



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)'  
>>> |
```

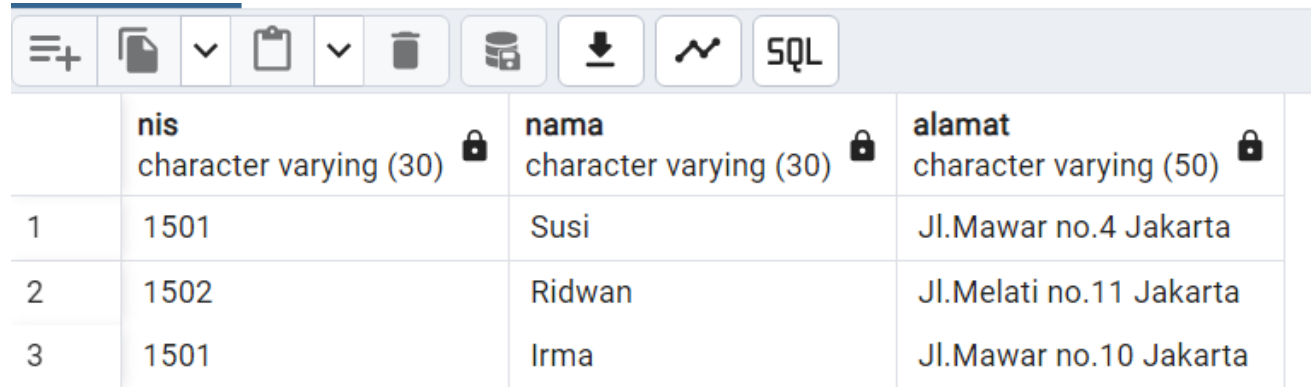
Database connection (1)

Database name : postgres

Table name : siswa

Database administration tool : pgadmin

Figure 1 : Table of siswa



The screenshot shows the pgAdmin interface for a table named 'siswa'. The table has four columns: 'id' (integer), 'nis' (character varying (30)), 'nama' (character varying (30)), and 'alamat' (character varying (50)). The data is as follows:

	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

