Exercise 1.6

What are databases and what are the advantages of using them?

Databases are organized collections of data, typically stored and accessed electronically from a computer system. They are designed to efficiently manage, retrieve, and manipulate large sets of data. Databases come in various types, including relational databases (like MySQL, PostgreSQL, Oracle), NoSQL databases (such as MongoDB, Cassandra), and others. Here are some advantages of using databases:

- Data Organization: Databases provide a structured way to organize data, allowing for easy storage, retrieval, and management of information.
- Data Integrity: Databases often enforce data integrity constraints, such as uniqueness or referential integrity, ensuring that the data stored remains accurate and consistent over time.
- Data Security: Databases offer features for controlling access to data, such as user authentication and authorization, to ensure that only authorized users can view or modify data.

List 3 data types that can be used in MySQL and describe them briefly:

Data type	***Definition***
VARCHAR	VARCHAR is a variable-length character string data type
INT	INT is a standard integer data type used to store whole numbers
DATE	DATE is a data type used to store dates in the format 'YYYY-MM-DD'

In what situations would SQLite be a better choice than MySQL?

SQLite is preferable over MySQL in scenarios such as:

- Embedded Systems or Mobile Applications: Due to its lightweight nature and self-contained design, SQLite is ideal for embedded systems and mobile applications.
- Single-User or Small-Scale Applications: For projects that don't require concurrent access from multiple users or high scalability, SQLite offers simplicity and efficiency.
- Prototyping and Testing: SQLite is great for rapid prototyping and testing, providing quick setup and ease of use without complex configuration.

Think back to what you learned in the Immersion course. What do you think about the differences between JavaScript and Python as programming languages?

JavaScript and Python are both popular programming languages, but they have differences:

- Syntax: JavaScript uses curly braces and semicolons, while Python relies on indentation.
- Typing: Both are dynamically typed, but Python supports optional type hints.
- Ecosystem: JavaScript is strong in web development with frameworks like React and Node.js, while Python has diverse libraries for web, data science, and machine learning.
- Concurrency: JavaScript uses event-driven model, while Python provides solutions like threading and async programming.
- Execution Environment: JavaScript primarily runs in web browsers and Node.js, while Python can run on various platforms including servers and embedded systems.

Now that you're nearly at the end of Achievement 1, consider what you know about Python so far. What would you say are the limitations of Python as a programming language?

Some limitations of Python include:

- Performance: Slower execution compared to compiled languages and limited multithreading due to the Global Interpreter Lock (GIL).
- Mobile Development: Less commonly used for mobile app development compared to languages like Java and Swift.
- Resource Consumption: Can consume more memory and resources due to dynamic typing and high-level abstractions.
- Static Typing: Lacks built-in static type checking, potentially leading to runtime errors.