SAS® Global Certification

FOUNDATION

SAS® Certified Base Programmer for SAS®9

SAS® Certified Advanced Programmer for SAS®9

SAS® Clinical Trials Programmer Using SAS®9

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THE POWER TO KNOW®

SAS® Certified Base Programmer for SAS®9 Credential

EXAM TO COMPLETE

☑ SAS® Base Programming for SAS®9

AUDIENCE

Successful candidates for this exam should have the following programming and data management experience:

- Import and export raw data files.
- Manipulate and transform data.
- Combine SAS data sets.
- Create basic detail and summary reports using SAS procedures.
- Identify and correct data syntax and programming logic errors.

EXAM CONTENT

Accessing Data

- Use FORMATTED and LIST input to read raw data files.
- Use INFILE statement options to control processing when reading raw data files.
- Use various components of an INPUT statement to process raw data files, including column and line pointer controls, and trailing @ controls.
- Combine SAS data sets using the DATA step.
- Access and Excel workbook.

Creating Data Structures

- Create temporary and permanent SAS data sets.
- Create and manipulate SAS date values.
- Export data to standard and comma-delimited raw data files.

Managing Data

- Investigate SAS data libraries using Base SAS utility procedures.
- Sort observations in a SAS data set.
- Conditionally execute SAS statements. Using the DATA step to modify variable attributes using options and statements, accumulate subtotals and totals, and use assignment statements.

- Use SAS functions to manipulate character data, numeric data and SAS date values.
- Use SAS functions to convert character data to numeric and vice versa.
- Process data using DO loops and SAS arrays.
- Validate and clean data.

Generating Reports

- Generate list reports using the PRINT procedure.
- Generate summary reports and frequency tables using Base SAS procedures.
- Enhance reports through the use of user-defined formats, titles, footnotes and SAS system reporting options.
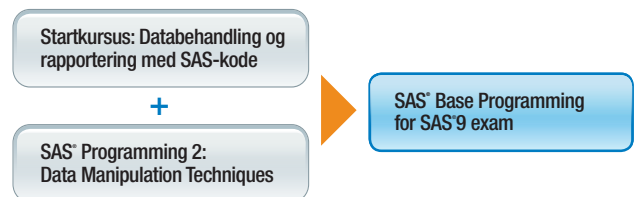- Generate HTML reports using ODS statements.

Handling Errors

- Identify and resolve programming logic errors.
- Recognize and correct syntax errors.
- Examine and resolve data errors.

EXAM PREPARATION OPTIONS

Experience is a critical component to becoming a SAS® Certified Professional.

SAS Education provides the following training courses to help you prepare.

Startkursus: Databehandling og rapportering med SAS-kode

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SAS® Programming 2: Data Manipulation Techniques

▶ | SAS® Base Programming for SAS®9 exam |

SAS® Certified Advanced Programmer for SAS®9 Credential

CREDENTIAL HELD

SAS® Base Programming for SAS®9

EXAM TO COMPLETE

☑ SAS® Advanced Programming for SAS®9

AUDIENCE

Successful candidates for this exam should hold a SAS® Certified Base Programmer for SAS®9 credential and have current programming and data management experience using SAS®9 to:

- Write efficient SAS code to solve complex problems in accordance with system specifications, while minimizing use of computing resources.

- Use advanced DATA step programming statements and efficiency techniques.

- Write and interpret SAS SQL code.

- Use the SAS MACRO facility.

EXAM CONTENT

Accessing Data

- Generate detail reports by working with a single table, joining tables, or using set operators in the SQL procedure.

- Generate summary reports by working with a single table, joining tables, or using set operators in the SQL procedure.

- Construct subqueries and in-line views within an SQL procedure step.

- Compare solving a problem using the SQL procedure versus using traditional SAS programming techniques.

- Access Dictionary Tables using the SQL procedure.

Macro Processing

- Create and use user-defined and automatic macro variables within the SAS Macro Language.

- Automate programs by defining and calling macros using the SAS Macro Language.

- Understand the use of macro functions.

- Use various system options that are available for macro debugging and displaying values of user-defined and automatic macro variables in the SAS log.

- Create data-driven programs using the SAS Macro Language.

Advanced Programming Techniques

- Demonstrate the use of advanced data look-up techniques such as array processing, hash objects, formats, and combining/merging data.

- Reduce I/O by controlling the space required to store SAS data sets using compression techniques, length statements, or eliminating variables and observations.

- Reduce programming time by developing reusable SAS programs that incorporate DATA step views, DATA steps that write SAS programs, and the FCMP procedure.

- Perform effective benchmarking by using the appropriate SAS system options and interpreting the resulting resource utilization statistics.

- Determine the resources used by the SORT procedure and avoid unnecessary sorts by using appropriate indexes, data set options, BY statement options, and the CLASS statement.

- Identify appropriate applications for using indexes and create them using the DATA step, the DATASETS procedure, or the SQL procedure.

- Compare techniques to eliminate duplicate data using the DATA step, the SORT procedure, and the SQL procedure.
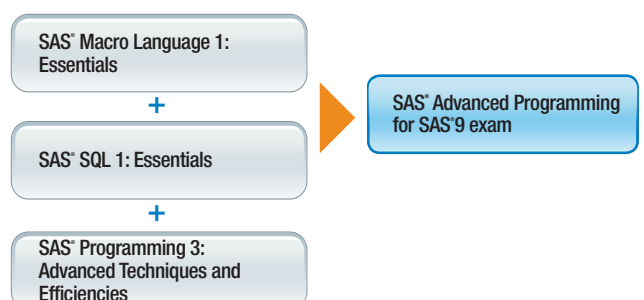
EXAM PREPARATION OPTIONS

Experience is a critical component to becoming a SAS® Certified Professional.

SAS Education provides the following training options to help you prepare. Remember, you must hold the Base programmer credential before sitting for the Advanced programmer exam.

☑ SAS® Certified Base Programmer for SAS®9

AND

> SAS® Macro Language 1: Essentials
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> SAS® SQL 1: Essentials
>
> +
>
> SAS® Programming 3: Advanced Techniques and Efficiencies

→ SAS® Advanced Programming for SAS®9 exam

SAS® Clinical Trials Programmer Using SAS®9 Credential

EXAM TO COMPLETE

☑ SAS® Clinical Trials Programming Using SAS®9

OR

☑ SAS® Certified Base Programming for SAS®9

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☑ SAS® Clinical Trials Programming Using SAS®9 – Accelerated Version

AUDIENCE

Successful candidates for this exam should have experience in:

- Clinical trials process.
- Accessing, managing and transforming clinical trials data.
- Statistical procedures and macro programming.
- Reporting clinical trials results.
- Validating clinical trial data reporting.

EXAM CONTENT

Clinical Trials Process

- Describe the clinical research process.
- Work with Statistical Analysis Plans and annotated Case Report Forms.
- Describe regulatory requirements.
- Work with clinical trials data structures, including CDISC SDTM and ADaM data models.

Clinical Trials Data

- Combine SAS data sets and access Excel workbooks.
- Efficiently import, subset, transpose and sort data sets.
- Apply regulatory requirements to exported SAS data sets.
- Investigate SAS data libraries using SAS utility procedures and DICTIONARY Tables.
- Create and modify variable attributes.
- Process data with DO LOOPS, arrays and RETAIN statements.
- Apply categorization techniques to clinical trials data.

- Apply observation carry forward techniques to clinical trials data.
- Obtain counts of events and calculate change from baseline results.

Statistics and Macros

- Obtain descriptive statistics for clinical trials data.
- Use PROC FREQ and TTEST to obtain p-values.
- Create output data sets from SAS statistical procedures.
- Create and use macro variables.
- Define and call macros.
- Debug macros with system options.

Report Clinical Trials Results

- Use PROC REPORT to produce tables and listings.
- Use ODS and global statements to produce and augment reports.

Validate Clinical Trial Data Reporting

- Explain the principles of programming validation in the clinical trials industry.
- Utilize the log file to validate clinical trial data reporting.
- Use programming techniques to validate clinical trial data reporting.
- Identify and resolve data, syntax and logic errors.

EXAM PREPARATION OPTIONS

Experience is a critical component to becoming a SAS® Certified Professional.

SAS Education provides several training options to help you prepare for this exam. Please visit our website for details on how to prepare. **sas.com/certify**

REGISTRATION

These exams are administered by Pearson VUE. Get registration details on our website. **sas.com/certify**

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