DS2 Programming Essentials

Course Length: 2 days **CEUs** 1.2

Format: Hands on Training

NOTE: This course requires SAS 9.4 software

AUDIENCE

This course teaches object-oriented programming concepts, programming DS2 standard and user-defined methods, DS2 use of packages for data and program sharing, threading during data manipulation, and in-database execution. Students will learn the importance of FedSQL coding, an integral part of combining tables in DS2 which is more efficient than Proc SQL.

BENEFITS

Students will be able to:

- Understand the features and benefits of Object-Oriented Programming
- Create Packages for code reuse that contain Methods and data definitions
- Learn about DS2 Data Types and their advantages
- Create query examples with FedSQL
- Gain faster processing with Threading or In-Database processing
- Learn nuances of code by comparing DS2 with the Data Step

PREREQUISITES

Programming I: SAS Essentials course or equivalent understanding

Programming II: Data Manipulation using the Data Step or equivalent understanding

COURSE TOPICS

Basic DS2 and the Data Step

- Object-Oriented Programming Concepts
- Objects Examined
- Packages Examined
- DS2 Programming Advantages
- DS2 Programming Structure
- DS2 Basic Programming Examples including Keep/Drop, Set, Format, Label
- Conditional Logic

Methods and Variable Scope

- Init Method
- Run Method
- Term Method
- Global and Local Variables
- Undeclared Variables

Do Loops (Data Step vs DS2)

- Bounded Loops
- Generating Data with Do Loops
- Nested Loops
- Output Statement Positioning
- Conditional Termination

Arrays (Data Step vs DS2)

- Array Statement
- Vararray Statement
- General Usage
- Dim Function
- Temporary Arrays
- Declare (temporary DS2) Arrays

Enhanced DS2 and the Data Step

- Comparison of Statements
- Subtle Differences
- Compilation and Execution
- Quotation Marks
- New Method with Do Loop
- Arrays and the PDV

FedSQL 1 – Query Mechanics

- Federated Databases
- SQL Language
- Individual Query Clauses: Select, Order By, Where, Group By, Having

Data Types and Related Syntax

- Data Type Advantages
- Character Data Types
- Numeric Data Types
- Integer Data Types
- Binary Data Types
- Date and Time Data Types
- Automatic Type Conversion
- Missing vs. Null Values
- IFN Function
- IFC Function
- Date, Time, and DateTime Functions

FedSQL 2 – Filtering and Joining

- Sub-setting
- Using Parentheses
- Subquery with Function
- Null
- Common Joins
- Subquery with Filter
- Self Join

FedSQL 3 – Grouping and Merging

- Set with Select
- By Statement
- First./Last. Review
- Totaling Algorithm
- Match Merge
- Match Merge with Sub-setting If

Methods, Packages, and Threads

- Proc FCMP
- Method Overloading
- Packages
- FCMP Package
- SQLSTMT Package
- Threading Concepts
- Evolution of Threading
- SAS In-Database Code Accelerator

Proc HPDS2 and Tracing

- Proc HPDS2 Background
- DS2 and HPDS2
- Tracing
- Logger Package
- Logging Result
- Log4sas Macro
- Message Levels

Object-Oriented Program

- Program Defined
- General Purpose
- Six Methods Described
- Package Implementation
- Modification of Package