ORM Tools

Estimated time needed: **5** minutes

Object-Relational Mapping (ORM) tools are widely used in modern software development to bridge the gap between object-oriented programming languages and relational databases. ORM tools provide a convenient and efficient way to interact with databases using programming language objects and concepts, eliminating the need for developers to write complex and repetitive SQL queries.

Programming languages have their own ORM tools that simplify database operations and streamline the development process. This reading will teach you about some widely used ORM tools for different programming languages.

Python

- Django is a Python web framework with a built-in ORM that provides a high-level Application Programming Interface (API) for interacting with databases. Django offers features like model definition, query construction, database migrations, and automatic query optimization.
- SQLAlchemy is a popular and comprehensive ORM library in Python, providing a flexible and expressive API for working with databases. SQLAlchemy offers high-level and low-level ORM approaches, allowing developers to choose the level of abstraction needed.
- web2py is an open-source, full-stack web framework written in Python that aims to simplify web application development by providing an all-in-one solution that includes a web server, a database abstraction layer, and a web-based development environment.

Java

- Hibernate is widely used for Java applications as it offers a powerful and feature-rich API for mapping Java objects to relational databases. Hibernate supports various database systems and provides advanced features like lazy loading, caching, and transaction management.

- EclipseLink is another popular tool for Java. It's an open-source framework that offers extensive support for mapping Java to relational databases. EclipseLink supports features like Java Persistence API (JPA), caching, advanced query capabilities, and integration with various application servers.
- Apache OpenJPA is an open-source implementation of the JPA specification. It facilitates mapping Java classes to relational database tables and provides transparent persistence of Java objects.

.NET

- Entity Framework is Microsoft's ORM framework for .NET applications. It provides an easy-to-use API for mapping .NET objects to relational databases. Entity Framework supports different database providers, offers query capabilities, and includes features like code-first and database-first approaches for model creation.
- Dapper is a micro-ORM for .NET that focuses on performance and simplicity. It provides a lightweight and efficient API for querying databases. Dapper is suitable for scenarios where direct control over SQL queries and execution is desired.
- NHibernate is a widely used ORM tool for the .NET platform. It's inspired by the Hibernate ORM tool for Java. NHibernate bridges object-oriented programming in .NET and relational databases, allowing developers to interact with databases using .NET objects.

Ruby

- ActiveRecord is the default ORM in Ruby on Rails, a popular web framework in Ruby. It offers a convention-over-configuration approach, making mapping Ruby objects to database tables easy. ActiveRecord provides features like model associations, query generation, and database migrations.
- Sequel is a flexible and feature-rich ORM tool for Ruby that emphasizes simplicity and a SQL-centric approach. Sequel supports various database systems, offers advanced query capabilities, and provides plugins for additional functionality.
- DataMapper focuses on simplicity, flexibility, and ease of use. It aims to provide a clean and intuitive API for working with databases in Ruby applications. DataMappr features include flexible mapping, data abstraction, querying, and repository pattern.

PHP

- Propel is a high-performance ORM tool for PHP that focuses on code generation and simplicity. It provides a code-first approach, where PHP classes and objects define the database schema. Propel generates efficient SQL queries and offers features like lazy loading, eager loading, and caching.
- CakePHP includes a built-in ORM component that provides a powerful and intuitive API for working with databases, offering features like database abstraction, query building, and association management.
- Eloquent is the default ORM provided by the Laravel framework, a popular PHP framework. It offers a straightforward and expressive syntax for defining database models and relationships. Eloquent simplifies database operations, including querying, data retrieval, and database migrations, and supports different database engines.