Data Analysis with SQL and Python

Prepared for Intuit

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Course Overview:

In this class you will learn the fundamentals of SQL, a ubiquitous programming language specifically for querying databases. These basics include creating tables, querying records, joining related tables together, and performing grouping and aggregates. You'll also learn about some of the limitations of SQL for data analysis, and when and how to use Python and SQL together to overcome these limitations.

This course is designed for students who do not speak SQL, and already have limited experience with Python.

Course Duration: This course will be delivered in 3 days

Prerequisites:

- Experience with basic Python, enough to:
    - Create variables and functions
    - Write if statements and for loops
    - import libraries

Course Objectives:

After this course, you will be able to:

- Write SQL queries to:
    - Select data
    - limit the returned data to fit specific criteria
    - Join records from multiple tables
    - Use operators to perform mathematical and text process operations.

    - Group data and apply aggregates
- Use the SQLAlchemy and Pandas Python libraries to:
    - Fetch data from SQL databases
    - Store data to SQL databases
    - Perform statistical analysis and make charts.

This course does include:

- Simple to Medium complexity SQL Queries
- Basic Extract Transform Load workflows in Python
- Simple chart making with Python

This course does NOT include:

- Advanced analytics, AI, or machine learning content
- Advanced data engineering and pipeline content

Course Outline:

- What is a database?
    - Database vs database management system
    - Different implementations of SQL
    - SQL vs NOSQL DBMS
- Creating tables in SQL
    - The importance of data types
    - DDL Commands
    - DML Commands
    - Integrity Constraints
- Selecting data
    - Selecting specific columns
    - Selecting specific rows
    - Ordering and limiting returned data
    - Joins
    - Types of Joins
    - Cross Product
- Relationships between records in SQL
    - Foreign Keys
    - 1-1, 1-many, and many-to-many

    - joins and different join types

- Grouping data and using aggregates
    - aggregates (sum, avg, count)
    - grouping data

- Connecting to SQL databases in Python
    - Lots of painful configuration, typically
    - SQLAlchemy
    - Pandas
    - Querying and storing data to and from SQL databases

- Basic Analysis in Python
    - Making basic charts
    - Matplotlib Library
    - Numpy Library
    - Computing basic statistics
    - Transforming data
    - Read Data from DBMS and Export to Excel
    - Read Data from Excel and insert into DBMS Table