Marissa Ratschki

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LAB 01: PostgreSQL Setup

ABSTRACT:

This lab provided hands-on experience installing and exploring PostgreSQL and pgAdmin while covering fundamental database concepts. Through written analysis, we examined the distinction between data and information and compared early data models to the relational model used by PostgreSQL. This lab also built familiarity with GitHub, strengthening both technical and conceptual understanding of modern database systems.

Figure 1: pgAdmin running on MacOS

DATA vs. INFORMATION:

PostgreSQL is an open-source relational database commonly used in a wide range of project types ("What is PostgreSQL," n.d.). In PostgreSQL, data is represented by raw values stored in tables without inherent meaning—that is, until they are related, primarily through the use of tables, columns, and keys (PostgreSQL, 2025). Common elements of PostgreSQL data include table rows (records), column values (attributes), foreign keys, primary keys, and numeric values such as quantities or login times. PostgreSQL organizes raw data into meaningful information by structuring values into tables, defining relationships between those tables, and enforcing rules that give data context. For example, the date 1-28-2026 has no useful meaning without the context provided by defined columns and relating rows across tables using primary and foreign key constraints. With this context, we can learn, for example, that a given student registered for a given course on the date of 1-28-2026.

DATA MODELS:

Hierarchical data models organize data into trees, where each piece of data has a single parent with the potential for multiple child records (GeeksforGeeks, 2025). Because of this, Hierarchical models are most effective for representing simpler, one-to-many relationships. Network data models differ in that they allow for records to have multiple parent relationships, enabling the representation of many-to-many relationships. However, this requires more complex programming. The relational model addresses these limitations

by representing data in tables and defining relationships logically through keys, allowing data to be queried based on conditions rather than physical access. Because XML uses a hierarchical structure, it is best suited for simple relationships that follow a clear parent–child pattern. While effective for structured documents and data exchange, XML becomes inefficient for complex, highly relational data as compared to relational database models.

REFERENCES

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