

SAS PROGRAMMING @ BIOAXIS DNA RESEARCH CENTRE

MODULE-III :SAS PROGRAMMING

DURATION: 90 DAYS

(TWO INDUSTRIAL PROJECTS)

Introduction to SAS software

1. History of SAS software
2. Versions of SAS software
3. Applications of SAS software

SAS Windowing Environment

1. Introduction to Explorer window
2. Introduction to Programming windows
3. Introduction to Results window
4. Opening windows in the SAS windowing environment Customizing the SAS windowing environment
5. Using the SAS Registry Editor
6. Using the SAS Desktop

Working with SAS Libraries

1. Opening the EFI
2. Getting Familiar with the Primary EFI Window
3. Importing Data into a SAS Data Set
4. Exporting Data from a SAS Data Set
5. Changing EFI Default Settings
6. Window Reference

Working with Tables in VIEWTABLE

1. Opening a table
2. Editing the data in a table
3. Searching, sorting, and subsetting data in a table
4. Modifying the format of a table
5. Saving a table
6. Printing tables
7. Setting table page properties
8. Closing the VIEWTABLE window
9. Customizing VIEWTABLE

Creating Queries

1. Building the Query
2. Menus

Working with File Shortcuts

1. Making a file shortcut to a program
2. Deleting a file shortcut
3. Browsing and submitting a file shortcut to a SAS program
4. Viewing file shortcut properties

Managing Your Files

1. Copying Items
2. Moving Items
3. Duplicating Items
4. Deleting Items
5. Displaying and Changing Properties of items
6. Renaming Items
7. Saving SAS Files
8. Selecting Multiple Items
9. Sorting Items

Working with SAS Programs

1. Creating a program
2. Opening a program
3. Submitting a program
4. Recalling a program
5. Saving a program
6. Making a file shortcut to a program
7. Browsing and submitting a SAS program shortcut

Essential Concepts of Base SAS Software

1. Overview of Base SAS Software
2. Components of the SAS Language
3. Ways to Run Your SAS Session
4. Customizing your SAS Session
5. Conceptual Information about Base SAS S/W

SAS Processing

1. Definition of SAS Processing
2. Types of Input to a SAS Programming
3. The DATA Step
4. The Proc Step

Rules for Words and Names in the SAS Language

1. Words in the SAS Language
2. Names in the SAS Language

Data Set Options

1. Definition of Data Set Option
2. Syntax for Data Set Options
3. Using Data Set Options
4. Data Set Options by Category

Formats

1. Definition of a Format
2. Syntax of a Format
3. Using Formats
4. Data Conversions and Encodings
5. International Date and Datetime Formats
6. Formats by Category

Informats

1. Definition of an Informat
2. Syntax of an Informat
3. Using Informats
4. International Date and Datetime Formats
5. Informats by Category

Statements

1. Definition of Statements
2. DATA Step Statements
3. Global Statements

SAS System Options

1. Definition of SAS System Options
2. Syntax of SAS System Options
3. Using SAS System Options
4. Comparisons
5. SAS System Options by Category

Missing Values

1. Definition of Missing Values

2. Special Missing Values
3. Order of Missing Values
4. When Variable Values Are Automatically Set to Missing by SAS
5. When Missing Values Are Generated by SAS
6. Working with Missing Values

Expressions

1. Definitions for SAS Expressions
2. Examples of SAS Expressions
3. SAS Constants in Expressions
4. SAS Variables in Expressions
5. SAS Functions in Expressions
6. SAS Operators in Expressions

Dates, Times, and Intervals

1. About SAS Date, Time, and Datetime Values
2. International Date, Time and Datetime Formats
3. About Date and Time Intervals

Error Processing and Debugging

1. Types of Errors in SAS
2. Error Processing in SAS
3. Debugging Logic Errors in the DATA Step

SAS Variables

1. SAS Variable Attributes
2. Ways to Create Variables
3. Variable Type Conversions
4. Aligning Variable Values
5. Automatic Variables
6. SAS Variable Lists
7. Dropping, Keeping, and Renaming Variables
8. Numeric Precision in SAS Software

SAS Output

1. Definitions for SAS Output
2. Routing SAS Output
3. The SAS Log
4. Traditional SAS Listing Output
5. Changing the Destination of the Log and the Output
6. Output Delivery System

BY-Group Processing in SAS Programs

1. Definition of BY-Group Processing
2. References for BY-Group Processing

WHERE-Expression Processing

1. Definition of WHERE-Expression Processing

2. Where to Use a WHERE Expression
3. Syntax of WHERE Expression
4. Combining Expressions Using Logical Operators
5. Constructing Efficient WHERE Expressions
6. Processing a Segment of Data That Is Conditionally Selected
7. Deciding Whether to Use a WHERE Expression or a Subsetting IF Statement
3. Syntax for Defining and Referencing an Array
4. Processing Simple Arrays
5. Variations on Basic Array Processing

Managing Your Data in the SAS Windowing

Environment

1. Introduction to Managing Your Data in the SAS Windowing Environment
2. Copying and Viewing Files in a Data Library
3. Using the Workspace to Manipulate Data in a Data Set
4. Importing and Exporting Data
5. Why Use a DATA Step?
6. Overview of DATA Step Processing
7. Processing a DATA Step: A Walkthrough
8. About DATA Step Execution
9. About Creating a SAS Data Set with a DATA Step
10. Writing a Report with a DATA Step
11. The DATA Step and ODS

Reading Raw Data

1. Definition of Reading Raw Data
2. Ways to Read Raw Data
3. Kinds of Data
4. Sources of Raw Data
5. Reading Raw Data with the INPUT Statement
6. How SAS Handles Invalid Data
7. Reading Missing Values in Raw Data
8. Reading Binary Data
9. Reading Column-Binary Data

Reading, Combining, and Modifying SAS Data Sets

1. Definitions for Reading, Combining, and Modifying SAS Data Sets
2. Overview of Tools
3. Reading SAS Data Sets
4. Combining SAS Data Sets: Basic Concepts
5. Combining SAS Data Sets: Methods
6. Error Checking When Using Indexes to Randomly Access or Update Data

Array Processing

1. Definitions for Array Processing
2. A Conceptual View of Arrays

SAS Data Library

1. Definition of a SAS Data Library
2. Library Engines
3. Library Names
4. Library Concatenation
5. Permanent and Temporary Libraries
6. SAS System Libraries
7. Sequential Data Libraries

SAS Data Sets

1. Definition of a SAS Data Set
2. Descriptor Information for a SAS Data Set
3. Data Set Names
4. Special SAS Data Sets
5. Sorted Data Sets
6. Tools for Managing Data Sets
7. Viewing and Editing SAS Data Sets

SAS Data Files

1. Definition of a SAS Data File
2. Differences between Data Files and Data Views
3. Understanding an Audit Trail
4. Understanding Generation Data Sets
5. Understanding Integrity Constraints
6. Understanding SAS Indexes
7. Compressing Data Files

External Files

Output Delivery System (SAS/ODS)

1. Definition of External Files
2. Referencing External Files Directly
3. Referencing External Files Indirectly
4. Referencing Many External Files Efficiently
5. Referencing External Files with Other Access Methods
6. Working with External Files
7. What Is the Output Delivery System?
8. Commonly-Used ODS Terminology
9. How Does ODS Work?
10. What Are the ODS Destinations?
11. What Are Table Definitions, Table Elements, and Table Attributes?
12. What Are Style Definitions, Style Elements, and Style Attributes?
13. Customized ODS Output

14. Summary of ODS

SAS Functions

1. Definitions of Functions
2. Syntax of Functions
3. Application SAS Functions

BASE/SAS PROCEDURES

Utility Procedures

1. Proc Sort
2. Proc Contents
3. Proc Append
4. Proc Compare
5. Proc Import
6. Proc Export
7. Proc Options
8. Proc Copy
9. Proc Forms
10. Proc datasets
11. Proc Transpose
12. Proc Printto
13. Proc Format
14. Proc Tabulate
15. Proc Report
16. Proc Cimport
17. Proc Cport
18. Proc Template

Report-Writing Procedures

1. Proc Print
2. Proc Tabulate
3. Proc Report
4. Proc Forms
5. Proc Means or Summary
6. Proc Plot
7. Proc Timeplot

SAS/GRAPHS

1. Introduction to SAS/GRAPHS
2. Introduction to SAS/GRAPH Statements
3. Procedures in SAS/GRAPHS
4. PROC CHART
5. RPOC GCHART
6. PROC PLOT
7. PROC GPLOT
8. PROC G3D
9. PROC GPRINT

SAS/SQL

1. Introduction to SAS/SQL
2. Understanding SQL through SAS

3. Proc SQL Statements
4. Proc SQL Options
5. Joins in SAS/SQL
6. Proc SQL(Pass Through Facility)

SAS/MACROS

1. Introduction to the Macro Facility
2. Getting Started with the Macro Facility
3. Replacing Text Strings Using Macro Variables
4. Generating SAS Code Using Macros
5. More Advanced Macro Techniques

SAS Programs and Macro Processing

1. Introduction to SAS Programs and Macro Processing
2. How SAS Processes Statements without Macro Activity
3. How SAS Processes Statements with Macro Activity

Macro Variables

1. Introduction to Macro Variables
2. Macro Variables Defined by SAS
3. Macro Variables Defined by Users
4. Using Macro Variables
5. Displaying Macro Variable Values

Macro Processing

1. Macro Variables
2. Introduction to Macro Variables
3. Macro Variables Defined by SAS
4. Macro Variables Defined by Users
5. Using Macro Variables
6. Displaying Macro Variable Values
7. Macro Processing
8. Introduction to Macro Processing
9. Defining and Calling Macros
10. How the Macro Processor Compiles a Macro Definition
11. How the Macro Processor Executes a Compiled Macro
12. Global Macro Variables
13. Local Macro Variables
14. Writing the Contents of Symbol Tables to the SAS Log
15. How Macro Variables Are Assigned and Resolved
16. Examples of Macro Variable Scopes

Interfaces with the Macro Facility

1. Introduction to Interfaces with the Macro Facility
2. DATA Step Interfaces
3. Using SAS Language Functions in the DATA Step and Macro Facility
4. Interfaces with the SQL Procedure
5. Interfaces with the SAS Component Language

Macro Language Elements

1. Macro Statements
2. Macro Functions
3. Automatic Macro Variables

Macro Quoting

1. Introduction to Macro Quoting
2. Deciding When to Use a Macro Quoting Function and Which Function to Use
3. Using the %STR and %NRSTR Functions
4. Using the %QUOTE and %NRQUOTE Functions
5. Referring to Already Quoted Variables
6. Deciding How Much Text to Mask with a Macro Quoting Function

SAS/ACCESS Software

1. Definition of SAS/ACCESS Software
2. Dynamic LIBNAME Engine
3. SQL Procedure Pass-Through Facility
4. ACCESS Procedure and Interface View Engine
5. DBLOAD Procedure
6. Interface DATA Step Engine

SAS/CONNECT

1. Introduction to SAS Connect
2. Single-User Server
3. Multi-User Server
4. Communications Access Method
5. Establishing a Connection
6. Using the SAS Windowing Environment to Start and Stop SAS/CONNECT
7. Compute Services
8. Remote Library Services
9. Data Transfer Services

SAS/STAT

1. Introduction to SAS Statistics
2. Working with Statistical Analysis

PROCEDURES IN SAS/STATS

1. Proc Means

2. Proc Summary
3. Proc Univariate
4. Proc Freq
5. Proc Corr
6. Proc Reg
7. Proc Anova
8. Proc Glm
9. Proc TTest
10. Proc Rank
11. Proc Forecast

- SAS Analyst applications

Introduction to Regression Procedures

1. Interactive Features in the GLM and REG Procedures
2. Linear Models
3. Parameter Estimates and Associated Statistics
4. Testing Linear Hypotheses
5. Multivariate Tests

Statistical Details for Analysis of Variance

1. Statistical Definitions
2. Fixed and Random Effects
3. Tests of Effects
4. General Linear Models
5. Linear Hypotheses

Analysis of Variance for Fixed Effect Models

1. PROC GLM for General Linear Models
2. PROC ANOVA for Balanced Designs
3. Comparing Group Means with PROC ANOVA and PROC GLM
4. PROC TTEST for Comparing Two Groups

SAS /CLINICAL TRAILS

1. Drug Development Process and Introduction to Pharmacogenomics /Pharmacogenetics driven Clinical Trials
2. Introduction & History of clinical trails
3. Protocol Designing
4. Good Clinical Practice (ICH -GCP) and Ethics in Clinical Research
5. Drug Regulatory Affairs (Clinical Trial)
6. GxP and Quality Auditing Practices
7. Clinical Safety & Pharmacovigilance
8. Clinical Safety & Pharmacovigilance
9. Fundamentals of Monitoring and Site Managements
10. Case Report Form Development, Query Resolution, and Expanded Access to Investigational Product(s)
11. Clinical Data Management Good Quality Control Laboratory Practices
12. Statistical Principles for Clinical Trials
13. Statistical programmer's Environment
 - a. Understanding SAP & Clinical trail Design
 - b. Importing clinical Raw Data
 - c. Creating derived variables
 - d. Transforming , Managing data
 - e. Creating analysis Datasets
 - f. Generating TLG(Tables, Listings ,Graphs)
 - g. Preparing Documentation for submission
 - h. Saving Log & creating transport files
14. Medical Writing/Documentation
15. Introduction to Clinical Data Interchange Standards Consortium (CDISC) Project Management and Principles of Pharmacoeconomics

