e-Learning SAS SQL
Training Content

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Course Aims

After attending this course, attendees should be able to use the SQL procedure to: create, query, delete, update and modify SAS data; combine SAS tables; apply conditional processing in queries; summarize data; report on data; and create macro variables.

Duration

2 days

Required Knowledge

Delegates should have completed the base programming course or have a level of knowledge equivalent to that. No previous experience of SQL is required.

SQL Course

1. SQL Concepts
    - 1.1 What is SQL?
        - SAS SQL
        - PROC SQL Features
    - 1.2 When to use SQL
        - The 'Right' Technique

2. SAS SQL Queries
    - 2.1 SAS SQL Terminology
        - Basic Terminology
        - SAS Data Sets in PROC SQL
    - 2.2 What is a PROC SQL Query?
        - Definition of a 'Query'
        - The SELECT Statement
        - SELECT Statement Clauses
    - 2.3 Using a Query to Retrieve Data
        - Retrieving Data from a Table
        - Creating new Columns
        - 2.3 Exercises
        - 2.3 Solutions
    - 2.4 Using a Query to Subset Data
        - Removing Identical Rows
        - The WHERE Clause
        - 2.4 Exercises
        - 2.4 Solutions
    - 2.5 Sorting & Summing Data with SAS SQL
        - The ORDER BY Clause
        - Calculating Descriptive Statistics
        - Remerge
        - 2.5 Exercises
        - 2.5 Solutions
    - 2.6 Grouping Data with SAS SQL
        - The GROUP BY Clause
        - Subsetting groups of data - the HAVING Clause
        - 2.6 Exercises
        - 2.6 Solutions
    - 2.7 Sub-Queries & In-Line Views
        - What is a Sub-Query?
        - Non-Correlated Sub-Queries
        - Correlated Sub-Queries
        - In-Line Views
        - 2.7 Exercises
        - 2.7 Solutions
    - 2.8 Creating Tables and Views with SAS SQL
        - Customising Query Output Appearance

- Creating Tables
- Adding Data to Tables
- Creating PROC SQL Views

2.8 Exercises

2.8 Solutions

2.9 Tailoring SAS SQL Execution

- The VALIDATE Statement
- PROC SQL Options
- The RESET Statement

3. SAS SQL Joins

3.1 What is a Join?

- Cartesian products
- Definition of a Join

3.2 Inner Joins

- Definition of an Inner Join
- Table Aliases

3.2 Exercises

3.2 Solutions

3.3 Outer Joins

- Definition of an Outer Join
- Left Joins
- Right Joins
- Full Joins
- The COALESCE Function
- Joining more than two Tables

3.3 Exercises

3.3 Solutions

3.4 Joins vs. Data Step Merges

- Deciding which to use to join Tables
- Difference in processing

4. SAS SQL Set Operations

4.1 What is a Set Operation?

- Definition of a Set Operation
- Types of Set Operations

4.2 The UNION Set Operator

- Using the UNION Set Operator
- Default behaviour
- Modifying its behaviour

4.3 The OUTER UNION Set Operator

- Using the OUTER UNION Set Operator
- Default behaviour
- Modifying its behaviour
- Summary of UNION and OUTER UNION Set Operators

4.3 Exercises

4.3 Solutions

4.4 The INTERSECT Set Operator
- Using the INTERSECT Set Operator
- Default behaviour
- Modifying its behaviour

4.5 The EXCEPT Set Operator
- Using the EXCEPT Set Operator
- Default behaviour
- Modifying its behaviour
- Summary of EXCEPT and INTERSECT Set Operators

4.5 Exercises
4.5 Solutions

4.6 Set Operations vs. DATA Step Programming
- When it is preferable to use a Set Operation/ DATA Step
- Order of precedence when using multiple Set Operations

5. Further SQL Topics

5.1 Maintaining Tables
- The DESCRIBE Statement
- The ALTER TABLE Statement
- The UPDATE Statement
- The DELETE Statement
- The DROP Statement

5.1 Exercises
5.1 Solutions

5.2 Conditional Processing
- The CASE Expression
- Boolean Expressions

5.2 Exercises
5.2 Solutions

5.3 Indexes
- CREATE INDEX Statement
- Simple Indexes
- Composite Indexes
- Proper use of Indexes

5.4 Interface with SAS Macro Language
- Creating Macro Variables during PROC SQL Execution - The INTO Clause
- Resolution of Macro Variable References
- Automatic Macro Variables created by PROC SQL

5.4 Exercises
5.4 Solutions

5.5 Dictionary Tables
- Definition of Dictionary Tables
- Using SAS Dictionary Tables

5.5 Exercises
5.5 Solutions

5.6 Benchmarking Programmes
- Considerations when developing SAS SQL Programs

5.7 Integrity Constraints

- Purpose of Integrity Constraints
- How to define Integrity Constraints & the different types
- Documenting Integrity Constraints
- Removing Integrity Constraints

5.7 Exercises

5.7 Solutions

5.8 The SQL Optimiser

- Definition of the SQL Optimiser
- The _METHOD option
- Different SQL Join Operations

5.8 Exercises

5.8 Solutions