

# SQLAlchemy for PostgreSQL

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# Introduction

- Like other programming languages, Python need a Database driver to interact with Database.
- The most Advanced Open source Relational Database is PostgreSQL [1].
- SQLAlchemy is the Python SQL toolkit and Object Relational Mapper (ORM) with full power and flexibility of SQL [2].
- SQLAlchemy supports SQLite, PostgreSQL, MySQL & MariaDB, Oracle and MS-SQL [3]



# SQLAlchemy Installation and Testing

Install di terminal :

```
> pip install sqlalchemy  
> pip install psycopg2
```

Testing di Python shell

```
>>> import sqlalchemy  
>>> sqlalchemy.__version__  
'2.0.45'  
>>>
```

```
>>> import psycopg2  
>>> psycopg2.__version__  
'2.9.11 (dt dec pq3 ext lo64)'  
>>> |
```

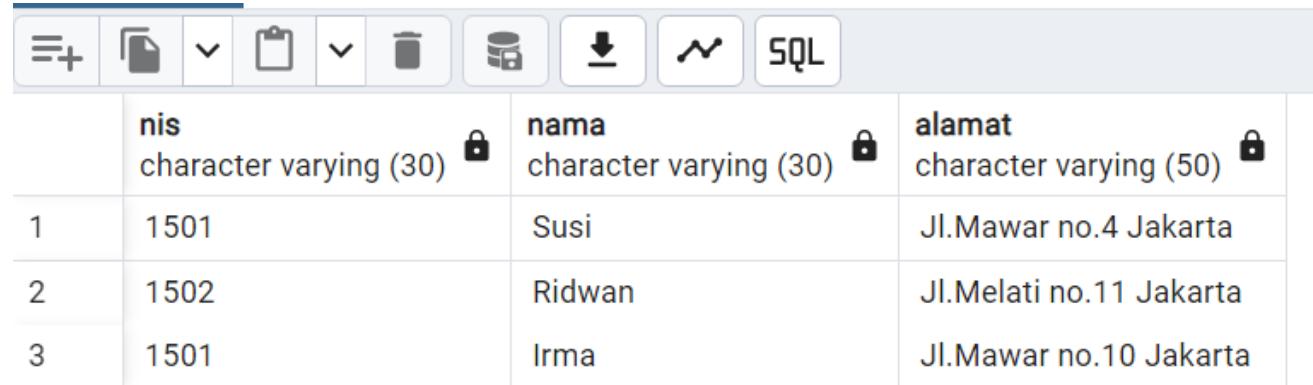
# Database connection (1)

Database name : postgres

Table name : siswa

Database administration tool : pgadmin

Figure 1 : Table of siswa



The screenshot shows the pgAdmin interface with the 'siswa' table selected. The top bar includes standard database management icons and a SQL tab. The table has three columns: 'nis' (character varying (30)), 'nama' (character varying (30)), and 'alamat' (character varying (50)). The data consists of three rows:

	nis character varying (30)	nama character varying (30)	alamat character varying (50)
1	1501	Susi	Jl.Mawar no.4 Jakarta
2	1502	Ridwan	Jl.Melati no.11 Jakarta
3	1501	Irma	Jl.Mawar no.10 Jakarta

# Database Connection (2)

- Connect and print the content of table siswa (with raw sql) :

```
from sqlalchemy import create_engine,text,select  
  
host="localhost"  
database = "postgres"  
user="postgres"  
password="postgres"  
connection_string =f"postgresql://{{user}}:{{password}}@{{host}}/{{database}}"  
  
conn=engine.connect()  
  
sqlnengine=create_engine(connection_string)  
ya=text("select * from siswa")  
results=conn.execute(sqlnya).fetchall()  
print(results)
```

[4]

# Database Connection (3)

Output :

```
[('1501', 'Susi', 'Jl.Mawar no.4 Jakarta'), ('1502', 'Ridwan', 'Jl.Melati no.11 Jakarta'), ('1501', 'Irma', 'Jl.Mawar
```

```
Process finished with exit code 0
```

# Database Connection (4)

Connect and print the content of table siswa (with ORM)

```
from sqlalchemy import create_engine, text, select, Column, String  
from sqlalchemy.orm import declarative_base, Session
```

```
Base = declarative_base()
```

```
host="localhost"  
database = "postgres"  
user="postgres"  
password="postgres"  
connection_string = f"postgresql://{user}:{password}@{host}/{database}"  
engine=create_engine(connection_string)
```

# Database Connection (5)

```
class siswa(Base):
    __tablename__ = "siswa"
    nis = Column(String, primary_key=True)
    nama = Column(String)
    alamat = Column(String)

sqlnya=select(siswa)
with Session(engine) as session:
    result = session.execute(sqlnya)
    for row in result.scalars():
        print(row.nis, row.nama, row.alamat)
```

[4]

# Database Connection (6)

Output :

```
1501 Susi Jl.Mawar no.4 Jakarta  
1502 Ridwan Jl.Melati no.11 Jakarta  
1501 Susi Jl.Mawar no.4 Jakarta
```

```
Process finished with exit code 0
```

# Analysis

- Sqlalchemy is easy to install
- Sqlalchemy doesn't work independently. It works on Psycopg2
- Sqlalchemy with raw SQL need fewer methods than with ORM
- Sqlalchemy provides dialects with some Relational Databases. Hence it is powerful and wider usage.
- Sqlalchemy is active development

# Conclusion

- SQLAlchemy is a database driver for Python.
- SQLAlchemy has dialects for some relational databases.
- SQLAlchemy can work with raw sql or ORM.

# References

- [1] The PostgreSQL Global Development Group, Home, 2025.  
<https://www.postgresql.org/>. Accessed : Dec 13, 2025
- [2] SQL Alchemy authors and contributors, Home, 2025.  
<https://www.sqlalchemy.org/>. Accessed : Dec 13, 2025.
- [3] SQL Alchemy authors and contributors, Features and Philosophy.  
<https://www.sqlalchemy.org/features.html>. Accessed : Dec 14, 2025,
- [4] Akhmad Sofwan, Geographic Data Visualization using Geopandas and PostgreSQL, Nerd for Tech, 2024. Accessed : Dec 13, 2025

With help with ChatGPT at fixing code connection with ORM

Source codes and slide :

[https://github.com/sofwanbl/talk\\_sofwan\\_pycon25](https://github.com/sofwanbl/talk_sofwan_pycon25)