**What is SQLite?**

**Learn what is SQLite, its key features, use cases, and step-by-step installation for Windows, Mac, and Linux.**

In this article, we will be exploring the extremely prevalent database engine called [SQLite](https://www.sqlite.org/index.html). We will describe what it does, its main uses, and then explain how to set it up and use it on your own computer.

**What is SQLite?**

SQLite is a database engine. It is software that allows users to interact with a [relational database](https://www.codecademy.com/resources/docs/general/database/relational-database). In SQLite, a database is stored in a single file — a trait that distinguishes it from other database engines. This fact allows for a great deal of accessibility: copying a database is no more complicated than copying the file that stores the data, sharing a database can mean sending an email attachment.

**Drawbacks to SQLite**

SQLite’s signature portability unfortunately makes it a poor choice when many different users are updating the table at the same time (to maintain integrity of data, only one user can write to the file at a time). It also may require some more work to ensure the security of private data due to the same features that make SQLite accessible. Furthermore, SQLite does not offer the same exact functionality as many other database systems, limiting some advanced features other relational database systems offer. Lastly, SQLite does not validate data types. Where many other database software would reject data that does not conform to a table’s schema, SQLite allows users to store data of any type into any column.

SQLite creates schemas, which constrain the type of data in each column, but it does not enforce them. The example below shows that the id column expects to store integers, the name column expects to store text, and the age column expects to store integers:

CREATE TABLE celebs (  
   id INTEGER,   
   name TEXT,   
   age INTEGER  
);

However, SQLite will not reject values of the wrong type. We could accidentally insert the wrong data types in the columns. Storing different data types in the same column is a bad habit that can lead to errors that are difficult to fix, so it’s important to be strict about your schema even though SQLite will not enforce it.

**Common use cases for SQLite**

Even considering the drawbacks, the benefits of being able to access and manipulate a database without involving a server application are huge. SQLite is used worldwide for testing, development, and in any other scenario where it makes sense for the database to be on the same disk as the application code. SQLite’s maintainers consider it to be among the [most replicated pieces of software in the world](https://www.sqlite.org/mostdeployed.html).

**How to install SQLite**

Binaries for SQLite can be installed at the [SQLite Download](https://www.sqlite.org/download.html) page. This page has versions of SQLite for Windows, Mac OS X, and [Linux](https://www.codecademy.com/resources/docs/open-source/linux). The last number in each file name is the current SQLite version. Our video walkthrough uses the version number 3200100. You should download whichever version is listed on the SQLite Download page, and replace 3200100 in the instructions below with the version number you downloaded. For example, if the name of the file you download is sqlite-tools-win-x64-3490100.zip, you would change 3200100 in each command to 3490100.

**Installing SQLite on Windows**

For Windows machines:

1. Download the **sqlite-tools-win-x64-3490100.zip** file and unzip it.
2. From your [git-bash terminal](https://www.codecademy.com/article/command-line-setup), open the directory of the unzipped folder with cd ~/Downloads/sqlite-tools-win-x64-3490100.zip/sqlite-tools-win-x64-3490100.zip/. 3.Try running sqlite with the command winpty ./sqlite3.exe. If that command opens a sqlite> prompt, congratulations! You’ve installed SQLite.

We want to be able to access this command quickly from elsewhere, so we’re going to create an alias to the command. Exit the sqlite> prompt by typing in Ctrl + C, and in the same git-bash terminal without changing folders, run these commands:

echo "alias sqlite3=\"winpty ${PWD}/sqlite3.exe\"" >> ~/.bashrc

and

source ~/.bashrc

The first command will create the alias sqlite3 that you can use to open a database. The second command will refresh your terminal so that you can start using this command. Try typing in the command sqlite3 newdb.sqlite. If you’re presented with a sqlite> prompt, you’ve successfully created the sqlite3 command for your terminal. Enter Ctrl + C to quit. You can also exit by typing .exit in the prompt and pressing Enter.

**Video Tutorial:** [Setting Up SQLite Locally (Windows)](https://youtu.be/dcfh5iQ_-3s)

**Installing SQLite on Mac**

For Macs, use the Mac OS X (x86) sqlite-tools package:

1. Install it, and unzip it.
2. In your terminal, navigate to the directory of the unzipped folder using cd.
3. Run the command mv sqlite3 /usr/local/bin/. This will add the command sqlite3 to your terminal path, allowing you to use the command from anywhere.
4. Try typing sqlite3 newdb.sqlite. If you’re presented with a sqlite> prompt, you’ve installed SQLite! Enter control + d to quit. You can also exit by typing .exit in the prompt and pressing return.

**Video Tutorial:** [Setting Up SQLite Locally (Mac)](https://youtu.be/4MJSZi4qvIE)

**Installing SQLite on Linux**

In Ubuntu or similar distributions:

1. Open your terminal and run sudo apt-get install sqlite3. Otherwise, use your distribution’s package managers.
2. Try typing in the command sqlite3 newdb.sqlite. If you’re presented with a sqlite> prompt, you’ve successfully created the sqlite3 command for your terminal. You can exit by typing .exit in the prompt and pressing enter.

**Conclusion**

You’ve installed database software and opened a connection to a database. Now you have the full power of SQL at your fingertips. You’ll be able to manage all the data for any application you can dream of writing.

To explore how to use SQLite in real-world applications, check out [Learn Node-SQLite](https://www.codecademy.com/learn/learn-node-sqlite). This course teaches you how to integrate SQLite with JavaScript using the node-sqlite3 package, making it a great next step after learning SQLite basics.

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**Setting Up DB Browser**

**Learn about this tool that allows you to perform SQL tasks visually.**

**What is DB Browser**

DB Browser is a visual tool used to organize commands sent to SQLite. With databases, it’s easy to lose track of commands that have been run. DB Browser lets you see exactly the sequence of commands you are executing before you run them. DB Browser will also allow you to see the column structure for the tables within the database you’re working with, so inserting data or other manipulation of data is more manageable and doesn’t require performing queries every time you need to remember the structure of your data.

**Installing DB Browser**

DB Browser has packages available for each operating system on the right panel of the [DB Browser website](http://sqlitebrowser.org/). Follow along with this video for installation instructions:

After following the installation process, open up the software and you will presented with an interface for opening or creating a new database.

**Using DB Browser to Create a New Table**

Steps: Creating a new database with DB Browser will open a File dialog box, where you can set where the SQLite database will live in your file structure. After creating a db, you will be presented with an interface for creating a table. Add a name for the table at the top, and then add and remove fields in the Fields window. Each field has a free-text name, a dropdown for its type, and four checkboxes for not-null, primary key, autoincrement, and unique attributes, as well as other parameters. You will see the SQL query that DB Browser executes to create this table update as you add information to this table. Update these and press “OK”. You will see the Database Structure tab of DB Browser refresh with the updated information. Note that no changes have been made to any database file yet, and queries are only executed by DB Browser when the “Write Changes” button is pressed. Press the “Write Changes” button and create your table.

**Adding Data to a SQLite Table Using DB Browser**

Steps: Switch from the Database Structure tab to the Browse Data tab. You can add a row to the table with the New Record button. Click it, and update the columns in the viewport as you would a spreadsheet. Remember that no data will be inserted into the SQLite database until the “Write Changes” button is pressed. Press that button and you will have successfully added a row to your table.

**Conclusion**

You’ve installed DB Browser and used it to perform SQL tasks visually. You can now use DB Browser to visualize what SQL commands will accomplish without worrying about affecting the state of your database. Verify these commands do what you want, and press “Write Changes” to commit to them. Congratulations! You’re ready to manage a database.