

# Databases 101

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# What is a Database

- A database is a system intended to organize, store, and retrieve large amounts of data easily. It consists of an organized collection of data for one or more uses, typically in digital form.

# Main type is a Relational DBMS (RDBMS)

- Interface drivers—These drivers are code libraries that provide methods to prepare statements, execute statements, fetch results, etc. Examples include ODBC, JDBC, MySQL/PHP, FireBird/Python.
- SQL engine—This component interprets and executes the DDL, DCL, and DML statements. It includes three major components (compiler, optimizer, and executor).
- Transaction engine—Ensures that multiple SQL statements either succeed or fail as a group, according to application dictates.
- Relational engine—Relational objects such as Table, Index, and Referential integrity constraints are implemented in this component.
- Storage engine—This component stores and retrieves data from secondary storage, as well as managing transaction commit and rollback, backup and recovery, etc.

# Structured Query Language (SQL)

- SQL is how you talk to a database
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```
SELECT *  
FROM Book  
WHERE price > 100.00  
ORDER BY title;
```

```
SELECT Book.title,  
       count(*) AS Authors  
FROM   Book JOIN Book_author  
ON     Book.isbn = Book_author.isbn  
GROUP BY Book.title;
```

Example output might resemble the following:

Title	Authors
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The Joy of SQL	1
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