Introduction to SQL

FinTech

Lesson 7.1

Learning Outcomes

By the end of this unit, you will be able to:

01

Create a data model to represent the objects and relationships in a dataset.

02

Create schemas, tables, and databases for relational data.

03

Retrieve data using advanced database queries.

Class Objectives

By the end of today's class, you will:

- Install and run PostgreSQL (SQL) and pgAdmin (GUI) on your computer.
- Create databases and tables using pgAdmin.
- Define SQL data types, primary keys, and unique values.
- Load CSV files into a database and query the data.
- Articulate and apply the four basic functions of persistent storage: Create, Read, Update, and Delete (CRUD) and apply them to a database.
- Combine data from multiple tables using JOINs.

Why SQL?

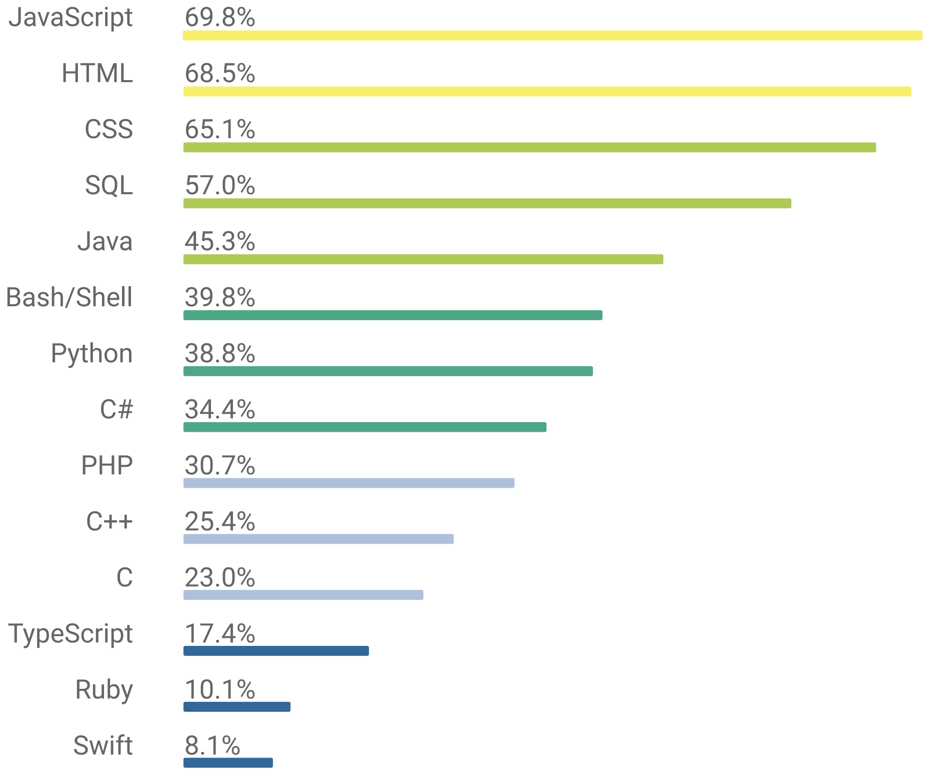
Structured **Q**uery **L**anguage (SQL) is one of the main query languages used to access data within relational databases.

SQL is designed to efficiently handle large amounts of data, resulting in high value to organizations.

Data is stored in tables similar to spreadsheets that you would create in Microsoft Excel, making it easy to visualize and search.

Experienced **SQL** programmers are in high demand.

Programming, Scripting, and Markup Languages *(all respondents)*



Data provided by 2018 Stack Overflow Survey

Postgres and pgAdmin

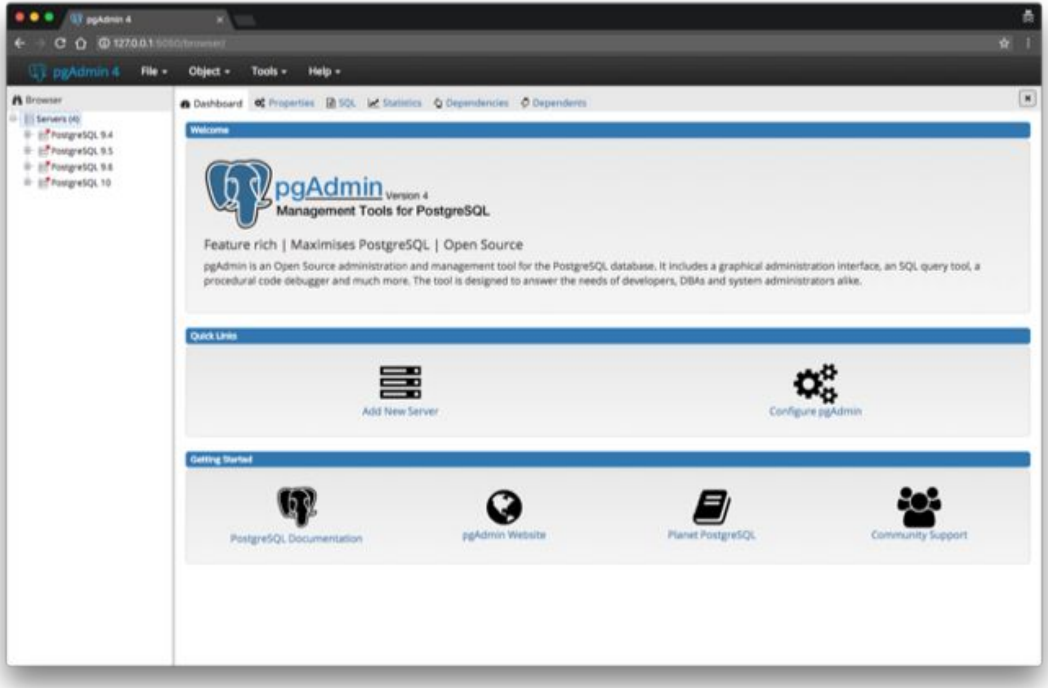
Postgres

PostgreSQL (usually referred to as "Postgres") is an object-relational database system that uses the SQL language.

- Database engine
- Open source
- Great functionality

pgAdmin

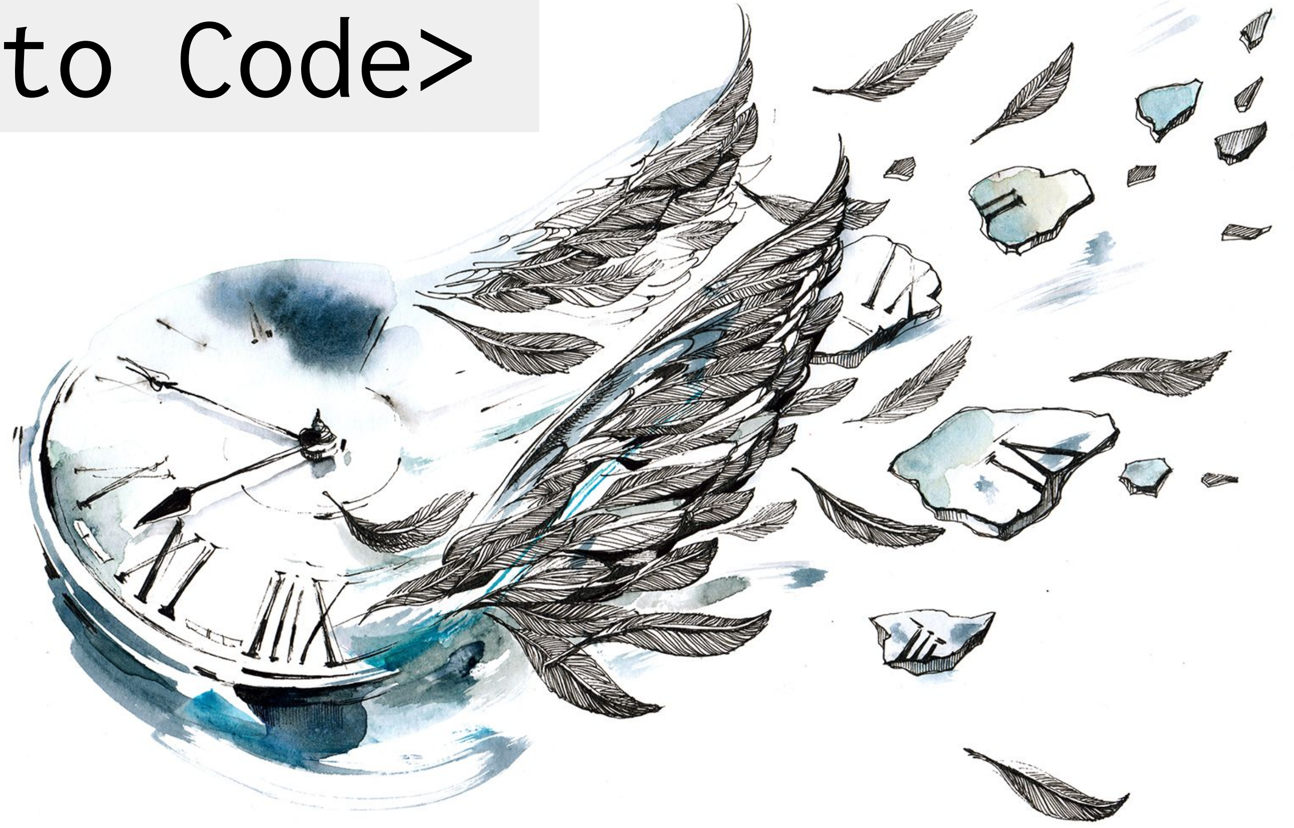
pgAdmin is a database management tool used with Postgres. It simplifies creation, maintenance, and use of database objects by providing a Graphical User Interface (GUI)



Feature rich | Maximises PostgreSQL | Open Source

pgAdmin is an Open Source administration and management tool for the PostgreSQL database. It includes a graphical administration interface, an SQL query tool, a procedural code debugger and much more. The tool is designed to answer the needs of developers, DBAs and system administrators alike.

<Time to Code>



Break

Create, Read, Update, Delete (CRUD)

CRUD Operations

Create Read Update Delete is a set of operations used with persistent storage.

Create	INSERT INTO table (column1, column2, column3)
Read	SELECT * FROM table
Update	UPDATE table SET column1 = VALUE WHERE id = 1
Delete	DELETE FROM table WHERE id = 5

These tools are fundamental to all programming languages, not just SQL.

Wildcards

Wildcards: % and _

Wildcards are used to substitute zero, one, or multiple characters in a string. The keyword **LIKE** indicates the use of a wildcard.

```
SELECT *

FROM actor

WHERE last_name LIKE ‘Will%’;
```

The **%** will substitute **zero**, **one**, or **multiple** characters in a query.

For example, all of the following will match: **Will**, **Willa**, and **Willows**.

```
SELECT *

FROM actor

WHERE first_name LIKE ‘_AN’;
```

The **_** will substitute one—and only one—character in a query.

_AN returns all actors whose first name contains three letters, the second and third of which are **AN**.

<Time to Code>