

"Andrew's guidance with my Resume & throughout the interview process helped me land my amazing new role (and at a much higher salary than I expected!)"

- Barun

"DSI is a fantastic community & Andrew is one of the best instructors!"

- Keith

"I'm now at University, and my Data Science related subjects are a piece of cake after completing this course!

I'm so glad I enrolled!"

- Jose

"In addition to the great content, Andrew's dedication to the growing DSI community is amazing"

- Sophie

"The course has such high quality content - you get your ROI even from the first module"

- Donabel

"The Statistics 101 section was awesome! I have now started to get confidence in Statistics!"

- Shrikant

"I can't emphasise how good this programme is...well worth the investment!"

- Dejan

"I'd completed my Master's in Business Analytics, but DSI was the first time I felt I had a solid foundation in Data Science to go forward with"

- Scott

...come and join the hundreds & hundreds of other students getting the **results** they want!

https://data-science-infinity.teachable.com