SQL

A gentle introduction

What is SQL?

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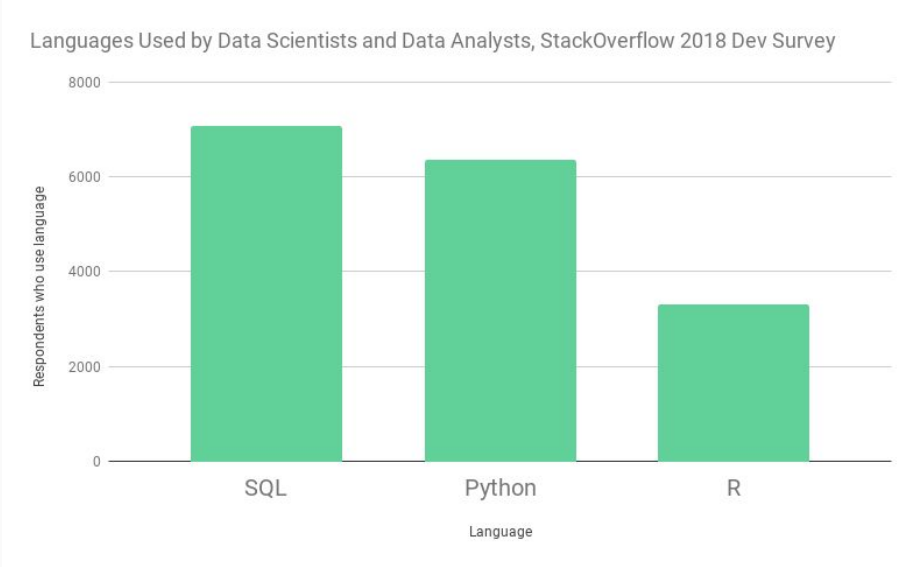
(Don´t worry. We´ll get there.)

Why learning SQL?

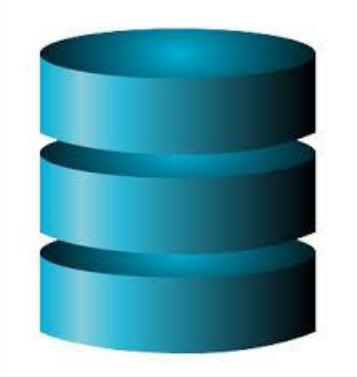
- Manipulate **large** amounts of **data** efficiently.
- SQL is a **highly demanded** skill in the job market!



Some useful terminology

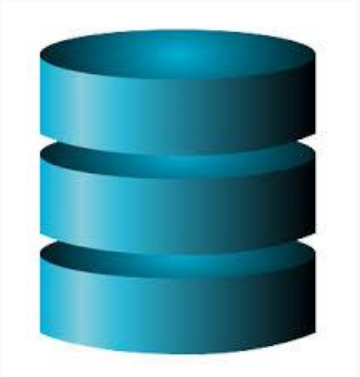
Database

- A database is an **organized collection of data** from which you can access and/or modify information.
- They are designed to ensure **speed, efficiency, integrity,** and **consistency**.
- There are two main types:
  - **Relational**
  - **Non-relational**



Database

(Tip: You can think of a **database** as a fancy electronic files cabinet)



Database Management Systems (DBMS)

To **interact with DB** we use specific pieces of software called **DBMS**. In this bootcamp you will learn two of the most popular ones:

- Relational Database Management System (**RDBMS**):
  - **MySQL**

- Non-Relational Database Management System (**NRDBMS**)
  - **MongoDB**

Database Management Systems (DBMS)

Which database is right for your business?		
	MySQL	MongoDB
Use case	Legacy applications or applications that require multi-row transactions (i.e. accounting systems)	Real-time analytics, content management, internet of things, mobile apps
Data structure	Structured data with clear schema	No schema definition required
Risk	Risk of SQL injection attacks	Less risk of attack due to design
Analysis	A great choice if you have structured data and need a traditional relational database.	A great choice if you have unstructured and/or structured data with the potential for rapid growth.

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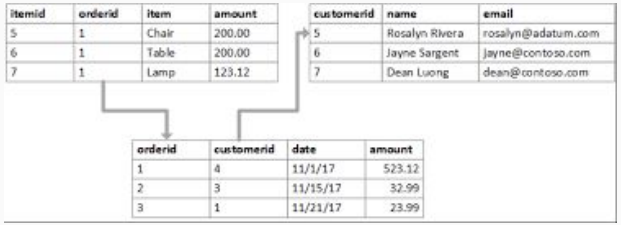
Relational vs **Non-Relational** Databases

- **Relational** databases:
  - Are based on relational algebra.
  - Store information in **tabular** form
  - Use **SQL**
- **Non-Relational** Databases
  - Store data in **non-tabular** form (“documents”)
  - **NoSQL**



itemid	orderid	item	amount
5	1	Chair	200.00
6	1	Table	200.00
7	1	Lamp	123.12

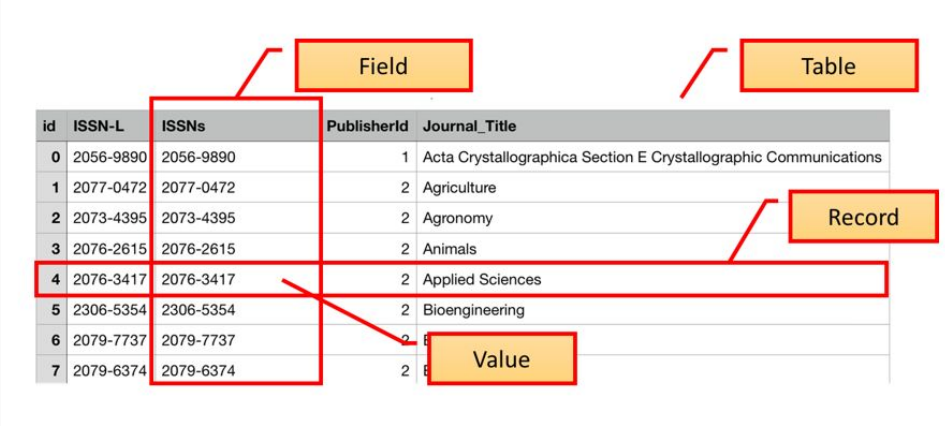
customerid	name	email
5	Rosalyn Rivera	rosalyn@adatum.com
6	Jayne Sargent	jayne@contoso.com
7	Dean Luong	dean@contoso.com

orderid	customerid	date	amount
1	4	11/1/17	523.12
2	3	11/15/17	32.99
3	1	11/21/17	23.99

Key	Document
1001	{ "CustomerID": 99, "OrderItems": [{ "ProductID": 2010, "Quantity": 2, "Cost": 520 }, { "ProductID": 4365, "Quantity": 1, "Cost": 18 }], "OrderDate": "04/01/2017" }
1002	{ "CustomerID": 220, "OrderItems": [{ "ProductID": 1285, "Quantity": 1, "Cost": 120 }], "OrderDate": "05/08/2017" }

Relational vs **Non-Relational** Databases

- According to the relational model, data is stored in “relations”, which are perceived by the users as **tables**.
- Each “relation” is composed of tuples (or records or **rows**) and attributes (or fields or **columns**)



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1	2077-0472	2077-0472	2	Agriculture
2	2073-4395	2073-4395	2	Agronomy
3	2076-2615	2076-2615	2	Animals
4	2076-3417	2076-3417	2	Applied Sciences
5	2306-5354	2306-5354	2	Bioengineering
6	2079-7737	2079-7737	2	B
7	2079-6374	2079-6374	2	B

Relational vs **Non-Relational** Databases

This link seems incredible… but it is true!

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Query

- "**query**" ("consulta") is a piece of code to ask the computer for some data.
- Since SQL is a ***declarative*** programming language, you must only focus on **what** you want, rather than the details on **how** to do it.

  For example: *How many products are there in my DB?:*

```
SELECT COUNT(product_id) FROM products;
```

What is SQL?

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Any questions?

Time to get your hands dirty!

- Type `mysql -u root -p` (mac) or `winpty mysql -u root -p` (Windows) in the terminal to test your MySQL installation .
- Open Sequel Pro (or MySQL Workbench) and check that you are connected to your localhost MySQL server.
- Prework review: Code along!!
- The police needs you!

SQL Cheat Sheet

What is SQL?

SQL is a database language used to query and manipulate the data in the database.

MySQL/Language/Definitions

- Data Definition Language(DDL)
- Data Manipulation Language(DML)
- Data Control Language(DCL)
- Data Query Language(DQL)
- Data Transfer Language(DTL)

Querying from a Table

- SELECT **a, b** FROM **T**; (Querying Data in Columns a, b from Table T)
- SELECT * FROM **T**; (Querying all rows and columns from a table)
- SELECT **a, b** FROM **T** WHERE **Condition;** (Query data and filter rows with a condition)
- SELECT DISTINCT **a** FROM **T** WHERE **condition**; (Query distinct rows from a table)
- SELECT **a, b** FROM **T** ORDER BY ASC/DESC; (Sort the result set in ascending or descending order)
- SELECT **a, b** FROM **T** ORDER BY **a** LIMIT **n** OFFSET **Offset**; (Skip Offset of rows and return the next n rows)
- SELECT **a,** aggregate**(b)** FROM **T** GROUP BY **A**; (Group rows using an aggregate function)
- SELECT **a,** aggregate**(b)** FROM **T** GROUP BY **A** HAVING **condition**; (Filter groups using HAVING Clause)