

# Principles of Data Management

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August 2018 - December 2018

## Database Interaction

SQL alone is not enough to interact with a database. It cannot display a GUI since it has no non-declarative actions. There are a few options:

- Embedded SQL
- Dynamic SQL: ORM/interface

We can connect to a database via a direct connection, Open Database Connection (ODBC), or Java Database Connection (JDBC). Both ODBC and JDBC add a level of abstraction by acting as a proxy between the application and the database. While it may slow things down by adding a layer of complexity, it allows you to switch between databases seamlessly. The application developer can interface with the ODBC/JDBC in a database agnostic manner. ODBC started out as a Windows-specific platform but it has grown to almost every platform. Because these interfaces cater to the lowest common denominator, they do not support database-specific functionality and are primarily used for simple databases.

## Interacting with Python (sample)

```
import psycopg2

conn_string = "host='reddwarf.cs.rit.edu'" \
              "dbname='db'" \
              "user='user'" \
              "password='pw'"
conn = psycopg2.connect(conn_string)
```

When connecting to a server, instead of copying data over the network connection, it is usually always more efficient to use a server side cursor to query the data. The server will instead hold a small portion of the database in memory with the cursor pointing to the first element.

```
cursor=conn.cursor()
cursor.execute("select * from car")
for data in cursor:
    print(data)
```

You can find all my notes at <http://omgimanerd.tech/notes>. If you have any questions, comments, or concerns, please contact me at [alvin@omgimanerd.tech](mailto:alvin@omgimanerd.tech)