Introduction to SQL

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 PostgreSQL and pgAdmin on your computer.

Create databases and tables using pgAdmin.

Define SQL data types, primary keys, and unique values.

Load CSV files into a database.

Query data from a database.

Articulate the four basic functions of CRUD and apply them to a database.

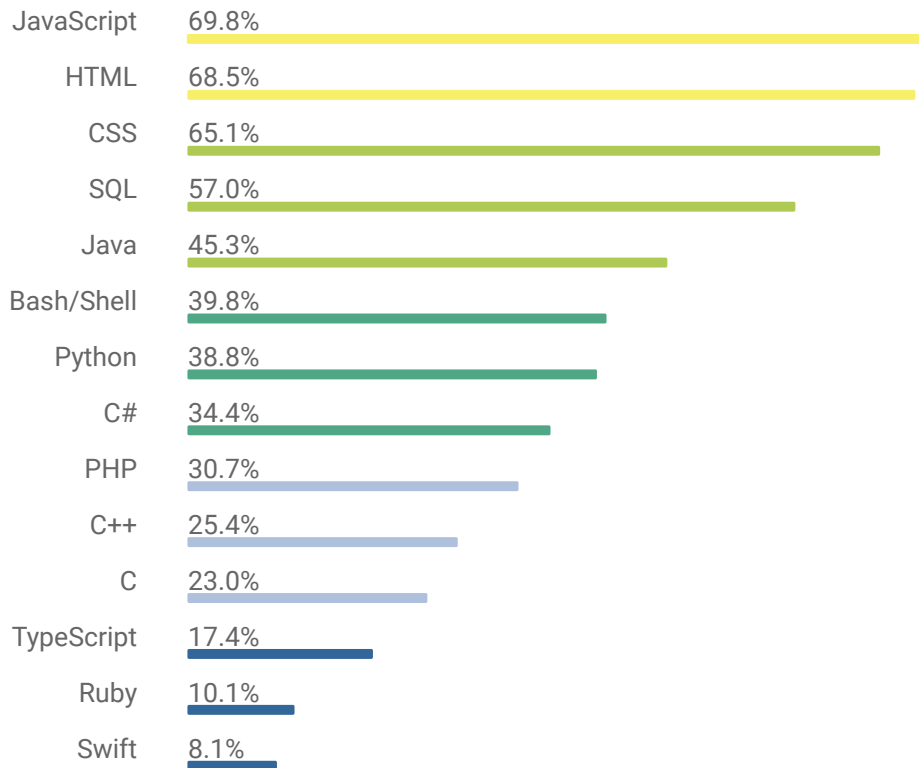Combine data from multiple tables using JOINs.

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.

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

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

| Language	Percentage
JavaScript	69.8%
HTML	68.5%
CSS	65.1%
SQL	57.0%
Java	45.3%
Bash/Shell	39.8%
Python	38.8%
C#	34.4%
PHP	30.7%
C++	25.4%
C	23.0%
TypeScript	17.4%
Ruby	10.1%
Swift	8.1%

Data provided by 2018 Stack Overflow Survey

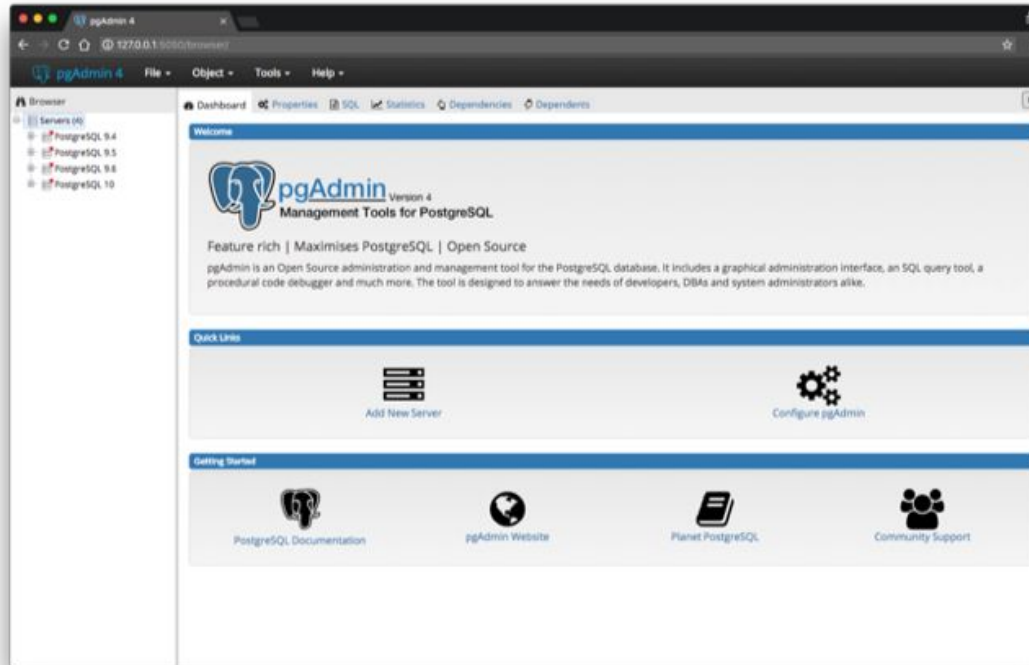# Postgres and pgAdmin

Postgres

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

- Database engine

- Open source

- Great functionality
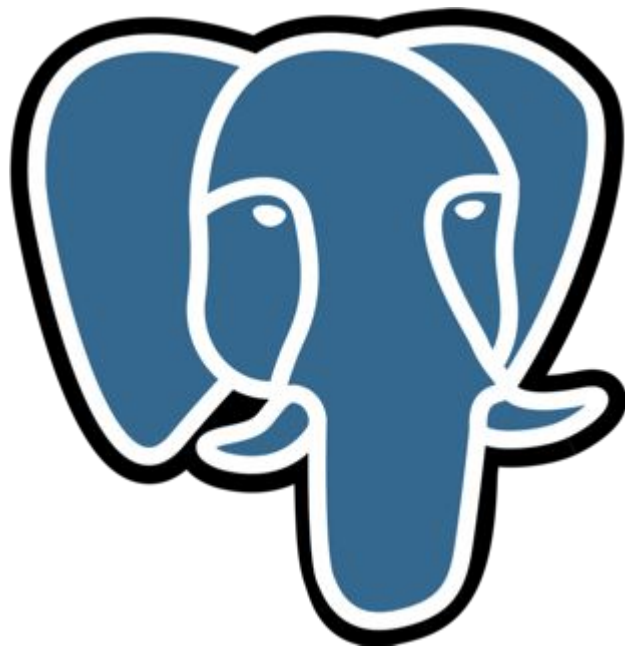
pgAdmin

pgAdmin is the management tool used for working with Postgres.
It simplifies creation, maintenance, and use of database objects.

<Time to Code>

Take a Break!

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%';
```

```
SELECT *

FROM actor

WHERE first_name LIKE '_AN';
```

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

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

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>