
e-Learning Base Programming Training Content



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Course Aims

The goal of this course is to take someone with little or no previous exposure to the SAS System, or any other programming language, and produce someone who is able to perform elementary coding operations.

After attending this course, attendees should have a broad understanding of data input, manipulation, reporting and output with the SAS System. They should be able to: write data steps that read/write raw input or native SAS tables; apply code to deal with date processing structures; shape, transform and conditionally process data; and, produce simple reports with the Output Delivery System in many different formats (e.g. HTML, RTF and PDF).

Duration

5 days

Required Knowledge

No prior knowledge of the SAS system is required

Base Programming – Course Content

1. SAS Data Sets

1.1 SAS Libraries

- Assigning and deassigning a library - LIBNAME Statement

1.1 Exercises

1.1 Solutions

1.2 Viewing SAS Data Sets

- Components of SAS Data Sets
- SAS file storage
- Referencing SAS Data Sets
- Viewing the descriptor portion of SAS Data Sets - PROC CONTENTS
- Viewing the data portion of SAS Data Sets - PROC PRINT

1.2 Exercises

1.2 Solutions

1.3 The DATA Step

- Reading SAS data - SET Statement
- Writing SAS data
- The PDV
- OBS= and FIRSTOBS= data set options

1.3 Exercises

1.3 Solutions

1.4 Controlling Variables Read & Written

- Controlling Variables written to Data Sets - DROP/KEEP Statements
- Controlling Variables read from Data Sets - DROP/KEEP Data set options
- Renaming variables - RENAME Statement/Data set option

1.4 Exercises

1.4 Solutions

1.5 Controlling Observations Written

- The DELETE statement
- The Subsetting IF statement
- Explicit output - the OUTPUT Statement

1.5 Exercises

1.5 Solutions

1.6 Controlling Observations Read

- The WHERE Statement
- The WHERE Data set Option

1.6 Exercises

1.6 Solutions

1.7 Combining SAS Data Sets: Unrelated Observations

- Concatenation - SET Statement
- One-to-One Merging - MERGE Statement

1.7 Exercises

1.7 Solutions

1.8 Combining SAS Data Sets: Related Observations

- Sorting Observations in a Data Set - PROC SORT
- Interleaving

- Match Merging
- Conditional Match Merging - IN= data set option
- 1.8 Exercises
- 1.8 Solutions

2. Processing Data with the DATA Step

2.1 Conditional Processing

- IF-THEN/ELSE statements
- The SELECT statement
- Defining Variable lengths - The LENGTH statement
- Reordering Variables - LENGTH statement

2.1 Exercises

2.1 Solutions

2.2 Data Transformations

- Numeric Functions
- Character Functions
- Concatenation Functions

2.2 Exercises

2.2 Solutions

2.3 Data-Type Conversions

- IF-THEN/ELSE Logic Functions - IFN/IFC Functions
- Functions for Data-Type Conversions - PUT/INPUT Functions

2.3 Exercises

2.3 Solutions

2.4 Date Processing

- Date/Time Functions
- Time interval Functions - INTCK/INTNX Functions

2.4 Exercises

2.4 Solutions

2.5 Retaining Values

- The RETAIN statement
- The SUM statement
- BY Group Processing - First. and Last. Variables

2.5 Exercises

2.5 Solutions

2.6 DO Loops

- DO Loop Logic
- Iterative DO Loops
- Conditional DO Loops - DO WHILE and DO UNTIL
- Nested DO Loops

2.6 Exercises

2.6 Solutions

2.7 Arrays

- Defining Arrays
- Temporary Arrays
- Referencing Arrays/Elements of Arrays
- Using Arrays to rotate data

- Multi-dimensional Arrays

- 2.7 Exercises

- 2.7 Solutions

3. Reading Raw Data

3.1 What is Raw Data?

- Terminology
- Viewing External Raw files in SAS

3.2 Preliminaries

- Referencing files - FILENAME Statement
- Reading Raw Data - External files/Instream Data - INFILE Statement
- Specifying How to Read Raw Data - INPUT Statement

3.3 Reading Data from Basic Data Structures - List Input

- List Input
- Modified List Input
- Using Informats to read formatted Data

- 3.3 Exercises

- 3.3 Solutions

3.4 Reading Data from Basic Data Structures - Column & Formatted Input

- Column Input
- Formatted Input
- Pointer Control
- Reading from the Clipboard

- 3.4 Exercises

- 3.4 Solutions

3.5 Reading Data from Advanced Data Structures

- Multiple Records per Observation
- Skipping file Headers & Footers - Trailing @
- Multiple Observations per Record - Double Trailing @
- Hierarchical Data
- Subsetting Raw Data

- 3.5 Exercises

- 3.5 Solutions

4. Writing Raw Data

4.1 The PRINTTO Procedure

- Procedure options
- Using PROC PRINTTO

- 4.1 Exercises

- 4.1 Solutions

4.2 Writing Raw Data with the DATA Step

- Compilation and Execution
- The FILE Statement - specifying where to write
- The PUT Statement - specifying what to write
- LIST Output

4.3 FORMAT Statement

- Formats - numeric, character, date/time

- Alignment of Formatted Values
- Formatted Output
- The PUTLOG Statement
- Using functions to permanently associate a format to a variable

4.3 Exercises

4.3 Solutions

4.4 PROC FORMAT

- The VALUE Statement
- The PICTURE Statement
- Format Storage
- Format Retrieval
- Creating Formats from a Data Set - CNTLIN= Statement option

4.4 Exercises

4.4 Solutions

5. Reporting

5.1 The Report Procedure

- Procedure options
- The COLUMN Statement
- The DEFINE Statement
- Producing Detailed Reports
- Adding Summary Lines
- Producing Summary Reports
- Adding Sub/Grand Totals

5.1 Exercises

5.1 Solutions

5.2 The TABULATE Procedure

- The CLASS Statement
- The VAR Statement
- The TABLE Statement
- Column, Row and Page dimensions
- Customising Headings
- Formatting Cells
- Adding Summary Rows/ Columns

5.2 Exercises

5.2 Solutions

5.3 The MEANS Procedure

- The CLASS Statement
- The VAR Statement
- The OUTPUT Statement
- The automatic `_TYPE_` Variable - NWAY Option

5.3 Exercises

5.3 Solutions

5.4 Web-Ready Reports

- The ODS
- ODS Destinations
- Producing HTML Output

5.4 Exercises

5.4 Solutions

5.5 ODS Document

- General Syntax

- The DOCUMENT Procedure

- The SASDOC Engine

5.5 Exercises

5.5 Solutions