e-Learning SAS Macro
Training Content

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Course Aims

After completing this course, attendees should have a thorough knowledge of the principles of Macro processing and be able to use Macro Language to generate dynamic, maintainable code.

Duration

2 days

Required Knowledge

Delegates should have completed the Base Programming and SQL courses or have a level of knowledge equivalent to that. No previous experience of Macros is required.

Macro Course

1. Macro Concepts
    1.1 What is the Macro Language?
    1.2 Macro Facilities
        - Automatic Macro Variables
        - User-Defined Macro Variables
        - Elective/Repetitive/Data dependent Processing

2. Macro Language Foundations
    2.1 Processing SAS Programs
        - SAS program compilation and execution
        - Tokenisation
    2.2 Processing SAS Macro Language
        - Macro processing
        - Special token sequences
        - How does the Macro Processor work?
        - The %INCLUDE statement
        2.2 Exercises
        2.2 Solutions
    2.3 The Basics of Macro Variables
        - Global macro variables
        - Creating macro variables
        - Referencing macro variables
        - Displaying macro variable values - SYMBOLGEN Option
        2.3 Exercises
        2.3 Solutions
    2.4 Automatic Macro Variables
        - Automatic macro variables
        - SYSPARM macro variable
        2.4 Exercises
        2.4 Solutions
    2.5 User-Defined Macro Variables
        - The %LET statement
        - The %PUT statement
        2.5 Exercises
        2.5 Solutions
    2.6 Combining Text & Macro Variables
        - Combining Text & Macro Variables
        - Macro variable delimiters
        2.6 Exercises
        2.6 Solutions

3. Passing Information To and From the Macro Language
    3.1 Interface with SQL
        - The INTO clause in PROC SQL
        - Storing multiple values in one macro variable

- 3.1 Exercises
- 3.1 Solutions

3.2 Creating Macro Variables
- - Creating macro variables in the DATA step
- - The CALL SYMPUT routine
- - The CALL SYMPUTX routine
- 3.2 Exercises
- 3.2 Solutions

3.3 Indirect References to Macro Variables
- - Creating multiple macro variables
- - Indirect references to macro variables
- - Macro rescan rules
- 3.3 Exercises
- 3.3 Solutions

3.4 Resolving Macro Variable References During Execution
- - The SYMGET function
- - Applications of the SYMGET function
- 3.4 Exercises
- 3.4 Solutions

4. SAS Macro Language Programming

4.1 Macro Programs - Structure & Processing
- - Macro definition compilation
- - Macro invocation
- - Macro execution
- - Monitoring macro execution - MPRINT and MLOGIC
- 4.1 Exercises
- 4.1 Solutions

4.2 Symbol Tables
- - Global symbol tables - %GLOBAL Statement
- - Local symbol tables - %LOCAL Statement
- - Macro variable creation rules
- - Multiple local symbol tables
- 4.2 Exercises
- 4.2 Solutions

4.3 Macro Parameters
- - Macro parameter lists
- - Positional parameters
- - Keyword parameters
- - Mixed parameter lists
- 4.3 Exercises
- 4.3 Solutions

4.4 Macro Functions
- - Macro character functions
- - Using SAS functions in macro processing - %SYSFUNC
- 4.4 Exercises
- 4.4 Solutions

4.5 Macro Quoting
- The %STR function
- Quoting with %SYSFUNC function
4.5 Exercises
4.5 Solutions

4.6 Elective Processing
- Elective execution - %IF–%THEN/%ELSE statement
- Compilation and execution with elective processing
- Comparison expressions - IN Operator
4.6 Exercises
4.6 Solutions

4.7 Repetitive Processing
- The %DO statement
- Generating SAS programs
4.7 Exercises
4.7 Solutions

4.8 Evaluating Expressions in Macro Code
- Evaluating expressions - %EVAL/%SYSEVALF Functions
- Implicit use of the %EVAL function
- Using expressions to control loops - %DO-%WHILE and %DO-%UNTIL
4.8 Exercises
4.8 Solutions

4.9 Macro Storage & Retrieval
- Storing macro Definitions
- Retrieving macro Definitions